United States Department of the Interior
Bureau of Land Management

Montana State Office

November 1990

BULL MOUNTAINS EXCHANGE
Final EIS

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

BLM-MT-ES-91-001-4120

PROPERTY OF BILLINGS D.E.Q.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MONTANA STATE OFFICE
222 NORTH 32ND STREET
P.O. BOX 36800
BILLINGS, MONTANA 59107-6800

TAKE PRIDE IN AMERICA

IN REPLY TO:

Dear Reader:

Enclosed for your review is the Final Environmental Impact Statement (EIS) for the Bull Mountains Exchange. The Draft EIS was published in October 1989, and was followed by a 60-day public comment period from November 3, 1989 - January 5, 1990. Public meetings were also held in Roundup, Billings, and Butte in November - December 1989.

Changes based on public comments and concerns have been incorporated into this document. Written comments and oral comments from public meetings and the Bureau of Land Management's responses to these comments are presented in Chapter 5. Revisions were made to the "Hydrology", "Subsidence", and "Socioeconomics" sections for the selected coal lands. The resource sections for the "offered lands" have also been expanded. The priority 4 offered lands in Custer County that were inadvertently sold by Glacier Park Company have been replaced by additional lands in Carbon County. The Peabody coal-for-coal alternative has been dropped from consideration. The Final EIS incorporates all changes and revisions to the Draft EIS and has been printed in its entirety.

The Final EIS addresses the proposed action; i.e., the exchange of selected federal coal lands to Meridian Minerals Company for high-value recreational and wildlife offered lands. The proposed action is BLM's preferred alternative. The mirror image coal-for-coal exchange alternative, a leasing alternative, and a no-action alternative are also addressed.

Development impacts of the coal as a small room-and-pillar underground mine producing 0.5 million tons of coal per year is analyzed. A 3.0 million tons of coal per year longwall underground mine is analyzed as the maximum development scenario. A generic railroad to haul the coal is also addressed under this scenario.

The Final EIS concludes BLM evaluation of the proposed exchange and alternatives. Thirty days after issuance of the Final EIS, BLM will make a decision on the proposed exchange. This decision will be recorded in a Record of Decision which will be available to the public.

We wish to thank the individuals and organizations who participated in the public review and comment of this project. Your interest is appreciated.

Sincerely,

Robert W. Faithful

Robert W. Faithful
Acting State Director

Dennis D. Casey
Commissioner, Montana
Department of State Lands

BULL MOUNTAINS EXCHANGE

FINAL
ENVIRONMENTAL IMPACT STATEMENT

November 1990

Robert W. Faithful
Acting State Director
Bureau of Land Management

Dennis D. Casey
Commissioner
Montana Department of State Lands
Lands Administration Division
Cooperating Agency

ENVIRONMENTAL IMPACT STATEMENT

Draft ( ) Final (X)

LEAD AGENCY: DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MILES CITY DISTRICT OFFICE
MILES CITY, MONTANA

COOPERATING AGENCY: LAND ADMINISTRATION DIVISION
DEPARTMENT OF STATE LANDS
STATE OF MONTANA
HELENA, MONTANA

TYPE OF ACTION: Administrative

JURISDICTION: Miles City and Butte Districts

ABSTRACT: This is a Final Environmental Impact Statement (EIS). Public meetings were held in Roundup, Billings and Butte, Montana in November, and December 1989 on the Draft EIS.

The Bull Mountains Exchange Final EIS addresses the proposed exchange of selected federal coal lands to Meridian Minerals Company for high-value recreation and wildlife offered lands in Montana. The proposed exchange is the Bureau of Land Management's (BLM) preferred alternative. A coal-for-coal exchange alternative, a leasing alternative, and a no-action alternative are also addressed. The Peabody coal-for-coal exchange alternative was dropped from consideration. The development of the coal as a small room-and-pillar underground mine producing 0.5 million tons of coal per year is analyzed. A 3.0 million tons of coal per year longwall underground mine is analyzed as the maximum development scenario. A generic railroad to haul the coal is also addressed under the maximum development scenario.

A decision regarding the proposed exchange will be made after a thirty-day period and a Record of Decision (ROD) will be issued at that time.

For further information regarding this Final EIS, contact Mat Millenbach, District Manager, Bureau of Land Management, West of Miles City, P.O. Box 940, Miles City, Montana 59301, Telephone (406) 232-4331.

SUMMARY

The Bull Mountains Exchange Environmental Impact Statement (EIS) addresses the proposed exchange of 3,674.36 acres of federal coal for 9,873.18 acres of high-value recreation and wildlife lands offered by Meridian Minerals Company (Meridian). The proposed action is the Bureau of Land Management's (BLM) preferred alternative. A coal-for-coal alternative, a leasing alternative and a no-action alternative are also addressed. The Peabody coal-for-coal exchange alternative was dropped from further consideration.

In addition to the proposed action and alternatives, BLM analyzed the development of the coal and the impacts as the reasonably foreseeable development scenarios. The development impacts of the coal as a small room-and-pillar underground mine producing 0.5 million tons of coal per year is analyzed. A 3.0 million tons of coal per year longwall underground mine is analyzed as the maximum development scenario. A generic railroad to haul the coal is also addressed under this scenario.

If and when the federal coal is developed, the mining company will be required to submit a mine plan to the regulatory agencies, Montana Department of State Lands (MDSL) and Office of Surface Mining Reclamation and Enforcement (OSM), for their review and subsequent preparation of a joint state and federal EIS on the proposed site-specific development of the coal resource. In addition, the proposed railroad would require an evaluation and additional environmental documentation from the state and the Interstate Commerce Commission. The Interstate Commerce Commission and the state will probably complete another EIS on the site-specific impacts of the railroad or address these impacts as part of the mine plan EIS.

ALTERNATIVE A — COAL-FOR-LAND EXCHANGE — PROPOSED AND PREFERRED ACTION

The proposed action is to exchange 3,674.36 acres of BLM-administered federal coal for private high-value recreation and wildlife lands offered by Meridian. Surface ownership of the coal lands would be unaffected by the exchange proposal.

The in-place federal coal reserves included in the exchange application total 54.5 million tons. Depending upon the mining technique used, 43.6 million tons of coal are recoverable by a longwall mining operation and 27.3 million tons of coal are recoverable by a room-and-pillar mining operation. The value of the federal coal under consideration for exchange has been determined to have a fair market value of $730,000. This value was determined by the BLM's Northwest Regional Evaluation Team (NRET).

In return for the federal coal under consideration for exchange, BLM selected lands from the Meridian offered lands. The top priority acquisition lands are discussed, as well as replacement lands for the priority 4 lands that were inadvertently sold by Glacier Park Company. The top priority acquisition lands and replacement lands have a minimum value ($1,149,000) BLM would accept in an exchange for the federal coal. A brief discussion and description of the top priority acquisition lands and replacement lands follows:

Priority lands 1,2,3 — These three parcels of land are located in Madison County and total 697.45 acres. All three parcels are riverfront properties along the Madison River. Primary anticipated use by the public would be fishing and dispersed recreation, such as sight-seeing and picnics.

Priority lands 4 — This 640 acre parcel of land is located in Custer County and adjoins a large block of public land. These lands have been inadvertently sold by Glacier Park Company and are no longer available for exchange.

Priority lands 5 — These three parcels of land in Beaverhead and Deerlodge Counties total 1,475.48 acres. The lands border the Big Hole River. The lands are critical elk and mule deer habitat. Primary anticipated use by the public would be fishing and big game hunting.

Priority lands 6 — These thirteen parcels of land are located in Carbon County and total 6,195.56 acres. These lands contain endangered plant species habitat and mule deer habitat. Primary anticipated use by the public would be big game hunting.

Replacement Lands — These four parcels of lands are also located in Carbon County and total 1,504.7 acres. These lands are adjacent to the priority lands 6, although they are in a different grazing allotment. The lands have essentially the same resource values as the priority lands 6 (mule deer habitat). Primary anticipated use by the public would be big game hunting.

ALTERNATIVE B — COAL-FOR-COAL EXCHANGE — MIRROR IMAGE

Under the mirror image coal-for-coal exchange, the federal and Meridian coal in the project area would be split into two logical mining units of approximately equal size and value. Meridian would get one unit, BLM would get the other unit.

About 32.7 million tons of in-place federal coal in the southern half of the project area would be exchanged for 30.5 million tons of in-place Meridian owned coal in the northern half of the project area. This alternative would provide a block of private coal of 70.8 million tons in the south half and a block of federal coal of 60.2 million tons in the north half.

The south tract would have sufficient recoverable reserves to sustain a mine for 22 years assuming a longwall operation at 3.0 million tons annually and 5 years to reach full production. The north tract would sustain a similar mining operation for 19 years. With the addition of state Section 16 in the north half, there would be sufficient recoverable reserves for 23 years.

For a room-and-pillar mine operating at 0.5 million tons per year, and 5 years to reach full production, there would be sufficient recoverable reserves for 69 years in the south tract and 52 years for the north tract. Mine life could be expanded an additional 18 years if state Section 16 was included in the north tract.

If a larger mining operation began in the south tract, it is likely that the operation would eventually lease the federal coal in the north tract.

PEABODY COAL-FOR-COAL EXCHANGE

This alternative considered the option of exchanging the federal coal in the Bull Mountains for Meridian coal in mining permit Area B of the Big Sky Mine south of Colstrip, Montana. The federal coal lands would be exchanged for the Meridian offered coal lands. Under this proposal, selected federal coal in the Bull Mountains and Meridian offered coal in the Peabody Big Sky Mine Area B would be appraised and exchanged on an equal cash value basis.

This alternative was dropped from consideration. The lease and exchange agreement would be most difficult for BLM to administer and to renegotiate the lease terms and conditions. The economic evaluation also determined that it would not be in the public's interest to pursue this alternative.

ALTERNATIVE C — LEASING

The federal coal being considered for exchange could be leased competitively. Leasing could occur through the lease by application process since the Powder River Coal Production Region is now partially decertified.

Lease-By-Application

Since the Powder River Coal Production Region is now partially decertified, BLM could lease the federal coal by the lease-by-application process. Processing an application usually takes a year or longer. For analytical purposes, it is assumed that the in-place 56.9 million tons of federal coal reserves would be offered for lease.

State Coal Status

As part of Meridian's efforts to secure long-term coal reserves in the Bull Mountains, they submitted three coal lease applications to MDSL for the state owned coal lands.

MDSL then requested that BLM consider evaluating the state lands in the EIS, if possible. T. 6 N., R. 27 E., Section 16 was relatively easy to address and is included in the EIS under the leasing alternative. T. 6 N., R 26 E., Section 36 has no current marketable coal but was needed by the mining company for surface facilities. The mining company will probably have to change this application to an application for surface facilities once their plans are final. T. 7 N., R 26 E., Section 36 has recoverable coal reserves but this section of land is several miles outside the geographic area this EIS addresses.

Other Federal Coal

Under the leasing alternative, BLM included 197.59 acres of federal mineral estate which contains 148 acres of recoverable coal reserves in T. 6 N., R. 26 E., Section 24 for discussion and analysis. These lands contain an estimated 2.4 million tons of in-place coal.

Lease Royalties

Current coal market conditions indicate that the Bull Mountains' coal would not become economically feasible for development until market conditions approached a $20 to $30 minimum selling price (1990 dollars). This probably would not occur until 20 to 40 years in the future. Based on these assumptions, royalty stream flows were calculated using a $25 F.O.B. mine sale price starting in 2020 (midrange). Using these figures, a 0.5 million tons of coal per year underground mine would generate $13,367,592 in royalty payments over a 40-year period. The discounted royalty payment value is $176,941 under this scenario. A 3.0 million tons of coal per year underground mine would generate $76,622,000 in royalty payments over the 40-year period with a discounted value of $1,008,208 (1990 dollars).

If BLM were able to lease the federal coal immediately and it was developed with a $15 sale price, a 0.5 million tons of coal per year underground mine would generate $7,985,628 in royalty payments over the 40-year period with a discounted value of $1,676,763 (1990 dollars). A 3.0 million tons of coal per year underground mine generates $45,773,000 in royalty payments over the same 40-year period with a discounted value of $9,554,192 (1990 dollars).

ALTERNATIVE D — NO ACTION

This alternative would continue present management. It is in essence a two-part no action alternative, i.e., denial of the exchange(s) and denial of the leasing. There would be no development of federal coal under this alternative.

Should BLM deny the exchange(s), the Bull Mountains federal coal lands included in the exchange application would remain in public ownership and would not be developed in the foreseeable future. The offered recreational properties would remain in private ownership as would the private coal.

Should BLM deny leasing in the Bull Mountains, the federal coal lands would still remain in public ownership for development by future generations. There would be no immediate coal development unless it was done on private coal lands.

CONCLUSION

Changes based on public comments and concerns have been incorporated into this document. Written comments and oral comments from the public meetings and the BLM's responses to these comments are presented in chapter 5. Revisions were made to the "Hydrology", "Subsidence", and "Socioeconomics" sections for the selected coal lands. The resource value sections for the "offered lands" have also been expanded. The offered lands in Custer County (priority 4) that were inadvertently sold by Glacier Park Company have been replaced by additional lands in Carbon County. The Peabody coal-for-coal alternative has been dropped from further consideration. The Final EIS incorporates all changes and revisions to the Draft EIS and has been printed in its entirety.

The proposed exchange and subsequent development of the coal by underground mining is consistent and in conformance with the Billings Resource Area Resource Management Plan (RMP). Our evaluation of the proposed exchange and alternatives indicates that the proposed action is the preferred alternative.

TABLE OF CONTENTS

SUMMARY i

ALTERNATIVE A — COAL-FOR-LAND EXCHANGE — PROPOSED AND PREFERRED i
ALTERNATIVE B — COAL-FOR-COAL EXCHANGE — MIRROR IMAGE i
PEABODY COAL-FOR-COAL EXCHANGE ii
ALTERNATIVE C — LEASING ii
Lease-By-Appplication ii
State Coal Status ii
Other Federal Coal ii
Lease Royalties ii
ALTERNATIVE D — NO ACTION ii
CONCLUSION iii

ABBREVIATIONS AND ACRONYMS xix

CHAPTER 1 — PURPOSE AND NEED

INTRODUCTION 1
LAND-USE PLAN CONFORMANCE 1
MILES CITY DISTRICT PLANS 1
Billings Resource Area RMP 1
Supplement to State Directors Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment 2
BUTTE DISTRICT PLANS 2
Dillon Resource Area Management Framework Plan 2
Upper and Lower Big Hole River Management Plan 2
Supplement to State Directors Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment 2
Madison River Corridor Study 3
SCOPING ISSUES AND CONCERNS 3
PUBLIC MEETINGS AND COMMENTS 3
DECISION FACTORS AND PROCESS 4
EIS Process 4
Economic Evaluation and Appraisals 4
Consultation with the Attorney General 4
Regional Coal Team Consultation 4
Governor's Consultation 5
Other Consultations 6
Record of Decision—Notice of Realty Action—Notice of Lease Sale 6
AUTHORIZING ACTIONS NEEDED 6

CHAPTER 2 — ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION 7
COAL LAND-USE SCREENS 7
ALTERNATIVES CONSIDERED BUT DISMISSED OR NOT ANALYZED 11
Other Coal-for-Coal Exchange Proposals 11
Reduced Exchange 11
ALTERNATIVES CONSIDERED IN DETAIL 12
ALTERNATIVE A — COAL-FOR-LAND — PROPOSED AND PREFERRED ACTION 12
ALTERNATIVE B — COAL-FOR-COAL EXCHANGE — MIRROR IMAGE 12
ALTERNATIVE C — LEASING 16
Lease-By-Application 16
State Coal Status 16
Other Federal Coal 18
Lease Royalties 18
ALTERNATIVE D — NO ACTION 18
SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE 18

CHAPTER 3 — AFFECTED ENVIRONMENT

INTRODUCTION 29
COAL LANDS 29
OWNERSHIP 29
CURRENT MANAGEMENT 30
AFFECTED ENVIRONMENT 30
Socioeconomics 30
Industrial Sector Composition 30
Employment 31
Employment Characteristics 31
Employment Conditions 32
Baseline Employment Projections 32
Income 32
Income Characteristics 32
Income Conditions 35
Baseline Income Projections 36
Fiscal Conditions 37
Counties 38
Municipalities 39
School Districts 39
Social Environment 40
Definition of Social Study Area 40
Demography 40
Social Life 43
History 45
Community Organizations 47
Diversification 47
Extra-Local Linkages 48
Stratification 48
Community Coordination and Cooperation 49
Community Interaction 51
Community Resources 52
Social Well-Being 52
Attitudes and Concerns 53
Scoping Procedures 53
Survey Results 54
Community Services 54
Education 54
Law Enforcement 55
Fire Protection 56
Ambulance Service 56
Hospitals and Long-Term Care Facilities 57
Local Physicians 57
Water Supply 57
Wastewater Treatment 57
Solid Waste 58
Social Welfare 58
Housing 58
Housing Characteristics 58
Real Estate For Sale 58
Mobile Home Parks 60
Housing Units For Rent 60
Motels 62
Transportation 62
Definition of Transportation Study Area 62
Modes of Transportation 62
Road and Bridge Conditions 62
Traffic Conditions 64
School Bus Transportation Routes 65
Climate 66
Air Quality 67

Areas of Critical Environmental Concern 67
Cultural Resources 67
Agriculture 68
Floodplains 68
Native American Religious Concerns 68
Threatened and Endangered Species 68
Hazardous Wastes 68
Wetland/Riparian Zones 68
Wild and Scenic Rivers 68
Wilderness 68
Topography and Soils 68
Vegetation 69
Wildlife 69
Game Species 69
Nongame Species 70
Macroinvertebrates 70
Minerals 70
Coal 70
Oil and Gas 70
Mineral Materials 70
Locatable Minerals 70
Hydrology 72
Groundwater Hydrogeologic Setting 72
Groundwater Hydrostratigraphy 72
Groundwater Recharge 72
Groundwater Flow 72
Groundwater Discharge 74
Wells and Springs 74
Surface Water and Drainage Systems 76
Water Quality 76
Recreation 76
Stratigraphy and Geology 77
Existing Subsidence 77
Data Adequacy 77
OFFERED PRIVATE LANDS 78
PRIORITY LANDS 1,2,3 — MADISON COUNTY 78
Current Management 78
Priority Lands 1 78
Priority Lands 2 78
Priority Lands 3 78
Affected Environment 78
Socioeconomics 78
Air Quality 79
Areas of Critical Environmental Concern 79
Cultural Resources 79
Agriculture 79
Floodplains 79
Native American Religious Concerns 79
Threatened and Endangered Species 79
Hazardous Wastes 79
Wetland/Riparian Zones 79
Wild and Scenic Rivers 79
Wilderness 79
Topography and Soils 79
Vegetation 80
Wildlife 80
Big Game 80
Waterfowl 80
Nongame Species 80
Fisheries 80

Minerals 80
Oil and Gas 80
Mineral Materials and Mining Claims 80
Hydrology 80
Surface Water 80
Groundwater 81
Water Quality 81
Recreation 81
Stratigraphy and Geology 81
PRIORITY LANDS 5 — BEAVERHEAD/DEERLODGE COUNTIES 81
Current Management 81
Affected Environment 82
Socioeconomics 82
Air Quality 82
Areas of Critical Environmental Concern 82
Cultural Resources 82
Agriculture 82
Floodplains 82
Native American Religious Concerns 82
Threatened and Endangered Species 82
Hazardous Wastes 82
Wetland/Riparian Zones 82
Wild and Scenic Rivers 83
Wilderness 83
Topography and Soils 83
Vegetation 83
Grasses 83
Timber 84
Wildlife 84
Elk 84
Mule Deer 84
Moose 84
Black Bear 84
Waterfowl 84
Raptors 84
Upland Game Birds 85
Nongame 85
Fisheries 85
Minerals 85
Oil and Gas 85
Mineral Materials and Mining Claims 85
Hydrology 85
Surface Water 85
Groundwater 85
Water Quality 85
Recreation 86
Stratigraphy and Geology 86
PRIORITY LANDS 6 — CARBON COUNTY 86
Current Management 86
Affected Environment 86
Socioeconomics 86
Air Quality 86
Areas of Critical Environmental Concern 86
Cultural Resources 86
Agriculture 87
Floodplains 87
Native American Religious Concerns 87
Threatened and Endangered Species 87
Hazardous Wastes 87
Wetland/Riparian Zones 87
Wild and Scenic Rivers 87

Wilderness 87
Topography and Soils 87
Vegetation 87
Wildlife 87
Big Game 87
Nongame 87
Minerals 88
Oil and Gas 88
Mineral Materials and Mining Claims 88
Coal 88
Hydrology 88
Surface Water 88
Groundwater 88
Water Quality 88
Recreation 88
Stratigraphy and Geology 88
REPLACEMENT LANDS — CARBON COUNTY 88
Current Management 88
Affected Environment 88
Socioeconomics 88
Resource Values 88

CHAPTER 4 — ENVIRONMENTAL CONSEQUENCES

INTRODUCTION 89
Assumptions and Assessment Guidelines 89
Reasonably Foreseeable Development Scenarios 89
Development of the Coal Lands 89
0.5 Million Tons Annual Production 90
Transportation Corridor 90
Employment 90
3.0 Million Tons Annual Production 91
Employment 91
The Bull Mountains Railroad 92
Route and Design Characteristics 92
Resource Impacts 93
Socioeconomics 93
Transportation 93
Air Quality 93
Cultural Resources 93
Agriculture 93
Floodplains 93
Wetlands/Riparian Zones 93
Topography and Soils 93
Vegetation 93
Wildlife 93
Hydrology 94
Recreation 94
ALTERNATIVE A — COAL-FOR-LANDS EXCHANGE — PROPOSED AND PREFERRED ACTION 94
SELECTED FEDERAL COAL LANDS 94
0.5 Million Tons of Coal Per Year Mine 94
Resource Impacts 94
Socioeconomic Impacts 94
Economic Environment 94
Economic Assumptions 94
Employment 95
Employment by Type 95
Employment Distribution 95
Income 99
Fiscal 99
Social Environment 102
Demography 102
Social Life 104

Community Services 104
Housing 104
Transportation 105
Assumptions 105
Traffic 105
Capacity 105
Safety 106
Roads and Bridges 106
School Bus Routes 106
Climate 106
Air Quality 106
Cultural Resources 107
Topography and Soils 107
Vegetation 107
Wildlife 107
Hydrology 108
Recreation 108
Stratigraphy and Geology 108
Subsidence 108
3.0 Million Tons of Coal Per Year Mine 108
Resource Impacts 108
Socioeconomic Impacts 109
Economic Environment 109
Project Assumptions 109
Employment 109
Employment by Type 109
Employment Distribution 113
Income 113
Fiscal 115
Social Environment 117
Demography 117
Social Life 118
Community Services 119
Housing 119
Transportation 120
Assumptions 120
Traffic 120
Capacity 120
Safety 121
Roads and Bridges 121
School Bus Routes 121
Climate 121
Air Quality 121
Agriculture 122
Cultural Resources 122
Topography and Soils 123
Vegetation 123
Wildlife 123
Hydrology 123
Water Quality 124
Recreation 124
Stratigraphy and Geology 124
Subsidence 124
OFFERED PRIVATE LANDS 125
Priority Lands 1,2 and 3 — Madison County 125
Resource Impacts 125
Socioeconomics 125
Cultural Resources 125
Agriculture 125
Floodplains 126
Native American Religious Concerns 126
Wetland/Riparian Zones 126

Topography and Soils 126
Vegetation 126
Wildlife 126
Minerals 126
Hydrology 126
Recreation 126
Priority Lands 5 — Beaverhead/Deerlodge Counties 127
Resource Impacts 127
Socioeconomics 127
Transportation 127
Cultural Resources 128
Agriculture 128
Floodplains 128
Native American Religious Concerns 128
Threatened and Endangered Species 128
Wetland/Riparian Zones 128
Wild and Scenic Rivers 128
Topography and Soils 128
Vegetation 128
Wildlife 128
Minerals 129
Hydrology 129
Recreation 129
Priority Lands 6 — Carbon County 129
Resource Impacts 129
Socioeconomics 129
Transportation 130
Areas of Critical Environmental Concern 130
Cultural Resources 130
Agriculture 130
Native American Religious Concerns 130
Threatened and Endangered Species 130
Wetlands/Riparian Zones 131
Topography and Soils 131
Vegetation 131
Wildlife 131
Minerals 131
Hydrology 131
Recreation 131
Replacement Lands — Carbon County 131
Resource Impacts 131
Socioeconomics 131
ALTERNATIVE B — COAL-FOR-COAL EXCHANGE — MIRROR IMAGE 132
Socioeconomics (0.5 Million Tons Per Year Mine) 132
Economic Environment 132
Employment and Income 132
Fiscal 132
Social Environment 133
Demography 133
Social Life 133
Community Service 133
Housing 133
Socioeconomic Impacts (3.0 Million Tons Per Year Mine) 133
Economic Environment 133
Employment and Income 133
Fiscal 133
Social Environment 133
Demography 133
Social Life 133
Community Services 133
Housing 133

ALTERNATIVE C — LEASING 133
0.5 Million Tons Per Year Mine 133
Socioeconomic Impacts 134
Economic Environment 134
Employment and Income 134
Fiscal 134
Social Environment 134
Demography 134
Social Life 137
Community Services 137
Housing 137
3.0 Million Tons of Coal Per Year Mine 137
Socioeconomic Impacts 137
Economic Environment 137
Employment and Income 137
Fiscal 137
Social Environment 138
Demography 138
Social Life 138
Community Services 138
Housing 138
Hydrology 141
ALTERNATIVE D — NO ACTION 141
ENVIRONMENTAL IMPACTS AVOIDED 141
SOCIOECONOMIC IMPACTS AVOIDED 141
Economic Environment 141
Employment 141
Income 141
Fiscal 141
Social Environment 141
Demography 141
Social Life 141
Community Services 141
Housing 141
OPPORTUNITIES FOREGONE 142
LIKELY FUTURE OF THE COAL 142
LIKELY FUTURE OF THE OFFERED LANDS 142
Priority Lands 1,2 and 3 142
Priority Lands 5 142
Priority Lands 6 142
Replacement Lands 142
ENERGY AND NATURAL RESOURCE REQUIREMENTS AND CONSERVATION POTENTIAL 142
MITIGATION MEASURES 142

CHAPTER 5 — CONSULTATION AND COORDINATION

PREPARATION 145
PUBLIC INVOLVEMENT 145
AGENCIES AND ORGANIZATIONS INVOLVED 145
DISTRIBUTION OF EIS 146
LIST OF PREPARERS 146
PUBLIC LETTERS AND COMMENTS 149
RESPONSES TO PUBLIC COMMENTS 233

APPENDICES

1 Summary of Public Comments and Concerns 249
2 Major Federal, State and County Authorizing Actions 251
3 Application of Planning Screens 253
4 Application of Unsuitability Criteria — Bull Mountains Coal Field 255
5 Prediction of Subsidence Caused by Underground Mining in the Bull Mountains 259
6 Coal Leasing By Application Flow Chart — Coal Lease Sale Procedures Flow Chart 263
7 Methodology for Economic and Demographic Projections 265

8 Quality of Life Surveys 269
9 Enrollment Projections 283
10 Data Adequacy 285
11 Summary of Coal Market Conditions Affecting Development of the Bull Mountains Property 287
12 Methodology for Gravity Model Allocation 293
13 Assumptions for Local Government Finances 293
14 In-Migration Distribution Background 297
15 Payment in Lieu of Taxes Act 303
16 Hypothetical Federal Royalty Calculations — 1991 and 2020 305
17 Fiscal Comparison of Alternative A and Alternative C 309
18 Listings of Wildlife Species 321

GLOSSARY 333

PLANT AND ANIMAL SCIENTIFIC NAMES 339

REFERENCES 341

INDEX 347

LIST OF TABLES

1.1 LAND VALUES OF PRIORITY OFFERED LANDS 5

2.1 SELECTED FEDERAL COAL LANDS 12

2.2 OFFERED PRIVATE LANDS 15

2.3 MIRROR IMAGE SCENARIO 17

2.4 ALTERNATIVE COMPARISON AND IMPACT SUMMARY 22

3.1 LEGAL DESCRIPTIONS OF BULL MOUNTAINS 3 MILLION TONS PER YEAR MINE PLANS 29

3.2 PRIVATE NONFARM ESTABLISHMENTS BY EMPLOYMENT SIZE — MUSSELSHELL AND YELLOWSTONE COUNTIES 30

3.3 1985 EMPLOYMENT BY INDUSTRY — STATE OF MONTANA, MUSSELSHELL COUNTY, AND YELLOWSTONE COUNTY 31

3.4 RESIDENT CIVILIAN LABOR FORCE — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES 31

3.5 JOB APPLICANTS — BILLINGS JOB SERVICE OFFICE 32

3.6 EMPLOYMENT BY INDUSTRY IN MUSSELSHELL COUNTY — 1970 AND 1980-1986 33

3.7 EMPLOYMENT BY INDUSTRY IN YELLOWSTONE COUNTY — 1970 AND 1980-1986 33

3.8 ACTUAL AND PROJECTED EMPLOYMENT BY INDUSTRY FOR MUSSELSHELL COUNTY 34

3.9 ACTUAL AND PROJECTED EMPLOYMENT BY INDUSTRY FOR YELLOWSTONE COUNTY 34

3.10 AVERAGE WEEKLY WAGES BY INDUSTRY — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES — 1987 35

3.11 PER CAPITA INCOME — UNITED STATES, STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES — 1970 AND 1980-1986 36

3.12 EARNINGS BY MAJOR SOURCE, MUSSELSHELL COUNTY — 1970 AND 1980-1986 36

3.13 EARNINGS BY MAJOR SOURCE, YELLOWSTONE COUNTY — 1970 AND 1980-1986 37

3.14 EARNINGS BY INDUSTRY IN MUSSELSHELL COUNTY — 1990-2010 37

3.15 EARNINGS BY INDUSTRY IN YELLOWSTONE COUNTY — 1990-2010 38

3.16 LOCAL GOVERNMENT FINANCES — MUSSELSHELL COUNTY 38

3.17 LOCAL GOVERNMENT FINANCES — YELLOWSTONE COUNTY 39

3.18 LOCAL GOVERNMENT FINANCES — ROUNDUP 40

3.19 LOCAL GOVERNMENT FINANCES — BILLINGS 41

3.20 LOCAL GOVERNMENT FINANCES — ROUNDUP SCHOOL DISTRICT 42

3.21 HISTORICAL AND PROJECTED POPULATION — MUSSELSHELL AND YELLOWSTONE COUNTIES, ROUNDUP AND BILLINGS 43

3.22 SELECTED DEMOGRAPHIC CHARACTERISTICS — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES, ROUNDUP AND BILLINGS 44

3.23 SELECTED VITAL STATISTICS — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES 44

3.24 VOTING PATTERNS — MUSSELSHELL COUNTY 47

3.25 COMPARISON OF SELECTED SOCIAL WELL-BEING INDICATORS OF SIX CENTRAL MONTANA COUNTIES 53

3.26 ACTUAL AND PROJECTED SCHOOL ENROLLMENT — ROUNDUP SCHOOL DISTRICT #55 AND #55H .. 55

3.27 NUMBER OF INDEX CRIMES IN MUSSELSHELL COUNTY (1984-1987) 56

3.28 SELECTED SOCIAL WELFARE STATISTICS — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES (1986-1988) 59

3.29 CHARACTERISTICS OF YEAR-ROUND HOUSING IN MUSSELSHELL COUNTY AND ROUNDUP (1980) .. 59

3.30 SIX-MONTH MONITORING OF REAL ESTATE FOR SALE AND HOUSING UNITS FOR RENT — MUSSELSHELL COUNTY STUDY AREA 60

3.31 REPOSSESSED HOMES (VA OR HUD) IN ROUNDUP 60

3.32 NUMBER OF LICENSED MOBILE HOME COURT SPACES — ROUNDUP AND BILLINGS AREAS 61

3.33 SELECTED CHARACTERISTICS OF MOBILE HOME PARKS IN ROUNDUP 62

3.34 SELECTED CHARACTERISTICS OF MOTELS IN ROUNDUP 62

3.35 ESTIMATED ANNUAL MAINTENANCE COSTS — BULL MOUNTAINS TRANSPORTATION STUDY AREA 64

3.36 CHARACTERISTICS OF BRIDGES ON U.S. HIGHWAY 87 AND HIGHWAY 312 (HUNTLEY ROAD) 65

3.37 AVERAGE DAILY TRAFFIC VOLUMES — U.S. HIGHWAY 87 65

3.38 AVERAGE DAILY TRAFFIC VOLUMES — HIGHWAY 312 (HUNTLEY ROAD) 65

3.39 HISTORIC DATA ON NUMBER OF TRAFFIC ACCIDENTS ON U.S. HIGHWAY 87 AND HIGHWAY 312 (HUNTLEY ROAD) 66

3.40 INTERACTING SCHOOL BUS ROUTES — BULL MOUNTAINS STUDY AREA 66

3.41 AMBIENT AIR QUALITY STANDARDS FOR SUSPENDED PARTICULATES 67

3.42 BULL MOUNTAINS WELL INVENTORY DATA 75

3.43 BULL MOUNTAINS RECORD OF SELECTED SPRINGS 76

3.44 BULL MOUNTAINS WATER QUALITY DATA FROM SELECTED WELLS 77

3.45 WATER QUALITY OF SELECTED SPRINGS 78

4.1 RECOVERABLE COAL RESERVES 89

4.2 0.5 MILLION TONS PER YEAR MINING EQUIPMENT 90

4.3 COAL DEVELOPMENT/TRANSPORTATION SUMMARY — ROOM-AND-PILLAR MINING (0.5 MILLION TONS PER YEAR PRODUCTION) 91

4.4 3.0 MILLION TONS PER YEAR MINING EQUIPMENT 91

4.5 COAL DEVELOPMENT/TRANSPORTATION SUMMARY — LONGWALL MINING (3.0 MILLION TONS PER YEAR PRODUCTION 92

4.6 PROJECTED COAL PRODUCTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO 95

4.7 TOTAL EMPLOYMENT SUMMARY — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) .. 95
4.8 MINE EMPLOYMENT — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 96
4.9 LOADING FACILITY EMPLOYMENT — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 96
4.10 TRANSPORTATION EMPLOYMENT — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 97
4.11 LOCAL HIRE DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 98
4.12 IN-MIGRATING WORKER DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 96
4.13 TOTAL MINE EMPLOYEE DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 99
4.14 TOTAL SECONDARY WORKER DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995) 99
4.15 PAYROLL BY SOURCE — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 100
4.16 ALTERNATIVE A — EXCHANGE (0.5 MILLION TON SCENARIO) NET FISCAL IMPACT 100
4.17 PROJECTED LOCAL GOVERNMENT REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1991-2030) 101
4.18 PROJECTED STATE AND FEDERAL REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1991-2030) 103
4.19 PROJECTED IN-MIGRATION TO THE STUDY AREA — 0.5 MILLION TONS MINE PRODUCTION SCENARIO 104
4.20 INTERVALS AT WHICH TRUCKS WOULD LEAVE THE MINE SITE AND LOADING FACILITY — 0.5 MILLION TONS MINE PRODUCTION SCENARIO 105
4.21 BULL MOUNTAINS MINE (0.7 MILLION TPY RAW COAL) (0.5 MILLION TPY CLEAN COAL) TOTAL SUSPENDED PARTICULATE EMISSIONS 107
4.22 BULL MOUNTAINS MINE (0.7 MILLION TPY RAW COAL) (0.5 MILLION TPY CLEAN COAL) PM-10 SUSPENDED PARTICULATE EMISSIONS 107
4.23 BULL MOUNTAINS MINE (0.7 MILLION TPY RAW COAL) (0.5 MILLION TPY CLEAN COAL) GASEOUS POLLUTANT EMISSIONS 107
4.24 PROJECTED COAL PRODUCTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO 109
4.25 TOTAL EMPLOYMENT SUMMARY — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 110
4.26 MINE EMPLOYMENT — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 110
4.27 LOADING FACILITY EMPLOYMENT — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 111
4.28 TRANSPORTATION EMPLOYMENT — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 111
4.29 LOCAL HIRE DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 112
4.30 IN-MIGRATING WORKER DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 112
4.31 TOTAL MINE EMPLOYEE DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 113
4.32 TOTAL SECONDARY WORKER DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990-1996) 114
4.33 PAYROLL BY SOURCE — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1991-1996) 114
4.34 ALTERNATIVE A — EXCHANGE (3.0 MILLION TON SCENARIO) NET FISCAL IMPACT 115

4.35 PROJECTED LOCAL GOVERNMENT REVENUES — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1991-2025) 116

4.36 PROJECTED STATE AND FEDERAL REVENUES — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1991-2025) 117

4.37 PROJECTED IN-MIGRATION TO THE STUDY AREA — 3.0 MILLION TONS MINE PRODUCTION SCENARIO 118

4.38 INTERVALS AT WHICH TRUCKS WOULD LEAVE THE MINE SITE AND LOADING FACILITY — 3.0 MILLION TONS MINE PRODUCTION SCENARIO 120

4.39 BULL MOUNTAINS MINE (3.0 MILLION TONS PER YEAR) TOTAL SUSPENDED PARTICULATE EMISSIONS 122

4.40 BULL MOUNTAINS MINE (3.0 MILLION TONS PER YEAR) PM-10 SUSPENDED PARTICULATE EMISSIONS 122

4.41 BULL MOUNTAINS MINE (3.0 MILLION TONS PER YEAR) GASEOUS POLLUTANT EMISSIONS 122

4.42 ALTERNATIVE C — LEASING (0.5 MILLION TONS LEASE SCENARIO) NET FISCAL IMPACT 134

4.43 PROJECTED LOCAL GOVERNMENT REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (2020-2059) 135

4.44 PROJECTED STATE AND FEDERAL REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (2020-2059) 136

4.45 ALTERNATIVE C — LEASING (3.0 MILLION TONS SCENARIO) NET FISCAL IMPACT 138

4.46 PRODUCTION LEASE SCENARIO — 3.0 MILLION TONS MINE (2020-2054) — $25/TON SALE PRICE PROJECTED LOCAL GOVERNMENT REVENUES 139

4.47 PROJECTED STATE AND FEDERAL REVENUES — 3.0 MILLION TONS MINE PRODUCTION LEASE SCENARIO (2020-2054) — $25/TON SALE PRICE 140

APPENDIX 4

TABLE 1 APPLICATION OF UNSUITABILITY CRITERIA — BULL MOUNTAINS COAL FIELD (20:1 STRIPPING RATIO) 255

TABLE 2 APPLICATION OF UNSUITABILITY CRITERIA — BULL MOUNTAINS COAL FIELD (10:1 STRIPPING RATIO) 256

APPENDIX 7

TABLE 1 THE ECONOMIC DATA BASE OF THE REGIONAL ECONOMIC PROJECTIONS SERIES, REPS(tm) ... 266

APPENDIX 11

TABLE 1 POWDER RIVER BASIN MINE SUPPLY CAPABILITY 289

APPENDIX 12

TABLE 1 LOCAL HIRE RATIOS 294

TABLE 2 BULL MOUNTAINS STUDY AREA — GRAVITY MODEL ALLOCATION 294

APPENDIX 14

TABLE 1 PROJECTED MIGRATION — ROUNDUP (0.5 MILLION TONS MINE PRODUCTION SCENARIO) 297

TABLE 2 PROJECTED MIGRATION — BILLINGS (0.5 MILLION TONS MINE PRODUCTION SCENARIO) 297

TABLE 3 PROJECTED MIGRATION — RURAL MUSSELSHELL COUNTY (0.5 MILLION TONS MINE PRODUCTION SCENARIO) 298

TABLE 4 PROJECTED MIGRATION — RURAL YELLOWSTONE COUNTY (0.5 MILLION TONS MINE PRODUCTION SCENARIO) 298

TABLE 5 PROJECTED MIGRATION — BULL MOUNTAINS STUDY AREA (0.5 MILLION TONS MINE PRODUCTION SCENARIO) 299

TABLE 6 PROJECTED MIGRATION — ROUNDUP (3.0 MILLION TONS MINE PRODUCTION SCENARIO) 299

TABLE 7 PROJECTED MIGRATION — BILLINGS (3.0 MILLION TONS MINE PRODUCTION SCENARIO) 300

TABLE 8 PROJECTED MIGRATION — RURAL MUSSELSHELL COUNTY (3.0 MILLION TONS MINE PRODUCTION SCENARIO) 300

TABLE 9 PROJECTED MIGRATION — RURAL YELLOWSTONE COUNTY (3.0 MILLION TONS MINE PRODUCTION SCENARIO) 301

TABLE 10 PROJECTED MIGRATION — BULL MOUNTAINS STUDY AREA (3.0 MILLION TONS MINE PRODUCTION SCENARIO) 301

APPENDIX 15

TABLE 1 PILT PAYMENT TO PRIORITY COUNTIES 304

APPENDIX 16

TABLE 1 BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION — 0.5 MILLION TONS PER YEAR SCENARIO, YEAR 1991 START-UP 305

TABLE 2 BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION — 3.0 MILLION TONS PER YEAR SCENARIO, YEAR 1991 START-UP 306

TABLE 3 BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION — 0.5 MILLION TONS PER YEAR SCENARIO, YEAR 2020 START-UP 307

TABLE 4 BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION — 3.0 MILLION TONS PER YEAR SCENARIO, YEAR 2020 START-UP 308

APPENDIX 17

TABLE 1 HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE A, 0.5 MILLION TON PER YEAR SCENARIO 310

TABLE 2 HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE C, 0.5 MILLION TON PER YEAR SCENARIO 311

TABLE 3 BULL MOUNTAINS EXCHANGE/LEASE COMPARISON 314

TABLE 4 HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE A, 3 MILLION TON PER YEAR SCENARIO 315

TABLE 5 HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE C, 3 MILLION TON PER YEAR SCENARIO 316

TABLE 6 BULL MOUNTAINS EXCHANGE/LEASE COMPARISON 319

APPENDIX 18

TABLE 1 VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA 321

TABLE 2 SUMMARY OF TERRESTRIAL AND SEMI-AQUATIC WILDLIFE SPECIES OCCURRENCE WITHIN THE BULL MOUNTAINS STUDY AREA 328

TABLE 3 MACROINVERTEBRATE SPECIES LIST 331

LIST OF FIGURES

2.1 MAP — BULL MOUNTAINS ROOM-AND-PILLAR MINE PLAN — EXCHANGE ALTERNATIVE 8

2.2 MAP — BULL MOUNTAINS LONGWALL MINE PLAN — EXCHANGE ALTERNATIVE 9

2.3 MAP — BULL MOUNTAINS LONGWALL MINE PLAN — LEASING ALTERNATIVE 10

2.4 MAP — BULL MOUNTAINS COAL FIELD 13

2.5 MAP — MIRROR IMAGE COAL-FOR-COAL EXCHANGE ALTERNATIVE 14

2.6 NET REVENUE COMPARISON 0.5 MILLION TON SCENARIO 19

2.7 NET REVENUE COMPARISON 3.0 MILLION TON SCENARIO 20

2.8 TOTAL UNDISCOUNTED NET REVENUES — ALTERNATIVE A VS ALTERNATIVE C 21

2.9 TOTAL DISCOUNTED NET REVENUES — ALTERNATIVE A VS ALTERNATIVE C 21

3.1 BULL MOUNTAINS LAND EXCHANGE TRANSPORTATION STUDY AREA 63

3.2 STRATIGRAPHIC POSITION OF THE MAMMOTH COAL BED AND OTHER RELATIVELY PERSISTENT COAL BEDS IN THE BULL MOUNTAINS COAL FIELD 71

3.3 GEOLOGIC CROSS SECTION THROUGH THE BULL MOUNTAINS AREA 73

3.4 SCHEMATIC DIAGRAM ILLUSTRATING GROUNDWATER FLOW IN THE BULL MOUNTAINS AREA ... 74

APPENDIX 5

Figure 1 SUBSIDENCE AS A FUNCTION OF W/D FOR FULL CAVING 216

Figure 2 SUBSIDENCE OVER A LONGWALL FACE 216

Figure 3 GRAPH FOR PREDICTING MAXIMUM SLOPE AND STRAIN 262

APPENDIX 11

Figure 1 UNITED STATES COAL DEMAND AND POWDER RIVER BASIN SUPPLY 288

APPENDIX 17

Figure 1 ALTERNATIVE A: EXCHANGE — 0.5 MILLION TON SCENARIO 312

Figure 2 ALTERNATIVE C: LEASE — 0.5 MILLION TON SCENARIO 313

Figure 3 ALTERNATIVE A: EXCHANGE — 3 MILLION TON SCENARIO 317

Figure 4 ALTERNATIVE C: LEASE — 3 MILLION TON SCENARIO 318

LIST OF MAPS

Map 1 BULL MOUNTAINS COAL LANDS ..... Back of Book

Map 2 BULL MOUNTAINS SURFACE OWNERSHIP ..... Back of Book

Map 3 BULL MOUNTAINS COAL EXCHANGE PRIORITY LANDS 1,2,3 ..... Back of Book

Map 4 BULL MOUNTAINS COAL EXCHANGE PRIORITY LANDS 5 ..... Back of Book

Map 5 BULL MOUNTAINS COAL EXCHANGE PRIORITY LANDS 6 AND REPLACEMENT LANDS .... Back of Book

Map 6 WELL AND SPRING LOCATIONS ..... Back of Book

Map 7 STRUCTURE CONTOUR TOPS OF MAMMOTH COAL ..... Back of Book

Map 8 HYDROGEOLOGIC DATA ..... Back of Book

Map 9 PROPOSED RAILROAD ROUTES AND TRUCK HAUL ROUTE TO HUNTLEY ..... Back of Book

Map 10 DEPTHS TO MAMMOTH COAL ..... Back of Book

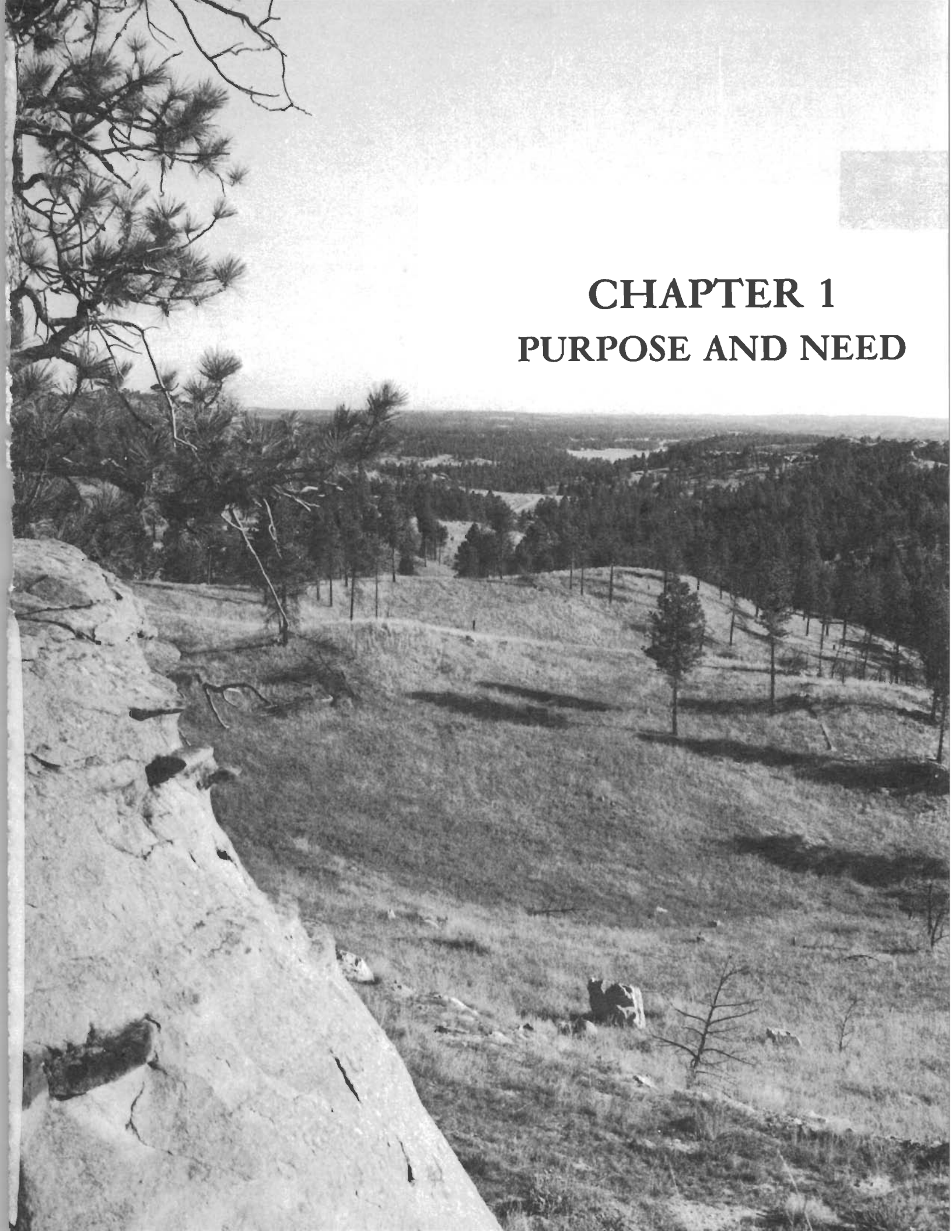
Map 11 POTENTIOMETRIC SURFACE MAMMOTH OVERBURDEN ..... Back of Book

Map 12 LOCATOR MAP OF ALL LANDS IN STATE ..... Map Pocket

ABBREVIATIONS AND ACRONYMS

ACEC	Areas of Critical Environmental Concern
ACT	Assessment Court Treatment
AFDC	Aid to Families With Dependent Children
AIRFA	American Indian Religious Freedom Act
AMP	Allotment Management Plan
AUM	Animal Units Per Month
BEA	U.S. Bureau of Economic Analysis
BLM	Bureau of Land Management
BN	Burlington Northern
BRI	Burlington Resources, Inc.
BSR	Birth Survival Rate
BTU	British Thermal Unit
CEQ	Council on Environmental Quality
CFM	Cubic Feet Per Minute
CFR	Code of Federal Regulations
DHES	Department of Health and Environmental Sciences
DUI	Driving Under the Influence (of Alcohol)
ECN	Economics Consultants Northwest
EIS	Environmental Impact Statement
EMT	Emergency Medical Technician
F	Fahrenheit
FAP	Federal Aid Primary System (refers to Highway Funding)
F.O.B.	Free On Board
FY	Fiscal Year
GNP	Gross National Product
gpm	gallons per minute
GVM	Gross Vehicle Weight
HUD	U.S. Department of Housing and Urban Development
KRCRA	Known Recoverable Coal Resource Area
LBA	Lease By Application
LOS	Level Of Service
MBMG	Montana Bureau of Mines and Geology
MDFW&P	Montana Department of Fish, Wildlife and Parks
MDHES	Montana Department of Health and Environmental Sciences
MDOH	Montana Department of Highways
MDSL	Montana Department of State Lands
MERDI	Montana Energy and MHD Research and Development Institute

Meridian	Meridian Minerals Company
MFP	Management Framework Plan
MG	Milligram
MHD	Magneto-Hydro-Dynamics
MTI	Montana Teen Institute on Substance Abuse
NEPA	National Environmental Policy Act
NIPA	National Income and Product Accounts
NPA	National Planning Association
NPRC	Northern Plains Resource Council
NRET	Northwest Regional Evaluation Team
ORV	Off-Road Vehicle
OSM	Office of Surface Mining Reclamation and Enforcement
PILT	Payment-In-Lieu of Taxes
PM-10	10 Micron Particulate Matter
PRDAS	Powder River Data Adequacy Standards
RCT	Regional Coal Team
REPS	Regional Economic Projections Series
RMP	Resource Management Plan
ROD	Record of Decision
RR	Retention Rate
RV	Recreational Vehicle
SCS	Soil Conservation Service
SE	School Enrollment
SMCRA	Surface Mining Control and Reclamation Act
SYB	School Year Births
TIP	Teens In Partnership
TPY	Tons Per Year
TSP	Total Suspended Particulate Matter
USDI	U.S. Department of Interior
USGS	U.S. Geological Survey
VA	Veterans Administration
VRM	Visual Resource Management
YCC	Yellowstone Coal Company



CHAPTER 1
PURPOSE AND NEED

CHAPTER 1

PURPOSE AND NEED

INTRODUCTION

On May 3, 1988, Meridian Minerals Company (Meridian), a wholly-owned subsidiary of Burlington Resources, Inc. (BRI) submitted a land exchange proposal for consideration by the Bureau of Land Management (BLM). Meridian proposed the exchange to acquire 3,674.36 acres of federally owned coal in the Bull Mountains area, south of Roundup, Montana (map 1). The present coal ownership is distributed in a checkerboard pattern of alternating sections between Meridian minerals and federal minerals administered by BLM. The proposed exchange would consolidate an underground coal tract for future development by Meridian or a lessee coal company. Surface ownership of the coal lands would be unaffected by the exchange proposal (map 2).

Yellowstone Coal Company (YCC), a mining company whose principals operate small independent mining operations in eastern Kentucky and southern West Virginia, approached Meridian and requested that it seek an exchange. The present checkerboard coal ownership pattern effectively isolates individual sections of coal from each other and limits the capability of large-scale mining to take place without some cooperation from Meridian and BLM. An exchange would block coal reserves and a tract of sufficient size to justify its development.

A major factor in the negotiations between a coal supplier and a potential customer is the adequacy of long-term coal reserves that the mining company controls. If the federal coal was exchanged and/or leased to Meridian, they in turn could lease the acquired coal to YCC or another mining company.

Since publication of the Draft Environmental Impact Statement (EIS), YCC has officially withdrawn their involvement with the project. Meridian is continuing to pursue development of the coal and has indicated that they would be receptive to proposals from other mining companies on development. Given the possibility that Meridian could indeed acquire another lessee mining company or pursue the development on the smaller scale envisioned by YCC, the 0.5 million tons per year is still analyzed as the likely scenario for EIS purposes. However, Meridian has submitted a mine plan to Montana Department of State Lands (MDSL) and the Office of Surface Mining Reclamation and Enforcement (OSM) on a longwall underground mine. Although BLM analyzed 3.0 million tons of coal per year as the maximum development scenario, it appears that this scenario could become the most likely development scenario. For EIS purposes, the 3.0 million tons per year longwall mine is still analyzed as the maximum development scenario.

Meridian would convey lands with high recreation, wildlife and watershed values, in trade for the federal coal. Meridian and its BRI affiliates, Plum Creek Timber Company and Glacier Park Company, made lands available for possible acquisition in eleven counties throughout the state (maps 3-5). Most of these lands were identified by BLM as high priority lands for acquisition purposes. Map 12 gives a general location of the top priority lands and replacement lands being considered within the state.

As part of their effort to market the Bull Mountains coal, Meridian has applied to the state of Montana for a test burn permit for 100,000 to 250,000 tons of coal. The actual amount of coal to be mined for the test burn will vary depending upon their customer commitments. Since the test burn coal is privately owned and would be mined from private coal in T. 6 N., R. 26 E., Section 13, BLM is not involved in the permitting process. However, the results of the coal test burn will influence the marketability and subsequent development of the Bull Mountains coal. Since publication of the Draft EIS, MDSL has approved Meridian's test burn permit and the company is mining coal for test burns.

LAND-USE PLAN CONFORMANCE

All BLM resource management actions must conform with existing approved land-use plans (43 CFR 1610.5-3). Because of the widespread distribution of the lands in the exchange proposal, BLM land-use plans for both the Miles City District and the Butte District are involved and their conformance is discussed accordingly.

MILES CITY DISTRICT PLANS

All the subject coal lands proposed for exchange are within the Billings Resource Area and their management is addressed in the Billings Resource Area RMP. Lands proposed for acquisition in the Miles City District are also located in the Billings Resource Area. The plans and policy documents addressing management of public lands in these areas are as follows:

(1) Billings Resource Area RMP
(2) Supplement to State Director Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment

A discussion of each of these documents and their affect on the lands proposed for acquisition follows:

Billings Resource Area RMP

The Billings Resource Area RMP and associated Record of Decision (ROD) were completed in September 1984. The RMP states that "federal coal exchanges will be considered on a case-by-case basis" and that "all the federal coal which is minable by underground methods is suitable for further consideration for leasing or exchange pending further study" (USDI 1984a). Based on these decisions, it was determined that BLM's consideration of the proposed exchange is in conformance with the Billings Resource Area RMP.

The RMP eliminates considerable acreage from surface coal mining and "specifically seeks to encourage underground mining at the expense of other mining methods in the Bull Mountains" (USDI 1984a). Large scale surface mining of federal coal in the Bull Mountains was specifically discouraged. As a result of these decisions, only underground mining would be allowed if the subject coal lands were exchanged. An agreement prohibiting surface coal mining was made with Meridian as part of the exchange proposal and the associated Memorandum of Agreement and would be handled with an appropriate provision in the patent prohibiting surface coal mining or through a separate agreement. This arrangement satisfies the underlying intent of the decision to encourage underground mining in the Bull Mountains and would be in conformance with the RMP.

The RMP also requires a site-specific analysis prior to all land actions involving sale, exchange or acquisition. "This analysis is handled in subsequent activity planning through the Environmental Assessment/Land Report" (USDI 1984a). This report, in this case an EIS, examines and evaluates the effect of the proposed action on all affected resource values and "must show that the proposed action accrues significant benefit to the public. The same showing is required in a minerals exchange" (USDI 1984a). Before an exchange of lands can take place, it must be shown that it is in the public's interest to do so. This EIS documents the required site-specific analysis which will lead to the public interest determination and to the ultimate decision on the proposed exchange.

The same RMP decision and process applies to the lands proposed for acquisition by BLM in Carbon County (priority lands 6 and replacement lands). The RMP identified public land retention and disposal zones and stated that "lands to be acquired by exchange would generally be located within retention zones." The proposed acquisition lands are located in the retention zones.

Supplement to State Director Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment

This supplement was published in 1984 to provide guidance for all major types of land adjustment. To assist in categorizing the public lands and in making decisions concerning specific land adjustment actions, three types of criteria were established: retention, disposal and acquisition. Through the application of these criteria, retention and disposal zones were identified for Montana. Retention zones predominantly contain public lands that meet the retention criteria and define areas where BLM intends to retain existing public lands and to acquire additional lands. All of the tracts in this exchange, prioritized and nonprioritized, meet the acquisition criteria as defined in the supplemental guidance and/or are within retention zones.

BUTTE DISTRICT PLANS

All lands proposed for acquisition in the Butte District are addressed in various land-use planning documents. These include resource area land-use plans, the Supplement to State Director's Guidance for Resource Management Planning, river management plans and a river corridor study. These various land-use planning documents are as follows:

(1) Dillon Resource Area Management Framework Plan
(2) Upper and Lower Big Hole River Management Plans
(3) Supplement to State Director Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment
(4) Madison River Corridor Study

A discussion of each of the documents and their affect on the lands proposed for acquisition is given below.

Dillon Resource Area Management Framework Plan (MFP)

This MFP, which was completed in September 1979, prescribed land adjustments in the Dillon Resource Area to increase opportunities for public use of public resources and to improve the management of those resources. The Dillon MFP specifically identified the Madison River tracts (priority lands 1,2,3) for acquisition in section L-9.1.

Acquisition of the Upper Big Hole River tracts (priority lands 5) and other nonprioritized tracts within the Dillon Resource Area would be in conformance with general MFP guidance which states that lands are to be acquired or disposed of in the resource area to meet management objectives. These management objectives are to be determined in specific activity plans or through similar analyses. Two such activity plans, the Upper and Lower Big Hole River Management Plans, have since been completed. Also, the Supplement to State Director Guidance for Resource Management Planning for Land Pattern Review and Land Adjustment was subsequently completed.

Upper and Lower Big Hole River Management Plans

These plans were completed in 1985 and 1987, respectively, to address the problems and opportunities associated with the heavy recreational use of the Big Hole River. These plans recommend the retention of federal lands which are within a one-mile corridor on each side of the Big Hole River and acquisition of lands through exchange as opportunities arise to provide for increased recreational opportunities.

As the recreational use of the river continues to increase, as is projected, public access sites on the river will become more crowded and congested. The acquisition of these lands will help alleviate these types of problems in managing future recreational use of the river.

Supplement to State Director Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment

This supplement was published in 1984 to provide guidance for all major types of land adjustment. Three types of criteria were established to provide guidance in categorizing the public lands and making decisions concerning specific land adjustment actions; retention, disposal and acquisition. Through the appli-

cation of these criteria, retention and disposal zones were identified for Montana. Retention zones predominantly contain public lands that meet the retention criteria, define areas where BLM intends to retain existing public lands, and to acquire additional lands. All of the tracts in this exchange, prioritized and nonprioritized, meet the acquisition criteria as defined in the supplemental guidance and/or are within retention zones.

Madison River Corridor Study

This was a joint project by Madison County, the Montana Department of Fish, Wildlife and Parks (MDFW&P), the BLM and the U.S. Forest Service. The study was completed in 1983 and recommended that BLM pursue land exchanges to acquire lands with Madison River frontage. The long-term purpose of such a land exchange program would be to limit the rapid development occurring in the Madison River corridor, (a one-mile wide corridor on either side of the river established for planning purposes) and also to enhance the recreational opportunities that exist in conjunction with the Madison River. As recreational use of the river increases, more opportunity for access and use of the river must be made available.

SCOPING ISSUES AND CONCERNS

BLM started public scoping for an EIS on the proposal to exchange federal coal lands in the Bull Mountains area for other lands with high public values in May 1988. This proposal by Meridian was also the subject of public meetings in Roundup and Ennis, Montana. A scoping brochure was distributed to all interested parties, soliciting their point of view on the proposal and the EIS. Specific comments were sought on what the EIS should examine, the relative importance of the different issues, and how or why the public interest may or may not be served.

During the scoping process, BLM received oral comments from 36 people and written responses from 26 individuals and groups. Many others attended the open house and public meetings, but did not comment for the record. A total of 432 comments were recorded. Appendix 1 gives a summary of public comments and concerns.

Based on public comments, BLM decided to look at a number of different alternatives and ways of analyzing Meridian's original proposal. Two possible coal development scenarios associated with the proposed exchange and/or lease have been identified for full analysis. A low level of development (represented by the current YCC proposal) which calls for 0.5 million tons per year of production from a room-and-pillar mining operation is analyzed. A high level of development would involve a longwall mine and a target production level of around 3.0 million tons per year is also analyzed. This high level of production is analyzed as the maximum possible impact level.

The leasing developmental configuration is slightly different from the exchange developmental configuration primarily because the leasing configuration includes one section of state coal T. 6 N., R. 26 E., Section 16, a portion of the federal coal in T. 6 N., R. 27 E., Section 24 (197.59 acres) and additional private coal in portions of several sections of land that are not included in the exchange proposal.

Most of the issues raised by the public in scoping are addressed in the EIS. Some issues, such as whether or not the exchange would have an adverse impact on competitiveness or would tend to create a monopolistic situation, are not within the analytical scope of this document. These issues are germane to the public interest determination of this exchange proposal and so all public comments on these and other issues were provided to the United States Attorney General as part of the required antitrust review at the conclusion of the public comment period on the Draft EIS.

It should be noted that the EIS assesses the impacts of the proposed exchange and alternatives and the subsequent development of the coal lands. Although the impacts of reasonably foreseeable coal development are analyzed, they are not addressed in detail at this stage of the process. If a coal mine were to be developed, these impacts would be assessed in greater detail during the permitting process required by the state of Montana and the OSM. If the coal lands were exchanged and/or leased, Meridian or any other mining company would be required to submit a mine and reclamation plan to MDSL, Reclamation Division. The mine and reclamation plan would discuss all resources and impacts. MDSL would then complete the required environmental analysis and documentation for the project which summarizes all resources, impacts and mitigation measures necessary for approval. Since publication of the Draft EIS, Meridian has submitted a proposed mine plan to MDSL and the OSM for their review. Both agencies have begun their review and subsequent permitting process.

Likewise, an in-depth analysis of building and operating a railroad is not fully assessed in this EIS. If a railroad were to be built, Meridian and/or any other mining company would be required to apply for a permit from the Interstate Commerce Commission. An environmental analysis and probably another EIS which addresses the site-specific resource impacts in much greater detail would be required before the railroad could be built. Consequently, this analysis focuses on some of the more apparent or generic impacts that would be expected if a railroad was built.

PUBLIC MEETINGS AND COMMENTS

The Draft EIS was published and released to the public on October 23, 1989. The Notice of Availability appeared in the Federal Register on November 3, 1989, which started the official public comment period on the Draft EIS. Although BLM allowed a 60-day comment period on the Draft EIS which ended January 5, 1990, public comments were accepted through January 31, 1990.

A press release on the Draft EIS availability was sent to the Montana media on November 1, 1989. Newspaper articles, radio and television announcements on the project and scheduled public meetings appeared in the media shortly thereafter. Public meetings were held in Roundup and Billings on November 27 and 28, 1989, respectively, and in Butte on December 4, 1989. Transcripts of comments and BLM responses are shown in chapter 5.

BLM received approximately 600 letters on the Draft EIS. Many of these letters were written in support of the proposed exchange. Because of the large volume of letters, many of the

letters which merely expressed support for the proposed exchange are not printed. A listing of individuals who mailed these letters is shown in chapter 5. Letters with comments and concerns that needed to be addressed by BLM and the responses are also shown in chapter 5.

Major concerns expressed by the public were hydrology, subsidence, and socioeconomics, primarily loss of royalties. Revisions and changes were made to these sections, and have been incorporated into the Final EIS. The priority 4 offered lands in Custer County that were inadvertently sold by Glacier Park Company have been replaced by additional lands in Carbon County and are addressed in the Final EIS. The Peabody coal-for-coal alternative has been dropped from further consideration.

DECISION FACTORS AND PROCESS

EIS Process

"All internally or externally proposed actions on or affecting public lands or resources under BLM jurisdiction must be reviewed for National Environmental Policy Act (NEPA) compliance. The first step in the NEPA process is to screen the proposed action in order to determine the appropriate response for ensuring NEPA compliance" (USDI 1988a). In this case, BLM made a determination that an EIS would be required to make a decision on the proposed exchange. All significant environmental and socioeconomic impacts, both beneficial and adverse, are analyzed to enable management to make the best possible decision on the proposed exchange.

There are six basic steps in the EIS process: (1) scoping the EIS; (2) conducting the analysis and preparing the Draft EIS; (3) issuing the Draft EIS; (4) analyzing the comments and preparing the Final EIS; (5) issuing the Final EIS; and (6) reaching and recording the decision. In addition to the EIS, there are other factors that are considered and play a major role in determining the decision on the proposed Bull Mountains Exchange.

Economic Evaluation and Appraisals

One of the first steps in this proposed exchange was to determine fair market values for the offered private lands and the selected federal coal lands. The Bull Mountains proposed exchange, like all exchanges, must be an equal value for equal value exchange, based on a cash value. Appraisals and economic evaluations were completed for the offered private lands that BLM would acquire and for the selected federal coal lands that Meridian would acquire as part of the exchange proposal.

The offered private lands were appraised by the BLM Montana State Office appraisal staff, using a comparable sales approach to determine the values. BLM would acquire the surface and all mineral rights to the offered private lands, except oil and gas rights. The land values for the priority offered private lands are shown in table 1.1. Only the top priority offered private lands and replacement lands were appraised.

The value of the federal coal lands selected by Meridian was determined by BLM's Northwest Regional Evaluation Team (NRET), located in Cheyenne, Wyoming. Coal, geologic and mine engineering data supplied by BLM's Montana State Office (Branch of Solid Minerals) plus information from Meridian and YCC were used to determine an economic value for the coal. Meridian would acquire a patent for only the coal rights. Surface and all other mineral rights will be retained in their present ownership.

Consultation With the Attorney General

When considering a fee exchange of federal coal deposits, BLM must consult with and give due consideration to the views and advice of the Attorney General in accordance with the regulations in 43 CFR 2203. The determination as to whether the public interest is served by the exchange will include the Attorney General's advice concerning whether the exchange will create or maintain a situation inconsistent with the federal antitrust laws.

The proponent for a fee exchange of federal coal deposits is required to disclose the nature and extent of its coal holdings in a certain geographic area as well as a description of the reserves which would be added or eliminated by the proposed exchange on forms prescribed by the Department of Justice. This confidential data is handled under the Freedom of Information Act and forwarded to the Attorney General. If there is a change in the information submitted to the Department of Justice pertaining to the proponent's coal reserves, the proponent of the exchange is required to furnish a statement of any and all changes in holdings since the date of the previous submission.

As part of the EIS process, the public is afforded an opportunity to comment on the impacts of the proposed exchange. Copies of all written comments and transcripts of oral comments received in response to the request for public comment during scoping (provided for in 43 CFR 2203.1) were furnished to the Department of Justice. Following publication of the Draft EIS and at the conclusion of the public comment period on the Draft, copies of all public comments on the proposed exchange were also sent to the Attorney General.

At this time, pursuant to 43 CFR 2203.4, the Attorney General will have 90 days to review and analyze all of the information provided. The Attorney General may request additional time and/or information. The 90-day period will be extended for the period required to obtain the additional information or for the period requested by the Attorney General. Within 90 days or longer if an extension is warranted, the Attorney General may advise, in writing, on the antitrust consequences of the proposed exchange. Any advice received from the Attorney General is made part of the public record of the proposed exchange. If the Attorney General has not responded to the request for review within the time granted, the State Director may proceed with the exchange. The ROD shall discuss the consideration given to the Attorney General's advice in reaching the final decision on the proposed exchange.

Regional Coal Team Consultation

The Regional Coal Team (RCT) also "serves as the forum for the Department — State consultation and cooperation in all other major Department coal management program decisions in

TABLE 1.1

LAND VALUES OF PRIORITY OFFERED PRIVATE LANDS

Priority	Tracts/County	Township	Range	Section	Aliquot Part	Acres	Appraised Value	Cost/Acre
1	Madison	8S	1W	15	Part West of River	572.00	$471,900	$825.00
2				25	N½NE¼ East of River	48.00	$161,000	$3,354.17
3		9S	1W	1	Lots 6,7, SW¼NE¼	77.45	$245,700	$3,172.37
					Total	697.45	$878,600	
4	Inadvertently Sold							
5	Beaverhead/ Deer Lodge	1N	13W	9	NW¼NW¼, SW¼	200.00		
				17	All	640.00		
				19	All (Frac.)	635.48		
					Total	1,475.48	$117,000	$80.00
6	Carbon	9S	21E	1	All (Frac.)	197.06		
				3	Lots 2 to 4, S½N½, S½	600.63		
				5	Lots 1 to 4, S½N½, N½S½, S½SE¼	560.44		
				7	All (Frac.)	624.08		
				9	NE,N½NW¼,S½SW¼	320.00		
				11	All	640.00		
				13	Lots 3,4	80.83		
				15	N½,W½SW¼,E½SE¼, SW¼SE¼	520.00		
				17	All	640.00		
				19	All (Frac.)	626.16		
				21	All	640.00		
				23	All	640.00		
				31	All (Frac.)	106.36		
					Total	6,195.56	$124,000	$20.01
Replacement Lands	Carbon	9S	21E	25	Lots 1,2,3	111.89		
				27	All	640.00		
				29	All	640.00		
				33	Lots 1,2,3,4	112.80		
					Total	1,504.70	$30,100	$20.01
					TOTAL VALUE OF OFFERED LANDS		$1,149,700	

the region, including preference right lease applications, public-body and small business set-aside leasing, emergency leasing, lease transfers and readjustments and exchanges" (USDI 1988b). Thus their involvement and consultation is a necessary part of the proposed Bull Mountains exchange.

Although formal consultation with the RCT was not initiated at the time, the proposed Bull Mountains exchange was included as an agenda item at the December 1988 RCT meeting in Miles City, Montana. The RCT was fully briefed on the proposed exchange and its status.

At the October 31, 1989, RCT meeting in Sheridan, Wyoming, the RCT recommended that the Powder River Coal Production Region be decertified. This recommendation was approved by the Director of BLM on January 9, 1990. Applications to lease federal coal can now be accepted by BLM in the region. Coal lease applications that would involve starts of new mines or expand existing mine facilities will be considered on a case-by-case basis by the RCT, prior to processing the application. The RCT also made a recommendation that the Bull Mountains project, as it is identified in the Draft EIS, be allowed to fall under the lease-by-application procedures if an application is filed. This recommendation was also approved so the State Director of Montana is free to proceed to a decision without further involvement from the RCT. The RCT was updated on the project status again at the April 1990 RCT meeting in Billings, Montana.

Governor's Consultation

As part of the exchange process, BLM initiated formal consultation with the Governor of Montana in May 1988. The Governor, or his representative, is also a voting member of Powder River RCT. His comments and recommendations on the proposed exchange and alternatives will have considerable influence on BLM's ultimate decision. The Governor of Montana has formally commented on the proposed exchange (see letter in chapter 5).

BLM met with representatives from the various state agencies having an interest in this project in March 1989 to identify their issues and concerns. At the request of MDSL, BLM has included and analyzed two sections of state land in the EIS. The MDSL, Lands Administration Division, a cooperating agency in the review of the EIS, will make the final decision on the disposition of the state lands involved.

Other Consultations

American Indian Religious Freedom Act (AIRFA) consultation with the Crow Tribe was initiated in June 1988 on the selected federal coal lands. This was initiated because the selected lands lie within aboriginal Crow territory.

To date, the Crow tribe is the only Native American group to identify the Bull Mountains area as their traditional tribal territory. BLM did not receive a response from the Crow tribe regarding the proposed exchange.

Threatened and endangered species consultation was initiated with the U.S. Fish and Wildlife Service in October 1988. The proposed exchange will not affect any threatened and endangered species (letter dated December 29, 1989, from U.S. Fish and Wildlife Service in chapter 5).

Record of Decision—Notice of Realty Action—Notice of Lease Sale

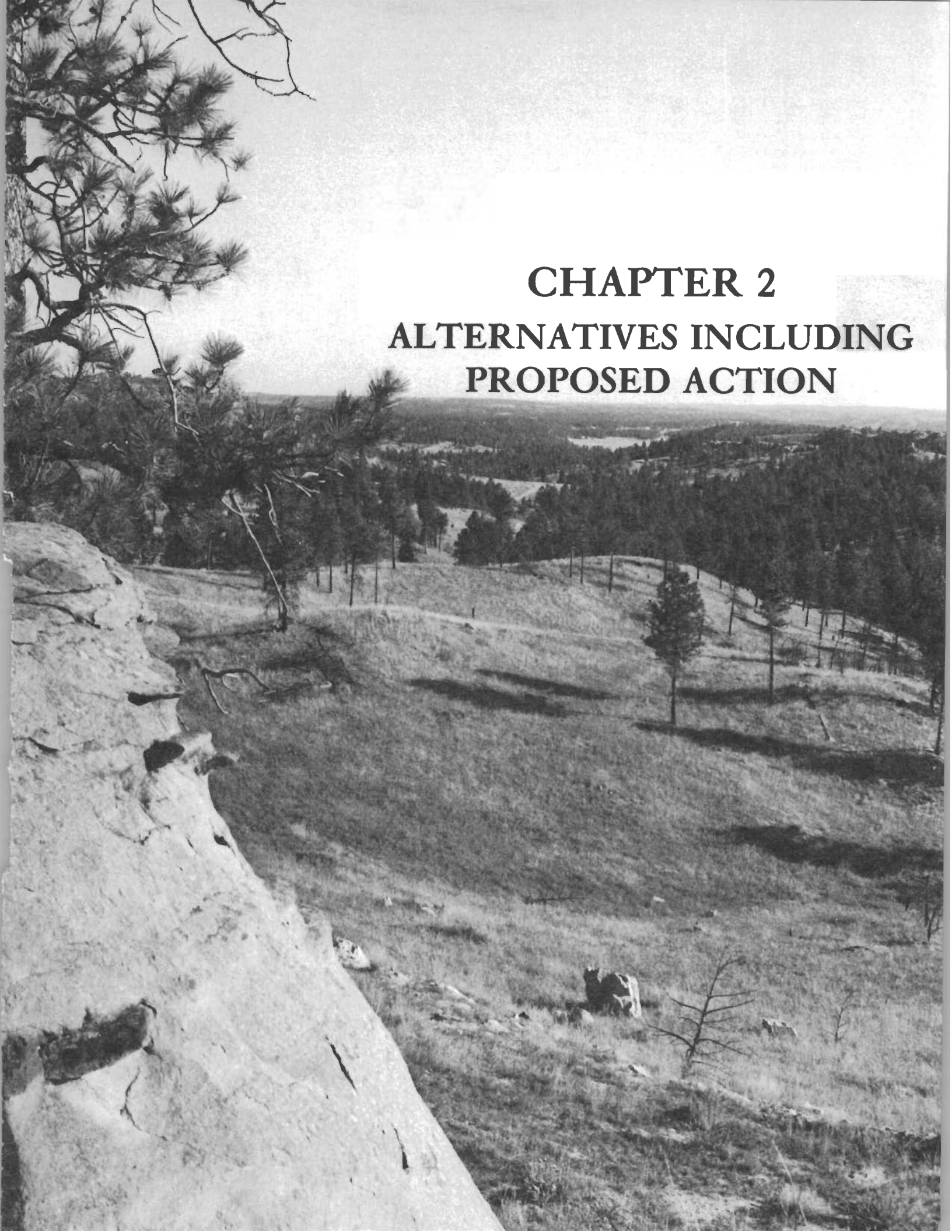
Thirty days after the Final EIS is released, a decision on the proposed exchange will be made. All decisions relevant to the EIS are recorded in a ROD which will be available to the public. If the final decision is to consummate the exchange of lands, BLM will issue a notice of realty action notifying all interested parties of our intent to pursue the exchange of lands. The public and the Governor have 45 days to respond. After 60 days, the exchange can be completed and deeds and patents exchanged. The Notice of Realty Action would probably be issued simultaneously with the ROD.

Should BLM decide to lease these federal coal lands, Meridian and other qualified applicants could pursue the lease-by-application process. The Powder River Coal Production Region was decertified to allow BLM to use this leasing process for the federal coal lands identified in the Draft EIS. Under this process, BLM would issue a ROD to lease the federal coal lands. Meridian or another company would have to submit a lease application for the federal coal lands. At that time BLM would prepare a fair market value appraisal report and a maximum economic recovery report for a lease of the federal coal lands and issue a Notice of Lease Sale. The public has 30 days after the Notice of Lease Sale is issued to respond to the fair market value appraisal and maximum economic recovery reports on the offered federal coal lands.

After 30 days, BLM would conduct a competitive lease sale whereby Meridian or any other mining company could bid on the offered lease. The lease would then be offered to the highest bidder if they met the necessary requirements and qualifications.

AUTHORIZING ACTIONS NEEDED

A number of agencies are involved in the review of the EIS. BLM has the primary responsibility for preparation of the EIS and will make the final decision on the disposition of the federal coal lands involved. The MDSL, Lands Administration Division, is a cooperating agency in the review of the EIS and will make the final decision on the disposition of the state lands involved. If the federal coal lands are exchanged or leased and the company proceeds as planned, a number of agencies will be involved in the issuance of permits needed for a mining operation. Major federal, state and county authorizing actions are listed in appendix 2.



CHAPTER 2
ALTERNATIVES INCLUDING PROPOSED ACTION

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

Further refinement of the proposed action, alternatives and development scenarios were formulated from meetings and correspondence with Meridian and YCC, scoping concerns and issues, and BLM personnel. Alternatives other than the proposed action, i.e., the exchange of federal coal lands for private high-value recreation and wildlife lands, include a coal-for-coal exchange alternative, a leasing alternative and no action. Each alternative represents a reasonable approach to resolving various issues and concerns.

Under the exchange alternative, the subsequent development of these lands as a small underground room-and-pillar mining operation producing 0.5 million tons of coal per year (figure 2.1) is analyzed along with a 3.0 million tons of coal per year underground longwall mining operation, (figure 2.2). A leasing alternative with the same two developmental scenarios is also analyzed, the only difference being that the lands involved in the leasing alternative include a state section, T. 6 N., R. 27 E., Section 16 (640 acres) and part of another section of federal coal land, T. 6 N., R. 26 E., Section 24 (197.59 acres of which 148 acres contain recoverable coal). There are also parts of several other sections of private coal lands that differ (figure 2.3).

The coal-for-coal exchange alternative addresses anticipated socioeconomic differences, particularly the loss of royalties, that one would expect between the exchange of coal-for-land and the exchange of coal-for-coal. The development of the Bull Mountains coal under the mirror image coal-for-coal exchange alternative is not addressed because it is similar to the development impacts under the proposed action. The Peabody coal-for-coal exchange was dropped from further consideration. Finally, the no-action alternative represents denial of the exchange(s) and denial of leasing, in essence, a no-development alternative.

COAL LAND-USE SCREENS

Coal land-use planning involves four planning screens to determine whether the coal is acceptable for further consideration for leasing or exchange. The four coal screens are as follows:

1. development potential of the coal lands
2. unsuitability criteria application
3. multiple land-use decisions that eliminate federal coal deposits
4. surface owner consent

Only federal coal lands that pass these coal screens are given further consideration for leasing or exchange. In the Billings Resource Area RMP, coal land-use planning was partially completed for the Bull Mountains coal field. Appendix 3 shows the results of that effort.

The Billings Resource Area RMP ROD states that "all the federal coal which is minable by underground methods is suitable for further consideration for leasing or exchange pending further study. BLM will not apply coal unsuitability criteria to these areas until a site-specific mine plan is filed, detailing the location of surface facilities" (USDI 1984a).

Surface owner consent, one of the coal screens, merits discussion. The surface owner consent provisions of the Surface Mining Control and Reclamation Act (SMCRA) do not apply if the split estate coal is to be mined by underground mining techniques. BLM and Meridian have agreed that only underground mining will be allowed on the Bull Mountains federal coal lands. This will be handled through an appropriate provision prohibiting surface mining within the patent or through a separate arrangement.

Unsuitability criteria, another coal land-use planning screen, also deserves discussion. Before BLM can exchange or dispose of federal coal lands, the application of unsuitability qualifications are relevant and will be applied (43 CFR 2200.1(d)). Normally, federal coal lands that will be mined by underground techniques are exempt from the application of unsuitability criteria, except when there are surface operations or surface impacts incident to an underground mine. In those cases, unsuitability criteria are relevant and must be applied to the federal coal lands (43 CFR 3461.2).

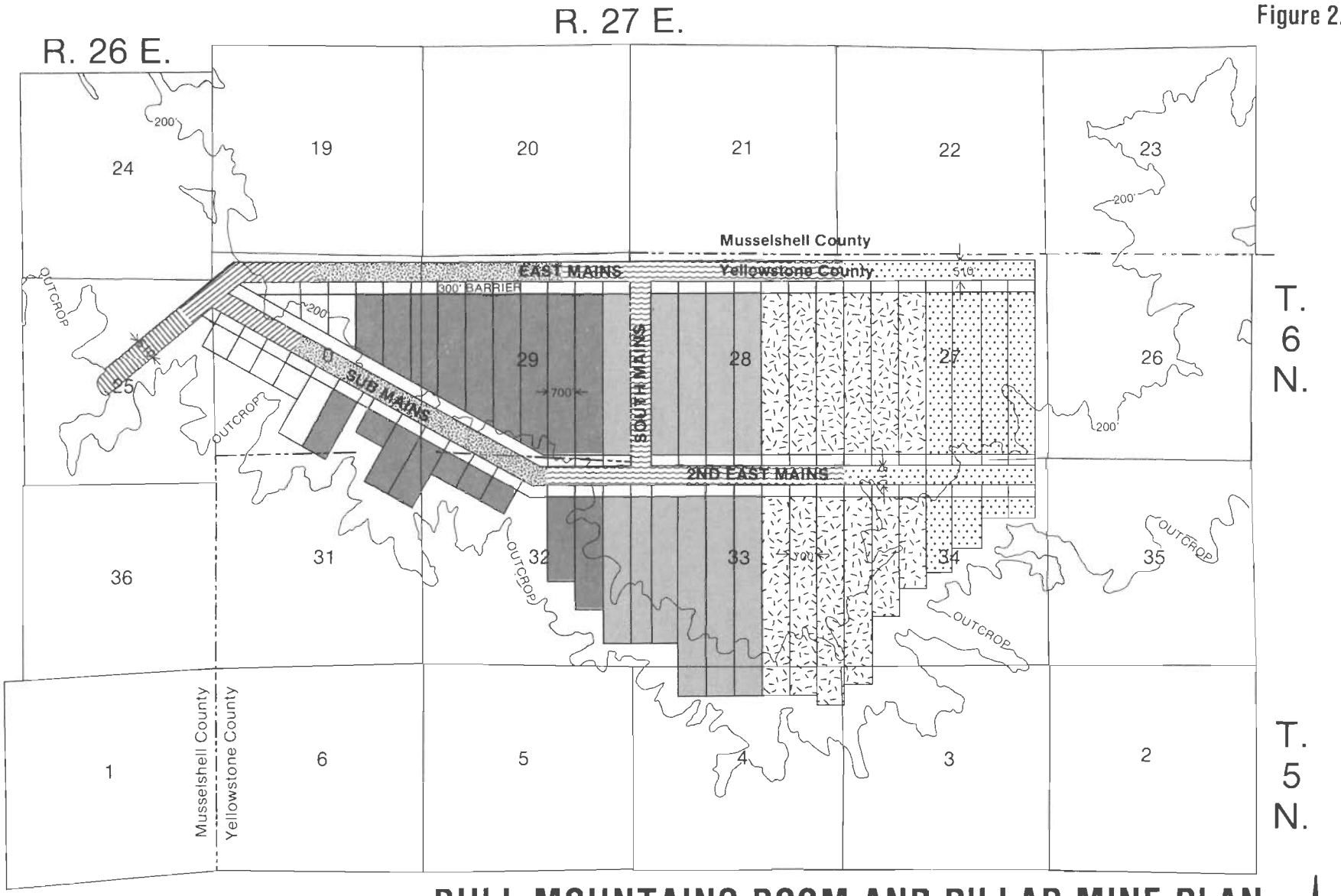
BLM completed a partial application of unsuitability criteria for surface coal mining on the Bull Mountains coal field in the Billings Resource Area RMP (appendix 4). Only certain unsuitability criteria were applied because there was insufficient data to fully apply the criteria. BLM's intent was to apply the remaining criteria after sufficient data was acquired or when needed.

The longwall mining technique involves controlled, designed subsidence. Appendix 5 discusses the prediction of subsidence for the proposed longwall mine in the Bull Mountains. Because of the surface impacts caused by longwall mining, unsuitability criteria are relevant and must be fully applied to the federal coal lands prior to an exchange or lease. The application of the remaining unsuitability criteria to the federal coal lands is shown in appendix 4.

Three criteria that were applied, criterion 2 (rights-of-way), criterion 3 (roads, dwellings), and criterion 16 (floodplains), are relevant to the selected federal coal lands.

Approximately 2,750 feet of the Fergus Electric Cooperative power line right-of-way crossed T. 6 N., R. 27 E., Section 32, S½NE¼ and NW¼SE¼. Federal coal lands encompassed by this 20-foot right-of-way are unsuitable for mining (approximately 1.3 acres) because of unsuitability criterion 2 unless an exception is applicable. An exception will require a written agreement from Fergus Electric Cooperative to relocate the right-of-way. Meridian and Fergus Electric Cooperative have reached an

Figure 2.1



LEGEND

PROGRESS	Yr. No.	PROGRESS	Yr. No.
	1		5-10
	2		10-20
	3		20-30
	4		30-40

BULL MOUNTAINS ROOM AND PILLAR MINE PLAN EXCHANGE ALTERNATIVE

0.5 Million Tons Per Year Annual Production

0 1 2 3

SCALE IN MILES

N

Source: Yellowstone Coal Company, November 1988.

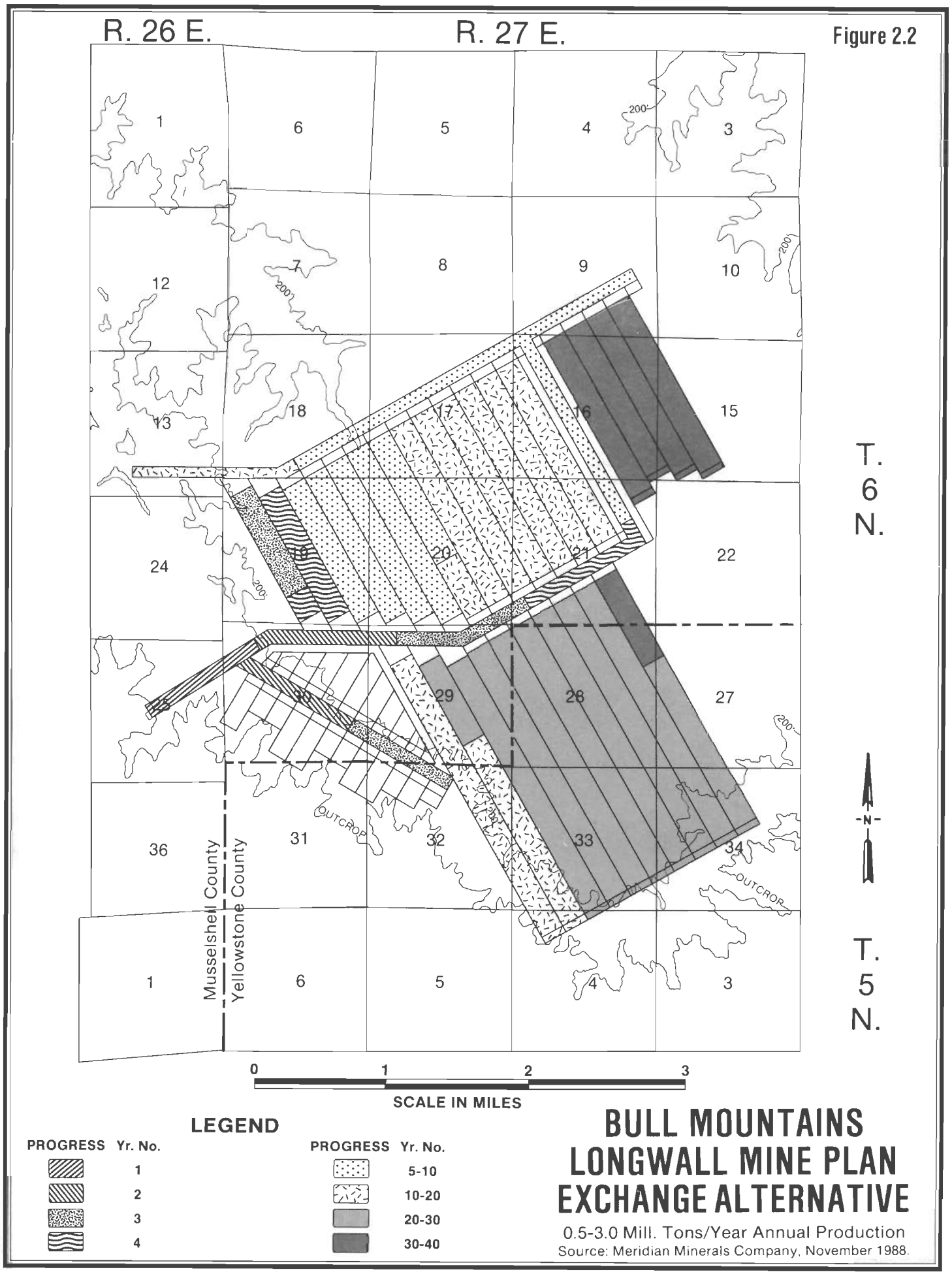
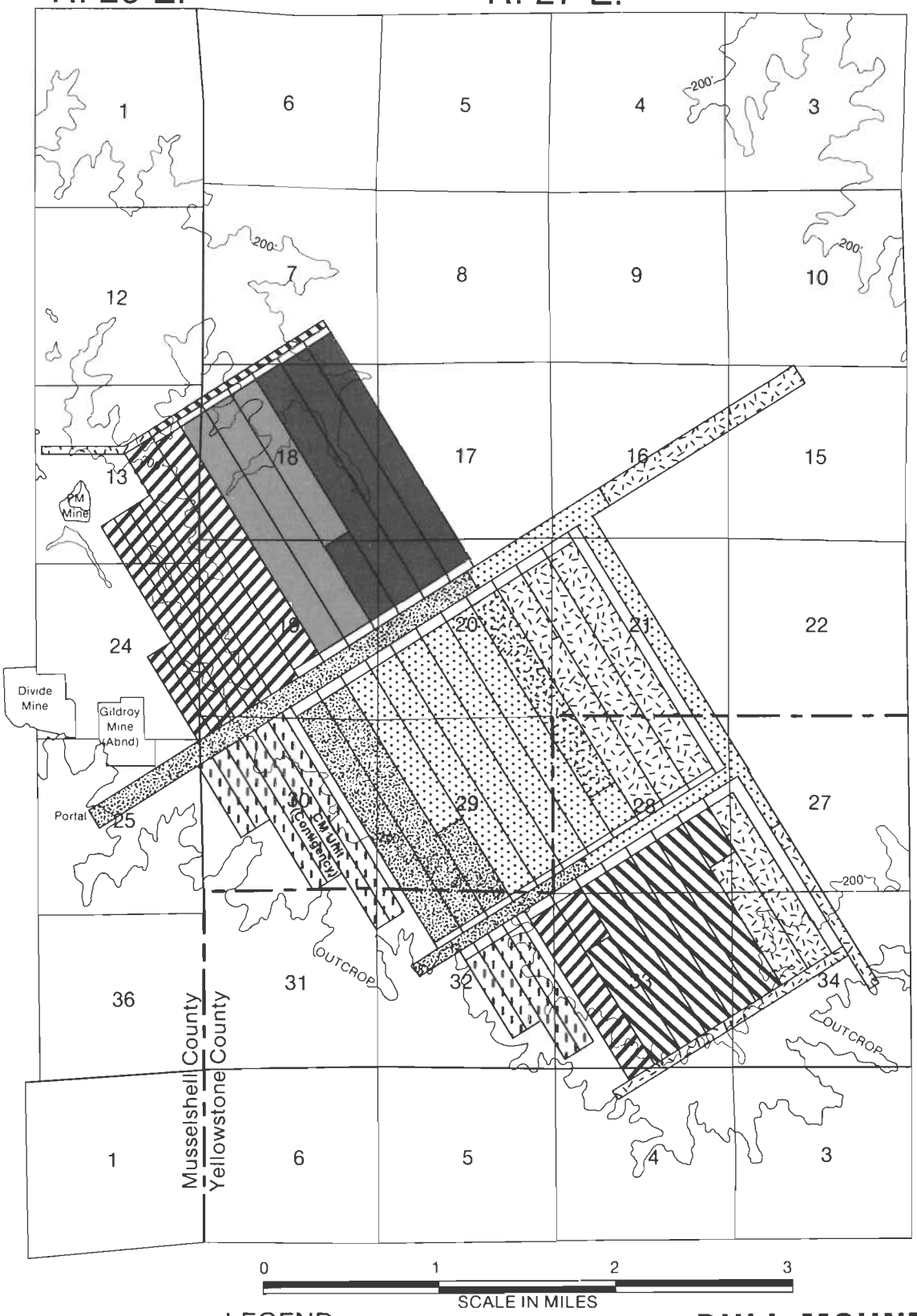

R. 26 E.
R. 27 E.
Figure 2.2
T. 6 N.
T. 5 N.
Musselshell County
Yellowstone County
OUTCROP
200'
N
0 1 2 3
SCALE IN MILES
LEGEND
PROGRESS Yr. No.
1
2
3
4
PROGRESS Yr. No.
5-10
10-20
20-30
30-40
BULL MOUNTAINS
LONGWALL MINE PLAN
EXCHANGE ALTERNATIVE
0.5-3.0 Mill. Tons/Year Annual Production
Source: Meridian Minerals Company, November 1988.

Figure 2.3



0 1 2 3
SCALE IN MILES

LEGEND

PROGRESS	Yr. No.	PROGRESS	Yr. No.	PROGRESS	Yr. No.
	1-5		16-20		31-35
	6-10		21-25		Continuous Miner Unit/ Contingency Area
	11-15		26-30		

BULL MOUNTAINS LONGWALL MINE PLAN LEASING ALTERNATIVE

0.5-3.0 Mill. Tons/Year Annual Production

Note: Continuous Miner Machine would be used in this area to mine coal when not used in advancing portals and entries in the Longwall Mining Operation.

Source: Meridian Coal Company, 1988.

agreement to relocate the right-of-way, as needed, so an exception has been applied. These federal coal lands within this right-of-way are now considered suitable for mining.

Approximately 250 feet of the Fattig Creek Road crosses T. 6 N., R. 27., Section 18, NW¼NW¼. Federal coal lands within 100 feet of the outside line of the right-of-way are unsuitable for mining (approximately 1.5 acres) unless an exception is applicable. An exception to this unsuitability criterion 3 will require consent and approval from the Musselshell County Commissioners to relocate the road. Meridian and the Musselshell County Commissioners have reached an agreement on relocation of the road as needed so an exception has been applied. These federal coal lands are now considered suitable for mining. There is also a home in Section 18, NW¼; lands within 300 feet of the dwelling are unsuitable for mining (approximately 6 acres) unless an exception is applicable. An exception will require written permission from the owners of this home.

Within the same T. 6 N., R. 27 E., Section 18, N½N½, a floodplain along the upper reaches of Rehder Creek was identified as unsuitable for mining. There are no exceptions to criterion 16 (floodplains); therefore, these federal coal lands (approximately 24.5 acres) would be unsuitable for mining by the longwall technique of mining (appendix 4). It should be noted that these coal lands can be mined by the room-and-pillar underground mining technique. Also noteworthy, is the fact that BLM makes an initial determination of the unsuitability criteria; the regulatory agencies (MDSL and OSM) make a final determination of unsuitability for mining based on BLM's determination after the company submits a mine plan. Their final determination could differ from BLM's determination.

It should be noted that these same lands were also identified as a preliminary alluvial valley floor (data preliminary) and could also be unsuitable for this reason (criterion 19). A final determination would be made at the mine plan stage by the regulatory agencies.

Appendix 4 addresses the results of the remaining unsuitability criteria, 7 and 9 through 15. No additional federal coal lands were identified as unsuitable for mining because of the remaining unsuitability criteria.

For criterion 7, cultural resources, there have been no sites identified as eligible for the National Register of Historic Places; however, there are some potential sites that could qualify for eligibility. Before mining, a company would be required to inventory all areas of surface disturbance for eligible sites. At that time, the State Historic Preservation Office and the Advisory Council on Historic Preservation, determine whether any potential sites are eligible, whether mining will have an adverse affect on the properties, and whether an exception may be applied.

For criteria 9 through 15, wildlife and threatened and endangered species, there were no known areas identified as unsuitable, based on existing wildlife inventories and information. Before a mine plan would be approved, a wildlife inventory of the permit area would be required. Any critical wildlife areas identified in the inventory that qualified under these criteria would be dealt with as part of the mine plan approval.

In summary, three areas in T. 6 N., R. 27 E., Section 18, and one area in T. 6 N., R. 27 E., Section 32 were tentatively identified as areas unsuitable for mining by the longwall mining technique. An exception has been applied to two unsuitability criteria for two areas (the road and the power line right-of-way). The homesite and the floodplains are still tentatively unsuitable for mining by the longwall mining technique. These findings are only BLM's determinations; the regulatory agencies will make a final determination of unsuitability for these areas after a mine plan is submitted. Since these areas can still be mined underground by the room-and-pillar mining technique, no areas have been excluded as unsuitable for exchange or leasing as part of this project.

ALTERNATIVES CONSIDERED BUT DISMISSED OR NOT ANALYZED

Several alternatives were considered during the formulation process but were dismissed or were not analyzed in detail. A brief description of these alternatives and the underlying rationale for dismissing or not analyzing them follows.

Other Coal-For-Coal Exchange Proposals

A second coal-for-coal exchange proposal in the Bull Mountains that was considered was to trade BLM coal lands in the exchange proposal for Meridian coal lands on the north end of the Bull Mountains. Coal lands in both areas would be appraised and exchanged on a cash value basis. This proposal was dismissed by BLM because there was insufficient coal data for the federal coal lands on the north end of the Bull Mountains. Preliminary indications were that the coal on the north end was also a poorer quality coal. To make a rational decision on this type of exchange would require a very expensive drilling program to secure coal quality data; therefore, this proposal was dropped.

The Peabody coal-for-coal alternative which was considered in the Draft EIS has been dropped from further consideration in the Final EIS. There were several reasons for dropping this alternative. The existing leases and exchange agreement would be very difficult for BLM to administer and to renegotiate the lease terms and conditions during readjustment. The economic evaluation of this proposed exchange also confirmed the fact that this alternative was not in the public's interest; therefore, it was dropped from further consideration.

Reduced Exchange

Consideration has been given to reducing the size of the exchange. A reduced exchange is a possibility, as well as other combinations of exchange and lease configurations. Any one of these proposals or combinations thereof could become BLM's final decision; however, they were not analyzed in the EIS because their impacts are within the range of impacts of the exchange alternative and the leasing alternative. In summary, BLM's final decision could be to reduce the size of the exchange, exchange the coal for combinations of land and coal, or combinations of reduced exchange proposals and lease agreements.

