MINUTES OF THE MEETING
TAXATION COMMITTEE
50TH LEGISLATURE SESSION
HOUSE OF REPRESENTATIVES

January 28, 1987

The meeting of the Taxation Committee was called to order by Chairman Ramirez, on January 28, 1987, at 9 a.m. in Room 312 B of the State Capitol.

ROLL CALL: All members were present. Also present was Dave Bohyer, Researcher, Legislative Council.

Chairman Ramirez announced that HB's 252, 274, and 456, all coal severance tax reduction bills, would be heard together. He explained that each sponsor would be allowed to open, that the Committee would then hear proponents of any of the three bills, then opponents, after which each sponsor would be allowed to close.

CONSIDERATION OF HOUSE BILLS 252, 274, and 455: Rep. Marian Hanson, House District 100, sponsor of HB 252, said the bill would lower coal severance tax rates from 30% of value in 1987, to 25% in 1989 and 1990, and 15% after June 30, 1991.

Rep. Tom Asay, House District #27, sponsor of HB 274, said the state needs a method to encourage coal purchasers to come back to Montana. He stated that any tonnage above the base of the preceding year would be allowed new coal production incentive tax credit, as provided on page 9 (4) of the bill.

Rep. Dave Brown, House District #72, sponsor of HB 456, read from a prepared statement in support of the bill (Exhibit #1). He said the bill makes everyone a sales person for Montana coal and that the state will benefit in increased employment opportunities.

PROPONENTS OF HOUSE BILLS 252, 274, and 456: Jim Mockler, Director, Montana Coal Council, read from a prepared statement in support of all three bills (Exhibit #2).

Ken Williams, Western Energy, read from a prepared statement in support of HB 252 (Exhibit #3).

Bret Boedecker, Montana Forward Coalition, read from a prepared statement in support of the bills (Exhibit #4)

Frank Tooke, Co-Chairman, Montana Forward Coalition Taxation Committee, also read from a prepared statement in support of HB 252, and said he believes the bill would be a good investment for the state (Exhibit #5).

Wally Miller, Miller & Associates, said he recently shared comments from Montana coal purchasers. He advised that Manitoba Hydra is competitive with Montana, and has replaced about 2 million tons of Montana coal. Mr. Miller stated that if there are no cuts, Montana will be out of the ball game by 1990. He added that, if the price were right, Montana could sell more coal. (Exhibit #5a)

Mr. Miller commented that excessive severance tax is an issue, and said the Silverman study is in error, as it is based upon the assumption that contracts will be renewed, and upon a 2% growth factor. Mr. Miller said he believes the sliding scale will result in bringing contracts to Montana, and more coal sales.

Mr. Miller recommended a cap on the coal trust fund, and that the Committee look at the suggestion made by the Montana Forward Coalition study, concerning royalties.

Victor Wood, President, V.H. Wood and Associates, told the Committee his is a coal consulting firm, and that he primarily supports HB 456, but would support any of the three bills. Mr. Wood said HB 456 offers quick action via a new comprehensive approach, through better longterm opportunities for Montana (Exhibit #6).

Duane Ackney, Rosebud County, Save Our State, told the Committee he represented about 700 persons in the private sector, who stand to lose their jobs, if the coal severance tax is not lowered. He advised that lost wages in the mines already total $14.8 million, and other lost wages, $18.2 million.

Mr. Ackney, explained that 13 million tons of coal equal $130 million in coal sales and $27 million to Montana. He said that in 1985, 140 million tons of coal were mined in Wyoming, while only 33 million tons were mined in Montana and that Montana's severance tax is 2.8 times that of Wyoming.

Mr. Ackney, said the bill would hold the 1985 level of revenue, at a tax rate 23.5% of that of the 1985 rate decreasing to 10% by 1990. He added that if the situation is allowed to exist as it is, coal mining as we know it will cease in 10-15 years.

Buck Boles, Montana Chamber of Commerce, stated his support of the bills.

Rep. Dennis Iverson, House District #12, told the Committee he supported all three bills, but more particularly HB 456.

Dennis Burr, Montana Taxpayers Association, reiterated the statements made by Rep. Brown in support of the bills.

Larry Brown, Forsyth Chamber of Commerce, told the Committee he is a miner, employed by Western Energy, whose retail sales have dropped 39% in the past 21 months. He stated he believes HB 274 is the most appropriate of the three bills.

Mike Micone, Executive Director, Western Environment Trade Association, said the 84% of persons responding to an Association poll, believe the coal industry is essential to the economy of Montana. He stated that Montana is first in coal reserves, and ninth in production, and said that even if production is increased, reserves should last until the year 3047. (Exhibit #6b)

Jim Murray, Director, Montana State AFL-CIO, advised that he would support a reasonable reduction in the 30% severance tax, if it were based upon replacement of sources of revenue and not with regressive tax proposals. (Exhibit #6c)

Mike Keating, business representative for Local 400, said he believed the coal severance tax should be lowered.

Gene Fenderson, Montana State Building and Construction Trades Council, of which there are 10,000 members in the state, said Montana needs to make a meaningful compromise, which he believes can be done. Mr. Fenderson advised that the legislature needs to look at the competitiveness of rail rates in the state.

Craig Nile, a machinist from Colstrip, read from a prepared statement in support of the bills (Exhibit #7). He said not all statements made with regard to the coal severance tax are factual.

Dan Stanley, coal miner and President, Save Our State, said HB 274 would put the miners back to work immediately. He also read from a prepared statement in support of that bill (Exhibit #8).

Joe Novasio, a coal miner from Colstrip, told the Committee he supports HB 274, and said the bill would provide business incentive to purchasers of Montana coal. Mr. Novasio said he believes the present coal severance tax is gluttonous, and asked the Committee to give HB 274 a chance.

Leonard Collins, United Mine Workers, asked the Committee to support HB 274.

OPPONENTS OF HOUSE BILLS 252, 274, and 456: Terry Cohea, Governor's Chief of Staff, said she agreed with the objective, but disagreed with the proposed method of achieving that objective. Ms. Cohea read from a prepared statement in opposition to the bills (Exhibit #9).

Bill Gillin, Rosebud County rancher, also read from a prepared statement in opposition to HB 456 (Exhibit #9a). Mr. Gillin said he believes HB 456 could be special interest legislation, and commented that if Montana enters into a severance tax war with Wyoming, sooner or later it will end up deleting the severance tax altogether. Mr. Gillin added that there are more unemployed farmers and ranchers in Montana, than coal miners, but the sympathy lies with the miners.

Arnold Silverman, Missoula, read from a prepared statement in opposition to the bills (Exhibit #10). He said Montana is not competitive with Wyoming, simply because of the severance tax, but also because the sulphur content in Wyoming coal is lower. He asked the Committee to reject the three bills.

Bob Tully, Roundup rancher, also read from a prepared statement in opposition to the bill (Exhibit #11).

George Ochensky, Montana Environmental Information Community Action Fund, read from a prepared staement in opposition to the bills (Exhibit #12).

Sara Parker, State Library Committee, read from a prepared statement in opposition to the bills (Exhibit #13).

John Compbell, Montana Education Association, told the Committee he opposes all three bills, because it does not make sense to give profit-making counties such a tax break for schools.

QUESTIONS ON HOUSE BILLS 252, 274, and 456: Rep. Ream stated that the Coal Tax Oversight Subcommittee recommended extension of tax credits and looked at alternative forms of taxation. Referring to HB 252, page 7, he suggested that the marginal rate of return be different for different qualities of coal and that some of the BTU categories remain the same.

Rep.Keenan asked Ken Williams how much of the $1-2 more per ton that he referred to in his testimony, was severance tax dollars. Ken Williams replied it is about 6 cents per mill BTU's, or 9.5 cents of each $1.28 delivered price per mill BTU.

Rep. Raney asked Mr. Mockler if the coal companies no longer lower the cost of production and rail rates. Mr. Mockler replied he could not comment, but did say rail rates are the same in Montana as they are in Wyoming.

Rep. Raney asked where facilities that burn Montana coal are located. Mr. Mockler replied most Montana coal is burned in the Great Lakes, Minneapolis, and Wisconsin areas.

Rep.Koehnke asked Jim Mockler if most contracts contained a minimum purchase amount. Mr. Mockler replied most contracts have such a clause.

Rep. Sands asked Arnold Silverman how a price of $25 per ton was determined for Commonwealth. Dr. Silverman replied it is public information.

Rep. Sands asked Sam Scott, representative of Decker Coal, if he agreed with Dr. Silverman. Mr. Scott replied he did not, and said royalties and other information is not included. He added that the price is not in the neighborhood described by Dr. Silverman.

Chairman Ramirez commented that the three bills would be put into a subcommittee, and the times of those meetings would be posted for interested persons.

Rep. Harp asked Ken Williams what the benefit would be to Montana coal versus Wyoming coal, if the severance tax were reduced to 15%. Mr. Williams replied the price would still be $1.80 per ton more than it is in Wyoming.

Rep. Harp asked Mr. McPherson about a discussion concerning his problem with Houston Power and Light, and his statement that he would continue to ship coal as long as he could sell it. Rep. Harp continued, asking where the market place is, and where prices are going. Mr. McPherson replied he believes a price of $4.90 is inaccurate, and said he could not give a fair estimate of coal prices in Montana today, except to state that it is an extrememly competitive market.

Rep. Raney asked Mr. Wood if purchasers of coal were not more interested in cheapest BTU's, and where Montana could sell more coal. Mr. Wood replied more coal can be sold to existing purchasers and said generation of new coal won't be a factor until the late 1990's.

Rep. Ellison asked Dave Peterson of Northern States Power, if he agreed that any of the three bills would make Montana coal more competitive. Mr. Peterson replied that he thought it would help.

Rep. Ream asked how production costs compare for different mines, and how that affects profit. Dr. Silverman replied that coal mined at a cost of $8.50 - 9.50 per ton, might sell for $11.50 per ton, for a $2.00 - 3.00 profit on medium BTU coal. He added that these figures vary from quarter to quarter and said higher BTU coals earn around $10 - 20 per ton profits.

CLOSING ON HOUSE BILL 252, 274, and 456: Rep. Marian Hanson stated that Westmoreland plans to remove a $25 million drag line out of state, which could leave the Bighorn Company with a terrible tax burden. She added that last year, 50% of the coal mined in Montana came from her district.

Rep. Tom Asay commented that reclamation is being done in an excellent manner, and that cooperation is important to the area. He expressed his concern about local governments receiving adequate income to meet basic functions, and said profit is essential to the coal industry, Rep. Asay said many things can be done with coal, to help with education, jobs, and the general future of Montana.

Rep. Dave Brown advised that he would be willing to work with the Coal Tax Subcommittee, when it is appropriate. He said he did not see Terry Cohea's stumbling blocks for this legislation, and was concerned about the state of the coal industry in Montana.

ADJOURNMENT: There being no further business before the Committee, the meeting was adjourned at 12:30 p.m.

Jack Ramirez

Representative Jack Ramirez,
Chairman

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DAILY ROLL CALL

HOUSE TAXATION COMMITTEE

50th LEGISLATIVE SESSION -- 1987

Date 1-28-87

NAME	PRESENT	ABSENT	EXCUSED
REP. RAMIREZ	✓		
REP. ASAY	✓		
REP. ELLISON	✓		
REP. GILBERT	✓		
REP. HANSON	✓		
REP. HARP	✓		
REP. HARRINGTON	✓		
REP. HOFFMAN	✓		
REP. KEENAN	✓		
REP. KOEHNKE	✓		
REP. PATTERSON	✓		
REP. RANEY	✓		
REP. REAM	✓		
REP. SANDS	✓		
REP. SCHYE	✓		
REP. WILLIAMS	✓		

The Big Sky Country

EXHIBIT #1
DATE 1-28-87
HB

MONTANA HOUSE OF REPRESENTATIVES

REPRESENTATIVE DAVE BROWN
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(406) 782-3604
HELENA ADDRESS:
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COMMITTEES:
JUDICIARY,
LOCAL GOVERNMENT
RULES
ENVIRONMENTAL QUALITY COUNCIL

January 28, 1987

OPENING STATEMENT OF REPRESENTATIVE DAVE BROWN
IN SUPPORT OF HB-456

Mr. Chairman, for the record, my name is Dave Brown, House District 72, Butte-Silver Bow. Along with my principal co-sponsor, Representative Dennis Iverson, I am here in support of House Bill 456. I also support HB-252 and HB-274, but believe one is too little too late, and the other offers no assurances for the long-term salvation of the coal industry and a reasonable return to Montana citizens for the removal of the resource.

I became interested in the sliding scale approach after reading about it in early December. The more I read the Montana Forward study and its recommendations, the more convinced I am that, in spite of declining revenues and budget shortfalls, we had better do something now because our coal patient is in serious condition. Continuing declines in both price and production have resulted in less revenues to Montana, job layoffs, and a general decline in our service area.

If existing producers are to survive and expand in this climate and if the state is to attract new mines, a new, innovative and bipartisan approach is necessary.

Promotion of this legislation is premised on three assumptions: (1) that the facts are clear and the votes are here in this legislature to lower the coal severance tax; (2) that the Administration's proposal is of little or no benefit to promote coal production and will not pass this legislature; and (3) that we in the legislature will be willing to risk short-term minimum loss of revenue to promote long-term revenue stability and expand coal industry related employment.

Simply dropping the tax five, ten or even fifteen percent over a four-year period is a gamble. Why? Montana is gambling that its existing purchasers will "stay and pay" a thirty percent tax until 1988, receive a five percent reduction, and wait a

couple more years for another reduction. This is a risky gamble in view of the reduced tonnage purchased or the outright loss of two long-term contracts to two Texas utilities over the past four years. Will a direct ten or fifteen percent reduction over four years keep the wolves from the door? I don't believe it will.

It's time for a new approach which throws the ball into the market's court. Buy more, pay less. House Bill 456 is simple; it rewards contract switching to Montana, not from Montana as we have seen since 1985. This bill does the following:

1) Extends the "window of opportunity" from July 1, 1987, to July 1, 1988; and

2) Reduces the rate on all coal sold to a maximum of twenty percent, and even lower for purchasers who buy more than 2.5 million tons of coal.

This is now a purchaser's bill. He pays the tax now anyway; the bill eliminates the producer as the middle man collection agent.

On pages 7 and 8 of the bill, the rate schedule is imposed.

0 - 2.5 million tons	- 20 percent
2.5 - 5.0 million tons	- 18 percent
5.0 - 7.5 million tons	- 16 percent
7.5 - 10.0 million tons	- 14 percent
10 million and above	- 12½ percent

The facts are well known that the industry is deteriorating. Under the Brown/Iverson bill, the purchaser would in the third quarter of 1988 be assessed according to the new rate schedule. This is not for incremental tonnage. It is based on the amount purchased on an annual basis. Where you fall within the tonnage categories sets your rate for all the coal you purchase.

It is not necessary to buy from one producer. Existing practice will not be altered. Tax rate is determined on total purchases.

Section 4 amends 15-35-104 and insures that no cheating can occur. Mr. Wood, who will testify later, will show you some of the increased tonnage projections resulting from implementation of this bill. I think they are conservative. I'm convinced that if a utility purchaser can lower his costs for all of his Montana coal purchases by buying more coal, he will do it and his rate commission will be pushing him to expand Montana coal purchases.

Although the words "put up or shut up" were overused in 1985, I think this could be Montana's put-up or shut-up challenge - this time to the market. With enactment of this legislation, the focus is then on the market to respond. If the market responds and purchasers buy more, we gain and get something in return.

COST - The budget office and LFA change numbers and projections almost weekly, but I believe that in Fiscal Year 1989 (July 1, 1988 to July 1, 1989), HB-456 will result in a reduction of $32.3 million. Of this $32.3 million, $16.1 million automatically flows to the Coal Trust unless three fourths of each body in the legislature says otherwise. 23.1 percent, or nearly $7.4 million, will not flow into the general fund in FY 1989, the second half of the biennium. I believe shortfalls will be reduced dramatically as purchases increase.

It is my opinion that $7.4 million is a relatively small investment to protect the severance tax revenues flowing to this state. This does not take into account the jobs, industry expansion, the growth of secondary service industry, and revenue to local governments generated by this legislation. I believe this is an insurance policy, not a gamble.

This proposal is innovative, unique, easy to explain and workable. We didn't think of it first, Montana Forward did. Rather than oppose it on those grounds, we took the idea and made it into HB-456.

If this is special interest legislation, it is for the citizens of Montana who will now be challenging the utility industry to buy more.

Finally, section 6 of the bill provides for a feasibility study conducted by the Coal Tax Oversight Subcommittee of creating a coal research and development institute. We have a 2000 year supply of coal, yet its useful life could be a fraction of this unless we develop innovative technologies which will continue competitive coal industry development. I urge both the state and industry to pursue this idea as an additional vehicle with substantial potential to maintain clean coal use and promote Montana's coal industry.

In closing, I need to emphasize that HB-456 makes everyone a "salesman" for Montana coal. Passage of this legislation should eliminate the Montana vs. Wyoming discussion by any purchaser. And finally, this bill assures that Montana benefits from a lower coal severance tax by providing an incentive to the purchaser that leads to expanded industry growth, stable and increasing revenues, and more jobs.

EXHIBIT #2
HB 1-28-87
252

HB 252

Mr. Chairman, members of the Committee, I am James D. Mockler, Executive Director of the Montana Coal Council, 2301 Colonial Drive, Helena, MT.

The Montana Coal Council is a trade association representing all of Montana's major coal producers, most of the utilities who purchase Montana coal, companies representing the majority of the private coal reserves in Montana and over 50 firms who supply the industry with products and services. Specifically, there are representatives here from the following companies should the committee have specific questions concerning those companies. Representing the producers are:

Sam Scott - Decker Coal Co.

J. R. McPherson - Spring Creek Coal Co.

Joe Presley - Westmoreland Resources Inc.

Jim Kelly - Western Energy Co.

Terry O'Connor - Peabody Coal Co.

Tom Burkhardt
~~Pat Hooks~~ - Knife River Coal Mining Co.

Representing the utilities are:

John Ethen - Detroit Edison

Dave Peterson - Northern States Power

Gene Pigeon - Montana-Dakota Utilities

Tom Anderson - Minnesota Power

Representing the suppliers is:

Jack Mercer - Tractor & Equipment Co.

We appear here in support of HB 252 offered for your consideration by Representative Hanson.

We did not arrive at this position either quickly or without agonizing hours of deliberations, numerous meetings and discussions with our members, legislative leaders, and the Governor.

In December we met with Governor Schwinden seeking his support in the lowering of the coal tax. At that meeting we stressed the importance of lowering our tax to a level which would allow us to be truly competitive with our closest competitor, Wyoming. We feel that in order to do so the severance tax would have to be lowered to at least 10% with the gross proceeds remaining at 4.5% and the Resource Indemnity Trust Tax at .5% for a total tax load of 15%.

The Governor responded that the budget constraints faced by both the legislative and executive branches were so critical that there was no way consideration could be given to such an immediate permanent reduction in the severance tax. He said any such reduction must be phased in with no more than a 5% reduction in any one biennium.

We contend that in order to have any chance of competing for our present contracts as they expire in the early 1990's the severance tax must be lowered to at least 15% on a permanent basis.

The approach presented another dilemma--what could we do between now and 1991 to help keep our miners working and our production up until the phase-in takes place? Obviously those laid off from work cannot wait until 1991 and hope they get their jobs back. The small businesses can't wait until 1991 to see the

payrolls spent on their products again, and the industry can't bide its time until 1991 hoping to restart.

As a result we came up with the revision of the "window" to change the base consumption to the lesser of the 1983-84 average consumption or the 1986 consumption. Any future coal those customers annually take over their new base consumption level would be at a 15% rate.

For example, in 1983-84 Northern States Power took an average of 6,809,648 tons of coal which is their base consumption under current law. In 1986 they took delivery of 3,506,000 tons. In 1987 and 1988 they project a take of 2,500,000. Under our proposal any tonnage over the 3,506,000 they took last year would be taxed at the 15% level. It is our sincere hope that this will enable us to entice back the business we have lost and are losing, and at the same time protect the revenue projections while the phase-in takes place.

I have attached for your perusal a list of customers that we have identified as potential increased tonnages that we will be competitive for if HB 252 passes. As you can see, there is an additional 5.2 million tons with a potential increase in severance tax revenue of over $7 million. Not included in this estimate are the increased gross proceeds of $1,816,920 or the Resource Indemnity Trust Tax of $130,000. Obviously these projections would continue for future years and in fact escalate. Likewise, it does not include any estimates for the several hundred miners that would be put back to work, the increased business dollars that would be generated, and additional federal, state, and Indian royalties.

Also attached is a statement signed by all the coal producers and the majority of consumers of Montana coal in support of HB 252.

Make no mistake about it, Representative Asay's HB 274 lowering the tax to 10% and the "window" at 0% for 1987 and 10% thereafter would sell more coal, secure more jobs and help more small businesses and the industry than HB 252 will.

The logical question is then why are we supporting HB 252? The answer is simple. We are dealing with a three-legged stool --one leg represented by the House, one leg by the Senate and one by the Executive. All three must be equal before the stool will stand.

The Governor has told us what he will accept. We felt that we were forced to compromise in order to work within the system. The compromise we agreed to was a painful step for us to take but one we took nevertheless.

We are asking you today to help with a leg of the stool. While not ideal, the bill will allow us to compete for increased tonnages providing revenue, employment and enhanced economic activity for Montana.

You have been distributed a copy of the Montana Coal Council position paper and by reference I ask that that paper be adopted for the record.

It is with that we ask this committee to give a "Do Pass" recommendation on HB 252.

Potential Additional Tonnage and Tax Receipts
for 1987 if HB 252 is Passed

Purchaser	Contract Sales Price	Tax
Detroit Edison	$10.16[1]	
1,000,000 @ 15%		1,524,000
Upper Peninsula Gen. Co.	7.145[2]	
600,000 @ 15%		643,000
Northern States Power	7.145[2]	
1,000,000 @ 30%		2,143,500
2,000,000 @ 15%		2,143,500
Minnesota Power	7.49[3]	
[illegible],000 @ 15%		674,100

Total Additional Tons	Total Additional Severance Tax
5,200,000	$7,128,100

[1]Average contract sales price of Decker Coal and Spring Creek Coal as supplied by the Governor's Budget Office.

[2]Average contract sales price of Westmoreland Resources and Western Energy Co. as supplied by the Governor's Budget Office.

[3]Average contract sales price of Peabody Coal as supplied by the Governor's Budget Office.

HB 252

The following coal producers and utility customers support the compromise position contained in HB 252.

Decker Coal Co.

Westmoreland Resources Inc.

Western Energy Co.

Spring Creek Coal Co.

Peabody Coal Co.

Knife River Coal Mining Co.

Northern States Power

Detroit Edison

Montana-Dakota Utilities

Minnesota Power

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Montana Coal Tax
A Time for Revision

Montana Coal Council
2301 Colonial Drive
Helena, MT 59601

January, 1987

Table of Contents

Introduction

In order to gather some understanding of the coal severance tax a look back at the mood that was prevalent at the time of its passage sheds light on how its passage came about.

In the early 1970's we were in a period of exponential energy consumption and an energy crisis. The Northern Great Plains Power Study was predicting that Montana coal fields would support some twenty odd coal conversion facilities. We would be expected to ship as much as 100 million tons per year to outside utilities to supply their energy needs by the year 2000.

Buzz words of the day were "social impacts", "rape, ruin and run", "destruction of lifestyle", and "corporate dominance". Coal production was increasing, new mines were opening and contracts for long terms were in place.

When the tax was passed, it was accompanied by a conference committee report explaining the purposes for its level. The preamble states in part ". . . A tax differential between Montana and Wyoming may shift some new contracts to Wyoming. . ."

Opponents to coal mining had just lost a bill in the House to ban surface mining in Montana. That bill failed by a single vote and the stage was set to, if not prohibit the industry from operating altogether in the state, at least limit it and shift new business that the industry may have competed for to Wyoming.

Three other reasons were stated in the report in support of the tax: "a) To preserve or modestly increase the revenue to the general fund; b) To respond to social impacts attributable to coal development; and c) To invest in the future, when new technologies reduce our dependence and mining activities may decline."

While there was great concern about "social impacts", keep in mind that on top of the 30% severance the Legislature also passed an additional gross proceeds tax which is paid to the county where the coal is mined and is added to the county's property tax rolls. This tax averages about 4.5% of the f.o.b. mine price.

In 1977 the Legislative Fiscal Analyst's report stated: "Our review of counties, incorporated towns and school districts in areas certified as impacted by coal development shows that, with few exceptions, the impacted units have the means to finance the required expenses without state support. The coal area is characterized by some of the lowest mill levies in the state and has been blessed by mushrooming property valuations. This analysis would indicate that the need for state supported local impact grants may be much less than originally anticipated by the Legislature." The Legislature has responded by nearly eliminating severance taxes to impact areas.

There is now about $300 million in the permanent coal tax trust fund set aside for "the future". The problem is no one has ever said when the "future" starts, who is eligible to participate or how many lost jobs need to be exported in order to save "the future". Those who work and are productive in mining jobs here and raise their children and grandchildren here feel that the future is now and that $300 million saved from their labors is enough of a legacy for "the future".

When Montana made its decision to shift the new contracts to Wyoming in 1975, we produced 22 million tons of coal and Wyoming 23.8 million tons or a difference of 9.2%. Ten years later in 1985 Montana produced 33.1 million tons and Wyoming 140.4 million tons, a difference of 424%. While Wyoming's total tax rate is less than half Montana's, last year they collected over twice as much money, employed around four times as many people, and enjoyed all of the secondary benefits that come with a healthy expanding industry and the associated high-paying jobs.

In January 1986 a poll of the Montana coal producers showed that 1986 production was expected to be 36.1 million tons, a gain of 3 million tons over 1985. It now appears our production will be around 33 million tons for 1986, a loss of 3 million tons under our own projections and about the same as 1985. In January of 1986 our production estimates for 1987 were for 38.1 million tons and for 1988 for 39.5 million tons. We now have revised those estimates to 28.6 million tons for 1987 and 29.5 million tons for 1988. In addition we have been forced to lay off several hundred of the highest paid, most productive workers in the state. Not only is it a loss to them but also to the secondary businesses that supply the industry with goods and services and who in turn support the entire economy. Instead the state is forced to increase unemployment benefits while losing income and other taxes.

While we all were pleased with Westmoreland's announcement of a new 1 million ton per year contract, at the "window of opportunity" rate of 20%, it is with limited celebration as we watch our traditional customers comply with the wishes of the 1975 Legislature and take their business to Wyoming.

Wyoming currently has a severance tax of 10.5% and an ad valorem tax of approximately 6.5% for a total of 17%. As of January 1, 1987, the severance tax is to be reduced 2% to 8.5%, plus the 6.5% for a total of 15%. Montana has a 30% severance tax, approximately 4.5% gross proceeds tax and a Resource Indemnity Trust Tax of .5% for a total of 35%.

Tax Comparison
Montana-Wyoming

Much has been said about the "effective rate" for Montana and Wyoming coal. Following are two comparisons of the taxes levied by the respective states.

The first set of columns (Table I) uses prices that were presented to the Coal Tax Oversight Committee as representative of the lowest mine contract sales price by the Governor's Budget Office.

The second set of columns (Table II) is from data supplied by the Department of Revenue at the same Coal Tax Oversight Committee meeting.

Montana

Table I			Table II	
$6.40		Contract Sales Price (F.O.B. Mine Price Less Taxes & Fees)		$8.61
	1.92	Severance @ 30%	2.58	
	.29	Gross Proceeds @ 4.5%	.39	
	.03	Resource Indemnity Trust @ .5%	.04	
2.24		**Total Production Taxes**		**3.01**
	.35	Abandoned Mine Reclamation Fee	.35	
	.39	Black Lung Fee	.50	
.74		Total Federal Taxes		.85
$9.38		F.O.B. Mine Price		$12.95
	35%	Production Taxes as % of Contract Sales Price	35%	
	23.9%	Production Taxes as % of F.O.B. Mine Price	23.2%	

		Wyoming		
$4.50		F.O.B. Mine Price		$8.85
	.15	Royalty Deduction	.15	
	1.85	Processing Deduction	1.85	
2.50		Taxable Value		6.85
	.17	Ad Valorem @ 6.7%	.46	
	.26	Severance @ 10.5%	.72	
.43		**Total Production Taxes**		**1.18**
	.35	Abandoned Mine Reclamation Fee	.35	
	.19	Black Lung Fee	.40	
.54		Total Federal Taxes		.75
	$3.53	Contract Sales Price (F.O.B. Less Taxes & Fees)	$6.90	
	12.2%	Production Taxes as % of Contract Sales Price	17.1%	
	9.6%	Production Taxes as % of F.O.B. Mine Price	13.3%	

The real effect of the rate is how much the tax raises the price to the customer on a ton of coal. When you view it in that manner, Montana's production taxes raise the price of our most competitive coal by $2.24. Wyoming on the other hand through its production taxes raises the price of its competitive coal by $.43, a difference of $1.81.

Using DOR's somewhat higher prices, we see that the taxes raise the price of Montana coal $3.01 and the Wyoming coal $1.18 for a difference of $1.83.

Because of the processing deduction allowed by Wyoming, the higher the price the less influence it has on the percentage of F.O.B. mine price.

Mining Costs

Wyoming coal producers have a significant operating advantage over their Montana counterparts. The Gillette area seams, on average, are approximately 82 feet thick. This is a substantially greater coal seam thickness than for either the Montana North (average coal thickness 39 ft.) or the Montana South (average coal thickness 44 ft.). Moreover, the Montana producers go to a deeper depth to remove the coal seam. The depth of overburden (overlying earth) that must be removed to uncover the coal in Wyoming is, on average, only 111 feet. The overburden depth for the Montana North and Montana South coals are 128 feet and 124 feet respectively. Figure 1 on the next page graphically reflects the coal thickness and overburden comparison of the three coals.

This overburden to coal relationship is typically expressed as the stripping ratio. The lower the stripping ratio, the fewer tons of overburden need to be removed to uncover one ton of coal. The average stripping ratio for the three areas, as calculated from the Keystone Manual and other published sources, is shown below:

Comparative Stripping Ratio

Coal Category	Stripping Ratio
Montana North	3.28
Montana South	2.82
Wyoming	1.35

Restating this relationship, to extract one ton of coal and deliver it to the railcar:

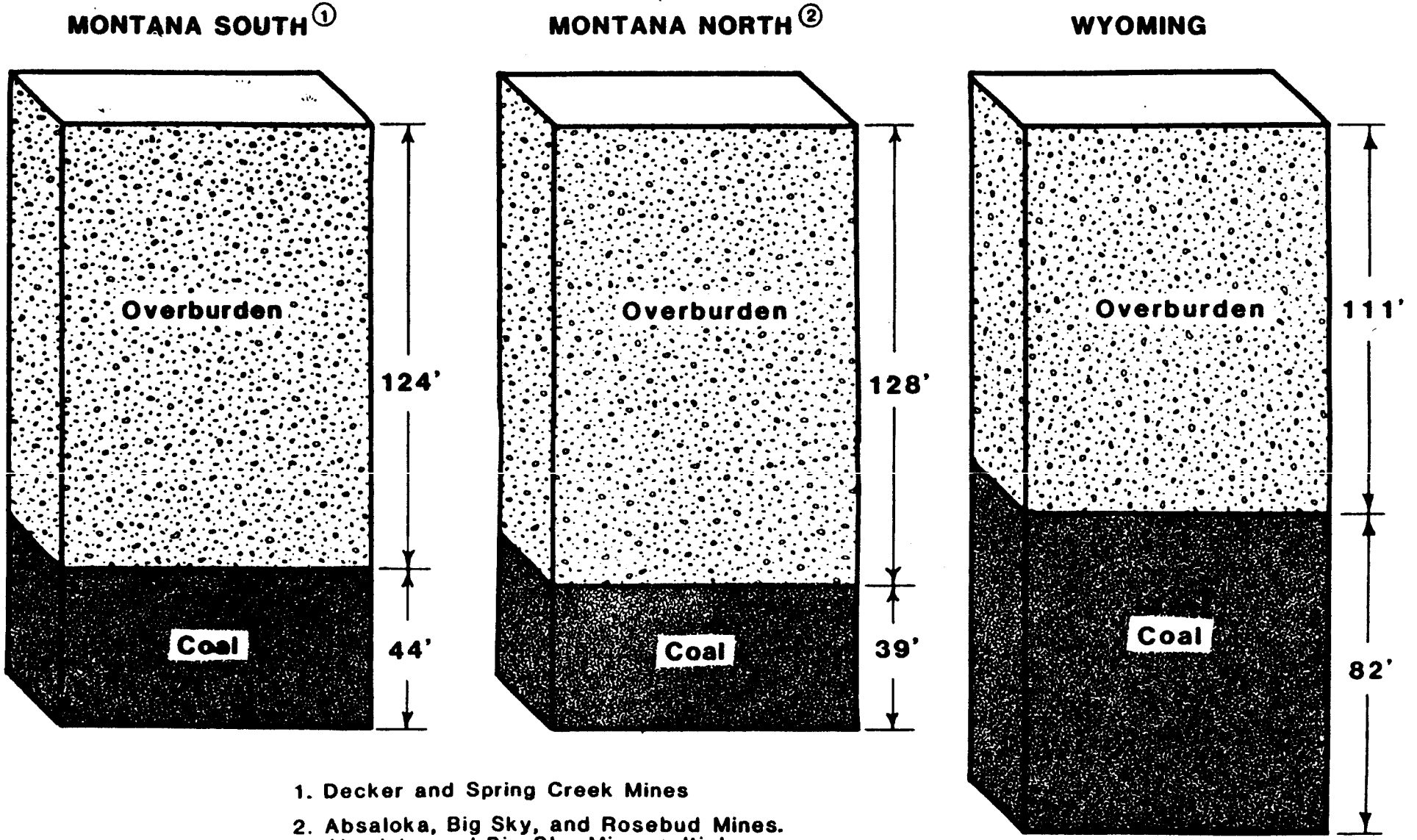
A. A Wyoming producer has to move an extra 1.35 tons of overburden for a total of 2.35 tons.

B. A Montana North producer has to move an extra 3.28 tons of overburden for a total of 4.28 tons or 82 percent more material than the Wyoming producer.

C. A Montana South producer has to move an extra 2.82 tons of overburden for a total of 3.82 tons or 63 percent more material than the Wyoming producer.

While it is an oversimplification, this analysis clearly indicates the cost of mining Montana coals is substantially greater than the cost of mining Wyoming coals. This cost difference is reflected in the current prices charged for the products from the two states.

POWDER RIVER BASIN



1. Decker and Spring Creek Mines
2. Absaloka, Big Sky, and Rosebud Mines. Absaloka and Big Sky Mine multiple seams.

Chart developed from information obtained from the Wyoming Geological Survey and the Keystone Coal Industry Manual

Figure 1

Coal Quality

The coals produced in Montana and Wyoming are sub-bituminous coals which are primarily used for steam electric generation plants owned and operated by utility companies. For steam generation purposes, the most important quality characteristic is the heating value of the coal, measured in millions of British thermal units per pound (MMBtu/lb). Generally, the higher the heating value of a sub-bituminous coal, the more suitable it is for steam generation.

The coals in both Montana and Wyoming are low rank sub-bituminous coals, i.e., have relatively low heating value. In Montana, there are essentially only two types of coal produced. There is essentially only one type of coal produced in Wyoming. These coal types are compared in the table below:

Comparative Coal Quality

	Montana North	Montana South	Wyoming
Heating Value	8,600 Btu/lb	9,300 Btu/lb	8,000-9,000 Btu/lb
Sulfur	Non-compliance	Compliance	Compliance

The Montana North type of coal is all produced within 20 miles of Colstrip at the Rosebud, Absaloka and Big Sky Mines. The Montana South type is produced just inside the Montana border immediately north of Sheridan, Wyoming, at the Decker and Spring Creek Mines. Ninety-nine percent of Montana's coal is produced from these five mines. The Wyoming coal listed shows the range of coals produced in the Gillette area which accounts for approximately 92 percent of the coal produced in the state. For competitive purposes, the other Wyoming coals are not important as the production of these other, generally higher, heating value coals is decreasing because of the low production cost/price of the Gillette area coals.

The Montana and Wyoming coals are very similar products and could be used in steam electric generation plants on a completely interchangeable basis except for two factors:

1. Government Imposed Sulfur Emission Restrictions. Steam generating plants built or permitted between August 1971 and September 1978 without emission control "scrubbers" are required to use a coal which, when burned, will emit less than 1.2 lbs SO_2/MMBtu. This type coal has been characterized as compliance coal. The Montana South and Wyoming coals are "compliance" coals while the Montana North coal is not. Therefore, the Montana North coal cannot be used for those plants (plants without scrubbers built during that eight year period) or other older plants which, by state regulation, may be restricted to the old 1.2 lbs/MMBtu federal standard.

Since 1978, all plants built require scrubbers and the three coals under consideration can be used somewhat interchangeably in these plants. Additionally, the three coals can be used in all older plants except those, as mentioned above, required by specific state regulation to use a compliance coal, such as all plants in Cook County, Illinois (Chicago). Future regulation may further restrict utilization of the higher sulfur Montana North coal but the presently pending legislation (acid rain bill, etc.) seems directed at reducing sulfur emissions overall and, in so doing, may benefit the marketability of all coals under consideration since all are relatively low sulfur coals.

2. Utilization Problems. Certain coal quality characteristics cause utilization problems. In general, the troublesome quality characteristics are either the amount of ash in the coals or the constituent components of the ash content. Typically, the utilization problems which occur can be overcome through technical adjustments to the boiler system, but there is an economic penalty of doing so in the form of higher operating costs. All of the coals under consideration are relatively low in ash content. The ash content of two of the coals, however, has a relatively high percentage of sodium. Sodium is the single most troublesome ash constituent. The sodium percentage of the ash content of the three coals are as follows:

Comparative Sodium Content

Coal	Sodium
Montana North	.5% - 5%
Montana South	6% - 8%
Wyoming	1.5% - 3%

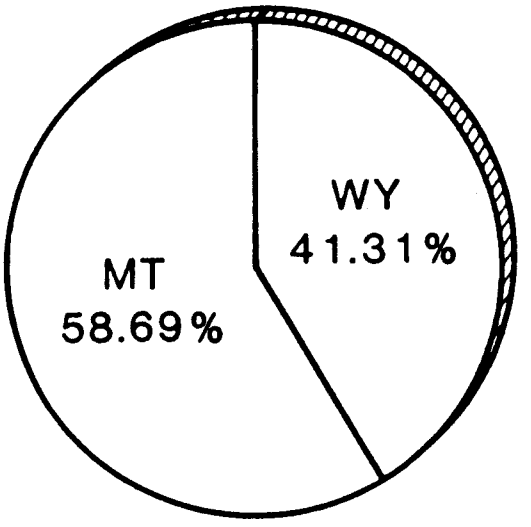
The Montana South coal would bear a high operating cost penalty and the higher sodium Montana North and Wyoming coal would bear a moderate operating cost penalty as compared with the utilization of the low sodium Montana North coal.

While there are several other minor considerations that would create a market preference between the three coals, the two listed above are the major product differentiation factors. The two major factors do not affect a significant segment of the potential market. In Montana's traditional market, the upper Midwest (Minnesota, Michigan, Wisconsin), they affect only approximately 4.1 million tons out of a total of 38 million tons of consumption or about 10 percent of the total. Therefore, for virtually the entire market for which the Montana and Wyoming coals compete, the Montana and Wyoming coals can be used interchangeably and the purchase decision is based almost completely on the delivered price, i.e., the cost of the heating value acquired ($/MMBtu).

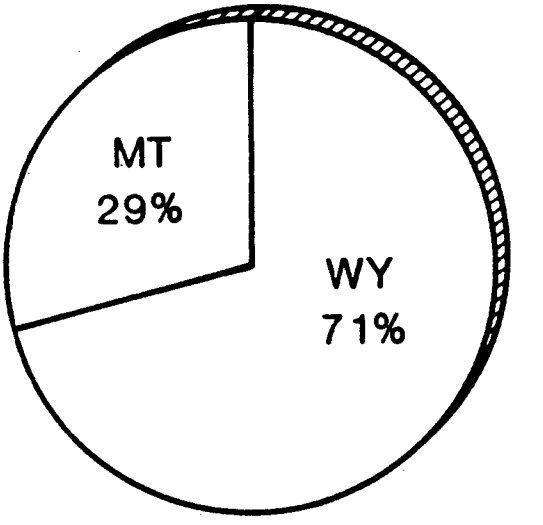
The Market

Montana's coal is primarily shipped by unit train to the Upper Midwest, our so-called "traditional markets". For example, the following pie charts demonstrate our shipments in 1979 and in 1986.

MONTANA/WYOMING COAL MARKET SHARE
(to MN, WI, AND IA)



1979



1986 (Estimate)

Keep in mind that we enjoy a 200 to 250 mile freight advantage over the Wyoming coals to many delivery points.

Prior to the deregulation of rail rates it cost about $.02/ton mile to ship coal to these markets. This gave Montana a $4-$5 freight advantage over Wyoming. With deregulation and the new competition from the competing Chicago-Northwestern into Wyoming, freight rates have dropped dramatically in both states.

While these rates are confidential, there is significant evidence that the rates are now in the $.014-.016/ton mile range. Using $.015 as an example, our freight advantage to these markets is now in the range of $3.00-$3.75.

Montana's higher taxes coupled with our higher mining costs now allows Wyoming to deliver into these markets, and in fact as can be seen from the charts, they are capturing an ever larger share.

The Contracts

On face value our current long-term contracts expire as early as 1989 and as late as 2008 with a large number expiring in 1993.

In recent years we have found that while these contracts certainly have value, they also can be and are being broken and/or negotiated.

For example, Lower Colorado River Authority (LCRA) had a long-term contract with Decker for 2 million tons per year with an expiration date of 2003. LCRA simply refused shipments from Decker and the matter is in litigation. Whatever happens, any settlement will be monetary and the coal will never be shipped from Montana.

Another example is Westmoreland Resources who has long-term contracts for 4,380,000 tons per year (not including their new contract to start in 1988). Their 1986 shipments will be about 2 million tons and their estimate for 1987 is for 1.7 million tons.

Another factor contained in many contracts is that of re-openers. These contract provisions call for the mining company and the customer to periodically (normally 3-5 years) renegotiate monetary terms contained in the contract. The customer has the option to obtain new price quotes and if the mining company will not or cannot meet the terms then the production is lost.

Based on "contracted" tonnage the Montana coal producers in February 1986 estimated that they would produce 38.1 million tons in 1987 and 39.5 million tons in 1988. In November 1986 these estimates were revised to 28.6 million tons for 1987 and 29.5 million for 1988 or a production loss of 10 million tons per year.

Action Needed by the 1987 Legislature

The Montana Coal Council has consistently advocated a permanent reduction in the state's 30% severance tax. It has been our position that a substantial reduction in the tax is necessary to make our coal competitive in the marketplace. Governor Schwinden has announced that he will ask the Legislature to gradually reduce the severance tax to 20% over four years. The Montana Coal Council supports the Governor in this effort. In addition, we believe the reduction must go further in order to make Montana's coal more competitive in today's long-term market.

The Coal Council believes the Legislature should seek a permanent reduction of the severance tax to 15%. We suggest this be accomplished as follows:

* On 7/1/88, reduce the tax to 25%;
* On 7/1/89, reduce the tax to 20%; and
* On 7/1/91, reduce the tax to 15%.

Staggering the reductions in this fashion will spread the revenue impacts over three biennia and will allow the state sufficient planning time to correct revenue imbalances. In addition, it will provide coal customers with a degree of certainty as to the level of tax which they will be required to pay. This should have a positive effect on maintaining existing customers and stimulating new coal sales.

A similar reduction in taxes on lignite of 3%, 4% and 3% to arrive at 10% may well serve to spark interest in our vast lignite deposits.

The Window of Opportunity

Governor Schwinden has also proposed that the Legislature extend the "window of opportunity" until the permanent severance tax reductions have been phased in. Again we feel the level needs to be 15%.

The Coal Council proposes accomplishing this goal by broadening the definition of base consumption level. The way to do this would be to add language that provides for the base consumption level to be calculated on the lesser of the current law or the 1986 consumption. In addition to encouraging our present customers to increase consumption, the incentive to buy new coal will be improved if the tax rate is dropped to 15%.

By expanding the "window of opportunity" we believe we can reverse the trend of lost markets and the corresponding loss of employment while the tax reductions are being phased in.

These proposals would still leave the total production taxes for Montana higher than Wyoming's, and further adjustments eventually may well be in order. We believe the proposals to be the absolute minimums necessary to allow us any opportunity to compete in the market both in the long and short term.

Northern States Power Company

414 Nicollet Mall
Minneapolis, Minnesota 55401
Telephone (612) 330-5500

EXHIBIT #2
DATE 1-28-87
HB 252

January 16, 1987

The Honorable Ted Schwinden
Governor of Montana
State of Montana
Office of the Governor
Helena, Montana 59620

Dear Governor Schwinden:

It has been some time since I have corresponded with you and I thought that this would be an appropriate time to bring you up to date on NSP's coal procurement program.

I'm sure that you are aware that our use of Montana coal has dropped over the last two years and if the present situation continues, our use of Montana coal will continue to go down albeit not as dramatically.

NSP Coal

Year	Montana Coal Deliveries (1000's Tons)	Total Coal Deliveries (1000's Tons)
1982	6828	7112
1983	6419	6663
1984	7383	7823
1985	6626	7358
1986	3506	6540
1987 (Projected)	2500	8500
1988 (Projected)	2500	9000

The reason for the dramatic drop in coal from Montana is the delivered cost to our power plants. I have attached a copy of the November coal delivery costs to our Sherburne County Generating Plant. This report illustrates the problem with Montana coal.

Over the past 1½ years, we have renegotiated our contracts with Westmoreland, Western Energy and the Burlington Northern Railroad. All of these companies reduced their prices to us. But we are still being forced to seek coal supplies from other sources since the delivered costs from Wyoming are still less than Montana.

If the coal taxes levied in Montana were reduced, the situation could be changed dramatically since our contracts with Westmoreland and Western Energy contain a large amount of tonnage flexibility.

Overall, it really seems a shame that we are being driven from Montana after 17 years primarily because of high taxes.

I would be happy to meet with you to discuss this matter further at your convenience.

Very truly yours,

D H Peterson
Director
Fuel Supply Department

vf

cc: Jim Mockler

Attach

MONTHLY REPORT OF TAX QUALITY OF ELECTRIC UTILITY PLANT

Form Approved OMB No 1902-
(Expires

This report is mandatory under the Federal Power Act. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. The Federal Energy Regulatory Commission does not consider this report to be of a confidential nature.

1. Company-Plant Code	2. Month and Year of Report	3. Name of Reporting Company	4. Page Number
52107 - 6090	November 1986	Northern States Power Company	1 OF 1

5. Plant Name	6. Plant Location (nearest village, town, city, etc.)
Sherburne County	Becker, Minnesota

7. Name, Title and Address of person to be contacted concerning data entered on this form	8. Telephone No.
A H Shipton, Coordinator, Fuel Operations & Planning, 414 Nicollet Mall, Mpls, MN	Area Code (612) 330-6150 Extension:

9. Signature of Official submitting this report	10. Title	11. Date Report Completed
	Director, Fuel Supply Department	1/15/87

Line No.	PURCHASES: Type (Use code) (a)	PURCHASES: If Contract Expires Within 24 Mos, Expirat. Date (b)	Fuel Type (Use code) (c)	COAL MINES ONLY: Type (Use code) (d)	LOCATION: Coal District No. (e)	LOCATION: State Abbrev. (f)	LOCATION: County No. (g)	SOURCE DATA (For coal, enter name of mine or broker from which coal originated or was purchased. For oil, enter name of supplier and refinery, or port of entry. For gas, enter name of pipeline (supplier) or distributor, and producing area by state; or port of entry.) (h)	Quantity Received (1000 units for coal, tons; for oil, barrels; for gas, Mcf) (i)	QUALITY (AS RECEIVED): BTU Content (Average of: coal, per lb; oil, per gal; gas, per cu. ft) (j)	QUALITY (AS RECEIVED): Sulfur Content (To nearest 0.01%) (k)	QUALITY (AS RECEIVED): Ash Content (To nearest 0.1%) (l)	Purchase Price (In ¢ per million BTU to nearest 0.1 cent) (m)
12	CE		Sub	S	22	MT	087	Colstrip	187.4	8616	0.71	8.9	127.0
13	CE		Sub	S	22	MT	003	Absaloka	188.4	8677	0.58	9.4	119.7
14	CE		Sub	S	19	WY	005	Rochelle	70.5	8775	0.30	4.8	114.0
15													
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FERC Form No. 423 (11-82)

(USE CONTINUATION SHEET IF NECESSARY)

EXHIBIT #3
DATE 1-28-87
HB 252

1/27/87

Testimony by Kenneth L. Williams
Western Energy Co. Butte, Mt.
at House Taxation Committee Hearing
January 28, 1987

Mr. Chairman, members of the Committee, my name is Ken Williams. I appear this morning on behalf of Western Energy Co. and the Montana Coal Council in support of HB 252.

I'd like to focus my remarks today on an area of particular concern to Western. The erosion of the upper Midwest market for Montana coal due to competition from lower priced Wyoming coal. The upper Midwest market includes utilities in the states of Iowa, Minnesota, and Wisconsin.

There are five mines in Montana that ship coal out of the state. The three northern mines ship into the upper Midwest market area. They are Western's Rosebud Mine, Peabody's Big Sky Mine, and Westmoreland's Absaloka Mine. Together they produce over one-half of Montana's total coal production.

In 1979, coal shipments from Montana and Wyoming to the upper Midwest totaled 24 million tons. Montana coal accounted for 14 million tons or 59%. By 1985, the market increased 25% to 30 million tons, but Montana's market share fell to 44% and shipments dropped to 13 million tons. (Refer to Chart 1) The erosion of Montana's market share by lower priced Wyoming coal has been occurring over a period of time. (Refer to Chart 2) The downward trend accelerated in 1986. Based on information available through August of 1986 and projections to the end of the year, total Western coal shipments were approximately the same as 1985. However, Montana's market share plummeted to 29% or approximately 8.5 million tons. (Refer to Chart 3)

Coal prices in the upper Midwest market have dropped to the point where the provisions in long-term contracts no longer provide a safety net for Montana's coal producers. Montana's shipments ranged between 12 to 14 million tons annually form 1979 through 1985. In 1986 Montana's shipments to the upper Midwest fell more than 30% to 8.5 million tons while total coal shipments stayed approximately the same. Wyoming coal replaced Montana coal ton for ton. Unfortunately, we may not have reached the bottom as indicated by recent further cutbacks on deliveries to Minnesota.

Speaking for Western, our coal shipments to the upper Midwest show the same relationship. We shipped a high of 8.5 million tons in 1979 and approximately 7 million tons each year through 1985. In 1986 our shipments fell to 4.1 million tons. Our 1987 shipments are projected to be about 3 million tons.

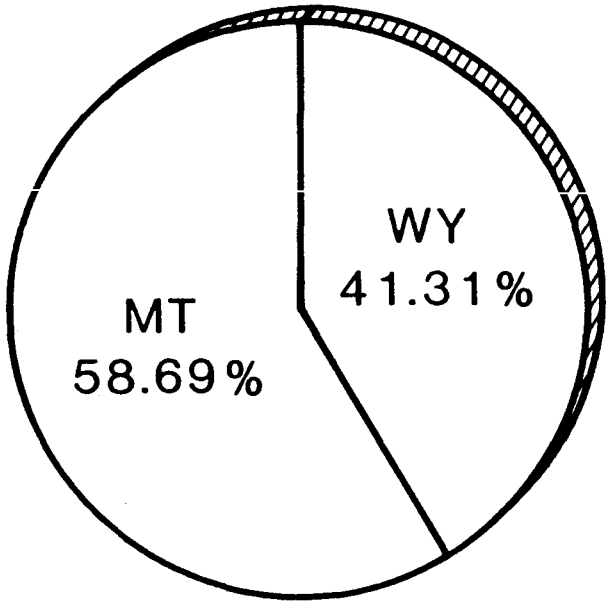
Traditionally, Montana's distance advantage to the upper Midwest markets offset the lower cost of Wyoming coal. Wyoming coal is cheaper to mine because the seams are thicker, the overburden thinner, and taxes are less. Montana miners have to move roughly twice as much dirt to produce a ton of coal. This geologic disadvantage is exacerbated by the application of higher percentage production taxes to a higher tax base.

The problem is obvious, Montana coal is too expensive at the mine. Montana coal producers have taken and are taking steps to become more efficient and offer a lower cost product. However, our ability to cut prices, compared to Wyoming, is finite due to the geologic constraints. Recent reports filed with the Federal Energy Regulatory Commission show Montana's coal being one to two dollars per ton more expensive than Wyoming coal. This difference is being reflected in reduced deliveries.

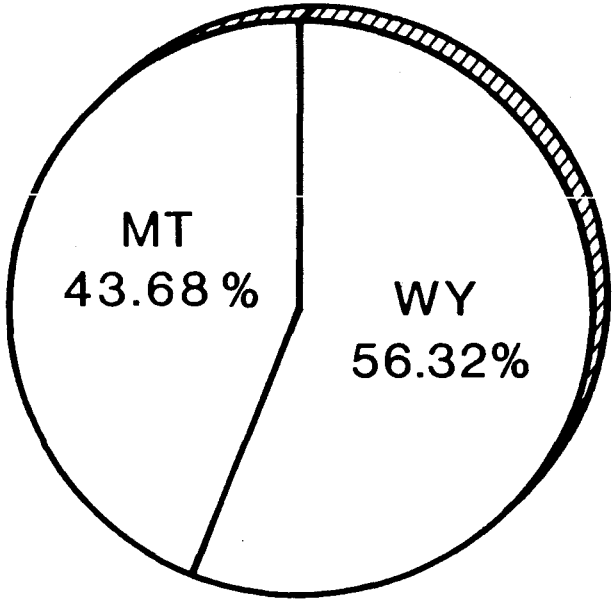
I urge this committee to support HB 252 to help stem the erosion of our market and help get tons back to Montana. Thank you.

MONTANA/WYOMING COAL MARKET SHARE

(to MN, WI, IA)



1979



1985

CHART 1

PERCENT OF TOTAL SHIPMENTS
To Iowa, Minnesota and Wisconsin

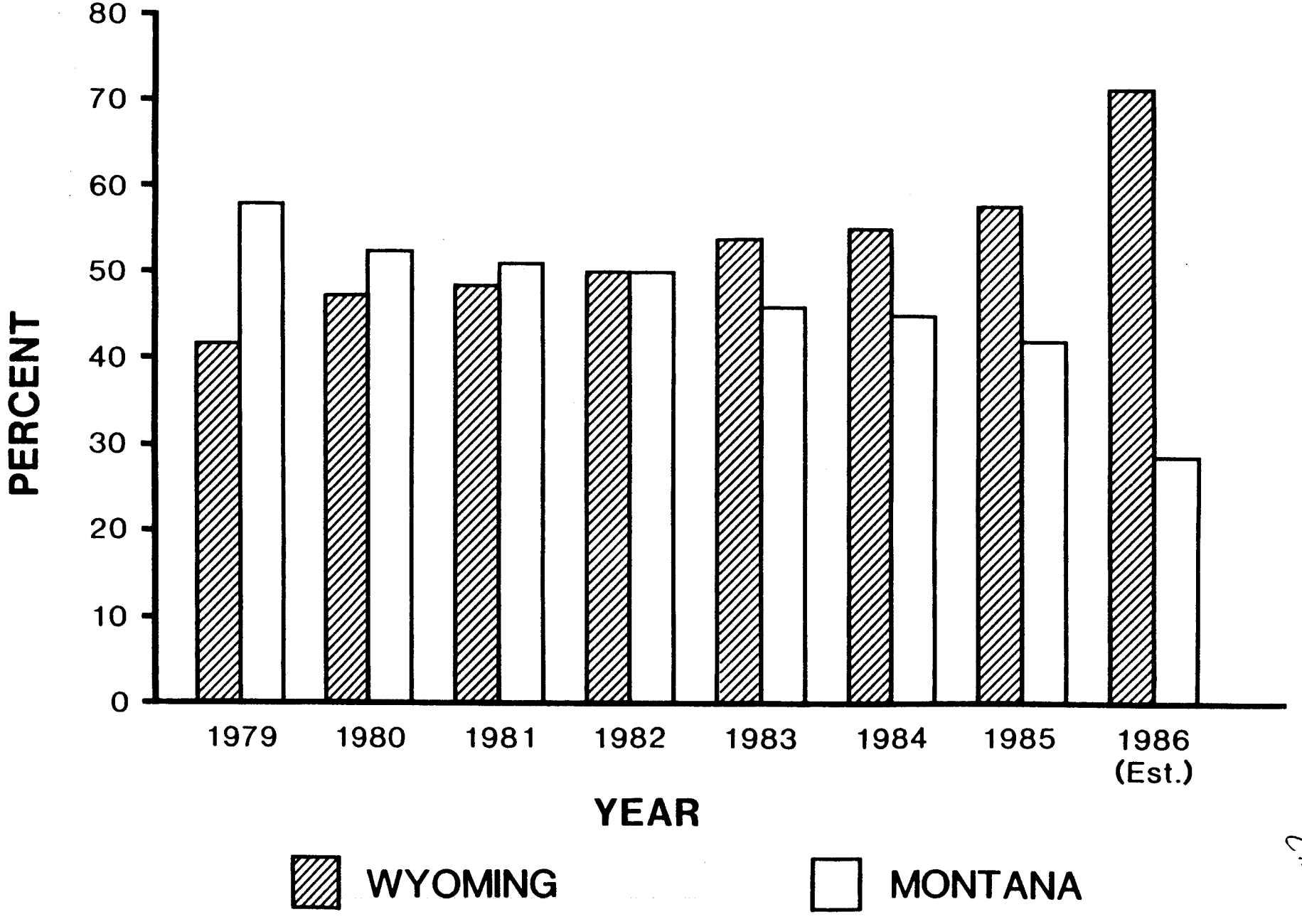
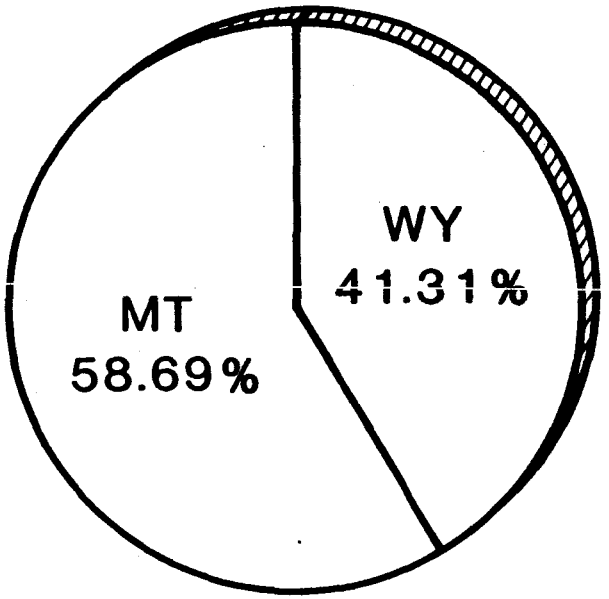


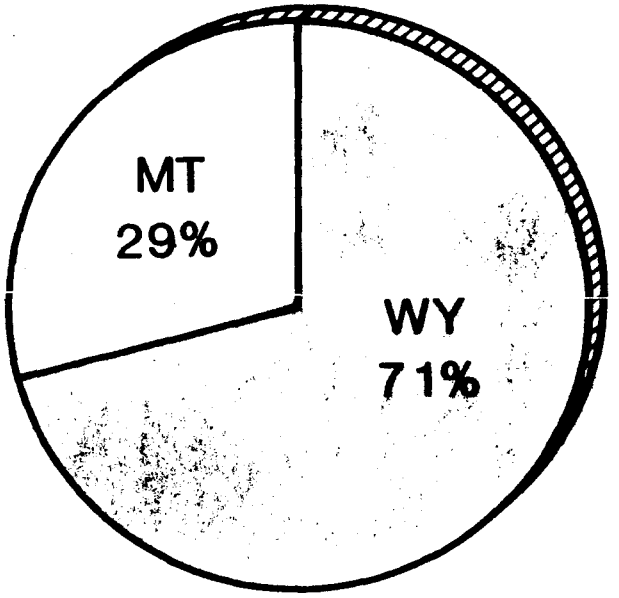
Chart 3

MONTANA/WYOMING COAL MARKET SHARE

(to MN, WI, IA)



1979



1986
(Estimate)

Chart 3

#4
1-28-87
456

TESTIMONY OF BRETT BOEDECKER
IN SUPPORT OF HB 456

My name is Brett Boedecker, and I am Chairman of the Montana Forward Coalition, Inc. Montana Forward is a group of individuals, businesses, and communities from all walks of life in Montana.

