Special Publication 25

Forecast of Colorado Coal Industry Production and Employment 1984 to 2004

by Peter Rushworth
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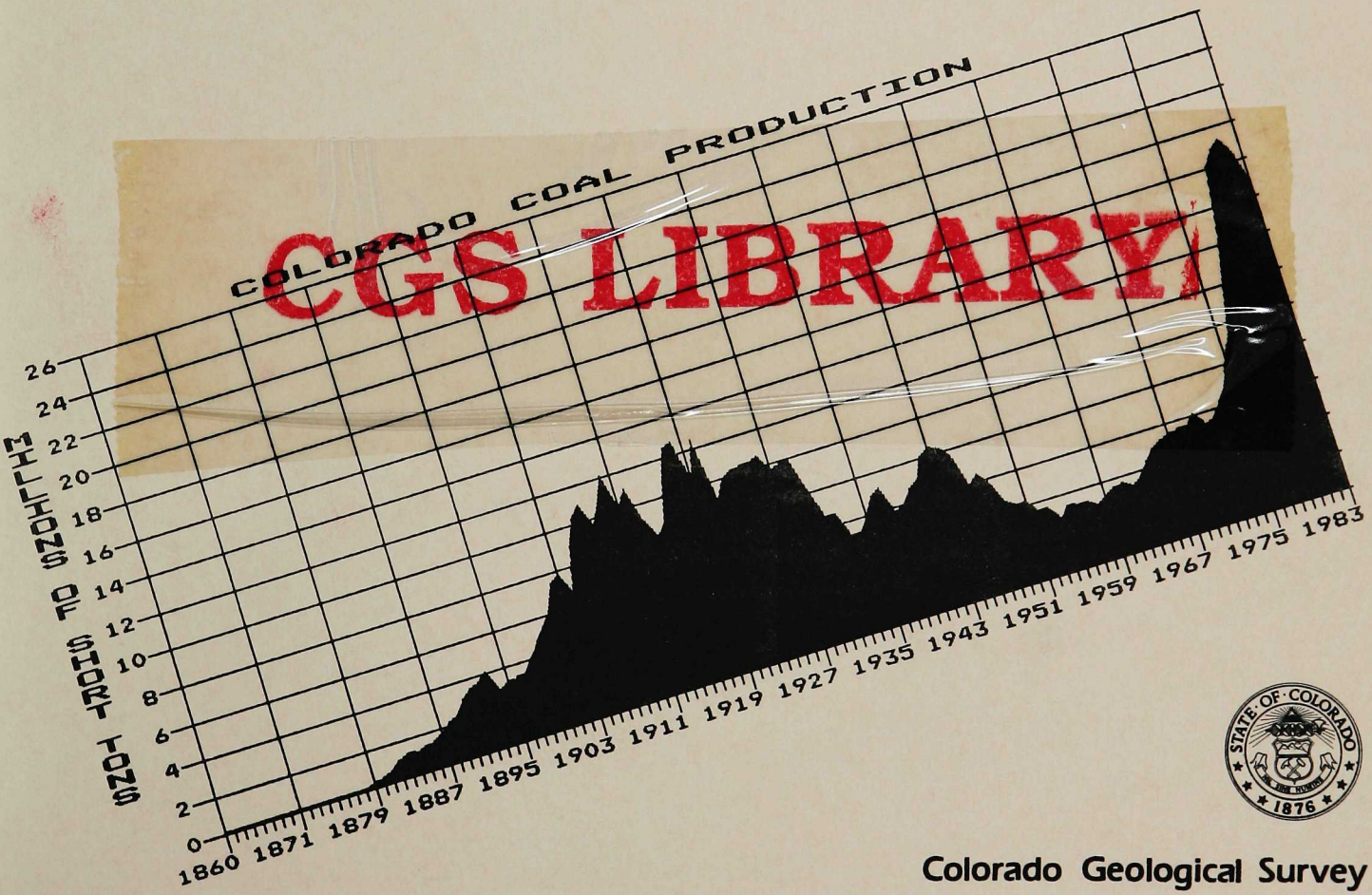

Colorado Geological Survey
Dept. of Natural Resources
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FORECAST OF COLORADO COAL INDUSTRY PRODUCTION AND EMPLOYMENT 1984 TO 2004

by
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COLORADO GEOLOGICAL SURVEY

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EXECUTIVE SUMMARY

The Colorado coal industry will face increasing competition from other coal-producing states and from foreign coal producers in coastal geographic markets. Production is forecast to increase from 16.5 million tons per year (mtpy) in 1984 to 20.2 mtpy in 2004 at an average rate of about one percent per year. Direct employment is forecast to increase from 2,585 miners in 1984 to 2,696 miners in 2004, an increase of 4.3 percent.

A total of four coal-producing scenarios were developed on computer-linked spreadsheets. Changes may be made rapidly, reflecting changing conditions, and acquisition of additional data with the passage of time. The linked spreadsheet method is simple, yet could be refined to the point of estimating demand for coal from a specific mine.

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PREFACE

The forecast of Colorado coal production and employment is based on extrapolation of historical Colorado coal consumption and distribution within the geographic market for Colorado coal. The forecast is demand-driven and hinges on application of marketshare to quantify trends pertaining directly to Colorado coal production. The forecast data are production destined for distribution to market and do not account for exchanges in or out of stockpiles or coal used at the mine. Many conclusions, opinions and some text material are abstracted from "Analysis of the Colorado Coal Industry" (Rushworth, 1984). Various statistical methods were used to analyze consumption, distribution and marketshare of Colorado coal. Historical data, statistical methods and results are presented in this report. The methods used are simple and are designed to allow the interested reader with access to spreadsheet or business graphics software to duplicate, review or modify results to suit.

A method with flexibility was sought since markets change constantly and modification will be required. Forecast modification is described in Appendix A. The six years of study, 1978 through 1983, were a time of dynamic change and shifting markets. Projecting trends based on these data is fraught with uncertainty.

Two key assumptions are built into the study:

- Reserve availability
- Continued relative cost differential

Reserve availability is critical to sustaining production. Although coal resources are plentiful in Colorado, economic reserves in changing markets are more rare; furthermore, economic surface-minable coal is rapidly becoming scarce. Surface-minable coal properties are available and it is assumed that they will continue to be available for the term of the study.

Continued relative cost differential assumes that the changes in coal prices observed between 1978 and 1983 will continue. In other words, if external factors raise or lower relative coal prices of one producer with respect to all others, marketshare will decrease or increase accordingly. Cost factors affecting Western Coal Province producers, but not Eastern or Interior Coal Province producers will reduce the marketshare of western coal. Transportation costs are one such factor. Limited competition raises transport costs for western producers at a rate above that experienced in full transport competition.

Colorado, specifically, will be subjected to increased royalty payments on Federal coal that will not apply equally to most other western coal producing states. Royalty payments on pre-1976 leases will increase from about $0.15 per ton to 12.5 percent of selling price of surface-mined coal and eight percent of underground-mined coal (Colorado Coal Committee, 1981). Higher cost coal will pay substantially more fees than coal mined by low-cost producers. If left unchanged, this royalty payment increase will serve only to reduce marketshare of a significant volume of Colorado coal.

Errors may interfere with the accuracy of the forecast through mistakes in logic, construction of a database, errors in statistical analyses or typographical errors. Errors are certain to exist and we would appreciate being informed of these as they become known in order that errata sheets may be distributed to recipients of the report and/or data disks.

Data were available for a six-year period and considerable variation among coal products led to the decision to aggregate coal products in most geographic markets. Statistics run on a market region apply equally to all coal products; for example, the real demand for industrial coal products will not follow the trend for the steam coal products. This error was thought to be small since demand for steam coal far outweighs demand for other coal products in most markets.

No effort was made to deseasonalize data. It is apparent from data pertaining to net generation by fuel source, Section 2, that fuel switching affected the steam coal market. Years with high rainfall or high reservoir storage from previous years allows many utilities within the market region of Colorado to switch from coal to hydropower. Similarly, when nuclear power is available it is produced. Therefore, a more sophisticated analysis would examine trends in climatic conditions, average rainfall, heating degree-days and cooling degree-days, adjustment for fuel-switching and electricity sales between utilities and create a base demand for steam coal. In addition, data are available by quarter, but are presented in this report on an annual basis, or in the case of 1983, annualized from the first three quarters. Higher degrees of confidence will be attained with more data points.

There is an underlying problem with using calendar-year coal data. Coal use is seasonal and the calendar year cuts through December and January of two different winters. A far better approach would be to establish a coal production year, perhaps running from October to October. The effect of seasonal changes for a complete cycle of seasons would be better reflected in production and distribution of coal within such a coal production year.

All databases used are in the public domain, however, discrepancies exist. A full discussion of problems in Federal coal data is available in "An assessment of the quality of selected EIA data series" (EIA, 1984). For example, in MSHA records production is understated and, hence, productivity overstated relative to other EIA reports and State data. No adjustments were made. Coal distribution data were obtained from EIA records, and corrected with data from the New Mexico Energy and Minerals Department. Distribution data by county were obtained from the State Department of Mines up until 1980 then estimated from Colorado Geological Survey sources through 1983. Errors in any one of these sources are compounded when combined and there is no method of accounting for discrepancies.

The premise of the study is that a relationship exists between total coal demand and total coal consumed from a particular source. In the short-term, this appears valid, however, projecting data from six years on to a 20-year period is an error in logic which is unavoidable. The intent of these statistical studies was to avoid using coal producer/consumer data which may by over-optimistic and laden with good intentions. Not all producers will operate at 100 percent capacity or even approach it. It is unfortunate that some producers must fail as markets change.

Finally, simple mathematical errors or typographical errors may exist. To reduce this possibility the Base Case was done entirely by hand then checked with the computer rather than the other way around. Close agreement was found. With regards to precision and accuracy that estimate is left to the user. There is no guarantee that production computed to the thousands of tons will coincide with what will occur. Rather, the forecast data should be considered as the midpoint of an error range which, unfortunately, can not be ascertained except from an historical viewpoint.

The following disclaimer applies to this forecast, and in the case of data diskette sales must be signed by the purchaser:

> These spreadsheets have been verified with respect to the given numerical examples. The user accepts and uses these program materials at his own risk, in reliance solely upon his own inspection of the program materials and without reliance upon any representation or description concerning the program materials.
>
> Neither the Colorado Geological Survey nor the authors make any express or implied warranty of any kind with regard to these data, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Neither the Colorado Geological Survey nor the authors shall be liable for incidental or consequential damages in connection with or arising out of the furnishing, use or performance of these program materials.

Computer-based spreadsheets are a powerful tool in forecasting coal production and employment for the State. With appropriate modification, market studies of a mine, or group of mines, may be able to identify growth markets for a particular coal product. A Delphi analysis of various users' forecasts will be published if sufficient numbers are returned to the Colorado Geological Survey.

Acknowledgments

This work effort was made possible by a grant from the Department of Local Affairs, State of Colorado. We wish to thank Porter Bennett - Consultant, Ron Cattany - Department of Natural Resources, Steve Colby - Department of Local Affairs, Russ Frum - Colorado Mining Association, Charles Margolf - W. R. Grace, Ruth Maurer - Colorado School of Mines, and Steve Norris - Department of Natural Resources for their assistance and critical review of the methodology, and participation in the project. We also wish to thank Valerie Taylor-Pierce for typing the manuscript.

Section 1

1.0 CONSUMPTION OF COAL

The Industrial Revolution of the United States brought major changes in choice of fuels. As fuel-wood depleted and exacted higher prices in the mid-1800's coal was seen as more desirable. Concurrent improvements in technology permitted coal to gain marketshare and find new applications. The emergence of electricity as an energy source was fueled increasingly by coal. In the early 1900's petroleum gained advantage over coal due to underpricing and overproduction. Petroleum maintains numerous advantages over coal due to physical characteristics, and, generally, fewer externalities in uncontrolled combustion in the form of pollution.

Despite production increases, mainly due to increased demand from World War II, the decline of coal continued relative to other energy sources. Only a series of disruptions in the supply of petroleum changed the trend in marketshare of coal in the national energy mix. The convenience and relative low cost of petroleum created a commitment to petroleum and natural gas to the extent that 77 percent of the 1973 energy consumption was met by these sources. The reliance of the United States on petroleum and natural gas had exceeded the domestic ability to produce at cost relative to foreign sources. As a result, foreign sources gained market power and the resulting price structure stopped the trend of increasing reliance on petroleum. Table 1-1 lists trends in consumption of energy by source from 1949 to 1983.

Project Independence, a Federal initiative to relieve reliance on foreign energy sources, was implemented to shift from petroleum to coal and nuclear as a method to increase the marketshare of domestic energy sources. Most projections of energy use ignored price elasticity of demand and assumed that demand for energy was independent of price. Starting in 1973, conservation became a major force in decreasing the rate of growth in petroleum and natural gas demand.

The Power Plant and Industrial Fuel Use Act of 1978 created disincentives for petroleum combustion in electrical generation. Coal gained marketshare more rapidly as its relative cost versus petroleum decreased. Restrictions on use of natural gas were eliminated as part of the Omnibus Budget Reconciliation Act of 1981. Coal cannot displace petroleum and natural gas entirely. For example, coal will never again be a significant fuel in residential applications. In transport, coal may potentially regain use as railroad and steamship fuel, but in no other practical applications. Coal is best used in large baseload plants such as in electrical generation, steelmaking and significant industrial applications. Continued growth in coal will be mainly due to growth in the electrical generation market. Table 1-2 lists source of fuel for electrical generation from 1949 to 1983. Table 1-3 shows the average cost of fuel delivered to electric utilities from 1973 to 1983, and Figure 1-1 shows these data graphically.

TABLE 1-1 CONSUMPTION OF ENERGY BY SOURCE, 1949-1983 (modified from EIA 1984b)

Year	Coal [1]		Natural Gas		Petroleum [2]		Hydropower [3]		Nuclear Power		Geothermal [4]		Wood and Waste [5]		Net Imports of Coal Coke		Total Energy Consumption	Change from Previous Year
	Quadrillion Btu	Million Short Tons	Quadrillion Btu	Trillion Cubic Feet	Quadrillion Btu	Million Barrels	Quadrillion Btu	Billion kWh [6]	Quadrillion Btu	Billion kWh [6]	Quadrillion Btu	Billion kWh [6]	Quadrillion Btu	Billion kWh [6]	Quadrillion Btu	Thousand Short Tons	Quadrillion Btu	Percent [7]
1949	12.60	483.2	5.15	4.97	11.88	2,104	1.45	96.4	0	0	0	0	(*)	(*)	-0.01	-269	31.08	—
1950	12.89	494.1	5.97	5.77	13.32	2,357	1.44	102.7	0	0	0	0	(*)	(*)	(*)	40	33.62	8.2
1951	13.20	505.9	7.05	6.81	14.43	2,561	1.45	106.6	0	0	0	0	(*)	(*)	-0.02	-865	36.11	7.4
1952	11.84	454.1	7.55	7.29	14.96	2,661	1.50	112.0	0	0	0	0	(*)	(*)	-0.01	-479	35.83	-0.8
1953	11.87	454.8	7.91	7.64	15.56	2,774	1.44	111.6	0	0	0	0	(*)	(*)	-0.01	-363	36.76	2.6
1954	10.17	389.9	8.33	8.05	15.84	2,831	1.39	114.0	0	0	0	0	(*)	(*)	-0.01	-272	35.73	-2.8
1955	11.52	447.0	9.00	8.69	17.25	3,086	1.41	120.3	0	0	0	0	(*)	(*)	-0.01	-405	39.17	9.6
1956	11.72	456.9	9.61	9.29	17.94	3,212	1.49	129.8	0	0	0	0	(*)	(*)	-0.01	-525	40.75	4.0
1957	11.14	434.5	10.19	9.85	17.93	3,215	1.56	137.0	0	0	0	0	(*)	(*)	-0.02	-704	40.80	0.1
1958	9.83	385.7	10.66	10.30	18.53	3,328	1.63	146.9	(*)	0.2	0	0	(*)	(*)	-0.01	-271	40.65	-0.4
1959	9.79	385.1	11.72	11.32	19.32	3,477	1.59	144.7	(*)	0.2	0	0	(*)	(*)	-0.01	-337	42.41	4.3
1960	9.78	398.1	12.39	11.97	19.92	3,586	1.66	154.0	0.01	0.5	(*)	0	(*)	0.1	-0.01	-227	43.75	3.2
1961	9.58	390.4	12.93	12.49	20.22	3,641	1.68	157.8	0.02	1.7	(*)	0.1	(*)	0.1	-0.01	-318	44.41	1.5
1962	9.86	402.3	13.73	13.27	21.05	3,796	1.82	172.6	0.03	2.3	(*)	0.1	(*)	0.1	-0.01	-222	46.48	4.7
1963	10.36	423.5	14.40	13.97	21.70	3,921	1.77	169.1	0.04	3.2	(*)	0.2	(*)	0.1	-0.01	-298	48.27	3.8
1964	10.91	445.7	15.29	14.81	22.30	4,034	1.91	182.3	0.04	3.3	(*)	0.2	(*)	0.1	-0.01	-421	50.44	4.5
1965	11.51	472.0	15.77	15.28	23.25	4,202	2.06	196.8	0.04	3.7	(*)	0.2	(*)	0.3	-0.02	-744	52.62	4.3
1966	12.08	497.7	17.00	16.45	24.40	4,411	2.07	199.0	0.06	5.5	(*)	0.2	(*)	0.3	-0.03	-1,006	55.59	5.7
1967	11.85	491.4	17.94	17.39	25.28	4,585	2.34	224.6	0.09	7.7	0.01	0.3	(*)	0.3	-0.02	-618	57.50	3.4
1968	12.27	509.8	19.21	18.63	26.98	4,902	2.34	225.2	0.14	12.5	0.01	0.4	(*)	0.4	-0.02	-698	60.94	6.0
1969	12.31	516.4	20.68	20.06	28.34	5,160	2.66	254.5	0.15	13.9	0.01	0.6	(*)	0.3	-0.04	-1,456	64.12	5.2
1970	12.19	523.2	21.79	21.14	29.52	5,364	2.65	252.9	0.24	21.8	0.01	0.5	(*)	0.4	-0.06	-2,325	66.36	3.5
1971	11.54	501.6	22.47	21.79	30.56	5,553	2.86	273.1	0.41	38.1	0.01	0.5	(*)	0.3	-0.03	-1,335	67.82	2.2
1972	12.01	524.3	22.70	22.10	32.95	5,990	2.94	283.6	0.58	54.1	0.03	1.5	(*)	0.3	-0.03	-1,047	71.19	5.0
1973	12.90	562.6	22.51	22.05	34.84	6,317	3.01	289.7	0.91	83.5	0.04	2.0	(*)	0.3	-0.01	-317	74.21	4.2
1974	12.60	558.4	21.73	21.22	33.45	6,078	3.31	316.9	1.27	114.0	0.05	2.5	(*)	0.3	0.06	2,262	72.48	-2.3
1975	12.60	562.6	19.95	19.54	32.73	5,958	3.22	309.3	1.90	172.5	0.07	3.2	(*)	0.2	0.01	546	70.48	-2.8
1976	13.52	603.8	20.35	19.95	35.17	6,391	3.07	295.5	2.11	191.1	0.08	3.6	(*)	0.3	(*)	-4	74.30	5.4
1977	13.85	625.3	19.93	19.52	37.12	6,727	2.51	241.0	2.70	250.9	0.08	3.6	0.01	0.5	0.02	588	76.21	2.6
1978	13.71	625.2	20.00	19.63	37.97	6,879	3.14	303.2	3.02	276.4	0.06	3.0	(*)	0.3	0.13	5,029	78.04	2.4
1979	14.98	680.5	20.67	20.24	37.12	6,757	3.14	303.4	2.78	255.2	0.08	3.9	0.01	0.5	0.07	2,534	78.84	1.0
1980	15.37	702.7	20.39	19.88	34.20	6,242	3.12	300.1	2.74	251.1	0.11	5.1	(*)	0.4	-0.04	-1,412	75.90	-3.7
1981	15.86	732.6	19.93	19.40	31.93	5,861	3.11	297.1	3.01	272.7	0.12	5.7	(*)	0.4	-0.02	-643	73.94	-2.6
1982	15.29	706.9	18.51	18.00	30.23	5,583	3.59	343.1	3.11	282.8	0.10	4.8	(*)	0.3	-0.02	-873	70.82	-4.2
1983[10]	15.85	735.4	17.43	16.95	29.98	5,542	3.86	368.3	3.22	292.1	0.13	6.1	(*)	0.4	-0.02	-630	70.45	-0.5

[1] Bituminous coal, subbituminous coal, lignite, and anthracite.
[2] Refined petroleum products supplied including natural gas plant liquids and crude oil burned as fuel.
[3] Electric utility and industrial generation of hydropower and net electricity imports.
[4] Consumed by electric utilities.
[5] Wood, refuse, and other vegetal fuels consumed by electric utilities. Converted to Btu by applying national average heat rates for fossil fuel steam electric plants. Data do not include the consumption of wood-derived fuel (other than that consumed by the electric utility industry) which amounted to an estimated 2.2 quadrillion Btu in 1981. This table excludes small quantities of energy forms for which consistent historical data are not available, such as solar energy obtained by the use of thermal and photovoltaic collectors; wind energy; and geothermal, biomass, and waste energy other than that consumed at electric utilities.
[6] See Explanatory Note 1.
[7] Percent change calculated from data prior to rounding.
(*) Less than 0.005 quadrillion Btu.
(*) Less than 0.05 billion kWh.
[10] Preliminary.

Note: Sum of components may not equal total due to independent rounding.

Sources: See sources for Tables 35, 66, 73, 78, 84, 86, and EIA estimates for industrial hydropower, and conversion factors in the Units of Measure, Conversion Factors, Price Deflators, and Energy Equivalents section.

TABLE 1-2 PRODUCTION OF ELECTRICITY BY THE ELECTRIC UTILITY INDUSTRY BY TYPE OF ENERGY SOURCE, 1949-1983 (in billion kilowatthours).

Year	Coal	Petroleum [2]	Natural Gas	Nuclear Power	Hydropower	Geothermal and Other [3]	Total
1949	135	29	37	0	90	(4)	291
1950	155	34	45	0	96	(4)	329
1951	185	29	57	0	100	(4)	371
1952	195	30	68	0	105	(4)	399
1953	219	38	80	0	105	(4)	443
1954	239	32	94	0	107	(4)	472
1955	301	37	95	0	113	(4)	547
1956	339	36	104	0	122	(4)	601
1957	346	40	114	(4)	130	(4)	632
1958	344	40	120	(4)	140	(4)	645
1959	378	47	147	(4)	138	(4)	710
1960	403	48	158	1	146	(4)	756
1961	422	49	169	2	152	(4)	794
1962	450	49	184	2	169	(4)	855
1963	494	52	202	3	166	(4)	917
1964	526	57	220	3	177	(4)	984
1965	571	65	222	4	194	(4)	1,055
1966	613	79	251	6	195	1	1,144
1967	630	89	265	8	222	1	1,214
1968	685	104	304	13	222	1	1,329
1969	706	138	333	14	250	1	1,442
1970	704	184	373	22	248	1	1,532
1971	713	220	374	38	266	1	1,613
1972	771	274	376	54	273	2	1,750
1973	848	314	341	83	272	2	1,861
1974	828	301	320	114	301	3	1,867
1975	853	289	300	173	300	3	1,918
1976	944	320	295	191	284	4	2,038
1977	985	358	306	251	220	4	2,124
1978	976	365	305	276	280	3	2,206
1979	1,075	304	329	255	280	4	2,247
1980	1,162	246	346	251	276	6	2,286
1981	1,203	206	346	273	261	6	2,295
1982	1,192	147	305	283	309	5	2,241
1983[5]	1,259	145	274	292	332	6	2,309

[1] See Explanatory Note 6.
[2] Includes distillate fuel oil, residual fuel oil (including crude oil burned as fuel), jet fuel, and petroleum coke.
[3] Includes production from plants which consume wood, refuse, and other vegetal fuels.
[4] Less than 0.5 billion kilowatt-hours.
[5] Preliminary.
Note: Sum of components may not equal total due to independent rounding.
Sources: •1949 through September 1977—Federal Power Commission, Form 4, "Monthly Power Plant Report." •October 1977 through 1981—Federal Energy Regulatory Commission, FPC Form 4, "Monthly Power Plant Report." •1982 and 1983—Energy Information Administration, Form EIA-759, "Monthly Power Plant Report."

Utilities retain a marked ability to switch fuels from year to year and even quarter to quarter. The availability of hydropower cut into the marketshare of coal in several market regions. Despite the marked cost savings of coal use in the utility sector, Table 1-3, natural gas and petroleum are still significant fuels in electrical generation within the geographic market for Colorado coal. High capital costs of new plants prevent immediate fuel switching to save money through fuel costs. Over the long-term, natural gas and petroleum use will be curtailed, but probably not eliminated. The continued ability of utilities to switch fuels is essential to their flexibility and security of fuel supply. Dependence on one source of fuel is an unstable and undesirable situation. Coal will certainly gain marketshare in the electric utility industry, but will coexist with nuclear and hydropower, and to a lesser extent, petroleum and natural gas.

1.1 Market Structure

The coal industry is capital-intensive and can react only slowly to changing economic circumstances. Time-frames for decision-making applied to the coal industry are specified as follows:

Short-Term

The short-term does not allow much leeway in meeting new market conditions. This time period is highly inelastic since expanded production must be preceded by extensive mine planning and equipment purchases. Existing mines can increase production by either increasing work time or opening new working sections with under-utilized equipment.

Mid-Term

The mid-term response of the coal industry is observed within two to five years. This is about the time needed to bring a mine already in the planning stages online to production. Increased storage or production capabilities are possible within the time period. In addition, new workers may be hired and trained to full productivity. However, within the mid-term new companies may not be able to enter the market.

Long-Term

The long-term is a time period in excess of five years. New mines and reserves may be evaluated and brought into production. Older operating mines may be depleted and closed. The basic cost factors of the industry set the F.O.B. price of coal:

- .Labor
- .Transport/Transhipment
- .Capital Requirements
- .Government
- .Reserves and Reserve Availability

In a competitive environment, the cost of coal will be closely correlated with these long-run average costs.

TABLE 1-3. AVERAGE COST OF FOSSIL FUELS DELIVERED TO STEAM-ELECTRIC UTILITY PLANTS[1]

Year	Cents per million Btu			
	Coal	Residual Oil	Gas[3]	All Fossil Fuels
1973	40.5	78.5	33.8	47.6
1974	70.9	189.0	48.2	91.4
1975	81.4	200.5	75.2	104.4
1976	84.8	195.2	103.4	111.9
1977	94.7	219.8	129.1	129.7
1978	111.6	212.5	142.2	141.1
1979	122.4	298.8	174.9	163.9
1980	135.1	426.7	219.9	192.8
1981	153.2	533.4	280.5	225.6
1982	164.7	483.2	337.6	224.9
1983	165.6	457.8	347.4	220.6

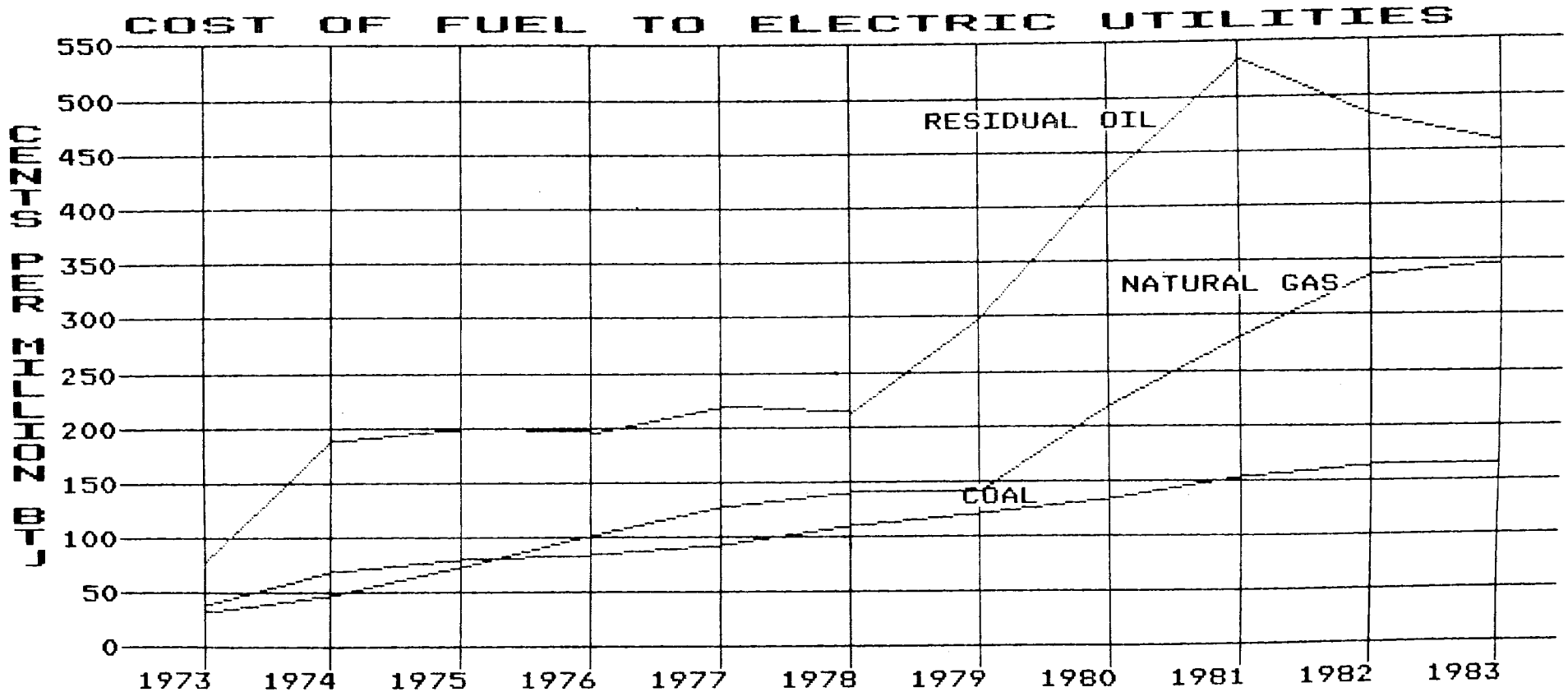
[1]Data through December 1982 cover all steam-electric utility generating plants with a capacity of 25 megawatts or greater. From 1974 through 1982, data include peaking units. Beginning with January 1983, data cover steam-electric utility plants with a capacity of 50 megawatts or greater.

[2]Data through 1979 cover privately owned electric utilities in Classes A and B. Data for 1980 forward cover selected utilities in Class A only whose electric operating revenues were $100 million or more during the previous year.

[3]Includes small quantities of coke oven gas, refinery gas, and blast furnace gas.

Modified from EIA, February, 1984.

FIGURE 1-1 AVERAGE COST OF FOSSIL FUELS DELIVERED TO STEAM-ELECTRIC UTILITY PLANTS



1.2 Coal Product and Geographic Markets

Coal is a heterogeneous product with widely variable chemical properties which influence its purchase and associated costs. Product and geographic markets are determined by the intrinsic value of a specific coal, the associated transport cost and the availability of substitutes at a comparable price.

1.2.1 Product Markets

The basic product markets of coal are:

- .Steam
- .Metallurgical (met)
- .Industrial/Specialty
- .Residential/Commercial

The largest product market is long-term contract steam coal for utilities. Typically, coal boilers are most efficient when one type of coal is used exclusively. Blending of coals from several sources is another method of achieving a relatively homogeneous product. Table 1-4 shows trends in coal consumption by end-use sector from 1949 to 1983.

Overall, the coal product market is expanding on the domestic front, as Table 1-5 indicates. On average, the energy contribution of coal in quadrillion Btu's increased marketshare 2.6 percent per year since 1973 with respect to overall energy consumption. The marketshare of coal is about 22 percent of the total energy consumed in 1983. In absolute terms, coal provides increasing increments to a presently shrinking market demand for energy.

Following the "Energy Crisis" of 1973-1974 the long-term response of the coal consuming community was not observed until 1979 or about five years later. Between 1979 and 1983 the marketshare of coal increased from 19.0 to 22.5 percent or an average annual percent change of 4.3 percent per year. Coal use might be expected to expand at this rate at least in the short- to mid-term until relative equilibrium is reached for all forms of energy and competing fuels.

TABLE 1-4 COAL CONSUMPTION BY END-USE SECTOR, 1949-1983 (in millions of short tons). (from EIA, 1984b)

Year	Electric Utilities	Industry and Miscellaneous			Transportation	Residential and Commercial	Total
		Coke Plants	Other Industry and Miscellaneous	Total			
1949	84.0	91.4	121.2	212.6	70.2	116.5	483.2
1950	91.9	104.0	120.6	224.6	63.0	114.6	494.1
1951	105.8	113.7	128.7	242.4	56.2	101.5	505.9
1952	107.1	97.8	117.1	214.9	39.8	92.3	454.1
1953	115.9	113.1	117.0	230.1	29.6	79.2	454.8
1954	118.4	85.6	98.2	183.9	18.6	69.1	389.9
1955	143.8	107.7	110.1	217.8	17.0	68.4	447.0
1956	158.3	106.3	114.3	220.6	13.8	64.2	456.9
1957	160.8	108.4	106.5	214.9	9.8	49.0	434.5
1958	155.7	76.8	100.5	177.4	4.7	47.9	385.7
1959	168.4	79.6	92.7	172.3	3.6	40.8	385.1
1960	176.7	81.4	96.0	177.4	3.0	40.9	398.1
1961	182.2	74.2	95.9	170.1	0.8	37.3	390.4
1962	193.3	74.7	97.1	171.7	0.7	36.5	402.3
1963	211.3	78.1	101.9	180.0	0.7	31.5	423.5
1964	225.4	89.2	103.1	192.4	0.7	27.2	445.7
1965	244.8	95.3	105.6	200.8	0.7	25.7	472.0
1966	266.5	96.4	108.7	205.1	0.6	25.6	497.7
1967	274.2	92.8	101.8	194.6	0.5	22.1	491.4
1968	297.8	91.3	100.4	191.6	0.4	20.0	509.8
1969	310.6	93.4	93.1	186.6	0.3	18.9	516.4
1970	320.2	96.5	90.2	186.6	0.3	16.1	523.2
1971	327.3	83.2	75.6	158.9	0.2	15.2	501.6
1972	351.8	87.7	72.9	160.6	0.2	11.7	524.3
1973	389.2	94.1	68.0	162.1	0.1	11.1	562.6
1974	391.8	90.2	64.9	155.1	0.1	11.4	558.4
1975	406.0	83.6	63.6	147.2	(2)	9.4	562.6
1976	448.4	84.7	61.8	146.5	(2)	8.9	603.8
1977	477.1	77.7	61.5	139.2	(2)	9.0	625.3
1978	481.2	71.4	63.1	134.5	(2)	9.5	625.2
1979	527.1	77.4	67.7	145.1	(2)	8.4	680.5
1980	569.3	66.7	60.3	127.0	(2)	6.5	702.7
1981	596.8	61.0	67.4	128.4	(2)	7.4	732.6
1982	593.7	40.9	64.1	105.0	(2)	8.2	706.9
1983[3]	625.6	37.0	64.4	101.4	(2)	8.5	735.4

[1] See Explanatory Note 10.
[2] Less than 0.05 million short tons. Quantities are included in the Other Industry and Miscellaneous category.
[3] Preliminary.
Note: Sum of components may not equal total due to independent rounding.
Sources: •1949 through 1975—Bureau of Mines, *Minerals Yearbook*, "Coal-Bituminous and Lignite" and "Coal-Pennsylvania Anthracite" chapters. •1976—Energy Information Administration, Energy Data Report, *Coal-Bituminous and Lignite in 1976* and *Coal-Pennsylvania Anthracite 1976*. •1977 and 1978—Energy Information Administration, Energy Data Report, *Bituminous Coal and Lignite Production and Mine Operations-1977;....1978* and *Coal-Pennsylvania Anthracite 1977;....1978*. • 1979 through 1980—Energy Information Administration, Energy Data Report, *Weekly Coal Report*. •1981 through 1983—Energy Information Administration, *Weekly Coal Production*.