ALTERNATIVES CONSIDERED IN DETAIL

ALTERNATIVE A — COAL-FOR-LAND — PROPOSED AND PREFERRED ACTION

This proposed action is to exchange 3,674.36 acres of BLM-administered federal coal for private high-value recreation and wildlife lands offered by Meridian. Surface ownership of the coal lands would be unaffected by the exchange proposal. Legal descriptions are shown in tables 2.1 and 2.2 and the lands involved are shown in maps 1 to 5.

The federal coal being proposed for exchange is in alternating sections (a checkerboard pattern of Meridian and BLM-administered federal coal) and is part of the Mammoth-Rehder coal field which encompasses 85 square miles in the Bull Mountains area (figure 2.4). This coal field has several coal beds, but only two coal beds are notable, the Mammoth and the Rehder. Only the Mammoth coal bed which averages 10.2 feet in thickness is considered an economically minable deposit.

The in-place federal coal reserves included in the exchange application total 54.5 million tons. Depending upon the mining technique used, 43.6 million tons of coal are recoverable by a longwall mining operation and 27.3 million tons of coal are recoverable by a room-and-pillar mining operation. The value of the federal coal under consideration for exchange has been determined to have a fair market value of $730,000. This value was determined by BLM's NRET.

In return for the federal coal under consideration for exchange, BLM selected lands from the Meridian offered lands (table 2.2). The top priority acquisition lands and replacement lands for the priority lands 4 that were inadvertently sold are discussed. This exchange, like all exchanges, must be equal value for equal value. If the final coal value is less than the total value of the top priority lands and replacement lands ($1,149,000) then any difference in value would be considered a donation gift from Meridian to BLM. A brief discussion and description of the top priority acquisition lands and replacement lands follows:

Priority lands 1,2,3 — These three parcels of land are located in Madison County and total 697.45 acres. All three parcels are riverfront properties along the Madison River. Primary anticipated use by the public would be fishing and dispersed recreation, such as sight-seeing and picnics.

Priority lands 5 — These three parcels of land in Beaverhead and Deerlodge Counties total 1475.48 acres. The lands border the Big Hole River. The lands are critical elk and mule deer habitat. Primary anticipated use by the public would be fishing and big game hunting.

Priority lands 6 — These thirteen parcels of land are located in Carbon County and total 6,195.56 acres. These lands contain endangered plant species habitat and mule deer habitat. Primary anticipated use by the public would be big game hunting.

Replacement Lands — These four parcels of lands are also located in Carbon County and total 1504.7 acres. These lands are adjacent to the priority 6 lands, although they are in a different grazing allotment. the lands have essentially the same resource values as the priority 6 lands (mule deer habitat). Primary anticipated use by the public would be big game hunting.

TABLE 2.1

SELECTED FEDERAL COAL LANDS

Proposed Lands Selected by Meridian Containing Federal Coal to be Transferred to Meridian in Private Ownership

County	Township	Range	Section	Description	Acres
Musselshell	6N	27E	18	All (Frac.)	636.92
			20	All	640.00
			30	All (Frac.)	638.00
				Total	1,914.92
Yellowstone	5N	27E	4	Lots 1 to 4	159.44
	6N	27E	28	All	640.00
			32	N½,SE¼	480.00
			34	N½,SW¼	480.00
				Total	1,759.44
GRAND TOTAL					3,674.36

ALTERNATIVE B — COAL-FOR-COAL EXCHANGE — MIRROR IMAGE

Under the mirror image coal-for-coal exchange, the federal and Meridian coal in the project area would be split into two logical mining units of approximately equal size and value. Meridian would get one unit, BLM would get the other unit.

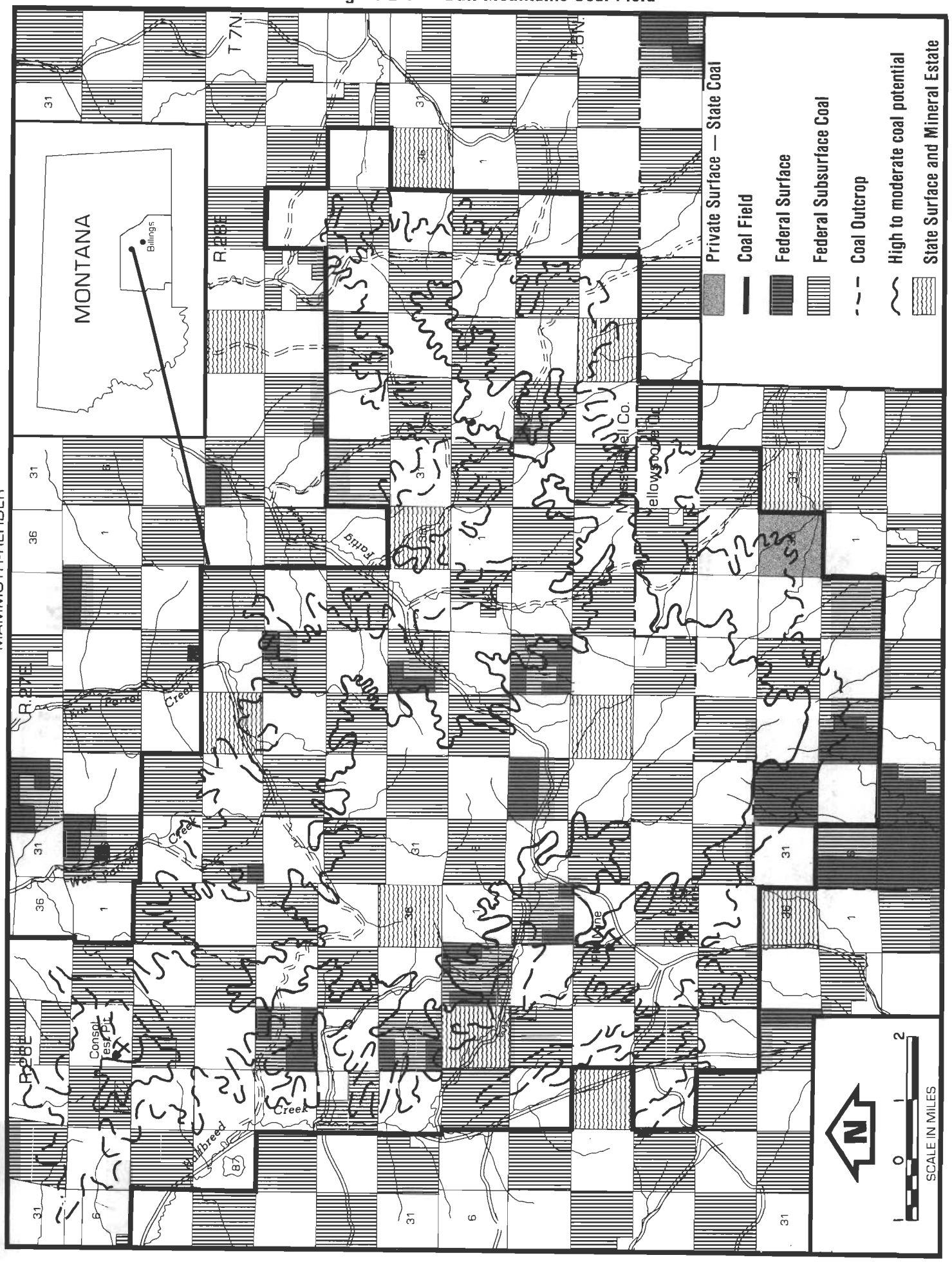
About 32.7 million tons of in-place federal coal in the south half of the project area would be exchanged for 30.5 million tons of in-place Meridian owned coal in the north half of the project area. This alternative would provide a block of private coal of 70.2 million tons in the south half and a block of federal coal of 60.2 million tons in the north half. Figure 2.5 shows Meridian and federal coal that could be exchanged. Table 2.3 shows the coal reserves.

The south tract would have sufficient recoverable reserves to sustain a mine for 22 years, assuming a longwall operation at 3.0 million tons annually, and five years to reach full production. The north tract would sustain a similar mining operation for 19 years. With the addition of state Section 16 in the northern half there would be sufficient recoverable reserves for 23 years.

For a room-and-pillar mine operating at 0.5 million tons per year, and five years to reach full production, there would be sufficient recoverable reserves for 69 years in the south tract and 52 years for the north tract. Mine life could be expanded an additional 18 years if state Section 16 was included in the north tract.

If a larger mining operation began in the south tract, it is likely that the operation would eventually lease the federal coal in the north tract.

Figure 2.4 — Bull Mountains Coal Field



Source: USDI-BLM, Billings RMP, 1984

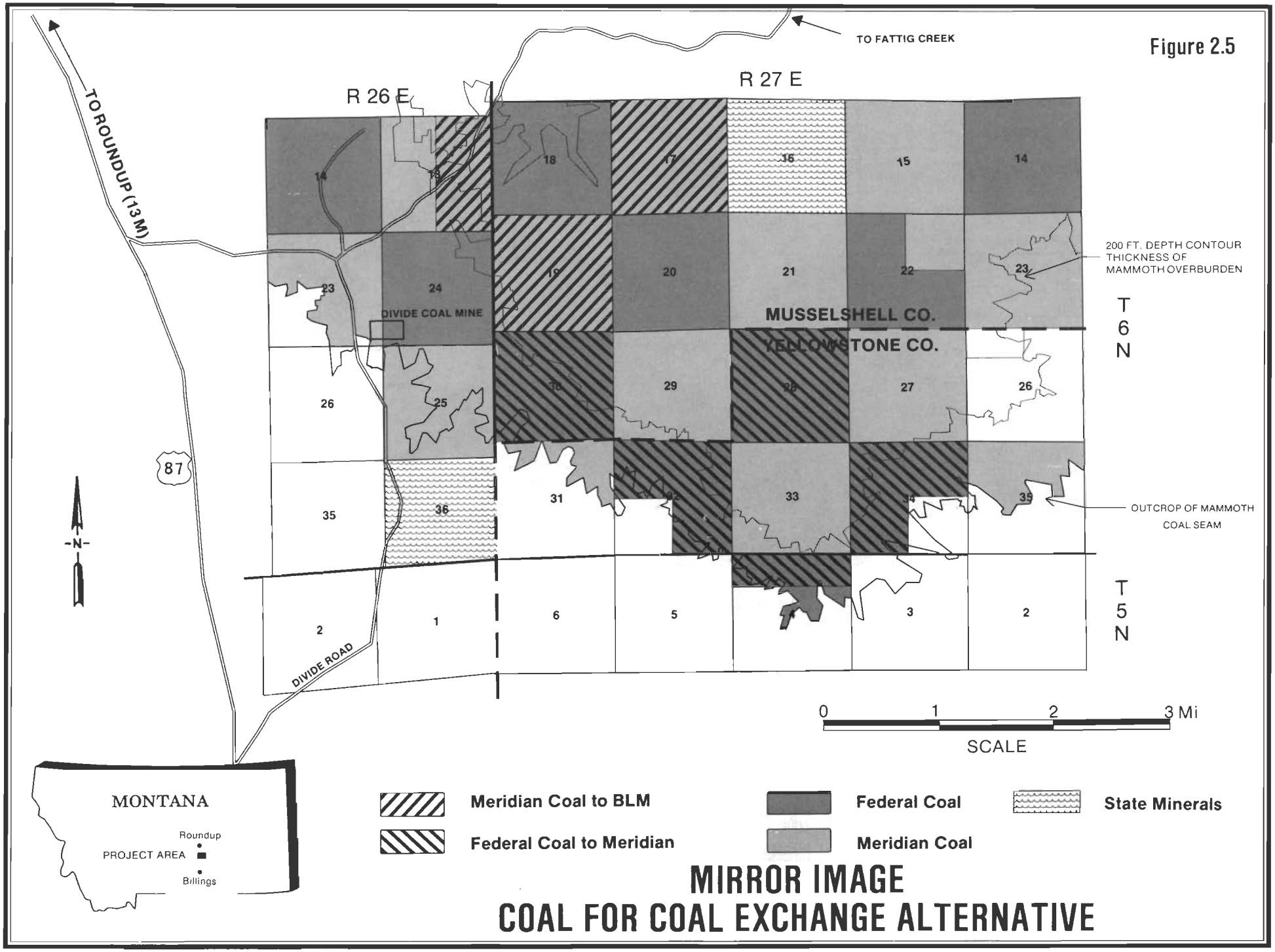


Figure 2.5
TO FATTIG CREEK
R 26 E
R 27 E
TO ROUNDUP (13 M)
87
DIVIDE COAL MINE
DIVIDE ROAD
MUSSELSHELL CO.
YELLOWSTONE CO.
200 FT. DEPTH CONTOUR THICKNESS OF MAMMOTH OVERBURDEN
OUTCROP OF MAMMOTH COAL SEAM
T 6 N
T 5 N
N
0 1 2 3 Mi
SCALE
MONTANA
Roundup
PROJECT AREA
Billings
Meridian Coal to BLM
Federal Coal to Meridian
Federal Coal
Meridian Coal
State Minerals
MIRROR IMAGE
COAL FOR COAL EXCHANGE ALTERNATIVE

TABLE 2.2

OFFERED PRIVATE LANDS

Proposed Private Lands Offered by Meridian to be Transferred to BLM in Public Ownership (with BLM priorities)

County	Township	Range	Section	Description	Acres	BLM Priority
Madison	8S	1W	15	All West of East Bank of River	572.00	1
			25	Part N½NE¼ lying East of West Bank	48.00	2
	9S	1W	1	Lots 6,7, SW¼NE¼	77.45	3
				TOTAL	697.45	
Inadvertently Sold						4
Beaverhead	1N	13W	9	SW¼,NW¼NW¼	200.00	5
			17	Part lying SE of C/L of Big Hole River	608.00	5
Deerlodge			17	Part W½NW¼ lying West of C/L of Big Hole River	32.00	5
Beaverhead			19	Part lying SE of C/L of Big Hole River	489.92	5
Deerlodge			19	Part lying NW of C/L of Big Hole River	145.56	5
				TOTAL	1,475.48	
Carbon	9S	21E	1	Lots 1 to 4	197.06	6
			3	Lots 2 to 4,S½N½, S½	600.63	6
			5	N½,N½S½, S½SE¼ (Frac.)	560.44	6
			7	All (Frac.)	624.08	6
			9	NE¼,N½NW¼, S½SW¼	320.00	6
			11	All	640.00	6
			13	Lots 3,4	80.83	6
			15	N½,W½SW¼, E½SE¼,SW¼SE¼	520.00	6
			17	All	640.00	6
			19	All (Frac.)	626.16	6
			21	All	640.00	6
			23	All	640.00	6
			31	Lots 1 to 4	106.36	6
				TOTAL	6,195.56	

TABLE 2.2 (Continued)

OFFERED PRIVATE LANDS

Proposed Private Lands Offered by Meridian to be Transferred to BLM in Public Ownership (with BLM priorities)

County	Township	Range	Section	Description	Acres	BLM Priority
Carbon	9S	21E	25	Lots 1,2,3	111.89	Replacement Lands
			27	All	640.00	Replacement Lands
			29	All	640.00	Replacement Lands
			33	Lots 1,2,3,4	112.80	Replacement Lands
				TOTAL	1,504.18	
				TOTAL — TOP PRIORITY LANDS	9,873.18	
Broadwater	2N	2E	3	Lots 4,5,6 less 16 ac. Milwaukee R/W	79.04	None
			9	Lots 1,2, NW¼NW¼ less 10.38 ac. Milwaukee R/W	107.94	None
	4N	3E	7	Lots 1,2,4,5, S½NE¼,N½SE¼, less 16.17 ac. BN R/W	251.46	None
	5N	1E	3	SW¼	160.00	None
Custer	7N	51E	1	All	640.40	None
	8N	51E	35	Lots 1,4,5,8, SE¼NE¼,E½SE¼	238.25	None
	7N	52E	7	All	627.04	None
	12N	45E	5	All, Frac. less 1 acre	603.60	None
			17	All	640.00	None
Dawson	18N	56E	25	Part SW¼ lying NWerly, BN R/W less 41.25 ac. Townsite of Intake, less 0.52 ac. school site	52.93	None
			35	Part Lots 1 to 4, lying NWerly of line 200 ft. NWerly from C/L of Yellowstone River Branch R/W	98.06	None
Gallatin	2N	2E	3	Lots 1,2,3,7,8,9, S½NE¼,E½SW¼, SE¼, less 29.13 ac. BN R/W	119.48	None
			9	NE¼SW¼, N½SE¼, less 0.52 ac. BN R/W	119.48	None

TABLE 2.2 (Continued)

OFFERED PRIVATE LANDS

Proposed Private Lands Offered by Meridian to be Transferred to BLM in Public Ownership (with BLM priorities)

County	Township	Range	Section	Description	Acres	BLM Priority
Gallatin (continued)	3N	2E	27	Lots 1,4,6,7, E½E½, less 28.17 ac., BN R/W	304.11	None
Jefferson	5N	2W	19	All (Frac.)	654.56	None
			29	All	640.00	None
			31	Lots 1 to 6,NE¼, E½NW¼, NE¼SW¼, N½SE¼	635.46	None
Madison	1S	6W	31	All(Frac.)	664.56	None
	5S	5W	21	All(Frac.)	653.54	None
	6S	6W	27	SE¼	160.00	None
			35	S½(Frac.)	321.29	None
	7S	6W	1	All(Frac.)	650.20	None
	4S	8W	1	All(Frac.)	659.88	None
			13	All(Frac.)	639.16	None
			23	E½	320.00	None
			25	NW¼,Frac.E½	478.09	None
	4S	7W	19	Frac.SW¼	160.27	None
			31	Part of Lot 3 lying N of C/L of main channel of Big Hole River, NW¼	182.64	None
Musselshell	9N	26E	29	All	640.00	None
	10N	27E	27	E½,less 1.23 acres	318.77	None
Prairie	13N	48E	25	All	640.00	None
			27	E½	320.00	None
			35	All	640.00	None
	13N	47E	21	All	640.00	None
				TOTAL	23,933.40	

ALTERNATIVE C — LEASING

The federal coal being considered for exchange could be leased competitively. Leasing could occur through the lease-by-application process since the Powder River Coal Production Region is now decertified.

The Department of the Interior, in 1979, issued regulations implementing a federal coal leasing program consistent with the Leasing Amendments Act of 1976 and other laws passed in the 1970s. Key features of the program include designation of federal coal production regions, the use of regionally-based coal teams, the integral study of market conditions in support of major leasing decisions, and the use of competitive lease sales. It also contains provisions for the leasing of coal in response to applications in areas where federal coal resources are in less demand. Twelve coal production regions were designated nationally, each with a regional coal team. In the last several years, all of the coal production regions have been decertified.

A Federal Register notice soliciting public comment on the decertification of all or a portion of the region was published on February 9, 1989. Partial decertification (the deletion of Yellowstone, Musselshell and Golden Valley counties from the coal region) or decertification of the entire region was included on the October agenda of the next RCT meeting. The RCT recommended that region be decertified at their October 31, 1989 meeting.

A notice appeared in the January 9, 1990 Federal Register decertifying the Powder River Coal Production Region. Applications to lease federal coal can now be accepted by BLM in the region. Coal lease applications that would involve the opening of new mines or expand existing mine facilities will be considered on a case-by-case basis by the RCT, prior to processing the application. The RCT recommended that the Bull Mountains project, as it was identified in the Draft EIS, be allowed to fall under the lease-by-application procedures. The Director of BLM approved this recommendation.

The RCT serves as the Secretary of the Interior's major forum for balancing regional and national interests as a way of assuring that both federal and state concerns are given proper consideration. Should interest in regional leasing be renewed, the Powder River Coal Production Region could be recertified.

Lease-By-Application

Since the Powder River Coal Production Region is now decertified, BLM could lease the federal coal by the lease-by-application process. Processing an application usually takes a year or longer. For analytical purposes, it is assumed that the in-place 56.9 million tons of federal coal reserves would be offered for lease. Generally the process includes the following:

(1) Review of the application.
(2) Determine if application is in conformance with land-use plans.
(3) Prepare maximum economic recovery report.
(4) Prepare site-specific environmental analysis.
(5) Prepare fair market value analysis report.
(6) Consult with governor and attorney general.
(7) Reject application or hold competitive sale.
(8) Appendix 6 further describes the leasing-by-application process.

State Coal Status

As part of Meridian's efforts to secure long-term coal reserves in the Bull Mountains, they submitted three coal lease applications to MDSL for the following state owned lands:

T. 6 N., R. 27 E., Section 16
T. 6 N., R. 26 E., Section 36
T. 7 N., R. 26 E., Section 36

TABLE 2.3

MIRROR IMAGE
COAL-FOR-COAL EXCHANGE
EXCHANGE SOUTH FEDERAL PARCELS FOR NORTH MERIDIAN PARCELS

Location	Current Ownership	Coal Acres	Inplace Tons (millions)	Room and Pillar Recoverable Tons[1] (millions)	Longwall Recoverable Tons[2] (millions)	Exchange Parcel Private to Federal
			NORTH TRACT			
T6N,R26E						
Sec. 13	P	610.0	9.6	4.8	7.7	*
Sec. 24	F	519.0	7.9	3.9	6.3	
T6N,R27E						
Sec. 16	S	640.0	11.3	5.7	9.0	
Sec. 17	P	640.0	10.8	5.4	8.6	*
Sec. 18	F	650.0	10.8	5.4	8.6	
Sec. 19	P	643.0	10.2	5.1	8.2	*
Sec. 20	F	650.0	10.9	5.5	8.7	
	Federal	1,819.0	29.7	14.8	23.8	
	State	640.0	11.3	5.7	9.0	
	Private	1,893.0	30.5	15.3	24.4	
	Total	4,352.0	71.5	35.8	57.2	
			SOUTH TRACT			Federal to Private
T5N,R27E						
Sec. 4	F	84.0	1.8	0.9	1.4	*
T6N,R26E						
Sec. 25	P	49.0	0.7	0.3	0.6	
T6N,R27E						
Sec. 27	P	652.0	14.7	7.4	11.8	
Sec. 28	F	639.0	11.9	5.9	9.5	*
Sec. 29	P	635.0	10.1	5.1	8.1	
Sec. 30	F	413.0	6.4	3.2	5.1	*
Sec. 31	P	18.0	0.3	0.1	0.2	
Sec. 32	F	229.0	3.9	2.0	3.1	*
Sec. 33	P	618.0	11.7	5.9	9.4	
Sec. 34	F	345.0	8.8	4.4	7.0	*
	Federal	1,710.0	32.7	16.4	26.2	
	Private	1,991.5	38.0	19.0	30.4	
	Total	3,701.5	70.8	35.4	56.6	

Note: Slight variations in totals are due to rounding.

[1]50% recovery rate.
[2]80% recovery rate.

MDSL then requested that BLM consider evaluating the state lands in the EIS, if possible. T. 6 N., R. 27 E., Section 16 is included in the EIS under the leasing alternative.

T. 6 N., R. 26 E., Section 36 lies outside of the Bull Mountains coal field and has no currently marketable coal. Per discussion with Meridian and MDSL, it was determined that the company wanted these lands for surface facilities and any associated rights-of-way needed for the mining operation. Since a state coal lease does not necessarily grant surface rights, the company will probably withdraw this coal lease application. The mining company would then submit an application for rights-of-way for roads or other transportation needs. Likewise, the mining company would apply for a land-use license, easement or special lease for any surface facilities associated with the mining operation, when needed. MDSL would address the site-specific impacts as part of their environmental assessment for the project at the time they receive the company's application.

T. 7 N., R. 26 E., Section 36 is within the Bull Mountains coal field and is underlain with recoverable coal reserves. These lands are not analyzed in the EIS because this state section is several miles outside the geographic area of consideration this EIS is designed to address.

Other Federal Coal

Under the leasing alternative, BLM included 197.59 acres of federal mineral estate which contains 148 acres of recoverable coal reserves in T. 6 N., R. 26 E., Section 24 for discussion and analysis. These additional federal coal lands, containing an estimated 2.4 million tons of in-place coal, were not included in the proposed exchange application because Meridian was concerned with interfering with the Divide/Storm King mining operation and that company's long-term coal reserves.

The Divide/Storm King mine is located in T. 6 N., R. 26 E., Section 24, W½SW¼ and was mining federal coal under coal lease M-52647; however, the mine is not in operation at this time.

BLM is concerned with the recoverable federal coal reserves within this section and insuring that the coal would be mined and not bypassed by a mining company. Therefore, 148 acres of recoverable federal coal reserves within the 197.59 acres to be leased in this section are analyzed under the leasing alternative and would probably be included in a federal coal lease in this area.

Lease Royalties

Current coal market conditions indicate that the Bull Mountains coal would not become economically feasible for development until market conditions approached a $20 to $30 minimum selling price (1990 dollars). This probably would not occur until 20 to 40 years in the future. Based on these assumptions, royalty stream flows were calculated using a $25 F.O.B. mine sale price starting in 2020 (mid-range). Using these figures, a 0.5 million tons of coal per year underground mine would generate $13,367,592 in royalty payments over a 40-year period. The discounted royalty payment value is $176,941 under this scenario. A 3.0 million tons of coal per year underground mine would generate $76,622,000 in royalty payments over the 40-year period with a discounted value of $1,008,208 (1990 dollars). Appendix 11 and 16 show these values and the underlying assumptions used for this scenario.

If BLM were able to lease the federal coal immediately and assuming that the company was willing to lease and develop it, a 0.5 million tons of coal per year underground mine would generate $7,985,628 in royalty payments over the 40-year period with a discounted value of $1,676,763 (1990 dollars). A 3.0 million tons of coal per year underground mine generates $45,773,000 in royalty payments over the same 40-year period with a discounted value of $9,554,192 (1990 dollars). Appendix 11 and 16 show these values and the underlying assumptions used for this scenario.

This lease scenario was not fully developed as an alternative because BLM did not perceive the $15 per ton sale price and 1991 start-up date as an economically viable venture. See appendix 11 for an in-depth discussion of the factors which influence the development of the coal.

ALTERNATIVE D — NO ACTION

This alternative would continue present management as it exists now for all the lands. It is in essence a two-part no action alternative, i.e., denial of the exchange(s) and denial of the leasing. There would be no development of the federal coal under this alternative.

Should BLM deny the exchanges, the Bull Mountains federal coal lands included in the exchange application would remain in public ownership and would not be developed in the foreseeable future. The offered recreational properties would remain in private ownership as would the private coal.

Should BLM deny leasing in the Bull Mountains, the federal coal lands would still remain in public ownership for development by future generations. There would be no immediate coal development unless it was done on private coal lands.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES BY ALTERNATIVE

Figures 2.6 and 2.7 show fiscal comparisons of the 0.5 and 3.0 million tons per year mine(s) under the exchange and lease alternatives. Appendix 17 contains more in-depth information used to derive these figures for comparison.

A comparison of the net revenues generated by Alternative A (exchange) and Alternative C (lease) involves the economic evaluation concept referred to as discounting. Money has earning power measured by the interest rates at which it could be invested. Because money has a time value and projects start at different times, project revenues and costs must be adjusted to the same year to compare projects which have different starting and ending dates. The interest rate used is commonly referred to as the discount rate. The current year is usually the basis for comparison so future values are "discounted" to their present value, in this case to the year 1990.

Figures 2.8 and 2.9 show a comparison of the net revenues generated by Alternatives A and C for the three million-ton mine scenarios. The values in figure 2.8 are undiscounted while those in figure 2.9 are the same values from figure 2.8 discounted to 1990 dollars.

The $15 per ton and 1991 start-up date lease scenario was not fully developed as an alternative because BLM did consider it an economically viable venture. See appendix 11 for factors which influence development of the coal.

Alternative A would generate 291 million dollars in total net revenues to all levels of government through the year 2025 while Alternative C would generate 556 million dollars in total net revenues through the year 2054 (figure 2.8). However, the mine in Alternative C would not begin until 2020 so the net revenues must be discounted over a much longer period of time than those in Alternative A. The present value of the net revenues discounted to 1990 are 65 million dollars for Alternative A and 8 million dollars for Alternative C (figure 2.9).

A comparison of the impacts by alternatives is presented in table 2.4. Detailed discussion of each of the alternatives and impacts is presented in chapter 4.

FIGURE 2.6

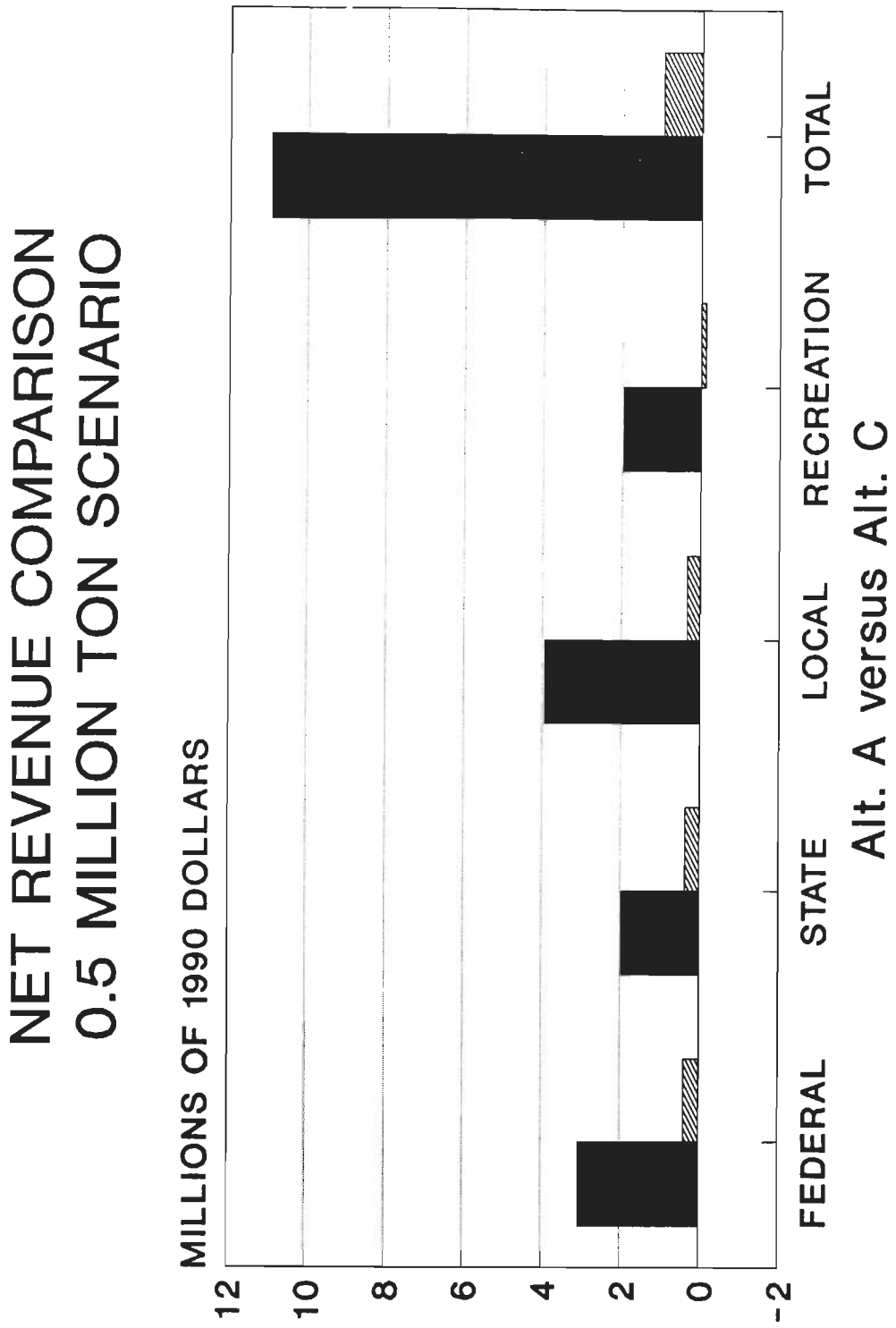

NET REVENUE COMPARISON
0.5 MILLION TON SCENARIO
MILLIONS OF 1990 DOLLARS
12
10
8
6
4
2
0
-2
FEDERAL
STATE
LOCAL
RECREATION
TOTAL
Alt. A versus Alt. C
ALT A
ALT C

FIGURE 2.7

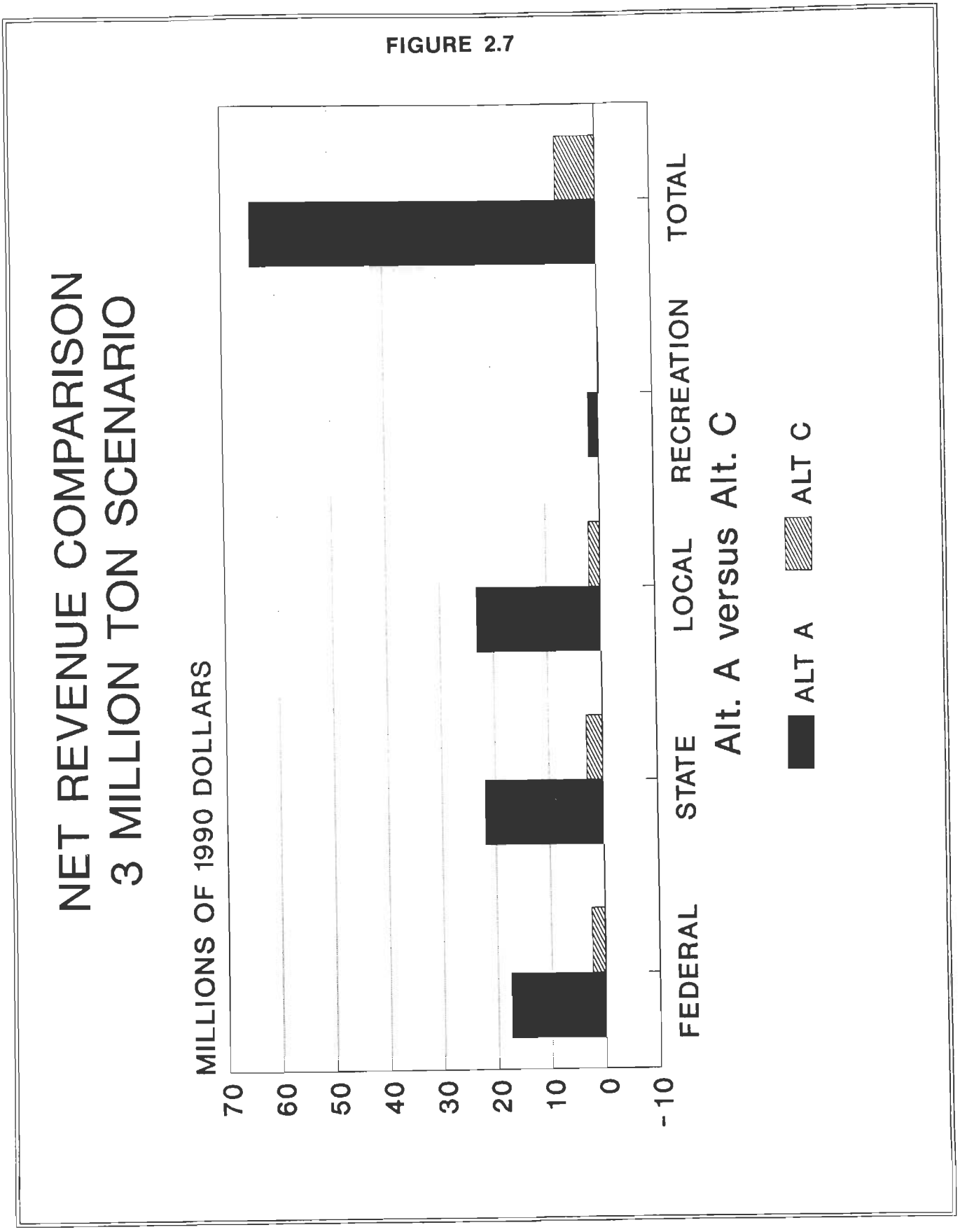
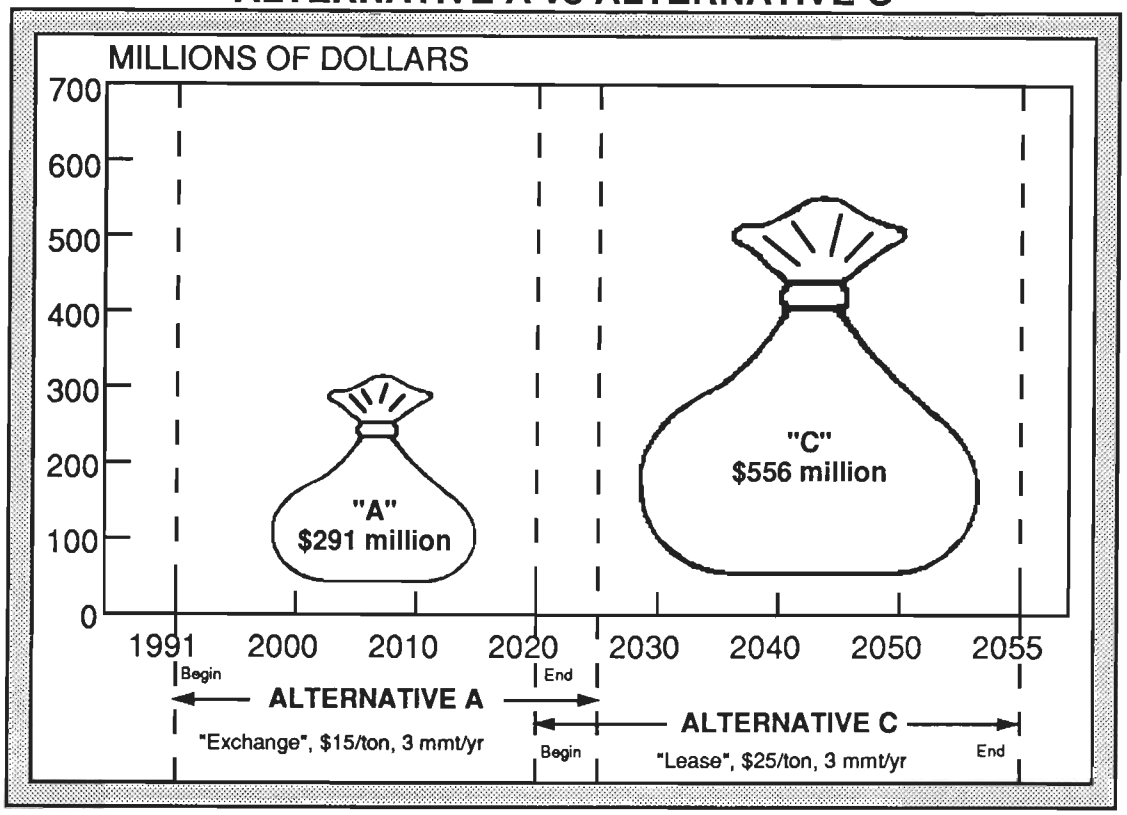

NET REVENUE COMPARISON
3 MILLION TON SCENARIO
MILLIONS OF 1990 DOLLARS
70
60
50
40
30
20
10
0
-10
FEDERAL
STATE
LOCAL
RECREATION
TOTAL
Alt. A versus Alt. C
ALT A
ALT C

FIGURE 2.8

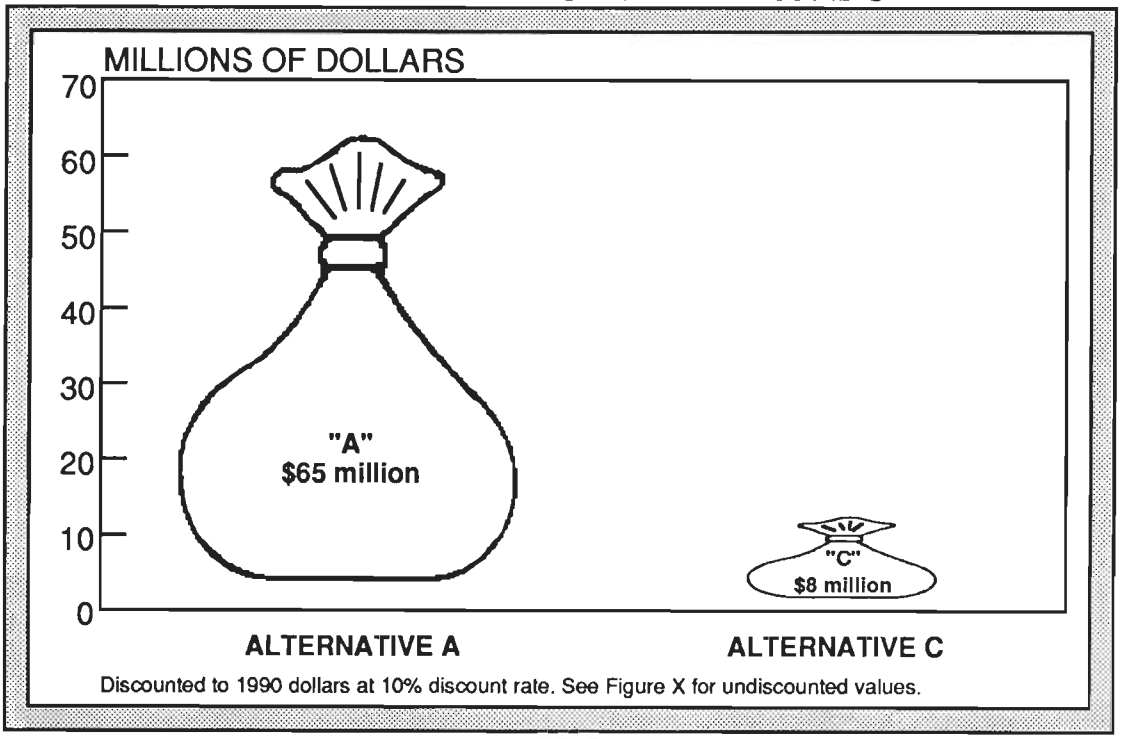
TOTAL UNDISCOUNTED NET REVENUES ALTERNATIVE A vs ALTERNATIVE C



Source: Appendix 17

FIGURE 2.9

TOTAL DISCOUNTED NET REVENUES ALTERNATIVE A vs ALTERNATIVE C



Source: Appendix 17

TABLE 2.4

ALTERNATIVE COMPARISON AND IMPACT SUMMARY

	Alternative A-Preferred Coal-for-Land Exchange	Alternative B Mirror Image Coal-for-Coal Exchange	Alternative C Leasing	Alternative D No Action
Summary	BLM would exchange 3,674 acres of federal coal reserves containing 54.4 million tons of in-place coal in the Bull Mountains project area with a fair market value of $730,000 for 9,873 acres of privately owned high-value recreation lands with an appraised value of $1,149,700 belonging to Meridian.	BLM would exchange 3,701 acres with 32.7 million tons of in-place coal in the south tract of the Bull Mountains project area for 4,352 acres with 30.5 million tons of in-place Meridian owned coal in the north tract (mining units would be of about equal size and value).	BLM would lease some or all of the 3,482 acres of Bull Mountains project area federal coal to Meridian (197.59 acres of additional federal coal and 640 acres of state coal are considered under this alternative).	Continue present management as it exists now. No coal or lands would be exchanged or leased.
Socioeconomics				
Employment	Mine development would employ from 35 to 207 mine workers and create from 15 to 92 secondary jobs plus 26 railroad construction jobs. Thirty to 153 jobs would be filled by local hires: 70 percent from Billings, 20 percent from Roundup and 5 percent from Yellowstone and Musselshell Counties. From 5 to 54 new in-migrants could be expected to move to the area with from 4 to 40 individuals living in Billings, 1 to 7 in Roundup and in the 3.0 million tons per year development scenario, 4 in Yellowstone County and 3 in Musselshell County.	Same as Alternative A.	Slightly less than Alternative A by year 2020.	No change from baseline.
Income and Purchases	The mine will create from $887,480 to $5.3 million in job related income. The mine will spend locally from $1 million to $3.4 million per year.	Same as Alternative A.	Same as Alternative A.	No change.
Local Government Costs	Mine development would create major increases in road and maintenance costs for Musselshell County and minor increases in costs for Yellowstone County. Law enforcement and ambulance services would need to be increased but no new personnel or capital costs are expected for either county.	Impacts to priority lands. N/A	Same as Alternative A.	No change.

TABLE 2.4 (continued)

ALTERNATIVE COMPARISON AND IMPACT SUMMARY

	Alternative A-Preferred Coal-for-Land Exchange	Alternative B Mirror Image Coal-for-Coal Exchange	Alternative C Leasing	Alternative D No Action
State and Federal Costs	Mine development would create major costs to the state for maintenance of U.S. Highway 87 and Highway 312. Road life would be shortened. Increased revenues would come from fuel taxes, use fees, and GVW fees. Foregone royalty payments would range from $8.0 million to $45.8 million. The discounted royalty values would range from $1.7 million to $9.6 million.	Impacts same as Alternative A. Federal royalty payments would be made on the available coal should it be leased.	State and federal government would benefit from receipt of federal coal royalty.	No change.
Local Government Revenues	Mine development would create from $100,000/yr. to $1 million/yr. additional revenues for Yellowstone County. Roundup schools would gain $100,000/yr. and Yellowstone County schools would gain $750,000/yr. from increased revenues. In the long-term, Yellowstone County would realize a net gain in revenues while Musselshell County would lose revenues due to road maintenance costs. Those counties in which BLM acquires land would receive 12.5 to 50.0 percent of the grazing fees that are collected. -Madison County would lose $124/yr. in property taxes but gain $523 in PILT payments: Net gain, $398/yr. -Beaverhead County would lose $364 in property taxes but gain $873 in PILT payments: Net gain $609/yr. -Anaconda/Deer Lodge Counties would lose $24/yr. in property taxes but gain $133 in PILT payments: Net gain $108/yr. -Carbon County would lose $871/yr. in property taxes but gain $5,775 in PILT payments: Net gain $4,904/yr. NOTE: This is for priority lands 6 and replacement lands in Carbon County.	Same as Alternative A.	Same as Alternative A.	No change.

State and Federal Revenues	State would gain from $450,000/yr. to $2.6 million/yr. while the federal government will gain from $500,000 to $2.9 million in new revenues.	Same as Alternative A.	Same as Alternative A. If BLM leased the federal coal immediately, royalty payments would range from $8.0 million to $45.8 million. Discounted royalty values would be $1.7 million to $9.6 million. If BLM were not able to lease the federal coal until market conditions were favorable for development (year 2020), the royalty payments would range from $13.4 million to $76.6 million. Discounted royalty values would be $0.2 million to $1.0 million.	No change.
Demographics	No significant impacts would be felt by any municipality as the small number of the in-migrating population could be easily assimilated into the existing population.	Same as Alternative A.	Same as Alternative A.	No change.
Social Life	Perception by Roundup residents would be that the mine would revitalize the depressed economy of Musselshell County; however, the small number of jobs would not provide a significant infusion of wage money into the economy to change much. Although the expenditures by the mining company would be significant to the Musselshell County economy, not all jobs will be filled by county residents and only a portion of their income would be spent in-county.	Same as Alternative A.	Similar to Alternative A.	No change.
Community Services	The small number of workers and family members moving to Musselshell and Yellowstone Counties would have no significant impacts on community services. Increased traffic on U.S. Highway 87 and Highway 312 would create the need to shift more enforcement duties from other parts of counties to the coal haul route.	Same as Alternative A.	Same as Alternative A.	No change.
Housing	No impact. The small number of in-migrants would not impact available housing.	Same as Alternative A.	Same as Alternative A.	No change.

TABLE 2.4 (continued)

ALTERNATIVE COMPARISON AND IMPACT SUMMARY

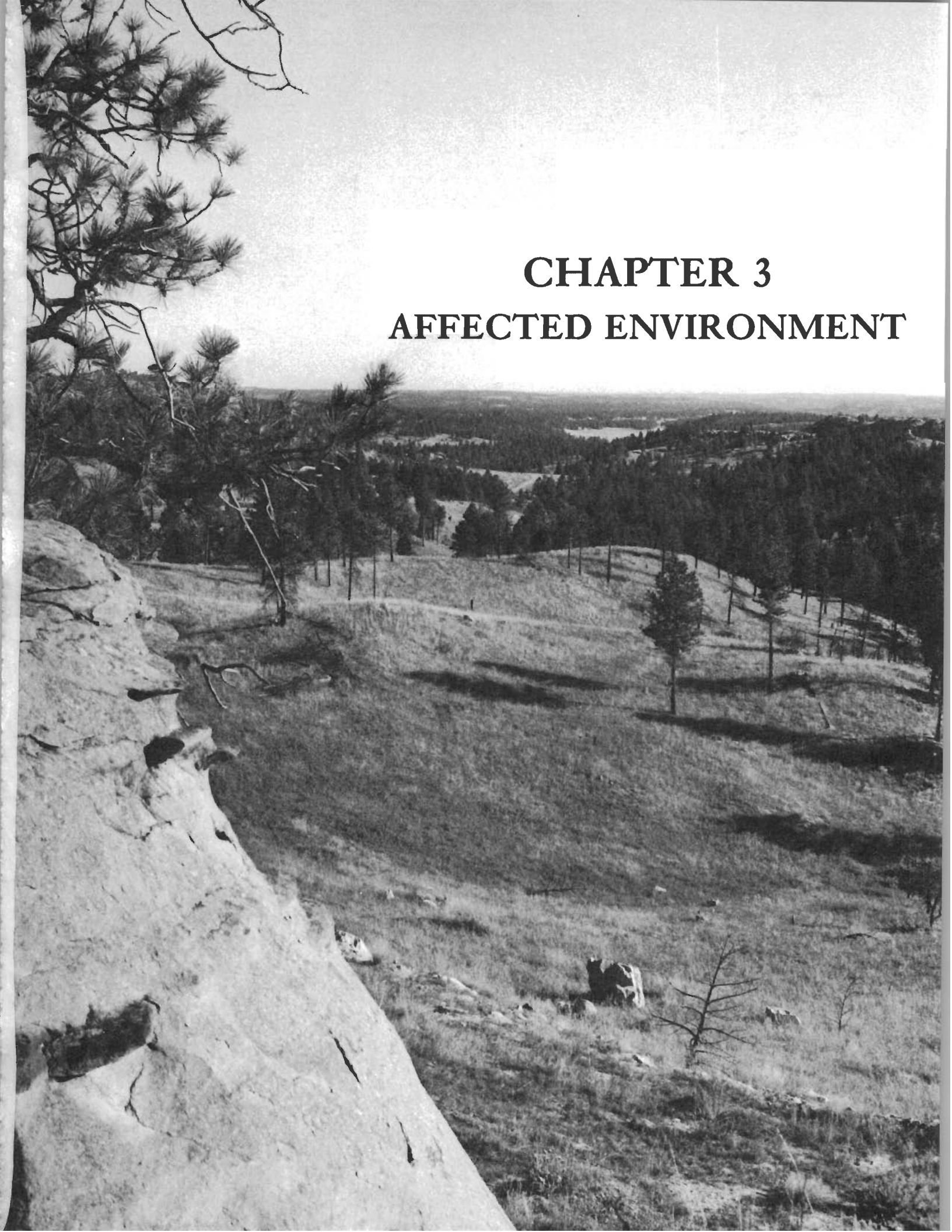
	Alternative A-Preferred Coal-for-Land Exchange	Alternative B Mirror Image Coal-for-Coal Exchange	Alternative C Leasing	Alternative D No Action
Transportation	Mine development would create from 17 to 99 additional commuter round trips per day on U.S. Highway 87. Coal hauling will create an additional 10 to 90 truck round trips per dayon U.S. Highway 87 and Highway 312. The accident rate on the haul route will likely increase from 30 percent to 70 percent with additional accidents at the railroad crossing of U.S. Highway 87. Roadway pavement conditions would deteriorate at an increased rate and annual maintenance costs would increase. To maintain the structural integrity of the three proposed construction projects on U.S. Highway 87 would cost an additional $70,000 to $78,000 per mile. Annual maintenance on Highway 87 would need to be increased by $50,000 per year and on Highway 312 by $90,000 to $100,000 per year. Traffic accidents with children and school buses could increase.	Same as Alternative A.	Same as Alternative A.	No change.
Air Quality	No effect on climate. Particulate levels would increase somewhat but would still be within allowable concentrations even for the high level mining scenario. In the low development scenario the air separator process would be the largest contributor to particulate emissions while the wet benefication process used in the high development scenario would keep particulate emissions low.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
ACEC	No impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Cultural Resources	Subsidence in both development scenarios would have major impacts on rock art sites.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.

Agriculture	No impacts from low development scenario and little or no effect from the high development scenario. The railroad may change the vegetative distribution with changes in the drainage patterns.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Floodplains	No impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Native American Religious Concerns	No impacts on selected coal lands. A positive effect on offered private lands.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Threatened and Endangered Species	No impacts to selected coal lands. If rare plants should occur on the offered private lands, they would be protected.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Hazardous Wastes	No impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Wetlands/Riparian Areas	No impacts to selected coal lands. Riparian areas would be managed for improvement on the offered private lands.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Wild and Scenic Rivers	No impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Wilderness	No impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Topography and Soils	Sink hole subsidence in areas of less than 40 feet of overburden would cause minor impact to topography. However, subsidence from the high development scenario would have major impacts to topography and yet would not be readily noticeable. Subsidence will have limited impacts to soils. Surface fissures and slope failure can cause altered drainage patterns, and change soil structure, permeability and infiltration rates.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Vegetation	Little or no impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Wildlife	Mine mouth and haul road activities would displace and disturb wildlife to a small degree. Major impacts from the railroad would be noise, human harassment and collisions. Most impacts could be mitigated. Minimal effect on habitat quality and use of area.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.

TABLE 2.4 (continued)

ALTERNATIVE COMPARISON AND IMPACT SUMMARY

	Alternative A-Preferred Coal-for-Land Exchange	Alternative B Mirror Image Coal-for-Coal Exchange	Alternative C Leasing	Alternative D No Action
Oil and Gas	Ownership will remain with Meridian on the offered private lands. BLM would acquire surface owner rights.	N/A	Same as Alternative A.	All impacts associated with mining would be avoided.
Mineral Materials/Mining Claims	On priority lands 1, 2, 3, and 5 no sales would be allowed. On priority lands 6 and replacement lands sales would be allowed. On all tracts, claims would be managed under existing laws and regulations.	N/A	Same as Alternative A.	All impacts associated with mining would be avoided.
Hydrology	Impacts would be minimal on both surface and groundwater under both development scenarios.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Recreation	Minimal impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Stratigraphy and Geology	50 percent to 80 percent of coal bed will be removed.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Subsidence	Subsidence will definitely occur but will have minimal overall impacts.	Same as Alternative A.	Same as Alternative A.	All impacts associated with mining would be avoided.
Land Use	Minimal impacts.	Minimal impacts.	Same as Alternative A.	All impacts associated with mining would be avoided.
Esthetics	Minimal impacts.	Minimal impacts.	Same as Alternative A.	All impacts associated with mining would be avoided.
Noise	Minimal impacts.	Minimal impacts.	Same as Alternative A.	All impacts associated with mining would be avoided.
Opportunities Foregone				-No opportunity to manage high value lands. -No opportunity for royalty payments. -Priority lands will likely be sold and developed.



CHAPTER 3
AFFECTED ENVIRONMENT

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

Lands described in this section are all lands involved with the proposed exchange and the alternatives. Present management, use, ownership, and resource concerns of these lands are addressed.

COAL LANDS

OWNERSHIP

Map 1 and table 3.1 show all the coal lands in the Bull Mountains that are discussed in this chapter. The proposed action is to exchange 3,674.36 acres of federal coal; however, the leasing alternative differs from the exchange alternatives in that additional coal lands are included under the leasing alternative. A section of state owned coal, T. 6 N., R. 27 E., Section 16 (640 acres), part of another section of federal coal, T. 6 N., R. 26 E., Section 24 (197.59 acres of which only 148 acres contain recoverable coal reserves), and part of a section of Meridian coal, T. 6 N., R. 27 E., Section 7 are included and discussed under leasing. If BLM were to delineate logical mining unit(s) and maximize the coal resource recovery, these coal lands would be included in the logical mining unit. These coal lands are included in the leasing alternative and discussed under the affected environment of the coal lands.

Most of the surface above the federal coal lands in the project area is privately owned. T. 6 N., R. 27 E., Section 32 and T. 5 N., R. 27 E., Section 4, N½NW¼ is public land administered by BLM. T. 6 N., R. 27 E., Section 16 is state coal and surface administered by MDSL. Although T. 6 N., R. 26 E., Section 36,

TABLE 3.1

LEGAL DESCRIPTIONS OF BULL MOUNTAINS 3.0 MILLION TONS PER YEAR MINE PLANS UNDER BOTH THE EXCHANGE AND LEASING ALTERNATIVES

(Legals described to the nearest 40 acre parcels)

Alternative A Coal-for-Land Exchange	Ownership		
	Fed	Mer	State
T.5N., R.27E.			
Sec. 4: Lots 2 to 4 inclusive	*		
T.6N., R.26E.			
Sec. 13: Lot 4, SE¼SW¼,SW¼SE¼		*	
Sec. 25: Lots 1 to 3 inclusive, SW¼NE¼, SE¼NW¼,NE¼SW¼,NW¼SE¼		*	
T.6N., R.27E.			
Sec. 9: NE¼SW¼,S½SW¼,SE¼		*	
Sec. 15: W½NW¼,SW¼		*	
Sec. 16: All			*
Sec. 17: E½,S½NW¼,SW¼		*	
Sec. 18: Lot 4, SE¼SW¼,SE¼	*		
Sec. 19: Lots 1 and 2, E½,E½W½		*	
Sec. 20: All	*		
Sec. 21: All		*	
Sec. 27: W½NW¼,SW¼		*	
Sec. 28: All	*		
Sec. 29: All		*	
Sec. 30: All	*		
Sec. 31: N½NE¼,SE¼NE¼,NE¼NW¼		*	
Sec. 32: N½,E½SE¼	*		
Sec. 33: All		*	
Sec. 34: W½NE¼,NW¼,N½SW¼,SW¼SW¼	*		

TABLE 3.1 (continued)

Alternative C Leasing	Ownership			Acres Leased[2]
	Fed	Mer	State	
T.5N., R.27E.				
Sec. 4: Lots 2 and 3	*			79.72
T.6N.,R.26E.				
Sec. 13: Lots 1 to 4 inclusive, W½NE¼, S½NW¼,SE¼SW¼,W½SE¼		*		
Sec. 24: Lots 1 to 4 inclusive, NW¼NE¼, E½SW¼NE¼,E½NW¼SE¼[1]	*			197.59
Sec. 25: Lots 1 and 2, W½NE¼,SE¼NW¼		*		
T.6N., R.27E.				
Sec. 7: SE¼SW¼,S½SE¼		*		
Sec. 15: N½NW¼,SW¼NW¼		*		
Sec. 16: S½NE¼,SW¼,N½SE¼			*	
Sec. 17: W½NW¼,SW¼,SE¼SE¼		*		
Sec. 18: All	*			636.92
Sec. 19: All		*		
Sec. 20: All	*			640.00
Sec. 21: SW¼NE¼,W½,SE¼		*		
Sec. 27: W½NW¼,SW¼,SW¼SE¼		*		
Sec. 28: All	*			640.00
Sec. 29: All		*		
Sec. 30: Lots 1 to 3 inclusive, E½,E½NW¼,NE¼SW¼, W½SE¼SW¼,SE¼SE¼SW¼[1]	*			568.43
Sec. 31: N½NE¼		*		
Sec. 32: NE¼,E½NW¼,NW¼NW¼, SE¼SW¼NW¼,NE¼SE¼, N½NW¼SE¼,SE¼NW¼SE¼, NE¼SW¼SE¼,N½SE¼SE¼[1]	*			390.00
Sec. 33: All		*		
Sec. 34: W½NW¼NE¼,SE¼NW¼NE¼, SW¼NE¼,SW¼SE¼NE¼,NW¼, N½NE¼SW¼,NW¼SW¼, NW¼SW¼SW¼,NW¼NE¼SE¼, NE¼NW¼SE¼[1]	*			320.00
		Total		3,482.66

[1]These parcels are described to the nearest 10 acres: The smallest aliquot part that can be leased by Federal Regulation.

[2]Total acres of Federal coal that could be leased under Alternative C leasing mine plan.

also state land, is not over coal proposed to be mined, the surface lands may be affected by mining. Existing surface ownership is shown on map 2.

CURRENT MANAGEMENT

The current private landowners use these lands for livestock grazing. Glacier Park Company's private surface lands are leased to ranchers for livestock grazing. Public lands and state lands are also incorporated into livestock grazing allotments and are an integral part of the ranches in the area.

A power line right-of-way owned by Fergus Electric Cooperative traverses public land in T. 6 N., R. 27 E., Section 32. The right-of-way is 20 feet in width.

The subject coal lands are accessed from the west side by U.S. Highway 87 and the Divide Road, a dedicated paved county road. Several private two-track trails off the Divide Road traverse the coal lands on the west side. Coal lands on the north side can be accessed by the Fattig Creek Road, a dedicated graveled county road, that heads northeast from the Divide Road.

Likewise, several two-track trails from the Fattig Creek Road provide private access to the coal lands from the north. Access from the south and east can be gained by private roads and two-track trails that lead into the area.

AFFECTED ENVIRONMENT

Socioeconomics

The economic study area for the selected federal coal lands is in the southern portion of Musselshell County and the northern end of Yellowstone County.

Industrial Sector Composition

The U.S. Bureau of the Census reported that in 1986 there were 119 private nonfarm establishments in Musselshell County with one or more employees (table 3.2). Thirty-three of the 119 establishments were in the retail trade industry, 30 were in the services sector, and nine establishments were in the mining sector (including oil and gas extraction and services). Only one establishment in the county reported employing 50 or more people (services sector) and 80 of the 119 establishments reported employing fewer than five persons.

Major employers in Musselshell County include the Roundup Memorial Hospital and Nursing Home, oil and gas extraction services, and local governments including the school districts. The hospital is the only employer in the county which employs more than 50 persons (U.S. Department of Commerce 1986).

In contrast, within Yellowstone County, 4,093 private nonfarm establishments reported employing one or more people (table 3.2). Twenty-three percent (944) of the 4,093 establishments were in the retail trade industry and 31 percent (1,281) were in the services sector. Yellowstone County reported 132 establishments with more than 50 employees and 316 establishments with between 20 and 50 employees.

TABLE 3.2

PRIVATE NONFARM ESTABLISHMENTS BY EMPLOYMENT SIZE — MUSSELSHELL AND YELLOWSTONE COUNTIES

		Number of Employees				
	Total Number of Establishments	1-4	5-9	10-19	20-50	Over 50
Musselshell County						
All Establishments	119	80	24	9	5	1
Mining	9	2	4	1	2	0
Construction	8	7	1	0	0	0
Manufacturing	4	3	1	0	0	0
Transportation	12	9	2	1	0	0
Wholesale Trade	8	5	1	1	1	0
Retail Trade	33	19	10	2	2	0
Finance, Insurance, & Real Estate	7	5	0	2	0	0
Services	30	22	5	2	0	1
Other	8	8	0	0	0	0
Yellowstone County						
All Establishments	4,093	2,333	823	489	316	132
Mining	71	44	8	8	7	4
Construction	326	221	49	37	16	3
Manufacturing	143	66	29	17	18	13
Transportation	214	98	39	29	30	18
Wholesale Trade	406	155	96	89	52	14
Retail Trade	944	416	243	145	100	40
Finance, Insurance, & Real Estate	382	267	54	33	21	7
Services	1,281	783	277	120	68	33
Other	326	283	28	11	4	0

Source: U.S. Department of Commerce (1986).

The federal government and the Billings School District are the major employers in Yellowstone County, with each employing approximately 1,800 employees. Other primary employers in Yellowstone County include Deaconess Medical Center (1,200 employees), St. Vincent's Hospital (1,200 employees), city of Billings (660 employees), and Eastern Montana College (450 employees). Major private sector employers include Burlington Northern Railroad (400 employees), Interstate Brands Corporation (400 employees), Cenex (370 employees), and U.S. West Communications (350 employees).

Employment

Employment Characteristics

The farming and services industries are the major employers in Musselshell County, together employing nearly 40 percent of all county employees (table 3.3). State and local governments in Musselshell County employ approximately 12 percent, while the mining industry employs about 7.4 percent of the county work force. In Yellowstone County, the major employers are in the retail trade (19.7 percent) and services industries (27.3 percent). Total government employment comprises about 12 percent of all employees in Yellowstone County. Employment in farming and mining industries in Yellowstone County total 2.1 percent and 1.5 percent of total employment, respectively.

The civilian labor force in Musselshell County increased by approximately 400 persons between 1970 and 1980 (table 3.4). From 1980 to 1985, the labor force increased to 1,984, but decreased to 1980 levels by 1988, reflecting the declining economic conditions of the county. In Yellowstone County, the employment situation is almost identical to the state and Musselshell County. The labor force in Yellowstone County increased from 35,170 in 1970 to 55,542 by 1980. The civilian labor force increased from 55,542 to 61,749 between 1980 and 1985, but since that time, the county's labor force has declined to 59,518.

TABLE 3.3

1985 EMPLOYMENT BY INDUSTRY — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES
(Percent of Total)

Category	Montana	Musselshell County	Yellowstone County
Total Employment	100.0	100.0	100.0
Farm	8.0	17.9	2.1
Private	73.8	67.5	85.9
Agricultural Services	1.2	1.7	0.8
Mining	1.9	7.4	1.5
Construction	5.5	4.9	6.6
Manufacturing	6.0	4.8	5.2
Transportation and Utilities	6.3	3.6	7.7
Wholesale Trade	4.3	3.5	8.9
Retail Trade	17.9	16.4	19.7
Finance	6.6	3.8	8.4
Services	24.1	21.6	27.3
Government	18.2	14.6	12.0
Federal (civilian)	3.2	1.1	2.5
Federal (military)	2.0	1.3	1.0
State and Local	13.0	12.2	8.5

Source: U.S. Department of Commerce (1985).

The unemployment rate in Musselshell County was 7.4 percent in 1970 (table 3.4). With the increased oil and gas activity in the late 1970s, the unemployment rate for the county declined to 2.3 percent by 1980. Since 1980, the unemployment rate has steadily increased and has been consistently near or over 10 percent since 1986. In Yellowstone County, the unemployment rate has remained at or near 7 percent, except in 1980 when oil and gas activity was high and unemployment decreased to below 5 percent.

TABLE 3.4

RESIDENT CIVILIAN LABOR FORCE — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES

	1970	1980	1985	1986	1987	1988[1]
Montana						
Civilian Labor Force	273,000	370,000	405,000	407,000	403,000	402,000
Employed Persons	261,000	347,000	374,000	374,000	373,000	374,000
Unemployed Persons	12,000	23,000	31,000	33,000	30,000	28,000
Unemployment Rate	4.4%	6.2%	7.7%	8.1%	7.4%	7.0%
Musselshell County						
Civilian Labor Force	1,440	1,841	1,984	1,961	1,883	1,865
Employed Persons[2]	1,333	1,798	1,838	1,754	1,693	1,695
Unemployed Persons	107	43	146	207	190	170
Unemployment Rate	7.4%	2.3%	7.4%	10.6%	10.1%	9.1%
Yellowstone County						
Civilian Labor Force	35,170	55,542	61,749	61,423	60,043	59,518
Employed Persons	32,966	52,861	57,259	56,718	55,726	55,648
Unemployed Persons	2,204	2,681	4,490	4,705	4,317	3,870
Unemployment Rate	6.3%	4.8%	7.3%	7.7%	7.2%	6.5%

Source: Montana Department of Labor and Industry (1988).

[1]Data for 1988 are based upon 12-month moving average through August 1988.
[2]Employed persons listed in this table are only those employees covered under the Montana unemployment insurance laws who earned wages during the year.

The occupational groups listed in table 3.5 are applicants registered at the Billings Job Service that could be trained to work in jobs related to construction and operation of an underground coal mine such as the proposed Bull Mountains mine. Laborers account for the largest group, whereas mechanics represent the smallest group of registered applicants.

TABLE 3.5

JOB APPLICANTS — BILLINGS JOB SERVICE OFFICE

Occupation	Applicants (February 20, 1989)
Administrative	438
Equipment Operators	196
Truck Drivers	422
Technicians (Mine-related)	528
Mechanics	177
Laborers	1,533

Source: Lythgoe pers. comm. (1989).

Note: The administrative category includes secretarial, clerk, accountants, and accounting clerks. Equipment operators include heavy equipment operators and log tractor operators. Truck drivers include tractor/trailer drivers and truck drivers (light and heavy). Technicians (mine-related) include pipe fitters, plumbers, electrician/linemen, ironworkers, boilermakers, welders, sheet metal workers, carpenters, millwrights, cement finishers, and brick layers. Mechanics include auto mechanics, diesel mechanics, and small engine mechanics. Laborers include laborers (construction and store), fallers, loggers, and sawmill workers.

Employment Conditions

Employment in the study area, in general, is reflective of the deteriorating economy of eastern Montana since 1980. Major declines in oil and gas exploration employment (42 percent statewide decrease between 1981 and 1986) together with deteriorating farm prices have caused the level of basic industry jobs to decline and have produced few additional secondary jobs. Statewide employment has increased only 4.3 percent, with most new jobs occurring in the private sector since 1980.

Total employment, as described in table 3.6 and table 3.7, for the affected counties includes not only those persons covered by Montana unemployment insurance laws, but also self-employed persons and federal military persons not covered by unemployment insurance. These employment figures are 10 to 20 percent higher than the employment figures illustrated in table 3.4.

Total employment in Musselshell County peaked in 1981, when a total of 2,109 persons were employed county-wide (table 3.6). At that time, farm employment was about the same as current levels. Mining employment (including oil and gas exploration and services) accounted for 342 persons or over three times the employment level reported in 1986. The decline in mining employment in Musselshell County also produced decreases in secondary employment. For example, wholesale trade employment decreased about 53 percent between 1981 and 1986, while employment in the retail trade sector declined approximately 5 percent during the same period.

Billings, the largest city in Montana, is located in south-central Yellowstone County about 35 miles south of the proposed land exchange area, and dominates the industrial makeup of the employment distribution in Yellowstone County. Employment in nearly all industrial sectors in Yellowstone County has remained stable since 1980 (table 3.7). The possible exception to this no-growth situation is the mining sector (including oil and gas services and exploration) which experienced an employment decrease from a peak of 1,090 persons in 1981 to 842 persons by 1986. Employment in the services sector increased from 15,292 in 1981 to 18,794 by 1986, while employment in the wholesale trade sector decreased by approximately 12 percent since 1981.

Baseline Employment Projections

Baseline employment projections for Musselshell and Yellowstone counties were developed by the National Planning Association Data Services, Inc. (NPA), Washington, D.C. (appendix 7 describes in detail the methodology used by NPA to develop the projections).

Total employment in Musselshell County is projected to show little growth between 1990 and 2010 (table 3.8). Farm employment is expected to decline from 350 in 1986 to 250 by 2010. Mining employment, which decreased from a high of 342 persons in 1981 to 106 persons by 1986, is expected to continue to decrease to 80 persons by 1990 and to 40 persons by 2010. Most of the remaining industrial sectors in Musselshell County are expected to remain at about the same level through 2010. Some growth is expected in the retail trade, government, and services sectors. The growth associated with the services sector is a continuation of the demand for additional services. Similar growth occurred between 1970 and 1986, when total employment (excluding the services sector) grew 10 percent from 1,314 to 1,447 people and the services sector grew 79 percent from 250 to 448 persons (see table 3.6).

Total employment in Yellowstone County is projected to increase to 93,630 by the year 2010, representing a 32.1 percent increase over the 20-year projection period (table 3.9). This projected annual growth rate of 1.4 percent is much less than the historical 1970 to 1986 annual employment growth rate of 3.4 percent. Major increases are expected to occur in the services, finance, and retail trade sectors, whereas employment is projected to decline in the mining, manufacturing, and farming sectors.

Income

Income Characteristics

The average wages paid for all workers in Musselshell County was $242 per week in 1987 (table 3.10), or approximately 24 percent lower than the average wages for all workers in Montana. Within industry groups, the average wage in Musselshell County is less than the state average for corresponding groups, except for wages paid in the agricultural services sector. Since there are only 12 employees in the agricultural services sector, the higher wages have little impact on the county average. Federal government jobs pay the highest wages in Musselshell County followed by agricultural services and transportation jobs. The lowest paying jobs in Musselshell County are in the services and retail trade industries. Services sector jobs in Musselshell County pay 60.9 percent of the state average for services sector jobs.

TABLE 3.6

EMPLOYMENT BY INDUSTRY IN MUSSELSHELL COUNTY, 1970 AND 1980-1986

	1970	1980	1981	1982	1983	1984	1985	1986
Total Employment	1,564	1,944	2,109	2,047	1,950	1,931	1,936	1,895
Farm	350	332	347	353	363	353	346	350
Nonfarm	1,214	1,612	1,762	1,694	1,587	1,578	1,590	1,545
Private	997	1,349	1,454	1,389	1,299	1,289	1,307	1,264
Agriculture, Forestry, and Fisheries	36	31	30	37	36	31	32	32
Mining	192	278	342	282	195	154	143	106
Construction	49	75	65	92	88	94	94	96
Manufacturing	50	69	70	67	80	87	93	75
Transportation, Communications, and Public Utilities	48	92	99	76	70	65	69	72
Wholesale Trade	49	86	104	69	63	61	67	49
Retail Trade	260	331	334	334	328	335	318	316
Finance, Insurance, and Real Estate	63	74	76	72	71	73	73	70
Services	250	313	334	360	368	389	418	448
Government	217	263	308	305	288	289	283	281
Federal (civilian)	13	19	21	20	20	23	21	20
Federal (military)	28	26	21	21	24	26	25	27
State and Local	176	218	266	264	244	240	237	234

Source: U.S. Department of Commerce (1988a).

TABLE 3.7

EMPLOYMENT BY INDUSTRY IN YELLOWSTONE COUNTY, 1970 AND 1980-1986

	1970	1980	1981	1982	1983	1984	1985	1986
Total Employment	38,796	60,286	61,650	62,562	63,859	66,607	66,314	66,459
Farm	1,413	1,378	1,392	1,377	1,424	1,389	1,365	1,377
Non-farm	37,383	58,908	60,258	61,185	62,435	65,218	64,949	65,082
Private	31,079	51,017	52,509	53,367	54,391	56,857	56,973	56,780
Agriculture, Forestry, and Fisheries	231	445	503	498	552	583	517	514
Mining	523	783	1,090	1,088	1,030	1,184	976	842
Construction	2,195	3,523	3,433	3,679	4,129	4,343	4,362	4,175
Manufacturing	3,519	4,454	4,368	4,201	4,150	3,656	3,440	3,471
Transportation, Communications, and Public Utilities	3,191	4,865	4,829	4,820	4,686	5,015	5,104	4,967
Wholesale Trade	3,366	5,827	5,984	5,763	5,860	6,064	5,910	5,233
Retail Trade	7,370	12,231	12,190	12,635	12,625	13,222	13,048	13,056
Finance, Insurance, and Real Estate	2,468	4,414	4,820	4,780	4,972	5,294	5,546	5,728
Services	8,216	14,475	15,292	15,903	16,387	17,496	18,070	18,794
Government	6,304	7,891	7,749	7,818	8,044	8,361	7,976	8,302
Federal (civilian)	1,346	1,636	1,686	1,646	1,645	1,669	1,680	1,715
Federal (military)	732	679	538	535	631	660	658	708
State and Local	4,226	5,576	5,525	5,637	5,768	6,032	5,638	5,879

Source: U.S. Department of Commerce (1988a).

TABLE 3.8

ACTUAL AND PROJECTED EMPLOYMENT BY INDUSTRY FOR MUSSELSHELL COUNTY

	Actual	Projected				
	1986	1990	1995	2000	2005	2010
Total Employment	1,895	1,880	1,890	1,930	1,970	1,990
Farm	350	330	300	280	260	250
Non-farm	1,545	1,550	1,590	1,650	1,700	1,740
Private	1,264	1,250	1,290	1,340	1,380	1,410
Agriculture, Forestry, and Fisheries	32	30	30	30	30	30
Mining	106	80	60	50	40	40
Construction	96	110	110	120	120	130
Manufacturing	75	80	80	90	80	80
Transportation, Communications, & Public Utilities	72	70	70	70	70	70
Wholesale Trade	49	40	40	40	40	30
Retail Trade	316	310	320	340	350	350
Finance, Insurance, & Real Estate	70	60	60	60	60	60
Services	448	470	500	540	580	620
Government	281	290	300	310	320	330
Federal (civilian)	20	20	20	30	30	30
Federal (military)	27	30	30	30	30	30
State and Local	234	240	250	260	270	270

Source: National Planning Association Data Services, Inc. (1989).

Note: Data may not add to totals due to rounding.

TABLE 3.9

ACTUAL AND PROJECTED EMPLOYMENT BY INDUSTRY FOR YELLOWSTONE COUNTY

	Actual	Projected				
	1986	1990	1995	2000	2005	2010
Total Employment	66,459	70,860	77,840	84,240	89,750	93,630
Farm	1,377	1,300	1,190	1,110	1,040	960
Non-farm	65,082	69,550	76,650	83,130	88,710	92,670
Private	56,780	60,900	67,680	73,770	79,040	82,760
Agriculture, Forestry, and Fisheries	514	570	620	670	710	720
Mining	842	800	760	760	750	730
Construction	4,175	4,580	4,960	5,150	5,320	5,400
Manufacturing	3,471	3,420	3,300	3,190	3,050	2,860
Transportation, Communications, & Public Utilities	4,967	5,310	5,560	5,750	5,800	5,700
Wholesale Trade	5,233	5,520	5,940	6,250	6,460	6,510
Retail Trade	13,056	14,030	15,750	17,240	18,310	18,820
Finance, Insurance, & Real Estate	5,728	6,070	6,650	7,120	7,440	7,560
Services	18,794	20,610	24,150	27,650	31,210	34,470
Government	8,302	8,650	8,970	9,370	9,670	9,910
Federal (civilian)	1,715	1,810	1,930	2,040	2,140	2,230
Federal (military)	708	720	720	720	720	720
State and Local	5,879	6,120	6,320	6,610	6,820	6,960

Source: National Planning Association Data Services (1989).

Note: Data may not add to totals due to rounding.

TABLE 3.10

AVERAGE WEEKLY WAGES BY INDUSTRY — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES — 1987

	Montana Average Weekly Wage	Average Weekly Wage	Percent of State	Percent of County Average
Musselshell County				
All Industries	$316	$242	76.6	100.0
Federal Government	470	465	98.9	192.2
Agricultural Services	232	424	182.8	175.2
Transportation	445	387	87.0	159.9
State Government	387	367	94.8	151.7
Mining	561	358	63.8	147.9
Wholesale Trade	381	352	92.4	145.5
Finance, Insurance, & Real Estate	354	308	87.0	127.3
Construction	396	273	68.9	112.8
Local Government	324	261	80.6	107.9
Manufacturing	414	205	49.5	84.7
Services	266	162	60.9	66.9
Retail Trade	182	153	84.1	63.2
Yellowstone County				
All Industries	$316	$341	107.9	100.0
Federal Government	470	542	115.3	158.9
Agricultural Services	232	233	100.4	68.3
Transportation	445	451	101.4	132.3
State Government	387	364	94.1	106.7
Mining	561	596	106.2	174.8
Wholesale Trade	381	432	113.4	126.7
Finance, Insurance, & Real Estate	354	388	109.6	113.8
Construction	396	422	106.6	123.8
Local Government	324	348	107.4	102.1
Manufacturing	414	437	105.6	128.2
Services	266	328	123.3	96.2
Retail Trade	182	195	107.1	57.2

Source: Montana Department of Labor and Industry (1987).

The average wages paid in Yellowstone County are higher than the statewide average and higher than nearly all jobs in Musselshell County (agricultural services jobs being the exception). The only industry in Yellowstone County that pays less than the state average is state government, which pays 94.1 percent of the state average for state government jobs (table 3.10). The highest paying jobs in Yellowstone County are in the mining sector (including oil and gas exploration and services) which pay an average of $596 per week. Jobs in the mining sector also pay approximately 75 percent more than the average county job. Similar to Musselshell County and the state, the lowest paying jobs in Yellowstone County are in the agricultural services and the retail trade industries.

Per capita income for Musselshell County was $3,429 in 1970, or about 85 percent of the United States average and 97 percent of the state per capita income (table 3.11). With the increased oil and gas economic activity, per capita income in Musselshell County had increased to $9,454 by 1980, and had proportionally increased to 95 percent of the United States average income and 106 percent of the state average. However, by 1986, the per capita income in Musselshell County has declined to 74 percent of the United States average and 92 percent of the state average.

Until recent years, the per capita income in Yellowstone County has been near the United States average and consistently higher than the state average (table 3.11). However, by 1986, the per capita income of Yellowstone County was $13,019, or 89 percent of the United States average.

Income Conditions

Total current earnings in Musselshell County increased at an annual rate of 9.1 percent between 1970 and 1980 (table 3.12). Since 1980, however, total earnings have changed very little, declining from a high of $26.9 million in 1981 to $24.2 million by 1986. The most significant decline in earnings occurred in the mining industry, decreasing 71 percent from a high of $8.0 million in 1981 to $2.3 million by 1986. The wholesale trade industry also experienced a 53.8 percent decline in earnings ($2.3 million in 1981 to $1.1 million by 1986), while earnings in the transportation industry decreased 7.1 percent. Earnings in the services sector and government have shown the largest increases between 1980 and 1986.

Major sources for earnings in Musselshell County are, in order of importance, the services sector, the government sector, the

TABLE 3.11

PER CAPITA INCOME — UNITED STATES, STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES — 1970 AND 1980-1986

			Musselshell County			Yellowstone County		
Year	United States	Montana	Amount	Percent of United States	Percent of Montana	Amount	Percent of United States	Percent of Montana
1970	$ 4,051	$ 3,528	$ 3,429	84.7	97.2	$ 3,624	89.5	102.7
1980	9,919	8,924	9,454	95.3	105.9	10,198	102.8	114.3
1981	10,949	9,874	10,573	96.6	107.1	11,110	101.5	112.5
1982	11,480	10,084	10,347	90.1	102.6	11,719	102.1	116.2
1983	12,098	10,424	10,040	83.0	96.3	12,085	99.9	115.9
1984	13,114	10,836	9,901	75.5	91.4	12,584	96.0	116.1
1985	13,895	11,021	9,933	71.5	90.1	12,735	91.7	115.6
1986	14,606	11,726	10,827	74.1	92.3	13,019	89.1	111.0

Source: U.S. Department of Commerce (1988a).

retail trade sector, the mining industry (including oil and gas exploration and services), and the transportation and utilities sector. Government earnings totalled $4.2 million in 1986, comprising 17.5 percent of total earnings. Farm earnings rebounded from a net loss in 1985 of $186,000 to a high of $3.8 million by 1986 (table 3.12).

Total current earnings in Yellowstone County increased at an annual rate of 11 percent between 1970 and 1980 (table 3.13), but since 1980, earnings have grown at a much smaller rate of 4 percent. In fact, between 1983 and 1986, total earnings in Yellowstone County grew only 8 percent—less than the 1970-1980 annual growth rate. Earnings in Yellowstone County are dominated by the services sector which comprised over 24 percent of all earnings in the county in 1986. Government earnings usually make up approximately 13 percent of all earnings, while farm earnings typically account for about 1 percent of total earnings.

Baseline Income Projections

Earnings for Musselshell and Yellowstone Counties were projected by NPA (see appendix 7 for methodology). Total earnings (1982 dollars) for Musselshell County are projected to grow at an annual rate of 2.6 percent between 1990 and 2010 (table 3.14). This growth is attributable to increased productivity and is slightly less than the 1970 to 1980 growth rates of 3.1 percent for earnings (1982 dollars). Most of the growth is projected to occur in the private sector. Specifically, the services industry, which is one of the few sectors with a projected increase in employment, is expected to increase from $4.8 million in 1990 to $10.4 million by 2010. Government earnings are projected to increase 53 percent over the projection period, while farm earnings are expected to increase marginally from $4.2 million in 1990 to $4.9 million by year 2010.

TABLE 3.12

EARNINGS BY MAJOR SOURCE, MUSSELSHELL COUNTY, 1970 AND 1980-1986 (In Current Dollars)

	1970	1980	1981	1982	1983	1984	1985	1986
Total Earnings	$8,981	$23,470	$26,882	$24,306	$22,671	$21,861	$21,463	$24,204
Farm	1,817	1,723	2,589	1,143	431	364	(186)	3,771
Non-farm	7,164	21,747	24,293	23,163	22,240	21,497	21,649	20,433
Private	6,281	19,146	21,246	19,787	18,551	17,473	17,450	16,188
Agriculture, Forestry, & Fisheries	169	252	242	267	492	411	374	516
Mining	1,621	6,468	7,971	7,551	5,392	3,594	3,224	2,287
Construction	269	1,088	888	986	1,111	1,187	1,305	1,334
Manufacturing	153	331	345	352	571	781	812	525
Transportation, Communications, & Public Utilities	677	2,055	2,327	2,251	2,074	2,324	2,288	2,161
Wholesale Trade	547	2,175	2,344	1,403	1,248	1,234	1,441	1,084
Retail Trade	1,140	2,462	2,644	2,781	3,065	3,024	2,846	2,855
Finance, Insurance, & Real Estate	295	916	942	896	971	959	968	990
Services	1,410	3,399	3,543	3,300	3,627	3,959	4,192	4,436
Government	883	2,601	3,047	3,376	3,689	4,024	4,199	4,245
Federal (civilian)	102	304	417	428	461	528	517	512
Federal (military)	31	76	74	83	109	122	129	149
State and Local	750	2,221	2,556	2,865	3,119	3,374	3,553	3,584

Source: U.S. Department of Commerce (1988).

Note: Data may not add to totals due to rounding.

TABLE 3.13

EARNINGS BY MAJOR SOURCE, YELLOWSTONE COUNTY — 1970 AND 1980-1986 (In Current Dollars)

	1970	1980	1981	1982	1983	1984	1985	1986
Total Earnings	$271,790	$862,410	$928,513	$994,033	$1,056,145	$1,118,312	$1,135,086	$1,140,455
Farm	13,752	6,962	2,113	2,888	4,210	5,354	4,248	13,990
Non-farm	258,038	855,448	926,400	991,145	1,051,935	1,112,958	1,130,838	1,126,465
Private	219,456	751,603	813,498	868,688	918,108	970,104	985,410	970,664
Agriculture, Forestry, & Fisheries	1,333	4,325	4,926	5,446	6,494	6,187	4,869	4,837
Mining	4,174	16,635	26,836	30,128	29,758	36,241	31,638	26,508
Construction	19,971	74,866	71,635	77,807	86,592	87,968	93,834	90,684
Manufacturing	33,048	93,343	104,779	106,418	105,575	99,516	95,580	97,023
Transportation, Communications, & Public Utilities	30,453	106,192	116,949	126,753	128,256	138,477	139,517	135,006
Wholesale Trade	28,715	114,295	125,643	127,028	132,617	143,148	141,059	128,424
Retail Trade	38,761	116,029	121,940	131,407	139,889	145,765	145,545	143,614
Finance, Insurance, & Real Estate	13,272	42,852	47,229	48,427	54,549	57,090	61,642	65,964
Services	49,729	183,066	193,561	215,274	234,378	255,712	271,726	278,604
Government	38,582	103,845	112,902	122,457	133,827	142,854	145,428	155,801
Federal (civilian)	13,487	33,570	37,989	39,526	42,773	45,412	48,106	48,016
Federal (military)	1,186	2,255	2,166	2,556	3,155	3,418	3,487	3,979
State and Local	23,909	68,020	72,747	80,375	87,899	94,024	93,835	103,806

Source: U.S. Department of Commerce (1988).

TABLE 3.14

EARNINGS BY INDUSTRY IN MUSSELSHELL COUNTY — 1990-2010 (Thousands of 1982 Dollars)

	1990	1995	2000	2005	2010
Total Earnings	$23,690	$26,840	$30,670	$34,910	$39,940
Farm	4,200	4,440	4,560	4,730	4,940
Non-farm	19,490	22,400	26,110	30,180	35,000
Private	15,520	17,960	21,130	24,630	28,930
Agriculture, Forestry, and Fisheries	460	490	550	590	650
Mining	1,650	1,470	1,460	1,500	1,600
Construction	1,370	1,800	2,270	2,810	3,420
Manufacturing	590	920	1,320	1,730	2,140
Transportation, Communications, & Public Utilities	1,990	2,180	2,400	2,610	2,830
Wholesale Trade	880	910	980	1,040	1,160
Retail Trade	2,810	3,310	3,910	4,570	5,290
Finance, Insurance, & Real Estate	910	1,030	1,160	1,320	1,490
Services	4,870	5,840	7,080	8,470	10,350
Government	3,970	4,450	4,980	5,550	6,070
Federal (civilian)	500	560	620	690	730
Federal (military)	150	180	210	240	280
State and Local	3,320	3,710	4,150	4,620	5,060

Source: National Planning Association Data Services, Inc. (1989).

Note: Data may not add to totals due to rounding.

In Yellowstone County, earnings are expected to nearly double over the 20 year projection period, increasing from $1.16 billion in 1990 to $2.04 billion by year 2010 (table 3.15). Major increases in earnings are expected to occur in the services sector and, to a lesser extent, in the retail trade and public utilities sectors. Government earnings are projected to increase 41 percent over the projection period, whereas farm earnings are expected to increase 20 percent over the 20 year period.

Fiscal Conditions

The following sections describe the fiscal conditions of Musselshell County, the municipality of Roundup, the elementary and high school districts in Roundup, Yellowstone County, and the city of Billings. Fiscal conditions for each local governmental unit are presented in terms of public service funding and expenditures.

TABLE 3.15

EARNINGS BY INDUSTRY IN YELLOWSTONE COUNTY — 1990-2010 (Thousands of 1982 Dollars)

	1990	1995	2000	2005	2010
Total Earnings	$1,159,820	$1,402,370	$1,671,530	$1,970,130	$2,305,650
Farm	15,700	16,730	17,310	18,060	18,930
Non-farm	1,144,120	1,385,640	1,654,220	1,952,070	2,286,720
Private	999,850	1,227,120	1,480,870	1,763,380	2,083,260
Agriculture, Forestry, & Fisheries	4,950	6,220	7,900	9,630	11,440
Mining	24,090	25,370	27,930	30,770	33,780
Construction	90,300	109,650	127,850	148,450	171,910
Manufacturing	86,750	92,270	98,180	103,670	108,920
Transportation, Communications, & Public Utilities	133,480	156,080	179,650	202,420	224,930
Wholesale Trade	124,920	150,080	176,240	203,140	231,120
Retail Trade	152,180	188,080	227,330	267,400	309,080
Finance, Insurance, & Real Estate	69,870	91,020	114,820	140,620	168,640
Services	313,310	408,360	520,970	657,270	823,440
Government	144,260	158,520	173,360	188,690	203,460
Federal (civilian)	44,710	48,590	52,130	55,500	58,850
Federal (military)	4,040	4,790	5,610	6,480	7,380
State and Local	95,510	105,140	115,610	126,710	137,230

Source: National Planning Association Data Services, Inc. (1989).

Note: Data may not add to totals due to rounding.

In Montana, the most important component of public service funding for local governmental units is property taxation. Depending upon the class of property and its taxable valuation, local governments have the flexibility to set revenues by attaching mill levies for specified purposes. They are limited, however, by current law to not raise more funding than prior years if no growth has occurred. Other sources of revenue for local governments include licenses and permits, intergovernmental transfers from state and federal governments, fines and forfeitures, charges for services, and other miscellaneous sources.

Counties

Table 3.16 lists the taxable valuation, mill levies, revenues, and expenditures for Musselshell County for fiscal year (FY) 1982 and FY 1987. The taxable valuation in Musselshell County has changed very little over the five-year period; however, mill levies have increased over 50 percent. Musselshell County general fund revenues from property taxes increased 61.2 percent from $365,644 to $589,514 between 1982 and 1987, while general fund revenues from other sources increased 24 percent.

Total taxable valuation in Yellowstone County decreased from $227.7 million in FY 1987 to $210.5 million by FY 1988, representing a decrease of 7.6 percent in one year (table 3.17). Most of this decline was attributable to decreasing values on land and improvements and reduced valuation on centrally assessed utilities. In FY 1988, land and improvements comprised about 63 percent of all taxable valuation followed by centrally assessed utilities (19 percent) and personal property (18 percent). Mill levies in Yellowstone County have increased from 69.3 mills in FY 1986 to 74.14 mills by FY 1988. General fund mills usually total about 30 percent of all levies, while mills for welfare (poor fund) usually average about 14 percent of all county levies.

Total revenues for Yellowstone County increased from about $22 million in FY 1986 to $22.7 million by FY 1988 (table 3.17). Approximately 60 percent of all revenues are raised through property taxes and about 15 percent are obtained through intergovernmental transfers. Total expenditures for Yellowstone County decreased from $26.4 million in FY 1986 to $20.6 million by FY 1988. During this time period, expenditures for general government declined by over $450,000. General fund revenues and expenditures both increased from FY 1986 to FY 1988. In terms of real per capita expenditures, costs for general fund spending have remained about the same.

TABLE 3.16

LOCAL GOVERNMENT FINANCES — MUSSELSHELL COUNTY

	1981-82	1986-87	Percent Change
Taxable Valuation ($000)	$24,029	$23,788	-1.0
Mill Levy	30.47	48.28	58.5
General Fund Revenues			
Property	$365,644	$589,514	61.2
Other	406,912	504,388	24.0
General Fund Expenditures			
General Government	$283,334	$715,832	152.7
Other	315,161	464,943	47.5
Per Capita General Fund Expenditures	$136	$256	88.2

Source: Montana Department of Commerce.

Note: Only limited fiscal data are available for Musselshell County.

TABLE 3.17

LOCAL GOVERNMENT FINANCES — YELLOWSTONE COUNTY

	1985-86		1986-87		1987-88	
	Amount	Percent	Amount	Percent	Amount	Percent
Taxable Valuation ($000)	$223,301.9	100.0	$227,726.8	100.0	$210,534.5	100.0
Land & Improvements	141,348.5	63.3	140,170.9	61.6	132,714.6	63.0
Centrally Assessed Property	45,787.4	20.5	47,909.7	21.0	40,514.3	19.2
Personal Property	36,166.0	16.2	39,646.2	17.4	37,305.6	17.7
Mill Levies	69.30	100.0	72.18	100.0	74.14	100.0
General Fund	19.90	28.7	18.80	26.0	22.10	29.8
Poor	9.00	13.0	11.10	15.4	10.60	14.3
Other	40.40	58.3	42.28	58.6	41.44	55.9
All Revenues	$21,989,913	100.0	$21,285,301	100.0	$22,714,567	100.0
Property Taxes	10,889,036	49.5	11,171,843	52.5	14,053,527	61.9
Transfers	3,784,190	17.2	4,081,780	19.2	3,228,810	14.2
Other	7,316,687	33.3	6,031,678	28.3	5,432,230	23.9
All Expenditures	$26,399,685	100.0	$23,725,651	100.0	$20,579,494	100.0
General Government	5,176,939	19.6	4,881,260	20.6	4,719,932	22.9
Public Safety	2,970,308	11.3	3,147,309	13.3	4,366,142	21.2
Public Works	3,264,893	12.4	2,675,968	11.3	2,682,949	13.0
Public Health	2,249,915	8.5	2,079,444	8.8	2,000,208	9.7
Other	12,737,630	48.2	10,941,670	46.1	6,810,263	33.1
Population	120,600		120,000		118,000	
Real Per Capita Expenditures	$219		$198		$174	
General Fund Statistics						
Revenues	$ 7,342,726		$ 6,317,316		$ 7,677,446	
Expenditures	6,561,300		6,386,700		6,959,632	
Per Capita Expenditures	54		53		59	
Expenditures (1987 Dollars)	6,933,028		6,577,014		6,959,632	
Per Capita Expenditures (1987 Dollars)	61		56		59	

Sources: Montana Tax Foundation, Inc.; Montana Department of Commerce.

Municipalities

The taxable valuation for Roundup declined from $1.7 million in FY 1986 to $1.5 million by FY 1988 (table 3.18). The taxable valuation on land and improvements during this same time period declined by over $100,000, while personal property valuation decreased by $78,000. Mill levies also decreased between FY 1986 and FY 1988, representing an effort to tighten the budget of Roundup. General fund revenues and expenditures both decreased between FY 1986 and FY 1988. On a per capita basis, the decrease in expenditures was slight, declining from $89 per person in FY 1986 to $82 per person by FY 1988.

The taxable valuation for Billings declined 7 percent from FY 1986 to FY 1988 (table 3.19). Land and improvements, which usually comprise about 80 percent of total taxable valuation, decreased from $104.5 million in FY 1986 to $98.2 million by FY 1988. Total mill levies remained constant over the period, while mills for general fund purposes increased marginally from 66.27 to 68.57 mills. Although total revenues for Billings decreased between FY 1986 and FY 1988, general fund revenues remained fairly constant. Total expenditures were $40.8 million in FY 1986, $45.2 million in FY 1987, and $40.1 million in FY 1988.

General fund expenditures increased somewhat; however, per capita general fund expenditures decreased from $213 per person in FY 1986 to $199 per person by FY 1988.

School Districts

Financial information on school districts in Musselshell County is presented for the elementary and high school districts of Roundup. No financial information is presented for Yellowstone County school districts because only minor impacts are expected for these school districts. The data presented in this section was collected from annual trustee reports submitted to the Montana Office of Public Instruction and from the Montana Tax Foundation, Inc., a private nonprofit corporation in Helena, Montana.

Taxable valuation for Roundup Elementary School District has remained stable since FY 1986, and taxable valuation for the high school district has decreased 10.3 percent between 1986 and 1988 (table 3.20). District mill rates have declined by nearly 50 percent from 58.2 mills in FY 1986 to 33.18 mills by FY 1988. Of the total district levies, approximately 47 percent are for the elementary general fund, 16 percent for transportation, and 33 percent for high school purposes.

TABLE 3.18

LOCAL GOVERNMENT FINANCES — ROUNDUP

	1985-86		1986-87		1987-88	
	Amount	Percent	Amount	Percent	Amount	Percent
Taxable Valuation ($000)	$1,726.9	100.0	$1,687.1	100.0	$1,543.2	100.0
Land & Improvements	1,267.7	73.4	1,250.6	74.1	1,159.9	75.2
Centrally Assessed Property	214.9	12.4	226.9	13.4	217.1	14.1
Personal Property	244.3	14.1	209.6	12.4	166.2	10.8
Mill Levies	75.00	100.0	66.00	100.0	66.00	100.0
General Fund	65.00	86.7	59.00	89.4	56.00	84.8
Streets	.00	.0	.00	.0	.00	.0
Other	10.00	13.3	7.00	10.6	10.00	15.2
All Revenues	$425,918	100.0	$553,686	100.0	$582,414	100.0
Property Taxes	198,716	46.7	272,325	49.2	197,782	34.0
Transfers	110,219	25.9	136,827	24.7	135,926	23.3
Other	116,983	27.5	144,534	26.1	248,706	42.7
All Expenditures	$327,619	100.0	$593,503	100.0	$609,724	100.0
General Government	49,136	15.0	80,773	13.6	89,879	14.7
Public Safety	90,776	27.7	200,466	33.8	205,656	33.7
Public Works	96,528	29.5	264,831	44.6	268,213	44.0
Other	91,179	27.8	47,433	8.0	45,976	7.5
Population	2,450		2,580		2,400	
General Fund Revenues	$243,392	57.1	$190,216	34.4	$199,583	34.3
General Fund Expenditures	$217,510	66.4	$213,125	35.9	$196,595	32.2
Per Capita						
Total Expenditures	$134		$230		$254	
General Fund Revenues	99		74		83	
General Fund Expenditures	89		83		82	

Sources: Montana Tax Foundation, Inc.; Montana Department of Commerce.

Elementary school revenues increased from $1.1 million in school year 1985/1986 to $1.5 million by school year 1987/1988. In 1987/1988, district levies accounted for 13 percent of the budget and county levies for 30 percent.

Statewide levies, including the school foundation program, accounted for nearly one-half of all revenues. Total elementary expenditures also have increased since 1986, with general fund expenditures accounting for most of the increase. In 1987/1988, debt service totalled less than 1 percent of all expenditures. Similar to the elementary school district, the high school district revenues have increased by over one-third since 1985/1986. District levies at the high school in 1987/1988, accounted for 28 percent of total revenues, county-wide levies for 21 percent, and state levies and the school foundation program accounted for 44 percent. Total expenditures at the high school also increased between 1985/1986 and 1987/1988 from $0.8 million to $1.1 million. General fund expenditures in 1987/1988, made up about three-fourths of the budget and spending on transportation accounted for about 6 percent. The cost to the high school district for retirement was approximately 10 percent of the budget.