Montana Forward was formed because we felt that the explanations for the economy's demise as being "in transition," or "national in nature" were inaccurate. Instead, we believed that a coalition could focus its direction on economic initiatives that would promote Montana's economic growth.

Fifteen months later, I am able to represent to you that there are options available to stimulate Montana's economic growth. Montana Forward did more than blame others or suggest that it was beyond our control. We commissioned a comprehensive tax study of Montana which, after analyzing the tax structure and budget, resulted in certain findings and recommendations.

Montana Forward believes that the coal industry is critical to the overall economic health of the state. We further believe it is important to foster measures that will increase production by existing and new producers.

Frankly, few in Montana Forward were surprised at Mr. Miller's findings on the 30% tax, but we were startled about the degree of economic trouble the industry was experiencing, and the adverse impact to state revenues and jobs. We were pleased that Mr. Miller offered us what we think is an innovative, commonsense proposal to achieve our objectives to stabilize and promote the growth of our Coal Industry.

We are aware of the other two coal severance tax proposals and can support their concept to reduce the tax level. However, HB 456 has a distinguishing factor in that it does not provide a tax rebate or reduction without the market place responding with more coal purchases. The bill is designed to

create an economic mechanism that will require the purchaser to increase his purchases in exchange for a lower tax rate. This bill will result in stabilizing and expanding Montana's Coal Industry, and create an entrepreneurial atmosphere which will result in more "sunshine" and new business. Additional capital will be employed and new high paying productive jobs will be available to Montanans.

We think this bill shows creativity, and initiates an affirmative commitment to do business in Montana. We support your bill, and if this is acceptable to the committee, I would like to call upon Mr. Frank Tooke, Co-chairman of the MFC Tax Committee, to be followed by Mr. Wally Miller, Miller & Associates, and then Mr. Vic Wood, who is a coal marketing consultant.

MFC, a bipartisan group, urges support, and is pleased with the bipartisan support for the bill.

EX #5
1-28-87
HB 456

TESTIMONY OF FRANK TOOKE
IN SUPPORT OF HB 456

Mr. Chairman and members of the Committee, my name is Frank Tooke, and I am a CPA in Miles City, Montana, and serve on the Miles City City Council. As co-chairman of the Montana Forward Taxation Committee, I have reviewed Mr. Miller's assessment of the coal industry, the utility purchaser, the jobs it creates, and the impact the current tax is having on the industry and to the revenues of Montana.

It became clear to both Miller & Associates and our committee that even if we had the money in this biennium, a 5% decrease immediately would not even begin to address the coal industry's tax problems.

Miller & Associates told us this fall that, based upon their research and interviews, that simply reducing the tax over a phased period could not result in developing a competitive coal industry. After reviewing several options, a sliding scale tax plan was developed and recommended to Montana Forward. The plan essentially developed a "quid pro quo" approach, the greater the volume, the lower the tax rate.

Somehow, we needed to lower the tax and create some assurance that Montanans would get something in return. The recent contract shifts by midwestern utilities on current Montana maximum/minimum contracts to Wyoming are excellent examples of a need to incur some stability and reliability in Montana's coal industry before it is too late.

Our plan is simple, and rewards purchasers who buy more Montana coal. This concept is not new and is used in all forms of business and trade. The coal business is a volume business. Tariffs, capital employment, and the development or expansion of mines is predicated on the requisite volumes to justify the rate of investment.

Because of a desire not to impact current revenues, it would have been nice to start with 30% and work downward. However, the passage of the "window of opportunity" established the rate at 20% for new coal and that, in effect, has established a ceiling as far as the utilities are concerned. Mr. Miller's words to us after his visits to the utility industry were blunt and unanimous. "We have no plans to ever buy coal again at 30%."

To cushion the impact from the reduction of the tax, the bill's sponsors have deferred the effective date of the reduction to July 1, 1988. To bridge the gap, the bill extends the Governor's "window" one year. On July 1, 1988, the permanent maximum tax on subbituminous surface mined coal will be reduced to 20%, with lesser rates contingent on the amount purchased. Who benefits---we think we all do---more jobs, chances for growth of the coal industry, opening of new markets and more. If this plan is adopted, we could be in the ball park with Wyoming in less than 18 months---particularly in the upper midwest.

I would like to think of this as an investment in Montana's future, not too dissimilar to what was done with approval of the lottery. The voters last fall committed themselves to spending revenues on the lottery apparatus without assurance that it will be successful, but the voters felt it was a solid investment. The same holds true for our plan. A $7 million general fund shortfall in fiscal 1989 to an industry which has returned over $700 million since 1975 seems like a good bet to me.

We support this bill. I would now like to call upon Mr. Wally Miller.

#5a
1-28-87
456

HB 456
1-28-87

TESTIMONY OF WALLY MILLER
IN SUPPORT OF HB 456

Mr. Chairman and members of the Committee, my name is Wally Miller, and I am President of Miller & Associates of Olympia, Washington. I am pleased to appear here in support of HB 456, which contains many of our recommendations in the coal portion of the Montana Economic and Tax Reform Program for 1987, which was presented and adopted by the Montana Forward Coalition in November, 1986. I addressed members of this committee and the Senate Taxation Committee last week as to our complete findings and recommendations. My testimony is limited to the coal tax recommendation.

One of the key findings we made after studying the coal and oil industries was that Montana's extractive industries needed to be stimulated in order for them to compete with their neighbors and survive.

The plan contained in this bill is differenct, simple to explain, and represents conclusions reached after comparing the tax structure, analyzing the market, the transportation, the quality of the coal, the industry, and the utility market. To take advantage of the lower tax rate requires a response from the industry. There is a cost to this bill in the early years, but there is a very real possibility of receiving something back in return.

You don't need to be continually told how disparate the tax is with neighboring states. That is a fact and is contained in the study. You have already been told about the deterioration and loss of market to Wyoming, so I won't belabor this point further.

In order to receive evidence first hand of this critical issue, I interviewed or personally visited with Montana's coal producers and coal buyers. I hope that these interviews have special weighted value because I had nothing to sell, did not represent a company, industry or government. Thus I allowed the utilities to elaborate at will.

I can tell you that the interviews conducted this fall were quite a sobering experience. It was blatantly obvious to me that Montana had to do something and fast or nothing would be left of the coal industry.

The first common statement among the utilities is that they would never renew their contracts at 30%, and most said if there was a way out of their existing contracts, they would use it.

Let me share some other quotes.

- "Manitoba Hydro is competitive with Montana coal. The contract is in place and will run through the mid-90's. In 1986 Canadian Hydro displaced about 2 million tons of Montana coal."
- "The only way that Montana coal can stay in the market is for producers, the transporters and the state to each make major cuts. If they don't, the ball game by 1995 will be over for Montana."
- "All other things being equal. I wouldn't buy Montana coal again."
- "We are a big coal buyer. We would take more if the price was right."
- "I really like the people of Montana and the coal producers. We understand the need for reclamation and environmental protection--these aren't issues. Excessive taxation is an issue."

The research done and interviews conducted earlier in the year by Arnold Silverman of 63-85 million tons per year sales of Montana coal totally missed the mark for the following reasons:

1) It was based on the fact that virtually all existing contracts would be renewed;

2) It anticipated a load growth rate of 2% or better; and

3) It anticipated substantial new sales.

With a 30% tax in place an optimistic forecast for Montana in the year 2000 would be in the 10 to 15 million ton per year range, or 1/3 to 1/2 of our already declining revenues.

The idea of the sliding scale was developed to its present form at the conclusion of our analysis and interviews with the utilities. One fuel buyer said: "Our Public Service Commission has to approve any long term fuel supply contract commitments. The Commission enforces our effort to make prudent purchases." Exploring further I found this was the case in all of the states buying Montana coal. If this is the case why wouldn't the utility commission urge one to lower its fuel costs by buying more? Wouldn't this result in "switching" take-or-pay contract <u>to</u> Montana instead of away?

Under this bill, Montanans have an opportunity to see results, in exchange for reduction of the tax.

Although testimony of the Montana Coal Council and others indicates support for the other bills, I believe this plan gives Montanans more than just hope in return for their agreement to reduce the tax rate. There are incentives for the entire amount purchased--not just a small portion; and that makes sense to a utility purchaser and his rate commission.

We made other recommendations such as a cap on the trust fund for 10 years and allowing full deduction for federal, state, and private royalties. We still think they are good ideas, but we are realists. Our analysis is contained in our study, and I would be happy to discuss our conclusions in depth at another time.

Thank you.

EXHIBIT #6
DATE 1-28-87
HB 456

TESTIMONY OF V. H. WOOD
IN SUPPORT OF HB 456

Mr. Chairman and Members of the Committee, my name is Victor Wood, President of V. H. Wood & Associates in Minneapolis, Minnesota. V. H. Wood & Associates is a consulting firm principally involved in coal and other fuel market analysis and associated activities.

For 25 years prior to 1978, I was employed by Northern States Power of Minneapolis, with the last position held being manager of fuel procurement for all fuel supplies to power plants in the NSP system. As such, I am most familiar with Western coal, particularly Montana and Wyoming, and have been familiar with coal purchasing strategies for several decades.

My testimony today is offered in support of HB 456, sponsored by Representatives Brown and Iverson and is submitted on behalf of Wesco Resources, Inc., a member of the Montana Forward Coalition.

My client and I also are in support of HB 252 and HB 274, as these bills also recognize the inherent problems the 30% coal severance tax has caused for Montana's industry.

My testimony, however, is offered in support of HB 456, because I feel it gets to the problem quicker, offers a new, simple, and logical approach based on the concept of a lower price as an incentive for increased purchases and provides equal opportunity for all producers to enjoy increased production potential. I also believe that HB 456 will offer better long-term opportunities for Montana's industry, consumers, and taxpayers.

State of the Coal Market

Previous testimony offered today has made a strong statement about the deteriorating health of Montana's coal industry. Since I am

in the market and look closely at the industry from both a producer's and utility's perspective, I would like to share with you my observations of what is going on in the utility industry as it affects Montana and Wyoming. I will share with you some facts of life about Montana coal and delineate the positive features of HB 456 from a legislator's perspective.

There are some terms you need to be familiar with, and their significance from my perspective as a former fuel purchaser and now a fuel consultant.

1) Minimum/Maximum Contracts - Most current contracts for Montana coal purchasers contain minimum/maximum provisions which enable the "purchaser" to take as much or as little coal as possible within a given range--as an example-- 2 - 5 million tons. What has happened since 1985 is the taking of the minimum tonnage on existing contracts and shifting the amount not taken to Wyoming, or other states

Published reports at the time of signing the Western Fuels one million ton contract and a report issued by the Coal Tax Oversight Subcommittee, show that at least two Montana coal producers, in exchange for an extension of existing contracts, had to agree to expanded or new minimum/maximum provisions allowing more latitude for the purchasers to take less coal if they so desire.

HB 456 is a response to the minimum/maximum problem. Instead of taking the minimum and shifting the remainder to Wyoming, this bill encourages shifting coal to Montana in exchange for a lower tax on all purchases, not just the shifted coal.

2) Spot Sales - Because it is a buyer's market, utility purchasers are playing producer against producer and state against state

by entering into "spot contracts" or in essence "short-term" arrangements. These contracts lend little to the stability of the industry, or the budget picture in Montana. It's even worse if those "spot sales" go to Wyoming.

HB 456 may not end spot sales, nor is it intended to. However, it may do two things: encourage sales to Montana and act as an impetus to add coal to an existing purchaser's total in Montana in order to get the lower overall tax rate for all the purchases.

Both minimum/maximum and spot sales serve to give the coal purchaser the edge. This is in dramatic contrast to general purchasing practices prior to 1975 and your 30% rate. HB 456 is both a short-term and long-term response from Montanans to blunt this edge, assuming no third party event such as litigation occurs.

Facts of Life Montana Legislators Must Face

As others preceding me have stated, there are realities existing today that must be considered by the Legislature. Some may not agree with these facts as to degree, but they at least should be considered by the Committee.

1) No utility with whom I am familiar would even consider renewing any contracts at 30%, or even 25% for that matter.

2) In my opinion, 20% is the absolute ceiling for the tax on new purchases of coal in today's market. Efficient producers able to reduce other costs, with an advantage in transportation to certain market areas, can enable the 20% tax to be competitive. However, that is probably the extent of the circumstances, and even then it is barely competitive.

HB 456 reduces the tax on all coal to a maximum of 20% by July 1, 1988. The sliding scale would put more than 75% of Montana's

coal in the 14-18% category, which is competitive in many instances, given transportation advantages. Naturally, an 18, 16, 14, 12, or even a 16, 14, 12, 10 would be preferable, but I am trying to be a realist concerning the loss of revenues.

3) You should be aware that the emergence of the C & NW as a competitor to BN has resulted in lower and more competitive rates in Wyoming. Rail rates have also dropped in Montana, but Montana producers do not enjoy the luxury of head-to-head competition.

In spite of these blunt realities, with enactment of HB 456 or similar meaningful and equitable legislation, there is 8-10 million tons per year of new production that can be captured in the next 4-5 years. Should our sliding scale be employed on a permanent basis, this 8-10 million could be complimented in the mid to late 1990s with additional generation which means more purchases of Montana coal.

One further point: Montana is perceived to be insensitive to the utility marketplace. HB 456 is intended not only to correct the perception, but provide long-term stability and predictability for coal purchases.

Positive Features of HB 456 from a Legislator's Viewpoint

Although I am not and have never been a legislator, I have attempted with my utility background to look at HB 456 from a legislator's perspective and offer for your consideration, the following:

1) Montana's coal purchasers are interested in the total costs per million BTUs of coal. If a lower price on all coal purchases

for a plant or plant within the utility's system could be obtained by purchasing more coal or by switching coal to Montana, this incentive for an overall lower rate must be considered a solid financial proposition which utilities would consider.

2) If a utility were able to lower its overall costs by the amount a lower tax would bring, additional opportunities could present themselves in the form of cogeneration and other non-utility facilities.

3) The regulatory climate in states that I am familiar with--namely Texas, Minnesota, Wisconsin and Michigan--are demanding strict financial accountability by utilities in their fuel purchases. If a utility passes up an opportunity to reduce its costs on its total fuel purchases by buying from a competitive state without solid reasons, the utility could be carefully scrutinized by its rate commission.

4) You can consider HB 456 to be consistent with the new strategies being employed by utilities. During the past few years, high costs of new generation facilities, lower than projected load growths, and reluctance of utility commissions to include new plants fully in the rate base have caused utilities to rethink past practices. Some are now brokering and receiving power to and from other plants. HB 456 would encourage more coal purchases and resale of electricity to other utilities outside their service area. Montana legislators can seize upon and be at the forefront of such a strategy.

Four questions have arisen regarding the operation of this bill which I would like to clarify so there can be no misunderstandings as to intent or purpose.

1) What is to preclude a utility from buying an extra amount one quarter and multiplying it by four and claiming a lower rate?

Two responses: The bill provides for the Department to make adjustments to insure this doesn't happen; and second, the realities of coal purchases, and movement to a plant by rail are established so such a practice would be difficult to achieve, even if a purchaser tried.

2) What is to prevent several purchasers from "teaming up" and buying their coal together and qualifying for the lower rate?

The authors of this bill intend to encourage creativity but not teaming up to achieve a lower rate for coal they need for their operations. I think the Department has authority under this bill and the existing statute to determine that this joint coal will not qualify for the lower rate, but just to be sure, I would offer the following new language:

> "Such purchases shall not exceed that specifically required and utilized in the industrial, commercial, or energy conversion facilities owned at least 33 1/3% by the purchaser".

3) What about the "small purchaser" of 0-2.5 million tons of coal? Doesn't this discriminate in favor of the already large purchaser?

Prior to answering this question, I want to clear up the meaning of a "small purchaser," compared to a "small producer." A small producer in Montana is one producing less than 500,000 tons of coal per year. He is able to stay in business due to proximity of his mine to market, spot sales and industrial facilities nearby.

A small purchaser, however, is likely one who is buying from several coal sources in different locations or states. This bill would encourage purchases in one state--Montana.

Second, the small purchaser will pay 20% in 1988 which is already lower than the older two bills before you for all coal, at least at first, so he is better than he was before.

Third, if you still feel this to be a problem and wish to encourage truly small purchasers to get a lower than 20% tax, you could amend the bill and allow small purchasers the right to form cooperatives subject to strict requirements as to the end use of the coal and lower the rate.

I personally do not view this as a problem given the nature of the utility industry, nor do I perceive it as a problem for a co-operative with an interest in a specific power plant to combine its purchases with the majority owner. I would be happy to suggest language covering these instances if the Committee so desires.

4) Does this bill favor new producers at the expense of existing producers?

My response is absolutely not. All new tonnage would be treated equally, because it is based upon the same incentive rate for all producers. If there is any benefit in the near term it probably would favor existing producers with current excess capacity, or the producers with minimum/maximum contracts.

The longer term will place all producers on equal footing and HB 456 sets the stage for increased market share which will facilitate the expansion of existing mines.

Fiscal Impacts and Tonnage Increases Under Bill

Attached to my testimony is a series of tables including projected production levels and revenue forecasts for HB 456 and the proposal announced by Governor Schwinden for a phased reduction over the next four years.

The first point I want to emphasize to the Committee is that forecasting is an inexact science in today's declining coal market. Therefore, my estimates cannot be exact through FY 92. I feel, however, that the tonnage projections for HB 456 are conservative and definitely attainable.

To emphasize the conservative approach, the tonnages projected under HB 456 do not account for any of the following:

- Any new generation facilities in the market area including on-site generation in Montana.
- The extension of Montana's market reach through 1992.
- Any new small industrial buyers.
- Expansion by utilities into the non-utility coal business.
- Does not reflect new jobs, wages and a broadened Montana tax base.

A review of recent mine slowdowns in the area indicates that an average of 40 jobs are directly affected by a change of one million tons of production.

As to wages, the average salary per job is above $30,000 per year, so an 8.6 million tons per year increase in production will significantly increase jobs and the tax base.

Projected Revenues Foregone

Although our plan is progressive and innovative, it takes effect sooner than the Governor's proposal, HB 252 and HB 274, and will result in a decline in revenues beginning in FY 89. In my opinion, unless meaningful legislation is enacted, the revenue base will decline in any event along with reduced tonnage levels. By doing nothing will further jeopardize new renewals of existing contracts.

The decline in revenues in fiscal year 1989 will be $32.3 million, of which 50% or $16.2 million automatically flows to the Permanent Fund. As to declines to the General Fund in FY 89: $7.4 million.

The Schwinden proposal in FY 1989, calling for a 25% tax, will result in a decline in revenues of $14.1 million, of which $7.1 million is Permanent Fund. Declines in the General Fund in FY 89 would be $3.2 million.

There is a $7.4 million decline in the General Fund in FY 89 under our proposal, and this is $4.2 million more costly than the 25% proposal in FY 89 by Governor Schwinden.

Both the Governor and the Budget Office are assuming that the same or increased tonnage and revenues will occur by maintaining the status quo or making phased reductions over a four-year period.

In view of the rapidly deteriorating coal industry in Montana, this event seems unlikely to occur and would appear risky to assume.

In conclusion, I firmly believe that it is necessary to immediately establish a meaningful incentive and positive business atmosphere for the marketplace. Delaying such an incentive would not appear to best serve the State of Montana.

Long-range utility planning has commenced for the mid to late 1990s and a competitive, predictable basis must be established for Montana to enjoy the benefits of increased growth. In my opinion, HB 456 will accomplish these desirable goals and should be seriously considered by the Committee.

Thank you.

[illegible]

EXHIBIT
DATE 1-28-87
HB 274

1-28-87
[redacted]

13 million tons = appox 130 mill Coal Sales
That works to approx additional 27 mill in sales for Mt. Vendors

The loss in taxable income and Sales is alone very significant

loss of Gross proceeds tax to the effected counties is around 4.7 million

FACT IN 1985 10.5% Wyo produced 140,424,446 tons
collected 131,736,881 Severance tax
or .93 per to
Mt produced 33,148,300 tons
89,262,995 Severance
or $2.63 per ton
2.82 times higher

I've heard alot of discussion that with the deductions our coal tax isn't really that high. But Nobody seems to be real sure of the figures. you ask 10 people you get 10 answers Well here are some facts that anyone can get with a litte reserch or a few phone calls.

In Closing I will quote from a Major midwestern Coal buyer
If the present taxation is allowed to exist in Montana the is a very good possibility that Significant coal mining in MT will cease to exist over the next 10-20 yrs

We urge your support IN HB 274

Thank you

The 13 mil. to I refer to is Contracted tonnages at Decker, Spring Creek, Peabody, Sarpy Creek, Western Energy

As to the mechanics of the bill we advocated 10% severance tax to go into affect immediately. But working with rep assay we decided to phase this in. This we feel that a phase in was as much a compromise as possible and still get immediate results

Good morning Mr. Chairman and members of the committee
Duane Ankney coal miner from Rosebud County
I am here to urge support of Rep Higgins
H.B. 224.

We have over the past 7-8 years
worked hard to put together
facts to show the drastic need
for severance tax reduction - 10% by 1990
and allowing the state to
adjust to the lowering of the coal
tax and passing loss of revenue to the
state.

We are not under any false
assumptions that this will bring
astronomical increases in production
But it will get the
mine operators back to contracted
tonnage mark. Which right now is
approx 13 million tons of coal that we
contracted but not being taken
this lost tonnage effects every
coal operator in S.E Mont.
the Contracts are either litigation,
taking their min. or paying and not
taking Reason this is that
we have a 350 mw freight advantage

Facts

There are in excess of 400 miners
out of work due to lost tonnage
This ripples out in to the private
sector as an additional 700 + people
that are now or will be out of work
In mining there 14.8 mill lost wages
Private 13.7
Sector

THE PUBLIC PERCEPTION

- Resource industries are important to the economic health of the state.
- Few Montanans view the state's resource industries as thriving and successful.
- Almost no one sees the current pace or level of development as too fast or too high.
- Overall impressions of the industries are favorable, but marks for responsible citizenship are somewhat lower.
- Development adjacent to wilderness is more acceptable than that near national parks, and few object to development on other government lands.
- Substantial numbers of Montanans lack awareness about the state's resource industries.

Table 1
Montanans' Assessment of Natural Resource Development in the State

	Natural Resource Development in General	Lumber and Wood Products Manufacturing	Oil and Gas Production	Coal Mining	Hard Rock Mining
Importance to the state's future economic health					
Very essential	64%	63%	52%	45%	28%
Fairly essential	29%	30%	36%	39%	41%
Not too essential or not essential at all	4%	4%	9%	10%	22%
Don't know	2%	4%	3%	6%	9%
Current pace or level of development					
Too fast or too high	7%	8%	5%	6%	2%
About right	46%	44%	42%	51%	32%
Too slow or too low	35%	33%	37%	20%	31%
Don't know	10%	14%	15%	23%	35%

Source: University of Montana, Bureau of Business and Economic Research, *Natural Resource Development in Montana: A Survey of Montana Public Opinion* (Missoula, Montana, 1986) for the Western Environmental Trade Association, Helena, Montana.
Note: The percentage detail may not add to 100 because of rounding.

Table 2
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	Lumber and Wood Products	Oil and Gas	Coal Mining	Hard Rock Mining
Current health of the industry				
Thriving and successful	14%	20%	24%	3%
Static: Not thriving or declining	42%	46%	45%	31%
Unhealthy and declining	37%	20%	14%	42%
Don't know	8%	13%	16%	23%
Overall impression of the industry				
Favorable	78%	72%	63%	51%
Unfavorable	11%	16%	21%	23%
Don't know	11%	12%	16%	26%
Performance as a responsible citizen of the state				
Excellent	6%	5%	5%	3%
Pretty good	47%	38%	34%	22%
Only fair	29%	30%	29%	28%
Poor	4%	8%	10%	12%
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Table 3
Montanans' Attitudes regarding the Location of Natural Resource Development Activity

	Timber Cutting	Oil and Gas Extraction	Coal Mining	Hard Rock Mining
Adjacent to wilderness areas				
Should allow	70%	64%	51%	55%
Should prohibit	28%	33%	45%	39%
Don't know	2%	3%	3%	7%
Adjacent to national parks				
Should allow	60%	56%	43%	45%
Should prohibit	38%	42%	54%	49%
Don't know	2%	2%	4%	6%
On other government lands[a]				
Should allow	85%	83%	78%	79%
Should prohibit	11%	12%	17%	15%
Don't know	3%	4%	5%	6%

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EXHIBIT
DATE 1-26-87
HB 274

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	Timber Cutting	Oil and Gas Extraction	Coal Mining	Hard Rock Mining
Adjacent to wilderness areas				
Should allow	70%	64%	51%	55%
Should prohibit	28%	33%	45%	39%
Don't know	2%	3%	3%	7%
Adjacent to national parks				
Should allow	60%	56%	43%	45%
Should prohibit	38%	42%	54%	49%
Don't know	2%	2%	4%	6%
On other government lands[a]				
Should allow	85%	83%	78%	79%
Should prohibit	11%	12%	17%	15%
Don't know	3%	4%	5%	6%

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- Resource industries are important to the economic health of the state.
- Few Montanans view the state's resource industries as thriving and successful.
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	Natural Resource Development In General	Lumber and Wood Products Manufacturing	Oil and Gas Production	Coal Mining	Hard Rock Mining
Importance to the state's future economic health					
Very essential	64%	63%	52%	45%	28%
Fairly essential	29%	30%	36%	39%	41%
Not too essential or not essential at all	4%	4%	9%	10%	22%
Don't know	2%	4%	3%	6%	9%
Current pace or level of development					
Too fast or too high	7%	8%	5%	6%	2%
About right	46%	44%	42%	51%	32%
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	Lumber and Wood Products	Oil and Gas	Coal Mining	Hard Rock Mining
Current health of the industry				
Thriving and successful	14%	20%	24%	3%
Static: Not thriving or declining	42%	46%	45%	31%
Unhealthy and declining	37%	20%	14%	42%
Don't know	8%	13%	16%	23%
Overall impression of the industry				
Favorable	78%	72%	63%	51%
Unfavorable	11%	16%	21%	23%
Don't know	11%	12%	16%	26%
Performance as a responsible citizen of the state				
Excellent	6%	5%	5%	3%
Pretty good	47%	38%	34%	22%
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Current pace or level of development					
Too fast or too high	7%	8%	5%	6%	2%
About right	46%	44%	42%	51%	32%
Too slow or too low	35%	33%	37%	20%	31%
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	Lumber and Wood Products	Oil and Gas	Coal Mining	Hard Rock Mining
Current health of the industry				
Thriving and successful	14%	20%	24%	3%
Static: Not thriving or declining	42%	46%	45%	31%
Unhealthy and declining	37%	20%	14%	42%
Don't know	8%	13%	16%	23%
Overall impression of the industry				
Favorable	78%	72%	63%	51%
Unfavorable	11%	16%	21%	23%
Don't know	11%	12%	16%	26%
Performance as a responsible citizen of the state				
Excellent	6%	5%	5%	3%
Pretty good	47%	38%	34%	22%
Only fair	29%	30%	29%	28%
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Montanans' Attitudes regarding the Location of Natural Resource Development Activity

	Timber Cutting	Oil and Gas Extraction	Coal Mining	Hard Rock Mining
Adjacent to wilderness areas				
Should allow	70%	64%	51%	55%
Should prohibit	28%	33%	45%	39%
Don't know	2%	3%	3%	7%
Adjacent to national parks				
Should allow	60%	56%	43%	45%
Should prohibit	38%	42%	54%	49%
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	Timber Cutting	Oil and Gas Extraction	Coal Mining	Hard Rock Mining
Adjacent to wilderness areas				
Should allow	70%	64%	51%	55%
Should prohibit	28%	33%	45%	39%
Don't know	2%	3%	3%	7%
Adjacent to national parks				
Should allow	60%	56%	43%	45%
Should prohibit	38%	42%	54%	49%
Don't know	2%	2%	4%	6%
On other government lands[a]				
Should allow	85%	83%	78%	79%
Should prohibit	11%	12%	17%	15%
Don't know	3%	4%	5%	6%

Source: University of Montana, Bureau of Business and Economic Research, *Natural Resource Development in Montana: A Survey of Montana Public Opinion* (Missoula, Montana, 1986) for the Western Environmental Trade Association, Helena, Montana.

Notes: The "Allow" and "Prohibit" categories each include some who gave those responses but with some qualification of their response. Percentage detail may not add to 100 because of rounding.

[a]Government lands other than those in wilderness areas and national parks.

1-28 EV

#6C
1-28-87
252, 274,
456

MONTANA STATE AFL-CIO
APRIL 29 1956

Box 1176, Helena, Montana

JAMES W. MURRY
EXECUTIVE SECRETARY

ZIP CODE 59624
406/442-1708

TESTIMONY OF JIM MURRY ON HOUSE BILLS 252, 274 AND 456 BEFORE THE HOUSE TAXATION COMMITTEE, JANUARY 28, 1987

My name is Jim Murry and I am here today on behalf of the Montana State AFL-CIO to testify on HB 252, HB 274 and HB 456.

Our labor organization represents workers at all levels of the economic spectrum who are employed in both the public and private sectors and engaged in a broad variety of occupations. At our August 1986 annual convention, our labor federation modified its position on Montana's coal severance tax. Whereas, prior to this convention we had maintained a firm position in support of the 30 percent severance tax rate, our 30th annual convention adopted a position that, ". . . the Montana State AFL-CIO review its position to support a reasonable reduction of the 30 percent rate."

The positions taken by our state federation were contingent upon a review of our current 30 percent tax rate which would show that through a reduction in the 30 percent level, ". . . the competitive bidding positions of Montana coal would be substantially improved." At the same time, our convention declared that this reduction in the severance tax be predicated on replacement sources of revenue, such as implementation of a progressive state corporate income tax.

Mr. Chairman, we do not claim to be experts on the coal severance tax. In fact, we suggest that you, the legislators, are the authority which should review the impact our 30 percent coal tax rate has on our competitive bidding process. It is the responsibility of the legislature, as the elected representatives of the people, to make the determination as to what level of coal taxation is appropriate. We do not, therefore, appear before you to testify in support or opposition to HB 252, HB 274 or HB 456. You may have several other proposals, as well as these, to choose from as you deliberate on the most prudent course of action.

However, we state emphatically that should the legislature deem it necessary to reduce the 30 percent rate, progressive replacement sources of revenue must be adopted.

Members of the Committee, the Montana Legislature must not replace the revenue shortfalls caused by coal severance tax reductions with regressive tax proposals. A sales tax would place an inordinate burden on not only our members, but on the vast majority of Montanans as well. We urge instead that you seek progressive tax reform measures to replace revenue lost by any reduction in our coal severance tax. Taxes based on income and the ability to pay are the only positive way to balance revenue between coal tax reduction losses and the needs of state and local government. It is important for you to keep this in mind when deliberating over possible coal tax reductions.

RESOLUTION 41

WHEREAS, the Montana State AFL-CIO has a long-standing position in favor of maintaining the Montana coal severance tax at 30 percent of mine-mouth price; and

WHEREAS, the coal severance tax was enacted to mitigate the impacts of coal mining in Montana, and has been effective in doing so; and

WHEREAS, social costs associated with large-scale coal mining such as building roads, schools, water and sewer systems, and other infra-structure needs have been largely alleviated through the Montana coal severance tax; and

WHEREAS, on-going mining in Montana demands that we maintain a coal production-related tax of a level sufficient to meet current social needs, and place some revenue in reserve for future generations as compensation for a lost non-renewable resource; and

WHEREAS, coal mining in Montana as well as all across the nation is at a decline because of reduced demand for coal; and

WHEREAS, competition for sale of Montana coal with other states in this power region is becoming stiffer as a result of reduced demand for coal power; and

WHEREAS, Montana coal faces a disadvantage in bidding competition because non-competitive rail transportation rates are related to the monopoly of rail transportation in Montana by the Burlington Northern Railroad; and
WHEREAS, neither President Reagan nor the Congress appears willing to force rail rates down to a responsible level; and

WHEREAS, the Montana legislature can do little to affect rail rates in Montana, but can improve the competitive position for sale of Montana coal by regulating the taxation level of the coal; and

WHEREAS, the livelihood of many union Brothers and Sisters is at risk due to cutbacks in production of Montana coal;

THEREFORE BE IT RESOLVED, that the Montana State Building and Construction Trades Council convention goes on record as encouraging the Montana State AFL-CIO to review its position on the retention of the 30 percent coal severance tax; and

BE IT FURTHER RESOLVED, that should this review establish that the competitive bidding position of Montana coal could be substantively improved through a reduction in the 30 percent level of Montana's coal severance tax, that the Montana State AFL-CIO review its position to support a reasonable reduction of the 30 percent rate; and

BE IT FURTHER RESOLVED, that support for such a reduction in the coal severance tax be contingent upon support for and legislative adoption of a replacement source of revenue for state and local governments impacted by any reduction in the coal severance tax; and

BE IT FURTHER RESOLVED, that one such area of replacement tax to be supported by the Montana State AFL-CIO come from a revision of the Montana corporate income tax to establish a progressive corporate income tax based upon the ability to pay; and

BE IT FINALLY RESOLVED, that this resolution be submitted to the 30th Annual Convention of the Montana State AFL-CIO for its concurrence and adoption.

SUBMITTED BY THE MONTANA STATE BUILDING AND CONSTRUCTION TRADES COUNCIL
CONVENTION VOTED CONCURRENCE, AS AMENDED

#7
1-28-87
HB 274

MISTER CHAIRMAN AND COMMITTEE MEMBERS

MY NAME IS CRAIG NILE AND I AM A MACHINEST FOR PEABODY COAL WHICH IS LOCATED IN COLSTRIP, MONTANA.

I AM HERE TO EXPRESS MY CONCERN ABOUT THE DECLINE OF COAL PRODUCTION IN MONTANA. THIS IS NOT MY FIRST TRIP TO HELENA, AS I WAS HERE FOR THE SPECIAL SESSION. AFTER TALKING TO VARIOUS LEGISLATORS DURING THE SPECIAL SESSION, I BECAME QUITE CONFUSED. SOME LEGISLATORS FELT THAT THE SEVERANCE TAX DOES NOT AFFECT THE PRICE OF A TON OF COAL, SOME BLAME THE RAILROAD, SOME BELIEVE IT IS OUR GEOGRAPHIC LOCATION, OTHERS FEEL IT IS THE COST OF PRODUCTION OR LABOR OR CORPORATE PROFIT, SOME WENT AS FAR AS TO SAY THEY DID NOT WANT COAL MINED IN MONTANA AT ALL. SO I DECIDED TO GO HOME AND STUDY THE FACTS. I READ EVERY FACT AND FIQURE THAT I COULD GET MY HANDS ON ABOUT THE SEVERANCE TAX AND DREW A BLANK. I FOUND THAT 30 VERY WELL QUALIFIED PEOPLE CAN TAKE ONE TON OF COAL AND THE SEVERANCE TAX FORMULA AND COME UP WITH 30 DIFFERENT PRICES. I CAME TO THE CONCLUSION THAT NOT ALL THE SO CALLED "FACTS" WE ARE PRESENTED WITH ARE IN FACT FACTUAL. WHAT WE OFTEN GET IN PLACE OF FACTS ARE "FACTOIDS". A FACTOID IS A STATEMENT LIKE A FACT BUT IS IN FACT NOT A FACT. I DECIDED TO FIND MY OWN FACTS THAT ARE INDISPUTABLE STATEMENTS EXPRESSING REALITY AND PRESENT THEM TO YOU TODAY.

THE SEVERANCE TAX WAS ENACTED IN PART TO LIMIT THE GROWTH OF THE COAL INDUSTRY IN MONTANA AND IT HAS DONE JUST THAT! IN 1975, WYOMING PRODUCED 23.8 MILLION TONS OF COAL AND MONTANA PRODUCED 22 MILLION TONS, YET JUST 10 YEARS DOWN THE ROAD IN 1985 MONTANA PRODUCED 33.1 MILLION TONS AND WYOMING PRODUCED 140.4 MILLION TONS.

IN 1986, MONTANA EXPERIENCED AN EXPORT DECREASE OF 7.2%, WHILE THE REST OF THE UNITED STATES WAS HAVING A 1% INCREASE.

BIG SKY MINE, WHERE I WORK, HAS LAID OFF 19 MEN AND THE ANNUAL GROSS INCOME OF THE AVERAGE WORKER HAS DROPPED 25% FROM 1985.

PEABODY COAL CLAIMS TO HAVE DROPPED THE PRICE OF A TON OF COAL $.70 IN 1986 TO TRY AND STAY IN THE MARKET.

THE RAILROAD HAS CUT THEIR RAIL RATES $~~.02 PER TON~~ MILE OUT OF MONTANA, AND THAT IS A START IN THE RIGHT DIRECTION.

OUR GEOGRAPHIC LOCATION IS ONE OF THE BEST THINGS WE HAVE GOING FOR US, AS WE ARE 200 MILES CLOSER TO THE MINNESOTA MARKET THAN ALL OTHER MINES IN THE POWDER RIVER BASIN.

MONTANA PRODUCTION COSTS ARE BOUND TO BE A LITTLE MORE THAN THOSE OF THE MINES IN THE POWDER RIVER BASIN, BECAUSE MONTANA COAL HAS 60 FOOT OF OVERBURDEN AND A 30 FOOT VEIN OF COAL, WHEREAS, WYOMING COAL ONLY HAS 30 FOOT OF OVERBURDEN AND A 90 FOOT VEIN OF COAL.

AS FOR THE ARGUEMENT, "THAT WE DON"T WANT COAL MINED IN MONTANA AT ALL", I DON'T THINK THE PERSON WAS THINKING ABOUT THE FACT THAT THE REVENUE GENERATED BY MINING IS ABOUT ~~25% OF~~ ALL MONIES GENERATED IN THE STATE AND I DONT THINK THE STATE BUDGET COULD STAND A ~~25~~% CUT OR COULD THEY?

IF YOU READ WYOMING GEO-NOTES, NO. 12, by Gary Glass, State Geologist, READ BETWEEN THE LINES A LITTLE BIT AND HE PREDICTS THAT WYOMING WILL HAVE A GRADUAL INCREASE IN PRODUCTION UNTIL 1991, YOU WILL COME TO THE SAME CONCLUSION THAT I HAVE AND THAT IS WYOMING IS LOOKING AT MONTANAS ~~MINNESOTA~~ MARKET.

I DONT THINK MONTANA WILL EVER BE ABLE TO MATCH WYOMINGS PRODUCTION LEVELS, BUT I WOULD BE HAPPY TO REGAIN SOME OF OUR LOST EXPORT PRODUCTION AND EXPERIENCE A GRADUAL INCREASE. I FEEL HB 274 COULD DO JUST THAT. FIRST, THE BILL GIVES IMMEDIATE RELIEF TO COMPANIES COMPETING IN THE SPOT MARKET. SECOND, IT PROVIDES INCENTIVE FOR COMPANIES WITH LONG TERM CONTRACTS TO BUY MORE THAN THE MINIMUM CONTRACT AMOUNT. THIRD, IT WILL PROVIDE EXTENSIONS OF OLD LONG TERM CONTRACTS. FOURTH, IT WILL GENERATE REVENUE FOR THE STATE OF MONTANA IN THE BEGINNING YEARS.

TO SUM IT UP, LET US USE THE OLD ADAGE "KEEP IT SIMPLE ST~~UPID~~", AND LET'S PUT OUR HEADS TOGETHER AND MAKE A LAW THAT WILL WORK FOR THE MONTANA COAL MINER AND LET IT BE SIMPLE ENOUGH THAT MINERS CAN UNDERSTAND IT WHEN THE TIME COMES TO REVISE IT AGAIN.

THANK YOU FOR YOUR TIME.

EX
1-28

DATE 1-28-87
HB 274

If we get rid of our basic industries, it'll be just like the good old days.

This is a plug for the farmer. The forester. The aluminum worker. For those 1,000,000 Northwesterners who make a living by actually making something.

Theirs are the critical jobs. The jobs that support other jobs—two to one. The day we think we can live without them, is the day we'll have trouble living at all.

If we lose our basic industries, this may be all the Northwest has to export.

When the Northwest wants to do business with the rest of the world, we do it in aluminum, forest products and food. Last year, nine of our top ten exports were from such basic industries.

So while the Northwest economy may be changing, the foundation remains the same. Basic industry. If we forget that, we'll flunk the most important test

If the Northwest becomes a service economy, 1,000,000 parents could spend a lot more time with the kids.

All jobs are important. But those in basic industry are critical to this region's future. Every farmer, forester, fisherman and aluminum worker who's employed creates the need for at least two other jobs in the Northwest. Basic industry in this part of the world is just that. Basic.

Turning the Northwest into a service economy would be easy. Why, this man is dying to start his life over.

Imagine what it would feel like to put 30 years of your life into a job, only to be told it's no longer important.

If we abandon our basic industries, we're going to watch it happen to over 1,000,000 men and women. Farmers. Loggers. Mill workers. Aluminum workers.

Then, we will have reached the point where we're throwing away a lot more than jobs. We'll be throwing away our region's most precious resource.

WITNESS STATEMENT

NAME Ken Williams BILL NO. 252

ADDRESS 16 East Granite, Butte, MT 59701 DATE 1/28/87

WHOM DO YOU REPRESENT? Western Energy Co and the MT Coal Council

SUPPORT ✓ OPPOSE _____ AMEND _____

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments: Prepared statement

EX 1-28

EXHIBIT 7 8
DATE 1-28-87
HB 274

HB 274

I am Dan Stanley, a coal miner and President of Save Our State.

I am here to speak to you on behalf of the coal miners.

It has come to my attention that it seems the only thing the state is interested in is the revenue that the coal industry has given the state, NOT the jobs it has created or the people that have worked in the mines, giving one of the highest productions per person in the United States.

We have to move more dirt, dig deeper for a shorter coal seam than in all Wyoming.

Let's take a look at the miners. All we are are just people, trying to support our families. We buy from local busineses. We participate in baseball, as wrestling coaches, and in the Deacon Church. And we are taxpayers.

In 1983 the state took $87 million in severance tax and there was $153.6 million in state, local and federal taxes taken. The payroll was only $57.3 million. Mineral costs and service costs being $37.9 million. It behooves me that when we pay 61.7% in taxes why we are in the coal mining business in Montana today.

Last time I was up here was during the special session to testify to put a cap on the coal tax trust fund. I could not believe the people that were against the cap just so they could get their hands on some of the coal tax moneys that the people in the mines work for. They did not care when 300 miners were out of work or even if they were going back to work, just as long as they got their piece of the pie.

Let me ask how many of you have ever been to a coal mine in Montana, talked to the people who work in the mines or talked to the people who have been laid off--some over a year. Some families have moved away trying to find jobs--some wondering where their next paychecks would come from and how they will feed their families and heat their homes. <u>These are people.</u> Their labors that have put $300 million in the coal permanent trust fund and millions in the general fund, not counting schools, parks, water projects, libraries, and all of the other funding that comes from the severance tax.

We feel that Tom Asay's House Bill 274 will satisfy the state in revenue. The bill will also put our miners back to work and with our long-term contracts coming up in the future, maybe we can keep them. And this is the only bill we feel will possibly put the miners back to work immediately.

Thank you.

EXHIBIT #9
DATE 1-28-87
HB 456

TESTIMONY ON HB 456

HOUSE TAXATION COMMITTEE

TERESA OLCOTT COHEA, EXECUTIVE ASSISTANT TO GOVERNOR

JANUARY 28, 1987

Mr. Chairman and members of the Committee, I appear in opposition to HB 456, Representative Brown's bill.

The stated purpose of HB 456 and the other two bills the Committee has heard today is to make sure Montana coal remains competitive in the market and to keep this industry -- which is so important to Montana's economy -- producing coal.

We agree with this objective. Based on the success of his "window of opportunity" tax credit which proved that reducing the tax rate to 20% did help a Montana producer secure a major contract, --the Governor has proposed that the coal severance tax rate be permanently reduced to 20% by July 1, 1990 -- before most of the current contracts come up for renewal.

However, while we are in agreement with the stated objectives of HB 456, we think there are two serious flaws in the bill.

1) Administration. This bill imposes the coal severance tax on the purchaser of Montanas coal, rather than the producer. So, instead of collecting the tax from six Montana producers, we will try to collect the tax from about 50 purchasers -- most of whom are outside the State of Montana. To illustrate -- Western Energy sells to over 30 customers. Instead of collecting tax on the 11 million tons produced each year by Western Energy, the Department of Revenue will have to collect from the City of Sleepy Eye for its 1,500 tons/year purchase, from Fergus Falls, MN, for 1,800 tons/year, Northern Minnesota Sugar Beet Coop for 950 tons/year, and so on. Obviously, the administrative costs of collecting the tax are increased when the number of returns is increased from 6 to 50 per quarter but, more importantly, DOR will be trying to collect the tax from purchasers who have no economic or physical presence in Montana. I suspect that enforcing Montana tax law in Minnesota, Wisconsin, and Michigan will be difficult undertaking!

Another problem is the point it which the tax is imposed. Under sections 1 and 3 of the bill, the tax is imposed upon the purchaser who actually burns the coal. A broker who buys the coal for resale is specifically excluded from paying the tax. So, a broker could buy the coal from a Montana mine, transport it to the midwest, store it in a facility where it will possibly be mixed with other coal, and later resell it to a utility. The coal only becomes taxable when the utility purchases it.

Montana coal would be taxed only after it left Montana and only after it has changed hands, at least one and perhaps twice.

Furthermore, there could be a year's lag in collecting portions of the tax. Section 4 of the bill allows the purchaser to multiply his first quarter's production by four and take the lowest tax rate for this annualized purchase. If his total purchases for the year fall short of this level, the Department has to recalculate the tax due and bill him for the extra. As an example, a purchaser could buy 1.5 million tons in the first quarter of 1989, making his purchase eligible for the 16% tax rate. However, if he only purchased 1 million tons during the remainder of the year, the Department would have to recalculate a 20% tax rate on the first quarter's production and bill him in January 1990 for the extra. In other words, the Department would be trying to collect tax on coal that was produced over a year before, that has been shipped out of state, and that has changed hands several times.

The coal severance tax is too important a revenue source to risk collections with these long-distance, second and third-hand transactions.

2) Discrimination. The sliding scale in the bill would be available to fewer than 10% of Montana coal customers -- those that purchase more than 2.5 million tons per year.

Ninety per cent of our customers -- who account for nearly 60% of total production -- would not receive any benefit from the bill's sliding scale. Several witnesses today have discussed the importance of treating our existing customers fairly and encouraging their business. This bill seems to do the exact opposite to 90% of our customers.

I understand that Representative Brown is considering an amendment that would extend the sliding scale to smaller customers by allowing a lower rate for coal purchased through brokers. However, if the purpose of this bill is to decrease the delivered price of Montana coal, how can requiring sales through a broker in order to receive a lower tax rate achieve this goal? The broker will, of course, have costs and take a profit in passing the coal onto a purchaser. So, the tax saving would simply be transferred to the brokers' pocket rather than lowering the market price of the coal. For example, the tax savings between a 20% tax rate and a 16% tax rate is 25¢/ton. The brokers' cost will no doubt consume a major portion of this tax savings.

For these reasons, we oppose HB 456 and hope the committee will instead consider the several other bills that treat all Montana customers equally and allow for cost-effective collection, while still providing a permanently lowered tax rate that will help keep Montana coal competitive.

#4
1-28-87
456

PROJECTED PRODUCTION LEVELS AND REVENUE
FORECASTS FOR H.B. 456 AND GOVERNOR SCHWINDEN PROPOSAL

TONNAGE	FISCAL YEAR 88	89	90	91	92
Gov. Schwinden (1)	29.9	31.8	31.8	30.8	30.8
H.B. 456 (2)	29.9	35.7	37.0	38.4	38.5
	-0-	3.9	5.2	7.6	7.7

REVENUES/$MILLIONS	FISCAL YEAR 88	89	90	91	92
Office of Budget	78.7	81.9*	----not available----		
Gov. Schwinden (1)	78.7	67.8*	----not available----		
H.B. 456 (2)	78.7	49.6*	----not available----		
	-0-	18.2			

* The difference in FY 89 between the Budget Office and H.B. 456 is $32.3 million; the difference in FY 89 between the Budget Office and Governor Schwinden is $14.1 million.

NOTE:

(1) Forecast Assumes:

1. No reduction in current tonnage levels under existing contracts despite the fact that 50% of Montana's coal production is priced at an average contract sales price of $10.60/ton. Current market for coal in Montana is approximately $7.50/ton.

NOTE:

(2) Forecast Excludes:

1. The development of new generation facilities in Montana's market area, including new onsite generation in Montana.
2. Geographical extension of Montana coal market reach by 1992.
3. Development of industrial buyers.
4. Expansion of utilities into non-utility coal businesses.
5. Economic benefits (i.e. jobs, wages, broader tax base) resulting from increased production level.

#9
1-28-87
456

MONTANA COAL PURCHASE PROJECTIONS UNDER GOVERNOR SCHWINDEN'S PROPOSAL

Purchasers	Fiscal Year 1987	1988	1989	1990	1991	1992
Montana Power Co. (Corette, Colstrip 1-4)	6.2	6.5	7.2	7.2	7.2	7.2
Detroit Edison	8.5	6.4	8.0	8.0	7.0	7.0
Commonwealth Edison	2.6	3.7	3.7	3.7	3.7	3.7
Northern States Power	3.5	4.2	3.5	3.5	3.5	3.5
Minnesota Power	2.8	2.8	2.8	2.8	2.8	2.8
Utility Fuels	2.1	2.1	2.1	2.1	2.1	2.1
Wisconsin Power & Light	1.5	1.6	1.5	1.5	1.5	1.5
Western Fuels	0.2	0.5	1.0	1.0	1.0	1.0
Miscellaneous	1.4	2.1	2.0	2.0	2.0	2.0

Note:

1. Effective tax rate 7-1-88

   25% for FY 89 and FY 90, and 20% for FY 91 and beyond;
   20% window through FY 90

#9
1-28-87
456

MONTANA COAL PURCHASE PROJECTIONS UNDER HB 456

EFFECTIVE 7-1-88 UNDER THE BILL

Purchasers	Fiscal Year 1987	1988	1989	1990	1991	1992
Montana Power Co. (Corette, Colstrip 1-4)	6.2 | 14	6.5 | 14	7.5 | 14	7.5 | 14	7.5 | 14	7.5 | 14
Detroit Edison	8.5 | 14	6.4 | 14	8.5 | 14	8.5 | 14	8.5 | 14	8.5 | 14
Commonwealth Edison	2.6 | 18	3.7 | 18	3.7 | 18	3.7 | 18	3.7 | 18	3.7 | 18
Northern States Power	3.5 | 16	4.2 | 16	5.0 | 16	6.2 | 16	7.5 | 14	7.5 | 14
Minnesota Power	2.8 | 18	2.8 | 18	4.0 | 18	4.0 | 18	4.0 | 18	4.0 | 18
Utility Fuels	2.1 | 20	2.1 | 20	2.1 | 20	2.1 | 20	2.1 | 20	2.1 | 20
Wisconsin Power & Light	1.5 | 20	1.6 | 20	1.7 | 20	1.7 | 20	1.7 | 20	1.7 | 20
Western Fuels	0.2 | 20	0.5 | 20	1.0 | 20	1.0 | 20	1.0 | 20	1.0 | 20
Miscellaneous	1.4 | 20	2.1 | 20	2.2 | 20	2.3 | 20	2.4 | 20	2.5 | 20

Notes:

1. Bill extends "Window of Opportunity" for new incremental production from 7-1-87 to 7-1-88.

2. Effective 7-1-88 the rate for all coal purchased by each purchaser

0 - 2.5 million tons:	20%
2.5 - 5.0 million tons:	18%
5.0 - 7.5 million tons:	16%
7.5 - 10.0 million tons:	14%
10 million tons & above:	12½%

3. Percentage each purchaser will pay under bill effective FY 89.

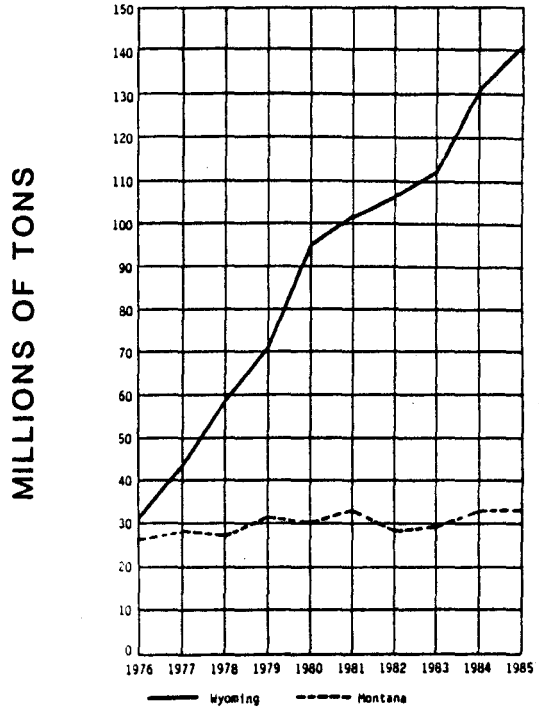
DATE 1-28-81
HB 274

Montana Coal

State	Reserve base (Billions of Tons)	Rank by Reserve Base	1984 Production (Millions of Tons)	Rank by Production
Montana	120.3	1	33.0	9
Illinois	79.1	2	63.8	5
Wyoming	69.6	3	130.9	3
Kentucky	40.2	4	159.5	1
West Virginia	39.1	5	131.0	2
Pennsylvania	30.0	6	73.3	4
Ohio	18.9	7	39.3	7
Colorado	17.2	8	18.0	12
Texas	13.8	9	41.1	6
Indiana	10.5	10	37.6	8
North Dakota	9.9	11	22.1	11
Utah	6.4	12	12.3	13
Alaska	6.2	13	.9	15
Missouri	6.0	14	6.7	14
Alabama	5.2	15	27.1	10

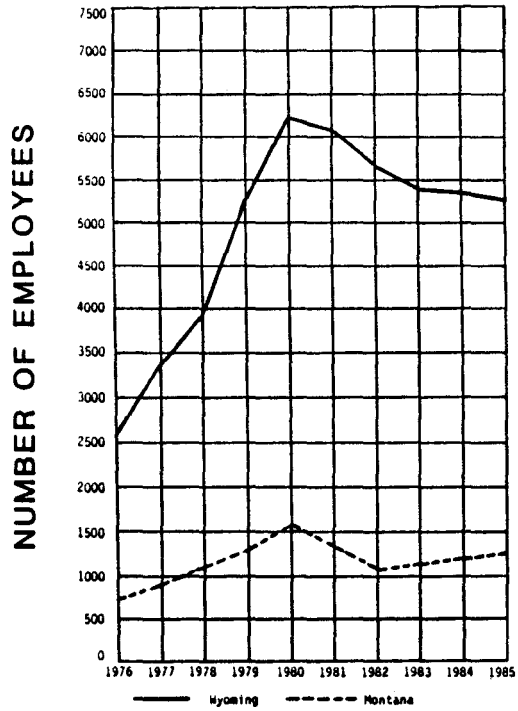
Source: U.S. Energy Information Administration

MONTANA - WYOMING COAL PRODUCTION



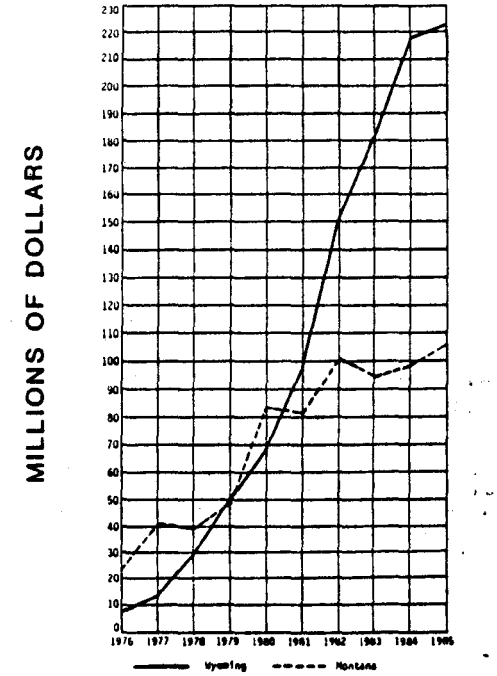
Source: Wyoming - Annual Report of the State Inspector of Mines of Wyoming, 1985
Montana - Workers Compensation Division, Bureau of Safety and Health

MONTANA - WYOMING COAL MINE EMPLOYMENT



Source: Wyoming - Annual Report of the State Inspector of Mines of Wyoming, 1985
Montana - Montana Coal Council and Keystone Coal Industry Manual

MONTANA - WYOMING COAL PRODUCTION TAXES



Source: Wyoming - Legislative Service Office, Ad Valorem and Severance Taxes
Montana - Department of Revenue, Severance and Resource Indemnity Trust
County Treasurers, Gross Proceeds Taxes

EXHIBIT #4
DATE 1-28-87
HB 274

PROPOSED AMENDMENTS

House Bill 274

June 30, 1987 Credit Expiration

1. Page 10, line 16

   Following: "Was Produced"
   Insert: "Each Quarter"

2. Page 10, line 21

   Following: "Qualified Purchaser"
   Insert: "Each Quarter"

3. Page 10, line 24

   Following: "Production For A" (line 23)
   Strike: "Calendar Year"
   Insert: "Quarter"

4. Page 11, line 8

   Following: "DURING THE"
   Insert: "1985 and 1986"
   Strike: "Previous"

5 Page 11, line 8

   Following: "Calendar"
   Strike: "Year"
   Insert: "Years" Credits earned from January 1, 1987 through June 30, 1987 will be claimed in the corresponding quarters of the following year."

December 31, 1986 Credit Expiration

1. Page 8, lines 6-12

   Delete: (3rd column)
   "% of VALUE"
   "of Incremental"
   "Production:"
   "0%"
   "10%"
   "10%"
   "10%"

2. Page 8, line 12

   Following: "10%"
   Insert: "On incremental production after December 31, 1986 the tax rate is 10% of value.

3. Page 8, lines 14-20

   Delete: (3rd column)
   "% of VALUE"
   "Of Incremental"
   "Production:"
   "0%"
   "7%"
   "7%"
   "7%"

4. Page 8, line 20

   Following: "7%"
   Insert: "On incremental production after December 31, 1986 the tax rate is 7% of value."