Table 1-5. DOMESTIC COAL CONSUMPTION
AND TOTAL ENERGY CONSUMPTION
(in Quadrillion Btu's)

Year	Domestic Coal Consumption	Total Energy Consumption	Percent
1973	12.903	74.212	17.4
1974	12.596	72.479	17.4
1975	12.601	70.485	17.9
1976	13.519	74.297	18.2
1977	13.848	76.215	18.2
1978	13.710	78.039	17.6
1979	14.983	78.845	19.0
1980	15.373	75.900	20.3
1981	15.860	73.940	21.4
1982	15.291	70.822	21.6
1983	15.850	70.454	22.5

(Modified from EIA Monthly Energy Review March, 1984)

Table 1-6 shows coal consumption trends in the electric utility industry. Coal consumption in this sector increased steadily since about 1960. Over half of the nation's electrical output is generated by coal combustion. Since 1979 electric utilities have increased marketshare of coal, in energy equivalents, from 46.68 percent to about 55.03 percent in 1983, yielding an average rate of increase of 4.2 percent per year. Coal consumption is most sensitive to changes in consumption by electric utilities. Political, environmental and economic uncertainties bearing on the coal industry will affect the prime consumers of coal in an uncertain fashion.

Table 1-7 reflects trends in coal consumption in the industrial sector. In energy equivalents, coal use dropped 4.60 percent per year since 1973 in this consumption group. Since 1979 the average decline in the marketshare of coal consumption is 3.54 percent per year. Included in this group are manufacturing, mining and steelmakers. A floor on the rate of decrease of coal consumption may be nearing since coal is essential to steelmaking and others are committed to coal by virtue of sunk costs and proximity of fuel supply.

Table 1-8 lists trends in coal consumption in the residential and commercial sectors. Since 1979 the average rate of increase, in energy equivalents, in coal consumption was 1.79 percent per year. This sector is most likely to be able to switch fuels to petroleum, natural gas or electricity and may be more sensitive to recessionary effects. Over the long-term, the residential and commercial sector will not be a significant market for coal sellers.

Table 1-6 CONSUMPTION OF COAL BY ELECTRIC UTILITIES
(in Quadrillion Btu's)

Year	Total Coal Consumed	Total Energy Consumed	Percent
1973	8.658	19.852	43.61
1974	8.535	20.023	42.63
1975	8.786	20.350	43.17
1976	9.720	21.573	45.06
1977	10.243	22.694	45.14
1978	10.236	23.722	43.15
1979	11.264	24.129	46.68
1980	12.122	24.501	49.48
1981	12.583	24.752	50.84
1982	12.582	24.271	51.84
1983	13.234	24.965	55.03

(Modified from EIA Monthly Energy Review, March 1984)

Table 1-7 CONSUMPTION OF COAL BY INDUSTRIAL SECTOR
(in Quadrillion Btu's)

Year	Total Coal Consumed	Total Energy Consumed	Percent
1973	3.984	31.463	12.66
1974	3.800	30.630	12.41
1975	3.602	28.343	12.71
1976	3.595	30.177	11.91
1977	3.394	31.021	10.94
1978	3.258	31.363	10.39
1979	3.532	32.567	10.85
1980	3.103	30.549	10.16
1981	3.109	29.208	10.64
1982	2.520	26.111	9.65
1983	2.422	25.932	9.34

(Modified from EIA, Monthly Energy Review, March 1984)

Table 1-8 CONSUMPTION OF COAL BY RESIDENTIAL AND COMMERCIAL SECTOR
(in Quadrillion Btu's)

Year	Coal Consumption	Total	Percent
1973	0.259	24.147	1.07
1974	0.260	23.729	1.10
1975	0.212	23.902	0.89
1976	0.206	25.020	0.82
1977	0.207	25.375	0.82
1978	0.215	26.084	0.82
1979	0.188	25.810	0.73
1980	0.147	25.654	0.57
1981	0.171	25.246	0.68
1982	0.189	25.638	0.74
1983	0.193	25.523	0.76

(Modified from EIA Monthly Energy Review, March 1984)

1.2.2 Geographic Markets

Geographic markets for coal radiate from historic centers of production. Concurrent surges in coal consumption by utilities and expansion of the geographic market for coal resulted from implementation of unit trains for coal delivery. The limit of a geographic market is set by the lowest-delivered cost coal. If transportation factors are equal the low cost producers set the floor or base price for coal. Geographic markets are defined by product quality and the availability of substitutes. The ability to discriminate among coals on a delivered equivalent cost basis is the arbiter of limit on the geographic market. Coal has a relatively low value per unit volume compared with other bulk goods. Low transport rates benefit market interpenetration.

Geographic markets change over time and may contain sub-markets for specialty coal or different coal products. For example, in 1978 Colorado steam coal was present in 11 states. However, in 1983 only seven states used Colorado steam coal. Table 1-9 shows the geographic change in Colorado coal product markets. Figure 1-2 displays geographic market regions of Colorado.

Geographic markets are states which purchase Colorado coal. The basis for geographic market definitions are Census Regions used for data collection purposes by the Federal government. In turn, Census Regions designate geographic areas with similarities in climate, physiography, industry and population demographics. States within a Census Region do not universally accept Colorado coal, even within the Mountain Census Region. Therefore, the term "Market Region" is applied to those states within specific Census Regions which consume coal from Colorado. The following market regions are recognized as purchasers of Colorado coal:

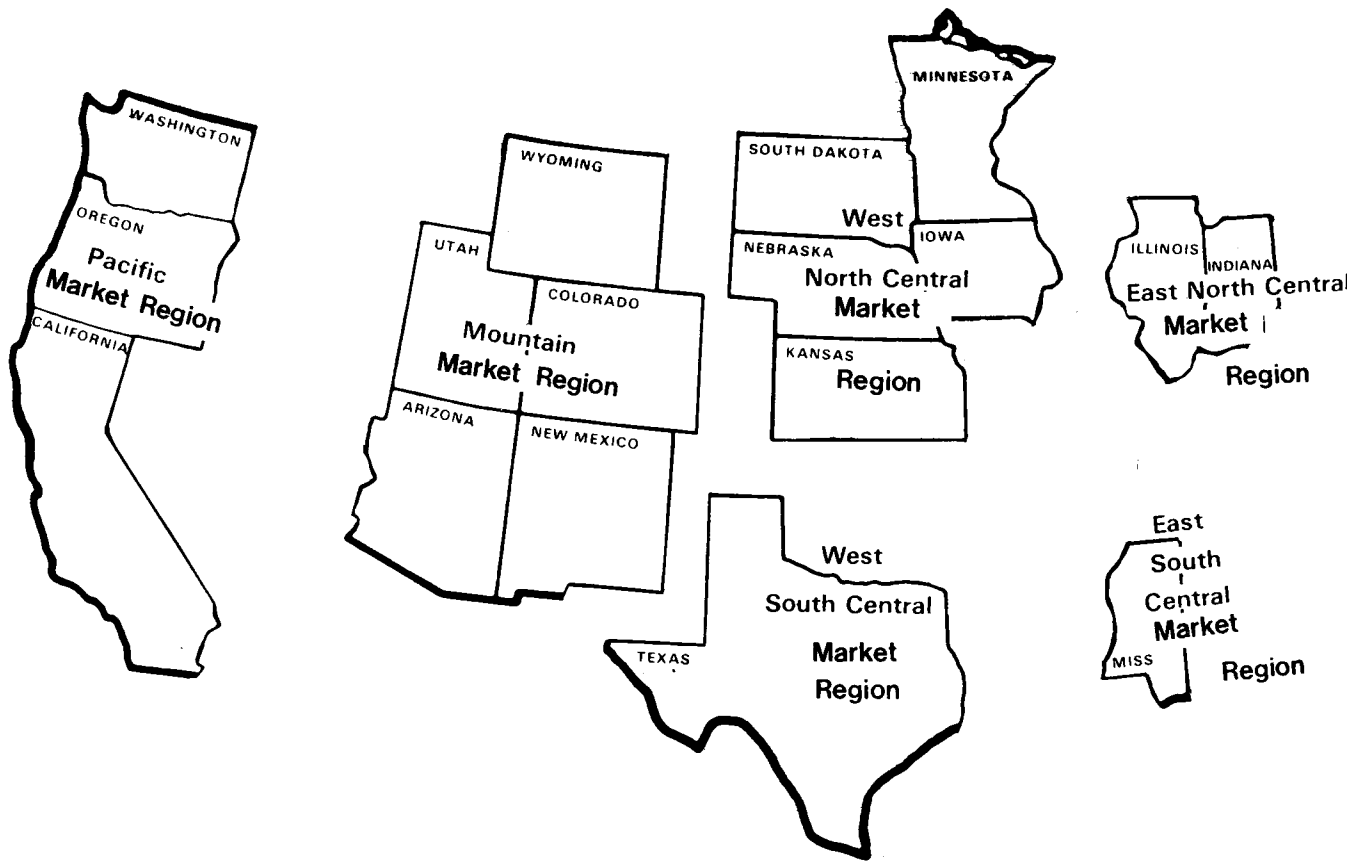
- East North Central Market Region
- West North Central Market Region
- East and West South Central Market Region
- Mountain Market Region
- Pacific Market Region

Listings of states within each Market Region consuming Colorado coal are presented in Sections 2.2.1 to 2.2.5.

TABLE 1-9 STATE GEOGRAPHIC MARKETS OF COLORADO COAL

Coal Product	1978	1979	1980	1981	1982	1983
Steam	11	10	11	9	11	7
Met	5	4	4	4	4	2
Industrial	14	12	12	12	14	15
Residential	5	6	8	5	5	3
Total	35	32	35	30	34	27

FIGURE 1-2 GEOGRAPHIC MARKET REGIONS OF COLORADO COAL
(from EIA Coal Distribution Reports)



The contraction of the Colorado steam coal geographic market represents the greatest production loss for the Colorado coal industry. Changes in the steel industry reduced the numbers of met coal state geographic markets from five states in 1978 to two states in 1983. The industrial coal product and geographic market is relatively strong picking up new markets and gaining marketshare in a low growth market. The geographic distribution of low-value residential/commercial coal products is down to three state markets in 1983 from the peak year 1980 when the Colorado residential/commercial coal product was present in eight state markets.

Presence of Colorado coal in a state geographic market may not indicate significant consumption. Several state geographic markets exhibit quite variable consumption of Colorado coal. Colorado coal was present in a maximum of 35 product and geographic markets between 1978 and 1983. In 1983 low demand and contracting geographic markets dropped the total product and state geographic markets for Colorado coal to 27.

Section 2

2.0 COLORADO COAL PRODUCTION AND CONSUMPTION

The Colorado coal market developed to serve growing industry sparked by discoveries of commodities such as gold and silver. Coal was required to replace the supply of wood used to fuel smelters, and in heating applications. The mining of Colorado coal originated as close to the source of demand as possible. Coals from the Denver Coal Region served the Denver area and coals from the Raton Mesa Coal Region served industrial centers of southern Colorado and points east. Coal mining in other regions developed to serve varied local interests. Table 2-1 lists trends in consumption of energy by source from 1960 to 1982 for Colorado.

Throughout the history of coal mining in Colorado the ability to transport coal limited the market and therefore the size of mines. Spot markets and seasonal markets do not require large mines and their inherent economies-of-scale. The initial surge in coal production was met by numerous small operators and a few large ones. Barriers-to-entry were small; coal located at the outcrop required only short drifts and the lack of environmental regulation led to the economic extraction of easily accessible coal. Disorganized mining, though, leaves a legacy of present day externalities in the form of disrupted mining patterns, disaggregated land ownership and stringent environmental regulation due to poor past practice. In addition, funds from present coal production must pay to reclaim abandoned mines and shafts from past operations.

Production from Colorado rose and fell with the long-term prospects of alternative fuels since 1864 when coal mining was first recorded. Figure 2-1 shows the history of Colorado coal production. Cumulative production to the close of 1983 was about 724 million tons. Production of coal in 1978 met and exceeded the previous record of 12.6 million tons in 1918 for the first time.

The advent of unit train service in the early 1960's allowed the geographic market for all western coals to expand. Colorado production increased at an average annual rate of 4.58 percent between 1960 and 1973. Following disruptions of petroleum supply in 1973 and Federally mandated shifts to low sulfur fuels, the desirability of Western coals, including Colorado, increased. Between 1973 and 1981 production, in short tons, from Colorado increased at an average rate of 15.5 percent per year. Slack markets and increased price competition ended the rapid increase in rate of coal production. From 1981 to 1983 production levels decreased at an average rate of 6.89 percent per year.

Table 2-2 lists domestic Colorado consumption data by market region and state from 1974 to 1983. Data for 1983 are annualized from Energy Information Administration reports. Coal consumption data are abstracted from national coal consumption figures compiled by the U.S. Bureau of Mines and the Department of Energy (various years).

TABLE 2-1 CONSUMPTION OF ENERGY BY SOURCE, STATE OF COLORADO - 1960 TO 1982 (trillion Btu's). (from EIA 1984e)

Year	Coal	Natural Gas (Dry)	Petroleum											Nuclear Power	Hydro-electric Power[2]	Geo-thermal Power[3]	Wood and Waste[4]	Net Interstate Sales of Electricity[5]	Total Energy Consumed
			Asphalt	Aviation Gasoline	Distil-late Fuel	Jet Fuel	Kero-sene	LPG[1]	Lubri-cants	Motor Gasoline	Residual Fuel	Road Oil	Other Petro-leum	Total Petro-leum						
1960	**67.5**	**195.0**	**10.2**	**4.5**	**24.4**	**2.8**	**1.6**	**12.6**	**2.3**	**86.5**	**11.8**	**0.5**	**11.9**	**169.2**	**0.0**	**10.4**	**0.0**	**0.0**	**-16.8**	**425.3**
1961	76.2	210.9	9.8	3.3	25.6	9.5	1.3	12.3	2.2	90.0	16.2	0.4	13.7	184.3	0.0	8.9	0.0	0.0	-16.0	464.3
1962	78.5	202.3	9.7	3.7	24.0	12.4	1.0	12.4	2.4	94.2	16.0	0.6	13.9	190.3	0.0	10.7	0.0	0.0	-13.9	468.0
1963	88.0	204.8	10.0	3.3	26.4	13.1	1.6	12.3	2.4	96.3	16.5	0.9	15.6	198.5	0.0	10.8	0.0	0.0	-14.8	487.3
1964	88.7	235.9	10.0	3.3	23.7	15.2	3.1	15.1	2.5	98.1	16.5	0.4	16.0	203.9	0.0	11.0	0.0	0.0	-15.1	524.5
1965	**97.1**	**231.4**	**9.3**	**2.8**	**22.9**	**19.5**	**6.3**	**13.4**	**2.5**	**101.5**	**12.9**	**0.1**	**14.9**	**206.1**	**0.0**	**9.8**	**0.0**	**0.0**	**-13.0**	**531.4**
1966	108.0	235.0	10.2	2.6	26.6	24.5	7.1	14.0	2.6	105.8	11.2	0.7	16.4	221.8	0.0	10.4	0.0	0.0	-19.1	556.1
1967	107.0	238.9	10.6	1.9	27.4	30.9	15.5	16.9	2.6	109.8	8.7	1.1	20.3	245.6	0.0	9.7	0.0	0.0	-15.8	585.5
1968	112.1	264.8	14.9	1.4	32.4	36.4	9.0	18.4	2.8	119.1	9.8	1.2	22.4	267.8	0.0	9.8	0.0	0.0	-14.2	640.3
1969	103.7	280.9	16.3	1.1	31.9	39.1	7.2	18.7	2.5	125.9	13.5	2.0	23.5	281.8	0.0	10.4	0.0	0.0	-8.7	668.2
1970	**114.9**	**291.1**	**19.1**	**1.1**	**30.4**	**42.5**	**4.7**	**17.8**	**2.6**	**137.1**	**9.5**	**2.2**	**22.3**	**289.2**	**0.0**	**13.0**	**0.0**	**0.0**	**-10.4**	**697.8**
1971	104.9	298.3	15.1	1.0	36.4	43.7	3.6	19.1	2.6	145.3	10.0	4.7	23.4	304.9	0.0	16.6	0.0	0.0	-11.8	713.1
1972	118.2	318.1	16.8	1.1	40.1	44.1	3.6	22.4	2.8	157.7	12.4	3.7	25.0	329.5	0.0	12.9	0.0	0.0	-8.0	770.7
1973	139.5	330.7	20.4	1.2	46.1	43.8	3.2	21.8	2.8	165.6	14.4	2.2	26.9	348.4	0.0	13.3	0.0	0.0	-9.0	823.0
1974	137.4	320.4	16.4	1.2	51.3	41.7	1.9	19.1	2.7	161.7	19.2	1.3	29.1	345.6	0.0	14.8	0.0	0.0	-6.7	811.4
1975	**158.5**	**314.2**	**14.0**	**1.1**	**51.5**	**40.6**	**1.6**	**18.8**	**2.8**	**167.7**	**21.3**	**0.8**	**29.6**	**349.8**	**0.0**	**15.7**	**0.0**	**0.0**	**-7.9**	**830.3**
1976	184.2	308.2	16.0	1.2	55.0	44.0	1.4	20.2	3.1	173.1	24.1	0.8	33.6	372.5	0.0	13.4	0.0	0.0	-11.5	866.7
1977	222.9	287.9	17.1	1.3	57.9	44.7	1.4	19.3	3.9	180.2	20.4	0.3	35.6	382.1	2.4	11.2	0.0	0.0	-23.8	882.8
1978	218.0	272.7	14.5	1.3	59.6	46.9	2.1	21.9	4.2	193.8	24.7	0.2	37.5	406.8	6.7	13.9	0.0	0.0	-13.7	904.3
1979	237.2	298.1	18.3	1.3	70.2	34.2	1.6	14.4	4.4	185.3	5.8	*	31.4	366.7	2.3	16.7	0.0	0.0	-19.0	902.0
1980	**246.4**	**262.8**	**15.1**	**1.2**	**65.4**	**26.7**	**2.3**	**14.2**	**3.9**	**180.1**	**11.4**	**0.1**	**41.5**	**361.9**	**7.3**	**17.8**	**0.0**	**0.0**	**-18.8**	**877.4**
1981	280.7	217.4	11.9	1.1	50.8	31.0	1.2	13.5	3.7	181.9	0.9	0.1	22.5	318.7	8.3	14.6	0.0	0.0	-0.6	839.0
1982	274.1	230.9	11.5	1.0	53.8	31.4	1.5	16.7	3.4	184.4	0.1	0.1	19.1	322.9	6.3	17.3	0.0	*	-4.0	847.4

Physical Units

Year	Coal	Natural Gas (Dry)	Petroleum											Nuclear Power	Hydro-electric Power[2]	Geo-thermal Power[3]	Wood and Waste[4]	Net Interstate Sales of Electricity[5]
			Asphalt	Aviation Gasoline	Distil-late Fuel	Jet Fuel	Kero-sene	LPG[1]	Lubri-cants	Motor Gasoline	Residual Fuel	Road Oil	Other Petro-leum	Total Petro-leum				
	Thousand Short Tons	Billion Cubic Feet	Thousand Barrels												Million Kilowatt-Hours			
1960	**2941**	**188**	**1541**	**885**	**4194**	**528**	**277**	**3153**	**378**	**16460**	**1883**	**76**	**1957**	**31332**	**0**	**970**	**0**	**0**	**-4938**
1961	3274	204	1481	652	4403	1703	235	3062	368	17128	2575	54	2236	33896	0	836	0	0	-4680
1962	3393	195	1466	732	4118	2223	169	3096	397	17936	2545	88	2270	35040	0	1016	0	0	-4084
1963	3794	199	1500	647	4534	2334	288	3077	397	18338	2631	141	2548	36435	0	1034	0	0	-4347
1964	3829	229	1513	658	4065	2707	547	3771	417	18672	2630	54	2639	37672	0	1056	0	0	-4421
1965	**4204**	**224**	**1404**	**550**	**3925**	**3472**	**1108**	**3339**	**416**	**19321**	**2056**	**20**	**2492**	**38101**	**0**	**938**	**0**	**0**	**-3819**
1966	4727	227	1539	506	4564	4358	1251	3496	432	20142	1788	108	2742	40927	0	998	0	0	-5587
1967	4762	232	1594	378	4708	5474	2734	4403	427	20896	1385	159	3407	45566	0	928	0	0	-4623
1968	4944	257	2248	282	5564	6447	1594	4824	469	22664	1555	183	3701	49531	0	944	0	0	-4166
1969	4603	272	2456	216	5474	6927	1275	4918	416	23974	2144	308	3821	51928	0	993	0	0	-2538
1970	**5101**	**282**	**2882**	**211**	**5212**	**7519**	**822**	**4710**	**423**	**26104**	**1507**	**338**	**3617**	**53343**	**0**	**1236**	**0**	**0**	**-3049**
1971	4600	289	2271	201	6249	7731	638	5064	435	27662	1593	702	3807	56354	0	1585	0	0	-3447
1972	5295	310	2529	211	6883	7800	628	5949	466	30020	1966	558	4050	61059	0	1243	0	0	-2341
1973	6296	324	3067	236	7909	7754	571	5831	456	31522	2286	339	4333	64304	0	1281	0	0	-2624
1974	6494	313	2478	232	8813	7386	327	5129	437	30779	3050	188	4691	63511	0	1415	0	0	-1967
1975	**7603**	**308**	**2111**	**220**	**8846**	**7187**	**278**	**5053**	**458**	**31917**	**3388**	**120**	**4774**	**64351**	**0**	**1507**	**0**	**0**	**-2326**
1976	9003	302	2418	234	9439	7773	249	5445	509	32947	3833	124	5431	68401	0	1288	0	0	-3375
1977	10689	282	2579	251	9935	7900	255	5256	641	34312	3246	48	5782	70205	225	1072	0	0	-6963
1978	10576	268	2192	252	10238	8297	371	5979	688	36885	3928	31	6078	74938	609	1343	0	0	-4011
1979	11347	292	2750	251	12053	6047	276	3905	720	35268	929	4	5218	67422	213	1612	0	0	-5562
1980	**11974**	**256**	**2272**	**228**	**11228**	**4725**	**413**	**3870**	**641**	**34282**	**1814**	**11**	**6644**	**66128**	**667**	**1717**	**0**	**0**	**-5523**
1981	13602	212	1791	228	8725	5494	215	3715	615	34625	136	11	3541	59095	749	1399	0	0	-190
1982	13776	225	1735	190	9228	5556	262	4618	561	35099	15	8	3090	60361	569	1650	0	1	-1167

[1] Liquefied petroleum gases include ethane, ethylene, propane, propylene, butane, butylene, butane-propane mixture, ethane-propane mixture, and isobutane. The 1979-1982 LPG data may not be directly comparable to the pre-1979 data due to modifications to the LPG sales survey form and an updated sampling frame. See the notes in the LPG section of the Technical Documentation.

[2] Includes industrial and utility production, and net imports of electricity.

[3] Consumed at utilities to produce electricity.

[4] Net interstate sales of electricity is the difference between the amounts of energy in the electricity sold within a state (including associated losses) and the energy input at the electric utilities within the state. The net interstate sales, therefore, include associated electrical energy losses. A positive number indicates that more electricity (including associated losses) came into the state than went out of the state during the year; conversely, a negative number indicates that more electricity (including associated losses) went out of the state than came into the state.

* Represents small, non-zero value.

Note: Totals may not equal sum of components due to independent rounding.

Note: Does not include wood consumed by the non-utility sectors. Also excludes small quantities of other energy sources for which consistent historical data are not available such as: (1) solar energy obtained by the use of thermal and photovoltaic collectors; (2) wind energy; (3) and geothermal, biomass, and waste energy other than that consumed at the electric utilities.

FIGURE 2-1 COLORADO COAL PRODUCTION

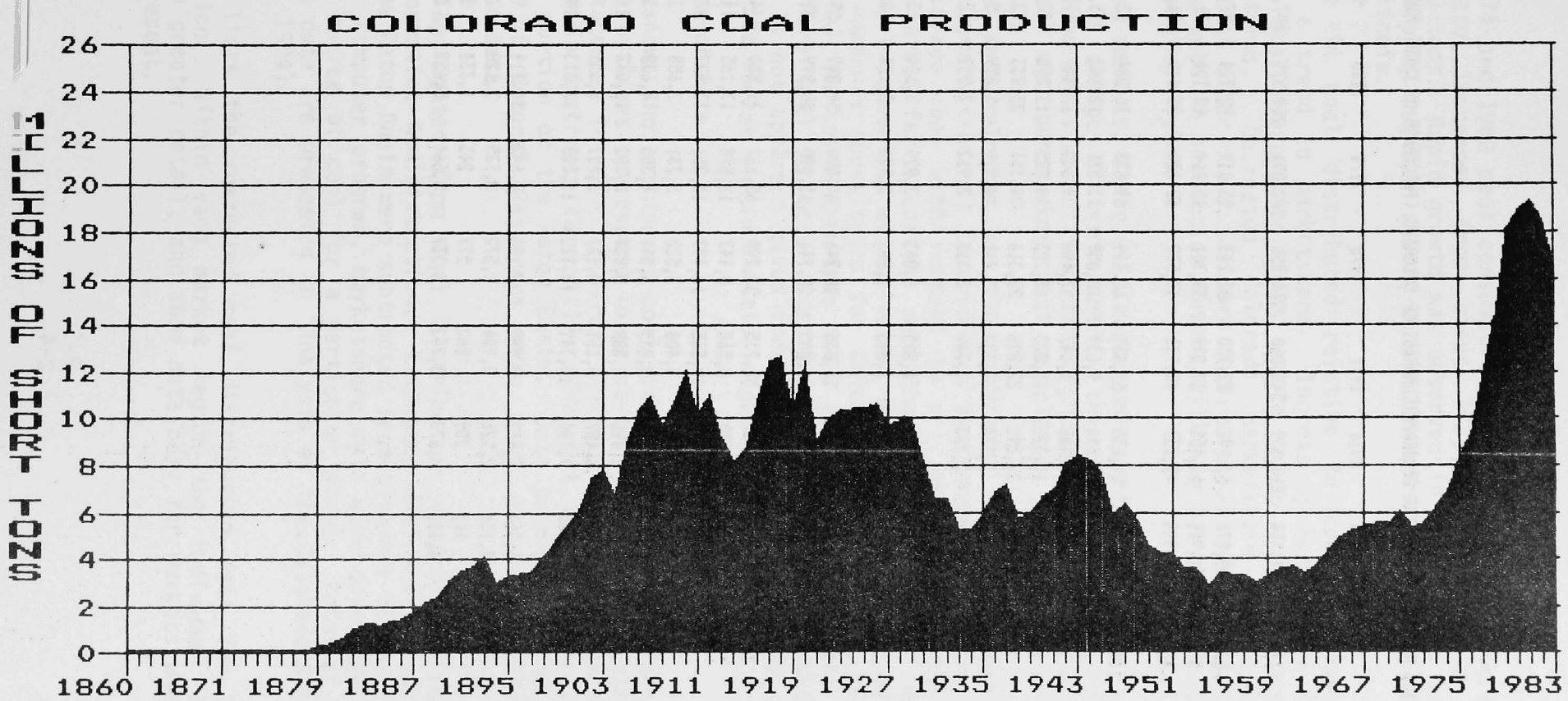


TABLE 2-2 CONSUMPTION OF COAL WITHIN THE GEOGRAPHIC MARKET OF COLORADO (THOUSANDS OF SHORT TONS)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983 ANNUALIZED
MARKET REGION/STATE	172,330	191,734	210,829	245,060	234,756	282,891	299,525	297,668	303,817	303,219
E. NORTH CENTRAL	82,975	88,876	87,292	82,730	82,273	95,039	92,724	82,661	81,474	82,222
ILLINOIS	39,054	41,948	41,455	38,299	38,701	42,719	42,106	36,585	36,342	36,050
INDIANA	43,921	46,928	45,837	48,931	43,572	52,320	50,618	46,076	45,132	46,172
W. NORTH CENTRAL	38,154	44,781	51,630	57,437	60,449	69,633	70,584	68,302	70,544	70,093
IOWA	6,589	6,741	7,894	9,039	10,659	13,571	12,568	12,127	12,705	13,342
KANSAS	1,825	3,333	3,482	6,142	7,498	9,640	12,840	11,471	11,445	13,442
MINNESOTA	9,668	11,033	12,322	13,873	13,203	14,225	13,275	13,288	12,465	10,510
MISSOURI	17844	19,741	22,795	22,898	22,316	24,356	23,933	23,124	25,025	24,950
NEBRASKA	1,786	1,733	2,274	2,725	3,461	4,929	5,029	5,349	6,393	5,593
SOUTH DAKOTA	442	2,200	2,863	2,760	3,312	2,912	2,939	2,943	2,511	2,256
E. SOUTH CENTRAL	1,594	1,593	1,671	1,895	1,803	2,820	3,624	3,311	3,865	4,042
MISSISSIPPI	1,594	1,593	1,671	1,895	1,803	2,820	3,624	3,311	3,865	4,042
W. SOUTH CENTRAL	8,607	12,370	16,417	21,805	28,746	41,090	50,899	59,625	61,283	69,464
TEXAS	8,607	12,370	16,417	21,805	28,746	41,090	50,899	59,625	61,283	69,464
MOUNTAIN	34,500	37,750	46,357	55,735	53,299	65,667	71,580	74,114	77,415	71,746
ARIZONA	3,059	3,985	7,070	8,568	8,143	12,878	13,165	14,108	14,140	12,712
COLORADO	7,290	8,210	9,201	10,535	10,497	13,251	13,422	13,301	13,173	12,829
MONTANA	907	1,252	2,565	3,408	3,522	3,731	3,658	3,578	2,824	2,377
NEVADA	4,575	4,512	5,158	5,833	3,844	4,303	4,638	5,280	6,748	6,358
NEW MEXICO	7,686	7,422	8,096	8,888	8,834	8,702	11,032	11,426	12,500	14,105
UTAH	4,252	4,514	4,487	5,161	5,337	6,797	7,352	7,009	7,973	6,857
WYOMING	6,731	7,855	9,780	13,342	13,122	16,005	18,313	19,412	20,057	16,508
PACIFIC	6,500	6,364	7,462	8,988	8,186	8,642	10,114	9,655	9,236	5,652
CALIFORNIA	2,184	2,136	2,526	2,986	2,572	2,735	3,128	3,069	2,827	1,301
OREGON	149	107	259	260	277	243	1,334	1,490	1,352	118
WASHINGTON	4,167	4,121	4,677	5,742	5,337	5,664	5,652	5,096	5,057	4,233

Between 1974 and 1983 coal consumption in the domestic geographic market for Colorado increased from about 172,000,000 tons to just over 300,000,000 tons. Rapid growth was observed in some states such as Texas and Mississippi, and near static conditions were observed in other states, such as Illinois.

The change in coal distributed relative to coal consumed over time represents a trend in marketshare. Increasing marketshare in a growth region for coal consumption means growth in Colorado coal production in absolute terms. Decreased Colorado marketshare in growth markets indicates that other coals are more desirable, and although production may increase, growth in production levels will lag behind the rate of growth of the consuming region.

In declining markets, changes in marketshare affect production relative to the rate of change of marketshare, the size of market and rate of decline. Even areas exhibiting modest growth and declining marketshare of Colorado coal are soon markets lost to Colorado producers.

Marketshare was selected as the statistic for prediction of future production levels since it incorporates the consumer's desire to continue use of Colorado coal with respect to all other coals over time. The geographic market for a coal is determined by the limit of the marginal cost of competing coal on an equivalent quality basis. Consumers have the choice of numerous substitutes for Colorado coal. States that perceive Colorado coal as non-competitive will purchase other coals from other States. Where coal is under contract, changes in marketshare belie a trend that is not apparent given constant levels of purchases of Colorado coal, when the market within a state is growing.

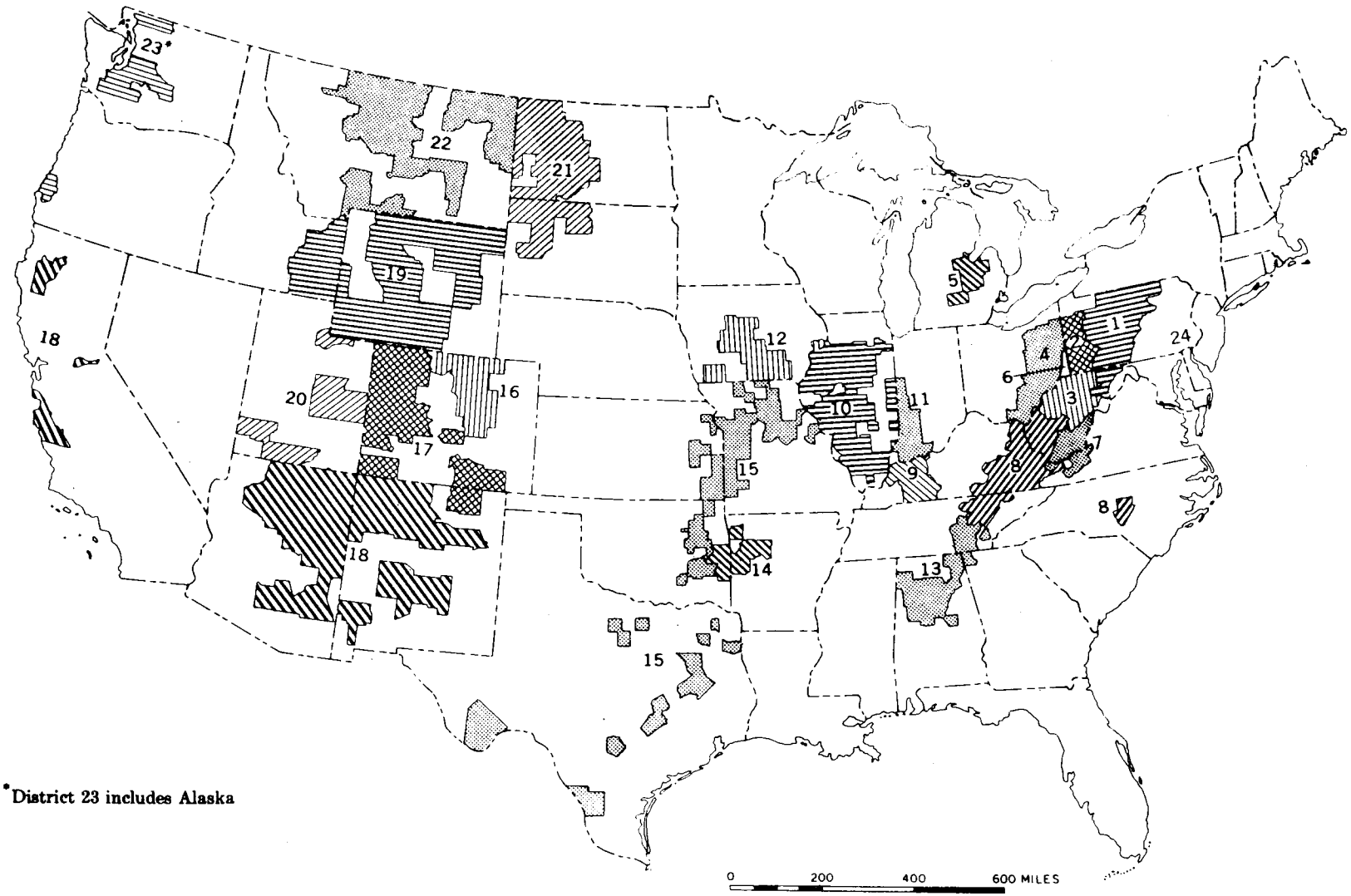
2.1 Sources of Data

Figure 2-2 shows the outline of coal production districts employed by the DOE. These outlines correspond to price-control districts established in 1937 and abandoned in 1943. Colorado production and domestic distribution is embedded in Districts 16 and 17. District 17, however, includes the New Mexico portion of the Raton Basin. Data supplied by the New Mexico Department of Natural Resources were used to correct Colorado coal distribution data.