Social Environment

Definition of Social Study Area

The study area encompasses southern Musselshell County (including the community of Roundup) and the northern portion of Yellowstone County (excluding, for the most part, towns and cities). Major emphasis in the description of the social environment has been placed on Musselshell County and Roundup, since the number of people expected to migrate into the area could be easily absorbed into a city the size of Billings. However, due to increased traffic on U.S. Highway 87 and Highway 312 (Huntley Road) as a result of the project, emergency services in Billings have been addressed.

Demography

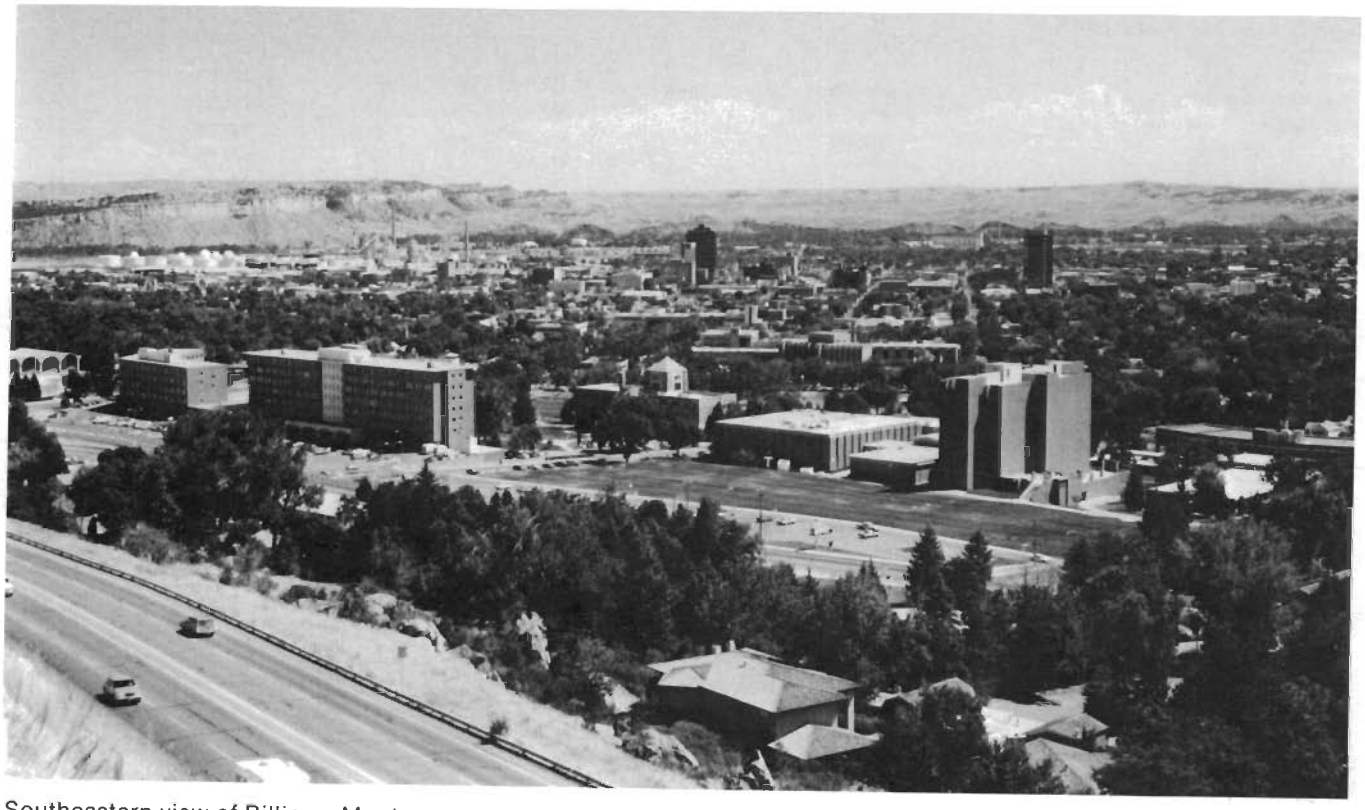
The U.S. Bureau of the Census (1980) reported the population of Musselshell County to be 4,428 persons, an increase of 18.6 percent over the 1970 census count of 3,734 (table 3.21). Most of this increase occurred in the rural part of the county, with the

TABLE 3.19

LOCAL GOVERNMENT FINANCES — BILLINGS

	1985-86		1986-87		1987-88	
	Amount	Percent	Amount	Percent	Amount	Percent
Taxable Valuation ($000)	$132,181.9	100.0	$130,424.6	100.0	$123,083.3	100.0
Land & Improvements	104,460.6	79.0	103,157.4	79.1	98,227.7	79.8
Centrally Assessed Property	11,863.1	9.0	13,039.4	10.0	11,052.2	9.0
Personal Property	15,858.2	12.0	14,227.8	10.9	13,803.4	11.2
Mill Levies	81.40	100.0	81.40	100.0	81.40	100.0
General Fund	66.27	81.4	66.48	81.7	68.57	84.2
Streets	.00	.0	.00	.0	.00	.0
Other	15.13	18.6	14.92	18.3	12.83	15.8
All Revenues	$42,858,545	100.0	$37,591,517	100.0	$39,799,617	100.0
Property Taxes	12,881,911	30.1	12,048,563	32.1	14,393,919	36.2
Transfers	5,324,288	12.4	4,297,527	11.4	3,829,772	9.6
Other	24,652,346	57.5	21,245,427	56.5	21,575,926	54.2
All Expenditures	$40,821,489	100.0	$45,241,463	100.0	$40,077,625	100.0
General Government	2,218,251	5.4	2,331,237	5.2	2,493,905	6.2
Public Safety	8,726,681	21.4	9,011,378	19.9	9,065,891	22.6
Public Works	3,708,854	9.1	3,894,232	8.6	3,799,547	9.5
Other	26,167,703	64.1	30,004,616	66.3	24,718,282	61.7
Population	70,500		80,310		80,000	
General Fund Revenues	$16,117,809		$15,094,955		$16,877,574	
General Fund Expenditures	$15,048,140		$15,194,254		$15,915,852	
Per Capita						
Total Expenditures	$579		$563		$501	
General Fund Revenues	229		188		211	
General Fund Expenditures	213		189		199	

Sources: Montana Tax Foundation, Inc.; Montana Department of Commerce.



Southeastern view of Billings, Montana.

TABLE 3.20

LOCAL GOVERNMENT FINANCES — ROUNDUP SCHOOL DISTRICT

	1985-86		1986-87		1987-88	
	Amount	Percent	Amount	Percent	Amount	Percent
Taxable Valuation ($000)						
Elementary District	$11,845.0		$11,253.8		$11,093.4	
High School District	16,280.7		16,180.6		14,606.4	
Mill Levies						
Countywide Levies	49.92	100.0	55.42	100.0	56.98	100.0
High School General	19.44	38.9	22.18	40.0	22.82	40.0
School General	30.48	61.1	33.24	60.0	34.16	60.0
District Levies	58.20	100.0	41.22	100.0	33.18	100.0
General Fund	23.21	39.9	14.57	35.3	15.64	47.1
Transportation	7.62	13.1	2.19	5.3	5.24	15.8
High School	24.74	42.5	22.05	53.5	10.89	32.8
Other	2.63	4.5	2.41	5.8	1.41	4.2
Elementary District Financial Data						
ANB	530		624		478	
All Revenues	$1,122,434	100.0	$1,477,451	100.0	$1,528,437	100.0
General Fund Revenues	737,521	65.7	1,068,556	72.3	1,061,988	69.5
District Levies	631,028	85.6	158,423	14.8	142,120	13.4
County Funds	0	.0	742,875	69.5	324,314	30.5
State Funds	98,957	13.4	125,893	11.8	528,100	49.7
Other Funds	7,536	1.0	41,365	3.9	67,454	6.4
All Expenditures	$1,050,458	100.0	$1,555,753	100.0	$1,444,724	100.0
General Fund	697,476	66.4	1,116,562	71.8	1,051,415	72.8
Transportation	87,949	8.4	82,397	5.3	62,803	4.3
Retirement	82,081	7.8	138,868	8.9	136,260	9.4
Debt Service	17,160	1.6	14,581	.9	12,861	.9
Other	165,792	15.8	203,345	13.1	181,385	12.6
Per ANB Expenditures	$1,982		$2,493		$3,022	
High School District Financial Data						
ANB	186		171		242	
All Revenues	$894,575	100.0	$1,113,944	100.0	$1,235,276	100.0
General Fund Revenues	655,640	73.3	807,966	72.5	857,086	69.4
District Levies	567,145	86.5	279,390	34.6	238,775	27.9
County Funds	0	.0	412,530	51.1	179,664	21.0
State Funds	73,098	11.1	74,431	9.2	378,726	44.2
Other Funds	31,577	4.8	41,615	5.2	59,921	7.0
All Expenditures	$777,741	100.0	$1,138,906	100.0	$1,094,278	100.0
General Fund	577,397	74.2	829,505	72.8	823,322	75.2
Transportation	88,366	11.4	92,098	8.1	60,952	5.6
Retirement	58,218	7.5	102,070	9.0	107,266	9.8
Debt Service	33,470	4.3	28,872	2.5	25,501	2.3
Other	47,089	6.1	86,361	7.6	77,237	7.1
Per ANB Expenditures	$4,181		$6,660		$4,522	

Sources: Montana Tax Foundation, Inc.; Montana Department of Commerce.

population of Roundup remaining at about the 1970 level. Since 1980, the rural population has decreased, while Roundup's population has increased about 13.3 percent.

The population of Yellowstone County increased 29.6 percent from 83,367 in 1970 to 108,035 in 1980. Between 1980 and 1987, the population increased by 10,000 people, or approximately 9 percent (table 3.21). The city of Billings increased 8.5 percent between 1970 and 1980, and since 1980, the population has increased almost 20 percent.

County population projections were developed by NPA from 1990 to year 2010 (see appendix 7 for methodology). Based on these population projections, Musselshell County is expected to increase in population through the 20 year projection period, reaching 5,000 by year 2010 (table 3.21). The projections for Musselshell County are indicative of some net out-migration over the projection period since natural increase is usually 20 to 30 persons per year. For example, from 1978 through 1987, there were 689 births and 482 deaths or an expected natural increase of 247 persons or 24.7 persons per year. Yellowstone County is projected to increase in population by about 19 percent during the 20 year period (1990 to 2010), reaching a high of 144,440 people by year 2010.

The population projections illustrated in table 3.21 for Roundup and Billings were developed using 1987 city to county population ratios and applying these ratios to the county projections. Thus, the projected growth rates for Roundup and Billings are similar to the county rates.

The number of persons per square mile in Musselshell County in 1980 was 2.4 compared to the state average of 5.4 (U.S. Department of Commerce 1980). All of the population of Musselshell County was categorized as rural and over 99 percent of the population was classified as white (table 3.22). In Yellowstone County, the number of persons per square mile was 41.2, with 95.8 percent classified as white. Approximately one-half of the 4.2 percent minority population in Yellowstone County were native Americans.

The number of persons per family in the study area was about equal to the state average in 1980, while the age characteristics differed somewhat (table 3.22). In Musselshell County, about 17 percent of the people were 65 years old and over compared to the state average of about 12 percent. The median age of females and males in Musselshell County was 33.3 years and 32.0 years, respectively, slightly higher than the median age of the state (29.6 years for females and 28.4 years for males).

Per capita personal income within the study area differs markedly by location. In Yellowstone County, the 1986 per capita personal income was estimated to be $13,019, a figure 10 percent higher than the state average and about 20 percent higher than the Musselshell County average of $10,827. Similarly, educational attainment, measured by percent of population (18 years old and over) completing 12 years of school, was higher in Yellowstone County than in both Musselshell County and the state in 1980. These differences are not unusual in that urbanized areas tend to pay higher wages and employment requirements tend to require more educational attainment than in rural areas.

Number of live births by residence per 1,000 population in Musselshell County was lower than that reported for both the state and Yellowstone County in 1987 (table 3.23). Conversely, number of deaths by residence per 1,000 population was higher in Musselshell County relative to both the state and Yellowstone County. The higher death rate may be due to the larger number of elderly people residing within Musselshell County.

Nationwide, the two leading causes of death are cancer and heart disease. Musselshell County in 1987, reported almost twice as many deaths per 1,000 population due to cancer and heart disease as did Montana and Yellowstone County (table 3.23).

Social Life

BLM has adopted the *Guide to Social Assessment* (Branch et al. 1982) to assist in predicting social consequences of coal development in the Powder River Coal Production Region. Since Musselshell County is included in the Powder River Coal Production Region, social conditions of the study area have been examined using the methodology developed in the Guide.

Social elements of a community are greatly influenced by past events. To understand the present characteristics of a community's social life, past ethnic, economic, and cultural features were examined. Historical events and social processes of the Roundup area have been discussed as they relate to values and life-styles of the current residents.

The social organization, community resources, and perceived well-being of the population also were assessed to describe the social characteristics of Roundup and the surrounding area. These components form the basis for describing how the proposed project would affect the community and individuals within the community.

TABLE 3.21

HISTORICAL AND PROJECTED POPULATION — MUSSELSHELL AND YELLOWSTONE COUNTIES ROUNDUP AND BILLINGS

	Musselshell County	Roundup	Yellowstone County	Billings
Census				
1940	5,717	2,644	41,182	23,261
1950	5,408	2,856	55,875	31,834
1960	4,888	2,842	79,016	52,851
1970	3,734	2,116	83,367	61,581
1980	4,428	2,119	108,035	66,842
Estimates				
1981	4,600	2,150	110,200	67,000
1982	4,600	2,261	113,500	68,787
1983	4,700	2,300	116,400	69,000
1984	4,700	2,342	118,700	69,836
1985	4,800	2,450	120,600	70,500
1986	4,700	2,580	120,000	80,310
1987	4,500	2,400	118,000	80,000
Projections				
1990	4,550	2,550	121,240	81,070
1995	4,670	2,620	128,110	85,670
2000	4,780	2,680	134,200	89,740
2005	4,890	2,740	139,640	93,380
2010	5,000	2,800	144,440	96,590

Sources: U.S. Department of Commerce (1940-1980); National Planning Association Data Services, Inc. (1989).

Note: The 1986 estimate for Billings includes the annexation of the Billings Heights area.

TABLE 3.22

SELECTED DEMOGRAPHIC CHARACTERISTICS — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES, ROUNDUP AND BILLINGS

	Montana	Musselshell County	Roundup	Yellowstone County	Billings
Population (1980)	786,690	4,428	2,119	108,035	66,842
Female (1980)	50.1%	49.7%	51.4%	51.0%	51.8%
Under 18 Years	28.6%	28.9%	24.5%	27.9%	24.6%
18 to 64 Years	59.3%	54.2%	51.2%	61.6%	62.8%
65 Years and Over	12.1%	16.9%	24.3%	10.5%	12.6%
Median Age	29.6 Years	33.3 Years	NA	29.1 Years	NA
Male (1980)	49.9%	50.3%	48.6%	49.0%	48.2%
Under 18 Years	30.3%	30.4%	25.5%	30.7%	28.0%
18 to 64 Years	60.3%	55.0%	55.8%	61.6%	63.1%
65 Years and Over	9.4%	14.6%	18.7%	7.7%	8.9%
Median Age	28.4 Years	32.0 Years	NA	28.0 Years	NA
Households (1980)	283,742	1,698	922	39,891	26,253
Persons Per Household	2.70	2.60	2.30	2.66	2.54
Persons Per Family	3.24	3.17	3.51	3.20	3.80
Race (1980)					
White	94.1%	99.3%	99.4%	95.8%	95.4%
Native American	4.7%	0.3%	0.5%	2.1%	2.4%
Other	1.2%	0.4%	0.1%	2.1%	2.2%
Percent Completing 12 Years or More of School (1980)	75.4%	65.9%	NA	77.3%	NA
Median Family Income (1979)	$18,413	$14,094	$15,682	$20,744	$20,989
Families Below Poverty Level (1979)	9.2%	15.1%	8.4%	7.1%	7.3%

Sources: Montana Department of Commerce (1985); U.S. Department of Commerce (1980).

NA = Not Available

TABLE 3.23

SELECTED VITAL STATISTICS — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES

Characteristics (per 1,000 population)	State of Montana			Musselshell County			Yellowstone County		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
Live Births by Residence	16.3	15.6	15.1	11.9	8.9	10.4	15.9	15.5	14.5
Deaths[1] by Residence	8.1	8.2	8.2	11.0	8.3	11.6	6.9	6.6	6.4
Marriage Licenses Issued	8.7	8.2	8.1	6.7	5.7	4.9	9.6	8.9	8.2
Marital Dissolutions Granted	5.1	5.2	5.0	4.8	3.0	3.6	5.8	6.0	5.5
Out-of-Wedlock Births by Residence	2.7	2.8	2.9	1.7	0.9	1.6	2.4	2.2	2.3
Induced Abortions by Residence	4.0	4.0	3.9	2.3	1.7	2.0	4.0	3.9	3.9
Two Leading Causes of Death by Residence									
— Cancer	1.7	1.8	1.9	2.9	2.6	3.8	1.7	1.7	1.7
— Heart Disease	2.7	2.7	2.6	4.6	1.9	4.4	2.2	2.0	2.1

Source: Montana Department of Health and Environmental Sciences (1986, 1987, and 1988).

[1]Exclusive of fetal deaths.

The social organization of the community is defined by how people of the community relate to each other based on shared ideas and expectations. Ethnic, political, and religious ties are important factors in determining patterns and forms of social interaction. According to Branch et al. (1982), the following five characteristics of social organization are also important in assessing social change within communities:

(1) Diversity and complexity
(2) Outside ties (extra-local linkages)
(3) Distribution of resources and power
(4) Coordination and cooperation among community members
(5) Patterns of social interaction

Community resources include social services (hospitals, schools, housing) as well as community attitudes and experience developed over time (Branch et al. 1982). Important determinants of community resources of the area also are based upon:

(1) Previous experience of the community with development (coal mining and oil and gas activities)
(2) Cultural characteristics of the community
(3) Demographic characteristics of the community
(4) Labor force characteristics of the community
(5) Employment and income characteristics of the community
(6) Facilities, services, and fiscal resources
(7) Organizational and regulatory structure of the community
(8) Leadership characteristics of the community

(9) Residents' attitudes toward development and perceptions of the community

The social well-being of the study area was assessed by examining the rates of behaviors such as crime, divorce, and welfare. Behaviors and attitudes concerning access to community resources or perceived lack of access to resources also are addressed.

Information on current social life conditions in the area was obtained through both quantitative and qualitative research methods. Published and unpublished reports were reviewed and news articles in local newspapers (*Roundup Record-Tribune* and *Bull Sheet*) were examined.

Quality of life surveys were conducted with residents in the Roundup and the Bull Mountains areas. A description of the procedures used in conducting the interviews and the survey instrument are presented in appendix 8. A total of 140 telephone interviews were completed, and survey results were analyzed and are presented for the following two groups:

(1) Roundup area residents: Interviews were conducted with 99, randomly selected individuals residing in and around Roundup.
(2) Bull Mountains residents: Forty-one people who reside within five miles of the PM Coal Mine were interviewed.

Bull Mountains residents were analyzed separately because they would be the group most likely to experience adverse impacts because of their proximity to the proposed mine. An on-site, unstructured interview was also conducted with a group of three Bull Mountains residents.

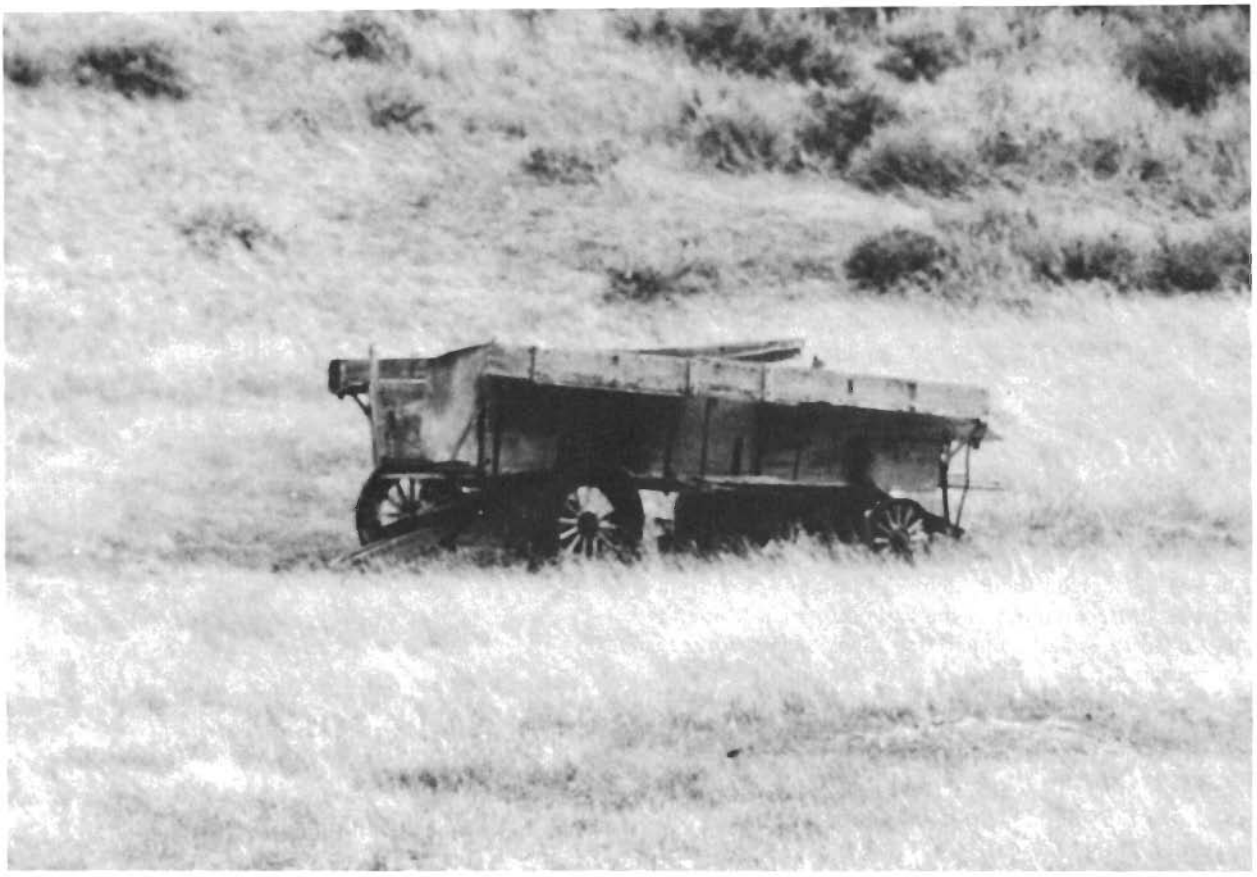
The Montana Energy and MHD Research and Development Institute, Inc. (MERDI), under contract to the Montana Power Company, conducted a telephone survey of Musselshell residents concerning development of a thermal electric generation facility in 1979. Attitudes and opinions of residents concerning growth and development in the area were similar to those obtained in the 1989 quality of life interviews conducted by Economic Consultants Northwest.

History

The social and economic character of Roundup and the surrounding area has evolved in conjunction with the development of the livestock and hydrocarbon industries. Ranching, coal mining, and oil production historically have been the dominant sources of employment and income for Roundup area residents.

Early settlement of the Roundup area by Euroamericans in the 1870s and 1880s was primarily in conjunction with the open range cattle business on public domain lands. Large herds of cattle grazed the open range during that period. The severe winter of 1886/87 almost wiped out the vast herds, putting many stockmen out of business.

Following the rapid expansion and equally precipitous crash of the cattle business in the late 1880s, homesteaders began settling in the Musselshell valley. Land was fenced and dryland farming was initiated by many in-migrants homesteading the land. Generally, dryland farming was unprofitable and most small farms went out-of-business by the 1920s. The widespread failure of farming in the 1920s led to the failure of three banks in



Roundup due to defaults on mortgage payments (*Roundup Record-Tribune* 1983). Following the drought years of the early 1930s, most of the land homesteaded in the early 1900s reverted to Musselshell County due to tax delinquency or was acquired by the federal government under the submarginal lands program (*Roundup Record-Tribune*, April 6, 1983).

Old Roundup, settled in 1882, started as a stage stop between Roundup and Billings and consisted of a store, saloon, and post office which provided goods and services to local stockmen. The advent of coal mining in 1908 and the completion of the railroad in 1909 greatly expanded the population of Roundup and the surrounding Bull Mountains (Musselshell Valley Historical Museum 1974). The Republic Coal Company, a subsidiary of the Milwaukee Railroad, opened the first commercial mine. Roundup became a "coal camp" with facilities to support more than 100 miners. South of Roundup, the small communities of Klein, Gibbtown, Republic, and Farrelltown developed near the mines.

Roundup had a population of 1,500 by 1909 and was incorporated as a Montana city. The city grew rapidly, reaching a population of 2,434 in 1920 and 2,573 in 1930.

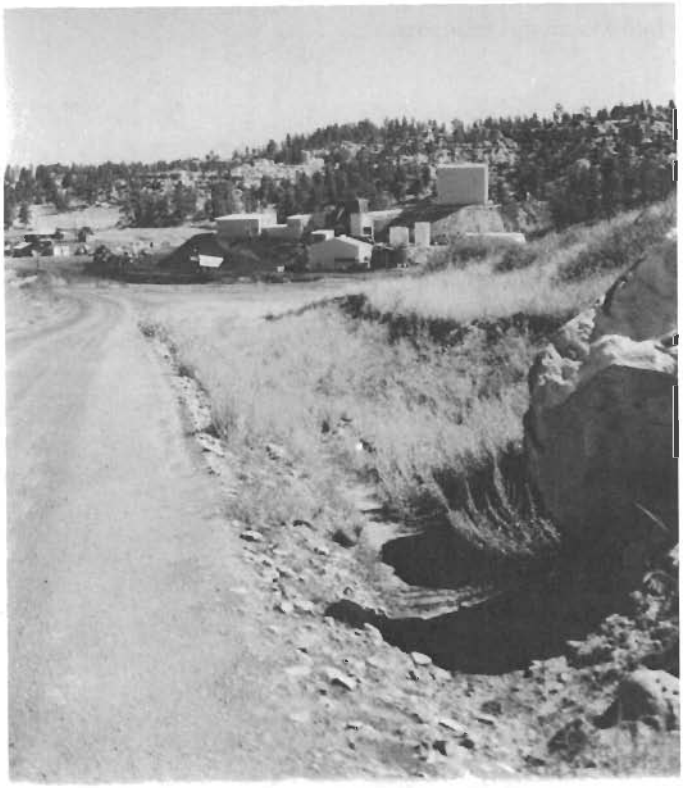
The Klein Mine, located about 3.5 miles south of Roundup, was one of the largest coal mines in the Roundup area. It operated from 1909 until 1956, and employed as many as 550 workers in 1927. More than 20 million tons of coal were taken from the Klein Mine utilizing underground mining techniques. The conversion of railroad engines from coal to diesel ultimately reduced the market for Roundup coal and the mine closed in 1957 (Musselshell Valley Historical Museum 1974). The last large underground mine in the Roundup area, Roundup Coal Company No. 3 Mine, closed in 1962.

There were five small coal mines operating in Musselshell County in 1972 (Intermountain Planners, Inc. 1973). Some were originally underground shaft mines, but in the 1970s they were converted to surface mines because it was not economically feasible to recover the coal with underground mining methods. Only the PM Mine is still permitted and operating.

The discovery of oil near Roundup in 1919 at Devil's Basin and in 1920 at Cat Creek has provided important economic benefits to Roundup for more than 40 years. Oil well fields expanded and oil supply and service companies located in Roundup (*Roundup Record-Tribune* 1983). Income of residents of the Roundup area has been generated by oil development from leasing, royalty payments, and salaries paid to workers.

Oil production in the Roundup area (Central Montana Oil and Gas Region) peaked in the 1960s at about 20,000 barrels of oil a day (Montana Department of Natural Resources and Conservation, No date). Oil production has steadily declined from the 1966 peak to approximately 6,500 barrels a day in 1986. During the last few years, the oil and gas industry in the Roundup area has been in a slump, but there are indications that there would be more exploration and production if the price of oil and gas were to increase.

The forest products industry prior to 1972, consisted of small sawmills which produced one to two million board feet of lumber per year. Approximately 142,000 acres of commercial forest in the Bull Mountains provided logs for the mills.



PM Mine coal cleaning facilities, Roundup, Montana.

Louisiana Pacific, Inc. opened a sawmill in Roundup in 1972 and the annual harvest of sawlogs increased to 25 million board feet—three times the estimated annual forest growth (MDFW&P 1978). The mill was rebuilt and modernized in 1974 and 1975, but closed during the fall of 1976.

Historically, the Roundup area economy has experienced "boom/bust" effects starting with the cattle industry in the 1880s and extending through the coal mining and oil development periods. Many area residents' social values, perceptions, and life-styles have been influenced by the cyclic nature of good economic times followed by economic recession. Longtime residents of the Roundup area take pride in their ability to withstand economically difficult times and view Roundup's past as diverse, colorful, and, at times, romantic. Because of area residents' strong commitment to stay in the area during good, as well as poor economic times, they are concerned about the fate of the area's land, natural resources, businesses, and their life-styles.

TABLE 3.24

VOTING PATTERNS — MUSSELSHELL COUNTY

	Year of Election		
	1980	1984	1988
General Election			
President	Republican	Republican	Republican
U.S. Senator	NA	Democrat	Republican
Representative in Congress	Republican	Republican	Republican
Governor	Democrat	Democrat	Republican
Secretary of State	Republican	Republican	Republican
Attorney General	Unopposed	Democrat	Republican
Superintendent of Public Instruction	Democrat	Republican	Democrat

	Year of Election	
	1986	1988
State and County Election		
County Attorney	Democrat	Appointed
Clerk of District Court	Republican	Republican
Sheriff	Democrat	Democrat
Clerk and Recorder	Republican	Republican
County Commissioners	Democrat (1) Republicans (2)	Democrat (1) Republicans (2)
School Superintendent	Republican	Republican
Treasurer	Republican	Republican
Public Administrator	Republican	Republican
Assessor	Republican	Democrat
Coroner	Democrat	Democrat

Source: Compiled and published by the Secretary of the State, Helena, Montana.

NA = Not applicable.

Community Organization

Diversification

Social diversity of the study area developed over time as employment opportunities expanded from the agricultural base to include coal mining, oil field work, forest products industries, and railroad operation and maintenance. The early residents of the Roundup area were farmers and ranchers with life-styles, attitudes, and expectations quite different from the industrial workers who came to work in the mines and oil fields. Ranchers in the area are typically conservative politically and in life-style and are committed to frugality, self-reliance, and hard work.

Many ranchers today are longtime residents whose relatives were the first settlers of the area. They live outside of the community of Roundup and have different life-styles and social interaction than Roundup residents.

Mine and oil field workers were often of different ethnic background and religion than the agricultural community. Coal miners were typically union workers with strong social ties to their fellow workers. Their recreation, social interaction, and alliances were often centered around co-workers and families of co-workers. Miners played on baseball teams and competed in other athletic events based upon their employment in the mines. There was a great deal of camaraderie, group spirit, and pride associated with being a coal miner in Roundup.

Typically, miners and other labor groups with strong unions are politically less conservative than ranchers and farmers. Miners in Butte and Anaconda, for example, nearly always elect democratic candidates. Unlike the strongly democratic leanings of Butte and Anaconda miners, coal miners in Roundup historically did not demonstrate strong allegiance to a particular political party. Today, there is not an obvious political voting pattern of Musselshell County residents. Musselshell County elected republicans for national office and fewer democrats than republicans for state and county offices in 1988 (table 3.24).

Workers in the petroleum industry are relatively new to Roundup. Many were young men who worked seasonally in the oil fields and moved on when drilling and construction were finished. Because of their transient status, oil field workers did not usually become active in community events or affect the community structure and community interaction of Roundup to a great extent.

Currently, most of the coal mines and sawmills have closed and the oil industry has greatly declined. Many of the early coal miners have left the community, died, or retired, but their families and the community are still well aware of the mining heritage of Roundup.

Interviews with Roundup and Bull Mountains residents revealed that 98 and 95 percent, respectively, are proud of the mining history of the area. An annual community activity is Miner's Day, a day when miners and their contribution to the community are honored publicly. Reminders of the past mining era include the United Mine Workers Cemetery near Klein and historic houses of miners and other buildings identified as part of the self-guided historical tour of Roundup.

There is a relatively large population of retired people in Roundup who provide an important link between the past and the present in terms of tradition and culture. Retired people have been identified as a distinct social stratum in Roundup. Perceptions of those interviewed varied as to the role of retirees socially and economically in the community. Some informants indicated that retirees tended to have relatively little influence politically and economically in the community. Other informants indicated

United Mine Workers Cemetery south of Roundup, Montana.

that retired people were an important force, particularly in slowing social change and resisting new ideas and direction of the community.

In recent years, the Bull Mountains area has experienced an influx of people who have sought the seclusion, scenery, and relatively pristine natural surroundings of the area. Many of those interviewed from the Roundup area have termed these newcomers "mini-farmers" because they have purchased small amounts of acreage and have a few animals such as horses, cows, and goats. Residents of Roundup consider "mini-farmers" to be relatively affluent, young people who have not become integrated into the community and who often share views on development similar to those of the area ranchers. It is perceived by Roundup residents that Bull Mountains residents are becoming a social, political, and economic influence because they are organizing to reflect their specific interests (e.g., Bull Mountains Landowners Association, *Bull Sheet* newspaper, Bull Mountains Volunteers).

Many of the informants in the Bull Mountains indicated that their designation as "mini-farmers" was somewhat derogatory. They often perceive themselves as being discriminated against by the Roundup residents and by the large ranchers because of their short-term residence in the area. An editorial in the *Bull Sheet* (1989) addressed the designation of Bull Mountains residents as "mini-farmers." The editorial expressed confusion as to why Bull Mountains residents were perceived as not being part of Roundup. It also stated that "some folks get very angry and some really furious when they are called a mini-farmer."

Some informants from the Bull Mountains commented that they view themselves as "modern pioneers." Many have purchased undeveloped land in the area, cleared the forest, and constructed their own homes. Because of their commitment of time and resources to build their homes, develop roads, and secure a water supply, many residents have a strong personal tie to their home and land.

Extra-local Linkages

The social processes of the study area are influenced by factors and interests outside of the Roundup area. Important decisions concerning the leasing of coal, development of mines, and exploration/extraction of petroleum are often made by individuals, corporations, and regulatory agencies with little or no affinity with the community of Roundup. Whether coal mines, railroads, coal-fired generating plants, or other developments will occur is determined by state and federal regulatory and land management agencies as well as BRI (Meridian) and other large corporations. Decisions about hiring policies, development plans, and mitigation measures are often made in Billings, Helena, Miles City, or other cities far from Roundup. Sixty-four percent of the Roundup area informants believed groups or organizations outside of the area have a great influence on the area, while 43 percent of the Bull Mountains informants shared this belief.

Linkages between Billings and Roundup are well developed due to the fact that some residents of the area maintain homes or land in both communities. Seventy-five percent of the Roundup area informants and 83 percent of the Bull Mountains informants reported shopping in Billings for articles such as clothing, small appliances, or kitchenware. Both groups considered the close proximity of the Roundup stores to their places of residence as the best feature of shopping in Roundup. Bull Mountains informants thought the worst features of shopping in Roundup were selection of goods and high prices; whereas, Roundup informants described the limited selection of goods as the worst feature. Most of the informants also reported travelling to Billings to shop for major purchases such as cars, furniture, and appliances. Billings also attracts area residents for entertainment, athletic events, and medical services, and some residents, particularly in the southern Bull Mountains, commute to Billings for work.

Stratification

Residents interviewed in the study area believe that there are differences in how resources and power are distributed in the community. Both the Roundup and Bull Mountains informants expressed similar perceptions as to the nature of social and economic strata in Musselshell County. Roundup informants most often identified business and professional people as having the most economic and political power in the community, while the Bull Mountains informants thought the large ranchers with a history of several generations in the county had the most economic and political power in the community.

The large ranchers and business and professional people in Roundup were identified as the "power elite" with a disproportionate amount of access to community resources. Longtime residents in both the ranching and business communities possess the most influence and prestige in the community. Professionals and white-collar workers are viewed as having special status due to their wealth, property, and role in the community. In general, status and power in the community are correlated with income, education, and term of residence in the community.

A distinct middle class in Roundup is composed of retired people. Approximately 27 percent of the population was over 60 years of age in 1980 (U.S. Department of Commerce 1980). As was discussed previously, it is not clear as to how much influence this group has on the social, economic, and political status in the community. One informant reported:

> *It's a pretty good mix of people-like anywhere. There are more retired here and because they are dominant, they pack a lot of weight.*

Another informant, recognizing the large number of retired persons in the community, commented that you "need to have the older people behind you for support."

Gold (1985) described the socio-cultural attributes of small western towns faced with energy developments. He identified a vulnerable elderly population as a characteristic of many of these communities. Because older people have developed social circles over the course of many years, changes that would drastically alter their social interaction are a threat to their security in the community. The elderly population in Roundup value their social history in the community and the possibility of major social change may be a cause of anxiety and unwelcome to many.

Residents of the Bull Mountains are also middle class citizens. This group is relatively diverse in their background, term of residence, employment status, and their view of new coal development. Some are retired, others commute to Billings or Roundup for work; whereas, others are self-employed, technical, and professional people. Although the majority of the Bull Mountains people appear to be newcomers to the area, many residents were born and raised in Roundup and have moved to the Bull Mountains to raise their families. In general, their desire for isolation, privacy, and personal freedom is a dominant factor that has shaped patterns of communication and coordination. A *laissez faire* attitude prevails in every day life resulting in a loosely-knit social organization. Although there are not well developed patterns of social interaction among Bull Mountains residents, there is a strong community commitment to cooperating during emergencies such as fires. The common goal of maintaining privacy and personal freedom has fostered a self-enforced system to avoid conflict and resolve it through informal means.

Informants expressed the view that conflict was avoided because people tended to mind their own business. Minor conflicts that did arise were dealt with by openly communicating and quickly resolving the issue.

Petroleum company workers currently do not appear to have a large influence on the community. In the past, during the oil boom, workers as well as support services and management were headquartered in Roundup. The transient young exploration and drilling workers were visible socially, but were usually not active in determining the dynamics of community interaction. Those interviewed did not usually identify petroleum workers as a distinct social stratum today.

Unemployed and low income people were identified by respondents as having the least influence on decision-making in the community. Due to the commonly-cited lack of jobs and depressed economic conditions of the county, it is likely that this group has expanded in recent years.

Informants in both Roundup and the Bull Mountains often commented that it is difficult to be accepted by the most influential and social groups in the area (ranchers, business people, and long-established families). It is perceived by many that well-established cliques exist and that these groups possess and have access to most of the community resources.

Several informants alluded to the fact that they have lived in the community for more than 20 years, but are still considered to be outsiders. One informant reported:

> *Big ranchers have money and land and have more political clout, like their great-great grandfathers. The big ranchers do not accept most of the people who come in-this is a cliquish town. If you're not born in the general area, you're considered an outsider.*

The response of informants in the Roundup area that they are outsiders because they have not lived in the community all of their lives appears to be in contradiction to the common perception that it is easy to get to know people in the area and that newcomers would be easily accepted. About 60 percent of those interviewed expressed the opinion that it is easy to meet people and approximately 80 percent said that they would welcome or easily accept newcomers. Ninety-three percent said that it would be easy for newcomers to become active members of the community.

A similar contradictory response can be seen in studies conducted by Western Analysis (no date) and Economic Consultants Northwest (1989a) to assess the socioeconomic impacts of natural resource development projects in Lincoln County, Montana.

Informants in the survey conducted by Western Analysis (no date) reported that it often requires 15 to 20 years to be socially accepted in the community. However, respondents in the 1989 survey conducted in the same area stated that they believed it was easy to meet people in the area and that they would readily accept newcomers.

The apparent contradiction between acceptance in the community and the perception that the town is friendly and open to newcomers may lie in the degree to which people are integrated into the influence and power base of the community. Although it is easy to meet people casually on a day-to-day basis, it is not as simple to become a participant in the rancher/business person/professional strata which has the political and economic control in the community.

Community Coordination and Cooperation

The extent to which various elements of the community coordinate and cooperate often determines the success of solving community problems. In the Roundup area, there are governmental, civic, and charitable or volunteer organizations which influence the social and economic environment of the community and surrounding rural area. In addition, there are groups which have formed to support specific projects or interests.

Informants reported that the County Commissioners are the dominant governmental unit which most strongly directs the course of community affairs. Based on interviews with local residents, many commented that coordination and cooperation between the public and the County Commissioners were not

Main Street, Roundup, Montana.

good. Many residents are critical of the policies, decisions, and interests represented by the commissioners. There is a perception by some of the residents that the County Commissioners are secretive and discourage open discussions and consideration of policy decisions that influence the community. About 10 percent of those interviewed in the Roundup area believed that the county government was above-average, whereas 64 percent considered it average, and 26 percent reported the county government to be below average. Bull Mountains informants were similar in their rating of the activities of the county government—2.5 percent considered it above-average, 65 percent rated it as average, and 32.5 percent indicated it was below average.

There also does not appear to be widespread community support for the City-County Planning Board, a volunteer organization. In 1988, 200 residents attended a public meeting to protest regulations proposed by the Board concerning land-use planning. Discussion was directed at the specific regulations proposed as well as the composition of the Planning Board itself (*Roundup Record-Tribune* 1988e).

In contrast to the lack of enthusiasm expressed by some residents for functioning of local governments, many people belong to volunteer, charitable, and civic groups to promote social and economic well-being in the community. Approximately 83 percent of survey respondents thought that there were a lot of community-oriented activities in Roundup. Organizations and support groups in the community include the Musselshell Unity Drive, Musselshell County Food Bank, Meals on Wheels, Alcoholic Anonymous, Alateen, Toys for Tots, church groups, Montana Teenage Institute on Substance Abuse, Teens in Partnership, Alzheimers Support Group, Overeaters Anonymous, and Helping Hands Hospice.

About 92 percent of those interviewed said it is not difficult to organize help for families who have suffered hardships. In an editorial in the *Roundup Record-Tribune* (1988a), it stated:

> *One of the things that really makes a small community tick is volunteerism—concerned citizens who give so much of their time and money to community causes.*
>
> *It's too bad that somebody can't mosey around the area for awhile and come up with some statistics on the number of people who volunteer to serve a host of different projects. No doubt we'd be astounded by the figures.*

The editorial went on to list and compliment the various volunteer organizations in the Roundup area.

Approximately 92 percent of Roundup and Bull Mountains residents interviewed believe that church activities are important to most people of the community. There are a variety of churches in the Roundup area including the denominations of Methodist, Roman Catholic, Lutheran, Jehovah's Witnesses, Latter Day Saints, Church of Christ, Assembly of God, Episcopal, Baptist, and Evangelical.

Community projects undertaken in Roundup which indicate a high level of community organization and cooperation include the Main Street Tree Project, Old Town Roundup Project, Musselshell Valley Historical Museum, and the Musselshell Valley Development Corporation. The Main Street Tree Project, initiated in 1988, raised $10,000 to purchase and plant trees in

Roundup. Volunteers planted and care for the trees. The Old Town Roundup Project, also initiated in 1988, developed a self-guided walking tour to depict life during the pioneer period.

One of Roundup's most outstanding examples of community cooperation was the fund drive to reopen the Roundup Memorial Hospital in 1977. The hospital was closed in 1976 because there were no doctors in the community. During 1977, $200,000 was raised by local residents with over 1,000 individuals donating to the hospital fund. As one informant added:

> *There's a good hospital because people in the community have worked their tails off to keep it going through volunteer efforts and donations.*

The Montana Department of Natural Resources and Conservation initiated a Community-led Rural Economic Development Program for six central Montana counties in 1988 (Musselshell, Fergus, Wheatland, Judith Basin, Golden Valley, and Petroleum). This pilot project is a grass-roots effort, headquartered in Roundup, to provide local people the knowledge and skills to attract economic development to central Montana. Funding for a full-time program coordinator would be funded by the state and the Soil Conservation Service (Beck pers. com. 1989). The Musselshell Valley Development Corporation has prepared a document to formally establish the six-county program. The document presents the objectives, goals, and various development ideas.

The "pull-yourself-up-by-the-bootstraps" approach of the Roundup area residents to reinvigorating the community's economic base also is evident in the development of cottage industries. A workshop was sponsored by the Musselshell Agricultural Alliance, an affiliate of the Northern Plains Resource Council, to promote rural tourism and recreation. Part-time ranch recreation and bed and breakfast businesses, to be operated by local families, are envisioned as a viable economic opportunity in Musselshell County (*Roundup Record-Tribune* 1988f). Roundup Wools, a local cottage industry, employs 30 people to spin, knit, and weave wool into handmade garments (*Roundup Record-Tribune* 1988d).

In response to concerns that affect specific sectors of the community, interest groups have been formed to address concerns in a coordinated manner. Such groups include the Northern Plains Resource Council, Senior Citizens, Musselshell Agricultural Alliance, 4-H Club, Eastern Coal County Task Force, Bull Mountains Civic Club, Bull Mountains Landowners Association, and Protective Organization for Water and Environmental Resources (POWER). Numerous civic organizations, active in the community of Roundup, include Lions Club, American Legion, Moose, Rotary Club, Masons, Odd Fellows, Eastern Star, Junior Women, Rainbow Girls, and Cowbelles. Community entertainment and recreation events which reflect community involvement include the Tri-county Fair, Harvest Roundup, Community Christmas Party, and Shakespeare in the Park.

Community Interaction

Patterns of how people identify and respond to one another in Roundup are typical of a small town—informal and personal. Residents know almost everyone in town and are aware of individuals' character, occupation, and socioeconomic status.

Roundup Memorial Hospital and Nursing Home.

The small town atmosphere, the quiet and predictable pace of life, and mutually supportive networks of family and friends are valued by residents.

Roundup typifies the social organization that is found in many small western towns and cities. According to Gold (1985), this form of social organization is characterized by strong interpersonal bonds, based on shared ideas, mutual trust, traditions, and activities. Members of the community have a deep-seated commitment to the community and neighborhood relationships, with the church being an important social institution. In contrast to the often-mentioned existence of cliques in the community, there are numerous social, civic, and support groups which actively work and interact to provide an improved human and natural environment in the county.

Many of the informants in the Roundup area identified the ranchers as a social stratum distinct from the Roundup residents. To mutually acquaint the ranchers and town residents with the life-styles of both rural and urban aspects of the community, an annual farm-city tour is sponsored by the Musselshell Valley Chamber of Commerce and the Musselshell-Golden Valley Extension Office. Participants of the tour visit both rural areas and the city of Roundup to demonstrate aspects of business, recreation, and everyday life of various sectors of the community.

The recent proposed coal development has polarized some people in the area based upon their support or opposition to new projects. In general, the residents of Roundup favor new coal development, whereas the ranchers and "mini-farmers" are perceived by Roundup residents to oppose it because of potential effects on their life-style and the natural environment. However, the majority of Bull Mountains informants reported that they were not opposed to the mine. Social interaction between the "pro" and "anti" factions has become more strained due to the relatively high levels of emotion associated with large-scale development of coal resources and the recent publicity concerning the possible development.

The Northern Plains Resource Council (NPRC), a private interest group headquartered in Billings, was mentioned by informants as opposing coal development. Although NPRC has a

relatively small representation in the Bull Mountains (about 10 people being members of the Bull Mountains Landowners Association, an affiliate of NPRC), they are well organized and effective in articulating their concerns. Members of the Bull Mountains Landowners Association expressed concerns that the proposed mine would adversely affect water supplies and has the potential to create a monopoly by "Burlington Northern" (Meridian). One informant added that the checkerboard system was established for a reason (to protect against monopoly) and that system should be maintained.

Community Resources

The availability of resources such as medical care, police and fire protection, schools, mental health facilities, and welfare programs are described in the community services section of this report. The level of community services in Roundup are adequate and, in general, most informants reported the services to be average or above-average.

Although water supply and treatment facilities are sufficient, survey respondents often complained about the taste of the water in Roundup. Characteristic of the regional water supply, the water contains a high level of hardness which, to most people, imparts an unpleasant taste. One informant remarked that doctors have warned people with low sodium diets to avoid drinking tap water. Purified water is offered for sale locally; however, people on fixed or low incomes may not be able to afford to purchase the purified water.

Due to budget constraints of the county government, some services have been curtailed. The Montana Department of Social and Rehabilitation Services filed a lawsuit in district court to force Musselshell County to provide adequate funding for social services and protective services to county residents (*Roundup Record-Tribune* 1988g). The court, with the consent of the county, found in favor of the state which means the county will need to levy more than 3.03 mills for the poor fund (Cater pers. com. 1989). The November 1989 tax statements will reflect this increase to local taxpayers.

The County Mental Health Center has been forced to reduce services available to the public due to budget constraints. According to the Rural Services Supervisor in Billings the number of caseloads can be managed under the reduced program; however, services have been limited to the chronic mentally ill. Because of the small town atmosphere (i.e., everyone knows everyone), many people seeking such services will travel to Billings to avoid recognition by community residents. In addition, due to out-migration of the younger population, the number of caseloads is not as high (Walker pers. com. 1989)

The majority of the survey respondents reported that the Musselshell County Fire Department provided above-average fire protection services. Some areas in the county are long distances from the Roundup station and, although emergency response time is quick, closer local fire departments could arrive sooner. Residents of the Bull Mountains have reacted to this situation by actively organizing the Bull Mountains Volunteers to work with the county fire department (see "Community Services" section). One informant commented that after last year's drought conditions and increased potential for fires, the people in the Bull Mountains realized how vulnerable they and their homes were to loss by fire.

There is a perception by some area residents that access to community resources associated with political and economic power is not equally accessible to everyone. Those who have not lived in the community for a longtime, do not come from locally prominent families, or have limited wealth and education believe that they are impeded from equal participation in directing their own destiny as well as that of the community as a whole.

Social Well-being

Social well-being is a subjective concept that is based upon individuals' perceptions of how their lives compare with their expectations of themselves and the community. According to Branch et al. (1982), the incidence and rate of certain behaviors (crime, divorce, suicide, family violence, alcohol/drug abuse, welfare rates, school dropouts, and unemployment) are indicators of social well-being.

Informants in Roundup and the Bull Mountains reported most services (police, fire, medical care) to be average or above-average, and about 90 percent of the interviewees are satisfied with the condition and location of their home. Drug and alcohol abuse were identified as the major social problems in the area. Some informants added that the social problems were no worse than other communities the size of Roundup. With respect to drinking problems, an informant reported:

> *Musselshell County is not unique from other rural areas such as Judith Basin or Wheatland counties. Drinking is an ingrained part of society, and parents must be impacted before anything gets started to change this.*

Informants also mentioned crime as being a problem in the community and that young people need more things to occupy their free time.

Many informants were aware of the Montana Teenage Institute on Substance Abuse (MTI) and Teens in Partnership (TIP) programs that are assisting with alcohol and drug abuse among teens in the community. The TIP Program is aimed at students in grades 7 through 9, while MTI focuses on students in grades 10 through 12. According to the Center for Adolescent Development, MTI brings together "teenagers and professional resources to share information and examine feelings about alcohol/drug misuse and related life problems." The TIP Program trains students to positively and effectively influence friends who may be struggling with adolescent problems such as addictions, suicide, communication, and personal limits.

Interviews with Roundup and Bull Mountains residents indicated that 83 and 93 percent, respectively, believe that the economy is depressed with new jobs being badly needed. Almost 90 percent of the informants thought that young people did not have the opportunity to stay in the area and work because there were no jobs available. Unemployment in Musselshell County was 10.1 percent compared with 7.4 percent for the state in 1987 (nonmetropolitan areas) as a whole. Of the six central Montana counties (Musselshell, Golden Valley, Wheatland, Fergus, Petroleum, and Judith Basin), only Wheatland County had a higher unemployment rate (10.9 percent) than Musselshell County (table 3.25). Per capita personal income in 1986 for Musselshell County ($10,827) was lower than nonmetropolitan

areas of the state ($11,435). Of the six central Montana counties, only Wheatland and Petroleum counties had lower per capita personal income ($10,620 and $9,432, respectively) than Musselshell County.

The crime rate was 2,706.9 as compared with the statewide rate of 4,270.8 per 100,000 population, ranking Musselshell County 20th of all counties in the state (table 3.25). The divorce rate was 3.6 per 1,000 population as compared to 5.0 per 1,000 statewide. Out-of-wedlock births for Musselshell County were 1.6 per 1,000 compared with the statewide rate of 2.9 per 1,000 population. Induced abortions in Musselshell County (2.0 per 1,000) were below the statewide rate of 2.8 per 1,000 persons.

Death rates from heart disease and cancer, the two leading causes of death in Montana, were significantly higher in Musselshell County than the statewide rate. The death rates due to heart disease and cancer in Musselshell County were 4.4 per 1,000 and 3.0 per 1,000 population, respectively. The statewide death rates for heart disease and cancer were 2.6 and 1.9 per 1,000 persons, respectively.

Attitudes and Concerns

Scoping Process

The Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of the NEPA of 1969 are contained in 40 CFR Part 1500. These regulations provide for an early and open process for determining the scope of issues to be addressed in an environmental impact statement and identifying the significant issues related to a proposed action. The regulations direct that the term "scoping" be applied to this process. The intent of the scoping process is to ensure that the EIS is responsive to the public, governmental agencies, and other interested parties.

BLM held scoping meetings in Roundup (May 25, 1988) and in Ennis (May 26, 1988). Eighty people attended the meeting in Roundup and 10 people were in attendance at the Ennis meeting. A total of 432 comments were received during the scoping process concerning the proposed mine and land exchange. The highest percentage of comments (13 percent) addressed the question of whether the proposed land exchange would allow Meridian to tie up coal reserves and establish a monopoly on coal mining and transport in the Bull Mountains. Some concerns were expressed that the government (BLM) and Meridian should not be working together to exclude competition and free enterprise regarding coal mining in the Bull Mountains.

The second most common concern expressed (11 percent) was whether public interests were appropriately served by the land exchange. Some commentors, particularly from Madison County, believed that the land exchange would have a positive effect on recreation. Others believed that the exchange would not be equitable because the lands to be converted to public ownership have no coal values.

The economic impacts, both positive and negative, of the proposed mine and land exchange were mentioned by 10 percent of those responding to the scoping process. Many people expressed the belief that the economy of Musselshell County was depressed and that new jobs and money injected into local businesses would be highly beneficial. Comments also were directed at whether federal royalties from coal would be lost with the exchange.

Other concerns were how the proposed mine would affect transportation (5 percent) and water quality (5 percent). Traffic and quality of roads and highways were described as currently being county problems. Increased truck traffic hauling coal was viewed as an inconvenience to local drivers, a safety hazard (particularly to school children on busses), and potentially damaging to road surfaces.

Water quality and quantity changes as a result of the mine are viewed by some as serious potential environmental impacts. Currently, water quality is poor and quantities of water are not adequate for irrigation demands. Existing springs are considered to be very important to agricultural operations.

TABLE 3.25

COMPARISON OF SELECTED SOCIAL WELL-BEING INDICATORS OF SIX CENTRAL MONTANA COUNTIES

	Montana	Musselshell County	Golden Valley County	Wheatland County	Fergus County	Petroleum County	Judith Basin County
Population (1987)	809,000	4,500	1,100	2,200	12,300	600	2,500
Per Capita Personal Income (1986)[1]	$11,435	$10,827	$12,436	$10,620	$11,434	$9,432	$10,979
Unemployment Rate (1987)	7.4%	10.1%	9.1%	10.9%	8.8%	4.5%	5.3%
Crime Rate (1987)[2]	4270.8	2706.9	NA	1472.6	3174.4	NA	856.4
Out-of-Wedlock births/1,000 (1987)	2.9	1.6	1.8	1.4	1.2	1.7	0.8
Heart Disease Death/1,000 (1987)	2.6	4.4	3.6	5.5	3.4	0	4.0
Cancer Death/1,000 (1987)	1.9	3.8	0.9	4.5	1.6	1.7	1.6
Divorces/1,000 (1987)	5.0	3.6	0	4.1	4.9	6.7	2.0
Induced Abortions/1,000 (1987)	2.8	2.0	0	1.4	1.6	0	2.4
Suicide/1,000 (1987)	0.2	0.2	0	0	0.1	0	0

Sources: Montana Department of Health and Environmental Sciences (1986-1988); U.S. Department of Commerce (1988a); Montana Board of Crime Control.

[1]Non-metropolitan portion, excluding Billings and Great Falls.

[2]Crime rate is obtained by dividing the total number of index crimes by the population of the law enforcement jurisdiction and multiplying by 100,000.

Two percent of the commentors thought that the project would have social impacts. One commentor believed that the proposed mine would promote a beneficial social change in Roundup, while another was concerned that Roundup would become a "company town" and lose its existing social structure.

Survey Results

Scoping concerns also were identified by Economic Consultants Northwest (1989b) through interviews with Roundup and Bull Mountains area residents. Concerns most often expressed about the land exchange were whether the exchange would lead to a coal and transportation monopoly; whether the land exchange would be equitable in terms of land values and resources; and whether access to hunting and recreation would be reduced. Other concerns (impacts on water, environmental effects, impacts on roadways) were expressed, even though they are not directly related to the land exchange itself.

Potential positive and negative impacts that could occur with development of the mine and coal transportation were identified by informants in the Roundup and Bull Mountains area. Positive impacts that area residents expect with the project would be more jobs and improved economic conditions. Seventy-eight percent of the comments from the Bull Mountains informants focused on favorable employment and economic benefits that would be realized with the project. The majority of the Roundup informants (76 percent of the comments) believed that more jobs and improved economic conditions would result from the project. Seventy-one percent of those interviewed in the Bull Mountains and 69 percent in the Roundup area indicated that, if in need of a job, they would be willing to work at the mine.

When asked about possible negative impacts, approximately 50 percent of the Roundup and 83 percent of the Bull Mountains informants identified adverse impacts, while the remaining 50 percent and 17 percent of the Roundup and Bull Mountains respondents either responded "none" or did not comment. Potential impacts included: degradation of water quality and losses or reductions in water supplies; accelerated damage to roads and highways; increased traffic, noise, and dust; and reduction in the quality of life due to increased population, drugs, crimes, and welfare recipients. The possibility that many workers would be hired nonlocally was viewed negatively because of the perception that the local work force is underemployed.

Community Services

Education

In Musselshell County, the elementary, middle, and high schools are located in Roundup (School Districts 55 and 55H). The Central Elementary School, serving grades kindergarten through 6, employs 22 teachers, seven teacher aides, one administrator, one clerical person, two custodians, and 12 other workers including housekeepers, kitchen help, and playground and crosswalk attendants. The number of staff employed by the school is an adequate number to provide the students with the quality of education expected by the local community (Erdie pers. com. 1989).

Central Elementary School, Roundup, Montana.

The Roundup middle school (grades 7 and 8) and high school (grades 9 through 12) share the same building. The community library also is housed in the school building. The city of Roundup and Musselshell County contribute financially to the maintenance and operation of the library and employ the librarian.

The middle school employs seven teachers, three teacher aides, a half-time administrator and clerical worker, and one custodian. Based on current enrollment, no additional staffing needs are required to provide the students with the quality of education expected by the local community (Erdie pers. com. 1989).

The Roundup High School has a staff of 26 people; 18 teachers, three teacher aides, a half-time administrator and clerical worker, one custodian, and three housekeepers. Similar to the elementary and middle schools, there is a sufficient number of staff employed by the high school (Erdie pers. com. 1989). Student enrollment in Roundup schools has been declining in recent years and is expected to continue this downward trend through 1993 (table 3.26). In grades kindergarten through 8, enrollment increased by 18.7 percent from 530 students in 1980 to a high enrollment of 629 students in 1984. Since 1984, enrollment has been declining and, in school year 1988/1989, enrollment reached a low of 487 students, a 22.6 percent decrease from 1984.

In grades 9 through 12, school enrollment fluctuated between 1980 and 1987, from a low of 166 in 1983 to a high of 242 in 1987. Between 1987 and 1988, enrollment decreased by 13.2 percent or 32 students in grades 9 through 12 (table 3.26).

School enrollment projections for the Roundup School District were made using a grade retention model (appendix 9). Enrollment for all grades is projected to continue a downward trend, decreasing by 12.2 percent between 1989 and 1993 and reaching a low of 619 students by 1993 (table 3.26).

Based on current enrollment figures, there is sufficient classroom space for all grades in the Roundup schools. If students were evenly distributed within grades, the school could accommodate the following number of students without constructing additional classrooms: approximately 25 to 27 students in grades kindergarten through 6, about 40 to 45 students in grades 7 and 8, and an estimated 45 to 50 students in grades 9 through 12 (Erdie pers. com. 1989).

TABLE 3.26

ACTUAL AND PROJECTED SCHOOL ENROLLMENT — ROUNDUP SCHOOL DISTRICTS #55 AND 55H

	Grades K-8	Grades 9-12	Special Education	Total All Grades
Actual				
1980	530	186	9	725
1981	529	181	10	720
1982	553	167	21	741
1983	572	166	19	757
1984	629	178	18	825
1985	624	171	13	808
1986	526	237	20	783
1987	478	242	13	733
1988	487	210	12	709
Projections				
1989	481	212	12	705
1990	467	215	12	694
1991	442	202	12	656
1992	431	199	11	641
1993	421	187	11	619

Source: Montana Office of Public Instruction; Economic Consultants Northwest (1989b).

Current Montana recommendations for student/teacher ratios in single classroom situations are 24 students per teacher for kindergarten, 26 students per teacher for grades 1 and 2, 28 students per teacher for grades 3 and 4, and 30 students per teacher for grades 5 through 8. This averages to approximately 28 students per teacher for grades kindergarten through 8. Based on 1988/1989 school enrollment of 487 students, Roundup Elementary School District had 16.8 students per teacher.

The recommended standard of the state of Montana for maximum number of students per teacher in grades 9 through 12 is 30 students per teacher. Using the 1988/1989 enrollment of 210 students, the student/teacher ratio for Roundup High School District was 11.7 students per teacher.

Roundup High School and Middle School.

Law Enforcement

In the Musselshell County study area, law enforcement services are provided by the Musselshell County Sheriff's Department and the Montana Highway Patrol. The Sheriff's Department is a consolidated city (Roundup) and county law enforcement agency headquartered in Roundup serving an estimated population of 3,700. There are five sworn officers (including the Sheriff and undersheriff) and five dispatchers. Typical standards for number of police officers per 1,000 population in small western United States communities are 1.4 to three officers per 1,000 people (Mountain West Research, Inc. 1979).

The current number of officers provides the county with 24-hour patrol coverage; however, more officers could be used to patrol the outlying areas (Neidhardt pers. com. 1988) Due to county budget constraints, the only officer responsible for patrol activities in the Melstone area was recently laid off. The Melstone deputy was the area's sole means of rapid response to law enforcement and medical emergencies (*Roundup Record-Tribune* 1988b).

The Sheriff's Department owns three emergency vehicles. According to Sheriff Neidhardt (pers. com. 1989), an additional emergency vehicle is needed. Standards for number of emergency vehicles vary from one vehicle per each patrol officer to one vehicle per every three officers. The actual number of vehicles needed depends upon the town's particular needs (Mountain West Research, Inc. 1979).

The 14-bed county jail is the only detention facility within Musselshell County. The department can concurrently house female, male, and juvenile offenders in the facility. Minor adjustments in the jail should be made to maintain current requirements (Neidhardt pers. com. 1989).

Musselshell County had a crime rate of 2,706.9 per 100,000 population in 1987, a rate well below the Montana average of 4,270.8 per 100,000 population (table 3.27). Musselshell County ranked 20 among the 46 reporting counties in number of index crimes (homicide, rape, robbery, aggravated assault, burglary, larceny/theft, motor vehicle theft) per 100,000 population. The highest crime rate was 6,426.8 per 100,000 population reported by Lewis and Clark County and the lowest rate (242.9) was reported by McCone County.

There were 123 index crimes reported by the Sheriff's Department for Musselshell County in 1987. This number was slightly lower than the number of crimes reported in 1986 (131 index crimes), but higher than the number reported in 1984 and 1985 (108 and 109, respectively).

The Yellowstone County Sheriff's Department, in conjunction with the Montana Highway Patrol, patrols and responds to emergency situations on U.S. Highway 87 within Yellowstone County. There is one resident deputy who is responsible for law enforcement activities on U.S. Highway 87 and the area between the highway and Huntley. The Sheriff believes that this is not an adequate number of officers for this area and that at least one additional deputy is needed (Schafer pers. com. 1988).

Due to state budget reductions, the Montana Highway Patrol recently laid off one of the two officers that patrol areas in Musselshell County (Griffith pers. com. 1989). If one officer is not enough to adequately patrol the area, a Billings officer will be recruited to assist (Griffith pers. com. 1988).

TABLE 3.27

NUMBER OF INDEX CRIMES IN MUSSELSHELL COUNTY
(1984-1987)

	1984	1985	1986	1987
Homicide	0	0	0	0
Rape	1	0	0	0
Robbery	1	0	0	0
Aggravated Assault	7	15	3	8
Burglary	29	25	44	25
Larceny/Theft	62	61	77	81
Motor Vehicle Theft	8	8	7	9
Total	108	109	131	123
Crime Rate Per 100,000[1]				
Musselshell County	2,297.9	2,313.7	2,799.7	2,706.9
State of Montana	4,246.1	4,231.0	4,226.9	4,270.8

Source: Montana Board of Crime Control (1984, 1985, 1986, and 1987).

[1]Crime rate is obtained by dividing the total number of index crimes by the population of the law enforcement jurisdiction and multiplying by 100,000.

Fire Protection

Fire protection in the Musselshell County study area is provided by the Musselshell County Volunteer Fire Department, the Roundup Volunteer Fire Department, and the Bull Mountains Volunteers. Although the Musselshell County Fire Department has the responsibility for handling fires within the entire county, there are two other departments located in Melstone and Musselshell that assist in fire fighting activities in the eastern portion of the county. Fire suppression on public lands within Musselshell County is the responsibility of MDSL and BLM.

The Musselshell County and Roundup Fire departments have 28 active volunteers; all have received fire fighting training. The fire departments respond to approximately 80 emergency calls a year (20 in Roundup and 60 in Musselshell County).

The combined departments maintain eight fire vehicles (four pumpers, two tankers, one brush fire truck, and one communication van). For small communities (up to 30,000 people), two pumpers and a staff car are considered adequate basic equipment and about 20 volunteer fire fighters would be sufficient to operate one pumper (Mountain West Research, Inc. 1979). In Montana, the number of volunteer fire fighters is limited to 28.

The equipment is considered to be appropriate and in good condition (Picchioni pers. com. 1989). On a scale from 1 to 10, with class 1 being the highest rating and 10 being unprotected, Roundup has a class 6 fire protection rating (Huestis pers. com. 1988). There are excellent fire flows (a measurement of the capacity of a water system to provide water for fire fighters) in Roundup (Picchioni pers. com. 1988).

Recognizing the need for more immediate fire protection services in the Bull Mountains area, the Bull Mountains Volunteers started organizing their fire fighting effort in 1988. Since that time, local residents have elected officers (including a fire chief and assistant fire chief) and are preparing the necessary paperwork to become incorporated. The service area encompasses about a 30 mile by 20 mile area in the Bull Mountains within Musselshell County and provides fire protection to about 500 families.

The Bull Mountains Volunteers has about 125 volunteers. Because the department is still new, no volunteers have received fire fighting training. MDSL will be providing fire training to at least 45 volunteers in the near future.

Last year, volunteers canvassed the 500 households in the area obtaining telephone numbers of residents and gathering pertinent information for evacuation activities (whether a member of the household was handicapped or whether there were elderly persons within the household). At this time, the only fire equipment that the fire department has available is hand tools provided by MDSL. Fire protection clothing is not yet available to the fire fighters and the four emergency vehicles are "homemade" slide-in units similar to those used by MDSL. Water tanks with 300 to 500 gallon capacities and pumps, donated by community residents, are slid into the back of four-wheel drive pickup trucks to suffice as fire trucks.

Volunteers are notified through a "inverted pyramid" type system in which the first person calls designated volunteers, who in turn, contact volunteers on their list. Within 20 minutes, all available volunteers can be contacted to respond to a fire (Smith pers. com. 1989).

Within Yellowstone County, there is no fire protection from the boundary of Musselshell and Yellowstone Counties until Alexander Road, about one mile north of the Billings city limits. South of Alexander Road to Billings, and within one mile southeast on Highway 312 (Huntley Road), is the Billings Urban Fire Service area. The Huntley Volunteer Fire Department is responsible for fire fighting activities beyond that one mile boundary on Highway 312 to Huntley (McCann pers. com 1988).

Roundup Volunteer Fire Department.

Ambulance Service

The Musselshell County Ambulance Service in Roundup has an estimated service area population of 4,500 and averages about 240 emergency calls annually. They have responded to emergency calls in Musselshell County and in adjacent counties (Rosebud, Fergus, Wheatland, Golden Valley, and Yellowstone).

The ambulance service is staffed by 18 volunteers, all of which are certified Emergency Medical Technicians (EMTs). More volunteers are needed to provide the community with more reliable service (Ferguson pers. com. 1988)

The ambulance service owns two radio-equipped ambulances. The condition of the ambulance barn and equipment are considered to be good. In addition, the available equipment is considered to be appropriate to adequately serve the community (Ferguson pers. com. 1989). For small towns (up to 30,000 people), one ambulance is considered adequate (Mountain West Research, Inc. 1979).

Four ambulance services in the Billings area were contacted concerning number of personnel, available equipment, and number of emergency vehicles available for responding to emergency situations. The following provides a brief description of the ambulance services:

(1) Billings Ambulance Service: Twenty-two ambulance attendants; 18 of the 22 are EMTs; and five radio-equipped emergency vehicles equipped with hand tools (Taylor pers. com. 1989).
(2) Arrow Medical Services: Eighteen ambulance attendants; all attendants certified EMTs; one or two attendants trained in emergency mine rescue; four radio-equipped emergency vehicles; three of the four emergency vehicles have such equipment as chains, pulleys, wedges, pry bars, and air chisels (Pinkstaff pers. com. 1989).
(3) Deaconess Medical Center: Twenty-two ambulance attendants; 11 of the 22 are EMTs; two radio-equipped emergency vehicles with full advanced life support (including drugs, monitoring equipment, and intravenous solutions), full extrication tools (including wedges, cutting tools, and air chisels); two fixed-wing air ambulances (Newell pers. com. 1989).
(4) St. Vincent Hospital and Health Center: No on-the-ground ambulance service provided; one fully-equipped helicopter and one fully-equipped fixed-wing aircraft; pilot, EMT, and registered nurse on board of aircraft/helicopter to provide emergency service under the direction of a physician at the hospital (Sorg pers. com. 1989).

All ambulance services reported that there were a sufficient number of ambulance attendants, emergency vehicles, and adequate equipment.

Hospitals and Long-Term Care Facilities

The only licensed hospital in Musselshell County is the Roundup Memorial Hospital and Nursing Home. The 17-bed hospital has a staff of 70 employees including two full-time physicians, one part-time physician, seven Registered Nurses, and 12 consulting physicians from Billings (Mikkelson pers. com. 1989). Based on a standard of four beds per 1,000 population (Mountain West Research, Inc. 1979), there is an adequate number of available beds at the Roundup Hospital.

The number of hospital patient days has decreased significantly since 1984 at the Roundup Memorial Hospital. In the annual survey of hospitals conducted by the Montana Department of Health and Environmental Sciences (MDHES) with the assistance of the Montana Hospital Association, the hospital reported 2,147 hospital patient days in 1984 and, in 1987, they reported 479 hospital patient days, a decrease of 77.6 percent (MDHES 1988).

The Roundup Memorial Nursing Home is in the same building as the hospital. In 1987, 21 beds were added, increasing the number of licensed beds to 37 at the nursing home. The nursing home reported 5,744 patient days in 1985, 5,380 in 1986, and increasing to 10,558 patient days in 1987, an 83.8 percent increase over the three-year period (MDHES 1988).

Local Physicians

The Roundup Family Medical Center is served by two full-time general practitioners and a part-time physician from Billings who visits the clinic three times a week. Roundup also has one and dentist one optometrist. A recommended number of physicians is 1 per 1,000 population and for dentists 0.5 per 1,000 (Mountain West Research, Inc. 1979).

The Musselshell Chemical Dependency Center and Musselshell County Mental Health Center also provide services to residents of Musselshell and Golden Valley Counties. The Chemical Dependency Center provides out-patient counseling, makes referrals to patients for in-patient care, and operates the Assessment Court Treatment (ACT) Program (mandatory classes for DUI offenders). Staff at the Center includes one counselor and a secretary who also provides secretarial services for the Musselshell County Mental Health Center (Des Jarlais pers. com. 1989).

The Mental Health Center is a branch office of the Billings Mental Health Center. Due to reduced budgets, a counselor from Lewistown visits Roundup one day a week to counsel the chronic mentally ill in Musselshell County. They hope there will be sufficient funds by July 1989 to employ a full-time counselor (DesJarlais, pers. com. 1989).

Water Supply

Roundup obtains municipal water from two water sources, each combining into a main pump station. The majority of the municipal water comes from an abandoned coal mine on the south side of the Musselshell River, which is supplemented by water from an infiltration gallery adjacent to the Musselshell River. Water is pumped across the river by two 1,000 gallons per minute (gpm) pumps to the main pump station. Two pumps (900 and 1,400 gpm) at the main pump station pump the water into the water distribution system. Water treatment consists of chlorination and fluoridation.

There are approximately 1,000 service connections hooked into the system with capacity far exceeding utilization (Thomas pers. com. 1989) Operation and maintenance of the water system have been rated as very good by the MDHES (MDHES 1986).

Water storage facilities consist of two concrete reservoirs with two million and one million gallon capacities (Thomas pers. com. 1988) Pumping and storage facilities are seven years old and the last major improvements to the system were made in 1982. There appears to be a considerable water source and pumping and storage capacity (Burns pers. com. 1988).

Wastewater Treatment

Wastewater treatment (sewage) facilities serving Roundup consist of a two-cell facultative lagoon system constructed in 1958. The first cell is 12 acres and the second cell is four acres. The lift station at the lagoon was completely rebuilt in 1987. Treated wastewater is not discharged into any watercourse. The lagoon

is well maintained and in adequate condition (Burns pers. com. 1988). According to Public Works Director Gary Thomas (pers. com. 1989), the system is underutilized.

Solid Waste

Solid waste collection and disposal services in Roundup are provided by the City of Roundup. Refuse is hauled to the Roundup transfer station where it is picked up and hauled by Big Sky Haul-Away, a private contractor, to a Billings landfill (Leiter pers. com. 1988).

About three years ago, the Musselshell County Refuse District developed a countywide waste disposal operation. Solid waste in all communities within Musselshell County is hauled to the county-owned transfer station building in Roundup. The caretaker and manager of the transfer station is employed by Big Sky Haul-Away. Annually, on the average, they haul six, 40-cubic yard loads of garbage a week. There would need to be a large influx of population within the county to increase the number of trips currently made to the landfill (Johnston pers. com. 1988).

Social Welfare

Funding for social welfare services in Musselshell County comes from state, federal, and county sources. The welfare program is administered by the county and provides the following services:

(1) Aid to families with dependent children
(2) Food stamps
(3) County assistance (medical and general)
(4) Medicaid

The staff consists of one eligibility technician and one clerical position. The director of the program operates out of the Lewistown office and is responsible for six counties (Fergus, Wheatland, Golden Valley, Petroleum, Musselshell, and Judith Basin).

The current number of staff in Roundup can adequately dispense the required services. The highest caseload months are December, January, and February. Personnel have been rotated from the offices within the six-county jurisdiction to assist during high caseload months, when necessary (Braunbeck pers. com. 1988).

Per capita cases per month for families receiving Aid to Families With Dependent Children (AFDC) payments in Musselshell County was lower than that reported for the state as a whole (table 3.28). The average monthly payment per case was $319.96 in 1988, as compared to the state average payment of $333.78. Similarly, per capita food stamp cases per month for Musselshell County was reported to be lower relative to the state average, as well as the average value of food stamps per case ($120.79 for Musselshell County and $135.56 for the state).

AFDC per capita cases per month for Yellowstone County were also lower than the state average in 1988 (table 3.28) the average monthly payment per case was higher relative to the state ($340.35 for Yellowstone County and $331.73 for the state).

Although the average number of cases per capita per month for medical assistance was similar for Musselshell County, Yellowstone County, and the state, the average monthly payment per case was lower in Yellowstone County in 1988 than in both Musselshell County and Montana.

Housing

Communities within the study area include Roundup (Musselshell County) and Billings (Yellowstone County). Because housing is not limited in the Billings area, more emphasis has been placed on the Roundup area with respect to available housing units.

Housing availability and characteristics were assessed through personal interviews conducted with mobile home park owners, apartment complex owners, and realtors; from data compiled by the U.S. Bureau of the Census, MDHES, and other published and unpublished documents; from an inventory of real estate listed in the classified section of the *Roundup Record-Tribune* and the *Billings Gazette*; and through an on-site reconnaissance housing inventory.

Housing units for sale and rent are ever-changing, thus providing up-to-date information on available housing is difficult. The U.S. Bureau of Census data, for example, are nearly ten years old, but provide a general overview of the housing situation in the study area and are the only descriptive information available in such detail.

Housing Characteristics

Based on U.S. Bureau of the Census data (1980), there were 1,997 year-round housing units in Musselshell County in 1980 (table 3.29). Approximately 54 percent of these units (1,073 homes) were located in Roundup. The vacancy rate was 15 percent in Musselshell County and 14 percent in Roundup.

Of all year-round housing, about 73 percent were classified as one-unit structures in both the county and Roundup. Sixteen percent of year-round housing in Musselshell County were mobile homes, while 8.8 percent were mobile homes in Roundup.

A large proportion of the homes in Roundup were built prior to 1940 (table 3.29). In 1980, 64.4 percent of year-round housing units in Roundup were constructed prior to 1940 as compared to 53.5 percent for Musselshell County. Since the 1980 census, more building activity has occurred in rural Musselshell County than in Roundup.

Unlike Musselshell County, of the 42,689 year-round housing units in Yellowstone County, 17.3 percent were built prior to 1940, and 18.5 percent were constructed before 1940 in Billings. Approximately 65 percent (27,984) of the year-round homes in Yellowstone County are located in Billings (table 3.29). About two-thirds of the year-round housing units were classified as one-unit structures in both the county and Billings, while mobile homes accounted for almost 9 percent of all year-round housing in Yellowsonte County and about 5 percent in Billings.

Real Estate For Sale

Real estate for sale and housing units for rent were monitored in the real estate classified section of the *Roundup Record-Tribune*, the local newspaper in Roundup. Beginning in September 1988 and ending in February 1989, real estate and rentals advertised in every other issue of the newspaper were recorded and a weekly average for the six-month period was calculated (table 3.30).

TABLE 3.28

SELECTED SOCIAL WELFARE STATISTICS — STATE OF MONTANA, MUSSELSHELL AND YELLOWSTONE COUNTIES (1986-1988)

	State of Montana			Musselshell County			Yellowstone County		
	1986	1987	1988	1986	1987	1988	1986	1987	1988
Aid to Families with Dependent Children									
— Average Number of Cases/Month	8,675	9,320	9,628	27	33	28	902	1,010	1,087
— Average Number of Cases/Month/Capita	.011	.012	.012	.006	.007	.006	.008	.009	.009
— Average Monthly Payment/Case	$326.10	$328.63	$331.73	$333.78	$323.52	$319.96	$340.67	$335.99	$340.35
Food Stamps									
— Average Number of Households/Month	21,537	22,066	21,635	89	92	84	2,095	2,176	2,367
— Average Number of Cases/Month/Capita	.026	.027	.027	.019	.020	.019	.018	.018	.020
— Average Value of Food Stamps/Case	$121.92	$123.89	$135.56	$112.28	$114.16	$120.79	$120.51	$123.75	$134.45
Medical Assistance									
— Average Number of Cases/Month	21,405	24,926	26,207	94	116	110	2,470	2,883	3,150
— Average Number of Cases/Month/Capita	.026	.031	.032	.020	.026	.024	.021	.024	.027
— Average Monthly Payment/Case	$411.06	$432.49	$449.87	$270.81	$284.98	$402.67	$306.49	$334.71	$376.66

Sources: Montana Department of Health and Environmental Sciences (1986, 1987, and 1988); U.S. Department of Commerce (1987).

An average of two homes were listed for sale in the *Roundup Record-Tribune* during the six-month monitoring period. Homes ranged in price from $7,000 to $159,900, depending upon the condition, size, and location of the home and whether acreage was included in the selling price (table 3.30). Number of bedrooms ranged from two to five, while acreage ranged from 0 to 216 acres.

The classified section of the Sunday edition of the *Billings Gazette* lists by area the number of U.S. Department of Housing and Urban Development (HUD) and Veterans Administration (VA) repossessed homes for sale. In June 1988, the classified section in the *Billings Gazette* was monitored to determine the number of repossessed HUD and VA homes that were for sale in Roundup. During June 1988, an average of four repossessed HUD or VA homes were listed for sale, ranging in price from $2,000 to $39,000 (table 3.31).

Personal interviews were conducted with local Roundup realtors to obtain estimates of housing availability. According to area realtors, there were approximately 60 homes listed for sale in and around Roundup (Sysum 1988; McLeod 1988; Churchill 1988 pers. com.).

TABLE 3.29

CHARACTERISTICS OF YEAR-ROUND HOUSING IN MUSSELSHELL COUNTY AND ROUNDUP, 1980

	Musselshell County		Roundup		Yellowstone County		Billings	
Year-Round Housing Units	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Number Occupied	1,698	85.0	923	86.0	39,891	93.4	26,265	93.9
Number Vacant	299	15.0	150	14.0	2,798	6.6	1,719	6.1
Total	1,997	100.0	1,073	100.0	42,689	100.0	27,984	100.0
By Units in Structure								
One Unit (Attached and Detached)[1]	1,454	72.8	798	74.4	29,132	68.2	18,360	65.6
Two Unit	66	3.3	49	4.6	3,078	7.2	2,576	9.2
Three and Four Units	25	1.3	16	1.5	2,035	4.8	1,689	6.0
Five Units or More	132	6.6	115	10.7	4,642	10.9	3,989	14.3
Mobile Homes or Trailers	320	16.0	95	8.8	3,802	8.9	1,370	4.9
Total	1,997	100.0	1,073	100.0	42,689	100.0	27,984	100.0
By Year Built								
1939 and Earlier	1,069	53.5	691	64.4	7,393	17.3	5,169	18.5
1940-1969	423	21.2	218	20.3	20,454	47.9	15,514	55.4
1970-1980	505	25.3	164	15.3	14,842	34.8	7,301	26.1
Total	1,997	100.0	1,073	100.0	42,689	100.0	27,984	100.0

Source: U.S. Department of Commerce (1980).

[1]One unit, detached = one-unit structure detached from any other house. One unit, attached = one-unit structure which has one or more walls extending from ground to roof separating it from adjoining structures.

TABLE 3.30

SIX—MONTH MONITORING OF REAL ESTATE FOR SALE AND HOUSING UNITS FOR RENT — MUSSELSHELL COUNTY STUDY AREA

	Average Number Per Week	Range
Homes for Sale	2	Price: $7,000 to $159,900 # Bedrooms: 2 to 5 # Acres: 0 to 216
Mobile Homes For Sale	1	Price: $10,500 to $37,000 # Bedrooms: 1 to 3 # Acres: 0 to 55
Acreage For Sale	0[1]	# Acres: 24 to 40 acres
Rental Housing Units		
Homes	4	Rent: $90 to $300
Apartments	3	Rent: No Prices Listed
Mobile Homes	1	Rent: $150 and No Price Listed

Source: Roundup-Record Tribune (September 1988 through February 1989). Every other issue was used during this monitoring period to derive the average used in this table.

[1]Only 3 parcels listed in six-month monitoring period.

The Billings Board of Realtors Multiple Listing Service has over 500 realtors (or approximately 90 percent of all area realtors) listing homes through the service. By year-end 1988, there were 3,408 residential listings with Multiple Listing Service and in January and February 1989, there were an additional 441 new listings in and around the Billings area (Klein pers. com. 1989).

TABLE 3.31

REPOSSESSED HOMES (VA OR HUD) IN ROUNDUP

	VA or HUD	Price of Home	Number of Bedrooms and Baths
June 5, 1988	VA	$5,000 cash	2 bdrm, 1 bath
	HUD	$8,000	4 bdrm, 1 bath
	HUD	$12,000	1/3 bdrm, 1 1/2 baths
	HUD	$39,000	3 bdrm, 1 1/2 baths, 17 acres
June 12, 1988	VA	$5,000 cash	2 bdrm, 1 bath
	HUD	$26,000	2 bdrm, 1 bath
	HUD	$21,000	2 bdrm, 2 baths
	HUD	$9,500	1/3 bdrm, 1 1/2 baths
	HUD	$8,000	4 bdrm, 1 bath
	HUD	$39,000	3 bdrm, 1 1/2 baths, 17 acres
June 19, 1988	VA	$2,000 cash	2 bdrm, 1 bath
	HUD	$26,000	2 bdrm, 1 bath
	HUD	$21,000	2 bdrm, 2 baths
	HUD	$9,500	1/3 bdrm, 1 1/2 baths
June 26, 1988	VA	$2,000 cash	2 bdrm, 1 bath
	HUD	$26,000	2 bdrm, 1 bath
	HUD	$9,500	1/3 bdrm, 1 1/2 baths

Source: Billings Gazette (1988).

Mobile Home Parks

Mobile home courts, campgrounds, and recreational vehicle (RV) and tent parks in Montana are required by law to be licensed by the MDHES, Food and Consumer Safety Bureau. A list of licensed mobile home courts is prepared by MDHES that provides the name of the park owner, address, and number of licensed spaces by category (recreational trailers, tents, cabins, and mobile homes). Because the MDHES list cannot be used for the purpose of unsolicited telephone calls (surveys), owners of the mobile home parks on the list could not be contacted to gather such information as rental fees, number of vacancies, and occupancy rates. Based on this MDHES list, there are 68 mobile home lots and three RV lots in the Roundup area (table 3.32).

Two mobile park owners were interviewed concerning number of trailer spaces for rent, occupancy rate, and monthly rental fees (table 3.33). Monthly rental fees ranged from $70 to $75, excluding electricity. (NOTE: Sources other than the MDHES list were used to obtain the names of park owners. Interviews were conducted with the owners to obtain information concerning specifics of the parks.) Of the 40 mobile home lots in the two courts, 12 were occupied by permanent residents (Tull 1988, Christensen 1988. pers. com.).

In the Billings area, there are at least 2,812 licensed mobile home spaces and 149 RV spaces (table 3.32). The largest court provides lots for 482 mobile homes as well as temporary spaces for 18 RVs.

Housing Units For Rent

A reconnaissance housing inventory was conducted within the Roundup area by driving the city streets in June 1988. "For Sale" signs and apartment complexes were counted within the defined survey area. Although three apartment complexes were identified during the inventory (Santa Fe Apartments, Roundup Apartments, and Tri-County Housing), there did not appear to be any major apartment complexes in the city. However, there may be small apartment buildings such as duplexes and triplexes nestled within the residential area.

During the six-month monitoring period of the *Roundup Record-Tribune*, two other apartment complexes were identified-Home on the Range and Rose Apartments. Similar to the Tri-County Housing Apartment complex, Home on the Range is set aside for the elderly.

The Rose Apartments have nine apartments available for rent to the general public, ranging in size from one to two bedrooms with monthly rental charges from $100 to $225, plus electricity. According to the apartment complex owner, within the past one to two years, they have had difficulty in maintaining full occupancy due to limited demand (Rose pers. com. 1989). Only three of the apartment units were rented in March 1989.

There was an average of four homes listed for rent during the six-month monitoring period of the newspaper. Rent ranged from $90 to $300 a month. In addition, an average of three apartments and one mobile home were listed for rent (table 3.30).

Local realtors reported that although there are a relatively large number of housing units for sale, rental homes and apartments are scarce. The number of rental units could increase if out-

TABLE 3.32

NUMBER OF LICENSED MOBILE HOME COURT SPACES — ROUNDUP AND BILLINGS AREAS

Mobile Home Courts	Number of Licensed Spaces
ROUNDUP AREA	
Mini Court #1	3
Mini Court #2	2
Enterprise Sales/Rent	4
Hi Land Trailer Park	25
Ideal Motel Trailer Court	19
Riverside Trailer/Campground	2 (+3 RV spaces)
Star Apartments Trailer Court	7
Wall's Trailer	6
Total Mobile Home Spaces	68
Total RV Spaces	3
BILLINGS AREA	
Agri Center Subdivision	3
Allen Mobile Home Court	9
Atlantic Trailer Court	11
B & C's Court	11
Bauer's Court	4
Becraft Mobile Home Park	27
Belknap Trailer Court	12
Big Sky Trailer Court & Campground	NA
Billings KOA Kampground	NA
Birch Mobile Court	11
Blain's Mobile Home Court	219
Billings Realty Mobile Home Park	8
Blue Creek Trailer Court	14
Broadmoor Trailer Court	18
Broken Spoke	52
Bud's Trailer Court	5
C & C Mobile Court	60
C & D Mobile Court	16 (+1 RV space)
C & M Rentals	6
Canary Lane Court	9
Capri Mobile Home Court	19
Carrie Lynn Estates	92
Casa Village	482 (+18 RV spaces)
Cleveland Trailer Court	4
Clyde's Trailer Court	6
Country Lane Mobile Court	27
Cozy Court Trailer Park	6
Custer Avenue Trailer Court	3
D-J Mobile Home Court	5
Dalke Trailer Court	5
Davis Court	4
Don's Mobile Home Park	21
Drifka/Krug Trailer Park	7
Duck Creek Trailer Court	30
East Gate Mobile Village	27
Eastwood Estates Trailer Court	36
Emerald View Park	102
Florine Trailer Court	9
Garden Avenue Campground	115 RV spaces
Gauger's Sales Corp.	37
Glentana Mobile Home Court	84
Golden Meadows Mobile Home Park	194
Green Acres Mobile Court	20
Happy Acres Trailer Court	20
Hoffman Trailer Court	4
Hole's Court	7

TABLE 3.32 (Continued)

NUMBER OF LICENSED MOBILE HOME COURT SPACES — ROUNDUP AND BILLINGS AREAS

Mobile Home Courts	Number of Licensed Spaces
Holmes Trailer Court	10
Howard Lee Trailer Court	2
Humphrey Mobile Home Court	13
J & E Trailer Court	5
J.B.'s Court	4
J & J Court	5
King's Rest Mobile Home Manor	18
Kramer's Court	11
Kraske Mobile Home Lot	6
L & G Trailer Court	10
Lake Elmo Mobile Home Park	30
Lakeside Mobile Home Park	8
Lyndes Trailer Court	3
Marvin's Mobile Home Court	10
North Park Village	28 (+2 RV spaces)
Piccolo Lane Mobile Court	3
Pine Court	24
Pine View Court	48
Polar Row	6
Preble Trailer Court	3
R & R Trailer Court	13
Ray Weber Trailer Court	5
Restad Trailer Court	5
Rimrock Village Mobile Home Park	40
River Grove Estates	52
River Park Mobile Court	56
Roslien Trailer Court	7
Ryder's Trailer Court	10
Sage View Village	56
Saveway Trailer Court	12
Ser Sco Way Mobile Court	16
Shiloh Village Mobile Home Park	14
Smith Trailer Court	4
South Frontage Road Trailer Court	4
Southgate Village Mobile Park	60
Sunset Mobile Home Court	49
Susie Trailer Court	6
Susie Trailer Court #2	8
T & J Court	5
Taylor's Trailer Court	14
Three "S" Trailer Spaces	4
Trailer Village	62 (+13 RV spaces)
Triangle J Trailer Court	8
Triple E Mobile Court	12
Washington Court	2
Western Trails Motor Court	16
Wilkerson Trailer Court	4
Windsor Park	213
Woodland Court	31
Yellowstone Baptist College Trailer Court	6
4 C L Estates	25
Total Mobile Home Spaces	2,812
Total RV Spaces	149

Source: Montana Department of Health and Environmental Sciences (1988).

NA = Not available

TABLE 3.33

SELECTED CHARACTERISTICS OF MOBILE HOME PARKS IN ROUNDUP

	Number of Spaces	Rent	Comments
Ideal Motel & Trailer Court	15	$70/month + electricity	Full hookups. One permanent resident.
Highland Trailer Park	25	$75/month + electricity	Full hookups. Three of the 25 spaces would only be suitable for smaller trailers. Eleven permanent residents.

Sources: Tull, pers. com. (1988); Christensen, pers. com. (1988).

migration due to poor economic conditions in the area continues and more homeowners are forced to rent their unsold homes (McLeod pers. com. 1988).

Motels

Interviews were conducted with three operators of motels in Roundup to determine number of motel rooms, number of kitchenettes, and room rates of the motels (table 3.34). Overnight rates for one person ranged from $21.84 to $24.96 a night. There were a total of 61 rooms in the three motels, with eight of the rooms equipped with cooking facilities.

In the Billings area, there are 2,720 rooms in 38 motels licensed by MDHES, Food and Consumer Safety Bureau. Because of the abundance of the number of available motel rooms, interviews were not conducted with motel operators.

Transportation

Definition of Transportation Study Area

The study area for transportation includes state and county highway systems within the southern portion of Musselshell County and the northern portion of Yellowstone County (figure 3.1). More specifically, major highways include U.S. Highway 87 from the intersection of U.S. Highway 12 south to the intersection of Highway 312 (Huntley Road); Old Divide Road; and Highway 312 (Huntley Road) from the intersection of U.S. Highway 87 northeast to the Huntley railroad siding.

TABLE 3.34

SELECTED CHARACTERISTICS OF MOTELS IN ROUNDUP

	Number of Rooms	Nightly Charge	Comments
Ideal Motel & Trailer Court	10 units	$21.84/1 person/night ($87.36/week for 1 person).	Eight units are kitchenettes
Big Sky Motel	22 units	$24/1 person/night	No special rates for weekly or monthly stays.
Sage Motel	29 units	$24.96/1 person/night	Special rates for weekly/monthly stays negotiated.

Sources: McCleary, pers. com. (1988); Neidhardt, pers. com. (1988).

Modes of Transportation

Railway transportation is nonexistent in Musselshell County. The closest freight rail services from the proposed land exchange area are in Broadview (Golden Valley County) and Huntley (Yellowstone County).

Commercial transportation is available through Intermountain Transportation Company. The bus offers a daily service in Roundup in the morning originating from Billings, and in the late evening originating from Great Falls.

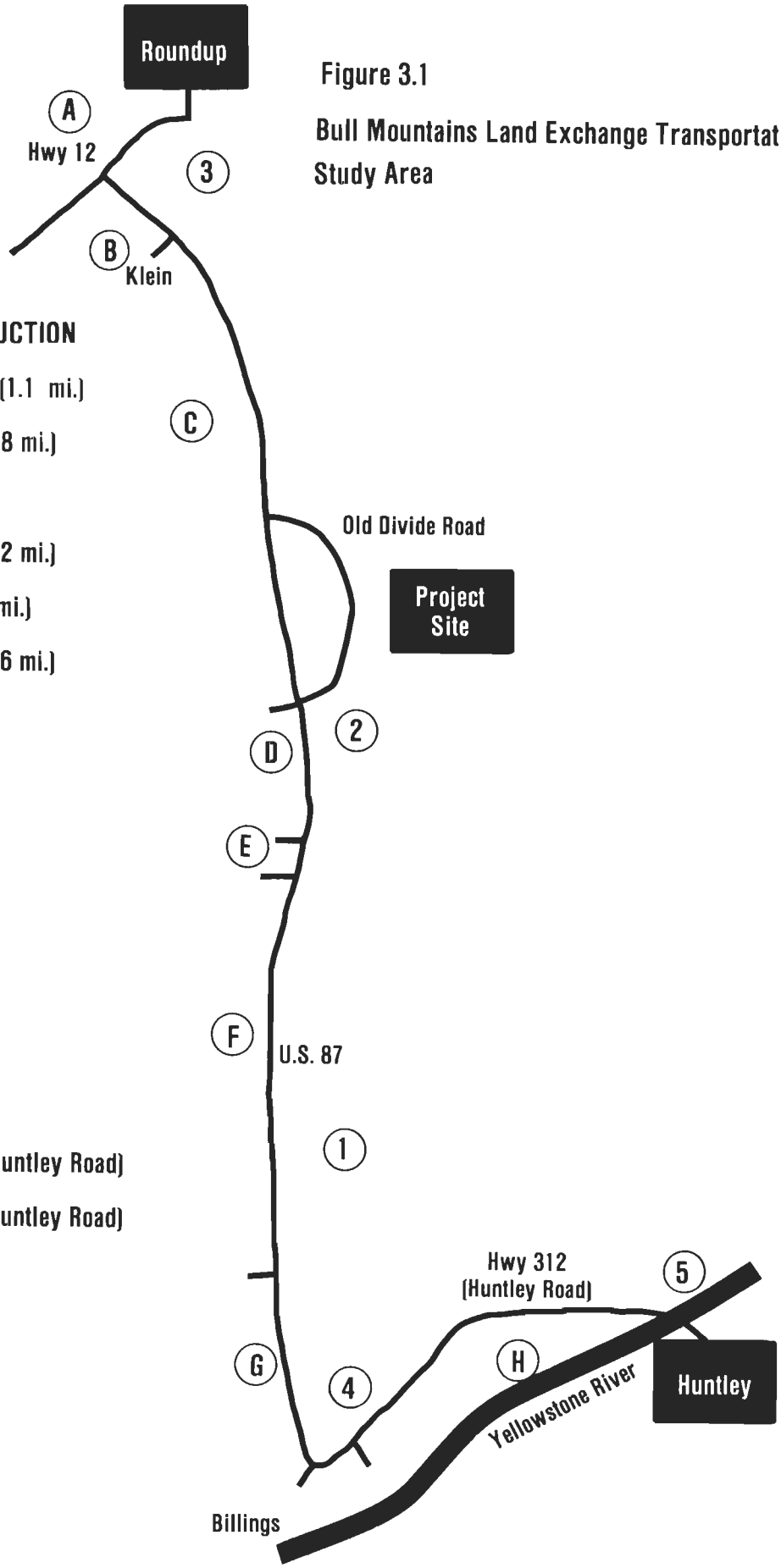
There is a public airport for light aircraft 1.2 miles from Roundup. The Roundup airport has a 5,100 foot, hard surface, lighted runway. The nearest commercial air service is about 50 miles from Roundup at the Logan International Airport in Billings.

Road and Bridge Conditions

The federal lands are accessible from the north and south by U.S. Highway 87. U.S. Highway 87 is a two-lane, paved road that connects U.S. Highway 12 (near Roundup) to the Billings area. One county road (Old Divide Road) provides access to the project site directly. Old Divide Road, a two-lane, paved road, makes an approximate seven-mile loop to the east off of U.S. Highway 87 and is under the jurisdiction of Musselshell County. Several private, two-track trails traverse the project area and are used primarily by ranchers for access into the area.

Figure 3.1

Bull Mountains Land Exchange Transportation Study Area



CONSTRUCTION/RECONSTRUCTION

- A Reconstruct Planned for 1993 (1.1 mi.)
- B Reconstruct Planned for 1993 (1.8 mi.)
- C Widen & Repave 1988 (16.5 mi.)
- D Reconstruct Planned for 1993 (6.2 mi.)
- E Repaving Planned for 1989 (1.7 mi.)
- F Reconstruct Planned for 1990 (9.6 mi.)
- G Constructed 1977 (7.5 mi.)
- H Constructed 1947 (9 mi.)

TRAFFIC COUNTERS

1. Site 1 — U.S. Highway 87
2. Site 2 — U.S. Highway 87
3. Site 3 — U.S. Highway 87
4. Site 1 — U.S. Highway 312 (Huntley Road)
5. Site 2 — U.S. Highway 312 (Huntley Road)

The Montana Department of Highways (MDOH) evaluates the surface conditions of the state-maintained roadways every two years through the Pavement Management System. The pavement condition or "distress rating" is one factor that is used to identify locations of highways that may need repair or improvement. The pavement condition rating system is measured on a scale from 10 to 40 points with the best possible rating for this evaluation being 40 points.

The distress rating of U.S. Highway 87 as of August 1988 was 27 points for that part of the highway from the junction of U.S. Highway 87 and Highway 312 (Huntley Road-K-Mart corner) north for 7.5 miles and a four-mile stretch of the highway 20 miles north of the junction (K-Mart corner). The remainder of U.S. Highway 87, between the Old Divide Road and the junction of U.S. Highway 87 and Highway 312 (K-Mart corner), was rated 15 to 16. The projected repaving and reconstruction of U.S. Highway 87 (see figure 3.1) would most likely raise the distress ratings of this roadway to levels near 40 points from the current ratings of 15 and 16 (Cromer pers. com. 1989).

The pavement conditions of Highway 312 (Huntley Road) were somewhat higher than U.S. Highway 87, ranging from 38 to 40 points near the junction with U.S. Highway 87 (K-Mart corner) to 28 points for nine miles east of the junction (K-Mart corner). These relatively high ratings reflect a maintenance seal coat project completed within a year of when the pavement was rated.