5. Page 10, line 10

   Following: "or after"
   Strike: "June 30, 1987"
   Insert: "December 31, 1986"

6. Page 11, line 9

Following: "prior to"
Strike: "July 1, 1987"
Insert: "January 1, 1987"

7. Page 14, line 5

Insert: "NEW SECTION. Section 8. Applicability. The amendments to 15-35-103 in Section 3 that provide for tax rates or incremental production after January 1, 1987, apply retroactively, within the meaning of 1-2-109."
Renumber: subsequent sections

NORTHERN PLAINS RESOURCE COUNCIL

EX.
1-28

Field Office
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EXHIBIT #9a
DATE 1-28-87
HB 252

Testimony Presented to House
Taxation Committee in Opposition to
House Bills: 252 & 274

January 28, 1987

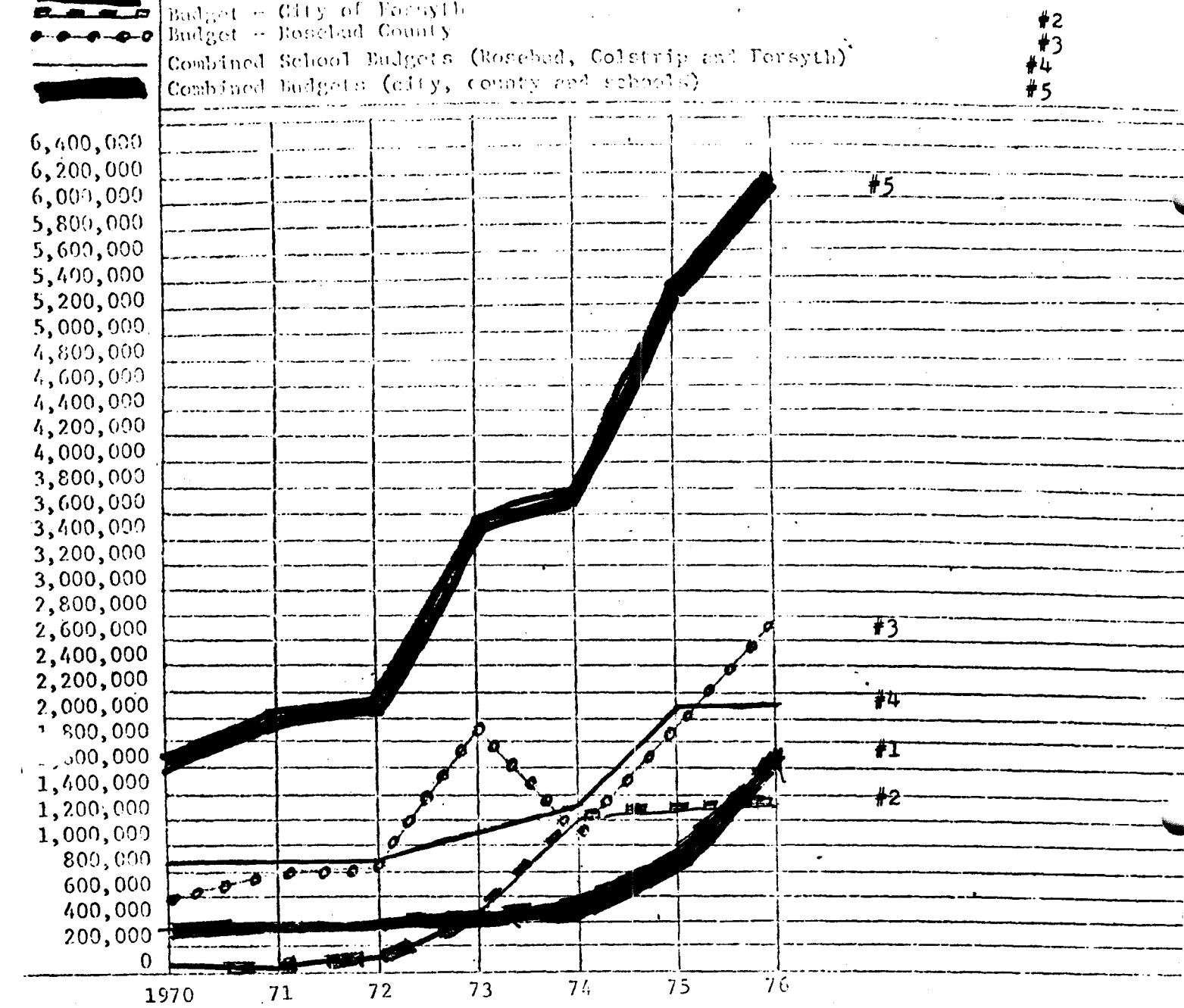
MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE, MY NAME IS BILL GILLIN. I'M A RANCHER IN ROSEBUD COUNTY AND MY RANCH IS LOCATED NORTHWEST OF COLSTRIP. I'M A PAST CHAIRMAN OF NORTHERN PLAINS RESOURCE COUNCIL, AND I'M TESTIFYING TODAY ON THEIR BEHALF. IN 1974 and 1975, I HAD THE PRIVILAGE OF TESTIFYING BEFORE THIS COMMITTEE AT THE TIME THEY WERE FIRST CONSIDERING CHANGING THE METHODS OF TAXING COAL AND COAL PRODUCTION IN MOntana. IN THE INTEREST OF FAIRNESS TO ALL INVOLVED IN THE CONSIDERATION OF THE BILLS NOW BEFORE THIS COMMITTEE, I FEEL THAT SOME BACKGROUND ON THE ORIGIN OF THE COAL SEVERENCE TAX SHOULD BE REVIEWED.

AS A RANCHER AND TAXPAYER IN BOTH ROSEBUD COUNTY AND THE COLSTRIP SCHOOL DISTRICT, I AM VERY AWARE OF THE IMPACT BROUGHT ON BY THE OPENING OF THE WESTERN ENERGY ROSEBUD AND PEABODY BIG SKY MINES, AND ALSO THE SIGNIFICANT IMPACT BROUGHT ON BY THE CONSTRUCTION OF THE COLSTRIP 1 & 2 POWER PLANTS. THE FINANCIAL IMPACTS ON THE RANCHERS IN THE AREA WAS VERY SERIOUS. AS AN EXAMPLE, ON MY RANCH, BETWEEN the RE-START OF COAL DEVELOPMENT AND THE PEAK CONSTRUCTION PHASE OF COLSTRIP 1 & 2, MY TAXES TRIPLED. THE SEVERE FINANCIAL IMPACT WAS ONLY PART OF THE PROBLEM. THE SOCIAL IMPACT

quite POSSIBLE THAT A SEVERENCE TAX WOULD NOT HAVE PASSED THE 1975 LEGISLATURE. INSTEAD, THESE COMPANIES INITIALLY CAME IN WITH THE ATTITUDE THAT THE EXISTING AGRICULTURAL COMMUNITY WAS JUST PART OF THE OVERBURDEN THAT HAD TO BE REMOVED AS PART OF THEIR OPERATION.

I WAS ON THE COLSTRIP SCHOOL BOARD IN THE EARLY DAYS OF DEVELOPMENT WHEN PEABODY WAS SHOWING AN INTEREST IN MINING AND MPC HAD ANNOUNCED PLANS TO RE-OPEN THE COLSTRIP MINES AND CONSIDER POWER PLANT CONSTRUCTION OUR SCHOOL FACILITIES AT THAT TIME WERE AT NEAR CAPACITY AND WE FELT OBLIGATED TO A BUILDING PROGRAM TO HANDLE THE INITIAL 75-100 FAMILIES THAT WERE TO BE BROUGHT IN BY THE MINING COMPANIES. AT THAT TIME OUR TAXABLE VALUATION WAS SO LOW THAT IT WAS DEFINITELY GOING TO BE A FISCAL BURDEN ON THE EXISTING TAXPAYERS, SO WE CONTACTED MONTANA POWER AND TOLD THEM OF OUR DIFFICULTIES THAT AS TAXPAYERS AND SCHOOL BOARD MEMBERS WE WOULD BE FACING AND ASKED FOR THEIR HELP. THEIR ANSWER WAS A BLUNT NO! WE WENT AHEAD ANYWAY AND ASSUMED THE TAX BURDEN RATHER THAN SEE THE SCHOOL OVERCROWED AND EDUCATION DIMINISH. WHILE THIS HELPED WHEN THE MINES OPENED, THE ONSLAUGHT OF STUDENTS THAT OCCURRED WITH THE BEGINNING OF CONSTRUCTION FOR UNITS 1 & 2, WAS OVERWHELMING. CLASSES HAD TO BE HELD ON THE STAGE OF THE AUDITORIUM, THE GYMNASIUM AND EVEN IN THE SHOWER ROOMS.

THE POINT I'M MAKING IS THAT UNLIKE THE CONSPIRACY THEORY PROPOSED BY THE COAL COUNCIL THAT THE SEVERENCE TAX WAS A DELIBERATE ATTEMPT TO SEND COAL MINING TO WYOMING, WE FOUGHT FOR A SEVERENCE TAX IN RESPONSE TO DEFINITE FISCAL IMPACTS THAT WE AS PROPERTY TAXPAYERS WERE BEING ASKED TO BEAR.



UPRC
Ex #8

Bill Gillin

EXHIBIT #10
DATE 1-28-87
HB 456

HB 456
1-28-87

Testimony of Arnold Silverman before
House Taxation Committee

January 28, 1987

Mr. Chairman, Members of the Committee:

My name is Arnold Silverman and I live in Missoula, Montana. I have been employed by the University of Montana for the last 28 years, but I do not appear before you today as a representative of that organization. I do appear before you as somebody who has had a long time interest in coal severance taxation and along with my colleague, John Duffield, provided a Coal Severance Taxation Report to the 1985 Montana legislature, and in August of this past year provided an update of Montana coal markets and coal severance tax impacts for the Montana legislative council and the Coal Tax Oversight Subcommittee of the Montana legislature. That report is available to you through the Montana legisative council office and I will summarize some of its conclusions here today.

Mr. Chairman, a cold wind blows through the window of opportunity and this is an appropriate time to wonder whether that window should be left permanently ajar given our concerns about revenue sources for a potential $200 million biennium deficit. The Montana coal industry has told you that this is indeed an appropriate time to cut severance taxes and this will somehow enable Montana coal producers to continue business in the state. My view, Mr. Chairman and the Members of the Committee, is that the coal industry has turned greed into a public policy, fear and threat into a way of life and political discourse, and greatly undervalues what we do <u>for</u> each other and extolls what we do <u>to</u> each other. We can survive these troubled

times only if we are not deceived and led astray by outrageous charges and misleading forecasts.

The three bills before you are inappropriate at this time and in the long term will do more to disrupt the solvency of Montana's revenue flow than almost any act the legislature can undertake.

With those of you who are philosophically opposed to a tax on minerals, including severance tax, under any circumstances, I have no quarrel, because that is a philosophical position that one can take and defend without the accusation of special-pleading or public irresponsibility. I do not take that position, but rather believe that it is both just and equitable for the legislature to set mineral severance taxes at a rate that responds to state needs and industry affordability. The question before us today is whether the Montana coal severance tax is appropriate for the industry and for the economic conditions of today and near future. My answer to both those questions is a resounding, yes. Although the coal industry would have you believe that Montana passed the Coal Severance Tax in 1976 as a way to divert coal production from Montana to Wyoming, we all know that in its wisdom the legislature passed the severance tax in order to provide a permanent trust fund for the future, to provide transition revenues for the state when appropriate, and for the next generation of investment opportunity in Montana as either our reliance on our energy base resources diminishes as a source of income, or a shift in the nature and the materials of employment provide us with the opportunity to reinvest in jobs for our children and grandchildren. That trust fund, if allowed to accumulate at a

reasonable rate, could make available to the people of Montana at least a $100 million a year in income alone within the next decade. This is a legacy to our political wisdom, humanity and foresight, and fills us with pride in our land. Part of the severance tax trust, the interest on the account, has been used for general fund appropriations. The other half of half the severance tax is applied to those economic and social activities that result from coal mining and coal use that cannot be accommodated in the current price of coal. So far the system has worked admirably well.

But what of the future? The Coal Council claims, without any reference to their sources of information, that Montana coal production will decline precipitously in the years ahead unless we significantly cut the coal severance tax. There is no indication at all that Montana production will fall as projected by the coal industry. Montana production will soon recover from a national coal mining slump, and resume normal growth, along with a modest recovery of coal prices keeping pace with rising oil costs. It is true that Colstrip Power Plant IV is under repair and will probably mean a million to a million and one-half tons less of coal production this year than orginally anticipated, but no amount of coal tax reduction could make up for the loss as a result of the equipment failure. We have also lost a two million ton/year contract to the Lower Colorado River Authority when Peter Kiewit, the operators of the Decker Mine in Montana, refused to renegotiate a contract which one could only describe as providing excess profits, profits that we estimate to be in the range of $20-$25 a ton minimum. Lower Colorado wanted a renegotiation of that contract based on currently available competing coal sources and when Peter Kiewit refused that request they canceled that contract. But Kiewit is not so wounded by

that loss that they aren't able to replace that coal production at the Decker mine. The contract that Peter Kiewit has with Commonwealth Edison in Chicago provides that the company can substitute Decker coal for Bighorn Mine, Wyoming coal. It turns out that Bighorn coal is more expensive to mine and sells at a high price than the Decker coal, and is of lower quality. Planned for the last few years, well before the window of opportunity opened, was the closure of the high cost Bighorn mine and shifting of that production to the Decker mine. That production is considered an addition to the base and qualifies for tax reduction, adding more than $1/ton to inflated profit margins. We will soon be in the process of providing Peter Kiewit and Sons with additional revenues of $3 to $4 million a year that was coming to Montana as the Bighorn Mine was phased out of production. Commonwealth Edison is delighted because they will receive better coal from the Decker mine than if production continued from the Bighorn Mine. Everyone wins but the State of Montana and the window of opportunity funnels a chilly breeze through unseen cracks in the molding.

A recent million ton a year contract signed by Westmoreland has been attributed by the Governor's office as an example of the "window success". It is clear from our report last summer and the report of the Coal Tax Oversight Committee this past fall, that one cannot be sure that Westmoreland's contract is exclusively or dominantly the result of severance tax reduction. Our own estimate in 1985 suggested that we should get the Sherco contract under the old tax structure and that Montana mines were the low cost deliverer of coal to the Northern States Power and Minnesoto Power and Light Systems. Without doubt the lower tax rate helped, but just how much it helped is certainly unclear because of the

confidentiality that has been imposed on the array of bids for that contract. The key, however, is not that we may have saved the Sherco contract, but what other new contracts might come to Montana as a result of the coal tax reduction. As we pointed out at the last legislative session, and again last summer, there is nothing in the next 10 year horizon that provides for dramatic increase in Montana coal production for new plants that would balance the loss of taxes coming from the decreased severance rate.

To allow the window of opportunity to stay open for new production above the base, however, seems still to be a reasonable challenge to the coal industry if in fact it is a matter of severance tax cost that is dividing contract allocations between Montana and Wyoming. The dollar to dollar twenty-five cent a ton difference on the average between Wyoming and Montana coal, as a result of the severance tax, is far smaller than the four to five dollar per ton difference in mining costs that favor Wyoming and are currently in effect. That difference, in mining costs, however, is accommodated by the two to three hundred mile advantage that Montana has in its northcentral market area. Our traditional markets are still secure and wil be secure at the time of contract renegotiation in the early to mid-nineties, especially with the window in place.

A look at coal markets in general show that there has been a modest decline around the nation in terms of coal production during 1986. The reduced economic activity, the slump in much of heavy industry which uses

electricity, and conservative practices has provided a minor recession in the coal industry. On top of that, the enormous amount of excess capacity in the Powder River Basin, particularly in Wyoming, and the precipitous decline in oil prices, which to a very large extent fix coal prices, drove the price of coal down to levels that we hadn't seen for a very long time. The recent turnaround in the price of petroleum and the U.S. economy bodes well for U.S. coal production in the next year or two. The recent slump both in price and in coal tonnage will gradually reverse, however, the enormous market overhang in Wyoming will continue to be a depressing effect on mine prices for Powder River Basin producers, both in Wyoming and in Montana. Within their market area Montana producers will be able to hold their market share and be able to renew contracts that expire in the early 1990's. In addition, the additional low sulfur coal that will be necessary if the U.S. Congress passes national acid rain legislation could increase somewhat the share that Montana will have of that market.

What can we say about the most recent of the events that have affected the Montana coal industry? The ability of Montana Power to put Colstrip III into their rate base last year has provided $80 million in revenues that they did not have in 1985. MPC's recent sale and operating contracts for Colstrip IV should provide the company with an additional measure of profit. Enough profit that MPC can now invest in gold mining in Brazil as a way to invest earnings. Westmoreland has received a million ton a year contract from Minnesota Power and Light and the Wall Street Journal reported last November that Westmoreland has had it's most profitable year in its history in 1985. Peter Kiewit, as a result of the unique contract it has with Commonwealth Edison, is shifting anywhere from two to three million tons of

production from the Bighorn Mine in Wyoming to the Decker Mine in Montana, an interesting example of gaining coal production at Wyoming's expense for the Montana producers. At the same time this coal tonnage applies to the current window of opportunity and will increase profitability at the Decker Mine by something in the order of $3 or $4 million a year. All in all, Montana producers have had, and will continue to have, an awfully good year in terms of profits. Clearly, to make the window of opportunity, that is, reduction of coal severance permanent, is to reduce Montana tax revenues by an amount that is unnecessary and uncalled for under the current economic and energy demand circumstances.

We were able to show that the amount of coal production increase as a result of the coal severance deduction, will not come close to making up the amount of lost revenues that reduced coal severance will incur. From a state revenue point of view its a bad deal for Montana. By making coal severance reduction permanent on all contracts, the State of Montana is issuing a fiscal note that tells the people of this State that by the year 2000 over $850 million in coal severance revenues will be lost to the general fund, trust fund and the special funds of Montana, and at a time we are running a $200 million/biennium deficit. The Montana coal industry will continue to profit with the current tax structure and as a coal prices rise, and national economic activity improves, they will profit hansomly in the years to come.

Does anyone believe, Mr. Chairman, Members of the Committee, that Western Energy which mines coal for Montana Power Company at the Rosebud Mine would

stop mining coal for Colstrip I, II, III, and IV, if the coal severance tax is not reduced? Does anyone believe, Mr. Chairman, Members of the Committee, that Commonwealth Edison would end, what they call the best coal contract in their system, and which provides Decker Coal with a $25 a ton profit margin, if the Montana coal severance tax is not reduced by a dollar a ton? Does anyone believe, Mr. Chairman, that Westmoreland will be a company on the edge of financial ruin if the severance tax is not reduced by a dollar a ton? Does anyone believe, Mr. Chairman, that Montana coal operators can make up for transportation disadvantage and coal mining costs and capture part of the Wyoming market by reducing coal severance tax by one to two dollars a ton? It is not reasonable, it is not logically, it flies in the face known information; these are bills designed not to increase Montana coal production and thereby make up the revenue deficit caused by reduced coal severance tax, but it is meant to further line the pockets of a few companies that are profiting hansomly from the current operation.

EXHIBIT #10
DATE 1-28-87
HB 252

MONTANA COAL MARKET TO THE YEAR 2000: IMPACT OF SEVERANCE TAX, AIR POLLUTION CONTROL AND RECLAMATION COSTS

by

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Prepared for the
Montana Department of Commerce
Helena, Montana

January, 1985

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Executive Summary

Conclusions

The major conclusions of this study are as follows:

1. The Montana coal market through the 1971-1985 period has been relatively stable due to locational advantage in Minnesota, Wisconsin, Michigan and by wire to the Pacific Northwest (PNW).

2. The very large relative growth in Wyoming is due to three factors: a) locational advantage to a much larger market including south-central oil and gas states, b) major shifts from oil and gas generation to coal due to rising world oil prices, and c) the expansion of the low sulfur coal market under the New Source Performance Standards for sulfur dioxide emissions in 1971.

3. The cost differentials related to locational advantage (transportation) and air pollution regulations (scrubbers) are on the order of $5 to $15/ton. Cost differentials due to Montana and Wyoming coal severance taxes, which are more on the order of $1/ton, have had an insignificant market impact.

4. In all likelihood, most existing contracts with Montana producers that will expire in the mid-1990's will be renewed even in the absence of severance tax reductions.

5. Based on industry sources and known new contracts, the Montana coal industry is in for steady 3% to 4% annual growth out to 1988, reaching 42 million tons per year (mtpy).

6. The long term forecast for Montana coal production is for substantial growth to between 48 and 85 mtpy in the year 2000, depending on the growth rate of electrical consumption in the market area.

7. Reclamation policies and potential acid rain legislation are unlikely to significantly impact Montana production during the next 15 years.

8. The impact of a $1 price reduction on Montana coal production is slight--around 1.5 mtpy increase in 1990 and 1995 and 6 mtpy in the year 2000, at a 2% electrical growth rate.

9. Severance tax reductions will in no case generate sufficient increased production to offset tax revenue losses on new production that will occur.

10. Revenue losses of a 50% reduction ($1.50) in severance tax for new production will rise from $10 million per year in 1990 to $34 million per year in 2000. The same reduction on the production of all coal will amount to a loss for the state of $58 million per year in 1990 and $83 million per year in 2000.

11. The net present value of lost tax revenues to the year 2000 on a 50% tax reduction on new production only is $105 to $205 million, depending on growth in electrical sales. The net loss on all production of a 50% reduction in tax is $685 to $785 million to the year 2000.

In the following, the analysis underlying these basic conclusions is briefly summarized. The interested reader seeking greater detail is referred to the full report and an earlier analysis completed in 1982 for the Office of Surface Mining, entitled "Projections of Coal Demand from the Northern Great Plains through the Year 2010."

Introduction

This paper provides an economic analysis of the market for Montana and Wyoming coal. The basic purpose of the study is to provide a Montana coal production forecast to the year 2000 and show the sensitivity of this forecast to three policies: The coal severance tax, acid rain legislation, and reclamation policies. The focus is entirely on the derived demand by coal-fired plants in the electric utility sector. This category of use currently accounts for about 95% of Northern Great Plains production. As developed in some detail elsewhere (Duffield et al, 1982), the other current and potential users: (industrial, synfuels, and export) are unlikely to be significant before the turn of the century.

For purposes of our analysis, the electric utility market for coal can be divided into three categories: existing contracts, new plants, and "acid rain" plants. These categories correspond to three different vintages of coal-fired generating units. Existing contracts are mostly for plants that came on line from around 1968 to the present, new plants are those coming on line in the future, and "acid rain" plants are older plants built under lenient sulfur emission regulations. Our basic conclusions for each market will be summarized in turn.

Existing Plants and Contracts

The dominant factor explaining the pattern of current contracts for Montana and Wyoming coal is location. For example, given the existing rail network, Colstrip area coal has a 240 mile edge over Wyoming Powder River for shipments east to Minneapolis. However, to the south (Texas, Oklahoma, etc.) Gillette area coals have a 330 mile advantage. At the current average rate for coal unit trains of .017 $/ton-mile, the respective advantages are $4.08/ton to Montana in some north-central markets and $5.61/ton advantage to

Wyoming to the south. This difference is very important and has the same impact on delivered price as an equivalent difference in FOB mine price. Because of these very important locational differences vis-a-vis markets and existing rail routes, there are well defined spatial markets for Montana and Wyoming coals.

Between 1971 and 1985, 176 major new coal-fired plants were built in the 19 state coal market in which Wyoming and Montana compete. In this period there were only six states where new plants were burning Montana coal as they came on line: Montana, Minnesota, Wisconsin, Illinois, Michigan and Texas. (The deliveries to Texas were for Decker and Spring Creek coals, which are located only 125 miles north of Gillette, and can compete on some longer rail hauls due to their higher BTU content.) Market shares in the 19 state area for three specific time periods 1971-1975, 1976-1980, and 1981-1985 are summarized in Table S-1. As can be noted, the Montana market share has been relatively stable at around 10%, while the Wyoming share jumped dramatically from 16% to 53% between 1971-75 and 1976-80.

As developed in some detail in the report, the change in the Wyoming market is mainly due to the dramatic increase in oil and gas prices following the Arab oil embargo of 1973-74. Prior to that time almost all electric generation in the large south-central market of Arkansas, Louisiana, Oklahoma, Nebraska, and Texas was by oil and gas. Between 1971-1975 there were only four new coal-fired plants brought on-line in this area (all in Texas) and none used Wyoming coal. However, between 1976 and 1985, 51 coal-fired plants were built and 41 of these burned Wyoming coal, accounting for increased Wyoming prodution of about 66 million tons per year. By contrast, Montana picked up only a share of several new Texas plants in the south-central area in this period or about 4 million tons per year.

Table S-1

Market Share Summary for New Coal-Fired Plants in the 19 State Market Area*

Coal Source	Time Period: On Line Date 71-75	76-80	81-85	Total
Montana				
# of plants	5	9	6	20
mw capacity	1744	3589	2929	8262
share of mw	.080	.095	.107	.095
Wyoming				
# of plants	10	38	35	83
mw capacity	3392	19785	17121	40298
share of mw	.156	.526	.623	.464
Other				
# of plants	31	25	16	73
mw capacity	16664	14255	7420	38339
share of mw	.764	.379	.270	.441
Total				
# of plants	46	73	57	176
mw capacity	21800	37629	27470	86899

* AR, CO, IL, IA, IN, KS, LA, MI, MN, MO, MT, NB, ND, OK, OR, SD, TX, WS, and WY

The other major market factor in 1971-1985 was the adoption of federal New Source Performance Standards (NSPS) limiting sulfur dioxide (SO_2) emissions from coal-fired plants to 1.2 lbs. of SO_2 per million BTU's. These standards were applied to plants which began construction after September 1971. Given a construction time lag of five to eight years, these standards impact coal source choices after 1976. Most Gillette area and Montana Decker and Spring Creek coals are well below .6% sulfur by weight and high enough in BTU value that they can meet NSPS without scrubbing. However, Colstrip area coals are around .7% to .8% sulfur and require costly scrubbing to meet NSPS. As a result, for example, new plants on line in Wisconsin after 1976 have used Wyoming coal even though Montana has a lower delivered price due to locational advantage.

In 1978, sulfur regulations were revised to require scrubbing on all coals. The cost of scrubbing low sulfur western coals is around $5.00 to $8.00/ton (1980 dollars) and $15/ton for 3.4% sulfur Illinois coal. These Revised New Source Performance Standards (RNSPS) mean that states on the fringe of both the Montana and Wyoming markets (Illinois, Texas, Louisiana, Arkansas, etc.) will be less likely to buy NGP coal than in the past. On the other hand, most of the relative disadvantage to slightly higher sulfur Colstrip area coals disappears under RNSPS.

Locational advantage and changes in sulfur emission regulations account for cost differences on the order of $5 to $15 per ton. By contrast the effective coal severance tax rates (as a % of selling price) for Montana and Wyoming are 21% and 11% respectively. On typical $10 to $11/ton coal this amounts to only about a dollar a ton difference. For typical delivered prices of $25 to $40 per ton (with transportation accounting for $15 to $25 of the cost), coal severance tax differences are relatively small--2% to 4% of

delivered price. Needless to say, very small differences in the transportation rate (for example, only 1 mill per ton-mile differences over 1000 miles) have an equivalent effect.

Changes in the Montana coal market share by state for new plants in the 1971-1985 period were analyzed. There were no cases identified where the small difference between Montana and Wyoming coal severance taxes were a significant factor in determining the least cost choice of the utility purchasing the coal.

The major conclusions from this analysis of market share for existing plants are as follows. The Montana coal market share through the 1971-1985 period has been small but relatively stable due to the locational advantage in Minnesota, Wisconsin, Michigan and by wire to the PNW. The very large relative growth in Wyoming is due to three factors: 1) locational advantage to a much larger market including the south-central oil and gas states, 2) major shifts from oil and gas generation to coal due to rising world oil prices, and 3) the expansion of the low sulfur coal market under the NSPS of 1971. As developed in some detail in our main report only the Decker and Spring Creek coals in Montana benefited significantly in this period from the NSPS.

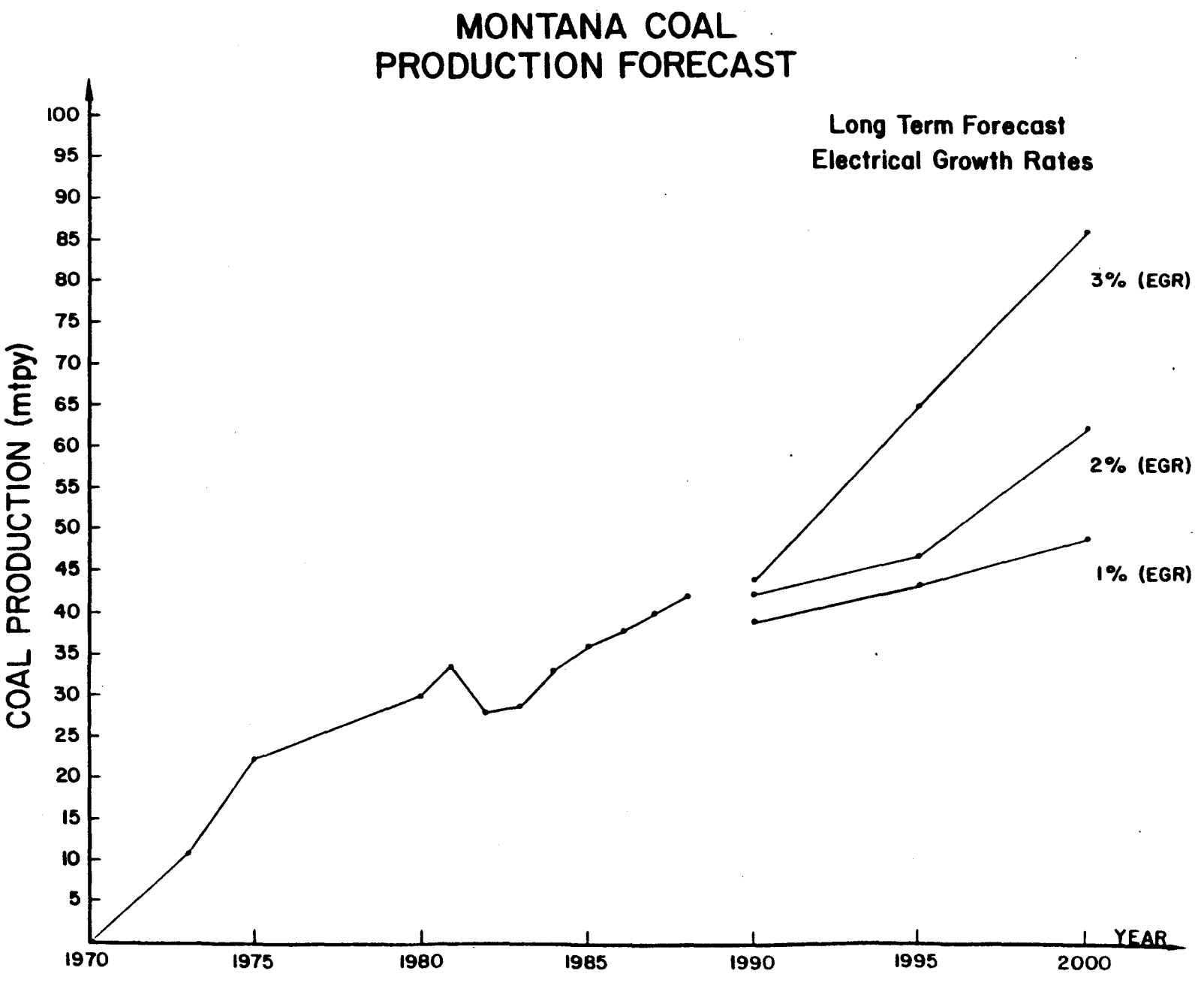
Our forecast for production related to existing contracts is for no major changes to the year 2000. About 12 million tons of current production is tied to contracts that are up for renewal in 1993-1995. Almost all of this coal is for burn sites in Minnesota and Wisconsin. Our analysis indicates that most of these sites continue to be in the Montana market for the most probable set of new bid prices. In the late 1990's, some Decker and Spring Creek contracts begin to expire in Illinois, Texas, and Michigan. These have not been closely analyzed given the proximity of the expiration date to the last year of our forecast, and the uncertainty concerning new bid levels from Decker.

New Plants--Near Term

Our forecast for Montana coal production is summarized in Figure S-1. As it is assumed that the greater part of existing contracts will be renewed, the increases we project are based on the steam coal market due to new plants on line after 1984. The near term forecast (to 1988) is based on a survey of Montana mines undertaken by the Montana Governor's office. Montana mines expect production to increase from 32.3 mtpy (estimate) in 1984 to 41.6 in 1988. Much of this growth is due to contracts for a new plant in Michigan (Belle River #2) and Colstrip 3 and 4. It appears, based on industry sources, that the Montana coal industry is in for a period of steady growth (3% to 4% annually) for the next few years.

The near term forecast can be extended to 1993 based on utility ten year plans as summarized by the National Electric Reliability Council (NERC). In the historical Montana market described above there are only two plants without coal contract commitments that will be coming on line to 1993, Northern States Power (NSP) Sherco #3 in 1988 near Minneapolis and NSP's Wisconsin Coal #1 in 1993. These units combined would contract for about 4 million tons of coal. Even very major extensions of the Montana market due to substantial price reduction could at most add to this another 7 million tons of potential new plant market by 1993 in Iowa, Missouri, Nebraska and Indiana. There is no new uncontracted coal-fired capacity to come on line to 1993 in Montana, Michigan, the Dakotas, Nebraska, Kansas, Oregon, Illinois, or Wyoming. This new production range of 4 to 11 new mtpy by 1993 is an upper limit since it is predicated on the current NERC "sum of utilities" forecast for our market of around 2.5% electric sales growth per year. This is down considerably from even last year's NERC forecast of around 3.2%.

Figure S-1


MONTANA COAL
PRODUCTION FORECAST
Long Term Forecast
Electrical Growth Rates
3% (EGR)
2% (EGR)
1% (EGR)
COAL PRODUCTION (mtpy)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
YEAR
1970
1975
1980
1985
1990
1995
2000

Sherco #3

Because it is possible that the only new plant on line in our market to 1993 is NSP's Sherco #3, we have closely analyzed the relative cost of Wyoming and Montana coals at this burn site. We have used costs estimated from delivered prices at NSP plants in the Minneapolis area. NSP is currently taking deliveries on the first Wyoming coal contracts ever in Minnesota (historically Montana's market). This coal is from a new mine, the Rochelle, with relatively high BTU content (8900) and a mine mouth price of only $6.00 a ton. On a delivered price basis, this coal is about $1.11/ton (or 8.3¢/MMBTU) cheaper in Minneapolis than Colstrip deliveries under old contracts at around $11.00 a ton. This is in part due to the new rail extension into the southern Powder River by Chicago Northwestern and Union Pacific, which are apparently underbidding Burlington Northern by about 1 mill per ton-mile--good for around $1.00/ton on 1,000 mile deliveries. In general both Wyoming and Montana new bid prices (for 8400 to 8700 BTU coal), estimated to average $7.70/ton and $9.50/ton respectively, are below the current average prices for existing contracts of $9.77/ton Wyoming and $11.00/ton for Montana. In short, market conditions are leading to price reductions, which, in some cases, are quite substantial.

When we compare potential new bids at Sherco #3, taking a low Wyoming bid ($6.00 on 8900 BTU coal) and an average Montana bid ($9.50 on 8700 BTU coal), we show Montana with a $1.08 a ton advantage, or about 6.2¢/MMBTU. Since CNW does not deliver directly at the Sherco #3 site, we have assumed equal rail rates. A more typical Wyoming bid, at $7.70 and 8450 BTU would make the advantage to Montana even greater, at about $2.80 per ton.

There are three "wild cards" here: the FOB bid prices, uncertainty over rail rates, and the basis for the NSP decision. On the Wyoming FOB, a bid

lower than $6.00 for 8900 BTU coal seems doubtful. On the Montana FOB, it is unclear why to date Montana producers have not matched Wyoming price reductions. An analysis of production costs was initially proposed for this study, but not funded, and is beyond the scope of our current investigations. Conservatively assuming that Montana producers can go to at least $9.50 FOB, it is likely this would be the low bid for delivered coal at Sherco #3.

Rail rates are the fastest rising part of the price puzzle for electricity. As long as they do not rise differentially between carriers of Montana and Wyoming coal, we should be competitive in markets where rail distance, BTU content and sulfur content make Montana coals the least cost choice.

The third "wild card" is the basis of the NSP decision. It has been asserted that at least at some utilities there is a "subjective bias" against Montana coal because of our severance tax and "antibusiness attitude." It appears to us that utilities have to pay close attention to even rather small differences in price. For example the estimated $1.08/ton or 6.2¢/MMBTU difference at Sherco #3 for Montana coal amounts to about $2 million per year or $60 million over the plant life on fuel costs alone. Our conclusion here is that for typical new bid prices and similar rail costs, Montana will continue to dominate the Minnesota market. Even taking a very low Wyoming bid and an average Montana price, we show a continued locational advantage to Montana producers.

New Plants--Long Term

Our long term forecast for Montana coal production is also shown in Figure S-1. The key uncertainty here has to do with the growth rate of electrical consumption in our market area. We illustrate the difference between 1%, 2%, and 3% electric sales growth scenarios. In the year 2000, the "3%" forecast results in 85.4 mtpy, or almost double the 1% case at 48.3 mtpy. The

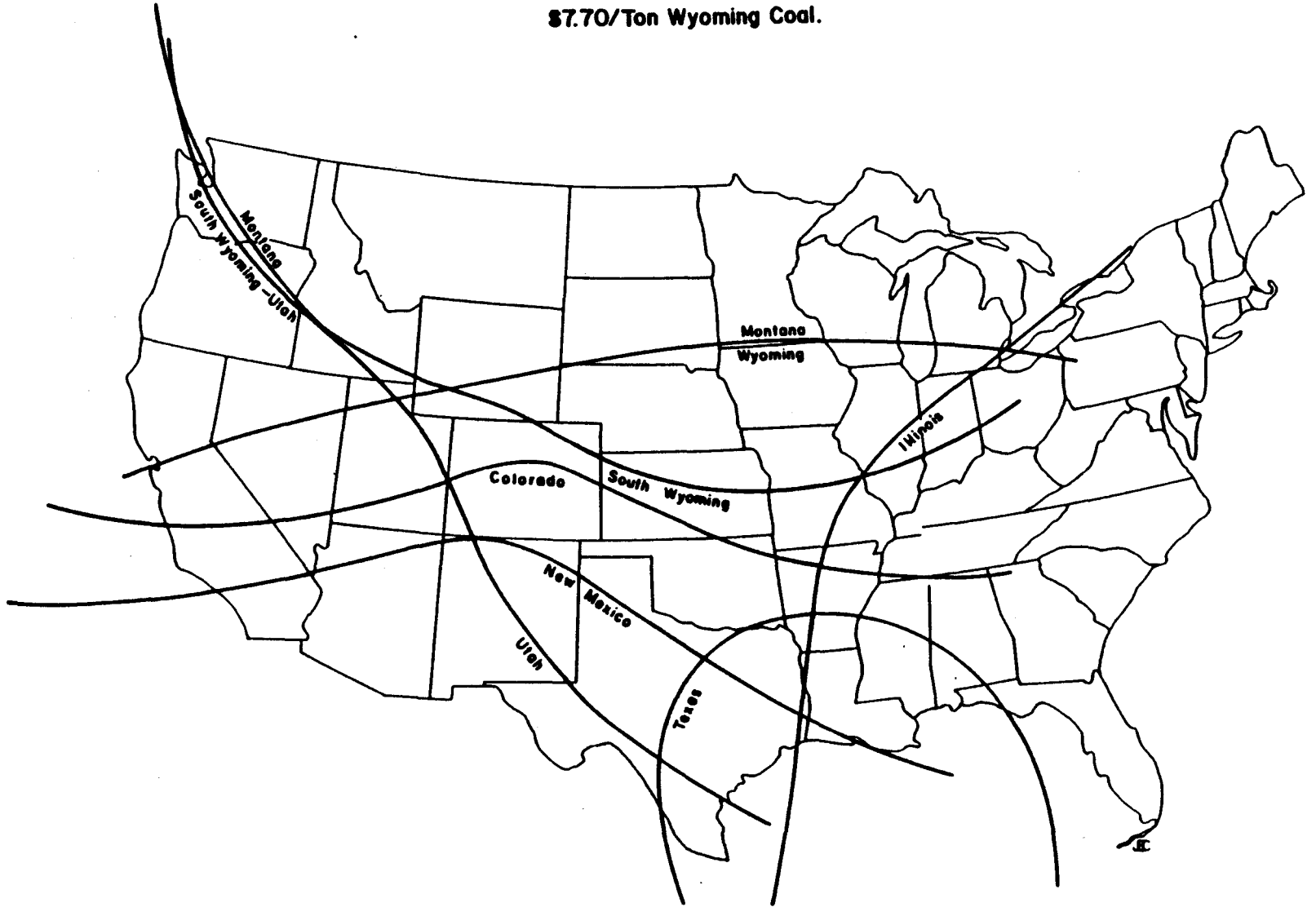
sophisticated forecasting models being applied to the Pacific Northwest by the Northwest Power Planning Council (NPPC) and Bonneville Power Administration (BPA) are predicting growth at around 1.5% to the year 2000, with zero probability of growth greater than 3%. On the other hand utilities in the midwest are building to meet growth no greater than around 2.5%. On this basis, we have chosen 2% as our base case, and performed sensitivity analysis on our major results at both 1% and 3%.

Our long term forecasting model has three key components: a spatial market model, electric growth forecast, and an interfuel substitution algorithm. In our spatial market model we identify the geographical area where Montana coal is least cost against seven competing coal supply centers including Texas, Wyoming, Utah, and Illinois. As detailed in the report, we incude all costs associated with burning a specific coal, including air pollution control costs (scrubbers), boiler size due to BTU content, transportation, etc. Costs are on a present value basis over the life of a prototype 500 mw generating unit, and include fuel and transportation escalation assumptions.

The results of a typical computer run of the model is the spatial map illustrated in Figure S-2. The results indicate that at $9.50/ton Montana versus $7.70 per ton Wyoming, the Montana market includes most of Minnesota, Wisconsin, Michigan, Washington, Montana, and northern Idaho. Because the model is based on the assumption that a coal supply center is a single point, the Montana market is overstated to the extent that there are many potential mine locations within a given coal production region. For example, we have ignored Central Basin coals in Iowa and Missouri, and in Wyoming the supply center we use is to the south of Gillette at Bridger Junction. Because of extensive coal deposits throughout Wyoming and North Dakota, the latter are excluded from the

Figure S-2

Montana Coal Market Area for $9.50/Ton FOB Against $7.70/Ton Wyoming Coal.



Montana market in all cases. Mine mouth generation using North Dakota lignites has historically served electric growth in both the Dakotas.

Once a spatial market is identified, the total electric generation in that market is estimated. Known projected and existing nuclear, hydro, oil and gas, and exisiting coal generation is then subtracted on a state level to estimate residual (new coal) generation.

Using this model we have identified the spatial market (and coal tonnages) associated with alternative prices of Montana coal: $10.50, $9.50, $8.50, $7.50, and $6.50. Comparison of the results at $10.50 and $9.50, for example, provides a basis for predicting the new coal production associated with a $1.00 price cut (due to severance tax change, etc.). Because of uncertainties in Wyoming prices, we ran the model for both a $7.70 and $6.00 Wyoming case. The results for our base case are summarized in Table S-2. A major finding is that because of Montana's locational advantage in the north-central region and PNW, there is likely to be steady and substantial growth in coal production even without price reduction. The second major finding is that the incremental production associated with a given $1.00 price reduction is small, averaging around 1.5 mtpy in 1990 and 1995 and 6 mtpy in the year 2000 against the base prices, all for 2% growth.

As developed in considerable detail in the main report, price reductions in every case expand our market. However, in many cases, the new areas where we become competitive have no potential new coal generation to the year 2000. For example, Illinois has a very large amount of nuclear capacity (about 8000 mw) coming on in the next few years and shows no need for new coal in even a 3% growth scenario. Similarly, in the Pacific Northwest we have relied on the NWPPC's forecast of loads and resources. Only in the "high" case (3% growth) is there any need for new coal in the Northwest, and then only in the year

Table S-2

SUMMARY

Base Case Montana Coal Production Forecast
(million tons per year)

Year:	1990			1995			2000		
Electric Growth Rate:	1%	2%	3%	1%	2%	3%	1%	2%	3%
Total Production	38	42	43	42	46	65	48	63	85
New Production	6	9	11	10	14	32	16	31	53
[a]Increase for $1/ton Price Reduction	.9	1.5	1.3	1.6	1.2	6.9	1.0	5.7	13.5

Note: [a]Increase is based on average of 9.50 and 10.50 Montana FOB and 6.00, 7.70 Wyoming FOB cases.

2000. This is due in part to the conservation, hydro, and combustion turbine resources expected in the Northwest.

Acid Rain Plants

Another potential market for Montana coal is the set of older plants, mainly in the midwestern states, that currently burn high sulfur fuels. Because of the increased scientific evidence that links coal-fired electric generating plant emissions of SO_2 with acid precipitation impacts, a number of bills were proposed in the last Congress to reduce SO_2 emissions by 8 to 12 mtpy. The bills are of two major types. The Sikorsky/Waxman Bill (HR3400) for example, would require scrubbers on the "top 50" emitters and leave a potential of 30 to 50 mtpy of high sulfur coal use that could be switched to low sulfur. The other type of bill, typified by S2001, the Durenburger Bill, would have no explicit technology forcing provisions. Utilities would be free to choose the least cost mix of scrubbing and switching on their system. At present there is a great deal of uncertainty over the target level of reduction and the means of achieving that reduction.

While the potential "acid rain" market for the NGP may be anywhere from 37 to 117 mtpy, the actual share will depend critically on the type of legislation (scrub or switch) and on the unit-specific economics. Many of the older plants designed for bituminous coals may not be able to burn the low BTU, high ash, high sodium western coals or only at a large expense. An analysis has been undertaken by ICF that takes into account the match of unit and coal source characteristics and assumes that utilities will minimize costs. The ICF report estimated that by 1990, acid rain legislation would add only 10 mtpy to the NGP market. Based on historical market shares, this would imply perhaps 2.5 mtpy for Montana. In short, even under the most optimistic scenario (there is an

acid rain bill and it allows utilities to scrub or switch), the Montana market for acid rain plants is anywhere from 0 to 3 mtpy.

In fact, given the current mood of the National Congress, the pull-back of legislative leaders who championed acid rain reduction in the last Congress, and the Presidential (E.P.A.) assessment of new study requirements, it appears unlikely that acid rain reduction will be mandated by the Congress in this decade.

Policy Analysis

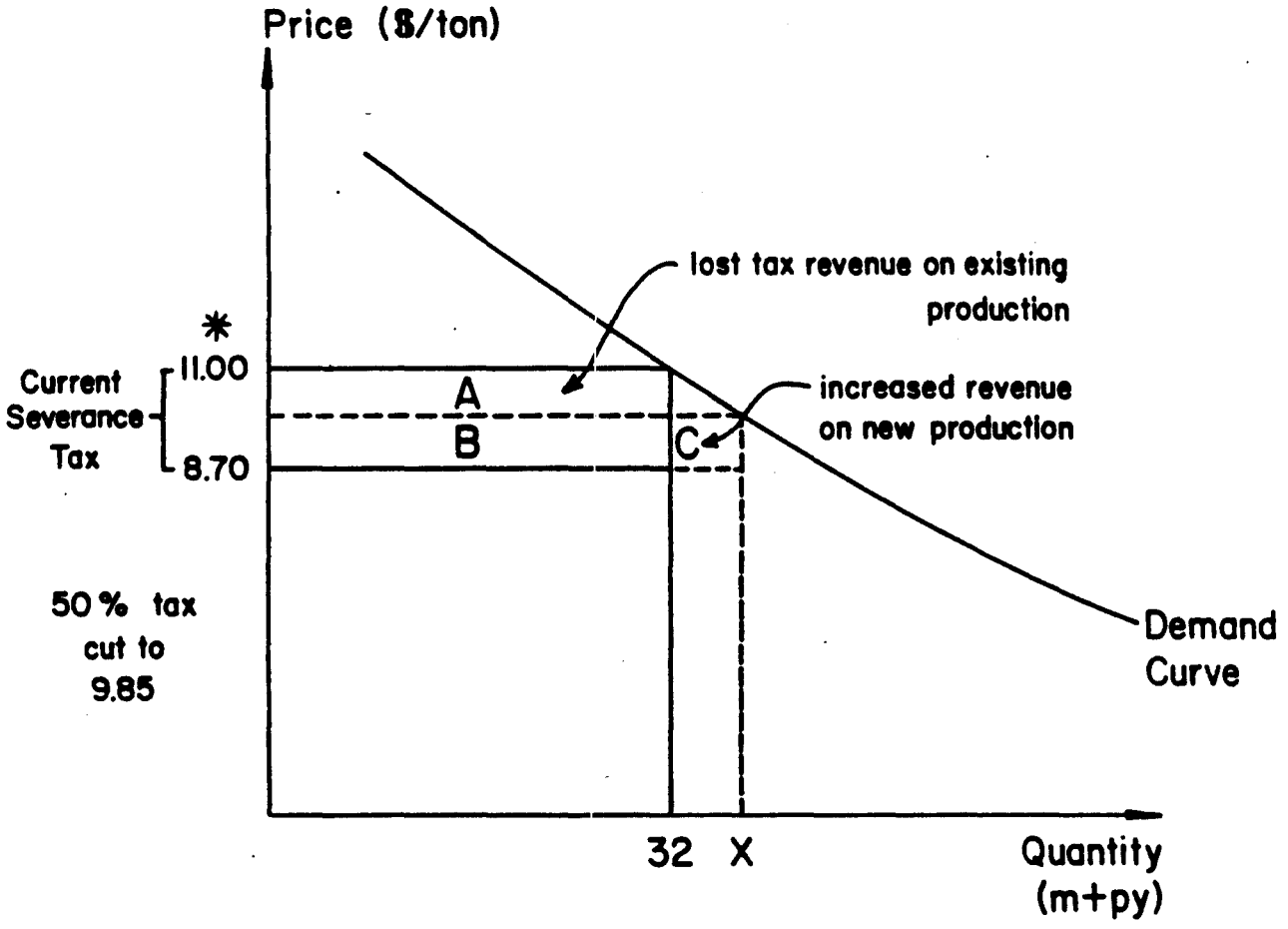
We have analyzed the impact of three policies on our long term coal production forecasts: acid rain legislation, reclamation, and severance taxes.

Based on the preceding discussion, we conclude that new contract potential for Montana based upon some form of SO_2 reduction does not seem likely, or is at best very small, to the end of our forecast period. As developed in our main report, on a delivered basis, the cost of reclamation is very small, perhaps averaging 2.0 to 2.5 cents per million BTU out of a delivered price of $1.50 to $1.60 per million BTU. In addition, state/federal rules and guidelines applied in individual sites offer only minor differences between Montana and Wyoming. We conclude that potential changes in reclamation policy are very unlikely to significantly impact coal markets.

The analytical model for our analysis of the changes in the Montana coal severance tax is summarized in Figure S-3. Given the demand for coal, a reduction in severance tax (and price) has two effects: revenue is lost on existing production (area A) and revenue is gained (area C) on new production (taxed at the new reduced rate). As shown, there is a net loss as "A" outweighs "C." In general the extent of net loss or gain depends critically on the shape of the demand function. A convenient statistic used by economist

Figure S-3

Effect of a Tax Decrease on Production and Revenue



A+B= current revenue.
A=lost revenue under tax reduction.
C=revenue on new production.
C-A=net change in tax revenue.

Issue: X=new production level (elasticity of demand).
* Average price of 8700 BTU producers, for example.

to represent the response of quantity demanded to changed price is "elasticity of demand." It can be shown analytically that unless demand is extremely elastic (in fact an elasticity around -4.6), tax reductions on coal will result in a net loss of income to the state. Based on our preceding analysis of price reductions, the demand curve faced by Montana producers is inelastic at least through 1995, and then only barely elastic (around -1.0) in the year 2000.

The net loss for two specific tax reduction policies are shown in Table S-3 for 2% electric growth (base case). For example, in the year 2000 a 50% tax cut on new production results in a loss of $46.5 million (area A of Figure S-3) on new production that would occur anyway and a $12.0 million gain (corresponding to area C) on new production stimulated by the tax cut. The net loss is then $34.5 million per year. Results for all scenarios and years are conceptually similar: new production that will occur anyway dwarfs incremental production stimiulated by a tax cut. In short, with reference to Figure S-3, area "A" is greater than "C" in every case we modeled. Our empirical results are, incidently, similar to those developed by utility consultant Victor Wood, in a report we obtained through the Montana International Trade Commission.

Table S-3 also provides an estimate for another possible policy: a 50% tax cut on <u>all</u> production. In this case an additional annual $48.5 million tax revenue loss on <u>existing</u> production is added to the previously described net loss on new production, for a year 2000 loss of $83.0 million annually.

The net present value of the tax loss under the two policies to the year 2000 can be estimated from the annual losses of Table S-3. A 50% tax cut on new production has a negative present value of $105 to $205 million at 1% to 3% electric growth; a 50% cut on all production has a negative present value ranging from $685 to $785 million.

Table S-3

Summary Tax Policy Analysis

Tax Policy Alternative	Change in Tax Revenues (million $/year) and Coal Production (million $/year)							
	1985		1990		1995		2000	
	Tax (10^6 $)	Coal (mtpy)	Tax (10^6 $)	Coal (mtpy)	Tax (10^6 $)	Coal (mtpy)	Tax (10^6 $)	Coal (mtpy)
A. 50% Tax Cut on New Production:								
Loss on Base Case New Production:			13.5		21.0		46.5	
Tax on Increase in New Production:			3.6	2.4	2.7	1.8	12.0	8.0
Net Effect:			9.9	2.4	18.3	1.8	34.5	8.0
B. 50% Tax Cut on All Production:								
Loss on Existing Production:	48.5		48.5		48.5		48.5	
Net Effect New Production:			9.9	2.4	18.3	1.8	34.5	8.0
Total	48.5		58.4	2.4	66.8	1.8	83.0	8.0

Offsetting the tax revenue losses to the state as a whole are coal production gains (also quantified in Table S-3). An interesting question is the decision weight to be placed on production gains (or profits, or wages, or employment or etc.) as opposed to tax revenue losses. These appear to us to be largely distributive issues which are beyond the scope of our analysis. We have also simplified our study by assuming that there is no move by producers or railroads to capture any profits potentially created by tax reductions, but that in fact reductions show up in delivered prices. Similarly we have adopted a "naive" model in the sense that Wyoming producers and legislators do not strategically respond to Montana tax cuts. Relaxing these assumptions only strengthens our basic conclusion. The main finding here is that tax revenues will in all cases decline on net due to tax reductions.

Montana Coal Market to the Year 2000: Impact of Severance Tax, Air Pollution Control, and Reclamation Costs

Chapter I. Introduction

This paper provides an economic analysis of the market for Montana and Wyoming coal. The basic purpose of the study is to provide a Montana coal production forecast to the year 2000 and show the sensitivity of this forecast to three policies: The coal severance tax, acid rain legislation, and reclamation policies. The focus is entirely on the derived demand by coal-fired plants in the electric utility sector. This category of use currently accounts for about 95% of Northern Great Plains production. As developed in some detail elsewhere (Duffield et al, 1982), the other current and potential users: (industrial, synfuels, and export) are unlikely to be significant before the turn of the century.

For the purposes of our analysis, the electric utility market for coal can be conveniently divided into three categories: existing contracts, new plants, and "acid rain" plants. As summarized in Figure 1, these categories are based on three different vintages of coal-fired generating units. Most of the generating units now being supplied under contract with Montana and Wyoming coal producers were either built under stringent state-specific air pollution standards (mostly in the west) or under the New Source Performance Standards (NSPS) that came into effect on boilers ordered after 1971 (1.2 lbs. of SO_2 per million BTU). New plants coming on line from the mid-1980's on are mostly under the Revised New Source Performance Standards (RNSPS) that are effective on boilers ordered after 1978. The third category of plants, the so-called "acid rain" plants are mostly older plants built under very lenient to nonexisting sulfur emissions. Many of these plants are in the industrialized midwest and currently burn mostly high sulfur Illinois Basin

Figure 1

Montana Coal
Market Overview

Market Sector	Plant Vintage	Typical Sulfur Emission Regulation
1. Contracts	mostly on line from 1968 to the present	less than 1.8 lbs. $SO_2/10^6$ BTU
2. New Plants	Present to 1993 and beyond	Revised New Source Performance Standards (70%, 90% Scrubbing)
3. Acid Rain	Mostly pre-1975	greater than 3.0 lbs. $SO_2/10^6$ BTU

and Appalachian coals. There is a possibility that these plants will be required by federal legislation to either install scrubbers or switch to low sulfur fuels (such as Montana or Wyoming coals).

Each of these basic existing and potential markets for Montana coal (contracts, new plants, and "acid rain") will be discussed in turn. The analysis of existing contracts is described in Chapter II. The focus is on identifying the historical spatial markets for Montana and Wyoming coals and the influence of specific factors on recent trends. Based on known contracts, a short term forecast to 1988 is discussed. The Montana coal market potentially associated with new plants expected to come on line to the year 2000 is described in Chapter III. The "near term" analysis (to 1993) is based on the historical spatial coal market and published summaries of electric utility 10 year plans. A brief analysis of the delivered cost of Montana and Wyoming coal at the Northern States Power's Sherco #3 plant (to come on line in late 1987 in Minnesota) is included in this section. The long term analysis is based on a spatial market model originally developed under a contract with the U.S. Office of Surface Mining (Duffield, et al, 1982). This section also provides a discussion of the magnitude and significance of reclamation costs. In Chapter IV, the potential Montana coal market due to proposed acid rain legislation is discussed. Chapter V is an analysis of the impact of changes in Montana coal severance tax on each of the three market categories identified above: contracts, new plants, and "acid rain."

Chapter II. Existing Contracts

A. Contracts and Market Share

The purpose of this chapter is to examine the historical markets for Montana and Wyoming coal and to explain differences in the growth and distribution of contracts and deliveries.

Existing contracts for Montana and Wyoming coal are summarized in Appendix B. The listing is based on reported deliveries and industry sources. Because contracts are confidential, it is difficult to validate this information.

In order to identify market trends, we have analyzed reported deliveries to all 176 new coal-fired power plants that will have come on line between 1971 and 1985 in the 19 state market* for Northern Great Plains (NGP) coal. This information is summarized in Table 1 for three five-year periods. The basic finding is that the Montana market share has been relatively stable, with Montana producers supplying about 10% of new coal-fired generating capacity in each of the three periods (1971-75, 1976-80, 1981-85). By contrast, Wyoming's share jumped dramatically from 16% in 1971-75 to 53% and 62% in 1976-80 and 1981-85 respectively.

Assuming a 60% capacity factor, a new 500 mw coal-fired plant will use about 1.6 million tons per year (mtpy) of 8700 BTU/lb. Montana coal. On this basis, the mw capacity information is converted in Table 2 to an estimated share of tonnage. The total 176 new plants require 275.3 mtpy. Montana has served about 10% of this capacity or 26.2 mtpy. Wyoming captured 46% or 128 mtpy and other producers (Colorado, Texas, Illinois, etc.) captured 44%. It should be noted that these estimates do not, of course, correspond exactly to current Montana and Wyoming production, which is likely to be around 32 mtpy and 129 mtpy in 1984 respectively. This is in part because the Tables include contracts

* AR, CO, IL, IA, IN, KS, LA, MI, MN, MO, MT, NB, ND, OK, OR, SD, TX, WS, and WY

Table 1

Market Share Summary
for New Coal-Fired Plants
in the 19 State Market Area*

Coal Source	Time Period: On Line Date 71-75	76-80	81-85	Total
Montana				
# of plants	5	9	6	20
mw capacity	1744	3589	2929	8262
share of mw	.080	.095	.107	.095
Wyoming				
# of plants	10	38	35	83
mw capacity	3392	19785	17121	40298
share of mw	.156	.526	.623	.464
Other				
# of plants	31	26	16	73
mw capacity	16664	14255	7420	38339
share of mw	.764	.379	.270	.441
Total				
# of plants	46	73	57	176
mw capacity	21800	37629	27470	86899

* AR, CO, IL, IA, IN, KS, LA, MI, MN, MO, MT, NB, ND, OK, OR, SD, TX, WS, and WY

Table 2

Market Share Summary
for New Coal-Fired Plants
in the 19 State Market Area
(million tons per year equivalents*)

Coal Source	Time Period: On Line Date 71-75	76-80	81-85	Total
Montana				
# of plants	5	9	6	20
mtpy	5.5	11.4	9.3	26.2
share	.080	.095	.107	.095
Wyoming				
# of plants	10	38	35	83
mtpy	10.7	62.7	54.2	127.6
share	.156	.526	.623	.464
Other				
# of plants	31	26	16	73
mtpy	52.8	45.2	23.5	121.4
share	.764	.379	.270	.441
Total				
# of plants	46	73	57	176
mtpy	69.1	119.2	81.0	275.3

* Based on an assumed 3167.5 tons per year/mw capacity (assumes a heat rate of 10486 BTU/kwh, 8700 BTU coal, at 60% capacity factor).

for plants coming on line in 1985, and because new plants were allocated on the basis of deliveries in the last year of each period (1975, 1980, and current). In some cases deliveries to new plants in 1975 and 1980 are being made by another supplier at present. In addition, some current deliveries are being made to plants on line before 1971 and actual capacity factors can vary significantly by year. The purpose of the tables is to provide a consistent picture over time of the Montana and Wyoming market shares based on deliveries to new plants.