Data were aggregated from Coal Distribution reports published by the Energy Information Administration. Estimated distribution of New Mexico mines in the Raton Basin were subtracted from District 16 and 17. Using a spreadsheet computer program, marketshare data were developed as well as changes in source of coal for a particular state. Point-of-origin coal consumption data are presented in "Analysis of the Colorado Coal Industry" (Rushworth, 1984).

Table 2-3 lists the corrected coal distribution data for Colorado by market region. Within each market region the individual states were analyzed in greater detail, and show data only for markets where Colorado coal was present.

FIGURE 2-2 COAL PRODUCTION DISTRICTS



*District 23 includes Alaska

Bituminous Coal Producing Districts as Defined in the Bituminous Coal Act of 1937 and Amendments
The districts were originally established to aid in formulating minimum prices of bituminous coal and lignite. Because much statistical information was compiled in terms of these districts, their use for statistical purposes has continued since the abandonment of that legislation in 1943.
District 24 is the anthracite producing district in Pennsylvania.

TABLE 2-3 DISTRIBUTION OF COLORADO COAL TO MARKET REGIONS BY COAL PRODUCT, 1978 TO 1983 (THOUSANDS OF SHORT TONS)

MARKET REGION	1978	1979	1980	1981	1982	1983 ANNUALIZED
E. NORTH CENTRAL						
STEAM	60,976	70,277	70,571	65,883	63,572	63,152
COLORADO	2,242	2,970	2,627	2,797	2,448	1,291
MARKETSHARE (%)	3.68	4.23	3.72	4.25	3.85	2.04
MET COAL	10,737					6,914
COLORADO	8					12
MARKETSHARE (%)	0.07					0.17
INDUSTRIAL	8,169	6,636				2,032
COLORADO	269	7				8
MARKETSHARE (%)	3.29	0.11				0.39
RESIDENT/COM	254					
COLORADO	35					
MARKETSHARE (%)	13.78					
TOTAL	80,136	76,913	70,571	65,883	63,572	72,098
COLORADO	2,788	2,984	2,627	2,797	2,448	1,319
MARKETSHARE (%)	3.48	3.88	3.72	4.25	3.85	1.83
W. NORTH CENTRAL						
STEAM	51,282	48,049	53,219	37,705	51,826	17,210
COLORADO	1,484	1,754	1,552	892	543	284
MARKETSHARE (%)	2.89	3.65	2.92	2.37	1.05	1.65
MET	12,169					
COLORADO	908					
MARKETSHARE (%)	7.46					
INDUSTRIAL	3,707	3,981	2,594	2,702	3,383	2,299
COLORADO	476	410	286	252	300	110
MARKETSHARE (%)	12.84	10.30	11.03	9.33	8.87	4.78
RESIDENT/COM	61	180	253	270	27	205
COLORADO	2	10	17	13	12	51
MARKETSHARE (%)	3.28	5.56	6.72	4.81	44.44	24.88
TOTAL	67,219	52,210	56,066	40,677	55,236	19,714
COLORADO	2,870	2,174	1,855	1,157	855	445
MARKETSHARE (%)	4.27	4.16	3.31	2.84	1.55	2.26

TABLE 2-3 (CONTINUED) DISTRIBUTION OF COLORADO COAL TO MARKET REGIONS BY COAL PRODUCT, 1978 TO 1983 (THOUSANDS OF SHORT TONS)

EAST AND WEST SOUTH CENTRAL	1978	1979	1980	1981	1982	1983 ANNUALIZED
STEAM	28,398	40,004	51,214	57,669	60,440	69,275
COLORADO	262	702	1,730	2,570	2,833	3,012
MARKETSHARE (%)	0.92	1.75	3.38	4.46	4.69	4.35
MET	374	1,122	840	593	400	
COLORADO	31	210	190	173	145	
MARKETSHARE (%)	8.29	18.72	22.62	29.17	36.25	
INDUSTRIAL	1,706	3,362	2,406	4,556	4,210	4,077
COLORADO	3	109	603	692	917	995
MARKETSHARE (%)	0.18	3.24	25.06	15.19	21.78	24.41
RESIDENT/COM						
COLORADO						
MARKETSHARE (%)						
TOTAL	30,478	44,488	54,460	62,818	65,050	73,352
COLORADO	296	1,021	2,523	3,435	3,895	4,007
MARKETSHARE (%)	0.97	2.30	4.63	5.47	5.99	5.46

COLORADO	1978	1979	1980	1981	1982	1983
STEAM	9,108	11,577	11,583	11,592	12,102	12,101
COLORADO	6,014	8,526	8,405	8,269	8,154	7,607
MARKETSHARE (%)	66.03	73.65	72.56	71.33	67.38	62.86
MET	649	1,086	888	961	359	
COLORADO	641	880	764	732	292	
MARKETSHARE (%)	98.77	81.03	86.04	76.17	81.34	
INDUSTRIAL	644	532	852	652	583	661
COLORADO	431	487	708	619	529	657
MARKETSHARE (%)	66.93	91.54	83.10	94.94	90.74	99.39
RESIDENT/COM	95	58	99	94	129	65
COLORADO	28	54	94	82	120	56
MARKETSHARE (%)	29.47	93.10	94.95	87.23	93.02	86.15
TOTAL	10,496	13,253	13,422	13,299	13,173	12,827
COLORADO	7,114	9,947	9,971	9,702	9,095	8,320
MARKETSHARE (%)	67.78	75.05	74.29	72.95	69.04	64.86

TABLE 2-3 (CONTINUED) DISTRIBUTION OF COLORADO COAL TO MARKET REGIONS BY COAL PRODUCT, 1978 TO 1983 (THOUSANDS OF SHORT TONS)

MOUNTAIN	1978	1979	1980	1981	1982	1983 ANNUALIZED
STEAM	7,710	8,609	10,980	4,837	6,153	
COLORADO	8	7	8	8	18	
MARKETSHARE (%)	0.10	0.08	0.07	0.17	0.29	
MET	1,576	1,568	1,464	1,384	832	859
COLORADO	1,224	1,244	1,146	1,030	695	825
MARKETSHARE (%)	77.66	79.34	78.28	74.42	83.53	96.04
INDUSTRIAL	2,060	770	845	3,232	3,294	3,287
COLORADO	30	123	106	266	362	416
MARKETSHARE (%)	1.46	15.97	12.54	8.23	10.99	12.66
RESIDENT/COM			45		160	
COLORADO			2		4	
MARKETSHARE (%)			4.44		3	
TOTAL	11,346	10,947	13,334	9,453	10,439	4,146
COLORADO	1,262	1,374	1,262	1,304	1,079	1,241
MARKETSHARE (%)	11.12	12.55	9.46	13.79	10.34	29.93
PACIFIC		1978	1979	1980	1981	1982
STEAM						
COLORADO						
MARKETSHARE (%)						
MET	1,443	1,648	1,730	1,367	1,403	
COLORADO	280	726	531	206	141	
MARKETSHARE (%)	19.40	44.05	30.69	15.07	10.05	
INDUSTRIAL	753	804	576	655	354	1,412
COLORADO	8	13	14	34	20	149
MARKETSHARE (%)	1.06	1.62	2.43	5.19	5.65	10.55
RESIDENT/COM						
COLORADO						
MARKETSHARE (%)						
TOTAL	2,196	2,452	2,306	2,022	1,757	1,412
COLORADO	288	739	545	240	161	149
MARKETSHARE (%)	13.11	30.14	23.63	11.87	9.16	10.55
GRAND TOTAL	201,871	200,263	210,159	194,152	209,227	183,549
COLORADO TOTAL	14,618	18,239	18,783	18,635	17,533	15,481
MARKETSHARE (%)	7.24	9.11	8.94	9.60	8.38	8.43

2.2 Market Regions

Table 2-4 lists net generation by fuel source, in million kilowatthours, for each market region defined in this report for 1982 and 1983. Growth in coal is tied closely to growth in its largest product market, steam coal. Within the geographic market for Colorado coal, steam coal consumption increased 5.8 percent between 1982 and 1983. The increase would probably have been higher were it not for the availability of hydropower which increased 7.6 percent, from 229,140 million kilowatthours in 1982 to 246,724 million kilowatthours in 1983. Figure 2-3 shows the change in net electrical generation by fuel source for the years 1982 and 1983. All data pertaining to electrical generation from "Electric Power Monthly" published by the Energy Information Administration."

2.2.1 East North Central Market Region

The East North Central Market Region is a distant geographic market well-served by competing coal producing states. Tables 2-5 and 2-6 list consumption data for total coal, coal from Colorado and derived marketshare of Colorado coal for the states of Illinois and Indiana.

Future growth in coal consumption is keyed to the region's economic growth. Colorado marketshare is declining sharply while total coal consumption is increasing slightly. This market is served by a relative few long-term contracts from Colorado nearing expiration.

Between 1982 and 1983 coal used for electrical generation, expressed in million kilowatthours, increased 11.3 and 9.3 percent in Indiana and Illinois, respectively. For the two states, net use of petroleum for electrical generation, in million kilowatthours, declined 21 percent during this time, from 4,246 to 3,330 million kilowatthours. Nuclear power generation is up 11 percent since 1982 in Illinois. In 1983, Indiana produced 98 percent of its electrical requirements by coal and Illinois produced 65 percent of its needs by coal. Figure 2-4 shows the source of electrical generation capacity by fuel for the two state East North Central Market Region.

2.2.2 West North Central Market Region

The West North Central Market Region consists of the states of Iowa, Kansas, Minnesota, Missouri, Nebraska and South Dakota. These states are centrally located with respect to supplies of coal and are discriminating against Colorado coal in favor of other producers. Tables 2-7 through 2-13 show consumption trends for Iowa, Kansas, Nebraska, Minnesota, Missouri and Oklahoma and South Dakota, respectively. Data for Oklahoma are shown but not included in the definition of the West North Central Market Region since the coal movement represents an isolated minor met coal shipment between captive mine and user.

TABLE 2-4 NET GENERATION BY FUEL SOURCE--OVERALL GEOGRAPHIC MARKET MILLION KILOWATTHOURS

MARKET REGION/STATE	YEAR	COAL	PETROLEUM	GAS	HYDRO	NUCLEAR	OTHER	TOTAL
EAST NORTH CENTRAL	1983	136,912	3,330	1,223	535	28,044	NA	170,044
	1982	124,099	4,246	980	535	27,625	NA	157,485
WEST NORTH CENTRAL	1983	117,720	583	4,631	10,405	20,146	46	153,531
	1982	110,998	634	5,961	10,047	21,219	27	148,886
EAST AND WEST	1983	96,347	2,124	119,919	1,107	NA	75	219,572
SOUTH CENTRAL	1982	88,011	1,295	132,970	1,027	NA	61	223,364
COLORADO	1983	22,243	54	308	1,870	748	1	25,224
	1982	22,879	74	405	1,649	569	1	25,577
MOUNTAIN	1983	123,069	686	5,746	47,396	748	40	177,685
(INCLUDING COLORADO)	1982	124,703	660	9,007	34,534	569	29	169,502
PACIFIC	1983	6,554	6,341	42,827	187,281	11,091	6,128	260,222
	1982	6,203	9,485	50,045	182,997	12,158	4,895	265,783
GRAND TOTAL	1983	480,602	13,064	174,346	246,724	60,029	6,290	981,055
	1982	454,014	16,320	198,963	229,140	61,571	5,013	965,021

MODIFIED FROM ELECTRIC POWER MONTHLY MARCH 1984

FIGURE 2-3 NET GENERATION BY FUEL SOURCE FOR OVERALL GEOGRAPHIC MARKET

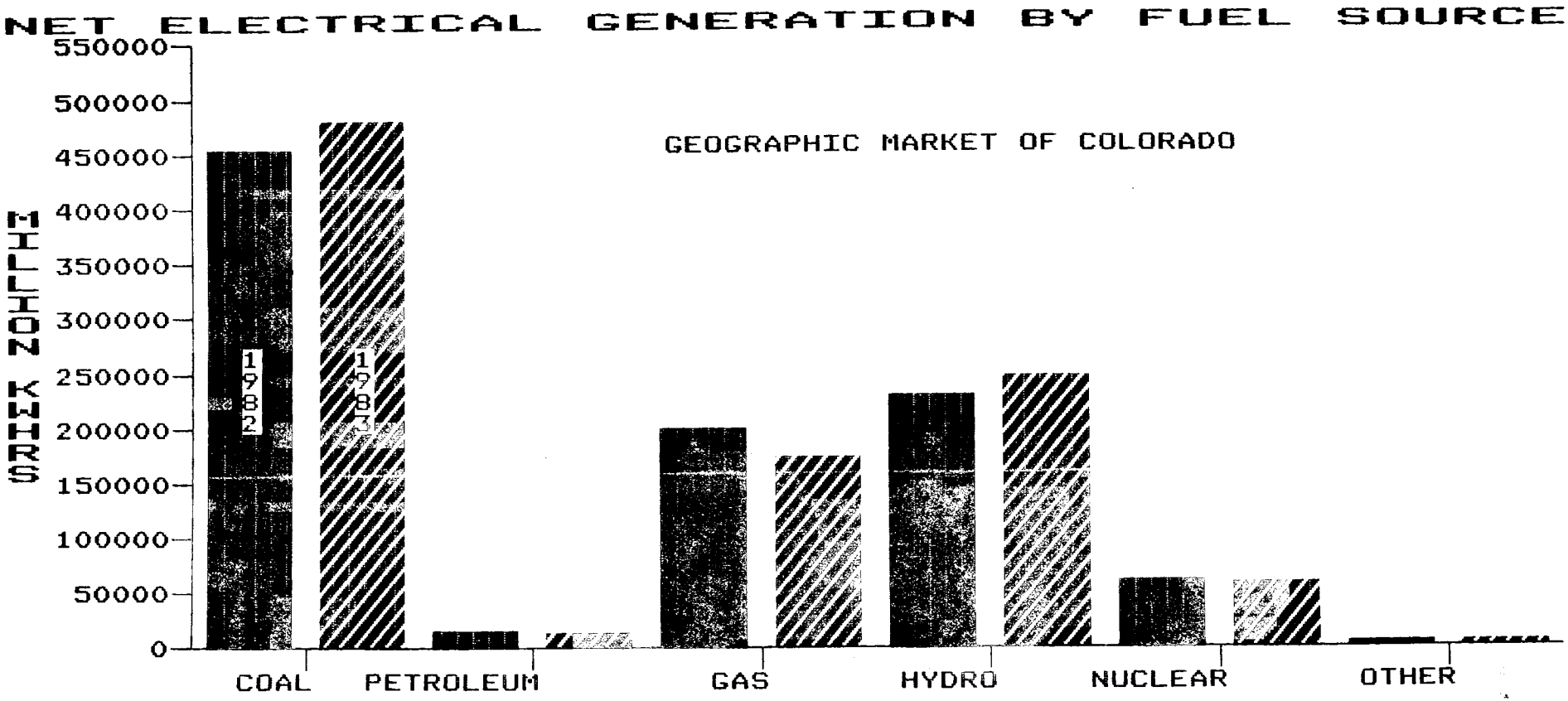


TABLE 2-5 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF ILLINOIS

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	33,195	37,268	36,508	31,820	32,118	31,512
COLORADO CONTRIBUTION	1,743	1,767	1,631	2,026	1,445	551
MARKETSHARE (%)	5.25	4.74	4.47	6.37	4.50	1.75
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	3,164					2,032
COLORADO CONTRIBUTION	261					8
MARKETSHARE (%)	8.25					0.39
RESIDENT/COM	209					
COLORADO CONTRIBUTION	26					
MARKETSHARE (%)	12.44					

1983 figures are annualized from third quarter data

TABLE 2-6. COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF INDIANA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	27,781	33,009	34,063	29,487	31,454	31,640
COLORADO CONTRIBUTION	499	1,203	996	771	1,003	740
MARKETSHARE (%)	1.80	3.64	2.92	2.61	3.19	2.34
MET COAL	10,737					6,914
COLORADO CONTRIBUTION	8					12
MARKETSHARE (%)	0.07					0.17
INDUSTRIAL	5,005	6,636				
COLORADO CONTRIBUTION	8	7				
MARKETSHARE (%)	0.16	0.11				
RESIDENT/COM	45					
COLORADO CONTRIBUTION	9					
MARKETSHARE (%)	20.00					

1983 figures are annualized fora third quarter data

FIGURE 2-4 NET GENERATION BY FUEL SOURCE FOR EAST NORTH CENTRAL MARKET REGION

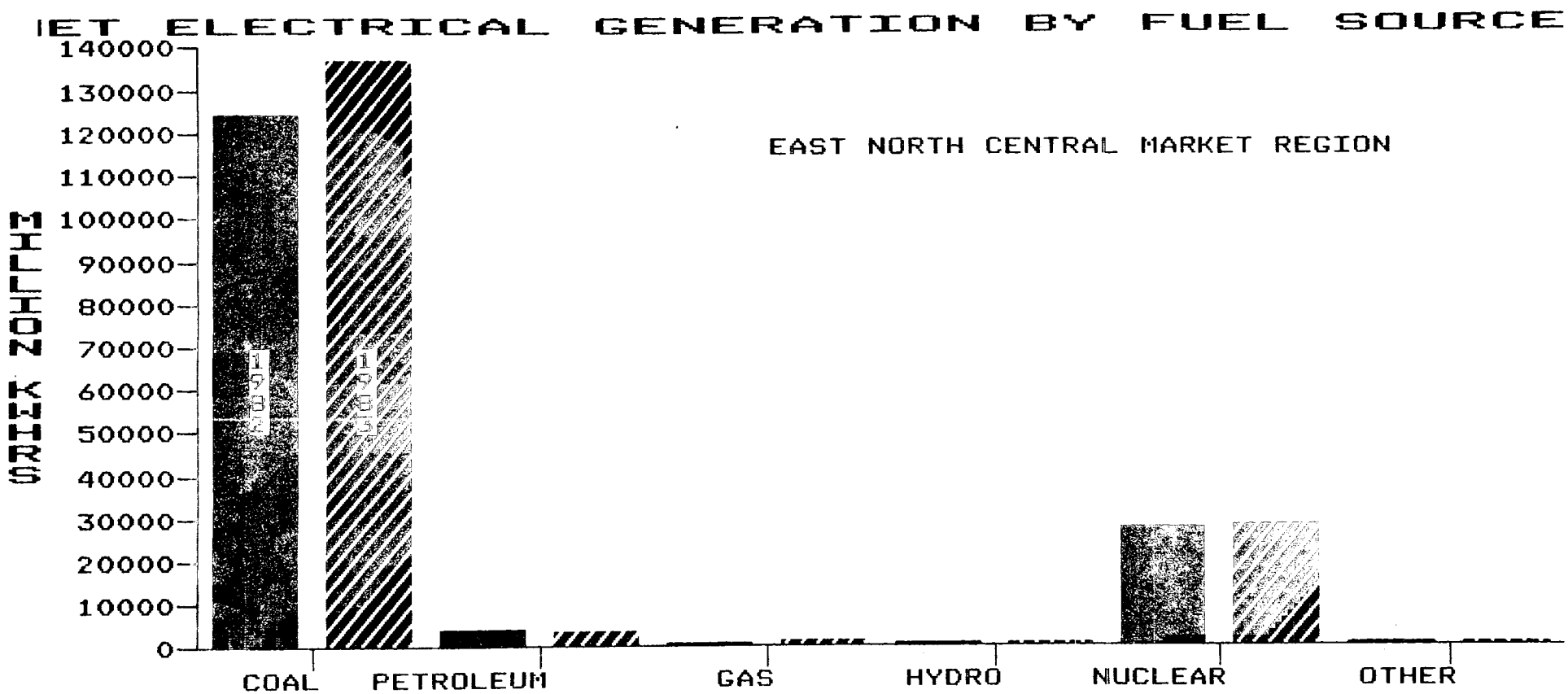


TABLE 2-7 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF IOWA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	9,268	11,812	10,996		11,112	11,735
COLORADO CONTRIBUTION	624	342	353		150	264
MARKETSHARE (%)	6.73	2.90	3.21		1.35	2.25
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	1,329	1,674	1,449	1,206	1,398	1,432
COLORADO CONTRIBUTION	188	257	173	146	135	9
MARKETSHARE (%)	14.15	15.35	11.94	12.11	9.66	0.65
RESIDENT/COM	61	84	90	197		149
COLORADO CONTRIBUTION	2	7	13	4		3
MARKETSHARE (%)	3.28	8.33	14.44	2.03		1.79

1983 figures are annualized from third quarter data

TABLE 2-8 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF KANSAS

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	7,395	9,413	12,499	11,166	11,091	
COLORADO CONTRIBUTION	91	363	265	276	1	
MARKETSHARE (%)	1.23	3.86	2.12	2.47	0.01	
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	99	219	335		340	
COLORADO CONTRIBUTION	1	13	4		3	
MARKETSHARE (%)	1.01	5.94	1.19		0.88	
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized for third quarter data

TABLE 2-9 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF NEBRASKA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	2,901	4,373	4,719	5,029	6,095	5,475
COLORADO CONTRIBUTION	284	276	184	116	231	20
MARKETSHARE (%)	9.79	6.31	3.90	2.31	3.79	0.37
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	554	540	291	305	270	60
COLORADO CONTRIBUTION	97	136	92	85	93	31
MARKETSHARE (%)	17.51	25.19	31.62	27.87	34.44	51.11
RESIDENT/COM		16	19	16	27	56
COLORADO CONTRIBUTION		2	2	1	12	48
MARKETSHARE (%)		12.50	10.53	6.25	44.44	85.71

1983 figures are annualized from third quarter data

TABLE 2-10 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF MINNESOTA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	11,198					
COLORADO CONTRIBUTION	11					
MARKETSHARE (%)	0.10					
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL		1,548		1,191	1,123	602
COLORADO CONTRIBUTION		4		21	68	65
MARKETSHARE(%)		0.26		1.76	6.06	10.80
RESIDENT/COM		80	144			
COLORADO CONTRIBUTION		1	2			
MARKETSHARE (%)		1.25	1.39			

1983 figures are annualized from third quarter data

TABLE 2-11 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF MISSOURI

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	20,520	22,451	22,236	21,510	23,510	
COLORADO CONTRIBUTION	474	773	744	500	161	
MARKETSHARE (%)	2.31	3.44	3.35	2.32	0.68	
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	1,548					
COLORADO CONTRIBUTION	24					
MARKETSHARE (%)	1.55					
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

TABLE 2-12 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF OKLAHOMA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL						
COLORADO CONTRIBUTION			14			
MARKETSHARE (%)						
INDUSTRIAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

TABLE 2-13 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF SOUTH DAKOTA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM			2,769			
COLORADO CONTRIBUTION			6			
MARKETSHARE (%)			0.21			
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	177		96		252	205
COLORADO CONTRIBUTION	166		3		1	5
MARKETSHARE (%)	5.65		2.36		0.40	2.60
RESIDENT/COM				57		
COLORADO CONTRIBUTION				8		
MARKETSHARE (%)				14.04		

1983 figures are annualized from third quarter data

Coal use increased 6.0 percent between 1982 and 1983 on a net electrical generating increase of 3.1 percent. Electrical generating fuel sources petroleum, natural gas and nuclear were down 8, 22 and 5 percent, respectively within the region. Coal has about a 77 percent marketshare of net electrical generation in millions of kilowatthours in 1983. Figure 2-5 graphically shows changes in net electrical generation by fuel source for the West North Central Market Region.

2.2.3 East and West South Central Market Region

The East and West South Central Market Region consists of two non-contiguous Gulf Coast states, Texas and Mississippi. This region is distant for Colorado and is well-served by rail, barge and intracoastal waterways. Owing to good port facilities these states are potentially large markets for foreign coal imports. Coal consumption data for Mississippi and Texas are listed in Tables 2-14 and 2-15, respectively.

Between 1982 and 1983 Texas cut electrical production 0.1 percent, but increased coal consumption by 11.1 percent from 78,752 to 87,488 million kilowatthours in 1983. The marketshare of coal increased from 38.2 to 42.4 percent. The marketshare of electricity generated by natural gas fell about eight percent from 125,463 million kilowatthours in 1982 to 115,524 million kilowatthours in 1983.

In Mississippi, net electrical generation is off about 22 percent between 1982 and 1983 from 16,971 million kilowatthours in 1982 to 13,359 million kilowatthours in 1983. Net coal-fired electrical generation fell 4.3 percent, from a 1982 value of 9,259 million kilowatthours to 8,859 million kilowatthours in 1983. Despite the decline in net electrical output from coal the marketshare of coal increased 21 percent, from 54.3 percent of total in 1982 to 66 percent of total in 1983. Other fuels, notably petroleum and natural gas were cut faster than coal. A reduction of 3,212 million kilowatthours of electricity produced by petroleum and natural gas occurred between 1982 and 1983 in Mississippi. Figure 2-6 shows the aggregate net electrical generation by fuel source for the region.

2.2.4 Mountain Market Region

The Mountain Market Region is the most significant consuming region for Colorado coal. The Mountain Market Region is the center of Colorado's historic product and geographic market, and the future of Colorado coal industry hinges upon consumption patterns within the region. Due to its importance to Colorado, individual states are analyzed.

FIGURE 2-5 NET GENERATION BY FUEL SOURCE FOR WEST NORTH CENTRAL MARKET REGION

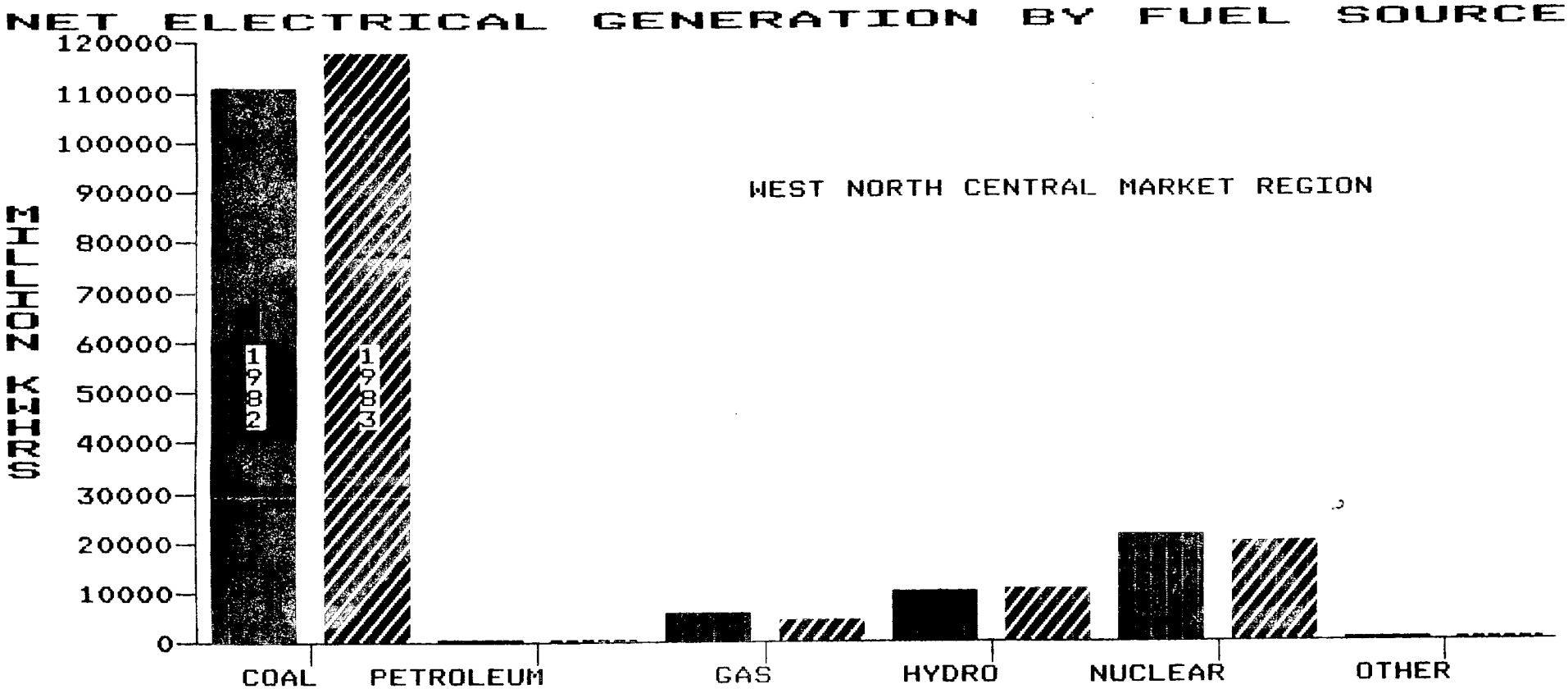


TABLE 2-14 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF MISSISSIPPI

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	1,732	3,400	3,568	3,201	3,776	3,887
COLORADO CONTRIBUTION	256	664	748	775	785	961
MARKETSHARE (%)	14.78	19.53	20.96	24.21	20.79	24.73
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

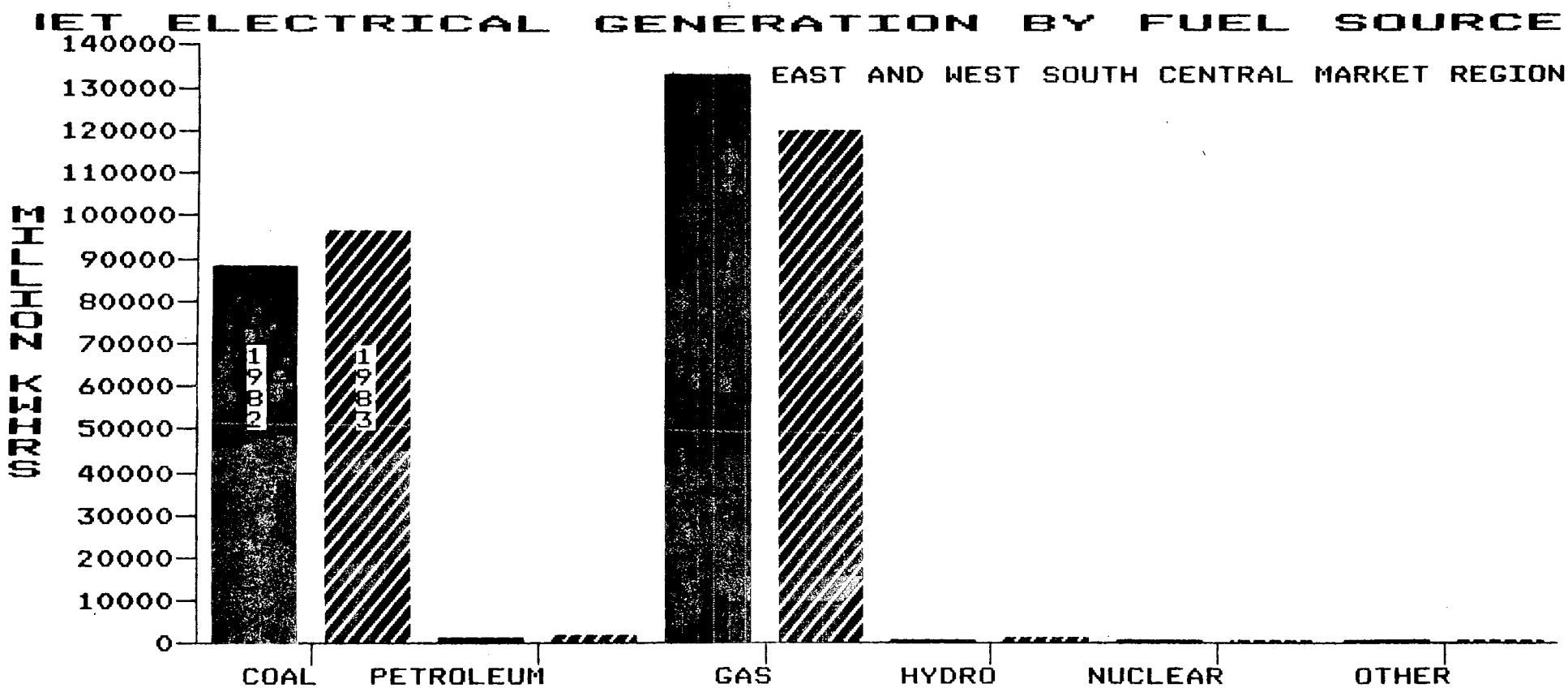
1983 figures are annualized from third quarter data

TABLE 2-15 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF TEXAS

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	26,666	36,604	47,646	54,468	56,664	65,388
COLORADO CONTRIBUTION	6	38	982	1,795	2,048	2,051
MARKETSHARE (%)	0.02	0.10	2.06	3.30	3.61	3.14
MET COAL	374	1,122	840	593	400	
COLORADO CONTRIBUTION	31	210	190	173	145	
MARKETSHARE (%)	8.29	18.72	22.62	29.17	36.25	
INDUSTRIAL	1,716	3,362	2,406	4,556	4,210	4,077
COLORADO CONTRIBUTION	3	109	603	692	917	995
MARKETSHARE (%)	0.18	3.24	25.06	15.19	21.78	24.40
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

FIGURE 2-6 NET GENERATION BY FUEL SOURCE FOR EAST AND WEST SOUTH CENTRAL MARKET REGION



Within the Mountain Market Region, including Colorado, net generation using coal dropped from 124,703 million kilowatthours in 1982 to 123,069 million kilowatthours in 1983, a decline of 1.31 percent. The marketshare of coal used in electrical generation was 73.6 percent in 1982 and 69.2 percent in 1983, expressed in percent of total net generation, the decline in marketshare is a drop of about six percent. Again, increased availability of hydropower cut the marketshare of net coal generation. Figure 2-7 shows trends in net generation of electricity from 1982 to 1983.