Both U.S. Highway 87 and Highway 312 (Huntley Road) are maintained by the state of Montana (Wolverton pers. com. 1988). Highway 312 (Huntley Road) was formerly the principal east/west arterial highway through the Billings area, formerly U.S. Highway 10. This function was transferred to Interstate 94 upon its completion and Highway 312, (Huntley Road) was then removed from the Federal-Aid Primary (FAP) System. Since that time, jurisdiction and maintenance responsibilities have been retained by MDOH. Highway 312 (Huntley Road) currently functions as the major access to the communities which have developed to the northeast of the Billings urban area.

The estimated annual maintenance costs for the highways in the study area are listed in table 3.35. These costs are based upon the average costs developed by MDOH for 1984 through 1988 (Cromer pers. com. 1989).

TABLE 3.35

ESTIMATED ANNUAL MAINTENANCE COSTS — BULL MOUNTAINS TRANSPORTATION STUDY AREA

	Approximate Miles of Road	Estimated Annual Maintenance Cost
Old Divide Road	7.0	$ 19,398
U.S. Highway 87	27.5	84,060
Highway 312 (Huntley Road)	11.0	112,220

Source: Cromer, pers. com. (1989).

Notes: Maintenance costs are an average of 1984 through 1988 data; maintenance cost for Old Divide Road was estimated using per mile estimates developed by the Montana Department of Highways.

The Bridge Bureau of MDOH inspects and files a report on all bridges within Montana every two years. All bridges in the study area are in reasonably good condition, considering that most of the bridges were constructed in the 1930s or 1940s (table 3.36). All bridges on the transportation route are suitable for commercial vehicles with heavy, legal (and properly permitted) loads (Rognlie pers. Com. 1988).

Traffic Conditions

Average daily traffic counts on U.S. Highway 87 and Highway 312 (Huntley Road) are presented in tables 3.37 and 3.38, respectively. Traffic counts on U.S. Highway 87 fluctuated between 1982 and 1985, increased in 1986, and remained stable in 1987 (except in the stretch from Klein to the junction of U.S. Highways 87 and 12).

Traffic from Billings to the boundary of Yellowstone and Musselshell counties (site 2) increased 18.6 percent during the 1982 to 1987 period; from the county boundary to Klein (site 2), traffic increased 29.1 percent; and from Klein to the junction of U.S. Highway 87 and U.S. Highway 12 (site 3), traffic decreased by 14 percent (table 3.37 and figure 3.1).

Commercial traffic on U.S. Highway 87 from Billings to the junction of U.S. Highway 87 and U.S. Highway 12 (sites 1, 2, and 3) has shown a decrease of approximately 24 percent between 1982 and 1987 (table 3.37). More specifically, from Billings to the county boundary (site 1), there was a 17 percent decrease; from the county boundary to Klein (site 2), a 9 percent decrease; and from Klein to the junction of U.S. Highways 87 and 12 (site 3), a 39.6 percent decrease in commercial average daily traffic volumes (figure 3.1).

Average daily traffic counts on Highway 312 (Huntley Road) near the intersection of U.S. Highway 87 has increased between the 1982 to 1987 period (table 3.38). Although traffic counts have fluctuated during this six-year period, the overall increase was 33.2 percent for Site 1 (figure 3.1). Traffic counts also have been recorded on Highway 312 (Huntley Road) where the highway crosses the Yellowstone River (site 2). During the 1984 to 1987 period, traffic on Highway 312 (Huntley Road) (figure 3.1; site 2) has decreased approximately 14 percent (table 3.38 and figure 3.1).

Traffic accidents on U.S. Highway 87 and Highway 312 are presented in table 3.39 for years 1979 through 1988. On U.S. Highway 87, between the junction with Highway 312 and the junction with Old Divide Road, there were 173 accidents between January 1, 1983 and September 30, 1988. Two of the accidents were fatal and 88 were injury accidents. The total number of fatalities in this time period was five and the total number of injuries was 153. The accident rate during this time period was 1.65 per 1,000,000 vehicle miles driven, while the accident severity rate was 1.564. This compares to the statewide accident severity rate of 1.51 for the same time period (Cromer pers. com. 1989).

Between January 1, 1983 and September 30, 1988, the intersection of U.S. Highway 87 and Highway 312 (Huntley Road/K-Mart corner) experienced eleven accidents resulting in six injuries, three of which were incapacitating injuries. No large trucks were directly involved in any of these accidents.

TABLE 3.36

CHARACTERISTICS OF BRIDGES ON U.S. HIGHWAY 87 AND HIGHWAY 312 (HUNTLEY ROAD)

	Approximate Location	Type of Structure	Bridge Width (feet)	Bridge Length (feet)	Year Built	Year Improved
U.S. Highway 87						
South Fork Crooked Creek	13 mi. no Billings	Timber deck with asphalt	24.6	58	1930	1954
North Fork Crooked Creek	13 mi. no. Billings	Timber deck with asphalt	24.5	58	1930	1954
Dry West	17 mi. no. Billings	Timber deck with asphalt	24.5	57	1930	1954
Drainage	21 mi. so. Klein	Timber deck with asphalt	24.5	58	1930	1954
Drainage	21 mi. so. Klein	Timber deck with asphalt	24.3	59	1930	1954
Drainage	19 mi. so. Klein	Timber deck with asphalt	24.5	38	1930	1954
Drainage	18 mi. so. Klein	Timber deck with asphalt	27.0	57	1930	1948
Stockpass-Drainage	16 mi. so. Klein	Timber deck with asphalt	27.2	21	1930	—
Razor Creek	16 mi. so. Klein	Timber deck with asphalt	28.0	75	1955	—
Highway 312 (Huntley Road)						
Fivemile Creek	3 mi. ne. Billings	Timber Deck with asphalt	30.0	65	1947	—
BBWA Canal	4 mi. ne. Billings	Timber Deck with asphalt	30.0	69	1947	—
BBWA Canal	5 mi. ne. Billings	Culvert with asphalt	39.5	22	1973	—
Sevenmile Creek	5 mi. sw. Huntley	Timber deck with asphalt	30.0	25	1947	—
Twelvemile Creek	2 mi. sw. Huntley	Timber deck with asphalt	30.0	102	1947	—
Yellowstone River	Huntley	Timber deck with asphalt	28.0	1024	1949	—

Source: Montana Department of Highways (1985).

Because Highway 312 is not on the Federal Aid System, a comparable analysis of accident rates to those provided for U.S. Highway 87 is not available. The average number of accidents for Highway 312 (Huntley Road) over the past three years has been 21 accidents per year (table 3.39).

School Bus Transportation Routes

Six school systems operate buses that transport school children on the proposed coal haul route: Roundup School, Shepherd School, Pioneer School, Billings Junior High School, Billings Senior High School, and Huntley Project School. Roundup School buses travel both U.S. Highway 87 (south to the boundary of Musselshell and Yellowstone Counties) and the Old Divide Road. Shepherd School buses travel both U.S. Highway 87 and Highway 312 (the Huntley Road). Pioneer School buses travel Highway 312. Billings Senior High School has a bus route on U.S. Highway 87, while Billings Junior High School uses Highway 312 (Huntley Road) as a bus route. Buses for the Huntley Project School also travel on Highway 312 (Huntley Road) into Huntley to pick up and drop off students.

TABLE 3.37

AVERAGE DAILY TRAFFIC VOLUMES — U.S. HIGHWAY 87

	Site 1[1]		Site 2[2]		Site 3[3]	
	All Vehicles	Commercial[4]	All Vehicles	Commercial	All Vehicles	Commercial
1982	1,506	182	1,377	166	2,070	250
1983	1,440	172	1,521	182	1,865	223
1984	1,579	192	1,553	189	1,925	234
1985	1,449	131	1,491	135	1,700	154
1986	1,760	167	1,658	157	1,960	186
1987	1,786	151	1,777	151	1,780	151

Source: Montana Department of Highways, Program Development Division (Unpublished data).

[1]From Billings city limits to the boundary of Yellowstone and Musselshell counties (total stretch of highway = 20.2 miles).
[2]From boundary of Yellowstone and Musselshell counties to Klein (total stretch of highway = 21.0 miles).
[3]From Klein to Junction U.S. Highway 87 and U.S. Highway 12 (total stretch of highway = 1.8 miles).
[4]Commercial = Trucks with 2 axles and 6 tires (dual rear tires).

TABLE 3.38

AVERAGE DAILY TRAFFIC VOLUMES — HIGHWAY 312 (HUNTLEY ROAD)

	All Vehicles	
	Site 1[1]	Site 2[2]
1982	5,060	NA
1983	6,120	NA
1984	5,860	1,980
1985	6,070	1,800
1986	5,700	1,920
1987	6,740	1,700

Source: Montana Department of Highways, Program Development Division (Unpublished data).

Note: NA = Not available.

[1]On U.S. Highway 312 (Huntley Road) a short distance from intersection of U.S. Highway 87 and U.S. Highway 312 (Huntley Road).
[2]On U.S. Highway 312 (Huntley Road) where the highway crosses the Yellowstone River.

TABLE 3.39

HISTORIC DATA ON NUMBER OF TRAFFIC ACCIDENTS ON U.S. HIGHWAY 87 AND HIGHWAY 312 (HUNTLEY ROAD)

	U.S. Highway 87[1]	Highway 312[2] (Huntley Road)
1979	55	NA
1980	50	NA
1981	56	NA
1982	54	NA
1983	45	NA
1984	46	NA
1985	48	NA
1986	32	19
1987	28	21
1988	25	23[3]

Sources: Montana Department of Justice, Highway Patrol Division (Unpublished data); Montana Department of Justice, Highway Traffic Safety.

Note: NA = Not Available

[1]From intersection of U.S. Highway 87 and U.S. Highway 12 to intersection of U.S. Highway 87 and Highway 312 (Huntley Road).
[2]An 8-mile stretch of highway from intersection of U.S. Highway 87 and Highway 312 (Huntley Road) to town of Huntley.
[3]1988 data is through October 1988.

Table 3.40 presents the 1988/1989 schedule of school district bus routes applicable to the study area and the times that they would be on the proposed haul route. Most of the bus interaction with trucks on the haul route would be in the area of Highway 312 (Huntley Road) from U.S. Highway 87 into Huntley. Although these schedules are somewhat consistent from year-to-year, they may change depending on pickup points. For example, the Shepherd School bus that travels on U.S. Highway 87 currently does not go to the county line to pick up students; however, in the future there may be school-aged children in the area requiring bus transport services.

TABLE 3.40

INTERACTING SCHOOL BUS ROUTES — BULL MOUNTAINS STUDY AREA

School District	Bus Route	Highway	Interacting Time A.M.	Interacting Time P.M.
Roundup #55	Southern	Old Divide Road/ U.S. 87	7:25-8:00	4:15-4:50
Huntley Project 24	Huntley	312	6:50-7:15	3:30-4:15
Shepherd 37	1	312	7:35-7:50	3:45-4:15
Shepherd 37	2	312	7:25-7:50	3:45-4:15
Shepherd 37	3	312	7:45-8:00	3:45-4:00
Shepherd 37	8	U.S. 87	7:20-7:50	3:55-4:25
Shepherd 37	9	312	7:50-8:00	3:45-3:55
Pioneer 41	1	312	7:50-8:10	3:50-4:00
Pioneer 41	2	312	7:40-8:25	3:20-4:10
Billings 2	9	312	7:00-7:15	3:25-3:40
Billings 2	3	312	7:30-7:50	4:00-4:20

Source: Personal communications with staff from various school districts.

Peak use for the Highway 312 (Huntley Road) school buses is from 7:15 to 8:30 in the mornings and from 3:15 to 4:30 in the afternoons. It should be noted that at least two of the school districts (Shepherd and Pioneer schools) may have buses leaving in the afternoon up to one hour earlier than the schedule listed in table 3.40 on at least one day of the week because students are excused from school earlier on those days.

Climate

The project area is located approximately 13 miles south of Roundup and 35 miles north of Billings in Musselshell and Yellowstone Counties in the Bull Mountains of central Montana. The area is characterized by rolling hills covered by pine trees and sagebrush. The country slopes to the south and east into the Yellowstone River drainage.

The annual average precipitation ranges between 12 to 14 inches (three-fourths of which falls during the April to September growing season) which is adequate for many types of grains and grasses. The average precipitation at the nearest National Weather Service station (Broadview) is 12.62 inches. Winter time precipitation is light, averaging only 1.14 inches. May and June experience the greatest amount of precipitation with a combined total of 4.63 inches.

Temperature extremes in the area can be great with the warmest average temperatures recorded in July (71.8° Fahrenheit(F)) and coldest average temperatures recorded in January (21.7° F). The average annual temperature is 46.9° F and the frost-free season is 120 to 130 days.

Wind data in the study area is scarce. However, data collected over a ten-month period in 1981 indicated no predominant wind direction. Northerly winds were the most common. Average wind speeds were light averaging 3.5 miles per hour.

Air Quality

The study area for air quality is located in an area of previous mining activity. However, the mining was small-scale. The two active coal mines in the area produced a total of 32,244 tons of coal in 1984. Primary existing sources of air pollution are wind on unpaved roads, wood burning, and slash burning. The area is considered ind erosion), vehicle traffic as attaining the federal and Montana ambient air quality standards. The area is also classified as a Class II area under the Federal Prevention of Significant Deterioration regulations, allowing moderate growth. The nearest Class I area is located approximately 75 miles north-northeast in the U.L. Bend wilderness within the U.L. Bend National Wildlife Refuge.

Air quality measurements were made in 1981 for total suspended particulate matter (TSP) at three locations at the PM Mine (formerly the Bull Mountains Coal Company). The measurements of TSP were made for eleven months, from February through December, 1981. The maximum TSP concentration recorded was 107 micrograms per cubic meter ($\mu g/m^3$). This is compared to the federal secondary standard at that time of 150 $\mu g/m^3$. The federal particulate standards have now been changed to measure only 10 micron or smaller particulates (PM-10). The maximum geometric average TSP concentration measured for the eleven months was 23.6 $\mu g/m^3$. This is compared to the old federal secondary standard of 60 $\mu g/m^3$. No measurements of PM-10 particulates have been made in the area. The TSP measurements made in 1981 were also well within the PM-10 standards and as such, the PM-10 concentrations should be lower and within the standards. The present federal and Montana particulate standards are shown in table 3.41.

TABLE 3.41

AMBIENT AIR QUALITY STANDARDS FOR SUSPENDED PARTICULATES
(Values in micrograms per cubic meter)

Time Period	Montana PM-10	Federal PM-10
24-Hour	150*	150*
Annual	50+	50+

Source: Gelhaus (1989).

*Not to be exceeded more than once per year.
+Arithmetic average of the quarterly averages.

Areas of Critical Environment Concern (ACEC)

Within the affected area there are no designated areas of critical environmental concern. The possibility of a surface ACEC occurring on BLM surface ownership is remote because BLM administers very little surface in the project area (719.72 acres).

Cultural Resources

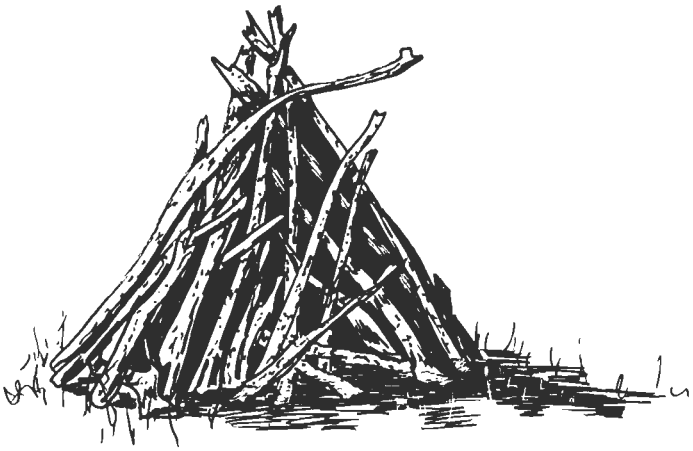
Three major inventory efforts have occurred within the project area. The first effort, conducted by BLM to Class III standards for resource planning, covered 8.7 percent of the selected federal coal lands. A total of five cultural properties were recorded within two 160 acre blocks. This permits a projection of one property for each 64 acres, or a total of 57.4 cultural properties within the selected federal coal lands.

Three lithic scatters, one aboriginal wooden structure, and two historic graffiti panels were found within these inventoried areas. Five additional aboriginal wooden structures and one historic cabin site were found during the inventory.

The second effort was conducted by a private consulting firm for a proposed mine plan. Areas inventoried to BLM Class III standards consisted of mine portal development areas of private surface within the project area. On the selected federal coal lands, non-intensive inventory was performed to provide information on impacts to cultural resources in buffer zone areas. A total of nine sites were recorded during this effort. These sites consisted of four historic homestead sites, one prehistoric rock art site, and four historic graffiti panels. sam?

The area was engulfed by the Hawk Creek wildfire in 1984. All standing wooden structures were destroyed by the fire. None of the aboriginal wooden structure sites have been relocated since this event.

The third inventory was performed in 1989 by a consulting firm Metcalf specifically for the proposed longwall mine. Class III inventory of 690 acres was conducted in areas with proposed surface facilities and waste disposal areas. A less intensive reconnaissance survey and Class I literature review was done for other lands within the mine plan area. The class III inventory yielded eleven cultural properties and eighteen isolated finds, a site density of one site per 63 acres agreeing favorably with BLM projections (Rood 1989). An additional site and isolated find were recorded within the reconnaissance area. The results of the 1989 inventory indicate that not only were all standing wooden structures destroyed by the Hawk Creek wildfire but Native American rock art sites may have been adversely affected as well.



The existing inventory information indicates a fairly intensive prehistoric utilization of the surface above the coal lands. Abundant porcellanite reserves provided raw materials for stone tool manufacture. The pine breaks ecozone was important winter game habitat. The complex and elevated topography or solitude vided fand viewshed characteristics important to prehistoric Native American religious practices.

Historic utilization of the area was also intense. As early as 1881, the coal reserves of the area were recognized as important and initial mining development was made by the Northern Pacific Railroad for their own coal needs. Transportation problems from the mine to the railhead made this early development infeasible at the time. In 1884, T. 6 N., R. 27 E., was summarized as being ". . . believed to contain more coal than any other in the Bull Mountains Field . . ." (Woolsey et al. 1917). Prospect work in the area began again in 1914.

Settlers began to homestead within the project area after 1900. Both grazing and agricultural lands were available. These were supplemented by income opportunities for logging and small coal mine operations. Most efforts were successful and only 19.6 percent of the patented land reverted to the federal government through the provisions of the Bankhead-Jones Act. All federal lands within the project area were patented during the homestead period.

Agriculture

The selected lands are currently used for livestock grazing and have no farmland potential. The public surface on the selected lands (T. 6 N., R. 27 E., Section 32 and T. 5 N., R. 27 E., Section 4, N½NW¼) are used as part of the Pfister Ranch and are classified as an "M" (maintain) category livestock grazing allotment. Existing range improvements include a well just outside the proposed exchange area but still on public surface.

Floodplains

In the Billings Resource Area RMP, floodplains were identified within upper reaches of Rehder Creek in T. 6 N., R. 27 E., Section 18, N½N½ of the selected federal coal lands. Within the project area, floodplains also exist on Meridian private lands in T. 6 N., R. 26 E., Section 7, SW¼ through the middle of Section 17, and in Section 13, SW¼.

Native American Religious Concerns

There are no known areas on the subject coal lands of religious concern to Native Americans. Consultation was initiated with the Crow tribe in June 1988. As of yet, BLM has received no response regarding religious concerns.

Threatened and Endangered Species

The three endangered species that could potentially occur in the project area include the bald eagle, peregrine falcon and the black-footed ferret. Though an occasional bald eagle may be seen migrating through this area, none of these three species are known to occur on or make current use of the project area.

Hazardous Wastes

There are no known hazardous wastes or landfill sites within the project area.

Wetland-Riparian Zones

There are no wetland or riparian areas, except springs, on the federal coal lands or within the project area.

Wild and Scenic Rivers

There are no proposed or designated wild and scenic rivers with-in the project area, nor are there any drainages that feed into a wild and scenic river.

Wilderness

There are no proposed or designated wilderness areas within the project area. The wilderness qualities of the area are low because of off-site and some on-site activities such as an adjacent highway, a major county road and coal mining activity.

Topography and Soils

The following soil descriptions were derived from the Soil Conservation Service (SCS) Soil Survey of Yellowstone County (1972) and unpublished survey data (Wegman pers. com. 1989). Major soils include the Bainville, Cabbart Delpoint, and Havre series.

The soils are derived from the Tongue River member of the Fort Union geologic formation. This member is composed of interbedded sandstone, siltstone, shale and coal beds as thick as 80 feet. The soils consist of mainly well-drained loams and sandy loams over weathered sandstone, siltstone and shale. Depths range from shallow to deep. Permeability is moderate and the hazard from wind and water erosion is moderate to severe.

These soils are used primarily for livestock grazing and wildlife habitat. The main management concerns are wind and water erosion, very low available water capacity and slope.

The sandstone and silty-shale bedrock has been dissected into narrow, smooth-topped ridges that are separated by deep, narrow coulees and dry stream valleys. Large, thick masses of sandstone outcrop on the sides of the coulees and valleys. The most prominent features of the landscape are the vertical ledges of sandstone 20 to 50 feet thick. The larger stream valleys contain thick alluvial deposits that surround knolls and hills. The drainageways are tributaries of the Yellowstone River. Elevation ranges from 3,500 to 5,000 feet.

Vegetation

The vegetation of the project area consists of 50 percent Ponderosa pine forest with Rocky Mountain juniper. Shrubs consist of skunkbush sumac, while grasses consist of little bluestem, bluebunch wheatgrass, sideoats grama and western wheatgrass. The remaining 50 percent of the area is dominated by grasslands composed primarily of little bluestem, green needlegrass, bluebunch wheatgrass, prairie sandreed, big bluestem, prairie junegrass and bluegrama.

Common forbs found within these vegetative communities include yarrow, cudweed sagewort, sunflower, yellow sweet clover, dandelion, salsify, and Russian thistle. Shrubs include silver sagebrush, big sagebursh, prairie rose, Wood's rose, and yucca.

Small wetland-type communities are found around springs in the project area. Species include rushes, cattails, prairie cordgrass, sedges, bulrushes, and snowberry.

The Hawk Creek fire burned extensive areas of the Ponderosa pine forest in the Bull Mountains in 1984. Much of the Ponderosa pine forest in the project area was destroyed setting this vegetative community back to an early seral stage as burned Ponderosa pine and grassland. The vegetative composition is basically the same as the Ponderosa pine grassland community, except invader species such as cheatgrass and Russian thistle tend to be found in these areas.

Wildlife

Game Species

The project area provides habitat for a variety of game and nongame species of wildlife. Appendix 17 lists all wildlife species known to occur in Yellowstone and Musselshell Counties. Species found by Meridian Minerals Company in their baseline inventory efforts and their relative abundance are also shown.

The primary vegetative type in this area prior to 1984 consisted of a Ponderosa pine overstory and a shrub/forb/grass understory. The 1984 wildfire burned through the area and created substantial changes in the habitat available to both game and nongame wildlife species in the area in 1984. The most apparent effect of the fire was the removal of much of the Ponderosa pine overstory which resulted in the release of the shrub/forb/grass understory. Grass and forb production has increased dramatically. The elk, mule deer, antelope and wild turkeys in the area have responded to this situation by making increased warm-season use of this abundant forage resource. A negative impact of the fire was the removal of the Ponderosa pine overstory and the loss of thermal and escape cover for the local elk and mule deer populations as well as roosting cover for the turkey population.

Prior to the 1984 fire, mule deer and elk used the area during the winter months and at other times of the year when escape cover

was needed. Both the elk and mule deer now seek thermal and escape cover on private lands to the east of the proposed exchange area. Though white-tailed deer, sharp-tailed grouse and pheasants occur in the general area, they are not known to occur on the subject coal lands (Dusek 1978).

Nongame Species

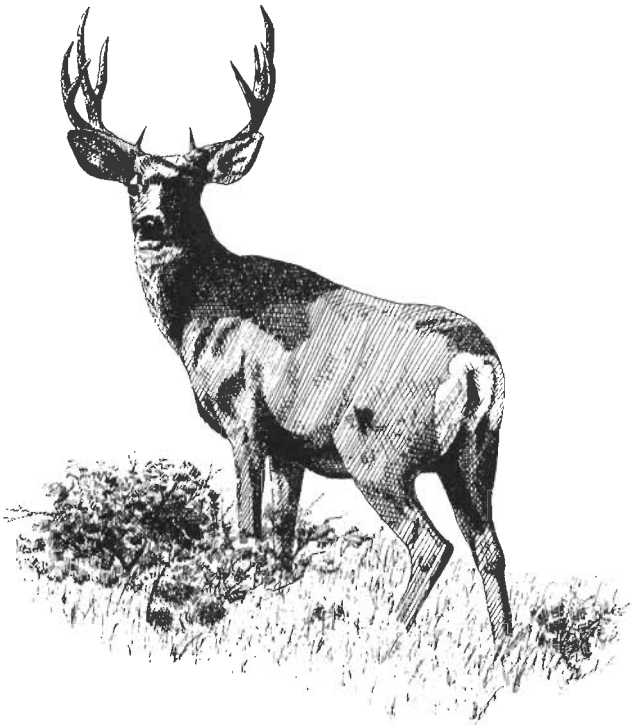
A wide variety of nongame mammals and birds occur in the Bull Mountains area. A nongame mammal study was conducted in the general area in 1976 (McCann 1976). As has been the case with the big game animals that occurred in this area, the 1984 fire has had a secondary positive effect on nongame species in the burned-over area. The return of the vegetative cover to an earlier seral stage has been beneficial to a host of small nongame mammals as well as some nongame bird species.

Woodcutters have removed many of the larger fire-killed Ponderosa pine trees in the area, thereby reducing the availability of nesting habitat for large nongame birds such as hawks and owls. However, there will likely be an increase in habitat for smaller cavity nesting species such as flickers and woodpeckers.

Red-tailed hawks are occasionally seen in the area and there is one known prairie falcon aerie off-site in the vicinity of the subject coal lands (Farmer pers. com. 1989).

Macroinvertebrates

As part of Meridian's baseline inventory efforts for the mine plan, macroinvertebrate populations in the project area were sampled. A listing of these species is found in appendix 17. There were no rare or unusual life forms and the samples collected indicated low to moderate species diversity, low to moderate species densities, and low productivity (Meridian 1990).



Minerals

Coal

There are several coal beds in the area (figure 3.2). Only the Mammoth bed in the upper Fort Union formation is of sufficient thickness to be considered an underground mineable resource within the proposed exchange area. It ranges from eight to 15 feet thick in the study area, averaging 10.2 feet. It is thinnest in T. 6 N., R. 26 E., Section 25, thickening to 11 feet in T. 6 N., R. 27 E., Section 33. On the eastern edges of sections 21, 28, and 33 the Mammoth merges with the overlying Rehder bed and the combined bed rapidly thickens to 15 feet by the center of Section 34.

The Rehder coal bed is 1.5 to four feet thick throughout the study area. The parting between the Rehder and the Mammoth beds is 40 feet or more in the western half of the Bull Mountains area.

Quality analyses for the Mammoth bed in the project area, based on samples from 27 sites, are:

	Average	Range
Btu/lb	9,640.00	8,970 to 10,200
Moisture %	17.65	16.57 to 20.29
Ash %	10.20	6.93 to 13.88
Volatile Matter %	29.68	27.77 to 32.35
Fixed Carbon %	42.12	39.27 to 45.00
Sulfur %	.87	.50 to 01.22

Oil and Gas

The Bull Mountains lie on the southern edge of the Bull Mountains basin. Oil is developed in the Melstone area approximately 20 miles north of the project area. There are three dry wells in the vicinity of the project area. Given the presence of oil and gas bearing formations and the fact that all possible horizons were not tested in the three dry wells, the project area has been classified as having moderate oil and gas development potential (USDI in press). There is no known current active interest in the area for oil and gas development.

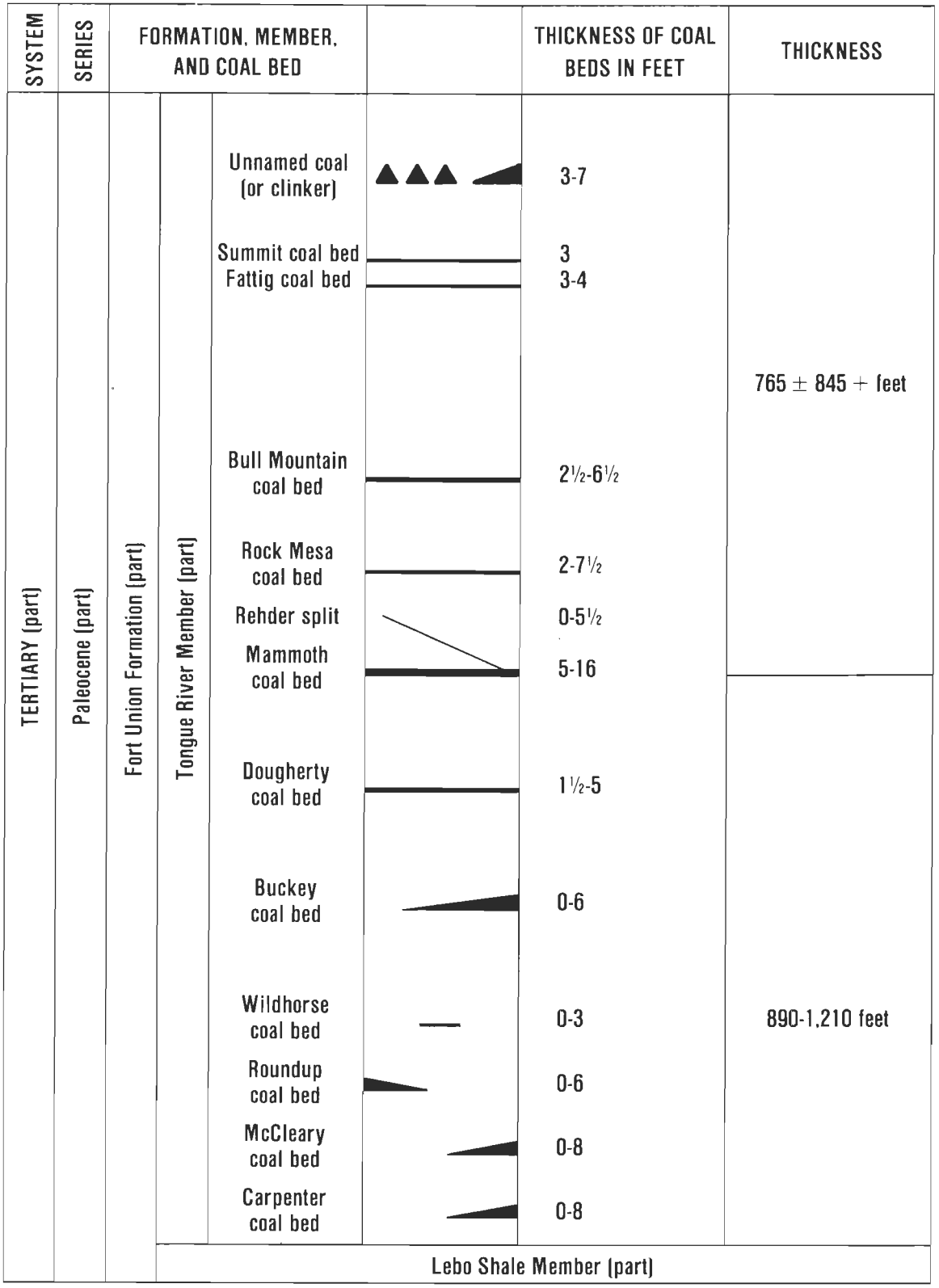
Mineral Materials

Within the project area there are several deposits of clinker. Clinker (also known as scoria) is the baked and fused rock which resulted from the inplace burning of coal deposits. Clinker is used as road surfacing material on a local basis. Due to the relative remoteness of the area and the ready availability of clinker and gravel for road surfacing in the Bull Mountains area, the clinker is of little significance. It may be useful to local ranchers and for any roadwork done in conjunction with mine development.

Locatable Minerals

There are no known deposits of locatable minerals or mining claims within the area.

Figure 3.2 — Stratigraphic position of the Mammoth coal bed and other relatively persistent coal beds in the Bull Mountain coal field.



Source: Connor, 1988

Hydrology

Groundwater Hydrogeologic Setting

The project area (map 6) lies within that portion of the Bull Mountains basin defined by surface outcrops of the Fort Union formation of Paleocene age, specifically the Tongue River member. This member consists of consolidated sediments ranging from light-buff to dark-gray shaley siltstones and shales, brown to black carbonaceous shales, and coal beds. Locally, coal outcrops have burned out with associated baking of overlying sandstones and shale to form clinker.

Locally, the affected portion of the Bull Mountains basin consists of a very flat-limbed syncline (1° to 2° dips) that plunges gently to the northwest (map 7). Higher elevations in central portions of this structure are capped by mesa-like outcrops of clinker beds up to 80 to 90 feet thick. Otherwise, the hydrogeologic setting is dominated by highly dissected terrain underlain by discontinuous sandstone lenses, bounded by siltstones and shales, and relatively thin coal seams. The stratigraphic sequence is basically the same in the Bull Mountains area (figure 3.3) as it is regionally throughout eastern Montana.

Groundwater Hydrostratigraphy

Several hydrogeologic units of this formation have regionally been defined as aquifers and generally yield significant quantities of water to both wells and springs (Hotchkiss and Levings 1986). Three aquifers overlie the thick impermeable Bearpaw shale unit of the Bull Mountains basin and other portions of the Powder River basin Fort Union Coal Region (figure 3.3). In ascending order these are:

1. Fox Hills-Lower Hell Creek Aquifer — composed of the Fox Hills sandstone and the lower part of the Hell Creek formation. This aquifer yields water in most areas, generally less than 100 gpm to wells, but occasionally greater than 200 gpm locally. Yields of 20 gallons per minute are common.

2. Tullock Aquifer — composed of the basal channel sandstone of the Lebo shale member, where present, and the Tullock member of the Fort Union formation. Because of its stratigraphic position between thick shales, the Tullock aquifer is hydrologically confined. Yields in both sandstones and coals range as high as 40 gpm, but 15 gpm is more common.

3. Tongue River Aquifer — composed of the Tongue River member of the Fort Union formation. It also includes channel sandstones of the upper Lebo shale member where present. This unit is the uppermost of the post-Bearpaw shale aquifer system of eastern Montana and is considerably thicker than underlying units. Generally it is hydrologically confined except near the surface. In spite of highly variable thicknesses and poor horizontal continuity, thick saturated sandstones of the unit have yielded as much as 160 gpm in other areas. The thinner, lens-like distribution of sands of the Tongue River member in the Bull Mountains area limits yields to the 15 to 30 gpm range. Coal seams of the Tongue River member, like those of the Tullock member, have good yield potential in favorable situations.

In the Bull Mountains area, wells and springs tend to be confined to the Tongue River member because of its thickness and the 1000 to 2000+ feet depths required to tap deeper aquifers. For this reason, development of deeper aquifers has not been undertaken except at near-surface outcrop locations having limited recharge potential. Lack of data precludes adequate evaluation of these deeper units within more central portions of the Bull Mountains basin, but based on other similar geologic configurations, substantial quantities of water might be yielded by deep drilling in central areas of the basin.

Groundwater Recharge

Primary groundwater recharge of shallow hydrogeologic units in the southern portion of the Bull Mountains basin results from surface infiltration of precipitation. Because of the flat-lying nature of stratigraphic units, such infiltration tends to be limited to the uppermost exposed horizon of the Tongue River member, in this case the 80 to 90 feet of clinker beds forming the mesa-like cap of Dunn Mountain (map 7). Elsewhere, exposure to precipitation of permeable sandstones are limited by their cliff-like outcrops. Slopes of the highly dissected Bull Mountains terrain also tend to be underlain by siltstones and shales, and thus are more conducive to runoff than to infiltration.

In the absence of a major losing stream system, total recharge for the southern portion of the Bull Mountains project area results from snowmelt and precipitation. Deeper sandstones are recharged primarily by leakage from overlying sand lenses, in spite of losses from the latter by outflow where they intersect the surface.

Groundwater Flow

Flow of shallow groundwater in the Bull Mountains is highly dependent on recharge, which in turn is dependent on infiltration from snowmelt and precipitation. Hydraulic conductivities of the Mammoth coal and of sandstones above and below the coal range from .002 to 2.9 feet per day. Such variability makes it difficult to predict flow rates with a high degree of certainty.

Seasonal and annual fluctuations in precipitation strongly control the magnitude of groundwater recharge of the Tongue River aquifer. As a result, springs and possibly wells may be affected, with flow irregularities being the rule rather than the exception, especially in the case of perched zones above the Mammoth coal. The more confined nature of deeper units results in less seasonality of flow due to the added potential for pressure release of stored waters under potentiometric head conditions and from the larger recharge area involved.

Figure 3.4 schematically represents local groundwater flow in the Bull Mountains. Precipitation infiltrates primarily into the clinker beds which act as a temporary storage reservoir. Slow downward movement through less permeable strata ultimately feeds confined sand lenses so that multilevel, perched water systems are created. Where surface channels intersect these sands, springs occur. Vertical permeability variations tend to complicate the general downward migration of groundwater, but the net result is recharge to a regional system. Locally, flow may be interrupted by topographic irregularities resulting in springs and diversion of infiltrating waters to shallow alluvial systems.

Based on available well data, the groundwater gradient for the Mammoth coal has been determined (map 8). In general, flow is to the northwest, much as would be predicted for a northwest

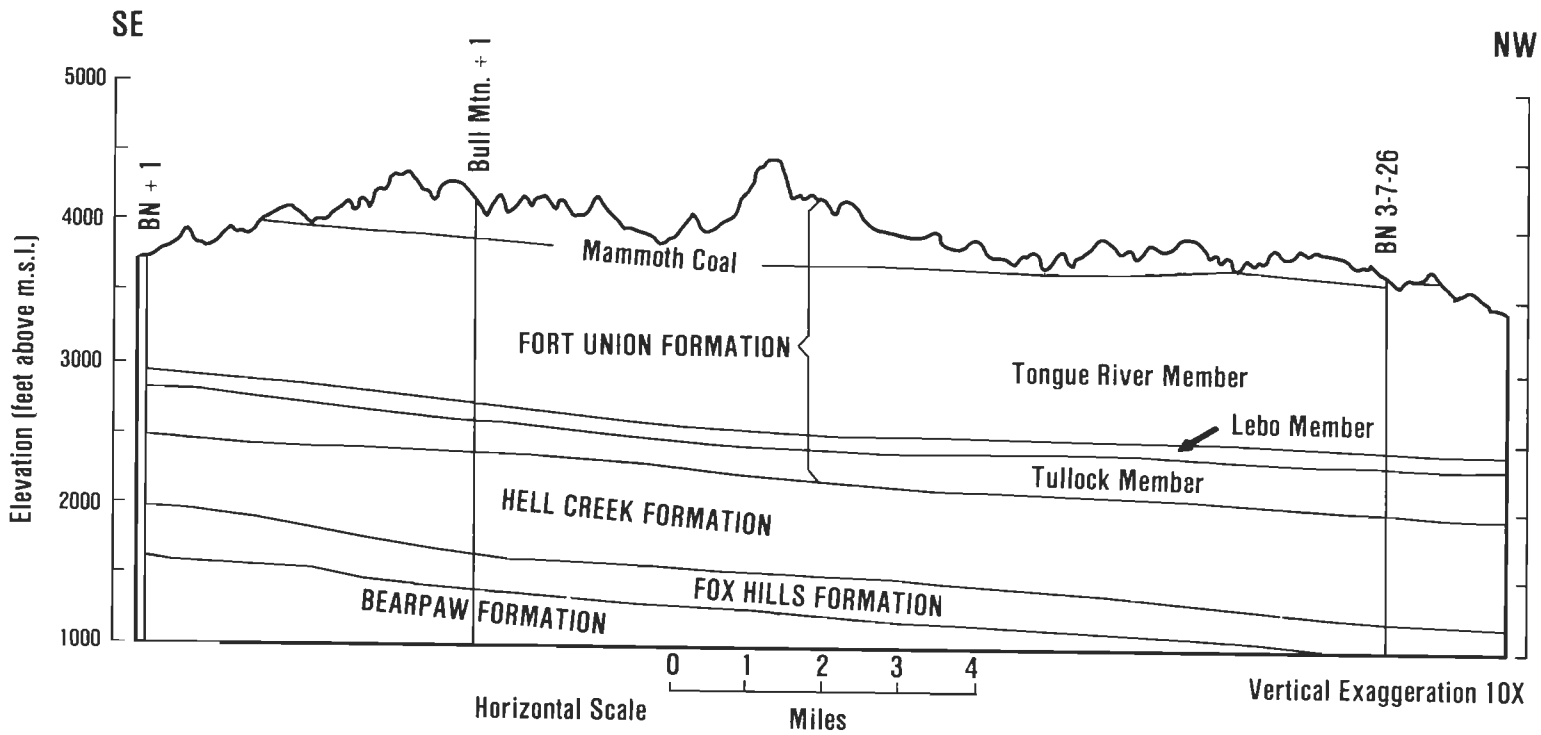
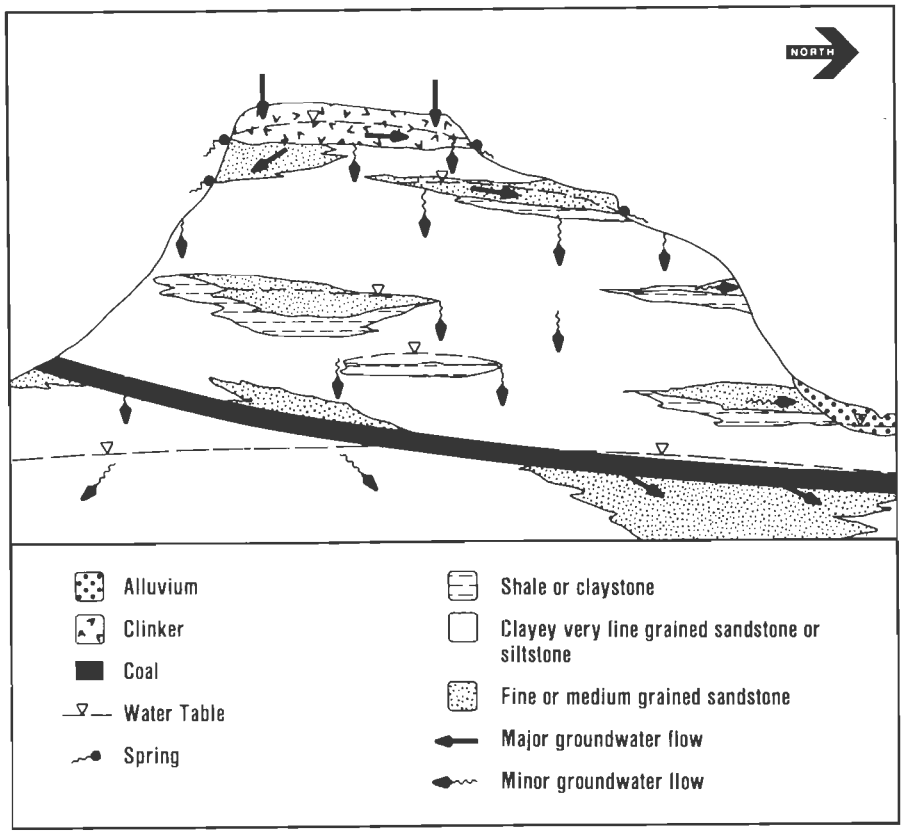


Figure 3.3 — Geologic cross section through the Bull Mountains area. Formation and member contacts based on Integrity Oil and Gas Company wells (names shown above wells); Mammoth coal occurrence based on numerous shallow exploration holes not shown on section. Section is approximately along the axis of a broad, gently plunging syncline. (Source: Thompson, 1982)

Figure 3.4 — Schematic diagram illustrating ground-water flow in the Bull Mountains area. (Source: Thompson, 1982)



plunging synclinal structure. Premining flow of deeper confined groundwater thus tends to be away from outcrops and toward the center of the Bull Mountains basin under strong influence of regional stratigraphy and structure.

Groundwater Discharge

Groundwater discharge in the Bull Mountains area generally takes two forms. Seepage of groundwater from sand lenses and/or perched systems above the Mammoth coal seam occurs in the form of springs at the intersections of topographic channels with such zones. This is basically unconfined discharge and is severely limited by recharge conditions. This discharge temporarily recharges channel alluvium locally, but downstream groundwater in alluvium may either infiltrate back into bedrock or contribute to perennial stream flow through surface discharge.

Except for near outcrop areas, the deeper system is characterized as semiconfined or confined. As flow continues downward and laterally into central portions of the Bull Mountains basin, groundwater can be discharged only by deep well release or by upward hydraulic flow to surface streams outside the project area, depending on geologic conditions and/or local pressure differentials.

Wells and Springs

As stated previously, saturated sandstone lenses, especially those with associated perched groundwater, may discharge as springs where intersected by surface channels. For this reason most springs in the Bull Mountains tend to be located along drainage bottoms, and in spite of being commonplace, exhibit high seasonal variability. These shallow "outcrop type" springs are the most common livestock and wildlife water source. Similarly, shallow wells tapping alluvium and/or perched groundwater in sands above the Mammoth coal seam also serve as livestock and domestic sources. Because of their low hydraulic conductivities (.04 feet per day average), and relatively thin nature, average transmissitivities are in the range of 1.1 square feet per day. Thus, shallow wells in the area (less than 300 feet) cannot be considered to be good groundwater producers and are probably prone to overpumping.

Characteristics of major springs and wells of the Bull Mountains area, are tabulated in tables 3.42 and 3.43; locations are plotted in map 6. Most lie outside the immediate vicinity of the proposed mine area, and several nearby wells actually tap sub-Mammoth sandstones. Within approximately one mile of its outcrop, the Mammoth coal itself appears to be dry, according to test wells and exploration cores. To the northwest, however, deeper wells appear to tap confined groundwater of more central portions of the Bull Mountains basin, and the Mammoth coal is considered to be saturated with groundwater under hydraulic head.

TABLE 3.42

BULL MOUNTAINS
WELL INVENTORY DATA

Well No.	Legal Location	Ground Elevation	Depth of Well (feet)	Aquifer	Discharge (gpm)	Depth to Water	Water Elevation	Mammoth Elevation	Comments
				PRIVATE WELLS					
PW-001	5N 27E 6 NW4NW4	3868	250	Sub-Mam.	—	—	3868.0	—	
PW-002	5N 27E 6 NW4SE4	3825	120.50	Sub-Mam.	8	24.80	3801.0	—	From Quad Map
PW-003	6N 26E 12 SW4NE4	3850	132	Sub-Mam.	5	71.10	3778.9	3790	Log/SS aquifer 105-114
PW-004	6N 26E 13 SW4SW4	3890	200	Sub-Mam.	12	7.00	3815.0	3885	Aquifer at 200 ft
PW-005	6N 26E 13 SW4NE4	—	250.96	—	12	200.00	—	—	
PW-006	6N 26E 24 Center	3940	206	Sub-Mam.	32	—	—	—	Sandstone and clay aquifer
PW-007	6N 26E 35 NE4SE4	3734	50	Sub-Mam.	10	30.00	3704.0	—	
PW-008	6N 26E 36 SW4SW4	3720	—	Sub-Mam.	—	33.00	3687.0	—	
PW-009	6N 26E 36 SW4SE4	3720	—	Sub-Mam.	—	—	3720.0	—	
PW-010	6N 26E 36 NW4NW4	—	75	Sub-Mam.	2	75.00	—	—	Sandstone aquifer below surface gravel
PW-011	6N 27E 7 SW4NE4	3940	—	Sub-Mam.	20	47.30	3892.7	3740	
PW-012	6N 27E 7 SW4SW4	3970	190	Mam. O.B.	1	146.00	3824.0	3788	
PW-013	6N 27E 11 SW4NE4	3900	100	Sub-Mam.	5	63.00	3837.0	3824	
PW-014	6N 27E 11 SW4SW4	4077	443	Sub-Mam.	4	115.00	3692.0	3802	
PW-015	6N 27E 11 SE4NW4	—	200	—	5	110.00	—	—	Log/Mammoth not present
PW-016	6N 27E 18 SW4NW4	4035	190	Mam. O.B.	1	4.00	3990.0	3812	
PW-017	6N 27E 19 NW4SW4	4030	360	SUB-Mam.	3	173.50	3856.5	3915	
PW-018	6N 27E 30 SW4	—	250	—	8	—	—	—	Water table reported at 150 ft
PW-019	6N 27E 31 NW4SE4	3963	170	Sub-Mam.	12	1.70	3911.3	—	Perforations 130-170
PW-020	6N 27E 32 SW4SW4	3900	85	Sub-Mam.	—	65.90	3834.1	—	
PW-021	6N 27E 34 SE4SW4	3982	270	Sub-Mam.	—	189.60	3792.4	—	Exploration hole temporarily used
PW-022	6N 27E 35 SW4NE4	3980	195	Sub-Mam.	—	153.70	3826.3	—	
				OBSERVATION WELLS					
OW-001A (BM8A)	6N 26E 24 SW4SE4	4065	170	Sub-Mam.	—	156.86	3908.1	393	MBMG Observation Well 8A
OW-001B (BM8B)	6N 26E 24 SW4SE4	4065	142	Mammoth	—	—	—	3935	MBMG Observation Well 8B (dry)
OW-002A (BM5A)	6N 27E 14 SE4SE4	4325	456	Mammoth	—	424.08	3900.9	3885	MBMG Observation Well 5A
OW-002B (BM5B)	6N 27E 14 SE4SE4	4325	291	SS Mam. O.B.	—	286.62	4038.4	3885	MBMG Observation Well 5B
OW-002C (BM5C)	6N 27E 14 SE4SE4	4325	75	Mam. O.B.	—	Dry	—	—	MBMG Observation Well 5C (dry)
OW-003A (BM4A)	6N 27E 10 NW4NW4	4035	277	Mammoth	—	220.98	3814.0	—	MBMG Observation Well 4A
OW-003B (BM4B)	6N 27E 10 NW4NW4	4035	160	Mam. O.B.	—	123.41	3911.6	—	MBMG Observation Well 4B

Source: Northern Engineering and Testing, Inc. (1988).

Note: Well locations are shown on Map 6.

TABLE 3.43

BULL MOUNTAINS
RECORD OF SELECTED SPRINGS

Spring No.	Location	Altitude of Land Surface (feet)	Discharge (gallons per minute)	Specific Conductance (umhos/cm) at 25°C	Temperature (degrees C)
SP-001	05N26E01AAA	3760	—	1000	2.0
SP-002	06N27E09DAD	4200	2	2080	13.0
SP-003	06N27E11CAA	3895	—	2930	15.4
SP-004	06N27E14BDC	4380	—	2000	16.2
SP-005	06N27E15AAA	4086	—	1300	15.0
SP-006	06N27E15CBD	4400	0.5	800	12.0
SP-007	06N27E15CCC	4460	2	480	7.8
SP-008	06N27E15DBA	4440	1	410	9.0
SP-009	06N27E17AAA	4090	—	1320	5.8
SP-010	06N27E17ACC	4075	—	770	13.0
SP-011	06N27E20AAB	4160	0.2	2250	2.5
SP-012	06N27E20BCC	4090	—	1400	10.5
SP-013	06N27E21ADD	4440	0.2	850	2.0
SP-014	06N27E21BAC	4270	3	990	7.0
SP-015	06N27E21BBA	4220	2	1510	6.5
SP-016	06N27E21DAD	4465	3	430	3.0
SP-017	06N27E22ABB	4450	3	460	9.2
SP-018	06N27E22ACB	4420	1	380	8.1
SP-019	06N27E22CBC	4490	—	470	8.5
SP-020	06N27E27BAC	4360	0.3	490	6.8
SP-012	06N27E27ACC	4260	0.8	890	10.0
SP-022	06N27E28CBD	4370	—	1305	9.0
SP-023	06N27E28CDD	4480	0.2	780	8.2
SP-024	06N27E29AAA	4260	—	—	—
SP-025	06N27E34ADD	3990	—	1960	10.3

Source: Rioux and Dodge (1980).

Notes: Many known springs were dry on 8/5/88, due to lack of normal precipitation in the area; spring locations are shown on Map 6.

Surface Water and Drainage Systems

No major stream system is present in the Bull Mountains; the nearest perennial stream of consequence is the Musselshell River, approximately 18 miles to the northwest. Major surface drainage of the area is by intermittent surface runoff via ephemeral channels. Most surface drainage is northward via the upper reaches of Rehder and Fattig Creeks. Southeasterly drainage is provided by Pompeys Pillar and Railroad Creeks (map 6), although only ephemeral tributary channels of their upper reaches lie within the area to be impacted by mining. No designated alluvial valley floor situations are present within the project area in association with any of these drainages.

Water Quality

Water quality analyses (tables 3.44 and 3.45), collected from both wells and springs of the Bull Mountains area, indicate that groundwater chemistry is diverse but tends to reflect location in the flow system, aquifer mineralogy, and time of aquifer contact. Specific conductances range from 500 to 3000+ micro mhos per centimeter (μ mhos per cm), the median value being approximately 2000 μ mhos per centimeter. This appears to compare favorably with lower concentrations associated with sodium-bicarbonate waters of the deeper Fox Hills-lower Hell Creek aquifer rather than the higher concentrations commonly associated with the Fort Union formation of eastern Montana (Montana Bureau of Mines and Geology (MBMG) 1978). Otherwise, water quality of springs and wells in the Bull Mountains is typical of Fort Union water elsewhere, particularly in terms of cation/anion concentrations.

According to Lee (1980), the geochemistry of Fort Union formation water in southeastern Montana is of a dual character. Deeper waters (greater than 200 feet) tend to be less variable than shallow waters, with water quality in general being more or less related to a number of localized geochemical cells. Chemical quality appears to change as groundwater flows from areas of low sodium and potassium percentage (recharge areas) to areas of higher sodium and potassium percentage (discharge areas), but composition also varies according to position in the system, both in terms of depth and topographic location. At higher elevations, wells and springs are dominant in magnesium, calcium, sodium and bicarbonate, with moderate sulfates and low chloride concentrations. Shallow wells at lower elevations are dominant in sodium and sulfate or sodium and bicarbonate with increased chloride.

According to Thompson (1982) recharge water from precipitation takes on a calcium-magnesium-bicarbonate, low-dissolved solids character on entry into the groundwater system. As waters move through the Tongue River member, total dissolved solids and sulfate concentrations increase while calcium and magnesium become selectively absorbed into clays with simultaneous release of sodium ions into the water. The end product becomes water with varying concentrations of sulfate and bicarbonate and with sodium as the dominant cation. In deeper, down-gradient portions of the groundwater system, sodium-sulfate (sands) and sodium-bicarbonate (coals) waters dominate. In the Bull Mountains area, intermediate compositions appear to be the most common.

Both dissolved solids and sulfate concentrations of groundwater samples exceed U.S. Environmental Protection Agency 1975 secondary standards for public drinking water supplies, and a few samples contain excess iron, manganese and nitrate (Thompson 1982). On the average these waters can be used for both livestock watering and human consumption without harmful effects in spite of its low quality.

Recreation

In the project area, the major recreational activity is hunting, primarily for mule deer, although there is some elk and turkey hunting that occurs. Public recreational opportunities are limited by the lack of public landownership and access. Most private landowners allow the general public access to their lands by permission for recreational purposes, usually hunting. This varies amongst the private landowners as to who they allow and for what recreational purposes.

Other recreational activities include cross-country skiing, snowmobiling, hiking and camping. These opportunities are also limited and controlled by the private landowner by permission. The potential to increase the public recreational opportunities is low, given the small amount of public lands involved.

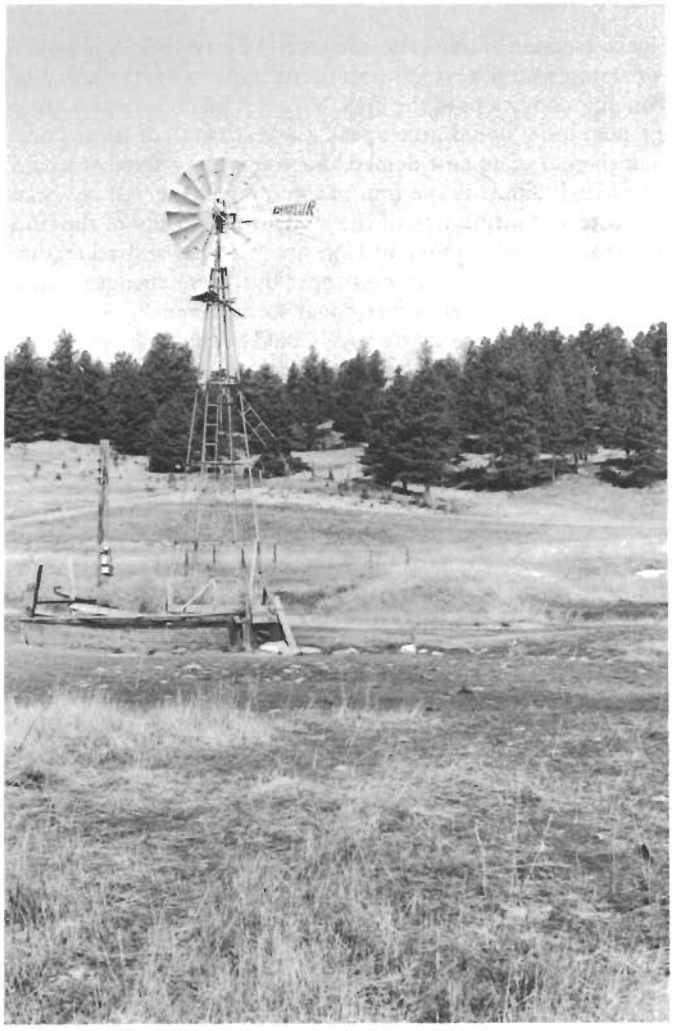
TABLE 3.44

BULL MOUNTAINS
WATER QUALITY DATA FROM SELECTED WELLS

Well No.	Specific Conductance (umhos/cm) at 20° C	pH	Temp (°C)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Potassium (mg/l)	Bicarbonate (mg/l)	Sulfate (mg/l)	Calculated Dissolved Solids (mg/l)	Sodium Absorption Ratio	Aquifer
					PRIVATE WELLS							
PW-004	2850	7.3	10	270	240	58	7	500	1200	2060	0.6	Sub-Mam.
PW-009	1620		9									Sub-Mam.
PW-012	2510	7.5	8.7	28	14	550	5	440	870	1740	21	Mammoth
PW-014	1350	8	10.5	71	140	46	8.1	480	440	970	0.7	Unknown
PW-017	2600	7.8	8.0	80	60	330	9	370	830	1500	7	Mammoth
PW-019	2400	7.9	11	46	29	470	7	600	660	1580	13	Sub-Mam.
					OBSERVATION WELLS							
OW-001A	2770	7.1	12.5	65	17	570	7.4	800	846	1920	16.2	Sub-Mam.
OW-002A	3010	7.8	11.3	21	6.5	680	7.7	560	1130	2140	33.2	Mammoth

Source: Modified from Rioux and Dodge (1980), and Thompson (1982).

Note: Well locations are shown on Map 6.



Stratigraphy and Geology

The coal in the Bull Mountains is in the Fort Union formation (Paleocene). The Lebo shale is the lowest member of the Fort Union to outcrop in the Bull Mountains. It consists of dark shales, sandstone, and coal beds. Above the Lebo is the undifferentiated Tongue River member of the Fort Union formation, consisting of light-colored sandstone, shale, and coal. Both units are nonmarine deposits.

The area lies in a broad syncline with an east-west axial trend. Regional structure dips 1° to 4°. Locally, the structural trend is a 0.8 northward dip. This changes slightly to a shallow north-northeast plunging syncline in T. 6 N., R. 27 E, Section 17, on the north edge of the project area.

As the structure is relatively level, overburden on the coal rises as a direct function of the topography. This results in a series of narrowly contoured bands of overburden zones rising rapidly from the outcrop.

Existing Subsidence

Existing subsidence from previous mining in the Bull Mountains has been very minimal. Only two "sinkholes" required repair of surface subsidence damage (Mundie pers. com. 1989). In both cases, the subsidence occurred over areas where the overburden ranged from 30 to 40 feet thick. These sinkholes were approximately 20 to 30 feet in diameter and about 15 feet deep. See appendix 5 for further discussion of subsidence.

Data Adequacy

Resource information and data adequacy for the federal coal lands is discussed in appendix 10.

TABLE 3.45

WATER QUALITY OF SELECTED SPRINGS

Spring No.	Specific Conductivity (umhos at 25° C)	pH	Temp (°C)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Potassium (mg/l)	SAR	Bicarbonate (mg/l)	Sulfate (mg/l)	Chloride (mg/l)	Calculated Dissolved Solids (mg/l)
SP-009	1450	8	16.5	34	97	150	7	3	740	190	4	1240
SP-012	1400	8	10.5	71	140	46	8	.7	480	440	10	1210
SP-017	500	8	9	46	30	8.6	3	.2	290	11	13	272
SP-023	1350	7.7	7	96	100	22	6	.4	520	250	11	757

Source: Rioux and Dodge (1980).

Note: Spring locations are shown on Map 6.

OFFERED PRIVATE LANDS

As part of Meridian's effort to facilitate the exchange, they made high-value recreation and wildlife lands available to BLM for possible acquisition. BLM selected lands from table 2.2. The top priority selections, replacement lands, and their general locations are shown in maps 3 through 5.

PRIORITY LANDS 1,2,3 — MADISON COUNTY (697.45 acres)

CURRENT MANAGEMENT

Priority Lands 1 (572 acres)

This tract has legal access from both the north and south on the west side of the Madison River by a primitive county road that is little used. The access is a dedicated county road that has not been maintained and for approximately seven miles is nothing more than a two-track, primitive road. The road maintenance effectively ends at the junction of the Call Road in T. 7 S., R. 1 W., Section 30, NE¼. This tract fronts the Madison River for 3/4 of a mile, and slopes up to a bench overlooking the river and valley. This tract is currently leased for cattle grazing.

Priority Lands 2 (48 acres)

U.S. Highway 287 bisects this tract. Approximately one acre lies east of the highway; the balance of the tract is between the highway and the Madison River. Currently this tract is leased for cattle grazing. This tract is included in an allotment management plan developed by BLM in 1987.

Priority Lands 3 (77.45 acres)

This tract is bisected by a BLM road that leads to the West Madison Recreation Area and Wall Creek State Game Range. There are 5.65 acres on the east side of the river; the remainder of the tract is west of the river. This tract is grazed in conjunction with the adjoining private and BLM lands. Main access to the property is south from Ennis via U.S. Highway 287. U.S. Highway 287 is a paved, two-lane highway, with year-around access. The road is maintained by the MDOH.

AFFECTED ENVIRONMENT

Socioeconomics

The conversion of small isolated tracts of private land to public ownership would have no significant impacts on the social or economic conditions of the area. No permanent in-migration or out-migration would accompany the exchange of landownership; therefore, no new demand for community services would be realized. Similarly, no impacts would be expected on social structure and interaction of the area in the vicinity of the land exchange. Some changes in land-use patterns and recreation may accompany the land exchange, but these changes would minimally affect local and regional socioeconomic conditions. The most likely land-use changes would be that more dispersed recreation would take place after the land has changed from private to public ownership; or, if the land is rangeland, the cost of leasing grazing rights may change (lessened) due to the exchange.

The three tracts of property being considered for exchange in Madison County are located approximately 20 miles south of Ennis, Montana, along the Madison River. The area is rural with limited available services.

Property taxes on the three tracts totalled $124.15 in 1987. Primary economic use of the property is for grazing, with priority lands 1 (572 acres) having a grazing capacity of 98 animal units per month (AUMs); priority lands 2 (48 acres), a capacity of 10 AUMs; and priority lands 3 (77.45 acres), a capacity of 9 AUMs.

The Madison River valley from Quake Lake to Bear Trap Canyon has been heavily subdivided for recreation and vacation homesites. These tracts vary in size from one to 40 acres and are intermingled with working cattle ranches. The river is heavily used by fishermen from across the United States from May through October. The big game hunting season in October and November also attracts many people. The influx of these short-term visitors is a revenue-producing source for the town of Ennis and local fishing and hunting guides.

Air Quality

Air quality over these affected lands is Class II.

Areas of Critical Environmental Concern

These lands are not located in any areas of critical environmental concern.

Cultural Resources

Systematic cultural resource inventory of these lands has not been accomplished. Existing inventory, indicates three cultural properties will be acquired through the proposed exchange action. All three properties are prehistoric and consist of a stone circle or tipi ring site, cairn site, and a bison drive alignment system.

Agriculture

Agricultural uses on priority lands 1, 2, and 3 favor livestock grazing of native and introduced forage plants for red meat production. The lands are rangelands with no indication they have been plowed, farmed or cultivated in the recent past. No ditches are present that would indicate flood irrigation.

These lands have soils which, if found in large blocks, could be farmed for small grains and alfalfa hay with irrigation and intense management. These soils are found as small, isolated inclusions in larger units. It is uneconomical or impractical to develop these soils into a cultivated field or farm unit. The best uses of these lands are for watershed, wildlife, recreation and domestic livestock grazing.

Floodplains

Portions of the priority lands 1, 2, and 3 are located within the 20-, 50- and 100-year floodplains and are subject to seasonal flooding by the Madison River. Priority lands 1 contains approximately 3,800 feet of Madison River shoreline and 4.4 acres of floodplain. Priority lands 2 is bordered on the west by 2,200 feet of the Madison River with 2.5 acres in the floodplain. Priority lands 3 is bisected by 1,200 feet of the Madison River and contains 2.7 floodplain acres.

The possibility for seasonal flooding restricts the use of these lands to water-related recreation, riparian habitat, watershed, water for domestic livestock, wildlife and fisheries. Lands within the floodplain are not suited as homesites, campgrounds and recreational development, except as boat landings. These tracts contain nonfloodplain areas which are more suited to roads, campgrounds, homesites, structures and developed uses.

Native American Religious Concerns

There are no known sites or areas believed to be of religious concern to Native Americans.

Threatened and Endangered Species

There are no known threatened or endangered plant species on these tracts. Bald eagles, an endangered species, utilize the Madison River as winter habitat, primarily as a foraging area. No suitable roosting or nesting trees occur along the river, although there is potential for cottonwood generation. No other threatened or endangered animal species occur.

Hazardous Wastes

There are no known hazardous waste or landfill sites on these lands.

Wetland/Riparian Zones

These tracts have approximately 1.5 miles of riparian habitat along the river. Riparian condition has deteriorated as a result of grazing practices. Remnant shrubs include firmleaf willow, slender willow, Bebb willow and water birch; however, these shrubs are declining. The Madison River channel is very resistant to erosion and detachment so channel stability is not a problem. Cherry Creek runs through the entire length of the tract in T. 8 S., R. 1 W., Section 15. This creek has about a ten-foot riparian zone comprised of rushes and sedges; no woody species are present. The Madison River borders the northeastern portion of this tract. The riparian zones of these tracts have little chance for expansion due to the stoniness of the soils and the limitations of capillary action. All these tracts have infestations of spotted knapweed and Canada thistle particularly along the river. It should be noted that priority lands 1 are adjacent to an existing allotment management plan (AMP) on the east side of the Madison River. This livestock grazing allotment is one of BLM's "riparian showcase" AMPs with very specific riparian improvement objectives.

Wild and Scenic Rivers

The Madison River is not designated as a wild and scenic river, but has been considered for study status as a potential addition to the wild and scenic river system.

Wilderness

None of these lands are being studied for or managed as wilderness.

Topography and Soils

Topography is typical of broad, glaciated river valleys of southwestern Montana. The priority lands are located on floodplains, low teraces and benchlands along the Madison River. Elevation ranges from 5,330 to 5,530 feet. Slopes range from nearly level on floodplains, terraces and benches to 8 to 45 percent on steeper upland areas.

Priority lands 1, 2, and 3 contain no known soils which were classified as prime, unique or of statewide importance. None would require special management and protection.

Soils on these tracts are silty, sandy and shallow to gravels. Textures are loams, sandy loams, or gravelly, very gravelly, cobbly loams, formed in cobbly and gravelly alluvium and valley fill. Upland soils are cool, dry, contain 35 to 80 percent gravels and cobbles and have a calcareous layer below the soil surface.

These soils are subject to wind and water erosion when vegetation is removed. Soils in upland areas may be suited for the development for campgrounds, roads, homesites.

Vegetation

The perennial vegetation found on the upper terraces of the Madison River Valley tracts is composed of bluebunch wheatgrass, native bluegrass, junegrass, and needle-and-thread communities. Lower terraces may have a mixture of the cool-season species mentioned above, and also the mat-forming blue grama, a warm season grass species.

The moist, subirrigated vegetative sites along the Madison River and side drainages are composed of sedges, rushes, and bluegrass herbaceous species, underlying woody riparian vegetation. The shrub canopy consists of rose, water birch, and several species of willow.

Wildlife

Big Game

The principal big game habitat value is for antelope. Yearlong use is made of Section 15 by about 30 to 50 antelope. Mule deer and white-tailed deer usage is minor due to the deteriorated cover values. Potential for moose winter use exists, on priority lands 1, given recovery of riparian shrubs.

Waterfowl

Canada geese nest throughout the Madison River. Potential for significant nesting use on any of the tracts is minor.

Nongame Species

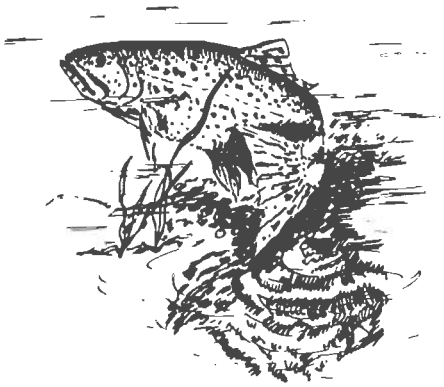
A wide variety of nongame birds and mammals occur in the Madison Valley. A nongame study was done in the general area in 1978 (Frissell 1978). Most species on priority tracts are associated with dry, upland grasslands. The deteriorated condition of riparian areas and a lack of vertical habitat (tall shrubs and trees) is limiting species diversity. Breeding bird use is limited primarily to passerine species nesting in remnant willow stands or on the ground.

The north-south orientation of the Madison Valley is a natural migration corridor, and many species of raptors are seasonally seen migrating through the area. Breeding raptors using adjacent lands include red-tailed hawk, golden eagle, prairie falcon, kestrel and Swainson's hawk.

Fisheries

The Madison River is a Class I fishery; also popularly known as a "blue ribbon" stream. Trout production on this reach of the Madison is enhanced by sustained flow management from the Montana Power Company regulated Hebgen Lake Dam facility. The productive rainbow trout and brown trout fishery on the Madison River is nationally recognized and intensively utilized. Restrictive sport fishing regulations and cessation of a hatchery fish stocking program have enhanced the quality of this wild trout (sustained by natural reproduction) fishery.

Due to its large size, the Madison River is largely autotrophic. Riparian improvement can enhance trout production and hiding cover values where there is the potential for vegetation overhanging the stream surface, particularly by shrubs.



Minerals

Oil and Gas

Oil and gas rights will be reserved by Meridian and will not be transferred.

Mineral Materials and Mining Claims

Sand and gravel deposits exist in substantial amounts throughout the entire Madison River valley. There are no mining claims on the adjacent federal lands, nor are there any mineral leases or operations on these lands.

Hydrology

Surface Water

None of the priority lands are located within a municipal watershed. Ennis is the nearest city and receives it's water from two wells in town.

The subject lands are adjacent to the Madison River which is a tributary to the Missouri River system. The Montana Water Quality Bureau has tentatively classified the Madison as having class B-1 water quality. Waters classified B-1 are suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth

and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

In addition to the Madison River, Cherry Gulch, a perennial stream, flows through priority lands 1 (Section 15) and comprises 6,000 feet of riparian habitat. This stream supplies good quality water to both wildlife and livestock before entering the Madison River. The only perennial stream on priority lands 2 and 3 is the Madison River.

Groundwater

All priority lands located within the Madison River have alluvial gravels and have groundwater within 80-100 feet of the ground surface. The groundwaters are of such quality and quantity as to be suitable for domestic, livestock and irrigation uses.

Water Quality

High, naturally occurring levels of arsenic have been reported in waters of the Madison River which flow from Yellowstone National Park. The source of this arsenic is the geothermal activity in Yellowstone National Park which is the headwaters for the Madison River. River water leaving Yellowstone Park typically contains 200 micrograms per liter dissolved arsenic. Arsenic concentrations downstream of Yellowstone National Park decline due to dilution flows from good quality tributaries. This downstream dilution normally reduces the concentration of arsenic to 40-80 micrograms per liter dissolved arsenic in the lower valley (Sonderegger et al. 1989).

Recreation

The Madison River is a nationally famous, "blue ribbon" trout stream and ranks number one statewide, in total fishing days. BLM and MDFW&P use-surveys show nonresident fishermen account for 50 percent of recorded use along the entire river, and come from 38 states and Puerto Rico. In recent years, use has been estimated to total more than 100,000 visits yearly. The river is a major recreation destination point. Other significant recreational use, such as camping and picnics occurs due to the river's close proximity to the major travel route between Yellowstone and Glacier National Parks. Approximately 27 percent of the riverfrontage is in BLM ownership and management, from Quake Lake to the Madison and Gallatin County line. The river corridor's importance led to its designation as a special recreation management area.

Resource problems, involving intense fishing pressure, lack of public access, and especially the threat of uncontrolled subdivision development, resulted in the current land-use plan decision to study BLM lands located within a one-mile corridor along each side of the Madison River from Quake Lake to the northern boundary of BLM's Dillon Resource Area as an area of concern. The subdivision issue also led to a federal/state/county effort to preserve river values. The primary recommendation of the resulting corridor preservation plan calls for BLM to acquire river lands where possible through land exchange actions. In the past, the river has been considered for study status as a potential addition to the Wild and Scenic River System. With the exception of the Bear Trap unit of the Lee Metcalf Wilderness, no BLM or other lands along the river are under study for, or are being managed as, wilderness.

The primary scenic values associated with these lands are their frontage on the Madison River and the absence of all man-made structures, except for fences. The sagebrush/grass and riparian vegetation in combination with the layered river bench topography do add to the scenic values, but it is the river's national importance for fishing and floating which elevates the importance of maintaining, and if possible, improving the area's scenic values. The open, undeveloped river corridor with its views of spectacular mountain ranges on either side of the river immeasurably enhance the quality of the recreation experience. As a result of these values, all three tracts are located within a river corridor area designated a Class 2 Visual Resource Management (VRM) area. This means that any changes in any of the basic landscape elements on public lands, (form, line, color, and texture) should not be evident in the characteristic landscape. Contrasts can be seen, but must not attract attention.

Stratigraphy and Geology

The subject lands are located along the Madison River in the central part of the Madison River valley. This area is structurally within the Craton, or older basement rocks. Tertiary-Paleozoic rocks occur, in general, as a veneer on these pre-Cambrian rocks. The lands themselves are composed entirely of Quaternary alluvium in the form of river terraces along the Madison River.

PRIORITY LANDS 5 — BEAVERHEAD/ DEERLODGE COUNTIES (1,475.48 acres)

CURRENT MANAGEMENT

Main access to the exchange properties is 15 miles north from Wisdom, Montana via Montana Highway 43. Montana Highway 43 is a paved, two-lane highway, with year-around access. The road is maintained by the MDOH. The principal use of this highway is for local access to communities and ranches. Recreation use is heaviest in the summer (fishing) and fall (hunting). The area is rural with limited available services.

T. 1 N., R. 13 W., Sections 17 and 19, have legal public access via Montana Highway 43 and the Big Hole River. T. 1 N., R. 13 W., Section 9, SW¼ has legal access by foot from adjoining National Forest lands. The NW¼NW¼ of Section 9 will not have legal access. A primitive road in Section 17 fords the Big Hole River and provides access to a large area (about 10,000 acres) of the Beaverhead National Forest via Sawlog Gulch.

Current management does not restrict public access. The present owner plans to sell these properties if the lands are not exchanged. Private interest in these lands would tend toward purchase for livestock grazing or a private hunting and fishing area, eliminating public access to these lands and adjacent National Forest lands.

Private ownership of these lands allows for unrestricted timber harvesting. With the even-aged, monoculture nature of the

existing lodgepole pine stands, existing terrain and road considerations, and current private practices, the entire forested area would probably be harvested upon the initial timber entry. Reforestation depends on the methods used to conduct the harvest and existing conifer seed supplies on the site, as it is unlikely that artificial regeneration treatments would be applied. Harvesting will probably occur in the next 10 to 20 years as these lands are currently owned by Plum Creek Timber Company.

All of the tracts are currently leased for grazing. The current livestock grazing lease arrangements are detrimental to many areas on these tracts. The most impacted area is along the river corridor and adjacent floodplain. Present grazing management does not reflect a set or patterned grazing system that is conducive to proper vegetation management under livestock grazing influences.

AFFECTED ENVIRONMENT

Socioeconomics

The traditional economy of the area is based on ranching. Commercial forestry has played a smaller role. The upper Big Hole Valley is nationally recognized for it's recreational opportunities. The growing numbers of visitors interested in fishing, hunting, and general recreation are becoming an increasingly important component of the local economy.

Property taxes on the tracts totalled $400.92 in 1987 ($24.52 for Anaconda-Deerlodge County lands and $376.40 for Beaverhead County lands). Primary economic use of the property is for livestock grazing. Section 9 (200 acres) has a grazing capacity of 23 AUMs; Section 17 (640 acres) has a grazing capacity of 94 AUMs; and Section 19 (635.48 acres) has a grazing capacity of 96 AUMs.

Air Quality

Air quality is excellent throughout the Upper Big Hole drainage and is rated Class II.

Areas of Critical Environmental Concern

There are no designated or proposed ACEC's on or near these lands.

Cultural Resources

Review of the Beaverhead and Deerlodge County lands was accomplished within the Upper Big Hole River Recreation Management Plan. Although Class III cultural resource inventory of the area is incomplete, both prehistoric and historic cultural properties can be expected to occur within the offered lands. No such properties have yet been recorded.

Agriculture

Plum Creek Timber Company leases these lands for livestock grazing. Neither a specific grazing season, nor numbers of livestock are stipulated in the leases. There are no potential farmlands on these tracts.

Floodplains

Portions of Sections 17 and 19 are located within the Big Hole River floodplain. A one-mile wide floodplain corridor is located on these tracts. Currently, there is no development within the floodplain.

Native American Religious Concerns

There are no known sites or areas on these lands believed to be of religious concern to Native Americans.

Threatened and Endangered Species

Bald eagles use the river corridor during the late fall/early spring period for migration and as an over-winter foraging area.

Hazardous Wastes

There are no signs or knowledge of past dumping or disposal activity. The only reasonable source of any hazardous materials would be from use of Montana Highway 43. There are no indications of any accidental spills of toxic substances. It is likely that the highway right-of-way has been sprayed for noxious weeds but this would have no long-term effect.

Wetland/Riparian Zones

Riparian habitat diversity within the tracts is very high. Separate and distinct riparian site types are found along the river, perennial and intermittent streams, wet meadows and mesic topographic depressions. Dominant riparian vegetation includes several willow species, aspen, sedges, rushes and many wetland grasses. About 8.5 miles of linear-shaped riparian areas covering

approximately 200 acres are found within these lands. The Big Hole River bisects two parcels for a total of three miles of riverfrontage. All or part of six islands covering about 11 acres are included.

Riparian habitat conditions range from poor to excellent. Generally, the riparian areas within Sections 9 and 17 are in satisfactory condition. An obvious exception is the river corridor which is in unsatisfactory condition. Riparian habitat conditions in the Section 19 parcel are, for the most part, in unsatisfactory condition.

Wild and Scenic Rivers

The Big Hole River is not a designated wild and scenic river.

Wilderness

These lands, in conjunction with the contiguous existing BLM parcels, do not possess the mandated wilderness characteristics of the Wilderness Act.

Topography and Soils

The topography consists of moderately steep to steep slopes along the river and side drainage with more gently, open slopes along the ridgetops. The narrow river floodplain separates the mountainous lands south and east of the river from the drier benchlands north and west of the river.

Soils vary greatly across these tracts from shallow to deep, and rocky and cobbled to sandy and loamy. Erosion hazards vary from moderate to severe.

Vegetation

There are approximately 475 acres of commercial forestlands and 1,000 acres of meadow, open rangeland, aspen stands, and willow riparian on these lands. The meadow and rangelands are usually found on the south and west aspects. They are dominated by perennial grasses and sagebrush with some Douglas fir encroachment. The aspen and willow areas occur in the drainage bottoms that dissect the tracts, usually accompanying perennial streams that flow from the southwest to the northeast and empty directly into the Big Hole River. Some aspen stands are also found in sidehill swales. The forestlands occur on mainly northerly aspects and on broad ridges at higher elevations. The stands are often fingers or islands of timber extending toward lower elevations along the Big Hole River from higher forested slopes. The forest stands consist of 100 year old (mature) lodgepole pine, with a few Douglas fir occurring mostly along timber boundaries, in drainages and on south slopes. The trees are post and pole in size and include some small, sawlog sized timber.

Grasses

The vegetation in Section 9 can be typed into two categories as relating to livestock and wildlife use. The first, a sedge/Idaho

fescue/big sagebrush type encompasses about 87 acres located mainly on southwest facing slopes on the Section 9 lands. About 70 percent of this vegetation type is composed of various species of sedge, Idaho fescue and big sagebrush type. Other common species include prairie junegrass, lupine, umbrella plant, and numerous other forbs. These lands contain 18 AUMs.

The second vegetative type is a pinegrass type found primarily on north slopes under the predominately lodgepole pine overstory. Pinegrass makes up about 60 percent of the ground cover with Idaho fescue, sedges, grouse whortleberry, twinflower, kinnikinick, and vetches well represented. Other common species include Kentucky bluegrass, bluebunch wheatgrass, buffaloberry, wild strawberry, lupine, and several other forb species. These pinegrass-dominated areas provide little desirable forage for livestock. This type has approximately 113 acres with a carrying capacity of five AUMs. Most of the livestock grazing occurs in small openings and in the creek bottom.

Section 17 has vegetation categorized in three different types. The first is an Idaho fescue/sedge/big sagebrush type with plant composition very similar to this same type in Section 9. This vegetation type takes in approximately 390 acres, lies on south and west facing aspects, and has a carrying capacity of 69 AUMs. This section also contains 167 acres in the pinegrass type which lies on north facing, timbered slopes. The carrying capacity has been rated at three AUMs. Rough fescue is the dominant grass species present.

The last vegetative type is a sedge/willow type lying along the bottoms of Sawlog and Tucker Creeks and the Big Hole River.

The sedge and willow species comprise approximately 40 percent of the vegetation. Other well-represented plant species include Kentucky bluegrass, redtop, rushes, and shrubby cinquefoil. Timothy, slender wheatgrass, big sagebrush, wild strawberry, clover and other forb species are also present. This vegetative type measures 56 acres in size and has a carrying capacity of 22 AUMs.

Section 19 can be separated into four vegetation types. Three of the four of these vegetative types have been described in the previous narrative.

Idaho fescue/sedge/big sagebrush type lies on the ridges and southern slopes and encompasses 377 acres with a carrying capacity of 68 AUMs. The pinegrass type is located on about 129 acres on timbered northern aspects and has a carrying capacity of three AUMs. Section 19 also contains a small sedge/willow area along the riverbanks and some streams. No AUMs have been assigned to these areas.

The Idaho fescue/sedge type lies on the north side of the river and highway. Idaho fescue and sedges make up approximately 60 percent of this vegetative type. Prairie junegrass, Richardson's needlegrass, Kentucky bluegrass, phlox, shrubby cinquefoil and big sagebrush are well represented on the site. This area comprises 116 acres with a rated carrying capacity of 25 AUMs. Aspen is a deciduous tree species which is also present on the uplands in moister areas, as well as in the riparian zones. This species is important to mention because its presence denotes these wetter sites.

Timber

The stands are heavily overstocked with a number of live trees per acre ranging from 900 to 1500, with approximately five to ten percent of the trees attaining commercial sawlog sizes. These stocking levels significantly reduce individual tree growth and vigor. Although natural mortality is expected to kill many trees, this is a slow process in this area and stand stagnation is common. Currently, these stands have a moderate risk of mountain pine beetle attack and overstocking tends to increase this risk because of the reduced tree vigor. These stands are expected to increase to high risk over the next 20 years as a higher percentage of trees grow into the eight to eleven inch diameter range, creating optimal conditions for mountain pine beetle attack.

Timber productivity on most forested sites on these tracts is estimated to be moderate. Habitat types are mainly lodgepole pine/grouse whortleberry, with some lodgepole pine/dwarf huckleberry on moister, gentler slopes and lodgepole pine/twinflower and subalpine fir/twinflower on north slopes along the major drainage. The drier, more westerly exposures have a low timber productivity estimate, as these sites tend to have Douglas fir/sedge or Douglas fir/bunchgrass habitat types.

Wildlife

Elk

Critical habitat exists on each tract for elk during the fall/late spring period. This area is especially critical during heavy snow years for winter range. All of the tracts are also important as elk summer range. Calving habitat exists but its importance is not documented. Important rutting habitat exists throughout. Primary use is by the resident elk population (500 acres critical).

Mule Deer

These tracts are critical habitat for mule deer during the winter period. They are also important as spring through fall habitat. Fawning habitat exists which is undoubtably used to some extent (600 acres critical).

Moose

These tracts offer year-round critical habitat for moose. Upland portions are used in the spring through fall. Drainage bottoms and riparian habitats are extremely critical to the wintering population. The area supports a larger population of moose in the winter than in the other seasons (550 acres critical).

Black Bear

Nearly all of the area is important black bear habitat, the exception being the heavily used river and highway corridors. Although not rated critical, some areas are extremely important to the resident black bear population.

Waterfowl

The river corridor, including associated islands and sloughs provides important waterfowl habitat. Breeding populations of Canada geese and several species of ducks are common. Waterfowl production in the area is regionally significant. The floodplain is used extensively by brooding Canada geese. Most of the breeding duck activity is by the later nesting species such as gadwall, widgeon, and cinnamon teal.

Raptors

The area supports very important habitat for a wide variety of raptors. It is most important as foraging and nesting habitat of summer resident species, including three buteos, three accipiters, northern harrier, kestrel, prairie falcon, and occasionally, osprey. Several species of owls frequent the area as do golden eagles. The importance of this area to raptors is reflected in the diversity of species common to the area. Species diversity is attributed to the wide range of habitats found in the vicinity. Rough-legged hawks commonly winter in the area.

Upland Game Birds

High-value habitat exists for the three forest grouse species. Blue and Franklin's grouse are common, while ruffed grouse are uncommon and are probably nearing the edge of their suitable habitat requirements. Sage grouse are common on nearby sagebrush benchlands. This species may occasionally use portions of Section 19, west of the highway.

Nongame

Habitat diversity makes these tracts highly important to a wide variety of nongame species. Distinct and unique habitat components and features such as river riparian, stream riparian, floodplains, sagebrush/grassland, northslope conifer, rock outcrop, and aspen stands are located within these tracts. They provide the habitat diversity and variation necessary to support the ample nongame species diversity. At least ten federally designated sensitive species occur in the area, while at least 16 state-listed species of special concern inhabit the area.

Fisheries

The Big Hole River is rated a Class I fishery along the reach that intersects these tracts. This designation describes the national significance of this fishery. Rainbow, brown, and brook trout are common to this portion of the river, as are arctic grayling and mountain whitefish. The grayling is a sensitive species on state and federal listings and may soon receive threatened and endangered species status.

Minerals

Oil and Gas

Oil and gas rights will be reserved by Meridian and will not be transferred.

Mineral Materials and Mining Claims

These lands are situated along the Big Hole River approximately three air miles from the nearest significant mining activity which occurred at the Calvert Mine, a producer of tungsten during the 1950s under a government tungsten purchasing program.

The Calvert Mine produced about 102,000 tons of ore in 1956 and 1957 and another 10,000 tons in 1959. There was some exploration and development work done on the Calvert Mine in 1966 and 1967 but the project has since been abandoned.

Other prospects and operations nearby produced small tonnages of gold, silver, and copper from lode deposits but none of them are currently operating and all produced less than 500 tons of ore. No placer production has been recorded in the area and the occurrence of a viable placer deposit within the area is highly unlikely.

Moderate to good potential for the occurrence of lode deposits of gold, silver, copper or tungsten exists in the area as indicated by the presence of the metals previously discussed. Therefore, if the right economic stimulus occurs, an increase in exploration activity can be expected with the possibility of producing mines operating on or near the parcels.

There is a high probability of economically recoverable gravel deposits along the river corridor, although development is unlikely because of better sites nearby.

Hydrology

Surface Water

About 1.5 miles of the Big Hole River cross Sections 17 and 19. The river channel is gradually becoming wider and shallower due to erosion of the stream bank, caused primarily by livestock grazing. Sawlog Creek, a perennial stream, crosses Section 17 for 3/4 of a mile. There are several seeps scattered across the tracts.

Groundwater

The quality and quantity of groundwater is not known. The water table can be assumed to be shallow due to the proximity of the river and several seeps found in the tracts.

Water Quality

Water quality of Sawlog Creek is excellent, while water quality of the Big Hole River is good. The amount of suspended solids is

low. There is a lot of color (dissolved solids) from extensive use for irrigation of native haylands. There are some thermal problems in the summer along this stretch of river.

Recreation

These tracts are highly important to recreationists because they are adjacent to the nationally renowned Big Hole River which is a floatable Class I fishery. Statewide, the river ranks second to only the Madison River for total fishing days. River floating and fishing are the primary recreation attractions of the area. Specifically, these lands border the river on both sides for approximately one and a half miles. The natural and physiographic characteristics of the upper slopes provide high quality scenic values. Recreation opportunities associated with these parcels include fishing for mountain whitefish, brook trout, arctic grayling, and rainbow trout; hunting for deer, elk, and waterfowl; trapping for a variety of furbearers; undeveloped camping, and day-use activities such as photography, picnicking, hiking, horseback riding, and nature study. River floating along this stretch of the river is best suited to rafts from May to mid-July. The setting and characteristics of this area are categorized as "rural" by the Recreation Opportunity Spectrum guidelines and have a VRM rating of Class II. No recreation developments exist on these parcels.

Stratigraphy and Geology

This portion of the Big Hole River basin is situated near the forward edge of the Grasshopper thrust plate. A large tertiary granitic pluton which forms the western flank of the Pioneer Mountains is separated from the Pioneer Batholith on the east by Missoula Group metasediments. Minor occurrences of tertiary volcanic rocks of composition ranging from felsic to mafic also may be observed. Sedimentary rocks other than the Missoula Group metasediments are limited to Quaternary surficial deposits.

PRIORITY LANDS 6 — CARBON COUNTY (6,195.56 acres)

CURRENT MANAGEMENT

Main access to the property is south from Laurel and Belfry via U.S. Highway 310 and Montana Highway 72. Highways 310 and 72 are paved, two-lane highways, with year-around access. The roads are maintained by the MDOH. Primary use of the roads in this area are local use, with some traffic resulting from recreational use in the summer. Access to the east entrance of Yellowstone National Park from Billings may be made along this route.

The lands themselves are accessed by a number of dirt two-track trails that crisscross the area. Access to the area is from a county road (Meeteetse Trail Road) bordering the northeast boundary of the township and from county roads that extend up to the southeast edge of the township. These trails crisscross the checkerboard pattern of landownership of private and public lands. These lands are presently used for livestock grazing. The present lessee does not restrict public access.

AFFECTED ENVIRONMENT

Socioeconomics

The 13 tracts of property being considered for exchange in Carbon County are located approximately 6 to 12 miles southwest of Belfry, Montana, west of the Clarks Fork River. The area is rural with limited available services. Property taxes on the 13 tracts totalled $709.17 in 1987. Primary economic use of the property is for grazing, with a total grazing capacity of 984 AUMs.

Air Quality

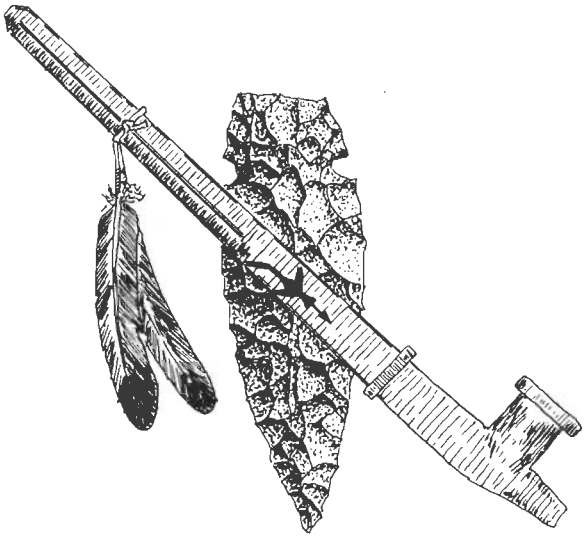
This area is a Class II air quality area.

Areas of Critical Environmental Concern

There are no designated ACECs on these lands although the N½ of Section 5 is within an area proposed by The Nature Conservancy for special designation known as the Meeteetse Spires Preserve. This proposed special designation for this area would protect a rare plant species for Montana, shoshonea. This area contains the largest known population of this plant species in Montana and possibly the world. Population estimates for this particular plant species are in the range of 6,000 individual plants.

Cultural Resources

No cultural resource Class III inventories have been conducted on the offered private lands. Existing inventory, completed in part for the Grove Creek Allotment Management Plan and for the Phillips Ruby A Federal 1-9 Exploratory Oil and Gas Well Draft EIS (U.S. Department of Agriculture 1989), indicates a diverse array of both prehistoric and historic cultural properties. Of particular note is the historic Meeteetse Trail, an early transportation route eligible for listing on the National Register of Historic Places.



Agriculture

There are no agricultural (farm) lands on the offered lands. These lands are part of the Grove Creek allotment in which the public lands in this allotment are categorized as a "M" category livestock grazing allotment. These lands are currently being managed for livestock under an allotment management plan using a deferred rest-rotation grazing system. Existing range improvements on the allotment include wells, fences, and a pipeline.

Floodplains

There are no floodplains on the affected lands.

Native American Religious Concerns

There are no known areas on these lands of religious concern to Native Americans.

Threatened and Endangered Species

There are no known threatened or endangered wildlife species utilizing this area. Shoshonea is a rare plant species found in this area that has been nominated as a candidate for listing as a threatened and endangered plant by the U.S. Fish and Wildlife Service.

Hazardous Wastes

There are no known hazardous waste or landfill sites on these lands.

Wetland/Riparian Zones

Three-Corner Spring in T. 9 S., R. 21 E., Section 21, SW¼ is located on the offered lands. There are several intermittent streams (Ruby Creek, Spring Creek, and Dillworth Creek). Only Grove Creek which flows through T.9 S., R. 21 E., Section 1, N½ is considered a perennial stream.

Wild and Scenic Rivers

There are no proposed or designated wild and scenic rivers or drainages in this area.

Wilderness

No proposed or designated wilderness or wilderness study areas exist in the immediate area. Due to the number of existing roads and the low wilderness qualities, this would probably preclude any of this area from being considered or designated as wilderness. The closest wilderness area is several miles to the west on Forest Service land.

Topography and Soils

The following soil descriptions were derived from the SCS Soil Survey of Carbon County, Montana (U.S Department of Agriculture 1975). Major soils include the Midway series, Romberg series, Stormitt complex, undulating series, Torchlight clay, sloping series, and Vona fine sandy loam series.

The soils are mainly deep, well-drained, stony loams and loams. They occur, for the most part, on gently sloping to moderately steep stream terraces and alluvial fans. These soils tend to be stoney and unsuitable for cultivation and have a moderate erosion hazard. The primary use is rangeland for livestock grazing and wildlife habitat.

Vegetation

Vegetation on these offered lands consist of bluebunch wheatgrass, western and thickspike wheatgrass, needle and thread, green needlegrass, basin wildrye, threadleaf sedge, prairie junegrass, native legumes, big and silver sagebrush, skunkbush sumac, common chokecherry and blue grama. All these plant species are common to areas of the silty range site condition within the western sedimentary plains which make up approximately the western two-thirds of the offered lands in the township.

Plant species on the lands in the eastern third of the township are common to the dense clay-clayey-saline upland range site complex within the western sedimentary plains. Plant species consist of western and thickspike wheatgrass, inland saltgrass, Nuttall saltbush, big sagebrush, black sagebrush, bud sagebrush, shadscale saltbush, greasewood, sandberg bluegrass, prairie junegrass, bluebunch wheatgrass, plains reedgrass, milkvetches, winterfat, blue grama, alkali sacaton, basin wildrye, and bottlebrush squirreltail.

Wildlife

Big Game

The area supports a low density resident population of antelope and provides transitional range for mule deer that move from higher elevation summer ranges to the west to lower elevation winter ranges to the east. The area does not support a year-round resident mule deer herd. Several of the parcels provide habitat for a resident year-round population of white-tailed deer. These lands also include several sagegrouse leks that would add to the known grouse leks that occur on the existing public lands in the area.

Nongame

A wide variety of nongame wildlife species occur on the subject lands. Amphibians such as the tiger salamander, leopard frog and chorus frog are found around the springs, stock ponds and intermittent streams. Reptiles (short-horned lizard, racer, bullsnake, and prairie rattlesnakes) are those species associated with the upland habitats. Most birds found in the area would be raptors and upland species, such as the western meadowlark and the horned lark. Nongame mammals include jackrabbits, deer mice, coyotes, badgers, and other upland species.

Minerals

Oil and Gas

Oil and gas will be reserved by Meridian and will not be transferred or change ownership. These lands lay just west of the abandoned 2 well, Belfry oil field, in T. 9 S., R. 22 E., Section 7.

Mineral Materials and Mining Claims

No known deposits of salable, leasable or locatable minerals are known to exist on these lands. There are no mineral leases, mining claims, mineral material sites or mineral operations on any of these tracts.

Coal

These tracts are adjacent to the Bear Creek coal field which extends north from the north township line of T. 9 S., R. 21 E. Coal in this township is Fort Union coal in beds no more than 14 feet thick. No outcrops occur.

Hydrology

Surface Water

The lands are located on the east side of the Beartooth range. The only major perennial stream in the area is Grove Creek. This is a result of the area being in a rainshadow.

Groundwater

The surface material of the area is composed of outwash from the mountain range. The colluvium is composed of gravel and rock but it does contain groundwater which is evidenced by the many springs in the area. There is also groundwater available in limited quantities at the bottom of the colluvium. The depth of the colluvium is approximately 200 feet thick with groundwater at or near the base in portions of the area.

Water Quality

The quality of the water is adequate for livestock and is not normally used for domestic purposes.

Recreation

Recreation use on these lands is considered light and consists mainly of mule deer hunting. At the present time the rancher permits limited walk-in hunting and will give permission to hunters to retrieve their game by vehicle. Recreation use is estimated at 150 user days, although there is excellent potential to increase this use considerably. There are no unique visual qualities and most of the area would be classified as a Class III VRM management class.

Stratigraphy and Geology

The subject tracts are located within the bench lands along the west side of the Clarks Fork of the Yellowstone River. The entire township, except for the northeast corner, is underlain by Quaternary Pliocene/Pleistocene terrace remnants composed of gravel, sand and silt deposits. The northeast corner of the township is underlain by the Fort Union formation, a tertiary Paleocene clay shale, siltstone and sandstone formation.

REPLACEMENT LANDS — CARBON COUNTY (1,504.7 acres)

CURRENT MANAGEMENT

Main access to the property is south from Laurel and Belfry via U.S. Highway 310 and Montana Highway 72. Highways 310 and 72 are paved, two-lane highways, with year-around access. The roads are maintained by the MDOH. Primary use of the roads in this area are local use, with some traffic resulting from recreational use in the summer. Access to the east entrance of Yellowstone National Park from Billings may be made along this route.

The lands themselves are accessed by a number of dirt two-track trails that crisscross the area. Access to the area from the north is from a county road (Meeteetse Trail Road) bordering the northeast boundary of the township and from county roads that extend up to the southeast edge of the township. These trails crisscross the checkerboard pattern of landownership of private and public lands. These lands are presently used for livestock grazing but are part of a different a grazing allotment, adjacent to the Grove Creek allotment. Public lands on this allotment are categorized as a "C" (custodial) category grazing allotment.