The main finding here is that the Montana market has been small, but stable, compared to Wyoming production which increased six times as fast as Montana after 1976.

B. Market Factors

There are a large number of potentially significant market factors that could explain these differences. A partial list is provided in Figure 1. Here the market factors are sorted by coal characteristics versus political and economic events. A common misconception is that the only difference between Montana and Wyoming coals are coal severance tax rates. In fact any or all of the listed factors could affect the respective markets in different ways.

Coal Characteristics

Some basic characteristics of Montana and Wyoming coals are listed in Table 3. There are in fact at least four distinct coals. The Montana Powder River Basin coals centered around Colstrip, Montana at 8700 BTU/lb. and .7% sulfur are fairly similar to the Powder River Wyoming coals averaging 8400 BTU's and .4% sulfur. Average FOB prices of these two coals are fairly similar at around 60¢/MMBTU. The other Montana coal is Decker/Spring Creek; this is higher BTU and lower sulfur coal and commands a price premium of 20¢ to

Figure 1A

Market Factors

A. Coal Characteristics

- Location
- BTU Content
- Sulfur
- Ash/Moisture

B. Key Political and Economic Events of 70-84

- Clean Air Act of 1970
- Arab Oil Embargo, 73-74 oil price rise
- Rail Escalation
- Coal Severance Taxes
- Nuclear Decline
- Electric Demand Slowdown
- Revised New Source Performance Standards (1978)

Table 3

Some Characteristics of Montana and Wyomming Coals

	BTU	% Sulfur	$/Ton FOB (1983)	¢/MMBTU
Montana				
Western Energy			11.13	
Westmoreland	8700	.7	10.77	64.0
Peabody			10.90	
Decker	9600	.34	19.31	100.6
Spring Creek	9000	.34	15.96	89.7
Wyoming				
Powder River	8400	.4	9.72	57.9
South Wyoming	10500	.6	30.31	144.3

40¢/MMBTU. The other Wyoming coal is south Wyoming, which is bituminous in rank (10,500 BTU), low sulfur and much higher in price (144.3¢/MMBTU).

Location Advantage: Spatial Market

The locations of the Powder River coals with respect to Burlington Northern Railroad are shown in Figure 2, and with respect to the Minnesota market in Figure 3. The main thing to note here is that for shipments east to Minneapolis Colstrip area coal has a 240 mile edge over Wyoming Powder River. However, to the south (Texas, Oklahoma, etc.) Gillette area coals have a 330 mile advantage. At the current average rate for coal unit trains of .017 $/ton-mile, the respective advantages are 4.08 $/ton to Montana to the north-central states and a 5.61 $/ton advantage to Wyoming to the south-central states. This difference is very important and has the same impact on delivered price as an equivalent difference in FOB mine price. Table 4 shows the relative cost differences associated with location advantages. Because of these very important locational differences vis-a-vis markets and existing rail routes, there are strongly defined spatial markets for Montana and Wyoming coals. This point will be developed in greater detail in Chapter III below; however, it is useful at this point to note as an example the areas where Montana and Wyoming coal are least cost (on a delivered basis) with a $9.50 Montana FOB price and $7.70 Wyoming (see Figure 4). Basically Montana picks up the north-central states and Wyoming has the market roughly south of the Minnesota-Iowa border.

While location is probably the key characteristic in explaining coal spatial markets, BTU and sulfur are also significant. Because Decker is higher BTU per ton than Colstrip and Gillette area coals (and because it is only 125 miles north of Gillette rather than 330), Decker can potentially compete to the south (assuming similar FOB) at distances over 1000 miles (Texas) with lower BTU Gillette coals. South Wyoming coals and, to a lesser extent, Decker also

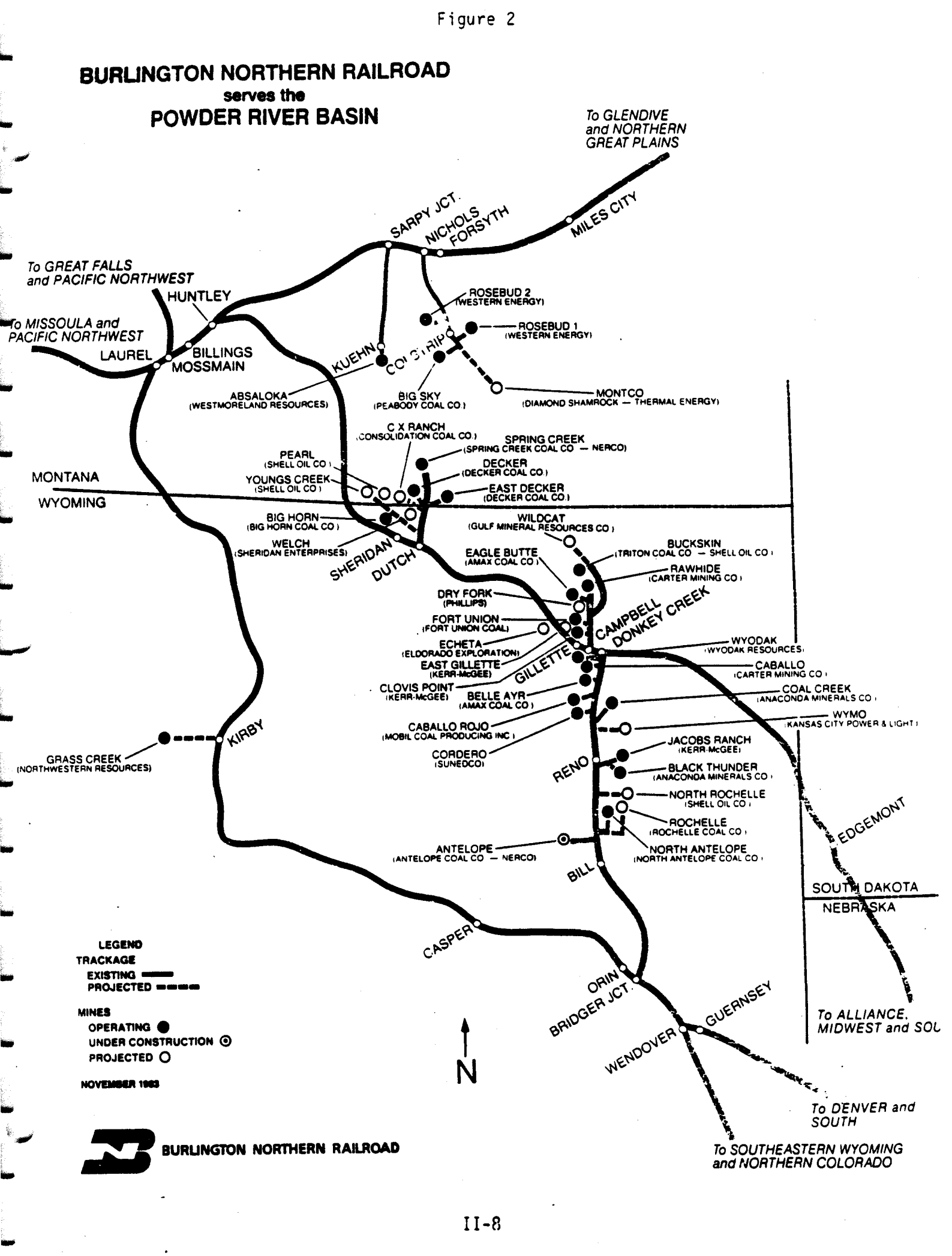
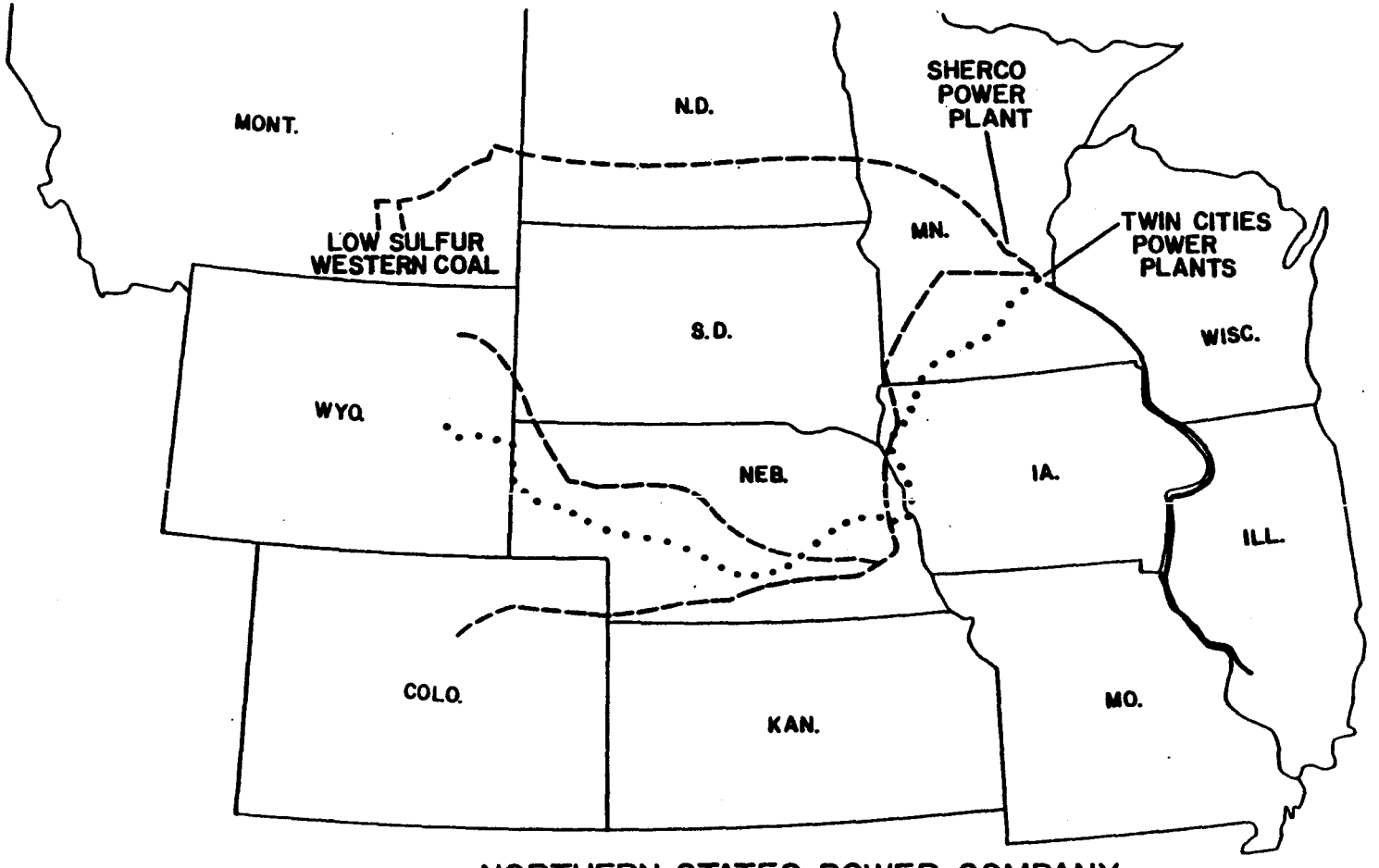

BURLINGTON NORTHERN RAILROAD
serves the
POWDER RIVER BASIN
To GLENDIVE and NORTHERN GREAT PLAINS
MILES CITY
FORSYTH
NICHOLS
SARPY JCT.
To GREAT FALLS and PACIFIC NORTHWEST
HUNTLEY
To MISSOULA and PACIFIC NORTHWEST
LAUREL
BILLINGS
MOSSMAIN
KUEHN
COLSTRIP
ROSEBUD 2 (WESTERN ENERGY)
ROSEBUD 1 (WESTERN ENERGY)
ABSALOKA (WESTMORELAND RESOURCES)
BIG SKY (PEABODY COAL CO.)
MONTCO (DIAMOND SHAMROCK — THERMAL ENERGY)
C X RANCH (CONSOLIDATION COAL CO.)
SPRING CREEK (SPRING CREEK COAL CO — NERCO)
PEARL (SHELL OIL CO.)
DECKER (DECKER COAL CO.)
YOUNGS CREEK (SHELL OIL CO.)
EAST DECKER (DECKER COAL CO.)
MONTANA
WYOMING
BIG HORN (BIG HORN COAL CO.)
WELCH (SHERIDAN ENTERPRISES)
SHERIDAN
DUTCH
WILDCAT (GULF MINERAL RESOURCES CO.)
BUCKSKIN (TRITON COAL CO — SHELL OIL CO.)
EAGLE BUTTE (AMAX COAL CO.)
RAWHIDE (CARTER MINING CO.)
DRY FORK (PHILLIPS)
FORT UNION (FORT UNION COAL)
CAMPBELL
DONKEY CREEK
ECHETA (ELDORADO EXPLORATION)
WYODAK (WYODAK RESOURCES)
EAST GILLETTE (KERR-McGEE)
GILLETTE
CABALLO (CARTER MINING CO.)
CLOVIS POINT (KERR-McGEE)
BELLE AYR (AMAX COAL CO.)
COAL CREEK (ANACONDA MINERALS CO.)
WYMO (KANSAS CITY POWER & LIGHT)
CABALLO ROJO (MOBIL COAL PRODUCING INC.)
CORDERO (SUNEDCO)
JACOBS RANCH (KERR-McGEE)
KIRBY
GRASS CREEK (NORTHWESTERN RESOURCES)
RENO
BLACK THUNDER (ANACONDA MINERALS CO.)
NORTH ROCHELLE (SHELL OIL CO.)
ROCHELLE (ROCHELLE COAL CO.)
EDGEMONT
ANTELOPE (ANTELOPE COAL CO — NERCO)
NORTH ANTELOPE (NORTH ANTELOPE COAL CO.)
BILL
SOUTH DAKOTA
NEBRASKA
CASPER
LEGEND
TRACKAGE
EXISTING
PROJECTED
MINES
OPERATING
UNDER CONSTRUCTION
PROJECTED
NOVEMBER 1983
ORIN
BRIDGER JCT.
GUERNSEY
WENDOVER
N
To ALLIANCE, MIDWEST and SOU
To DENVER and SOUTH
To SOUTHEASTERN WYOMING and NORTHERN COLORADO
BURLINGTON NORTHERN RAILROAD

Figure 3



NORTHERN STATES POWER COMPANY
MAJOR COAL SOURCES AND TRANSPORTATION ROUTES

LEGEND

B.N. = ----------

CNW & U.P = ...

SO. ILL. = ——————

Table 4

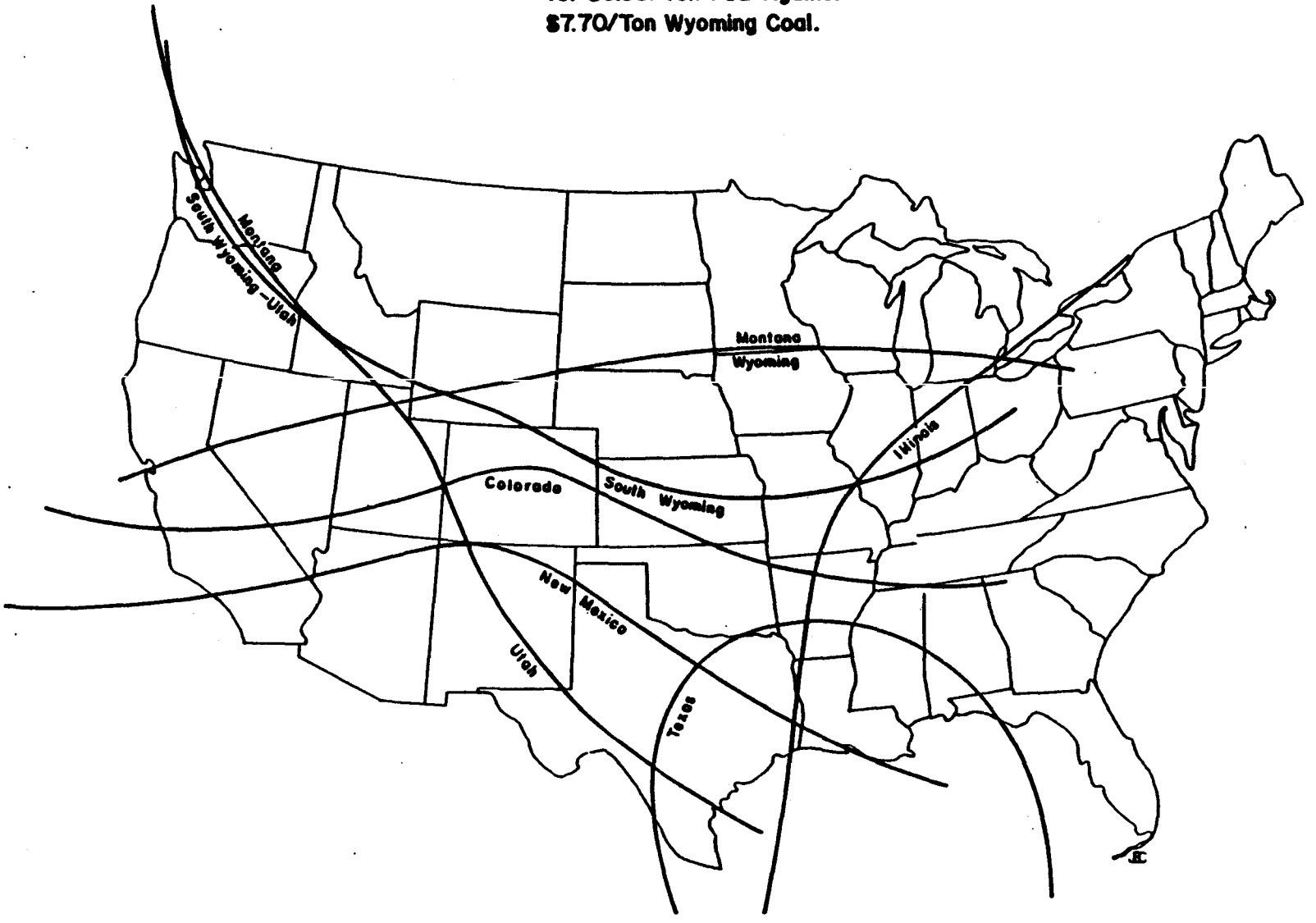
$/Ton Equivalents of Rail Mileage Differentials

Mileage Differential	*$/Ton Equivalent
50	.85
100	1.70
150	2.55
200	3.40
250	4.25
300	5.10
350	5.95

* at .017 $/ton-mile

Figure 4

Montana Coal Market Area for $9.50/Ton FOB Against $7.70/Ton Wyoming Coal.



command a price premium because they are low sulfur but can be burned in boilers designed for some bituminous coals. On the other hand, Colstrip coals are higher sulfur (.7% to .8%) than Gillette (.3% to .4%). Even this relatively small difference in sulfur content can be significant. Under the NSPS of 1.2 lbs. $SO_2/10^6$ BTU, Montana coal that averages greater than .6% sulfur cannot be burned without scrubbing or blending with even lower sulfur coal. For example, at the Wisconsin Power and Light Columbia plants Colstrip coal is cheaper at 29.07 $/ton delivered (or 168.5¢/MMBTU in 1984) than Wyoming coal (Belle Ayr at $31.97/ton or 188.2¢/MMBTU in 1984). However, Colstrip at .8% sulfur is apparently blended with .35% sulfur Wyoming coal to meet the 1.2 standard.

Another example is the Interstate Power Lansing plant in Iowa. Wyoming Coal is blended with Illinois coal that is 44.3¢/MMBTU cheaper but 2.76% sulfur. Blending Montana coal at this plant (under a 1.94 SO_2 reg.) would reduce by about half the share of cheap high-sulfur Illinois coal that could be burned. The net saving to using Wyoming coal here is around $840,000 even assuming equal Montana and Wyoming delivered prices. In short, the slightly higher sulfur content of Montana coals can be significant at some burn sites.

The importance of locational advantage appears to be supported by state-level information on new plants that burned Montana and Wyoming coal 1971-1985. There are only six states where new plants burned Montana coal in this period: Illinois, Michigan, Minnesota, Montana, Texas, and Wisconsin (Table 5). This is consistent with the sample spatial market map noted previously (Figure 4). It should be noted that North Dakota and South Dakota are dominated by mine mouth North Dakota lignites. Only Minnesota and Montana are solidly in our market while Texas, Illinois, and Wisconsin are on the market boundary. The share of Michigan is due to our location and advantage in northern Minnesota since this coal goes by lake steamer from Duluth/Superior

Table 5

Montana Contracts to New Power Plants by Period

	71-75		76-80		81-85	
	units	1000 mw	units	1000 mw	units	1000 mw
A. South Central Oil Gas States						
Texas	0/4	0/2372	2/17	966/10029	1/8	176/4042
MT share	.00	.00	.12	.10	.13	.04
B. Residual States						
Illinois	2/7	465/4125	0/5	0/1849	0/1	0/600
Michigan	0/7	0/3620	3/4	270/1040	3/4	1353/1411
Minnesota	1/1	365/365	3/3	1995/1995	0/0	0/0
Montana	1/1	358/358	1/1	358/358	2/2	1400/1400
Wisconsin	1/1	556/556	0/2	0/1173	0/3	0/1282
Subtotal	5/17	1744/9024	7/15	2623/6415	5/10	2753/4693
MT share	.29	.19	.47	.41	.50	.59
Total	5/21	1744/11396	9/32	3589/16444	6/18	2929/6705
MT share	.24	.15	.28	.22	.33	.44

to lakeside Detroit Edison plants. Similarly, the locational advantage to Wyoming is indicated in its historical market share for states south of and including Nebraska and Iowa (Table 6).

Oil and Gas Price Escalation

While location is clearly important, it is possible with the state-level data on new plants to also investigate several of the other factors listed in Figure 1. It appears that the main cause of the large jump in Wyoming production after 1975 is not due to intrafuel competition (e.g. Montana vs. Wyoming coals) but to interfuel substitution. Specifically, the very large increase in oil and gas prices following the Arab oil embargo of late 1973 drastically altered the market for electric utility fuels. The most vulnerable states were the south central oil and gas states of Texas, Oklahoma, Arkansas, Louisiana, and (to a lesser extent) Nebraska. These states historically have burned very little coal and were not building coal-fired plants in 1971-1975. As shown in Table 6, only four new coal units were added in Texas (supplied by Texas lignite). However, in response to new oil and gas prices (and relatively high electric consumption growth rates in the Sun Belt), a large amount of coal-fired capacity was added in these states after 1976.

Prior to 1976 Wyoming captured no new coal-fired units in these states (even though it was a least-cost coal source at many sites) because no new units were built. Since 1976, Wyoming's share of the five south-central gas states has been around 70% to 80% and has accounted for 66.1 mtpy or 53% of Wyoming's new plant tonnages (totaling 124.9, Table 7). This interfuel substitution plus location also has relevance for other states such as Kansas (where some coal has been burned historically) and for Oregon, where coal is competitive against incremental hydro and nuclear.

Table 6

Wyoming Contracts to New Power Plants by Period

	71-75		76-80		81-85	
	units	1000 mw	units	1000 mw	units	1000 mw
A. South Central Oil Gas States						
Arkansas	0/0	0/0	2/2	1262/1262	3/3	2422/2422
Louisiana	0/0	0/0	0/0	0/0	5/5	2793/2793
Nebraska	0/0	0/0	3/3	1306/1306	3/3	835/835
Oklahoma	0/0	0/0	6/6	3178/3178	4/4	1787/1787
Texas	0/4	0/2372	11/17	5282/10029	4/8	2012/4042
Subtotal	0/4	0/2372	22/28	11028/15775	19/23	9849/11879
WY share	.00	.00	.79	.70	.83	.83
B. Residual States						
Colorado	1/2	282/514	1/5	396/1765	2/3	802/1202
Iowa	2/2	880/880	3/3	1480/1480	3/4	1442/1592
Kansas	2/3	462/1434	3/3	2162/2162	3/3	1210/1210
Missouri	0/4	0/2463	1/5	726/2762	2/2	905/905
Oregon	0/0	0/0	1/1	530/530	0/0	0/0
Wisconsin	0/1	0/556	2/2	1173/1173	3/3	1282/1282
Wyoming	5/5	1668/1668	4/4	1897/1897	3/3	1167/1167
Subtotal	10/23	3392/10031	16/31	8759/15608	18/24	8177/11110
WY share	.43	.34	.52	.56	.75	.74
Total	10/27	3392/12403	38/59	19787/31383	37/47	18026/22989
WY share	.37	.27	.64	.63	.79	.78

Table 7

Summary 1971-1985
Contracts to New Power Plants
(Million tons per year equivalents)

	Montana tonnage	Montana Market share	Wyoming tonnage	Wyoming Market share
A. South Central Oil Gas States				
Arkansas			11.7	1.00
Louisiana			8.8	1.00
Nebraska			6.8	1.00
Oklahoma			15.7	1.00
Texas	3.6	.07	23.1	.44
Subtotal	3.6	.07 (of 52.1)	66.1	.70 (of 95.1)
B. Other States				
Colorado			5.0	.45
Illinois	1.5	.07		
Iowa			12.0	.96
Kansas			12.1	.80
Michigan	5.1	.27		
Minnesota	7.5	1.00		
Missouri			5.2	.27
Montana	6.7	1.00		
Oregon			1.7	1.00
Wisconsin	1.8	.18	7.8	.81
Wyoming			15.0	1.00
Subtotal	22.6	.35 (of 63.8)	58.8	.70 (of 84.4)
Total	26.2	.23 (of 115.9)	124.9	.70 (of 179.49)

By contrast (Table 5), Montana is by location at a $5 to $6/ton disadvantage to the south-central oil and gas states and did not share in the oil price-induced boom that Wyoming coal experienced. As noted in Table 5, Montana has had a small share of the Texas market. This is mostly Decker/Spring Creek which is higher BTU and much closer to Gillette (as explained earlier).

Excluding the oil and gas states, the market shares for both Wyoming and Montana (in their respective markets) have increased. For Montana, on a mw basis, the share was 20%, 40%, and 60% in 1971-75, 1976-80, 1981-85 respectively (Table 5); and for Wyoming 35%, 55%, and 75% respectively. In short, both Montana and Wyoming market shares, excluding the oil and gas states, have increased in their respective markets. The biggest difference between the two states is that historically Wyoming has a locational advantage to the south, where growth and substitution out of oil and gas have been the greatest. Excluding Texas, only 42 plants were built between 1971 and 1985 in the five states where Montana has delivered to new plants. By contrast, 133 plants were added in the 12 states where Wyoming has locational advantage.

SO_2 Emission Regulations

Another significant factor in the Montana and Wyoming coal markets from 1971-1985 was the establishment of sulfur emission standards for new coal-fired plants. The first standards (NSPS) were on boilers ordered after 1971 and requiring a 1.2 lbs/MMBTU standard. This meant that burning low sulfur coals was a permissable strategy. However, as noted previously, mainly the Decker/Spring Creek coals (at .3% to .4%) have benefited from this legislation as the Colstrip area coals run around .7% to .8% sulfur. The second set of standards (RNSPS) on boilers after 1979 required 70% scrubbing on low sulfur

coals and 90% on high sulfur. The effect of these regulations should be to lessen the market for both Wyoming and Montana vis-a-vis the high sulfur Illinois Basin coals and take away most of the disadvantage of the Colstrip area coals vis-a-vis slightly lower sulfur Wyoming Powder River coal.

In assessing any of the political and economic market factors (Figure 1) one needs to know how early coal sourcing decisions are made vis-a-vis on line dates. For example, were the new plants that came on line in 1976-1980 reflecting current prices and policy? Prices and policy from five years earlier? Some partial information on this is provided in Table 8 and Table 9*. From Table 8, almost 90% of new coal-fired plant (120 of 137) prior to 1975 came in under lenient sulfur regulations. Between 1976 and 1982 7 of 104 or 7% came in under lenient standards, and after 1982--none. The lag between boiler order date (Table 9) and on-line date has apparently increased from 5.2 to 8.3 years. These are probably approximate estimates of lead times for aspects of the coal sourcing discussion, at least to the level of selecting rank if not specific source. Based on these tables, one would expect to see the effects of the NSPS showing up as early as the 1976-1980 new plant market shares and the RNSPS only beginning to impact the end of the 1981-1985 period.

Before trying to identify the net effect of new air emission regulations, it is useful at this point to summarize the policy effects that were indicated in Figure 1. In Figure 5, the effects of specific political and economic events is summarized both for intra- and inter-fuel substitution. As noted previously, the large interfuel substitution effect on the Wyoming market has been at least partially isolated by separating out the south-central oil and gas states. As noted previously in Tables 5 and 6, the market shares of both

*These tables include Washington and Idaho to make a 21 state market area.

Table 8

Classification of Coal-Fired Plants in
21 State[f] Market Area by
On-Line Date and Sulfur Emission Regulation

On-Line Date		Sulfur Regulation			
	Total	Greater than 1.2 lb/10^6 BTU	NSPS or 1.2 lb/10^6 BTU	RNSPS	PSD and/or less than 1.2 lb/10^6
1960-1975	137	120	12[a]	0	5[b]
1976-1982	104	7[c]	78	0	19
1983-1986	49	0	14[d]	26	9
1987-1990	34	0	0	33	1
Totals	324	127	104	59	34[e]

Source: Derived from Appendix B, Duffield, et al, 1982.

Notes

[a] These are all Wyoming and Colorado plants built to meet state standards.

[b] Wyoming plants built to meet state standards of .2 to .5 and a 1.0 Montana PSD plant.

[c] Missouri and Indiana plants, mainly 2nd or 3rd units ata a given site.

[d] Indiana, Iowa, Louisiana, Michigan, Texas, and Wisconsin plants that appear to have been ordered by 11-78; usually 2nd unit.

[e] Eleven PSD plants (Montana, Washington, Kansas, Minnesota); 18 more stringent state standards in the west (Montana, Wyoming, Colorado, N.D.) and 5 more stringent Arkansas and Missouri plants.

[f] Arkansas, Colorado, Illinois, Idaho, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri, Montana, Nebraska, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Washington, Wisconsin, Wyoming.

Table 9

Distribution of Time Lag Between Boiler Order Date and On-Line for Coal-Fired Steam Plants in a 21 State Market Area

	Sample	
Years Lag	Plants Built 1960-1982	Plants Proposed 1983-1990
3	3	
4	5	1
5	8	2
6	7	2
7		3
8	2	1
9	1	
10		3
11		1
12		3
Mean	5.23	8.25
Standard deviation	1.48	2.66
Approximate 90% Confidence Interval	3 to 7-1/2 yrs.	4 to 12-1/2 yrs.

Source: Derived from Appendix B, Duffield et al, 1982.

Figure 5

Policy Effect of Fuel Choice

Event	Interfuel Substitution	Intrafuel Substitution	
	Coal vs. other fuels	NGP vs. other coals	MT vs. WY
A. Oil and Gas Price Escalation:			
1. New Coal-fired plants in the south-central states	+ Coal	+ NGP	++ WY
2. Rail Rate Escalation	- Coal	- NGP	neutral
B. SO_2 Emission Regulations:			
1. NSPS-1971	- Coal	+ NGP	+ WY + Decker
2. RNSPS-1978	- Coal	- NGP	+ MT
C. Coal Severence Taxes	- Coal	- NGP	- MT
D. Nuclear Decline	+ Coal	neutral	neutral
E. Electric Growth Down	neutral	neutral	neutral

Montana and Wyoming increased strongly 1971-75 to 1976-80 and and 1976-80 to 1981-85. Looking at the factors in Figure 5, the negative indicators for NGP as a whole are rail escalation, RNSPS, and coal severance tax. The positive are NSPS and possibly the positive effect of oil and gas substitution in residual states. Since both Montana and Wyoming increased their shares of their respective markets in 1976-80 and again 1981-85, it appears that the expected market expansion due to NSPS dominated the potential market contracting effects of rail escalation and coal severance taxes.

The NSPS also appear to explain the mixed pattern of state specific changes that have been tabulated (referring again to Table 5). Between 1971 and 1985 Montana's share increased in Texas and Michigan, declined in Illinois and Wisconsin and was stable at 100% in Montana and Minnesota. The first thing to note is that the increases in Michigan and Texas were for Decker and Spring Creek coal. These coals are .3% to .4% sulfur and could, of course, be burned without scrubbing to meet NSPS. They compete with the low-sulfur Wyoming fuels and, having a locational advantage to Duluth, pick up Michigan after NSPS were instituted. To Texas, the distance advantage to Gillette is only 130 miles and as noted can be largely overcome by Decker and Spring Creek higher BTU. This has given these coals a small but stable share of the Texas market. Given limits on capacity and reserves for these coals, the mines are apparently allocating their production to obtain premium prices in their best markets.

In Wisconsin the change is again due to NSPS. The new plant on line in Wisconsin in 1971-75, the Columbia unit #1, was not under NSPS and could burn Montana's .7% S coal without scrubbing. However, a Columbia unit #2 in 1978 came under NSPS and went to Wyoming .41% S coal, which didn't require

scrubbing. In 1982, the cost of scrubbing NGP coal (in 1980 dollars) for 70% to 90% removal was $5 to $8 per ton or 28¢ to 48¢ per million BTU. Of course, to meet NSPS with .7% to .8% S coal, less than 50% scrubbing would be required. However, at the time the coal source decision was made on Columbia unit #2, scrubber technology was not as well developed and cost estimates were probably higher. The prices for delivered coal at the Columbia units in 1979 were 84.8¢ (Montana) and 121.1¢ (Wyoming) or a 36.3¢/MMBTU difference. In 1980 the price difference was 29.8¢. The cost and uncertainty associated with scrubbers appears to justify and explain the choice of Wyoming coal at new units in Wisconsin under NSPS.

By comparison, in 1980 the average FOB price for Rosebud County, Montana coals was $6.96. At this price the Montana severance tax and the Wyoming severance tax would amount to about $1.53 and $.73 respectively or an $.80 difference. In cents per million BTU's this amounts to 4.6¢ difference in 1980. It would appear that at least in Wisconsin, the severance tax effect is an order of magnitude short of explaining the shift in market share.

The shift in Illinois also appears to be related to NSPS. Both of the new Illinois plants that burned Montana coal in 1971-75 were under low-sulfur regulations, but 1.8 lb./SO_2 state standards rather than 1.2 lb. NSPS. For example, the Edwards plant (unit 3 on line in 1972) could burn .7% to .8% S Montana coal and meet the standards. The other coal at this plant through the years has been mainly Kentucky low-sulfur coal. (Interestingly, this contract was lost to Kentucky in 1984 due to a $13 decrease in delivered price resulting from a cut in rail rates.) The other new plant in Illinois was Powerton (units added in 1972 and 1975). As of 1976, Decker coal was blended

with high sulfur Illinois at 102¢ and 57¢ per million BTU respectively. More recently southern Wyoming 9600 BTU coal has also be burned at this plant. For example, in 1979 Illinois, Montana, and Wyoming were 76.2¢, 166.1¢ and 197.5¢ per million BTU respectively. The price differential here between Illinois and the western coals is on the order of 90¢ to 121¢. In 1980 the differential was 145.2¢ per million BTU. By comparison, estimated scrubber costs for 3.4% S Illinois coal to meet NSPS in 1980 were $15.43/ton or about 73¢/MMBTU. In short, in 1980 and earlier scrubbers were significantly cheaper than western coal. An examination of the six Illinois plants that came on line 1976-1985 indicates that all chose high sulfur Illinois/Indiana coals plus scrubbing over the Montana or Wyoming coals. This appears justified by the economics of delivered price differentials (145.2¢) versus scrubbing (73¢) or a 72¢/MMBTU advantage to scrubbers for a Powerton site. The economics will vary of course by location. Again, it might be noted that a 23% effective severance rate tax (here on Decker's average 1980 FOB price of $15.43) amounts to 18¢/MMBTU which is small compared to the scrubber advantage.

NSPS did not shift the new plant share in the two remaining states of the Montana market: Montana and Minnesota. The Montana plants are Colstrip 1 through 4, all of which faced state and federal emission standards that were more stringent than 1.2 lbs. SO_2/MMBTU and required scrubbing in any case. (This is not to mention the substantial transportation differential against Wyoming coals to Montana.) There has only been one Minnesota plant to come on line under the NSPS. The Clay Boswell #4 unit on line in 1980 went for .7% S Montana coal with scrubbing. The economics were probably close on this versus Wyoming coal based on the Wisconsin numbers. In 1981-85 no utilities in Minnesota added new units under NSPS so there is no evidence on that recent market.

As noted previously, the RNSPS have had little effect on the market shares for the 1971 to 1985 new plants (no more than 5 of these 176 plants are under RNSPS). The dominant feature of the RNSPS is that now all low sulfur coals must be scrubbed 70% (and high sulfur 90%). For typical Powder River coals this amounts to an estimated $6.25/ton or 35¢/MMBTU penalty against high sulfur coals in 1984 dollars. In fact the RNSPS improve the relative position of the typical .7% sulfur Montana coals against .3% to .4% Decker and Wyoming coals. However, the NGP market as a whole will shrink. Based on known contracts for 30 RNSPS plants to come on line in the 19 state market by 1993, only 8/30 or 27% are taking NGP coals. This contrasts with the 1971-1985 average of 103/176 or 59% and the NGP share of low sulfur regulation plants (less than 1.8 lbs. SO_2/MMBTU) of 58/83 or 70%. A preliminary analysis of the RNSPS plants indicates that states on the market boundary, such as Indiana, Illinois, Louisiana, Texas, Michigan, Iowa, and Missouri will be less likely to buy NGP coal than in the past.

C. Summary

The major conclusions from this analysis of market share are as follows. The Montana coal market share through the 1971-1985 period has been small but relatively stable due to the locational advantage in Minnesota, Wisconsin, Michigan and by wire to the PNW. The very large relative growth in Wyoming is due to three factors: 1) locational advantage to a much larger market including the south-central oil and gas states, 2) major shifts from oil and gas generation to coal due to rising world oil prices, and 3) the expansion of the low sulfur coal market under the NSPS of 1973. As developed in some detail, only the Decker and Spring Creek coals in Montana benefited significantly in this period from the NSPS. Changes in the Montana coal market share by state

for new plants in this period were analyzed. No cases were identified where the small difference between Montana and Wyoming coal severance taxes were a significant factor.

Chapter III. New Plants

In this chapter the Montana coal market change due to new plants coming on line in the near term and long term will be described.

A. Near Term Contracts

The contract deliveries that were used in Chapter II to analyze historical market share are also the best basis for short term forecasts. Because of the lead time between contracts and on-line dates for plants of at least three to four years, mines already have a fairly good idea of production levels out to around 1990.

Short-run forecasts based on discussions with industry sources and reported contracts for Montana and Wyoming are provided in Table 10. Montana mines expect to expand production from an estimated 32.3 mtpy in 1984 to 41.6 mtpy by 1988. The production decline from 1981 to 1983 is in part the national recession as reflected in capacity utilization at coal-fired plants. Utilities have been taking deliveries at contract minimums and also taking advantage of the spot market. Electrical generation in Minnesota, as an example, actually declined from 1981 to 1982 and in 1983 was still below the 1981 level. The 1981-88 growth rate for Montana is 3.2% annually compared to 4.4% for Wyoming. Montana as a share to Wyoming was .32 in 1981 and is projected to be .30 in 1988. It appears, based on industry sources, that the Montana coal industry is in for a period of steady growth for the next few years.

NERC Coal Unit Additions

A more complete picture of the potential Montana production due to new coal-fired units can be derived from National Electric Reliability Council (NERC) data. NERC publishes annually summary statistics on utility ten year

Table 10

Short Term Forecasts for
Montana and Wyoming: Coal Production
(mil. tons)

Coal Source	1981	1983	1984*	1988	1990
Montana:					
Decker, Spring Creek	15.07	12.46	12.74	16.63	--
Peabody, Western Energy, Westmoreland	15.95	15.95	19.34	24.69	--
Total	33.19	28.68	32.31	41.59	--
Wyoming:					
Total	102.7	112.2	129	139.5	145

Growth Rate	81-88	83-88
Montana	3.2%	7.4%
Wyoming	4.4%	4.4%

*preliminary

Source: Jim Oppedahl, Office of the Governor, Montana and Richard Jones, Wyoming Geological Survey.

plans for capacity additions. Given the lead time to bring a new coal-fired unit on line these plans are an upper limit to new capacity additions. A summary comparison of the two most recent NERC reports for the total U.S. coal-fired additions is provided in Table 11. The nine years that overlap in the 1983 and 1984 forecasts are compared. In just one year the forecasts are down by 44.1 mtpy equivalent or 23% due to delay in unit on line date or project cancellation. The growth rate implicit in the first forecast is about 3.2% and in the second 2.5%. The point here is that the ten year forecasts are an upper limit given miminum lead time plus the potential for slippage and cancellation. Secondly, key determinants of coal production in the long run are clearly coal-fired capacity additions and the growth rate of electrical generation. Both of these are quite volatile and difficult to predict as is apparent here. Our approach in the longer term modeling below is to look at a range of electrical forecasts for 1%, 2%, and 3% electric growth.

Based on the NERC reports, an upper limit estimate of uncommitted new coal-fired capacity in the market area 1985-1993 is reported in Table 12. In the historical Montana new plant market (as developed in Chapter II) of Montana, Illinois, Michigan, Minnesota and Wisconsin, there are only 2 new units totaling 1172 mw or 3.7 mtpy potential that is not currently contracted. Texas is tabulated here in the Wyoming market with 11 units and 21.2 mtpy. The basic picture is that the uncommitted tonnage associated with new plants in the historical 19 state market for NGP coal is small--only 47 mtpy for the next nine years. Almost half of this is in Texas, which is now almost certainly out of the NGP market due to scrubber reqirements. As will be seen below, even a $3 reduction in Montana price would only extend the Montana market beyond historical limits to include parts of Iowa, Nebraska, Missouri and Indiana.

Table 11

Comparison of NERC Forecasts for U.S. Total New Coal-Fired Generating Capacity 1984-1992

Year of Forecast	# Units	mw Capacity	mtpy* coal (equivalent)
1983	115	61,300	194.2
1984	89	47,386	150.1
Difference	26	13,914	44.1

*Assumes 3167.5 tons/mw-year.

Table 12

1985-1993
Uncommitted New Coal-Fired Capacity in
19 State Market

Market*	#Units	mw Capacity	MM tons/year**
A. Montana			
Minnesota	1	772	
Wisconsin	1	400	
Subtotal	2	1,172	3.7
B. Wyoming			
Arkansas	1	836	
Colorado	4	1,485	
Indiana	2	859	
Iowa	1	550	
Louisiana	2	1,340	
Missouri	4	900	
Oklahoma	2	1,140	
Texas	11	6,688	
Subtotal	27	13,798	43.7
C. Total	29	14,970	47.4

*NONE in Montana, Illinois, Michigan, North Dakota, South Dakota, Nebraska, Kansas, Oregon, Wyoming.

**Assumes 3167.5 tons/mw-year.

But these states are only adding 7.2 mtpy of capacity. To conclude, the potential new generation capacity for Montana coals in the near term ranges from 3.7 mtpy to 10.9 mtpy for even very large price reductions.

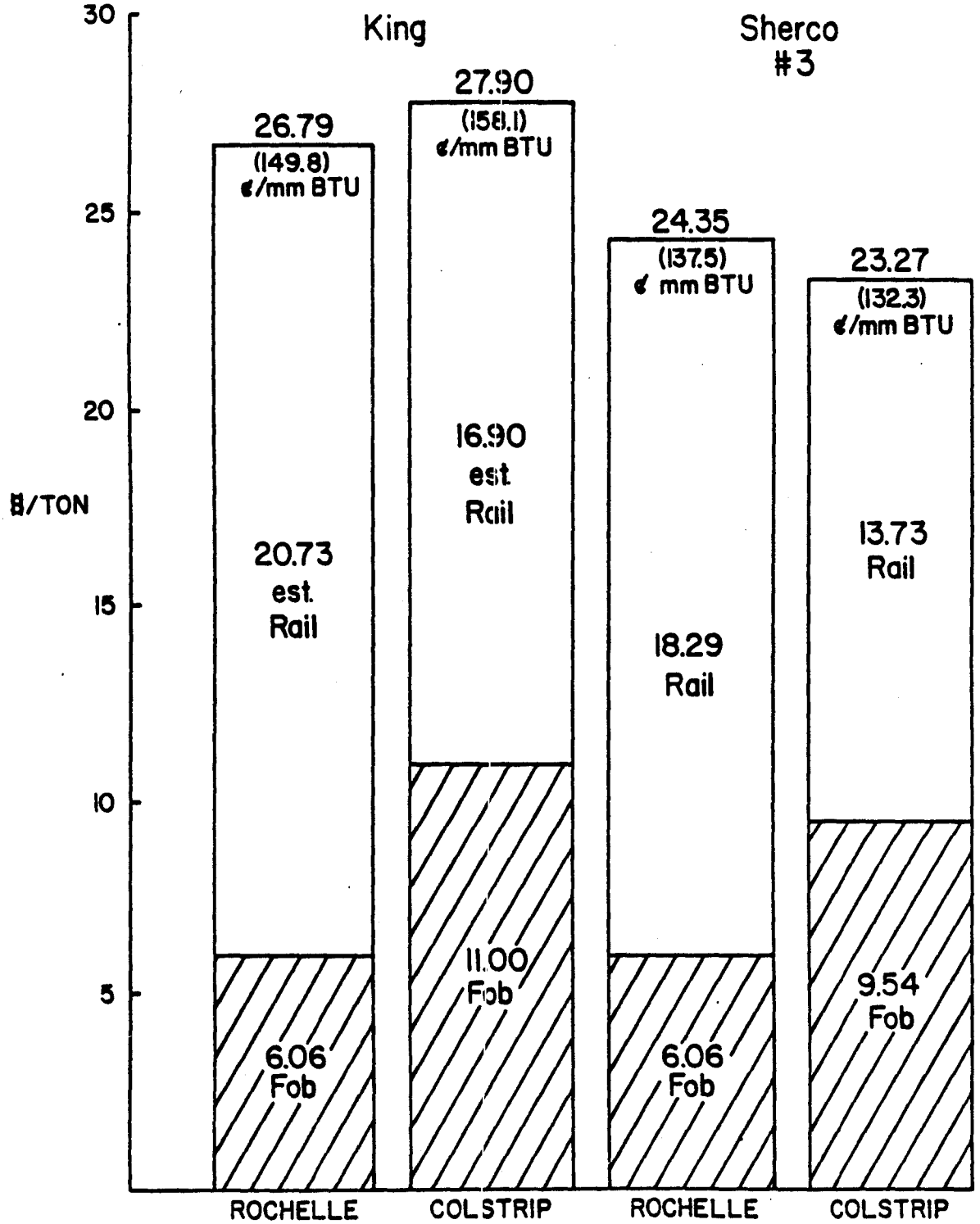
B. Sherco Unit #3

The two new units that comprise the market potential to 1993 in Wisconsin and Minnesota are Northern State Power (NSP) Sherco #3, on line in late 1987; and NSP's Wisconsin Coal #1 slated to be on line 5/93. The timing of the NSP unit projected for 5/93 will depend on electric generation growth and may well be rescheduled to 1995 or later. In short, it is possible that to 1993, the only new plant that Montana 8700 BTU coal producers may pick up is Sherco #3. In fact bids have been taken on this plant in November 1984 and a contract will be let in April 1985 for 1.5 to 2.5 mtpy.

Recently NSP signed a contract with a new Wyoming mine, the Rochelle mine, for 1 mtpy to be delivered to its Minneapolis/St. Paul area plants. This has raised questions about whether Montana will maintain its market share in Minnesota. In Figure 6 we provide a comparison of actual and estimated delivered prices at an older NSP plant in Minneapolis (King) and at Sherco #3. We will compare Rochelle and Western Energy (Colstrip) coals. Since BTU's are similar, we present the analysis in $/ton for convenience.

Actual delivered prices at King in 1984 were $27.90 Colstrip and $26.79 Rochelle. Based on the average Colstrip FOB of 11.00, we estimated rail at 16.90. Rochelle benefits from the CNW rail expansion into the Powder River. NSP has indicated that BN and CNW rates are similar, but that CNW may be 1 mill/ton-mile lower. Using this information and the actual rail mileages, we estimate CNW rail at $20.73 and derive a $6.06 $/ton FOB for Rochelle. Industry sources indicate this is a fairly accurate estimate. The difference

Figure 6



MOTANA vs. WYOMING DELIVERIES TO NORTHERN STATES POWER

here is only $1.11 $/ton or cents per million BTU (Colstrip 8824, Rochelle 8942 BTU/lb. on August 1984 shipments) 158.1¢ versus 149.8¢ or 8.3¢.

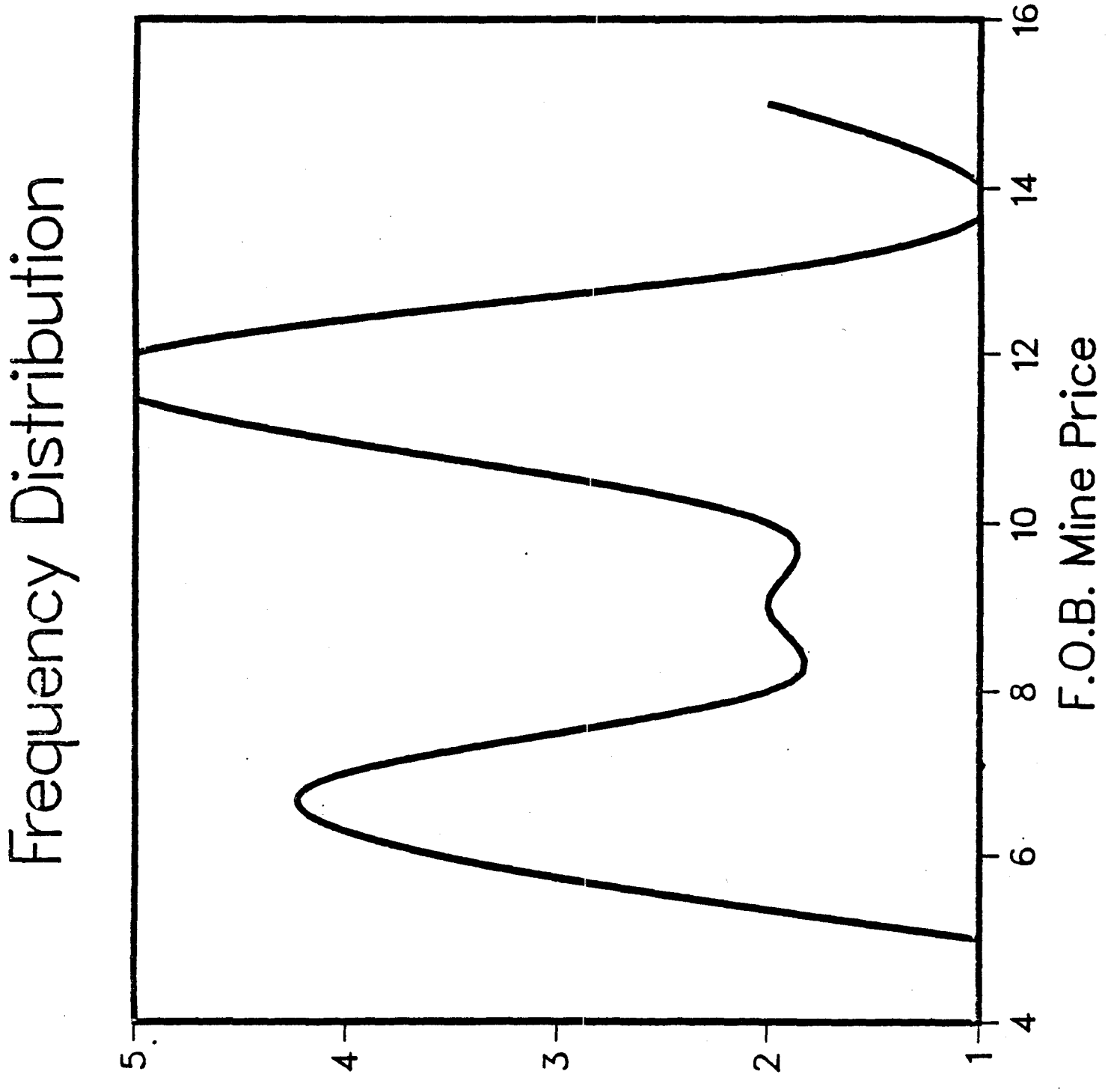
The Rochelle mine is probably as competitive in Minneapolis as any Wyoming mine. It is higher BTU than average (8900 vs. 8400), it benefits from the CNW, and the FOB is at the bottom end of the frequency distribution for Wyoming coal prices. The latter is illustrated for a sample of derived 1984 Wyoming FOB's in Figure 7. The main finding is that the distribution is bimodal at around $7/ton and $11-$12 per ton. The lower prices are reflecting major price reductions on new contracts out of Wyoming, possibly due to large excess capacity of 60 to 80 mtpy and the current soft coal market. For perspective, the average Wyoming FOB for Powder River mines is close to $10.00 and the new contract average is around $7.70, but Rochelle to NSP is $6. By comparison the Montana average FOB is around $11 and only exceeds Rochelle in delivered price by $1.11 at King. In short, modest price reductions by Montana coal producers in the Minneapolis area of only around $1 will continue to make them competitive even against a $4 Wyoming reduction (to $6) with CNW service.

For Sherco #3, delivered price is reported in Figure 6 based on Colstrip actual deliveries to Sherco #1 and #2 of $23.27. Industry sources indicate rail is 13.73 (or 1.8¢/ton-mile) implying a $9.54 Montana FOB. Sherco #3 is in Becker, Minnesota, which is not served by CNW. Accordingly, we have assumed that rail rates from Montana and Wyoming will be the same. On this basis, and assuming Rochelle bids $6.06, the Rochelle delivered is $24.35 or $1.08 above Colstrip. In cents per million BTU it is 132.3¢ Montana and 137.5¢ Wyoming, or 5.2¢ advantage to Montana.

It appears that Montana has the edge at Sherco #3, but only by a slim margin at the assumed prices. The interesting question here concerns the potential for price reduction at Montana mines. If some Wyoming producers are

Figure 7

Frequency Distribution of 1984
Wyoming FOB Mine Prices



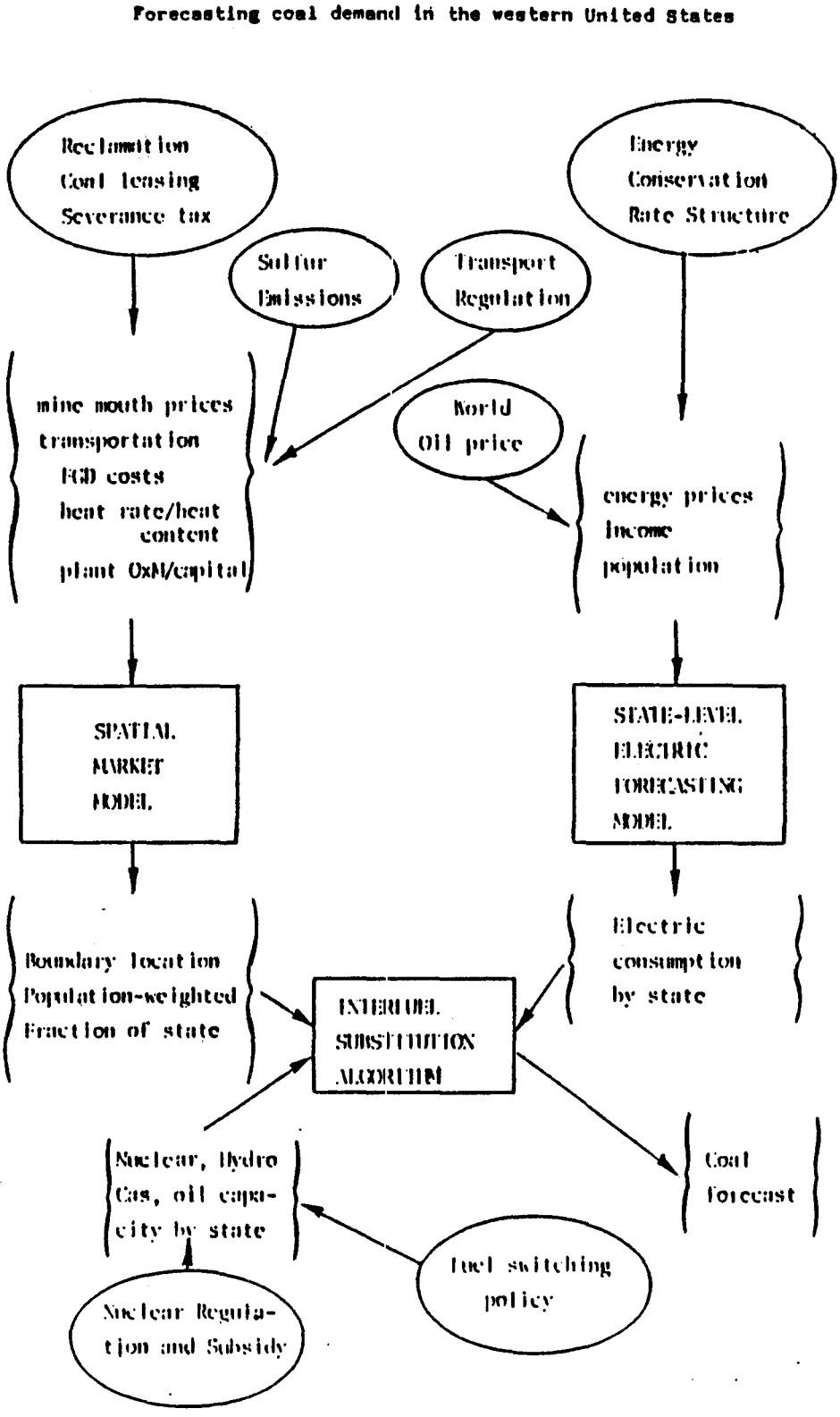
cutting prices from $10 to $6 and opening new mines at $6, what are possible competitive prices out of Montana given 1983 average FOB of $11.00. There may well be significant differences in production costs across mines due to overburden ratios, seam thickness, and mine scale. However, it may also be that there is potential for significant price reduction (at least on incremental production) by Montana producers.

C. Long-Term Forecast

While contracts and known coal-fired additions are the best basis for short-term forecasts, a long run projection requires a more formal model. The basic forecasting model used in this analysis was originally developed under a contract with the U.S. Office of Surface Mining (Duffield et al, 1982). The model provides estimates of the derived demand for coal by the electric utility sector. This end use accounts for 95% of current coal consumption out of the Northern Great Plains.

The model has three principle components (Figure 8): a spatial market model, an electric forecasting model, and an interfuel substitution algorithm. In the original model, the spatial analysis concerned Powder River coal versus seven competing coal supply centers in Illinois, Texas, New Mexico, southwest Wyoming, Utah and Washington. A Powder River supply center at Gillette was used to represent both Montana and Wyoming Powder River coals. The current analysis requires an additional market boundary delineation--between Montana and Wyoming coals. The new Montana supply center is located at Forsyth, with the Wyoming supply center at Bridger Jct. The programming for the modified computer model for generating new hyperbolic market boundaries (NEWHYP) is provided in Appendix A. The basic purpose of the spatial model is to identify the geographical areas where Montana and Wyoming coals are least cost against

Figure 8


Forecasting coal demand in the western United States
Reclamation
Coal leasing
Severance tax
Energy
Conservation
Rate Structure
Sulfur
Emissions
Transport
Regulation
mine mouth prices
transportation
FGD costs
heat rate/heat content
plant O&M/capital
World
Oil price
energy prices
income
population
SPATIAL
MARKET
MODEL
STATE-LEVEL
ELECTRIC
FORECASTING
MODEL
Boundary location
Population-weighted
Fraction of state
Electric
consumption
by state
INTERFUEL
SUBSTITUTION
ALGORITHM
Nuclear, Hydro
Gas, oil capa-
city by state
Coal
forecast
Nuclear Regula-
tion and Subsidy
fuel switching
policy

competing fuels. Assuming that electric utilities are well-informed and that utilities are cost-minimizers, the model will have identified the spatial coal markets for Montana and Wyoming coals, respectively. The basis of the cost comparison is not simply current $/ton or cents/MBTU delivered, but is instead based on the estimated present value of all coal-related costs to a given utility over the life of a given plant. These costs include variations in coal-fired plant construction and operating expenses as a function of coal rank (BTU content) and quality (sulfur, ash). The latter are in turn a function of the flue-gas desulfurization standards assumed to be in effect. In addition, the present value calculation requires specification of a discount rate and escalation rates for each of the key cost components (e.g. transportation, etc.). The original data base is described in considerable detail in Duffield et al, 1982.