2.2.4.1 Arizona

Most steam coal is produced in-state or imported from New Mexico. The only market for Colorado coal is in the industrial coal product market. Demand is variable, but marketshare is surprisingly steady. Table 2-16 lists coal consumption data for Arizona.

2.2.4.2 Colorado

Colorado is the most significant consumer of Colorado coal and therefore is most sensitive to changes in steam coal consumption. Between 1982 and 1983 steam coal consumption decreased from 22,879 to 22,243 million kilowatthours in 1983, a decline of 2.8 percent. Overall net electrical production was down 1.4 percent from 25,577 in 1982 to 25,224 million kilowatthours in 1983. The marketshare of coal in net electrical production was 89.5 percent in 1982 and 88.2 percent in 1983, a decline of 1.45 percent. Increases in hydropower availability were responsible for decreased steam coal utilization. Figure 2-8 shows net electrical generation by fuel source for Colorado.

Up until 1983, Colorado produced and consumed coal for all coal product markets. Changes in the met coal product market were brought about by the shutdown of the CF & I steel mill in Pueblo. In-state demand for met coal is unlikely to resume. Steam coal use appears to have reached a temporary plateau of about 12.1 million tons per year. Increasingly, other sources of coal are sought to meet the Colorado demand for steam coal. Industrial coal use hovers at about 600,000 tons per year. Table 2-17 lists coal consumption and marketshare data for Colorado.

2.2.4.3 Idaho

Spot shipments were sent to feed a small percentage of industrial coal product needs in 1978 and 1979. Idaho is not a significant consumer of Colorado coal and pertinent data are shown in Table 2-18.

2.2.4.4 Montana

Industrial coal consumption and consumption of the Colorado industrial coal product are declining. One test shipment was shipped in 1982 for steam generation. Table 2-19 shows consumption trends of Colorado coal.

FIGURE 2-7 NET GENERATION BY FUEL SOURCE FOR MOUNTAIN MARKET REGION

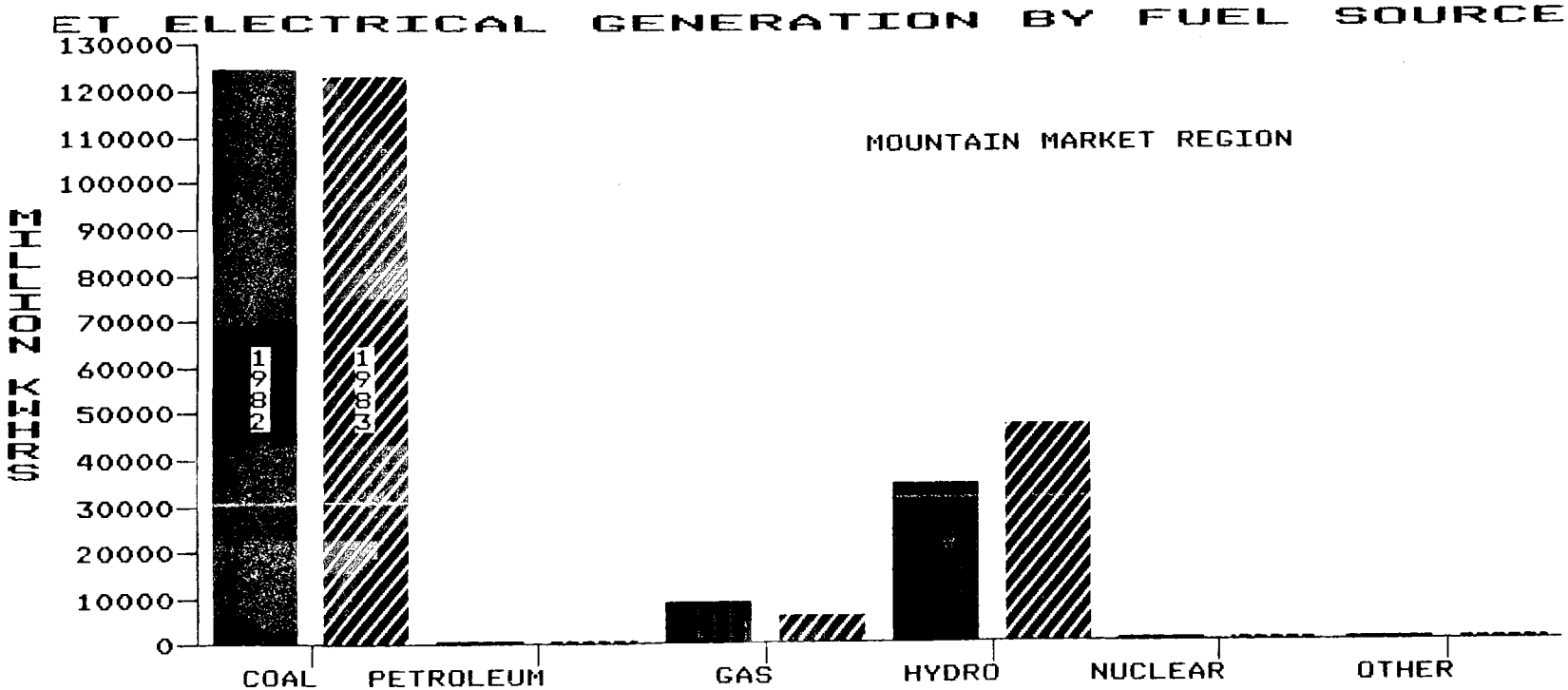


TABLE 2-16 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF ARIZONA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	7,710					
COLORADO CONTRIBUTION	8					
MARKETSHARE (%)	0.10					
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL			655	1,177	1,508	1,395
COLORADO CONTRIBUTION			76	153	213	177
MARKETSHARE (%)			11.60	13.00	14.12	12.72
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

FIGURE 2-8 NET GENERATION BY FUEL SOURCE FOR COLORADO

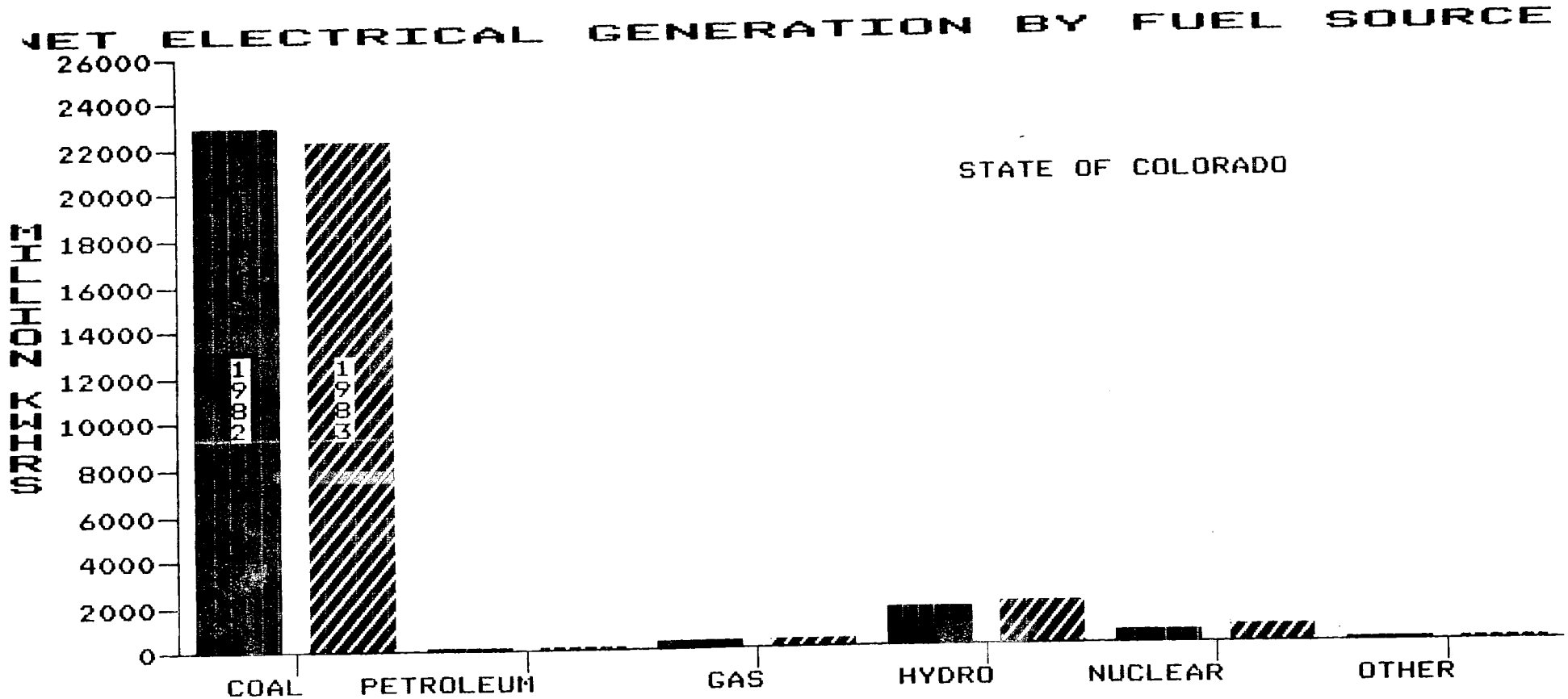


TABLE 2-17 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF COLORADO

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM	9,108	11,577	11,583	11,592	12,102	12,101
COLORADO CONTRIBUTION	6,014	8,526	8,405	8,269	8,154	7,607
MARKETSHARE (%)	66.03	73.65	72.56	71.33	67.38	62.86
MET COAL	649	1,086	888	961	359	
COLORADO CONTRIBUTION	641	880	764	732	292	
MARKETSHARE (%)	98.77	81.03	86.04	76.17	81.34	
INDUSTRIAL	644	532	852	652	583	661
COLORADO CONTRIBUTION	431	487	708	619	529	657
MARKETSHARE (%)	66.93	91.54	83.10	94.94	90.74	99.40
RESIDENT/COM	95	58	99	94	129	65
COLORADO CONTRIBUTION	28	54	94	82	120	56
MARKETSHARE (%)	29.47	93.10	94.95	87.23	93.02	85.71

1983 figures are annualized from third quarter data

TABLE 2-18 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF IDAHO

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	364	463				
COLORADO CONTRIBUTION	17	11				
MARKETSHARE (%)	4.67	2.38				
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

TABLE 2-19 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF MONTANA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	183	214	183	253	197	125
COLORADO CONTRIBUTION	12	31	23	21	9	4
MARKETSHARE (%)	6.56	14.49	12.51	8.30	4.57	3.19
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

2.2.4.5 New Mexico

Small test samples were shipped to New Mexico in 1979 and 1980 for steam. Colorado has a variable position in an unstable industrial coal product market. Coal consumption trends of Colorado coal in New Mexico are shown in Table 2-20.

2.2.4.6 Utah

Colorado has a strong presence in the Utah met coal market due to U.S. Steel requirements met by a captive mine in Gunnison County. A similar relationship exists in the Utah steam coal market. A Utah coal-fired generator, Deseret, near Bonanza, Utah is fed by a captive mine in Rio Blanco County, Colorado. Current over-capacity in Utah electrical generating network is holding down steam coal from Colorado. Table 2-21 shows coal consumption data for Utah.

2.2.4.7 Wyoming

Colorado provides industrial and some residential coal to unpredictable and spotty markets. Table 2-22 lists coal consumption data of Colorado coal in Wyoming.

2.2.5 Pacific Market Region

The Pacific Market Region for Colorado coal consists of California, Oregon and Washington. California purchases mostly Colorado coal and historically this was met coal. However, the shutdown of a Kaiser Steel facility closed this market, at least temporarily. An industrial coal product demand was observed in the third quarter of 1983. Oregon and Washington purchase steam coal from suppliers other than Colorado. The recent introduction of a cool water coal-gasification plant in California is unlikely to open a market for Colorado due to intervening opportunities for coal purchase, although coal products from Colorado could meet chemical requirements of this plant.

Tables 2-23, 2-24 and 2-25 list coal consumption trends of Colorado coal for California, Oregon and Washington, respectively. Figure 2-9 presents net electrical generation by fuel source. Since no Colorado coal is purchased for steam, and coal is a relatively small contributor to overall electrical production the data are presented without further comment.

TABLE 2-20 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF NEW MEXICO

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM		8,609	10,980			
COLORADO CONTRIBUTION		7	8			
MARKETSHARE (%)		0.08	0.07			
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL		93	7	115	127	95
COLORADO CONTRIBUTION		81	7	15	15	95
MARKETSHARE (%)		87.10	100.00	13.04	11.81	100.00
RESIDENT/COM			45		13	
COLORADO CONTRIBUTION			2		1	
MARKETSHARE (%)			4.44		7.69	

1983 figures are annualized from third quarter data

TABLE 2-21 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF UTAH

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM				4,837	6,153	
COLORADO CONTRIBUTION				8	18	
MARKETSHARE (%)				0.17	0.29	
MET COAL	1,576	1,568	1,464	1,384	832	859
COLORADO CONTRIBUTION	1,224	1,244	1,146	1,030	695	825
MARKETSHARE (%)	77.66	79.34	78.28	74.42	83.53	96.12
INDUSTRIAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

TABLE 2-22 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF WYOMING

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	1,513			1,687	1,462	1,672
COLORADO CONTRIBUTION	1			77	125	140
MARKETSHARE (%)	0.07			4.56	8.55	8.37
RESIDENT/COM					147	
COLORADO CONTRIBUTION					3	
MARKETSHARE (%)					2.04	

1983 figures are annualized from third quarter data

TABLE 2-23 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF CALIFORNIA

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL	1,443	1,648	1,730	1,367	1,403	
COLORADO CONTRIBUTION	280	726	531	206	141	
MARKETSHARE (%)	19.40	44.05	30.69	15.07	10.05	
INDUSTRIAL						1,297
COLORADO CONTRIBUTION						142
MARKETSHARE (%)						11.00
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

1983 figures are annualized from third quarter data

TABLE 2-24 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF OREGON

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	223	237	226	317		115
COLORADO CONTRIBUTION	3	2	4	2		7
MARKETSHARE (%)	1.35	0.84	1.77	0.63		5.81
RESIDENT/COM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						

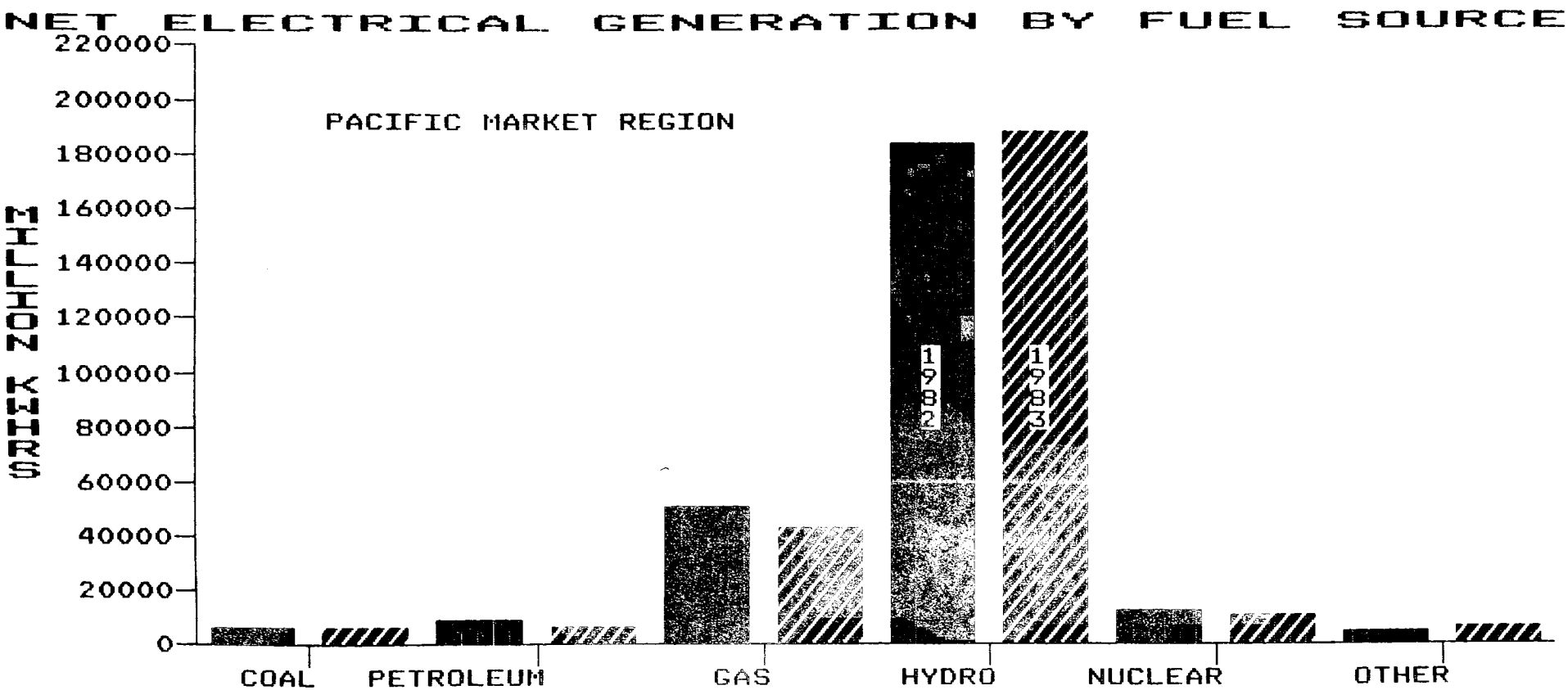
1983 figures are annualized from third quarter data

TABLE 2-25 COAL CONSUMPTION, COLORADO COAL DISTRIBUTION AND MARKETSHARE FOR THE STATE OF WASHINGTON

COAL PRODUCT (thousands of short tons)	1978	1979	1980	1981	1982	1983
STEAM						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
MET COAL						
COLORADO CONTRIBUTION						
MARKETSHARE (%)						
INDUSTRIAL	530	567	350	338	354	
COLORADO CONTRIBUTION	5	11	10	32	20	
MARKETSHARE (%)	0.94	1.94	2.86	9.47	5.65	
RESIDENT/COM				121		
COLORADO CONTRIBUTION				1		
MARKETSHARE (%)				0.83		

1983 figures are annualized from third quarter data

FIGURE 2-9 NET GENERATION BY FUEL SOURCE FOR PACIFIC MARKET REGION



Section 3

3.0 PRODUCTION FORECAST

The forecast of Colorado production is demand-driven. Past consumption and trends of marketshare of Colorado coal in a geographic market were examined statistically and extrapolated to derive Colorado production. Changes in coal consumption and changes in preference or desire for coal from Colorado determine the overall demand for the coal product.

Numerous assumptions were made which are biases and alter the production forecast. These biases and assumptions may be withdrawn and new assumptions entered in order to ascertain the effect on overall production. Through the use of linked spreadsheets numerous forecasts can be run quickly and at low cost once data are loaded. Statistical methods may be overidden when other data are available such as contract commitments. On the other hand, all raw data pertaining to Colorado are presented and more advanced statistical methods could be employed.

3.1 Market Adjustments

Market adjustments were made to reflect changes in locations of demand centers and changes in desirability of Colorado coal. Markets which are assumed to have failed or no longer exist were backed out in order that statistical analysis reflect only those markets assumed to demonstrate continuity. By backing out markets from historical data were Colorado coal appears non-competitive, trends may be ascertained where potential exists. The assumptions and backouts are listed as follows:

- Steam coal in West North Central Market Region for Iowa and Nebraska only
- Loss of met coal market in Colorado, Texas and California
- No residential coal sales outside of Colorado

Given these assumptions, a revised summary of consumption and marketshare was constructed and is shown as Table 3-1. These data constitute the base case for forecasting Colorado coal production.

3.2 Statistical Adjustments

Coal consumption and marketshare data are in reality a step function. Addition of one coal-fired unit increases total demand for coal in a discontinuous, non-linear manner. Similarly, winning or losing one utility contract could rapidly change marketshare from year to year. In order to avoid anticipating utilities, a simple statistical methodology was selected for this study.

TABLE 3-1 REVISED SUMMARY OF DOMESTIC COLORADO COAL PRODUCT MARKETS BY YEAR AND MARKET REGION
1978 TO 1983 (THOUSANDS OF SHORT TONS)

MARKET REGION/STATE	1978	1979	1980	1981	1982	1983
E. NORTH CENTRAL						
TOTAL	79,882	76,913	70,571	65,883	63,572	72,098
COLORADO	2,519	2,977	2,627	2,797	2,448	1,311
MARKETSHARE (%)	3.15	3.87	3.72	4.25	3.85	1.82
W. NORTH CENTRAL						
TOTAL	15,937	20,346	18,562	8,001	20,617	19,714
COLORADO	1,386	1,038	840	381	693	445
MARKETSHARE (%)	8.70	5.10	4.53	4.76	3.36	2.26
EAST+WEST SOUTH CENT.						
TOTAL	30,104	43,366	53,620	62,225	64,650	73,352
COLORADO	265	811	2,333	3,262	3,750	4,007
MARKETSHARE (%)	0.88	1.87	4.35	5.24	5.80	5.46
COLORADO						
TOTAL	9,847	12,167	12,534	12,338	12,814	12,827
COLORADO	6,437	9,067	9,207	8,970	8,803	8,320
MARKETSHARE (%)	65.73	74.52	73.46	72.70	68.70	64.86
MOUNTAIN (IND)						
TOTAL	2,060	770	845	3,232	3,294	3,287
COLORADO	30	123	106	266	362	416
MARKETSHARE (%)	1.46	15.97	12.54	8.23	10.99	12.66
MOUNTAIN (MET)						
TOTAL	1,516	1,568	1,464	1,384	832	859
COLORADO	1,224	1,244	1,146	1,030	695	825
MARKETSHARE (%)	77.66	79.34	78.28	74.42	83.53	96.12
PACIFIC						
TOTAL	753	804	576	655	354	1,412
COLORADO	8	13	14	34	20	149
MARKETSHARE (%)	1.06	1.62	2.43	5.19	5.65	10.55
REVISED GRAND TOTAL	140,159	155,934	158,172	153,718	166,133	183,549
COLORADO	11,905	15,273	16,273	16,740	16,771	15,473
MARKETSHARE (%)	8.49	9.79	10.29	10.89	10.09	8.43

Note: No historical data for Mountain Market Region steam coal product outside Colorado
1983 figures annualized from third quarter data

Coal consumption and marketshare data are irregular and not deseasonalized. Weather, hoarding prior to strikes and buying stocks in anticipation of rising prices influences consumption trends. To counteract this influence and the influence of step additions to coal consuming units a smoothing method was run on consumption data. Coal consumption and marketshare data were smoothed by a moving average. This method smooths the data, but also introduces a bias towards recent trends.

Table 3-2 lists moving average data for coal consumption and Colorado marketshare for each market region. Also incorporated in this table is the average annual percentage change for consumption and marketshare run on the smoothed averages. Data from this table are used in regression analyses.

3.3 Forecast Methodology

No one statistical method was applied to all geographic markets. Rather, several methods were analyzed and one selected. Biases are again introduced in this process, but a rationale is listed for each method and each geographic market in Table 3-3.

3.4 Market Regions

3.4.1 East North Central Market Region

Coal consumption in the East North Central Market Region grew at an average rate of 0.22 percent per year. Due to non-linear changes in demand, regression analysis is not appropriate. Future coal consumption was projected at an increasing rate of 0.22 percent per year. Colorado marketshare was estimated using linear regression and a good fit was observed. The trend in marketshare is one of decline while the trend in coal consumption is increasing modestly. Coal production from Colorado will decline.

3.4.2 West North Central Market Region

Coal consumption grew at an average annual rate of 3.32 percent since 1978. This statistic was applied to project coal consumption trends to 2004. Colorado marketshare was computed using linear regression. It was assumed that a small, 100,000 ton per year, spot market will exist and total Colorado production was held at the 100,000 tpy level following a period of decline.

3.4.3 East and West South Central Market Region

The East and West South Central Market Region is a growth market for coal consumption. The Gompertz Curve was used to extrapolate coal consumption trends. The Gompertz Curve, described in Appendix B, statistically limits the growth curve, and was selected for just this reason. On the other hand, Colorado marketshare increased at an average rate of 7.04 percent per year from 1978 to 1983. A constant marketshare, the 1983 value of 5.46 percent, was selected as a simple and conservative estimate.

TABLE 3-2. MOVING AVERAGES OF CONSUMPTION AND MARKETSHARE
(THOUSANDS OF SHORT TONS)

STATE/MARKET REGION	AVERAGE SINCE 1978	AVERAGE SINCE 1979	AVERAGE SINCE 1980	AVERAGE SINCE 1981	AVERAGE SINCE 1982	1983	AVERAGE ANNUAL PERCENT CHANGE
E. NORTH CENTRAL							
TOTAL	71,486	69,807	68,031	67,184	67,835	72,098	0.22
MARKETSHARE (%)	3.44	3.50	3.41	3.31	2.84	1.82	-10.77
W. NORTH CENTRAL							
TOTAL	17,196	17,448	16,723	16,110	20,165	19,714	3.32
MARKETSHARE (%)	4.79	4.00	3.73	3.46	2.81	2.26	-13.77
EAST + WEST SOUTH CENT							
TOTAL	54,552	59,442	63,461	66,742	69,001	73,352	6.12
MARKETSHARE (%)	3.93	4.54	5.21	5.50	5.63	5.46	7.04
COLORADO							
TOTAL	12,087	12,536	12,628	12,659	12,820	12,827	1.20
MARKETSHARE (%)	70.00	70.85	69.93	68.75	66.78	64.86	-1.50
MOUNTAIN (MET)							
TOTAL	1,280	1,221	1,134	1,025	845	859	-7.45
MARKETSHARE (%)	81.56	82.34	83.09	84.69	89.83	96.12	3.37
MOUNTAIN (IND)							
TOTAL	2,248	2,285	2,664	3,271	3,290	3,287	8.30
MARKETSHARE (%)	10.31	12.08	11.11	10.63	11.83	12.66	4.62
PACIFIC							
TOTAL	759	760	749	807	883	1,412	15.15
MARKETSHARE (%)	4.42	5.09	5.96	7.13	8.10	10.55	19.15
GRAND TOTAL	159,610	163,501	165,393	167,800	174,841	183,549	2.85
MARKETSHARE (%)	9.66	9.90	9.93	9.80	9.26	8.43	-2.60

TABLE 3-3 FORECAST METHODOLOGY

STATE/MARKET REGION	LINEAR REGRESSION R2	r	coefficient a	coefficient b	USED IN FORECAST	USED INSTEAD	RATIONALE
E. NORTH CENTRAL TOTAL					NO	AVERAGE ANNUAL PERCENT CHANGE	GROWTH IN RECOVERY , CONVERSION FROM PETROLEUM TO COAL
MARKETSHARE (%)	0.7045	0.84	579.0962	-0.2909	YES		CONSERVATIVE ESTIMATE
W. NORTH CENTRAL TOTAL	0.4059	0.64	-1121066.667	575.0857	NO	AVERAGE ANNUAL PERCENT CHANGE	GROWTH EXPECTED AS CONVERSION FROM
MARKETSHARE (%)	0.9801	0.99	936.6076	-0.4711	YES	(WITH MODIFICATION)	SPOT SALES WILL EXIST TO SOME EXTENT, 100,000 TPY USED AS BASE
EAST + WEST SOUTH CENTRAL TOTAL	0.986	0.99	-7063000.000	3598.8	NO	GOMPERTZ	GROWTH MARKET LIMITED BY GOMPERTZ TREND
MARKETSHARE (%)	0.7997	0.89	-629.281	0.3203	NO	1983 MARKETSHARE	CONSERVATIVE
COLORADO TOTAL			-246733.3333	130.9429	NO	AVERAGE ANNUAL PERCENT CHANGE	MODEST GROWTH SEEN
MARKETSHARE (%)	0.8804	0.94	2280.4667	-1.1169	NO	1983 AVERAGE	BEST GUESS, GOES AGAINST RECENT TREND IN MARKETSHARE
MOUNTAIN (IND) TOTAL	0.8716	0.93	-496075.2381	251.9143	YES		BEST GUESS
MARKETSHARE (%)	0.3432	0.59	-583.8476	0.3006	NO	LONG-TERM AVERAGE	CONSERVATIVE
MOUNTAIN (MET) TOTAL	0.929	0.96	190169.5238	-95.4857	YES	(WITH MODIFICATION)	RETURN TO LONG-TERM HISTORIC AVERAGE AT 5% PER YEAR
MARKETSHARE (%)	0.6711	0.82	-5395.2381	2.7677	YES	(WITH MODIFICATION)	COLORADO MARKETSHARE GROWS TO 100%
MOUNTAIN (STEAM)					NO	PRODUCTION BUILDUP	PUBLISHED INFORMATION
PACIFIC TOTAL	0.5756	0.76	-208020.000	105.4857	YES		POSSIBLE GROWTH MARKET
MARKETSHARE (%)	0.9489	0.97	-2304.6514	1.1671	YES	(WITH MODIFICATION)	MARKETSHARE PARALLELS DEMAND, CONSTANT AT 15%

3.4.4 Colorado

The Colorado market is most significant to overall Colorado production. The average annual percent change of 1.20 percent was used to escalate Colorado coal consumption. Marketshare of Colorado coal in Colorado declined at a rate of 1.50 percent per year from 1978 to 1984. Despite this trend the 1983 Colorado marketshare of 64.86 percent was held constant. Continued loss of marketshare within Colorado will severely restrict State coal production.

3.4.5 Mountain Market Region - Industrial Coal

Demand for industrial coal within the Mountain Market Region was estimated using the linear regression method. Although marketshare of Colorado coal escalated at an average rate of 4.62 percent per year, the 1983 marketshare of 12.66 percent was held constant for all derivations of Colorado coal destined for this product and geographic market.

3.4.6 Mountain Market Region - Met Coal

The Colorado market for met coal in the Mountain Market Region is U.S. Steel in Utah. Consumption of met coal is arbitrarily escalated five percent per year until the historic long-term average of 1.2 million tons per year is reached. Similarly, it is assumed that Colorado in time will provide all coal needs for that facility.

3.4.7 Mountain Market Region - Steam Coal

Demand for steam coal from Colorado in the Mountain Market Region, outside of Colorado, is solely from the Bonanza Power Project in Utah. Over-capacity in the electrical generation grid may keep production of coal from reaching published levels. The production buildup method was used to arbitrarily escalate demand for coal up to a maximum of 1.5 million tons per year. Since this mine is captive it necessarily retains 100 percent marketshare.

3.4.8 Pacific Market Region

The linear regression method was employed to estimate demand for the industrial coal product provided by Colorado. While Colorado marketshare increased during the period of 1978 to 1983, this trend was continued using linear regression and arbitrarily held at 15 percent marketshare.

3.5 Production Forecast (1984 to 2004)

3.5.1 Case Definition

Four cases, or trials, of coal production forecasts were run. The base case was defined and analyzed through statistical and market adjustments. Other cases add to, or subtract from the base case, however, modifications of the forecast need not follow this method.

Case No. 1 - Base Case

The primary assumptions of the Base Case are decreasing marketshare in the East North Central and West North Central Market Regions, and increasing demand from Texas and Mississippi. Production increases are forecast for industrial, steam and met coal products in the Mountain Market Region. Complete loss of the met coal market in Texas, California and Colorado was assumed. Only minor industrial coal product markets remain in the Pacific Market Region in the Base Case. The marketshare of Colorado coal in Colorado was assumed constant, and this is the only assumption which runs counter to a statistical trend. The marketshare of Colorado coal for the in-state market is statistically one of decline.

Table 3-4 lists projected production for the base case. Total production ranges from about 16.5 mtpy in 1984 to 20.2 mtpy in 2004.

Case No. 2 - Colorado Loses Marketshare

Case No. 2 applies the statistically derived rate of marketshare decline to determine Colorado production destined for the in-state market. Table 3-5 presents data for Case No. 2. Production in this event varies little from about 16.5 mtpy, but reaches a peak in 1996 at a level of 16.8 mtpy. It is unlikely that Colorado coal could maintain marketshare in other geographic regions if it cannot maintain marketshare in its home base.

Case No. 3 - Met Coal Market Resumes

The met coal market in Case No. 3 resumes in the states of California and Texas, but not in Colorado, in 1985. An average value of 150,000 tpy was added to the Colorado total for the East and West South Central Market Region, and 377,000 tons added to the computed Colorado total for the Pacific Market Region. This is an example of overriding the calculations performed on the spreadsheet since the percent marketshare for the two regions is rendered incorrect. Table 3-6 lists projected production for Case No. 3. Production ranges from 16.7 mtpy in 1985 to about 20.8 mtpy in 2004. Using a constant production demand for both markets is facile, but not necessarily realistic. Methods of escalating met coal demand from these regions could also have been employed.

Case No. 4 - Acid Rain Legislation Benefits Colorado

Case No. 4 assumes that demand for Colorado coal increases in the East North Central Market Region by five percent per year for ten years and is thereafter constant. It is equally likely that some types of acid rain legislation could hurt Colorado producers, such as another tax on coal production. Case No. 4, however unlikely, assumes a benefit for Colorado producers. Table 3-7 lists projected production data for Case No. 4. Production rises from 16.5 mtpy in 1984 to 22.6 mtpy in 2004.