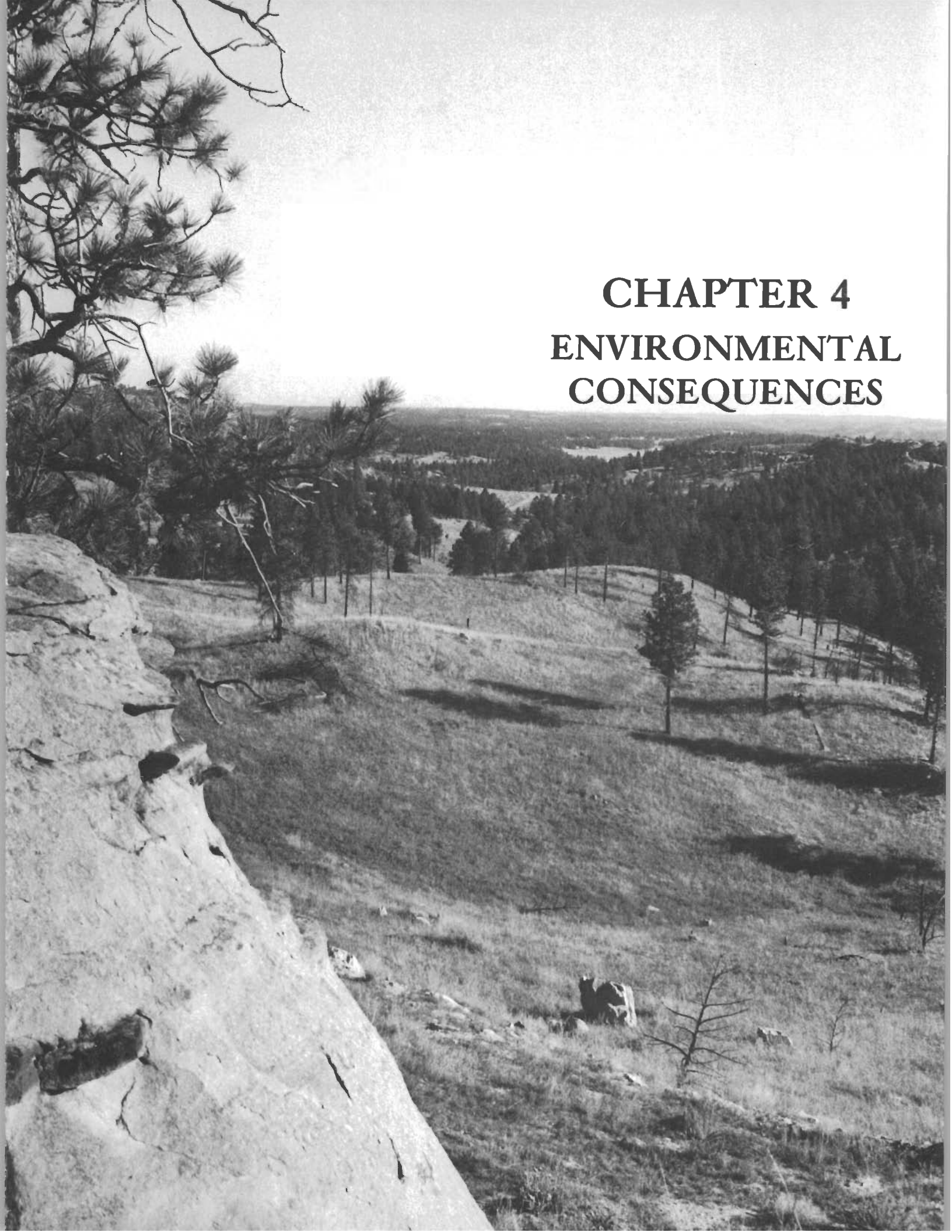
AFFECTED ENVIRONMENT

Socioeconomics

The four additional tracts of property being considered for exchange in Carbon county are located approximately 10 to 12 miles southwest of Belfry, Montana, west of the Clarks Fork River. The area is rural with limited available services. Property taxes on the four tracts totalled $161.75 in 1987. Primary economic use of the property is for livestock grazing with a total grazing capacity of 257 AUMs.

Resource Values

Resource values such as air quality, cultural resources, wildlife, etcetera would be essentially the same as priority lands 6 as these lands are adjacent to the priority lands 6.



CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section analyzes the site-specific and cumulative effects of exchanging the lands and minerals involved in the proposed action and various alternatives. This section also analyzes the effects of constructing and operating a small (0.5 million tons per year) and large (3.0 million tons per year) underground coal mine in the Bull Mountains. Impacts relating to the transportation and temporary storage of the coal at the load-out facility are also addressed.

ASSUMPTIONS AND ASSESSMENT GUIDELINES

The following assumptions were used to develop the analysis if the federal coal lands were exchanged or leased:

(1) Meridian or another mining company would develop the coal.

(2) The coal company would be able to find a market for the coal and secure long-term contracts of sufficient quantity to justify development in the 0.5 million to 3.0 million tons of coal per year range.

(3) The actual sale price of the Bull Mountains coal from these contracts would be $15 per ton F.O.B. mine. This figure was used for all the socioeconomic figures associated with Alternatives A and B. The actual sale price could be higher as indicated by current coal market conditions or lower based on Meridian's operating cost estimates; however, for comparison purposes and consistency, a $15 per ton F.O.B. mine figure was used for this analysis.

(4) For the leasing alternative, a $15 per ton F.O.B. mine figure was used to calculate royalty values if BLM leased the coal immediately. If BLM had to wait until coal market conditions were favorable for development, a $25 per ton F.O.B. mine figure with a 2020 mine start-up date was used to calculate royalty values. Appendix 11 gives an in-depth discussion of current market conditions. BLM used the midrange of the sale price values and start-up to develop this scenario.

(5) The mining company would apply for a mining permit in June 1989. The mining permit would be approved by June 1990. Construction of the mine would begin then and the mine would be in production by November 1990. This assumption was based on Meridian overall plans for the project. Although they did not submit their mining plan until February 1990, as required for this earlier assumption, the overall effect and change to the socioeconomics sections would be negligible.

(6) The production figures for the 0.5 million tons per year mining operation were provided by YCC. Although YCC is no longer involved with the project, these figures are reasonable development figures for a small mining operation and were used for this scenario. The figures for the 3.0 million tons per year mining operation were provided by Meridian. BLM used these figures and existing coal data from the area to develop the two mining scenarios.

(7) If BLM's decision was to lease federal coal rather than to exchange it, the mining company would submit an application to lease these lands and BLM would be free to lease the federal coal lands to the company.

(8) Regardless of which decision or alternative BLM selects, the timeframes to process the decision and associated actions would be within the constraints and limits that the mining company would need to secure a contract for the coal and develop a mine.

REASONABLY FORESEEABLE DEVELOPMENT SCENARIOS

Development of the Coal Lands

Two levels of mining for both the exchange and leasing alternatives are analyzed in this EIS. These levels are a 0.5 million tons of coal per year room-and-pillar operation and a 3.0 million tons per year longwall operation. The acreage and recoverable coal reserves for the exchange and leasing alternatives are shown in table 4.1.

TABLE 4.1

RECOVERABLE COAL RESERVES

	Acres of Recoverable Coal	In Place Coal (million tons)	Room-and-Pillar Mining[1] (million tons)	Longwall Mining[2] (million tons)
Exchange Alternative				
Recoverable Federal Coal	3010.0	54.5	27.3	43.6
Recoverable Private Coal	3274.5	59.0	29.5	47.2
Total	6284.5	113.5	56.8	90.8
Leasing Alternative[3]				
Recoverable Federal Coal	3158.0	56.9	28.4	45.5
Recoverable Private Coal	3869.0	67.3	33.6	53.8
Recoverable State Coal	640.0	11.3	5.7	9.1
Total	7667.0	135.5	67.7	108.4

[1]Mining rate of 0.5 million tons annually and a 50% recovery rate.

[2]Mining rate of 3.0 million tons annually and an 80% recovery rate.

[3]There are an additional 197.59 acres of Federal mineral estate of which 148 acres contain recoverable coal resources considered in the leasing alternative. At a 50% recovery rate, the amount of recoverable coal would increase by 1.1 million tons using a room and pillar mining method. At an 80% recovery rate, the amount of recoverable coal would increase by 1.9 million tons using a longwall mining method.

0.5 Million Tons Annual Production

A room-and-pillar mining method would likely be used to produce coal at the 0.5 million tons per year rate. Necessary equipment and facilities are listed in table 4.2. This method of mining utilizes continuous mining machines, and shuttle car/conveyor belt haulage to move the coal to the surface. For the room-and-pillar mining technique about 50 percent of the coal is recovered by two intersecting sets of parallel entries, usually nearly perpendicular to one another. The result is a checkerboard array of coal pillars which will remain to support the roof strata.

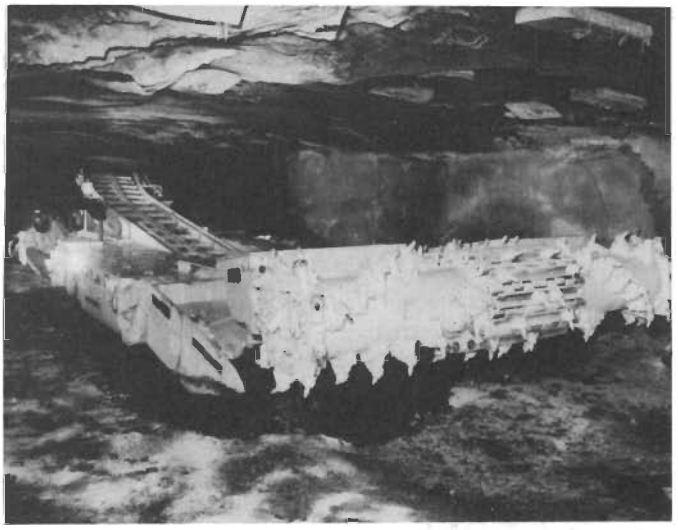
Access to the coal seam would be by five main headings being driven on 70 foot centers with mining widths of 18 to 20 feet depending on local roof conditions. This method would leave coal pillars 50 to 52 feet wide to support the roof over the main entries. The headings containing the conveyor belt, air courses, utilities, and man-trip/supply routes would be driven from the portal site on the western edge of the coal field to the eastern limit of the mine. Barrier pillars 300 feet wide would be left between the main entries and the mining panels. The mining panels would then be developed southward from the main entries on 50 foot centers. Room widths would remain at 18 to 20 feet while coal pillars are reduced to 30 to 32 feet to increase coal recovery. There are no current plans for secondary mining, i.e., pillar robbing, which would increase room widths. Past mining and empirical estimates show that subsidence over most of the proposed room-and-pillar mining areas would not be a noticeable problem. There is some chance that under shallow overburden, less than 40 feet, sinkhole subsidence could occur. Figure 2.1 shows a plan view of the room-and-pillar mining layout.

TABLE 4.2

0.5 MILLION TONS PER YEAR MINING EQUIPMENT

Underground Mining Equipment		Mine Surface Facilities
Units	Equipment	Equipment
2	Continuous miners	Stacking belt
3	Shuttle cars	Run-of-mine stockpile (approx. 5,000 tons)
1	Roof bolter	Cleaning plant
2	S & S scoop	Clean coal stacker
2	Personnel carriers	Clean coal stockpile (approx. 10,000 tons)
1	Power center and associated high voltage lines	Refuse area
1	42-inch belt drivers and tailpieces	Mine office/changehouse
1	8-foot ventilation fans capable of moving 13,000 CFM of air at the mining face	Shop

Mine surface facilities would be located at the mine site in T. 6 N., R. 26 E., Section 13 or Section 25. Coal would be conveyed from the mine to a run-of-mine stockpile. From this stockpile it would be conveyed to two 8 by 16 one inch double-deck screens. One inch plus oversize coal would be crushed by a 60 inch roll crusher. The crushed coal would then be fed to two air flotation cells with baghouses. Reject from the air flotation cells would be sent to a refuse bin and hauled by truck to a refuse fill area in the vicinity of the mine mouth facilities. Clean coal would then be conveyed to a radial stacker and stockpiled.



SR500 SHC Miner Continuous Miner
Photo courtesy Joy Technologies, Inc.

Trucks would be loaded from the clean coal stockpile and hauled to a rail loadout facility located in T. 2 N., R. 28 E., Section 19, at Huntley, Montana and stored in a 12,000 to 15,000 ton stockpile. The rail car loading rate would be 3,000 tons per hour using a 60 inch belt from the stockpile onto 12,000 ton unit trains. A railroad siding would be able to hold 120 rail cars. The plan also calls for the loading of industrial coals in lesser amounts, at 10 to 30 cars at a time.

Transportation Corridor

All coal would be trucked from the mine site on the Old Divide Road onto U.S. Highway 87 south to Highway 312 just north of Billings, Montana and then east to Huntley, Montana. All trucks would be adequately tarped and inspection ready to meet all highway standards. An estimated 50 one-way trips a day would be needed to haul the coal from the mine to the loadout facility at Huntley. Map 9 shows the proposed route.

Employment

The following number of employees are expected for the 0.5 million ton per year mining rate.

Number of Employees	Facility
2	Office
12	Underground
5	Mine surface facility
5	Loadout facility
11	Contract independent truckers

Additional information regarding employment and payroll is shown on table 4.3.

Depending on how successfully the coal is marketed, expansion of the mining operation could occur. Coal production could increase to about 1.2 million tons per year using the room-and-

TABLE 4.3

COAL DEVELOPMENT/TRANSPORTATION SUMMARY
ROOM-AND-PILLAR MINING
0.5 million tons per year production

YEAR	(x 1000) PRODUCTION TONNAGE	(Cumulative) WASTE DISPOSAL (acres covered)	DIRECT EMPLOYMENT						(Based on TCC Rates) DIRECT PAYROLL (x $1000)						PERCENT LOCAL HIRES[1]						TRANSPORTATION		
			MINE		TRANSPORT.		LOADING FAC		MINE		TRANSPORT.		LOADING FAC.		MINE		TRANSPORT.		LOADING FAC.				
			Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Mode[2]	Trips-Day[3]	Route
1. 1990	100	.09	9	10	—	3	5	3	84	104	—	31	47	31	89%	75%	—	100%	100%	100%	TRK	10	87/312
2. 1991	200	.18	7	15	—	5	—	4	112	312	—	100	—	56	100%	75%	—	100%	—	100%	TRK	20	87/312
3. 1992	300	.28	—	16	—	7	—	4	—	336	—	140	—	56	—	75%	—	100%	—	100%	TRK	20	87/312
4. 1993	400	.37	—	18	—	9	—	5	—	385	—	180	—	75	—	75%	—	100%	—	100%	TRK	40	87/312
5. 1994	500	.47	—	19	—	11	—	5	—	416	—	220	—	83	—	75%	—	100%	—	100%	TRK	50	87/312

Sources: USDI (1989); Yellowstone Coal Company development estimates.

[1]Local hires are defined as people who are residents of the area and who do not change their residence when they accept employment.
[2]Truck or rail.
[3]Loaded trucks or rail cars per day.

pillar mining plan described above without major expenditures for additional underground mining equipment. Increased production could occur by adding a second work shift using essentially the same mining equipment and surface facilities. Additional employment would be expected, for mining and coal transportation. At some point near the high end of an expanded production scenario, it would become economical and desirable to convert to a longwall mining operation and to build a railroad spur to the mine site. Coal production between 1.2 and 3.0 million tons per year would likely be mined by a longwall mining method. It is also possible that longwall mining could be used at the outset.

3.0 Million Ton Annual Production

Longwall mining would increase the coal recovery rate to approximately 80 percent. Access to the coal seam under the longwall mining method will be much the same as in the room-and-pillar mining method previously described, except that the entries will be directed more to the northeast. Longwall panels will be developed on both sides of the main entries to the southeast and northwest. Figures 2.2 and 2.3 show plan views for the longwall mining layout.

During longwall mining a block or panel of coal approximately 600 feet wide is isolated by two sets of parallel entries driven by continuous mining machines. The lengths of the panels are variable, but usually determined by geologic or engineering considerations. Longwall mining equipment consists of: a plow or shearer used to break the coal from the coal face; a face conveyor belt to transport the coal away from the face; and a mobile roof support system placed at the far end of the longwall panel. The coal mining face retreats toward the panel entries and the roof support system temporarily supports the overlying strata as the coal is being severed from the face. The roof support system then retreats, allowing the roof to cave in behind the longwall equipment. Planned subsidence is an integral part of longwall mining. Needed equipment is listed in table 4.4.

As with the room-and-pillar mining method, the coal is conveyed to a run-of-mine stockpile. Sizing and cleaning the coal would be the same as described in the discussion of the 0.5 million tons per year production rate except that a wet coal benefication process will probably be used in the cleaning operation.

Before a production rate of 3.0 million tons of coal per year could be obtained, a rail spur to the mine would be needed to move the coal efficiently. The route for a spur has not yet been selected; however, two possible routes are being reviewed.

TABLE 4.4

3.0 MILLION TONS PER YEAR MINING EQUIPMENT

Underground Mining Equipment		Mine Surface Facilities
Units	Equipment	Equipment
2	Continuous miners	Stacking belt
4	Shuttle cars	Run-of-mine stockpile (app.
2	Roof bolters	30,000 tons)
3	S & S scoops	Cleaning plant
3	Personnel carriers	Clean coal stacker
2	Power centers and high	Refuse area
	voltage cables	Mine office/changehouse
4	60-inch belt drives and	Shop
	tailpieces	Clean coal storage
2	17-foot vent fans	2 silos of approx. 12,000 tons
1	Longwall miner and	each for clean coal
	associated equipment	Surface mobile equipment
1	Shearer	
1	Conveyor equipment	
1	Roof support equipment	
1	Underground mobile	
	equipment	

Employment

Operating at full capacity, an estimated 199 employees would be needed for the underground, surface, and office operations. An

TABLE 4.5

COAL DEVELOPMENT/TRANSPORTATION SUMMARY
LONGWALL MINING
3.0 million tons per year production

YEAR	(x 1000) PRODUCTION TONNAGE	(Cumulative) WASTE DISPOSAL (acres covered)	DIRECT EMPLOYMENT						(Based on TCC Rates) DIRECT PAYROLL (x $1000)						PERCENT LOCAL HIRES[1]						TRANSPORTATION		
			MINE		TRANSPORT.		LOADING FAC.		MINE		TRANSPORT.		LOADING FAC.		MINE		TRANSPORT.		LOADING FAC.				
			Const.	Ops.	Const.	Ops.	Const	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Const.	Ops.	Mode[2]	Trips-Day[3]	Route
1. 1990	0	0.00	23	30	—	—*	12	—	239	156	—	—	125	—	75%	67%	—	—	83%	—	—	—	—
2. 1991	500	1.49	12	71	—	12	6	4	239	1,477	—	250	31	83	75%	67%	—	90%	83%	53%	TRK	50	87 312
3. 1992	800	2.38	—	71	—	19	—	4	—	1,477	—	395	—	83	—	67%	—	90%	—	53%	TRK	80	87 312
4. 1993	1,200	3.58	—	136	—	27	—	8	—	2,830	—	562	—	166	—	74%	—	90%	—	60%	TRK	120	87 312
5. 1994	2,100	6.27	12	168	13	27	7	8	250	3,485	270	562	135	166	75%	70%	90%	90%	70%	60%	TRK RAIL	120 6 mo.=110	87 312
6. 1995	3,000	8.96	—	199	—	—	—	8	—	4,140	—	—	—	166	—	75%	—	—	—	60%	RAIL	110	**

Sources: USDI (1989); Meridian Minerals Company development estimates.

[1]Local hires are defined as people who are residents of the area and who do not change their residence when they accept employment.
[2]Truck or rail.
[3]Loaded trucks or rail cars per day.

*Transportation employment does not include railroad workers and it is assumed that trucking will be done by contractors instead of mine employees, although truck drivers are included in the table above.
**Specific route not determined; see text for two alternative routes.

additional eight employees would be needed for the loading facility. Table 4.5 provides additional information on direct employment, payroll, and transportation.

The Bull Mountains Railroad

Route and Design Characteristics

The process of expanding the mine from 0.5 million tons of coal per year to 3.0 million tons of coal per year, would necessitate the building of a railroad spur for transporting the coal from the mine to the rail head. The increased volume of coal, probably somewhere around 1.5 million tons of coal per year, triggers the necessity of a railroad because it becomes uneconomical and infeasible to use trucks for transportation. The railroad spur route has not been determined but two alternatives are being considered (map 9).

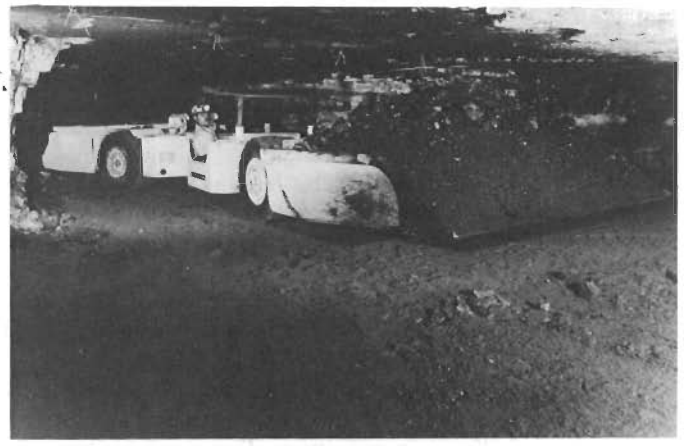
The first alternative route would head north from the mine along U.S. Highway 87 to a point west of Roundup, Montana. It would then follow the old Milwaukee railroad grade west to Lavina, Montana, where it would join the mainline Burlington Northern railroad. The second alternative route would head west from the mine towards the vicinity of Broadview, Montana and join the mainline Burlington Northern railroad there (map 9).

It would require a permit from the Interstate Commerce Commission and supplemental environmental analysis and documentation, probably another EIS, to build this railroad spur. Since a specific route has not been selected, only the more apparent environmental issues associated with building a generic railroad are addressed here. The site-specific impacts of building the railroad will be addressed in a forthcoming environmental document when the mining company submits an application to the Interstate Commerce Commission. It should be noted that both routes involve mostly private surface lands. BLM would only be involved in the permitting process if the selected route crossed BLM-administered public lands.

General design characteristics of the rail line would include:

(1) Single track rail line from the mine to the mainline railroad. Major sidings (10 to 20 miles apart) may or may not be required, depending upon the route selected.
(2) Right-of-way width of 100 to 200 feet depending upon the terrain with an average width of 150 feet. The right-of-way would probably be fenced.
(3) Maximum grade of one percent and maximum curvature of three degrees.
(4) Average unit train consisting of 110 cars, each having a capacity of 100 tons of coal. Depending upon the mine production, the number of trains per day needed to haul the coal would vary. At the 3.0 million tons per year production rate, approximately one train per day would be needed to transport the coal.

Using these general design characteristics and the alternative routes described previously, the north route would be approximately 40 to 45 miles in length and would require 727 to 818 acres



488X90 UN-A-TRAC Load-Haul-Dump Tractor
Photo courtesy Joy Technologies, Inc.

of right-of-way. The estimated cost to build this railroad spur would be 40 to 45 million dollars (assuming one million dollars per mile). Likewise, the west route would be approximately 25 to 30 miles in length and cost 25 to 30 million dollars. It would require 1 to 1½ years to construct the railroad spur.

Resource Impacts

The major impacts associated with building the railroad spur would mainly be associated with construction, although there would be some long-term impacts associated with maintenance and operations. There will be minimal or no impacts to the following:

Areas of Critical Environmental Concern
Native American Religious Concerns
Hazardous Wastes
Wild and Scenic Rivers
Wilderness
Minerals
Threatened and Endangered Species

Anticipated impacts from construction and operation of the railroad spur are as follows.

Socioeconomics

Construction of the railroad would probably be accomplished by contracted construction firms (Morehead pers. com. 1989). The construction labor force would involve approximately 26 workers. It is anticipated that most of this work force would consist of present employees of the contracted construction firm.

Depending upon the route chosen, it could cost 25 to 30 million dollars (west route) to 40 to 45 million dollars (north route) to build this railroad spur. An estimated breakdown of these costs over the two years would be 40 percent for wages and salaries of the labor force, 30 percent for capital expenditures such as rail and railroad ties, and 30 percent for local expenditures such as gasoline, gravel and operating costs.

Most of the capital expenditures would be out-of-state purchases since these items are not readily available in Montana. Local businesses will experience a boom from the infusion of money spent on local purchases by the construction company and workers over the two-year period. There are no long-term adverse economic and social impacts expected from the construction of the railroad.

Transportation

The movement of materials, equipment and workers would create a short-term increase in transportation use in the area during construction of the right-of-way. Access to the right-of-way would probably be over existing roads and trails and along the proposed route. There would be considerable highway use by large trucks hauling materials and equipment to the site, increasing the potential for highway accidents. Long-term transportation impacts would primarily be limited to the use of the right-of-way by approximately one unit train per day hauling coal from the mine. If the proposed right-of-way crosses U.S. Highway 87, there would be increased potential for accidents at the crossing.

Air Quality

There will be a temporary, minor impact to the air quality of the area from construction. Emissions would be intermittent and localized to the railroad right-of-way. During operations there will be air pollutant emissions from dust blowing off the rail cars and emissions from the locomotives. These emissions will be relatively low, short-term and insignificant to the overall air quality.

Cultural Resources

Cultural impacts are expected to be relatively low for either route. Most of these impacts would occur along that portion of the route in the Bull Mountains area. Heading north, the route would follow existing developed rights-of-way where disturbance has already occurred. Likewise, the west route would cross areas of cultivated agricultural lands where cultural sites have already been destroyed.

Agriculture

Approximately 727 to 818 acres of agriculture lands would be removed by the right-of-way for the north route and 454 to 545 acres would be removed for the west route. Most of the lands would be rangeland used for livestock grazing. There would also be some disruption of ranching operations and inconvenience from the railroad right-of-way.

Floodplains

Impacts would be minor for either route. Halfbreed Creek and the Musselshell River could be impacted on the north route; whereas, very few drainages and floodplains would be affected by the west route.

Wetlands/Riparian Zones

There will be minor impacts (see Floodplains).

Topography and Soils

Impacts to the topography and soils would result from the varied amounts of disturbance required to develop the right-of-way. There would be some soil erosion until the right-of-way has stabilized. There would also be a long-term loss of soil surface from productivity, i.e., that portion of the right-of-way used for the railroad bed. Overall, these impacts are relatively minor for the entire area.

Vegetation

The impacts on vegetation in the right-of-way would range from slight disturbance to destruction. Most of the impacts would occur during construction. Over time, the right-of-way vegetation would stabilize and become productive again. There would probably be some long-term changes in plant communities and composition within the right-of-way.

Wildlife

The major impacts on wildlife would be noise, human harassment and train/animal collisions. Some species, particularly

large mammals and some birds, would probably be displaced. Long-term changes in the plant communities and composition along the right-of-way would also cause changes in the wildlife species and numbers utilizing the right-of-way. Some mortalities from train collisions would be expected along the right-of-way. The portion of the right-of-way used for the railroad bed would be lost as wildlife habitat. It is unknown whether any crucial or sensitive wildlife area would be impacted along the route. It is presumed that route selection and mitigation measures would be implemented, if needed, to minimize these wildlife impacts.

Hydrology

The major impacts on hydrology would be increased sediment from cuts and fills along the proposed route and distur bance of stream channels during the construction phase of the railroad. Afterwards, soil erosion will decrease and stream channels will stabilize accordingly. Long-term impacts on hydrology would be minor.

Recreation

Recreational activities in the area would not be appreciably affected by the railroad. There would be a loss of hunting and other dispersed recreational activities along the right-of-way. There would probably be increased demand for recreation activities and facilities by workers during construction but these demands would be localized and short-lived.

As part of the right-of-way permitting process, it is anticipated that mitigation measures would be required that would lessen or eliminate most adverse impacts resulting from construction and operation of the railroad spur. Examples could include restrictions for travel, construction, route selection, erosion, and reseeding.

Some adverse impacts from the railroad spur would be unavoidable, such as loss of lands for agriculture and impacts on topography, visual resources, vegetation, cultural resources, wildlife, etcetera. It is anticipated that the overall impacts would be minor to the region.

ALTERNATIVE A — COAL-FOR-LANDS EXCHANGE — PROPOSED AND PREFERRED ACTIONS

SELECTED FEDERAL COAL LANDS

0.5 Million Tons of Coal Per Year Mine

Development of the selected federal coal lands is considered the most likely development to occur in the Bull Mountains as an underground mine producing 0.5 million tons coal per year.

RESOURCE IMPACTS

This small room-and-pillar mining operation will have minimal or no impacts to the following resources:

Areas of Critical Environmental Concern
Agriculture
Floodplains
Native American Religious Concerns
Threatened and Endangered Species
Hazardous Wastes
Wetlands/Riparian Areas
Wild and Scenic Rivers
Wilderness
Other Minerals
Oil and Gas
Mineral Materials and Mining Claims

Anticipated impacts from mining to the other resource values are as follows.

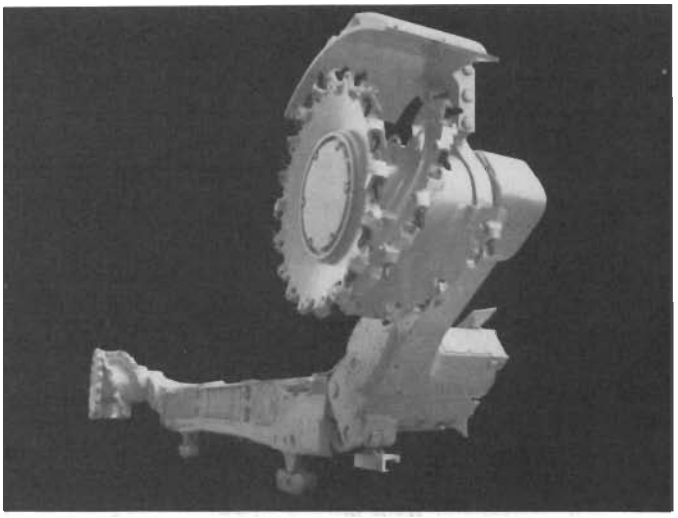
SOCIOECONOMICS

Economic Environment

Economic Assumptions

The proposed coal mine, located in southern Musselshell County and northern Yellowstone County, would be an underground facility. Construction of the mine would commence in July 1990, and production would begin in late 1990. Although the mining company did not submit a mine plan until February 1990 as required for this earlier assumption, the overall effect to the socioeconomics section would be negligible. Production would increase steadily until 1994 when the mine is expected to be at full production. The project would produce an estimated 0.5 million tons of coal per year (table 4.6) and, during full production, would employ approximately 35 mine-related workers.

It is assumed that coal contracts would be negotiated with an out-of-state utility and coal would be shipped by rail to the utility site. Since there are currently no rail loading facilities in Musselshell County, the coal produced from the proposed mine would be transported by truck from the mine site to a rail load-out facility. For purposes of this study, it is assumed that the railroad siding in Huntley, Montana, approximately 38 miles southeast from the proposed mine site, would be used for ship-



4LS Longwall Shearer
Photo courtesy Joy Technologies, Inc.

TABLE 4.6

PROJECTED COAL PRODUCTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (Tons of Coal)

	Yellowstone County	Musselshell County	Total
1990	0	100,000	100,000
1991	0	200,000	200,000
1992	0	300,000	300,000
1993	0	400,000	400,000
1994	100,000	400,000	500,000
1995-2037	500,000	0	500,000
2038-2063	0	500,000	500,000

Sources: USDI (1989); Yellowstone Coal Company development estimates.

ping the coal. Economic impacts due to the land exchange and subsequent operation of the mine are described in the following sections in terms of impacts on employment, income, and the fiscal conditions of local, state, and federal governments.

Employment

As a direct result of the proposed land exchange and subsequent operation of the underground coal mine, employment opportunities would be created in the mining, transportation, and public service sectors. At full production and through the life of the mine, the proposed project is expected to create a total of 35 direct (mine, loading facility, and coal transportation) and 15 indirect (secondary) jobs (table 4.7).

Employment by Type

The following sections describe the types and number of employees expected to be hired for construction and operations.

Mine Employment — Nine employees would be hired for construction of the mine during the last two quarters of 1990 (table 4.8). During the last year of construction (1991), approximately seven construction workers would be employed.

Mine operations should begin in late 1990, with 15 full-time employees working at the mine by the beginning of 1991. Following 1991, approximately one employee per year is expected to be added to the work force until 1994, when full operations employment would be attained (19 employees).

As illustrated in table 4.8, nearly 100 percent of the construction workers and three-fourths of the operations workers would be expected to be hired locally (Billings Job Service area). Most positions could be filled by local applicants who would be trained on site. Positions which would require special expertise, such as the underground supervisor and some technical employees, would most likely be recruited from outside the study area.

Load-out Facility Employment — Five employees are expected to be hired for construction of the loading facility during the last two quarters of 1990 (table 4.9). Construction should be completed by the end of 1990, when full operations would commence.

During mine operations, four employees would be hired for the first two years of operations and, in 1993, one employee would be added, bringing total employment at the loading facility to five employees (table 4.9). Nearly 100 percent of the loading facility employees would probably be hired locally (Billings Job Service area).

Transportation Employment — A mining company would probably contract with or hire approximately five employees during the first full year of production, two additional employees during the next year when production is increased by 100,000 tons, and two more in 1993 when production is increased again by 100,000 tons (table 4.10). During full operations, eleven full-time persons would be employed in transportation including ten drivers and one mechanic.

The number of truck drivers needed to transport the coal from the mine to the Huntley load-out facility was estimated by assuming 0.5 million tons of coal would be transported using 45-ton trucks, yielding approximately 11,111 trips per year. Based on a 260-day work year, about 42 trips would be made per work day. Assuming one driver could make four round trips per shift, the transportation of the coal during full operations would require approximately ten truck drivers. One mechanic would be required to support this number of trucks and drivers. It is expected that all transportation employees would be hired locally (within the Billings Job Service area) since there is an adequate supply of persons experienced in transportation services in both Musselshell County and Yellowstone County (table 3.5).

Employment Distribution

The following sections describe the geographical distribution of the employees to be hired by a mining company during construction and operations.

Expected Local Hire Distribution — The distribution of workers hired locally was allocated to Roundup, rural Musselshell County, Billings, and rural Yellowstone County (primarily

TABLE 4.7

TOTAL EMPLOYMENT SUMMARY — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995) (Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employees	14	14	6	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employees	3	16	24	24	24	24	27	27	27	27	32	32	32	32	35	35	35	35	35	35	35	35
Secondary	0	5	11	11	11	11	11	11	11	11	11	14	14	14	14	15	15	15	15	15	15	15
Total	17	35	41	42	42	42	38	38	38	38	43	46	46	46	49	50	50	50	50	50	50	50

Sources: USDI (1989); Yellowstone Coal Company development estimates.

TABLE 4.8

MINE EMPLOYMENT — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990-1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employment — Mine																						
Local Hire Ratio	.89	.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Administrative	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	1	1	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	6	5	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Operators	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Employment	9	9	6	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employment — Mine																						
Local Hire Ratio	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
Administrative	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technicians	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mechanics	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
Laborers	0	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Equipment Operators	0	5	10	10	10	10	12	12	12	12	13	13	13	13	14	14	14	14	14	14	14	14
Total Operations Employment	0	10	15	15	15	15	16	16	16	16	18	18	18	18	19	19	19	19	19	19	19	19
Total Mine Employment	9	19	21	22	22	22	16	16	16	16	18	18	18	18	19	19	19	19	19	19	19	19

Sources: USDI (1989); Yellowstone Coal Company development estimates.

TABLE 4.9

LOADING FACILITY EMPLOYMENT — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employment — Loading Facility																						
Local Hire Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Operators	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Employment	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employment — Loading Facility																						
Local Hire Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Equipment Operators	1	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3
Total Operations Employment	3	3	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
Total Loading Facility Employment	8	8	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5

Sources: USDI (1989); Yellowstone Coal Company development estimates.

TABLE 4.10

TRANSPORTATION EMPLOYMENT — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
Employment Category	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Operations Employment — Transportation																						
Local Hire Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Administrative	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Truck Drivers/Operators	0	2	4	4	4	4	6	6	6	6	8	8	8	8	10	10	10	10	10	10	10	10
Total Transportation Employment	0	3	5	5	5	5	7	7	7	7	9	9	9	9	11	11	11	11	11	11	11	11

Sources: USDI (1989); Yellowstone Coal Company development estimates.

the area between Billings, Huntley, and the northern Yellowstone County border). The allocation of local hire was approximately 70 percent for Billings, 20 percent for Roundup, and 5 percent each for rural Musselshell and Yellowstone counties. This allocation scheme was developed through interviews with personnel from the Billings Job Service and representatives of YCC, although YCC is no longer involved with the project. The allocation is also similar to the distribution of new workers to the area estimated by using a gravity model (Lythgoe pers. com. 1989).

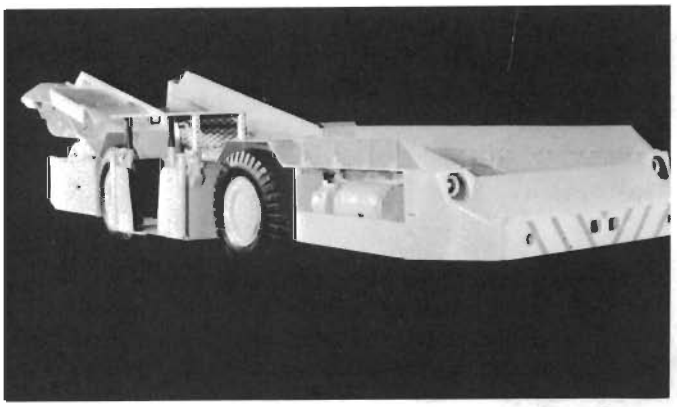
During the first year of operations (1991), a mining company would be expected to employ approximately 24 persons (table 4.7) of which 20 would be hired locally. Of the 20 employees hired locally, 14 are expected to be from Billings, four from Roundup, and one each would come from rural Musselshell and Yellowstone counties (table 4.11). During full operations, the distribution of the 30 workers hired locally is expected to be approximately 22 from Billings, six from Roundup, and one each from rural Musselshell and Yellowstone counties.

Expected In-migrating Workers Distribution — The distribution of expected in-migrating workers by general geographic area is illustrated in table 4.12. The number and distribution of in-migrating workers was developed using company-supplied local-hire ratios and the gravity model described in appendix 12. The gravity model yielded the following distribution of mine workers to the area: 74 percent to Billings, 13 percent to Roundup, 6 percent to rural Musselshell County, and 7 percent to rural Yellowstone County. This distribution scheme indicates that, during full operations, four of the total five in-migrating mine workers would live in Billings and one would live in Roundup (table 4.12). No in-migrating workers are expected to reside in rural Musselshell County or rural Yellowstone County. Table 4.13 summarizes the expected final distribution of all mine-related workers including those that would be hired locally and those that would migrate into the area. During full operations, 26 of the mine-related employees are expected to reside in Billings, seven in Roundup, and one each in rural Musselshell and rural Yellowstone Counties.

Secondary Employment — In addition to the projected employment created directly by mine operations and coal transportation, the project is expected to stimulate economic activity and employment in various trade and public service sectors of the study area. This new employment created indirectly as a result of the project is called "indirect or secondary" employment.

For rural areas, such as Roundup and county areas, an employment multiplier of 0.25 during construction and 0.4 during operations was found to be an average ratio of indirect to new direct employment (Gilmore et al. 1982). For more urban areas, such as the Billings area, an employment multiplier of 0.35 during construction and 0.5 during operations was found to be an average ratio of indirect to new direct employment. Based on these multipliers, should the mine operations and coal transportation create 35 direct jobs at full production, then approximately 15 secondary jobs also would be created. Because secondary jobs typically do not require extensive training or specialized education, they probably would be filled by the local labor force. A local hire ratio of 90 percent was utilized to estimate expected secondary employment in-migration to the study area.

During full operations, demand from direct mine employees is expected to create two new secondary jobs in Roundup and 13 new secondary jobs in Billings (table 4.14). Only one secondary worker is expected to migrate into the study area and the remaining 14 are projected to be hired from the local labor force.



10SC32A Shuttle Car
Photo courtesy Joy Technologies, Inc.

TABLE 4.11

LOCAL HIRE DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
Type of Employment by Area	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction																						
Roundup	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Billings	11	11	5	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Roundup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Local Hire — Construction	13	13	6	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operations																						
Roundup	0	2	4	4	4	4	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	6
Billings	3	11	14	14	14	14	17	17	17	17	20	20	20	20	22	22	22	22	22	22	22	22
Rural Roundup	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rural Yellowstone	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Local Hire — Operations	3	13	20	20	20	20	23	23	23	23	27	27	27	27	30	30	30	30	30	30	30	30
Total Local Hire Distribution																						
Roundup	2	4	5	5	5	5	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	6
Billings	14	22	19	20	20	20	17	17	17	17	20	20	20	20	22	22	22	22	22	22	22	22
Rural Roundup	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rural Yellowstone	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Local Hire	16	26	26	27	27	27	23	23	23	23	27	27	27	27	30	30	30	30	30	30	30	30

Source: Economic Consultants Northwest (1989b).

TABLE 4.12

IN-MIGRATING WORKER DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
Type of Employment by Area	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction																						
Roundup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Billings	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Settlement	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operations																						
Roundup	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Billings	0	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Operations Settlement	0	3	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
Total Migration																						
Roundup	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Billings	1	4	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Settlement	1	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5

Source: Economic Consultants Northwest (1989b).

TABLE 4.13

TOTAL MINE EMPLOYEE DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Roundup	2	4	6	6	6	6	5	5	5	5	6	6	6	6	7	7	7	7	7	7	7	7
Billings	15	26	22	23	23	23	20	20	20	20	24	24	24	24	26	26	26	26	26	26	26	26
Rural Musselshell	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rural Yellowstone	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Settlement	17	30	30	31	31	31	27	27	27	27	32	32	32	32	35	35	35	35	35	35	35	35

Source: Economic Consultants Northwest (1989b).

Income

Income (payroll) from the mine and secondary jobs was estimated and is presented in table 4.15. Projections of secondary income were derived by multiplying the number of secondary workers by an estimated weekly salary of $216. This figure is based on a statewide average of services-related employees reported by the Montana Department of Labor and Industry.

Total wages and salaries should be about $887,480 during full operations. Approximately $719,000 of this income would come directly from the mine, while $168,480 would come from secondary jobs. Since many of the workers are expected to reside in the Billings area, the majority of this income would most likely be spent in Yellowstone County.

Other income to the area would be from expenditures by the coal company for supplies and equipment and from the transportation contractor for fuel, repairs, and other supplies. Most of the mining equipment would be bought outside the study area. Since the trucking firm would be a contractor, it is not known where the firm would purchase their trucks or trailers. The expected local purchases by the mining company should average $1.0 million per year estimated on an average supply cost of $2 per ton of coal (Morehead pers. com. 1989).

Fiscal

Each level of government would receive additional revenues or incur additional costs if the mine is developed as described. In addition, the public would receive recreational benefits as a result of the land exchange. Over the projected life of the mine the tax revenues, fees, and recreation benefits would exceed the additional governmental costs or foregone royalties. That value, discounted to 1990 dollars would have a present value of $11 million (table 4.16). An in-depth discussion of each of the fiscal conditions follows.

TABLE 4.14

TOTAL SECONDARY WORKER DISTRIBUTION — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1995)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
Employment Distribution	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In-Migrating Distribution																						
Roundup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Billings	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total In-Migrating	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Local Hire Distribution																						
Roundup	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
Billings	0	5	10	9	9	9	9	9	9	9	9	11	11	11	11	12	12	12	12	12	12	12
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Local Hire	0	5	10	10	10	10	10	10	10	10	10	13	13	13	13	14	14	14	14	14	14	14
Total Secondary Distribution																						
Roundup	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
Billings	0	5	11	10	10	10	10	10	10	10	10	12	12	12	12	13	13	13	13	13	13	13
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Secondary Distribution	0	5	11	11	11	11	11	11	11	11	11	14	14	14	14	15	15	15	15	15	15	15

Source: Economic Consultants Northwest (1989b).

TABLE 4.15

PAYROLL BY SOURCE — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)

	1990	1991	1992	1993	1994	1995	1996
Direct Income							
Mine	$188,000	$424,000	$336,000	$385,000	$416,000	$416,000	$416,000
Loading Facility	78,000	56,000	56,000	75,000	83,000	83,000	83,000
Transportation	31,000	100,000	140,000	180,000	220,000	220,000	220,000
Total Direct Income	$297,000	$580,000	$532,000	$640,000	$719,000	$719,000	$719,000
Indirect Income	$16,848	$123,552	$134,784	$151,632	$65,672	$168,480	$168,480
Total Income	$313,848	$703,552	$666,784	$791,632	$884,672	$887,480	$887,480
Annual Income (Per Worker)							
Direct Workers	$25,277	$18,862	$19,704	$20,000	$20,543	$20,543	$20,543
Indirect Workers	$11,232	$11,232	$11,232	$11,232	$11,232	$11,232	$11,232

Source: Economic Consultants Northwest (1989b).

Local Government Costs — The major cost to Musselshell County would be the maintenance of the Old Divide Road. The Old Divide Road is a two-lane road that may not sustain the type of traffic that is projected to occur under this mining scenario. The state of Montana provides maintenance on the highways between the junction of U. S. Highway 87 with Old Divide Road and the junction of Highway 312 with the local access road (Heath Street) into Huntley. Yellowstone County should experience minor increased costs with respect to the road system in Yellowstone County. The increase in traffic may require additional services from both the sheriff's department and ambulance service providers; however, no new personnel or capital costs are anticipated.

One new family is projected to migrate into Musselshell County which is not expected to add any costs to the budget of the Musselshell County or Roundup governments. Similarly, five new families are projected to migrate into Yellowstone County which should not add any costs to the budget of Yellowstone County or Billings governments. The small number of children expected to migrate into the study area is not expected to appreciably affect the budgets of any of the school districts within the study area (see "Demography" impacts).

State and Federal Government Costs — The major cost to the state of Montana would be the increased maintenance of U.S. Highway 87 and Highway 312 (the Huntley Road) within the study area. Furthermore, the life of the road may be shortened due to the increased traffic (see "Transportation impacts"). However, to offset these impacts, indirect revenues would be generated through diesel fuel taxes, Gross Vehicle Weight (GVW) fees, and federal use fees paid by the trucking firm.

Federal costs due to the land exchange would amount to foregone royalty payments, assuming a mining company would be willing to lease the property (see "Socioeconomics" under Alternative C, chapter 4). Similar to Meridian, BLM holds properties that checkerboard the Bull Mountains area. It is unknown whether third party mining companies would be interested in leasing both the federal and private coal and paying royalties to both the federal government and Meridian.

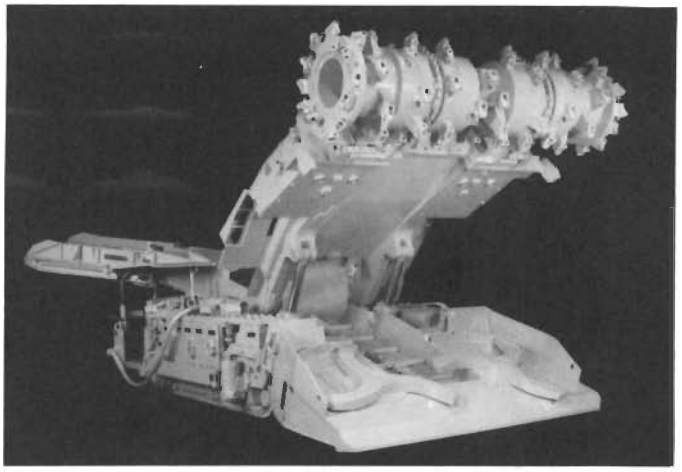
Local Government Revenues — Musselshell County government is expected to receive approximately $100,000 per year for the first five years of the project (table 4.17). Most of the new revenue would be from taxes on the gross proceeds of the coal. Production is expected to shift to Yellowstone County and a

TABLE 4.16

ALTERNATIVE A — EXCHANGE
(0.5 MILLION TON SCENARIO)
NET FISCAL IMPACT
($ in millions)

	DISCOUNTED		
	Total Revenues	Total Costs	Net Revenues
Federal	3.9	0.8	3.1
State	4.4	2.4	2.0
Local	3.9	0	3.9
Recreation	2.0	0	2.0
Totals	14.2	3.2	11.0

Note: See Appendix 17 for an explanation of revenue and cost items, by governmental unit.



12CM12 Continuous Miner
Photo courtesy Joy Technologies, Inc.

TABLE 4.17

PROJECTED LOCAL GOVERNMENT REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1991-2030)

	Musselshell County Government			Roundup Elementary School			Roundup High School			Yellowstone County Government			Yellowstone County Schools		
	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total
1991	$29,200	$13,350	$42,550	$15,588	$7,135	$22,723	$12,412	$5,681	$18,093	$0	$682	$682	$0	$1,127	$1,127
1992	58,400	13,981	72,381	31,177	7,471	38,648	24,823	5,949	30,772	0	665	665	0	1,099	1,099
1993	87,600	14,691	102,291	46,765	7,851	54,616	37,235	6,251	43,486	0	648	648	0	1,072	1,072
1994	116,800	15,475	132,275	62,353	8,270	70,623	49,647	6,585	56,232	0	632	632	0	1,045	1,045
1995	116,800	15,395	132,195	62,353	8,227	70,580	49,647	6,551	56,198	33,600	1,391	34,991	55,600	2,299	57,899
1996	0	11,507	11,507	0	6,150	6,150	0	4,897	4,897	168,000	4,067	172,067	278,000	6,722	284,722
1997	0	11,344	11,344	0	6,063	6,063	0	4,827	4,827	168,000	3,644	171,644	278,000	6,023	284,023
1998	0	11,207	11,207	0	5,989	5,989	0	4,769	4,769	168,000	32,732	200,732	278,000	54,096	332,096
1999	0	11,075	11,075	0	5,919	5,919	0	4,713	4,713	168,000	38,958	206,958	278,000	64,385	342,385
2000	0	10,949	10,949	0	5,851	5,851	0	4,659	4,659	168,000	46,285	214,285	278,000	76,495	354,495
2001	0	10,828	10,828	0	5,786	5,786	0	4,607	4,607	168,000	42,387	210,387	278,000	70,052	348,052
2002	0	10,711	10,711	0	5,724	5,724	0	4,558	4,558	168,000	38,819	206,819	278,000	64,156	342,156
2003	0	10,600	10,600	0	5,665	5,665	0	4,510	4,510	168,000	35,554	203,554	278,000	58,759	336,759
2004	0	10,493	10,493	0	5,608	5,608	0	4,465	4,465	168,000	32,566	200,566	278,000	53,821	331,821
2005	0	10,391	10,391	0	5,553	5,553	0	4,421	4,421	168,000	60,006	228,006	278,000	99,170	377,170
2006	0	10,292	10,292	0	5,500	5,500	0	4,379	4,379	168,000	63,908	231,908	278,000	105,620	383,620
2007	0	10,198	10,198	0	5,450	5,450	0	4,339	4,339	168,000	68,294	236,294	278,000	112,869	390,869
2008	0	10,107	10,107	0	5,402	5,402	0	4,301	4,301	168,000	65,783	233,783	278,000	108,718	386,718
2009	0	10,021	10,021	0	5,355	5,355	0	4,264	4,264	168,000	60,222	228,222	278,000	99,527	377,527
2010	0	9,937	9,937	0	5,311	5,311	0	4,228	4,228	168,000	55,133	223,133	278,000	91,117	369,117
2011	0	9,857	9,857	0	5,268	5,268	0	4,194	4,194	168,000	80,651	248,651	278,000	133,290	411,290
2012	0	9,780	9,780	0	5,227	5,227	0	4,162	4,162	168,000	82,795	250,795	278,000	136,834	414,834
2013	0	9,707	9,707	0	5,187	5,187	0	4,130	4,130	168,000	85,572	253,572	278,000	141,424	419,424
2014	0	9,636	9,636	0	5,149	5,149	0	4,100	4,100	168,000	81,588	249,588	278,000	134,839	412,839
2015	0	9,568	9,568	0	5,113	5,113	0	4,071	4,071	168,000	74,680	242,680	278,000	123,423	401,423
2016	0	9,503	9,503	0	5,078	5,078	0	4,043	4,043	168,000	68,359	236,359	278,000	112,976	390,976
2017	0	9,440	9,440	0	5,045	5,045	0	4,017	4,017	168,000	92,749	260,749	278,000	153,285	431,285
2018	0	9,380	9,380	0	5,013	5,013	0	3,991	3,991	168,000	93,862	261,862	278,000	155,124	433,124
2019	0	9,322	9,322	0	4,982	4,982	0	3,967	3,967	168,000	95,695	263,695	278,000	158,154	436,154
2020	0	9,266	9,266	0	4,952	4,952	0	3,943	3,943	168,000	90,848	258,848	278,000	150,142	428,142
2021	0	9,213	9,213	0	4,923	4,923	0	3,920	3,920	168,000	83,149	251,149	278,000	137,420	415,420
2022	0	9,162	9,162	0	4,896	4,896	0	3,898	3,898	168,000	76,105	244,105	278,000	125,778	403,778
2023	0	9,112	9,112	0	4,870	4,870	0	3,877	3,877	168,000	99,834	267,834	278,000	164,994	442,994
2024	0	9,065	9,065	0	4,844	4,844	0	3,857	3,857	168,000	100,342	268,342	278,000	165,833	443,833
2025	0	9,019	9,019	0	4,820	4,820	0	3,838	3,838	168,000	101,621	269,621	278,000	167,948	445,948
2026	0	8,975	8,975	0	4,797	4,797	0	3,819	3,819	168,000	96,267	264,267	278,000	159,099	437,099
2027	0	8,933	8,933	0	4,774	4,774	0	3,801	3,801	168,000	88,106	256,106	278,000	145,611	423,611
2028	0	8,893	8,893	0	4,752	4,752	0	3,784	3,784	168,000	80,638	248,638	278,000	133,268	411,268
2029	0	8,854	8,854	0	4,732	4,732	0	3,767	3,767	168,000	103,979	271,979	278,000	171,844	449,844
2030	0	8,816	8,816	0	4,712	4,712	0	3,751	3,751	168,000	104,131	272,131	278,000	172,096	450,096

Source: Economic Consultants Northwest, Helena, Montana, 1989b.

Note: Gross proceeds projected assuming $15 per ton coal. See Appendix 13 for assumptions relating to this table.

major shift in taxable valuation of the coal to Yellowstone County would occur in 1996.

Beginning in 1996, Yellowstone County should receive slightly over $172,000 per year in taxes due to the project. No coal production is projected for Musselshell County from 1996 to 2038. Revenues to Musselshell County would be minimal during this time period.

Revenues to the Roundup Elementary School District average approximately $50,000 per year and the High School District should receive approximately $40,000 per year through the first five years of operations. By 1996, when production changes to Yellowstone County, revenues are expected to decline to approximately $5,000 per year for each of the elementary and high school districts. Revenues to the Yellowstone County School Districts would increase markedly in 1996 due to taxation on gross proceeds of coal mined in Yellowstone County (table 4.17 and appendix 13).

Minor local governmental revenues that are expected, but not listed in table 4.17, are: school foundation program revenues for every new child enrolled in public schools, increased property valuation due to new home construction, and increased property valuation on new business or business expansion due to the in-migrating population.

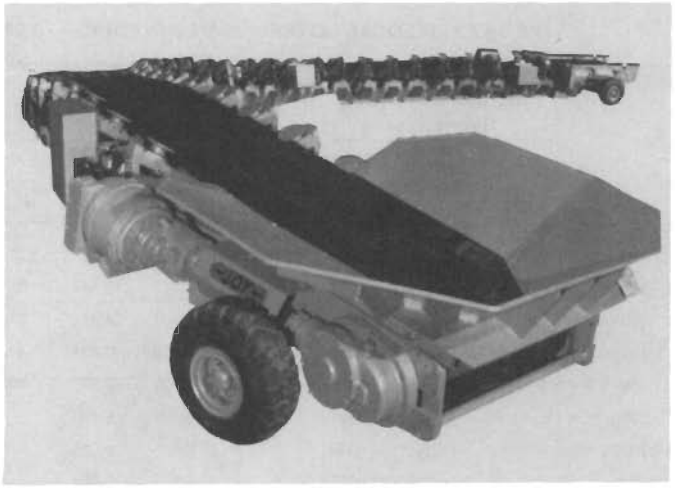
The net effect of the project on local governments within the study area should be positive since, in most cases, revenues are expected to exceed expenditures. The possible exception would be maintenance of the Old Divide Road by Musselshell County since, by 1996, revenues from the project to Musselshell County may decrease below the projected costs of maintaining this road.

State and Federal Government Revenues — During full production, the state of Montana should receive an estimated $450,000 per year in additional revenues from taxes on the mine and payrolls of the mine and the secondary workers (table 4.18). Federal revenues are expected to exceed $500,000 per year by full operations. Other state and federal revenues that are expected, but not listed in table 4.18, include corporate taxes paid by the mining company and GVW and federal use fees paid on the trucks (appendix 13).

Social Environment

Demography

The average family size of in-migrating workers depends not only on demographic characteristics of the workers (percent married with families, number of children present), but also on the particular phase of the mine development (construction or operations) at the time of in-migration. Several monitoring studies and surveys (Mountain West Research Inc. 1975; Leholm et al. 1975; Wieland et al. 1977) indicate that in mineral and energy-related developments, the number of dependents accompanying the worker, and consequently the overall family size for in-migrating workers, is 20 to 30 percent less for construction than for operational workers. In a comparison of related worker characteristics for North Dakota mines, it was found that the family size for in-migrating construction workers was 2.24 compared to 3.37 for in-migrating operational workers (Leholm et al. 1975). The primary reason for this smaller family



3FCT Flexible Conveyor Train
Photo courtesy Joy Technologies, Inc.

size of construction workers is that many families of construction workers often do not accompany their spouse to the study area because of the short duration of construction. The construction worker either commutes to the project site or establishes a temporary residence in the study area during the construction phase and the family remains at the place of permanent residence.

Average family size of construction workers and secondary workers for this project were assumed to be 2.1, while family size for operations employees were assumed to be 3.1. Slightly larger family sizes (3.3) have been used in past environmental impact statements; however, these figures were based upon studies conducted in the middle and late 1970s, when family sizes were larger than currently being reported. Today's family sizes tend to be smaller because of the decline in fertility rates since the 1960s.

The number of school-aged children (children between the ages of 0 and 18 living at home) accompanying in-migrating workers was estimated using ratios developed based on 1987 Montana school statistics and on the estimated number of children 18 years old and younger living in the state during 1987. Based on this data, it is estimated that about 45 percent of the children 18 years old and younger are enrolled in grades kindergarten through 8, approximately 19 percent of the children are enrolled in high school, about 35 percent are not enrolled in school, and about 1 percent are ungraded or enrolled in special education.

The production scenario of mining 0.5 million tons of coal per year would provide about nine new jobs (seven direct and two secondary) for Roundup residents, 39 new jobs (26 direct and 13 secondary) for Billings residents, and two additional jobs for rural residents of Musselshell and Yellowstone Counties (see appendix 14 for a more detailed breakdown). Most of the jobs would be filled by the local available work force; however, some in-migration of workers and their families would take place. During peak construction of the proposed project, Billings would be the only area to experience in-migration (table 4.19). It is projected that one construction worker would move to Billings to work at the mine. No spouse or children are assumed to accompany the worker.

TABLE 4.18

PROJECTED STATE AND FEDERAL REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (1991-2030)

	State of Montana Revenues						Federal Revenues				
	Coal Severance Tax	RIT Tax	Individual Payroll	Diesel Fuel Taxes	Property Taxes (Schools)	Total	Individual Payroll	Diesel Fuel Taxes	Abandoned Mine Tax	Black Lung Tax	Total
1991	$42,080	$7,500	$24,624	$7,111	$53,245	$134,560	$64,727	$5,369	$15,000	$66,000	$151,096
1992	94,680	15,000	23,337	14,222	90,962	238,201	61,344	10,738	30,000	132,000	234,082
1993	147,280	22,500	27,707	21,333	128,773	347,593	72,830	16,107	45,000	198,000	331,937
1994	199,880	30,000	30,964	28,444	166,670	455,958	81,390	21,476	60,000	264,000	426,866
1995	251,180	37,500	31,062	35,556	204,344	559,642	81,648	26,844	75,000	330,000	513,492
1996	246,240	37,500	31,062	35,556	202,522	552,880	81,648	26,844	75,000	330,000	513,492
1997	246,240	37,500	31,062	35,556	201,904	552,262	81,648	26,844	75,000	330,000	513,492
1998	246,240	37,500	31,062	35,556	231,169	581,527	81,648	26,844	75,000	330,000	513,492
1999	246,240	37,500	31,062	35,556	237,314	587,672	81,648	26,844	75,000	330,000	513,492
2000	246,240	37,500	31,062	35,556	244,57	594,937	81,648	26,844	75,000	330,000	513,492
2001	246,240	37,500	31,062	35,556	240,494	590,852	81,648	26,844	75,000	330,000	513,492
2002	246,240	37,500	31,062	35,556	236,750	587,108	81,648	26,844	75,000	330,000	513,492
2003	246,240	37,500	31,062	35,556	233,317	583,675	81,648	26,844	75,000	330,000	513,492
2004	246,240	37,500	31,062	35,556	230,169	580,527	81,648	26,844	75,000	330,000	513,492
2005	246,240	37,500	31,062	35,556	257,808	608,166	81,648	26,844	75,000	330,000	513,492
2006	246,240	37,500	31,062	35,556	261,642	612,000	81,648	26,844	75,000	330,000	513,492
2007	246,240	37,500	31,062	35,556	265,969	616,327	81,648	26,844	75,000	330,000	513,492
2008	246,240	37,500	31,062	35,556	263,322	613,680	81,648	26,844	75,000	330,000	513,492
2009	246,240	37,500	31,062	35,556	257,596	607,954	81,648	26,844	75,000	330,000	513,492
2010	246,240	37,500	31,062	35,556	252,350	602,708	81,648	26,844	75,000	330,000	513,492
2011	246,240	37,500	31,062	35,556	278,071	628,429	81,648	26,844	75,000	330,000	513,492
2012	246,240	37,500	31,062	35,556	280,151	630,509	81,648	26,844	75,000	330,000	513,492
2013	246,240	37,500	31,062	35,556	282,874	633,232	81,648	26,844	75,000	330,000	513,492
2014	246,240	37,500	31,062	35,556	278,762	629,120	81,648	26,844	75,000	330,000	513,492
2015	246,240	37,500	31,062	35,556	271,694	622,052	81,648	26,844	75,000	330,000	513,492
2016	246,240	37,500	31,062	35,556	265,224	615,582	81,648	26,844	75,000	330,000	513,492
2017	246,240	37,500	31,062	35,556	289,824	640,182	81,648	26,844	75,000	330,000	513,492
2018	246,240	37,500	31,062	35,556	290,879	641,237	81,648	26,844	75,000	330,000	513,492
2019	246,240	37,500	31,062	35,556	292,666	643,024	81,648	26,844	75,000	330,000	513,492
2020	246,240	37,500	31,062	35,556	287,698	638,056	81,648	26,844	75,000	330,000	513,492
2021	246,240	37,500	31,062	35,556	279,848	630,206	81,648	26,844	75,000	330,000	513,492
2022	246,240	37,500	31,062	35,556	272,662	623,020	81,648	26,844	75,000	330,000	513,492
2023	246,240	37,500	31,062	35,556	296,609	646,967	81,648	26,844	75,000	330,000	513,492
2024	246,240	37,500	31,062	35,556	297,068	647,426	81,648	26,844	75,000	330,000	513,492
2025	246,240	37,500	31,062	35,556	298,309	648,667	81,648	26,844	75,000	330,000	513,492
2026	246,240	37,500	31,062	35,556	292,842	643,200	81,648	26,844	75,000	330,000	513,492
2027	246,240	37,500	31,062	35,556	284,536	634,894	81,648	26,844	75,000	330,000	513,492
2028	246,240	37,500	31,062	35,556	276,934	627,292	81,648	26,844	75,000	330,000	513,492
2029	246,240	37,500	31,062	35,556	300,501	650,859	81,648	26,844	75,000	330,000	513,492
2030	246,240	37,500	31,062	35,556	300,611	650,969	81,648	26,844	75,000	330,000	513,492

Source: Economic Consultants Northwest (1989b).

Note: Gross proceeds projected assuming $15 per ton coal. See Appendix 13 for assumptions relating to this table.

TABLE 4.19

PROJECTED IN-MIGRATION TO THE STUDY AREA — 0.5 MILLION TONS MINE PRODUCTION SCENARIO

	Rural Musselshell County		Roundup		Rural Yellowstone County		Billings	
	Peak Construction	Full Operations	Peak Construction	Full Operations	Peak Construction	Full Operations	Peak Contruction	Full Operations
Mine-related Workers	0	0	0	1	0	0	1	4
Secondary Workers	0	0	0	0	0	0	0	1
Spouses	0	0	0	1	0	0	0	3
Children — Total	0	0	0	1	0	0	0	5
K-8	0	0	0	1	0	0	0	3
9-12	0	0	0	0	0	0	0	1
Not in School	0	0	0	0	0	0	0	1
Total	0	0	0	3	0	0	1	13

Source: Economic Consultants Northwest (1989b).

Rural Musselshell and Yellowstone Counties would experience no increase in mine-related population during full mine operations under the 0.5 million tons per year production scenario. One mine worker accompanied by a spouse and one elementary school-aged child would move to Roundup during full operations. An estimated four direct workers and one secondary worker would move to Billings during full operations (table 4.19). In addition to the five workers, it is assumed that the in-migrating population to Billings would include three spouses, three children in grades kindergarten through 8, one high school-aged child, and one child not enrolled in school, a total of 13 people moving into Billings.

It is concluded that, under the 0.5 million tons per year mining scenario, there would be no significant impacts with respect to demographic characteristics on any areas in the study area. The small number of in-migrating population would be assimilated into the existing population without impacts to the demographic characteristics of the study area.

Social Life

The magnitude of potential impacts on community resources, social organization, and social well-being would depend upon the scale of development (e.g., number of new jobs and number of newcomers to the area) and the ability of the community to accommodate or adapt to changes elicited by the project. The ability of the community to accommodate social change is related to the perceptions and expectations of the community in regard to the proposed coal mining; past history of coal and other resource developments in the area; availability and adequacy of community resources; and the socioeconomic heterogeneity of the affected population.

The principal impacts that would result from providing coal through the land exchange would be fiscal (highway maintenance). Social impacts also may occur because some area residents perceive that a land exchange may create a coal and transportation monopoly. Those who oppose the land exchange because of their fear of a coal and transportation monopoly could be adversely affected because they perceive that the government may be collaborating with industry to facilitate and expedite coal development.

Social life in the Roundup area would only be affected by the project to the extent that many area residents have high expectations that the proposed project would revitalize the depressed economy of Musselshell County. The small numbers of new jobs and in-migrants with this alternative would not provide a significant infusion of wages into the local economy.

Community Services

The expected low number of workers, families, and secondary employment that would come into both Yellowstone and Musselshell Counties would have no significant impact on community services. Both Billings and Roundup have experienced out-migration of population due to declines in the economies associated with oil, coal, and agriculture. Because of population declines in recent years, the community services of Roundup are being utilized below capacity. The expected small numbers of in-migrants would not stress the capacity of existing community-service providers such as schools, hospitals, fire protection, or other services.

Law enforcement and the county road department are currently not adequately staffed. The transport of coal by truck from the mine to the Huntley siding would stress traffic patrol, enforcement, and emergency services. Due to the projected increase in traffic, officers may have to commit more time and resources to patrolling U.S. Highway 87. This demand would shift enforcement and patrol duties from other portions of the county to the coal hauling route. Residents experiencing reduced law enforcement could view this community resource to be not allocated equitably.

It is concluded that the small number of in-migrants into the study area with the 0.5 million tons per year scenario would elicit minor impacts to community services in the area.

Housing

Although rental housing is limited in the Roundup area, there are an adequate number of houses for sale to accommodate the projected number of in-migrants (one family) to the Roundup

area. Homeowners who have not been successful in the sale of their home may offer their homes for rent. In the Billings area, there is a sufficient number of rentals and homes for sale to accommodate the predicted number of in-migrating operations workers (five families) under the 0.5 million tons per year scenario.

Transportation

Assumptions

The coal would be transported from the mine site to Huntley, Montana, using 45-ton trucks. The first year production level of 100,000 tons would require, at a minimum, two trucks with approximately ten round trips per day for 260 days per year. In an eight hour day, this would require a truck leaving the mine site approximately every 48 minutes (table 4.20). With two trucks, this would necessitate one round-trip every 96 minutes. More than likely, given the size of the trucks and the traveling distance, the round trip would require approximately two hours. The hauling day would probably be closer to ten hours for each of the drivers. The following year, when production increases to 200,000 tons, the number of trucks would double, and the trip frequency would increase to one truck every 24 minutes. These schedules are based on an eight-hour day. By increasing the work day to 12 or 14 hours, more dispersed trips to and from the loading facility could be scheduled (table 4.20). For example, with a production level of 0.5 million tons per year and a 12-hour work day, one truck would leave the mine site and the Huntley loading facility approximately every 14 minutes (table 4.20). Under the same production level, if trucks were to haul coal 24 hours a day, a truck would leave every 29 minutes.

In addition to the aforementioned truck traffic, there would be commuter and other minor hauling traffic (supplies and solid waste) associated with the project. Of the 35 full-time employees, 26 are expected to reside in or near Billings. Assuming 1.5 commuters per vehicle, this would imply that there would be an additional 17 round trips per day in commuter traffic on U.S. Highway 87.

TABLE 4.20

INTERVALS AT WHICH TRUCKS WOULD LEAVE THE MINE SITE AND LOADING FACILITY — 0.5 MILLION TONS MINE PRODUCTION SCENARIO

Annual Production Level	Day Length of Hauling			
	8 Hours	12 Hours	16 Hours	24 Hours
100,000	48 minutes	72 minutes	96 minutes	144 minutes
200,000	24 minutes	36 minutes	48 minutes	72 minutes
300,000	16 minutes	24 minutes	32 minutes	48 minutes
400,000	12 minutes	18 minutes	24 minutes	36 minutes
500,000	10 minutes	14 minutes	19 minutes	29 minutes

Source: Economic Consultants Northwest (1989b).

Note: Table assumes 45-ton trucks, 2-hour round-trip, and 260-day work year.

Traffic

The following discussion is based upon excerpts from letters from the Montana Department of Highways (Cromer pers. com. 1989).

Capacity

In general, the roadway "capacity" is the estimated traffic-carrying capabilities of a roadway over a range of defined operational conditions. These operational conditions are defined by using the concept of "level-of-service" (LOS). LOS for a particular section of roadway is a qualitative measure that describes operational conditions within a traffic stream and the perception of these conditions by motorists and/or passengers. Factors such as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety are general considerations involved in LOS. The best service is designated as LOS"A", while the worst is designated as LOS"F" at which point traffic flow breaks down.

Current ratings of the proposed haulage route are "B" for U.S. Highway 87 (except for a two-mile stretch which is rated "C") and a high "C" rating for most of Highway 312 (Huntley Road). During the period when approximately 120 round trips would be made daily, MDOH expects that four segments of the proposed haulage route would experience a reduction in their LOS rating due to the increased truck traffic.

The locations where the level of service may be decreased are a 11.4 mile stretch of roadway on U.S. Highway 87 approximately 11.8 miles north of the junction of U.S. Highway 87 and Highway 312 (Huntley Road) (from a "B" rating to a "C" rating); a 4.5-mile stretch of roadway on U.S. Highway 87 approximately 25.1 miles north of the U.S. Highway 87/Highway 312 junction (from a "B" rating to a "C" rating); and, during peak traffic periods, the intersection of U.S. Highway 87 and Highway 312 (Huntley Road) (from a current "C/D" rating to an "E" rating). The two segments of U.S. Highway 87 which are projected to decrease in LOS ratings are scheduled for reconstruction between 1991 and 1993 and, following reconstruction, the LOS rating of these roadways would be a "B" rating even with the additional mine traffic.

The intersection of U.S. Highway 87 and Highway 312 (Huntley Road) is the most critical link in the haulage route for LOS considerations. The left turning movement through this intersection would take a longtime to complete for the coal trucks and would severely restrict left turns from the southbound lane of U.S. Highway 87. This critical situation is a result of the high number of commercial vehicles turning left from a stop sign through a high volume of unstopped traffic moving west and east through the intersection from Billings and Huntley, respectively. Because of the geometry of the intersection, it would take a relatively long time for trucks of the proposed axle configuration to complete this turn. Analysis also indicates that the movement through the intersection cannot be improved by simply dedicating an outside southbound lane of U.S. Highway 87 to left turns only. Alternatives for improving the projected LOS rating of the intersection would be signalization of the intersection (at a cost of between $50,000 and $100,000) or selective scheduling through the intersection. Analysis indicates selective scheduling would raise the LOS rating of the intersection from an "E" back to the current rating of "C/D" (Cromer pers. com. 1989).

Safety

Traffic safety studies performed by MDOH indicate that accident rates for large trucks are proportional to the mix of these vehicles in the traffic stream. This implies that the percentage of accidents involving large trucks as well as the overall accident rate on U.S. Highway 87 would increase as a result of the proposed transportation scenario. MDOH projects that the number of accidents involving large trucks may increase 30 percent from the proposed project.

Of special concern to MDOH are potential accident sites at the following intersections/segments:

(1) The intersection of U.S. Highway 87 with Highway 312 (Huntley Road/K-Mart corner) would experience increases in accidents from coal trucks making the left turn movement from U.S. Highway 87.
(2) The accident rate on Highway 312 (Huntley Road) would be worsened. Of special concern is the curve near the Chicago Road/5-Corners Junction as well as the junction itself. Both of these locations have a high potential for increased accident rates.

Roads and Bridges

The pavement conditions for the proposed haulage routes would deteriorate at an accelerated rate under the proposed transportation scenario. MDOH currently has four construction projects scheduled for U.S. Highway 87 between 1990 and 1993. The additional use attributable to the proposed coal haulage may necessitate the addition of either crushed base materials or plant mix to preserve the structural integrity of the roadway (Cromer pers. com. 1989). Reconstruction projects on U.S. Highway 87 would require an additional 0.40 feet of crushed base course ($70,000 per mile) or an additional 0.15 feet of plant mix ($78,000 per mile) in order for U.S. Highway 87 to maintain its structural integrity.

Annual maintenance costs would increase for all sections of the proposed haulage route due to increased truck movement. The increased use probably would cause the failure of either of the roadways earlier than the projected designed life for the planned projects on U.S. Highway 87. The additional use may necessitate reconstruction of 7.5 miles of U.S. Highway 87 and overlaying ± 17.5 miles of roadway on or before year 2005. MDOH estimates that the proposed project would increase maintenance costs on U.S. Highway 87 by approximately $50,000 per year and that the maintenance costs on Highway 312 (Huntley Road) would increase by approximately $90,000 to $100,000 annually. To some extent, maintenance costs would be indirectly alleviated through diesel fuel taxes, federal use fees, and GVW fees paid by the trucking firm.

Bridge structures on the proposed haulage route currently have sufficiency and load ratings that are adequate to accommodate the proposed coal haulage (Cromer pers. com. 1989). However, narrow structures on Highway 312 (Huntley Road) may need to be reconstructed to improve safety.

School Bus Routes

There are currently eleven school bus routes within the proposed transportation route. These buses are on the routes for approximately 1½ hours in the morning and in the afternoon. In addition, some of the schools operate buses on the route on a different schedule one day a week.

Local school officials have expressed concern about the safety of school children on buses that operate on the same transportation route as the proposed coal haulage route (Erdie pers. com. 1989). These concerns are related to the frequent stops a school bus must make on a route and the safety of the children as they embark or disembark from the buses.

MDOH compared proposed traffic volumes on U.S. Highway 87 with other Montana highways near schools or on school bus routes. MDOH found that none of the other highways had accident clusters that specifically involved accidents associated with school activities or school bus transportation. The potential for increased traffic accidents involving school children would exist because of the increased traffic related to the proposed mine development (Cromer pers. com. 1989).

Climate

The exchange will have no effect on the climate of the area. If the property is developed by a mining company for coal, the result will also have little or no effect on the climate of the area.

Air Quality

The exchange will have no effect on the air resources of the area. Possible plans by a mining company to open a 0.5 million tons per year underground coal mine were examined as to the effect on the air resources. The resulting air pollutant emissions from the mining and cleaning process are shown in tables 4.21 through 4.23. The air separator process used in the 0.5 million tons per year mine is one of the largest contributors to the particulate emissions. In order for the mining company to ship 0.5 million tons of clean coal, it will have to mine 0.7 million tons of raw coal. From this analysis, total suspended particulates and PM-10 particulates will have the maximum emissions. Total suspended

particulate emissions are estimated to be 71.3 tons per year. PM-10 particulate emissions would be 52.2 tons per year. The maximum gaseous emissions will be nitrogen oxides, approximated to be 15.6 tons per year. In calculating the emission estimates, it was assumed that the mine would utilize the "best available control technology" as required by Montana regulations. The effect of the exchange, should an underground mine of the 0.5 million tons per year size be built, would be that the particulate levels would increase above the present baseline. However, the air quality levels would still be well within the allowable concentrations under both federal and Montana standards.

Cultural Resources

Development and operation of a 0.5 million tons per year coal mine will primarily create impacts to cultural resource properties outside the affected environment. Direct impacts to the selected federal coal lands will occur only during a drilling/exploration program. The major cause of probable expected cultural resource impacts will be through subsidence. Mixing of soil horizons and subsurface deposits of multiple stratified prehistoric occupations is possible and could occur at the margins of subsidence areas (Bohman pers. com. 1989). Major impacts to rock art sites can be expected due to scaling and collapse of vertical sandstone outcrops in subsidence areas and at subsidence margins. Such displacement can also be expected through the ongoing vibrations from underground operations, e.g. explosives, if used. No impacts are expected at other cultural resource property types.

Topography and Soils

The topography will be impacted primarily from sinkhole subsidence. These "sinkholes" and impacts will be minor and primarily in areas with less than 40 feet of overburden. Soils will be impacted slightly, primarily from sinkholes. Sinkholes may cause slope failure and surface fissures which may alter the soil structure, infiltration and permeability rates to a limited extent, as a result of mixing of surficial soil horizons, and alter drainage patterns in the area around the sinkholes. Soils will also be impacted by surface facilities and other areas of surface disturbance. These areas will be reclaimed so the long-term impact would be insignificant.

Vegetation

Vegetation will be unaffected by mining except at the entrance air vents, and associated surface facilities. Vegetation on these areas will probably be destroyed in the short-term but reclamation of these disturbed areas would be required at mine closure. The long-term vegetation impacts would be insignificant.

Wildlife

There will be a certain amount of wildlife displacement and loss of habitat associated with mine-mouth activities. There will also be some disturbance to local wildlife populations associated with haul-road activities. However, there will be no apparent long-term adverse changes in wildlife habitat quality or use of the area as the disturbed areas would be reclaimed at mine closure.

TABLE 4.21

BULL MOUNTAINS MINE (0.7 Million TPY Raw Coal)
(0.5 Million TPY Clean Coal)
TOTAL SUSPENDED PARTICULATE EMISSIONS

Activity	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
Mine Area		
1. Mine Ventilation Exhaust	0.94	0.94
2. Dumping Run of Mine (ROM)	4.46	4.46
3. Conveying, Screening ROM	70.00	0.70
4. Primary Roll Crusher	6.00	0.06
5. Pneumatic Coal Cleaning	—	33.79
6. Coal Storage	11.83	11.83
7. Load Coal For Transport	3.82	3.82
Train Loadout		
1. Dump Coal At Loadout	3.82	3.82
2. Train Loadout	0.06	0.06
3. Coal Stockpile	11.83	11.83
Total	112.76[1]	71.31

Source: Gelhaus (1989).

[1]Total uncontrolled emissions do not include pneumatic coal cleaning.

TABLE 4.22

BULL MOUNTAINS MINE (0.7 Million TPY Raw Coal)
(0.5 Million TPY Clean Coal)
PM-10 SUSPENDED PARTICULATE EMISSIONS

Activity	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
Mine Area		
1. Mine Ventilation Exhaust	0.94	0.94
2. Dumping Run of Mine (ROM)	2.14	2.14
3. Conveying, Screening ROM	25.20	0.25
4. Primary Roll Crusher	2.16	0.02
5. Pneumatic Coal Cleaning	—	33.79
6. Coal Storage	5.68	5.68
7. Load Coal For Transport	1.84	1.84
Train Loadout		
1. Dump Coal At Loadout	1.84	1.84
2. Train Loadout	0.03	0.03
3. Coal Stockpile	5.68	5.68
Total	45.51[1]	52.21

Source: Gelhaus (1989).

[1]Total uncontrolled emissions do not include pneumatic coal cleaning.

TABLE 4.23

BULL MOUNTAINS MINE (0.7 Million TPY Raw Coal)
(0.5 Million TPY Clean Coal)
GASEOUS POLLUTANT EMISSIONS

Activity	Sulfur Oxide TPY	Carbon Monoxide TPY	Hydrocarbons TPY	Nitrogen Oxides TPY
Explosives	0.15	5.02	—	1.28
Diesel Fuel	1.56	6.18	1.04	14.30
Total	1.71	11.20	1.04	15.58

Source: Gelhaus (1989).

Hydrology

No significant surface water impacts are anticipated since all drainages present are small ephemeral channels. Groundwater impacts are considered to be minimal, regardless of extraction method, although room-and-pillar mining would probably be used where overburden thicknesses are less than 200 feet (map 10).

Mining occurs primarily outside of where the Mammoth coal is saturated, with the water table of the deep aquifer system occurring within underburden sands. The limited extent of mining at or below the water table, and low hydraulic conductivities of materials involved, tend to preclude major dewatering and subsequent temporary lowering of the water levels of the deep aquifer that potentially could affect domestic wells southwest of the project area. No wells in current use have been identified within the area to be mined under this scenario.

Springs present within the area of mine impact are associated with overburden sand outcrops that are stratigraphically 300 or more feet above the Mammoth coal. Because 50 to 70 percent of the overburden section is comprised of shales and fine-grained siltstones, and due to the perched nature of the aquifer sands related to these springs, they are considered to be well insulated from both subsidence impacts (fracture development and/or roof caving) and deep aquifer dewatering.

Subsidence effects are minimized due to dry coal conditions. Locally, small room-and-pillar underground workings are present at Mammoth coal outcrops that show no subsidence over a 30-to 50-year period.

Use of the room-and-pillar extraction method in areas of relatively shallow overburden, under 200 to 300 feet (map 10), has potential for long-term impacts that are not easily characterized at the present time. This is mostly true of those expanded areas where regional water levels would inundate pillars. Over time the effect of load pressures greater than hydraulic pressures, and concomitant weakening of pillar material through combined solution and physical sapping, could result in sinkhole collapse of unpredictable magnitude, location and extent.

Recreation

Most recreational activities or opportunities will remain about the same except for hunting. With the increase in man's activity, it is anticipated that some wildlife species will move out of the area, thus hunting opportunities will decrease somewhat. Other types of recreational opportunities will be affected minimally. Overall, recreational impacts would be insignificant and limited by the large amount of private ownership of the surface lands.

Stratigraphy and Geology

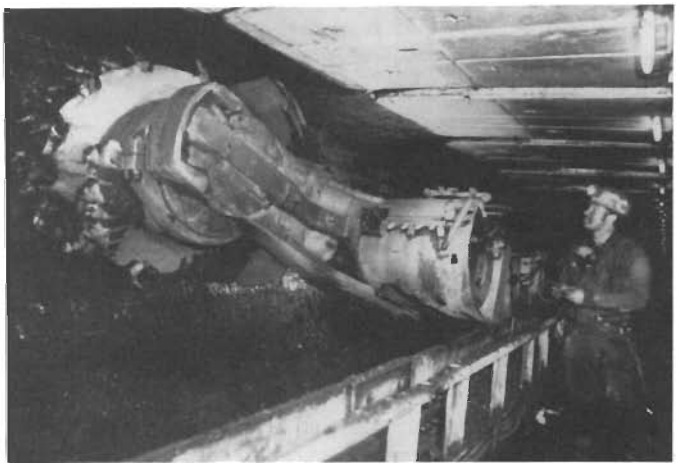
Approximately 50 percent of the Mammoth coal bed will be removed within the mine area.

Subsidence

Past mining and empirical estimates show that subsidence over most of the proposed room-and-pillar mining area in the Bull Mountains will not be a noticeable problem. There is some chance that room-and-pillar mining under shallow overburden, less than 40 feet, will result in sinkhole subsidence necessitating repair. Appendix 5 contains a more in-depth discussion of subsidence.

3.0 Million Tons of Coal Per Year Mine

Development of the selected federal coal lands as a longwall mine producing 3.0 million tons of coal per year is considered the maximum development to occur in the Bull Mountains. If the longwall mine was developed, it would necessitate the building of a railroad spur to haul the coal to the load-out facility. Two proposed routes were addressed previously, as well as the anticipated impacts of building the railroad.



3LS Longwall Shearer in action
Photo courtesy Joy Technologies, Inc.

RESOURCE IMPACTS

The longwall mining operation will have minimal or no impacts to the following resources:

Areas of Critical Environmental Concern
Floodplains
Native American Religious Concerns
Threatened and Endangered Species
Hazardous Wastes
Wetlands/Riparian Areas
Wild and Scenic Rivers
Wilderness
Other Minerals
Oil and Gas
Mineral Materials/Mining Claims

Anticipated impacts from mining to the other resource values are as follows.

SOCIOECONOMICS

Economic Environment

Project Assumptions

The proposed coal mine would be an underground coal mine operated by Meridian located in southern Musselshell County and northern Yellowstone County. Construction of the mine would commence in July 1990, and production would begin in 1991 and increase steadily until 1994, when the mine is expected to be at full production (table 4.24). Although the mine plan was not submitted until February 1990, as required for this earlier assumption, the effect on the socioeconomics sections would be negligible. The project would produce an estimated 3.0 million tons of coal per year and, during full production, would employ approximately 207 mine-related workers. It is assumed that coal contracts would be negotiated with out-of-state utilities and coal would be shipped by rail to the utility site. Since there are no rail facilities near the mine site in Musselshell County, the coal produced from the proposed mine would initially be transported by truck from the mine site to a rail load-out facility in Huntley, Montana.

TABLE 4.24

PROJECTED COAL PRODUCTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (Tons of Coal)

	Yellowstone County	Musselshell County	Total
1991	72,000	453,000	525,000
1992	317,000	683,000	1,000,000
1993	287,000	1,813,000	2,100,000
1994	297,000	2,703,000	3,000,000
1995	455,000	2,545,000	3,000,000
1996	545,000	2,455,000	3,000,000
1997-2000	1,062,000	1,938,000	3,000,000
2001-2005	1,589,000	1,411,000	3,000,000
2006	2,764,000	236,000	3,000,000
2007	2,349,000	651,000	3,000,000
2008	2,149,000	851,000	3,000,000
2009	2,149,000	851,000	3,000,000
2010	690,000	690,000	1,380,000

Sources: USDI (1989); Meridian Minerals Company development estimates.

Note: The projected coal mining production information submitted by Meridian Minerals Company only carried their figures on their 3.0 million tons per year mine production scenario out to 20 years. Most socioeconomic impacts would be realized after 20 years of mining.

Beginning in the third quarter of 1991, construction of a railroad spur would commence from the mine site to the Burlington Northern mainline railroad. Construction would continue for two years and, upon completion of the railroad spur, coal would be transported entirely by rail. Rail transport would be scheduled to begin by mid-1993, when production would reach 2.1 million tons.

Economic impacts due to the land exchange and subsequent operation of the mine are described in terms of impacts on employment, income, and the fiscal conditions of local, state, and federal governments.

Employment

As a direct result of the proposed land exchange and subsequent operation of the underground coal mine, employment opportunities would be created in the mining, transportation, and public service sectors. At full production and through the life of the mine, the proposed project is expected to create a total of 207 direct (mine, loading facility, and coal transportation) and 92 indirect (secondary) jobs. Employment would increase from an initial hiring of 35 to 65 construction and operations employees in 1990, to full employment of 207 employees by 1994 (table 4.25). Construction employees would begin work in the third quarter of 1990 and continue construction work through 1993. Maximum construction employment of 38 employees would be attained in 1993 during construction of the railroad spur.

Employment by Type

The following sections describe the types and number of employees expected to be hired for construction and operation of the proposed project.

Mine Employment — Meridian expects to hire 23 employees for construction of the mine during the last two quarters of 1990 (table 4.26). Construction should be completed by the end of the second quarter of 1991 with approximately 23 construction employees working during the first two quarters of that year. When mine production increases from 1.0 million to 2.1 million tons of coal in 1993, there would be additional construction activities. This construction phase would last one year and total construction employment should equal twelve persons (table 4.26).

Mine operations should begin in late 1990, with an expected 71 full-time, mine-related employees working by the beginning of 1991 (table 4.26). In 1993, 65 operations employees would be added during the first two quarters and an additional 63 employees would be hired in the last two quarters. By 1994, when full production should be attained, there would be approximately 199 persons working at the mine site.

As illustrated in table 4.26, Meridian expects to hire 75 percent of the construction workers and two-thirds to three-fourths of the operations workers locally (Billings Job Service area). Most positions could be filled by local applicants who would be trained on site. Positions which would require special expertise, such as the underground supervisor and some technical employees, would most likely be recruited from outside the study area.

Loading Facility Employment — Meridian expects to hire 12 employees for construction of the loading facility during the last two quarters of 1990 (table 4.27). Construction should be completed by the first quarter of 1991, when full operations have commenced. Further construction of a loading facility would occur during the last two quarters of 1993 to accommodate the new rail system to the mine site. Construction employment during this phase should total 13 employees.

TABLE 4.25

TOTAL EMPLOYMENT SUMMARY — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employees	35	35	29	23	26	26	26	26	26	26	38	38	25	25	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employees	0	30	87	87	87	87	94	94	94	94	171	171	234	234	207	207	207	207	207	207	207	207	207	207	207	207
Secondary	0	11	22	48	47	48	48	49	49	49	49	89	89	114	114	92	92	92	92	92	92	92	92	92	92	92
Total	35	76	138	158	160	161	168	169	169	169	258	298	348	373	321	299	299	299	299	299	299	299	299	299	299	299

Sources: USDI (1989); Meridian Minerals Company development estimates.

For the first two years of operations, Meridian expects to hire four employees to operate the load-out facility. In 1993, an additional four employees would be hired, bringing total employment at the load-out facility to eight employees. Between 53 and 83 percent of the construction and operations loading facility employees are expected to be hired from the local work force area (Billings Job Service area).

Transportation Employment — Meridian expects to initially contract with or hire twelve employees during 1991 to transport the coal to the railroad siding at Huntley (table 4.28). Following 1991, seven additional employees would be hired when production increases by 475,000 tons, and eight more employees would be hired in 1993 when production increases by 1.1 million tons. Construction of the railroad is expected to begin in mid-1991 and last for two years. Meridian expects that 26 employees would be involved in rail construction over the two-year period. By mid-1993, construction of the railroad should be complete and transportation of the coal by rail should commence. The transportation of the coal by rail would be increased over the last six months of 1993 so that by 1994, truck transportation of coal should cease.

The number of truck drivers needed to transport the coal from the mine to the Huntley load-out facility was estimated by assuming the coal would be transported using 45-ton trucks. For example, in 1992 when 1.0 million tons of coal would be shipped, the transportation of the coal would require 22,222 trips per year.

TABLE 4.26

MINE EMPLOYMENT — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employment — Mine																										
Local Hire Ratio	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
Administrative	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	2	2	2	2	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	8	8	8	8	0	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	6	6	6	6	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Operators	6	6	6	6	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Employment	23	23	23	23	0	0	0	0	0	0	12	12	12	12	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employment — Mine																										
Local Hire Ratio	.67	.67	.67	.67	.67	.67	.67	.67	.67	.67	.70	.70	.70	.70	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
Administrative	0	5	11	11	11	11	11	11	11	11	20	20	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Technicians	0	5	13	13	13	13	13	13	13	13	23	23	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Mechanics	0	5	9	9	9	9	9	9	9	9	18	18	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Laborers	0	8	9	9	9	9	9	9	9	9	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Equipment Operators	0	7	29	29	29	29	29	29	29	29	57	57	83	83	83	83	83	83	83	83	83	83	83	83	83	83
Total Operations Employment	0	30	71	71	71	71	71	71	71	71	136	136	199	199	199	199	199	199	199	199	199	199	199	199	199	199
Total Mine Employment	23	53	94	94	71	71	71	71	71	71	148	148	211	211	199	199	199	199	199	199	199	199	199	199	199	199

Sources: USDI (1989); Meridian Minerals Company development estimates.

TABLE 4.27

LOADING FACILITY EMPLOYMENT — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employment — Loading Facility																										
Local Hire Ratio	.83	.83	.83	.83	.83	.83	.83	.83	.83	.83	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70	.70
Administrative	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	1	1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	6	6	3	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	2	2	1	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Operators	2	2	1	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Employment	12	12	6	0	0	0	0	0	0	0	0	0	13	13	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employment — Loading Facility																										
Local Hire Ratio	.53	.53	.53	.53	.53	.53	.53	.53	.53	.53	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60	.60
Administrative	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technicians	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mechanics	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Laborers	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Equipment Operators	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total Operations Employment	0	0	4	4	4	4	4	4	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Total Loading Facility Employment	12	12	10	4	4	4	4	4	4	4	8	8	21	21	8	8	8	8	8	8	8	8	8	8	8	8

Sources: USDI (1989); Meridian Minerals Company development estimates.

TABLE 4.28

TRANSPORTATION EMPLOYMENT — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction Employment — Transportation																										
Local Hire Ratio	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Administrative	0	0	0	0	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	0	0	0	0	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	0	0	0	0	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	0	0	0	0	6	6	6	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Equipment Operators	0	0	0	0	6	6	6	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Construction Employment	0	0	0	0	26	26	26	26	26	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operations Employment — Transportation																										
Local Hire Ratio	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
Administrative	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Technicians	0	0	1	1	1	1	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Mechanics	0	0	1	1	1	1	1	1	1	1	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Drivers/Operators	0	0	9	9	9	9	15	15	15	15	22	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0
Total Operations Employment	0	0	12	12	12	12	19	19	19	19	27	27	27	27	0	0	0	0	0	0	0	0	0	0	0	0
Total Transportation Employment	0	0	12	12	38	38	45	45	45	45	53	53	27	27	0	0	0	0	0	0	0	0	0	0	0	0

Sources: USDI (1989); Meridian Minerals Company development estimates.

TABLE 4.29

LOCAL HIRE DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction																										
Roundup	5	5	4	3	4	4	4	4	4	4	6	6	3	3	0	0	0	0	0	0	0	0	0	0	0	0
Billings	19	19	15	14	17	17	17	17	17	17	24	24	15	15	0	0	0	0	0	0	0	0	0	0	0	0
Rural Roundup	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Local Hire — Construction	26	26	21	17	23	23	23	23	23	23	32	32	18	18	0	0	0	0	0	0	0	0	0	0	0	0
Operations																										
Roundup	0	4	11	11	11	11	13	13	13	13	24	24	33	33	30	30	30	30	30	30	30	30	30	30	30	30
Billings	0	14	44	44	44	44	47	47	47	47	87	87	118	118	109	109	109	109	109	109	109	109	109	109	109	109
Rural Roundup	0	1	2	2	2	2	3	3	3	3	6	6	8	8	7	7	7	7	7	7	7	7	7	7	7	7
Rural Yellowstone	0	1	2	2	2	2	3	3	3	3	6	6	8	8	7	7	7	7	7	7	7	7	7	7	7	7
Total Local Hire — Operations	0	20	59	59	59	59	66	66	66	66	123	123	167	167	153	153	153	153	153	153	153	153	153	153	153	153
Total Local Hire Distribution																										
Roundup	5	9	15	14	15	15	17	17	17	17	30	30	36	36	30	30	30	30	30	30	30	30	30	30	30	30
Billings	19	33	59	58	61	61	64	64	64	64	111	111	133	133	109	109	109	109	109	109	109	109	109	109	109	109
Rural Roundup	1	2	3	2	3	3	4	4	4	4	7	7	8	8	7	7	7	7	7	7	7	7	7	7	7	7
Rural Yellowstone	1	2	3	2	3	3	4	4	4	4	7	7	8	8	7	7	7	7	7	7	7	7	7	7	7	7
Total Local Hire	26	46	80	76	82	82	89	89	89	89	15	155	185	185	153	153	153	153	153	153	153	153	153	153	153	153

Source: Economic Consultants Northwest (1989b).

TABLE 4.30

IN-MIGRATING WORKER DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Construction																										
Roundup	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Billings	6	6	6	5	3	3	3	3	3	3	5	5	6	6	0	0	0	0	0	0	0	0	0	0	0	0
Rural Musselshell	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total In-Migrating	9	9	8	6	3	3	3	3	3	3	6	6	7	7	0	0	0	0	0	0	0	0	0	0	0	0
Operations																										
Roundup	0	1	4	4	4	4	4	4	4	4	6	6	9	9	7	7	7	7	7	7	7	7	7	7	7	7
Billings	0	7	20	20	20	20	20	20	20	20	36	36	49	49	40	40	40	40	40	40	40	40	40	40	40	40
Rural Musselshell	0	1	2	2	2	2	2	2	2	2	36	3	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Rural Yellowstone	0	1	2	2	2	2	2	2	2	2	3	3	5	5	4	4	4	4	4	4	4	4	4	4	4	4
Total Operations Settlement	0	10	28	28	28	28	28	28	28	28	48	48	67	67	54	54	54	54	54	54	54	54	54	54	54	54
Total Migration																										
Roundup	1	2	5	5	4	4	4	4	4	4	7	7	10	10	7	7	7	7	7	7	7	7	7	7	7	7
Billings	6	13	26	25	23	23	23	23	23	23	41	41	55	55	40	40	40	40	40	40	40	40	40	40	40	40
Rural Musselshell	1	2	2	2	2	2	2	2	2	2	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Rural Yellowstone	1	2	3	2	2	2	2	2	2	2	3	3	5	5	4	4	4	4	4	4	4	4	4	4	4	4
Total Settlement	9	19	36	34	31	31	31	31	31	31	54	54	74	74	54	54	54	54	54	54	54	54	54	54	54	54

Source: Economic Consultants Northwest (1989b).

Based on a 260-day work year, approximately 85 round trips would be made per work day, requiring 15 truck drivers. It is expected that most of the transportation employees would be hired locally (within the Billings Job Service area) since there is an adequate supply of persons experienced in transportation in both Musselshell County and Yellowstone County (table 3.5).

Employment Distribution

The following sections describe the expected geographical distribution of the employees to be hired by Meridian for construction and operation of the mine.

Expected Local Hire Distribution — The distribution of workers hired locally was allocated to Roundup, rural Musselshell County, Billings, and rural Yellowstone County (primarily the area between Billings, Huntley, and the northern Yellowstone County border). The allocation of local hire was approximately 70 percent for Billings, 20 percent for Roundup, and five percent each for rural Musselshell and Yellowstone counties. This allocation scheme was developed through interviews with personnel from the Billings Job Service and representatives of Meridian. The allocation is also similar to the distribution of new workers to the area estimated by using a gravity model (Lythgoe pers. com. 1989).

During the first year of operations (1991), Meridian expects to employ approximately 87 persons for mine operations (table 4.25) of which 59 would be hired from within the study area (table 4.29). Of the 59 employees hired locally, 44 are expected to be from Billings, 11 from Roundup, and two each are expected to come from rural Musselshell and Yellowstone counties (table 4.29). During full operations, the distribution of the 153 workers hired locally is expected to be approximately 109 from Billings, 30 from Roundup, and seven each from rural Musselshell and Yellowstone counties.

Expected In-migrating Workers Distribution — The distribution of expected in-migrating workers by general geographic area is illustrated in table 4.30. The number and distribution of in-migrating workers was developed using company-supplied local hire ratios and the gravity model described in appendix 12. The gravity model yielded the following distribution of mine workers to the area: 74 percent to Billings, 13 percent to Roundup, 6 percent to rural Musselshell County, and 7 percent to rural Yellowstone County. This distribution scheme indicates that, during full operations, 40 of the total of 54 in-migrating mine workers would live in Billings, seven in Roundup, three in rural Musselshell County, and four in rural Yellowstone County (table 4.30).

Table 4.31 summarizes the expected final distribution of all mine-related workers including those that would be hired locally and those that would migrate into the area. During full operations, 149 of the mine related employees are expected to reside in Billings, 37 in Roundup, ten in rural Musselshell County, and eleven in rural Yellowstone County.

Secondary Employment — In addition to the projected employment created directly by mine operations and coal transportation, the project is expected to stimulate economic activity and employment in various trade and public service sectors of the study area. This new employment created indirectly as a result of the project is called "indirect or secondary" employment.

For rural areas, such as Roundup and rural county areas, an employment multiplier of 0.25 during construction and 0.4 during operations was found to be an average ratio of indirect to new direct employment (Gilmore et al. 1982). For more urban areas, such as the Billings area, an employment multiplier of 0.35 during construction and 0.5 during operations was found to be an average ratio of indirect to new direct employment. Based on these multipliers, should the mine operations and coal transportation create 207 direct jobs at full production, then approximately 92 secondary jobs would also be created. Because secondary jobs typically do not require extensive training or specialized education, they probably would be filled by the local labor force. A local hire ratio of 90 percent was utilized to estimate expected secondary employment in-migration to the area.