Once the spatial market is identified, it is necesssary to forecast the growth of electric consumption in the market area. Since the demand for Powder River coal is largely derived from the demand for electricity, coal production is closely tied to the growth rate of electric generation in the market area. An econometric state-level forecasting model developed at the Oak Ridge National Laboratory has been adapted to forecast electric consumption in the market area. Consumption in states bisected by the market boundary is allocated to competing coals on the basis of the grid location of population centers vis-a-vis the boundary. The electric forecast is driven by exogenous population, income and price scenarios. An alternative approach is to use the rates of growth currently being forecast at the state and regional level by other analysts (e.g. the U.S. Department of Energy, the National Electric Reliability Council [NERC], etc.).

The final component of the overall model is an interfuel substitution algorithm for allocating electric production capacity among competing fuels (coal, oil, gas, nuclear and hydro). The latter is simplified by long construction lead times and known commitments to nuclear facilities. The overall model is relatively simple, robust and low cost compared to the linear programming approach taken in the large national coal models. Nonetheless, model predictions have been found to be consistent with the pattern of change in current and contracted coal deliveries in the region. Future levels of coal production from the NGP will be closely tied to real increases in mining labor costs, rail transportation, and the growth rate in electrical consumption. The other key factors will be federal policy for sulfur dioxide air pollution control, transportation regulation, fuel switching, and federal subsidy and regulation of nuclear and synthetic fuel plants. The scale, timing and location of development is also closely tied to federal reclamation and leasing policy.

It is beyond the scope of this paper to provide a complete discussion of the basic model. The interested reader is referred to Duffield et al (1982). In the following section, the spatial market model is briefly described. The schematic in Figure 8 provides an overview of the basic model components, information flows, and key policy inputs.

Spatial Market Model

Commodities which have a low value to weight ration, such as coal or cement, have a fairly well-defined geographical market. The basic theory of spatial markets is due to Hyson and Hyson (1950) and has been previously applied to model coal markets by Watson (1972), Silverman et al (1976) and Campbell and Hwang (1978). The work described here is an extension of the applications by Watson and Silverman, which were limited to two competing coal sources. Campbell and Hwang's paper provides a solution for multiple sources

and quadratic transportation functions, but did not account for the critical differences in coal qualities (especially sulfur content).

The spatial market boundary is defined by the following equilibrium relationship:

(1) $M_1+T_1D_1=M_2+T_2D_2$ or solving for D_2:

(2) $D_2=(M_2-M_1)/T_2 + T_1D_1/T_2$ or

(3) $D_2=k+hD_1$ where:

M_1 is the mine mouth (FOB) price of coal 1

T_1 is the variable cost of transportation

D_1 is the distance from mine 1 to the market boundary

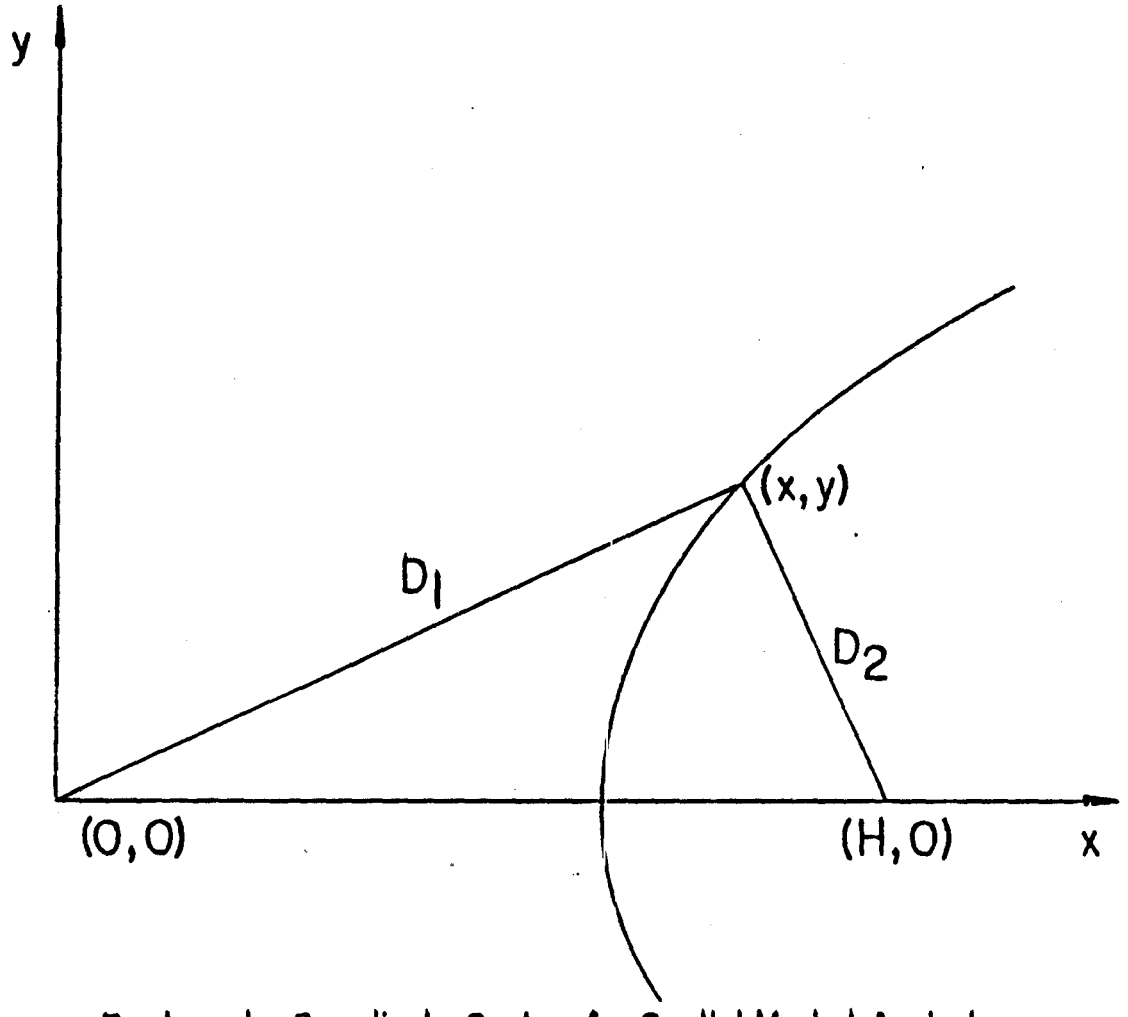
In short, the spatial market boundary between two competing coals is defined as the loci of points where the delivered prices are equal. To one side or the other, a given producer has a cost advantage and dominates the market. Application assumes that buyers are cost minimizers, that producing areas may be approximated by point sources, that a fairly uniform transportation network exists, and that coal prices may be taken as exogenous. The latter can yield good approximation of reality here as current market structure in the mining areas, and the very vast scale of reserves, imply quite elastic supply curves. In any case, the forecasting model can be used to increment mine mouth prices and transportation rates in any given year.

A solution to the relationship in Eqs. 1-3 requires the introduction of a spatial constraint. For example, using a rectangular coordinate system (Figure 9) with H defined as the distance between competing centers and applying the Euclidian distance function, Eq. 3 becomes:

(4) $(H-x)^2+y^2=k^2+2hk(x^2+y^2)^{1/2}+h^2(x^2+y^2)$

The solutions to this quartic polynomial yield the loci of market boundary points. Solutions to Eq. (4) were originally investigated by DesCartes as a

Figure 9



Rectangular Coordinate System for Spatial Market Analysis.

problem in optics and are known as DesCartes' ovals. It can be shown that when the T_1 are equal, the boundary is a hyperbola and when the M_1 are equal it is a circle. The general case yields roughly eliptical curves. In application, Eq. (4) is first solved for the point on the straight line between market centers (y=0). Then y can be iterated to solve for additional points. Boundaries vis-a-vis more than one center are identified by rotation of the axis.

The application to coal entails defining the mine mouth price to include all distance independent costs of burning a given coal, then:

(5) $$M_1=(CP_1+FTC_1)TONS_1+KCOST_1FCR_1+OM_1T_1$$

$$T_1=VTC_1TONS_1$$

$$TONS_1=t_1HR_1/HC_12000$$ where:

CP_1 is the mine mouth price of coal 1

FTC_1 is the fixed transportation cost of coal 1

$TONS_1$ is the total tons of coal 1 required to utilize a unit of generating plant capacity (kilowatt) for one year

$KCOST_1$ is the generating plant capital cost associated with coal 1 (desulfurization equipment, oversize boilers, etc.)

FCR_1 is the fixed charge rate used to annualize capital expenditures OM_1 is the operation and maintenance charge specific to coal 1 (mainly pollution control equipment)

VTC_1 is the variable cost per ton-mile of transportation

t_1 is the hours per year that the tenerating plant is anticipated to operate

HR_1 is the heat rate at which coal BTU's are converted to kilowatt hours of energy by the generating plant

HC_1 is the heat content of coal 1 in BTU's per pound

The model was previously applied to seven major supply centers that compete with NGP coal: the Eastern Interior Basin (Illinois), Texas lignites, Washington (Centralia), Utah (Uinta Basin), New Mexico (San Juan Basin), Colorado, and southern Wyoming (Green River/Hams Fork). In general, NGP coal is lower BTU content (8500 BTU/lb average versus 11,000 to 12,000 for Interior and Utah coals), lower sulfur (0.6% for most western coals versus 3% and up for Illinois), and lower cost ($8 to $12 per ton versus around $20 per ton FOB for most of the other coals.)

A major determinant of the boundary location is the relative cost of meeting sulfur emission standards. The shipment of substantial amounts of NGP coal beginning in the 1970's was closely tied to the federal New Source Performance Standards (NSPS) that came into effect in 1971 and required that all new coal fired generating plants meet an emission standard of 1.2 lbs of sulfur per million BTU of fuel input. Some NGP coal was able to meet this standard with no flue gas desulfurization (or scrubbing) and therefore had a considerable cost advantage over high sulfur coals. However, the standards were revised in 1978 and the RNSPS in effect require 90% control on high sulfur coals and 70% control on low sulfur. This change increases the cost of using NGP coal and was in part brought about by the political power of the midwestern coal lobby that was attempting to protect its market from western coals.

The parameters required for an application of the spatial component of the model and forecast results for Montana versus Wyoming coals are presented below.

Data and Parameters

The basic data requirements for each boundary in a spatial market model run are listed in Figure 10. The actual data input files and spatial maps

Figure 10

Variable Description for Market Boundary Parameters*

Line #	Coal Supply Center	Variable Description
1	A & B	Power plant size (net MW)
2	A & B	Hours operated at full load (hours)
3	A	Power plant heat rate (BTU/KWhr)
4	A	Coal heat content (BTU/lb)
5	B	Power plant heat rate (BTU/KWhr)
6	B	Coal heat content (BTU/lb)
7	A	Power plant capital cost ($/KW)
8	B	Power plant capital cost ($/KW)
9	A & B	Fixed charge rate (decimal)
10	A	Operating and maintenance costs ($/KWhr)
11	B	Operating and maintenance cots ($/KWhr)
12	A	FOB mine price ($/ton)
13	B	FOB mine price ($/ton)
14	A	Fixed transportation cost ($/ton)
15	B	Fixed transportation cost ($/ton)
16	A	Variable transportation costs ($/ton-air mile)
17	B	Variable transportation costs ($/ton-air mile)
18	A & B	Straight line distance between A & B (miles)

*Duffield, Silverman (1982) p. 8-55

(discussed below) are provided in Appendix C. Many of the parameters are based in part on the original documentation (Duffield et al, 1982); since the latter runs to over 600 pages, only a brief summary of key parameters and updates will be provided here. Each column in Appendix C Tables corresponds to a boundary.

Each of the key parameters will be discussed briefly below:

1. Size:

The model plant for the current study was assigned a size of 500 MW. This was based on a survey of net capacity of utility boilers in Duffield, Silverman (1982), where the average net capacity equaled 500 MW.

2. Capacity Factor:

A 65% average capacity factor was assumed which results in 5694 operating hours per year. This average capacity factor was based on Duffield, Silverman (1982).

3. Heat Rates:

The heat rates for the 1984 study were based on the heat rates developed in Duffield, Silverman (1982). This was corroborated in a phone discussion with a member of ICF, where the original information was developed. Montana's model plant was assumed to be the same as the Powder River, Wyoming plant.

4. Power Plant Capital Costs:

These are based on costs developed in Duffield, Silverman (1982). PPCC w/o sulfur control costs were escalated to 1984 dollars at a real rate of 2.3%. The sulfur control costs were escalated to 1984 dollars at a real rate of 0.5%. After multiplying the PPCC w/o by a capacity penalty, the two costs are added together in order to get total power plant capital costs. These costs are levelized within the model when multiplied by the fixed capital recovery factor. In addition to accounting for real changes, all inputs were

converted from mid-1980 dollars to mid-1984 dollars by the Implicit Price Deflator (IPD) for GNP.

5. Fixed Capital Recovery Factor:

The FCRF in 1984 was assumed to be the same as in 1982, based on Duffield and Silverman (1982).

6. Operation and Maintenance Costs:

These are based on costs developed in Duffield, Silverman (1982). 1982 operating and maintenance costs without sulfur are escalated to 1984 dollars at a real escalation rate of 1.2%. The additional operation and maintenance costs for sulfur control was also escalated at a real rate of 1.2%. These two costs are added together to determine total 1984 operation and maintenance costs. (See tables 6, 7, 9 pp. 8-14:8-17, Duffield, Silverman, 1982) Montana operation and maintenance costs were assumed to be the same as Wyoming Powder River power plants.

7. FOB Mine Prices:

Because FOB mine prices on a contract basis are confidential, a number of alternative price sources were investigated as summarized in Table 13. One source for Montana coal FOB prices are a weighted average based on the mine specific reports on the Gross Proceeds Tax form for 1983. The Decker and Spring Creek mines produce coal that is somewhat higher BTU content (Decker averages 9600 BTU) than the other three subbituminous producers (Westmoreland, Western Energy and Peabody averaging around 8400 to 8700 BTU/lb). The latter three mines produce coal more similar to the average Wyoming Powder River coals centered around Gillette. The average FOB for the three mines in 1983 varied from 10.77 to 11.13 and averaged $11.01/ton.

By contrast, the Decker coal sells at a much higher average price of $19.31 in 1983. (Spring Creek is intermediate at $15.96.) The price premium

Table 13

Comparison of FOB Prices

Montana and Wyoming

Source	Montana		Wyoming	
	BTU	$/ton	BTU	$/ton
A. State Tax Records for 1983:				
	8700	10.77	8450	9.77
		11.13		
		10.90		
	9300	15.96		
	9600	19.31		
B. New Contract Information:				
	8700	9.50	8450	7.70
C. Coal Week - New Contracts 1984:				
	8600	9.75	8100	6.25
	9300	12.00		

reflects the higher BTU and low sulfur qualities of Decker coal. Based on an analysis of mine-utility specific deliveries for 1984 (U.S. Department of Energy tape of Form 423) Decker and the south Wyoming mines (Black Butte, Carbon County, etc.) appear to be competing in a somewhat separate market from the more typical lower BTU Montana and Wyoming PowderRiver coals.

The FOB mine price for Wyoming coal is more difficult to obtain since it is reported only on a confidential form. Only "value per ton" is reported by the Wyoming Department of Revenue. However, individuals in the Wyoming Ad Valorum Tax Division were able to supply us with an average for Powder River Basin mines of $9.77 for 1983.

Prices based on state tax records are probably the best source for current average price. However, this average includes prices based on contracts that were signed 10-15 years ago. For purposes of our model, it is necessary to know what current prices are for new contracts. One source for such estimates is Coal Week. Based on the latter, Wyoming producers are bidding new contracts at an average of 6.25$/ton. This is $3.50 below the existing contract average of $9.77 in 1983. Another estimate for Wyoming new contracts from individuals at the Wyoming Geological Survey is $7.70. The Coal Week $6.25 may be low for an average, but is close to the $6 estimate derived for the Rochelle Mine's Minneapolis deliveries as discussed above.

The current distribution of Wyoming Powder River prices was also summarized in Figure 7 above and briefly discussed. The distribution in Figure 7 is based on a set of estimated prices for Powder River Coal published in Coal Transportation Report (February 20, 1984). Figure 5 is a frequency plot of 20 useable observations (early 1984 prices) on Wyoming Powder River mines. The most interesting finding is that the distribution is bimodal at about $6.50 and

$12. This reflects perhaps the most important recent coal market development in the Powder River, which is price cutting by some of the large Wyoming producers. As an example, it was recently reported on the Wyoming Quarterly Update (summer 1984) that Omaha Public Power has renegotiated a coal supply price with Exxon (Caballo and Rawhide mines) that resulted in a drop in FOB mine price from $8.25/ton to $5.75/ton. Our preliminary analysis of delivered July 1984 prices based on Form 423 and BN tariffs disclosed a number of what appear to be long term contracts delivered on the order of $6 to $7/ton.

For Wyoming prices on average, it appears that market forces have lowered new coal contract prices by several dollars. While 7.70 $/ton may be the best available average, for our modeling we have also done a number of estimates at $6/ton, given the possible significance of these low bids for the Minnesota market.

Based on Coal Week and the contract estimate derived above for the Sherco #3 analysis, Montana coal producers have also lowered contract bids. The estimated reduction is $1.25 to $1.50 for 9.50 to 9.75 $/ton for 8700 BTU coal. Spring Creek type coal is down considerably, $4, to $12/ton from the contract average. For purposes of our analysis, we have taken 9.50 as a base estimate for 8700 BTU Montana coal and $12 to $12.50 for 9300 to 9600 BTU coal. However, it should be noted that unlike the Wyoming prices, there is not much market evidence on whether these are the most appropriate estimates. Particularly for Decker type coal, with an average FOB in 1983 of 19.31, if the Coal Week estimates are correct at least some Montana producers have considerable room for price adjustments. It is impossible to address these questions without analysis of mine specific production costs. The latter is important but beyond the scope of this analysis.

9. Transportation Rates:

For most coal shipments out of the Powder River the dominant cost component in delivered price is transportation. In 1980 the fixed and variable cost components for NGP shipments were $1.04/ton and $.0113/ton-mile respectively based on a study by ICF, Inc. In order to estimate current rates, the complete set of burlington Northern (BN) time-volume/unit train tariffs as of July 1984 was obtained for Wyoming and Montana coal shipments. Based on regression analysis of 120 observations, the following linear equation was specified:

$$\begin{array}{lccc} \text{TARIFF} & = & 1.77 + & .0166 \ \text{MILE} \\ \text{(t-statistic)} & & (2.67) & (27.80) \end{array}$$

The overall adjusted R-square was .88, indicating an excellent fit to the data. When "minimum volume" was included as a second independent variable, the estimated coefficient was not significantly different from zero. The estimates above are, of course, in mid-1984 dollars. This indicates a yearly nominal change in rail tariffs of 9.2% or (given the change in the IDP mid-80 to mid-84) 3.4% annual real increase. This is very close to the historical 3.5% change (15 year basis) as well and the escalation rate used for levelizing rail transport in our 1982 study. However, our preliminary analysis of the 1983 and 1984 unit train rate changes indicate a possible slowing of rate increases to perhaps 1% real per year. The latter was used in Tables 1 to 4 to derive levelized rail rates for 1984. For example, the first year variable cost per ton mile is estimated to be .0166 in 1984. Levelized over 30 years at 1% per year and a real weighted cost of capital of 3.77% yields a levelized variable cost of .0189 per rail mile. Since our model is run on actual (air mile) rectangular coordinates, this is inflated by the rail/air mile ratio for each boundary (e.g. 1.30 for most locations or .0246 as in Appendix C Tables).

In order to account for the substantial additional distance Wyoming coal must travel to the major Montana low-BTU market in Minnesota, fixed transportation cost equivalent to an extra 200 miles was included in the Wyoming transportation cost function. Similarly in modeling states just south of the Minnesota and Wisconsin borders, the difference in air to actual miles from the market centers required an 80 air mile addition to Wyoming fixed costs.

10. Contract Data:

Existing contracts for Wyoming (Powder River only) and Montana coals are summarized in Appendix B. This data is derived from a listing purchased from Coal Network Associates, Inc. and is difficult to verify. In particular, it appears that deliveries from all states to a given plant are occasionally averaged to yield the $/ton figures listed.

11. Reclamation Costs:

Reclamation costs in the Powder River Basin are truly site specific. Although state/federal rules and guidelines applied in the individual states offer minor differences between Montana and Wyoming, cost differences are clearly most sensitive to overburden ratios, coal seam thickness, quality of the overburden (acceptability as a growing medium) and the amount of heavy earth moving as a function of mine design. In general, for Powder River Basin area mines, earth moving costs will range from one-third to one-half total reclamation costs. Revegetation costs will average 10% to 15% of total costs, and depending upon the site, reclamation cost can range from a low of $.25 per ton (est.) to a high of perhaps $1.00 per ton (est.). High and low range can be found in both Montana and Wyoming. Because of the variation in costs in both states, resulting in some possible Montana reclamation costs being

slightly higher or lower than Wyoming costs it is impossible to generalize about the cost impact of mining regulations in both states. Suffice it to say that on a delivered BTU basis, the cost of reclamation is very small, perhaps averaging 2.0 to 2.5 cents per million BTU out of a delivered price of $1.40 to $1.60 per million BTU.

A model for reclamation costs in the Powder River Basin is the Rosebud Mine of Western Energy at Colstrip, Montana. Costs at this mine, shown below, probably reach the average for mines in the region, or slightly above the average. Big Sky Mine of Peabody Coal will probably have somewhat higher costs per ton, while Decker costs are probably somewhat lower. In Wyoming, most reclamation costs are somewhat lower than Rosebud due to thicker seams, lower overburden and perhaps more stringent permitting requirements, although the latter is not fully documented as yet.

In any case, reclamation costs at Rosebud, on a per acre basis averages just under $18,000, divided among Associated Level ($600.00/AC), Facilities Level ($5,800.00/AC) and Mining Level ($11,500.00/AC) components. Based upon an average seam thickness of 25 feet and a production of 45,000 tons per acre, these values give a reclamation cost of $0.40 per ton at Rosebud, or about 2 cents per million BTU.

One note about reclamation costs; neither in Montana nor Wyoming has a reclamation bond been released and reclamation certified as complete or accomplished. This is an important point; total reclamation has not been demonstrated at any mine site in either state, and estimated costs of reclamation as calculated in bonding requirements may in fact be slightly low. However, it is not expected that future reclamation requirements would double current estimates.

Table 14

Revised Status of Reclamation Bonding,

Rosebud Mine

Bond Level/ Cost Element	Operating Cost/Acre	Ownership Escalation	Net O&O Cost/Acre
Associated Level			
Revegetation	$ 480	1.22	$ 585
Facilities Level			
Scoria Removal	$ 2,400	-	$ 2,400
Regrading	$ 495	1.22	$ 605
Soil Redistribution	$ 1,800	1.22	$ 2,195
Revegetation	$ 540	1.22	$ 660
			$ 5,860
Mining Level			
Regrading	$ 2,244	1.22	$ 2,740
Soil Redistribution	$ 1,224	1.22	$ 1,495
Revegetation	$ 425	1.22	$ 520
Final Pit Reclamation	$ 6,816	-	$ 6,815
			$11,570

Source: Western Energy Co., December 1983

D. Montana Coal Production Forecast

The coal production forecast described in this section is based on the data inputs and spatial model described earlier. The Montana coal modeled is 8700 BTU coal. As developed in Appendix D, Decker 9600 BTU coal at $19.00/ton is clearly out of the RNSPS new plant market. The modeling choice of 8700 BTU coal is based on uncertainties about new Decker contract prices and apparent market dominance by 8700 BTU coal, even at somewhat lower prices for Decker type coal.

The basic analysis performed here was to estimate the spatial market for Montana coal against $6.00 and $7.70 Wyoming 8450 BTU coal. The focus is on identifying how the Montana market changes as Montana FOB price changes in $1 steps from $10.50 to $6.50 with $9.50 the base case. Specific data inputs and corresponding spatial market maps are described in Appendix C. The results are summarized in Tables 15 and 16, which show the population-weighted percent of each state lying within the Montana coal market for the ten specific price combinations.

Consistent with the specific discussion of the Minneapolis deliveries above, Minnesota is in the Montana coal market against $6 Wyoming coal even at $10.50 (Table 15). As the price drops to $9.50, the market expands in the northwest (NW) into Washington and Idaho and in the northcentral (NC) to include Wisconsin and part of Michigan. At $8.50 all of Michigan and Idaho are included and at $7.50 most of Oregon. At $6.50 parts of northern Illinois, Indiana, and Iowa are in the market. The market picture against $7.70 Wyoming coal is similar except that at lower prices the Montana coal market extends further south into Iowa, Illinois, and Indiana. When the Montana price is substantially below the Wyoming price (6.50 Montana vs. 7.70 Wyoming), the market even includes Nebraska and parts of Missouri. In the NW further market

Table 15

MONTANA COAL MARKET
POPULATION % SUMMARY
AGAINST 6.00 WYOMING FOB

State	Montana FOB				
	10.50	9.50	8.50	7.50	6.50
Montana	1.00	1.00	1.00	1.00	1.00
Washington	.10	.80	.80	.91	.96
Oregon	.09	.09	.09	.84	1.00
Idaho	.19	.64	1.00	1.00	1.00
Minnesota	.96	1.00	1.00	1.00	1.00
Wisconsin	.17	1.00	1.00	1.00	1.00
Michigan	0.0	.38	1.00	1.00	1.00
Iowa	0.0	0.0	0.0	0.0	.22
Illinois	0.0	0.0	0.0	0.0	.80
Indiana	0.0	0.0	0.0	0.0	.38
Nebraska	0.0	0.0	0.0	0.0	0.0
Missouri	0.0	0.0	0.0	0.0	0.0

Table 16

MONTANA COAL MARKET
POPULATION % SUMMARY
AGAINST 7.70 WYOMING FOB

State	Montana FOB				
	10.50	9.50	8.50	7.50	6.50
Montana	1.00	1.00	1.00	1.00	1.00
Washington	.10	.80	.80	.91	.96
Oregon	.09	.09	.09	.84	1.00
Idaho	.37	.75	1.00	1.00	1.00
Minnesota	1.00	1.00	1.00	1.00	1.00
Wisconsin	1.00	1.00	1.00	1.00	1.00
Michigan	.35	.38	1.00	1.00	1.00
Iowa	0.0	0.0	.09	.92	1.00
Illinois	0.0	0.0	.03	.90	1.00
Indiana	0.0	0.0	.04	.44	.86
Nebraska	0.0	0.0	0.0	.02	1.00
Missouri	0.0	0.0	0.0	0.0	.58

extension is precluded by proximity to Utah and south Wyoming coal centers. In fact the extent of the market in the NW may be somewhat overstated given the likelihood of minemouth generation in south Wyoming with transmission by wire to southern Idaho and Oregon. We have excluded both North and South Dakota from the market area based on historic and projected minemouth lignite plants.

Incremental demand for coal is each state (or portion of a state) in the market area was estimated for 1990, 1995 and 2000 at 1%, 2%, and 3% electric growth rates. After total electric generation was calculated for a given state (for a specific year and growth rate) projected and existing generation due to hydro, nuclear, oil and gas and existing coal was subtracted to get the residual electric generation needs to be met by new coal-fired plants. This residual generation was then converted into coal demand in million tons per year. The results of this calculation summed over all states is provided in Table 17 for each of the ten spatial market cases.

The results in Table 17 are consistent with known coal-fired capacity additions to 1990 and 1993 (for example, Table 12). Utility plans as reported to NERC were used as an upper limit to incremental coal demand in the 1990 forecasts and in 1995 for growth rates of 1% and 2%. As a result, the projections in Table 17 are more realistic but have some resulting discontinuities. For example, in 1990 the 3% case is not very different than the 2%. This is because utilities are not planning for 3% growth and if such occurred, unexpected growth could not be met with coal given the lead time on new plant construction. This constraint also limits 1% and 2% growth in 1995, but 3% is unconstrained and is substantially higher.

The results in Table 17 also incorporate the Northwest Power Planning Council's expected impact on the mix of new electric generation and

Table 17

Montana Coal Production
Forecast (million tons per year)

Year:		1990			1995			2000		
Electric Growth Rate:		1%	2%	3%	1%	2%	3%	1%	2%	3%
A. Wyoming FOB Price $6										
Montana FOB ($/ton)										
10.50		36.4	38.4	41.3	38.0	44.2	53.0	44.1	51.0	59.9
9.50	BASE	38.1	41.5	42.9	41.9	46.2	64.6	48.3	62.9	85.2
8.50		38.9	42.5	44.2	42.8	47.2	72.2	48.3	68.0	96.8
7.50		42.7	44.7	44.7	45.4	47.2	72.2	48.3	68.0	100.1
6.50		42.7	44.9	45.9	45.6	49.1	76.9	48.7	72.2	118.1
B. Wyoming FOB Price $7.70										
Montana FOB										
10.50		37.9	40.8	42.0	41.3	45.3	64.6	48.3	62.9	81.2
9.50	BASE	38.6	41.8	43.3	42.5	46.3	64.6	48.3	62.9	85.4
8.50		38.9	42.5	44.2	42.8	47.2	73.0	48.4	68.7	98.4
7.50		42.7	45.6	46.0	46.0	50.2	80.8	49.8	75.8	125.0
6.50		42.7	45.8	47.4	46.6	54.4	94.7	50.8	89.8	140.8

conservation resources in the northwest. For example, our model predicts a need for 4900 average mw of new resources in the NW at 2% electric growth and in the year 2000. If this was to be met with new coal-fired capacity, this would imply an additional 26 mtpy of coal demand. However, the Power Planning Council is expecting to meet this incremental load (if it occurs) with about 4000 average mw of conservation plus about 900 mw combustion turbines and cogeneration. Only for the Council's highest growth case (2.9%) is there any new coal-fired capacity in the NW even by the year 2000. The Council's estimate is for approximately 1900 mw or 10 mtpy of new coal demand in the high growth case. This contrasts with the approximate 48 mtpy our model would assign at 3% growth in the absence of this information. Given that we have not been able to quantify the effects of major state or regional level conservation efforts in the remainder of the Montana market area, the estimates in Table 17 should be taken as an upper limit.

It is also worth noting here that both the Power Planning Council and BPA are projecting NW regional growth at around 1.6% to 2000. The Council's high case of 2.9% growth is a very high "high" based on extreme demographic and economic assumptions. The Council expects that there is only a 22% chance of growth in excess of 2.3%, but a 33% chance that it could range from 1.7% to .8%. By contrast, the NERC projection for the NWPP (which also includes Utah) for 1983-1993 is for 2.5%. This supports the interpretation of the NERC projections as a reasonable upper limit. The U.S. Government's Energy Information Administration is forecasting 4.1% for 1984-1995 for the NW and Alaska. This seems quite unrealistic. In short, it appears that carefully developed regional forecasts comparable to those for the PNW are not available for other regions. In interpretations of Table 17, 2% growth may well be a reasonable base case. At 2% growth and for a base case Montana FOB price of 9.50, a likely production

forecast for Montana is 42 mtpy in 1990, 46 in 1995 and 63 in 2000. Coal production levels are quite sensitive to the annual rate of growth in electric sales. For example, the year 2000 base case forecast is 48 mtpy at 1% electric sales growth but almost double or 85 mtpy at 3%. The 1984-2000 average annual growth rate for base case coal production corresponding to 1%, 2%, and 3% compound growth in the electric sector are 2.5%, 4.3% and 6.2% respectively.

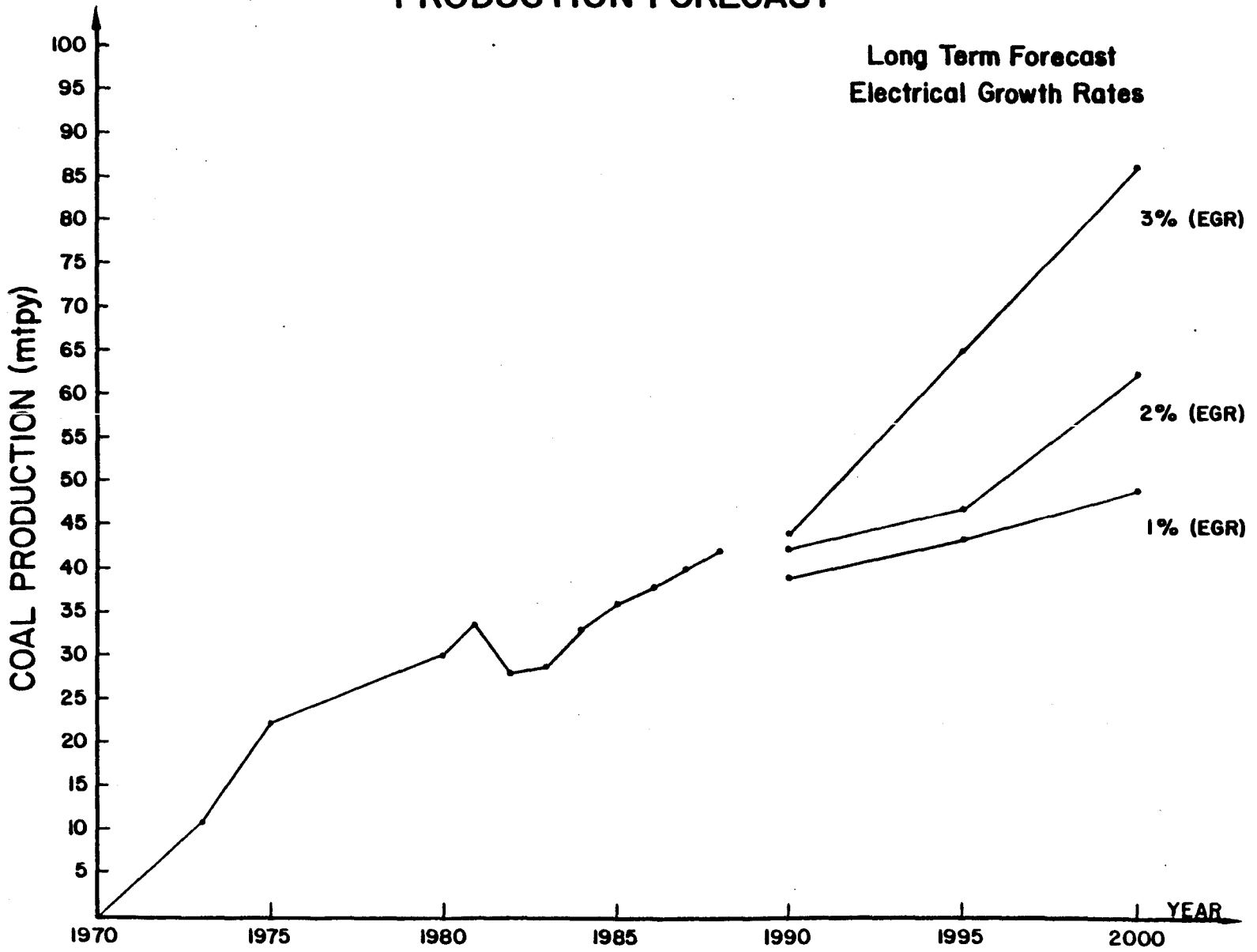
The various base case projections are summarized in Figure 11 along with historical production and the short term forecast. The 1990 forecast range of 38.6 mtpy to 43.3 mtpy is consistent with the mine survey-based forecast developed by the Montana Governor's office of 41.6 mtpy in 1988. The latter shows the expected growth over 1984 production due to Colstrip 3 and 4 and Belle River #2 plus movement toward contract maximums as capacity factors improve on existing units. It should be noted that even with no changes in contracts, there can be considerable swings in production levels within contract minimums and maximums. For example, Colstrip 3 and 4 operated at 40% capacity require about 3 mtpy and at 80%, 6 mtpy. These in fact correspond to the contract minimum and maximum on these units. The production swing within existing contracts just for Montana Power Company plants is about 4.7 mtpy and including other Western Energy contracts is at least 8.4 mtpy. In short, the range forecast for 1990 as a function of electrical growth rates (which impact capacity factors) is quite plausible and consistent with the short term forecast.

A final comment on the base forecast is that it assumes all existing contracts will be renewed as they expire to 2000. The major contracts that are due to expire in the mid-90's are all in Minnesota and Wisconsin. These states are in the market area for the Base Case of $9.50 and it would appear very likely that these contracts would be renewed.* In 1997, 1998, and 1999

*See Appendix F.

Figure II

MONTANA COAL PRODUCTION FORECAST



some Decker contracts with Commonwealth Edison in Illinois and Detroit Edison in Michigan expire. The potential for renewal of these contracts has not been closely investigated. Given the uncertainties of Decker prices, the special market (high BTU, low sulfur, older plants) involved, and the relative distance of the event in time, we have assumed that these contracts will be renewed for the year 2000 forecast.

E. Incremental Coal Production Forecast

The incremental or new coal production in Montana that could be expected for each of the ten spatial market cases is summarized in Table 18. This is derived from Table 17 by subtracting expected 1984 production of 32.3 mtpy. The discontinuities in Table 18 are again partly related to real constraints imposed by utility planned coal additions. Also, while it is clear from Tables 15 and 16 that the market expands for every price reduction, in some cases the state or portion of a state added will not be needing new coal-fired capacity at the growth rate and year indicated. For example, there is 7466 mw of nuclear capacity that is coming on line in Illinois in the next few years. Because of this legacy from days of expected higher electric growth, there is no need for new coal-fired capacity in Illinois even at 3% to the year 2000. Similarly, there will be no new coal-fired capacity in Michigan unless growth exceeds 2%.

The effect of a $1/ton price reduction at initial prices of 10.50, 9.50, 8.50, and 7.50 are summarized in Table 19 (again derived from Table 17). Again, the discontinuities here are due to the real constraints on new coal capacity expansion plus utility-specific planning for substitute resources: nuclear, oil and gas, hydro, and conservation. Given those discontinuities and the uncertainties about base prices, a better picture of the effect of a

Table 18

Incremental Coal Production
Forecast for Montana over
1984 Base (million tons per year)

Year:		1990			1995			2000		
Electric Growth Rate:		1%	2%	3%	1%	2%	3%	1%	2%	3%
A. Wyoming FOB Price $6										
Montana FOB ($/ton)										
10.50		4.1	6.1	9.0	5.7	11.9	20.7	12.0	18.7	27.6
9.50	BASE	5.8	9.2	10.6	9.6	13.9	32.3	16.0	30.6	52.9
8.50		6.6	10.2	11.9	10.5	14.9	39.9	16.0	35.7	64.5
7.50		10.4	12.4	12.4	13.1	14.9	39.9	16.0	35.7	67.8
6.50		10.4	12.6	13.6	13.3	16.8	44.6	16.4	39.9	85.8
B. Wyoming FOB Price $7.70										
Montana FOB										
10.50		5.6	8.5	9.7	9.0	13.0	32.3	16.0	30.6	48.9
9.50	BASE	6.3	9.5	11.0	10.2	14.3	32.3	16.0	30.6	53.1
8.50		6.6	10/2	11.9	10.5	14.9	40.7	16.1	36.4	66.1
7.50		10.4	13.3	13.7	13.7	17.9	48.5	17.5	43.5	92.7
6.50		10.4	13.5	15.1	14.3	22.1	62.4	18.5	57.5	108.5

Table 19

Effect of a $1/ton Reduction
on Montana Coal Production
(million tons per year)

Year:	1990			1995			2000		
Electric Growth Rate:	1%	2%	3%	1%	2%	3%	1%	2%	3%
A. Wyoming FOB Price $6									
Initial Montana FOB									
10.50	1.7	3.1	1.6	3.9	2.0	11.6	4.0	11.9	25.3
9.50	.8	1.0	1.3	.9	1.0	7.6	0.0	5.1	11.6
8.50	3.8	2.2	.5	2.6	0.0	0.0	0.0	0.0	3.3
7.50	0.0	0.0	1.2	.2	1.9	4.7	0.0	4.2	18.0
B. Wyoming FOB Price $7.70									
Initial Montana FOB									
10.50	.7	1.0	1.3	1.2	1.3	0.0	0.0	0.0	4.2
9.50	.3	.7	.9	.3	.6	8.4	.1	5.8	13.0
8.50	3.8	3.1	1.8	3.2	3.0	7.8	1.4	7.1	26.6
7.50	0.0	.2	1.4	.6	4.2	13.9	1.0	14.0	15.8

$1 reduction may be obtained by averaging the $9.50 and $10.50 Montana FOB prices and the $6.00 and $7.70 Wyoming FOB cases. The results are summarized in Table 20.

The effect of a $1 price reduction in 1990 and 1995 is to increase projected prodution by about 1 mtpy at all electric growth rates except 3% in 1995 where it is 7 mtpy. In 2000, a $1 reduction increases production by 1, 6, and 14 mtpy for 1%, 2% and 3% growth respectively (Table 20). The long-run elasticity of demand in the year 2000 corresponding to the three growth rates are -.2, -.9, and -1.6. These are within the range one would expect given general findings on the price-elasticity of demand for energy.

F. Comparison to Other Studies

We are aware of two other recent long-run estimates of the market for Montana coal. One is a study by Victor Wood entitled Montana Coal Market Study. An 18 page draft dated July 3, 1984, was made available to us through the Montana International Trade Commission. Wood does not provide much discussion of his method, but his key input assumptions: Montana base price of $9.75 for 8600 BTU coal and $13 for 9600, Wyoming at $7.50 and 8300 BTU, and rail at 2.0¢ to 2.2¢ in per ton-mile for western movements are similar to ours. He provides a coal production estimate based on the NERC overall utility load growth of 2.3% annually.

His spatial market estimate is also similar to ours except that he expects the Montana coal market would penetrate well into Missouri, Oklahoma, and Arkansas even for a $2 reduction. He is in apparent agreement that for the base case Minneapolis and most of Minnesota and Wisconsin are well within the market. He does not, however, expect any sensitivity of his market boundary in the NW (roughly, the Oregon-Washington border plus northern Idaho) to price reductions.

Table 20

SUMMARY

Base Case Montana Coal Production Forecast
(million tons per year)

Year:	1990			1995			2000		
Electric Growth Rate:	1%	2%	3%	1%	2%	3%	1%	2%	3%
Total Production	38	42	43	42	46	65	48	63	85
New Production	6	9	11	10	14	32	16	31	53
[a]Increase for $1/ton Price Reduction	.9	1.5	1.3	1.6	1.2	6.9	1.0	5.7	13.5

Note: [a]Increase is based on average of 9.50 and 10.50 Montana FOB and 6.00, 7.70 Wyoming FOB cases.

Wood's forecast at 2.3% electric growth is compared to our most similar ($9.50 Montana and $7.70 Wyoming base) case at 2% and 3% in Table 21. His forecast for 1990 at 2.3% is 3 to 4 mtpy new coal production, which is below both our 2% and 3% forecast by 7 to 11 mtpy. In 1995 his estimates are consistantly bracketed by ours and we appear to be in substantial agreement. However, in 2000 his numbers look high, with his 2.3% estimates very similar to ours for 3% growth. Wood's estimate of the production response to a $1/ton reduction is zero in 1990, +1 in 1995, and +7 mtpy in 2000. This is similar to our 1.5, 1.2, and 5.7 mtpy increases for 1990, 1995, and 2000 at 2% electric growth.

Without more information on Wood's method it is difficult to explain the differences. Perhaps the main point here is that the results are fairly similar. Both studies show substantial growth in Montana coal production even without price reductions. (Wood's forecast implies 5.8% annual growth 1984 to 2000). Both studies also show similar response to price reductions.

By contrast the only other long-run estimate we have seen was presented by Martin White of Western Energy in a recent interview reported in the Billings Tribune. White predicted a steady decline in coal sales from a peak of 33.3 mtpy in 1986 to 20.9 in 1995 at current price (and coal severance tax) levels. This forecast is apparently predicated on the loss of all existing contracts as they come up for renewal. In addition, it appears to preclude any new production related to plants coming on line between 1984 and 1995, including Colstrip 4 and Belle River #2. Based on the present analysis and the study by Victor Wood, there appears to be little basis for White's projection.

Table 21

Comparison of Incremental Coal Production Forecasts for Montana (million tons per year)

Year:	1990			1995			2000		
Electric Growth Rate:	2%	2.3% (Wood)	3%	2%	2.3% (Wood)	3%	2%	2.3% (Wood)	3%
Base Condition	10	3	11	14	21	32	31	50	53
$1/ton Reduction	10	3	12	15	22	41	36	57	66
$2/ton Reduction	13	4	14	18	32	49	44	88	93
$3/ton Reduction	14	4	15	22	39	62	58	108	109

Source: Forecast at 2.3% is Victor Wood's Montana Coal Market Study (July 1984). Assumes Base Montana price of 9.75 and 8600 BTU and Wyoming of 7.50 and 8300 BTU.

Comparison is to the present study with a base of $9.50 Montana (8700 BTU) and 7.70 Wyoming (8450 BTU).

Chapter IV. Acid Rain and Montana Coal Demand

A. Market Size

Another potential market for Montana coal is the set of older plants, mainly in the midwestern states, that currently burn high sulfur fuels. Because of the increased scientific evidence that links coal-fired generating plant emissions of SO_2 with acid precipitation impacts, a number of bills were proposed in the last congress to reduce SO_2 emissions by 8 to 12 mtpy. The bills are of two major types. The Sikorsky/Waxman Bill (HR3400) for example, would require scrubbers on the "top 50" emitters and leave a potential of 30 to 50 mtpy of high sulfur coal use that could be switched to low sulfur. The other type of bill, typified by S2001, the Durenburger Bill, would have no explicit technology forcing provisions. Utilities would be free to choose the lease cost mix of scrubbing and switching on their system. The latter, of course, could be constrained by state-level regulations that would protect the local high sulfur coal industry to varying degrees. At 10 mtpy SO_2 reduction, there is a total of 220 mtpy that could be scrubbed or switched.

At present there is a great deal of uncertainty over the target level of reduction and the means of achieving that reduction. It is probable that no acid rain bill will pass in the current congress.

A maximum potential acid rain market for the NGP is estimated in Table 22, based on tonnages delivered in 1983 to plants facing sulfur emission regulations more lenient than 3.0 lbs. SO_2/MMBTU. As is evident, the bulk of the "acid rain" plants are in states on the fringe of, or outside our historical market identified in Chapter 2, such as Ohio, Illinois, and Indiana. In the states where Montana coal specifically may have a clear competitive edge such as Montana and Minnesota, there are either no older plants or they are already burning low

Table 22

Maximum Potential Acid Rain Capacity in
Coal Market Area

State	Mil. Tons	1983 MT WY Deliveries	Maximum Potential
Minnesota	4.6	4.4 MT	.170
Wisconsin	6.7	.5 MT	6.28
Missouri	16.3	--	16.3
Illinois*	16.0	--	16.0
Indiana*	26.7	--	26.7
Ohio*	37.7	--	37.7
Kansas	4.1	2.7	1.5
Michigan	10.8	.8	10.0
Iowa	5.3	3.2	2.2
Total	128.2	11.6	116.6
*Market Fringe	79.4		79.4
Residual	48.8		37.2

Total tonnage by state with plants facing sulfur regulations equal to or more lenient than 3.0 lbs. $SO_2/10^6$ BTU.

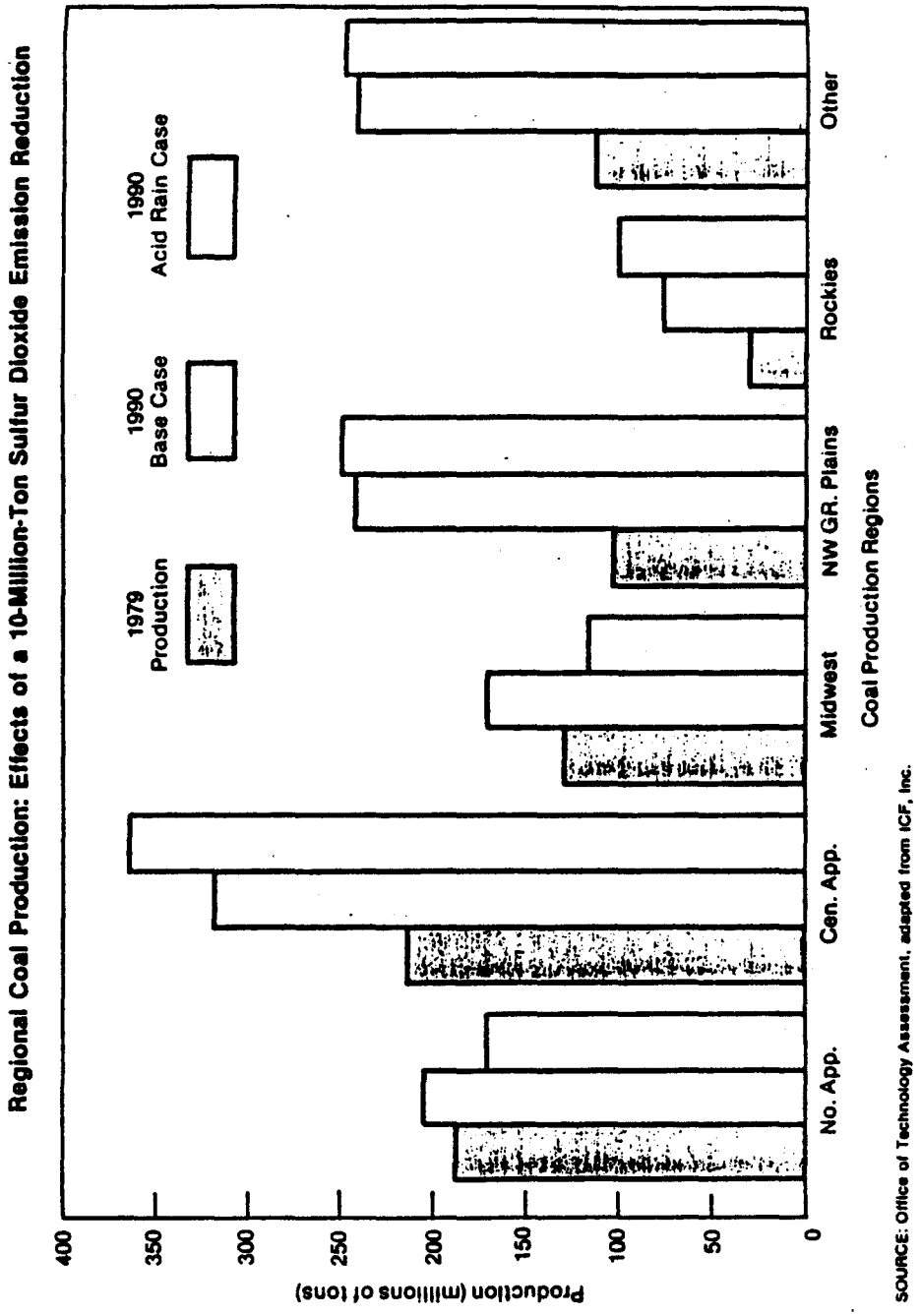
Source: Derived 1983 Cost and Quality, DOE.

sulfur coal. For example in Minnesota, Wisconsin, and Michigan there is a total potential of only 16.5 mtpy. The traditional Wyoming market also has few high sulfur plants, with the exception of Missouri (16.3 mtpy), because the south-central states have historically used gas and oil.

While the potential "acid rain" market for the NGP may be anywhere from 37 to 117 mtpy, the actual share will depend critically on the type of legislation (scrub or switch) and on the unit-specific economics. Many of the older plants designed for bituminous coals may not be able to burn the low BTU, high ash western coals, or burn them only at a large expense. An analysis by ICF that takes into account the match of unit and coal source characteristics, and assumes that utilities will minimize costs, is summarized in Figure 12. By 1990, acid rain legislation would only add 10 mtpy to the NGP market. Based on historical market shares, this would imply perhaps 2.5 mtpy for Montana. It is important to note that ICF assumed the Durenburger type of bill that did not mandate scrubbing. In short, even under the most optimistic scenario (there is an acid rain bill and it allows utilities to scrub or switch), the Montana market for acid rain plants is anywhere from 0 to 3 mtpy.

The conclusion here is that acid rain plants are not likely to add significantly to the Montana market.

Figure 12



SOURCE: Office of Technology Assessment, adapted from ICF, Inc.

B. Acid Rain Legislation

Although the new Congress has only been in session a few weeks, representatives, staff and observers all agree that it is very unlikely new acid rain legislation will pass this session. This assessment, together with the Administration's reluctance to propose or back one of the many SO_2 reduction plans introduced last session, essentially assures that the status quo will pertain for at least two more years.

In addition, the Administration's position is that further studies are necessary before an adequate bill can be drafted. At the same time, funding for such studies will be restricted, or non-existent, given the tight budget situation. In the next few years, then, it is unlikely that federal legislation will change the current supply relations dramatically. Utilities will be guided by current rules and laws in assessing the mix of coals, scrubbing and emissions that provide compliance and the lowest cost for a particular electrical generating boiler.

It is also constructive to look ahead, at least a short time, and assess the likely introduction of new acid rain legislation. The passage of national environmental legislation, any legislation, requires building a momentum for passage over two or more legislative sessions. That momentum will be broken in the current session to the point that some observers and staff suggest that leading House supporters of specific legislative initiatives may not even ask for committee hearings. In addition, few pieces of legislation can finally become law without Presidential signature, and active Presidential support will be needed to successfully negotiate the Congress. Acid rain is a bipartisan issue, but few Senators, perhaps, would want to challange Presidential leadership on this issue, knowing a veto lies at the end of the legislative road.

Given the current mood of the National Congress, the pull-back of legislative leaders who championed acid rain reduction in the last Congress, and the Presidential (E.P.A.) assessment of new study requirements, it appears unlikely that acid rain reduction will be mandated by the Congress in this decade. New contract potential for Montana and Wyoming based upon some form of SO_2 reduction does not seem likely before the 1990's at the earliest. Even then, given the uncertainty about the form, requirements and timing of any new legislation, the level of impact on Montana and Wyoming is uncertain. In any case, whatever may develop in the 1990's to enhance air pollution control and increase Northern Great Plains coal production is certain to benefit Wyoming more than Montana because of the geographic relation to the new markets.

Chapter V. Severance Tax Analysis

This chapter provides an analysis of the impact of changes in the Montana coal severance tax on the three market categories previously identified: existing contracts, new plants, and acid rain plants.

A. Magnitude of the Severance Tax

The Montana and Wyoming coal and severance tax and other state and local taxes are compared in Table 23. On an overall basis Montana's total taxes are 25% of selling price versus 17% for Wyoming. The severance taxes alone are 21% and 11%. On Western Energy coal in 1983, for example, the Montana coal severance tax was 2.30 $/ton or about 13¢/MMBTU. A change of 50% in the tax would amount to $1.15 and 6 1/2¢/MMBTU or about the difference in the Montana and Wyoming taxes. The table does not reflect the new royalty deduction which is being phased in and will reduce the Montana effective rate to about 18% in 5 years.

In relation to typical delivered prices, for example in the Minnesota market (recall Figure 2), of $25 to $30/ton even a 50% reduction in the tax is only 4 1/2% of delivered prices. In short, on *a priori* grounds one would not expect very significant changes in the Montana market due to even very large changes in the tax. Recalling the dominant effect of location discussed in Chapter 2, a 50% tax reduction would alter locational advantage by only about 67 miles for 8700 BTU Montana coal.

B. Impact on the Market

Theoretical Model

The theoretical impact of a tax reduction on production and tax revenue is outlined in Figure 13. The model assumes that the tax is completely forward shifted (perfectly elastic supply) so that tax cuts are reflected exactly in

Table 23

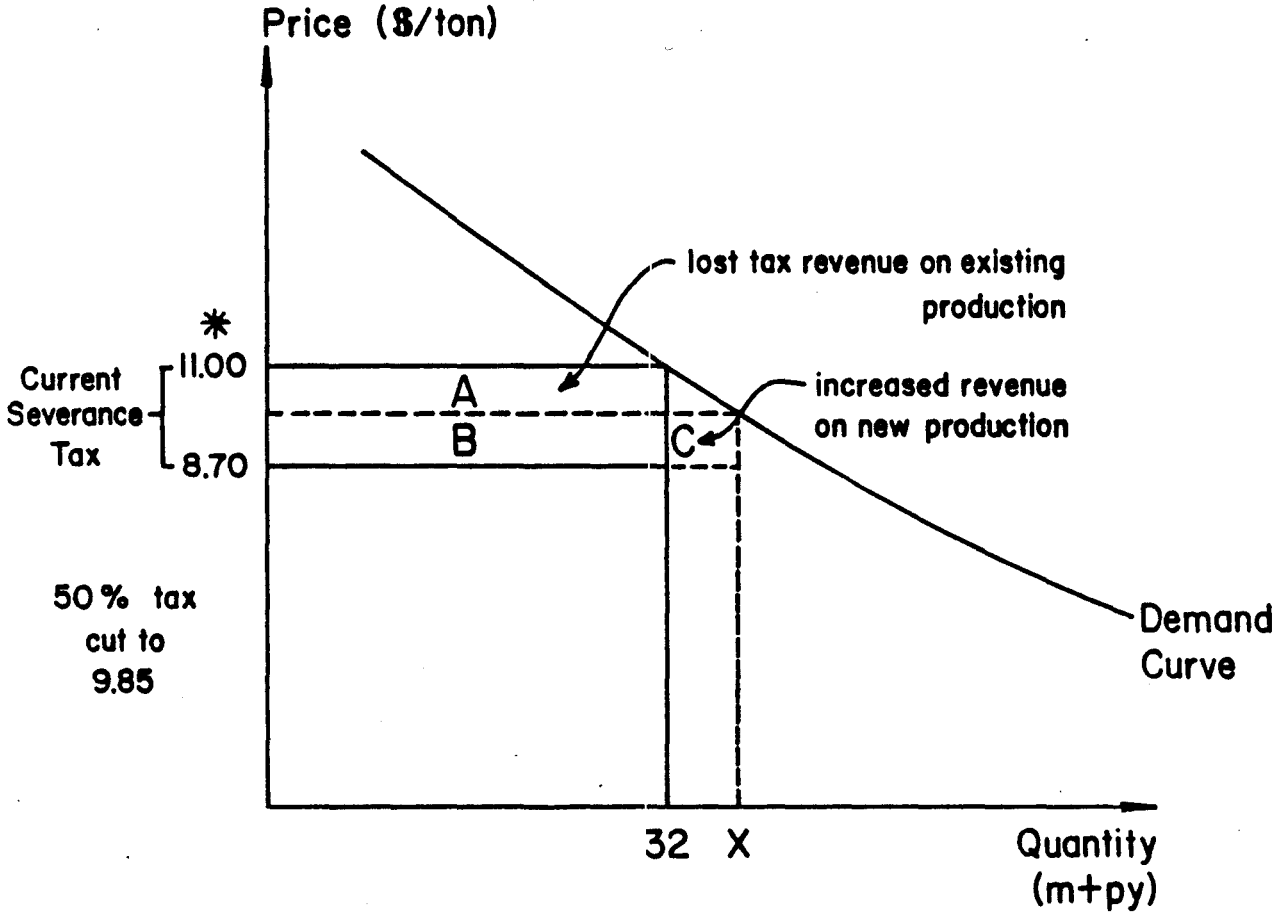
Montana and Wyoming Taxes as a Percent of Selling Price

	Montana	Wyoming
Severance Tax	21.34	10.50
Property Tax	3.40	5.92
Sales Tax	N/A	0.24
State Income Tax	.46	N/A
State and Local Sub	25.20	16.66

Source: The Competitive Position of Colorado Coal: A Comparative Analysis of Coal Taxation in Six Western States and Texas Gennifer Sussman et al April 1984. (Colorado Energy Research Inst.)

Figure 13

Effect of a Tax Decrease on Production and Revenue



A+B= current revenue.
A=lost revenue under tax reduction.
C=revenue on new production.
C-A=net change in tax revenue.