TABLE 3-4 PRODUCTION FORECAST--CASE NO. 1--BASE CASE

MARKET REGION/STATE	FORECAST METHODOLOGY	VARIABLE OR EQUATION	ANNUALIZED 1983 DATA	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	0.22	72,098	72,257	72,416	72,575	72,735	72,895	73,055	73,216	73,377	73,538	73,700	73,862	74,025	74,187	74,331	74,514	74,678	74,842	75,007	75,172	75,337	75,503
MARKETSHARE (I)	Linear regression	M=579.09+YEAR*-.2909	1.82	1.95	1.66	1.37	1.08	0.79	0.50	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLORADO (t x 1000)	Computed		1,311	1,409	1,202	993	784	574	362	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	3.32	19,714	20,369	21,045	21,743	22,465	23,211	23,982	24,778	25,601	26,451	27,329	28,236	29,173	30,142	31,143	32,177	33,245	34,349	35,489	36,667	37,885	39,142
MARKETSHARE (I)	Linear regression	M=936.6+YEAR*-.4711	2.26	1.95	1.47	1.00	0.53	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLORADO (t x 1000)	Computed		445	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
EAST AND WEST SOUTH CENTRAL																								
TOTAL (t x 1000)	Boepertz Curve Trend		73,352	74,601	76,413	77,925	79,182	80,224	81,085	81,794	82,378	82,859	83,253	83,576	83,841	84,058	84,235	84,381	84,499	84,597	84,676	84,741	84,794	84,837
MARKETSHARE (I)	Peak Marketshare--1982	5.63	5.46	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63
COLORADO (t x 1000)	Computed		4,007	4,200	4,302	4,387	4,458	4,517	4,565	4,605	4,638	4,665	4,687	4,705	4,720	4,732	4,742	4,751	4,757	4,763	4,767	4,771	4,774	4,776
COLORADO																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	1.20	12,827	12,981	13,137	13,294	13,454	13,615	13,779	13,944	14,111	14,281	14,452	14,626	14,801	14,979	15,158	15,340	15,524	15,711	15,899	16,090	16,283	16,478
MARKETSHARE (I)	Constant	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86
COLORADO (t x 1000)	Computed		8,320	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
MOUNTAIN (IND)																								
TOTAL (t x 1000)	Modified Linear Regression	T=-496075+YEAR*251.9	3,270	3,723	3,975	4,227	4,478	4,730	4,982	5,234	5,486	5,738	5,990	6,242	6,494	6,746	6,998	7,250	7,501	7,753	8,005	8,257	8,509	8,761
MARKETSHARE (I)	Constant Long-term Average	10.31	12.66	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31
COLORADO (t x 1000)	Computed		416	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
MOUNTAIN (MET)																								
TOTAL (t x 1000)	Modified 5I year		859	902	947	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MARKETSHARE (I)	Modified Linear Regression	M=-5395+YEAR*2.76	96.12	95.88	98.65	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		825	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN (STEAM)																								
TOTAL (t x 1000)	Production buildup		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
MARKETSHARE (I)	Constant		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC																								
TOTAL (t x 1000)	Linear Regression	T=-208020+YEAR*105.4	1,412	1,264	1,369	1,475	1,580	1,686	1,791	1,897	2,002	2,108	2,213	2,318	2,424	2,529	2,635	2,740	2,846	2,951	3,057	3,162	3,268	3,373
MARKETSHARE (I)	Modified Linear Regression	M=-2304+YEAR*1.16	10.35	10.88	12.04	13.21	14.38	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
COLORADO (t x 1000)	Computed		149	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
DOMESTIC MARKET TOTAL (t x 1000)			183,662	186,295	189,701	192,733	195,588	198,222	200,625	203,122	205,215	207,234	209,297	211,320	213,518	215,401	217,279	219,162	221,054	222,963	224,893	226,850	228,836	230,855
COLORADO MARKETSHARE (I)			8.50	8.59	8.56	8.48	8.42	8.39	8.32	8.36	8.29	8.30	8.35	8.40	8.53	8.53	8.54	8.54	8.54	8.55	8.55	8.55	8.55	8.55
COLORADO TOTAL (t x 1000)			15,603	16,011	16,243	16,346	16,471	16,623	16,698	16,983	17,016	17,195	17,470	17,743	18,213	18,382	18,551	18,719	18,887	19,055	19,223	19,393	19,563	19,733
EXPORT MARKET (t x 1000)	Constant		500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
COLORADO GRAND TOTAL (t x 1000)			16,103	16,511	16,743	16,846	16,971	17,123	17,198	17,483	17,516	17,695	17,970	18,243	18,713	18,882	19,051	19,219	19,387	19,555	19,723	19,893	20,063	20,233

TABLE 3-5 PRODUCTION FORECAST—CASE NO. 2--COLORADO LOSES MARKETSHARE

MARKET REGION/STATE	FORECAST METHODOLOGY	VARIABLE OR EQUATION	ANNUALIZED 1983 DATA	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	0.22	72,098	72,257	72,416	72,575	72,735	72,895	73,055	73,216	73,377	73,538	73,700	73,862	74,025	74,187	74,351	74,514	74,678	74,842	75,007	75,172	75,337	75,503
MARKETSHARE (I)	Linear regression	M=579.09+YEAR*-.2909	1.82	1.95	1.66	1.37	1.08	0.79	0.50	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLORADO (t x 1000)	Computed		1,311	1,409	1,202	993	784	574	362	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	3.32	19,714	20,369	21,045	21,743	22,463	23,211	23,982	24,778	25,601	26,451	27,329	28,236	29,173	30,142	31,143	32,177	33,245	34,349	35,489	36,667	37,885	39,142
MARKETSHARE (I)	Linear regression	M=936.6+YEAR*-.4711	2.26	1.95	1.47	1.00	0.53	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLORADO (t x 1000)	Computed		445	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
EAST AND WEST SOUTH CENTRAL																								
TOTAL (t x 1000)	Gompertz Curve Trend		73,352	74,601	76,413	77,925	79,182	80,224	81,085	81,794	82,378	82,859	83,253	83,576	83,841	84,058	84,235	84,381	84,499	84,597	84,676	84,741	84,794	84,837
MARKETSHARE (I)	Peak Marketshare--1982	5.63	5.46	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63
COLORADO (t x 1000)	Computed		4,007	4,200	4,302	4,387	4,458	4,517	4,565	4,605	4,638	4,665	4,687	4,705	4,720	4,732	4,742	4,751	4,757	4,763	4,767	4,771	4,774	4,776
COLORADO																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	1.20	12,827	12,981	13,137	13,294	13,454	13,615	13,779	13,944	14,111	14,281	14,452	14,626	14,801	14,979	15,158	15,340	15,524	15,711	15,899	16,090	16,283	16,478
MARKETSHARE (I)	Linear Regression	M=2280.46+YEAR*-1.116	64.86	64.54	63.42	62.30	61.19	60.07	58.95	57.84	56.72	55.60	54.49	53.37	52.25	51.13	50.02	48.90	47.78	46.67	45.55	44.43	43.32	42.20
COLORADO (t x 1000)	Computed		8,320	8,378	8,331	8,283	8,232	8,179	8,123	8,065	8,004	7,940	7,874	7,805	7,734	7,659	7,582	7,501	7,418	7,332	7,242	7,149	7,053	6,954
MOUNTAIN (IND)																								
TOTAL (t x 1000)	Modified Linear Regression	T=-496075+YEAR*251.9	3,270	3,723	3,975	4,227	4,478	4,730	4,982	5,234	5,486	5,738	5,990	6,242	6,494	6,746	6,998	7,250	7,501	7,753	8,005	8,257	8,509	8,761
MARKETSHARE (I)	Constant Long-term Average	10.31	12.66	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31
COLORADO (t x 1000)	Computed		416	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
MOUNTAIN (MET)																								
TOTAL (t x 1000)	Modified 5I year		859	902	947	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MARKETSHARE (I)	Modified Linear Regression	M=-5395+YEAR*2.76	96.12	95.88	98.65	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		825	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN (STEAM)																								
TOTAL (t x 1000)	Production buildup		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
MARKETSHARE (I)	Constant		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC																								
TOTAL (t x 1000)	Linear Regression	T=-208020+YEAR*105.4	1,412	1,264	1,369	1,475	1,580	1,686	1,791	1,897	2,002	2,108	2,213	2,318	2,424	2,529	2,635	2,740	2,846	2,951	3,057	3,162	3,268	3,373
MARKETSHARE (I)	Modified Linear Regression	M=-2304+YEAR*1.16	10.55	10.88	12.04	13.21	14.38	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
COLORADO (t x 1000)	Computed		149	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
ESTIC MARKET TOTAL (t x 1000)			183,662	186,295	189,701	192,733	195,588	198,222	200,625	203,122	205,215	207,234	209,297	211,320	213,518	215,401	217,279	219,162	221,054	222,963	224,893	226,850	228,836	230,855
COLORADO MARKETSHARE (I)			8.50	8.57	8.46	8.30	8.17	8.06	7.92	7.88	7.73	7.66	7.63	7.60	7.66	7.58	7.50	7.42	7.34	7.26	7.18	7.10	7.02	6.93
COLORADO TOTAL (t x 1000)			15,603	15,969	16,054	16,006	15,976	15,971	15,884	16,004	15,868	15,873	15,971	16,062	16,347	16,327	16,301	16,271	16,236	16,197	16,153	16,106	16,055	15,999
EXPORT MARKET (t x 1000)	Constant		500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
.ORADO GRAND TOTAL (t x 1000)			16,103	16,469	16,554	16,506	16,476	16,471	16,384	16,504	16,368	16,373	16,471	16,562	16,847	16,827	16,801	16,771	16,736	16,697	16,653	16,606	16,555	16,499

TABLE 3-6 PRODUCTION FORECAST--CASE NO. 3--WET COAL MARKET RESUMES

MARKET REGION/STATE	FORECAST METHODOLOGY	VARIABLE OR EQUATION	ANNUALIZED 1983 DATA	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	0.22	72,098	72,257	72,416	72,575	72,735	72,895	73,055	73,216	73,377	73,538	73,700	73,862	74,025	74,187	74,351	74,514	74,678	74,842	75,007	75,172	75,337	75,50
MARKETSHARE (%)	Linear regression	M=579.09+YEAR*-.2909	1.82	1.95	1.66	1.37	1.08	0.79	0.50	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
COLORADO (t x 1000)	Computed		1,311	1,409	1,202	993	784	574	362	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	3.32	19,714	20,369	21,045	21,743	22,465	23,211	23,982	24,778	25,601	26,451	27,329	28,236	29,173	30,142	31,143	32,177	33,245	34,349	35,489	36,667	37,885	39,142
MARKETSHARE (%)	Linear regression	M=936.6+YEAR*-.4711	2.26	1.95	1.47	1.00	0.53	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLORADO (t x 1000)	Computed		445	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
EAST AND WEST SOUTH CENTRAL																								
TOTAL (t x 1000)	Gompertz Curve Trend		73,352	74,601	76,413	77,925	79,182	80,224	81,085	81,794	82,378	82,859	83,253	83,576	83,841	84,058	84,235	84,381	84,499	84,597	84,676	84,741	84,794	84,837
MARKETSHARE (%)	Peak Marketshare--1982	5.63	5.46	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63
COLORADO (t x 1000)	Computed + 150,000 tpy met		4,007	4,200	4,452	4,537	4,608	4,667	4,715	4,755	4,788	4,815	4,837	4,855	4,870	4,882	4,892	4,901	4,907	4,913	4,917	4,921	4,924	4,926
COLORADO																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	1.20	12,827	12,981	13,137	13,294	13,454	13,615	13,779	13,944	14,111	14,281	14,452	14,626	14,801	14,979	15,158	15,340	15,524	15,711	15,899	16,090	16,283	16,478
MARKETSHARE (%)	Constant	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86
COLORADO (t x 1000)	Computed		8,320	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
MOUNTAIN (IND)																								
TOTAL (t x 1000)	Modified Linear Regression	T=-496075+YEAR*251.9	3,270	3,723	3,975	4,227	4,478	4,730	4,982	5,234	5,486	5,738	5,990	6,242	6,494	6,746	6,998	7,250	7,501	7,753	8,005	8,257	8,509	8,761
MARKETSHARE (%)	Constant Long-term Average	10.31	12.66	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31
COLORADO (t x 1000)	Computed		416	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
MOUNTAIN (MET)																								
TOTAL (t x 1000)	Modified 5% year		859	902	947	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MARKETSHARE (%)	Modified Linear Regression	M=-5395+YEAR*2.76	96.12	95.88	98.65	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		825	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN (STEAM)																								
TOTAL (t x 1000)	Production buildup		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
MARKETSHARE (%)	Constant		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC																								
TOTAL (t x 1000)	Linear Regression	T=-208020+YEAR*105.4	1,412	1,264	1,369	1,475	1,580	1,686	1,791	1,897	2,002	2,108	2,213	2,318	2,424	2,529	2,635	2,740	2,846	2,951	3,057	3,162	3,268	3,373
MARKETSHARE (%)	Modified Linear Regression	M=-2304+YEAR*1.16	10.55	10.88	12.04	13.21	14.38	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
COLORADO (t x 1000)	Computed + 377,000 tpy met		149	137	542	572	604	630	646	661	677	693	709	725	741	756	772	788	804	820	836	851	867	883
DOMESTIC MARKET TOTAL (t x 1000)			183,662	186,295	189,701	192,733	195,588	198,222	200,625	203,122	205,215	207,234	209,297	211,320	213,518	215,401	217,279	219,162	221,054	222,963	224,893	226,850	228,836	230,855
COLORADO MARKETSHARE (%)			8.50	8.59	8.84	8.75	8.69	8.65	8.59	8.62	8.55	8.55	8.60	8.63	8.78	8.78	8.78	8.78	8.78	8.78	8.78	8.78	8.78	8.78
COLORADO TOTAL (t x 1000)			15,603	16,011	16,770	16,873	16,998	17,150	17,225	17,510	17,543	17,722	17,997	18,270	18,740	18,909	19,078	19,246	19,414	19,582	19,750	19,920	20,090	20,260
EXPORT MARKET (t x 1000)	Constant		500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
COLORADO GRAND TOTAL (t x 1000)			16,103	16,511	17,270	17,373	17,498	17,650	17,725	18,010	18,043	18,222	18,497	18,770	19,240	19,409	19,578	19,746	19,914	20,082	20,250	20,420	20,590	20,760

TABLE 3-7 PRODUCTION FORECAST--CASE NO. 4--ACID RAIN LEGISLATION BENEFITS COLORADO

MARKET REGION/STATE	FORECAST METHODOLOGY	VARIABLE OR EQUATION	ANNUALIZED 1983 DATA	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	0.22	72,098	72,257	72,416	72,575	72,735	72,895	73,055	73,216	73,377	73,538	73,700	73,862	74,025	74,187	74,351	74,514	74,678	74,842	75,007	75,172	75,337	75,503
MARKETSHARE (%)	Increase 5%/yr for 10 yrs		1.82	1.91	2.01	2.11	2.21	2.32	2.44	2.56	2.69	2.82	2.96	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11
COLORADO (t x 1000)	Computed		1,311	1,381	1,453	1,529	1,609	1,693	1,782	1,875	1,973	2,076	2,185	2,299	2,304	2,309	2,314	2,319	2,325	2,330	2,335	2,340	2,345	2,350
WEST NORTH CENTRAL																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	3.32	19,714	20,369	21,045	21,743	22,465	23,211	23,982	24,778	25,601	26,451	27,329	28,236	29,173	30,142	31,143	32,177	33,245	34,349	35,489	36,667	37,885	39,142
MARKETSHARE (%)	Linear regression	M=936.6+YEAR*-.4711	2.26	1.95	1.47	1.00	0.53	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COLORADO (t x 1000)	Computed		445	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
EAST AND WEST SOUTH CENTRAL																								
TOTAL (t x 1000)	Gompertz Curve Trend		73,352	74,601	76,413	77,925	79,182	80,224	81,085	81,794	82,378	82,859	83,253	83,576	83,841	84,058	84,235	84,381	84,499	84,597	84,676	84,741	84,794	84,837
MARKETSHARE (%)	Peak Marketshare--1982	5.63	5.46	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63	5.63
COLORADO (t x 1000)	Computed		4,007	4,200	4,302	4,387	4,458	4,517	4,565	4,605	4,638	4,665	4,687	4,705	4,720	4,732	4,742	4,751	4,757	4,763	4,767	4,771	4,774	4,776
COLORADO																								
TOTAL (t x 1000)	Avg. Ann. Percent Change	1.20	12,827	12,981	13,137	13,294	13,454	13,615	13,779	13,944	14,111	14,281	14,452	14,626	14,801	14,979	15,158	15,340	15,524	15,711	15,899	16,090	16,283	16,478
MARKETSHARE (%)	Constant	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86	64.86
COLORADO (t x 1000)	Computed		8,320	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
MOUNTAIN (IND)																								
TOTAL (t x 1000)	Modified Linear Regression	T=-496075+YEAR*251.9	3,270	3,723	3,975	4,227	4,478	4,730	4,982	5,234	5,486	5,738	5,990	6,242	6,494	6,746	6,998	7,250	7,501	7,753	8,005	8,257	8,509	8,761
MARKETSHARE (%)	Constant Long-term Average	10.31	12.66	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31	10.31
COLORADO (t x 1000)	Computed		416	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
MOUNTAIN (MET)																								
TOTAL (t x 1000)	Modified 5% year		859	902	947	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MARKETSHARE (%)	Modified Linear Regression	M=-5395+YEAR*2.76	96.12	95.88	98.65	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		825	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN (STEAM)																								
TOTAL (t x 1000)	Production buildup		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
MARKETSHARE (%)	Constant		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
COLORADO (t x 1000)	Computed		130	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC																								
TOTAL (t x 1000)	Linear Regression	T=-208020+YEAR*105.4	1,412	1,264	1,369	1,475	1,580	1,686	1,791	1,897	2,002	2,108	2,213	2,318	2,424	2,529	2,635	2,740	2,846	2,951	3,057	3,162	3,268	3,373
MARKETSHARE (%)	Modified Linear Regression	M=-2304+YEAR*1.16	10.55	10.88	12.04	13.21	14.38	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
COLORADO (t x 1000)	Computed		149	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
MARKET TOTAL (t x 1000)			183,662	186,295	189,701	192,733	195,588	198,222	200,625	203,122	205,215	207,234	209,297	211,320	213,518	215,401	217,279	219,162	221,054	222,963	224,893	226,850	228,836	230,855
COLORADO MARKETSHARE (%)			8.50	8.58	8.70	8.76	8.84	8.95	9.03	9.21	9.25	9.30	9.39	9.48	9.61	9.61	9.60	9.60	9.60	9.59	9.59	9.58	9.57	9.57
COLORADO TOTAL (t x 1000)			15,603	15,983	16,495	16,882	17,296	17,743	18,117	18,708	18,990	19,271	19,655	20,042	20,518	20,692	20,865	21,038	21,211	21,385	21,558	21,733	21,908	22,084
EXPORT MARKET (t x 1000)	Constant		500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
GRAND TOTAL (t x 1000)			16,103	16,483	16,995	17,382	17,796	18,243	18,617	19,208	19,490	19,771	20,155	20,542	21,018	21,192	21,365	21,538	21,711	21,885	22,058	22,233	22,408	22,584

Section 4

4.0 EMPLOYMENT IN COLORADO COAL INDUSTRY

Mine productivity is the primary factor in setting employment levels. Productivity sets the cost which in turn affects price setting and discrimination among coals based on equivalent cost. Other factors being equal, a low productivity mine must charge a higher price than a mine with high productivity. Low productivity mines were common in the history of the Colorado coal industry due to captive markets isolated from competing coals.

Transportation is a limiting factor, indirectly, in determining employment levels. Low productivity mines are shunned in favor of available and lower cost coals from distant sources. The marketplace operates in favor of low cost coal. Total coal consumption within an isolated area is limited, production expansion is possible only by enlarging the geographic area of coal distribution. Before unit train service opened up a larger geographic market to Colorado in the early 1960's, coal production and derived employment fell. Total employment increased only when new, low-cost surface mines found a product market within the geographic market area of Colorado. Production rose faster than employment levels as a result of higher productivity inherent in large surface mines.

Increases in productivity lower costs but, in the end, net improvement results only when productivity increases faster than that of all competitors. Productivity and increases in productivity are much higher in coal mines located in the Powder River Basin in Wyoming and Montana. Mines in Wyoming are located in different geological settings in regions of relatively low relief. In addition, most mines are new and employ high-capacity mining equipment.

In contrast, Colorado coals do not exhibit the lateral continuity or thickness characteristic of coals mined by operators in the Powder River Basin. Associated mining costs are higher, high capacity equipment cannot be applied most efficiently and transport costs are high due to physiography and lack of transportation competition. Colorado mines will never demonstrate the aggregate productivity of competitors to the north. Mines will neither be as large nor will production be as significant in a regional perspective.

Moderate levels of production will yield employment for 2,500 to 4,000 persons and indirectly employ many others. Coal is an important contributor to the local economies of the Western Slope. Table 4-1 lists levels of coal employment since 1960. Figure 4-1 shows these data graphically. Colorado mines have increased in size, employed more people on increasing production and increased productivity.

TABLE 4-1. EMPLOYMENT IN COLORADO COAL INDUSTRY

1960-1983

Year	Employees of the Coal Industry
1960	2,051
1961	1,657
1962	1,594
1963	1,393
1964	1,474
1965	1,500
1966	1,518
1967	1,381
1968	1,364
1969	1,357
1970	1,385
1971	1,389
1972	1,361
1973	1,534
1974	1,736
1975	1,914
1976	2,259
1977	2,944
1978	3,645
1979	4,366
1980	4,261
1981	4,075
1982	3,282
1983	2,794

Federally mandated work rule changes caused a decline in productivity in 1969. However, surface mines demonstrate significantly higher productivity than underground mines. Working space constraints and roof control requirements limit underground mine productivity. Skill and training of underground miners is more critical than in surface mining. As a result, more miners are required for underground coal, higher levels of skill and compensation are required.

In high-capacity surface mining relatively few pieces of equipment are required to extract coal. Large, high-capacity equipment can produce large volumes of coal with semi-skilled to skilled workers drawn from analogous work in earth-moving and construction.

FIGURE 4-1 EMPLOYMENT IN COLORADO COAL INDUSTRY, 1960 TO 1983

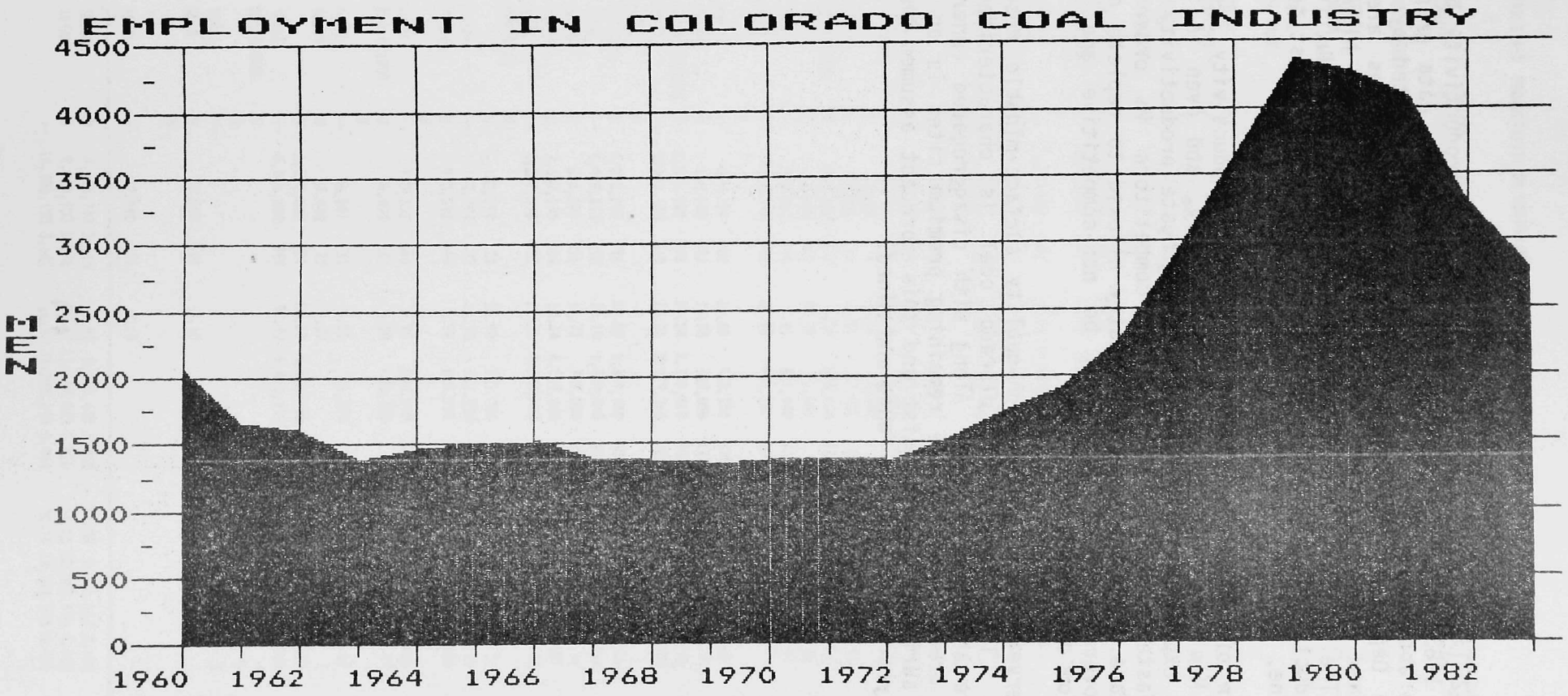


Table 4-2 lists underground and surface mine productivity by county from 1978 to 1983, Figure 4-2 shows these productivity data graphically. The data are abstracted from MSHA records and are augmented by data from the Colorado Department of Mines. Productivity increases are greatest in underground mines, however, productivity is still much higher in surface mines. The effect of depletion exacts a penalty in productivity. Surface mine productivity in Colorado peaked in 1983 and, at least temporarily, is on decline.

Depletion of present operations will cause productivity declines in all mines. New mines must be sought constantly, and even in times of coal surplus, exploration must continue. Aggregate productivity must increase at a faster rate than those of competitors in order to maintain marketshare. A Colorado coal industry allowed to deplete operations and reduce overall productivity will be non-competitive and suffer severe production declines.

New reserves, specifically high-quality surface-minable reserves must be located. The geology of Colorado coal is characterized by complex structure and stratigraphy. Along with disaggregated ownership patterns in many areas, locating the remaining premium sites is an onerous task. Quality surface reserves exist and this forecast assumes that within the next 20 years they will be found and mined.

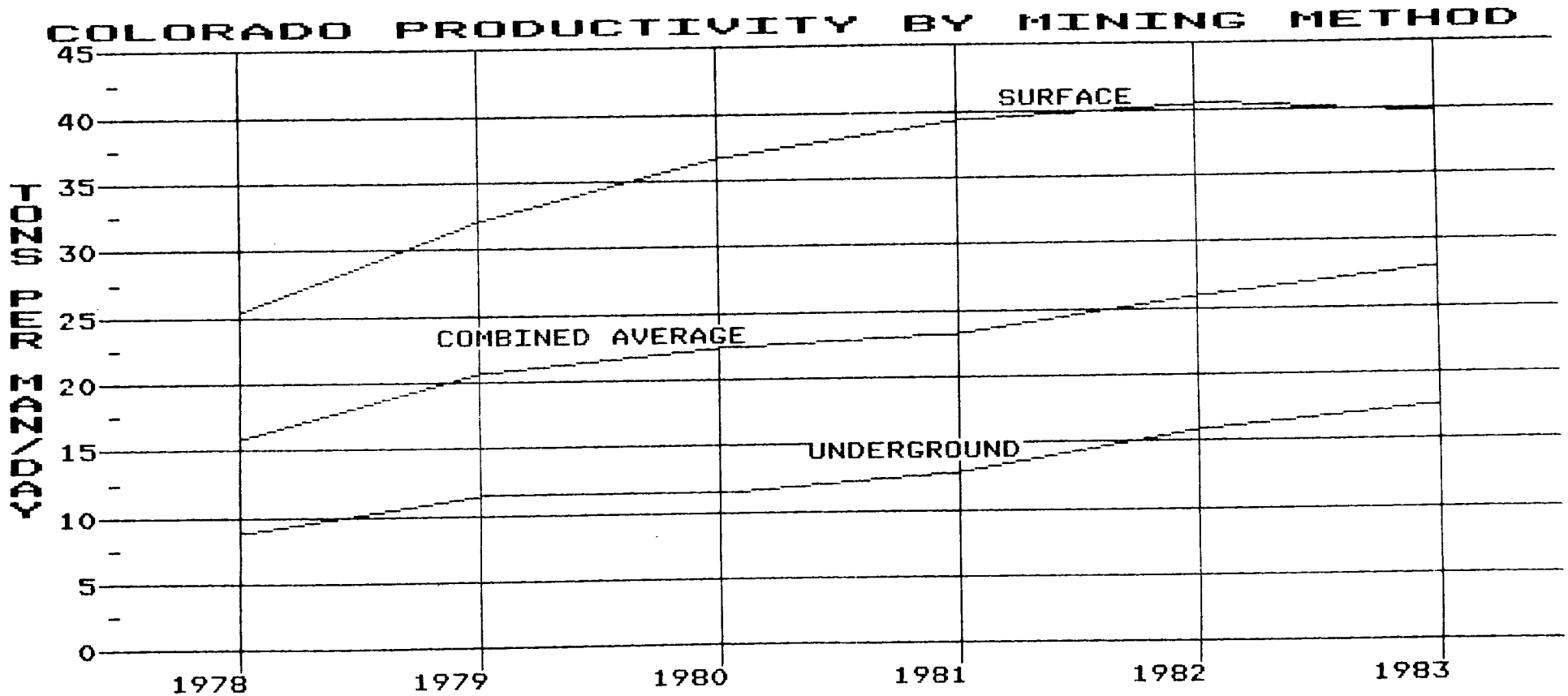
TABLE 4-2 PRODUCTIVITY BY MINING METHOD AND COUNTY, 1978 TO 1983

COUNTY	MINING METHOD	1978 PRODUCTION	1978 MEN	1978 TONS PER MAN-DAY	1979 PRODUCTION	1979 MEN	1979 TONS PER MAN-DAY	1980 PRODUCTION	1980 MEN	1980 TONS PER MAN-DAY
ARCHULETA	U	-	-	-						
	S	38,676	12	16.80	78,780	24	13.86	8,420	8	13.90
TOTAL	--	38,676	12	16.80	78,780	24	13.86	8,420	8	13.90
DELTA	U	451,616	172	10.80	823,000	142	22.86	879,530	170	22.13
	S	35,231	10	21.70	74,240	11	23.79	24,080	25	3.97
TOTAL	--	486,847	182	11.21	897,240	153	22.93	903,610	195	19.73
EL PASO	U									
	S							39,041	13	17.40
TOTAL	--							39,041	13	17.40
FREMONT	U	5,342	3	25.60	31,230	25	11.92	120,320	47	11.41
	S	119,206	33	12.57	130,815	29	18.10	95,830	29	14.05
TOTAL	--	124,548	36	12.85	162,045	54	16.46	216,150	76	12.45
GARFIELD	U	82,759	47	14.97	2,913	8	3.78	15,720	9	13.32
	S									
TOTAL	--	82,759	47	14.97	2,913	8	3.78	15,720		13.32
GUNNISON	U	1,209,380	503	11.76	1,587,832	427	16.27	1,102,432	518	16.70
	S									
TOTAL	--	1,209,380	503	11.76	1,587,832	427	16.27	1,102,432	518	16.70
HUERFANO	U									
	S	16,342	5	51.90	50,790	8	31.28	23,470	9	12.45
TOTAL	--	16,342	5	51.90	50,790	8	31.28	23,470	9	12.45
JACKSON	U									
	S	707,657	106	28.17	666,900	98	32.83	632,900	103	28.83
TOTAL	--	707,657	106	28.17	666,900	98	32.83	632,900	103	28.83
LA PLATA	U	66,046	22	10.60	74,350	34	10.98	93,626	40	8.54
	S	13,850	6	16.50	3,600	3	6.50			
TOTAL	--	79,896	28	11.30	77,950	37	10.64	93,626	40	8.54
LAS ANIMAS	U	582,003	471	6.04	608,400	427	5.77	766,770	437	7.06
	S	57,800	23	16.39	43,000	5	34.23	30,600	20	21.20
TOTAL	--	639,803	494	6.41	651,400	432	6.11	797,370	457	7.25
MESA	U	449,749	148	11.60	445,350	120	15.25	749,530	187	15.74
	S									
TOTAL	--	449,749	148	11.60	445,350	120	15.25	749,530	187	15.74
MOFFAT	U	610,103	211	13.73	729,050	177	17.02	632,709	190	14.19
(GREEN RIVER)	S	1,575,082	308	14.54	2,350,210	308	35.58	2,014,380	235	38.97
TOTAL	--	2,185,185	519	14.30	3,079,260	485	28.28	2,647,089	425	27.49
MOFFAT	U									
(UINTA)	S	1,072,113	296	10.10	1,699,440	311	25.34	2,642,080	316	32.65
TOTAL	--	1,072,113	296	10.10	1,699,440	311	25.34	2,642,080	316	32.65
MOFFAT	U	610,103	211	13.73	729,050	177	17.02	632,709	190	14.19
(TOTAL)	S	2,647,195	604	12.34	4,049,650	619	30.42	4,656,460	551	35.11
TOTAL	--	3,257,298	815	12.58	4,778,700	796	27.16	5,289,169	741	29.85
MONTROSE	U									
	S	102,394	23	16.90	121,750	22	21.63	93,070	20	18.89
TOTAL	--	102,394	23	16.90	121,750	22	21.63	93,070	20	18.89
PITKIN	U	915,392	640	5.94	840,190	543	6.90	739,260	484	6.57
	S									
TOTAL	--	915,392	640	5.94	840,190	543	6.90	739,260	484	6.57
RIO BLANCO	U	36,001	33	5.50	76,320	35	9.87	216,960	67	11.93
	S									
TOTAL	--	36,001	33	5.50	76,320	35	9.87	216,960	67	11.93
ROUTT	U	14,402	25	7.20				4,260	7	6.00
	S	6,072,102	524	50.63	6,420,530	707	34.93	7,276,555	659	42.28
TOTAL	--	6,086,504	549	49.92	6,420,530	707	34.93	7,280,815	666	42.13
SAN MIGUEL	U									
	S							50	8	0.30
TOTAL	--							50	8	0.30
WELD	U	72,909	41	7.10						
	S									
TOTAL	--	72,909	41	7.10						
GRAND	U	4,495,702	2,316	8.83	5,218,635	1,938	11.58	5,321,117	2,156	11.55
TOTALS	S	9,810,453	1,346	25.57	11,640,055	1,526	32.12	12,880,476	1,445	34.71
	--	14,306,155	3,662	16.02	16,858,690	3,464	20.74	18,201,593	3,601	22.01

TABLE 4-2 (CONTINUED) PRODUCTIVITY BY MINING METHOD AND COUNTY, 1978 TO 1983

COUNTY	MINING METHOD	1981 PRODUCTION	1981 MEN	1981 TONS PER MAN-DAY	1982 PRODUCTION	1982 MEN	1982 TONS PER MAN-DAY	1983 PRODUCTION	1983 MEN	1983 TONS PER MAN-DAY
ARCHULETA	U									
	S	255,000	42	21.05	259,480	47	19.50	252,500	42	18.40
TOTAL	--	255,000	42	21.05	259,480	47	19.50	252,500	42	18.40
DELTA	U	1,243,570	226	22.76	1,449,540	217	27.68	1,389,141	205	26.61
	S	100,790	18	19.55	41,920	16	18.33			
TOTAL	--	1,344,360	244	22.48	149,460	2	27.29	1,389,141	205	26.61
EL PASO	U									
	S									
TOTAL	--									
FREMONT	U	221,430	83	10.16	454,890	155	12.27	602,328	159	16.80
	S	100,160	31	14.33	75,640	23	13.29	35,375	18	10.50
TOTAL	--	321,590	114	11.17	530,530	178	12.41	637,703	177	16.50
GARFIELD	U	53,840	9	31.49	71,390	18	26.95	1,680	3	35.00
	S									
TOTAL	--	53,840	9	31.49	71,390		26.95	1,680	3	35.00
GUNNISON	U	1,615,832	547	14.43	1,257,790	445	15.33	1,108,992	2	18.52
	S									
TOTAL	--	1,615,832	547	14.43	1,257,790	445	15.33	1,108,992	2	18.52
HUERFANO	U									
	S	37,010	9	18.45						
TOTAL	--	37,010	9	18.45						
JACKSON	U									
	S	367,860	56	25.70	199,640	22	35.45	150,116		29.27
TOTAL	--	367,860	56	25.70	199,640	22	35.45	150,116	20	29.27
LA PLATA	U	135,685	35	18.13	89,800	24	16.00	65,077		10.10
	S									
TOTAL	--	135,685	35	18.13	89,800	24	16.00	65,077	25	10.10
LAS ANIMAS	U	662,750	418	7.65	220,770	153	7.73	112,770	1	5.58
	S	65,030	12	21.70	79,500	11	27.54	73,908	12	22.19
TOTAL	--	727,780	430	8.12	300,270	164	9.55	186,678	120	7.93
MESA	U	964,710	223	17.02	984,970	204	22.00	732,637	1	18.75
	S									
TOTAL	--	964,710	223	17.02	984,970	204	22.00	732,637	151	18.75
MOFFAT	U	763,916	235	13.62	1,200,680	256	19.73	649,368	1	14.90
(GREEN RIVER)	S	2,093,010	164	54.62	2,001,640	149	52.76	2,304,274	147	31.29
TOTAL	--	2,856,926	399	30.19	3,202,320	405	32.41	2,953,642	336	25.20
MOFFAT	U									
(UINTA)	S	3,155,650	303	39.90	3,153,430	299	43.66	3,021,617	290	48.16
TOTAL	--	3,155,650	303	39.90	3,153,430	299	43.66	3,021,617	290	48.16
MOFFAT	U	763,916	235	13.62	1,200,680	256	19.73	649,368	151	18.75
(TOTAL)	S	5,248,660	467	44.62	5,155,070	448	46.79	5,325,891	437	39.05
TOTAL	--	6,012,576	702	34.61	6,355,750	704	37.16	5,975,259	588	34.94
MONTROSE	U									
	S	74,690	15	21.91	61,240	16	14.91	41,815		13.51
TOTAL	--	74,690	15	21.91	61,240	16	14.91	41,815	16	13.51
PITKIN	U	772,380	449	8.22	698,590	418	7.74	783,450	2	15.35
	S									
TOTAL	--	772,380	449	8.22	698,590	4	7.74	783,450	2	15.35
RIO BLANCO	U	121,360	58	10.08	49,020	30	13.62	188,078		10.93
	S									
TOTAL	--	121,360	58	10.08	49,020	30	13.62	188,078	78	10.93
ROUTT	U	22,550	9	15.91	46,960	9	22.70	28,498	6	15.74
	S	6,750,040	633	41.23	5,570,220	575	41.76	5,027,864	422	50.53
TOTAL	--	6,772,590	642	41.01	5,617,180	584	41.47	5,056,362	428	49.91
SAN MIGUEL	U									
	S									
TOTAL	--									
WELD	U									
	S	7,290	38	4.70	98,290	27	14.03	194,033	50	12.70
TOTAL	--	7,290	38	4.70	98,290	27	14.03	194,033	50	12.70
GRAND TOTALS	U	6,578,023	2,292	13.04	6,524,400	1,929	15.92	5,428,941	1,412	17.67
	S	13,006,530	1,321	39.43	11,541,000	1,185	40.57	11,101,502	1,017	39.69
	--	19,584,553	3,613	23.47	18,065,400	3,114	26.02	16,530,443	2,429	25.35

FIGURE 4-2 COLORADO COAL MINE PRODUCTIVITY BY MINING METHOD, 1978 TO 1983



Section 5

5.0 FORECAST OF COAL EMPLOYMENT - (1984 to 2004)

Employment in coal is rooted in productivity and product demand. Without demand high productivity is unimportant, on the other hand, low productivity and higher costs will cause consumers to seek substitutes, in turn lowering demand. Stability in coal employment is not typical, although total numbers may be relatively constant, the flux of old mines exiting the industry disenfranchises some workers and new mines introduce new workers.