During full operations, demand from direct employees of the mine is expected to create twelve new secondary jobs in Roundup, 74 new secondary jobs in Billings, and three secondary jobs in rural Yellowstone and Musselshell counties (table 4.32). A total of eight secondary workers are expected to migrate into the study area due to the project. The remaining 84 secondary employees should all be hired from the local labor force.

Income

Income (payroll) from the mine and secondary jobs was estimated and is presented in table 4.33. Projections of secondary income were derived by multiplying the number of secondary

TABLE 4.31

TOTAL MINE EMPLOYEE DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Roundup	6	11	20	19	19	19	21	21	21	21	37	37	46	46	37	37	37	37	37	37	37	37	37	37	37	37
Billings	25	46	85	83	84	84	87	87	87	87	152	152	188	188	149	149	149	149	149	149	149	149	149	149	149	149
Rural Musselshell	2	4	5	4	5	5	6	6	6	6	10	10	12	12	10	10	10	10	10	10	10	10	10	10	10	10
Rural Yellowstone	2	4	6	4	5	5	6	6	6	6	10	10	13	13	11	11	11	11	11	11	11	11	11	11	11	11
Total Settlement	35	65	116	110	113	113	120	120	120	120	209	209	259	259	207	207	207	207	207	207	207	207	207	207	207	207

Source: Economic Consultants Northwest (1989b).

TABLE 4.32

TOTAL SECONDARY WORKER DISTRIBUTION — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
In-Migrating Distribution																										
Roundup	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Billings	0	1	2	4	3	4	4	4	4	4	4	7	7	9	9	7	7	7	7	7	7	7	7	7	7	7
Rural Musselshell	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Yellowstone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total In-Migrating	0	1	2	4	3	4	4	4	4	4	4	8	8	10	10	8	8	8	8	8	8	8	8	8	8	8
Local Hire Distribution																										
Roundup	0	1	2	6	6	6	6	6	6	6	6	10	10	14	14	11	11	11	11	11	11	11	11	11	11	11
Billings	0	9	18	36	36	36	36	37	37	37	37	65	65	82	82	67	67	67	67	67	67	67	67	67	67	67
Rural Musselshell	0	0	0	1	1	1	1	1	1	1	1	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3
Rural Yellowstone	0	0	0	1	1	1	1	1	1	1	1	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3
Total Local Hire	0	10	20	44	44	44	44	45	45	45	45	81	81	104	104	84	84	84	84	84	84	84	84	84	84	84
Total Secondary Distribution																										
Roundup	0	1	2	6	6	6	6	6	6	6	6	11	11	15	15	12	12	12	12	12	12	12	12	12	12	12
Billings	0	10	20	40	39	40	40	41	41	41	41	72	72	91	91	74	74	74	74	74	74	74	74	74	74	74
Rural Musselshell	0	0	0	1	1	1	1	1	1	1	1	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3
Rural Yellowstone	0	0	0	1	1	1	1	1	1	1	1	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3
Total Secondary Related Settlement	0	11	22	48	47	48	48	49	49	49	49	89	89	114	114	92	92	92	92	92	92	92	92	92	92	92

Source: Economic Consultants Northwest (1989b).

TABLE 4.33

PAYROLL BY SOURCE — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1990 - 1996)

Type of Income	1990	1991	1992	1993	1994	1995	1996
Direct Income							
Mine	$395,00	$1,716,000	$1,477,000	$3,735,000	$4,140,000	$4,140,000	$4,140,000
Loading Facility	125,000	114,000	83,000	301,000	166,000	166,000	166,000
Transportation	0	250,000	395,000	832,000	0	0	0
Total Direct Income	$520,000	$2,080,000	$1,955,000	$4,868,000	$4,306,000	$4,306,000	$4,306,000
Indirect Income	$30,888	$463,320	$547,560	$957,528	$1,095,120	$1,033,344	$1,033,344
Total Income	$550,888	$2,543,320	$2,502,560	$5,825,528	$5,401,120	$5,339,344	$5,339,344
Annual Income Per Worker							
Direct Workers	$20,800	$18,407	$16,292	$20,803	$20,802	$20,802	$20,802
Indirect Workers	$11,232	$11,232	$11,232	$11,232	$11,232	$11,232	$11,232

Source: Economic Consultants Northwest (1989b).

workers by an estimated weekly salary of $216. This salary is based on a statewide average of services related employees reported by the Montana Department of Labor and Industry.

Total wages and salaries from the project should be about $5.3 million during full operations. Approximately $4.3 million of this income would come directly from the mine, while $1.0 million would come from secondary jobs. Since many of the workers are expected to reside in the Billings area, the majority of this income would most likely be spent in Yellowstone County.

Other income to the area would be from expenditures by the coal company for supplies and equipment and from the transportation contractor for equipment, fuel, repairs, and other supplies. Most of the mining equipment would be bought outside the study area. Since the trucking firm would be a contractor, it is not known where the firm would purchase their trucks or trailers. The expected local purchases (timber, lubricants, concrete blocks, roof batting supplies, safety equipment and other parts and supplies) by the mining company should average $3.4 million per year (Morehead pers. com. 1989).

Fiscal

Each level of government would receive additional revenues or incur additional costs if the mine is developed as described. In addition, the public would receive recreational benefits as a result of the land exchange. Over the projected life of the mine the tax revenues, fees, and recreation benefits would exceed the additional governmental costs or foregone royalties. That value, discounted to 1990 dollars would have a present value of $64.7 million (table 4.34). An in-depth discussion of each of the fiscal conditions follows.

TABLE 4.34

ALTERNATIVE A — EXCHANGE
(3.0 MILLION TON SCENARIO)
NET FISCAL IMPACT
($ in millions)

	DISCOUNTED		
	Total Revenues	Total Costs	Net Revenues
Federal	22.0	4.4	17.6
State	26.7	4.7	22.0
Local	23.2	0	23.2
Recreation	1.9	0	1.9
Totals	73.8	9.1	64.7

Note: See Appendix 17 for an explanation of revenue and cost items, by governmental unit.

Local Government Costs — The major cost to Musselshell County would be the maintenance of the Old Divide Road. The Old Divide Road is a two-lane road that may not sustain the type of traffic that is projected to occur under this mining scenario. The state of Montana provides maintenance on the highways between the junction of U. S. Highway 87 with Old Divide Road and the junction of Highway 312 with the local access road (Heath Street) into Huntley. Yellowstone County should experience minor increased costs with respect to the road system in Yellowstone County. The increase in traffic may require additional services from both the sheriff's office and ambulance service providers; however, no new personnel or capital costs are anticipated.

Eleven new families (ten direct and one secondary) are projected to migrate into Musselshell County (see Demography impacts), which should add marginal administrative costs to the budget of Musselshell County. No new capital or personnel costs are anticipated for the county.

Fifty-one new families are projected to migrate into Yellowstone County (see Demography impacts), which would amount to approximately 150 people or about a 0.2 percent impact on the total population of the county. Marginal administrative costs to the county government budget are anticipated; however, no new capital or personnel costs are expected.

Eight new families (approximately 23 people) are projected to move into Roundup (see Demography impacts). This low number of in-migrating population should add marginal administration costs to the budget of the municipality of Roundup, but no new personnel or capital costs are anticipated. Forty-seven new families or approximately 138 new people are projected to move into Billings. This in-migration should amount to less than a 0.3 percent impact to the total population of the city. Marginal administrative costs are expected to the budget of Billings; however, no new capital or personnel costs are anticipated due to this increase in population.

Eight new students are expected to enroll in the Roundup School District. This small increase in mine-related enrollment should add marginal administrative and supply costs to the Roundup School District. No new capital or personnel costs are expected for the Roundup School District. Thirty-six mine-related students (26 in kindergarten through grade 8 and ten in grades 9 through 12) are expected to enroll in the school system in Billings. If these new students are well dispersed within the school district, no new capital or personnel costs should be experienced by the Billings school districts. Marginal administrative and supply costs may be added to the budget of the school districts in Billings.

State and Federal Government Costs — The major cost to Montana would be the increased maintenance of U.S. Highway 87 and Highway 312 (Huntley Road) within the area. The life of the road also may be shortened due to the increased traffic (see Transportation impacts). To offset these impacts, indirect revenues would be generated through diesel fuel taxes, GVW fees, and federal use fees paid by the trucking firm.

Federal costs from the land exchange would amount to foregone royalty payments (see "Leasing Socioeconomics"). Similar to Meridian, BLM administers federal coal properties that checkerboard the Bull Mountains area. It is unknown whether other mining companies would be interested in leasing both federal and private coal and paying royalties to both the federal government and Meridian.

Local Government Revenues — During full operation Musselshell County government is expected to receive about $1.0 million in new taxes per year due to the project (table 4.35). New revenues would be realized from taxes on gross proceeds of the coal and, to a lesser extent, property taxes on the mine, equipment and railroad.

Yellowstone County government should receive about $214,831 in taxes in 1995 from the mine project, including $152,880 in gross proceeds and approximately $62,000 from property taxation on the mine equipment and the railroad. A shift in coal production to Yellowstone County would occur in 1997 and consequently, revenues should increase to about $454,859 per year (table 4.35).

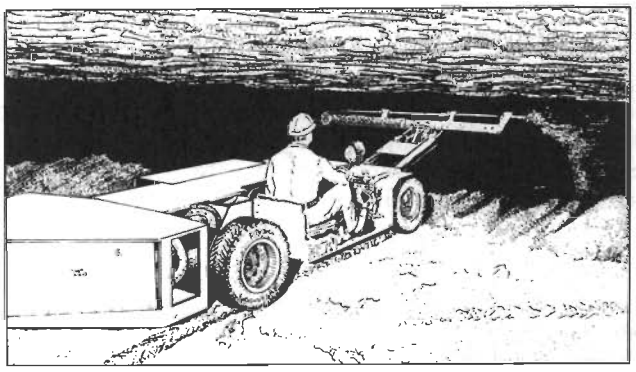


TABLE 4.35

PROJECTED LOCAL GOVERNMENT REVENUES — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1991 - 2025)

	Musselshell County Government			Roundup Elementary School			Roundup High School			Yellowstone County Government			Yellowstone County Schools		
	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total	Gross Proceeds	Mine & Equipment	Total
1991	$132,276	$71,615	$203,891	$70,615	$38,272	$108,887	$56,225	$30,473	$86,698	$24,192	$12,782	$36,974	$40,032	$21,124	$61,156
1992	199,436	89,819	289,255	106,468	48,000	154,468	84,772	38,219	122,991	106,512	37,214	143,726	176,252	61,503	237,755
1993	529,396	310,809	840,205	282,616	166,100	448,716	225,024	132,252	357,276	96,432	51,045	147,477	159,572	84,361	243,933
1994	789,276	361,551	1,150,827	421,351	193,217	614,568	335,489	153,843	489,332	99,792	51,012	150,804	165,132	84,307	249,439
1995	743,140	322,047	1,065,187	396,722	172,105	568,827	315,878	137,034	452,912	152,880	61,951	214,831	252,980	102,385	355,365
1996	716,860	292,396	1,009,256	382,692	156,260	538,952	304,708	124,417	429,125	183,120	64,691	247,811	303,020	106,914	409,934
1997	565,896	238,652	804,548	302,101	127,538	429,639	240,539	101,548	342,087	356,832	98,027	454,859	590,472	162,007	752,479
1998	565,896	260,079	825,975	302,101	138,989	441,090	240,539	110,666	351,205	356,832	112,602	469,434	590,472	186,096	776,568
1999	565,896	271,760	837,656	302,101	145,231	447,332	240,539	115,636	356,175	356,832	121,006	477,838	590,472	199,985	790,457
2000	565,896	341,767	907,663	302,101	182,644	484,745	240,539	145,425	385,964	356,832	166,202	523,034	590,472	274,679	865,151
2001	412,012	268,660	680,672	219,951	143,575	363,526	175,129	114,317	289,446	533,904	229,971	763,875	883,484	380,069	1,263,553
2002	412,012	264,644	676,656	219,951	141,428	361,379	175,129	112,608	287,737	533,904	227,132	761,036	883,484	375,377	1,258,861
2003	412,012	249,510	661,522	219,951	133,341	353,292	175,129	106,169	281,298	533,904	209,824	743,728	883,484	346,773	1,230,257
2004	412,012	238,858	650,870	219,951	127,648	347,599	175,129	101,636	276,765	533,904	198,285	732,189	883,484	327,702	1,211,186
2005	412,012	245,633	657,645	219,951	131,269	351,220	175,129	104,519	279,648	533,904	209,302	743,206	883,484	345,910	1,229,394
2006	68,912	119,313	188,225	36,788	63,762	100,550	29,292	50,769	80,061	928,704	344,116	1,272,820	1,536,784	568,715	2,105,499
2007	190,092	180,592	370,684	101,480	96,510	197,990	80,800	76,844	157,644	789,264	379,406	1,168,670	1,306,044	627,038	1,933,082
2008	248,492	203,320	451,812	132,656	108,656	241,312	105,624	86,515	192,139	722,064	341,469	1,063,533	1,194,844	564,340	1,759,184
2009	248,492	192,370	40,862	132,656	102,805	235,461	105,624	81,855	187,479	722,064	314,618	1,036,682	1,194,844	519,964	1,714,808
2010	201,480	168,567	370,047	107,559	90,084	197,643	85,641	71,727	157,368	776,160	326,972	1,103,132	1,284,360	540,381	1,824,741
2011	0	85,870	85,870	0	45,890	45,890	0	36,538	36,538	1,008,000	405,023	1,413,688	1,668,000	669,375	2,337,375
2012	0	84,153	84,153	0	44,972	44,972	0	35,808	35,808	1,008,000	410,688	1,418,688	1,668,000	678,738	2,346,738
2013	0	82,469	82,469	0	44,073	44,073	0	35,091	35,091	1,008,000	422,377	1,430,377	1,668,000	698,056	2,366,056
2014	0	80,820	80,820	0	43,191	43,191	0	34,390	34,390	1,008,000	526,026	1,534,026	1,668,000	869,354	2,537,354
2015	0	79,204	79,204	0	42,327	42,327	0	33,702	33,702	1,008,000	512,379	1,520,379	1,668,000	846,800	2,514,800
2016	0	77,620	77,620	0	41,481	41,481	0	33,028	33,028	1,008,000	471,330	1,479,330	1,668,000	778,960	2,446,960
2017	0	76,067	76,067	0	40,651	40,651	0	32,367	32,367	1,008,000	454,958	1,462,958	1,668,000	751,901	2,419,901
2018	0	74,546	74,546	0	39,838	39,838	0	31,720	31,720	1,008,000	436,697	1,444,697	1,668,000	721,723	2,389,723
2019	0	73,055	73,055	0	39,041	39,041	0	31,086	31,086	1,008,000	439,545	1,447,545	1,668,000	726,429	2,394,429
2020	0	71,594	71,594	0	38,261	38,261	0	30,464	30,464	1,008,000	448,659	1,456,659	1,668,000	741,492	2,409,492
2021	876,000	537,318	1,413,318	467,648	287,149	754,797	372,352	228,634	600,986	0	11,893	11,893	0	19,655	19,655
2022	876,000	522,405	1,398,405	467,648	279,179	746,827	372,352	222,288	594,640	0	11,655	11,655	0	19,262	19,262
2023	876,000	483,886	1,359,886	467,648	258,594	726,242	372,352	205,898	578,250	0	11,422	11,422	0	18,877	18,877
2024	876,000	466,962	1,342,962	467,648	249,549	717,197	372,352	198,696	571,048	0	11,193	11,193	0	18,499	18,499
2025	876,000	448,556	1,324,556	467,648	239,713	707,361	372,352	190,865	563,217	0	10,969	10,969	0	18,129	18,129

Source: Economic Consultants Northwest (1989b).

Note: A major shift in coal production occurs in 1997. Gross proceeds projected assuming $15 per ton coal. See appendix 13 for assumptions relating to this table.

Revenues to the Roundup Elementary School District should average $400,000 to $600,000 annually during full operation of the mine (table 4.35). Roundup High School District revenues are expected to average $300,000 to $400,000 annually due to the project. By 1997, revenues to the Yellowstone County School Districts should total approximately $750,000 per year due to taxation on the railroad, mine equipment, and the gross proceeds of coal mined in Yellowstone County. Appendix 13 gives an in-depth explanation of local government finances.

Minor local government revenues that are expected, but not listed in table 4.35, are: school foundation program revenues for every new child enrolled in public schools, increased property valuation due to new home construction, and increased property valuation on new business or business expansion due to the in-migrating population. The net effect of the project on local governments within the area should be positive since, in most cases, revenues are expected to exceed expenditures. The primary reason for the positive financial outlook is due to the short duration of the construction period for the mine, thus the flow of revenues to local governments begins early in the project timeframe.

State and Federal Government Revenues — During full production, the state of Montana should receive an estimated $2.6 million per year in additional revenues from taxes on the mine and payroll of the mine and secondary workers (table 4.36). Federal revenues are expected to total about $2.9 million per

TABLE 4.36

PROJECTED STATE AND FEDERAL REVENUES — 3.0 MILLION TONS MINE PRODUCTION SCENARIO (1991-2025)

	State of Montana Revenues						Federal Revenues				
	Coal Severance Tax	RIT Tax	Individual Payroll	Diesel Fuel Taxes	Property Taxes (Schools)	Total	Individual Payroll	Diesel Fuel Taxes	Abandoned Mine Tax	Black Lung Tax	Total
1991	$275,214	$39,375	$89,311	$37,333	$290,622	$731,855	$234,760	$28,187	$78,750	$346,500	$688,197
1992	521,879	75,000	87,884	71,111	512,298	1,268,172	231,011	53,689	150,000	660,000	1,094,700
1993	1,100,869	157,500	204,876	74,667	1,190,773	2,728,685	538,532	56,373	315,000	1,386,000	2,295,905
1994	1,574,139	225,000	190,219	0	1,582,861	3,572,219	500,003	0	450,000	1,980,000	2,930,003
1995	1,572,085	225,000	188,056	0	1,547,898	3,533,039	494,320	0	450,000	1,980,000	2,924,320
1996	1,570,915	225,000	188,056	0	1,516,124	3,500,095	494,320	0	450,000	1,980,000	2,924,320
1997	1,564,194	225,000	188,056	0	1,487,226	3,464,476	494,320	0	450,000	1,980,000	2,924,320
1998	1,564,194	225,000	188,056	0	1,526,936	3,504,186	494,320	0	450,000	1,980,000	2,924,320
1999	1,564,194	225,000	188,056	0	1,549,048	3,526,298	494,320	0	450,000	1,980,000	2,924,320
2000	1,564,194	225,000	188,056	0	1,676,336	3,653,586	494,320	0	450,000	1,980,000	2,924,320
2001	1,557,343	225,000	188,056	0	1,655,664	3,626,063	494,320	0	450,000	1,980,000	2,924,320
2002	1,557,343	225,000	188,056	0	1,648,113	3,618,512	494,320	0	450,000	1,980,000	2,924,320
2003	1,557,343	225,000	188,056	0	1,612,971	3,583,370	494,320	0	450,000	1,980,000	2,924,320
2004	1,557,343	225,000	188,056	0	1,588,888	3,559,287	494,320	0	450,000	1,980,000	2,924,320
2005	1,557,343	225,000	188,056	0	1,607,926	3,578,325	494,320	0	450,000	1,980,000	2,924,320
2006	1,542,068	225,000	188,056	0	1,597,124	3,552,248	494,320	0	450,000	1,980,000	2,924,320
2007	1,547,463	225,000	188,056	0	1,704,222	3,664,741	494,320	0	450,000	1,980,000	2,924,320
2008	1,550,063	225,000	188,056	0	1,692,326	3,655,445	494,320	0	450,000	1,980,000	2,924,320
2009	1,550,063	225,000	188,056	0	1,652,405	3,615,524	494,320	0	450,000	1,980,000	2,924,320
2010	1,547,970	225,000	188,056	0	1,637,169	3,598,195	494,320	0	450,000	1,980,000	2,924,320
2011	1,539,000	225,000	188,056	0	1,619,772	3,571,828	494,320	0	450,000	1,980,000	2,924,320
2012	1,539,000	225,000	188,056	0	1,623,502	3,575,558	494,320	0	450,000	1,980,000	2,924,320
2013	1,539,000	225,000	188,056	0	1,633,365	3,585,421	494,320	0	450,000	1,980,000	2,924,320
2014	1,539,000	225,000	188,056	0	1,736,294	3,688,350	494,320	0	450,000	1,980,000	2,924,320
2015	1,539,000	225,000	188,056	0	1,720,606	3,672,662	494,320	0	450,000	1,980,000	2,924,320
2016	1,539,000	225,000	188,056	0	1,677,235	3,629,291	494,320	0	450,000	1,980,000	2,924,320
2017	1,539,000	225,000	188,056	0	1,658,864	3,610,920	494,320	0	450,000	1,980,000	2,924,320
2018	1,539,000	225,000	188,056	0	1,638,619	3,590,675	494,320	0	450,000	1,980,000	2,924,320
2019	1,539,000	225,000	188,056	0	1,639,763	3,591,819	494,320	0	450,000	1,980,000	2,924,320
2020	1,539,000	225,000	188,056	0	1,647,280	3,599,336	494,320	0	450,000	1,980,000	2,924,320
2021	1,578,000	225,000	188,056	0	1,748,081	3,739,137	494,320	0	450,000	1,980,000	2,924,320
2022	1,578,000	225,000	188,056	0	1,730,465	3,721,521	494,320	0	450,000	1,980,000	2,924,320
2023	1,578,000	225,000	188,056	0	1,685,349	3,676,405	494,320	0	450,000	1,980,000	2,924,320
2024	1,578,000	225,000	188,056	0	1,665,399	3,656,455	494,320	0	450,000	1,980,000	2,924,320
2025	1,578,000	225,000	188,056	0	1,643,727	3,634,783	494,320	0	450,000	1,980,000	2,924,320

Source: Economic Consultants Northwest (1989b).

Note: A major shift in coal production occurs in 1997. Gross proceeds projected assuming $15 per ton coal. See Appendix 13 for assumptions relating to this table.

year by full operations. Other minor state and federal revenues that are expected, but not listed in table 4.36, include corporate taxes paid by the mining company and GVW and federal use fees paid on the trucks (appendix 13).

Social Environment

Demography

The average family size of in-migrating workers depends not only on demographic characteristics of the workers (percent married with families, number of children present), but also on the particular phase of the mine development (construction or operations) at the time of in-migration. Several monitoring studies and surveys (Mountain West Research 1975; Leholm et al. 1975; Wieland et al. 1977) indicate that in mineral and energy-related developments, the number of dependents accompanying the worker, and the overall family size for in-migrating workers, is 20 to 30 percent less for construction than for operational workers. In a comparison of related worker characteristics for North Dakota mines, it was found that the family size for in-migrating construction workers was 2.24 compared to 3.37 for in-migrating operational workers (Leholm et al. 1975). The

primary reason for this smaller family size of construction workers is that many families of construction workers often do not accompany their spouse to the study area because of the short duration of construction. The construction workers either commute to the project site or establishes a temporary residence in the study area during the construction phase and the family remains at the place of permanent residence.

Average family size of construction workers and secondary workers for this project were assumed to be 2.1, while family size for operations employees were assumed to be 3.1. Slightly larger family sizes (3.3) have been used in past environmental impact statements; however, these figures were based upon studies conducted in the middle and late 1970s, when family sizes were larger than currently being reported. Today's family sizes tend to be smaller because of the decline in fertility rates since the 1960s.

The number of school-aged children (children between the ages of 0 and 18 living at home) accompanying in-migrating workers was estimated using ratios developed based on 1987 Montana school statistics and on the estimated number of children 18 years old and younger living in the state during 1987. Based on this data, it is estimated that about 45 percent of the children 18 years old and younger are enrolled in grades kindergarten through 8, approximately 19 percent of the children are enrolled in high school, about 35 percent are not enrolled in school, and about one percent are ungraded or enrolled in special education.

The 3.0 million tons per year mine scenario would provide an estimated 25 and six jobs for Billings and Roundup residents, respectively, during the initial construction phase of the project. During full operations, it is expected that 149 workers would be from Billings, 37 from Roundup, and ten and eleven from the rural areas of Musselshell and Yellowstone counties, respectively. Although most jobs would be filled by the local available work force, some in-migration would occur (appendix 14).

During peak construction, one mine-related worker is predicted to move into rural Musselshell County, one into the municipality of Roundup, and one worker is expected to move into rural Yellowstone County (table 4.37). It is projected that no families would accompany the three in-migrating construction workers. Six in-migrating construction workers are expected to move into Billings during peak construction. Three of the six workers are expected to be accompanied by their spouse. In addition, the three workers would bring a total of three children (one elementary-aged child, one high-school aged child, and one child not in school).

Three mine workers are expected to migrate to rural Musselshell County during full mine operations (table 4.37). It is projected that two of the mine workers would be married with spouses present. Three children are expected to accompany the mine workers: one elementary-aged child, one high school-aged child, and one child not in school. During full operations, a total of 23 people would move to Roundup including seven mine workers, one secondary worker, six spouses, and nine children.

In rural Yellowstone County, twelve people are projected to move into the area during mine operations including four mine workers, three spouses, and five children. The largest influx of newcomers to the study area would be a total of 138 people moving to Billings (table 4.37). Forty would be mine workers and seven would be secondary employees. Thirty-six spouses and 55 children would accompany the in-migrating workers.

Past monitoring studies found that mine workers were between 25 and 39 years of age (Mountain West Research-North, Inc. 1983). Because of the small number of newcomers (eight families) expected to move into Roundup, it is concluded that under the 3.0 million tons per year scenario, there would be no significant demographic impacts on the community of Roundup. It is expected that the eight families moving into Roundup probably would not be unique in demographic characteristics from the existing residents. Similarly, the small number of in-migrating population expected to move into Billings probably would not be significantly different from the existing population and it is assumed that the 47 families would be dispersed throughout the city of Billings.

Social Life

Newcomers to the community would have little effect on the social life of Roundup. Past experiences of the community with cyclic resource developments (coal, oil, forest products, and agriculture) has imparted on the area a social history of boom and bust. Because of this cyclic growth pattern, many of the

TABLE 4.37

PROJECTED IN-MIGRATION TO THE STUDY AREA — 3.0 MILLION TONS MINE PRODUCTION SCENARIO

	Rural Musselshell County		Roundup		Rural Yellowstone County		Billings	
	Peak Construction	Full Operations	Peak Construction	Full Operations	Peak Construction	Full Operations	Peak Contruction	Full Operations
Mine-related Workers	1	3	1	7	1	4	6	40
Secondary Workers	0	0	0	1	0	0	0	7
Spouses	0	2	0	6	0	3	3	36
Children — Total	0	3	0	9	0	5	3	55
K-8	0	1	0	4	0	3	1	26
9-12	0	1	0	2	0	1	1	10
Not in School	0	1	0	3	0	1	1	19
Total	1	8	1	23	1	12	12	138

Source: Economic Consultants Northwest (1989b).

social processes and structures and the administrative and political experience necessary to deal with development already exist in Roundup.

The concept and reality of mining are respected and nonalien to the community. Social diversity in the Roundup area is relatively high due to the various social groups (ranchers, businesspeople, retired people, Bull Mountains residents) with differing life-styles, social experiences, and employment histories.

Extra-local linkages with Billings are already well developed and have provided an urban element to sociocultural awareness of the Roundup area residents. People seeking cultural aspects of a larger city, entertainment, or a wider selection of goods and services, would continue to travel to Billings for these amenities.

Positive impacts to the social well-being of Roundup area residents may be realized through increased job opportunities and local spending within the community. Those persons obtaining employment as a result of the project would gain the greatest benefits of social well-being. Mine and secondary workers as well as local merchants who were able to expand or stay in business as a result of increased spending within the community would benefit from the project.

Considering the history and experience of the Roundup area, it is unlikely that new coal miners and their families would represent a threat to the norms and values of the community. The relaxed, rural atmosphere of Roundup should be maintained since little population change is expected as a result of the project. Integration of newcomers should be relatively easy given the history of population influxes created by oil and gas activity. Informal interaction between longtime residents would continue, but interaction with newcomers may be more formal. Longtime residents are accustomed to newcomers moving into the area.

Social life in the Roundup area would be affected by the project to the extent that many area residents have high expectations that the proposed project would revitalize the depressed economy of Musselshell County. Although the number of jobs and projected expenditures by the mining company are significant when compared to the Musselshell County economy, not all of the jobs would be filled by Musselshell County residents and only a portion of the income is expected to be spent in Musselshell County.

Social impacts may occur because some area residents perceive that a land exchange may create a coal and transportation monopoly. Those who oppose the land exchange could be upset because they perceive that the government may collaborate with industry to facilitate and expedite coal development.

Community Services

Similar to the 0.5 million tons per year mine scenario, coal truck traffic on the road may stress law enforcement patrolling, response to emergencies, and issuance of citations. Law enforcement personnel may have to be shifted from other parts of the county to adequately meet the demands created by the increased heavy truck traffic. After the railroad spur has been constructed, coal truck traffic on U.S. Highway 87 would cease; however, commuter traffic to the mine site would continue. Loss of coal truck traffic would alleviate the additional workload of the law enforcement officers.

Most community services would not be stressed by the predicted numbers of newcomers to Roundup. According to community service providers, more than 300 new people would have no impact on fire protection and more than 400 new residents would not exceed the capacity of the ambulance service. Sewer and water facilities are more than sufficient to accommodate the predicted number of newcomers that would in-migrate to Roundup.

According to Jay Erdie (pers. com. 1989), Superintendent of Roundup School District, 30 or more new students would exceed accreditation standards in grades 3, 4, 5, and 6. Two additional classrooms and 1.5 to 2.0 new full-time equivalents (teaching positions) would be required with 30 new students, assuming equal distribution throughout all grades. No additional staffing or classrooms would be required with as many as 45 new students in grades 7 and 8 and in the high school grades. As a result of this project, twelve mine-related new students (residing in both Roundup and rural Musselshell County) are predicted to enter the Roundup school system, which is well below the number that would require additional teachers and classrooms.

Law enforcement and the county road department currently are not adequately staffed. Traffic patrol, enforcement, and emergency services would be stressed by the transport of coal by trucks and the increase in commuter traffic. More traffic accidents are expected to occur on U.S. Highway 87 and Highway 312 (Huntley Road), while coal is being transported by truck to the railroad siding at Huntley. After the railroad spur is operational and coal truck traffic ceases, the impact on law enforcement and emergency services would be reduced.

The increase in commuter traffic would be limited to the start and the end of worker shifts. The demand placed on law enforcement officers during shift changes could cause patrol and enforcement responsibilities in other portions of the counties to be reduced or could necessitate the hiring of additional officers during the peak periods of commuter traffic. Residents experiencing reduced law enforcement protection from the project could view this community resource as not being equitably allocated. Ambulance services should be able to meet the demand for emergency services from increased traffic accidents.

In conclusion, community services in Roundup and Billings should be adequate to meet the demands of the projected number of newcomers in-migrating to the area. Law enforcement agencies probably would experience minor impacts as a result of the increased traffic, primarily during the time that coal is transported to the Huntley railroad siding.

Housing

Although rental housing is limited in the Roundup area, there is an adequate number of houses for sale to accommodate the projected number of in-migrants (seven families) to the Roundup area. Homeowners who have not been successful in the sale of their home may offer their homes for rent. In the Billings area, there is a sufficient number of rentals and homes for sale to

accommodate the predicted number of in-migrating operations workers (40 families) under the 3.0 million tons per year mine scenario.

Transportation

Assumptions

The coal would initially be transported by 45-ton trucks from the mine site to Huntley, Montana, while the railroad spur to the mine site was under construction. The construction of the railroad would commence in 1991 and be completed by 1993. Production by the time the railroad is complete is expected to reach an annual rate of 1.2 million tons. Thus, transportation of the coal by truck would increase from 525,000 tons in 1991 to 1.0 million tons in 1992. Approximately 600,000 tons would be transported by truck in a six-month period in 1993 (or an annual rate of 1.2 million tons).

The first year production level of 525,000 tons would require approximately 45 to 50 round trips per day for 260 days per year assuming the coal was transported in 45-ton trucks (45 X 260 X 45 + 525,000). During the second year, 1.0 million tons per year would be transported by truck, requiring approximately 85 to 90 round trips per day. With a production level of 1.0 million tons and a 16-hour work day for hauling, one truck would leave the mine site and the Huntley load-out facility every ten minutes (table 4.38). For six months in 1993, the number of trips would reach 120 per day until construction of the railroad spur was complete.

TABLE 4.38

INTERVALS AT WHICH TRUCKS WOULD LEAVE THE MINE SITE AND LOADING FACILITY
3.0 MILLION TONS PRODUCTION SCENARIO

Annual Production Level	Day Length of Hauling			
	8 Hours	12 Hours	16 Hours	24 Hours
500,000	10 minutes	14 minutes	19 minutes	29 minutes
1,000,000	5 minutes	7 minutes	10 minutes	14 minutes
1,200,000	4 minutes	6 minutes	8 minutes	12 minutes

Sources: Calculations based on Bull Mountains Exchange Preparation Plan, USDI (1989); and Meridian Minerals Company development estimates.

Note: Table assumes 45-ton trucks, 2-hour round-trip, and 260-day work year.

In addition to the aforementioned truck traffic, there would be commuter and other minor hauling traffic (supplies, and solid waste) associated with the project. Of the 207 full-time employees, 149 are expected to reside in or near Billings. Assuming 1.5 commuters per vehicle, this would imply that there would be an additional 99 round trips per day in commuter traffic on U.S. Highway 87.

Traffic

The following discussion is based upon excerpts from letters from the Montana Department of Highways (Cromer pers. com. 1989).

Capacity

In general, the roadway "capacity" is the estimated traffic-carrying capabilities of a roadway over a range of defined operational conditions. These operational conditions are defined by using the concept of "level-of-service" (LOS). LOS for a particular section of roadway is a qualitative measure that describes operational conditions within a traffic stream and the perception of these conditions by motorists and/or passengers. Factors such as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety are general considerations involved in the LOS. The best service is designated as LOS"A", while the worst is designated as LOS"F" at which point traffic flow breaks down.

Current ratings of the proposed haulage route are "B" for U.S. Highway 87 (except for a two-mile stretch which is rated "C") and a high "C" rating for most of Highway 312 (Huntley Road). During the period when approximately 120 round trips would be made daily, MDOH expects that four segments of the proposed haulage route would experience a reduction in their LOS rating due to increased truck traffic.

The locations where the level of service may be decreased are a 11.4-mile stretch of roadway on U.S. Highway 87 approximately 11.8 miles north of the junction of U.S. Highway 87 and Highway 312 (Huntley Road) (from a "B" rating to a "C" rating); a 4.5-mile stretch of roadway on U.S. Highway 87 approximately 25.1 miles north of the U.S. Highway 87/Highway 312 junction (from a "B" rating to a "C" rating); and, during peak traffic periods, the intersection of U.S. Highway 87 and Highway 312 (Huntley Road) (from a current "C/D" rating to an "E/F" rating). The two segments of U.S. Highway 87 which are projected to decrease in LOS ratings are scheduled for reconstruction between 1991 and 1993 and, following reconstruction, the LOS rating of these roadways would be a "B" rating except between mile post 21.5 and 25.1 which would retain a LOS"C" rating under the projected transportation scenario.

The intersection of U.S. Highway 87 and Highway 312 (Huntley Road) is the most critical link in the haulage route for LOS considerations. The left turning movement through this intersection would take a longtime to complete for the coal trucks and would severely restrict left turns from the southbound lane of U.S. Highway 87. This situation is a result of the high number of commercial vehicles turning left from a stop sign through a high volume of unstopped traffic moving west and east through the intersection from Billings and Huntley, respectively. Because of the geometry of the intersection, it would take a relatively long time for trucks of the proposed axle to complete this turn. Analysis also indicates that the movement through the intersection cannot be improved by simply dedicating an outside southbound lane of U.S. Highway 87 to left turns only. Alternatives for improving the projected LOS rating of the intersection would be signalization of the intersection (at a cost of between $50,000 and $100,000) or selective scheduling through the intersection. Analysis indicates that selective scheduling for nonpeak traffic periods could raise the LOS rating of the intersection from an "E/F" back to the current rating of "C/D" (Cromer pers. com. 1989).

Safety

Traffic safety studies conducted by MDOH indicate that accident rates for large trucks are proportional to the mix of these vehicles in the traffic stream. This implies that the percentage of accidents involving large trucks as well as the overall accident rate on U.S. Highway 87 would increase as a result of the proposed transportation scenario. MDOH projects that the number of accidents involving large trucks may increase 70 percent from the proposed project.

Of special concern to MDOH are potential accident sites at the following intersections/segments:

(1) The intersection of U.S. Highway 87 with Highway 312 (Huntley Road-K-Mart corner) would experience increases in accidents from coal trucks making the left turn movement from U.S. Highway 87.
(2) The accident rate on Highway 312 (Huntley Road) would be worsened. Of special concern is the curve near the Chicago Road/5-Corners Junction as well as the junction itself. Both of these locations have a high potential for increased accident rates.

Roads and Bridges

The pavement conditions for the proposed haulage routes would deteriorate at an accelerated rate under the proposed transportation scenario. MDOH currently has four construction projects scheduled for U.S. Highway 87 between 1990 and 1993. The additional use attributable to the proposed coal haulage may necessitate the addition of either crushed base materials or plant mix to preserve the structural integrity of the roadway (Cromer pers. com. 1989).

Reconstruction projects on U.S. Highway 87 would require an additional 0.40 feet of crushed base course ($70,000 per mile) or an additional 0.15 feet of plant mix ($78,000 per mile) in order for U.S. Highway 87 to maintain its structural integrity. These quantities of additional base course and plant mix are based on the duration of hauling 120 round trips per day not exceeding six months.

Annual maintenance costs would increase for all sections of the proposed haulage route from increased truck movement. In addition, the increased use probably would cause the failure of either of the roadways earlier than the projected designed life for the planned projects on U.S. Highway 87. The additional use may necessitate reconstruction of 7.5 miles of U.S. Highway 87 and overlaying ± 17.5 miles of roadway on or before year 2005. MDOH estimates that the proposed project would increase maintenance costs on U.S. Highway 87 by approximately $50,000 per year and that the maintenance costs on Highway 312 (Huntley Road) would increase by approximately $90,000 to $100,000 annually. To some extent, maintenance costs would be indirectly alleviated through diesel fuel taxes, federal use fees, and GVW fees paid by the trucking firm.

Bridge structures on the proposed haulage route currently have sufficiency and load ratings that are adequate to accommodate the proposed coal haulage (Cromer pers. com. 1989). Narrow structures on Highway 312 (Huntley Road) may need to be reconstructed to improve safety.

School Bus Routes

There are currently eleven school bus routes that use the proposed transportation route. These buses are on the routes for approximately 1½ hours in the morning and in the afternoon. In addition, some of the schools operate buses on the route on a different schedule one day a week.

Local school officials have expressed concern about the safety of school children on buses that operate on the same transportation route as the proposed coal haulage route (Erdie pers. com. 1989). These concerns are related to the frequent stops a school bus must make on a route and the safety of the children as they embark and disembark from the buses.

MDOH compared proposed traffic volumes on U.S. Highway 87 with other Montana highways near schools or on school bus routes. MDOH found that none of the other highways had accident clusters that specifically involved accidents associated with school activities or school bus transportation. The potential for increased traffic accidents involving school children would exist because of the increased traffic related to the proposed mine development (Cromer pers. com. 1989).

Climate

The exchange will have no impact on the climate of the area. If the property is developed by a mining company for coal, the result will also have little or no effect on the climate of the area.

Air Quality

The overall affect of the exchange will have no impact of the air resources of the area. Possible plans by a mining company to open a 3.0 million tons per year mine were examined as to the effect on the air resources. The resulting air pollutant emissions from the mine are shown in tables 4.39 through 4.41. The particulate emissions from the 3.0 million tons per year mine would be lower than expected due to the wet coal benefication process used. From the scenario analyzed, total suspended particulates (tsp) and 10 Micron Particulate Matter (PM-10) particulates will have the maximum emissions. Total suspended particulate emissions are estimated to be 153.1 tons per year. PM-10 particulate emissions would be 75.2 tons per year. The maximum gaseous emissions will be nitrogen oxides, approximated to be 66.1 tons per year. In calculating the emission estimates, it was assumed that the mine would utilize the "best available control technology" as required by the Montana regulations.

The particulate emissions from the underground mine and processing facilities were simulated in an atmospheric dispersion model (Industrial Source Complex Model). The model calculated the worst case twenty-four hour concentrations of particulates using hypothetical meteorology. The model predicted a maximum twenty-four hour TSP concentration of 45.3 micrograms per cubic meter ($\mu g/m^3$) and the maximum twenty-four hour PM-10 concentration was 25.6 $\mu g/m^3$. The maximum twenty-four hour concentration around the train loadout area was 64.2 $\mu g/m^3$ for TSP and 36.1 $\mu g/m^3$ for PM-10. The federal and Montana twenty-four hour PM-10 standard is 150 $\mu g/m^3$. No estimation was made of an annual average particulate con-

TABLE 4.39

BULL MOUNTAINS MINE (3.0 Million TPY)
TOTAL SUSPENDED PARTICULATE EMISSIONS

Activity	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
Mine Area		
1. Mine Ventilation Exhaust	3.96	3.96
2. Dumping Run of Mine (ROM)	19.12	19.12
3. Conveying, Screening ROM	300.00	3.00
4. Primary Roll Crusher	25.00	0.25
5. Coal Storage	47.32	47.32
6. Load Coal For Transport	15.95	15.95
Train Loadout		
1. Dump Coal At Loadout	15.95	15.95
2. Train Loadout	0.25	0.25
3. Coal Stockpile	47.32	47.32
Total	474.87	153.12

Source: Gelhaus (1989).

TABLE 4.40

BULL MOUNTAINS MINE (3.0 Million TPY)
PM-10 SUSPENDED PARTICULATE EMISSIONS

Activity	Uncontrolled Emissions (TPY)	Controlled Emissions (TPY)
Mine Area		
1. Mine Ventilation Exhaust	3.96	3.96
2. Dumping Run of Mine (ROM)	9.18	9.18
3. Conveying, Screening ROM	108.00	1.08
4. Primary Roll Crusher	9.00	0.09
5. Coal Storage	22.72	22.72
6. Load Coal For Transport	7.68	7.68
Train Loadout		
1. Dump Coal At Loadout	7.68	7.68
2. Train Loadout	0.12	0.12
3. Coal Stockpile	22.72	22.72
TOTAL	191.06	75.23

Source: Gelhaus (1989).

TABLE 4.41

BULL MOUNTAINS MINE (3.0 Million TPY)
GASEOUS POLLUTANT EMISSIONS

Activity	Sulfur Oxide TPY	Carbon Monoxide TPY	Hydrocarbons TPY	Nitrogen Oxides TPY
Explosives	0.62	20.94	—	5.31
Diesel Fuel	6.63	26.24	4.44	60.80
TOTAL	7.25	47.18	4.44	66.11

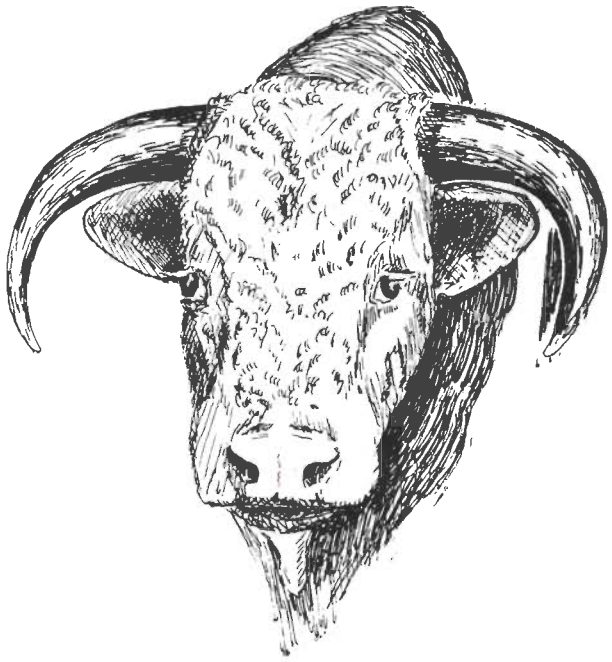
Source: Gelhaus (1989).

centration, due to the lack of available atmospheric data. Since the maximum twenty-four hour TSP and PM-10 concentrations are well within the standards, it is assumed that the annual concentrations would also be within the standards. Generally, with fugitive dust as that occurring around mining operations, the more restrictive standards are the short-term (twenty-four hour) standards. As an example, the baseline maximum twenty-four hour TSP concentration was 107 μ g/m^3, whereas the annual geometric mean was only 23.6 μ g/m^3.

The effect of the exchange, should an underground mine of the 3.0 million tons per year size stipulated in the analysis be built, would be that the particulate levels would increase above the present baseline. However, the air quality levels would still be well within the allowable concentrations under both federal and Montana standards.

Agriculture

Even with subsidence there should be little or no effect on grazing. Vegetation distribution may change somewhat because of altered drainage patterns but grazing animals will not be significantly affected. Areas for the surface facilities, mine-mouth entrance, and air vents would probably be fenced from livestock grazing; however, this acreage reduction would be insignificant for agriculture.



Cultural Resources

Longwall mining may create the greatest impacts to cultural resources. Subsidence from the longwall mine may damage or cause destruction to any rock art sites over the mining operations. Impacts to lithic scatter sites can be expected from soil displacement and expansion at subsidence margins (Bohman pers. com. 1989). Disturbance to standing wooden aboriginal and historic structures could be expected if these structures have not already been destroyed by the Hawk Creek wildfire.

Topography and Soils

Topography will be impacted primarily from the subsidence. Over a large area, the subsidence will not be readily noticeable to the topography. Soils will be impacted from the subsidence to a limited extent primarily by slope failure, altered drainage patterns and surface fissures which alter the soil structure, infiltration rates and permeability as a result of mixing of soil horizons.

Soils will also be impacted from the surface facilities and other areas of surface disturbance. These areas will be reclaimed so the long-term impact would be insignificant.

Vegetation

The type of vegetation would not be altered but the distribution may be changed because of altered drainage patterns. There would also be some vegetation removed for surface-type facilities. Vegetation on these areas will probably be destroyed in the short-term; however, reclamation of these disturbed areas would be required at mine closure. There could also be some vegetative impacts to the riparian vegetation in and around the springs depending upon whether they are affected by subsidence. The long-term vegetation impacts would be insignificant.

Wildlife

There is very little published data available regarding surface wildlife habitat impacts from longwall underground coal mining in the western United States. An operation in Utah that involved a coal seam very similar in thickness to the Bull Mountains deposits experienced subsidence to a degree that equaled the thickness of the mined coal seam. There were, in this case, no apparent adverse changes in habitat quality or wildlife use in the area (Farmer pers. com. 1989).

There will be a certain amount of wildlife displacement and loss of habitat associated with mine-mouth activities. There will also be some disturbance to local wildlife populations associated with haul-road activities.

If mining causes serious adverse geological disturbance, such as the dewatering of springs or other surface water sources, there likely would be some disruption in wildlife distribution and density patterns. The more mobile species would relocate to more favorable habitat areas and less mobile species may experience a reduction in total population numbers. Overall, long-term wildlife impacts from the mine are expected to be minimal as the company would be required to reclaim the areas of disturbance and replace any water sources destroyed by mining.

Hydrology

Generally, all impacts associated with the 0.5 million tons per year room-and-pillar mine would also affect the mined areas of the 3.0 million tons per year longwall mine. The area of impact is the same as the 0.5 million tons per year mine with the addition of T. 6 N., R. 27 E., Sections 16 through 21.

There would be greater potential for subsidence impact in federal Section 18 due to mining under portions of the section with less than 200 feet of overburden, especially if longwall extraction is planned. Some of this impact may be positive; i.e., the possibility of creating an impoundment basin within alluvial material of Rehder Creek is enhanced. At the same time, the only known well currently in use in the area may be impacted. It is presently obtaining water from depths approximating that of the Mammoth coal seam (well PW-012). Water quality associated with this well may be affected due to aquifer disruption during mining, and water levels would probably drop while mining occurred nearby. Over the long term, present groundwater conditions would most likely be reestablished with increased permeability attributed to longwall subsidence benefiting well yield. Little impact on springs is anticipated for they are conspicuously absent from Section 18.

Elsewhere, under overburden depths that range from 200 to 400 feet, subsidence associated with longwall extraction of coal may result in minor impacts at the surface, especially where the overburden section lacks massive sands within 100 feet of the coal seam. Most of these impacts would be confined to portions of the Rehder Creek drainages overlying the areas to be mined and consist of near-surface crack development and associated limited subsidence that could affect groundwater flow within alluvial channels. Such effects may be either positive or negative depending upon the magnitude and location of subsidence. It is conceivable that alluvial groundwater conditions could become enhanced by the development of local retention basins. On the other hand, fracturing may result in greater infiltration of surface runoff or may cause some leakage of shallow alluvial or perched overburden groundwater into the deeper aquifer system where the overburden thickness is less than 400 feet. Any loss of alluvial groundwater or surface runoff may affect downstream uses. This appears unlikely due to the presence of extensive shaley horizons which are not inclined to fail in brittle fashion. Wholesale subsidence as a coherent block is unlikely under conditions that favor caving of the overburden directly overlying the coal bed being mined. Trough subsidence, if it occurs, also favors compressional healing of surface fractures at moderate depths. This is difficult to precisely predict because the possibility exists that some fractures could remain open for an extended length of time.

Except for springs directly associated with alluvial channel fill, there should be few detrimental effects on springs in the expanded mine areas. They tend to occur where overburden thicknesses are greater than 400 feet, thus little subsidence impact appears probable. Where overburden thicknesses are less, primarily along Rehder Creek, surface cracking may either result in the development of new springs, create increased flow in existing springs, temporarily modify existing spring flow, or in some instances cause a spring to cease flowing.

It is doubtful that the overall availability of springs for stock watering purposes would be affected over the long-term. Groundwater associated with overburden materials defines a potentiometric surface (map 11) that strongly suggests recharge from direct infiltration into clinker beds in the Dunn Mountain area, immediately east of and adjacent to the area to be mined. No wells have been identified directly within the area to be mined and most nearby stock wells are not currently in use. It does not appear that coal extraction will have any direct impact on local use of the deep aquifer system. The expanded areas to be mined are locales where the static water level of the deep aquifer system lies above the Mammoth coal seam. Dewatering over an extensive area may steepen the groundwater gradient and subsequently cause some temporary lowering of water levels in upgradient domestic wells on the southwest edge of the Bull Mountains. Within a few years, the system would recover. Because the deep aquifer is recharged at outcrops over an extensive area along the perimeter of the Bull Mountains, any mine dewatering would have a minimal effect on downgradient water availability.

Fracturing and caving directly above the coal seam, has potential for increasing permeabilities associated with portions of the deep aquifer. This could lead to flow improvement (increased groundwater storage) and enhanced groundwater recharge of the deep aquifer.

Water Quality

No major water quality changes are expected to occur within the shallow groundwater system, nor would underground mining seriously affect the quality of surface waters under controlled mine drainage conditions.

Bull Mountains area water quality varies locally depending on location within the groundwater flow system. Most waters are intermediate in composition between sodium/sulfate and sodium/bicarbonate waters, with variable calcium/magnesium/sodium ratios. Groundwater flow reestablished within gob of the underground workings may result in localized water quality changes within the deeper aquifer. Increases in dissolved-solids concentrations would occur within mined areas and sodium and sulfate concentrations similar to overburden sandstones are expected, similar to that predicted for spoils water of southeastern Montana by Rehm et al. (1980).

Subsequent changes in groundwater quality may occur during groundwater migration from mined areas. Dissolved solids concentrations and calcium/magnesium/sodium ratios would decrease somewhat, and sulfates may increase. Groundwater flow is generally very slow so that off-site groundwater quality changes may not be felt for a number of years, if ever. Continuing downgradient groundwater movement would probably mitigate any measurable consequences, especially since downgradient waters already tend to be sodium-enriched. Increased potential for sulfate reduction downgradient from the underground workings would also result in a change to water of a sodium/bicarbonate type.

Expanded mine scenarios are not expected to affect water quality in any way different from that already described. A comparison of surface waters of Halfbreed Creek, 10 to 15 miles downstream from areas being considered for mining, with spring water and groundwater from wells tapping both shallow and deep aquifer systems indicate that water quality is not a function of form or location sampled. More important is the broad overlap between calcium/magnesium bicarbonate water associated with recharge areas and sodium/sulphate waters encountered in discharge areas and the transitional nature of each. Present water quality appears to take on regional characteristics, and may not be greatly affected by mining except for very local situations.

Caving and subsidence associated with longwall mining may result in slight decrease of water quality, especially some increase in total dissolved solids in water flowing through the coal seam. Overall, the deleterious effects on water quality of replacing mined coal with caved roof material in a longwall mine should not be as great as the effects of room-and-pillar operations (Hittman and Associates, Inc. 1980).

Recreation

Most recreational activities or opportunities will remain about the same except for hunting. With the increase in man's activity, it is anticipated that some wildlife species will move out of the area and hunting opportunities will decrease. A minor reduction in wildlife habitat is also expected to occur, thus reducing wildlife populations and hunting opportunities somewhat. Other types of dispersed recreational opportunities will be affected minimally — mostly in the area of the proposed surface facilities. Overall, public recreational impacts would be insignificant and limited by the large amount of private ownership of the surface lands.

Stratigraphy and Geology

Approximately 80 percent of the Mammoth coal bed will be removed.

Subsidence

Subsidence will definitely occur as a result of longwall mining. The surface expression is the form of broad troughs for single panels and over the entire mine area there is a lowering of the surface elevation by approximately seven feet. Overall, the landscape characteristics will exhibit little disruption. Appendix 5 contains an in-depth discussion of the predictions of subsidence.

OFFERED PRIVATE LANDS

Priority Lands 1,2,3 — Madison County (697.45 acres)

All parcels would be preserved in their natural state to provide high quality bank fishing or float fishing, and other dispersed recreational activities along the river. This is in accordance with existing MFP guidelines which call for no tree cutting, road building or mineral activities within the immediate river corridor. No recreation development is anticipated for these parcels in the near future.

Resource Impacts

The exchange of the private lands into federal ownership will have minimal or no impacts to the following resources:

Transportation
Air Quality
Areas of Critical Environmental Concern
Threatened and Endangered Species
Hazardous Wastes
Wild and Scenic Rivers
Wilderness
Stratigraphy and Geology

The following resources will be impacted by the exchange of these lands into federal ownership.

Socioeconomics

The proposed land exchange would remove 697.45 acres from the property tax base of Madison County and would add the same amount of acreage to the public domain under BLM holdings. At the present time, BLM manages 253,509 acres in Madison County. The land exchange would impact total landholdings less than 0.3 percent.

Madison County (including school districts) would lose approximately $124.15 per year in property tax revenues from the exchange. Increased revenues for Madison County would be from PILT and from grazing fee payments under the Taylor Grazing Act (appendix 15 contains an explanation of PILT payments). Madison County received $217,956 in PILT payments in FY 1988. The additional acreage resulting from the land exchange should add $523.09 to the Madison County PILT entitlement (the FY 1988 ceiling was $282,000). Grazing fees from the additional acreage are expected to total $217.62 of which 12.5 to 50.0 percent would be returned to the county. The overall effect of the land exchange upon revenues of Madison County and the local school districts are not considered to be significant.

The local economy should benefit directly from expenditures from increased recreational visitor days attributable to the proposed land exchange. BLM estimates that there would be 1,242 angler days and 100 dispersed recreational days on these properties due to the land exchange in Madison County (Botsford pers. com. 1989). Recent studies by the MDFW&P (1987) indicate that resident fishermen spend, on the average, approximately $22.31 per day in out-of-pocket costs for stream fishing. This would indicate that the local economy may benefit from $27,709 in annual expenditures due to the land exchange, assuming that the participants would not be spending income in other endeavors, should they choose not to go fishing.

The total recreational benefit to the public should increase as a result of the proposed exchange. In terms of net economic value as measured by willingness to pay, the estimated total public recreational benefit could increase by $127,484 based upon $102 per angler day and an estimate of 1,242 angler days and $8 per dispersed recreation day and an estimate of 100 recreation days on these properties (Botsford pers. com. 1989). As a comparison, the total public recreational benefit of fishing on the Madison River was estimated to be $22.2 million based on 108,712 angler days (MDFW&P 1987).

No significant impacts would be realized on the social life or community services in Madison County as a result of the land exchange, primarily because no in-or out-migration would accompany the exchange. There may be an increase in dispersed recreation but the effect would be minimal upon the area population.

The exchange from private to public land would have a positive effect on the social well-being of those who engage in dispersed recreational activities (fishing, hunting, horseback riding, wildlife viewing) by satisfying local and regional demand for recreational use and access. Adverse impacts on the social well-being of landowners adjacent to the public land and of landowners who lease the land for livestock grazing may occur if conflicts concerning land-use practices (gates left open, driving across unroaded rangeland, accidental fires, camping on private lands) arise between recreationists and ranchers.

Cultural Resources

Management of cultural properties by BLM within the selected priority lands will have a beneficial effect. If and when disturbance to areas in such lands is proposed, inventory of disturbance areas, evaluation under the criteria set for nomination to the National Register of Historic Places, and allocation of cultural resource use designation will take place. Any adverse impact will be mitigated and cultural properties will be preserved and protected.

Agriculture

Priority lands 1, 2, and 3 are unsuitable for farming. Cultivation would not be allowed. Grazing by wildlife and domestic livestock is expected to continue. Should these lands be acquired by BLM, the present livestock grazing permittee(s) will probably continue to lease these lands. Stocking rates may be adjusted to accommodate riparian/wetland habitat management goals and to improve ecological/range condition, if necessary. Spraying noxious weeds would be permitted should weeds become a problem.

Floodplains

Floodplains would be managed for watershed, recreation, wildlife and as riparian/wetland areas. Subdivision development will not be allowed on these areas due to their fragile environment and possible contamination of ground and surface water.

Native American Religious Concerns

The proposed action will have no adverse effects and may have possible beneficial effects on Native American religious concerns since any potential sites within the affected lands will be brought under federal protection under the American Indian Religious Freedom Act.

Wetland/Riparian Zones

These lands will be managed to improve the riparian vegetation. Improved management would enhance the vigor and diversity of woody riparian species to the benefit of most wildlife species.

Topography and Soils

Soils would be managed to maintain a protective cover of vegetation. Improved vegetative conditions would prevent soil loss by wind and water erosion and maintain site productivity.

Vegetation

Grazing will be continued, but will be managed to improve the riparian habitat and range condition of these parcels. Improved management of these communities will have a positive beneficial effect to wildlife, livestock, and the recreating public.

Wildlife

Federal ownership and management of the offered private lands will provide the opportunity for improved habitat condition. One tract is currently managed under an allotment management plan with specific riparian habitat improvement objectives. The remaining two tracts are adjacent to federal lands with recognized riparian values and improved management is being considered. Improved riparian habitat condition provides a greater diversity of vegetation and physical structure, which creates a greater variety of ecological niches. Improved upland condition may enhance wildlife populations, but will not greatly change the overall species diversity.

Minerals

Although Meridian will retain the oil and gas rights on these properties, BLM will be afforded surface owner property rights prior to any oil and gas development. No mineral material sales would be allowed in accordance with the Dillon MFP. These lands have very low mineral values. Consequently no mineral development is contemplated. If mining claims are filed, mineral development would be managed under existing procedures, laws and regulations.

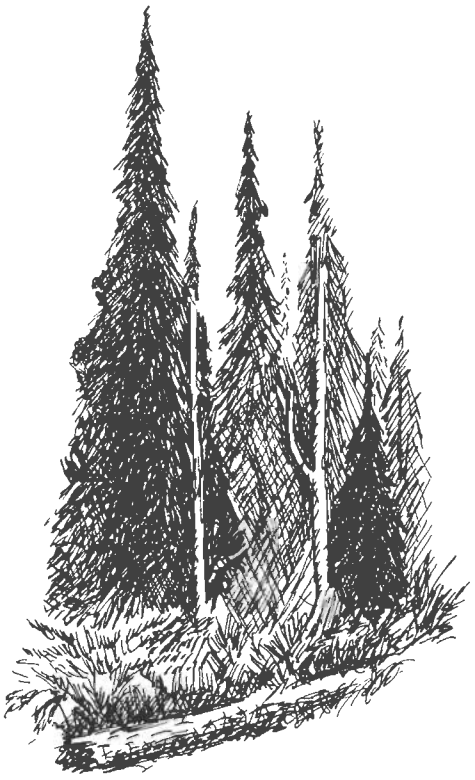
Hydrology

Acquisition of these tracts will not affect the groundwater quantity or quality. The arsenic levels of the Madison River are a natural occurrence and will continue. Improved riparian vegetation would prevent stream bank erosion and would help improve water quality. If acquired, these tracts would not be developed nor would water be extracted from the river for drinking water purposes.

Recreation

Acquisition of the tracts will provide legal access to the Madison River and will be managed for recreation. As recreational use of the river increases, these lands will provide opportunities to disperse that use and allow for more intensive management of the recreational use on the river.

Improvement and protection of the private tracts' visual resources from federal ownership could result in two ways. First, the present vegetative condition of the tracts could be improved through the development of improved allotment management grazing plans. The resulting vegetative growth and diversity would significantly improve scenic values. Second, public ownership could also preclude summer home and other riverside developments which could detract from the recreation experience.



Priority Lands 5 — Beaverhead/Deerlodge County (1,475.48 acres)

These lands will be managed to protect and enhance their outstanding wildlife and recreational values in accordance with the Upper Big Hole River Management Plan (USDI 1985). Dispersed recreation would be encouraged. No major developed recreation sites are planned at this time. Public access to 10,000 acres of public and National Forest lands would be preserved. Grazing use would be adjusted to allow recovery of the significant riparian resource on these lands.

Resource Impacts

The exchange of private lands into federal ownership will have minimal or no impacts to the following resources:

Air Quality
Areas of Critical Environmental Concern
Hazardous Waste
Wilderness
Stratigraphy and Geology

The exchange of these lands into federal ownership will impact the following resources.

Socioeconomics

The proposed land exchange would remove 1,297.92 acres from the property tax base of Beaverhead County and 177.56 acres from the tax base of Anaconda-Deerlodge County, but would add the same amount of acreage to the public domain under BLM holdings. At the present time, BLM manages 662,530 acres in Beaverhead County and 5,360 acres in Anaconda-Deerlodge County. The land exchange would impact total landholdings in Beaverhead County by less than 0.2 percent and landholdings in Anaconda-Deerlodge County by approximately 3.3 percent.

Beaverhead County (including school districts) would lose approximately $376.40 per year in property tax revenues from the exchange, while Anaconda-Deerlodge County would lose approximately $24.52 in property tax revenues annually. Increased revenues for Beaverhead and Anaconda-Deerlodge counties would be from PILT payments and from grazing fee payments under the Taylor Grazing Act (appendix 15 contains an explanation of PILT payments). Beaverhead County received $226,353 in PILT payments and Anaconda-Deerlodge County received $123,978 in FY 1988 (the FY 1988 ceiling for Beaverhead County was $342,000 and for Anaconda-Deerlodge County the ceiling was $374,000). The additional acreage resulting from the land exchange should add $973.41 to the Beaverhead County PILT entitlement and $133.17 to the Anaconda-Deerlodge PILT entitlement. Grazing fees from the additional acreage are expected to total $358.98 for Beaverhead County and $37.20 for Anaconda-Deerlodge County, of which 12.5 to 50.0 percent would be returned to the counties. The overall effect of the land exchange upon revenues of the counties and the local school districts are not considered to be significant.

The local economy should benefit directly from expenditures due to increased recreational visitor days attributable to the proposed land exchange. BLM estimates that there would be 500 angler days and 100 elk hunting days from the land exchange on these properties in Beaverhead and Anaconda-Deerlodge counties (Rodman pers. com. 1989). Recent studies by the MDFW&P (1987 and 1988) indicate that resident fishermen spend $22.31 per day and resident hunters spend $28.57 per day in out-of-pocket costs. This would indicate that the local economy may benefit from $14,012 in annual expenditures from the land exchange, assuming that the participants would not be spending income in other endeavors, should they choose not to go stream fishing or hunting.

The total recreational benefit to the public could increase as a result of the proposed exchange. In terms of net economic value as measured by willingness to pay, the estimated total public recreational benefit could increase by $57,600 based upon $102 per angler day and an estimate of 500 angler days and $66 per elk hunting day and an estimate of 100 elk hunter days on these properties (Rodman pers. com. 1989). As a comparison, the total public recreational benefit of fishing on the Big Hole River was estimated to be $6.8 million based on 47,910 angler days (MDFW&P 1987). The total recreational benefit of elk hunting in the Pioneer Mountains area was estimated to be $2.9 million based on 39,824 elk hunter days (MDFW&P 1988).

No significant impacts would be realized on the social life or community services in Beaverhead or Anaconda-Deerlodge counties as a result of the land exchange, primarily because no in-or out-migration would accompany the exchange. There may be an increase in dispersed recreation but effect would be minimal upon the area population.

The exchange from private to public land would have a positive effect on the social well-being of those who engage in dispersed recreational activities (fishing, hunting, horseback riding, wildlife viewing) by satisfying local and regional demand for recreation use and access. Conversely, adverse impacts on the social well-being of landowners adjacent to the public land and of landowners who lease the land for livestock grazing may occur if conflicts concerning land-use practices (gates left open, driving across unroaded rangeland, accidental fires, camping on private lands) arise between recreationists and ranchers.

Transportation

Acquisition of these tracts with the exception of Section 9, NW¼NW¼, will ensure long-term public access both within these immediate tracts as well as the adjacent Beaverhead National Forest land in the Pioneer Mountains. Motorized vehicle access within these lands west of the river will be limited to designated routes while the long-term use of the Sawlog Creek Road with it's undeveloped river crossing will be decided through a forthcoming travel plan and will be coordinated with the public through the southwest Montana Interagency Travel Plan and Map.

Cultural Resources

Management of cultural properties by BLM within the selected priority lands will have a beneficial effect. If and when disturbance to areas in such lands is proposed, inventory of disturbance areas, evaluation under the criteria set for nomination to the National Register of Historic Places, and allocation of cultural resource use designation will take place. Any adverse impact will be mitigated and cultural properties will be preserved and protected.

Agriculture

Under BLM management, a grazing system considering riparian improvement and rest rotation would be researched. This type of system would require more fencing and possibly a decrease in the number of livestock and duration of grazing. Grazing fees would be reduced. These offered lands would be combined with adjacent BLM lands into allotments presently leased to the Dell Bacon Ranch and Ray Bacon Ranch. A significant improvement in vegetative condition, primarily in the riparian zones, could be expected.

Floodplains

Improved vegetative conditions and reestablishment of a healthy riparian zone would stabilize the floodplains. Any future recreational or access developments would be compatible with floodplain management.

Native American Religious Concerns

The proposed exchange will have no adverse effects and may have possible beneficial effects on Native American religious concerns, since any potential sites will be brought under federal protection under the American Indian Religious Freedom Act.

Threatened and Endangered Species

Potential habitat would be protected. Any trees used by bald eagles for roosting or foraging would be protected.

Wetland/Riparian Zones

Any future grazing management system would be designed to allow full recovery of the riparian zones. This will result in a significant improvement of the important riparian areas present on these lands. One and one-half miles of the Big Hole River's banks would be restored to a healthy riparian community.

Wild and Scenic Rivers

Public ownership would be valuable for any potential future designations, but no such designations are expected.

Topography and Soils

Improved vegetative conditions would maintain soil stability and end current erosion of the riverbanks. The potential erosion of and siltation from a major timber harvest would be avoided.

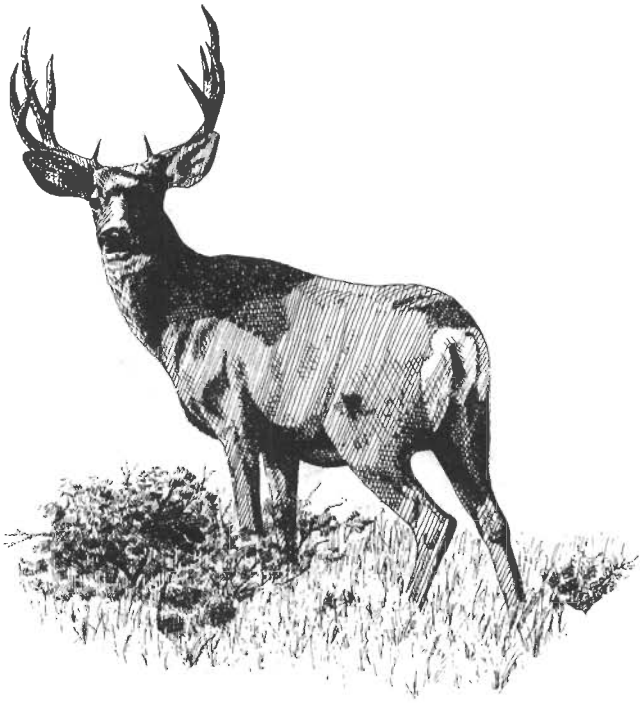
Vegetation

Improved management would allow a significant improvement in grassland and riparian communities. Of greatest importance would be the restoration of healthy riparian vegetation along the riverbanks and adjacent bottomlands. A major resurgence of brushy riparian species could be expected, especially willow species. Active vegetation management, including an improved grazing system and potential prescribed burns would increase available forage for big game.

Acquisition of these lands would result in the acquisition of 475 acres of forested land. This action would improve the public forest management situation on the south side of the Big Hole River for several miles by improving access and blocking up public ownership and forest lands. The amount of forested area involved is too small to have any significant effect overall on forest management or annual timber harvests in the Headwaters Resource Area. With the existing timber types and road situation, it is unlikely that BLM would do any timber harvesting in this area other than post and pole thinning in the current planning cycle.

Wildlife

The high wildlife values would be protected and could be significantly improved under public ownership. Disruption from extensive timber harvest or development of private hunting lodges would be avoided. Conflicts with livestock grazing would be minimized. Security cover for elk and deer would be retained



and available forage could increase. Habitat and forage for moose would significantly increase with improved riparian management. Black bear habitat would be protected.

Waterfowl habitat would improve, although opportunities are limited. Goose brooding habitat could be enhanced with proper grazing management. Duck nesting habitat will improve considerably with restoration of floodplain vegetation.

Fisheries values on these tracts will be greatly enhanced by restoration of riparian vegetation. This will stabilize the riverbanks and provide adequate cover. This will especially benefit the arctic grayling by minimizing summer thermal problems along nearly 1.5 miles of river.

Several stream drainages within the tracts show signs of historic beaver activity. In most cases, or possibly all cases, there is no current beaver activity. Reintroduction of beaver to some of these sites could enhance riparian and wildlife values.

Minerals

Meridian will retain the oil and gas rights. BLM will be afforded surface property owner rights prior to any oil and gas development. Mineral material sales and minerals management will be allowed and managed under existing laws and regulations. BLM management will improve the probability that any future development will be compatible with other resource values.

Hydrology

Acquisition of these tracts alone cannot control the hydrology of a major river system like the Big Hole or even Sawlog Creek which originates on National Forest lands. Proper management would stop bank erosion along the 1.5 miles on these tracts, and the return of riparian vegetation could allow for less heating of the river during summer months and help improve water quality.

Recreation

Existing public recreational use would be protected. Increased use could be expected once the area is identified as public land. Proper management, such as designated travel routes and pullout areas along the river, will be used to reduce user conflicts and to protect soil and vegetation. No developed recreation sites are planned. All forms of dispersed recreation and river use will be enhanced by public ownership.

Priority Lands 6 — Carbon County (6,195.56 acres)

These lands are within the Grove Creek allotment which are managed under an existing grazing allotment management plan. If the lands were acquired, they would probably be incorporated into and managed under this same plan. There would be increased recreational use of the area, resulting from the improved public access to the area. There could be some minor management changes because of the endangered plant species in the area. Increased minerals activity and associated rights-of-way could occur in this area if Phillips Petroleum Company's proposed well on Ruby Creek is a producer.

Resource Impacts

BLM acquisition of the offered Carbon County lands will have minimal or no impact to the following resources:

Air quality
Floodplains
Hazardous Wastes
Wild and Scenic Rivers
Wilderness
Stratigraphy and Geology

Other resource values affected by acquisition of these lands by BLM follow.

Socioeconomics

The proposed land exchange would remove 6,195.52 acres from the property tax base of Carbon County and would add the same amount of acreage to the public domain under BLM holdings. At the present time, BLM manages 206,659 acres in Carbon County. The land exchange would impact total land holdings approximately 3.0 percent.

Carbon County (including school districts) would lose approximately $709.17 per year in property tax revenues from the exchange. Increased revenues for Carbon County would be from PILT and from grazing fee payments under the Taylor Grazing Act (appendix 15 contains an explanation of PILT payments). In FY 1988, Carbon County received $322,913 in PILT payments. The additional acreage resulting from the land exchange should add $4,646.67 to the Carbon County PILT entitlement (the FY 1988 ceiling was $342,000). Grazing fees from the additional acreage are expected to total $1,824.66 of which 12.5 to 50.0 percent would be returned to the county. The overall effect of the land exchange upon revenues of Carbon County and the local school districts are not considered to be significant.

The local economy should benefit directly from expenditures from increased recreational days attributable to the proposed land exchange. BLM estimates that there would be 525 big game hunting days (mostly deer) on these properties from the land exchange in Carbon County (Mosbaugh pers. com. 1989). Recent studies by the MDFW&P (1987) indicate that resident deer hunters spend, on the average, $31.11 in out-of-pocket costs per day to hunt deer. This would indicate that the local economy may benefit from $16,330 in annual expenditures from the land exchange, assuming that the participants (hunters) would not be spending income in other endeavors, should they choose not to go hunting.

The total recreational benefit to the public could increase as a result of the proposed exchange. In terms of net economic value as measured by willingness to pay, the estimated total public recreational benefit could increase by $28,875 based upon $55 per hunter day and an estimate of 525 hunter days on these properties (Mosbaugh pers. com. 1989). As a comparison, the total

50.0 percent would be returned to the county. The overall effect of the land exchange upon revenues of Carbon County and the local school districts are not considered to be significant.

The local economy should benefit directly from expenditures from increased recreational days attributable to the proposed land exchange. BLM estimates that there would be 140 big game hunting days (mostly deer) on these properties from the land exchange in Carbon County (Mosbaugh pers. com. 1990). Recent studies by the MDFW&P (1987) indicate that resident deer hunters spend, on the average, $31.11 in out-of-pocket costs per day to hunt deer. This would indicate that the local economy may benefit from $4355 in annual expenditures from the land exchange, assuming that the participants (hunters) would not be spending income in other endeavors, should they choose not to go hunting.

The total recreational benefit to the public could increase as a result of the proposed exchange. In terms of net economic value as measured by willingness to pay, the estimated total public recreational benefit could increase by $7,700 based upon $55 per hunter day and an estimate of 140 hunter days on these properties (Mosbaugh pers. com. 1989). As a comparison, the total public recreational benefit of deer hunting in southern Montana (area south of the interstate between Billings and Livingston) was estimated to be $825,000 based on 24,807 hunter days (MDFW&P 1987).

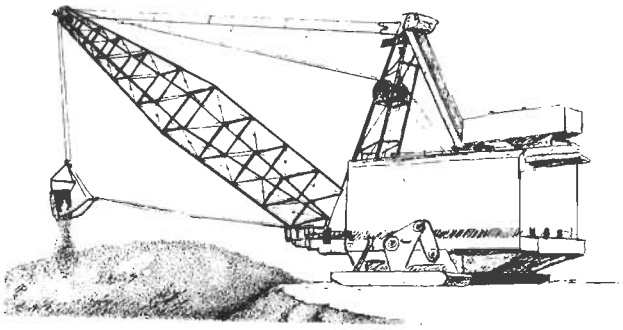
No significant impacts would be realized on the social life or community services in Carbon County as a result of the land exchange, primarily because no in-or out-migration would accompany the exchange. There may be an increase in dispersed recreation, but the effect would be minimal upon the area population.

The exchange from private to public land would have a positive effect on the social well-being of those who engage in dispersed recreational activities (fishing, hunting, horseback riding, wildlife viewing) by satisfying local and regional demand for recreational use and access. Conversely, adverse impacts on the social well-being of landowners who lease the land for livestock grazing may occur if conflicts concerning land-use practices (gates left open, driving across unroaded rangeland, accidental fires, camping on private lands) arise between recreationists and ranchers.

ALTERNATIVE B — COAL-FOR-COAL EXCHANGE MIRROR IMAGE

Under this coal-for-coal exchange proposal, the federal and Meridian coal in the project area would be split into two logical mining units of approximate equal size and value. Meridian would get one unit; BLM would get the other unit. It should be noted that both units would be equalized in value before an exchange was completed and the exact boundaries of each unit determined.

Merits to this type of exchange would be that both parties would acquire a contiguous block of coal land for mining or lease. A contiguous block of coal would be more economically attractive to potential mining companies because it allows for more com-



pact, efficient mining operations. Contiguous blocks of coal (one owner) also tend to be more valuable and generate higher bonus bids and rentals than lands divided into a checkerboard pattern.

While it is conceivable that both tracts of coal could be developed at the same time, this is highly improbable. The most likely scenario is the private coal tract would be developed first. The federal coal tract would probably be leased to the same mining company about fifteen years after the private coal tract was developed, i.e., under a longwall mining operation producing 3.0 million tons of coal per year. Under a room-and-pillar mining operation, BLM would probably have to lease the federal coal unit to a second mining company when the coal was economically feasible for development. This probably would not occur until 2020, based on NRET's projections for the coal market. Appendix 11 contains an in-depth discussion of the Bull Mountains coal and its development.

Since the coal lands in this alternative are essentially the same coal lands under the proposed exchange alternative, the environmental impacts from mining these lands will be the same as discussed previously. The socioeconomic impacts will be slightly different and are discussed below.

Socioeconomics (0.5 million tons per year mine)

Economic Environment

Employment and Income

Employment and income impacts are virtually identical to those described in the 0.5 million tons per year mine scenario under the proposed action Alternative A-Coal-for-Land Exchange-Preferred.

Fiscal

Fiscal impacts to Musselshell and Yellowstone counties would be almost identical to those described in the 0.5 million tons per year mining scenario under the proposed action, Alternative A-Coal-for-Land Exchange. Under Alternative B-Mirror Image-Coal-for-Coal Exchange, federal royalty payments would be available on the acquired coal, should the federal government be able to lease the coal in the future.

Social Environment

Demography

The demographic effects of the proposed development would be virtually identical to those described in the proposed action. Because substantial new settlement would not occur due to the development, the few newcomers could assimilate into the existing population without impacts to the demographic characteristics of the study area.

Social Life

The nature and magnitude of potential impacts on community resources, social organization, and social well-being would be similar to impacts presented in the proposed action. Because the communities have experienced population influxes and social changes with other resource-related developments, the small number of predicted newcomers would have little effect on the social life of the community.

Community Services

The small population increase attributable to the proposed project would not stress community services or facilities. Similar to impacts projected in the proposed action, minor impacts may be experienced by law enforcement and emergency services.

Housing

Similar to the proposed action, there is sufficient housing available for the expected number of in-migrants.

Socioeconomics (3.0 million tons per year mine)

Economic Environment

Employment and Income

Employment and income impacts are virtually identical to those described in the 3.0 million tons per year mine scenario under the proposed action, Alternative A-Coal-for-Land Exchange.

Fiscal

Fiscal impacts to Musselshell and Yellowstone Counties would be almost identical to those described in the 3.0 million tons per year mine scenario under the proposed action, Alternative A — Coal-for-Land Exchange. Under Alternative B — Mirror Image — Coal-for-Coal Exchange, federal royalty payments would be available on the acquired coal, should the federal government be able to lease the coal in the future.

Social Environment

Demography

Impacts to demographic characteristics from the proposed development would be similar to the impacts described in the proposed action (3.0 million tons per year mine scenario). It is expected that the in-migrating population would be assimilated into the existing population without impacts to the demographic characteristics of the area.

Social Life

Potential impacts on community resources, social organization, and social well-being would resemble the impacts described in the proposed action. Integration of newcomers should be relatively easy given the history of population influxes resulting from other resource-based developments.

Community Services

Similar to the proposed action, community services would experience minor impacts as a result of the proposed development. Coal traffic during the first two years of operation and increased commuter traffic may moderately stress law enforcement and emergency services in the study area.

Housing

There would be no difference in predicted impacts in this alternative than impacts from the proposed action (3.0 million tons per year mine). Rental units may be limited although, there is adequate housing for sale to accommodate the projected number of newcomers.

ALTERNATIVE C — LEASING

Lands involved in the leasing alternative are essentially the same lands as those in the exchange alternative, except that several additional tracts of land would be included; T. 6 N., R. 26 E., Section 24 (197.54 acres of federal coal) and T. 6 N., R. 27 E., Section 16 (640 acres of state coal).

0.5 MILLION TONS OF COAL PER YEAR MINE

For environmental analysis purposes, all the coal lands included under the leasing alternative are addressed in this section, even though it is highly unlikely that BLM would lease all the available coal to a mining company at the 0.5 million tons per year rate of production. Likewise, it is doubtful that a mining company would want to lease this much coal at one time. There are 7,667 acres of coal lands included in this scenario. At the production rate of 0.5 million tons per year, the mining company would have 67.7 million tons of recoverable coal or 134 years of production (table 4.1).

The environmental impacts of leasing the coal for the small room-and-pillar mine are essentially the same as the exchange small room-and-pillar environmental impacts for most resources, except socioeconomics which is discussed below. There is a slight difference in environmental impacts because of slightly different lands involved in leasing and the larger area involved but not significant enough to warrant further in-depth discussion.

Socioeconomic Impacts

This leasing alternative assumes a project start date of 2020, when coal would become economically feasible to mine at $25 (1990 dollars) per ton of coal. The following impact analysis is based upon the assumption that the baseline projections presented in chapter 3 would continue through year 2020. It should be noted that it is extremely difficult to predict, with a high level of accuracy, impacts that would occur 30 years into the future.

Economic Environment

Employment and Income

Employment impacts on the local economies would be virtually identical to those described in the 0.5 million tons per year mine scenario under the proposed action, Alternative A — Coal-for-Land Exchange. Projected baseline employment growth rates for the study area indicate that total employment in Musselshell County by year 2020 would be slightly higher than current levels. Baseline employment in Yellowstone County is projected to grow at an annual rate of 1.4 percent so that, by year 2020, total employment in Yellowstone County should exceed 100,000. The impacts due to the mine on the study area employment levels should be slightly less than those described under the 0.5 million tons per year mine scenario under Alternative A — Coal-for-land Exchange.

Income impacts on the local economies also would be virtually identical to those described in the 0.5 million tons per year mine scenario under the proposed action, Alternative A — Coal-for-Land Exchange. Inflating study area income levels to year 2020 should coincide with inflation factors used to project salaries and other expenditures made by the mining company.

Fiscal

Each level of government would receive additional revenues or incur additional costs if the mine is developed in 2020 at $25 (1990 dollars) a ton. The federal coal royalties would be revenues to both the state and the federal governments if the coal is leased and mined. There would not be any public recreational benefits under this alternative. The total government tax revenues, fees, and coal royalties projected to be generated by the mine would be greater than the additional costs and the foregone recreational benefits. The present value of the estimated net revenues discounted to 1990 would be approximately $1.0 million (table 4.42). Tables 4.43 and 4.44 show the projected local, state, and federal revenues that a 0.5 million ton per year mine would generate under a lease scenario at a $25 sale price and 2020 start-up date. An in-depth discussion of each of the fiscal conditions follows.

TABLE 4.42

ALTERNATIVE C — LEASING
(0.5 MILLION TON SCENARIO)
NET FISCAL IMPACT
($ in millions)

	DISCOUNTED		
	Total Revenues	Total Costs	Net Revenues
Federal	0.4	0	0.4
State	0.5	0.1	0.4
Local	0.3	0	0.3
Recreation	0	0.1	-0.1
Totals	1.2	0.2	1.0

Note: See Appendix 17 for an explanation of revenue and cost items, by governmental unit.

Fiscal impacts on local governments due to the mine would be similar to those described in the 0.5 million tons per year mine scenario under the proposed action, Alternative A — Coal-for-Land Exchange. State and federal government revenues would benefit from the receipt of federal coal royalty fees paid by the mining company. Through the life of the proposed mine, BLM estimates that there would be 7.938 million tons of recoverable federal coal associated with the lease in Musselshell and Yellowstone Counties. Assuming a start date of 2020 and $25 per ton for coal (1990 dollars), BLM estimates that the present value in 1990 dollars (discounted at 10 percent) of total future royalty payments would amount to $176,941. Actual value of the total royalty payments, based upon $25 per ton for coal in 1990 dollars, would be $13,367,592. Of these royalty payments, one-half would go to state government (school foundation program) and one-half to the federal government. In addition, any bonus fees associated with the lease would also be forthcoming. Appendix 11 and 16 show these values and the underlying assumptions used for this scenario.

If BLM were able to lease the federal coal immediately, and assuming that the company was willing to lease and develop it, and using a $15 per ton F.O.B. mine and a 1991 startup date, then the present value of the royalty payments discounted to 1990 dollars would be $1,676,763. Total royalty payments (1990 dollars) would be $7,938,000. Appendixes 11 and 16 show these values and the underlying assumptions used for this scenario.

The $15 per ton and 1991 start-up date lease scenario was not fully developed as an alternative because BLM did not consider it an economically viable venture. See appendix 11 for factors which influence development of the coal.

Social Environment

Demography

Impacts to communities in the study area would be similar to those anticipated under the 0.5 million tons per year mine in Alternative A. Baseline population projections indicate little

TABLE 4.43

PROJECTED LOCAL GOVERNMENT REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (2020-2059) — $25/TON SALE PRICE

	Musselshell County Government				Roundup Elementary School				Roundup High School				Yellowstone County Government				Yellowstone County Schools				Cumulative Local Government Taxes		
	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total Cumulative
2020	$48,800	$13,350	$62,150	$62,150	$26,055	$7,135	$33,189	$33,189	$20,745	$5,681	$26,426	$26,426	$0	$682	$682	$682	$0	$1,127	$1,127	$1,127	$95,600	$27,975	$123,575
2021	97,600	13,981	111,581	173,731	52,109	7,471	59,581	92,770	41,491	5,949	47,439	73,865	0	665	665	1,347	0	1,099	1,099	2,226	286,800	57,140	343,940
2022	146,400	14,691	161,091	334,822	78,164	7,851	86,015	178,785	62,236	6,251	68,487	142,353	0	648	648	1,996	0	1,072	1,072	3,298	573,600	87,653	661,253
2023	195,200	15,475	210,675	545,496	104,219	8,270	112,489	291,274	82,981	6,585	89,566	231,918	0	632	632	2,628	0	1,045	1,045	4,343	956,000	119,659	1,075,659
2024	195,200	15,395	210,595	756,091	104,219	8,227	112,446	403,720	82,981	6,551	89,532	321,450	56,300	1,391	57,691	60,319	93,000	2,299	95,299	99,642	1,487,700	153,522	1,641,222
2025	0	11,507	11,507	767,599	0	6,150	6,150	409,869	0	4,897	4,897	326,347	281,500	4,067	285,567	345,886	465,000	6,722	471,722	571,363	2,234,200	186,864	2,421,064
2026	0	11,344	11,344	778,943	0	6,063	6,063	415,932	0	4,827	4,827	331,174	281,500	3,644	285,144	631,030	465,000	6,023	471,023	1,042,386	2,980,700	218,765	3,199,465
2027	0	11,207	11,207	790,150	0	5,989	5,989	421,921	0	4,769	4,769	335,942	281,500	32,732	314,232	945,262	465,000	54,096	519,096	1,561,482	3,727,200	327,558	4,054,758
2028	0	11,075	11,075	801,225	0	5,919	5,919	427,840	0	4,713	4,713	340,655	281,500	38,958	320,458	1,265,720	465,000	64,385	529,385	2,090,867	4,473,700	452,607	4,926,307
2029	0	10,949	10,949	812,174	0	5,851	5,851	433,691	0	4,659	4,659	345,314	281,500	46,285	327,785	1,593,505	465,000	76,495	541,495	2,632,362	5,220,200	596,846	5,817,046
2030	0	10,828	10,828	823,002	0	5,786	5,786	439,477	0	4,607	4,607	349,921	281,500	42,387	323,887	1,917,392	465,000	70,052	535,052	3,167,414	5,966,700	730,506	6,697,206
2031	0	10,711	10,711	833,713	0	5,724	5,724	445,202	0	4,558	4,558	354,479	281,500	38,819	320,319	2,237,711	465,000	64,156	529,156	3,696,570	6,713,200	854,474	7,567,674
2032	0	10,600	10,600	844,313	0	5,665	5,665	450,866	0	4,510	4,510	358,989	281,500	35,554	317,054	2,554,765	465,000	58,759	523,759	4,220,329	4,459,700	969,563	8,429,263
2033	0	10,493	10,493	854,806	0	5,608	5,608	456,474	0	4,465	4,465	363,454	281,500	32,566	314,066	2,868,831	465,000	53,821	518,821	4,739,150	8,206,200	1,076,515	9,282,715
2034	0	10,391	10,391	865,197	0	5,553	5,553	462,027	0	4,421	4,421	367,875	281,500	60,006	341,506	3,210,336	465,000	99,170	564,170	5,303,320	8,952,700	1,256,055	10,208,755
2035	0	10,292	10,292	875,489	0	5,500	5,500	467,527	0	4,379	4,379	372,255	281,500	63,908	345,408	3,555,745	465,000	105,620	570,620	5,873,940	9,699,200	1,445,756	11,144,956
2036	0	10,198	10,198	885,687	0	5,450	5,450	472,977	0	4,339	4,339	376,594	281,500	68,294	349,794	3,905,539	465,000	112,869	577,869	6,451,809	10,445,700	1,646,907	12,092,607
2037	0	10,107	10,107	895,794	0	5,402	5,402	478,379	0	4,301	4,301	380,895	281,500	65,783	347,283	4,252,822	465,000	108,718	573,718	7,025,527	11,192,200	1,841,217	13,033,417
2038	0	10,021	10,021	905,815	0	5,355	5,355	483,734	0	4,264	4,264	385,159	281,500	60,222	341,722	4,594,543	465,000	99,527	564,527	7,590,055	11,938,700	2,020,605	13,959,305
2039	0	9,937	9,937	915,752	0	5,311	5,311	489,044	0	4,228	4,228	389,387	281,500	55,133	336,633	4,931,176	465,000	91,117	556,117	8,146,171	12,685,200	2,186,331	14,871,531
2040	0	9,857	9,857	925,609	0	5,268	5,268	494,312	0	4,194	4,194	393,582	281,500	80,651	362,151	5,293,327	465,000	133,290	598,290	8,744,462	13,431,700	2,419,591	15,851,291
2041	0	9,780	9,780	935,390	0	5,227	5,227	499,539	0	4,162	4,162	397,743	281,500	82,795	364,295	5,657,622	465,000	136,834	601,834	9,346,296	14,178,200	2,658,389	16,836,589
2042	0	9,707	9,707	945,096	0	5,187	5,187	504,726	0	4,130	4,130	401,873	281,500	85,572	367,072	6,024,694	465,000	141,424	606,424	9,952,719	14,924,700	2,904,409	17,829,109
2043	0	9,636	9,636	954,732	0	5,149	5,149	509,875	0	4,100	4,100	405,974	281,500	81,588	363,088	6,387,782	465,000	134,839	599,839	10,552,559	15,671,200	3,139,722	18,810,922
2044	0	9,568	9,568	964,300	0	5,113	5,113	514,989	0	4,071	4,071	410,045	281,500	74,680	356,180	6,743,962	465,000	123,423	588,423	11,140,981	16,417,700	3,356,577	19,774,277
2045	0	9,503	9,503	973,803	0	5,078	5,078	520,067	0	4,043	4,043	414,088	281,500	68,359	349,859	7,093,821	465,000	112,976	577,976	11,718,957	17,164,200	3,556,536	20,720,736
2046	0	9,440	9,440	983,243	0	5,045	5,045	525,112	0	4,017	4,017	418,105	281,500	92,749	374,249	7,468,070	465,000	153,285	618,285	12,337,242	17,910,700	3,821,072	21,731,772
2047	0	9,380	9,380	992,622	0	5,013	5,013	530,124	0	3,991	3,991	422,096	281,500	93,862	375,362	7,843,432	465,000	155,124	620,124	12,957,366	18,657,200	4,088,441	22,745,641
2048	0	9,322	9,322	1,001,944	0	4,982	4,982	535,106	0	3,967	3,967	426,063	281,500	95,695	377,195	8,220,627	465,000	158,154	623,154	13,580,520	19,403,700	4,360,560	23,764,260
2049	0	9,266	9,266	1,011,210	0	4,952	4,952	540,058	0	3,943	3,943	430,006	281,500	90,848	372,348	8,592,975	465,000	150,142	615,142	14,195,662	20,150,200	4,619,711	24,769,911
2050	0	9,213	9,213	1,020,423	0	4,923	4,923	544,981	0	3,920	3,920	433,926	281,500	83,149	364,649	8,957,624	465,000	137,420	602,420	14,798,082	20,896,700	4,858,337	25,755,037
2051	0	9,162	9,162	1,029,585	0	4,896	4,896	549,878	0	3,898	3,898	437,824	281,500	76,105	357,605	9,315,229	465,000	125,778	590,778	15,388,860	21,643,200	5,078,176	26,721,376
2052	0	9,112	9,112	1,038,697	0	4,870	4,870	554,747	0	3,877	3,877	441,701	281,500	99,834	381,334	9,696,564	465,000	164,994	629,994	16,018,854	22,389,700	5,360,864	27,750,564
2053	0	9,065	9,065	1,047,762	0	4,844	4,844	559,592	0	3,857	3,857	445,558	281,500	100,342	381,842	10,078,405	465,000	165,833	630,833	16,649,688	23,136,200	5,644,805	28,781,005
2054	0	9,019	9,019	1,056,781	0	4,820	4,820	564,411	0	3,838	3,838	449,396	281,500	101,621	383,121	10,461,527	465,000	167,948	632,948	17,282,636	23,882,700	5,932,051	29,814,751
2055	0	8,975	8,975	1,003,606	0	4,797	4,797	536,019	0	3,819	3,819	426,789	281,500	96,267	377,767	10,838,612	465,000	159,099	624,099	17,905,608	24,533,600	6,177,034	30,710,634
2056	0	8,933	8,933	900,959	0	4,774	4,774	481,212	0	3,801	3,801	383,151	281,500	88,106	369,606	11,207,553	465,000	145,611	610,611	18,515,120	25,088,900	6,399,094	31,487,994
2057	0	8,893	8,893	748,761	0	4,752	4,752	399,949	0	3,784	3,784	318,448	281,500	80,638	362,138	11,569,042	465,000	133,268	598,268	19,112,316	25,548,600	6,599,916	32,148,516
2058	0	8,854	8,854	546,940	0	4,732	4,732	292,192	0	3,767	3,767	232,650	281,500	103,979	385,479	11,953,888	465,000	171,844	636,844	19,748,115	25,912,700	6,861,086	32,773,786
2059	0	8,816	8,816	345,161	0	4,712	4,712	184,458	0	3,751	3,751	146,869	281,500	104,131	385,631	12,281,828	465,000	172,096	637,096	20,289,913	26,127,500	7,120,729	33,248,229

Source: Economic Consultants Northwest (1989b).

TABLE 4.44

PROJECTED STATE AND FEDERAL REVENUES — 0.5 MILLION TONS MINE PRODUCTION SCENARIO (2020 - 2059) — $25/TON SALE PRICE

	State of Montana Revenues							Federal Revenues					
	Coal Severance Tax	RIT Tax	Individual Payroll	Diesel Fuel Taxes	Property Taxes (Schools)	Total	Cumulative	Individual Payroll	Diesel Fuel Taxes	Abandoned Mine Tax	Black Lung Tax	Total	Cumulative
2020	$70,480	$12,500	$24,624	$7,111	$77,745	$192,460	$192,460	$64,727	$5,369	$15,000	$110,000	$195,096	$195,096
2021	158,580	25,000	23,337	14,222	139,962	361,102	553,562	61,344	10,738	30,000	220,000	322,082	517,178
2022	246,680	37,500	27,707	21,333	202,273	535,494	1,089,056	72,830	16,107	45,000	330,000	463,937	981,114
2023	334,780	50,000	30,964	28,444	264,670	708,857	1,797,913	81,390	21,476	60,000	440,000	602,865	1,583,980
2024	420,680	62,500	31,062	35,556	326,844	876,642	2,674,555	81,648	26,844	75,000	550,000	733,493	2,317,472
2025	412,320	62,500	31,062	35,556	325,022	866,459	3,541,014	81,648	26,844	75,000	550,000	733,493	3,050,965
2026	412,320	62,500	31,062	35,556	324,404	865,842	4,406,856	81,648	26,844	75,000	550,000	733,493	3,784,458
2027	412,320	62,500	31,062	35,556	353,669	895,107	5,301,963	81,648	26,844	75,000	550,000	733,493	4,517,950
2028	412,320	62,500	31,062	35,556	359,814	901,251	6,203,214	81,648	26,844	75,000	550,000	733,493	5,251,443
2029	412,320	62,500	31,062	35,556	367,079	908,516	7,111,730	81,648	26,844	75,000	550,000	733,493	5,984,935
2030	412,320	62,500	31,062	35,556	362,994	904,432	8,016,162	81,648	26,844	75,000	550,000	733,493	6,718,428
2031	412,320	62,500	31,062	35,556	359,250	900,687	8,916,849	81,648	26,844	75,000	550,000	733,493	7,451,921
2032	412,320	62,500	31,062	35,556	355,817	897,254	9,814,103	81,648	26,844	75,000	550,000	733,493	8,185,413
2033	412,320	62,500	31,062	35,556	352,669	894,107	10,708,210	81,648	26,844	75,000	550,000	733,493	8,918,906
2034	412,320	62,500	31,062	35,556	380,308	921,745	11,629,955	81,648	26,844	75,000	550,000	733,493	9,652,398
2035	412,320	62,500	31,062	35,556	384,142	925,579	12,555,534	81,648	26,844	75,000	550,000	733,493	10,385,891
2036	412,320	62,500	31,062	35,556	388,469	929,906	13,485,440	81,648	26,844	75,000	550,000	733,493	11,119,384
2037	412,320	62,500	31,062	35,556	385,822	927,260	14,412,700	81,648	26,844	75,000	550,000	733,493	11,852,876
2038	412,320	62,500	31,062	35,556	380,096	921,533	15,334,232	81,648	26,844	75,000	550,000	733,493	12,586,369
2039	412,320	62,500	31,062	35,556	374,850	916,288	16,250,520	81,648	26,844	75,000	550,000	733,493	13,319,861
2040	412,320	62,500	31,062	35,556	400,571	942,009	17,192,529	81,648	26,844	75,000	550,000	733,493	14,053,354
2041	412,320	62,500	31,062	35,556	402,651	944,088	18,136,617	81,648	26,844	75,000	550,000	733,493	14,786,847
2042	412,320	62,500	31,062	35,556	405,374	946,812	19,083,429	81,648	26,844	75,000	550,000	733,493	15,520,339
2043	412,320	62,500	31,062	35,556	401,262	942,699	20,026,128	81,648	26,844	75,000	550,000	733,493	16,253,832
2044	412,320	62,500	31,062	35,556	394,194	935,632	20,961,759	81,648	26,844	75,000	550,000	733,493	16,987,324
2045	412,320	62,500	31,062	35,556	387,724	929,161	21,890,920	81,648	26,844	75,000	550,000	733,493	17,720,817
2046	412,320	62,500	31,062	35,556	412,324	953,761	22,844,682	81,648	26,844	75,000	550,000	733,493	18,454,310
2047	412,320	62,500	31,062	35,556	413,379	954,817	23,799,498	81,648	26,844	75,000	550,000	733,493	19,187,802
2048	412,320	62,500	31,062	35,556	415,166	956,604	24,756,102	81,648	26,844	75,000	550,000	733,493	19,921,295
2049	412,320	62,500	31,062	35,556	410,198	951,635	25,707,737	81,648	26,844	75,000	550,000	733,493	20,654,787
2050	412,320	62,500	31,062	35,556	402,348	943,786	26,651,523	81,648	26,844	75,000	550,000	733,493	21,388,280
2051	412,320	62,500	31,062	35,556	395,162	936,600	27,588,123	81,648	26,844	75,000	550,000	733,493	22,121,773
2052	412,320	62,500	31,062	35,556	419,109	960,547	28,548,669	81,648	26,844	75,000	550,000	733,493	22,855,265
2053	412,320	62,500	31,062	35,556	419,568	961,005	29,509,674	81,648	26,844	75,000	550,000	733,493	23,588,758
2054	412,320	62,500	31,062	35,556	420,809	962,246	30,471,920	81,648	26,844	75,000	550,000	733,493	24,322,251
2055	412,320	62,500	31,062	35,556	415,342	956,779	31,236,239	81,648	26,844	75,000	550,000	733,493	24,860,647
2056	412,320	62,500	31,062	35,556	407,036	948,474	31,823,611	81,648	26,844	75,000	550,000	733,493	25,272,058
2057	412,320	62,500	31,062	35,556	399,434	940,872	32,228,989	81,648	26,844	75,000	550,000	733,493	25,541,614
2058	412,320	62,500	31,062	35,556	423,001	964,438	32,484,569	81,648	26,844	75,000	550,000	733,493	25,672,241
2059	412,320	62,500	31,062	35,556	423,111	964,549	32,572,476	81,648	26,844	75,000	550,000	733,493	25,672,241

Source: Economic Consultants Northwest (1989b).

growth in Musselshell County and Roundup. The number and characteristics of the in-migrating work force would be the same under both the land exchange and leasing alternatives. It is concluded that the small number of projected in-migrants would be assimilated into the existing population without impacts to the demographic characteristics of the study area.