Issue: X=new production level (elasticity of demand).
* Average price of 8700 BTU producers, for example.

in price changes. (This may result in an overestimate of the price change depending on tax incidence.) A given tax cut can then be expected to reduce price and increase production. Schematically the area "A" is lost tax revenue "C" is tax gained on increased production. As illustrated, losses far outweigh gains. In fact the magnitude of "A" vs. "C" depends on the response of increased quantity demanded to a given price change. The unknown new production level is indicated by "X" and will in general depend on the "elasticity of demand." The latter is simply the percent change in quantity demanded for a percent change in price. In Figure 14 a much more elastic demand curve is illustrated with a much larger new "X" (here Q_1). Even here losses continue to dominate gains. In fact, an exact "break even" elasticity for a tax cut to result in no change in tax revenues can be calculated (Figure 15). The basic finding is that demand would have to be extremely responsive to price changes (an elasticity of around -5.0) in order for tax revenue to be stable. In fact, it is highly unlikely that the long run elasticity of demand for Montana coal is much over -1.0, as noted in Chapter III.

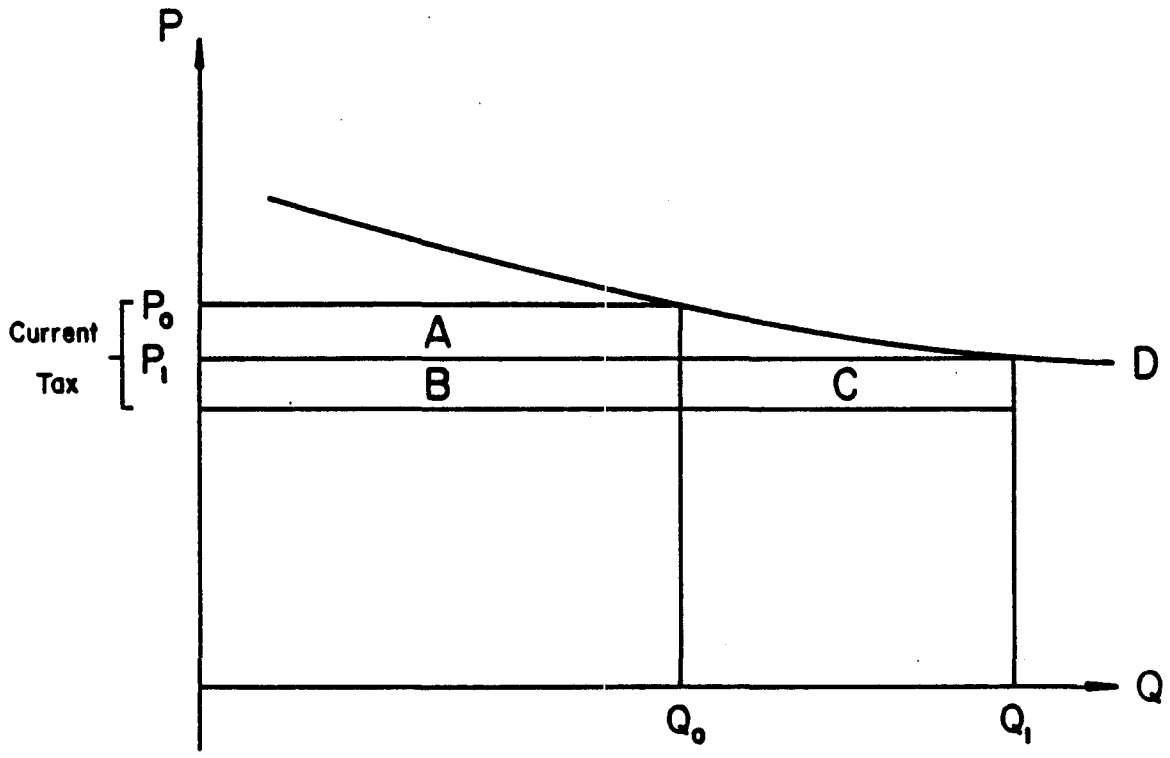
Timing Issues

To analyze the impact of a given tax change, it is necessary to identify the lag between coal sourcing decisions and on-line dates for new coal-fired units. Decisions on plants coming on line 5 to 10 years from now are based on current and projected economics. In short the impact of a tax change is delayed, or, conversely, to affect plant decisions in the future, one has to change taxes in the near term.

A summary estimate of the timing is provided in Figure 16. Based on the Boiler order date vs. on-line date information provided earlier, utilities must be making decisions relating to coal rank (i.e. lignites vs. subbituminous vs. bituminous) at least 8 to 10 years in advance. On the other

Figure 14

Tax Decrease with Highly Elastic Demand



Here net loss to a tax reduction (C−A) is reduced by large production response to a small price change (highly elastic demand).

Analytical: need an elasticity of about −4.6 to "breakeven".

Figure 15

Tax Revenue/Elasticity of
Demand Relationship

Independent Relationships:

1. Total Tax

$$T = t_e(P-K_2)Q \quad \text{or}$$

$$= (t_s/1 + t_s)\ (P-K_2)Q$$

where: K_1 = Contract Sales Price

K_2 = fixed deductions (black lung, etc.)

P = FOB

t_e = effective tax rate

t_s = severance tax rate

2. Tax Formulas

$$P = \frac{K_1}{(1-t_e)} + K_2$$

$$\left(t_e = \frac{t_s}{1 + t_s}\right)$$

3. Empirical Demand

$$\frac{dQ}{dP} \cdot \frac{P}{Q} = E_d$$

then:

$$\frac{dT}{dt_e} = QP(1 + Z\ [1 - \left|E_d\right|\ ]) - K_2Q(1 + \frac{K_2}{Q}\frac{dQ}{dt_e})$$

where:

$$Z = \frac{K_1 t_e}{(1 - t_e)(K_1 + K_2[1 - t_e])}$$

solve for $\left|E_d\right|$ when

$$\frac{dT}{dt_e} = 0 \quad \text{and} \quad K_1, K_2, t_e, Q \ \text{(given exogenous)}$$

for $t_e = .23$; $K_1 = 7.79$; $K_2 = .85$; $P = 11.00$ "breakeven" $E_d = -4.69$

Discrete approximate for $\Delta t_e = .01$ "breakeven" $E_d = -5.06$

Figure 16

Severance Tax Issue:

Timing

Market Sector Impacted	Timing re-market
1. Existing	~1 year
2. New Plants	3-5 year--source 8-10 year--rank
3. Acid Rain	~1 year

hand, within coal ranks, specific coal source decisions may be 3-5 years lead. For example, the NSP Sherco #3 unit bids were taken in November 1984 for a late 1987 start, or three years lead. (In fact the decision is only a 2.5 year lead.) It is presumed that existing contract renewals would be essentially based on the market price near the time of contract renewal, or one year.

Near Term Impacts

Given the timing assumed in Figure 16, a decision to change the severance tax in this legislature (1985) would potentially impact contract renewals through 1986, new plant coal source decisions for plants coming on line from 1988 to 1990 and new plant coal rank decisions for plants coming on in 1993 and 1995. Based on the historical analysis in Chapter 2, it seems unlikely that a change in delivered price on the order of 7¢/MMBTU will significantly alter the subbituminous-bituminous-lignite market shares. Assuming then that the dominant effect of a tax change will be vis-a-vis Wyoming coals, the impacts, if any, will be on plants coming on line before 1988 to 1990. The qualification "if any" here is important. In the following a "naive model" is assumed, that Wyoming will not strategically respond to Montana tax cuts. Since the latter is a possibility, the results below are likely, if anything, to be overestimates of the gains to tax cuts.

Given the timing and magnitude of the tax cut, we know the relevant markets that could be affected. If the impact at most would be restricted to new plants on line to 1990, in the Montana market area the impact is on one plant--the Sherco #3 unit. Based on the discussion above, it appears that Montana already has a competitive edge at this plant. Expanding the time frame to include 1993 may only pick up one other plant in Wisconsin or about 1 1/2 mtpy. In short, based on the near term analysis of the potential new plant market, to 1993 a severance tax cut of 50% would possibly impact decisions on about 3 1/2 mtpy of

new plant capacity. This would add at most about 3.5 mtpy to the 41 mtpy forecast for 1988, or about plus 8% in coal production for a price change of about 10%. This implies inelastic demand (around -0.8) to 1993 and would clearly result in very large decreases in tax revenue.

C. Decision Criteria

At this point it is useful to raise the issue of an appropriate basis for estimating the impacts of severance tax changes. It appears that the state faces a problem of evaluating multiple goals. At a minimum a decision criteria should weigh both tax revenue changes and changes in coal production levels (or coal revenues, producer profit, employment, etc.). For example, a hypothetical decision criteria could be specified as follows:

SOCIAL WELFARE = W_1 (TAX REVENUE) + W_2 (COAL PRODUCTION)

where W_1 and W_2 are weighting terms. What this equation suggests is that in some sense "social welfare" or "the public good" effect of a change in the severance tax is a weighted average of tax revenue changes and coal production with the weights essentially reflecting distributive assumptions on how we as a state evaluate a $1 of tax revenue accruing to the state as a whole compared to a $1 of coal production profits (jobs, revenue, or etc.) accruing to coal producers and other impacted sectors.

It is beyond the scope of this analysis to identify an appropriate index for coal production or to propose the appropriate weights. However, it is possible to at least quantify the tax revenue ($) versus coal production (mtpy) tradeoff for use by decision makers. For the near term case above, it appears that the net effect of a 50% tax cut would be mainly in the new plant market to 1993. Existing contracts do not begin to expire until 1993, even assuming the tax would have an impact. Acid rain should probably be assigned a zero probability by 1993 for an expected value of zero.

D. Analysis of Tax Policy Alternatives

Several coal severance tax policy alternatives have been proposed. One specific proposal is a 50% cut in the severance tax on all production. Another is a 50% cut in the severance tax, but to be applied only to new production (presumably over the 1984 base of around 32.3 mtpy).

On our base case price of 9.50 $/ton, a 21% effective tax rate generate $2/ton in severance tax. Accordingly, for 8700 BTU coal, a 50% tax cut corresponds to our $1/ton price reduction cases. However, on the average Montana coal in 1983, a 50% tax cut would actually amount to about a $1.50 (since higher price Decker and Spring Creek coals are included).

Table 24 provides a summary of the effect of a $1/ton, $1.50/ton, and $2/ton severance tax reduction on a new production. As noted previously, there will be substantial growth in new production even in the absence of a tax cut. For example, our forecast at 2% growth in the year 2000 is for 31 mtpy of new production over the 1984 base case. A $1/ton tax reduction results then in a $31 million/year revenue loss on new production that would occur even without the tax cut. The $1 reduction stimulates additional new production of 5.7 mtpy which may bring in a tax revenue of around $11.4 million per year that would otherwise not be realized. (The latter assumes that new production was the same price and BTU [Decker, Spring Creek, other] mix as current. If in fact new production was mainly 8700 BTU coal, incremental taxes would approach only $1/ton for an increase of $5.7 million per year.) The net effect is then a $19.6 million loss in year 2000 at a 2% growth rate for coal production. Estimates for other years and growth percentages, and price reductions are provided in Table 24. The $1.50 case is interpolated.

Using 2% growth as a base case, results for a cut in taxes on new production for a 50% reduction are summarized in Table 25. The net annual

Table 24

Annual Tax Revenue Changes
for Severance Tax Reductions

Year	1990			1995			2000		
Electric Growth	1%	2%	3%	1%	2%	3%	1%	2%	3%
New Production (mpty)	6.0	9.0	11.0	10.0	14.0	32.0	16.0	31.0	53.0
Change for $1 Price Reduction (mpty)	.9	1.5	1.3	1.6	1.2	6.9	1.0	5.7	13.5
Change for $2 Price Reduction (mtpy)	3.1	3.2	2.4	3.3	2.4	12.9	5.6	10.2	27.2
Change for $1.50 Price Reduction (mtpy)	2.0	2.4	1.9	2.5	1.8	9.9	3.3	8.0	20.4
	Revenue Change (million $/year)								
A. $1 Tax Reduction									
Loss on New Base	6.0	9.0	11.0	10.0	14.0	32.0	16.0	31.0	53.0
Gain on Change	1.8	3.0	2.6	3.2	2.4	13.8	2.0	11.4	27.0
Net Loss	4.2	6.0	8.4	6.8	11.6	18.2	14.0	19.6	26.0
B. $2 Tax Reduction									
Loss on New Base	12.0	18.0	22.0	20.0	28.0	64.0	32.0	62.0	106.0
Gain on Change	3.1	3.2	2.4	3.3	2.4	12.9	5.6	10.2	27.2
Net Loss	8.9	14.8	20.4	16.7	25.6	51.1	26.4	51.8	78.8
C. 50% Tax Change (1.50)									
Loss on New Base	9.0	13.5	16.5	15.0	21.0	48.0	24.0	46.5	79.5
Gain on Change	3.0	3.6	2.9	3.8	2.7	14.9	5.0	12.0	30.6
Net Loss	6.0	9.9	13.6	11.2	18.3	33.1	19.0	34.5	48.9

Table 25

Summary Tax Policy Analysis

Tax Policy Alternative	Change in Tax Revenues (million $/year) and Coal Production (million $/year)							
	1985		1990		1995		2000	
	Tax (10^6 $)	Coal (mtpy)	Tax (10^6 $)	Coal (mtpy)	Tax (10^6 $)	Coal (mtpy)	Tax (10^6 $)	Coal (mtpy)
A. 50% Tax Cut on New Production:								
Loss on Base Case New Production:			13.5		21.0		46.5	
Tax on Increase in New Production:			3.6	2.4	2.7	1.8	12.0	8.0
Net Effect:			9.9	2.4	18.3	1.8	34.5	8.0
B. 50% Tax Cut on All Production:								
Loss on Existing Production:	48.5		48.5		48.5		48.5	
Net Effect New Production:			9.9	2.4	18.3	1.8	34.5	8.0
Total	48.5		58.4	2.4	66.8	1.8	83.0	8.0

revenue loss is estimated to be $9.9 million in 1990 and $18.3 and $34.5 million in 1995 and 2000. The corresponding production gains are 2.4, 1.8 and 8.0 mtpy.

The other basic type of proposal is to reduce taxes on all production. For a 50% tax or $1.50 average price reduction this results in an immediate 48.5 million/year tax revenue loss on existing production plus the same net effect on new production as the previous case. Accordingly, the annual revenue loss is $60 to $80 million/year after 1990 (Table 25). Results using Victor Wood's estimates are similar, with revenue losses that are about $5 million/year higher in 1995 and 2000 (Table 26) and lower by the same amount in 1990.

The conclusion here is that estimates derived from both Wood's and this study are in substantial agreement. The basic finding is that tax cuts results in large revenue losses on new production that would occur in any case, even without tax on price cuts. The gain in tax revenue (at a reducted rate) on production stimulated by tax cuts are small, corresponding to the small gains identified earlier. In general the losses for a tax cut just on new production dominate the revenue gains by a ratio of 4:1 (Table 25). The annual tax revenue loss associated with production gains average at a minimum around $4 million annually per 1 mtpy of production gain. If the tax reduction is extended to all coal production, the tax revenue "cost" is $24.3 million per 1 mtpy in 1990, $37.1 million in 1995 and $10.4 million in 2000.

In order to get an aggregate estimate of these annual losses, one needs to take account of the time value of money. When this is done, on a present value basis (assuming a 3% real discount rate and constant 1984 dollars), the net cost of a 50% tax cut on new production only is around $150 million for the 1990-2000 period. The net cost of a 50% tax cut on all production is around $730 million

Table 26

Comparative Tax Policy Analysis

Year	1990	1995	2000
Production Estimates (mtpy)			
A. Present Study (2% elect. growth)			
New Production	9.0	14.0	31.0
New for $1 Price Change	1.5	1.2	5.7
*New for $1.50 Price Change	2.4	1.8	18.0
New for $2 Price Change	3.2	2.4	10.2
B. Victor Wood (2.3% elect. growth)			
New Production	3.0	21.0	50.0
New for $1 Price Change	0.0	1.0	7.0
*New for $1.50 Price Change	0.5	6.0	22.5
New for $2 Price Change	1.0	11.0	38.0
Tax Revenue Loss (million $/year)			
A. Present Study			
$1 Reduction	6.0	11.6	19.6
50% Reduction	9.9	18.3	34.5
$2 Reduction	14.8	25.6	51.8
B. Victor Wood			
$1 Reduction	3.0	19.0	36.0
50% Reduction	3.8	22.5	41.2
$2 Reduction	5.0	31.0	62.0

*Interpolated

Table 27

Present Value Basis Comparison
of Severance Tax Policy Alternatives
and Montana Coal Production

Policy	Electric Growth Rate	Production Gain (million tons per year)			Tax Revenue Loss (million $/year)
		1990	1995	2000	
A. 50% Tax Reduction on New Production					
	1%	2	2	3	105
	2%	2	2	8	150
	3%	2	10	20	205
B. 50% Tax Reduction on All Production					
	1%	2	2	3	685
	2%	2	2	8	730
	3%	2	10	20	785

for the 1985-2000 period. The production gains in both cases are around 2 mtpy in 1990 and 1995 and 8 mtpy in 2000 (Table 27). These estimates are for the base case of 2% electrical growth. If growth is more like 3%, the costs are around $205 million and $785 million for the two policies, for production gains of 2, 10, and 20 mtpy in 1990, 1995, and 2000. If growth is 1%, the costs are around $105 million and $685 million for production gains of 2 mtpy in 1990 and 1995 and 3 mtpy in 2000.

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Appendix A: Computer Program for Spatial Market Boundaries of the Northern Great Plains Coal Market Region

```
C  PROGRAMMER: MICHAEL H. LEE/ECONOMICS DEPARTMENT/U. OF M.
C                ALTERED BY JOHN TUBBS/1984
C
C     PROGRAM: THIS PROGRAM CREATES DATA COORDINATES FOR SEVEN
C              MARKET BOUNDARIES, RESULTING IN A COMPLETELY
C              BOUNDED NGP COAL MARKET REGION.
C
C              DATE: OCTOBER  1984
C
      DIMENSION A(18,8)
      DIMENSION AMAP(101,32)
      DIMENSION STORE(101,4)
C
      DATA AA,AHALF,ATRAN,ATRT,ADUA,ADUB,APROD/7*0.0/
      DATA BB,BPROD,BTRAN,CC,DTHETA,DXOLD,DYOLD,DXNEW1/8*0.0/
      DATA DXNEW2,DYNEW1,DYNEW2,DD,DSCMKW,DIFFAB,DIST1,DS1,DS2/9*0.0/
      DATA EE,FIXTRA,FIXTRB,S1,S2,SUM,THETA,TONA,TONB,TMKW,TOTA/11*0.0/
      DATA TOTB,VARB,XCORD,XNEW1,XNEW2,YNEW1,YNEW2,YPOS/8*0.0/
      DATA TOTA,TOTB,FLAG,RATIO1,RATIO2,RATIO3,RATIO4/7*0.0/
      DATA SQDIST,TWICE,ANUM,SQNEG,AMKT,DECIDE,DISTAB/7*0.0/
      DATA DIST1,DIST81,DISTB/3*0.0/
      DATA RATIO5,CKNUM,CKDEN/3*0.0/
C
      DATA I,J,K,INTGR1,INTGR2,JARAY,NCOUNT,IROW,JCOL/9*0/
      DATA IDISA1,IDISB1/2*0/
C
C INITIALIZE STORE(I,J)
C TEMPORARY STORAGE OF COORDINATES PASSED TO AMAP.
      DO 20 J=1,4
         DO 10 I=1,101
            STORE(I,J)=0.0
   10    CONTINUE
   20 CONTINUE
C INITIALIZE A(I,J)
C ECONOMIC PARAMETERS USED TO GENERATE MARKET BOUNDARIES ARE IN A(I,J).
      DO 40 I = 1,18
         DO 30 J = 1,8
            A(I,J) = 0.0
   30    CONTINUE
   40 CONTINUE
C INITIALIZE AMAP(I,J)
C AMAP(I,J) HAS THE TRANSFORMED X & Y COORDINATES FOR THE 7 BOUNDARIES.
      DO 60 I = 1,101
         DO 50 J = 1,32
            AMAP(I,J) = 0.0
   50    CONTINUE
   60 CONTINUE
C
      WRITE(5,70)
   70 FORMAT(//,1X,'TYPE IN A FIVE LETTER CODE IDENTIFYING THIS RUN:')
      ACCEPT 80,ALPHA
   80 FORMAT(A5)
      WRITE(5,90)ALPHA
   90 FORMAT(//,1X,'THIS RUN IS: ',1A5,////)
C UNIT FOR22.DAT HAS INPUT DATA READ INTO A(I,J)
      READ(22,100,END=110)((A(I,J), J=1,8),I=1,18)
  100 FORMAT(8F)
  110 CONTINUE
C
      WRITE(5,120)

  120 FORMAT(/,6X,'COLORADO',6X,'ILLINOIS',8X,'NEW MEXICO',7X,
     1'TEXAS',9X,'UTAH',10X,'WASHINGTON',6X,'WYOMING',6X,'MONTANA',//)
      WRITE(5,130,END=140)((A(I,J),J=1,8),I=1,18)
  130 FORMAT(' ',8F)
  140 CONTINUE
C
      DO 540 JARAY = 1,8 ! LOOP THROUGH ALGORITHM FOR EACH OF 8 BDYS
         GOTO(150,160,170,180,190,200,210,215)JARAY
C
  150    CONTINUE
         THETA = 248.38          ! COLORADO
         GOTO 220
  160    CONTINUE
         THETA = 333.46          ! ILLINOIS
         GOTO 220
  170    CONTINUE
         THETA = 247.85          ! NEW MEXICO
         GOTO 220
  180    CONTINUE
         THETA = 300.06          ! TEXAS
         GOTO 220
  190    CONTINUE
         THETA = 222.69          ! UTAH
         GOTO 220
  200    CONTINUE
         THETA = 157.77          ! WASHINGTON
         GOTO 220
  210    CONTINUE
         THETA = 217.97          ! WYOMING
         GOTO 220
  215    CONTINUE
         THETA = 116.01          !MONTANA
  220    CONTINUE
C
         S1 = COSD(THETA)
         S2 = SIND(THETA)
C
```

```
C  THE NUMBER OF TONS OF COAL FOR ANNUAL OPERATION OF A GIVEN
C  COAL-FIRED POWER PLANT IS COMPUTED.
          AA = A(1,JARAY)*A(2,JARAY)
          BB = A(4,JARAY)*2000.00
          CC = A(3,JARAY)*1000.0
          DD = A(6,JARAY)*2000.0
          EE = A(5,JARAY)*1000.0
          TONA = (AA/BB)*CC
          TONB = (AA/DD)*EE
C
C FIXED TRANSPORTATION COSTS FOR A GIVEN QUANTITY OF COAL PRODUCTION
C ARE COMPUTED.
          FIXTRA = TONA*A(14,JARAY)
          FIXTRB = TONB*A(15,JARAY)
C
C  ADDITIONAL COSTS ARE COMPUTED.
          DSCWKW = A(1,JARAY)*1000.0*A(9,JARAY)
          TWKW = A(2,JARAY)*A(1,JARAY)*1000.0
          ADDA = ( A(7,JARAY)*DSCWKW) + (A(10,JARAY)*TWKW)
          ADDB = ( A(8,JARAY )*DSCWKW) + (A(11,JARAY)*TWKW)
C
C  PRODUCTION AND TRANSPORTATION COSTS ARE COMPUTED.
          APROD = A(12,JARAY)*TONA




          BPROD = A(13,JARAY)*TONB
          ATRAN = A(16,JARAY)*TONA
          BTRAN = A(17,JARAY)*TONB
          TOTA = APROD + ADDA + FIXTRA
          TOTB = BPROD + ADDB + FIXTRB
C
C  THE FOLLOWING DETERMINES WHETHER THE MARKET BOUNDARY
C  INTERSECTS THE X-AXIS ON THE NEAR OR FAR SIDE OF MARKET B.
          DISTAB = A(18,JARAY)
          AMKT = TOTA + (ATRAN*DISTAB)
          DECIDE = AMKT - TOTB
  230     CONTINUE
          IF(DECIDE.LT.0.0) GOTO 370
C
C  DISTA IS COMPUTED FOR THE CASE THE MARKET BOUNDARY INTERSECTS
C  THE X-AXIS BETWEEN MARKETS A AND B.
          DIFFAB = TOTB-TOTA
          VARB = BTRAN * DISTAB
          SUM = DIFFAB + VARB
          ATBT = ATRAN + BTRAN
          DISTA = SUM / ATBT
C
C     TOTAL TRANSPORTATION COSTS ARE COMPUTED.
          TOTRA = FIXTRA + A(16,JARAY)*DISTA
          TOTRB = FIXTRB + A(17,JARAY)*(DISTAB-DISTA)
C
C  COMPUTE DATA USED IN GENERATING BOUNDARIES.
          AHALF = DISTAB / 2
          DISTB = DISTAB - DISTA
          IF(DISTA.EQ.DISTB)  GOTO 460
          RATIO1 = ATRAN/BTRAN
          RATIO2 = (TOTA-TOTB)/BTRAN
          RATIO3 = 1/RATIO1
          RATIO4 = (TOTB-TOTA)/ATRAN
          SQDIST = DISTAB**2
          TWICE  = 2 * DISTAB
          IF(DISTA.LT.AHALF)  GOTO 300
  240     CONTINUE
C
C  BELOW LOOP IS FOR THE CASE WHEN A BOUNDARY OPENS TO MARKET B.
          INTGR1 = INT(DISTA + 5)
          INTGR2 = INTGR1 + 1000
          I = 0
          FLAG = 0.0
          DO 290 IDISAI = INTGR1,INTGR2,10
              I = I + 1
              IF(I.GT.101) GOTO 290
              J = I
              IF(FLAG.GT.1.0) GOTO 250
              XCORD = DISTA
              YPOS = 0.0
              GOTO 270
  250         CONTINUE
              DISTBI = (IDISAI * RATIO1) + RATIO2
  260         CONTINUE
              ANUM = IDISAI**2 - (DISTBI**2) + SQDIST
              XCORD = ANUM/TWICE
              SQNEG = IDISAI**2 - (XCORD**2)
              IF(SQNEG.LT.0.0) GOTO 280 FOR ELLIPSES AND CIRCLES
              YPOS = SQRT(SQNEG)
```

```
  270           CONTINUE
                CALL EUCLID(XCORD,YPOS,XNEW1,YNEW1,XNEW2,YNEW2,S1,S2)
  280           CONTINUE
                STORE(I,J)=XNEW1
                J=J+1
                STORE(I,J)=YNEW1
                J=J+1
                STORE(I,J)=XNEW2
                J=J+1
                STORE(I,J)=YNEW2
                FLAG = 100.0
  290       CONTINUE
            GOTO 490
C
C  BELOW LOOP IS FOR THE CASE WHEN A BOUNDARY OPENS TO MARKET A.
  300       CONTINUE
            INTGR1 = INT(DISTB + 5)
            INTGR2 = INTGR1 + 1000
            I = 0
            FLAG = 0.0
            DO 360 IDISBI = INTGR1,INTGR2,10
                I = I + 1
                IF(I.GT.101) GOTO 360
                J = 1
                IF(FLAG.GT.1.0) GOTO 310
                XCORD = DISTA
                YPOS = 0.0
                GOTO 340
  310           CONTINUE
                DISTAI = ( IDISBI*RATIO3) + RATIO4
  320           CONTINUE
                ANUM = DISTAI**2 - (IDISBI**2) + SQDIST
                XCORD = ANUM / TWICE
                SQNEG = DISTAI**2-(XCORD**2)
                IF(SQNEG.LT.0.0) GOTO 350
                YPOS = SQRT(SQNEG)
  330           CONTINUE
  340           CONTINUE
                CALL EUCLID(XCORD,YPOS,XNEW1,YNEW1,XNEW2,YNEW2,S1,S2)
  350           CONTINUE
                STORE(I,J)=XNEW1
                J=J+1
                STORE(I,J)=YNEW1
                J=J+1
                STORE(I,J)=XNEW2
                J=J+1
                STORE(I,J) = YNEW2
                FLAG = 100.0
  360       CONTINUE
            GOTO 490
C
C  FIND THE INTERSECTION POINT OF THE MARKET BOUNDARY WITH
C  THE X-AXIS.
  370       CONTINUE
            CKNUM = BTRAN*A(6,JARAY) + HEAT CONTENT B
            CKDEN = ATRAN*A(4,JARAY) + HEAT CONTENT A
            RATIO5 = CKNUM/CKDEN
            IF(RATIO5.GT.1.0) GOTO 440
            DIFFAB = TOTB-TOTA
            VARB = BTRAN * DISTAB




            SUM = DIFFAB - VARB
            ATBT = ATRAN-BTRAN
            DISTA = SUM / ATBT
C
            IF(DISTA.GT.0.0) GOTO 390
            WRITE(5,380) JARAY
  380       FORMAT(' ',////,'DISTA IS NEGATIVE FOR JARAY=',1X,I)
            GOTO 520
  390       CONTINUE
C
C  COMPUTE TOTAL TRANSPORTATION COSTS
            TOTRA = FIXTRA + A(16,JARAY)*DISTA
            TOTRB = FIXTRB + A(17,JARAY)*(DISTA-DISTAB)
C  COMPUTE DATA FOR GENERATING THE MARKET BOUNDARY
            RATIO1 = ATRAN/BTRAN
            RATIO2 = (TOTA-TOTB)/BTRAN
            SQDIST = DISTAB**2
            TWICE  = 2*DISTAB
C
```

```
C  BELOW LOOP IS FOR THE I.E. THE BOUNDARY LYING ON THE OTHER SIDE
C  OF MARKET B.
           INTGR1 = INT(DISTA + 5)
           INTGR2 = INTGR1 + 1000
           I = 0
           FLAG = 0.0
           DO 430 IDISAI = INTGR1,INTGR2,10
               I = I + 1
               IF(I.GT.101) GOTO 430
               J = 1
               IF(FLAG.GT.1.0) GOTO 400
               XCORD = DISTA
               YPOS = 0.0
               GOTO 410
  400          CONTINUE
               DISTBI = ( IDISAI*RATIO1 ) + RATIO2
               ANUM = IDISAI**2 - (DISTBI**2) + SQDIST
               XCORD = ANUM / TWICE
               SQNEG = IDISAI**2 - (XCORD**2)
               IF(SQNEG.LT.0.0) GOTO 420
               YPOS = SQRT(SQNEG)
  410          CONTINUE
               CALL EUCLID(XCORD,YPOS,XNEW1,YNEW1,XNEW2,YNEW2,S1,S2)
  420          CONTINUE
               STORE(I,J) = XNEW1
               J=J+1
               STORE(I,J) = YNEW1
               J=J+1
               STORE(I,J) = XNEW2
               J=J+1
               STORE(I,J) = YNEW2
               FLAG = 100.0
  430      CONTINUE
           GOTO 490
C
  440      CONTINUE
           WRITE(5,450)JARAY
           WRITE(7,450)JARAY
  450      FORMAT(' ',///,1X,'THE MARKET BOUNDARY FOR JARAY EQUAL TO',1X
     1,I,1X,'DOES NOT EXIST')
           GOTO 520
C
  460      CONTINUE
           WRITE(5,470) JARAY
  470      FORMAT(' ',///,'THE MARKET BDY FOR JARAY EQUAL TO:',1X,I,1X,'I
     1S A STRAIGHT LINE.')
           GOTO 520     ! ENTER LOOP AND PROCESS NEXT STATE
C
  480      CONTINUE
           WRITE(5,190) JARAY,TONA,TONB,ADDA,ADDB,APROD,BPROD,DIFFAB
     1,TOTRA,TOTRB,DISTA
  490      FORMAT(///,' ','STATE NUMBER',3X,I,//,' ','THE QUANTITY OF COA
     1L REQUIRED FOR THE ANNUAL OPERATION',//,' ','OF A MODEL COAL
     2 FIRED GENERATING PLANT FOR COAL FROM MARKETS A & B EQUALS',
     3 /,' ',2(1X,F11.2),//,' ','THE ADDITIONAL COSTS FOR COAL FROM
     4 MARKETS A & B EQUALS:',/,' ',2(1X,F11.2),//,' ','PRODUCTION
     5 COSTS FOR COAL FROM A & B EQUALS:',//,' ',2(1X,F11.2),//,'
     6 THE DIFFERENCE IN TOTAL COST EQUALS:',1X,F11.2,//,' ','TOTAL
     7 TRANSPORTATION COSTS FOR A & B EQUALS',2(1X,F11.2),//,' ',
     8 'DISTA EQUALS:',1X,F8.2,///)
C
C  FOR EACH STATE, THE X & Y VALUES OF THE BOUNDARY ARE READ FROM
C  STORE(I,J) INTO ARRAY 'AMAP'.
           DO 510 IROW=1,101
               DO 500 J=1,4
                   JCOL=K + J
                   AMAP(IROW,JCOL)=STORE(IROW,J)
  500          CONTINUE
  510      CONTINUE
  520      CONTINUE
           K=K+4
  530      CONTINUE
  540  CONTINUE
       DO 560 I=1,101
           WRITE(21,550,END=560)(AMAP(I,J),J=1,32)
  550      FORMAT(' ',(32(' ',F9.2)))
  560  CONTINUE
  570  STOP
       END
C*************************************************************
C
C  SUBROUTINE EUCLID CREATES NEW COORDINATES FOR MARKET BOUNDARIES
C  BY ROTATING THE STANDARD BASIS VECTORS BY 'THETA' DEGREES.
       SUBROUTINE EUCLID(DXOLD,DYOLD,DXNEW1,DYNEW1,
      1DXNEW2,DYNEW2,DS1,DS2)
999    DXNEW1 = ( DS1*(DXOLD)-DS2*(DYOLD) )
       DYNEW1 = ( DS2*(DXOLD)+DS1*(DYOLD) )
       DXNEW2 = ( DS1*(DXOLD)-DS2*(-DYOLD))
       DYNEW2 = ( DS2*(DXOLD)+DS1*(-DYOLD) )
       RETURN
       END
```

Appendix B: Montana and Wyoming Coal Contracts (uncorrected)

WYOMING COAL CONTRACTS

COAL NETWORK ASSOCIATION

Utility by Mine	Plant Name	$/ton	$/milbtu	State	CONTRACTS Began/Ends	DOE,ORIS #	BTU	SULFUR	ASH	ESTIMATED QUANT. (mton)
Amex Coal Co. Bell Ayr										
Dairyland Power Coop	Alma	31.85	1.61	WS	83/?	50733 4140	8100	0.50	6.0	200
Iowa Power & Light	Council Bluffs	20.69	1.24	IO	78/99	51407 1082	8025	0.50	7.0	1600
" " "	Des Moines	24.84	1.17	IO	75/94	51407 1083	8100	0.50	6.0	120
Portland Gen. Elec Co.	Boardman	15.66	0.89	OR	74/99	52370 6106	8025	0.48	7.0	1200
Amex Coal Co. Bell Ayr , Eagle Butte										
C&SW:Southwestern Elec	Flint Creek	23.69	1.42	LA	72/01	52744 6138	8125	0.40	6.5	1500
" " "	Welsh	29.16	1.74	LA	76/04	52744 6139	8125	0.48	6.5	4000
Interstate Pwr. & Lgt.	Lansing	33.34	1.94	IO	73/96	51403 1047	8065	0.50	7.0	700
Kansas City Pwr.& Lgt.	Iatan	22.69	1.28	WS	84/13	51477 6065	8125	0.48	6.5	2100
" " " "	LaCygne	21.35	1.23	KN	76/13	51477 1241	8125	0.48	6.5	1800
" " " "	Jeffrey	20.40	1.22	KN	77/13	51479 6066	8025	0.48	6.5	6500
" " " "	Tecumsen	45.23	2.16	KN	85/?	51479 1252	8025	0.50	6.0	175
Pub. Serv. Co.of Colo.	Comanche	20.25	1.19	CO	76/08	52408 470	8250	0.60	5.2	2100
" " " "	Pawnee	17.98	1.07	CO	76/08	52408 6248	8025	0.48	7.0	1500
" " " "	5 Southeast	0.00	0.00	CO	89/?	52408 8220	8100	0.50	6.0	1000
Wisconsen Power & Lgt.	Columbia	29.19	1.70	WS	78/83?	53332 8023	8120	0.48	7.0	1500
Amex Coal Co. Eagle Butte										
Kansas Power & Light	Lawrence	45.09	2.16	KN	85/?	51479 1250	8025	0.50	6.5	1300
" " "	Tolk	47.25	2.69	TX	79/16	52748 6194	6500	0.30	4.9	2000
Arco-Thunder Basin Black Thunder										
Lower Colo. River Auth	Sam K. Seymore jr.	46.05	2.53							
Nebraska Public Pwr.D.	Gentleman	16.95	0.96	NB?	83/?	51988 6077	8800	0.40	6.0	2000
Oklahoma Public Pwr.D.	Muskogee	26.85	1.51	OK	77/93	52164 2952	8700	0.50	5.0	4000
" " "	Sooner	27.92	1.58	OK	73/93	52164 6095	8700	0.30	5.0	3600
Platte River Pwr. Auth	Rawhide	15.66	0.89	CO	83/85	52346 6761	8500	0.25	6.0	920
Southwestern Pub. Serv	Harrington	31.25	1.74	TX	77/16	52748 6193	9000	0.47	3.9	4800

" " "	Polk	47.25	2.69	TX	81/17	52748	6194	7900	0.47	5.6	2000
Union Electric Co.	Sioux	32.35	1.48	MS	80/85	52997	2107	8500	0.34	5.0	500
" " "	Rush Island	29.45	1.38	MS	83/?	52997	6155	8800	0.30	5.0	100
Wisconsen Pwr. & Lgt.	Dewey,Nelson	37.42	1.72	WS	85/04	53332	4054	8700	0.34	5.0	500
" " "	Pulliam	46.46	1.94	WS	84/84	53333	4072	8700	0.34	5.0	500
Arco-Thunder Basin Black Thunder , Coal Creek											
Kansas City Pwr.& Lgt.	Iatan	22.69	1.28	MS	80/83?	51477	6065	8816	0.37	5.0	2100
Wisconsen Pwr. & Lgt.	Columbia	29.19	1.70	WS	84/84	53332	8023	8000	0.60	8.8	1000
" " "	Edgerwater	?	?	WS	84/02	53332	4050	8000	0.34	6.0	500
" " "	Weston	38.59	2.13	WS	81/16	53333	4078	8500	0.34	5.0	1000
Arco-Thunder Basin Coal Creek											
Wisconsen Pwr. Lgt.	Blackhawk	40.24	1.79	WS	82/02	53332	4048	8000	0.60	8.8	10
Exon Coal USA Inc. Caballo											
Basin Elec. Coop.	Laramie River	14.93	0.69	MD	82/07	50161	6204	8400	0.46	6.0	2900
Exon Coal USA Inc. Rawhide											
AEP : Ohio Pwr. Co.	Gavin, Gen. Jim,	50.80	7.43	OH	83/?	54028	8102	8000	0.48	6.7	105
Grand River Dam	GRDA #1	28.84	1.76	OK	82/00	51154	165	8200	0.35	6.0	1800
Houston Lgt.& Pwr.Co.	Parish,W A	46.84	2.75	TX	83/87	51352	3470	8200	0.50	6.0	4550
Iowa Pub Serv. Co.	Neal, George	29.07	1.59	IO	77/98	51408	1091	8055	0.40	8.0	2200
Kansas City Bd of Pub.	Nearman Creek	28.09	1.71	KN	83/?	51476	6064	8000	0.40	6.0	1500
?	Kemp	?	?	?	86/16	53256	127	8227	0.50	6.0	2400
Omaha Public Pwr. Dis.	North Omaha	35.60	1.74	NB	83/?	52172	2291	8000	0.48	6.0	70
" " " "	Nebraska City	20.92	1.27	NB	82/97	52172	6096	8000	0.48	6.0	1700
Wisconsen Elec. Pwr. C	Pleasant Prarie	26.16	1.60	WS	80/00	53330	6170	8055	0.48	6.0	2000
Glen Rock Coal Co. Johnson, J											
Pacific Pwr. & Lgt.	Johnston, Dave (mm)	12.48	0.82	?	80/90	52225	4158	7600	0.47	10.	2500
Kerr-McGee Coal Co. Jacobs Ranch											
Arkansas Pwr. & Lgt.	Independance	30.29	1.73	AK	82/83?	50105	6641	8800	0.40	6.5	1900
" " "	White Bluff	32.46	1.83	AK	77/99	50105	6009	8524	0.48	7.5	5000
Cen. Louisiana Pwr. Coo	Dolet Hills	0.00	0.00	LA	86/?	50490	51	8500	0.50	5.8	1000

Gulf States Pwr.	Nelson	38.44	2.17	TX	82/84	51209	1393	8525	0.48	5.7	1800
" " " "	Rodemacher	38.79	2.18	LA	78/01	50490	6150	8524	0.48	5.7	600
Kerr-McGee Coal Co.	Jacobs Ranch , Clovis										
Cajun Elec. Pwr. Coop.	Big Cajun 2	39.39	2.41	LA	83/86	50399	6055	8100	0.50	6.5	2000
CEN&SW: Pub. Serv.of OK	Northeastern	32.22	1.90	OK	79/09	52413	2963	8500	0.50	6.5	3000
Houston Lgt. & Pwr. Co	Parish, W A	46.84	2.75	TX	77/03	51352	3470	8000	0.50	6.5	3000
Kiewit-Bighorn	Bighorn										
Common Wealth Edison	Crawford	43.62	2.20	IL	76/88	50643	867	9000	0.80	10.	160
" " "	Fisk Street	61.85	3.25	IL	76/88	50643	886	9000	0.80	10.	50
" " "	Joliet	63.44	3.32	IL	76/88	50643	874	9000	0.80	10.	1200
" " "	Powerton	?	?	IL	76/88	50643	879	9000	0.80	10.	1800
" " "	Waukegan	59.86	3.14	IL	83/88	50643	883	9000	0.80	10.	100
" " "	Will County	60.58	3.19	IL	76/88	50643	884	9000	0.80	10.	270
Com. Wealth Edison,IN	State Line	50.21	2.43	IN	76/88	54003	981	9000	0.80	10.	25
Mobil Coal Producing	Caballo Rojo										
Basin Elec. Coop	Laramie River	14.93	0.89	ND	82/02	50181	6204	8100	0.40	6.0	2500
Grand River Dam	GRDA #2	28.84	1.76	OK	85/10	51154	165	8100	0.50	6.0	2000
Sunflower Elec. Coop	Holcomb	25.57	1.56	KN	83/?	52855	108	8050	0.50	6.0	1250
Nerco-Antelope	North Antelope										
Arkansas Pwr & Lgt.	Independence	30.29	1.73	AK	84/06	50105	6641	8675	0.28	5.5	5000
Nerco-Antelope	Spring Creek (Antelope)										
Houston Lgt. & Pwr Co.	Parish, W A	46.84	2.75	TX	77/?	51352	3470	8500	0.25	6.0	2200
Louisiana Pwr. & Lgt.	Wilton	0.00	0.00	LA	90/10	51694	9999	8500	0.25	6.0	2500
Platte River Pwr. Auth	Rawhide	15.66	0.89	CO	86/03	52346	6761	8500	0.25	6.0	920
Shell Triton Coal Co.	Buckskin										
Basin Elec. Coop.	Laramie River	14.93	0.89	ND	84/95	50180	6204	8000	0.50	7.0	250
Cajun Elec. Pwr. Coop	Big Cajun 2	39.39	2.41	LA	79/88	50399	6055	8100	0.50	6.2	2400
Western Farmers Elec.	Hugo	33.82	2.05	OK	83/?	53262	6772	8000	0.50	7.0	1300
Sun DCO Coal Co	Coronado										

Basin Elec. Coop.	Laramie River	14.93	0.89	ND	82/02	50160	6204	8400	0.40	6.0	3000
Iowa-Illinois Gas&Ele	Louisa	28.53	1.69	IO	82/02	51406	6664	8100	0.30	6.6	1800
Iowa Pwr. & Lgt.	Council Bluffs	20.69	1.24	IO	83/7	51407	1082	8100	0.30	6.6	200
Iowa Southern Util.	Burlington	36.37	1.62	IO	77/01	51409	1104	8100	0.37	6.6	20
" " "	Ottumwa	23.96	1.42	IO	80/01	51409	6254	8100	0.37	6.6	1500
San Antonio Pub. Ser.	Deely, J T	35.53	2.11	TX	82/97	52567	6181	8300	0.40	6.2	2000
Wyodac Res. Dev.	Wyodac										
Black Hills Pwr.& Lgt	French, Ben	0.00	0.00	SD	77/88	50256	3325	7500	0.70	10.	400
" " " "	Kirk	"	"	SD	77/88	50256	3326	7500	0.70	10.	120
" " " "	Osage	"	"	SD	77/88	50256	4151	7500	0.70	10.	220
" " " "	Simpson, Neil	"	"	SD	77/88	50256	4150	7500	0.70	10.	130
Grand Island Util.	Platte	28.20	1.74	NB	78/01	51150	59	7720	0.50	7.5	350
Hastings Util. Dept.	Hasting	28.50	1.76	NB	83/7	51259	60	8100	0.40	6.0	120
Pacific Pwr. & Lgt.	Wyodac (mm)	7.29	0.45	WY	7/24	52225	6101	7500	0.70	10.	2500

1984 data from Coal Network Assoc., Inc. Fort Collins CO

MONTANA COAL CONTRACTS
COAL NETWORK ASSOCIATION

Utility by Mine	Plant Name	$/ton	$/milbtu	State	CONTRACT Began/Ends	DOE/ORIS #	BTU	SULFUR	ASH	ESTIMATED QUANT. (mton)
Westmoreland Res. Absaloka:										
Dairyland Power Coop.	Alma +	31.85	1.81	WS	83/?	50733 4140	8300	1.05	10.	120
" " "	Genoa	32.76	1.87	WS	83/?	50733 4143	8300	1.00	11.	350
Interstate Power Co.	Dubuque	35.17	1.67	IO	72/93	51403 1046	8000	1.00	14.	40
" " "	Lansing	33.34	1.97	IO	72/93	51403 1047	8000	1.00	14.	50
" " "	Fox Lake	39.84	2.29	MN	72/93	51403 1888	8000	1.00	14.	100
" " "	Kapp	?	?	IO	72/93	51403 1048	8000	1.00	14.	100
Marquette, City of	Shiras	40.38	?	MI	?/84	51778 1843	8450	0.75	10.	25
Northern States Pwr.	Black Dog	30.83	1.68	MN	72/93	52107 1904	8450	0.75	12.	100
" " "	River Side	27.44	1.44	MN	72/93	52107 1927	8450	0.75	11.	150
" " "	Sherburne Co	23.28	1.32	MN	83/?	52107 6090	8450	0.75	11.	1500
" " "	King	?	?	MN	72/93	52107 1915	8450	0.75	12.	700
" " "	High Bridge	?	?	MN	72/93	52107 1912	8450	0.75	11.	50
" " "	Minn. Valley	--	--	MN	lost cont prior to 1984					
Wisconsen Pwr. & Lgt.	Dewey,Nelson +	29.76	1.40	WS	74/93	53332 4054	8450	0.73	10.	150
Westmoreland Res Absaloka, Sarpy Ck:										
Central Illinois Lgt Co	E.D. Edwards	50.64	2.05	IL	73/93	50485 856	8100	1.00	9.0	250
Decker Coal Co Decker East:										
Common Wealth Edison Co.	Crawford +	43.62	2.30	IL	78/97	50643 867	9000	0.65	9.2	200
" " " "	Joliet +	63.44	3.32	IL	78/97	50643 874	9000	0.65	9.0	100
" " " "	Powertown +	49.21	2.63	IL	78/97	50643 879	9000	0.65	9.0	1600
" " " "	Waukegan +	59.86	3.14	IL	78/97	50643 883	9000	0.65	9.0	100
" " " "	Will County +	60.58	3.19	IL	78/97	50643 884	9000	0.65	9.0	300
Common Wealth Ed,Indiana	State Line +	50.21	2.64	IN	78/97	54003 981	9000	0.65	9.0	800
Illinois Pwr. Co.	Havana	--	--	IL	lost cont prior to 1984					

Lower Colo. River Auth.	Fayette	--	--	TX	lost cont prior to 1984						
Marquette, City of BD	Shiras	40.38	?	MI	?/84	51778	1843	9000	0.65	9.0	120
Decker Coal Co Decker West :											
Commonwealth Edison	Fisk Street +	61.85	3.25	IL	78/98	50643	886	9000	0.65	9.0	42
Detroit Edison Co.	Monroe	41.09	1.68	MI	73/99	50782	1733	9400	0.50	5.0	800
" " "	St. Clair	37.50	1.89	MI	72/99	50782	1743	9600	0.40	4.0	3800
" " "	Belle River (new plant)	0.00	0.00	MI	85/02	50782	6034	9600	0.50	5.0	4000
Lower Colorado River Aut	Sam R. Seymor????	46.05	2.53	TX	78/04	51702	6179	9200	0.50	4.5	2100
Upper Pen. Generating	Presque	--	--	MI	lost cont prior to 1984						
Western Energy Rosebud #6:											
Hibbing Public Util.	Hibbing	0.00	0.00	MN	?/83	51294	1979	8600	0.60	8.0	100
Lake Superior Dist Pwr.	Bay Front	0.00	0.00	WS	76/95	51570	3982	8600	0.90	8.5	50
Marquette City of BD	Shiras	40.38	?	MI	?/84	51778	1843	8300	0.90	9.0	25
Montana Power Co <MM>	Corette,J.E.	11.32	0.65	MT	69/89	51915	2187	8600	0.86	9.0	500
" " " "	Colstrip	12.18	0.72	MT	75/09	51915	6076	8300	0.90	9.0	3000
Northern States Power	Black Dog	30.83	1.68	MN	72/95	52107	1904	8300	0.90	9.0	60
" " "	High Bridge	32.28	1.69	MN	72/95	52107	1912	8300	0.90	9.0	50
" " "	Riverside	27.44	1.44	MN	72/95	52107	1927	8300	0.90	9.0	250
" " "	Sherburne	23.28	1.32	MN	?/95	52107	6090	8300	0.90	9.0	2500
" " "	King	?	?	MN	72/95	52107	1915	8300	0.90	9.0	500
United Pwr. Assn.	Elk River	--	--	MN	lost cont prior to 1984						
Virginia Pub. Util. Comm	Virginia	0.00	0.00	MN	83/?	53145	2018	8600	0.90	9.1	100
Willmar Municipal Util C	Willmar	0.00	0.00	MN	82/?	53305	2022	8500	0.75	8.5	60
Wisconsen Pwr. & Lgt.	Columbia +	29.76	1.40	WS	84/94	53332	8023	8700	0.75	8.8	1600
" " "	Dewey,Nelson	--	--	WS	lost cont prior to 1984						
Wisconsen Pub. Serv.	Pulliam	--	--	WS	lost cont prior to 1984						

Peabody Coal Co	Big Sky:										
Minnesota Pwr. & Lgt.	Aurora	0.00	0.00	MN	68/93	51880	1891	8700	1.30	10.	150
" " "	Boswell,Clay	20.90	1.21	MN	68/93	51880	1893	8600	1.30	10.	4200
Northern States Pwr.	Sherburne	23.28	1.32	MN	84/84	52107	6090	8700	0.70	10.	300
Knife River Coal Co.	Savage:										
Montana-Dakota Util.	Lewis & Clark	15.69	1.17	ND	73/93	51913	6089	8500	0.50	7.5	175

1984 data from Coal Network Assoc., Fort Collins CO
1979 data from Durfield and Silverman (1982)

Appendix C. Input File: Spatial Market Model

This appendix provides a sample of the data input file for running the spatial market model. The basic data format is summarized in Figure C-1, and a sample input file (for the base case at MT FOB = $9.50 and WY FOB = $6.00) is provided in Table C-1. Each row in Table C-1 is identified in Figure C-1. The columns in Table C-1 each correspond to boundaries between Montana coal and one other coal supply center. The column sequence from left to right is: Colorado, Illinois, New Mexico, Texas, Utah, Washington, South Wyoming, and Wyoming supply centers.

The spatial market maps discussed in the text of this report were generated by varying FOB prices for Montana (line 12), FOB prices for Wyoming (column 8, line 13), and fixed transportation charges (to adjust for differences between air and actual rail mile distances by region).

Figure C-1

Variable Description for Market Boundary Parameters*

Line #	Coal Supply Center	Variable Description
1	A & B	Power plant size (net MW)
2	A & B	Hours operated at full load (hours)
3	A	Power plant heat rate (BTU/KWhr)
4	A	Coal heat content (BTU/lb)
5	B	Power plant heat rate (BTU/KWhr)
6	B	Coal heat content (BTU/lb)
7	A	Power plant capital cost ($/KW)
8	B	Power plant capital cost ($/KW)
9	A & B	Fixed charge rate (decimal)
10	A	Operating and maintenance costs ($/KWhr)
11	B	Operating and maintenance cots ($/KWhr)
12	A	FOB mine price ($/ton)
13	B	FOB mine price ($/ton)
14	A	Fixed transportation cost ($/ton)
15	B	Fixed transportation cost ($/ton)
16	A	Variable transportation costs ($/ton-air mile)
17	B	Variable transportation costs ($/ton-air mile)
18	A & B	Straight line distance between A & B (miles)

*Duffield, Silverman (1982) p. 8-55

Table C-1

BASE 84 MT FOB. = 9.50 , WY FOB. = 6.00

1	500.0	500.0	500.0	500.0	500.0	500.0	500.0	500.0
2	5694.0	5694.0	5694.0	5694.0	5694.0	5694.0	5694.0	5694.0
3	10486.0	10058.0	10564.0	10251.0	10486.0	10486.0	10486.0	10486.0
4	8700.0	8700.0	8700.0	8700.0	8700.0	8700.0	8700.0	8700.0
5	10341.0	10204.0	10564.0	11045.0	10197.0	10486.0	10341.0	10486.0
6	10700.0	10500.0	10000.0	6300.0	11500.0	6100.0	10500.0	8450.0
7	1329.7	1167.3	1257.5	1049.3	1329.7	1329.7	1329.7	1329.7
8	1307.1	1206.8	1257.5	1357.0	1227.6	1333.5	1307.1	1329.7
9	0.07410	0.07410	0.07410	0.07410	0.07410	0.07410	0.07410	0.07410
10	.00671	.00633	.00665	.00630	.00671	.00671	.00671	.00671
11	.00665	.00822	.00665	.00699	.00660	.00775	.00665	.00671
12	9.50	9.50	9.50	9.50	9.50	9.50	9.50	9.50
13	21.25	25.52	25.00	11.92	26.30	27.22	16.50	6.00
14	2.02	2.02	2.02	2.02	2.02	2.18	2.02	2.02
15	2.18	5.30	2.02	2.02	2.18	2.02	2.02	2.02
16	.0246	.0256	.0265	.0265	.0246	.0265	.0246	.0246
17	.0265	.0256	.0265	.0265	.0265	.0246	.0246	.0246
18	395.7	1061.5	663.6	1106.6	521.6	779.1	321.6	252.8

Figure C-2

Montana Market Area for $1.00/Ton Price Reductions Against $7.70/Ton Wyoming Coal. Base is $9.50 Montana.

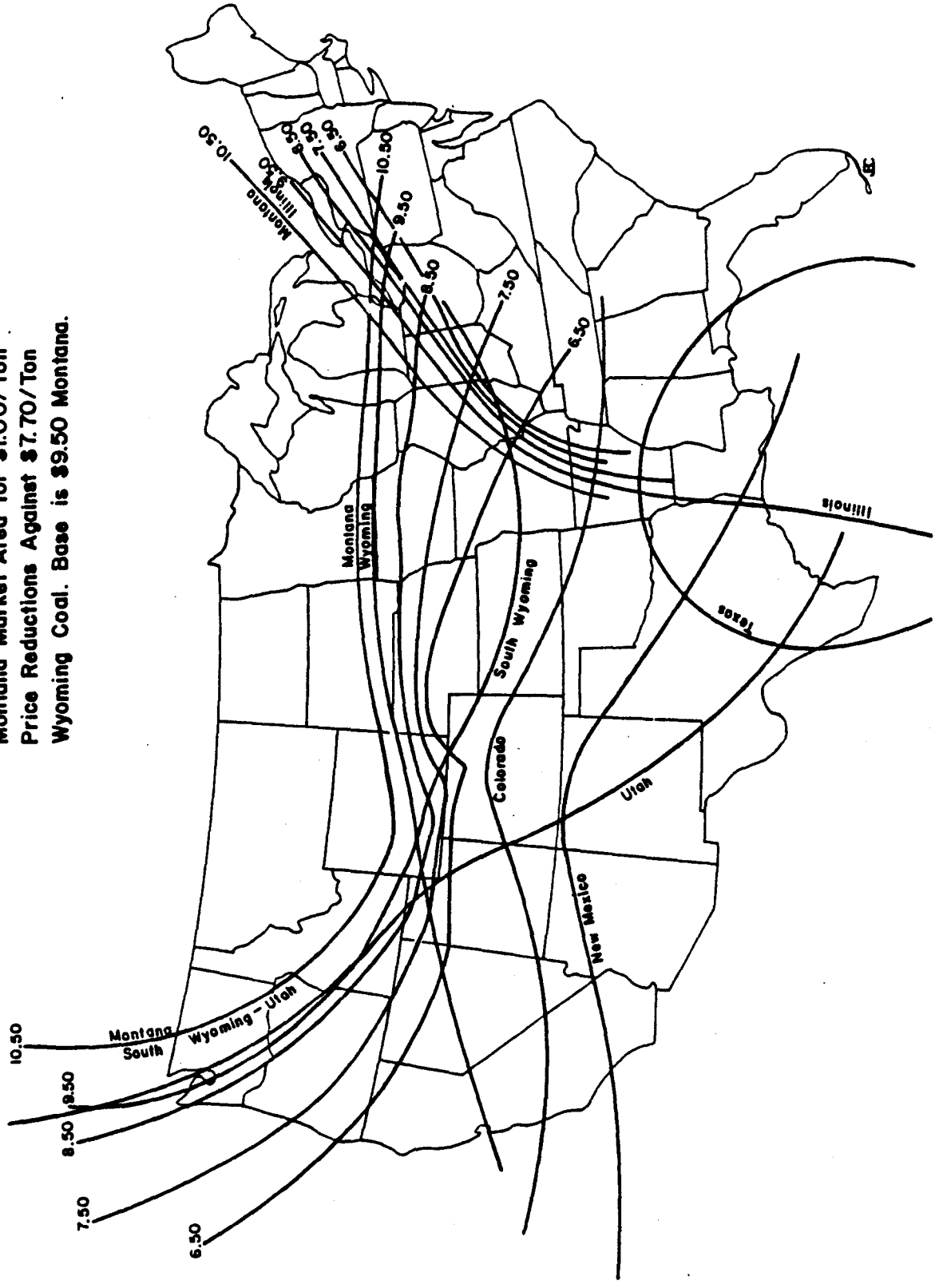
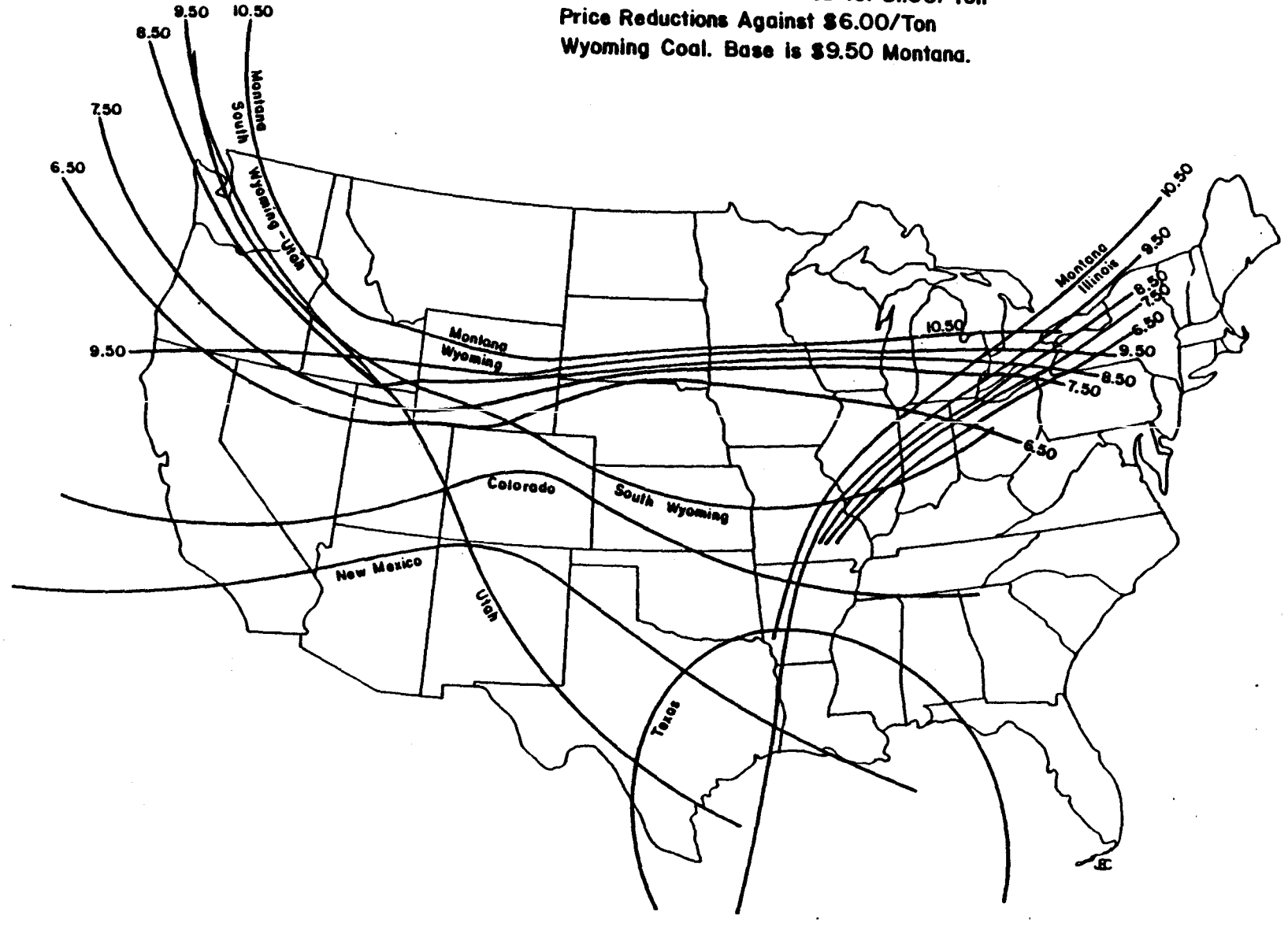


Figure C-3

Montana Coal Market Area for $1.00/Ton Price Reductions Against $6.00/Ton Wyoming Coal. Base is $9.50 Montana.