5.1 Coal Production and Distribution

The forecast of coal employment is undertaken on a county level for demographic and planning purposes. Historical county coal mining productivity and derived production levels were used to ascertain county employment in the coal industry. Forecast production of coal was calculated by the demand-pull of various domestic geographic markets and the export market. The contribution of each county to each of these geographic markets was averaged and used as the basis for forecasting county production. As demand from a geographic market rises or falls so does production from a particular county. Where several counties share a market, estimates from Taylor and Ladwig (1983) and Rushworth, Kelso and Ladwig (1984) were applied to determine county marketshare.

Table 5-1 shows in-state and out-of-state coal distribution data by county for 1978 to 1983. Although distinct variations are apparent, the 1983 in-state distribution was held constant for forecast purposes with few exceptions. The exceptions are based on imperfect knowledge of intent at the time of writing; they are listed as follows:

County	Assigned In-State Percentage
Jackson	0.20
La Plata	0.20
Garfield	0.20
Pitkin	0.20

Table 5-2 lists the percent of total in-state distribution by county. Competitive interaction may be reviewed at a glance. For example, since 1981 Moffat County mines increased marketshare in in-state distribution from about 10 percent to about 38 percent in 1983. During the same time period Routt County mines lost in-state marketshare, falling from 67.8 percent in 1981 to 44.3 percent in 1983, almost a one-to-one relationship of gain and loss between Moffat and Routt Counties. Holding a marketshare constant ignores competition and shifting centers of production. However, perfect knowledge of the microeconomy of coal mines and operators would be required to undertake a competitive model of in-state coal distribution. Table 5-3 lists out-of-state coal distribution by county.

TABLE 5-1 DISTRIBUTION OF COAL BY COUNTY, 1978 TO 1983

COUNTY	1978 IN-STATE DISTRIBUTION	1978 PERCENT OF TOTAL	1978 PERCENT IN-STATE	1978 OUT-OF-STATE DISTRIBUTION	PERCENT OF TOTAL	1978 PERCENT OUT-OF STATE	TOTAL DISTRIBUTED	USED AT MINE	STOCKPILED	1979 IN-STATE DISTRIBUTION	1979 PERCENT OF TOTAL	1979 PERCENT IN STATE	1979 OUT-OF-STATE DISTRIBUTION	1979 PERCENT OF TOTAL	1979 PERCENT OUT-OF-STATE	1979 OUT-OF-STATE DISTRIBUTION	USED AT MINE	STOCKPILED
ARCHULETA	32,540	0.50	92.43	2,664	0.05	7.57	35,204	3		61,500	0.78	78.90	16,450	0.23	21.10	77,950		20,000
DELTA	3,426	0.05	0.73	466,716	7.93	99.27	470,142	2	50,733	66,000	0.84	43.42	86,000	1.22	56.58	152,000		3,500
EL PASO																		
FREMONT	124,577	1.90	100.00			0.00	124,577	10	800	77,001	0.98	96.98	2,400	0.03	3.02	79,401	10	640
GARFIELD	281	0.004	100.00	946,232	16.07	0.00	281		2,500	113	0.001	2.20	5,015	0.07	97.80	5,128		
GUNNISON	255,091	3.88	21.23	5,296	0.09	78.77	1,201,323		37,211	254,475	3.23	16.19	1,317,392	18.65	83.81	1,571,867		16,011
HUERFANO	10,416	0.16	66.29	668,371	11.35	33.71	15,712			30,192	0.38	60.77	19,490	0.28	39.23	49,682		
JACKSON	37,941	0.58	5.37	43,750	0.74	94.63	706,312		17,277	18,008	0.23	2.26	778,088	11.01	97.74	796,096	2	11,800
LA PLATA	35,100	0.53	44.51	12,530	0.21	55.49	78,850	200	5,000	23,357	0.30	23.97	74,080	1.05	76.03	97,437	6	19
LAS ANIMAS	50,778	0.77	80.21			19.79	63,308	150		793,129	10.08	97.14	23,384	0.33	2.86	816,513		
MESA				1,337,248	22.71					44	0.001	0.01	681,486	9.65	99.99	681,530		
MOFFAT	1,318,730	20.08	49.65			50.35	2,655,978		618,763	1,369,275	17.40	54.31	1,151,798	16.30	45.69	2,521,073		874,487
MONTROSE	102,393	1.56	100.00	864,312	14.68		102,393			121,801	1.55	100.00			0.00	121,801		
PITKIN	51,114	0.78	5.58	23,780	0.40	94.42	915,426			13,150	0.17	1.56	828,750	11.73	98.44	841,900		
RIO BLANCO	6,836	0.10	22.33	1,517,468	25.77	77.67	30,616	100	3,500	45,307	0.58	47.63	49,821	0.71	52.37	95,128		249,814
ROUTT	4,538,159	69.10	74.94			25.06	6,055,627	100	3,553	4,996,776	63.49	71.11	2,030,040	28.74	28.89	7,026,816	100	
SAN MIGUEL								200										
WELD			100.00															
TOTAL	6,567,382	100		5,888,367	100		12,455,749	765	739,337	7,870,128	100		7,064,194	100		14,934,322	118	1,176,271

TABLE 5-1 (CONTINUED) DISTRIBUTION OF COAL BY COUNTY, 1978 TO 1983

COUNTY	1980 IN-STATE DISTRIBUTION	1980 PERCENT OF TOTAL	1980 PERCENT IN-STATE	1980 OUT-OF-STATE DISTRIBUTION	PERCENT OF TOTAL	1980 PERCENT OUT-OF STATE	TOTAL DISTRIBUTED	USED AT MINE	STOCKPILED	1981 IN-STATE DISTRIBUTION	1981 PERCENT OF TOTAL	1981 PERCENT IN STATE	1981 OUT-OF-STATE DISTRIBUTION	1981 PERCENT OF TOTAL	1981 PERCENT OUT-OF-STATE	1981 OUT-OF-STATE DISTRIBUTION	USED AT MINE	STOCKPILED
ARCHULETA	3,049	0.04	36.19	5,375	0.06	63.81	8,424			7,435	0.11	2.92	247,576	2.37	97.08	255,011		
DELTA	99,648	1.26	9.01	1,006,342	11.31	90.99	1,105,990		26,574	270,042	3.89	16.45	1,372,017	13.16	83.55	1,642,059		62,335
EL PASO																		
FREMONT	135,256	1.70	78.59	36,847	0.41	21.41	172,103	8	12,659	124,863	1.80	44.91	153,162	1.47	55.09	278,025	10	
GARFIELD	10,087	0.130	70.18	4,287	0.05	29.82	14,374		1,126	22,721	0.330	41.78	31,667	0.30	58.22	54,388		1,905
GUNNISON	288,626	3.64	14.69	1,676,303	18.84	85.31	1,964,929	23	10,936	272,598	3.92	16.23	1,407,086	13.49	83.77	1,679,684	100	8,605
HUERFANO	20,825	0.26	91.35	1,972	0.02	8.65	22,797		495	35,492	0.51	98.59	506	0.01	1.41	35,998		485
JACKSON	16,382	0.21	2.13	754,269	8.48	97.87	770,651	10	10,000	14,436	0.21	6.19	218,646	2.10	93.81	233,082	10	33,342
LA PLATA	10,963	0.14	11.79	82,000	0.92	88.21	92,963		10,500	9,310	0.13	6.52	133,450	1.28	93.48	142,760		200
LAS ANIMAS	765,629	9.65	96.51	27,676	0.31	3.49	793,305		20,000	669,741	9.64	91.15	65,038	0.62	8.85	734,779		
MESA	1,622	0.02	0.21	754,950	8.49	99.79	756,572		9,008	1,789	0.030	0.19	947,499	9.09	99.81	949,288		423
MOFFAT	1,132,045	14.27	36.86	1,939,026	21.80	63.14	3,071,071		625,343	683,231	9.83	18.91	2,929,125	28.09	81.09	3,612,356		307,889
MONTROSE	96,068	1.17	100.00		0.00		93,068		12,399	74,684	1.07	100.00				74,684		
PITKIN	9,032	0.11	1.25	715,101	8.04	98.75	724,133		137,453	4,848	0.07	0.65	735,323	7.05	99.35	740,171		4,000
RIO BLANCO	30,891	0.39	43.85	39,550	0.44	56.15	70,441	100	50,273	34,842	0.50	17.71	161,940	1.55	82.29	196,782		64,454
ROUTT	5,316,143	67.01	74.16	1,852,510	20.82	25.84	7,168,653			4,715,946	67.86	69.96	2,025,071	19.42	30.04	6,741,017		81,921
SAN MIGUEL																		
WELD										7,292	0.10	100.00				7,292.00		
TOTAL	7,936,266	100		8,896,208	100		16,829,474	141	926,766	6,949,270	100		10,428,106	100		17,377,376	120	565,559

TABLE 5-1 (CONTINUED) DISTRIBUTION OF COAL BY COUNTY, 1978 TO 1983

COUNTY	1982 IN-STATE DISTRIBUTION	1982 PERCENT OF TOTAL	1982 PERCENT IN-STATE	1982 OUT-OF-STATE DISTRIBUTION	PERCENT OF TOTAL	1982 PERCENT OUT-OF STATE	TOTAL DISTRIBUTED	1983 IN-STATE DISTRIBUTION	1983 PERCENT OF TOTAL	1983 PERCENT IN STATE	1983 OUT-OF-STATE DISTRIBUTION	1983 PERCENT OF TOTAL	1983 PERCENT OUT-OF-STATE	1983 OUT-OF-STATE DISTRIBUTION
ARCHULETA				259,477	2.45	100.00	259,477				245,500	2.76	100.00	245,500
DELTA	303,259	3.84	20.17	1,200,258	11.35	79.83	1,503,517	322,500	4.11	23.88	1,027,800	11.54	76.12	1,350,300
EL PASO			0.00											
FREMONT	367,493	4.65	52.39	333,965	3.16	47.61	701,458	504,300	6.43	59.87	338,000	3.79	40.13	842,300
GARFIELD	30,106	0.380	42.00	41,577	0.39	58.00	71,683							
GUNNISON	288,884	3.65	22.93	970,972	9.18	77.07	1,259,856	316,600	4.03	29.62	752,100	8.44	70.38	1,068,700
HUERFANO	29,192	0.37	100.00				29,192							
JACKSON	8,098	0.10	4.23	183,351	1.73	95.77	191,449	2,900	0.04	2.27	116,200	1.30	97.73	119,100 0
LA PLATA	14,528	0.18	12.00	106,540	1.01	88.00	121,068	10,800	0.14	198.00	43,300	0.49	80.04	54,100
LAS ANIMAS	274,454	3.47	93.83	18,048	0.17	6.17	292,502				518,000	5.81	100.00	518,000
MESA	2,107	0.03	0.20	1,051,850	9.95	99.80	1,053,957				716,300	8.04	100.00	716,300
MOFFAT	2,286,065	28.92	35.97	4,069,682	38.49	64.03	6,355,477	3,009,700	38.35	52.14	2,762,500	31.01	47.86	5,772,200
MONTROSE	61,237	0.77	100.00				61,237	59,400	0.76	100.00				59,400
PITKIN	7,387	0.09	1.16	629,438	5.95	98.84	636,825				546,900	6.14	100.00	546,900
RIO BLANCO	48,110	0.61	53.85	41,231	0.39	46.15	89,341				233,400	2.62	100.00	233,400
ROUTT	4,049,715	51.22	70.83	1,667,799	15.77	29.17	5,717,514	3,478,300	44.32	68.38	1,608,500	18.06	31.62	5,086,800
SAN MIGUEL			0.00				0							
WELD	135,651	1.72	100.00	0			135,651	143,000	1.82	100.00				143,000
TOTAL	7,906,286	100		10,574,188	100		18,480,204	7,847,500	100		8,908,500	100		16,756,000

TABLE 5-2. PERCENT OF TOTAL IN-STATE COAL DISTRIBUTION 1978 TO 1983

COUNTY	1978	1979	1980	1981	1982	1983	AVERAGE PERCENT	NORMALIZED AVERAGE PERCENT
ARCHULETA	0.50	0.78	0.04	0.11	0.00	0.00	0.24	0.24
DELTA	0.05	0.84	1.26	3.89	3.84	4.11	2.33	2.30
EL PASO								
FREMONT	1.90	0.98	1.70	1.80	4.65	6.43	2.91	2.87
GARFIELD	0.004	0.00	0.13	0.33	0.38	NIL	0.14	0.14
GUNNISON	3.88	3.23	3.64	3.92	3.65	4.03	3.73	3.69
HUERFANO	0.16	0.38	0.26	0.51	0.37	NA	0.28	0.28
JACKSON	0.58	0.23	0.21	0.21	0.10	0.04	0.23	0.23
LA PLATA	0.53	0.30	0.14	0.13	0.18	0.14	0.24	0.24
LAS ANIMAS	0.77	10.08	9.65	9.64	3.47	NA	5.60	5.53
MESA	NA	0.00	0.02	0.03	0.03	NA	0.01	0.01
MOFFAT	20.08	17.40	14.27	9.83	28.92	38.35	21.48	21.22
MONTROSE	1.56	1.55	1.17	1.07	0.77	0.76	1.15	1.14
PITKIN	0.78	0.17	0.11	0.07	0.09	NA	0.20	0.20
RIO BLANCO	0.10	0.58	0.39	0.50	0.61	NA	0.36	0.36
ROUTT	69.10	63.49	67.01	67.86	51.22	44.32	60.50	59.77
SAN MIGUEL								
WELD					1.72	1.82	1.82	1.80
TOTAL	99.99	100.01	100.00	99.90	100.00	100.00	101.22	100.02

TABLE 5-3. PERCENT OF TOTAL OUT-OF-STATE COAL DISTRIBUTION 1978 TO 1983

COUNTY	1978	1979	1980	1981	1982	1983	AVERAGE PERCENT	NORMALIZED AVERAGE PERCENT
ARCHULETA	0.05	0.23	0.06	2.37	2.45	2.76	1.32	1.32
DELTA	7.93	1.22	11.31	13.16	11.35	11.54	9.42	9.41
EL PASO								
FREMONT		0.03	0.41	1.47	3.16	3.79	1.48	1.48
GARFIELD		0.07	0.05	0.30	0.39		0.14	0.14
GUNNISON	16.07	18.65	18.84	13.49	9.18	8.44	14.11	14.10
HUERFANO	0.09	0.28	0.02	0.01			0.07	0.07
JACKSON	11.35	11.01	8.48	2.10	1.73	1.30	6.00	6.06
LA PLATA	0.74	1.05	0.92	1.28	1.01	0.49	0.92	0.92
LAS ANIMAS	0.21	0.33	0.31	0.62	0.17	5.81	1.24	1.24
MESA		9.65	8.49	9.09	9.95	8.04	7.54	7.53
MOFFAT	22.71	16.30	21.80	28.09	38.49	31.01	26.40	26.38
MONTROSE			0.00	0.00	0.00	0.00	0.00	0.00
PITKIN	14.68	11.73	8.04	7.05	5.95	6.14	8.93	8.92
RIO BLANCO	0.40	0.71	0.44	1.55	0.39	2.62	1.02	1.02
ROUTT	25.77	28.74	20.82	19.42	15.77	18.06	21.43	21.41
SAN MIGUEL								
WELD								
TOTAL	100.00	100.00	99.99	100.00	99.99	100.00	100.02	100.00

Table 5-4 lists the county distribution of coal production for Case No. 1 -- Base Case. Case Nos. 3 and 4 alter only out-of-state demand scenarios so that Table 5-4 is similar for Cases Nos. 1, 3 and 4. However, Case No. 2 - Colorado Loses Marketshare, Table 5-5, does change the allocated production by county since different demand data are prescribed by the Case No. 2 production estimate.

For Case No. 1 - Base Case, as well as Case Nos. 3 and 4, total in-state demand varies from 8.4 mtpy in 1984 to 10.6 mtpy in 2004. County production changes proportionally to the percent of total allocated in the table and does not change due to inter-mine, inter-county or regional competition. In Case No. 2 - Colorado Loses Marketshare, the projected 1984 in-state production and distribution is 8.3 mtpy falling to 6.9 mtpy in 2004.

In order to ascertain production from counties due to other geographic markets, counties were matched with markets. The approximate marketshare of a Colorado county to a particular market was estimated from data for the period 1981 to 1983. Most significant markets are apportioned among several counties and several markets are served by one county only. Percentages of county marketshare within a geographic market were, in some cases, divided into three time periods, for example, 1984 to 1986, 1987 to 1990 and 1991 to 2004. Several changes are expected in the 1987 to 1990 time period, some mines may be depleted and closed and many contracts expire at about this time. Changing percentages of county marketshare is an attempt to show competitive forces in operation. All changes are arbitrary and are not intended to reflect knowledge of intent, or bias against operators whose mines are affected by changing a percentage.

5.2 Market Regions

5.2.1 East North Central Market Region

In the East North Central Market Region, three counties split Colorado's contribution to this geographic market. Since this geographic market is forecast as one of decline, the relative county marketshare is held constant. The counties and marketshare data are listed as follows:

County	Marketshare (%)
Delta	65
Moffat	5
Routt	30

TABLE 5-4 FORECAST IN-STATE COAL DISTRIBUTION BY COUNTY, 1984 TO 2004, CASE NO. 1--BASE CASE

COUNTY	PERCENT OF TOTAL	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
ARCHULETA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	4.08	344	348	352	356	360	365	369	373	378	382	387	392	396	401	406	411	416	421	426	431	436
EL PASO	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	6.38	537	544	550	557	563	570	577	584	591	598	605	612	620	627	635	642	650	658	666	674	682
GARFIELD	0.40	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	4.00	337	341	345	349	353	357	362	366	370	375	379	384	389	393	398	403	408	412	417	422	428
HUERFANO	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	0.20	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LA PLATA	0.20	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LAS ANIMAS	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT	38.03	3,202	3,240	3,279	3,319	3,358	3,399	3,439	3,481	3,523	3,565	3,608	3,651	3,695	3,739	3,784	3,829	3,875	3,922	3,969	4,016	4,065
MONTROSE	0.75	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	0.20	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
RIO BLANCO	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT	43.95	3,700	3,745	3,790	3,835	3,881	3,928	3,975	4,023	4,071	4,120	4,169	4,219	4,270	4,321	4,373	4,425	4,478	4,532	4,587	4,642	4,697
SAN MIGUEL	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	1.81	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	100.00	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688

TABLE 5-5 FORECAST IN-STATE COAL DISTRIBUTION BY COUNTY, 1984 TO 2004, CASE NO. 2--COLORADO LOSES MARKETSHARE

INSTATE PRODUCTION		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
COUNTY	PERCENT OF TOTAL	8,378	8,331	8,283	8,232	8,179	8,123	8,065	8,004	7,940	7,874	7,805	7,734	7,659	7,582	7,501	7,418	7,332	7,242	7,149	7,053	6,954
ARCHULETA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	4.08	342	340	338	336	334	331	329	327	324	321	318	316	312	309	306	303	299	295	292	288	284
EL PASO	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	6.38	534	532	528	525	522	518	515	511	507	502	498	493	489	484	479	473	468	462	456	450	444
GARFIELD	0.40	34	33	33	33	33	32	32	32	32	31	31	31	31	30	30	30	29	29	29	28	28
GUNNISON	4.00	335	333	331	329	327	325	323	320	318	315	312	309	306	303	300	297	293	290	286	282	278
HUERFANO	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	0.20	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	14	14	14	14
LA PLATA	0.20	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	14	14	14	14
LAS ANIMAS	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESA	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT	38.03	3,186	3,168	3,150	3,131	3,110	3,089	3,067	3,044	3,020	2,995	2,968	2,941	2,913	2,883	2,853	2,821	2,788	2,754	2,719	2,682	2,645
MONTROSE	0.75	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	56	55	54	54	53	52
PITKIN	0.20	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	14	14	14	14
RIO BLANCO	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT	43.95	3,682	3,662	3,640	3,618	3,595	3,570	3,544	3,518	3,490	3,461	3,430	3,399	3,366	3,332	3,297	3,260	3,222	3,183	3,142	3,100	3,056
SAN MIGUEL	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	1.81	152	151	150	149	148	147	146	145	144	143	141	140	139	137	136	134	133	131	129	128	126
TOTAL	100.00	8,378	8,331	8,283	8,232	8,179	8,123	8,065	8,004	7,940	7,874	7,805	7,734	7,659	7,582	7,501	7,418	7,332	7,242	7,149	7,053	6,954

5.2.2 West North Central Market Region

Again, three counties share this geographic market, and it also is a declining market for Colorado coal. For this reason relative county marketshare is held constant. The counties and marketshare are listed as follows:

County	Marketshare (%)
Delta	15
Gunnison	35
Moffat	50

5.2.3 East and West South Central Market Region

The growing East and West South Central Market Region takes coal from six counties. Diversity of supply is expected due to the number of coal-fired facilities, utilities and fuel needs. Assumptions of changing coal distribution shift some production from Moffat and Routt Counties to counties south and east. Given a growing market along the Gulf Coast, mines with excess capacity due to loss of markets elsewhere will compete strongly for increased marketshare in the southeast. The assumptions are listed as follows:

County	Marketshare (%)		
	1984-1986	1987-1990	1991-2004
Delta	4	6	8
Fremont	8	10	12
Las Animas	13	15	18
Mesa	18	18	18
Moffat	50	45	40
Routt	7	6	4

5.2.4 Mountain Market Region - Industrial Coal

Changes in county marketshare for industrial coal production in the Mountain Market Region are due to probable depletion of one mine in Archuleta County. The assumed county marketshare for this product and geographic market are listed as follows:

County	Marketshare (%)		
	1984-1988	1989-1990	1991-2004
Archuleta	55	25	0
Jackson	35	35	35
La Plata	10	40	65

5.2.5 Mountain Market Region - Met Coal

The demand for met coal in the Mountain Market Region is served by one mine in Gunnison County.

County	Marketshare (%)
Gunnison	100

5.2.6 Mountain Market Region - Steam Coal

Demand for Colorado steam coal in the Mountain Market Region outside of Colorado is currently met by one captive mine in Rio Blanco County.

County	Marketshare (%)
Rio Blanco	100

5.2.7 Pacific Market Region

High-quality industrial coal destined for the Pacific Market Region is provided by one county.

County	Marketshare (%)
Pitkin	100

5.2.8 Export

High-quality export coal is currently derived from one county:

County	Marketshare (%)
Pitkin	100

5.3 Case Definition

Total coal production destined for the out-of-state and export market are computed on a simple percent of total relationship. Forecast demand provided by Colorado is allocated to counties on the percentage basis described previously over the forecast period. Colorado coal production varies with the presumed behavior of individual geographic markets and the assumed desirability of the Colorado coal product.

Table 5-6 lists the county production linked to various out-of-state market regions and coal product markets for Case No. 1 - Base Case. These data are summarized in Table 5-7. Table 5-8 is a recapitulation of coal production destined for in-state coal distribution by county. In-state and out-of-state coal distributions by county are shown in Table 5-9.

Distribution data for Case No. 2- Colorado Loses Marketshare are shown in Table 5-10. Since this case alters only the in-state distribution of coal the data in Table 5-10 are identical to Table 5-6, for Case No. 1 - Base Case. Table 5-11 summarizes county data from Table 5-10. The in-state distribution of coal by county is repeated in Table 5-12 for Case No. 2. Both in-state and out-of-state coal distributions for Case No. 2 are totalled in Table 5-13.

Out-of-state and export markets linked to counties for coal production and distribution in Case No. 3- Met Coal Market Resumes are presented in Table 5-14. These data are totalled by county in Table 5-15. The in-state county coal production and distribution are presented in Table 5-16. In-state and out-of-state coal distributions are reported in Table 5-17.

Table 5-18 lists production and distribution for counties in the out-of-state and export markets according to the criteria of Case No. 4- Acid Rain Legislation Benefits Colorado. These data are summarized by county in Table 5-19. The expected distribution of in-state coal is reiterated in Table 5-20, and all distribution data are summarized in Table 5-21.

5.4 Productivity

Total coal employment is derived from expected production divided by productivity, in tons per man-day, assuming a 230-day-year. Employment is sensitive to the productivity figure. Constant productivity ignores expected gains due to new mines and equipment, however, unrestrained escalation of productivity by county is also unrealistic.

Table 5-22 presents sample statistics of weighted average productivity data by county. Also included is an analysis of the weighted average days worked per year, tons per man-day and a comparison with observed statistics of 1983. The county with the highest average productivity is Routt County with 43.23 tons per man-day, and the lowest productivity excluding San Miguel County was observed in Las Animas County.

Since employment is based on productivity, several methods of analyzing productivity were examined for Case No. 1 - Base Case. One "reasonable" method was selected and used for comparing employment between cases.

Table 5-23 reports projected production and employment for Case No. 1 - Base Case using constant 1983 productivity. This method ignores the addition of new mines and new technologies. As total production increases 22 percent over the 20-year period total employment increases almost 44 percent from 2,778 miners in 1984 to 4,015 miners in 2004. The reason is market shifting over time from counties with high 1983 productivity to counties with relatively low productivity in 1983.

Table 5-24 uses production data from Case No. 1 and escalates 1983 productivity three percent per year. An unrestrained escalation of productivity even at the relatively modest level of three percent per year results in an 80 percent increase over 20 years. While production increases 20 percent over 20 years, employment drops 17 percent. It is certain that arbitrary escalation is as much in error as leaving productivity constant over the span of the forecast.

Table 5-25 again uses production data generated by Case No. 1 and escalates productivity selectively. Productivity in counties with mainly underground mines are escalated one percent per year, and counties with mainly surface mines are escalated 0.5 percent per year. The escalation in productivity is arbitrarily halted at a "reasonable" level. The addition of new mines and/or new technologies is simulated by arbitrarily raising a specific county's productivity to a new level. This method of escalating productivity is used in all four cases and simulates the manner in which productivity increases, although probably not in the way events will unfold.

Case No. 1 - Base Case

Employment increases about four percent over the 20-year period while production increases 22 percent. Total employment grows from 2,585 miners in 1984 to 2,696 miners in 2004.

Case No. 2 - Colorado Loses Marketshare

The change in employment is a decrease of 10.9 percent, from 2,579 miners in 1984 to 2,298 miners in 2004. Production is nearly unchanged with an increase of only 0.18 percent over 20 years from 16.4 mtpy in 1984 to 16.5 mtpy in 2004. While the method of productivity escalation is unchanged from the Base Case, different counties are affected by loss of market. If different markets are affected then different employment data will result and may not correlate with previously observed percent changes of production and employment. Table 5-26 shows these data.

Case No. 3 - Met Coal Market Resumes

Case No. 3 production increases from 16.5 mtpy in 1984 to about 20.7 mtpy in 2004 a change of 25 percent. Employment ranges from 2,585 miners in 1984 to 2,791 miners in 2004, a change of 7.9 percent. These data are presented by year and county in Table 5-27 for Case No. 3.

Case No. 4 - Acid Rain Legislation Benefits Colorado

Table 5-28 presents production, productivity and employment data for Case No. 4. Production increases from 16.4 mtpy in 1984 to 22.6 mtpy in 2004 or 37 percent. Employment increases 16 percent, from 2,581 miners in 1984 to 2,985 miners in 2004.