Social Life

The nature and magnitude of potential impacts on community resources, social organization, and social well-being would resemble the impacts described in the 0.5 million tons per year mine under Alternative A. Social well-being is related to an individual's ability to maintain a perceived quality-of-life including access to adequate employment, community services, health care, and recreational programs and areas. Since the population, employment, and fiscal conditions are projected to remain relatively stable, quality-of-life indicators should also remain fairly stable.

Those individuals who perceived that a land exchange would create a coal and transportation monopoly may not be threatened by the leasing alternative. For those area residents who oppose any development, an impact to their sense of social well-being would likely occur regardless of whether coal is made available through lease or land exchange. The small numbers of new jobs and in-migrants with this alternative would not provide a significant infusion of local wages into the economy; consequently, those expecting substantial economic recovery may be disappointed. Due to the experience of the community with population fluctuations and social changes as a results of other resource developments, in-migration of the newcomers would have little effect on the social life of the study area.

Community Services

Impacts to community services are associated with population increases. The communities of Billings and Roundup have experienced out-migration from declines in the economies associated with oil, coal, and agriculture, resulting in under utilization of some community services. Baseline projections indicate a slight increase in population in Musselshell County, thus impacts to community services would be the same as presented in the 0.5 million tons per year mine under Alternative A. Minor impacts would include increased mine-related commuter and coal truck traffic.

Housing

Housing availability and needs are closely associated with employment and population projections. As employment and population increase, housing needs increase and housing availability decreases. Since projected increases in employment and population in the study area are similar to those described in the 0.5 million tons per year mine scenario under Alternative A, impacts to housing would be the same under the leasing alternative.

3.0 MILLION TONS OF COAL PER YEAR MINE

There are 7,667 acres of coal lands and 108.4 tons of recoverable coal reserves included in this scenario (table 4.1). At a production rate of 3.0 million tons of coal per year, the mining company would have 36 years of production.

The environmental impacts of the leasing alternative longwall mine will be essentially the same as the exchange alternative longwall mine (Alternative A), except for hydrology and socioeconomics which are discussed below. There is a slight difference in environmental impacts because of slightly different lands involved in the leasing alternative and the larger area involved but not significant enough to warrant further in-depth discussion.

Socioeconomics Impacts

The leasing alternative assumes a project start date of 2020, when coal would become economically feasible to mine at $25 (1990 dollars) a ton. The following impact analysis is based upon the assumption that the baseline projections presented in chapter 3 would continue through year 2020. It should be noted; however, that it is extremely difficult to predict with a high level of accuracy impacts that would occur 30 years into the future.

Economic Environment

Employment and Income

Employment impacts on the local economies would be virtually identical to those described in the 3.0 million tons per year mine scenario under the proposed action, Alternative A — Coal-for-Land Exchange. Projected baseline employment growth rates for the study area indicate that total employment in Musselshell County by year 2020 would be slightly higher than current levels. Baseline employment in Yellowstone County is projected to grow at an annual rate of 1.4 percent so that, by year 2020, total employment in Yellowstone County should exceed 100,000. The impacts due to the mine on the study area employment levels should be slightly less than those described under the 3.0 million tons per year mine scenario under Alternative A — Coal-for-Land Exchange.

Income impacts on the local economies also would be virtually identical to those described in the 3.0 million tons per year mine scenario under the proposed action, Alternative A — Coal-for-Land Exchange. Inflating study area income levels to year 2020 should coincide with inflation factors used to project salaries and other expenditures made by the mining company.

Fiscal

Each level of government would receive additional revenues or incur additional costs if the mine is developed in 2020 at $25 (1990 dollars) a ton. The federal coal royalties would be revenues to both the state and the federal governments if the coal is leased

and mined. There would not be any public recreational benefits under this alternative. The total government tax revenues, fees, and coal royalties projected to be generated by the mine would be greater than the additional costs and the foregone recreational benefits. The present value of the estimated net revenues discounted to 1990 would be approximately $7.5 million (table 4.45). Tables 4.46 and 4.47 show the projected local, state, and federal revenues that a 3.0 million ton per year mine would generate under a lease scenario at a $25 sale price and 2020 start-up date.

Fiscal impacts on local governments due to the mine would be similar to those described in the 3.0 million tons per year mine scenario under Alternative A-Coal-for-Land Exchange. However, state and federal revenues would benefit from the receipt of federal coal royalty fees paid by the mining company. Through the life of the proposed mine, BLM estimates there would be 45.5 million tons of recoverable federal coal associated with the lease in Musselshell and Yellowstone counties. Assuming a start date of 2020 and $25 per ton for coal (1990 dollars), BLM estimates that the present value in 1990 dollars (discounted at 10 percent) of total future royalty payments would amount to $1,008,208. Actual value of the total royalty payments, based upon $25 per ton for coal in 1990 dollars, would be $76,622,000. Of these royalty payments, one-half would go to state government (school foundation program) and one-half to the federal government. In addition, any bonus fees associated with the lease would also be forthcoming. Appendixes 11 and 16 show these values and the underlying assumptions used for this scenario.

If BLM were able to lease the federal coal immediately, and assuming that the company was willing to lease and develop it, using a $15 per ton F.O.B. mine and a 1991 startup date, then the present value of the royalty payments discounted to 1990 dollars would be $9,554,192. Total royalty payments (1990 dollars) would be $45,773,000. Appendixes 11 and 16 show these values and the underlying assumptions used for this scenario.

The $15 per ton and 1991 start-up date lease scenario was not fully developed as an alternative because BLM did not consider it an economically viable venture. See appendix 11 for factors which influence development of the coal.

Social Environment

Demography

Demographic impacts of the 3.0 million tons per year mine scenario would be equivalent to those described under the 3.0 million tons per year mine in Alternative A. Baseline population projections indicate little growth in Musselshell County and Roundup. It is concluded that the mine workers and their families would be assimilated into the existing population without significant impacts to the demographic characteristics of the study area.

Social Life

Impacts of the proposed project on community resources, social organization, and social well-being would be similar to the impacts presented in the 3.0 million tons per year mine under Alternative A. Because of the past experiences of the community with cyclic resource developments, many of the social processes and structures and the administrative and political experience necessary to deal with development already exist in Roundup.

Social well-being is related to an individual's ability to maintain a perceived quality-of-life including access to adequate employment, community services, health care, and recreational programs and areas. Since the population, employment, and fiscal conditions are projected to remain relatively stable, quality-of-life indicators should also remain fairly stable.

Positive impacts to the social well-being of area residents may be realized through increased job opportunities and local spending within the community. The leasing alternative would be more desirable to those people who oppose the development under Alternative A because of their fear of a coal and transportation monopoly. Those who oppose development under all circumstances would be adversely affected under any alternative.

TABLE 4.45

ALTERNATIVE C — LEASING
(3.0 MILLION TON SCENARIO)
NET FISCAL IMPACT
($ in millions)

	DISCOUNTED		
	Total Revenues	Total Costs	Net Revenues
Federal	2.5	0	2.5
State	3.0	0	3.0
Local	2.1	0	2.1
Recreation	0	0.1	-0.1
Totals	7.6	0.1	7.5

Note: See Appendix 17 for an explanation of revenue and cost items, by governmental unit.

Community Services

Stress on community services is directly related to population increases and whether services or facilities are currently being under or over utilized. Baseline projections indicate a slight increase in population in Musselshell County. Similar to impacts on community services described in the 3.0 million tons per year mine under Alternative A, minor impacts to law enforcement and emergency services may be experienced, while other services should be adequate to meet the demands of the projected number of mine-related newcomers.

Housing

Housing availability and needs are closely associated with employment and population projections. As employment and population increase, housing needs increase and housing availability decreases. Since projected increases in employment and population in the study area are similar to those described under the 3.0 million tons per year mine scenario of Alternative A, impacts to housing would be the same under the leasing alternative.

TABLE 4.46

PRODUCTION LEASE SCENARIO — 3.0 MILLION TONS MINE (2020-2054) — $25/TON SALE PRICE PROJECTED LOCAL GOVERNMENT REVENUES

	Musselshell County Government				Roundup Elementary School				Roundup High School				Yellowstone County Government				Yellowstone County Schools				Cumulative Local Government Taxes		
	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total	Cumulative	Gross Proceeds	Mine & Equipment	Total Cumulative
2020	$221,064	$71,615	$292,679	$292,679	$118,028	$38,272	$156,300	$156,300	$93,976	$30,473	$124,449	$124,449	$40,536	$12,782	$53,318	$53,318	$66,960	$21,124	$88,084	$88,084	$540,564	$174,266	$714,830
2021	333,304	89,819	423,123	715,803	177,954	48,000	225,954	382,254	141,690	38,219	179,909	304,359	178,471	37,214	215,685	269,003	294,810	61,503	356,313	444,397	1,666,793	449,022	2,115,815
2022	884,744	310,809	1,195,553	1,911,356	472,372	166,100	638,471	1,020,725	376,112	132,252	508,364	812,723	161,581	51,045	212,626	481,628	266,910	84,361	351,271	795,668	3,828,512	1,193,588	5,022,100
2023	1,319,064	361,551	1,680,615	3,591,971	704,259	193,217	897,475	1,918,200	560,745	153,843	714,588	1,527,311	167,211	51,012	218,223	699,852	276,210	84,307	360,517	1,156,185	6,856,001	2,037,518	8,893,519
2024	1,241,960	322,047	1,564,007	5,155,978	663,092	172,105	835,197	2,753,398	527,968	137,034	665,002	2,192,313	256,165	61,951	318,116	1,017,967	423,150	102,385	525,535	1,681,720	9,968,336	2,833,039	12,801,375
2025	1,198,040	292,396	1,490,436	6,646,414	639,643	156,260	795,903	3,549,300	509,297	124,417	633,714	2,826,027	306,835	64,691	371,526	1,389,493	506,850	106,914	613,764	2,295,484	13,129,001	3,577,717	16,706,718
2026	945,744	238,652	1,184,396	7,830,810	504,940	127,538	632,478	4,181,778	402,044	101,548	503,592	3,329,619	597,906	98,027	695,933	2,085,426	987,660	162,007	1,149,667	3,445,150	16,567,295	4,305,489	20,872,784
2027	945,744	260,079	1,205,823	9,036,632	504,940	138,989	643,929	4,825,707	402,044	110,666	512,710	3,842,329	597,906	112,602	710,508	2,795,934	987,660	186,096	1,173,756	4,618,906	20,005,589	5,113,920	25,119,509
2028	945,744	271,760	1,217,504	10,254,136	504,940	145,231	650,171	5,475,879	402,044	115,636	517,680	4,360,009	597,906	121,006	718,912	3,514,846	987,660	199,985	1,187,645	5,806,551	23,443,383	5,967,538	29,410,921
2029	945,744	341,767	1,287,511	11,541,647	504,940	182,644	687,584	6,163,462	402,044	145,425	547,469	4,907,478	597,906	166,202	764,108	4,278,954	987,660	274,679	1,262,339	7,068,890	26,882,177	7,078,254	33,960,431
2030	688,568	268,660	957,228	12,498,874	367,632	143,575	511,206	6,674,669	292,716	114,317	407,033	5,314,511	894,607	229,971	1,124,578	5,403,531	1,477,770	380,069	1,857,839	8,926,729	30,603,470	8,214,844	38,818,314
2031	688,568	264,644	953,212	13,452,086	367,632	141,428	509,060	7,183,729	292,716	112,608	405,324	5,719,835	894,607	227,132	1,121,739	6,525,270	1,477,770	375,377	1,853,147	10,779,876	34,324,763	9,336,033	43,660,796
2032	688,568	249,510	938,078	14,390,164	367,632	133,341	500,972	7,684,701	292,716	106,169	398,885	6,118,720	894,607	209,824	1,104,431	7,629,701	1,477,770	346,773	1,824,543	12,604,419	38,046,056	10,381,649	48,427,705
2033	688,568	238,858	927,426	15,317,590	367,632	127,648	495,280	8,179,982	292,716	101,636	394,352	6,513,073	894,607	198,285	1,092,892	8,722,593	1,477,770	327,702	1,805,472	14,409,891	41,767,349	11,375,779	53,143,128
2034	688,568	245,633	934,201	16,251,791	367,632	131,269	498,900	8,678,882	292,716	104,519	397,235	6,910,308	894,607	209,302	1,103,909	9,826,502	1,477,770	345,910	1,823,680	16,233,571	45,488,642	12,412,411	57,901,053
2035	115,168	119,313	234,481	16,486,272	61,489	63,762	125,251	8,804,133	48,959	50,769	99,728	7,010,035	1,556,132	344,116	1,900,248	11,726,750	2,570,520	568,715	3,139,235	19,372,806	49,840,910	13,559,086	63,399,996
2036	317,688	180,592	498,280	16,984,552	169,616	96,510	266,126	9,070,260	135,052	76,844	211,895	7,221,931	1,322,487	379,406	1,701,893	13,428,643	2,184,570	627,038	2,811,608	22,134,414	53,970,323	14,919,476	68,889,799
2037	415,288	203,320	618,608	17,603,161	221,726	108,656	330,382	9,400,642	176,542	86,515	263,057	7,484,988	1,209,887	341,469	1,551,356	14,979,999	1,998,570	564,340	2,562,910	24,747,324	57,992,336	16,223,777	74,216,113
2038	415,288	192,370	607,658	18,210,819	221,726	102,805	324,530	9,725,172	176,542	81,855	258,398	7,743,385	1,209,887	314,618	1,524,505	16,504,503	1,998,570	519,964	2,518,534	27,265,858	62,014,349	17,435,388	79,449,737
2039	336,720	168,567	505,287	18,716,106	179,777	90,084	269,861	9,995,033	143,143	71,727	214,869	7,958,255	1,300,530	326,972	1,627,502	18,132,005	2,148,300	540,381	2,688,681	29,954,538	66,122,819	18,633,118	84,755,937
2040	0	85,870	85,870	18,801,976	0	45,890	45,890	10,040,923	0	36,538	36,538	7,994,793	1,689,000	405,023	2,094,023	20,226,028	2,790,000	669,375	3,459,375	33,413,914	70,601,819	19,875,815	90,477,634
2041	0	84,153	84,153	18,886,128	0	44,972	44,972	10,085,895	0	35,808	35,808	8,030,601	1,689,000	410,688	2,099,688	22,325,716	2,790,000	678,738	3,468,738	36,882,652	75,080,819	21,130,174	96,210,993
2042	0	82,469	82,469	18,968,598	0	44,073	44,073	10,129,968	0	35,091	35,091	8,065,692	1,689,000	422,377	2,111,377	24,437,094	2,790,000	698,056	3,488,056	40,370,708	79,559,819	22,412,241	101,972,060
2043	0	80,820	80,820	19,049,418	0	43,191	43,191	10,173,159	0	34,390	34,390	8,100,082	1,689,000	526,026	2,215,026	26,652,119	2,790,000	869,354	3,659,354	44,030,062	84,038,819	23,966,021	108,004,840
2044	0	79,204	79,204	19,128,622	0	42,327	42,327	10,215,486	0	33,702	33,702	8,133,784	1,689,000	512,379	2,201,379	28,853,498	2,790,000	846,800	3,636,800	47,666,862	88,517,819	25,480,433	113,998,252
2045	0	77,620	77,620	19,206,241	0	41,481	41,481	10,256,967	0	33,028	33,028	8,166,812	1,689,000	471,330	2,160,330	31,013,828	2,790,000	778,960	3,568,960	51,235,823	92,996,819	26,882,852	119,879,671
2046	0	76,067	76,067	19,282,309	0	40,651	40,651	10,297,618	0	32,367	32,367	8,199,179	1,689,000	454,958	2,143,958	33,157,786	2,790,000	751,901	3,541,901	54,777,724	97,475,819	28,238,796	125,714,615
2047	0	74,546	74,546	19,356,854	0	39,838	39,838	10,337,456	0	31,720	31,720	8,230,899	1,689,000	436,697	2,125,697	35,283,483	2,790,000	721,723	3,511,723	58,289,446	101,954,819	29,543,320	131,498,139
2048	0	73,055	73,055	19,429,909	0	39,041	39,041	10,376,498	0	31,086	31,086	8,261,985	1,689,000	439,545	2,128,545	37,412,028	2,790,000	726,429	3,516,429	61,805,876	106,433,819	30,852,477	137,286,296
2049	0	71,594	71,594	19,501,503	0	38,261	38,261	10,414,758	0	30,464	30,464	8,292,448	1,689,000	448,659	2,137,659	39,549,687	2,790,000	741,492	3,531,492	65,337,368	110,912,819	32,182,946	143,095,765
2050	1,464,000	537,318	2,001,318	21,502,822	781,641	287,149	1,068,790	11,483,548	622,359	228,634	850,993	9,143,441	0	11,893	11,893	39,561,580	0	19,655	19,655	65,357,022	113,780,819	33,267,594	147,048,413
2051	1,464,000	522,405	1,986,405	23,489,227	781,641	279,179	1,060,820	12,544,368	622,359	222,288	844,647	9,988,088	0	11,655	11,655	39,573,235	0	19,262	19,262	65,376,284	116,648,819	34,322,383	150,971,202
2052	1,464,000	483,886	1,947,886	25,437,114	781,641	258,594	1,040,235	13,584,603	622,359	205,898	828,257	10,816,345	0	11,422	11,422	39,584,657	0	18,877	18,877	65,395,161	119,516,819	35,301,060	154,817,879
2053	1,464,000	466,962	1,930,962	27,368,076	781,641	249,549	1,031,190	14,615,793	622,359	198,696	821,055	11,637,400	0	11,193	11,193	39,595,850	0	18,499	18,499	65,413,660	122,384,819	36,245,961	158,630,780
2054	1,464,000	448,556	1,912,556	29,280,632	781,641	239,713	1,021,354	15,637,147	622,359	190,865	813,224	12,450,624	0	10,969	10,969	39,606,820	0	18,129	18,129	65,431,789	125,252,819	37,154,193	162,407,012

Source: Economic Consultants Northwest (1989b).

TABLE 4.47

PROJECTED STATE AND FEDERAL REVENUES — 3.0 MILLION TONS MINE PRODUCTION LEASE SCENARIO (2020-2054) — $25/TON SALE PRICE

	State of Montana Revenues							Federal Revenues					
	Coal Severance Tax	RIT Tax	Individual Payroll	Diesel Fuel Taxes	Property Taxes (Schools)	Total	Cumulative	Individual Payroll	Diesel Fuel Taxes	Abandoned Mine Tax	Black Lung Tax	Total	Cumulative
2020	$460,941	$65,625	$89,311	$37,333	$419,247	$1,072,457	$1,072,457	$234,760	$28,187	$78,750	$577,500	$919,197	$919,197
2021	874,026	125,000	87,884	71,111	757,298	1,915,319	2,987,776	231,011	53,689	150,000	1,100,000	1,534,699	2,453,897
2022	1,843,786	262,500	204,876	74,667	1,705,273	4,091,102	7,078,878	538,532	56,373	315,000	2,310,000	3,219,905	5,673,802
2023	2,636,466	375,000	190,219	0	2,317,861	5,519,546	12,598,424	500,003	0	450,000	3,300,000	4,250,003	9,923,805
2024	2,632,990	375,000	188,056	0	2,282,898	5,478,945	18,077,369	494,320	0	450,000	3,300,000	4,244,320	14,168,125
2025	2,631,010	375,000	188,056	0	2,251,124	5,445,190	23,522,559	494,320	0	450,000	3,300,000	4,244,320	18,412,444
2026	2,619,636	375,000	188,056	0	2,222,226	5,404,919	28,927,477	494,320	0	450,000	3,300,000	4,244,320	22,656,764
2027	2,619,636	375,000	188,056	0	2,261,936	5,444,628	34,372,106	494,320	0	450,000	3,300,000	4,244,320	26,901,084
2028	2,619,636	375,000	188,056	0	2,284,048	5,466,740	39,838,846	494,320	0	450,000	3,300,000	4,244,320	31,145,403
2029	2,619,636	375,000	188,056	0	2,411,336	5,594,028	45,432,874	494,320	0	450,000	3,300,000	4,244,320	35,389,723
2030	2,608,042	375,000	188,056	0	2,390,664	5,561,762	50,994,636	494,320	0	450,000	3,300,000	4,244,320	39,634,043
2031	2,608,042	375,000	188,056	0	2,383,113	5,554,212	56,548,847	494,320	0	450,000	3,300,000	4,244,320	43,878,362
2032	2,608,042	375,000	188,056	0	2,347,971	5,519,070	62,067,917	494,320	0	450,000	3,300,000	4,244,320	48,122,682
2033	2,608,042	375,000	188,056	0	2,323,888	5,494,986	67,562,904	494,320	0	450,000	3,300,000	4,244,320	52,367,002
2034	2,608,042	375,000	188,056	0	2,342,926	5,514,024	73,076,928	494,320	0	450,000	3,300,000	4,244,320	56,611,321
2035	2,582,192	375,000	188,056	0	2,332,124	5,477,372	78,554,301	494,320	0	450,000	3,300,000	4,244,320	60,855,641
2036	2,591,322	375,000	188,056	0	2,439,222	5,593,600	84,147,901	494,320	0	450,000	3,300,000	4,244,320	65,099,961
2037	2,595,722	375,000	188,056	0	2,427,326	5,586,105	89,734,006	494,320	0	450,000	3,300,000	4,244,320	69,344,280
2038	2,595,722	375,000	188,056	0	2,387,405	5,546,183	95,280,189	494,320	0	450,000	3,300,000	4,244,320	73,588,600
2039	2,592,180	375,000	188,056	0	2,372,169	5,527,405	100,807,594	494,320	0	450,000	3,300,000	4,244,320	77,832,920
2040	2,577,000	375,000	188,056	0	2,354,772	5,494,828	106,302,422	494,320	0	450,000	3,300,000	4,244,320	82,077,239
2041	2,577,000	375,000	188,056	0	2,358,502	5,498,558	111,800,980	494,320	0	450,000	3,300,000	4,244,320	86,321,559
2042	2,577,000	375,000	188,056	0	2,368,365	5,508,421	117,309,402	494,320	0	450,000	3,300,000	4,244,320	90,565,879
2043	2,577,000	375,000	188,056	0	2,471,294	5,611,350	122,920,752	494,320	0	450,000	3,300,000	4,244,320	94,810,198
2044	2,577,000	375,000	188,056	0	2,455,606	5,595,662	128,516,414	494,320	0	450,000	3,300,000	4,244,320	99,054,518
2045	2,577,000	375,000	188,056	0	2,412,235	5,552,292	134,068,706	494,320	0	450,000	3,300,000	4,244,320	103,298,838
2046	2,577,000	375,000	188,056	0	2,393,864	5,533,920	139,602,626	494,320	0	450,000	3,300,000	4,244,320	107,543,158
2047	2,577,000	375,000	188,056	0	2,373,619	5,513,676	145,116,301	494,320	0	450,000	3,300,000	4,244,320	111,787,477
2048	2,577,000	375,000	188,056	0	2,374,763	5,514,819	150,631,121	494,320	0	450,000	3,300,000	4,244,320	116,031,797
2049	2,577,000	375,000	188,056	0	2,382,280	5,522,337	156,153,457	494,320	0	450,000	3,300,000	4,244,320	120,276,117
2050	2,643,000	375,000	188,056	0	2,483,081	5,689,138	161,842,595	494,320	0	450,000	3,300,000	4,244,320	124,520,436
2051	2,643,000	375,000	188,056	0	2,465,465	5,671,522	167,514,117	494,320	0	450,000	3,300,000	4,244,320	128,764,756
2052	2,643,000	375,000	188,056	0	2,420,349	5,626,406	173,140,522	494,320	0	450,000	3,300,000	4,244,320	133,009,076
2053	2,643,000	375,000	188,056	0	2,400,399	5,606,455	178,746,978	494,320	0	450,000	3,300,000	4,244,320	137,253,395
2054	2,643,000	375,000	188,056	0	2,378,727	5,584,784	184,331,761	494,320	0	450,000	3,300,000	4,244,320	141,497,715

Source: Economic Consultants Northwest (1989b).

Hydrology

The nature of the hydrological impacts for a leasing scenario would essentially be the same as for the exchange alternative. The widespread application of the longwall method would result in environmental consequences that are more readily identifiable during actual mining. Observed hydrologic impacts could be mitigated immediately.

ALTERNATIVE D — NO ACTION

Environmental Impacts Avoided

This alternative would continue present management as it exists now for all the lands. Under this alternative the exchange(s) would be denied as well as the leasing. BLM and Meridian coal lands would remain in a checkerboard pattern in the Bull Mountains. There would probably be no development of the federal coal.

All environmental impacts associated with development of the coal would all be avoided, such as subsidence or transportation, as well as any adverse impacts that would result from leasing or the exchange of the offered lands or coal into federal ownership.

Socioeconomic Impacts Avoided

Economic Environment

Employment

If the land exchange were denied and the leasing alternative was not selected as a viable option, employment in the area would not change from the baseline forecast.

Income

Under this alternative, earnings in the area would remain as projected in the baseline forecast.

Fiscal

Fiscal conditions in the area would not change if the land exchange or leasing alternative were denied.

Social Environment

Demography

If the project were not developed, the anticipated influx of workers and their families into the area would not occur. Therefore, no change in the demographic characteristics of the community would be realized.

Social Life

Although there would be no mining development with this alternative, some social impacts have already taken place. The potential of coal development has factionalized some elements of the community based upon support or opposition to the project. Nondevelopment would be welcomed by those opposed to the project. Individuals who opposed the project may derive satisfaction from their efforts in blocking the development and may consider the quality of their lives preserved. However, they may harbor ill feelings toward those in favor of the development thus increasing the social distance between the groups opposing and favoring the project.

Those with strong views for the project would likely resent, to some extent, those with opposing views. The decision not to develop the mine could be perceived by those who favor the project as being influenced by the antidevelopment faction. Because the expected jobs, wages, and associated economic benefits would not materialize without the project, those opposed to the project would be viewed as impeding much needed economic development in Musselshell County.

Anticipation that the project would be developed also may cause other social impacts. Some residents without jobs may remain in the Roundup area, thinking that the mine would be developed and provide employment. Rather than moving to an area where jobs are more plentiful, some unemployed or underemployed people may eke out an existence on welfare or with public assistance until the mine opens, anticipating employment opportunities.

In general, the Roundup area residents believe the mine would provide a much-needed boost to the economy. Not developing the project would be a disappointment to many. Anxiety and a loss of optimism, that may accompany unfulfillment of the expectation that Roundup would experience economic improvement, would decrease the feeling of community well-being.

Anticipation of a project also may cause some businesses to expand their inventories or facilities. Without the project, these businesses would not be able to recover their costs incurred as a result of this speculation.

Community Services

Denial of the land exchange and subsequent coal mine development should not impact the quality of services provided to the community.

Housing

No impacts to housing in the area are expected under this alternative.

Opportunities Foregone

Opportunities for BLM acquisition of the Meridian offered lands would be foregone as well as management opportunities of the resources associated with these properties if the exchange were denied. Opportunities associated with leasing the federal coal, such as economic development, royalty payments, etcetera, would be lost if leasing were denied.

Likely Future of the Coal

If the No Action Alternative became BLM's final decision, the ownership pattern for the coal lands would remain as it exists today. The federal coal lands would not be developed at this time, nor in the foreseeable future. Further development of federal coal by the Divide/Storm King mine is an unlikely occurrence. In summary, the federal coal reserves probably would not be mined anytime in the foreseeable future and would most likely remain undeveloped.

The likely future of the private coal lands in the Bull Mountains would probably be the same as the federal coal, i.e. undeveloped for quite a while into the future. While Meridian and other private interests have considerable coal reserves in the Bull Mountains, development of these coal reserves to any large scale requires some cooperation from the federal government (BLM), primarily because of the checkerboard ownership pattern. Based on this and the high costs involved to open a new mine, there would likely be no new development of private coal reserves in the Bull Mountains. The PM Coal Mine would probably continue to mine private coal reserves at their existing small-scale operation for local use.

The likely future of the state coal reserves will be the same as the other Bull Mountains coal, undeveloped. The state coal lands, T. 6 N., R. 27 E., Section 16, are in the 20- to 30-year range for the mine plan anyway. It is doubtful that these state coal reserves would be mined any sooner than that at the earliest. If the federal and private coal were undeveloped, this state coal would not be developed by itself.

Likely Future of the Offered Private Lands

Priority Lands 1,2 AND 3 — Madison County (697.45 acres)

The owner of record of these lands will continue to lease these lands for livestock grazing and this use will probably not change under the present ownership. However, Plum Creek Timber Company has indicated they are going to dispose of these tracts. If these tracts are sold, a good chance exists that all three parcels would be developed for second homes or vacation homes. This is the current trend of private lands along the Madison River.

Priority Lands 5 — Deerlodge/Beaverhead Counties (1,475.48 acres)

The most likely scenario for these lands is sale to another private party for ranching or private hunting use. Current public use would be lost as well as public access to adjacent National Forest lands. Extensive timber harvest could occur but is unlikely due to physical access problems.

Priority Lands 6 — Carbon County (6,195.56 acres)

Although these lands could remain in Glacier Park Company's ownership, they will more than likely be sold to other private interests. Glacier Park Company is presently disposing of their private grazing lands in this area so it would be safe to assume that these lands would eventually be sold to other private interests. The present land-use, livestock grazing, would probably continue, regardless of ownership.

Replacement Lands — The likely future of the replacement lands would probably be the same as priority lands 6 (sold by Glacier Park Company to other private interests). The present land-use, livestock grazing, would probably continue.

Replacement Lands — Carbon County (1,504.7 acres)

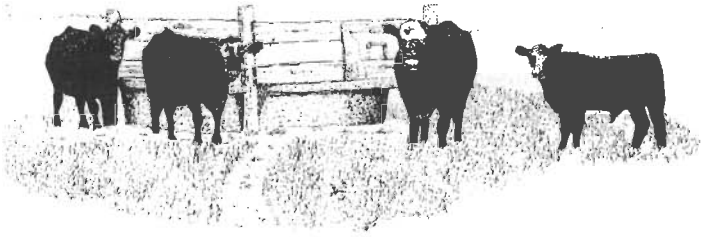
The likely future of the replacement lands would probably be the same as priority lands 6 (sold by Glacier Park Company to other private interests). The present land-use, livestock grazing, would probably continue.

Energy and Natural Resource Requirements and Conservation Potential

There would be no discernible differences in energy consumption, nor depletable natural resources between the exchange alternatives, unless the final decision was Alternative D — No Action. If any of the other alternatives were selected and the coal was subsequently developed, then there would be more coal available for consumption at the mining rate of production. If the longwall mining technique is used to mine the coal, more complete recovery of the coal resource is expected.

Mitigation Measures

The possible exchanges and/or lease of the federal coal lands itself causes relatively insignificant impacts. Further consideration of impacts in the exchange/permitting process may identify impacts that may result in mitigation measures needed to offset the impacts. This section addresses possible mitigation meas-



ures that could be implemented by the various federal and state agencies involved in the permitting process to reduce or lessen the impacts of development of the Bull Mountains coal. Most of these measures, if adopted, would be implemented and enforced as covenants to a deed or as stipulations to an approved mine plan.

The following measures are standard mitigation measures that would probably be required as part of the mine plan permit approval process or to comply with the various federal, state and county laws and regulations.

1. The mining company would protect all survey monuments, witness corners and reference monuments from destruction or damage from mining operations. Any damaged or destroyed monuments would be replaced by a registered land surveyor and recorded appropriately.

2. Any coal development would be subject to valid existing rights on federal and state lands, e.g., rights of way, oil and gas leases, etcetera.

3. Any surface use of federal and state lands would be permitted and subject to appropriate restrictions and stipulations of the authorizing agency.

4. Reclamation of surface disturbance would be accomplished as soon as possible. All reclamation would conform to applicable state and federal laws and regulations regarding spoil material, topsoil placement, seeding and grading.

5. The mining company would make every reasonable effort to avoid or, where avoidance is impracticable, minimize dust problems. This may necessitate sprinkling, oiling or other means of dust control on roads, trails, etcetera. The mining company would conduct processing so as to prevent, or if prevention is impossible, minimize to the maximum extent possible, environmental or health problems associated with dust.

6. Before undertaking any activities that may disturb the surface of the federal lands, the mining company would conduct an intensive field inventory for cultural resources on portions of the mine plan area and adjacent areas that may be adversely affected by mine-related activities and which have not been previously inventoried at such a level of intensity.

The mining company would protect all cultural resource properties within the mine area from mine-related activities until cultural resource mitigation measures could be implemented as part of an approved mining and reclamation plan.

The cost of conducting the cultural resource inventory, preparing reports and carrying out mitigation measures would be borne by the mining company.

All cultural resources would remain under the jurisdiction of the United States until ownership is determined under applicable law.

7. Before undertaking any activities that may disturb the surface of any federal lands, the mining company would contact the surface management agency to determine whether they would be required to conduct a paleontological appraisal of the mine plan and adjacent areas, which may be adversely affected by mine-related activities. If the agency determines that an inventory is necessary, the paleontological appraisal would be conducted by a qualified paleontologist.

The mining company would not knowingly disturb, alter, destroy or take any larger and more conspicuous fossils of significant scientific interest and would protect all such fossils in conformance with the measures included in the approval of the mining and reclamation plan.

The mining company would immediately bring to the attention of the OSM Regional Director or BLM, as appropriate, any such fossil discovery that might be altered or destroyed by their operation. Operations may continue as long as the fossil specimen or specimens would not be seriously damaged or destroyed by the activity. The OSM Regional Director or BLM, as appropriate, would evaluate or have evaluated such discoveries brought to their attention and would notify the mining company what action should be taken with respect to such discoveries.

All such fossils of significant scientific interest would remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of any mine plan requirements would be provided to the OSM Regional Director or BLM as appropriate.

8. The mining company would be required to conduct a survey for threatened and endangered species on the mine permit area. If any threatened or endangered species are identified, the mining company would develop a mitigation plan acceptable to the U.S. Fish and Wildlife Service.

9. The mining company would be required to conduct a four season wildlife inventory. If crucial wildlife habitat would be affected by mining operations, the mining company would develop a mitigation plan acceptable to the MDFW&P.

10. In accordance with state law and regulation, the mine plan submittal would address the effects of possible mined land subsidence and faulting, including measures that would minimize these effects.

11. The mining company would be required to develop equal or better water facilities to replace existing water facilities disturbed or destroyed by mining.

12. Construction sites would be maintained in a sanitary condition at all times; all wastes would be disposed of promptly at authorized waste disposal sites.

The following measures are additional mitigation measures that could be required to minimize the impacts of the development of the coal.

1. The federal coal would only be developed by underground mining techniques. Note: This mitigation measure has already been agreed to by Meridian.

2. Several areas were identified as unsuitable for underground longwall mining. On those areas, the mining company could be required to develop mitigation measures to insure protection of the general public and appropriate resources before an exception could be applied.

3. The mining company could be required to develop a socioeconomic mitigation plan to offset housing, education, health services and facilities and services impacts.

4. The mining company could be required to develop a transportation mitigation plan in consultation with the MDOH prior to the initiation of coal haulage in order to offset the immediate impacts from hauling the coal by truck along the proposed haul route and the long-term effect of building the proposed railroad.

5. The mining company could be required to prepare a hydrologic mitigation plan which would address the following:

Appropriate characteristics of the surface and groundwaters, which may include: yield or flow, conductance, pH, temperature, alkalinity, total dissolved solids, dissolved amounts of such elements as sulfates, chlorides, barium, cadmium, copper, iron, lead, radioactive materials, turbidity and total dissolved oxygen.

Identification of development activities that would affect the above waters and the probable impact to such waters from each activity.

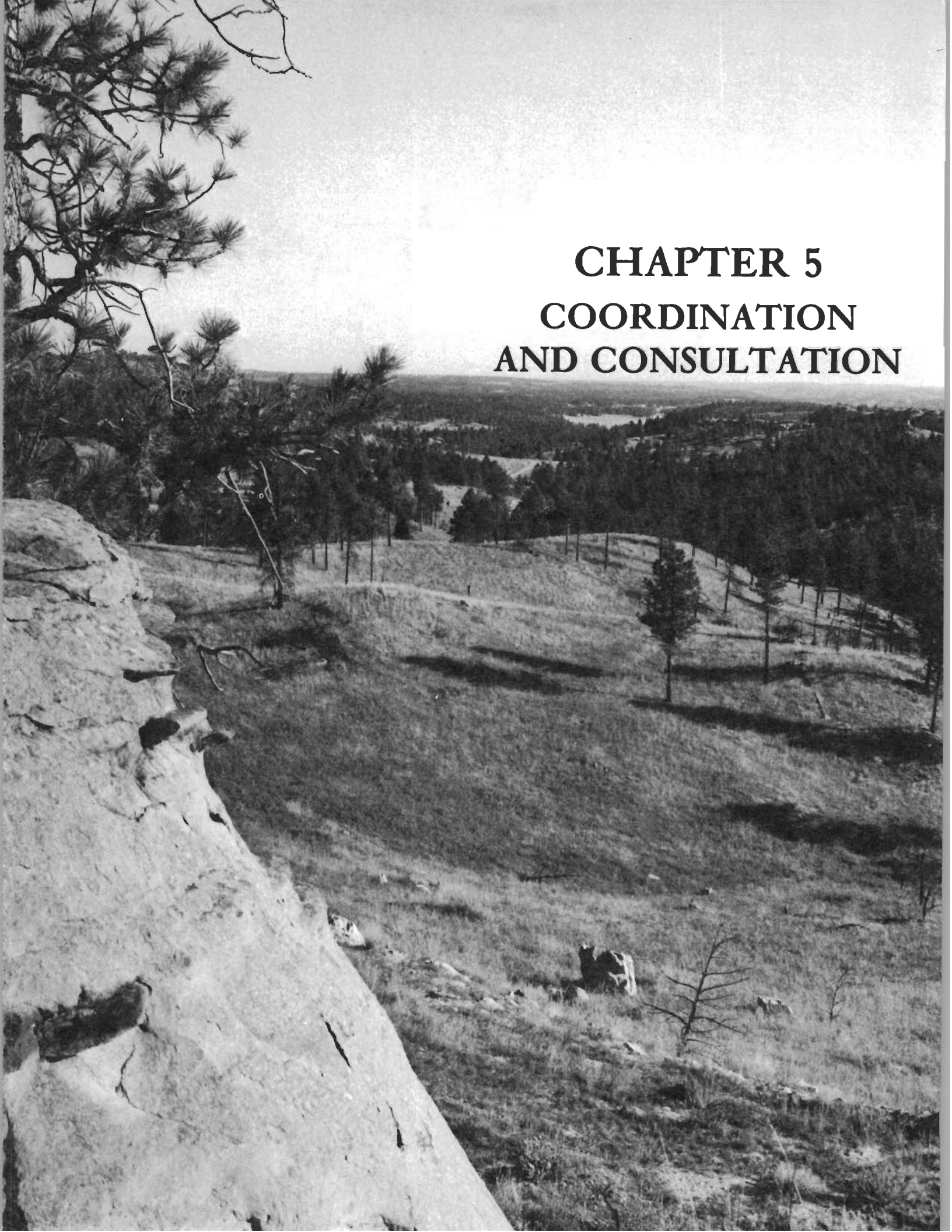
A discussion of the interrelationships between surface and groundwater in the project area and the likely effects to this relationship of developing the federal coal.

Identification of proposed mitigation measures to reduce the hydrological impacts from development.

Identification of impacts to waters and related elements of the environment (aquatic life, wildlife habitat, agricultural lands, etcetera) that cannot be mitigated.

A plan for monitoring surface and groundwater conditions in the project area and downstream from the project.

6. All aboveground structures not subject to or otherwise conflicting with safety requirements could be required to be painted by the mining company to blend with the natural landscape.



CHAPTER 5
COORDINATION AND CONSULTATION

CHAPTER 5

COORDINATION AND CONSULTATION

PREPARATION

The Bull Mountains Exchange EIS was prepared by specialists from the Miles City District Office, Butte District Office and contracted consultants, with assistance and guidance from the Montana State Office disciplines. The following skills and disciplines were used in the development of this EIS: geology, mining engineering, range and vegetation, forestry, recreation, soils, cultural resources, wildlife, fisheries, hydrology, sociology, economics, graphics and typing. Air quality, hydrology and the socio-economic portions of the EIS were prepared by contract consultants with BLM personnel specialists providing review and quality control of their work. A Federal Register Notice of Intent to prepare an EIS was published in May 1988; writing of the EIS began in February 1989. The Draft EIS was published in October 1989.

PUBLIC INVOLVEMENT

Public participation was conducted during the development of the EIS. Scoping was conducted at public meetings in Roundup and Ennis, Montana. Many people attended the public meetings. Thirty-six people gave oral comments and 26 people or groups gave written comments.

A scoping brochure was also distributed to all interested parties, soliciting their comments on the proposal and the EIS. Specific comments were given on what the EIS should examine, the relative importance of different issues and how or why the public interest may or may not be served. A total of 432 comments were recorded from the brochures and public meetings.

At the Powder River RCT meeting in December 1988, it was requested that BLM set up an informal working group of representatives of the various interested parties. The purpose of the working group was to assist BLM in resolving conflicts, problems and issues by offering recommendations and guidance. The project manager met with all the interested parties and organizations during February and March 1989. Each interested party selected one representative and the working group met in April 1989. More meetings were held as the project progressed until December 1989 when the meetings became virtually nonproductive and a fairly hostile relationship developed among several of the working group members.

An informal open house meeting was also held in Roundup, Montana during May 1989. The purpose was to answer questions and concerns from the public about the project, to advise them of the status of the EIS, and the forthcoming public meetings. News releases and display advertisements announcing the meetings and locations were issued to the media servicing the general area of the meetings.

The Draft EIS was released October 27, 1989, and the Notice of Availability appeared in the Federal Register on November 3, 1989. A press release on the Draft EIS availability was sent to the Montana media on November 1, 1989. Many newspaper articles and radio and television coverage appeared in the media thereafter. Approximately 700 copies of the Draft EIS were distributed to interested parties and governmental agencies.

Public meetings were held in Roundup, Billings, and Butte on November 27, 28, and December 4, 1989, respectively. The official transcripts of the public meetings are shown in this chapter. The public comment period was 60 days from November 3, 1989 to January 5, 1990, although BLM accepted many comments after the public comment period closed. Approximately 600 letters commenting on the EIS and project were received. Many of these letters are also shown later in this chapter. Because of the large volume of letters that were received, BLM printed only the letters requiring a response, selected letters from governmental agencies and official positions, and a listing of individuals who mailed letters stating their positions. All official letters and comments received from public are on file and become part of the official project file open to the public for their review.

AGENCIES AND ORGANIZATIONS CONSULTED

The Bull Mountains EIS team consulted and/or received comments from the following organizations during the preparation of the Draft EIS:

Bull Mountains Landowners Association
Bureau of Indian Affairs
Carbon County Commissioners
Crow Indian Tribe
Custer County Commissioners
Department of Justice
Ennis Chamber of Commerce
Fergus Electric Cooperative
Fishing and Floating Outfitters Association
Governor of Montana
Interstate Commerce Commission
Madison County Commissioners
Montana Coal Council
Montana Department of Fish, Wildlife and Parks
Montana Department of Health and Environmental Sciences
Montana Department of Highways
Montana Department of Natural Resources and Conservation
Montana Department of Revenue
Montana Department of State Lands
Montana Historical Society
Montana Office of Public Instruction
Musselshell County Commissioners

Musselshell Economic Development Corporation
Northern Plains Resource Council
Office of Surface Mining
Ruby Valley Sportsman Association
Shepherd School District
U.S. Fish and Wildlife Service
Yellowstone County Commissioners

DISTRIBUTION OF EIS

Copies of the Final EIS are being provided to approximately 700 persons, groups, local governments and agencies that have expressed interest in the Bull Mountains Exchange. The mailing list was compiled using names and addresses of:

(1) parties actively involved in past planning and environmental analysis activities;

(2) parties responding to our call for suggested issues and resource information;

(3) parties requesting further information during the preparation of the plan;

(4) agencies, governments and corporations potentially affected by the plan; and

(5) agencies, groups and tribes consulted during preparation of the EIS.

LIST OF PREPARERS

The following people wrote or were involved with preparing this EIS:

Mat Millenbach — District Manager, Miles City
B.S. Forestry, Michigan State University

Mat provided management guidance and was directly responsible for the entire project. He has worked for BLM for eighteen years.

Rob McWhorter — Project Manager, May, 1988 to December, 1988
B.S. Psychology, University of Georgia
M.S. Forestry, University of Georgia

Rob was project manager until he transferred to Alaska. He conducted the scoping, wrote most of the prep plan and was responsible for the overall initial coordination of the project. He has worked for BLM for thirteen years.

Bill Matthews — Project Manager, January, 1989 to present
B.S. Zoology, Clemson University
M.S. Wildlife Biology, Clemson University

Bill replaced Rob McWhorter in January, 1989. He completed the prep plan, wrote major portions of the Draft and Final EIS and was responsible for overall coordination of the project. He has worked for BLM for thirteen years.

Will Hubbell — Technical Coordinator
B.A. Anthropology, University of Colorado

Will was responsible for the technical coordination of the Draft EIS and insuring that all information was technically correct and consistent. He has worked for BLM for thirteen years.

Gloria Gunther — Editorial Assistant
Graduated from Custer County High School

Gloria replaced Will Hubbell as the Editorial Assistant for the Final EIS. She was responsible for editorial consistency, overall map and figure coordination, insuring all changes and revisions were made in the Final EIS and reviewing the public comments and responses for appropriateness. She has worked for BLM for ten years.

Terri Roberts — Clerk/Typist
Graduated from Custer County High School, completed two years of college at Montana State University, Eastern Montana College, and Miles Community College

Terri was responsible for typing the Final EIS. She also assisted in reviewing the Final EIS, and public comments and responses for grammatical errors and appropriateness. She has worked for BLM for six months.

John Taylor — Archaeologist
B.A. Anthropology, University of Pennsylvania
M.A. Anthropology, University of Montana

John compiled all the archaeology data for the EIS and wrote the archaeology sections of the document. He has been with BLM for ten years.

Don Gilchrist — Supervisory Mining Engineer
B.S. Geological Engineering, Montana College of Mineral Science and Technology

Don was responsible for coordinating and providing the mine plan information for environmental analysis. He has been with BLM for twelve years.

Bill Frey — Coal Coordinator, Montana
B.S. Geology, Marshall University

Bill was a member of the Steering Committee. He worked on providing coal geology data and information and wrote the mine plan section. He has worked for BLM for seventeen years.

Bob Giovanini — Mining Engineer
B.S. Mine Engineering, Montana College of Mineral Sciences and Technology

Bob researched and wrote the Predictions of Subsidence from Underground Mining (appendix 5) for the EIS and resource specialists. He has worked for BLM for twelve years.

John Spencer — Geologist
B.S. Geology, University of California
M.S. Earth Sciences, Iowa State University

John provided the coal reserve information and wrote the geology section of the Bull Mountains area. He worked for eight years for the U.S. Geological Survey, one year for the Minerals Management Service and seven years for BLM.

Loren Cabe — Regional Economist
B.S. Economics, University of Montana
M.S. Economics, University of Washington

Loren provided quality control and supervised the socioeconomics work for the EIS. He has worked for BLM for thirteen years.

Joan Trent — Sociologist
B.A. Psychology, Miami University (Ohio)

Joan assisted in the review and quality control for the socioeconomics portion of the EIS. She has worked for BLM for ten years.

Ed Hughes — Economist
B.S. Minerals Economics, Pennsylvania State University

Ed worked on socioeconomics tables and graphics for the Final EIS. He worked for a private coal mining firm for seven years and eight years for BLM.

Dan Lechefsky — Land—Use Specialist
B.S. Forestry, Syracuse University
Two years graduate work in Range Management, University of Nevada

Dan was a member of the steering committee. He provided environmental coordination and worked on reviews, tables, charts, etcetera for the EIS. He has worked for BLM for twelve years.

Roy Allen — Coal Economic Evaluation
B.S. Chemistry, Colorado State University
M.S. Economics, Colorado State University
Ph.D.Economics, Colorado State University

Roy Allen is the Chief, Northwest Regional Evaluation Team located in the BLM Wyoming State Office. He was responsible for the coal economic evaluations for the project. He has worked for BLM for thirteen years.

John S. Young — Coal Economic Evaluation
B.S. Animal Science, Colorado State University
M.S. Agricultural System Analysis, Colorado State University

John wrote the Summary of Coal Market Conditions Affecting the Development of the Bull Mountains Property (appendix 11). He has worked for BLM for 8½ years.

CONTRACTED CONSULTANTS

Dennis Garnet — EIS Liaison for Consultants
B.S. Mine Engineering, University of Missouri

Dennis served as the EIS liaison for Meridian and the contracted consultants. He coordinated the consultants work with BLM and resolved problems as needed. He has owned and managed a consulting firm, LETEC, in Billings for eleven years.

Marshall Corbett — Hydrology
B.S. Forestry, University of New Hampshire
M.S. Photogrammetric Engineering, Cornell University
Ph.D. Geology, University of Colorado

Marshall compiled the hydrology data and wrote that section of the document. He served as a Senior Hydrogeologist for Chen-Northern, Inc. in Helena, Montana. He is presently a Senior Hydrogeologist for Science Application International Corporation in Helena, Montana.

James Gelhaus — Air Quality
B.S. Mathematics, South Dakota School of Mines and Technology
M.S. Meteorology, South Dakota School of Mines and Technology

Jim completed the air quality analysis and wrote that section of the EIS. He is a consulting meteorologist in Helena, Montana.

Richard Dodge — Socioeconomics/Transportation
B.S. Mathematics, University of Montana
M.S. Statistics and Computer Science, Montana State University

Dick was responsible for the statistics, population, employment and income projections for the project. He wrote the socioeconomics and transportation portions of the EIS. He is the Senior Statistician for Economic Consultants Northwest in Helena, Montana.

Linda Priest — Socioeconomics/Transportation
B.S. Criminal Justice/Sociology, University of Nebraska

Linda conducted interviews and prepared the sociology and housing sections for the proposed project within the EIS. She has worked for Economic Consultants Northwest since 1982.

Other BLM personnel from the Butte District Office, Miles City District Office and Montana State Office assisted in preparing and reviewing the Final EIS:

Miles City District Office

Arnie Dougan — EIS Review
Dex Hight — Hydrology Support
Dan Bricco — Resource Information

Billings Resource Area

Billy McIlvain — Area Manager
David Jaynes — Resource Information
Keith Mosbaugh — Resource Information
Ken Hanify — Resource Information

Butte District Office

Russ Sorensen — Lands Support/Coordination

Headwaters Resource Area

Bob Rodman — Resource Information
Brad Rixford — Resource Information
Larry Rau — Resource Information
Bill Weatherly — Resource Information
John Sandford — Resource Information
Mike Small — Resource Information

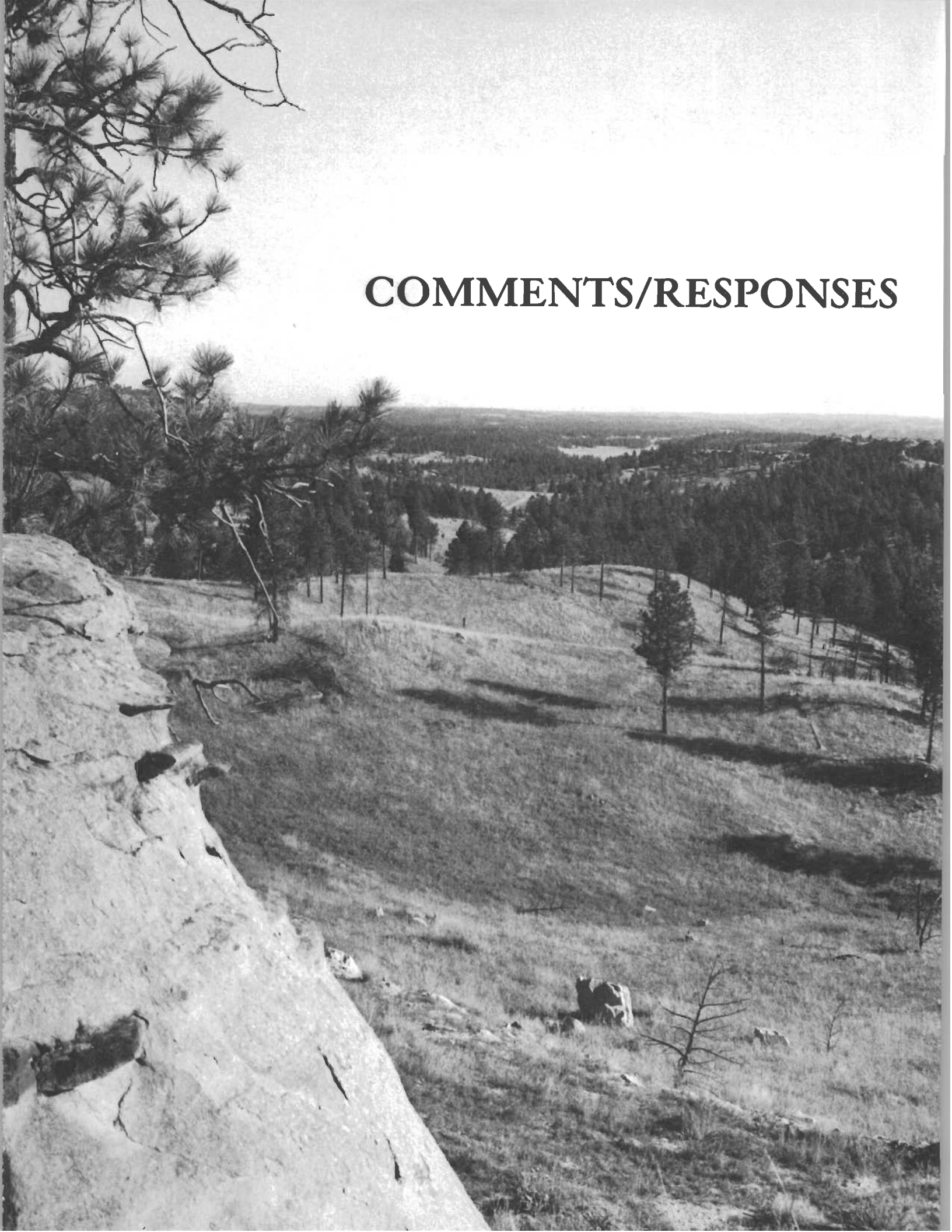
Dillon Resource Area

Fred Stokke — Resource Information
Bruce Botsford — Resource Information
Jim Roscoe — Resource Information
Bob Bump — Resource Information
Dave Williams — Resource Information

Montana State Office

Jeannette Bejot — Antitrust Review
Jackie Samsal — Antitrust Review
Jim Binando — Lands Support
Bob Bales — Lands Support
Peter Bierbach — Hydrology Support
Ron Appel — Lands Appraisal
Jim Clark — Lands Appraisal
Roy Johnson — Lands Appraisal
Olando Lomeland — Lands Appraisal
Dave Coppock — Minerals Appraisal
Rick Kirkness — Printing and Graphics
Kathy Ives — Printing and Graphics
Kelly Lennick — Printing and Graphics
Nancy Godwin — Printing and Graphics
Shelley McGlothlin — Printing and Graphics
State Office Printing and Graphics

COMMENTS/RESPONSES



TRANSCRIPT OF PUBLIC MEETING

RE: BULL MOUNTAINS EXHANGE DRAFT EIS

COPY

Roundup, Montana
Monday, November 27, 1989
7:00 p.m.

COMPUTER-ASSISTED TRANSCRIPTION BY
MICHELS REPORTING SERVICE
P.O. Box 20577, Billings, MT 59104
(406) 656-3355

Reported by
STEPHANIE MICHELS
RPR, CSR

ROUNDUP, MONTANA

Monday, November 27, 1989, 7:05 p.m.

MR. BINANDO: Ladies and gentlemen, welcome. This is the first of three public hearings scheduled for the Bull Mountains Exchange Draft EIS.

The second will be held on November 28, 1989 at Eastern Montana College in the Ballroom, 1500 North 30th Street, Billings, Montana, at 7:00 p.m.

The third will be held on December 4, 1989 at the Bureau of Land Management, Butte District Office, 106 North Parkmont, Butte, Montana, at 7:00 p.m.

I'd like to begin this hearing at this time. Time for the record is 7:05 p.m. I am Jim Binando, and I am chief of the Branch of Land Resources for the Bureau of Land Management in Billings, Montana. I will be conducting this hearing.

The court reporter is here to record the proceedings. The Bureau of Land Management recently completed the Bull Mountains Exchange Draft EIS. The draft document was mailed to all known interested parties on October 27, 1989.

The Bull Mountains Draft Exchange analyzes the proposed exchange of 3,674.36 acres of federal coal for 9,008 acres of recreation, wild life and other multiple use

potential lands offered by the Meridian Minerals Company.

Surface ownership of the involved coal lands will be unaffected by the exchange. The proposed action is BLM's preferred alternative. Development -- This proposed act -- Development impacts of the coal as a small room-and-pillar underground mine producing one-half million tons of coal per year is analyzed as the most likely development scenario.

A three million ton of coal per year longwall underground mine is analyzed as the maximum development scenario. A generic railroad to haul the coal is also addressed under this ladder maximum development scenario. Two coal-for-coal alternatives, a leasing alternative, and a no-action alternative are also analyzed in the document.

The federal coal reserves in the exchange application total 54.5 million tons. Depending on the mining technique used, 43.6 million tons are recoverable by a longwall mining operation, and 27.3 million tons are recoverable by a room-and-pillar mining operation. The fair market value of the 3,674.39 acres of federal coal has been appraised at $730,000.

In return for the federal coal under consideration for exchange, BLM selected six priority acquisition areas totaling 9,008.49 acres with a fair market value of $1,138,800. The six priority areas have a minimum value that BLM would accept in an exchange for the federal

coal.

Priority areas one through three total 697.75 acres situated along the Madison River. Priority area number four totals 640 acres and is located in Custer County. On this priority area, it came to BLM's attention late last week that this tract was inadvertently sold by Glacier Park Company. The BLM may select another parcel or parcels from the list offered by Meridian Minerals and prepare necessary supplemental information during the preparation of the final EIS. The appraised value of Tract No. 4 was $19,200.

And by the way, you received, as you came in, a supplemental sheet that addressed this change.

Priority area No. 5 is composed of three separate parcels totaling 1,475.48 acres adjoining or in close proximity to the Big Hole River. Priority area No. 6 comprises 13 parcels totaling 6,195.56 acres situated in Carbon County.

This hearing is being held by the Bureau of Land Management in accordance with 43 C.F.R. 1601.0-8 for the purpose of accepting testimony from anyone who could be affected by the recommendations.

Testimony will be accepted relevant to the recommendations and analysis set forth in the Draft Bull Mountains Environmental Impact Statement. Testimony which is relevant or related to this document only will be considered.

To ensure that everyone has an opportunity to have their testimony heard, I ask that, as nearly as possible, your remarks be limited to the recommendations and analysis presented in the draft document.

I would like to remind you at this time, if you have not already done so, to please register at the door and indicate if you wish to present a written or oral statement.

All statements received will be analyzed by the Bureau of Land Management and a written record of that analysis, as well as the transcripts of the hearing, will be available for inspection at their respective offices in Butte, Billings, and Miles City, Montana.

If you wish to purchase copies of the transcript of this hearing, please leave your name and address with the court reporter. A copy of the hearing record and analysis will be made available to each county involved in the proposed exchange upon request by those county commissioners.

Copies of all written comments and transcripts of oral comments received in response to the request for public comment, as provided for in 43 C.F.R. 2203.1, will also be furnished to the Department of Justice.

The analysis of the testimony received will be used to determine what changes, if any, will be required in the recommendations set forth in the document. The analysis of the testimony and a copy of the transcript will be

incorporated in the final environmental impact statement. Copies of the final documents will also be available to all known interested parties upon request.

This is a formal hearing and to ensure that all participants have an opportunity to express their views without interruption, there will be no debate, questions or distractions during the presentation of testimony.

BLM and Meridian Minerals officials are present and will be glad to discuss issues with you informally following the completion of this hearing.

I would like to introduce those agency and company representatives at this time. From Meridian Minerals we have Bob Morehead, who is their project manager.

(Mr. Morehead stood up.)

MR. BINANDO: Thank you, Bob. And from the Bureau of Land Management we have Bill Matthews, who is the project manager for the EIS.

These individuals will remain as long as needed after the hearing to discuss or answer your questions.

I want to emphasize that the hearing is not a forum for BLM to debate or explain the proposed exchange, but rather an occasion for the public to state for the record its observation of the adequacy of BLM's work on the adequacy of the EIS thus far.

I will call the names of those wishing to make a

statement in the order received. Those called will please come forward and begin by stating your name and whom you represent.

If you have a written text, please place a copy on the table upon completion of your statement. Those wishing to present written statements only may do so by bringing your text to the table following completion of the oral presentation.

Due to the large number of presenters, I'd like to limit individual testimony to ten minutes.

Are there any questions on procedures?

(No response.)

MR. BINANDO: As there are none, I would like to call upon for our first presenter, Mr. Monty Sealy.

MR. SEALY: Where do you want me to -- Right here (indicating).

My name is Monty Sealy, and I'm the secretary of the Musselshell Valley Development Corporation.

I think there is a statement to follow from the Development Corporation, their officers. I think, in general, my comments are in support of the EIS Draft in general.

I have a specific spot that I would like to question or suggest maybe it could be written a different way. It's on page 38, under "Counties,"and it is dealing

with the evaluation of mill levies and revenues and so forth from Musselshell County and Yellowstone County.

When using -- when citing the taxable valuation in Musselshell County, the years that were used were a comparison of a period of fiscal year 1982 through fiscal year 1987, and showing a slight decrease in valuation.

In the next paragraph in describing the valuation change in Yellowstone County, the years used, fiscal year 1987 and fiscal year 1988, representing a decrease in valuation of 7.6 percent in one year.

My question or suggestion is that, to quote Musselshell County and to put it in perspective as to the effects when you get farther into the EIS of Musselshell County, if fiscal year 1988 were used in the narrative on that first paragraph, I think you'd find that the valuation dropped from $23,780,000 per mill to somewhere in the neighborhood of $14,200, roughly, per mill, which is a very substantial loss in the same period of time that Yellowstone County is discussed in this EIS.

I guess the significance of that is, if you take it in the context with the rest of the impacts on tax dollars generated through the mining activities that are suggested here, that maybe it establishes the need is there in Musselshell County too.

MR. BINANDO: Thank you, Mr. Sealy. Our next

speaker is Steve Charter.

MR. CHARTER: My name is Steve Charter. I'm testifying on behalf of myself and the Northern Plains Resource Council.

The hearing concerns a proposal to exchange public coal reserves to BN-Meridian Minerals for recreational tracts. The proposal represents an incredibly poor trade for Montana. Our state is desperate for revenue. The coal is potentially worth many millions of dollars in royalty payments. The recreational tracts offer no financial return to us.

This trade would also set a precedent on future coal valuation and public revenue loss that makes the indians who traded Manhattan for $24 worth of beads look like smooth negotiators by comparison.

It should be noted at the outset that the Bull Mountains have recently been decertified from regional coal planning and there is nothing standing in the way of leasing to a bona fide coal mining firm.

The proposed trade is so ludicrous that it is difficult to know how to talk about it. It is hard to believe that anyone in Montana would take it seriously. But when an editorial comes out in the Billings Gazette claiming this to be a wonderful idea, it looks like it is necessary to explain what should be obvious.

Such a trade would involve a major revenue loss to the State of Montana.

The Bureau of Land Management is proposing to trade off between $76 million and $100 million in coal royalty revenues for $730,000 worth of recreational land tracts. By law, 50 percent of this lost revenue would go directly to the State of Montana to support -- to support the school system. It is also federal policy to give back almost all the remainder as well to the state that the coal is mined in.

The BLM gains recreational tracts. BN-Meridian gains control of a minable coal tract for almost nothing. The State of Montana loses a potential revenue source of up to $100 million.

The trade would put a value on Bull Mountain coal, which, according to Meridian, is some of the best coal in the state, at one and a third cents per ton. The royalties now received from other public coal in the state is more in the neighborhood of 82 cents per ton.

If this trade goes through, it will set a terrible precedent. Burlington Northern and its various consortium members have a lot more surface to trade off and coal to block up in the state.

If the Railroad and Meridian are allowed to mine coal and trade and to control a tract for one and a third

cents per ton versus leasing for 82 cents a ton or more, they will never lease any coal. If this kind of deal is only offered to Burlington Northern and Meridian, then only Burlington Northern and Meridian will mine coal in this state.

In the long run, the only fair thing to do would be to offer everyone public coal at the same price, including existing operations. If the government gives this kind of bargain to BN, they'll have to give it to everybody. The coal industry won't rest until they get the same deal. In fact, the Montana Coal Council is already on record in favor of eliminating federal coal royalties altogether.

In supporting this trade, the BLM is setting the stage to devalue all public coal to almost nothing. If they value Bull Mountain coal at one and a third cents per ton for this exchange they won't have a leg to stand on in valuing any other coal reserves higher.

The future loss in coal royalty revenues to Montana and our schools would be staggering. This would not just be in the millions, but in the billions.

The proposed coal exchange sets a terrible revenue precedent.

It also sets a terrible development precedent. Now BN and Meridian want what is almost free coal to open up the mine. It is not hard to imagine what they will say next.

They'll say they can't afford to pay for environmental protection or public impacts. I can hear them now claiming they'll have to shutdown unless the county lowers valuation on their longwall machines. I can hear them telling their employees: "If you guys want to keep your jobs, you'll have to put up with low wages and unsafe working conditions." If we start giving in to economic blackmail now, we'll never stop.

The draft EIS looks like a serious document. What it really amounts to is a basic intelligence test for the people of Montana. Does it make sense for a state starved for revenue to agree to trade off a hundred million dollars in royalties for public access to a few recreational sites? Does it make sense to lower public coal values and therefore revenue to almost nothing? Apparently, BN and BLM are counting on us to fail this test.

Thank you.

MR. BINANDO: Thank you, Mr. Charter. Our next speaker is Pete Tully.

MR. TULLY: My name is Pete Tully, and I'm representing myself as a Bull Mountain rancher and the Bull Mountain Landowners Association, which is affiliated with the Northern Plains Resource Council.

This Draft Environmental Impact Statement for the Proposed Bull Mountain Exchange has brought numerous

questions and contradictions to mind.

First of all, I have to question the impartiality of the document in certain areas, which I shall address later. Second, I certainly have the question of valuation of the coal in the proposed exchange.

11 On page 13 it states that 43.6 million tons of recoverable coal has a fair market in-place value of $730,000, or roughly between one and one-half cent per ton, depending on whether or not the current valuation rule is changed, which in all likelihood will be.

12 The contradiction here is that my figures tell me that 43.6 million tons of coal times an 8 percent royalty times $15 per ton equals $52,320,000.

13 I might add that the $15 per ton figure f.o.b. mined to recover cost of production is totally unreasonable since it's stated on page 182 of the EIS the average price of underground mined coal in Colorado and Utah is between 20 and $30 per ton.

14 Therefore, to refigure the 43.6 billion tons of coal times 8 percent royalty and times $25 a ton equals $87,200,000. Half of this goes directly to the state school foundation, which is $43,600,000.

15 Of the other half, generally the federal government keeps 10 percent to cover administration costs and sends the rest back to the state. Therefore, the state can

15 conceivably receive $78,480,000 in royalty revenues from this coal.

If exchanged, I feel that the BLM has conspired with Meridian Minerals, i.e., Burlington Resources, i.e., Burlington Northern, a huge corporation with tremendous holdings in Montana, to deprive the school children of Montana of millions of dollars of revenues that are rightfully theirs.

The local proponents for the mine, if indeed there is a mine, why not have it all? Revenues from the net coal proceeds and royalties.

For those of you who have been led to believe that this mine depends on consummation of this exchange proposal, I might point out that BN-Meridian already owns at least one-half of existing coal rights in the Mammoth-Rehder coal field; resources perfectly adequate for years of mining, particularly, when combined with federal coal leases which

16 have been opened for competitive bidding in this area since the south end of the Bull Mountains was decertified and no longer required Regional Coal Team planning.

Third, and probably the most important to me, I have to wonder where the complete asssessment of hydrology and subsidence impacts are. This document is completely inadequate in this category and this is the area where I question its impartiality.

17 The BLM relies heavily on a report done by a consultant, assumably hired by Meridian, named Marshall K. Corbett. To me this is a classic case of the fox guarding the hen house.

17a The BLM completely ignored comments by the Department of State Lands which were in total contradiction to the assessed impacts.

At this point I think that the difference between room-and-pillar mining, the half-a-million-ton-per-year scenario, and longwall mining, three-million-ton-per-year scenario, needs to be defined.

I would like to read to you the apparent extent of BLM's knowledge of longwall mining. This is on page 133, and I read this directly from the document.

18 "The immediate and more widespread application of the longwall method would result in environmental consequences that are more readily identifiable during actual mining. Thus, hydrological impacts could be directed immediately and long-term effects would not become a problem in the future."

This after-the-fact identification of impacts, I find completely reprehensible and totally unacceptable.

Longwall mining has never been done in Montana. Although this document addresses longwall mining and room-and-pillar mining as though they cause approximately the

same impacts, nothing could be further from the truth.

Room-and-pillar mining is the way they've mined coal around Roundup in the past. As the coal is extracted, pillars of coal were left to hold up the roof. There were impacts, needless to say, but they were not nearly as severe as those experienced after longwall mining.

In a longwall mine, huge panels of coal, approximately 800 feet wide by one mile long, are extracted by huge machines operated by very few personnel.

By their own admission on page 121, "There will be a lowering of the surface elevation by approximately

19 7 feet, or 70 percent of a 10-foot seam of coal removed." This, I might add, is the extent of the BLM's subsidence assessment.

In the rugged terrain of the Bull Mountains, this is not going to be a gradual lowering of the surface with no change in the surface topography, as the BLM pictures it.

As the roof above the extracted coal panel caves in, the ground above will heave and fracture sending cracks to the surface. These cracks will in turn intersect perched groundwater aquifers feeding springs and wells and thereby

20 dewater the area.

This has a definite effect on water quantity in the immediate area, but also has an effect on water quality in the surrounding areas. I might add that as far as

mitigation for a dried up spring goes, no well can possibly replicate the ease of maintenance, cost effectiveness and reliability of a spring.

This EIS does not address water quality in surrounding areas. When water flows to different strata, the quality changes and more than likely will deteriorate since it will be flowing through acid-forming coal compromised of the top 6 inches of the Mammoth seam and the Rehder seam right above it, both of which will be the first to cave in.

20

The long-term loss and degradation of water resources is a major forseeable impact from longwall underground mining in the Bull Mountains and should not be minimized.

The BLM further states that this will have no effect on agriculture in the area on page 120. We ranchers find it difficult to continue and maintain our livelihood when there is no water available and the quality is such that it is not acceptable for livestock and domestic use.

By condoning and propagating this exchange, the BLM is in effect allowing the taking of private surface since a longwall mine is nothing more than an underground strip mine with many of the same impacts.

21

If the BLM can exclude strip-mining -- If the BLM can exclude strip-mining in the Bull Mountains, they can also stipulate in the lease that longwall mining be excluded,

leaving room-and-pillar mining with wastes back-stowed into safe, dry areas and no pillar robbing allowed, is the only acceptable method.

I guess my final question for right now would be, why is the BLM willing to fly in the face of the obvious intent of the Mineral Leasing Act of 1920, Section 2C, "Preventing monopoly by railroads?"

22

This exchange would result in a total monopoly by BN-Meridian of all other coal mining and transportation and marketing ventures, quite possibly not only in the Bull Mountains, but regionwide as well.

23

This $87 million gift to BN-Meridian sets a dangerous precedent for future exchanges. Particularly in states such as Montana that are already burdened by huge land grant ownership and controlled situations.

To best protect the true public interests, the publicly owned resources should be retained in public ownership and management.

A federal presence needs to be maintained in the Bull Mountains in conjunction with the Department of State Lands to safeguard against public pressure for short-term gain resulting in long-term adverse impacts.

Thank you.

MR. BINANDO: Thank you, Mr. Tully. Our next speaker is F. W. Hodges.

MR. HODGES: My name is Forrest Hodges and I represent a Musselshell county taxpayer, hopefully. Just how many more I represent, I have no way of knowing.

And I do not -- I am not going to either support or show lack of support for the EIS as it is. My letter will explain, and I use a sort of shorthand, I don't do your thinking for you. There will be big gaps in this that you will have to fill in yourselves. And it's aimed directly at our new taxpayer, if they become such, Meridian Coal Company, is it?

My greatest interest is in Chapter 3, "The Affected Environment." My comments come from an intensive study of Musselshell County Local Government. My study includes attending and taking part in Public Forums and most particularly statutory legal forums in which I found a near total lack of interest other than my own.

Page 49, Re: City-County Planning Board. As an appointee of the City, I eventually became the Board Secretary, with a salary of $65 per month. Typical of this local government, the county commission insisted that a member of the Commission would be included in the planning board or there would be no planning board. At some later date I, as secretary of the Planning Board, was asked in a letter from the City Clerk to furnish the Council with a letter showing the board's approval of a zoning change. I

explained, at a City Council meeting, that zoning was not a part of the Planning Board's duties and refused to furnish such a letter. Shortly thereafter I resigned from the board, and the new appointee furnished the required approval letters.

On page 51, Re: "Access to political and economic power." I have brought this concept before statutory public forums and found that statements pointing out such derelictions were not only supported by others but were given -- were not given access to the public record.

Page 54, "law enforcement." It seems that law enforcement has nothing to do with statutory requirements on local government. This community has a legal environment with special problems. There are five county attorneys in residence. One is a district judge, one a retired district judge, two are the towns most prominent law firm, and the one in office is an appointee taking the place of an outsider who dared to become elected to the office and be critical of past actions of the local government.

Page 101. "Projected local government revenues." This is a question, and I'm not looking for an answer for it this evening. It's just to point it up.

What is the formula for arriving at the Gross Proceeds Revenue? I have heard a lot of that already. The 8 percent royalty. But I'm wondering about the split up and

how the payments will be made which will come in later.

Revenues from Net Proceeds on crude oil have been a source of all sorts of troubles in Montana. It is almost impossible to "fit" such revenues into the county budget system. Of course where such large sums of easy tax revenue is available, five county attorneys have no trouble in making a place for it.

If that's an innuendo, I would be glad to make it plainer.

Until the above question is answered in a way to change my mind, I will only say that any Gross Proceeds revenues receipts should show not only the quarter year they are derived from, but also the 12-month budget they are paid into.

I believe that is all I have to say at this time. There is a little addition here, but it is mainly to the office.

MR. BINANDO: Okay.

MR. HODGES: You have a copy.

MR. BINANDO: Yes. Thank you, Mr. Hodges. Our next presenter is Don Picchioni.

MR. PICCHIONI: My name is Don Picchioni, I'm president of the Musselshell Valley Development Corporation. I don't have a prepared statement for tonight. I have just got a couple of comments to make.

First of all, the Musselshell Valley Development Corporation wholeheartedly supports the exchange of land for coal. I think the reasons are fairly obvious. We are concerned mainly with the economic welfare of Musselshell County.

Unlike some others, we are trying to put the interests of everyone above those of a few people. The number of jobs, the quality of jobs and the increase in the tax base are very minor reasons for this exchange. They are probably the basis, but the impacts are very far reaching.

The effects of a coal mine operating in Musselshell County would reach all of us in every forum, basically, through our taxes. The ranch community should be very well aware of this after receiving their tax statements these past few weeks. If they think this was bad this year, wait until next year. It's going to be a whole lot worse.

The tax base provided by this coal mine would help everyone involved, including the ranchers, especially the ranchers.

The effects of hydrology and that type of thing are addressed in the EIS, but to my way of thinking, the exchange is really concerned with the federal royalties. The hydrology and all of the other impacts involved should be and will be addressed in the mine permitting process that would be covered by the State of Montana.

As far as the revenues that would be lost to our schools, I think a statement to this effect is ludicrous. How much money is the State of Montana making from Bull Mountain coal today? How much have they made in the last 30 years? How much do they stand to make if the coal mine goes into effect, whether the land is exchanged or not? These are the key issues.

Right now we're not getting one nickel from that coal sitting out in the Bull Mountains. And very possibly, if Meridian doesn't mine this coal, it might sit there for an eternity.

The lands that are being offered in exchange for the coal are prime recreational lands which the federal government will own forever. That coal, if it is ever mined, is then gone.

I guess if you're going to worry about posterity in future generations, maybe that is the way we should look at it. We're giving something to our future generations in public lands.

I think in conclusion I just want to reiterate the fact that we wholeheartedly support the exchange and we think it should proceed without any unnecessary delays.

Thank you.

(Clapping.)

MR. BINANDO: Thank you, Mr. Picchioni. Our next

presenter is Bob Morehead.

MR. MOREHEAD: My name is Bob Morehead, I'm the project manager for Meridian Minerals in the Bull Mountains. I guess we have all asked ourselves why Meridian proposed the exchange.

The checkerboard ownership has created management problems with multiple owners of the coal resource. It makes it difficult and expensive to obtain the resource necessary to develop a coal mine.

Another reason is the past leasing failures, previous attempts to develop the Bull Mountains coal by Consol or LL & E have failed because of high mining costs or high transportation costs whenever they projected the same.

A third reason we proposed this exchange is that the window of opportunity, it does exist. Since applying for the exchange, our preliminary marketing efforts have shown that there is a possible market for Bull Mountain coal in the Pacific Rim countries.

If we could be positioned to supply this coal in the early 1990s, we will be able -- we will be competing for these markets with Australian coal and must be able to produce a coal in the price range of 15 to $16 to match delivered prices for Australian coal.

Another reason is the Clean Air Bill. Because of the low sulphur content of the Bull Mountains coal, pending

revisions to the clean air legislation may create additional domestic markets for our coal.

Again, we must be competitive with the existing low-sulphur coal producers if we are to find an opportunity for selling this Bull Mountains coal.

My comments on the draft EIS, I think it's a very good job. We have some minor improvements and clarifications that we will submit with written comments.

The analysis in the EIS supports selection of the proposed -- of the proposal as preferred. We have offered lands to the BLM which we believe to be of high recreational value, which exceed BLM's estimate of the value of the federal coal.

Further, if the exchange leads to the coal mining development, the additional federal coal in the Bull Mountains will have increased value.

The analysis shows that the exchange is, in our view, in the best interest of the public to complete. No significant environmental impacts will result from the exchange or from subsequent development of the coal resource. In completing, the exchange may help spur some economic development in the Musselshell, Yellowstone County area that this analysis confirms is desperately needed.

Meridian's plans, I'm sure that most of you are aware, we have started a test pit. We are mining, we have

brought in a contractor to relocate the county road and to mine the test pit. He's already hired some local people and the training of those people took place today.

We are also upgrading the preparation plant at the BN mine, which is probably an increase in the tax base in this area. And this will increase the recovery of coal and upgrade the quality, so we feel we will have a marketable product. This again will also increase the marketing opportunity.

Our marketing, we still have targeted Korean, Taiwan and Japan as being Pacific Rim markets. And due to clean air, we feel like there will be some domestic markets available.

Because of the quality of the coal, we don't feel like we'll be competing directly with Powder River producers, but more from the Midwest and Eastern producers. We won't be displacing the Western coal that is sold now.

The development plans that we have prepared -- or are preparing, we are addressing the hydrology, subsidence, the other issues that have been mentioned here this evening. And we will have mitigation measures for each one of those situations. We're studying that as thoroughly as possible.

One thing is critical, that we can submit our operating permit to the Department of State Lands in early 1990. This does not mean that the mine development is

assured, but it does mean that in order to meet the potential market windows, we must start permitting as early as possible.

Thank you for the opportunity to comment.

(Clapping.)

MR. BINANDO: Thank you, Mr. Morehead. Our next speaker is Jeanne Charter.

MS. CHARTER: I have some copies of this map, small ones if anybody would be interested in them later, and I have a copy for you.

I have several individual comments on the EIS. My name is Jeanne Charter. We ranch in the Bull Hills and are members of the Northern Plains and the Bull Mountain Landowners.

The life of the mine shown in the EIS is out of date. I'm secretary of the Bull Mountain Landowners. We sent you a copy in May of Meridian's revised plan which you ignored. It's in pink on the map. It's quite a bit larger than what the EIS says the mine plan would be. We think that if you are going to talk about the mine, you should talk about the whole scope of it.

The main significance, from our point of view and from a groundwater point of view of the larger mine plan, is that it includes undermining the entire Dunn Mountain area.

The EIS mentions at one point, by implication,

that it's lucky that the Dunn Mountain area is outside the mine area because it's an important recharge area for the Bull Hills and the surrounding area.

The fact is that even under -- if you draw one over the other, even under the EIS plan, about two-thirds of Dunn would be undermined. And on Meridian's life of the mine, as of May, the whole of it would be undermined.

The point here is that if longwalling is done -- and as Pete said, it's a different technology than room-and-pillar -- the potential for cracking, vertical cracks to the surface, is very serious.

If that happens, the Clinker beds in the Bulls, as the impact statement admits, are a very important recharge for the southern part of Musselshell County around the Bulls. It's like a sponge. It soaks up a lot of water and some of it comes out in the springs and our ranches. A lot more of it flows down the creek drainages out of the central part of the Bulls, in Rehder Creek and Fattig Creek and Railroad Creek. And then some of it goes down to the bottom of the coal and flows come northeast towards Roundup.

If all of it cracks to the bottom and flows down toward Roundup, it is just not going to be a few ranches in the Bull Mountains that are going to have less water. It's going to be a lot more people.

And there is a real question about the quality of

water for people that are in the north end of the Bulls here. This is all subdivided areas. And people are dependent in large part on their water quality for what comes off our hills. It is not just a few ranchers that should pay very careful attention to the water questions with a longwall mine in our part of the hills.

25 The other thing that we find completely inadequate in the groundwater discussion in the EIS is that you received comments from the state criticizing the draft report this summer fully in time to include them in the draft and they seemed to have been ignored. I have got a copy of them and I suggest you try it again.

(Tendered document to Mr. Binando.)

MS. CHARTER: I'd like to read what the state hydrologist submitted. "One, the possible severe fracturing and leakage of shallow alluevial or perched overburdened groundwater into the deeper aquifer system mentioned on page 121 could have a very significant impact on valley floor hydrology."

Then, "The EIS postulates that sandstone -- that the high silt and clay content of the sandstones would favor plastic deformation and digressional healing of cracks would occur and spring loss due to fracturing would be improbable.

"These statements are backed by no geotechnical analyses and are contradictory with observations made at

underground mines all over the world. The loss of this water resource due to downward leakage through mining induced fractures is a major" -- and they underlined major -- "forseeable impact from underground mining in the Bull Mountains and should not be minimized but addressed.

"The hydrologic report appears too optimistic. The conclusion about impact -- conclusions about impacts go well beyond what the data justify. In particular, the definitive statements regarding percentages of shale in the stratagraphic column, the amount of plastic response to stress on subsiding materials, and the amount and uniformity of compressional healing. Expected are questions.

"A number of potential consequences which may be more adverse were admitted. These include brittle failure, open fracture zones and the long-term loss of most or all of the perched aquifers overlying the Mammoth coal seam.

"Therefore, the department believes that the significance of the hydrologic impacts must be reevaluated." To our knowledge, the EIS didn't do that and it should be done.

The only last comment I'd like to say, Mr. Picchioni mentioned that he didn't see any damage to

26 leasing over trading. In our interests in terms of protecting the land and water resources in the area, a lease allows the government to say some areas, for example, could

be longwalled and others couldn't be.

26 They have done this down in Colorado to protect water resources and we want to have that option available to us here. If it's traded off to the coal company, it's very difficult to restrict mining.

27 One example is down under the Tongue River Reservoir, this year Whitney Benefits (phonetic) owns the coal under the reservoir. They sued in Court and won against the government saying that they couldn't be restricted from mining that coal without being compensated.

It would be a great deal up here if we give them the coal for a cent and a half a ton and they turn around and say, "By, God, you can't stop us from mining this and if you do, you owe us $25 a ton for what you precluded us from doing," what we just gave them for a cent and a half. There is real damages to leaving this area in the federal lease.

Thank you.

MR. BINANDO: Thank you, Mrs. Charter. Is there anyone else wishing to testify?

(No response.)

MR. BINANDO: Are there any additional written statements that you would like to present?

(No response.)

MR. BINANDO: As there are none, this phase of the hearing is over. In closing the record, I would like to

remind you again that the testimony received at this hearing will be available in the form of a transcript, and if you wish to purchase copies, please leave your name and address with the court reporter.

You're also reminded that all testimony will be analyzed and a written record of that analysis will be prepared and will be available at the BLM offices in Butte, Billings, and Miles City, Montana.

The analysis of this testimony will be used to determine what changes, if any, will be made in the final EIS and recommendation. The final EIS is scheduled for completion in May 1990.

The hearing is now closed, however, the record shall officially remain open until January 5, 1990. BLM will continue to receive written statements during this period. All such statements post-marked on or before January 5, 1990 will be included in the final decision.

We wish to thank you for your time and interest in these issues and for your very candid and informative comments. Time for the record is 7:53.

(The public hearing in this matter was concluded.)

--oo0oo--

REPORTER'S CERTIFICATE

I, STEPHANIE MICHELS, Registered Professional Reporter, Certified Shorthand Reporter, and a Notary Public of the State of Montana,

Do hereby certify that I reported in machine shorthand the foregoing hearing at the time, place, and with the appearances of counsel hereinbefore noted.

I further certify that the transcript transcribed from my original shorthand notes by means of computer-assisted transcription, is a full, true, and correct transcript of the oral testimony adduced therein, to the best of my ability.

I further certify that I am not of counsel for, nor in any way related to, any of the parties in this matter, nor am I in any way interested in the outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal this 7th day of December, 1989.

Stephanie Michels

STEPHANIE MICHELS
Registered Professional Reporter,
Certified Shorthand Reporter
and Notary Public of the State of
Montana, residing at Billings,
Montana. My commission expires
September 26, 1991.

TRANSCRIPT OF PUBLIC MEETING

RE: BULL MOUNTAINS EXHANGE DRAFT EIS

COPY

Billings, Montana
Tuesday, November 28, 1989
7:00 p.m.

COMPUTER-ASSISTED TRANSCRIPTION BY
MICHELS REPORTING SERVICE
P.O. Box 20577, Billings, MT 59104
(406) 656-3355

Reported by
STEPHANIE MICHELS
RPR, CSR

BILLINGS, MONTANA

Tuesday, November 28, 1989, 7:05 p.m.

MR. BINANDO: Ladies and gentlemen, welcome. This is the second of three public meetings scheduled for the Bull Mountains Draft EIS.

The first was held last night in Roundup, Montana. The third will be held on December 4, 1989 at the Bureau of Land Management Butte District Office, 106 North Parkmont, Butte, Montana, at 7:00 p.m.

I'd like to begin the hearing at this time. Time for the record is 7:05 p.m. I am Jim Binando. I am the chief of the Branch of Land Resources for the Bureau of Land Management in Billings, Montana. I will be conducting this hearing. The court reporter is here to record the proceedings.

The Bureau of Land Management recently completed the Bull Mountains Exchange Draft EIS. The draft document was mailed to all known interested parties on October 27, 1989.

The Bull Mountains Exchange Draft EIS analyzes the proposed exchange of 3,674.36 acres of federal coal for 9,008.49 acres of recreation, wildlife and other multiple use potential lands offered by Meridian Minerals Company.

The surface ownership of the involved coal lands

would be unaffected by the exchange. This proposed action is BLM's preferred alternative.

Development impacts of coal as a small room-and-pillar underground mine producing one-half million tons of coal per year is analyzed as the most likely development scenario. A three million ton of coal per year longwall underground mine is analyzed as the maximum development scenario. A generic railroad to haul the coal is also addressed under this ladder maximum development scenario.

Two coal-for-coal alternatives, a leasing alternative, and a no action alternative are also analyzed in this document.

The federal coal reserves in the exchange application total 54.5 million tons. Depending on the mining technique used, 43.6 million tons are recoverable by a longwall mining operation, and 27.3 million tons are recoverable a room-and-pillar mining operation.

The fair market value of 3,674.39 acres of federal coal has been appraised at $730,000.

In return for the federal coal under consideration for exchange, BLM selected six priority acquisition areas totaling 9,008.49 acres, with a fair market value of $1,138,800. The six priority areas have a minimum value that BLM would accept in an exchange for the federal

coal.

Priority areas one through three total 697.75 acres situated along the Madison River. Priority area No. 4 totals 640 acres and is located in Custer County. On this priority area, it came to BLM's attention late last week that this tract was inadvertently sold by Glacier Park Company. The BLM may select another parcel or parcels from the list offered by Meridian Minerals and prepare necessary supplemental information during the preparation of the final EIS. The appraised value of tract No. 4 was $19,200.

And you received a flier on your way in on that adjustment to the proposed action.

Priority area No. 5 is composed of three separate parcels totaling 1,475.4 acres located in or close proximity to the Big Hole River. Priority area No. 6 comprises 13 parcels totaling 6,195.56 acres situated in Carbon County.

This hearing is being held by the Bureau of Land Management in accordance with 43 C.F.R. 1601.0-8 for the purpose of accepting testimony from anyone who could be affected by the recommendations.

Testimony will be accepted relevant to the recommendations and analysis set forth in the Draft Bull Mountains Environmental Impact Statement.

Testimony which is relevant or related to this document only will be considered. To ensure that everyone

has an opportunity to have their testimony heard, I ask that as nearly as possible, your remarks be limited to the recommendations and analysis presented in the draft document.

I would like to remind you at this time, if you have not already done so, to please register at the door and indicate if you wish to present a written or oral statement.

All statements received will be analyzed by the Bureau of Land Management and the written record of that analysis, as well as the transcripts of the hearing, will be available for inspection at their respective offices in Butte, Billings, and Miles City, Montana.

If you wish to purchase copies of the transcript of this hearing, please leave your name and address with the court reporter.

A copy of the hearing and analysis will be made available to each county involved in the proposed exchange upon request by those county commissioners. Copies of all written comments and transcripts of oral comments received in response to the request for public comment provided for in 43 C.F.R. 2203.1 will also be furnished to the Department of Justice.

The analysis of the testimony received will be used to determine what changes, if any, will be required in the recommendations set forth in the document.

The analysis of the testimony and a copy of the

transcript will be incorporated in the final environmental impact statement. Copies of the final document will also be available to all known interested parties upon request.

This is a formal hearing and to ensure that all participants have an opportunity to express their views without interruption, there shall be no debate, questions or distractions during presentation of testimony.

BLM and Meridian officials are present and will be glad to discuss issues with you informally following completion of this hearing.

I would like to introduce those agencies and company representatives at this time. From Meridian Minerals we have Mr. Bob Morehead, who is the project manager.

(Mr. Morehead stood up.)

MR. BINANDO: From the BLM, we have Bill Matthews, who is the project manager for the Environmental Impact Statement.

These individuals will remain as long as needed after the hearing to discuss or answer your questions.

I want to reemphasize that the hearing is not a forum for BLM to debate or explain the proposed exchange, but rather an occasion for the public to state for the record its observations of the adequacy of BLM's work on the EIS thus far.

I will call the names of those wishing to make a

statement in order received. Those called will please come forward and begin by stating your name and whom you represent.

If you have a written text, please place a copy on the table upon completion of your statement. Those wishing to present written statements only, may do so by bringing your text to the table following completion of the oral presentations.

Due to the large number of presenters, individual testimony will be limited to 10 minutes.

Are there any questions thus far on procedure?

(No response.)

MR. BINANDO: Okay. If there are no questions, I would like to call upon Ellen Pfister to present her statement.

MS. PFISTER: I am Ellen Pfister, I am a long-time resident of the affected area. I own land in the proposed mine area, and my mother owns a large portion of Dunn Mountain which lies within the proposed mine area.

I am a member of the Bull Mountains Landowners Association and a member of the Northern Plains Resource Council.

I could speak to you tonight about many things in this EIS, lists of things, the removal of funds from the school children of Montana in favor of recreational land, the

revenue figures in the EIS, and even the economic effect on my own business; but tonight I want to speak to you about something in my heart that every time I look at the mountain I cannot think otherwise about.

We are gathered here tonight at the command of Richard Bressler, Chairman and Chief Executive Officer of Burlington Northern Railroad and Burlington Resources, to comment on and possibly determine the fate of Dunn Mountain, whether it will live or die.

Chairman Bressler could not care less about the life or death of Dunn Mountain. He does care about extracting as much coal from underneath its foundation as possible. When Chairman Bressler finishes with Dunn Mountain, it will retain much the same shape as it has now, possibly even with a grassy cover, but beneath the covering of its corpse will be a broken body with the life's water drained from its springs.

We will have killed in a few short years what existed for thousands of years. We settlers are but passing through just as the Indian and the buffalo, but we will have done murder. We will have murdered a water system that exists where none should, a water system that provides rest and hiding for wildlife in the tract between the Missouri and the Yellowstone. It is an island of rest and shelter from the windswept and stormy death on the open prairies that

surround the Bulls.

Some people say: "What good are those hills out there, it's just a few ranchers." Well, maybe it is for now, and we too may pass. The wave of the future may be home seekers in the Bulls. There will need to be water for them.

28 The EIS says the water will be fine. They'll mitigate it as they go. Richard Bressler's company, Meridian Minerals, paid a consultant in Helena to do a water study, which included a one-day view from an airplane of the area. I have read Marshall Corbett's document. It is a conclusion, not a study.

Rioux and Dodge collected the unanalyzed data on much of the water in the area between 1977 and 1980. The data was subsequently analyzed by one Kieth Thompson in Open-File Report, Montana Bureau of Mines and Geology, MBMG 100.

I question Marshall Corbett's professional opinion on the matter of water damage. I also question Kieth S. Thompson's conclusions drawn from his analysis of the data involved.

In the first place, the authors of both reports shift from the discussion of one sort of underground mining to the second kind of underground mining with never a shift of gears.

There are two different kinds of underground

mining involved here. The first kind, room-and-pillar, where support is left for the rock strata above, has been done in the Bulls in the past with minimal affect so far as I know.

29 The smaller mine scheme set out here would use that method. It is questionable, however, whether the people who are the generators of that idea will ever surface again. They have business interests in Kentucky that keep them too busy to answer the phone.

The second mining plan involves the removal of panels of coal 780 feet wide by 1 mile along at a time. It is a total removal of support within the area.

Mr. Bob Morehead, Meridian's man on the spot, has assured me personally that Meridian will mine under our springs. The springs on Dunn Mountain are located in what are called perched aquifers.

30 On page 39 Thompson begins discussing subsidence as it relates to water and longwalling. And I quote as follows: "In the Bull Mountains, damage would primarily be in the form of drainage of perched aquifers subsequent to the fracturing of underlying beds during subsidence."

Using the elevation data for the various springs within the proposed trade and mine area and Figure 5 in Thompson of the Structure of the Mammoth Coal, it is possible to determine reasonably closely the amount of overburden under the point of outcrop of the various springs involved.

It ranges from about 600 feet in one case to as low as 195 feet. In most of the springs it ranges from 400 to 200 feet, well within the range of certain subsidence damage.

You may say: "Oh, just drill to deeper water, or use the water that will drain into the rubble where the coal used to be. The water that will go down through the sandstone just above the coal goes through a high sodium sandstone and the Rehder coal seam left in place along with some of the Mammoth. The Rehder and Mammoth left in place are too high in sulphur to sell.

The strata closest to the removed coal seam will fracture the most and, thus, have the most surface available to chemically combine with the water passing through.

I would like to read a portion from Thompson on page 43. Quote: "Resaturation of reclaimed surface-mine spoils or of underground mine workings would occur over a period of years, during and after mining. Because groundwater flow rates are very small, the downgradient migration of the plume of lower-quality spoils water would not affect water users even immediately adjacent to the mine for many years. The quality of water in the migrating plume would be altered somewhat by contact with the undisturbed rocks outside the mined area. The post-mining groundwater would still be suitable for stock watering, but not for domestic use."

Hydrologists talk about flushing the sulfate from one area around -- from the area around the spoils. That flushed sulfate goes someplace, presumably downstream in the aquifer. The person downstream is the septic tank for the flush and the next person and the next person.

What about drilling deeper? Thompson does not have any particularly good news for Bull Mountain residents. The Fox Hills formation and the Hell Creek formation seem to change textural characteristics under the Bull Mountains in a manner to limit their water-bearing capacity.

What we are left with is a water-bearing capacity of approximately 1,000 feet of the Tongue River Member that underlies the Mammoth coal. It plays out along the south side of Township 5 North, Range 27 East where our winter pasture is located. And I can tell you from experience that that portion of the Tongue River formation is not a high water producer. A well of 5 gallons a minute is a good well on most of our ranch.

It won't matter much to the well drillers who will get paid whether the water is sufficient or whether the quality is good. It will matter to the people who have homes in the Bulls or who attempt to run a stock operation.

They are finding at Colstrip that when the water system for an area is cut and degraded on one portion, that everyone pays, off-site and on-site, sooner or later.

Dunn Mountain will pay sooner, but the injury done to the water system on Dunn Mountain will come to all.

The third proposal is, that if the water gets bad, run in a pipeline. The Musselshell is overappropriated now and Yellowstone is overappropriated in dry years.

31 I keep hearing about mitigation of water damage. It is a phrase, but nothing concrete has been proposed. This EIS fails to address a question that is nothing more nor less than the life blood of the west.

32 Meridian got what it paid for, a favorable opinion from Marshall Corbett. BLM took the easy way out and failed to check the base data behind the opinion. BLM is supposed to be a neutral agency and not the captive of BN.

I think it is fitting that we remember why the federal government has the coal in this and other fields throughout the west. At the same time that the Appalachian coal fields were being taken from the Mountaineers by fair means and foul, the Guggenhiems and other financial wheeler dealers of the day devised a scheme to obtain large blocks of government coal in Alaska. Theodore Roosevelt and others of like mind became alarmed that coal fields in the Western United States would come under control of the Robber Barons to a greater extent than they already had due to the land grants to the various railroads.

In 1900 the west was withdrawn from settlement,

33 even though entered upon, until it could be determined which lands were coal and mineral bearing. There were three coal patents, and these coal patents were designed to keep the coal reserves out of the hands of the speculators.

In the marketing portion of this EIS, the marketing analysis concedes that at the projected cost of sale for this coal, this is a very speculative venture.

34 It is projected by Meridian to sell this coal in the Pacific Rim. The miners who work in this mine will be competing in wage levels with the Australians and Chinese who currently supply coal in those markets.

Now this is my personal opinion. I do not think that Meridian will operate this mine for long. Meridian does not have the past history of operating businesses that deal with much labor. I think that Meridian is putting this coal package together for sale as a total operating mine package for an oriental buyer.

I think then that not only will the profits from this mine go out of state, they will go out of the country in a closed-looped system within some large, possibly Japanese entity.

This exchange is the only way for Meridian to proceed with this speculation. A new owner of the coal reserve could then proceed to lease other reserves in the Bulls, but only after Dunn Mountain is dead.

I do not think Richard Bressler's Meridian has been candid about the ultimate ends to this exercise and bureaucratic process, but it has been more than candid to we landowners about its intentions with respect to the life of the land.

The Gazette editorialized raptuously that there would be no change in land ownership as a result of this project, but that is not because it has not been tried.

I think Meridian thinks it would be easier to get away with killing the Mountain if the hardheaded people who love it were not there.

35 What the BLM could do to save the Mountain and some of its life water is, in addition to putting a prohibition against strip-mining into the patent, it could also add a prohibition against longwalling under the springs. The wildlife of the Bulls would thank them, as well as the residents of the Bulls.

36 And now is the time to address this water issue, not later, Meridian has the coal, claims it as its own and the state might attempt to deny a mining permit under the springs.

If you fail to consider water protection in issuance of this patent, the life blood of the Bulls will be on your hands.

I thank you.

(Clapping.)

MR. BINANDO: Thank you, Mrs. Pfister. Our next speaker is John MacMartin.

MR. MACMARTIN: Good evening. My name is John MacMartin, I'm the vice-president of the Billings Chamber of Commerce and I appear here tonight on behalf of the board of directors of the Billings Chamber of Commerce. And would like to support the BLM's preferred alternative A as a method to move forward with the proposed land exchange.

Thank you.

MR. BINANDO: Thank you, Mr. MacMartin.

(Clapping.)