Appendix D. The Decker Market

Developing a coal production forecast for Montana coal is complicated by the fact that there are two somewhat different coals in Montana (as noted previously). The Decker/Spring Creek 9300 to 9600 BTU coal at '83 average prices is not competitive with 8450 BTU Wyoming coal at $6 to $7 a ton. These Montana coals appear to have commanded a substantial price premium in the past. There are several probable reasons for the much higher prices commanded by the high BTU coals. The principle destinations for these coals are Commonwealth Edison and other utility plants in northern Illinois, Indiana and Michigan. These are mostly older plants built in the 60's and 70's that now face sulfur emission regulations of sometimes as low as 1.2 lbs./SO_2 per million BTU. It is possible for these older plants to burn Decker and south Wyoming coal with no scrubbing and still meet the standards. Accordingly they are now paying $55 to $80 a ton delivered for Decker and south Wyoming rather than $30 Illinois coal because the latter is 3% sulfur and would require very high scrubber retrofit costs. These plants, in addition, may have no choice but to burn the higher BTU coals since they were originally designed for bituminous coal. In short, it appears that Decker and south Wyoming may have a captive special market.

Decker appears to have the edge in this market at present. This is supported by the prices reported for July 1984 shipments. For example, delivered prices to Commonwealth Edison's Waukegan plant was 343.8¢/MBTU (or $65.94/ton on 9591 BTU coal) from the Black Butte (Green River area) mine and 281.0¢/MBTU (or $53.82/ton on 9577 BTU/lb. coal) from Decker. However, from the standpoint of new plants which can design for any coal rank, Decker at $20/ton is clearly out of the market against Powder River Wyoming in all locations.

At the very much lower prices for new contracts suggested by Coal Week for 9300 BTU Montana coal of $12/ton, a corresponding price for Decker at 9600 BTU would be about $12.50 or 65¢/MMBTU. By contrast even at $7.70 and 8450 BTU, Wyoming coal is only 46¢/MMBTU. On top of this Wyoming Powder River coal has a 130 mile or so advantage to the south and south-central over Decker, worth another 13¢/MMBTU. This 32¢/MMBTU disadvantage to Decker against Wyoming Powder River is partially overcome by transportation savings due to higher BTU's per ton--around 13¢ at 1000 miles and 20¢ at 1500 miles. The conclusion here is that even at the prices suggested by Coal Week, Decker is not competitive for new plants in the south and south-central states. For large price reductions (up to $3) Decker is similar to 8700 BTU Montana in the south and south-central region and will accordingly be modeled together.

In the north central states of Minnesota, Wisconsin, and Michigan, Decker at $12.50 is not competitive against 8700 BTU Montana at $9.50, for new plants under the RNSPS. This is not contradicted by the fact that the one recent new Decker contract is for the new Belle River plant in Michigan. This plant is the last Michigan plant to come on-line under the old NSPS 1.2 lb. SO_2/MMBTU regulation. As explained earlier (Chapter II), the 8700 BTU Montana coal is priced out of this particular market due to scrubber requirements on this somewhat higher sulfur coal.

It appears that at present Decker is practicing intelligent price discrimination in the particular markets where it has an advantage. If Decker or similar mine locations should find it necessary to go into the RNSPS new plant market to utilize or expand existing capacity, it is not clear how low a price could be sustained. At current prices and rail rates, for new plants coming in under RNSPS, 8700 BTU Montana coal appears to dominate or equal Decker coal in most potential market locations. Accordingly, given price

uncertainty and market dominance, the production forecast and analysis presented in Chapter III is based on 8700 BTU Montana coal.

Decker Type Coal: Montana Resources

The unusual character of Decker/Spring Creek coal compared to the rest of the Powder River Basin raises the question of long and short term market availability and competition. Decker coal is high BTU (9300-9500), low sulfur (.3% to .4%) and average ash and water content compared to most other Montana and Wyoming coals. As such they would appear to be very desirable as replacement, mixing and even new boiler fuels in the Northern Great Plains market area as defined by Duffield and Silverman (1982). New contracts for the Decker-like coal from the Decker or Spring Creek mine, or other potential mining sites, depend upon the reserve base of the sites, as well as mining and delivered costs. It is therefore constructive to look at the resource factors at each current potential mining site in Montana containing Decker-like coal.

The two operating mines in Montana with high BTU coal are the East Decker mine, West Decker Mine (including the North Decker Extension) and the Spring Creek Mine. Table D-1 lists the coal production data for Montana for the last few years.

Both the Decker mines and the Spring Creek are important Montana producers, accounting for 15 mtpy in the year (1981) before the national recession that forced production cutbacks nationwide. The permited reserves and design capacity of the Decker and Spring Creek mines are presented in Table D-2. The reserves include those on both federal and non-federal lands. Production for the first 9 months of 1984 appears up over 1983, reflecting the rebound in the economy, and the ability of utilities to increase electric power production.

Table D-1

Montana Coal Production: 1979-1983

Name of Company	Name of Mine	County & Town	1979	1980	1981	1982	1983
Decker Coal Company	East Decker Mine	Big Horn Co. Decker	5,697,433	5,576,607	5,350,113	4,914,970	5,040,01[illegible]
Decker Coal Company	West Decker Mine	Big Horn Co. Decker	7,067,374	5,616,695	5,331,626	4,884,920	5,308,79[illegible]
Knife River Coal Co.	Savage Strip Mine	Richland Co. Savage	305,143	305,578	204,492	171,556	206,5[illegible]
Long Construction Co.	Rosebud Mine	Rosebud Co. Colstrip	11,725,556	10,401,972	10,352,966	9,424,857	9,544,062
Morrison-Knudsen Co., Inc.	Absaloka Mine	Big Horn Co. Hardin	4,947,606	4,905,262	4,450,296	4,156,578	3,86[illegible]
P & M Coal Company	P M Surface Strip	Musselshell Co. Roundup	11,692	11,189	7,404	15,141	1[illegible]
Peabody Coal Company	Big Sky Mine	Rosebud Co. Colstrip	2,457,633	2,964,359	3,193,570	2,891,428	2,571,861
Spring Creek Coal Co. (NERCO)	Spring Creek Mine	Big Horn Co. Decker		95,634	4,368,885	1,352,181	2,102,66[illegible]
Storm King Coal Mining Co. (Divide Coal Co. mid-1982)	Storm King Mine	Musselshell Co. Roundup	9,464	8,571	8,165	8,062	5,8[illegible]
Coal Creek Mining Co.	Coal Creek Mine	Powder River Co. Ashland	29,876	64,398	64,142	16,606	
Beartooth Coal Co.	Brophy #2 Mine (Underground)	Carbon Co. Red Lodge	715	7,321			
Total Coal Tonnage Production by Year			32,482,496	29,957,586	33,331,659	27,838,301	28,660,2[illegible]

Source: Dept. of Labor and Industry

Table D-2

Reserves, Design and Production of
High BTU Coal, Montana
(in 900 tons)

Mine	Reserves	Design Capacity (mt/yr)	1983 Prod.	1984 Prod. (to Oct. 1)
East Decker	172,590	6,000	5,040	4,458
West Decker	175,300	7,000	5,309	4,664
North Decker (W. Decker Extension)	57,412	2,400	0	0
Spring Creek	184,000	7,000	2,103	2,442

Source: Montana Dept. State Lands (1984)

For Montana's three (4) operating high BTU mines, available tonnage for new contracts, after subtraction of past production and current contract-life tonnage, is reported in Table D-3.

Table D-3

Uncommitted Reserves at Decker
and Spring Creek Mines
(in 10^6 tons)

Mine Name	Total Reserves	Mined to Date	Total Contracted Tonnage	Reserve Available
East Decker	172.6	20.0 (Est.)	62.0	+ 110.0
West Decker	175.3	74.0 (Est.)		
North Decker	57.4	0	236.3	- 3.6
Sub Total	405.3	94.0	298.3	106.4
Spring Creek	184.0	8.0	80.0 (Est.)	104.0
Total	589.3	102.0	378.3	211.0

Source: MBMG, Contract Data (Green)

Approximately 200 million tons of uncommitted coal remain at Decker and Spring Creek. Mined over a 20 year contract life, each mine site should still be in position to provide 5 million tons per year, or 10 million tons per year total; a substantial increase to current production levels. In both mines, only modest expansion of current design capacity would be needed to mine out all economic coal in 20 years.

Let us now consider Decker-like coals in public and private leases that are not yet developed for mining, and estimate the potential for production should markets develop in the future. Table D-4 provides data on mine lease sites, both federal and non-federal, and estimated minimum in place tonnage of high BTU (+ 9300) coal, as well as the OTA (1982) estimate of 1991 production likelihood and planned capacity. The Montco lease on non-federal land is included because of its recent history, even though most of the coal is below the 9300 BTU cutoff, ranging from 8500 to 9300 BTU per pound.

Table D-4: Estimated Resources of High BTU Coal at Undeveloped Leases in Montana

Federal Lease Mines	1991 Prod.	1991 Cap. (mt)	Est. Resources Base (m.t.)
Cx Ranch (Consol.)	Fav	8.0	(+ 200) 322
Cx Ranch (PKS)	Fav	4.0	(+ 100)
Pearl Mine (Shell)	Unfav	2.0	50-100
Wolf Mine ( )	Unfav	?	50-100
Non-Federal Lease Mines			
Montco	Fav	9.0	> 200
Youngs Creek	Unfav	8.0	235
		31.0	875(Min.)

Source: OTA, 1982, Montco Impact Statement, MBMG

It is important to point out that, although over 1 billion tons of high BTU coal remain for sale in Montana, no new contracts have been signed beyond what is already in place at either of the operating mines or the lease holdings. Although mining costs in the high BTU fields of Montana are not specifically known for undeveloped sites, they are all fairly comparable to the Decker/Spring Creek systems, which in turn are not too different from Colstrip.

In addition, the OTA (1982) survey of mine plans suggested that at least some of this uncommitted high BTU coal might even be in production by 1986, with 8.0 mtpy from Consolidation Coal's Cx Ranch site, 4.0 mtpy from Peter Kiewitt's Cx Ranch site and 2.0 mtpy from the Montco site. Clearly, none of these mine sites will reach the 1986 target, and Consolidation Coal has recently closed its Montana office. OTA also reported that mine developers at the Cx Ranch sites, Montco and Youngs Creek expected tonnage capacity to increase to 29 million tons per year by 1991. Again, this estimate looks highly unlikely, given the state of electric power consumption, utility planning, air pollution control strategies, and the state of the synthetic fuel industry in the U.S.

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Appendix E. Status of Mine Production in Montana and Wyoming

Thick seams, low sulfur content and shallow overburden all characterize the coals of Montana and Wyoming, and especially the shared Powder River Basin. In the late 1970's, concern about air pollution, especially acid rain, and unit train development brought northern plains coal into the midwest and midsouth markets. Early 1970's projections of high energy and electric utility growth rates, along with the conversion or phase out of oil- and gas-fired electric generation, suggest the very extensive development of Powder River Basin coals. Such forecasts, together with rapid leasing of federal, state and private coal lands in the late 1960's, placed the Powder River Basin in a position poised for rapid coal development in the eighties and nineties, continuing the startup surge of the seventies.

Needless to say, the collapse of the economy in 1981-82, conservation measures, the drop in world and U.S. oil prices and the realization that synthetic fuels from coal is many years away from competitive pricing, have set even the most conservative forecasts for coal development back (or forward in time). It is instructive, however, to review the level of planning in the early eighties in order to anticipate the competitive conditions that will, in part, guide future development of coal deposits.

In addition, the coal development scenarios of the Powder River/Northern Great Plains are in large part influenced by the federal government. As the largest coal owner in the PRB, lease policy, and rental and royalty fees drive competition for lease blocks and development plans. An important consideration is the "due diligence" requirements of federal leases. This requirement obligates the leasee to place resources into production at significant mining rates, and within relatively short time frames. For the

current federal leases, a number do not appear likely to meet the due diligence schedule, and therefore, can loose lease rights (OTA, 1982). Private and state leases generally offer more flexibililty in development schedules.

Table E-1, taken from the OTA (1982) study of coal leasing in the west, shows the number of mines, leases and estimated resource base for federal leases in Montana and Wyoming.

Table E-1: Approved Mine Plans with Federal Coal Leases (mil tons)

	No. Leases	No. Mines	Mine Reserves. (mt)	Federal Mine Reserves (mt)
Montana				
Powder River	12	5	480	400
Wyoming				
Powder River	24	12	4,500	4,200
Total	36	17	4,980	4,600
S. Wyoming				
Hanna	15	6	200	70
Rock Springs	5	3	400	800
Kemmerer	3	2	130	5

Source: OTA (1982) Table 49

Powder River Basin mines with federal leases are reviewed in Tables E-2 and E-3. Of specific note is the contract data and the leasees' estimate of 1991 production levels. The 1986 mine design capacity nearly exactly matches the 1991 production estimate made by the coal companies. With the recent set back in new coal sales and contract deliveries, it is unlikely that mine capacity expansion will take place on the original schedule.

Table E-2

—Powder River Basin Federal Mine Statistics

Mine name	Lessee[c]	Number of Federal leases	Federal[a] lease reserves	Acreage: Total permitted mine plan acreage	Acreage: Federal lease acreage	First coal shipped	Cumulative production 1976-1979	Production 1979	Remaining[b] mine life
			(billion tons)				(million tons)	(million tons)	
(Montana)									
Rosebud	Western Energy Co.	5	HM	6,198	6,227	1920's	41.3	11.7	40 years
Big Sky	Peabody Coal Co.	1	LM	2,351	4,307	1969	9.3	2.5	38 years
Spring Creek	Spring Creek Coal Co.	1	L	3,016	2,347	1980	0.0	0.0	25 years
West Decker	Decker Coal Co.	4	HM	3,137	4,961	1972	55.7	7.1	21 years
East Decker	Decker Coal Co.	1	L	4,378	9,410	1976	5.9	5.9	27 plus years
Montana totals		12	0.8	19,080	29,252		112	27.2	
(Wyoming)									
Buckskin	Shell Oil Co.	1	LM	1,467	800	1981	0.0	0.0	18 years
Rawhide	Carter Mining Co.	1	L	7,393	5,697	1977	7.2	3.6	26 years
Eagle Butte	AMAX Coal Co.	1	L	4,304	3,520	1978	4.0	3.7	37 years
Wyodak	Wyodak Resources	3	HM	3,240	1,880	1922	6.3	2.4	43 years
Caballo	Carter Mining Co.	2	L	10,040	5,360	1979	1.4	1.3	44 years
Belle Ayr	AMAX Coal Co.	2	L	6,280	2,401	1973	53.8	15.0	19 years
Rojo Caballos	Mobil Oil Corp.	2	L	5,815	3,959	1983	0.0	0.0	27 years
Cordero	Sunoco Energy Dev. Co.	1	L	8,232	6,560	1976	9.8	3.8	26 years
Coal Creek	Atlantic Richfield Co.	1	L	9,545	5,806	1981	0.0	0.0	35 years
Jacobs Ranch	Kerr-McGee Coal Co.	2	L	4,959	4,352	1978	6.5	4.7	22 years
Black Thunder	Thunder Basin Coal Co.	2	L	7,560	5,884	1977	10.3	6.2	38 years
Dave Johnston	Pacific Power & Light Co	6	LM	14,305	9,662	1958	13.1	3.8	16 years
Wyoming totals		24	4.4	83,140	55,660		112	44.5	
Powder River basin totals:		36	5.3	102,220	84,932		225	71.7	

[a]Non-Federal reserves in logical mining units with these Federal lease reserves will add approximately 0.3 billion tons of recoverable reserves in both Montana and in Wyoming to the above totals (approximately 0.6 billion tons in all would be added to the above Powder River basin lease total).
[b]As reported by the lessees in their mine plans.
[c]See the OTA Working Lease List, app. B, for a listing of both parent companies and subsidiaries.

Key to reserve ratings:
S = small reserves (zero to 30 million tons)
LM = low to medium reserves (30 million to 100 million tons)
HM = high to medium reserves (100 million to 180 million tons)
H = high reserves (over 180 million tons)

SOURCE: Office of Technology Assessment.

Table E-3

—Powder River Basin Federal Mine Production, Capacity, and Contracts
(millions of tons per year)

Mine name	1980 mine design capacity	Production 1980	1986 mine design capacity	OTA estimated production-1986 demand scenario: H	OTA estimated production-1986 demand scenario: L	Contracts for 1986	Lessees' estimates of production-1986	1991 mine design capacity	OTA estimated production-1991 demand scenario: H	OTA estimated production-1991 demand scenario: L	Contracts for 1991	Lessees' estimates of production-1991
Montana												
Rosebud	14.2	10.4	19.8	19.5	16.3	19.4	19.4	19.8	19.8	17.5	19.8	19.8
Big Sky	4.8	3.0	4.8	4.8	3.9	4.8	4.8	4.8	4.8	4.1	4.8	4.8
Spring Creek	0.2	0.1	10.0	7.6	5.9	7.0	7.6	10	9.2	6.2	7.0	10.1
West Decker	10.4	5.8	10.4	7.5	5.8	8.7	8.0	10.4	9.4	5.9	8.7	8.0
East Decker	6.7	5.8	6.7	6.8	5.8	6.7	6.8	6.7	6.9	5.9	6.7	6.8
Montana totals	36	24.7	52	46	37	44	46	52	50	40	45	49
Wyoming												
Buckskin	0	0	6.2	6.2	5.2	6.2	6.2	6.2	6.2	5.5	6.2	6.2
Rawhide and Caballo	12 + 4	6.4	24 + 12	20.4	13.5	16.0	31.0	24 + 12	30.7	14.2	16.0	36.0
Eagle Butte and Belle Ayr	14 + 21	24.5	25 + 11	33.7	27.8	33.0	33.0	25 + 11[a]	35.2	29.2	33.0	32.0
Wyodak	3	2.6	5	3.4	2.5	3.0	3.0	5	4.9	4.0	4.5	4.5
Rojo Caballos	0	0	9	4.5	2.7	2.6	9.0	15	12.5	5.0	5.6	15.0
Cordero	24	8.5	24	13.9	9.3	11.0	16.0	24	20.5	9.7	11.0	24.0
Coal Creek	0	0	12	8.4	4.0	4.8	9.8	12	10.1	4.2	4.8	12
Jacobs Ranch	16	6.2	16	13.8	11.1	13.2	15.6	16	15.3	11.7	13.2	15.6
Black Thunder	14	10.5	20.5	17.4	13.9	16.5	17.0	20.5	19.4	14.6	16.5	20.5
Dave Johnston	3.8	3.8	3.8	3.7	3.1	3.7	3.7	3.8	3.8	3.3	3.7	3.7
Wyoming totals	112	62.5	169	123	93	110	144	175	159	101	115	170
Powder River basin totals	148	87.2	220	169	130	154	191	226	209	141	159	219

[a]This capacity estimate based on remaining reserves.

SOURCE: Office of Technology Assessment.

Leases with approved mine plans (Table E-4) in Montana and Wyoming provide a potential production for the two states in 1986 and 1991 of 219 m.t. and 248 m.t. respectively. Montana potential production will closely follow the contract levels for the year 1986 and 1991; however, the Wyoming potential is far in excess of current contract commitments for 1991.

Table E-4: Approved Mine Plans with Federal Coal Leases (mil tons)

Montana:	1979 Prod.	1984 Prod.	1986 Pot.	1991 Pot.
Powder River Basin	27.1	33.0	46.0	49.0
Fort Union Basin	0.3	0.3	0.3	0.3
Sub Total	27.4	33.3	46.3	49.3
Wyoming:				
Powder River	45	120	144	170
Hanna	11	?	10	8
Rock Springs	7	?	13	15
Keinmerer	5	5	6	6
Sub Total	68	125+	173	199
Grand Total	95.4	158.3+	219.3	248.3

Note: Pending plans if not withdrawn range from 0-9.0 m.t. in MT (1986-91) and 10-70. m.t. in WY (1986-91)

Source: OTA, 1982, Table 47

In addition to mines on federal lands, private ownership and state leases provide additional opportunity for production (Table E-5). Although plans for capacity expansion are almost always predicated upon coal sales, planning often preceeds contract signatures and cutbacks are easier to implement than rapid expansion. Therefore, it is likely that Montana capacity will not reach

50 million tons in 1991 under current conditions. Wyoming expansion plans are mitigated by the enormous mine capacity already in place, and significant expansion of non-federal mines seems unlikely given the development requirements on federal leases. The incentive for federal lease holders is to cut costs and profits in order to put properties into production wherever possible.

Table E-5: Major Non-Federal Mines in the Powder River Basin (mt/yr)

	1986		1991	
	Capacity	Contracts	Capacity	Contracts
Montana				
Absaloka	10.5	5.1	10.5	5.1
Montco	2.0	0	9.0	0
Youngs Creek	--	--	8.0	0
Bull Mts.	0.5	0	2.0	0
Sub Total	13.0	5.1	29.5	5.1
Wyoming				
Bighorn	3.0	3.0	3.0	3.0
[a]Wymo	4.0	2.0	4.0	2.0
Clovis Point	5.0	0	5.0	0
Sub Total	12.0	5.0	12.0	5.0
Grand Total	25.0	10.1	41.5	10.1

a = utility captive

Source: OTA, 1982

Appendix F. Decision Theory Analysis of Severance Tax Cut Impacts on Expiring Montana Contracts

This appendix provides a preliminary analysis of the impacts of severance tax cuts on Montana coal contract renewals. The overall effect of a Montana tax cut will depend on a number of factors, such as the electric growth rate. For expiring contracts the key uncertainty is the level of supply prices for competing coals, particularly Wyoming. A decision theory model which takes account of the risk associated with alternative Wyoming prices is developed below, for application to the expiring contract issue. A similar analysis for all categories of potential demand (new plants, acid rain plants) would be appropriate but is beyond the scope of this project.

Montana coal contracts that are known to be expiring by 1995 are summarized in Table F-1. The contracts total around 14.5 mtpy (based on an average of contract minimums and maximums). Actual 1983 contract deliveries totaled 12.6 mtpy to these burn sites. By 1995 expiring contracts will be about one-third of projected 1995 Montana production (at 46 mtpy). All contracts expiring to 1995 are for the 8700 BTU Montana producers. Westmoreland and Peabody production is currently 100% on contracts that will expire by 1995. Western Energy is somewhat less exposed with 58% of today's production due to contracts to expire by 1995 and dropping to around 40% by 1988. In short, expiring contracts are a significant share of current and forecast production, particularly for Westmoreland and Peabody.

Table F-2 provides an estimate of a breakeven Wyoming minemouth (FOB) price that would just match Montana FOB of either 9.50 $/ton or 10.50 $/ton (both cases presented). The estimates are based on differences in transportation cost. For example the Corette plant in Billings is only 110 miles further from Gillette than from Colstrip. Using an incremental cost

Table F-1

Summary of Expiring Contracts by Burn Site

State	Utility	Burn Site	Quantity (mtpy)	Expiration Date
Montana	MPCo	Corette	.6	'90
	Subtotal		(.6)	
Minnesota	NSP	Sherburne	4.5	'93-'95
		Minneapolis Area	2.3	'93-'95
	MPL	Clay Boswell	3.6	'93
		Laskin (Aurora)	.2	'93
	Subtotal		(10.6)	
Wisconsin	WPL	Nelson Dewey	.2	'93
		Columbia	2.0	'94
	DP	Alma	.2	'93
		Genoa	.3	'93
	Subtotal		(2.7)	
Michigan	UPG	Presque Isle	.6	'91-'95
	Subtotal		(.6)	
Total			14.5	

of .017 $/ton-mile this is a $1.87 transportation difference that Wyoming coal would have to make up with lower FOB mine price to equal the delivered price of Montana coal. For example, if Colstrip FOB is 9.50, Wyoming "breakeven" FOB is 9.50 less 1.87 or 7.63 as shown in Table F-2. All other estimates are derived in a similar manner, except where actual rail tariffs were available. In general foremost Minnesota, Wisconsin, and Michigan burn sites, Montana has a rail advantage of 200 to 300 miles or $3.50 to $5.00 per ton. We have ignored here any boiler or scrubber-related costs that may vary due to coal characteristics.

Table F-2

Breakeven Wyoming Prices by Burn Site for Existing Montana Contracts

Burn Site			Montana FOB	
			9.50	10.50
State	Utility	Plant	Wyoming Break Even Price*	
Montana	MPCo	Corette	7.63	8.63
Minnesota	MPL	Clay Boswell	4.91	5.59
	NSP	City Plants	5.67	6.67
		Sherco	4.94	5.94
Wisconsin	WPL	Nelson Dewey	7.29	8.29
		Columbia	3.61	4.61
	DP	Alma	4.81	5.81
		Genoa	4.21	5.21
Michigan	UPG	Presque Isle	4.57	5.57

Source: Based on actual difference in rail tariffs where known (eg., Columbia) and estimated using .017 $/ton-mile and mileage difference (tariff or estimated) where not known. Breakeven is not corrected for BTU content difference (ie, assume all coal 8700 BTU/lb).

Given an actual distribution for Wyoming contract prices, it is possible to estimate the probability that Wyoming will secure an expiring Montana contract with a bid less than or equal to the "breakeven" price by burn site. The distribution used here is the lower half (10 observations) of the successful Wyoming bids (contracts) summarized in Figure 7 of Chapter III. The mean of this distribution is 7.33 $/ton, with a range of $4.75 to $8.72 and a sample standard deviation of 1.437. This mean is below but close to the mean for new Wyoming contracts suggested to us by the Wyoming Geological Survey at 7.70 $/ton and is accordingly perhaps a little pessimistic (favoring Wyoming) for current conditions. More importantly, it may be very pessimistic for the time when contracts are actually renewed. The actual mean for all Wyoming contracts is 9.77 $/ton. It is obviously difficult to predict the

aggregate coal market in 1990 to 1995. The following results may well be conservative since they are based on "soft" market conditions.

For purposes of illustration and simplicity, it is assumed that Wyoming prices are normally distributed. Based on this assumption and the breakeven prices in Table F-2, the probability of Wyoming successfully securing Montana's expiring contracts is summarized by burn site in Table F-3. For example, at Corette, we estimate the probability of a successful Wyoming bid at 82% if the Montana FOB is $10.50, 58% at 9.50 and 31% at 8.50. The probability of a Montana contract renewal here is of course "one" minus the Wyoming probability, so that as the Montana FOB (bid) price declines from 10.50 to 9.50 to 8.50 the likelihood of getting the contract increases from (1.00 minus .82, etc) 18% to 42% to 69%.

It should be noted that we have of course ignored the captive mine issue with respect to Corette. Similarly we ignore the presence of other competitors. Almost certainly Nelson Dewey, Alma, and Genoa (totaling only .7 mtpy) will be captured by low sulfur eastern coals. These two issues tend to cancel in the results; however, these burn sites are retained in Table F-3 to broaden the illustration.

Price difference in Table F-3 for Montana FOB can of course be interpreted as price reductions due to severance tax changes from a given base price (eg. Montana FOB of $9.50 or $10.50). For policy analysis of this decision under risk, an appropriate criteria is the expected value criteria:

$$\text{Expected Value (of Policy X)} = \sum_j \pi_j M(X)_j$$

Where π_j are the probabilities of the relevant "state of the world" (Wyoming or Montana gets the contract) over "j" burn sites;

$M(X)_j$ are the physical or monetary outcomes (eg. Montana severance tax revenue, or coal production levels) associated with policy "X" (eg. severance tax reduction, no tax reduction, etc.) at burn site j.

Table F-3

Probability of a Successful Wyoming Bid on Expiring Montana Contracts by Burn Site

Burn Site	Quantity (mtpy)	Montana FOB Price ($/ton) 10.50	9.50	8.50
Corette	.6	.82	.58	.31
Clay Boswell	3.6	.11	.05	.01
NSP City Plants	2.3	.31	.12	.03
Sherco	4.5	.17	.05	.01
Nelson Dewey	.2	.75	.49	.24
Columbia	2.0	.03	.01	.01
Alma	.2	.14	.04	.01
Genoa	.3	.07	.02	.01
Presque Isle	.6	.11	.03	.01

Source: Based on breakeven prices (Table F-2) and against a Wyoming contract (successful bids) price distribution with a mean of 7.33 $/ton and a sample standard deviation of 1.437 (assumed normal distribution).

In short, the preceding specification takes account of the fact that changing prices through severance tax reductions does not guarantee results but rather affects the probability of (here) retaining contracts. As can be seen in Table F-3, at most sites we are relatively sure of retaining contracts and the effect of $1.00 per ton (equivalent to 50% tax reduction at $9.50 Montana FOB) price reductions is small. For example at the largest contract, Sherco units 1 and 2 near Minneapolis, at $9.50 Montana FOB we estimate a 5% chance of a Wyoming contract. The tax reduction to $8.50 reduces this to 1%.

Using this methodology, the probable contract renewals (on a maximum of 14.3 mt, as the Laskin unit is excluded) is 11.6 mtpy at $10.50 Montana FOB, 13.1 mtpy at $9.50 and 13.9 mtpy at $8.50. As developed in Table F-4, the probable tax revenue with no change in tax rate is around $25 million per year. The tax revenue with a 50% tax cut is down considerably per ton and generates only a small probable increase in tonnage (1.5 mtpy at a base price of $10.50 and .8 mtpy at $9.50). As a result, the conclusion is that a large tax revenue loss is likely assuming Montana producers are at $10.50 or $9.50 FOB of around $13 million/year.

Table F-4

Expected Value of Annual Severance Tax Revenues for Changes in Tax Rate on Contracts Expiring by 1995

	Cases		
	Montana FOB Price ($/ton)		
Category	10.50	9.50	8.50
Probable quantity of contract renewals (mtpy)	11.6	13.1	13.9
Tax revenue, no tax cut (million $)	25.7	26.2	24.9
Tax revenue, 50% cut (million $) (by initial base price)	13.1	12.5	
Probable net loss to tax cut	12.6	13.7	

Source: Based on the probabilities of contract renewal provided in Table F-5 and assuming Wyoming is the only competitor. (In fact Genoa, Alma, and Nelson Dewey will all go to Eastern low sulfur coal for a net contract loss of .7 mtpy and offsetting this Corette will remain captive at .6 mtpy).

These results are sensitive of course to the assumed bid distribution. Alternatively, if we were certain that Wyoming producers would bid, say $6/ton for an appropriate coal, we could also use the breakeven price Table F-2 to

calculate the consequences of a "certainty" case. These results are summarized in Table F-5. As is apparent contract renewals are not sensitive to a Wyoming price range of $5 to $8/ton except at $10.50 Montana FOB. If Montana coal producers cannot offer an FOB below 10.50 $/ton in soft market conditions they are in trouble on contract renewals against $5/ton Wyoming. If this extreme low Wyoming bid and high Montana bid occurred at every burn site between 1990 and 1995 we would renew only 2 mtpy out of 14.3. A tax cut here would have a positive impact by getting us to 11.5 mtpy for a net tax revenue gain of $7.1 million. All other cases show a net loss of $10.8 million to $16.6 million. The odds of the $10.50 Montana and $5.00 Wyoming case consistantly occurring are probably quite low. In fact the "probable" case is what has been outlined in Tables F-3 and F-4. Clearly the risk/benefit result is sensitive to the assumed price distribution. We will know a lot more about this as the mid-1990's approach. On a simple tax revenue loss basis it would appear that the "no loose" solution here is to defer possible tax reductions to the future.

Table F-5

Certainty Case Summary of Annual Tax Revenue Loss on Montana Coal Contracts Expiring by 1995

Montana FOB Price	Wyoming FOB Mine Price ($/ton) 5.00	6.00	7.00	8.00
	A. Quantity of Renewed Montana Contracts (mtpy)			
10.50	2.0	11.5	13.8	13.8
9.50	11.5	13.8	13.8	14.3
8.50	13.5	13.5	14.3	14.3
	B. Tax Revenue with No Tax Cut (million $/yr)			
10.50	4.4	25.4	30.4	30.4
9.50	23.0	27.6	27.6	28.6
8.50	24.2	24.2	25.6	25.6
	C. Tax Revenue with 50% Cut (million $/yr)			
cut to 9.50	11.5	13.8	13.8	14.3
cut to 8.50	12.2	12.2	12.9	12.9
	D. Net Loss Due to Tax Cut (million $/yr)			
Base 10.50	(7.1)	11.6	16.6	16.1
Base 9.50	10.8	15.4	14.7	15.7

#10
1-28-87

UPDATE OF THE MONTANA COAL MARKET TO THE YEAR 2000
IMPACT OF SEVERANCE TAX ADJUSTMENT
AND OTHER ISSUES RELATED TO COAL DEMAND

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Prepared for

The Montana Legislative Council
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EXECUTIVE SUMMARY

The following is a set of conclusions based on the Duffield-Silverman report of January 1985 and on the update that follows. The major conclusions related to the continuing effort to define the Montana market for Powder River Basin coal in the near to mid-term future are as follows:

1) The Montana coal market for the period 1971-1985 has been relatively stable due to our locational advantage to Minnesota, Wisconsin, and Michigan, and by wire to the Pacific Northwest. In the period 1985-1995 this advantage should continue to provide Montana producers with a slowly expanding market if they increase their efficiency and are willing to meet the price competition of Wyoming mines with large overcapacities of low to medium BTU coal.

2) The large relative growth in the Wyoming coal market for the past 15 years will slow considerably over the next 10 years. Relatively few new utility contracts for plants now scheduled to come on-line between 1985 and 1995 are yet unsigned. However, the Wyoming market, buffered by:

a) its locational advantage to the much larger south-central electric market

b) a restablization of oil prices in the range of $15.00-$20.00 a barrel,

c) a potential expansion of the low-sulfur coal market due to acid rain legislation by the federal government, and

d) a willingness to accept short-term pricing at variable cost levels for coal in order to keep mining operations active,

all suggest that the Wyoming share of the 19-state Northern Great Plains market will continue to exceed that of Montana's.

3) Cost differentials between Montana and Wyoming related to locational advantage (transportation), mining costs, and air pollution regulations remain on the order of $5.00-$15.00/ton. Cost differentials due to Montana and

Wyoming coal severance taxes (Montana's effective 21% before the HB607 reduction, and Wyoming's effective 11%) are more on the order of approximately $1.00/ton and have an insignificant total market impact at this time. In a few specific burn sites, the severance tax differential could make the contract difference. Reliability of supply, experience with burning a given coal, continuity of coal quality on a monthly basis, and in some markets minor changes in sulfur content relative to the BTU value of the coal, are all generally much more important than a modest price differential created by the Montana-Wyoming coal severance tax rates.

4) In all likelihood most of the existing contracts with Montana producers that will expire in the 1993-1995 time period will be renewed, even if tax rates were reestablished at the pre-HB607 levels. As a matter of fact, one major contract, assumed to be Western Energy with Northern States Power, has already been extended for five years after the contract expiration date in the early '90s, and will deliver up to 33 million additional tons of Rosebud Mine coal to the Northern States Power system.

5) Based on industry sources and discussions, along with known contracts, the Montana coal industry will continue a steady growth rate after recovery from the downward economic turn of the past year and a half. This downward turn together with excess hydro power and low cost oil and gas, has reduced coal demand from the Powder River Basin. As the economy recovers and the electric utility market returns to projected growth rates, we will see coal production in Montana reach 42 million tons per year (mtpy) in 1990 and 46-48 mtpy in 1995. Our long-term forecasts for Montana coal production continues to be for substantial growth, to between 48-85 mtpy by the year 2000, depending upon the growth rate of electrical consumption in the Northern Great Plains market area. Our most likely forecast is that by the year 2000 Montana

coal production will reach levels of between 60-65 mtpy, adding approximately 30 million tons to Montana's current production level.

Although the federal congress is once again dealing with the acid rain issue, and could potentially pass a 10 mtpy annual SO_2 reduction requirement to be in place by the early 1990s, that legislation will only have a minor impact on Montana production. We would have to compete strenuously with Wyoming mines in order to capture any windfall from acid rain legislation. On the other hand, SO_2 performance standards passed in Wisconsin during the past year have forced Wisconsin utilities to look closely at low sulfur compliance coal in the Powder River Basin that can be produced from low-cost Wyoming operations. These coals could replace some Montana production when contracts expire in the early 1990s, and compete effectively for any new plant contracts in the future.

6) We believe that continuation of the severance tax reduction in all probability will not generate sufficient increased production to offset tax revenue losses on the new production that will occur. Even with the 1985 experience of one million dollars in severance tax reduction requests, equivalent to approximately one million tons of additional coal produced under certain contracts, it is not possible at this time to know for certain if any of that addition would have been forthcoming without the tax reduction in HB607.

7) In the long-term, however, we forecast that revenue losses for new production will rise from $10 million per year in 1990 to $35 million per year in the year 2000, with a 50% reduction in the Montana severance tax. This same tax reduction on all Montana coal will amount to a loss for the state of $58 million per year in 1990 and $83 million per year in the year 2000. Our analysis shows that we cannot increase coal production in the next 15 years by

an amount that would compensate for the reduced tax revenue flow to the state caused by a significant reduction in the severance tax.

These conclusions, based in part on our January 1985 study, and here carried forward over the following 18 months, provide in our judgment the most comprehensive outlook on near and mid-term coal markets for Montana producers. The discussion which follows provides the reader with specific information and analysis to support our updated conclusions above.

INTRODUCTION

The study here presented is an update of the Montana coal market report to the year 2000 prepared by Duffield, Silverman, and Tubbs for the Montana Department of Commerce dated January 1, 1985. An attempt has been made to complete the data base for the Powder River Basin coal market for the past 18 months, that is the period January 1985 to June 1986. In addition, an attempt has been made to reconsider the pertinent issues discussed in the coal market report of 1985, and to seek further update in the area of coal mine planning and market demand in the region where Powder River Basin coals can compete in the utility market. The update is a study of changes in utility coal demand, coal production capability, pricing, and mining costs within the Powder River Basin and its market region.

No attempt has been made to assess the export or industrial markets. The former of which remains essentially inactive, and will continue to be so in the foreseeable future; and the latter which has shown a small but steady growth until the period of rapidly declining oil prices at the beginning of 1986.

The synthetic fuels market will not be considered, as that program, funded by federal grants and price underwriting, is essentially dormant on the American scene today. We will therefore, only mention briefly in passing that the synfuels, industrial, and export coal markets for the Powder River Basin states of Montana and Wyoming are following our 1982 forecast and will not influence coal tax revenues in any important way.

The last 18 months in the Powder River Basin coal markets can be characterized by: 1) a sluggish economy, 2) a precipitous drop in oil and gas prices, and increased availability of these two alternative fuels, 3) continued progress in energy conservation, and 4) a continuing and very large

overcapacity of supply in Powder River Basin mines. These major elements in the U.S. and western coal markets have spawned a series of reactions that have substantially effected Montana-Wyoming coal mining.

Declining oil and gas prices and the huge coal capacity in the Powder River Basin has provided utilities with the ability to take minimum supply on contracts, and in some case pay off contracts, in order to enter the spot market for their incremental needs or to find new sources at much more favorable delivered prices. The spot market has therefore been the area of rapid growth in national and western marketing. In addition, the sluggish U.S. economy translated into a sluggish coal economy and renewed competition with oil and gas has developed a national shake out of coal companies through low sales prices, restructuring, and reorganization of management. The outcome of this activity of the last 18 months is the very pronounced and vigorous movement toward low-cost producers in the coal industry who will challenge for increasing market shares. At the same time that shake out and reorganization are going on, mining is becoming more efficient, particularly in the west where the ratio of surface to underground mining is going up and the efficiency of mining at individual areal strip mines also improving.

Acid rain legislation, which was unexpectedly voted out of a U.S. House subcommittee in 1986, could come to the House and Senate floor before the end of this year. The legislation provides for a national reduction of 10 million tons per year (mtpy) of SO_2, as well as a 4 mtpy reduction in NO_x. Should this legislation become law with the proviso that a variety of compliance strategies can be used, including switching to low sulfur coal, a noticeable effect on coal production in the Powder River Basin should be forthcoming with most of the benefit going to the Wyoming low-sulfur, high BTU coal mines on the basis of price competition.

The nuclear industry continues its cancelation, and conversion to coal trend, for uncompleted plants; and no new starts have been planned beyond the schedule of completion during the decades of the '80s and early '90s. The additional plants scheduled to come on line over the next ten years will add substantial capacity to electric generation throughout the country and will further negate the need for new coal-fired plants if the economy stays at its predicted slow rate of growth.

Lastly, it appears that competitive unit-train pricing in the Powder River Basin between Chicago and Northwestern and Burlington Northern has established high-volume, long distance coal rates at between 1.5 and 1.7 cents/ton-mile. The recent purchase by C&NW of shared BN track in the Powder River Basin has further increased the competitive dimension of coal shipment from Wyoming and will be an added factor in stabilizing unit train coal rates over the next few years. Although recent studies seem to indicate that coal is providing an inordinately large share of returns on investment in the rail transport industry, as a result of pricing coal higher than other commodities shipped by rail relative to their cost, the ICC is adamant in its contention that the 1980 Staggers Act is working and should continue to work in the present form to establish competitive rates. With respect to Wyoming and Montana unit train coal shipments, we appear to be close to establishing competitive rates, although many would argue that the rates themselves are higher than they should be for moving coal long distances cross-country.

SHORT-TERM EXPECTATIONS

Given the setting above, we believe that the following comments fairly well characterize the important contributors to coal marketing changes in the Powder River Basin during the next few years. First, oil prices may stabilize in the $15.00-$20.00/barrel area during 1987 or 1988, and hold that price

level into the 1990s. This will reduce the external pressure on coal pricing that rapidly falling oil prices provided in some parts of the country, and made oil look attractive in the near term as a substitute for coal. We do not believe that long-term oil pricing of $10/barrel, which is the price necessary to compete with coal in the utility market, can be stabilized in the world oil situation. Secondly, low natural gas prices, again competitive with coal in the south-central utility market, will rise as oil prices rebound in the late 1980s. Lastly, excess capacity of the Powder River Basin will gradually decline from its current levels of about 80 mtpy to about 40 mtpy by 1995. With few new mines opening in the next 10 years, a gradual increase in demand will soak up some, but not all, of the excess capacity keeping coal prices low and competition extremely active in the Powder River Basin.

Excess hydropower imported from Canada can have a local effect, as well as alter the Northwest-California utility link. This excess Canadian capacity can provide electricity, at least for a short time, for the expected growth in the Northwest utility market. In its 20-year plan (1986-2006), the Northwest Planning Council, together with the Bonneville Power Administration, is considering coal the resource of lowest priority and highest cost (4.5 ¢/kwhr) over the next 20 years. As the regions marginal resource, coal is capable of expanding only if all other resources do not meet or exceed their expected levels. Those other resources, of course, include conservation and Canadian hydropower.

Under a high growth base load scenario, about 7000 megawatts of coal-fired generation would be added to the Northwest region in the next 20 years. A more likely medium-high to medium-low growth projection would only require about 1800 megawatts of coal-fired addition, whereas no coal-fired facilities would be required under the medium-low to low growth scenarios provided by the

Planning Council. These projections would require at most from 6-25 mtpy of additional coal production, particularly from the Powder River Basin and Utah. However, the probability of loads between the high and medium-high scenarios is only 27%, between the medium-high and medium-low scenario is 42%, and between the medium-low to low scenario is 31%. There is, therefore, only about one chance in two that the Bonneville service area will demand a substantial increase in Powder River Basin coal for the next 20 years. That probability is low because the high to medium-high growth rates of between 2.0% and 3.0% a year are well beyond the expected 1.0%-1.5% increase of most recent projections for the region.

Our earlier projections (1982, 1985) of coal production for the Powder River Basin market area appears to be right on track. We suggested that potential new Montana contracts to 1995, that related to power plants, would be in the range of 4-11 mtpy and is an upper limit predicated on the current NERC "Sum of Utilities" forecast in our market area. The traditional market area for Montana, including Minnesota and part of Wisconsin, has not changed. Wyoming inroads into both the Wisconsin and Minnesota market will be discussed below and should be taken seriously in terms of long-term contracting, although there is also reason to believe that the Wisconsin market may stay source diversified even with a Wyoming delivered price advantage. Wyoming's traditional growth in market area to the south-central and gulf coast region of the United States should continue, but at a much slower rate than that of the '70s and early '80s, offering about 30 mtpy of new uncontracted potential.

Low sulfur, low BTU coal will continue to be a glut on the market for at least the next 10 years, as over-capacity will continue beyond 1995, thereby maintaining a highly competitive structure in the Wyoming part of the Powder River Basin. That price competition will exert price pressure on Montana producers and the continuing advantage of Wyoming over Montana in most of the

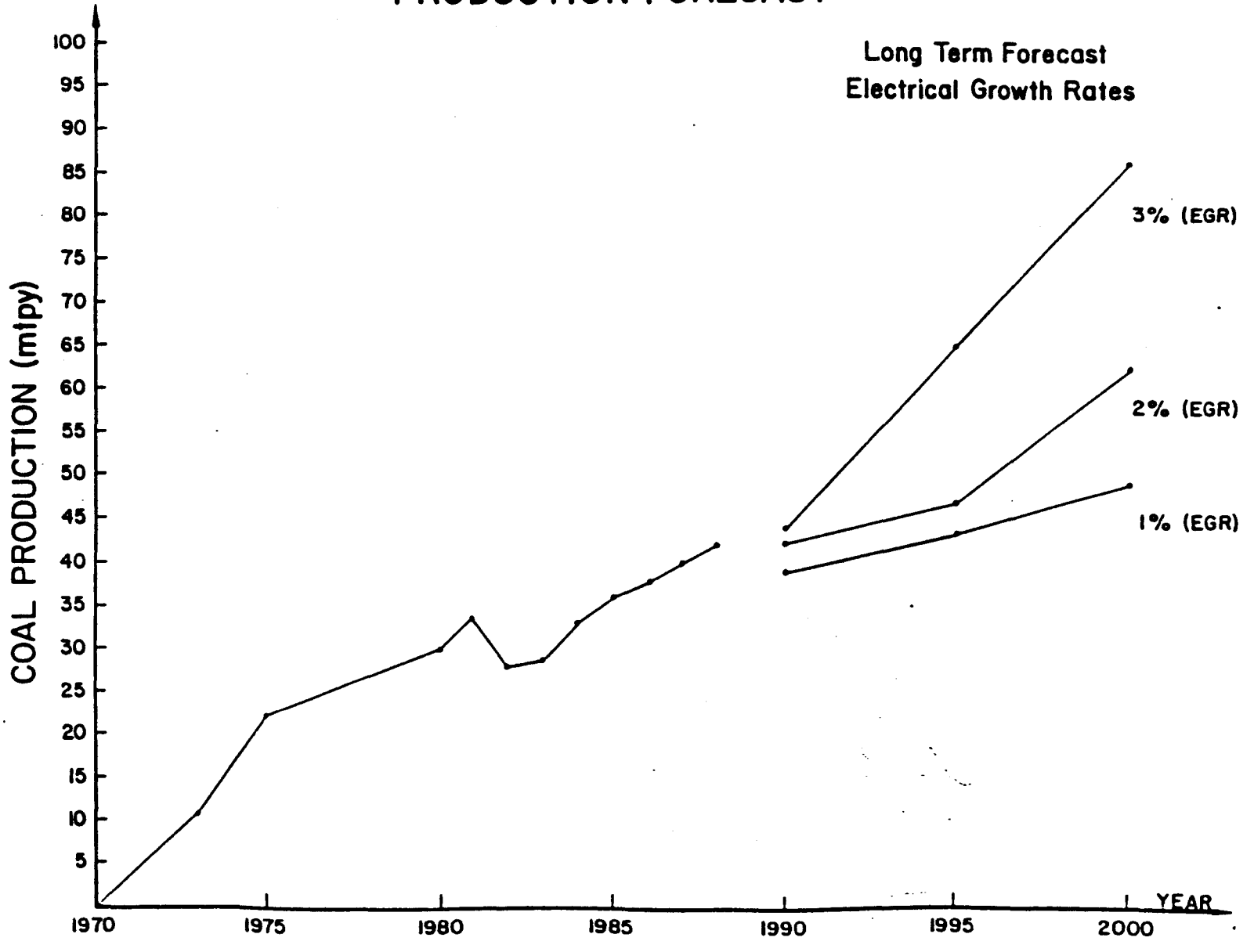
19-state Powder River Basin spacial market area identified in the 1985 Duffield, et al. report.

Montana's competitiveness can only be sustained if Montana's Colstrip area (medium BTU) coal producers are willing to settle for modest but reasonable rates of return in their coal mining enterprise. The $1.00/ton coal severance tax differential between Montana and Wyoming would in a few cases probably help Montana producers, but in most cases is not enough to provide a competitive Montana position in the market where Wyoming coal is sold. What's more, it is the very low break-even prices on larger mining operations that has provided Wyoming an important sales opportunity even in part of the traditional Montana market. A $5.00-$7.00/ton FOB bid recently by Wyoming producers for new contracts undercuts recent Montana bidding in the $9.50-$12.50 range and cannot be made competitive even with complete severance tax elimination. Either differential rail rates or modest reduction of profit levels are needed to maintain the Montana market in some places where cheap, low to medium BTU Wyoming coal can also compete for long-term contracts. Selling higher BTU coal (Decker type) enables Montana producers to compete very successfully in markets as far away as Chicago, Detroit, and Houston and make handsome profits as well. For medium BTU Colstrip coal it appears that Wyoming producers are $3.00-$5.00/ton lower at the mine and producing at a 25%-100% spread over Montana in the mine-mouth cost of BTUs.

Our long-term Montana coal forecast appears to be pretty much on track, and as reproduced on the next page (Figure S-1), is based on the electric energy growth rate anticipated to the year 2000. We believe Montana's production will rise slowly but steadily to reach a tonnage of between 45-65 mtpy by the year 2000. It is highly unlikely that the 3% energy growth rate curve will be reached and a 87 mtpy production projection for the year 2000 does not seem reasonable at this time.

Figure S-1

MONTANA COAL PRODUCTION FORECAST



MONTANA-WYOMING COAL MINING COSTS

One difficulty in adequately presenting our 1985 coal market and severance tax study to the Department of Commerce and Montana Legislature was the unavailability of specific mining costs related to properties in the Powder River Basin. Since that time, publicly presented mine data has become available, along with what would appear to be reasonable estimates by engineering consultants versed in these matters. In addition, coal contract pricing at mine-mouth has also become available in some cases and provided us with confirmation of the 1984 estimates we made based on FERC reported delivered prices and our own breakdown between transportation tariffs and mine price.

The cost estimates we provided in 1985 were very close to specific examples reported in a recent public trial (February 1986) in Forsyth, Montana (Western Energy vs. Genie Land Co. and the State of Montana). Western Energy testified that average mining costs of part of the Rosebud Mine with 80-85 ft of overburden is between $8.75-$9.30/ton; with overburden thicknesses increased to between 90-100 ft mining costs increased to between $9.15-$9.70/ton. At the same time contract prices with Colstrip 1 and 2 are $11.53/ton; with Corette, $12.10/ton; and with Great Lakes Coal and Dock Company, agent for Rosebud Coal with small users in the Minnesota-Wisconsin area, $10.69/ton. In parts of the mine, especially those with extremely high overburden conditions, Western Energy states that mining costs run as much as $10.25/ton. At least in the Rosebud Mine, depending upon where mining proceeds, profit margins for Western Energy are in the range of $2.00-$3.00/ton.

The most sensitive aspect of mining costs are "direct operating costs," which at Rosebud are in the range of $3.00/ton for average overburden areas; Montana plus Federal production taxes require another $3.00/ton; Federal royalties, $1.22/ton; reclamation costs reported by the company are 85 cents/

ton, including final high wall reclamation when mining is completed at the site, while overhead and other costs require 63 cents/ton. Outside of the unusually high reclamation costs, which translates into $34,000 an acre in at the Rosebud Mine, the other costs appear reasonable. Exact reclamation costs are difficult to calculate inasmuch as each company provides its own book-keeping system for that portion of the mining enterprise that is considered production versus that considered reclamation. One might, however, suggest costs of 40-50 cents/ton as the upper limit of current Rosebud Mine activity (as reported to State Lands in one version of a reclamation plan a few years ago), and therefore provide 35-40 cents/ton additional profit to the operation at Colstrip. There is no reason to think that other Colstrip contracts are priced significantly different from the Colstrip 1 & 2 and Corette, and therefore provide us a baseline of approximately $5.00-$6.00/ton above new contracts in the Wyoming portion of the Powder River Basin.

Other estimates of Powder River Basin coal production costs vary only slightly from those presented above. At least one consulting firm has estimated that within Montana only the Rosebud and West Decker mines can afford sale prices less than $9.00/ton for a 10% DCFROR. All other Montana mines are higher than this, or in the range of 50 cents/MMBTU for a 10% DCFROR. Looking at all mines in the Powder River Basin, the range is from $4.00/ton at 10% DCFROR to $15.00/ton, or 25-80 cents/MMBTU FOB mine price. The leading mines with cheap coal are all in Wyoming and include the Rawhide Mine of Exxon, the Eagle Butte Mine of AMAX and Arco's Black Thunder Mine. The most expensive are the Decker, Spring Creek, and Absaloka Mines of Montana, and Big Horn (Wyoming) owned by Kiewit/NERCO, NERCO, Westmoreland Resources, and Kiewit respectively. The higher BTU, low-sulfur, low-ash coals in the Powder River Basin of Wyoming provide serious competition for Montana suppliers where rail distances to the consumer are not greatly different.

POWDER RIVER BASIN PRICES

Within the last year and a half new contract bids and spot market prices have ranged as follows: for low BTU (8300 BTU) Powder River coal, $4.75-$5.25/ton FOB; for medium BTU coals (approximately 8600 BTU), $5.00-$7.00/ton; and for high BTU coals (9000 BTU and above), $10.00-$15.00/ton. For coals as a whole in the Powder River Basin the prices have ranged from 30 cents/MMBTU to 90 cents/MMBTU, depending upon the mine and BTU content. The range has been from 30 cents/MMBTU to 40 cents/MMBTU for low to medium BTU coals in the basin.

A number of supply-demand conditions are extant throughout the Powder River Basin. It is clear that new pricing is at or near break-even costs, depending upon the mine, for most of the Powder River Basin mines in Wyoming. Utilities are taking minimum volumes on long-term contracts and buying their additional needs on the spot market. The Powder River Basin coal is competitive with Gulf Coast lignites given the differential BTU, and transportation rates; and lastly, low oil and gas prices, forecast to rise faster than coal prices in the future, has had a dampening effect on coal sales in the last 18 months.

It will be very useful for our purposes to compare some coal delivery prices for producers from Montana and Wyoming shipping to the same utility power plant. As of December 1984, the following comparisons can be made: Wisconsin Power and Light Columbia plant bought coal from Western Energy's Rosebud Mine and AMAX's Eagle Butte mine in Wyoming; delivered costs from Rosebud were $1.71/MMBTU and from Eagle Butte, $1.72/MMBTU; Houston Power and Light Parish, Texas, plant purchased coal from NERCO's Spring Creek Mine in Montana and Exxon's Caballo Mine and Kerr McGee's Jacobs Ranch in Wyoming. Montana's Spring Creek Mine delivered coal at $2.01/MMBTU, same price as Kerr

McGee's Jacobs Ranch Mine operation; however, Exxon's Caballo Mine delivered at $1.49/MMBTU. The third example is the Lower Colorado River Authority Seymour-Fayette #2 plant, which received coal from Kiewit's Decker Mine and Arco's Black Thunder and Coal Creek mines in Wyoming. Decker delivered at $2.94/MMBTU whereas Arco's Coal Creek delivered at $2.34/MMBTU and Black Thunder at $2.17/MMBTU. Wyoming producers could do considerably better than Montana moving to the south and southeast, whereas in Wisconsin, Wyoming and Montana producers delivered at the same price.

During 1985, however, Wisconsin Power and Light's Columbia Plant began taking large tonnages from the Black Thunder Mine of Arco, along with that from Colstrip, Montana. On a delivered BTU basis the prices were quite comparable; however, Black Thunder is considerably lower in sulfur and ash content and, therefore, provided a low sulfur premium for Wisconsin Power and Light at no extra cost. Given the stringent air polution control requirements that have gone into effect in Wisconsin during this year, that no-cost low-sulfur premium is of major importance to Wisconsin Power and Light.

During the spring of 1985 the Lower Colorado River Authority declined to take any more Decker coal for its Seymour-Fayette Plant. Deliveries in the early part of the year from Decker averaged $2.95/MMBTU, whereas coal produced by Arco's Black Thunder and Coal Creek Mine in Wyoming averaged $2.00/MMBTU delivered; and Exxon's deliveries from their Caballo Mine averaged $1.60/MMBTU. Delivered prices from Caballo have increased from $1.49, whereas Arco and Decker's delivered prices have stayed relatively stable. On the assumption that Caballo is selling coal at approximately $8.00/ton and is delivering to the Seymour-Fayette Plant at $27.00/ton, the utility transportation costs are about $19.00/ton. Decker, on the other hand, was delivering coal to Seymour-Fayette at a total cost of approximately $55.00/ton. Assuming a $25.00/ton transportation cost, then FOB mine price for Decker coal under

this former contract was approximately $30.00/ton. Black Thunder coals are only slightly lower than Decker in BTU value, and have comparable sulfur and ash content. Exxon's Caballo coals are low sulfur, relatively low ash, and low BTU; but the price differential between Wyoming and Montana is so severe that the cancelation of the Decker contract, and with it nearly 2 mtpy of coal sales, was not an unexpected outcome (see Appendix A). At a $30.00/ton FOB mine price Decker's profits, based on best engineering guess, was approximate $15.00-$20.00/ton, while their break-even costs are somewhere in the neighborhood of $8.00-$10.00/ton. There can be little surprise that Lower Colorado River Authority balked at paying more than $15.00/ton over the market for coal deliveries to its Seymour-Fayette Plant.