TABLE 5-6 COUNTY PRODUCTION LINKED TO OUT-OF-STATE MARKETS--CASE NO. 1--BASE CASE

LINKED MARKETS	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL (T)	1,409	1,202	993	784	574	362	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA (% MARKET)	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DELTA (T)	916	781	646	510	373	236	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT (% MARKET)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
MOFFAT (T)	70	60	50	39	29	18	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT (% MARKET)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
ROUTT (T)	423	361	298	235	172	109	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL (T)	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
DELTA (% MARKET)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
DELTA (T)	59	47	33	18	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
GUNNISON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
GUNNISON (T)	139	109	76	42	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
MOFFAT (% MARKET)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
MOFFAT (T)	-198	155	109	60	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
E & W SOUTH CENT (T)	4,200	4,302	4,387	4,458	4,517	4,565	4,605	4,638	4,665	4,687	4,705	4,720	4,732	4,742	4,751	4,757	4,763	4,767	4,771	4,774	4,776
DELTA (% MARKET)	4	4	4	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8
DELTA (T)	168	172	175	267	271	274	276	371	373	375	376	378	379	379	380	381	381	381	382	382	382
FREMONT (% MARKET)	8	8	8	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12
FREMONT (T)	336	344	351	446	452	457	461	557	560	562	565	566	568	569	570	571	572	572	573	573	573
LAS ANIMAS (% MARKET)	13	13	13	15	15	15	15	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LAS ANIMAS (T)	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA (% MARKET)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
MESA (T)	756	774	790	802	813	822	829	835	840	844	847	850	852	854	853	856	857	858	859	859	860
MOFFAT (% MARKET)	50	50	50	45	45	45	45	40	40	40	40	40	40	40	40	40	40	40	40	40	40
MOFFAT (T)	2,100	2,151	2,194	2,006	2,032	2,054	2,072	1,855	1,866	1,875	1,882	1,888	1,893	1,897	1,900	1,903	1,905	1,907	1,908	1,910	1,911
ROUTT (% MARKET)	7	7	7	6	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ROUTT (T)	294	301	307	267	271	274	276	186	187	187	188	189	189	190	190	190	191	191	191	191	191
MOUNTAIN--IND. (T)	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
ARCHULETA (% MARKET)	35	35	35	35	35	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARCHULETA (T)	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
JACKSON (T)	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA (% MARKET)	10	10	10	10	10	40	40	65	65	65	65	65	65	65	65	65	65	65	65	65	65
LA PLATA (T)	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
MOUNTAIN--MET (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
GUNNISON (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
GUNNISON (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN--STEAM (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
RIO BLANCO (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
RIO BLANCO (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC (T)	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
EXPORT (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

(T) denotes thousands of short tons

TABLE 5-7 SUMMARIZED COUNTY COAL PRODUCTION TO OUT-OF-STATE MARKETS--CASE NO. 1--BASE CASE (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,144	1,000	854	795	659	524	389	386	388	390	391	393	394	394	395	396	396	396	397	397	397
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	336	344	351	446	452	457	461	537	560	562	565	566	568	569	570	571	572	572	573	573	573
GARFIELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUNNISON	1,003	1,043	1,071	1,086	1,131	1,186	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
LAS ANIMAS	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT	2,369	2,366	2,352	2,105	2,111	2,122	2,130	1,905	1,916	1,925	1,932	1,938	1,943	1,947	1,950	1,953	1,955	1,957	1,958	1,960	1,961
MONTROSE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PITKIN	637	665	695	727	753	769	784	800	816	832	848	864	879	895	911	927	943	959	974	990	1,006
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	717	662	605	503	443	383	321	186	187	187	188	189	189	190	190	190	191	191	191	191	191
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8,092	8,223	8,224	8,244	8,292	8,261	8,439	8,364	8,433	8,597	8,757	9,113	9,167	9,219	9,269	9,318	9,365	9,411	9,457	9,501	9,546

TABLE 5-8 RECAPITULATION OF COUNTY COAL PRODUCTION TO IN-STATE MARKET—CASE NO. 1—BASE CASE (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
ARCHULETA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	344	348	352	356	360	365	369	373	378	382	387	392	396	401	406	411	416	421	426	431	436
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	537	544	550	557	563	570	577	584	591	598	605	612	620	627	635	642	650	658	666	674	682
GARFIELD	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	337	341	345	349	353	357	362	366	370	375	379	384	389	393	398	403	408	412	417	422	428
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LA PLATA	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LAS ANIMAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT	3,202	3,240	3,279	3,319	3,358	3,399	3,439	3,481	3,523	3,565	3,608	3,651	3,695	3,739	3,784	3,829	3,875	3,922	3,969	4,016	4,065
MONTROSE	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
RIO BLANCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT	3,700	3,745	3,790	3,835	3,881	3,928	3,975	4,023	4,071	4,120	4,169	4,219	4,270	4,321	4,373	4,425	4,478	4,532	4,587	4,642	4,697
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688

TABLE 5-9 SUMMARIZED COUNTY COAL PRODUCTION —CASE NO. 1--BASE CASE (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,487	1,347	1,206	1,151	1,019	889	758	759	766	772	778	784	790	796	801	806	812	817	822	828	833
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	873	888	901	1,003	1,015	1,027	1,038	1,140	1,151	1,160	1,170	1,179	1,188	1,196	1,205	1,213	1,222	1,230	1,238	1,247	1,255
GARFIELD	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
LA PLATA	55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
LAS ANIMAS	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT	5,571	5,607	5,632	5,424	5,470	5,521	5,569	5,386	5,439	5,490	5,540	5,589	5,638	5,686	5,734	5,782	5,830	5,879	5,927	5,976	6,025
MONTROSE	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	654	682	712	745	770	787	803	819	835	851	867	883	899	915	931	947	963	979	995	1,011	1,027
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
ROUTT	4,417	4,406	4,395	4,338	4,324	4,310	4,296	4,208	4,257	4,307	4,357	4,408	4,459	4,511	4,563	4,616	4,669	4,723	4,777	4,833	4,888
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	16,511	16,743	16,846	16,971	17,123	17,198	17,483	17,516	17,695	17,970	18,243	18,713	18,882	19,051	19,219	19,387	19,555	19,723	19,893	20,063	20,233

TABLE 5-10 COUNTY PRODUCTION LINKED TO OUT-OF-STATE MARKETS—CASE NO. 2—COLORADO LOSES MARKETSHARE

LINKED MARKETS	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL (T)	1,409	1,202	993	784	574	362	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA (% MARKET)	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DELTA (T)	916	781	646	510	373	236	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT (% MARKET)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
MOFFAT (T)	70	60	50	39	29	18	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT (% MARKET)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
ROUTT (T)	423	361	298	235	172	109	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL (T)	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
DELTA (% MARKET)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
DELTA (T)	59	47	33	18	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
GUNNISON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
GUNNISON (T)	139	109	76	42	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
MOFFAT (% MARKET)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
MOFFAT (T)	198	155	109	60	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
E & W SOUTH CENT (T)	4,299	4,302	4,387	4,458	4,517	4,565	4,605	4,638	4,665	4,687	4,705	4,720	4,732	4,742	4,751	4,757	4,763	4,767	4,771	4,774	4,776
DELTA (% MARKET)	4	4	4	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8
DELTA (T)	168	172	175	267	271	274	276	371	373	375	376	378	379	379	380	381	381	381	382	382	382
FREMONT (% MARKET)	8	8	8	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12
FREMONT (T)	336	344	351	446	452	457	461	557	560	562	565	566	568	569	570	571	572	572	573	573	573
LAS ANIMAS (% MARKET)	13	13	13	15	15	15	15	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LAS ANIMAS (T)	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA (% MARKET)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
MESA (T)	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT (% MARKET)	50	50	50	45	45	45	45	40	40	40	40	40	40	40	40	40	40	40	40	40	40
MOFFAT (T)	2,100	2,151	2,194	2,006	2,032	2,054	2,072	1,855	1,866	1,875	1,882	1,888	1,893	1,897	1,900	1,903	1,905	1,907	1,908	1,910	1,911
ROUTT (% MARKET)	7	7	7	6	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ROUTT (T)	294	301	307	267	271	274	276	186	187	187	188	189	189	190	190	190	191	191	191	191	191
MOUNTAIN—IND. (T)	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
ARCHULETA (% MARKET)	55	55	55	55	55	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARCHULETA (T)	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
JACKSON (T)	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA (% MARKET)	10	10	10	10	10	40	40	65	65	65	65	65	65	65	65	65	65	65	65	65	65
LA PLATA (T)	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
MOUNTAIN—MET (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
GUNNISON (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
GUNNISON (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN—STEAM (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
RIO BLANCO (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
RIO BLANCO (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC (T)	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
EXPORT (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

(T) denotes thousands of short tons

TABLE 5-11 SUMMARIZED COUNTY COAL PRODUCTION TO OUT-OF-STATE MARKETS--CASE NO. 2--COLORADO LOSES MARKETSHARE (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,144	1,000	854	795	659	524	389	386	388	390	391	393	394	394	395	396	396	396	397	397	397
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	336	344	351	446	452	457	461	557	560	562	565	566	568	569	570	571	572	572	573	573	573
GARFIELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUNNISON	1,003	1,043	1,071	1,086	1,131	1,186	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
LAS ANIMAS	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT	2,369	2,366	2,352	2,105	2,111	2,122	2,130	1,905	1,916	1,925	1,932	1,938	1,943	1,947	1,950	1,953	1,955	1,957	1,958	1,960	1,961
MONTROSE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PITKIN	637	665	695	727	753	769	784	800	816	832	848	864	879	895	911	927	943	959	974	990	1,006
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	717	662	605	503	443	383	321	186	187	187	188	189	189	190	190	190	191	191	191	191	191
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8,092	8,223	8,224	8,244	8,292	8,261	8,439	8,364	8,433	8,597	8,757	9,113	9,167	9,219	9,269	9,318	9,365	9,411	9,457	9,501	9,546

TABLE 5-12 RECAPITULATION OF COUNTY COAL PRODUCTION TO IN-STATE MARKET--CASE NO. 2--COLORADO LOSES MARKETSHARE (THOUSANDS OF SHORT TONS)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
COUNTY	8,378	8,331	8,283	8,232	8,179	8,123	8,065	8,004	7,940	7,874	7,805	7,734	7,659	7,582	7,501	7,418	7,332	7,242	7,149	7,053	6,954
ARCHULETA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	342	340	338	336	334	331	329	327	324	321	318	316	312	309	306	303	299	295	292	288	284
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	534	532	528	525	522	518	515	511	507	502	498	493	489	484	479	473	468	462	456	450	444
GARFIELD	34	33	33	33	33	32	32	32	32	31	31	31	31	30	30	30	29	29	29	28	28
GUNNISON	335	333	331	329	327	325	323	320	318	315	312	309	306	303	300	297	293	290	286	282	278
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	14	14	14	14
LA PLATA	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	14	14	14	14
LAS ANIMAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT	3,186	3,168	3,150	3,131	3,110	3,089	3,067	3,044	3,020	2,995	2,968	2,941	2,913	2,883	2,853	2,821	2,788	2,754	2,719	2,682	2,645
MONTROSE	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	56	55	54	54	53	52
PITKIN	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	14	14	14	14
RIO BLANCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT	3,682	3,662	3,640	3,618	3,595	3,570	3,544	3,518	3,490	3,461	3,430	3,399	3,366	3,332	3,297	3,260	3,222	3,183	3,142	3,100	3,056
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	151	150	149	148	147	146	145	144	143	141	140	139	137	136	134	133	131	129	128	126
TOTAL	8,378	8,331	8,283	8,232	8,179	8,123	8,065	8,004	7,940	7,874	7,805	7,734	7,659	7,582	7,501	7,418	7,332	7,242	7,149	7,053	6,954

TABLE 5-13 SUMMARIZED COUNTY COAL PRODUCTION --CASE NO. 2--COLORADO LOSES MARKETSHARE (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,485	1,340	1,192	1,131	993	856	718	713	712	711	710	708	706	704	701	698	695	692	688	685	681
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	870	876	879	971	973	975	975	1,067	1,066	1,065	1,063	1,060	1,057	1,053	1,049	1,044	1,039	1,034	1,029	1,023	1,017
GARFIELD	34	33	33	33	33	32	32	32	32	31	31	31	31	30	30	30	29	29	29	28	28
GUNNISON	1,339	1,376	1,402	1,415	1,458	1,511	1,618	1,615	1,613	1,610	1,607	1,604	1,601	1,598	1,595	1,592	1,588	1,585	1,581	1,577	1,573
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	151	160	169	178	187	196	205	214	223	232	241	250	259	268	277	286	294	303	312	321	330
LA PLATA	55	58	60	63	65	222	232	384	400	417	434	451	467	484	501	518	534	551	568	584	601
LAS ANIMAS	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT	5,555	5,535	5,502	5,236	5,222	5,212	5,197	4,949	4,936	4,919	4,901	4,879	4,856	4,830	4,803	4,774	4,743	4,711	4,677	4,642	4,605
MONTROSE	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	56	55	54	54	53	52
PITKIN	654	682	711	744	769	785	801	816	832	848	863	879	895	910	926	942	957	973	989	1,004	1,020
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	4,399	4,323	4,245	4,121	4,038	3,953	3,866	3,703	3,676	3,648	3,619	3,588	3,556	3,522	3,487	3,451	3,413	3,374	3,333	3,291	3,247
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	151	150	149	148	147	146	145	144	143	141	140	139	137	136	134	133	131	129	128	126
TOTAL	16,469	16,554	16,506	16,476	16,471	16,384	16,504	16,368	16,373	16,471	16,562	16,847	16,827	16,801	16,771	16,736	16,697	16,653	16,606	16,555	16,499

TABLE 5-14 COUNTY PRODUCTION LINKED TO OUT-OF-STATE MARKETS--CASE NO. 3—WET COAL MARKET RESUMES

LINKED MARKETS	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL (T)	1,409	1,202	993	784	574	362	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA (% MARKET)	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DELTA (T)	916	781	646	510	373	236	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT (% MARKET)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
MOFFAT (T)	70	60	50	39	29	18	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT (% MARKET)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
ROUTT (T)	423	361	298	235	172	109	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL (T)	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
DELTA (% MARKET)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
DELTA (T)	59	47	33	18	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
GUNNISON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
GUNNISON (T)	139	109	76	42	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
MOFFAT (% MARKET)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
MOFFAT (T)	198	155	109	60	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
E & W SOUTH CENT (T)	4,200	4,452	4,537	4,608	4,667	4,715	4,755	4,788	4,815	4,837	4,855	4,870	4,882	4,892	4,901	4,907	4,913	4,917	4,921	4,924	4,926
DELTA (% MARKET)	4	4	4	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8
DELTA (T)	168	178	181	276	280	283	285	383	385	387	388	390	391	391	392	393	393	393	394	394	394
FREMONT (% MARKET)	8	8	8	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12
FREMONT (T)	336	356	363	461	467	472	476	575	578	580	583	584	586	587	588	589	590	590	591	591	591
LAS ANIMAS (% MARKET)	13	13	13	15	15	15	15	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LAS ANIMAS (T)	546	579	590	691	700	707	713	862	867	871	874	877	879	881	882	883	884	885	886	886	887
MESA (% MARKET)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
MESA (T)	756	801	817	829	840	849	856	862	867	871	874	877	879	881	882	883	884	885	886	886	887
MOFFAT (% MARKET)	50	50	50	45	45	45	45	40	40	40	40	40	40	40	40	40	40	40	40	40	40
MOFFAT (T)	2,100	2,226	2,269	2,074	2,100	2,122	2,140	1,915	1,926	1,935	1,942	1,948	1,953	1,957	1,960	1,963	1,965	1,967	1,968	1,970	1,971
ROUTT (% MARKET)	7	7	7	6	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ROUTT (T)	294	312	318	276	280	283	285	192	193	193	194	195	195	196	196	196	197	197	197	197	197
MOUNTAIN--IND. (T)	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
ARCHULETA (% MARKET)	55	55	55	55	55	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARCHULETA (T)	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
JACKSON (T)	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA (% MARKET)	10	10	10	10	10	40	40	65	65	65	65	65	65	65	65	65	65	65	65	65	65
LA PLATA (T)	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
MOUNTAIN--WET (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
GUNNISON (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
GUNNISON (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN—STEAM (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
RIO BLANCO (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
RIO BLANCO (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC (T)	137	542	572	604	630	646	661	677	693	709	725	741	756	772	788	804	820	836	851	867	883
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	137	542	572	604	630	646	661	677	693	709	725	741	756	772	788	804	820	836	851	867	883
EXPORT (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

(T) denotes thousands of short tons

TABLE 5-15 SUMMARIZED COUNTY COAL PRODUCTION TO OUT-OF-STATE MARKETS--CASE NO. 3--NET COAL MARKET RESUMES (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,144	1,006	860	804	668	533	398	398	400	402	403	405	406	406	407	408	408	408	409	409	409
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	336	356	363	461	467	472	476	575	578	580	583	584	586	587	588	589	590	590	591	591	591
GARFIELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUNNISON	1,003	1,043	1,071	1,086	1,131	1,186	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
LAS ANIMAS	546	579	590	691	700	707	713	862	867	871	874	877	879	881	882	883	884	885	886	886	887
MESA	756	801	817	829	840	849	856	862	867	871	874	877	879	881	882	883	884	885	886	886	887
MOFFAT	2,369	2,441	2,427	2,173	2,179	2,190	2,197	1,965	1,976	1,985	1,992	1,998	2,003	2,007	2,010	2,013	2,015	2,017	2,018	2,020	2,021
MONTROSE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PITKIN	637	1,042	1,072	1,104	1,130	1,146	1,161	1,177	1,193	1,209	1,225	1,241	1,256	1,272	1,288	1,304	1,320	1,336	1,351	1,367	1,383
RIO BLANCO	200	400	500	650	765	900	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	717	672	616	512	452	392	330	192	193	193	194	195	195	196	196	196	197	197	197	197	197
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8,092	8,750	8,731	8,771	8,819	8,788	8,966	8,891	8,960	9,124	9,284	9,640	9,694	9,746	9,796	9,843	9,892	9,938	9,984	10,026	10,073

TABLE 5-16 RECAPITULATION OF COUNTY COAL PRODUCTION TO IN-STATE MARKET--CASE NO. 3--NET COAL MARKET RESUMES (THOUSANDS OF SHORT TONS)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
COUNTY	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
ARCHULETA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	344	348	352	356	360	365	369	373	378	382	387	392	396	401	406	411	416	421	426	431	436
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	537	544	550	557	563	570	577	584	591	598	605	612	620	627	635	642	650	658	666	674	682
GARFIELD	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	337	341	345	349	353	357	362	366	370	375	379	384	389	393	398	403	408	412	417	422	428
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LA PLATA	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LAS ANIMAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT	3,202	3,240	3,279	3,319	3,358	3,399	3,439	3,481	3,523	3,565	3,608	3,651	3,695	3,739	3,784	3,829	3,875	3,922	3,969	4,016	4,065
MONTROSE	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
RIO BLANCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT	3,700	3,745	3,790	3,835	3,881	3,928	3,975	4,023	4,071	4,120	4,169	4,219	4,270	4,321	4,373	4,425	4,478	4,532	4,587	4,642	4,697
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688

TABLE 5-17 SUMMARIZED COUNTY COAL PRODUCTION —CASE NO. 3—NET COAL MARKET RESUMES (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,487	1,353	1,212	1,160	1,028	898	767	771	778	784	790	796	802	808	813	818	824	829	834	840	845
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	873	900	913	1,018	1,030	1,042	1,053	1,158	1,169	1,178	1,188	1,197	1,206	1,214	1,223	1,231	1,240	1,248	1,256	1,265	1,273
GARFIELD	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
LA PLATA	55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
LAS ANIMAS	546	579	590	691	700	707	713	862	867	871	874	877	879	881	882	883	884	885	886	886	887
MESA	756	801	817	829	840	849	856	862	867	871	874	877	879	881	882	883	884	885	886	886	887
MOFFAT	5,571	5,682	5,707	5,491	5,537	5,589	5,637	5,446	5,499	5,550	5,600	5,649	5,698	5,746	5,794	5,842	5,890	5,939	5,987	6,036	6,085
MONTROSE	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	654	1,059	1,089	1,122	1,147	1,164	1,180	1,196	1,212	1,228	1,244	1,260	1,276	1,292	1,308	1,324	1,340	1,356	1,372	1,388	1,404
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	4,417	4,417	4,405	4,347	4,333	4,319	4,305	4,214	4,263	4,313	4,363	4,414	4,465	4,517	4,569	4,622	4,675	4,729	4,783	4,839	4,894
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	16,511	17,270	17,373	17,498	17,650	17,725	18,010	18,043	18,222	18,497	18,770	19,240	19,409	19,578	19,746	19,914	20,082	20,250	20,420	20,590	20,760

TABLE 5-18 COUNTY PRODUCTION LINKED TO OUT-OF-STATE MARKETS--CASE NO. 4--ACID RAIN LEGISLATION BENEFITS COLORADO

LINKED MARKETS	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EAST NORTH CENTRAL (T)	1,381	1,453	1,529	1,609	1,693	1,782	1,875	1,973	2,076	2,185	2,299	2,304	2,309	2,314	2,319	2,325	2,330	2,335	2,340	2,345	2,350
DELTA (% MARKET)	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
DELTA (T)	898	944	994	1,046	1,101	1,158	1,219	1,283	1,350	1,420	1,494	1,498	1,501	1,504	1,508	1,511	1,514	1,518	1,521	1,524	1,528
MOFFAT (% MARKET)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
MOFFAT (T)	69	73	76	80	85	89	94	99	104	109	115	115	115	116	116	116	116	117	117	117	118
ROUTT (% MARKET)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
ROUTT (T)	414	436	459	483	508	535	562	592	623	655	690	691	693	694	696	697	699	700	702	704	705
WEST NORTH CENTRAL (T)	396	310	218	119	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
DELTA (% MARKET)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
DELTA (T)	59	47	33	18	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
GUNNISON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
GUNNISON (T)	139	109	76	42	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
MOFFAT (% MARKET)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
MOFFAT (T)	198	155	109	60	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
E & W SOUTH CENT (T)	4,200	4,302	4,387	4,458	4,517	4,565	4,605	4,638	4,665	4,687	4,705	4,720	4,732	4,742	4,751	4,757	4,763	4,767	4,771	4,774	4,776
DELTA (% MARKET)	4	4	4	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8
DELTA (T)	168	172	175	267	271	274	276	371	373	375	376	378	379	379	380	381	381	381	382	382	382
FREMONT (% MARKET)	8	8	8	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12
FREMONT (T)	336	344	351	446	452	457	461	557	560	562	565	566	568	569	570	571	572	572	573	573	573
LAS ANIMAS (% MARKET)	13	13	13	15	15	15	15	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LAS ANIMAS (T)	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA (% MARKET)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
MESA (T)	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT (% MARKET)	50	50	50	45	45	45	45	40	40	40	40	40	40	40	40	40	40	40	40	40	40
MOFFAT (T)	2,100	2,151	2,194	2,006	2,032	2,054	2,072	1,855	1,866	1,875	1,882	1,888	1,893	1,897	1,900	1,903	1,905	1,907	1,908	1,910	1,911
ROUTT (% MARKET)	7	7	7	6	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ROUTT (T)	294	301	307	267	271	274	276	186	187	187	188	189	189	190	190	190	191	191	191	191	191
MOUNTAIN--IND. (T)	384	410	436	462	488	514	540	566	592	618	644	670	695	721	747	773	799	825	851	877	903
ARCHULETA (% MARKET)	55	55	55	55	55	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ARCHULETA (T)	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON (% MARKET)	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
JACKSON (T)	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA (% MARKET)	10	10	10	10	10	40	40	65	65	65	65	65	65	65	65	65	65	65	65	65	65
LA PLATA (T)	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
MOUNTAIN--MET (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
GUNNISON (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
GUNNISON (T)	865	934	994	1,044	1,096	1,151	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260	1,260
MOUNTAIN--STEAM (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
RIO BLANCO (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
RIO BLANCO (T)	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
PACIFIC (T)	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	137	165	195	227	253	269	284	300	316	332	348	364	379	395	411	427	443	459	474	490	506
EXPORT (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
PITKIN (% MARKET)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PITKIN (T)	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

(T) denotes thousands of short tons

TABLE 5-19 SUMMARIZED COUNTY COAL PRODUCTION TO OUT-OF-STATE MARKETS—CASE NO. 4—ACID RAIN LEGISLATION BENEFIT (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,125	1,163	1,202	1,331	1,387	1,447	1,510	1,669	1,738	1,810	1,886	1,890	1,895	1,899	1,903	1,907	1,910	1,914	1,918	1,921	1,925
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	334	344	351	446	452	457	461	537	560	562	565	566	568	569	570	571	572	572	573	573	573
GARFIELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUNNISON	1,003	1,043	1,071	1,086	1,131	1,186	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295	1,295
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	134	143	153	162	171	180	189	198	207	216	225	234	243	253	262	271	280	289	298	307	316
LA PLATA	38	41	44	46	49	205	216	368	385	401	418	435	452	469	486	503	520	536	553	570	587
LAS ANIMAS	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT	2,367	2,379	2,379	2,146	2,167	2,193	2,216	2,004	2,020	2,034	2,047	2,053	2,058	2,063	2,066	2,069	2,072	2,074	2,075	2,077	2,078
MONTROSE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PITKIN	637	665	695	727	753	769	784	800	816	832	848	864	879	895	911	927	943	959	974	990	1,006
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,300	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	708	737	766	750	779	808	839	777	809	843	878	880	882	884	886	888	889	891	893	894	896
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	8,063	8,474	8,759	9,069	9,412	9,680	10,164	10,337	10,509	10,782	11,056	11,418	11,477	11,534	11,589	11,642	11,695	11,746	11,797	11,846	11,896

TABLE S-20 RECAPITULATION OF COUNTY COAL PRODUCTION TO IN-STATE MARKET—CASE NO. 4—ACID RAIN LEGISLATION BENEFIT (THOUSANDS OF SHORT TONS)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
COUNTY	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688
ARCHULETA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	344	348	352	356	360	365	369	373	378	382	387	392	396	401	406	411	416	421	426	431	436
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	537	544	550	557	563	570	577	584	591	598	605	612	620	627	635	642	650	658	666	674	682
GARFIELD	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	337	341	345	349	353	357	362	366	370	375	379	384	389	393	398	403	408	412	417	422	428
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LA PLATA	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
LAS ANIMAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MESA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MOFFAT	3,202	3,240	3,279	3,319	3,358	3,399	3,439	3,481	3,523	3,565	3,608	3,651	3,695	3,739	3,784	3,829	3,875	3,922	3,969	4,016	4,065
MONTROSE	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	17	17	17	17	18	18	18	18	19	19	19	19	19	20	20	20	20	21	21	21	21
RIO BLANCO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROUTT	3,700	3,745	3,790	3,835	3,881	3,928	3,975	4,023	4,071	4,120	4,169	4,219	4,270	4,321	4,373	4,425	4,478	4,532	4,587	4,642	4,697
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	8,419	8,520	8,623	8,726	8,831	8,937	9,044	9,153	9,262	9,374	9,486	9,600	9,715	9,832	9,950	10,069	10,190	10,312	10,436	10,561	10,688

TABLE 5-21 SUMMARIZED COUNTY COAL PRODUCTION --CASE NO. 4--ACID RAIN LEGISLATION BENEFITS COLORADO (THOUSANDS OF SHORT TONS)

COUNTY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA	211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DELTA	1,468	1,511	1,554	1,687	1,747	1,812	1,879	2,042	2,116	2,193	2,273	2,282	2,291	2,300	2,309	2,317	2,326	2,335	2,343	2,352	2,361
EL PASO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FREMONT	873	888	901	1,003	1,015	1,027	1,038	1,140	1,151	1,160	1,170	1,179	1,188	1,196	1,205	1,213	1,222	1,230	1,238	1,247	1,255
GARFIELD	34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
GUNNISON	1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
HUERFANO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON	151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
LA PLATA	55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
LAS ANIMAS	546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MESA	756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
MOFFAT	5,569	5,619	5,658	5,465	5,526	5,592	5,655	5,485	5,542	5,599	5,655	5,704	5,753	5,802	5,850	5,898	5,947	5,995	6,044	6,093	6,143
MONTROSE	63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
PITKIN	654	682	712	745	770	787	803	819	835	851	867	883	899	915	931	947	963	979	995	1,011	1,027
RIO BLANCO	200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
ROUTT	4,409	4,482	4,556	4,585	4,660	4,736	4,814	4,800	4,880	4,963	5,047	5,099	5,152	5,205	5,259	5,313	5,368	5,423	5,479	5,536	5,593
SAN MIGUEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELD	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
TOTAL	16,483	16,995	17,382	17,796	18,243	18,617	19,208	19,490	19,771	20,155	20,542	21,018	21,192	21,365	21,538	21,711	21,885	22,058	22,233	22,408	22,584

TABLE 5-22. SAMPLE STATISTICS OF PRODUCTIVITY AND DAYS WORKED

COUNTY	1978	1979	1980	1981	1982	1983	MEAN	MEAN AVERAGE DEVIATION	WEIGHTED AVERAGE DAYS WORKED	WEIGHTED AVERAGE TONS PER MAN-DAY	DAYS WORKED 1983	TONS PER MAN-DAY 1983
ARCHULETA	16.80	13.86	13.90	21.05	19.50	18.40	17.25	2.40	272	18.70	327	18.40
DELTA	11.21	22.93	19.73	22.48	27.29	26.61	21.71	4.16	199	21.99	255	26.61
EL PASO			17.40				17.40	0.00	173	17.40		
FREMONT	12.85	16.46	12.45	11.17	12.41	16.50	13.64	1.89	232	13.55	218	16.50
GARFIELD	14.97	3.78	13.32	31.49	26.95	35.00	20.92	10.23	126	19.21	16	35.00
GUNNISON	11.76	16.27	16.70	14.43	15.33	18.52	15.50	1.66	191	15.15	212	18.52
HUERFANO	51.90	31.28	12.45	18.45			28.52	13.07	188	21.89		
JACKSON	28.17	32.83	28.83	25.70	34.45	29.27	30.04	2.73	228	29.47	256	29.27
LA PLATA	11.30	10.64	8.54	18.13	16.00	10.10	12.45	3.08	255	12.07	258	10.10
LAS ANIMAS	6.41	6.11	7.25	8.12	9.55	7.93	7.56	0.97	220	7.17	196	7.93
MESA	11.60	15.25	15.74	17.02	22.00	18.75	16.73	2.53	249	16.84	259	18.75
MOFFAT	12.58	27.16	29.85	34.61	37.16	34.94	29.38	6.34	260	28.08	291	34.94
MONTROSE	16.90	21.63	18.89	21.91	14.91	13.51	17.96	2.85	243	18.18	193	13.51
PITKIN	5.94	6.90	6.57	8.22	7.74	15.35	8.45	2.30	220	7.58	169	15.35
RIO BLANCO	5.50	9.87	11.93	10.08	13.62	10.93	10.32	1.84	217	10.53	221	10.93
ROUTT	49.92	34.93	42.13	41.01	41.47	49.91	43.23	4.46	246	42.29	237	49.91
SAN MIGUEL			0.30				0.30	0.00				
WELD	7.10			4.70	14.03	12.70	9.63	3.73	219	10.92	306	12.70

TABLE 5-23 PROJECTED PRODUCTION, PRODUCTIVITY AND DIRECT LABOR--CASE NO. 1--BASE CASE, CONSTANT 1983 PRODUCTIVITY

COUNTY	PRODUCTIVITY CONSTANT 1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA (T)		211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	18.40	18.40	18.40	18.40	18.40	18.40	18.40	18.40														
Men		50	53	57	60	63	30	32														
DELTA (T)		1,487	1,347	1,206	1,151	1,019	889	758	759	766	772	778	784	790	796	801	806	812	817	822	828	833
	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61	26.61
Men		243	220	197	188	167	145	124	124	125	126	127	128	129	130	131	132	133	134	134	135	136
EL PASO (T)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FREMONT (T)		873	888	901	1,003	1,015	1,027	1,038	1,140	1,151	1,160	1,170	1,179	1,188	1,196	1,205	1,213	1,222	1,230	1,238	1,247	1,255
	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50
Men		230	234	237	264	267	271	273	301	303	306	308	311	313	315	317	320	322	324	326	329	331
GARFIELD (T)		34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Men		4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5
GUNNISON (T)		1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52	18.52
Men		315	325	332	337	349	362	389	390	391	392	393	394	395	396	397	399	400	401	402	403	404
HUERFANO (T)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
JACKSON (T)		151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27	29.27
Men		22	24	25	27	28	29	31	32	34	35	36	38	39	40	42	43	45	46	47	49	50
LA PLATA (T)		55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Men		24	25	26	27	29	96	101	166	174	181	188	196	203	210	218	225	232	240	247	255	262
LAS ANIMAS (T)		546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93	7.93
Men		299	307	313	367	371	375	379	458	460	463	464	466	467	468	469	469	470	470	471	471	471
MESA (T)		756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75
Men		175	180	183	186	189	191	192	194	195	196	196	197	198	198	198	199	199	199	199	199	199
MOFFAT (T)		5,571	5,607	5,632	5,424	5,470	5,521	5,569	5,386	5,439	5,490	5,540	5,589	5,638	5,686	5,734	5,782	5,830	5,879	5,927	5,976	6,025
	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94	34.94
Men		693	698	701	675	681	687	693	670	677	683	689	695	702	708	714	720	726	732	738	744	750
MONTROSE (T)		63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51	13.51
Men		20	21	21	21	21	22	22	22	22	23	23	23	23	24	24	24	25	25	25	25	26
PITKIN (T)		654	682	712	745	770	787	803	819	835	851	867	883	899	915	931	947	963	979	995	1,011	1,027
	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35	15.35
Men		185	193	202	211	218	223	227	232	236	241	246	250	255	259	264	268	273	277	282	286	291
RIO BLANCO (T)		200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93	10.93
Men		80	159	199	259	304	318	398	398	398	438	477	597	597	597	597	597	597	597	597	597	597
ROUTT (T)		4,417	4,406	4,395	4,338	4,324	4,310	4,296	4,208	4,257	4,307	4,357	4,408	4,459	4,511	4,563	4,616	4,669	4,723	4,777	4,833	4,888
	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91
Men		385	384	383	378	377	375	374	367	371	375	380	384	388	393	397	402	407	411	416	421	426
SAN MIGUEL (T)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WELD (T)		152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70	12.70
Men		52	53	53	54	55	55	56	57	57	58	59	59	60	61	62	62	63	64	65	65	66
TOTAL PRODUCTION		16,511	16,743	16,846	16,971	17,123	17,198	17,483	17,516	17,695	17,970	18,243	18,713	18,882	19,051	19,219	19,387	19,555	19,723	19,893	20,063	20,233
TOTAL MEN		2,778	2,879	2,933	3,058	3,123	3,185	3,295	3,414	3,448	3,520	3,592	3,743	3,774	3,804	3,834	3,865	3,895	3,925	3,955	3,985	4,015

(T) denotes thousands of short tons

TABLE 5-24 PROJECTED PRODUCTION, PRODUCTIVITY AND DIRECT LABOR--CASE NO. 1--BASE CASE, PRODUCTIVITY ESCALATES 3% PER YEAR

COUNTY	OBSERVED 1983 PRODUCTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA (T)		211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	18.40	18.95	19.52	20.11	20.71	21.33	21.97	22.63														
Men		48	50	52	53	55	25	26														
DELTA (T)		1,487	1,347	1,206	1,151	1,019	889	758	759	766	772	778	784	790	796	801	806	812	817	822	828	833
	26.61	27.41	28.23	29.08	29.95	30.85	31.77	32.73	33.71	34.72	35.76	36.83	37.94	39.08	40.25	41.46	42.70	43.98	45.30	46.66	48.06	49.50
Men		236	208	180	167	144	122	101	98	96	94	92	90	88	86	84	82	80	78	77	75	73
EL PASO (T)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FREMONT(T)		873	888	901	1,003	1,015	1,027	1,038	1,140	1,151	1,160	1,170	1,179	1,188	1,196	1,205	1,213	1,222	1,230	1,238	1,247	1,255
	16.50	17.00	17.50	18.03	18.57	19.13	19.70	20.29	20.90	21.53	22.17	22.84	23.53	24.23	24.96	25.71	26.48	27.27	28.09	28.93	29.80	30.69
Men		223	221	217	235	231	227	222	237	232	228	223	218	213	208	204	199	195	190	186	182	178
GARFIELD(T)		34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
	35.00	36.05	37.13	38.25	39.39	40.57	41.79	43.05	44.34	45.67	47.04	48.45	49.90	51.40	52.94	54.53	56.16	57.85	59.59	61.37	63.21	65.11
Men		4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3
GUNNISON (T)		1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
	18.52	19.08	19.65	20.24	20.84	21.47	22.11	22.78	23.46	24.16	24.89	25.64	26.41	27.20	28.01	28.85	29.72	30.61	31.53	32.47	33.45	34.45
Men		305	306	304	299	301	303	316	308	300	292	284	276	269	262	255	248	242	235	229	223	217
HUERFANO (T)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
JACKSON (T)		151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
	29.27	30.15	31.05	31.98	32.94	33.93	34.95	36.00	37.08	38.19	39.34	40.52	41.73	42.98	44.27	45.60	46.97	48.38	49.83	51.33	52.86	54.45
Men		22	22	23	24	24	25	25	25	26	26	26	26	27	27	27	27	27	27	27	27	27
LA PLATA (T)		55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
	10.10	10.40	10.72	11.04	11.37	11.71	12.06	12.42	12.79	13.18	13.57	13.98	14.40	14.83	15.28	15.74	16.21	16.69	17.19	17.71	18.24	18.79
Men		23	24	24	24	25	81	82	131	133	135	136	137	138	139	140	140	141	141	141	141	141
LAS ANIMAS (T)		546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	7.93	8.17	8.41	8.67	8.93	9.19	9.47	9.75	10.05	10.35	10.66	10.98	11.31	11.65	11.99	12.35	12.73	13.11	13.50	13.91	14.32	14.75
Men		291	289	286	326	320	314	308	361	353	344	335	327	318	309	301	293	284	276	269	261	253
MESA (T)		756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	18.75	19.31	19.89	20.49	21.10	21.74	22.39	23.06	23.75	24.46	25.20	25.95	26.73	27.54	28.36	29.21	30.09	30.99	31.92	32.88	33.86	34.88
Men		170	169	168	165	163	160	156	153	149	146	142	138	135	131	127	124	120	117	114	110	107
MOFFAT (T)		5,571	5,607	5,632	5,424	5,470	5,521	5,569	5,386	5,439	5,490	5,540	5,589	5,638	5,686	5,734	5,782	5,830	5,879	5,927	5,976	6,025
	34.94	35.99	37.07	38.18	39.33	40.51	41.72	42.97	44.26	45.59	46.96	48.37	49.82	51.31	52.85	54.44	56.07	57.75	59.48	61.27	63.11	65.00
Men		673	658	641	600	587	575	563	529	519	508	498	488	478	468	458	448	439	430	421	412	403
MONTROSE (T)		63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
	13.51	13.92	14.33	14.76	15.21	15.66	16.13	16.62	17.11	17.63	18.16	18.70	19.26	19.84	20.44	21.05	21.68	22.33	23.00	23.69	24.40	25.13
Men		20	19	19	19	18	18	18	17	17	17	17	16	16	16	15	15	15	15	14	14	14
PITKIN (T)		654	682	712	745	770	787	803	819	835	851	867	883	899	915	931	947	963	979	995	1,011	1,027
	15.35	15.81	16.28	16.77	17.28	17.79	18.33	18.88	19.44	20.03	20.63	21.25	21.89	22.54	23.22	23.91	24.63	25.37	26.13	26.92	27.72	28.56
Men		180	182	185	187	188	187	185	183	181	179	177	175	173	171	169	167	165	163	161	159	156
RIO BLANCO (T)		200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
	10.93	11.26	11.60	11.94	12.30	12.67	13.05	13.44	13.85	14.26	14.69	15.13	15.58	16.05	16.53	17.03	17.54	18.07	18.61	19.17	19.74	20.33
Men		77	150	182	230	262	267	323	314	305	326	345	419	406	394	383	372	361	350	340	330	321
ROUTT (T)		4,417	4,406	4,395	4,338	4,324	4,310	4,296	4,208	4,257	4,307	4,357	4,408	4,459	4,511	4,563	4,616	4,669	4,723	4,777	4,833	4,888
	49.91	51.41	52.95	54.54	56.17	57.86	59.60	61.38	63.22	65.12	67.07	69.09	71.16	73.29	75.49	77.76	80.09	82.49	84.97	87.52	90.14	92.85
Men		374	362	350	336	325	314	304	289	284	279	274	269	265	260	255	251	246	242	237	233	229
SAN MIGUEL (T)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WELD (T)		152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
	12.70	13.08	13.47	13.88	14.29	14.72	15.16	15.62	16.09	16.57	17.07	17.58	18.11	18.65	19.21	19.79	20.38	20.99	21.62	22.27	22.94	23.63
Men		51	50	49	48	47	46	46	45	44	43	42	42	41	40	40	39	38	38	37	36	36
TOTAL PRODUCTION		16,511	16,743	16,846	16,971	17,123	17,198	17,483	17,516	17,695	17,970	18,243	18,713	18,882	19,051	19,219	19,387	19,555	19,723	19,893	20,063	20,233
TOTAL MEN		2,697	2,713	2,684	2,717	2,694	2,667	2,679	2,695	2,642	2,619	2,595	2,625	2,570	2,515	2,461	2,408	2,356	2,305	2,255	2,206	2,158