Houston Power and Light's Parish, Texas, plant is an interesting example of market forces providing astonishing competition on a month by month delivered cost basis from NERCO's Spring Creek Mine, Kerr McGee's Jacobs Ranch and Exxon's Caballo mines. Delivered price per MMBTU is precisely the same for each supplier for every month of the 1985 year--high BTU, very low sulfur, and very low ash Spring Creek coal is equivalent in this market to relatively low sulfur, low BTU, relatively high ash Jacobs Ranch and Caballo coal. Higher value Montana coal has further to travel and prices out equal to inferior coals from Wyoming.

Some other interesting 1985 comparisons are in order here. For instance, Westmoreland's Absaloka Mine sent some coal in the middle and end of 1985 to Dairyland Power Coops Alma-Madgett Plant. Montana coal averaged about $1.76/MMBTU delivered. AMAX's Belle Ayr Mine in the Gillette area sent substantial quantities of coal to the same power plant at prices that are very close to $1.99/MMBTU. Montana shipped medium BTU, relatively high sulfur and ash coal, and Wyoming shipped low BTU, very low sulfur and low ash coal. Montana's advantage on a BTU basis was about 20 cents/MMBTU, but the lower sulfur

Wyoming coal will probably continue to dominate the Dairyland market because of air pollution regulations.

At Northern States Power, the Riverside plant received coal from both Western Energy's Rosebud Mine and Westmoreland's Absaloka deposit. The 1985 FERC record showed that Rosebud deliveries arrived at approximately 10 cents/MMBTU cheaper than those from Absaloka for the same BTU content. For the 1985 deliveries it appears that Absaloka was slightly lower than Rosebud in average sulfur content. Ash content of the two coals are about equal. The same relationship is true of coal received from the Rosebud and Absaloka Mines at the Sherburne County generator of Northern States Power during 1985.

Another interesting comparison is the coal supply for Northern States Power King plant in Minnesota. King received coal during 1985 from Western Energy's Rosebud Mine, Westmoreland's Absaloka Mine and near the end of 1985 from the newly opened Rochelle Mine in Wyoming. In each case a substantial monthly tonnage was shipped. The new Wyoming Rochelle Mine was delivered on the average of 15 cents/MMBTU below Westmoreland's Absaloka Mine and 5 cents/MMBTU below Rosebud. With comparable BTU values for the three coals, the lower sulfur and ash content, as well as pricing of the coal, has brought Wyoming into the traditional Montana market. This 10 cents/MMBTU average difference on delivered price, even over the long-term, may not be the deciding factor in coal shift by Northern States between Montana and Wyoming mines. However, coal severance tax reduction in the King Plant case helps Montana hold the contract.

During the discussion of HB607 by the Montana Legislature in 1985, a major concern centered around the ability to capture one of the very few new coal contracts that would be available over the next 10 years for Montana coal producers. The proponents of HB607 argued that reduction of coal severance

tax would help assure Montana capture of the Sherco #3 contract, while the Duffield-Silverman report suggested that the least cost alternative of coal supply for Northern States Power for Sherco #3 was a Montana supplier pre-tax reduction, though with little cushion in price advantage (about $1.00/ton). Upon the passage of HB607 there was considerable comment that this will now "guarantee" that Montana receive the Sherco contract. Northern States strategy, however, has been a more sophisticated approach to buying coal for its multiple generators in the Minneapolis area. Given the condition of vast overcapacity in the coal fields, the softness of the coal market, which promises to remain that way at least for the next few years, and rapidly falling oil prices, Northern States Power decided on a strategy of buying a considerable amount of spot market coal for its total needs.

Western Energy announced that last December it signed a five-year extension of one its major contracts, which will permit it to deliver up to 33 million tons of coal over a five-year period. Although unannounced by name, our assumption is that this extension is with Northern States Power, and would raise Rosebud coal deliveries at maximum from slightly over 4 mtpy to Northern States Power to about 6 mtpy. The additional coal will be used in the system, at least in part for Sherco generation. Rather than signing the usual 20-year contract for 2.5 mtpy the company has played low spot market pricing and short-term extension as a way of reducing the total generating costs in its system. This strategy in fact may provide Montana with part of the Sherco contract somewhere out in the period 1992-1997, and is another example of the aggressive cost minimizing that utilities employ when contracting coal. Adherence to that cost-minimizing strategy strongly supports the case we made in January 1985 that one can assess the probability of both contract renewal and new contract agreements on the basis of providing lowest delivered cost/ MMBTU of energy with select special cases for high BTU, and very low sulfur

coals, in select markets. The Montana market then appears to be performing as we suggested in 1985, with the added caveat that low price, spot market coal and continuing overcapacity will dominate the structure the Powder River Basin coal sales for the next 10 years.

Wyoming Powder River Basin Coal Pricing

Within the Wyoming part of the Powder River Basin there again exists considerable competition in coal contracting and delivered coal prices. A couple of examples will suffice to make the point. Oklahoma Gas and Electric's Muskogee Plant receives coal from both Arco's Black Thunder Mine and Mobil's Rojo Caballo Mine. The Black Thunder coals are high BTU, very low sulfur and low ash; Caballo's are low BTU, low sulfur, and low ash coals. The BTU differential of about 600 BTU/lb. translates into a delivered cost differential of 15 cents/MMBTU between the lower cost Rojo Caballo coals to the higher cost Black Thunder coals.

Again, Omaha Public Power receives coal at their North Omaha Plant from Exxon's Rawhide Mine and Trident Coal Company's Buckskin Mine. In this case Rawhide ships low BTU, low sulfur, moderate ash coals, whereas the Buckskin Mine ships low BTU, high sulfur, high ash coals. In this case Buckskin coals are about $13.20/ton delivered, whereas Rawhide coals arrive at Omaha at about $21.20/ton delivered. Apparently a 50 cent/MMBTU sulfur premium is paid by Omaha Public Power. Both these examples from the 1985 deliveries show that BTU and sulfur content play an important role in pricing and purchasing of coal within the Powder River Basin. Given the strategies for reducing SO_2 emissions nationally, these particular concerns will become more prominent over the next 5-10 years.

DEMAND FOR POWDER RIVER BASIN COAL

The Duffield-Silverman study of 1985 we believe is still very much on track in projecting growth of coal demand in the Powder River Basin. That study suggests that the amount of coal Montana will produce over the next 10-15 years is highly dependent upon electric utility growth rates. Using a base price of $9.50 FOB for Montana coal and varying the Wyoming FOB price between $6.00-$7.70/ton, and assuming our energy growth forecast of between 1%-2% a year, we model Montana production to be 41.5 million tons in 1990, 46 million tons in 1995, and approximately 63 million tons in the year 2000. Substantially higher energy growth rates, which appear to be unlikely from most of the informed forecasts that are being made today, might bring Montana production as high as 86 million tons by the year 2000. This forecast is reproduced as Table 17 from the 1985 Duffield-Silverman report.

In addition, one caveat is necessary. Should Wyoming coals contract over the long term at prices much below $5.00/ton, it would certainly have some effect on Montana's coal forecast because our traditional market might be further breached by such cut-rate pricing. However, as oil prices rise once again, and overcapacity in the Wyoming fields declines and economic activity picks up in the late 1980s and 1990s, we believe our forecast is the most reasonable for the Montana market.

During this study we have not had time to develop the full case for the Wyoming market on a mine by mine basis. In 1984 the Powder River Basin produced 142 million tons, projected to rise to 150 million tons for 1985. The 1984 distribution of production was approximately 106 million tons from the Gillette area, 18 million tons from the Colstrip-Ashland area, 16 million tons from the Sheridan Basin, and 3 million tons from Thunder Basin. Looking at a market forecast based on utility plants coal-fired generation and including the essential elements of electric utility growth, price availability,

Table 17

Montana Coal Production
Forecast (million tons per year)

Year:		1990			1995			2000		
Electric Growth Rate:		1%	2%	3%	1%	2%	3%	1%	2%	3%
A. Wyoming FOB Price $6										
Montana FOB ($/ton)										
10.50		36.4	38.4	41.3	38.0	44.2	53.0	44.1	51.0	59.9
9.50	BASE	38.1	41.5	42.9	41.9	46.2	64.6	48.3	62.9	85.2
8.50		38.9	42.5	44.2	42.8	47.2	72.2	48.3	68.0	96.8
7.50		42.7	44.7	44.7	45.4	47.2	72.2	48.3	68.0	100.1
6.50		42.7	44.9	45.9	45.6	49.1	76.9	48.7	72.2	118.1
B. Wyoming FOB Price $7.70										
Montana FOB										
10.50		37.9	40.8	42.0	41.3	45.3	64.6	48.3	62.9	81.2
9.50	BASE	38.6	41.8	43.3	42.5	46.3	64.6	48.3	62.9	85.4
8.50		38.9	42.5	44.2	42.8	47.2	73.0	48.4	68.7	98.4
7.50		42.7	45.6	46.0	46.0	50.2	80.8	49.8	75.8	125.0
6.50		42.7	45.8	47.4	46.6	54.4	94.7	50.8	89.8	140.8

alternate energy sources, available imported electricity, short-term commitments to co-generation projections and flat industrial, metalurgical, and export coal forecasts, at least one consulting engineering firm has projected a median growth rate of 1.8% a year for the Powder River Basin as a whole. That forecast would suggest that the total Powder River Basin will produce 158 million tons by 1990 and 192 million tons by 1995. With Montana's contribution previously suggested to be 42 mtpy in 1990 at a 2% growth rate, the Wyoming portion of the basin should produce 116 million tons by 1990; with a 46 million ton Montana production by 1995, the Wyoming portion of the basin might produce as much as 146 million tons by that date.

That growth of an additional 40 million tons of coal between 1985 and 1995 for the entire Powder River Basin is based on the assumption of a 52 mtpy contract potential by the year 1995 for the Powder River Basin. That potential is divided between approximately 31 million tons of new coal potential and 21 million tons of contract renewal. New sales opportunities appear to encompass nine of the 19-state market region for Powder River Basin coals as defined by Duffield and Silverman in 1985. The estimate of about 30 million tons of new coal-fired demand is the amount of uncontracted tonnage for new plants that currently exist within the market area states.

A substantial portion of the sales opportunities for Montana involve contract renewal, as Sherco #3 and possibly Wisconsin Coal #2 of N.S.P. appear to be the only new plants for which Montana coal producers can effectively bid. The Montana total tonnage up for renewal in Minnesota and Wisconsin is approximately 27% of the total sales opportunities for the region in the 1985-1995 period. The above forecast for the next 10 years is very different than the market growth rates of the '70s, in which Powder River Basin coal grew at 20%-25% a year. During that period of expansive growth, the Montana coal

producers essentially captured only 10% of the region's market because the most rapid expansion of the market was to the south and southeast, where Wyoming producers had both a transportation and break-even coal price advantage over the higher cost Montana mines. The '80s and '90s will look significantly different. As growth slows to between 1%-2% a year, mining overcapacity, especially in Wyoming, will be the dominant factor in coal pricing for the next 10 years in the Powder River Basin.

Production Overcapacity in the Powder River Basin

To understand the impact of this overcapacity for the long-term future of coal in Montana consider the following: the 1984 production capacity in the Powder River Basin was 222 mtpy. In 1985 Peabody's Rochelle Mine came on-line and provided Wyoming with its first contract to Northern States Power. In 1986 the Antelope Mine (owned by NERCO) also came on-line with a 3 mtpy capacity. These additions lifted total capacity in 1986 to 227 mtpy, which is assumed will hold at least to the year 1995, as additions in the Powder River Basin before that date are not expected.

With an approximate 2% growth rate per year, the overcapacity in the Powder River Basin by 1990 is estimated to fall to 69 mtpy and by 1995 to 35 mtpy. Ten years from now there will be a continuing overcapacity in the Powder River Basin essentially equivalent to the total new sales opportunities for the period 1985-1995. This overhang on the market is sure to keep prices competitive, Wyoming producers in a highly efficient, low-cost strategy for marketing coal, and will be a continuing pressure upon Montana producers to meet competitive Wyoming market prices.

New Mine Opportunities

A word here must be said about the potential for the Montco Mine in the Colstrip-Ashland area of Montana. It appears that this mine, if in fact it

were to open, would be competitive with the Absaloka and Big Sky mines of the Colstrip area, but have a higher break-even price than those of the Gillette area. Engineering estimates of the break-even price would bring the Montco Mine in at about $8.00/ton mine-mouth; however, the coals are of poor quality and have a lower BTU than other Montana mines. Planning for a 12 mtpy Montco facility could in fact add considerable more overcapacity to the region than it already has, especially in the already highly competitive, medium BTU coal market.

Shell's CX Ranch mine site in the Sheridan area has been abandoned, at least temporarily. Here high BTU coal has a relatively high break-even mine price and development has been shelved given the weak coal market and large overcapacity in the region. In the distant future, however, this facility could be competitive with Decker and Spring Creek coals and add a capacity of 8 mtpy.

New coal mines in the Wyoming portion of Powder River Basin are also possible beyond the year 2000. The next generation of Wyoming projects will most likely be characterized by very large production capacity, ranging from 6-20 mtpy with a low BTU content (in the range of 8100-8400 BTU/lb), and a break-even price of between $4.50-$8.00/ton mine-mouth. Again, characteristics such as these will continue to be competitive with Montana producers.

Recent Wyoming Developments

In order to be able to compare Montana-Wyoming coal market conditions, it might be useful to look at some recent Wyoming developments that may in fact portend the Montana market. Wyoming's Powder River Basin now has 19 surface mines with the addition of Rochelle in 1985 and Antelope in 1986. In 1985 Wyoming production increased by 9 million tons or 7%, with part of that increase coming in the Powder River Basin. However, there are six reported

decreases in production within Powder River Basin mines, or approximately one third of the total mines in the basin reported at 1.5 mtpy cumulative decline.

The other characteristic of the Wyoming coal mining industry, one which is being duplicated in Montana and which has obviously affected the economic impact of coal mining in the state, is that work force lay-offs continue and grew more severe during 1985 and the early part of 1986. At the same time productivity is increasing in mines overall, as Wyoming high-cost underground mining declines or is phased out, and surface mining becomes more efficient. This efficiency trend is also characteristic of Montana mines.

An interesting coal development in 1986 in Wyoming was the Northern Indiana Public Service cancelation and penalty payment of a long-term contract with Carbon County Coal Company. It cost NIPSCO $181 million in penalties to buy out the contract. NIPSCO then turned around and bought spot coal from the same mine for $15.00/ton less in delivered price. It will make up its penalty by purchasing only 12 million tons of coal at the lower price. Such runaway adjustment factors in long-term coal contracts at some mines have led to enormous concern by utilities, and has moved them toward contract cancelation or reduced coal acceptance, as they make up their differential coal needs in the spot market, and sign short-term rather than long-term contracts. This is a strategy for holding fuel costs down and maintaining electric rates at expected low inflation levels.

A number of spot and short-terms contracts have been signed in the past six months in the Wyoming portion of the basin. They include a five-year (1986-1991) contract between the Black Thunder Mine and Wisconsin Power and Light for 11 million tons of coal shipped under a new contract with the C&NW Railway. NERCO's Antelope Mine has signed a new contact with Platte River Power Authority for 35,000 tons of coal per month (420,000 tons per year) with

a new transportation contract with the Burlington Northern Railway. Platte River Power Authority is currently taking Black Thunder coal at 90 cents/MMBTU delivered. The Lower Colorado River Authority has contracted with Exxon's Caballo Mine for a six-month 1986 contract at 135,000 tons per month, or 810,000 tons for the year. Thunder Basin Coal has contracted with the city of Austin for a six-month 1986 contract of 70,000 tons per month, or 420,000 tons for the year. And lastly, the Chicago and Northwestern has agreed to buy into Burlington Northern's 10-mile line extension into the Gillette area, providing more competitive transportation for the three or four coal mines served exclusively before this year by Burlington Northern. This portends the potential for a stronger move by Wyoming producers to expand their markets and assure contract renewals.

Other contract adjustments in Wyoming are interesting to note. For example, Exxon's Rawhide Mine has renegotiated their contract with Iowa Public Service for a substantial FOB mine price reduction. Coal Week reports that Iowa Public Service received coal from the Rawhide Mine at $23.29/ton delivered, and the first quarter 1986 tariff for coal transport lists charges at $14.18/ton. That provides a mine price of $9.11/ton for the Rawhide Mine. The new contract for 1.8 mtpy provides a mine price of $6.84/ton, or a $2.27/ton reduction for future contract deliveries. This price cutting is a move in the opposite direction of that normally anticipated by the coal industry through the provisions of price escalators in contracts.

Another recent coal-related activity effecting Wyoming was the U.S. House Committee repeal of the 1978 Power Plant and Industrial Fuel Use Act withdrawing oil and gas as a utility fuel. In the wake of this event San Antonio City Public Service shut down its coal-fired Deely unit and is replacing it with gas-fired turbines at a fuel cost of $1.40/MMBTU. The Deely unit received coal from Wyoming's Cordero Mine under long-term contract at $1.73/MMBTU, and

on the spot market from Cordero at $1.51/MMBTU. The availability of gas and its anticipated usage as a utility fuel once again is providing substantial economic benefits to utilities that have gas-fired capability in reserve. Again, Wisconsin Power and Light is converting its Blackhawk plant from coal to natural gas in order to meet Wisconsin's new air pollution regulations. It is a small peaking unit, but it again conforms with a move to replace coal with cheaper fuels where possible.

In addition, Dairyland Power of Wisconsin has won a court order to renegotiate its contract with AMAX's Belle Ayr and Eagle Butte mines. Dairyland has been receiving coal from these Wyoming mines at $33.35/ton, and AMAX argued that because Dairyland was not in any financial difficulty they could afford to pay the contracted coal price. The court ruled, however, that the contract must be renegotiated. Lastly, Nebraska Public Power has renegotiated contracts with Arco mines in the Powder River Basin for a $2.00/ton reduction on nearly 40 million tons of contracted coal over the next 10 years. It is clear that spot pricing in the Powder River Basin is very close to covering only variable costs, as the Cordero and Rochelle mine contracts with Wisconsin Power and Light signed in 1986 suggest.

Recent Montana and National Developments

In Montana we are seeing the same trends as in Wyoming. In the spring of 1986 Western Energy's Rosebud Mine laid-off 116 miners or approximately one-third of the work force. They cited abundant available hydro, low oil prices and reduced coal demand as reasons for their cut-backs. Their expected recall is for August or September of 1986 if demand warrants it. However, Western Energy estimates that their 1986 production will only fall from 13.9 million tons in 1985 to 12.6 million tons in 1986, apparently as a result of the reduced demand by the parent Montana Power Company. A one-third reduction in

the mining force will result in only a 10% reduction in production, thereby dramatically increasing productivity and profits for this year.

An authoritative national outlook for coal is usually provided by the Department of Energy's Energy Information Administration. Their forecast suggests that total demand for electric power in the U.S. by the year 1995 will rise to 882 million tons of coal, from 693 million tons for 1985. Supply potential by 1995, however, will be about 110 million tons greater than nationwide demand for coal for all uses. Within their forecast, EIA projects a demand of 248 million tons of Northern Great Plains coal (Wyoming, Montana, North Dakota) by 1995. This projection would suggest a 3% growth rate for utility coal in the Powder River Basin, clearly at the high end of the spectrum. Historically, EIA has always provided the higher end of the coal forecast range when comparing national projections.

With a 248 million ton 1995 Northern Great Plains potential, the Powder River Basin of Wyoming and Montana might be expected to produce 210-215 million tons of coal. However, a very large overcapacity in the nation's potential for coal mining exists today and could get larger. A 110 mtpy excess national capacity will surely depress prices short-term, and act to discourage new mine development. What we might expect to see, however, is the closing of high-cost mines, shake-out of a large number of marginal coal mining operations, and a reduction of costs nationwide. Mid-continent plants that convert both eastern and western low-sulfur coals are keeping the eastern spot market prices at levels between $25.00-$30.00/ton FOB. In the Powder River Basin Wyoming spot market prices are falling to between $4.00-$5.00/ton FOB for the reasons indicated above.

In a recent report Scott Atkinson of the University of Wyoming and Joe Kerkvliet of New Mexico State University have argued that the 1980 Staggers

Act has failed to encourage competitive coal haulage rates in the west. The price of coal transport substantially exceeds the long run marginal costs of hauling that coal, and coal consumers are being charged a much higher mark up over cost than for the haulage of other commodities.

With respect to future production, it appears that federal coal leases will not be effected by the "due diligence" clause of the ammendments to the Leasing Act. There is a substantial move in the Congress to either ignore, or to adjust due diligence clauses, which require minimum production on certain older leases by fixed dates or the leases revert back to the federal government. Under such due diligence requirements, either unneeded capacity would have to be added to the nation's potential coal production capability, causing further problems in price cutting and coal market weakening, or the leases would revert to the federal government. Elimination of the diligence requirement will allow a more rational planning of future coal mines, but also suggests that there is a very large amount of unneeded coal currently under lease, especially under federal lease in the Powder River Basin.

MONTANA'S WINDOW OF OPPORTUNITY

Table I reports Montana coal production by mine for the period 1980-1985. Since 1982, total Montana coal mine production has increased modestly but steadily through calendar year 1985. Although the trend has been upward from 27.8 million tons in 1982 to 33.8 million tons in 1985, each mine has had its own up or down history.

Rosebud and Decker have grown steadily and substantially (15%-30%) over the last four years in terms of their total production, even with Decker's loss of the Lower Colorado River Authority contract for the first three quarters of the 1986 fiscal year. On the other hand, Peabody's Big Sky Mine and Westmoreland's Absaloka Mine have each declined 600,000 tons per year when

TABLE I: Montana Coal Production 1980-1985

Mine Name	County & Town	1980	1981	1982	1983	1984	1985
Rosebud Mine (Western Energy)	Rosebud County Colstrip	10,401,972	10,352,966	9,424,857	9,544,062	11,907,098	12,264,599
Decker Mine (Decker Coal Co.)	Big Horn County Decker	11,193,302	10,681,739	9,799,890	10,348,817	10,296,833	11,534,105
Big Sky Mine (Peabody Coal Co.)	Rosebud County Colstrip	2,964,359	3,193,570	2,891,428	2,571,861	3,951,315	3,338,990
Spring Creek Mine (NERCO)	Big Horn County Decker	95,634	4,368,855	1,352,181	2,102,606	2,961,075	2,837,972
Absaloka Mine (Westmoreland)	Big Horn County Hardin	4,905,262	4,450,296	4,158,578	3,868,844	3,602,179	3,093,241
Savage Strip Mine (Knife River Coal Co.)	Richland County Savage	305,578	204,492	171,556	206,543	229,119	213,533
Others (Coal Creek Mine, Brophy #2 Mine, Storm King Mine, PM Surface Strip)		91,479	79,711	39,811	17,551	16,380	24,651
Totals		29,957,586	33,331,659	27,838,301	28,660,284	32,964,049	33,807,091

comparing 1984 and 1985. NERCO's Spring Creek Mine has had steady production in the last two years. This increasing trend of total production has been forecast to continue through the near and mid-term by Duffield and Silverman (1985), and starting with the first Montana Coal Group forecast in 1976 we have accurately projected Montana and Northern Great Plains production to within ±5% of their values. Of particular note in the Absaloka Mine is that Westmoreland's production of Indian coal has fallen 500,000 tons between 1984 and 1985. Taxes on Indian coals reside in escrow until the settlement of the legal situation. Production at the Absaloka Mine on which taxes are paid to Montana has remained steady at about 1.1 million tons for 1984 and 1985.

The anticipated 1986 production rise in Montana will be offset by the Rosebud Mine's recent lay-offs and cutback in production, which is estimated to result in 1.3 million fewer tons of production for the year. A restimulated economy and upswing in the levels of coal contract shipments, as well as possible spot market purchases, might provide enough stimulation to increase 1986 total coal production in the state; but again, by only a modest amount.

For the 1985 calendar year, the state has received severance tax credit requests from Montana operators for a total of $1.1 million, which we have calculated to be approximately equivalent to 1.0 million tons of production at an average tax credit of about $1.00/ton under HB607. Seventy-three percent of that tax credit is at the Decker Mine where $814,000 in 1985 credit is equivalent to about 600,000 tons of coal. Peabody's Big Sky Mine has applied for $194,000 annual credit equivalent to 240,000 tons of coal, and Western Energy seeks $107,000 total for 150,000 tons of coal. The balance is distributed between Westmoreland ($12,000) and Knife River ($2,000) in tax credit relief.

The relevant question with regard to these severance tax credit applications, is whether or not the additional tonnage would have been forthcoming

TABLE II: Fiscal Year 1986

(June, September, December, 1985 and March 1986)

Coal Mines Severance Tax

	Tons Mined	Less Deductions	Net Tons	Total Tax	*Less Tax Credit	P & I	Total Tax, Penalty & Int.
Decker Coal (Big Horn County)	11,802,540	20,000	11,782,540	$38,949,392.00	($203,630.00)	-0-	$38,745,762.00
Knife River (Richland County)	205,930	20,000	185,930	388,619.54	(621.21)	-0-	387,998.33
Peabody Coal (Rosebud County)	3,000,533	20,000	2,980,533	7,271,628.00	(48,549.75)	-0-	7,223,078.25
Spring Creek Coal (Big Horn County)	2,931,618	20,000	2,911,618	9,621,874.00		-0-	9,621,874.00
Western Energy (Rosebud County)	12,225,464	20,000	12,205,464	25,983,796.22	(26,788.67)	-0-	25,957,007.55
Westmoreland Res. (Big Horn County)	1,047,943	-0-	1,047,943	2,256,457.78	(3,127.00)	-0-	2,253,330.78
P & M Coal (Musselshell County)	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Storm King Coal (Musselshell County)	-0-	-0-	-0-	-0-	-0-	-0-	-0-
TOTALS	31,214,028	100,000	31,114,028	$84,471,767.54	($282,716.63)	-0-	$84,189,050.91

Coal Dealers Tax: 9.99

Total Coal Severance & Dealers: $84,189,060.90

*15-35-201 "New Coal Production Incentive Tax Credit Act of 1985"

without severance tax relief (see Appendix A). A complete evaluation of the "window of opportunity" would have to consider the specific purchase increases and the alternative opportunities for coal purchase that might have also satisfied customer needs. Lacking the confidential data to provide such an analysis inhibits the ability to decide whether or not the approximately one million tons of coal under tax credit application is truly a response to HB607. Table II provides the coal mine severance tax credit data for FY86 (table shows quarterly payment or 25% of the total $1.1 million credit). Decker's loss of slightly over a million tons of coal in the Lower Colorado River Authority 1985 contract (May-December), may have enable it to increase production by nearly 600,000 tons of coal that qualified for tax credit status under a different contract.

Severance tax collections for FY86 fell $7.5 million from their FY85 level, even though coal production increased for the year by about 850,000 tons. The $84.5 million of coal severance tax collections is far below the projections made by the 1985 Legislature of $104 million and $2.5 million less than the March 1986 special session estimate by the Legislature. That revenue loss can be accounted for by two significant occurrences: 1) first, is the loss of a high price contract by Decker Mines with the Lower Colorado River Authority, which would have provided approximately $1-$2 million more to the cash flow during calendar year 1985; and 2) the concomitant lowering of the average contact sales price in Montana, estimated to have fallen from about $10.50/ton to around $9.25/ton by the Office of Budget and Program Planning. Although Decker increased production during 1984, the loss of its very high priced coal contract, estimated to be approximately $30.00/ton FOB, was not fully compensated by the new tonnage and prices that the mine achieved in FY86. In addition, the continuing weakness of coal prices will serve to

offset somewhat the expected increase in total coal production in 1986, so that perhaps only modest gains in coal severance revenues for the 1987 fiscal year can be expected.

The pressure is on, however, to renegotiate high priced contracts and bring them more line with current conditions. That trend can only serve as a note of caution in projecting coal severance revenues from future production. Based on tax revenues for FY86, the average severance tax per ton of coal for each of the mines are as follows: Decker coal, $3.30/ton; Spring Creek coal, $3.30/ton; Peabody coal, $2.44/ton; Westmoreland Resources, $2.15/ton; and Western Energy, $2.13/ton. As noted above, the 1985 tax rebate request of about $1.1 million conforms to a weighted average of about $1.00/ton rebate for coal qualifying under HB607. This qualifying production is approximately 3% of total production.

Hard times are affecting the coal industry everywhere, including Montana, and the intense competitive position in the Powder River Basin with respect to coals sales continues to keep pressure on Montana for cost cutting and greater coal mining efficiencies. The general benefits of a slowly, rather than rapidly, expanding industry, one finely tuned to low-cost production because of its competitive situation, will not provide an explosive job market, nor a rapidly increasing boom to the local and state economy. The state must learn to live with slow growth expectations for the Montana coal industry, and reduction of the severance tax by itself cannot provide opportunities that will significantly increase overall benefits to all Montana citizens. Given the limited coal sales opportunities that are available over the next 10 years, it is more than likely that over the long term a permanent reduction of the coal severance tax will be a net cash flow loser to the Montana treasury.

The loss in revenues that would accompany a severance tax cut with respect to the contracts that are expiring by 1995 is presented on Table F5 of

our 1985 study. This table suggests that in all reasonably expected cases, except where Wyoming FOB mine prices are $5.00/ton and the Montana base price is $10.50/ton, the net tax loss due to a 50% tax cut would be in the neighborhood of $15 million per year to the state. Table S-2 from the 1985 Duffield-Silverman report shows the annual changes in new production at different utility growth rates and the impact of a price reduction of $1.00/ton. Significant new production tonnages for a $1.00 change in price only occur with 3% growth rates in 1995 and 2% growth rates or higher in the year 2000. At the same time a $1.00-$2.00 tax reduction provides net revenue losses in every single year regardless of the incremental growth in new production, showing that production growth cannot make up for the revenue losses sustained by reducing the severance tax (Table 24).

In addition, the incremental new production that is available for a $1.00-$2.00/ton price change is so small as to be almost insignificant compared to other factors that would enhance Montana's economy and society. For example, the increased production at expected growth rates could easily be handled with the reduced work force that is currently operating in the Montana mines. Therefore net social and economic benefits as measured by mine employment and the multiplier effect, as well as tax revenues to the state of Montana, would decline over the next 10-15 years with reinstitution of HB607 on a permanent basis.

Table F-5

Certainty Case Summary of Annual Tax Revenue Loss on Montana Coal Contracts Expiring by 1995

Montana FOB Price	Wyoming FOB Mine Price ($/ton) 5.00	6.00	7.00	8.00
	A. Quantity of Renewed Montana Contracts (mtpy)			
10.50	2.0	11.5	13.8	13.8
9.50	11.5	13.8	13.8	14.3
8.50	13.5	13.5	14.3	14.3
	B. Tax Revenue with No Tax Cut (million $/yr)			
10.50	4.4	25.4	30.4	30.4
9.50	23.0	27.6	27.6	28.6
8.50	24.2	24.2	25.6	25.6
	C. Tax Revenue with 50% Cut (million $/yr)			
cut to 9.50	11.5	13.8	13.8	14.3
cut to 8.50	12.2	12.2	12.9	12.9
	D. Net Loss Due to Tax Cut (million $/yr)			
Base 10.50	(7.1)	11.6	16.6	16.1
Base 9.50	10.8	15.4	14.7	15.7

Table S-2

SUMMARY

Base Case Montana Coal Production Forecast
(million tons per year)

Year:	1990			1995			2000		
Electric Growth Rate:	1%	2%	3%	1%	2%	3%	1%	2%	3%
Total Production	38	42	43	42	46	65	48	63	85
New Production	6	9	11	10	14	32	16	31	53
[a]Increase for $1/ton Price Reduction	.9	1.5	1.3	1.6	1.2	6.9	1.0	5.7	13.5

Note: [a]Increase is based on average of 9.50 and 10.50 Montana FOB and 6.00, 7.70 Wyoming FOB cases.

Table 24

Annual Tax Revenue Changes
for Severance Tax Reductions

Year	1990			1995			2000		
Electric Growth	1%	2%	3%	1%	2%	3%	1%	2%	3%
New Production (mpty)	6.0	9.0	11.0	10.0	14.0	32.0	16.0	31.0	53.0
Change for $1 Price Reduction (mpty)	.9	1.5	1.3	1.6	1.2	6.9	1.0	5.7	13.5
Change for $2 Price Reduction (mtpy)	3.1	3.2	2.4	3.3	2.4	12.9	5.6	10.2	27.2
Change for $1.50 Price Reduction (mtpy)	2.0	2.4	1.9	2.5	1.8	9.9	3.3	8.0	20.4
	Revenue Change (million $/year)								
A. $1 Tax Reduction									
Loss on New Base	6.0	9.0	11.0	10.0	14.0	32.0	16.0	31.0	53.0
Gain on Change	1.8	3.0	2.6	3.2	2.4	13.8	2.0	11.4	27.0
Net Loss	4.2	6.0	8.4	6.8	11.6	18.2	14.0	19.6	26.0
B. $2 Tax Reduction									
Loss on New Base	12.0	18.0	22.0	20.0	28.0	64.0	32.0	62.0	106.0
Gain on Change	3.1	3.2	2.4	3.3	2.4	12.9	5.6	10.2	27.2
Net Loss	8.9	14.8	20.4	16.7	25.6	51.1	26.4	51.8	78.8
C. 50% Tax Change (1.50)									
Loss on New Base	9.0	13.5	16.5	15.0	21.0	48.0	24.0	46.5	79.5
Gain on Change	3.0	3.6	2.9	3.8	2.7	14.9	5.0	12.0	30.6
Net Loss	6.0	9.9	13.6	11.2	18.3	33.1	19.0	34.5	48.9

APPENDIX A

PETER KIEWIT, THE DECKER MINE, AND THE WINDOW OF OPPORTUNITY

During the period of July 24 to 29, 1986, while attempting to provide a revised edited copy of the coal severance update report for the Coal Tax Oversight Committee, we had occasion to again review the relevant statistics with regard to the 1985 response to HB607. I have especially reviewed the information related to Peter Kiewit's Decker Coal Mine, as that particular mine has approximately 600,000 to 700,000 tons of coal for tax credit valued at about $815,000. The following is the story that I have been able to piece together with regard to the Decker Mine, Peter Kiewit operations, Commonwealth Edison and the "window of opportunity."

Commonwealth Edison of Chicago has large coal contracts with Peter Kiewit mines at Decker, Montana, and the Big Horn Mine in Wyoming. The base production and consumption tonnage for the Decker Mine for 1983-84 under HB607 is 3.5 mtpy and 3.9 mtpy respectively. A contract with the Big Horn Mine provides Commonwealth Edison with about 3 million tons of coal per year. One interesting provision in the Big Horn contract is that Peter Kiewit may substitute Decker coal at the same delivered price as Big Horn coal for any or all tonnages in the Big Horn contract. The reverse is not applicable however; that is, Decker cannot pass through Big Horn coal in service of their tonnage requirements.

The Big Horn contracts with Commonwealth Edison are due to expire in 1988 and a review of the last six years of production at the Big Horn Mine indicates a continuing decline to only two million tons of production in 1985 from a high of four million tons in 1980. Clearly, Peter Kiewit is phasing the Big Horn coal mine down or out of production on the basis of perhaps high mining

costs, estimated to be around $14.00/ton at break-even, and high reclamation costs when compared to Powder River Basin mines. The Decker Mine, however, has a 20-year contract with Commonwealth Edison that expires in 1997. Since the 1983-84 base year, Decker coal has moved to Commonwealth Edison under the terms of the Big Horn contract, so that in calender in 1985, Decker provided one million tons of coal, or one-third of the contract requirements, for the Big Horn mine. A significant portion of that one million tons, about 600,000 tons, qualifies for incremental production for the Decker Mine according to the Montana Department of Revenue. Inasmuch as the Big Horn contract does not specify the amount of Decker coal that can be substituted, the Department of Revenue is apparently treating the contract provision as a spot market purchase from Decker anytime Big Horn chooses to substitute Decker coal in its Commonwealth Edison contract.

This interpretation seems to make sense, inasmuch as Peter Kiewit can vary the amount that it takes from Decker year to year in order to service the Big Horn contract. It is clear that Kiewit's apparent desire to either not renew the Commonwealth Edison contract with the Big Horn mine after 1988, or renew under current substitution terms, or perhaps to close the Big Horn Mine, means that the 3 mtpy contract previously signed with Big Horn will be completely or mainly shifted to the Decker mine in 1989. The principles in this activity are significant gainers from this contract arrangement whereas the state of Montana, with respect to tax collections, is left with less tax revenue than before HB607.

Apparently the shift of the Big Horn contract to Decker Mine production was long planned by Peter Kiewit and perhaps anticipated by Commonwealth Edison. Coal from the Big Horn Mine is delivered to Commonwealth Edison at prices from 10-15 cents/MMBTU higher than even better coal from Decker. Decker coal is slightly higher in BTU's and slightly lower in sulfur content.

The Big Horn contract allows Decker coal received under that contract to be sold at the higher Big Horn price. Therefore, by providing Decker coal under the Big Horn contract, Peter Kiewit makes about $2.50/ton more profit from its additional Decker coal operations. Commonwealth Edison is satisfied in that for the price of Big Horn coal they receive coal that has a slightly higher BTU content and very slightly lower sulfur content. In effect, its a premium, for the price and coal character they had already contracted for from Big Horn. The only loser in the operation seems to be the state of Montana, for the coal that is shifting to Decker under the Big Horn contract, and will probably be shifted completly in 1989, would be coming to Montana in any case because comparable coals are not available in the Powder River Basin or elsewhere at competitive prices. Only Wyoming's Black Thunder coals and NERCO's Spring Creek Mine might be able to meet the high BTU, low sulfur content needs of Commonwealth Edison, but apparently those coals could not arrive at Commonwealth Edison plants at Decker prices of about $55.00/ton on average.

The 2 to 3 mtpy of additional coal production from Decker for C.E. will now be taxed at the reduced severance tax rate. At a production level of 3 mtpy this represents a loss of approximately $4 million/year over the next 12 years or about $48 million over the life of the current Decker/Commonwealth contract. In the first substantial example of the operation of the "window of opportunity," Peter Kiewit has taken an interesting advantage in the law to increase its profits by approximately 10% on every ton of coal mined at Decker for the incremental C.E. contract, while at the same time the state of Montana has lost $3 to $4 million/year of severance tax income.

Although Commonwealth Edison has been supplied over short periods with small amounts of Decker tonnage under the Big Horn contract previously, it was only through Decker's escape from the Lower Colorado River Authority contract

that called for shipment of 1.9 mtpy to Austin, Texas, that gave the Decker Mines the capacity to service the increase in the Commonwealth Edison contract without substantially increasing the capital/labor investment in the Decker mines. When Peter Kiewit refused to renegotiate the LCRA contract to bring it more in line with coals the utility was receiving from Wyoming producers, perhaps Montana lost that 2 million tons of production in order for Peter Kiewit to significantly increase profits on the Commonwealth Edison contract. Given the very large profit margins that Decker makes on coal, anywhere from $15 to $25/ton if their breakeven costs are around $7.50/ton for West Decker and $10/ton for East Decker, it is hard to understand why they chose contract elimination rather than mine expansion in order to capture the windfall of the Commonwealth Edison/Big Horn contract relationship. Decker appears to have enough reserves to service both Lower Colorado River Authority and the Commonwealth Edison addition, but for corporate reasons unknown at this time, they chose in effect to exchange the contracts between the LCRA and Big Horn/Decker with Commonwealth Edison in order to increase profit margins on approximately the same tonnage.

In summary, therefore, it appears that under the terms of HB607, Peter Kiewit has been able to restructure coal mining from the Big Horn Mine in Wyoming to the Decker Mine in Montana in a way that will not increase, or slightly increase its Montana production (by adding 2 to 3 mtpy to CE, after the 2 mtpy loss of LCRA), but will reduce state tax revenues by $3 to $4 million/year, or $36-$48 million below what would have occurred without HB607 over the life of the Commonwealth Edison contract. At the same time, Peter Kiewit has given up a 2 mtpy contract where profits were between $25 and $30/ton, thereby depriving the state of Montana of a coal severance tax cash flow of about $6 million/year over the life of the LCRA contract. One might argue that HB607 has in fact reduced expected coal severance tax revenues to

the state of Montana in the first large contract adjustment to be executed under the act.

The other contracts recently signed or being discussed need to be briefly reviewed. NERCO's Spring Creek Mine anticipated sales to Detroit Edison are on a spot market basis and are subject to the vagories of demand and the marketplace. The hope is that this sale will provide 600,000 to 700,000 tons a year for some indefinite period. At first glance it appeared reasonable that NERCO's Spring Creek Mine was a supply alternative to the capacity limited Decker Mine. However, in the last few weeks, Detroit Edison has announced it is displacing 400,000 tons of Decker coal at its Monroe Plant (the displaced coal to be used elsewhere) and purchasing 750,000 tons of spot eastern Kentucky high BTU (12,500-13,000), low-sulfur coal for the rest of 1986. The eastern Kentucky coal is now competitive with high BTU, low sulfur western coal because of reduced FOB mine prices, estimated to be $26/ton, and substantially reduced transportation costs on the C & O Railroad. Aggressive reduction in transportation costs and the slack coal market has opened some Detroit Edison plants to high quality eastern Kentucky coal, at least for the near term, and makes the NERCO contract appears less likely.

AEM Corporation is a small contract with Western Energy and is restricted to the Colstrip Mine because of plant location and not severance tax reduction. Western Energy/Northern States Power five-year renewal, from 1995 to the year 2000, does expand the upper limit of annual contract to 5.5 mtpy, but does not raise the minimum; and therefore, it is not known whether or not Northern States Power will choose to increase their purchase from Western Energy. This contract cannot be considered as a direct response to a lower coal severance tax.

The one contract that is in the process of being negotiated at this time, and may be signed momentarily, is Southern Minnesota Power with Westmoreland's Absaroka Mine for its share of Sherco #3. It is a 1 mtpy contract beginning in 1988, and this particular purchase might well be secured by the additional price advantage that the severance tax provides against comparable BTU coals in Wyoming.

NORTHERN PLAINS RESOURCE COUNCIL

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EXHIBIT #11
DATE 1-28-87
HB 252+274

Testimony Presented to House Taxation
Committee in Opposition to House Bills:
252 & 274
January 28, 1987

MR. CHAIRMAN, MEMBERS OF THE COMMITTEE, LADIES AND GENTLEMEN, I'M BOB TULLY. I"M A RANCHER FROM THE BULL MOUNTAINS NEAR ROUNDUP, AND SPEAK TODAY ON BEHALF OF THE NPRC IN OPPOSITION TO HB 252 AND HB 274.

NPRC HAS GENERALLY ADVOCATED A STATE SEVERANCE TAX ON COAL TO PROVIDE REVENUES TO OFFSET THE STATE"S VARIOUS IMPACTS DUE TO LARGE SCALE STRIP MINING AND TO PROVIDE A LEGACY- A FOUNDATION- FOR FUTURE GENERATIONS AFTER THE BUST.

THIS CONCEPT IS AS VALID TODAY AS IT WAS IN 1975. IMPROTANT TO OUR POSITION IS OUR CONVICTION THAT, AT WHATEVER LEVEL, THE COAL SEVERANCE TAX CAN HAVE NO MEASURABLE EFFECT ON COAL PRODUCTION FIGURES IN MONTANA.

FURTHER, WE ARE UNALTERABLY PERSUADED THAT THE GEOLOGIC AND GEOGRAPHIC FACTS OF LIFE PRECLUDE ANY POSSIBLE COMPETITION WITH COAL OF VERY SIMILAR QUALITY CURRENTLY BEING MINED IN WYOMING.

DR. SILVERMAN HAS ESTIMATED THAT ABOUT 90% OF THE MARKETS AND ANY POTENTIAL FOR INCREASED MARKETINGS OF COAL IS MUCH CLOSER TO THE COAL FIELDS OF WYOMING THAN MONTANA. ALSO THE ACCIDENT OF GEOLOGIC REPOSE OF THE COAL BEDS IN WYOMING AFFORD A MUCH MORE ADVANTAGEOUS OVERBURDEN/SEAM THICKNESS RATIO- RESULTING IN A DRASTICALLY CHEAPER COST OF MINING.

RECOGNIZING THESE AS REALITIES INESCAPABLE LEADS US TO CONCLUDE THAT WHAT IS BEING PROPOSED HERE TODAY OFFERS NO REAL HOPE OF INCREASED COAL PRODUCTION IN MONTANA. MANY NPRC MEMBERS ARE IN AGRICULTURE AND WE ARE PAINFULLY AWARE OF WHAT THE WORDS "HARD TIMES" MEAN.

WE CAN READILY EMPATHIZE AND SYMPATHIZE WITH OUT OF WORK MINERS. WE FEEL THAT IT IS NOT ONLY INACCURATE BUT MISLEADING AND CRUEL FOR ANYONE TO HINT OR INFER THAT DRASTIC DOWNWARD ADJUSTMENT OF THE COAL SEVERANCE TAX WILL RESULT IN ANY OF THOSE MINERS BEING REHIRED. IT IS JUST AS MISLEADING TO SUGGEST THAT THE SEVERANCE TAX LEAD TO THEIR BEING LAID OFF. THE SHRINKING MARKET DEMAND FOR COAL CAUSED THE LAYOFFS AND THIS FACT SHOULD NOT BE CAMOFLAGED.

YOU MAY CHALLENGE OUR OPPOSITION TO THE PROPOSED BILLS AS NEGATIVE AND ASK "WHAT WOULD YOU SUGGEST IN THEIR STEAD?" I WOULD REPLY THAT IT MIGHT BE SUITABLE TO RECONCILE THE SO CALLED "EFFECTIVE" TAX RATE WITH THE "STATUTORY" RATE AND MAKE THEM ONE AND THE SAME. TO EQUITABLY ACCOMPLISH THIS IT MIGHT BE HELPFUL TO FACTOR IN THE RATES OF RETURN, OR PROFITS, MADE BY THE COAL COMPANIES UNDER THE PRESENT TAX STRUCTURE. THIS INFORMATION MIGHT BE QUITE REVEALING AND VERY PERTINENT IN DETERMINING AN APPROPRIATE TAX RATE.

THANK YOU.

The Montana Environmental Information Center Action Fund

January 27, 1987 • P.O. Box 1184, Helena, Montana 59624 (406)443-2520

EXHIBIT #12
DATE 1-28-87
HB 255-274-456

1-28-87
255
274
456

Mr. Chairman and Members of the Committee:

For the record, my name is George Ochenski and I am representing the Montana Environmental Information Center today in opposition to these attempts to lower the effective rate of the coal severance tax.

You may ask yourself, "Why is a representative of a public interest group concerned with the environment testifying at a tax hearing?" Indeed, I have often asked myself that question in the last couple of years as Montana's budgetary shortfalls have necessitated Special Sessions, spending cuts, and fiscal reviews. Many of the members of this Committee only months ago spent long hot days hearing testimony on the effects of across-the-board agency and program reductions. Since that time, many of us have experienced the various impacts of those actions: particularly those of us that are in nearly constant contact with the agencies that carry out the functions of government.

Make no mistake, many of the cuts were a beneficial tightening of the slack, but some of them have definitely reduced the ability to carry out the statutes you work so hard to produce.

The ability of our state agencies to protect the health of its citizens and the natural resources we are blessed with is at the marginal point. What is at stake is the soil, water and air of this state. Our very groundwater is being polluted statewide and the Water Quality Bureau acknowledges it cannot keep up with the rate of newly discovered incidents. For the environment, if energy was the focus of the 70s, truly, hazardous wastes is the issue of the 80s...and chemically polluted drinking water makes few distinctions for social or political affliliation.

Therefore, when we talk of lowering the coal severance tax, we must look at more than the numbers in the fiscal statement or the comparisons with Wyoming production. We must look at the consequences of our actions, and the ramifications of the proposed tax cut.

You have heard today that the coal industry is in trouble, that they are losing production, laying off workers, perhaps closing mines. Both sides have presented numbers concerning costs, and profits. But for the moment, I would like to examine only the premise that if, in fact, these taxes are cut, and revenues subsequently reduced, then what are the consequences and where shall we make up the difference?

Number crunching aside, who in this state is better prepared to carry the load you would lift from the coal company shoulders? Should we raid the Trust? That's no answer, only the opening of a hole that will bleed til it runs dry. Should we put the burden on the common citizen as a sales tax? Possibly, if we are willing

to tax those with the least ability to pay; the poor and under-privileged, the unemployed, the farmer on the skids. Or should we further dismantle state government, to the point of irresponsibility to our selves and the generations to follow?

The choice is clear--every time a bill is introduced that would make a tax cut, a revenue reduction, for one special interest or another, some new revenue must be generated, or some other limb of government hacked off. We are running out of limbs to hack. We are also running out of new tax options.

The coal companies have reaped tremendous profits digging the black gold from Montana's plains. While they share in the national 5% reduction in coal production, that is vastly more the result of the international glut of cheap oil than the impact of our severance tax. These companies are able to carry their share of the tax burden, as they have been for the last decade. To change that status would be to put the difference, the hard cash, into the pockets of the corporations, and take it out of the pockets of Montana citizens.

I urge you to reject these proposals to lower the severance tax further, and reject this corporate manipulation so very reminiscent of the Copper Kings.

Thank you.

EX 1-28-87

EXHIBIT 7
DATE 1-28
HB 456

MONTANA STATE LIBRARY

TED SCHWINDEN, GOVERNOR

1515 E.

STATE OF MONTANA

(406) 444-3115

HELENA, MONT.

TESTIMONY ON HB 252 AND HB 274 and 456

MCA 15-35-108 links funding for basic library services in Montana to the production and sale of coal. It is in the best interest of libraries in the state to have a healthy coal industry and an expansion of coal sales. Libraries are very aware of what is happening with the coal industry. The revenues received by libraries from coal severance taxes have ranged between $400,000 and $450,000 each year for the past 5 years. In contrast, our estimates for 1988 and 1989 range between $250,000 and approximately $300,000. Estimated on the current tax rate, libraries face revenue losses somewhere between $100,000 and $200,000.

HB 252 and HB 274, by changing the rate of the tax, will certainly affect libraries. I do not know whether the effect of these bills will be positive or negative in either the short or the long term. If they build a stronger coal industry and more coal tax revenues are received by the state, libraries will benefit. If they do not affect, or lower coal revenues to the state, libraries will suffer.

I have seen only one set of estimates for revenues if the coal rate is changed. This was prepared for the Coal Tax Oversight Committee in November and does not take into account possible increases in sales as a result of lowering the tax rate. Not having estimated changes in revenue handicaps us in knowing how the bill will affect library services. Libraries use coal severance tax revenues for current operations. These funds are the basis of a federation structure of libraries which provides for the interlibrary loan of materials; reference and information services when local libraries cannot provide them; collections of books and other materials; and assistance to local libraries through staff training, joint planning, participation in automation; help in serving children, and many other support services.

Coal severance tax revenues are the commitment made by Montana to provide equal access to library services regardless of where within the state a person lives. Library federations in Montana have been built a piece at a time over 30 years. We now face the opposite process of dismantling services because of shortfalls in revenue.

The Montana State Library Commission uses coal severance tax revenues combines with reductions in General Fund appropriations to the State Library and the Department of Institutions so that Montana is not able to maintain the effort, approximately $650,000 in federal funds would be lost to the state.

Thank you.

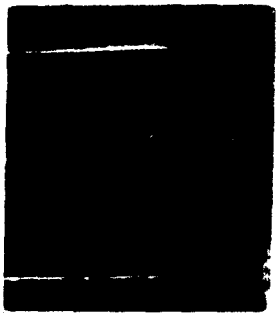
Sara Parker
State Librarian

MSL/SP
1/27/87

EXHIBIT
DATE 1-28-87
HB 274

MONTANA

PROPERTY TAX MILL LEVIES 1986-87



MONTANA
TAX FOUNDATION

EXHIBIT ____
DATE [illegible]
HB [illegible]

Through the Window of Opportunity and Beyond

A Report to the 50th Legislature
Coal Tax Oversight Subcommittee

November 1986

Montana Legislative Council

Published by
MONTANA LEGISLATIVE COUNCIL
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Helena, Montana 59620
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Glendive Forward

Of Montana

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DATE 1-28-87
HB 456

January 27, 1987

Representative Jack Remirez, Chairman
House Taxation Committee

Glendive Forward supports passage of House Bill 456 introduced by Representatives Brown and Iverson. We believe that, enactment of this bill would mean, because of the sliding scale feature applied to surface-mined subbituminois coal, an increase in coal sales. This will lead to increased mining and increased employment for our state.

We believe that the present 30% severence tax is excessive and does not permit Montana coal producers any advantage when competing for contracts. The present "Window of Opportunity" does provide some incentive but not what we believe to be necessary for future development of coal resources.

Again, we strongly support passage of House Bill 456.

Yours Truly,

Kathy Sparr

Kathy Sparr
President

WITNESS STATEMENT

NAME Neal Egan BILL NO. 456

ADDRESS PO Box 3707, Butte 59702 DATE 1-28-87

WHOM DO YOU REPRESENT? MSE, Inc.

SUPPORT ✓ OPPOSE _____ AMEND _____

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

MSE is in the business of making MT coal more competitive versus coals from other parts of the country, particularly Eastern coals. We are developing a process to burn coal more efficiently, and with less environmental impact – MHD. Also, we are developing other processes including coal drying to add value to MT coal. MT must add value to their products, particularly coal, to remain competitive. Other states where we presently sell coal or would hope to, ~~of~~ are very agressive in improving their coal product. We must capture that market now to prevent subsequent substition of their coal at a later date. The sliding reduction in coal taxes would immediately make it more desirable to buy MT coal. Subsequent improvement of the MT coal product will insure the

OVER

future competitiveness of MT's coal.

A sliding scale makes everyone from producer to user a salesman for MT coal. Also, we must address the improvement of the product through process development that will add value to the product — here in MT.

MONTANA
FARM BUREAU
FEDERATION

P.O. Box 6400
~~502 South 19th~~
Bozeman, Montana 59715
Phone (406) 587-3153

EXHIBIT _____
DATE 1-28-87
HB 252

TESTIMONY BY: Lorna Frank
BILL # HB-252 DATE 1/28/87
SUPPORT XXX OPPOSE _____

For the record my name is Lorna Frank, representing Montana Farm Bureau, Farm Bureau supports legislation that reduces the coal severance tax.

Farm Bureau members believe that by lowering the coal severance tax, Montana coal will be more competitive on the market place and will result in putting people back to work and the economy of Montana back on its feet.

This Legislature must take the first step in this process, we hope that this committee will take that step.

SIGNED: Lorna Frank

EXHIBIT
DATE 1-29-87
HB 257

January 28, 1987

Mr. Chairman and Members of the Committee:

I am Jeanne-Marie Souvigney, testifying for the Montana Chapter of the Sierra Club in opposition to HB252, HB 274, and HB 456. The Sierra Club is very interested and concerned about the development of Montana's nonrenewable energy resources, the impacts of this development on Montana's water and air resources, and the effects of the taxation of this development on Montana's fiscal stability.

We believe that the real issue behind these bills - and behind many others that you will hear this session - is: At what level is the coal tax a fair tax? We suggest that these bills do not establish a fair tax; these bills are not fair. They do not discuss the real tax rate. Our coal tax is not at 30%. We allow deductions against the value of the coal so that the effective tax rate is more in the range of 19-20%, or 12-14% under the "window". We ask that supporters of a reduced tax rate be up front about their proposals, and talk about the effective tax rate, not some rate in the statutes that no longer has meaning. There have been attempts to do this in other areas, to clarify the state's position regarding the unitary tax, or top tax rates for corporations, so that perception is reality. The same thing should be done with the coal tax rate so that we have a true and fair forum in which to discuss any proposals to change the coal tax.

Finally, Mr. Chairman and members of the committee, we question whether these proposed tax decreases for the coal companies are fair at a time when we are faced with severe budget shortfalls and drastic cuts in state services, and will be confronting citizens of this state with tax increases in the form of a sales tax, income tax surcharge, or some other tax. We suggest it is not fair. We urge you to oppose these three bills on the basis of fairness. Thank you.

VISITORS' REGISTER

House Taxation COMMITTEE

BILL NO. HB 252 DATE Jan 28, 1987

SPONSOR Hanson

NAME (please print)	RESIDENCE	SUPPORT	OPPOSE
[illegible]	[illegible]	✓	
J. Mockler	Mt. Coal Council	✓	
J. Miller	TIE Co.	✓	
H. [illegible]	[illegible] MT		✓
J. [illegible]	MERC / Detroit Edison	✓	
[illegible]	[illegible]	✓	
Mike Keating	[illegible] 400	✓	
Bill Gillett	Forsyth		✓
[illegible]	[illegible]	Technical	
[illegible]	[illegible]	✓	
[illegible]	Decker Coal	✓	
J. N. McPherson	NERCO Coal Corp	✓	
[illegible]	[illegible]	✓	
[illegible]	[illegible]		
[illegible]	[illegible]	✓	
[illegible]	[illegible]	✓	
Ken Williams	Western Energy	✓	
Dennis Burr	MONTAX	✓	
Bob Tully	Roundup		✓
Tom [illegible]	[illegible]	✓	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR WITNESS STATEMENT FORM.

[illegible] Min Power ✓

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Jeanne Marie Souvigney Mt Sierra Club ✓

Bob Pyfer MEDRS ✓

Erik Pigman MDU ✓

Mike Moore WETA ✓

Dave Field 329 3rd St Helena ✓

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VISITORS' REGISTER

House Taxation COMMITTEE

BILL NO. HB 274 DATE Jan 28, 1987

SPONSOR Asay

NAME (please print)	RESIDENCE	SUPPORT	OPPOSE
[illegible]	[illegible]	✓	
J. Mockler	MT Coal Council	✓	
D. Ankney	Rosebud County (Save our State)	✓	
J [illegible]	Rosebud County S.O.S.		
[illegible]	[illegible] State Inc	✓	
A. [illegible]	Missoula MT		✓
Bill Gillin	Forsyth, Mont		✓
[illegible]	DOR	Technical	
[illegible]	[illegible]	✓	
[illegible]	[illegible]	✓	
[illegible]	[illegible]		
[illegible]	Montana Chamber	✓	
[illegible]	[illegible]	✓	
[illegible]	[illegible] State	✓	
[illegible]	[illegible]	✓	
Ken Williams	Western Energy	✓	
[illegible]			
[illegible]	Forsyth	✓	
[illegible]	Forsyth	✓	
Bob [illegible]	Roundup		✓
Tom [illegible]	Townsend	✓	
[illegible]	Minnesota Power	✓	
Jeanne-Marie Souvigney	Sierra Club of MT	✓	
[illegible]	MEDIS	✓	
Tom E. [illegible]	Billings	✓	
Mike [illegible]	[illegible]	✓	
Dana Field	529 3rd Helena	✓	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR WITNESS STATEMENT FORM

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VISITORS' REGISTER

House Taxation COMMITTEE

BILL NO. HB 274 DATE Jan 28, 1987

SPONSOR ASAY

NAME (please print)	RESIDENCE	SUPPORT	OPPOSE
Deborah Schlesinger MT LIB ASS	Helena		✓
[illegible]	Helena		✓
[illegible]	State Library		
Bryan [illegible]	Helena		

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VISITORS' REGISTER

House Taxation COMMITTEE

BILL NO. HB 456 DATE Jan 28, 1987

SPONSOR Brown

NAME (please print)	RESIDENCE	SUPPORT	OPPOSE
Jim Mockler	Helena	✓	
[illegible]	[illegible]	✓	
[illegible]	Missoula [illegible]		✓
Teresa Cohea	Gov. Office		✓
Bill Gillin	Forsyth, Mt.		✓
[illegible]	[illegible]	Technical	
Brett H. [illegible]	Glendive	✓	
Tom [illegible]	Townsend	✓	
[illegible]	Duluth Mn	[crossed out]	[crossed out]
Bob [illegible]	MEDA		
Tom [illegible]	[illegible] Billings	✓	
Mike [illegible]	WETA	✓	
Sen. Gilbert Abrams	Senate Dist #12	✓	
DEBORAH SCHLESINGER MT. LIB ASSN	[illegible]		✓
GREG OSCHENSKI	MT. ENV. INF. CNTR		✓
Dave Brown	House District 72	X	
Neal Egan	MSE Inc.	X	
FRANK J. Tooke	Miles City MT	X	
M McClure	ASARCO	X	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR WITNESS STATEMENT FORM.

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Jeanne-Marie Souvigney Sierra Club of MT X

Daniel Field 524 3rd St Helena ✓

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Karen Frank [illegible] X