(T) denotes thousands of short tons

TABLE 5-25 PROJECTED PRODUCTION, PRODUCTIVITY AND DIRECT LABOR--CASE NO. 1--BASE CASE--MODIFIED PRODUCTIVITY ESCALATION

COUNTY	PEAK PRODUCTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA (T)		211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	21.05	21.16	21.26	21.37	21.47	21.58	21.69	21.80														
Men		43	46	49	51	54	26	27														
DELTA (T)		1,487	1,347	1,206	1,151	1,019	889	758	759	766	772	778	784	790	796	801	806	812	817	822	828	833
	27.29	27.56	27.84	28.12	28.40	28.68	28.97	29.26	29.55	29.85	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15
Men		235	210	186	176	154	133	113	112	112	111	112	113	114	115	116	116	117	118	119	119	120
EL PASO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FREMONT(T)		873	888	901	1,003	1,015	1,027	1,038	1,140	1,151	1,160	1,170	1,179	1,188	1,196	1,205	1,213	1,222	1,230	1,238	1,247	1,255
CHANGE IN 1990	16.50	16.67	16.83	17.00	17.17	17.34	17.52	21.00	21.21	21.42	21.64	21.85	22.07	22.29	22.51	22.74	22.97	23.20	23.43	23.66	23.90	24.14
Men		228	229	230	254	254	255	215	234	234	233	233	232	232	231	230	230	229	228	228	227	226
GARFIELD (T)		34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
	35.00	35.35	35.70	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06
Men		4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
GUNNISON (T)		1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
CHANGE IN 1986	18.52	18.71	18.89	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32
Men		312	318	280	281	288	296	315	312	310	308	306	303	301	299	297	295	293	291	289	287	285
HUERFANO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
JACKSON (T)		151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
	35.45	35.63	35.81	35.98	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16
Men		18	19	21	22	23	24	25	26	27	28	29	30	32	33	34	35	36	37	38	39	41
LA PLATA (T)		55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
CHANGE IN 1988	18.13	18.31	18.49	18.68	18.87	25.00	25.25	25.50	25.76	26.02	26.28	26.54	26.80	27.07	27.34	27.62	27.89	28.17	28.45	28.74	29.02	29.31
Men		13	14	14	15	12	38	40	65	67	70	72	74	76	78	80	82	83	85	87	89	90
LAS ANIMAS (T)		546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
CHANGE IN 1987	9.55	9.65	9.74	9.84	15.00	15.15	15.30	15.45	15.61	15.77	15.92	16.08	16.24	16.41	16.57	16.74	16.90	17.07	17.24	17.41	17.59	17.76
Men		246	250	252	194	194	195	194	233	232	230	229	227	226	224	222	220	218	216	214	212	210
MESA (T)		756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32	26.58	26.84	27.11
Men		148	150	151	152	153	153	153	152	152	151	150	149	148	147	146	144	143	142	140	139	138
MOFFAT (T)		5,571	5,607	5,632	5,424	5,470	5,521	5,569	5,386	5,439	5,490	5,540	5,589	5,638	5,686	5,734	5,782	5,830	5,879	5,927	5,976	6,025
	37.16	37.35	37.53	37.72	37.91	38.10	38.29	38.48	38.67	38.87	39.06	39.26	39.45	39.65	39.85	40.05	40.05	40.05	40.05	40.05	40.05	40.05
Men		649	649	649	622	624	627	629	606	608	611	614	616	618	620	622	628	633	638	643	649	654
MONTROSE (T)		63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
	21.91	22.02	22.13	22.24	22.35	22.46	22.58	22.69	22.80	22.92	23.03	23.15	23.26	23.38	23.49	23.61	23.73	23.85	23.97	24.09	24.21	24.33
Men		12	13	13	13	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14
PITKIN (T)		654	682	712	745	770	787	803	819	835	851	867	883	899	915	931	947	963	979	995	1,011	1,027
CHANGE IN 1990	15.35	15.50	15.66	15.82	15.97	16.13	16.29	20.00	20.20	20.40	20.61	20.81	21.02	21.23	21.44	21.66	21.87	22.09	22.31	22.54	22.76	22.99
Men		183	189	196	203	208	210	174	176	178	179	181	183	184	186	187	188	190	191	192	193	194
RIO BLANCO (T)		200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
CHANGE IN 1987	13.62	13.76	13.89	14.03	19.00	19.19	19.38	19.58	19.77	19.97	20.17	20.37	20.57	20.78	20.99	21.20	21.41	21.62	21.84	22.06	22.28	22.50
Men		63	125	155	149	173	179	222	220	218	237	256	317	314	311	308	305	302	299	296	293	290
ROUTT (T)		4,417	4,406	4,395	4,338	4,324	4,310	4,296	4,208	4,257	4,307	4,357	4,408	4,459	4,511	4,563	4,616	4,669	4,723	4,777	4,833	4,888
	49.92	50.17	50.42	50.67	50.93	51.18	51.44	51.69	51.95	52.21	52.47	52.74	53.00	53.26	53.53	53.80	54.07	54.34	54.61	54.88	55.16	55.43
Men		383	380	377	370	367	364	361	352	355	357	359	362	364	366	369	371	374	376	378	381	383
SAN MIGUEL (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WELD (T)		152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
CHANGE IN 1987	14.03	14.10	14.17	14.24	17.00	17.09	17.17	17.26	17.34	17.43	17.52	17.60	17.69	17.78	17.87	17.96	18.05	18.14	18.23	18.32	18.41	18.50
Men		47	47	48	40	41	41	41	42	42	42	42	43	43	43	44	44	44	45	45	45	45
TOTAL PRODUCTION		16,511	16,743	16,846	16,971	17,123	17,198	17,483	17,516	17,695	17,970	18,243	18,713	18,882	19,051	19,219	19,387	19,555	19,723	19,893	20,063	20,233
TOTAL MEN		2,585	2,645	2,625	2,546	2,562	2,559	2,527	2,547	2,551	2,576	2,601	2,667	2,669	2,671	2,672	2,676	2,680	2,684	2,688	2,692	2,696

(T) denotes production in thousands of short tons

TABLE 5-26 PROJECTED PRODUCTION, PRODUCTIVITY AND DIRECT LABOR--CASE NO. 2--COLORADO LOSES MARKETSHARE--MODIFIES PRODUCTIVITY ESCALATION

COUNTY	PEAK PRODUCTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA (T)		211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	21.05	21.16	21.26	21.37	21.47	21.58	21.69	21.80														
Men		43	46	49	51	54	26	27														
DELTA (T)		1,485	1,340	1,192	1,131	993	856	718	713	712	711	710	708	706	704	701	698	695	692	688	685	681
	27.29	27.56	27.84	28.12	28.40	28.68	28.97	29.26	29.55	29.85	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15
Men		234	209	184	173	150	128	107	105	104	103	102	102	102	101	101	101	100	100	99	99	98
EL PASO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FREMONT(T)		870	876	879	971	973	975	975	1,067	1,066	1,065	1,063	1,060	1,057	1,053	1,049	1,044	1,039	1,034	1,029	1,023	1,017
CHANGE IN 1990	16.50	16.67	16.83	17.00	17.17	17.34	17.52	21.00	21.21	21.42	21.64	21.85	22.07	22.29	22.51	22.74	22.97	23.20	23.43	23.66	23.90	24.14
Men		227	226	225	246	244	242	202	219	216	214	211	209	206	203	201	198	195	192	189	186	183
GARFIELD (T)		34	33	33	33	33	32	32	32	32	31	31	31	31	30	30	30	29	29	29	28	28
	35.00	35.35	35.70	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06
Men		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3
GUNNISON (T)		1,339	1,376	1,402	1,415	1,458	1,511	1,618	1,615	1,613	1,610	1,607	1,604	1,601	1,598	1,595	1,592	1,588	1,585	1,581	1,577	1,573
CHANGE IN 1986	18.52	18.71	18.89	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32
Men		311	317	277	277	283	290	307	304	300	297	293	290	287	283	280	276	273	270	266	263	260
HUERFANO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
JACKSON (T)		151	160	169	178	187	196	205	214	223	232	241	250	259	268	277	286	294	303	312	321	330
	35.45	35.63	35.81	35.98	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16
Men		18	19	20	21	22	24	25	26	27	28	29	30	31	32	33	34	35	36	38	39	40
LA PLATA (T)		55	58	60	63	65	222	232	384	400	417	434	451	467	484	501	518	534	551	568	584	601
CHANGE IN 1988	18.13	18.31	18.49	18.68	18.87	25.00	25.25	25.50	25.76	26.02	26.28	26.54	26.80	27.07	27.34	27.62	27.89	28.17	28.45	28.74	29.02	29.31
Men		13	14	14	14	11	38	40	65	67	69	71	73	75	77	79	81	82	84	86	88	89
LAS ANIMAS (T)		546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
CHANGE IN 1987	9.55	9.65	9.74	9.84	15.00	15.15	15.30	15.45	15.61	15.77	15.92	16.08	16.24	16.41	16.57	16.74	16.90	17.07	17.24	17.41	17.59	17.76
Men		246	250	252	194	194	195	194	233	232	230	229	227	226	224	222	220	218	216	214	212	210
MESA (T)		756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32	26.58	26.84	27.11
Men		148	150	151	152	153	153	153	152	152	151	150	149	148	147	146	144	143	142	140	139	138
MOFFAT (T)		5,555	5,535	5,502	5,236	5,222	5,212	5,197	4,949	4,936	4,919	4,901	4,879	4,856	4,830	4,803	4,774	4,743	4,711	4,677	4,642	4,605
	37.16	37.35	37.53	37.72	37.91	38.10	38.29	38.48	38.67	38.87	39.06	39.26	39.45	39.65	39.85	40.05	40.05	40.05	40.05	40.05	40.05	40.05
Men		647	641	634	600	596	592	587	556	552	548	543	538	532	527	521	518	515	511	508	504	500
MONTROSE (T)		63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	56	55	54	54	53	52
	21.91	22.02	22.13	22.24	22.35	22.46	22.58	22.69	22.80	22.92	23.03	23.15	23.26	23.38	23.49	23.61	23.73	23.85	23.97	24.09	24.21	24.33
Men		12	12	12	12	12	12	12	11	11	11	11	11	11	11	10	10	10	10	10	10	9
PITKIN (T)		654	682	711	744	769	785	801	816	832	848	863	879	895	910	926	942	957	973	989	1,004	1,020
CHANGE IN 1990	15.35	15.50	15.66	15.82	15.97	16.13	16.29	20.00	20.20	20.40	20.61	20.81	21.02	21.23	21.44	21.66	21.87	22.09	22.31	22.54	22.76	22.99
Men		183	189	196	202	207	209	174	176	177	179	180	182	183	185	186	187	188	190	191	192	193
RIO BLANCO (T)		200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
CHANGE IN 1987	13.62	13.76	13.89	14.03	19.00	19.19	19.38	19.58	19.77	19.97	20.17	20.37	20.57	20.78	20.99	21.20	21.41	21.62	21.84	22.06	22.28	22.50
Men		63	125	155	149	173	179	222	220	218	237	256	317	314	311	308	305	302	299	296	293	290
ROUTT (T)		4,399	4,323	4,245	4,121	4,038	3,953	3,866	3,703	3,676	3,648	3,619	3,588	3,556	3,522	3,487	3,451	3,413	3,374	3,333	3,291	3,247
	49.92	50.17	50.42	50.67	50.93	51.18	51.44	51.69	51.95	52.21	52.47	52.74	53.00	53.26	53.53	53.80	54.07	54.34	54.61	54.88	55.16	55.43
Men		381	373	364	352	343	334	325	310	306	302	298	294	290	286	282	277	273	269	264	259	255
SAN MIGUEL (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	N
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	N
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	N
WELD (T)		152	151	150	149	148	147	146	145	144	143	141	140	139	137	136	134	133	131	129	128	12
CHANGE IN 1987	14.03	14.10	14.17	14.24	17.00	17.09	17.17	17.26	17.34	17.43	17.52	17.60	17.69	17.78	17.87	17.96	18.05	18.14	18.23	18.32	18.41	18.5
Men		47	46	46	38	38	37	37	36	36	35	35	34	34	33	33	32	32	31	31	30	3
TOTAL PRODUCTION		16,469	16,554	16,506	16,476	16,471	16,384	16,504	16,368	16,373	16,471	16,562	16,847	16,827	16,801	16,771	16,736	16,697	16,653	16,606	16,555	16,49
TOTAL MEN		2,579	2,622	2,584	2,487	2,485	2,463	2,415	2,416	2,402	2,408	2,413	2,460	2,442	2,424	2,405	2,388	2,371	2,353	2,335	2,317	2,29

(T) denotes production in thousands of short tons

TABLE 5-27 PROJECTED PRODUCTION, PRODUCTIVITY AND DIRECT LABOR--CASE NO. 3--MET COAL MARKET RESUMES--MODIFIED PRODUCTIVITY ESCALATION

COUNTY	PEAK PRODUCTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA (T)		211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	21.05	21.16	21.26	21.37	21.47	21.58	21.69	21.80														
Men		43	46	49	51	54	26	27														
DELTA (T)		1,487	1,353	1,212	1,160	1,028	898	767	771	778	784	790	796	802	808	813	818	824	829	834	840	845
	27.29	27.56	27.84	28.12	28.40	28.68	28.97	29.26	29.55	29.85	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15
Men		235	211	187	178	156	135	114	114	113	113	114	115	116	116	117	118	119	120	120	121	122
EL PASO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FREMONT(T)		873	900	913	1,018	1,030	1,042	1,053	1,158	1,169	1,178	1,188	1,197	1,206	1,214	1,223	1,231	1,240	1,248	1,256	1,265	1,273
CHANGE IN 1990	16.50	16.67	16.83	17.00	17.17	17.34	17.52	21.00	21.21	21.42	21.64	21.85	22.07	22.29	22.51	22.74	22.97	23.20	23.43	23.66	23.90	24.14
Men		228	232	234	258	258	259	218	237	237	237	236	236	235	235	234	233	232	232	231	230	229
GARFIELD (T)		34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
	35.00	35.35	35.70	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06
Men		4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
GUNNISON (T)		1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
CHANGE IN 1986	18.52	18.71	18.89	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32
Men		312	318	280	281	288	296	315	312	310	308	306	303	301	299	297	295	293	291	289	287	285
HUERFANO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
JACKSON (T)		151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
	35.45	35.63	35.81	35.98	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16
Men		18	19	21	22	23	24	25	26	27	28	29	30	32	33	34	35	36	37	38	39	41
LA PLATA (T)		55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
CHANGE IN 1988	18.13	18.31	18.49	18.68	18.87	25.00	25.25	25.50	25.76	26.02	26.28	26.54	26.80	27.07	27.34	27.62	27.89	28.17	28.45	28.74	29.02	29.31
Men		13	14	14	15	12	38	40	65	67	70	72	74	76	78	80	82	83	85	87	89	90
LAS ANIMAS (T)		546	579	590	691	700	707	713	862	867	871	874	877	879	881	882	883	884	885	886	886	887
CHANGE IN 1987	9.55	9.65	9.74	9.84	15.00	15.15	15.30	15.45	15.61	15.77	15.92	16.08	16.24	16.41	16.57	16.74	16.90	17.07	17.24	17.41	17.59	17.76
Men		246	258	261	200	201	201	201	240	239	238	236	235	233	231	229	227	225	223	221	219	217
MESA (T)		756	801	817	829	840	849	856	862	867	871	874	877	879	881	882	883	884	885	886	886	887
	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32	26.58	26.84	27.11
Men		148	155	157	158	158	158	158	157	157	156	155	154	153	151	150	149	148	146	145	144	142
MOFFAT (T)		5,570	5,682	5,707	5,491	5,537	5,589	5,637	5,446	5,499	5,550	5,600	5,649	5,698	5,746	5,794	5,842	5,890	5,939	5,987	6,036	6,085
	37.16	37.35	37.53	37.72	37.91	38.10	38.29	38.48	38.67	38.87	39.06	39.26	39.45	39.65	39.85	40.05	40.05	40.05	40.05	40.05	40.05	40.05
Men		649	658	658	630	632	635	637	612	615	618	620	623	625	627	629	634	639	645	650	655	661
MONTROSE (T)		63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
	21.91	22.02	22.13	22.24	22.35	22.46	22.58	22.69	22.80	22.92	23.03	23.15	23.26	23.38	23.49	23.61	23.73	23.85	23.97	24.09	24.21	24.33
Men		12	13	13	13	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14
PITKIN (T)		654	1,059	1,089	1,122	1,147	1,164	1,180	1,196	1,212	1,228	1,244	1,260	1,276	1,292	1,308	1,324	1,340	1,356	1,372	1,388	1,404
CHANGE IN 1990	15.35	15.50	15.66	15.82	15.97	16.13	16.29	20.00	20.20	20.40	20.61	20.81	21.02	21.23	21.44	21.66	21.87	22.09	22.31	22.54	22.76	22.99
Men		183	294	299	305	309	310	256	257	258	259	260	261	261	262	263	263	264	264	265	265	266
RIO BLANCO (T)		200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
CHANGE IN 1987	13.62	13.76	13.89	14.03	19.00	19.19	19.38	19.58	19.77	19.97	20.17	20.37	20.57	20.78	20.99	21.20	21.41	21.62	21.84	22.06	22.28	22.50
Men		63	125	155	149	173	179	222	220	218	237	256	317	314	311	308	305	302	299	296	293	290
ROUTT (T)		4,417	4,417	4,405	4,347	4,333	4,319	4,305	4,214	4,263	4,313	4,363	4,414	4,465	4,517	4,569	4,622	4,675	4,729	4,783	4,839	4,894
	49.92	50.17	50.42	50.67	50.93	51.18	51.44	51.69	51.95	52.21	52.47	52.74	53.00	53.26	53.53	53.80	54.07	54.34	54.61	54.88	55.16	55.43
Men		383	381	378	371	368	365	362	353	355	357	360	362	364	367	369	372	374	377	379	381	384
SAN MIGUEL (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WELD (T)		152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
CHANGE IN 1987	14.03	14.10	14.17	14.24	17.00	17.09	17.17	17.26	17.34	17.43	17.52	17.60	17.69	17.78	17.87	17.96	18.05	18.14	18.23	18.32	18.41	18.50
Men		47	47	48	40	41	41	41	42	42	42	42	43	43	43	44	44	44	45	45	45	45
TOTAL PRODUCTION		16,511	17,270	17,373	17,498	17,650	17,725	18,010	18,043	18,222	18,497	18,770	19,240	19,409	19,578	19,746	19,914	20,082	20,250	20,420	20,590	20,760
TOTAL MEN		2,585	2,777	2,756	2,674	2,689	2,684	2,633	2,653	2,656	2,680	2,704	2,770	2,771	2,771	2,771	2,775	2,778	2,781	2,784	2,788	2,791

(T) denotes production in thousands of short tons

TABLE 5-28 PROJECTED PRODUCTION, PRODUCTIVITY AND DIRECT LABOR--CASE NO. 4--ACID RAIN LEGISLATION BENEFIT--MODIFIED PRODUCTIVITY ESCALATION

COUNTY	PEAK PRODUCTIVITY	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ARCHULETA (T)		211	225	240	254	268	128	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	21.05	21.16	21.26	21.37	21.47	21.58	21.69	21.80														
Men		43	46	49	51	54	26	27														
DELTA (T)		1,468	1,511	1,554	1,687	1,747	1,812	1,879	2,042	2,116	2,193	2,273	2,282	2,291	2,300	2,309	2,317	2,326	2,335	2,343	2,352	2,361
	27.29	27.56	27.84	28.12	28.40	28.68	28.97	29.26	29.55	29.85	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15	30.15
Men		232	236	240	258	265	272	279	300	308	316	328	329	330	332	333	334	335	337	338	339	340
EL PASO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FREMONT(T)		873	888	901	1,003	1,015	1,027	1,038	1,140	1,151	1,160	1,170	1,179	1,188	1,196	1,205	1,213	1,222	1,230	1,238	1,247	1,255
CHANGE IN 1990	16.50	16.67	16.83	17.00	17.17	17.34	17.52	21.00	21.21	21.42	21.64	21.85	22.07	22.29	22.51	22.74	22.97	23.20	23.43	23.66	23.90	24.14
Men		228	229	230	254	254	255	215	234	234	233	233	232	232	231	230	230	229	228	228	227	226
GARFIELD (T)		34	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	41	42	42	43
	35.00	35.35	35.70	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06	36.06
Men		4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
GUNNISON (T)		1,340	1,384	1,416	1,435	1,485	1,544	1,657	1,661	1,665	1,670	1,674	1,679	1,684	1,688	1,693	1,698	1,703	1,707	1,712	1,717	1,723
CHANGE IN 1986	18.52	18.71	18.89	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32
Men		312	318	280	281	288	296	315	312	310	308	306	303	301	299	297	295	293	291	289	287	285
HUERFANO (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Men		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
JACKSON (T)		151	160	170	179	188	198	207	216	226	235	244	254	263	272	281	291	300	309	319	328	338
	35.45	35.63	35.81	35.98	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16	36.16
Men		18	19	21	22	23	24	25	26	27	28	29	30	32	33	34	35	36	37	38	39	41
LA PLATA (T)		55	58	61	64	66	223	234	386	403	420	437	454	471	489	506	523	540	557	574	591	608
CHANGE IN 1988	18.13	18.31	18.49	18.68	18.87	25.00	25.25	25.50	25.76	26.02	26.28	26.54	26.80	27.07	27.34	27.62	27.89	28.17	28.45	28.74	29.02	29.31
Men		13	14	14	15	12	38	40	65	67	70	72	74	76	78	80	82	83	85	87	89	90
LAS ANIMAS (T)		546	559	570	669	677	685	691	835	840	844	847	850	852	854	855	856	857	858	859	859	860
CHANGE IN 1987	9.55	9.65	9.74	9.84	15.00	15.15	15.30	15.45	15.61	15.77	15.92	16.08	16.24	16.41	16.57	16.74	16.90	17.07	17.24	17.41	17.59	17.76
Men		246	250	252	194	194	195	194	233	232	230	229	227	226	224	222	220	218	216	214	212	210
MESA (T)		756	774	790	802	813	822	829	835	840	844	847	850	852	854	855	856	857	858	859	859	860
	22.00	22.22	22.44	22.67	22.89	23.12	23.35	23.59	23.82	24.06	24.30	24.54	24.79	25.04	25.29	25.54	25.80	26.05	26.32	26.58	26.84	27.11
Men		148	150	151	152	153	153	153	152	152	151	150	149	148	147	146	144	143	142	140	139	138
MOFFAT (T)		5,569	5,619	5,658	5,465	5,526	5,592	5,655	5,485	5,542	5,599	5,655	5,704	5,753	5,802	5,850	5,898	5,947	5,995	6,044	6,093	6,143
	37.16	37.35	37.53	37.72	37.91	38.10	38.29	38.48	38.67	38.87	39.06	39.26	39.45	39.65	39.85	40.05	40.05	40.05	40.05	40.05	40.05	40.05
Men		648	651	652	627	631	635	639	617	620	623	626	629	631	633	635	640	646	651	656	661	667
MONTROSE (T)		63	64	65	65	66	67	68	69	69	70	71	72	73	74	75	76	76	77	78	79	80
	21.91	22.02	22.13	22.24	22.35	22.46	22.58	22.69	22.80	22.92	23.03	23.15	23.26	23.38	23.49	23.61	23.73	23.85	23.97	24.09	24.21	24.33
Men		12	13	13	13	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14
PITKIN (T)		654	682	712	745	770	787	803	819	835	851	867	883	899	915	931	947	963	979	995	1,011	1,027
...GE IN 1990	15.35	15.50	15.66	15.82	15.97	16.13	16.29	20.00	20.20	20.40	20.61	20.81	21.02	21.23	21.44	21.66	21.87	22.09	22.31	22.54	22.76	22.99
		183	189	196	203	208	210	174	176	178	179	181	183	184	186	187	188	190	191	192	193	194
... BLANCO (T)		200	400	500	650	765	800	1,000	1,000	1,000	1,100	1,200	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
...E IN 1987	13.62	13.76	13.89	14.03	19.00	19.19	19.38	19.58	19.77	19.97	20.17	20.37	20.57	20.78	20.99	21.20	21.41	21.62	21.84	22.06	22.28	22.50
		63	125	155	149	173	179	222	220	218	237	256	317	314	311	308	305	302	299	296	293	290
... (T)		4,409	4,482	4,556	4,585	4,660	4,736	4,814	4,800	4,880	4,963	5,047	5,099	5,152	5,205	5,259	5,313	5,368	5,423	5,479	5,536	5,593
	49.92	50.17	50.42	50.67	50.93	51.18	51.44	51.69	51.95	52.21	52.47	52.74	53.00	53.26	53.53	53.80	54.07	54.34	54.61	54.88	55.16	55.43
		382	386	391	391	396	400	405	402	406	411	416	418	421	423	425	427	430	432	434	436	439
... MIGUEL (T)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
... (T)		152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	187	189	191	193
...E IN 1987	14.03	14.10	14.17	14.24	17.00	17.09	17.17	17.26	17.34	17.43	17.52	17.60	17.69	17.78	17.87	17.96	18.05	18.14	18.23	18.32	18.41	18.50
		47	47	48	40	41	41	41	42	42	42	42	43	43	43	44	44	44	45	45	45	45
... PRODUCTION		16,483	16,995	17,382	17,796	18,243	18,617	19,208	19,490	19,771	20,155	20,542	21,018	21,192	21,365	21,538	21,711	21,885	22,058	22,233	22,408	22,584
... MEN		2,581	2,678	2,696	2,654	2,708	2,741	2,747	2,796	2,811	2,847	2,886	2,953	2,955	2,957	2,958	2,963	2,967	2,972	2,976	2,980	2,985

...enotes production in thousands of short tons

SECTION 6

6.0 REFERENCES

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APPENDIX A - FORECAST MODIFICATION

The forecast may be easily modified to reflect different assumptions, inclusion of new data, market shifts or change in county status. The forecast was run on Multiplan, working in MS-DOS on a Wang Personal Computer. Individual markets and marketshare are trended according to criteria set in Section 3 of the report. The derived production demand is summed down to an aggregate Colorado total.

Counties are linked to markets by the NAME convention of Multiplan which permits easy linking of spreadsheets. As dependent spreadsheets are called up and saved, the changes made on the original spreadsheet are incorporated on the dependent spreadsheet. Counties with a stake in the in-state market are linked to the original forecast by LINKIN. Counties selling coal in the out-of-state and export markets are linked by LINKOUT. In turn, an employment spreadsheet, derived from production and productivity, is linked to aggregated county production contained within LINKOUT. There are six ways to view changes in productivity on the data diskette, although there is no practical upper limit to methods of escalating productivity.

A.1 Sample Forecast Modification - Assumes A: Drive

Two changes will be made in the forecast to demonstrate operation of the spreadsheet. Call A:BASECASE to the screen and save it as A:TRIAL, confirm overwrite existing file. The forecast is saved twice on the disk in order to preserve the Base Case. If permanent changes in the Base Case are desirable, make these changes, overwrite A:BASECASE and then overwrite A:TRIAL.

As new annual data are obtained they may be entered into table formats similar to Tables 2-5 through 2-25, by state or aggregated in a revised format such as Table 3-1. In any event, statistical analysis was done outside the spreadsheet. However, templates may be built to analyze these data statistically.

As more data are available with the passage of time or additional research into the past different statistical techniques may be employed. Six years of data are not sufficient to ascertain cycles of coal use, if indeed they exist.

A.2 Changes in Forecast for Colorado

Assume that it is known that in the year 1985 Colorado coal producers will ship 9.3 million tons to all in-state coal product markets instead of 8.52 million tons. Enter 9,300 since all calculations are in thousands, in the Colorado/1985 row/column for the State of Colorado. Accepting the in-state demand of 13,137,000 tons the marketshare is actually 70.8 percent. However, the 1985 value of marketshare in Colorado is incorrect since the computed production was overidden by insertion of 9,300.

Assume further that the total demand met by in-state markets increases five percent per year for eight years, is constant for three years, then increases two percent per year for the life of the forecast. Place cursor on 1986 computed Colorado production execute value/1.05* cursor left/return. Execute COPY RIGHT TAB 7/RETURN. Position cursor on computed production for 1994. Execute VALUE/cursor left/RETURN/COPY RIGHT TAB 2/RETURN. This action takes the 1993 value and carries it across for three years, then to escalate this value position cursor on 1997. Execute VALUE/1.02 */cursor left/RETURN/COPY RIGHT TAB 7. The modification is complete for the in-state market.

In the report, changes to the demand-side were made, the above example demonstrates changes in production level. Either, or both, may be changed independent of the spreadsheet template. In order to view the effect of changes in this one market, skip to Section A.4.

A.3 Change in West North Central Market Region

In the West North Central Market Region a value of 100,000 tpy overrides the computed value of demand times Colorado marketshare. In the year 1988 position the cursor in the marketshare row. Assume Colorado coal is more desirable due to some mechanism and that marketshare increases at five percent per year above the 1987 value for eight years then increases at three percent per year.

With cursor at 1988 execute VALUE/1.05* cursor left/COPY RIGHT 8/RETURN. Move cursor RIGHT one position and execute VALUE/1.03*/cursor left/COPY RIGHT 6/RETURN.

A.4 Linked Markets and Productivity

Save the spreadsheet A:TRIAL and confirm overwrite. Call up A:LINKIN and save and call up A:LINKOUT and save it. Either of these spreadsheets may be examined and modified. To view the link to employment through productivity proceed to Section A.5.

Spreadsheet LINKIN assigns a simple percent of total county production to the in-state market for the duration of the study. To change any values of the constants, position the cursor to the desired county and replace the existing value with a new value. Make all changes and confirm that the total equals 100 percent. As changes are made and completed re-save the spreadsheets.

Spreadsheet LINKOUT allocates portions of markets to counties and attempts to demonstrate inter-county rivalry by changing marketshare over time. As long as the percent of total of a market equals 100 percent, these too may be changed. However, it is desirable to rename and save any spreadsheet that will be extensively modified in order to preserve the original state.

Spreadsheet LINKOUT links counties to markets and sums down, it also is linked to LINKIN and aggregates these spreadsheets to a county total. In turn, all productivity spreadsheets are dependent upon LINKOUT.

A.5 Productivity and Employment

There is no certainty in predicting future productivity levels. Old mines closing raise average productivity, similarly new mines and new technology increase productivity and the average county productivity. Statistics used in the study incorporate the weighted average productivity of a county. These data include underground and surface mines. If a large surface mine closes and production retreats to remaining underground mines average county productivity will drop.

Six runs of productivity escalation are contained on Disk:

RUN1 - Constant 1983 productivity
RUN2 - 1 percent escalation per year
RUN3 - 3 percent escalation per year
RUN4 - Constant peak productivity
RUN5 - Constant average productivity
RUN6 - (described below)

RUN6 escalates productivity of counties with mainly underground mines at one percent per year. Counties with mainly surface mines are escalated at 0.5 percent per year. In addition, the effects of new mines, or closings of old mines, are reflected in arbitrary increases in certain counties. This template, RUN6, reflects bias, but since the template may be changed easily the assumptions of the authors need not interfere with assumptions of the user.

Direct employment is derived from production divided by productivity, in tons per man-day, for each county. A working year of 230 days was used, however, different mining methods and different counties, on average, work different days per year. Employment is demand-derived if a market served by a mine fails then jobs are lost.

APPENDIX B

Gompertz Curve Trend

The data points fit to the Gompertz curve are equally spaced along the x-axis (time) and all must be positive. The points are divided into three groups for entry:

$$b = \left(\frac{s_3 - s_2}{s_2 - s_1} \right)^{1/n}$$

$$c = \exp\left[\frac{1}{n} \left(\frac{s_1 s_3 - s_2^2}{s_1 + s_3 - 2s_2} \right) \right]$$

$$a = \exp\left[\frac{(b-1)(s_2 - s_1)}{b(b^n - 1)^2} \right]$$

where s_1, s_2, and s_3 are:

$$s_1 = \sum_{i=1}^{n} \ln y_i = n \ln c + b(\ln a) \frac{b^n - 1}{b-1}$$

$$s_2 = \sum_{i=n+1}^{2n} \ln y_i = n \ln c + b^{n+1} (\ln a) \frac{b^n - 1}{b-1}$$

$$s_3 = \sum_{i=2n+1}^{3n} \ln y_i = n \ln c + b^{2n+1} (\ln a) \frac{b^n - 1}{b-1}$$

Modified from Hewlett Packard Business Stat and Marketing Applications for the HP41C.

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Bulletin 41--BIBLIOGRAPHY AND INDEX OF PUBLICATIONS RELATED TO COAL IN COLORADO: 1972-1977. H. B. Fender, D. C. Jones and D. K. Murray, 1978, 54 p.

Resource Series 1--GEOLOGY OF ROCKY MOUNTAIN COAL--A SYMPOSIUM, 1976 D. K. Murray, ed., 1977, 175 p., 15 papers on stratigraphy, physical and chemical properties, analyses, petrology and resource evaluation.

Resource Series 4--PROCEEDINGS OF THE SECOND SYMPOSIUM ON THE GEOLOGY OF ROCKY MOUNTAIN COAL--1977. H. E. Hodgson, ed., 1978, 219 p., 14 papers on depositional environments, mine planning and development, geophysical and computer techniques, and coal petrography.

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