MR. BINANDO: Our next presenter is Dwight Mackay.

MR. MACKAY: Thank you very much. I am Dwight MacKay, the chairman of the commissioners here in Yellowstone County.

We continue to support this project. We went to Musselshell County and testified as so and have submitted documents to your group of the unanimous decision from our board that we support this project.

And I also would like to read a letter that I received from Sue Olson who is a county commissioner from Musselshell County.

"Dear Dwight: It is with much regret that I

cannot attend the hearing to show Musselshell County's support for the coal project.

This project will do much to enhance both our counties with much needed taxable valuation and employment. These are many benefits -- There are many benefits to be gained and I am confident that any of the problems that we can handle together.

Thank you for your support at the EA hearing and I hope these hearings will come to the same successful conclusions they did in Roundup."

I can't leave testimony, Mr. Chairman, without a couple of comments. Today, at seven o'clock this morning, we attended a meeting with the psychiatrists here in Yellowstone County who are asking the board of county commissioners to pass emergency budgets. We have met with the mental health center who is asking us to pass emergency budgets. We have a jail crisis in this county asking us to support emergency budgets. And, yes, there are broken bodies in this county.

There are people who are not being served. There are people who are not being held because simply the tax base is not there. The local government can only provide what we are able to provide. The people of this state have spoken and they have said "enough taxes." I-105 covers the mat of Montana in a very heavy manner.

What we need to do in order to create a good,

strong environment and a good, strong economy and a good system to provide services for those people in all our counties that are less fortunate than ourselves here tonight, is be able to increase the tax base, not increase taxes.

In order to do that, we have to provide a method by which local governments can spread the tax base.

We need this opportunity. There is an opportunity here to be able to deal with these problems that local government deals with every day. People demand services. People demand services. The welfare systems are increasing. AFDC is increasing. Food stamps is increasing. A number of foster kids that we have to deal with is increasing. How are we going to deal with that when people have said "no more taxes"?

I submit to you the answer is economic development, strong economic development with the checks and balances that are needed.

In order for a state to protect our environment that we all love -- I don't think there is anyone in this room who doesn't love their environment -- we must have a strong economy that allows the resources that we all have in the state to be used to enhance our environment. We can't do it the other way. It is not working. It simply isn't working.

Chairman, I strongly support this project and

would offer our support from the commissioners, a unanimous decision.

Thank you.

(Clapping.)

MR. BINANDO: Thank you, Commissioner Mackay. Our next speaker is Robert Morehead.

MR. MOREHEAD: My name is Robert Morehead and I'm the project manager of the Bull Mountains Coal Project. I guess we have four reasons why we proposed the exchange.

The first is that management problems created by multiple owners of the checkerboard system of resource management creates problems for a mining company to be able to establish a mining reserve in a situation that is a marginally economic project.

Previous attempts to develop the Bull Mountains coal, examples of Consol and LL & E, have failed because of the high mining costs and because of high transportation, construction costs.

Since applying for the exchange, our preliminary marketing efforts have shown that there is a possible market for the Bull Mountains coal in the Pacific Rim countries if we can be positioned to supply sufficient coal in the early 1990s.

We will be competing for these markets with Australian coal. And we must be able to produce the coal in

the price range of 15 to $16 to match delivered prices for Australian coal.

Also, the fourth reason, because of the low-sulphur content of Bull Mountains coal and clean burning quality, pending revisions to the clean air legislation may create additional domestic markets for our coal.

Again, we must be competitive with existing low-sulphur producers if we are to find an opportunity for selling the Bull Mountains coal.

We feel the draft EIS was well written and a very professional publication. We will submit detailed comments elaborating what we feel are our improvements or clarifications in written comments.

The analysis supports the selection of the proposal as preferred. We have offered lands to the BLM which we believe have high recreational value which exceed the BLM's estimates of the value of the federal coal.

Further, if the exchange leads to the Bull Mountain -- leads to coal mine development, the additional federal coal in the Bull Mountains will have increased value.

The analysis shows that the exchange is, in our view, in the best interest of the public to complete. No significant environmental impacts will result from the exchange or subsequent development of the coal resource that can't be mitigated.

In completing, the exchange may help spur the economic development in Musselshell, Yellowstone County area that the analysis confirms is desperately needed.

Our current plans, we're working on developing a test pit in Musselshell County now. We're currently relocating the county road, Fattig Creek County road to make room for the mine.

We have selected a contractor for the test pit. He has already hired local people. They went through training on Monday, they're annual fresh training, and they have started work on relocating the county road.

We also have been working on upgrading the PM preparation plan, to increase the recovery of the coal that they currently mine and upgrade the quality. This again will increase our marketing opportunities.

We certainly welcome public comments to help us complete a safe and environmentally sound coal mine.

Thanks for the opportunity to comment.

(Clapping.)

MR. BINANDO: Thank you, Mr. Morehead. Our next presenter is Bruce Hoiland.

MR. HOILAND: My name is Bruce Hoiland. I am a businessman in Roundup. I have recently been elected to the city counsel as of January of 1990. I am very familiar with the current views of the people in my ward, and their views

are definitely in support of the coal mine project. And they have asked me if I would get into office to do as much as I possibly could to bring jobs and bring development to Musselshell County.

Thank you.

(Clapping.)

MR. BINANDO: Thank you, Mr. Hoiland. Our next speaker is Sally Armstrong.

MS. ARMSTONG: Hi, my name is Sally Armstrong, I am a member of the Roundup city council, and I am the new mayor elect as of January 1.

I come -- the city council is strongly behind Meridian coal mine. We need jobs. We need Roundup to grow up and be like it was. When I was growing up, the coal mines were going big. Roundup had a lot.

I work in a dentist's office. I'm the business manager. Every day there is a new family coming in with a welfare card. They are coming to Roundup because there is welfare. But there is also people on welfare that need jobs.

If we had these jobs, we could take the people off of the rolls -- most of them don't want to be on the welfare, and we could take them off the rolls.

And I know what a coal mining city is like, it's a nice city to be in.

We are getting our water out of a coal mine

right now that used to be in there, and we are looking for another -- another mine. Meridian, I don't think is going to completely ruin the water. We are using it now.

Thank you very much.

(Clapping.)

MR. BINANDO: Thank you, Ms. Armstrong. Our next speaker is Kelly Gebhardt.

MR. GEBHARDT: Hi. I'm Kelly Gebhardt. I'm a businessman in Musselshell County. And I'd like to say that I support this proposal 100 percent. If we could get some more development in the community, we would possibly have some tax relief for the present businesses.

(Clapping.)

MR. BINANDO: Thank you, Mr. Gebhardt. Our next speaker is Paul F. Berg.

MR. BERG: My name is Paul F. Berg. I'm just a Billings sportsman. I'm not sure whether I'm for or against the project. Some of my friends are for the project and some of my friends are against it, but I'm for my friends. I remember reading that somewhere.

Economics -- I'll make some general comments. Economics is important. Jobs are important. But that is not the whole picture.

The part that bothers me really in this deal is, where is the coal going to end up? Overseas, I understand.

37

37 Coal is a nonrenewable resource. When it's gone brother, it's gone. And it is not going to go anywhere unless some guy digs it up. So it will be there for eons from now if we just leave it alone and it's always available. So I don't see why all the rush.

Sure, we need the jobs and so on, but many industries are getting mechanical devices to eliminate jobs. Everybody is buying japanese cars and that is eliminating millions of jobs. So this job situation, all that is important is really not the whole picture.

38 Now, the land pick proposed in area six preferred exchange, I think that BLM should proceed and try to get additional exchanges, to get the winter range for the Land Creek elk herd in public ownership right next to the forest.

And, also, we believe that an exchange could be further with the Towe Ranch, or whatever is involved there, and get public access to the Gold Creek area and also the North Fork of the Gold Creek area.

39 Groundwater bothers me. The Roundup mine pumpout is going to be a real can of worms. Of course, nobody is concerned, if the developers aren't concerned, our ranchers sure as hell aren't concerned. Everyone that owns a well out there is very much concerned. If they had a drought year, that taught them some lessons, anybody could learn, but that taught people to endure.

Now, I think that the first speaker made some comments on groundwater, and I pretty much agree with those, at least on the groundwater part of it.

40 And I think the company or the BLM, or both, should be responsible for any change in the groundwater system, for example, wells, springs, streams in the area, that may be affected by this project.

For example, it's a long-term thing. We won't know for 20 years whether you will impact the groundwater. If you do impact, it will take another 20 years or more to recharge the natural conditions if nobody bothers the surface of the land.

So I think that's something that should be looked into in some great detail.

41 I think, obviously, that parcel that was sold ought to be replaced.

And I think I will write a letter with more detail. I wasn't really prepared today. I just had something else cooking, but decided I better come to this one and get a couple of words in edgewise at least, that is a Berg for you. So I'll write my full comments in a letter.

Thank you.

MR. BINANDO: Thank you, Mr. Berg. Our next speaker is Cal Cumin.

MR. CUMIN: My name is Cal Cumin, I'm economic

development director for Yellowstone County. I'd like to speak in favor of this Draft Environmental Impact Statement and proposed exchange of land.

Yellowstone County is on record of being concerned with some of the environmental impacts in this thing that are involved in the actual mining of this operation. What we are talking about tonight is the exchange of land titles. How you ever got to the point where you have 42 to prepare an impact statement for an exchange of land title is beyond me.

But when they do get to the mine planned, this is what I would like to see done. We can deal with the problems that we're concerned with.

Two of the issues that Yellowstone County is concerned about, or concerned other people in this room, one is groundwater and one is haul roads. But I'd like to emphasize, we can't even address those issues until we get to them, and we're not there yet.

(Clapping.)

MR. BINANDO: Thank you, Mr. Cumin. Our next presenter is Larry Robson.

MR. ROBSON: First of all, I have a question. This is done right at the last minute. I have some verbal comments I could submit right now, but I would rather submit written testimony at a later date because this is not

adequate to submit to anybody for anything really. Would that be possible?

MR. BINANDO: That is possible.

MR. ROBSON: Also, I might add to that, in my verbal comments, may not address the EIS, the draft EIS, and hopefully I will do so in my written comments.

For the record my name is Larry Robson, I live at 1730 Road Eight, south of Huntley. I'm speaking largely on behalf of myself, although I'm a member of the Yellowstone Valley Citizens Council, it's been affiliated with Northern Plains Resource Council.

I don't have a lot of facts and figures associated with this proposed exchange, but I have some concerns and I have some observations I'd like to share with you.

43 I'd like to start first with the proposal, a couple years ago put forth by Burlington Northern to do away with the Jones and Muran junctions in the vicinity of the Huntley -- or the State of Montana experimental station. Move that entire connecting loop a few miles to the east and have the same thing there which would alleviate some of the mileage, the coal trains coming out of Wyoming would have to backtrack and go to their points east.

That proposal has been mysteriously shelled and in its place we have a new one. And that one was put forth

44 by Chrome Corporation of America to establish a chrome refinery in the immediate environs of the Muran junction, which is about a quarter mile south, southeast of the experimental farm.

That particular facility, if built, would consume approximately 195,000 tons of coal per year, which would come either from the Bull Mountains or from the area near Colstrip.

45 My second observation -- I guess the third observation is that there is a partially completed coal load-out facility located at the east end right now of Huntley, Montana. Now, I know it looks like a sugar beet dump, I thought it was too until a few days ago. But I have been told by a couple of sources that it is the beginnings of a load-out facility.

46 Now, the final observation that I have to present here tonight is that the Montana Highway Department is considering upgrading a section of US Highway 87 from about mile post 23 to mile post 29. And one of their primary considerations is this proposed mining operation of Meridian Minerals.

So what does this have to do with the coal and the lands coal exchange? Some people would say it has nothing to do with it. I guess I would submit that it may have and possibly does have everything to do with it.

I guess if I had a bottom line statement tonight, I would say that all these things should be considered in that final EIS. Because if the exchange goes through, obviously mining will start full scale, increased truck traffic would proceed down Highway 87, the load-out facility would go into full operation.

And if that is in operation, the chrome refinery is a step or two or three or four, five steps closer to

47 becoming a reality. If that goes into operation, we have got the Stillwater mine that's going to fire up out there. We are talking about a larger impact area than just the northern half of the Yellowstone County and southern half of Musselshell County. We're talking about a good portion of south central Montana.

So that is basically where I'm coming from. That is my statement I want to make. I think these things should be taken into consideration as well.

If anyone is interested in wondering how I feel about this, I guess I would have to say that if we put a vote forth tonight and decided this right here now, I would have to say that I would have to say I'm opposed based on the fact there is a lot of things we have not considered out there.

And that is the extent of my verbal testimony. I'll submit this later on.

Thank you very much.

MR. BINANDO: Thank you, Mr. Robson. Our next speaker is Dennis Olson.

MR. OLSON: My name is Dennis Olson, I live here in Billings. I'm representing myself tonight as a sportsman and a concerned citizen of Billings.

It was mentioned earlier by previous statement -- speaker about the high recreational value of the other lands that are being exchanged from the Bull Mountains. I guess this raises an issue with me, I have page 77 here from the draft EIS and I'm very concerned about the way the BLM has presented this. And I'd just like to read the statement. I'm concerned because the BLM is supposed to be a neutral agency and I don't think this statement reflects that neutrality, and I'll try to exlpain that later on.

But let me just read a couple sentences here -- a couple of paragraphs. Under recreation on page 77: "In the project area the major recreational activity is hunting mainly for mule deer with elk, turkey -- and turkey hunting occurring. These opportunities are limited due to lack of public land ownership and access. Resistence by private land owners to allow the general public to hunt on their land is also a limiting factor. Other activities include cross-country skiing, snowmobiling, hiking and camping, but like hunting these opportunities are limited. The potential to increase recreational activity in the area is low given

the large amount of land -- private lands involved."

I don't think that -- I was just hunting in the Bull Mountains for the last two weeks. I saw deer every day. I got a fairly nice buck this year out of the Bull Mountains and it is a pretty unique place to get out.

I grew up in Montana, in Livingston, and spent some time in North Dakota where you don't -- you don't have access to that type of wide open land. And what struck me about the land up there is how vast it is and how sparce the water sources are for the animals. And the deer definitely depend on those water sources just as the cattle and other wildlife in that area.

So I would just -- I would just ask that the BLM, in their next draft of this EIS, if they could either justify that statement in there about, for instance, resistence by private land owners to allow the general public to hunt on their land is a limiting factor. I would ask that they do a

48 survey for the draft EIS of those land owners and ask them how many people hunt on those lands, how many people come to their ranches every year and have some concrete data before they make statements like this.

I guess the other point I'd just like to make is to say the land is -- the recreational activities are limited because it's private land is unjustified. Hunters face limitations on public lands all the time. Elk permits are

48

given out on a limited basis, goat permits, those sorts of things, they are all limited. And if they are not limited, you destroy the resource.

So to say that resistence by private land ownership limits recreational values, I think is unjustified, and I would just ask that they consider my previous requests, that they do a survey of the land owners.

Thank you.

MR. BINANDO: Thank you, Mr. Olson. Our next presenter is Mike Matthew.

MR. MATTHEW: My name is Mike Matthew, I'm one of the commissioners of Yellowstone County. And Dwight has already spoken as far as the position of the commissioners from Yellowstone County and some thoughts there.

I am going to address my thoughts I guess more directly to the impact study itself. And when you look at Yellowstone County and you deal with the impact, the most obvious impact to Yellowstone County is going to be what it's going to do to roads, what it is going to do to traffic.

Because of the size of Billings and some of the facilities in Yellowstone County, the impact to the people and everything else like that is really going to be absorbed quite easily, and that is pointed out.

Those impacts with housing and schools and so forth are going to be more felt in Roundup, not so much in

Billings. But when it comes to roads, I think Dwight Mackay has already pointed out, if you have been on the highways out there, you're aware that it is not a good highway. The highway does need reconstruction. And it is slated for reconstruction. There isn't any doubt that coal trucks going over that highway will cause the deterioration of that highway as it goes on.

But we fund projects not only on the county level but on the state highway level and federal highway monies through taxes paid by users of those highways. And I guarantee you that any systems or improvements we need to make on county roads, state highways, anything like that, cannot possibly be made by taxing current taxpayers more money. They won't stand for it.

We have got to increase uses and increase revenues through those uses so we can make improvements to hold up, you know, development that we're incurring. And I really do feel that as we look at roads, we look at other things that need to be dealt with, and there is no doubt they need to be dealt with. As we get to Huntley and we go to the loading facility there, we have got to look at -- they are on county roads. By the time we get to that facility, we have to look at some things there. That is an impact to Yellowstone County.

But the revenues that are going to be generated

from the production of coal, from the fuel taxes that are paid by trucks, those are the things we need to make those improvements. Without the development, we won't have that revenue.

MR. BINANDO: Thank you, Commissioner Matthew. Our next speaker is Eileen Morris.

MS. MORRIS: My name is Eileen Morris and I live here in Billings. I'm a member of the Northern Plains Resource Council. I'd like to make the point that if it is really in the public interest to provide more recreational access, there is a better way to do it than trading huge amounts of public coal to Burlington Northern and its affiliates for a few recreational tracts.

Take the land grant back entirely. The Northern Pacific land grant of 1864 was given on the condition of construction and continued operation of the railroad. Burlington Resources and its various subsidiaries forfieted valid claim to their vast land and mineral holding when Burlington Resource financially separated itself from the Burlington Northern Railroad in December of 1988.

Congress specifically reserved the right to take the land grant back in Section 20 of the 1864 federal law that created the grant. This section has never been repealed or overturned. Section 20 reads: "And be it further enacted that the better to accomplish the object of this act, namely,

to promote the public interest and welfare by the construction of said railroad and telegraph line and keeping the same in working order and to secure to the government at all times, but particularly in the time of war, the use and benefits of the same for postal, military and other purposes Congress may at anytime, having due regards for the rights of said Northern Pacific Railroad Company add to, alter, amend or repeal this act."

49

The members of the Northern Plains Resource Council support action by Congress and effective states in the citizenry to take back the Northern Pacific land grant in order to fulfill the original intent of the legislation and reconstruct a viable and competitive rail transport system in the region.

Thank you.

MR. BINANDO: Thank you, Ms. Morris. That is the end of the speakers that I have on the list. Is there anyone else wishing to testify?

MR. PICCHINOI: (Raised his hand.)

MR. BINANDO: Yes, sir.

MR. PICCHIONI: My name is Don Picchioni, I'm president of the Musselshell Valley Development Corporation and a board member of the Musselshell Valley Chamber of Commerce, and I speak for both entities.

The first point I would like to make is the

50 purpose of this EIS. The purpose of this EIS is to talk about the exchange. The hydrology issues, the subsidence issues, are not pertinent at this time. They will be addressed later.

It's very clear that the BLM has decided their preferred alternative is the exchange. The issues of hydrology and subsidence will be discussed in length when the state permitting of the mine -- actual mine is done at some later date.

As far as the other alternatives in this proposal, the lease potential, we have to remember that in past years leasing has not been a viable option in the Bull Mountains. There was a recent action by the Powder River Coal Team that possibly made this an option, but that has not been enacted as of yet.

51 The Coal Team did make the motion and pass it at their meeting, but until that motion is acted on by the Secretary of Interior, it is not a viable option.

We have talked about the value of the coal versus the value of the lands offered. The value of the coal is set at $730,000. I believe that is an unrealistic figure. That coal is sitting out there doing no good to anyone. It is not worth anything until it is mined.

The value of the federal royalties. There is an eight percent federal royalty on leased coal that has been

discussed at various times. Four percent remains with the federal government, four percent goes to the state for school revenues. These are the funds that we will supposedly lose if the exchange goes through. We can't lose what we have never had. We are currently getting nothing in federal royalties.

The value of this mine, if it is realized, to Musselshell County, to Yellowstone County, to Montana, to the entire country, is tremendous. Looking at the figures in the EIS document, studying it on a three-million-ton-a-year basis over a seven-year period, the payroll alone for this mine is 27 and a half million dollars.

The governmental revenues for Musselshell and Yellowstone County and the school districts involved is $14.2 million in seven years. For Montana it is an additional $14 million. For the federal government it is $15.7 million.

If you add all of the revenues generated by this mine in payroll and taxation, etc., the first seven years of operation is over $71 million that will come into our area and we need it.

The EIS, we believe, is a very well written document. It's a very factual document. The exchange should be supported by everyone that truly has the interest of this region at heart.

Thank you.

(Clapping.)

MR. BINANDO: Thank you, Mr. Picchioni. Is there anyone else wishing to testify?

(No response.)

MR. BINANDO: Is there any additional written statements?

(No response.)

MR. BINANDO: As there are none, this phase of the hearing is over.

Closing the record I would like to remind you again that the testimony received at this hearing will be available in the form of a transcript, and if you wish to purchase copies, please leave your name and address with the court reporter.

You're also reminded that all testimony will be analyzed and a written record of that analysis will be prepared and will be available at the BLM offices in Butte, Billings and Miles City, Montana.

The analysis of this testimony will be used to determine what changes, if any, will be made in the final EIS and recommendations. The final EIS is scheduled for completion in May of 1990.

The hearing is now closed, however, the record shall remain officially open until January 5, 1990. BLM will

continue to receive written statements during this period. All such statements postmarked on or before January 5, 1990 will be included in the final decision.

We wish to thank you for your time and interest in these issues and for your very candid and formative comments.

Time for the record is 8:02 p.m. And at this time, again I'd like to invite you, as we have Bob Morehead and Bill Matthews, Meridian and Billings -- are Billings office BLM, if you have any questions you want to discuss about the proposal or have any comments and you want to discuss it, this is your opportunity.

Thank you.

(The hearing in this matter was concluded.)

--oo0oo--

REPORTER'S CERTIFICATE

I, STEPHANIE MICHELS, Registered Professional Reporter, Certified Shorthand Reporter, and a Notary Public of the State of Montana,

Do hereby certify that I reported in machine shorthand the foregoing hearing at the time, place, and with the appearances of counsel hereinbefore noted.

I further certify that the transcript transcribed from my original shorthand notes by means of computer-assisted transcription, is a full, true, and correct transcript of the oral testimony adduced therein, to the best of my ability.

I further certify that I am not of counsel for, nor in any way related to, any of the parties in this matter, nor am I in any way interested in the outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal this 7th day of December, 1989.

Stephanie Michels

STEPHANIE MICHELS
Registered Professional Reporter,
Certified Shorthand Reporter
and Notary Public of the State of
Montana, residing at Billings,
Montana. My commission expires
September 26, 1991.

PUBLIC HEARING BEFORE

THE BUREAU OF LAND MANAGEMENT

IN RE:

BULL MOUNTAINS EXCHANGE DRAFT EIS

TRANSCRIPT OF PROCEEDINGS

Taken at:

Bureau of Land Management
106 North Park Mont
Butte, Montana
December 4, 1989
7:12 p.m.

JIM BINANDO FOR THE BUREAU OF LAND MANAGEMENT, presiding

By Cara Enriquez
CANDI NORDHAGEN REGISTERED PROFESSIONAL REPORTER
Conference Room
1100 Utah

1036 Grand Boulevard
Butte, Montana 59701
(406) 494-2083

P R O C E E D I N G S

(7:12 p.m.)

MR. BINANDO: Ladies and gentlemen, welcome. This is the third of three public hearings scheduled for the Bull Mountains Exchange Draft EIS. The first was held on November 27, 1989 in Roundup. The second was held on November 28th in Billings, Montana. I would like to begin the hearing at this time. The time, for the record, is 7:12 p.m.

I am Jim Binando, and I am the Chief of the Branch of Land Resources for the Bureau of Land Management in Billings, Montana. I will be conducting this hearing. The court reporter is here to record the proceedings.

The Bureau of Land Management recently completed the Bull Mountains Exchange Draft EIS. The draft document was mailed to all known interested parties on October 27th, 1989.

The Bull Mountains Exchange Draft EIS analyzes the proposed exchange of 3,674.36 acres of federal coal for 9,008.49 acres of recreation, wildlife, and other multiple-use potential lands offered by the Meridian Minerals Company. Surface ownership of the involved coal lands would be unaffected by the exchange.

This proposed action is BLM's preferred alternative. Development impacts of the coal, as a small room-and-pillar underground mine producing one-half million tons of coal per year, is analyzed as the most likely development scenario.

A three million ton of coal per year long-wall underground mine is analyzed as the maximum development scenario. A generic railroad to haul the coal is also addressed under this latter maximum development scenario. Two coal-for-coal alternatives, a leasing alternative and a no-action alternative, are also analyzed in the document.

The Federal Coal Reserves in the exchange application total 54.5 million tons. Depending on the mining technique used, 43.6 million tons are recoverable by a long-wall mining operation and 27.3 million tons are recoverable by room-and-pillar operation.

The fair market value of the 3,674.39 acres of Federal coal under consideration has been appraised at $730,000. In return for the federal coal under consideration for example, BLM selected six priority acquisition areas totaling 9,008.49 acres with a fair market value of $1,138,800.

The six priority areas have a minimum value that the BLM would accept in an exchange for the federal coal. Priority areas one through three total 697.75 acres situated along the Madison River. Priority area number 4 totals 640 acres and is located in Custer County. On this priority area, it came to BLM's attention two weeks ago that this tract was inadvertently sold by Glacier Park Company. The BLM may select another parcel or parcels from the list offered by Meridian Minerals and prepare necessary supplemental information during the

preparation of the final EIS.

The appraised value of Tract No. 4 was $19,200. Priority Area No. 5 is composed of three separate parcels totaling 1,475.48 acres adjoining or in close proximity to the Big Hole River. Priority Area No. 6 comprises 13 parcels totaling 6,195.56 acres situated in Carbon County.

This hearing is being held by the Bureau of Land Management in accordance with 43 CFR 1601.0-8 for the purpose of accepting testimony from anyone who could be affected by the recommendations.

Testimony will be accepted relevant to the recommendations and analysis set forth in the Draft Bull Mountains Environmental Impact Statement. Testimony which is relevant or related to this document only will be considered. To ensure that everyone has an opportunity to have their testimony heard I ask that as nearly as possible, your remarks be limited to the recommendations and analysis in the draft document.

I would like to remind you at this time, if you have not already done so, please register at the door and indicate if you wish to present written or oral testimony. All statements received will be analyzed by the Bureau of Land Management and the written record of that analysis, as well as the transcript of the hearing, will be available for inspection at their respective offices in Butte, Billings, and Miles City.

If you wish to purchase copies of the transcript of this

hearing, please leave your name and address with the court reporter. A copy of the hearing record and analysis will be made available to each county involved in the proposed exchange upon request by those county commissioners. Copies of all written comments and transcripts of oral testimony received in response to the request for public comment provided for in 43 CFR 2203.1 will also be furnished to the Department of Justice.

The analysis of the testimony received will be used to determine what changes, if any, will be required in the recommendations set forth in the documents. The analysis of the testimony and a copy of the transcript will be incorporated in the final Environmental Impact Statement. Copies of the final documents will also be available to all known interested parties upon request.

This is a formal hearing and to ensure that all participants have an opportunity to express their views without interruption, there will be no debate, questions, or distractions during presentation of testimony. BLM and Meridian Minerals officials are present and will be glad to discuss issues with you informally following completion of this hearing. I would like to introduce those agency and company representatives at this time.

From Meridian Minerals, Bob Moorhead, who is the Project Manager for this effort. Bob's at the back of the room.

From the Bureau of Land Management; we have Bill Matthews, who is the Project Manager for the EIS that has been prepared. These individuals will remain as long as needed after the hearing to discuss or answer your questions.

I want to reemphasize that the hearing is not a forum for BLM to debate or explain the proposed exchange, but rather an occasion for the public to state for the record its observations of the adequacy of BLM's work on the EIS thus far.

I will call the names of those wishing to make a statement in the order received. Those called will please come forward and begin by stating your name and whom you represent. If you have a written text, please place a copy on the table next to the court reporter upon completion of your statement. Those wishing to present written statements only, may do so by bringing your text to the table following completion of the oral presentations.

Due to the large number of presenters, individual testimony this evening will be limited to five minutes. We have 23 signed up at this time and the rest of the list. I'm sure there are quite a few more. Are there any questions thus far on procedures? If not, I would like to call upon Richard C. Parks to present his statement.

MR. PARKS: For the record, my name is Richard Parks. I own and operate a sporting goods store and fly fishing service in Gardiner, MT. I am also a member of the Northern Plains

Resource Council, and I appear on this issue both on my own account as a sportsman and as a representative of Northern Plains Resource Council. Northern Plains is a grass-roots organization representing some 6,000 members and supporters state wide.

At the outset, I want to acknowledge that the portions of property offered do indeed have significant value as recreational property. The first thing that a con-artist needs to do is get the cooperation of his "mark," his target, and this is generally done by proposing something that seems to be such a good deal that it can't be refused. It is precisely because
52 of the recreational values of the offered lands that BN and BLM are able to propose this fraud as a legitimate exchange.

I oppose this exchange as drafted for two basic reasons:
53 In the first place, the coal is vastly undervalued in order to make this look like a legitimate exchange; and in the second place, the exchange itself flies in the face of rational management policy by creating split estates rather than consolidating management units.

I believe Mr. Tully will be addressing the undervaluation issue in some detail, so I will limit my remarks on that aspect. Carl Ican, Donald Trump and T. Boone Pickens have all made clear that the art of deal requires the use of OPM, other people's money. In this case, BN intends, with the help of BLM, to use our children's money to build a coal mine.

54

The Draft EIS identifies, on page 198, the value of the coal as $682,500,000, and on page 4 the recreational lands are valued at $1,138,800. Coal that is routinely being sold in the 7-12 dollar per ton range is being valued at one-and-one-third cents per ton. This is not a good deal.

55

The exchange would also mean that we would lose the royalty payments that would accrue if the coal were mined under the normal lease arrangements discussed as "Alternative D." Page 198 reveals that the lost royalty payments would amount to $45,773,000 of which at least one half, that is $22,886,500, would go to the state school funds.

56

One of the basic reasons for land exchanges between private owners and public agencies is to consolidate property into rational management units. It is recognized that checkerboard lands are difficult to manage because section lines almost never have anything to do with the geographic and biological boundaries that should guide management decisions. This exchange does not consolidate management units. On the contrary, it substitutes vertical checkerboarding for horizontal checkerboarding. I have attached to my testimony a graph showing the new controlling interest of the various types of property rights involved.

It's important to note that BN does not propose to give up rights to the oil and gas on the exchanged property nor does BLM give up the same rights in the Bull Mountains. The

57

exchanged land now has two owners instead of one, and the Bull Mountains now have three owners instead of two. This feeds back into the valuation issue in another way. Since the oil and gas rights are acknowledged to have significant potential in the exchanged lands, it is clear that BN is retaining a

58

significant portion of the value of these lands. Furthermore, the largest block of exchanged lands will be open to appropriation under the 1872 mining law and hence may not even be public land in the foreseeable future.

59

In the case of Unit No. 6, we are also puzzled by the boundary choice. It appears that for some reason the land being consolidated is not contiguous by two miles with the other public, that is US Forest Service, land in the area, thereby, again, selecting the less appropriate option.

60

While acknowledging the recreational value of the offered lands, I submit that BLM and BN could easily discuss alternative methods of preserving those values. Two ideas that come to mind are exchanges that would be for equal value in the immediate area, or an outright purchase, perhaps with the assistance of the Nature Conservancy or other similar agency. It appears that the only reason BN has offered these lands for exchange is that by doing so, they hope to keep most of the value of the land for themselves while financing the development of the mine by relieving themselves of the royalty payments.

61

In summary, then, I ask BLM to do the following: 1) Select Alternative D, the leasing option, for development of the Bull Mountain Coal, and; 2) Develop alternatives to protect the recreation values of the lands offered for exchange.

Thank you.

MR. BINANDO: Thank you, Mr. Parks. Tom Tully.

MR. TULLY: I see a lot of familiar faces out here tonight. My name is Tom Tully, and I'm here tonight to testify on behalf of Bull Mountain Landowners Association, an affiliated group of Northern Plains Resource Council. Our Bull Mountain group originally formed in the early '70s over a proposed strip mining venture, which would have negatively impacted a number of ranches in the area.

62

Essentially, the proposal being made by BLM and Meridian Minerals concerns the same coal field and same surface holders as before, with the distinction being that the present proposal is being actively promulgated by the BLM and is dependent for much of its input on a consultant hired by Meridian Minerals, Marshall K. Corbett.

From what I've seen in the news, this proposed coal for recreational land swap is billed as being good for recreational interests, with no problems resulting for anyone else concerned. Let me attempt to clarify a few points. First and foremost, the BLM proposes swapping 54.5 million tons of

63

federal coal in the Bull Mountains for around 9,000 acres of surface owned by Meridian Minerals. According to the BLM, the coal is worthless as it sits in the ground and the land being offered by Meridian is valuable in terms of recreational acres.

But wait a minute. The real estate offered has been appraised at 1.2 million dollars and the 54-and-a-half million tons of coal have been evaluated $730,000, or about 1.3 cents per ton, by the BLM's Northwest Regional Evaluation Team; 1.3 cents per ton.

On page 198 of the draft EIS, is a chart showing potential stream of income from royalty payments on the same coal, were the BLM to retain ownership of the coal and lease it for development. At the 3 million ton per year annual production level with a start up date of 1990, which is close to what Meridian has said they would like to shoot for, they total royalty payments foregone in this swap would be in the range of $46,000,000, 50 percent of which would be returned directly to the state of Montana and most of this to the educational system.

Of the remaining 50 percent, the Feds commonly retain 10 percent to cover administrative costs and return much of the remainder to the state in the form of direct grants. So in reality, if this coal were produced, and make no mistake, Meridian plans to produce it or sell it to someone else who

plans to produce it, the potential loss of revenue to the state of Montana would be at least 40 million dollars, and most likely much more than that. For instance, that figure is arrived at using a $15 per ton FOB and using the existing royalty discount formula, which could well be changed within a year. On the same page, look under the "Discounted Royalty Payment" column. This shows the discounted royalty payments for the same coal. These figures assume: 1) that the annual rate of inflation would be 10 percent annually for the next 35 years, and; 2) that the price of the coal would remain at $15 per ton for the next 35 years; both highly questionable assumptions.

64

In essence, the Federal Government, after giving half of the land and minerals to Northern Pacific Railroad in the 1800's as land grants, is now proposing to give the other half of the minerals to Meridian Minerals, a subsidiary of Burlington Resources, successor to the Northern Pacific land grant empire. This flies in the face of fair competition practices and will only contribute further to the stranglehold that BN had had and that Burlington Resources now has on much of the state.

65

Other problems inadequately addressed in the EIS are those resulting from the impact of long-wall mining, which is nothing more than underground strip mining. Those impacts are the impact subsidence on the adjacent surface and the

66

impact on the hydrology in and around the permit area.

There is little or no attempt to assess the impact on wildlife in the Bull Mountains, which also has recreational value. That wildlife includes game species such as deer, elk, and wild turkeys and non-game species such as raptors, some cats and a host of other species.

66

Although we have many areas of concern regarding this draft proposal, perhaps our greatest fear is that this proposed swap would set a terrible precedent for determining what the public receives in return. In other words, if the BLM is willing to trade federally owned coal for two cents on the dollar, how cheaply will they trade other public resources such as timber and wildlife?

In conclusion, we are certainly not opposed to the idea of the Federal Government or State Government dealing for recreational access. We recognize the desire and need for quality recreational opportunities. But we strongly oppose this particular method of trade in which federal or public resources are determined to have an absurdly low value and then traded to a large private interest.

67

This is no more than a huge subsidy to that interest -- interest that is not even voted on by Congress but which could well set a horrible precedent in determining the value of any and all public resources in the future. This proposed swap has all the makings of a national scandal. Let's

either put a stop to it or blow the lid off.

Thank you.

MR. BINANDO: Our next speaker is Bill Holdorf.

MR. HOLDORF: For the record, I'm Bill Holdorf. I'm president of the Skyline Sportsman Association here in Butte. However, I can't speak for the club because we haven't discussed this at a hearing. So I'll speak for myself. However, I didn't know much about this at all until the other day, so my comments will be very brief because I didn't have much to go on here, but I have some things to say.

To start with, many of you read this article in the paper. This was in last Friday's paper. It was a large article. It told how great this program could be for the sportsman. Up here, at the Big Hole, I have hunted and saw logged. That's the only area I'm familiar with, and then I would like to see public access. But I don't want to see public access into that area under these conditions.

There wasn't one thing said in this article about what they, the company, would be getting this land for -- the coal and this is some of the reasons. I'm not against exchanges if they're fair exchanges. I don't believe this is fair.

68

Now, this flier that you have in your hands that was passed out here just awhile ago, I'd like to read one line on this. In the second paragraph: "This revised total --" first of all, this is after they have reduced $19,200 from

the value for some land that was sold, "This revised total value of offered lands still exceeds the fair market value of the federal coal, which has been determined to be approximately $730,000."

All right, there we have 54-and-a-half million tons of coal. The fair market value written right here, $730,000; that's ridiculous. I would be in favor if we could get fair market value of selling that coal or exchanging it, but that is not fair market value.

Now, a couple of other comments and I will sit down here. This brings me back to James Watt when he wanted to sell coal in eastern Montana for seven-eighths cents a ton. Right here we have it at 1.3 cents a ton, and none of this money would go back to the School Foundation Program. It won't come back into the state.

If you can come up with a fair market value, fine. But I'm totally against this proposal the way it is. It will create a few jobs, but it will do nothing except for the Burlington Northern Railroad. Meridian is a subsidy of this organization.

When Governor Stephens signed a bill to give a tax break to the corporations in Montana, here, about six months ago, the people who got the largest tax break in the entire state was Burlington Northern. They don't need another one like this.

Thank you.

MR. BINANDO: Thank you, Mr. Holdorf. The next presenter is Don Picchioni.

MR. PICCHIONI: My name is Don Picchioni. I'm president of the Musselshell Valley Development Corporation. The Musselshell Valley Development Corporation has long been a supporter of this program. It also supports full heartily this EIS and exchange proposal.

I had written several comments to make tonight. In looking at the number of people that are here tonight, I have decided to revise those comments a little bit. According to this document, which is the Draft EIS, there are three items that are supposed to be analyzed at these public meetings: The first being any errors in the analysis contained within this document; the second, if there are any omissions in this document, and; third, clarification of any articles in this document.

As far as I'm concerned, there's a fourth item and probably the most important item, but it's not listed. It's not spelled out here, and that is: What is the public opinion of this project. And I think that is very evident, here, tonight.

The BLM, within this document, has already indicated what their preference is. They prefer alternative aid, which is the land for coal exchange. But to make the final decision, the BLM needs the support of everyone of us to back them up.

Now, nonight as you can see, there was a bus load and several carloads of people who came up from Roundup. They made this journey to show their support for this project. I think that says an awful lot for the dedication of these people to make that type of an effort.

I would hope that during the course of this meeting, each and everyone of those pepple would stand up here, state their name, and just state very briefly whether or not they support this issue. I think that will put to rest any doubts as to where the support lies.

This is another case where the voice of the majority needs to be heard. So many times we let small, special interest minorities control our destiny. This cannot be done anymore. If this sounds kind of like a campaign speech, it is. I'm campaigning for this project very definitely. And like all good campaigns, every campaign needs a slogan. The slogan for this campaign should be -- and it was put very simply a few weeks ago by Joe Hoiland: "Bull Mountain Coal; Dig it."

Thank you.

MR. BINANDO: Thank you, Mr. Picchioni. Our next presenter is Bob Carlson.

MR. CARLSON: I'm going to pass for right now.

MR. BINANDO: Mr. Carlson has passed. Next on the list is John Funk.

MR. FUNK: My name is John Funk. I'm from Roundup, and I'm just here representing myself as a local businessman and I am very much in support of this swap. I'm with Don Picchioni on the development board, and we do back this swap.

Thank you.

MR. BINANDO: Thank you, Mr. Funk. Our next speaker is Bill Funk.

BILL FUNK: My name is Bill Funk. I'm a local businessman in Roundup and a member of the Roundup City Council. And I'm representing myself and the city council in saying that we favor the findings found by the BLM and the draft EIS and support the land for coal exchange.

Thank you.

MR. BINANDO: Thank you, Mr. Funk. Our next speaker is Bill Edwards.

MR. EDWARDS: My name is Bill Edwards. I'm a Roundup, Montana, businessman, and I'm here to say that I support the land swap. And I feel that it is time that, like Don said, that the special interest groups not be allowed to control our destiny. We need to do something to pick up economics in this state, and this is one way to do it.

Thank you.

MR. BINANDO: Thank you, Mr. Edwards. Our next presenter is Darrell Brewer.

MR. BREWER: I'm Darrell Brewer, from Roundup, a local businessman there. And I came up to show my support for that land swap on that Alternative A, and I go right along with Don Picchioni.

Thank you.

MR. BINANDO: Thank you, Mr. Brewer. Our next speaker is John Legget.

MR. LEGGET: My name is John Legget, and I'm a retired Roundup businessman, I just want to express my support for Alternative A for the coal for land exchange.

Thank you.

MR. BINANDO: Thank you, Mr. Legget. Our next speaker is Robert B. Morehead, Jr.

MR. MOREHEAD, JR: I'm Robert Morehead, the Project Manager of the Bull Mountains Coal Project for Meridian Minerals. The first thing I would like to explain is the reason that Meridian Minerals proposed the land exchange.

As mentioned earlier about the management problems with the checkerboard pattern, and that is true, it's difficult to put together an economic project in a marginal project with the checkerboard ownership. It does need to be consolidated.

The second reason was that previous attempts to develop Bull Mountains coal had failed because of high mining cost and high transportation-construction costs. Since we have

applaud for the land exchange, preliminary marketing efforts have shown that it's possible to market the Bull Mountains coal in the Pacific rim countries. And we feel like this can be done if we are in the position by the 1990's.

We will be competing with Australian coal, and we would have to meet a price range of $15-$16 if it were to be amounted. Because of recent developments in the Clear Air Bill, or Clean Air Legislation, we feel like the fourth reason has come about and that we'll compete with other loose sulfer coal producers and we'll find the opportunity to sell Bull Mountains coal if we are competitive. And again, we have to remain competitive.

We feel that the draft EIS was a well written document and a very professional publication. The analysis does support Alternative A, the land for coal exchange, and we feel like that would be in the public's best interest also. No significant environmental impact will result from the exchange or from subsequent development of the coal that can't be mitigated.

In completing the exchange, it will help spur economic development in the Musselshell/Yellowstone County area that this analysis confirms is desperately needed. Right now we are developing a test pit in the Bull Mountains. We have hired some local people that are being trained. Contractors on site are moving dirt now. We are also upgrading the

present BN preparation plant that exists on the property, and this will increase the recovery of the coal and we will be decreasing the moisture as shipped so that it will become more competitive.

We've also relocated about a little over a half mile of county road. We should be looking at that by the end of this week. We certainly welcome public comment to help us complete a safe, environmentally sound coal mine.

Thank you for the opportunity to comment.

MR. BINANDO: Thank you, Mr. Morehead. Our next speaker is Joe Hoiland.

MR. HOILAND: My name is Joe Hoiland. I live in Roundup, and I'm in Butte tonight to say that I favor the land swap between the Bureau of Land Management and Meridian Coal. I would like to thank the BLM for having the opportunity to speak here tonight and make our views known.

Last month on the steps of the Capitol in Helena at the Centennial Celebration, Ambassador Mansfield said that for the future of Montana, forget Morris Greeley who said, "Go West young man," and change it to "Go East to the Pacific Rim Nations, because that's where the future of Montana lies." I agree with the ambassador.

I would like to see these nations on the Pacific Rims buy copper from Butte; I would like to see them buy timber from Missoula; wheat from Great Falls; Barley from Broadview;

cattle from Miles City; sugar from Billings, and yes, I would like to see them buy Roundup coal.

A few people in our state would like to overcontrol, overregulate, and staple an industry that is willing to offer and to bring good times to our area closer to reality. This is shameful. This is a good example of a value system that is turned upside down.

For the future of our state and your family and mine, I urge you to give Meridian your vote of confidence in this project.

Thank you.

MR. BINANDO: Thank you, Mr. Holland. Our next speaker is Rolan Albright.

MR. ALBRIGHT: I'll pass.

MR. BINANDO: Mr. Albright has passed. Our next person on the list is Jean Vaira.

MS. VAIRA: Thank you. My name is Jean Vaira, and I live in the Bull Mountains. I am not a businessman or a businesswomen, but I do agree with Don Picchioni. We have to have the mine produced, and it's going to bring jobs into our area, and that's really just what we really need.

Thank you.

MR. BINANDO: Thank you, Ms. Vaira. Our next speaker is Jeanette Devine.

MS. DEVINE: I'm Jeanette Devine, a resident of

Roundup, Montana. I'm here this evening in Butte to show my support for this land swap.

Thank you.

MR. BINANDO: Thank you, Ms. Devine. Our next speaker is Thomas Hopkins.

MR. HOPKINS: My name is Tom Hopkins. I'm from Roundup, Montana, and I was born and raised there all my life. I worked in the coal mines several years back until they closed, and you can hardly tell that there have been coal mines around town. If people come in there and they don't know where they are, they never know there was a coal mine there. And I believe that we should be supporting Don Picchioni for the land swap and BLM.

Thank you.

MR. BINANDO: Thank you, Mr. Hopkins. The next speaker is Jack Carlson.

MR. CARLSON: My name is Jack Carlson. I'm a retired person speaking from that point. I have lived all my life in Montana and the major share of it out in the Bull Mountains. And as far as I can see now, some years back when they decided timber had value, they started taxing it. But they never taxed coal underground. So as far as I'm concerned, they're saying what's underground has got no value. And Montana is losing population so fast that we are in danger now of losing a federal representative. And we have

a lot of people in Montana who are retired people, and to them it really don't make any difference or anything else, but our taxes are going up and they can leave the state. Then we might end up losing the other representative.

So I would like to see this adopted and -- the Choice A, wasn't it -- would be the one to go on. And I thank you.

MR. BINANDO: Thank you, Mr. Carlson. Our next presenter is Clem Johnson. Maybe I have got the first name wrong.

MR. JOHNSON: Is it Dan?

MR. BINANDO: If you signed up, this is a good time to come.

MR. JOHNSON: My name is Dan Johnson, and I'm a Roundup businessman. And I want to give my support for the Meridian land for coal swap because it will help Roundup.

Thank you.

MR. BINANDO: Thank you, Mr. Johnson. Our next speaker is Charles Hurt.

MR. HURT: My name is Charles Hurt, and I'm from Roundup, Montana. And I would like to go on record as being in favor of this land swap with Meridian.

Thank you.

MR. BINANDO: Thank you, Mr. Hurt. Our next presenter is Susan Carter.

MS. CARTER: Hello, my name is Susan Carter, and I'm

in favor of the land exchange.

Thank you.

MR. BINANDO: Thank you, Ms. Carter. Our next speaker is Shirley Gecho.

MS. GECHO: My name is Shirley Gecho, and I'm a Roundup businessman. And I'm in favor of this land exchange.

Thank you.

MR. BINANDO: Thank you, Ms. Gecho. Our next speaker is Dona Robson.

MS. ROBSON: My name is Dona Robson. I'm from Roundup, and I would like just to show my support for the land exchange with Meridian Minerals.

Thank you.

MR. BINANDO: Thank you, Ms. Robson. Our next speaker is Gary G. Robson.

MR. ROBSON: I'm Gary Robson from Roundup, and I'm chairman of the county planning board for Musselshell County. And I would like the record to show that myself and twelve members of the board are in favor of this land exchange.

Thank you.

MR. BINANDO: Thank you, Mr. Robson. Our next speaker is Ken Minnie.

MR. MINNIE: My name is Ken Minnie. I'm a rancher in Roundup. I'm also one of the supervisors of the lower Musselshell Conservation District, and both the district and

myself are in favor of the land exchange.

Thank you.

MR. BINANDO: Thank you, Mr. Minnie. Our next speaker is J. Balock.

MR. BALOCK: I'm John Balock from Elliston. And in the early 70's we did strike coal in Roundup. Northwest of Roundup reclaimed that. The bond was one of the first reclamation bonds to be released. And I think that this swap is to the best interest of the state of Montana and all concerned. So, therefore, in a word, "trade."

MR. BINANDO: Thank you, Mr. Balock. Our next speaker is John Armstrong.

MR. ARMSTRONG: I'm John Armstrong from Roundup. I've been in the banking and investment business for over 28 years in that area. And also through a marital agreement, I would like to put in a few words from the mayor-elect, my wife, Sally.

I feel there is a need for this type of action in the Roundup area. And from the standpoint of the alleged repercussion, I think maybe there's a story on the lighter side that -- of the two cavemen standing inside a cave, and the rain and the storm is just really pouring outside the cave. And the one of them said to the other "You know, we never had this problem before they invented bows and arrows."

MR. BINANDO: Thank you, Mr. Armstrong. Our next

speaker is Miklos Skrapits.

MR. SKRAPITS: My name is Miklos Skrapits. I'm a businessman and resident of the Bull Hills. I'm in favor of the land exchange for minerals in Roundup.

One point I notice was not pointed out here yet, and that is, our national deficit. It's great, and it's getting greater because of our exchange of goods with other countries. Everything is coming into our country and nothing is going out, and that balance is way off-kilter.

Here's an opportunity to ship this coal to the Pacific and get to those people, or get back at those people, and get the money back from those people that are tearing our deficit down. This is one opportunity. Let's take it and go for it. Send them the coal. That coal is worthless underground. It's just sitting there.

I've heard mention of millions of dollars worth of value versus 1.3 cents a ton. That coal might not even be worth 1.3 cents underground, but above ground it's worth so many millions of dollars. And I sure as heck would like to see a portion of that so many millions dollars, which are tremendous, returned to Roundup as a tax revenue so my taxes don't go up 31 percent as it did this year and expect to go up some more next year because there are no taxpayers. And I want those taxpayers back in Roundup.

Look down Main Street in Roundup. Do you see any

children playing anywhere? Do you see people between the years of 20 and 30 years old that might have a one-year-old next to them? You don't see them, because they do not exist. And they don't exist because there's no economic basis in Roundup to keep them there.

This gives us the opportunity to create that economic basis. It might start off with 15 employees, but two years, three years from now the 15 employees would increase to a tremendous number and the tax payer's share will be spread along all of them.

This is only the beginning. Roundup started it with the cattle drive to create an economic basis. That was a good start. Let's continue it and grow with the coal that exists underground that is useless unless it's above ground, and it's useless unless it's sold to somebody.

We are not bothering the land above the ground. We are increasing the land, utilizing acreage in Montana to become federal lands. Let's concern ourselves with the land that's there. Yes, we want it. I want more land to be public. This is one way of getting it. You're talking about land that cannot be managed. I don't care if it can be managed. It still draws me $600 a year as a lease base. I don't have it right now. It's sitting underground at Roundup, in Roundup, that's suffering worse than, probably, any other area in Montana.

The land exchange is the greatest idea. Matter of fact, people in this region and everywhere that are getting parcels should be happy about it, because they're not losing anything. All they are doing is gaining. They're telling themselves that they are losing property by giving coal up that is under Musselshell County. They've never been there. They do not even know what it looks like.

How does the man know what impact it's going to have in Gardiner on the land in Roundup? Come up there. Live up there with us, and go out there and look at the street where you don't see any kids, and then write your letter to your kids that have left you at the age of 18 to 24 to go to Texas to look for a job. You don't see them for two or three years. Then, think about worrying about the little-bitty fishing area that you can't control.

Thank you very much.

MR. BINANDO: Thank you, Mr. Skrapits. Our next speaker is Cheri Kilby.

MS. KILBY: I'm Cheri Kilby. I'm from Roundup, and I'm a businessman -- woman -- and a resident of the county. My husband works for the city. We are lucky. We have jobs that we can rely on. I have watched many people that I have grown up with leave town. I have seen my brothers leave town. Many come back because they have eventually found a job, but there's so many leaving, and this land swap would help our

economy. I'm definitely for it.

MR. BINANDO: Thank you, Ms. Kilby. Our next speaker is Tom Webber.

MR. WEBBER: My name is Tom Webber. I'm from Roundup. As president of the Musselshell Chamber of Commerce, I would like to state that our chamber supports the land exchange between Meridian Minerals and the BLM. It's our hope that this exchange does take place.

Economically, this proposed land exchange and the mining operation will help our area. In the past four years, Musselshell County and Roundup's economy has dropped because oil explorations and drilling has fallen off. We are now looking at the coal mining industry with the hopes that it will once again have an area that is prospering.

Thank you.

MR. BINANDO: Thank you, Mr. Webber. Our next speaker is Gary Thomas.

MR. THOMAS: My name is Gary Thomas. I live in Roundup. I think the question here is whether this coal that we are going to trade is as of the same value as the land that we are going to get for it. I don't know how I would figure the value of recreational land in 25 or 50 or 100 years, but I have lived there for 45 years and this chunk of coal we're talking about hasn't made anybody a nickel. So I'm in favor of the exchange.

MR. BINANDO: Thank you, Mr. Thomas. Our next speaker is Mr. Jim Anderson.

MR. ANDERSON: My name is Jim Anderson. I'm a local businessman and vice president of the Roundup Volunteer Fire Department. And I and we are all in favor of this land swap.

Thank you.

MR. BINANDO: Thank you, Mr. Anderson. I have a Jo Ann E. Mills.

MS. MILLS: My name is Jo Ann E. Mills, of Roundup, Montana. I am a coal miner's daughter. I am very much in favor of the land swap for coal, both my husband and myself.

Thank you.

MR. BINANDO: Thank you, Ms. Mills. Our next speaker is Dorothy McCleary.

MS. MCCLEARY: My name is Dorothy McCleary. My husband and I own several small businesses in Roundup. I was born in a coal mining camp several years ago in Roundup. I think there are a lot of good people affiliated with the coal mines, and we are very much in favor of the land exchange and hope that Meridian has a lot of good luck.

MR. BINANDO: Thank you, Mrs. McCleary. Our next speaker is Stub Burtow.

MR. BURTOW: I'm Stub Burtow, president of the city

council. On behalf of the city council and the mayor, we wholeheartedly approve of this land swap for coal. I'm also an owner of a welding and machine shop. I came to Roundup 33 years ago in the oil industry. And as you know, that's very depressed. The coal, I think, will pick up our economy.

In the 33 years that I have been in Roundup, I haven't seen one penny come out of that coal that's lying under the ground there now. And I'm sure if it gets coming out, that it's going to pick up the economy in Roundup, and that's what we dearly need.

MR. BINANDO: Thank you, Mr. Burtow. Our next speaker is Blaine Tull.

MR. TULL: Hello, my name is Blaine Tull. I'm a Bull Mountain resident, and I am a local businessman. I'm in favor of the coal for land swap and also agree with Don Picchioni. One thing I would like to state is: I have dealt with 10-percenters in the marine corps. And some of the people that are against it, I call them 10-percenters. So to hell with them.

MR. BINANDO: Thank you, Mr. Tull. Our next speaker is Gary G. Graves.

MR. GRAVES: My name is Gary Graves. I'm a rancher in northern Musselshell County, and I'm in favor of this exchange.

Thank you.

MR. BINANDO: Thank you, Mr. Graves. Our next speaker is Jay Erdie.

MR. ERDIE: Thank you. My name is Jay Erdie, and I'm employed as the District Superintendent of the Roundup Public Schools. I am here tonight to address the issue of property taxes, the devaluation of property taxes in Musselshell County and its effects on School Districts 55 and 55-H and the projected increase in taxes next year as a result of the new school funding that becomes effective with the 1990-1991 school year.

These comments are not to imply that the Board of Trustees of School Districts 55 and 55-H have taken a position of being for or against the land exchange. The issue has never been discussed at a stated meeting.

As everyone is aware, schools in Montana are funded in large part by local and state tax dollars with very little assistance from the Federal Government. Also, as everyone's aware, the school funding issue was the dominating issue in our most recent regular legislative session and special session; an issue that resulted in some counties being winners when it comes to paying less taxes for schools and some counties that will pay more taxes to support schools.

The taxpayers in Musselshell County will be losers in that their taxes are going up. To make the pill less palatable is the fact that Musselshell County taxpayers have

been losers for the past five years because of the continual decline in the devaluation of the various classes of property.

In 1985, in the elementary district, School District 55, a mill generated $11,253. For the current fiscal year beginning with July 1, 1989, that same mill value has dropped to $5,910; a decline of $5,343 or a 47 percent drop. The most current drop was from the '88 fiscal year to the present, which was 13 percent.

The scenario in the high school district, School District 55-H, mirrors the elementary district. In 1985, one mill generated $16,180. For this current fiscal year, the value is $9,052, a decline of $7,128, or 44 percent, in five years.

As you can see, the picture is glum for the taxpayers of Musselshell County, and it will become more so. I foresee a further decline in the tax base because of the manner in which different property values were devalued in the last legislature.

Looking at the new school funding, the picture becomes bleaker yet. Granted, the schools in Roundup will benefit, and chances are there will not have to be a voted levy. But the burden of paying for such still remains with the taxpayers who will be hit doubly hard; a continual decline in tax base and an increase because of school funding.

To pay taxes is the American way and the thing to do. As one Roundup businessman told me the other day, "We must pay

our bills." Musselshell County taxpayers have paid their fair share over the years, and yet the tax bill continues to grow with services being the same or less. As an employee of an entity that is financed by tax dollars and charged with preparing budgets that will enhance educational opportunity for Roundup youth and yet, being fiscally responsible to Musselshell taxpayers, I support the land exchange.

The tax base needs to improve in a local economy that is depressed and in a local economy that is going to ask still more from its taxpayers.

Thank you.

MR. BINANDO: Our next speaker is John Roylance.

MR. ROYLANCE: I came primarily to get some perception of what was happening here tonight. I regret that I haven't had the time to adequately review this draft D, is it? I'm sure that many potentially interested members of the public from this particular area have not had that opportunity also.

I would like to comment that better notification regarding the validity of the draft would have been appropriate and also would have been beneficial in securing a better informed public participation.

Public lands belong to all of us, whether you are from Roundup or Whitehall, Montana. It's sad that better notification of the substance and the value of the property

proposed for exchange would not have been printed in the newspapers. I can't say that I support this exchange of public lands unless the inequities in values can be worked out. It is obvious that gross inequities do now exist.

This exchange, as I understand it, would be trading unequal values, and I think it sets a very bad precedent to start exchanging public lands on that type of a bases.

Thank you very much.

MR. BINANDO: Thank you, Mr. Roylance. We had two individuals that passed. I'll call their names again to offer them an opportunity to present testimony.

The first was Bob Carlson.

MR. CARLSON: My name is Bob Carlson. I'm from Butte. I'm on the Board of Directors of Skyline Sportsman Association. What the previous speaker said is very true. Those of us in the Butte and Anaconda area had very little prior notification of this land trade. And we haven't -- the sportsman club and a lot of us, we haven't taken a position on this yet, but our preliminary thoughts are that it is not a good deal; that the coal is worth much more than the land would be exchanged for. So we want to look at it farther before we send in written comments or formal comments for this.

70

Again, in the future, perhaps if we can have better notification on these land swaps, I think it would help quite

71

a bit.

Thank you.

MR. BINANDO: Thank you, Mr. Carlson. The next individual that passed previously is Rolan Albright.

MR. ALBRIGHT: My name is Rolan Albright. I'm a retired businessman from Musselshell County, and I would like to go on record as favoring the swap at this time.

Thank you.

MR. BINANDO: Thank you, Mr. Albright. Is there anyone else wishing to testify? Yes, ma'am.

MS. MINNIE: My name is Jo Ann Minnie. I'm a city clerk for the City of Roundup. Also, we have a ranch east of Roundup. I would like to go on record as saying that I am in favor of the swap.

MR. BINANDO: Thank you, Ms. Minnie. Yes, sir.

MR. JENSULD: I'm Alden Jensuld, from Roundup, Montana. I was raised on a homestead north of town. And I'm not here to speak especially for Roundup. I'm here to speak for the state of Montana, for the United States of America.

We have got resources to develop, and let's go ahead and develop them. Eight or nine years ago, there was a company in there trying to develop a coal mine with substantial resources, and they finally gave up because of the obstacles. We missed that chance. Let's accept this chance and go ahead and develop our resources.

MR. BINANDO: Thank you. Yes, sir.

MR. NELSON: My name is Derrick Nelson. I'm from Missoula. There will be a lot of talk about value tonight: Value of the recreational land versus value of the coal. And I think one of the biggest values has been left out, and that's the value of future opportunity. And it's important not just for the area of Roundup but for the state in general, because it has a domino effect.

Once the economy there gets going in that area and the tax base expands, there are feeder groups and feeder businesses in Billings and all over the state that get involved, and it just dominos one after the other. And that opportunity is within this project. It's the project that could be the kick start that gets this whole thing going.

I think we also have an opportunity here as the state of Montana to send a message to other companies or other individuals or even foreign investors that Montana is once again a place they can do business in. I think for too long we have done everything in our power to throw obstacles in their course and to slow things down and, really, to discourage a lot of business.

This is something that, at least from my generation, we have paid for in the sense that we've had to go out of state in order to find jobs. I was one of the fortunate ones. Once I ended up going out of state, but after a couple of years,

I was able to find an opportunity to come back here. And I know a lot of kids, when I started school in Great Falls, who are now out of state, and for one reason: not because they didn't like the state or they like somewhere else better, but because that's where the jobs are. And I'm in favor of the Alternative A.

Thank you.

MR. BINANDO: Thank you, Mr. Nelson. Is there anyone -- yes, sir.

MR. BEAUDRY: My name is Haley Beaudry. I'm president of the Butte-Silver Bow Chamber of Commerce, and I'm trying to find a way to arrange one of these about twice a week to get everybody to come into Butte and enjoy themselves. Welcome to Butte.

One of the earlier speakers talked about a depressed local economy. It's more than locally depressed in the state of Montana. It's depressed throughout the state. The proposed project in the Bull Mountains would bring 219 people to work over some long period of time; mine life, 20 to 30 years. And the coal that's going to be mined in the Bull Mountains is not going to replace coal that's already mined in the state of Montana somewhere else. It's not going to displace workers. This is going to go to new markets, and there's going to be new jobs. So that's important.

By the way, I'm also a Registered Professional Mining

Engineer in the state of Montana. I'm a Montana native, and I have extensive experience in the coal business. So I am familiar with that somewhat.

From our point of view, here in Butte, in this part of the state, I can see absolutely nothing but good coming from more access to the Madison River and the Big Hole River. I, myself, am not sure there are any fish in either rivers, but I think that having that access to those rivers would be vitally important to us out here.

We hear people every day talk about the need for more access and better access. Groups squabble back and forth between each other. This provides help for everybody out here.

One final point: I've heard several people talk about the value of coal in the ground. You know, value of coal in the ground may be -- it may be nothing. Realistically and absolutely, it may be nothing. But people do put some value on it. You do that in order to find out how your economic investments stack up against the reserve and for other reasons like that.

The value of one-and-a-half, one-and-two-thirds, two cents per ton is a good reasonable value. That's not exceptionally low for this so somebody can sneak this by people that don't have calculators or something like that. This is a true, acceptable, good value for coal -- for coal

in the ground, undeveloped coal. And anyplace that has coal valued for more than that is valuing coal that is first, it's probably surface minable, and; second, it's a contiguous block. There are no checkerboards, or they have been erased, but this is a contiguous block of coal so the mine plan fits into one continuous flow over the reserve. Those are the things that cause coal in the ground to be valued more.

I don't believe, also, what another speaker said that it's obvious that there are gross inequities. I don't know it's obvious. It's not obvious to me. I think it's more obvious that there's a good value for good value trade here. And I, personally, and on behalf of the Butte Chamber of Commerce, am in favor of this trade.

Thank you.

MR. BINANDO: Thank you, Mr. Beaudry. Is there anyone else? Yes, sir.

MR. SELEY: My name is Monte Seley. I'm also from Roundup. I'm secretary of the Musselshell Development Corporation. I've been kind of sitting taking notes throughout what I had planned to say, but I wanted to go back. The issue here seemed to be on the value of this coal in the ground. I appreciate Mr. Beaudry's comments. He's certainly more familiar with the coal mining industry and the in-and-outs of the valuation at that level than I am. But some of the things that strike me on this issue of the valuation of

this coal -- the argument that I've heard that this Federal coal royalty, you know, at $45,000,000; I've heard it up to $122,000,000. I've heard all kinds of numbers. But that federal coal royalty should be factored into the value of this coal and this 700 or 1,800,000, or whatever, in land over here should be placed on a scale against this Federal coal royalty.

I don't believe that. I don't believe that's a valid argument. I don't believe that industry wide is looked at that way. But if in fact that were true, then why aren't we taking the close to $100,000,000 in taxation in gross proceeds tax and coal severance tax and resource indemnity tax and individual payroll tax and diesel fuel tax and property taxes that all are still valid, whether it's exchanged, whether it's leased, whatever it is, and put that on the scale too. And then we have got an equal value here.

72

So there is no doubt in my mind that this is a good thing for the state of Montana. It's good public access land over here. We've talked around this Butte area. A few of us in the corporation in recent times hear the people that generally say -- I'm not familiar with the land, personally, but generally say this is good land they would like to have in the public domain.

This will create jobs in the Roundup area. This will

create jobs in the Billings area. There's an offshoot of jobs around the state from an investment this size. The taxation thing is unarguable that it's good for our area. It's good for the whole state of Montana.

The acquisition of these public lands, from this end of the state, I can't see how it can be argued either that it could be anything but positive. And I'm 100 percent in favor of this exchange.

Thank you.

MR. BINANDO: Is there anyone else wishing to testify? Are there any additional written statements to be submitted.

UNIDENTIFIED WOMAN: I have two.

MR. BINANDO: Place them next to the court reporter. Are there any other written statements? Okay, if there are none, this phase of the hearing is over.

For the record, I would like to remind you that the testimony received at this hearing will be available in the form of a transcript. And if you wish to purchase copies, please leave your name and address with the court reporter.

I'll also remind you that all testimony will be analyzed and a written record of that analysis will be prepared and will be available at the BLM offices in Butte, Billings, and Miles City, Montana. The analysis of this testimony will be used to determine what changes, if any, will be made in

the final EIS and recommendations. The final EIS is scheduled for completion in May 1990.

The hearing is now closed. However, the record will certainly remain open until January 5, 1950 -- 1990, going back in the future, here. I'll make that very clear: January 5, 1990. BLM will continue to receive written statements during this period. All such statements postmarked on or before January 5, 1990, will be included in the final decision.

We wish to thank you for your time and interest in these issues and for your very candid and informative comments. The time, for the record, is 8:31 p.m. At this time, ladies and gentlemen, the hearing is over.

. . . .

C E R T I F I C A T E

STATE OF MONTANA)
; ss.
County of Silver Bow)

I, Cara Enriquez, Freelance Shorthand Reporter-Notary Public in and for the County of Silver Bow, State of Montana, do hereby certify:

That the hearing was taken before me at the time and place herein named; that the hearing was reported by me in machine shorthand and later transcribed by typewriter, and that the foregoing forty-three (43) pages contain a true record of the hearing, all done to the best of my skill and ability.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 1st day of December, 1989.

Notary Public for the State of Montana residing at Butte, Montana. My commission expires June 2, 1991.

(NOTARIAL SEAL)

November 28, 1989
324 1st St West
Roundup, Montana 59072

BLM
P.O. Box 36800
Billings, Montana 59107

To Whom This May Concern:
EIS Bull Mountain Land Exchange/BLM

I attended your public meeting held in Roundup, Monday, November 27, 1989. And for the record I would like to make a few comments. I am a wife, mother, grandmother, taxpayer, homeowner and part-time secretary. My husband is a small business owner, and employs one to fifteen employees. I don't claim to have any knowledge on Longwall Mining verses Room and Pillar Mining, or how much money the government can make if they lease the land in question or swap it outright, or how we will be depriving our teachers of additional funds, or even if longwall will affect the groundwater aquifers.that much.

I KNOW ABOUT NOW. We have the opportunity to improve two counties, MUSSELSHELL and YELLOWSTONE. The future jobs that will be created, how many of these people that have all ready been employed were on the rolls of Welfare and Unemployment? Look around and see how many people have all ready benefited from the mine. It is common knowledge around town Meridian's policy is to buy LOCAL. Go up and down Main Street, ask the store owners for an opinion.

I guarantee you ninty-nine (99) out of one hundred (100) people are FOR the LAND-COAL EXCHANGE.

Attached please find signatures of people who are in favor of the LAND-COAL EXCHANGE. (206)

Sincerely yours,

Johanna Soennichsen

Johanna (JO) Soennichsen

Enc's

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 Robin W. Abbey
2 Cheryl Lynn Stuckmann
3 L.C. Alford
4 Carol A. Alford
5 Wanda Wickland
6 Joy Swanson
7 Becky Swanson
8 Florin J. Soennichsen Jr.
9 Greg D. Scott
10 Clyde B. McElroy
11 Earline L. Osel
12 Marvin Stock
13 Ralph Fawcett
14 Milton Gorsch
15 Beatrice Ray
16 Gary Gibbs
17 Ike Newman
18 Bill Flaus
19 Jean Smith (Bull Mountains)
20 Tommy Soennichsen
21 Anthony A. Massy
22 Frank S. Kutnow
23 Chas Streeb
24 Duane Fowler
25 John Ray Jr.

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 Jean Ross
2 Helen Lockhart
3 Eric Ben Graves
4 Dorothy Goffena
5 Ellen H. Goffena
6 David Lee Goffena
7 Vicki Feist
8 August Feist
9 Dale Feist
10 Brenda Kay Mills
11 Lynette A Bellows
12 Lorraine Ludwig
13 Ruth Eggen
14 Lorene Immunen
15 Nina Cebull
16 Stan Cebull
17 [illegible]
18 [illegible]
19 John D Cuffman - Yellowstone County.
20 Gary Thomas
21 Chep Kelly
22 Mike Kelly
23 John A [illegible]
24 Sally [illegible]
25 Patti Taylor

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 [illegible]
2 Gary D. Graves
3 Sheryl J. Graves
4 Alan C. Graves
5 Marjorie Graves
6 Carol S Ginger
7 [illegible]
8 Thelma Barnum
9 Bob Barnum
10 [illegible]
11 [illegible]
12 [illegible]
13 Maxine Watt
14 Ruby E Ray
15 [illegible]
16 Clara Mae Speck
17 Ronald D Anderson
18 Louise Hurst
19 Nancy McCleary
20 [illegible]
21 Evelyn R Bigelle
22 [illegible]
23 Stella Yannish
24 Steve Yannish
25 Muriel M. Immunen

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 [illegible] 1505 2nd St Roundup Mont.
2 Harriett D. Drake 924 3W Roundup, MT
3 [illegible] 234 Main - Roundup, MT
4 Domenic Lupinski 514 1st East Roundup MT.
5 [illegible] 526 3RD ST Roundup Mt.
6 [illegible] 409 - 6th st W Roundup Mt.
7 [illegible] 239 Main Roundup Mt.
8 Shirley A Eggen 1319 2nd St. East Roundup Mt
9 Marion McRae 124 - 13th Ave. W Roundup Mt.
10 Debra Thomas 602 1st West Roundup
11 Eleanor Witt Box 858 Roundup
12 Joyce M. Brewer 909 2nd St W. Roundup
13 [illegible] 24 - 10th Ave W Roundup
14 [illegible] 1103 2nd West Rdp
15 Connie Mattfeld 301 5th St. W., Roundup, MT
16 [illegible] 1301 Main St. Roundup MT
17 [illegible] 416 2nd St West
18 Wendy Baker 201 3rd St West
19 Daniel J Potter 931 2ND ST. WEST ROUNDUP, MT.
20 [illegible] 307 - 4th St W Roundup MT
21 Sharon I Anderson 1424 5th St. W Roundup
22 Carol L Hanes 239 Hawthorne Roundup
23 [illegible] 514 - 3rd St W Roundup
24 [illegible] 712 1st St W Roundup
25 Janet Van Dyke 418 7th St West Roundup

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 [illegible] 201 3rd St E. Roundup MT
2 [illegible] 911 1st Street East
3 Margaret A. Richard 701 - 1st St. East - Roundup MT
4 [illegible] 1202 2½ St W Roundup MT.
5 Margaret [illegible] 1005 2nd W Roundup
6 [illegible] 1105 2nd St. W Roundup
7 [illegible] 1024 - 1st St W Roundup
8 [illegible] Box 282 Roundup
9 [illegible] 519 2nd W. Roundup
10 [illegible] 20 Aspen Dr Roundup
11 James A. Ruder 401 3rd East. Roundup
12 [illegible] Box 947 Roundup
13 [illegible] Box 947 Roundup
14 [illegible] 13 Way West. Roundup, MT
15 [illegible] 211 2nd W Roundup, MT
16 [illegible] Box 183 Roundup, MT
17 [illegible] 602 3rd W. Roundup, MT
18 [illegible] 107 4th W. Roundup MT
19 [illegible] Box 862 Roundup, Mont.
20 [illegible] 1108 2nd W Roundup MT 59072
21 Charlotte Cutler 703 - 3rd St W. Roundup, MT.
22 Mildred Ferguson 935 Main Roundup Mt.
23 William J. Olson - 13 - SMITH - ROUNDUP
24 [illegible] 12 Half Street Box 84 Roundup, MT 59072.
25 [illegible] 413 - 4th St W Roundup, MT 59072

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 Sue J Holand 420 2nd Street West Roundup, Montana
2 Lee H Holand 412 3rd W " "
3 Walter Burke 1312 1st East
4 Robert Brown 1424 3rd W Roundup, Montana 59072
5 Lindy Arnold 1105 Main Rdp, Mt.
6 K.T. JONES TRI COUNTY Housing
7 Reggie Martin Box 924 KSR Roundup, Mt. 59072
8 John Dalbak 6th St W Melstone MT 59054
9 Bernard A Joseph 1204 Main Roundup
10 Helene Eisenstein Box 491 Roundup, Mt
11 Jan Monroe Box 343 Roundup, Mt
12 Virginia Smith 116 4th Ave W. Roundup, Mt 59072
13 Dorothy H Youngblood 224 3RD Ave. West Rdp, MT 59072
14 Helen S Rogers 404 3 E Roundup MT 59072
15 Lois A Joseph 301 3 W apt 3, Roundup Mt. 59072
16 Ralph Peterson 601 2 W Roundup Mt. 59072
17 Russell Robertson 2nd AVE E " "
18 Keith M. Coulter 725 5th Roundup
19 Catherine Holand 412 3rd St W Rapirt 59072
20 Eric Holand 1409 2nd St W. Rdp MT 59072
21 Pat Kelly Box 703 Roundup MT.
22 Judy Updike 918 4th W Roundup Mt
23 Regina V. Gray 924 - 3RD St W. Roundup, Mt 59072
24 Ralph E Falk 814 3rd St W. Roundup MT 59072
25 Dora C Robson 1003 2nd Ave Roundup Mt. 59072

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 Charles W. McDonald — Charles W. McDonald
2 Natalie A Hazlett — 28 - Diana Durain
3 Marlette Rind — 28 - Dick Cartright
4 Ray Rind — 28 - Jack Carlson
5 Glen E Miles — 29 - [illegible]
6 [illegible] — 30 - [illegible] (David J. Sommers)
7 [illegible] — 31 - Lorraine Bellew
8 Eva N Pearson — 32 - Buford J Tibbs
9 Mary Ellen Rasmussen — 33 Tarrant J Tibbs
10 Jack O Sutton — 34 - [illegible]
11 Susan Mikelson
12 Jean Chiva
13 Glenn M Stone
14 Dolly Anderson
15 Barry D Adolph
16 George Kirby
17 Nina M. Burrage
18 Glen Hedges
19 James E Murphy
20 Pat E Arrington
21 Verlette Ramsey
22 Merrill Armstrong
23 Jane E Mang
24 Dan L Ramsey
25 [illegible]

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 Pat Cogen Roundup
2 Sanford Haugdal Roundup
3 Rex Brown Roundup
4 [illegible] Roundup
5 Regner Haugdal - Rdp.
6 Lucile Ratkovich Rdp
7 Louie Ratkovich Rdp
8 Emma Fraser Rdup
9 Bruce Nelson Rdup
10 Jerry Fraser Roundup
11 Donna Cogen Musselshell
12 Jay Cogen Musselshell
13 Anna Breece Roundup
14 Chris Joyce Roundup
15 Mavis Lasswick Roundup
16 Chris Magnavich Roundup
17 [illegible] Roundup
18 Gary Halverson Roundup
19 Violet Halverson Roundup
20
21
22
23
24
25

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

TO WHOM IT MAY CONCERN:
I AM ALL IN FAVOR OF THE COAL-LAND SWAP BETWEEN MERIDIAN MINERALS AND BLM.

1 Virginia L. Hearson
2 Gerda Schwab
3 Cheryl Doggena
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

This is to be attached to Jo Soennichsen's letter for the Land-Coal Swap.

FORD

HOILAND MOTORS, Inc.

Telephone 323-1102 104 Main Street
ROUNDUP, MONTANA 59072

Mr. Bill Matthews
B.L.M. Project Manager
Bull Mountains Exchange

December 04, 1989

I support alternative "A" coal for land exchange. We will be able to hunt, fish and picnic on these exchange lands, for many years to come. If the exchange doesn't happen we will have made a poor business decision. Lets face it a net gain of $408,800.00 for the BLM is not peanuts. Please pass Alternative "A".

Sincerely,

Bruce J. Hoiland

Bruce J. Hoiland

TO: DEPT. OF STATE LANDS
HELENA, MT.

FR: ORVILLE MOORE
1021 3RD. ST. E.
ROUNDUP, MT. 59072

RE: THE MEREDIAN MINERALS PROPOSAL TO MINE COAL IN THE BULL MOUNTAINS.

THIS LETTER IS TO LEND MY SUPPORT TO THE MINING OF COAL BY MEREDIAN MINERALS IN THE BULL MOUNTAINS. I AM CONVINCED THAT THIS COAL CAN BE MINED IN SUCH A WAY THAT THERE WILL BE A VERY MINIMAL ADVERSE ENVIRONEMTAL IMPACT AND THE ECONOMIC BENEFITS TO THE STATE, COUNTY, AND LOCAL AREA WILL BE A MUCH NEEDED SHOT IN THE ARM.

MEREDIAN MINERALS HAVE SHOWN BY THEIR ACTIONS SO FAR THAT THEY ARE WILLING TO CLOSELY MONITER THE AQUIFIER, THAT THEY ARE CONCERNED ABOUT THE IMPACT TO THE SURFACE IN THE VICINITY OF THE MINE, AND THAT THEY ARE CONCERNED ABOUT THE WILDLIFE IN THE AREA. THEY HAVE PROVEN BY THEIR ACTIONS SO FAR THAT THEY ARE WILLING TO CONDUCT THEIR MINING ACTIVITIES IN A VERY RESPONSIBLE MANNER.

FOR THE ABOVE MENTIONED REASONS I AM RECOMMENDING TO THE PEOPLE WHO MUST MAKE A DETERMINATION ON THEIR APPLICATION THAT THEY APPROVE THE FULL SCALE MINE WITH THE PROPER SAFEGUARDS.

VERY SINCERELY,

Orville Moore

ORVILLE MOORE

The Office of Public Instruction

Nancy Keenan
State Superintendent

State Capitol
Helena, Montana 59620
(406) 444-3654

JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

January 4, 1990

Bill Matthews, Project Manager
Bureau of Land Management
Miles City Office
P.O. Box 940
Miles City, Montana

Dear Mr. Matthews:

Thank you for the opportunity to comment on the draft Environmental Impact Statement(EIS) on the proposed Bull Mountains Exchange.

As Montana's chief state school officer, I am extremely concerned about any proposal that would reduce revenue to Montana's schools by $6.7 million to $38.3 million. The EIS repeatedly estimates that this amount of federal royalty payments to Montana's school equalization account will be foregone under the preferred alternative A, in which federal coal rights are exchanged for private lands held by Meridian Mineral Company.

73 What the draft EIS does not state is why alternative A(the coal exchange) is preferred over alternative D(leasing). Traditionally, the federal government has retained mineral rights on federal land(which are held in trust for the citizens of this country) and charged royalties for mineral production. These federal mineral royalties are an important source of revenue to the federal government and to the states. In 1988, total revenue from mineral production on federal land totalled $785 million, of which states received $398 million. Alternative A proposes a sharp break from this traditional practice--instead of leasing coal on federal land in the Bull Mountains, the Bureau of Land Management(BLM) proposes to trade Bull Mountain coal mineral rights for surface rights to recreational land elsewhere in Montana. This alternative means that when coal production occurs on the Bull Mountain land, no federal royalties would be paid, since the coal would be privately owned.

The EIS estimates that the federal government and the state of Montana would lose the following amount of royalties under this alternative:

1) $8 million to $45 million(depending on the size of the coal mine) over the 40 year life of the mine if coal production begins in late 1990; or

2)$13 million to $77 million(depending on the size of the coal mine) over the 40 year life of the mine if coal production begins 20 to 40 years in the future.(p.ii)

Montana schools would lose half this revenue, since the 50% state share of federal royalties is allocated under Montana law to the school equalization account.

The EIS makes clear that the development of the mine and its potential beneficial impacts on the area and the state do not depend on the coal exchange. It states that social and economic impacts of alternative D(leasing) are "virtually identical" to the preferred alternative A(coal exchange). **The same number of jobs would be created, the same level of coal production could occur, and the same amount of tax revenue would be collected under both alternatives**(pp. 131-3). The key difference between preferred alternative A(coal exchange) and alternative D(leasing) is that the federal government and the state of Montana will lose between $8 million and $77 million in mineral royalties under the preferred alternative in exchange for private land valued at $1,138,800(p.4).

74 Under federal law, any exchange must provide equal value for equal value. In the preferred alternative, the equal value calculation appears to be based on two major assumptions:

1)<u>the value of the federal coal is 1.3 cents per ton(p.13), despite the fact that the EIS assumes it will be sold at the minemouth for $20 to $30 per ton(p.ii).</u> In 1988, the average minemouth value of federal coal mined in Montana was $14.72/ton.

75 The average federal royalty paid on this production was $1.94/ton. The EIS notes that underground coal mined in Utah in 1987 sold for $27.50/ton and in Colorado $28.16/ton(p 182). Given these minemouth prices, it is difficult to understand how BLM's Northwest Regional Evaluation Team determined the in-place value of the Bull Mountain

76 coal was 1.3 cents/ton--or less than 1% of the royalty paid on all other federal coal production in Montana.

2)<u>the multimillion dollar loss in federal royalties is not considered.</u> The EIS considers the alleged in-place value of the coal ($730,000), compared to the value of the private land($1,138,800). The increased recreational value to the public,

77 which the EIS estimates at $215,609 per year(pp.122-8), falls far short of the royalty revenue foregone.

Given the numbers presented in the EIS, I question whether the preferred alternative A(coal exchange)is in the public interest and in the interest of Montana's school children.

78 It is ironic that under preferred alternative A the federal government would **give up** coal mineral rights in exchange for private land **without mineral rights.** Meridian Minerals Company clearly understands the longterm importance of retaining mineral rights--in the proposed exchange, it would retain the oil and gas mineral rights in the lands it trades to BLM(p. 4).

While I support a strong and healthy coal industry in the state and welcome economic activity, it is important that the proposed development does not shortchange the citizens of this country and state or the school children of Montana. For that reason, I request that the final EIS specifically address the following questions:

79 1)why is alternative A preferred over alternative D, in light of the royalty revenue foregone?
2)were the foregone mineral royalties included in the calculation of equal value exchange?
3)what methodology and/or comparable sales were considered in valuing this coal at 1.3 cents/ton?

Thank you for your consideration of these important issues.

Sincerely,

Nancy Keenan

---

montana wildlife federation

EDUCATION – CONSERVATION

P.O. Box 6537
Bozeman, MT 59715
(406) 587-1713

STATE AFFILIATE OF THE
NATIONAL WILDLIFE FEDERATION

EARTH DAY – EVERY DAY

TO: BILL MATTHEWS, EIS PROJECT MANAGER
BUREAU OF LAND MANAGEMENT
P.O. BOX 940
MILES CITY, MT
59301

RE: BULL MOUNTAIN EXCHANGE

DEAR BILL:

DURING THE DECEMBER 9, 1989 BOARD MEETING OF THE MONTANA WILDLIFE FEDERATION, WE PASSED A RESOLUTION SUPPORTING THE PROPOSED "BULL MOUNTAIN EXCHANGE".

OUR RESOLUTION IS A MODIFIED VERSION OF WHAT IS REFERRED TO, IN THE DRAFT "EIS", AS ALTERNATIVE A.

80 1. WE SUPPORT THE EXCHANGE OF COAL FOR CRITICAL HABITAT.
81 2. WE FEEL THAT ANY LAND RECEIVED SHOULD HAVE PERMANENT CONSERVATION EASEMENTS.
82 3. WE FEEL IT IS NECESSARY ON ANY MINERAL TRANSACTION TO SECURE ROYALTIES.

IF YOU HAVE ANY QUESTIONS ABOUT OUR POSITION, PLEASE CONTACT ME.

SINCERELY,

AL HOMME
ASSOCIATE DIRECTOR, REGION 7
MONTANA WILDLIFE FEDERATION

Mr. Bill Matthews, EIS Project Mgr.
Bureau of Land Management
PO Box 940
Miles City, MT 59301

Dear Mr. Matthews:

Having lived my entire 65 years in the Bull Mountains in the vicinity of this land exchange; as a rancher, small coal mine owner and also worked as an employee coal miner, I would like to make the following comments.

I believe the EIS assessment that Mammoth Coal bed is the only mineable coal resource in the Bull Mountains is a gross error. The Daugherty, Buckey, Wildhorse, Roundup, McCleary and Carpenter coal beds, to name a few, that have been mined and produced the most marketable coal in this region in the past. The Milwaukee Mine a Klein, with an artery south into the Bull Mountains was the largest producer of coal in the area.

The quality analyses of the coal in these underlying beds is equal to and in most instances exceeds the quality of the Mammoth-Rehder. Also the quantity would be greater as they cover a larger square mile area.

83 The fellows who were here with YCC who operate mining operations in Kentucky and West Virginia indicated they are mining seams of coal there of 28 inches and less. With coal fission and new technology these underlying coal beds will be more valuable than the Mammoth bed. These coal beds are easily accesible just to the south of the proposed mining area of Meridian Minerals.

If the BLM is to exchange it should be only for the Mammoth Coal seam that they propose to mine. If they are to get the rest of coal in these lands free it may be the biggest giveaway of the centurey.

Sincerely,

Nick Janich

Nick Janich
484 Old Divide Road
Roundup, MT 59072

CLAY BEDFORD

December 29th, 1989

323 Fattig Creek
Roundup, MT 59072

Mr. William Matthews,
EIS Project Manager
BLM District Office
Box 940
Miles City, MT 59301

RE: Longwall mine proposed for Bull Mountains by BLM

Dear Mr. Matthews:

My family ranches on Fattig Creek, which is a drainage below the proposed Meridian coal mine. We have been here for thirty years, and as Fattig Creek waters approximately ten miles of our ranch, the coal mine has become something we can't ignore.

84 In my mind, the main issue is greed. With the amount of coal available, the current depressed prices, and the number of areas, such as Decker, that offer more easily mined coal, the idea of the need for another coal mine, now or in the future, is ridiculous. Meridian is only doing this to increase the theoretical value of its mineral assets, and then sell them. Unfortunately, greed is not a word that is considered in the laws of our country. Meridian owns the minerals, and they can basically do whatever they want, independent of what damage it does to everyone else.

85 Well, not entirely. There have been measures taken to protect the environment, and the EIS is one of these. As I understand it, the EIS for the Meridian project was based on analysis done by a Meridian-hired consultant. This would seem to remove any possibility for an impartial opinion and would emphasize the possibilities for a mine rather than possibilities for environmental damage.

This is wrong. The BLM should have an independent and impartial study done of the area hydrology. As it stands, the BLM appears to be only a partner with Meridian and is not concerned with safeguarding the public. If Fattig Creek stops flowing, or the water becomes undrinkable, it will be too late. No amount of money or insincere apologies will change the fact that the water supply has been destroyed... for eternity. And by a coal mine that was never needed.

Please reconsider the methods used and the conclusions made in your EIS. It would be heartening to see the BLM ask some hard questions regarding this project.

Yours sincerely,

Clay Bedford

Clay Bedford

January 4, 1990

Mr. Bill Matthews
BLM District Office
P.O. Box 940
Miles City, Mt.

Dear Mr. Matthews;

In no way am I opposed to developing the natural resources of our region. However, when this development has a great possibility of affecting the economic well being of adjoining landowners, I believe their concerns must be addressed.

86 An impartial analysis should be made to determine the changes that may occur in the water quality and quantity. Also, wells in the affected area should be monitored through the life of the mine and a bond should be posted by the mine operators to insure landowners economic interests will be protected.

Sincerely,
Don and Peggy Glasscock
Box 537
Roundup, Mt.

1012 Terry Avenue
Billings, MT 59102
January 2, 1990

EIS Project Manager Bill Matthews
BLM District Office
P.O. Box 940
Miles City, MT 59301

JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dear Mr. Matthews:

I am writing in regard to the proposed Bull Mountain coal exchange. For various reasons I strongly oppose this exchange.

87 First and foremost why give a former Burlington Northern subsidiary more coal when they already own half of the coal in the state?

88 If BN Resources chooses to mine this coal why not lease it to them rather than give it to them outright? With a lease arrangement

89 the public (to whom these lands belong) has more input over the manner in which the mining would progress and some of the surface resources could be protected.

90 Also, if the exchange is granted and if BN Resources in fact mine the coal the hydrologic impacts will be considerably more than the EIS indicates.

I believe it would set a dangerous

- 2 -

91 precedent should this exchange be completed. The worth of federal coal would be devalued tremendously when considering the amount of dollars earned off royalties. The state would stand to lose millions of dollars in federal coal royalties which primarily go toward the state of Montana's school system. As a parent of three young children this fact concerns me.

Thank you for your consideration in this matter.

Sincerely,

Patricia T Dorth

Bench Ranch
Jack & Susan Heyneman
Fishtail, Montana 59028
(406) 328-6923

January 4, 1990

re: Decker Mt.

Wm. Matthews
Box 940
Miles City Montana 59301

JAN 08 1990

I urge most strongly that your department take a critical review of the EIS done on the Decker Mt project.

92 Where stated are advisory of adverse effects to both grazing lands and loss of flow then it behoves to accept the conclusions reached by the company hired consultant that impacts will be minimal.

Thank you for your consideration.

Sincerely,

Jack Heyneman

Peggy Moore
532 Pemberton Lane
Billings, Montana
59105

Bill Matthews
EIS Project Manager
BLM District Office
P.O. Box 940
Miles City, Montana 59301

January 3, 1990

Dear Mr. Matthews,

This letter concerns the recent statement by the BLM regarding the environmental consequences of coal mining in the Bull Mountains between Billings and Roundup. According to the EIS,
93 "Groundwater impacts are considered to be minimal" from such mining. Furthermore, it seems that a company-hired consultant was employed. I question
94 the statement that impact on groundwater would be minimal, particularly when contradictory statements have been made by hydrologists from both the Montana Department of State Lands and the Bureau of Mines.

Here on the Northern Plains, our water is finite, precious and irreplacable. So are the native grasses and rangelands of this area, not
95 to be found elsewhere. I strongly believe that the BLM should conduct a water impact statement and analysis which is independant of the company.

It seems that the environmentally concerned individual is often perceived (and accused) of being "anti-business". This could not be further from the truth. After all, we all must make a living. Furthermore, we are all consumers, who use the products, in one form or another, which resource-extraction industries produce.

However, large companies have often been quite
96 careless in their practices, leaving damaged lands, and economies, in the long run. Such has been Montana's economic history for a long time. Furthermore, I am increasingly concerned about the massive exporting of our natural resources, including Northwest raw lumber, to Asian countries, as Meridian Minerals Co. plans to do, in selling 20,000 tons to South Korea. Our lands are being consumed and it is quite plausible that we'll be buying back our resources at inflated prices in the future.

I hope that you will consider this and other public comments, and push for a comprehensive water impact analysis and EIS, done by the BLM separate from Meridian Minerals Co. Thank you for your time.

Sincerely,

Peggy Moore

January 4, 1990
RR 1, P.O. Box 491
Walthill, Nebraska 68067

Bill Matthews
Project Manager
Bureau of Land Management District Office
P.O. Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

I am writing to comment on the Bureau of Land Management's Environmental Impact Statement (EIS) on the proposed coal swap and longwall mine in the Bull Mountains.

I feel there are several major areas in which the EIS is inadequate:

1. The EIS does not adequately address the problems that longwall mining would bring to the area aquifers. Other reputable hydrologists (Montana Department of State Lands and U.S. Bureau of Mines) have predicted serious harmful consequences to groundwater in the area of the mine and downgradient from the mine.

97 2. The EIS fails to make an accurate assessment of the possible direct impacts of aquifer damage on area farms and ranches. Ranching and farming in the Bull Mountains depends heavily on adequate grondwater, whether from wells or springs. Reduced quantity or quality of the groundwater will mean drastic reductions in livestock carrying capacity, and may mean that water is also unfit for human use.

98 3. The EIS fails to describe the full range of obligations which the federal ownership of subsurface has in the area, and fails to recommend alternative actions which the BLM could take to safeguard the water resource in the event the BLM approves the swap. Under the present ownership structure of surface and subsurface property in the Bull Mountains, the BLM has the responsibility and authority to provide protection of a public good, the area's water resource. By trading away its subsurface ownership without making strong safeguards for the protection of the water resource, and therefore of local agricultural businesses, the BLM is abdicating its responsibility when it was entrusted with a public resource.

99 4. The BLM has failed to conduct its own detailed hydrologic study of the area. It is clear, with the evidence that exists regarding serious harmful impacts arising from longwall mining on the water resource, that the BLM needs to conduct its own complete investigation and analysis of the impacts of the longwall mine on the future hydrology of the area.

(continued)

100 5. The EIS does not adequately address the revenue issues of coal royalties lost to the State of Montana if the swap is approved. If the coal were mined under a regular federal coal lease, royalties of $.80 per ton would be returned to the state. However, under terms of the swap, the BLM would only receive a royalty of approximately $.015 per ton, meaning a

101 tremendous loss of public revenue. This loss of revenue is unnecessary and sets a poor precedent for other possible attempts to reduce royalty income in the future in other leases. In addition, the valuation at $.015 per ton is a ridiculously low and arbitrary figure.

102 6. The EIS does not adequately address the damage to the area's agricultural economy over the long run if the swap occurs. In fact, the BLM is trading away far more value than the artificially low value of $.015 per ton of the coal: the swap also means that an invaluable water resource may be lost for generations.

103 7. The BLM EIS does not adequately address the fact that if the swap is approved, the BLM voluntarily relinquishes public control of a huge coal resource (and an accompanying water resource) to a powerful private company. In fact, the swap is an outright giveaway of the resource at far less than

104 its value. Rarely is the public good protected by private interest. The BLM will have done an inadequate assessment of the resources with which it is entrusted if it approves the swap.

Sincerely,

Jennifer A. Tully

Billings, MT
Jan 5, 1990

Mr. Bill Matthews, Project Mgr.
Bureau of Land Management
P. O. Box 940
Miles City, MT 59301

Dear Sir:

Following are my comments on the October 1989 Bull Mountains Exchange Draft EIS.

105 I understand that the Department of State Lands and the Bureau of Mines have indicated that underground mining of coal in this area could have serious adverse effects on groundwater, domestic wells, springs and surface waters. These impacts would not become apparent for many years and would require many more years to correct -- if they can be corrected at all.

106 The BN sections in priority 6 land exchange do not contain "high quality" wildlife habitat. They are located in mixed ownership BLM/private lands, public access is difficult or impossible, and they are mostly overgrazed by livestock.

The BLM and BN should do something positive for wildlife by exchanging their lands for the private land located adjacent to the Custer National Forest boundary in the Line Creek Plateau area, and for the Waples property located in Silver Run near Red Lodge. Both of these areas are important winter ranges for elk and should be brought into public ownership before they are destroyed as elk winter

107 range by various developments.

In addition, the exchange should include public road access routes through the mixed ownership property to the forest boundary in the Ruby Creek, Gold Creek and Grove Creek areas.

Specific information on the lands needed should be obtained from Montana Department of Fish, Wildlife and Parks and Custer National Forest personnel.

108 The federal government gave the railroads millions of acres of land in the 1850's to help settle the west. The time is long overdue for the federal government to reclaim all of these lands possible, and this should be accomplished by any process available.

109 The developer indicates that the coal on the whole project area may be sold to the Pacific Rim countries. Coal is a nonrenewable resource -- once mined: gone forever! American coal should be used in America. We will need it ourselves in some future year. Selling it to a foreign entity for quick profit and to create a few jobs is false economy.

For the above reasons, I recommend that Alternative E (no action) be adopted. However, if the project is approved notwithstanding my above recommendation, I recommend that:

110 1. The developer and/or the BLM hire an independent expert to monitor the long-term project effects on groundwater, domestic wells, springs, and surface waters that may develop in future years, and compensate landowners for any adverse impacts.

Mr. Bill Matthews, Project Mgr.
Bureau of Land Management

Jan. 5, 1990

2. Priority 6 land exchange be revised to obtain private lands adjacent to the Custer National Forest and the Waples property near Red Lodge needed for elk winter range.

3. Priority 6 land exchange be further revised to include public access roads to the Custer National Forest Boundary in the Ruby Creek, Gold Creek and Grove Creek areas.

4. Procedures be initiated to return all possible "railroad" lands to the federal government.

5. None of the coal or its byproducts be sold to any foreign entity.

The opportunity to comment is appreciated.

Sincerely yours,

Paul F. Berg

Paul F. Berg
3708 Harry Cooper Place
Billings, MT 59106
Phone: (406) 656-2015

The Eagle

Box 6, Stockett, Montana 59480 (406) 736-5400

Jan. 4, 1990

Bill Matthews, EIS Project Manager
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews -

As the public agency responsible for so many of our public lands, the BLM must know the value of water. The potential disruption of a great part of the water systems and aquifers of the Bull Hills area is an unacceptable price to pay for the longwall coal mining being considered.

111 That such a proposal would be accepted by the BLM,without an independent analysis of the water impacts, is outrageous.

An independent analysis, and a public coal lease program, are both necessary to ensure the long-term benefits of this land, rather than the short-term financial bonanza which might come from a longwall operation. If the long-term future is without water, it's not a future at all.

If the BLM does not seek an independent analysis, I'm sure there will be a public outcry and I would certainly use the 1300-circulation Eagle, a weekly newspaper, to spread the information as far as possible. Ranchers and others who see a far vision of our state know that protection of our water is a crucial part of our ~~xxxxxx~~ very existence in the long run. Extraction of our coal is not.

Thank you for your consideration.

Sincerely yours,
Lauran Dundee
Editor/Publisher

BAR DIAMOND RANCH
2938 ROCKRIM LANE
BILLINGS, MONTANA 59102

VINCENT W. CARPENTER (MANAGER)
2938 ROCKRIM LANE
BILLINGS, MONTANA 59102
PHONE 252-6515

JOHN M. DIETRICH
3047 PRYOR LANE
BILLINGS, MONTANA 59102
PHONES: 252-3447
252-3441

RANCH
"CAMP ONE"
252-5533
"CAMP TWO"
256-0837

Dec 30, 1989

112 Dear Sirs: If the report prepared by the Bull Mountain Landowners Association is correct, the EIS on the proposed Dunn Mountain Coal mine has a groundwater impact conclusion based on analysis from a company-hired consultant.

113 This is hiring the fox to guard the hen-house. It's perfectly natural for profit-driven big business to slant its communications to government and the public. The job of government is to balance this bias and, in this case, conduct its own research. Otherwise, if the aquifers go bad, the company, having exhausted the coal, will eventually pull out, leaving a wasteland of deserted houses and people. On our ranch we have some springs with highly mineralized water. The cattle won't touch it, it is so toxic.

Vincent W. Carpenter, President.

RECEIVED
JAN 05 1991
BUREAU OF LAND MANAGEMENT
MILES CITY

David J. Paugh
207 William St.
Dyngate, MT 59[illegible]
ph.(406)375-43[illegible]
January [illegible]

Mr. Bill Mathews
EIS Project Manager
Bureau of Land Management District Office
P.O. Box 940
Miles City, MT 59301

RE: Bull Mountain hydrology.

Dear Mr. Mathews:

114 It has come to my attention, that there is considerable controversy over the implications of "long-wall mining" in the Bull Mountains area. I am sure your are aware of the prudence of seeking opinion of several experts from a variety of perspective, especially in situations of such long term consequence.

I encourage you to involve as much diversity of expertise and opinion as you can in formulating your agency's recommendations.

Sincerely,

David J. Paugh

Bill Matthews
BLM District Office
P.O. Box 940
Miles City,MT. 59301

RECEIVED
JAN 02 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

January 2, 1990

Dear Mr. Matthews,

As a landowner-rancher north of the Musselshell River, the proposed Meridian Mine land for minerals swap and accompanying mine development does not affect my land directly but the potential impacts on neighbors, community, local water resources and land compels me to respond. Roundup needs economic opportunities but these new opportunities should not create liabilities for existing enterprises. It has been brought to my attention that a State Land's suggests that serious groundwater impacts could occur from large scale longwall mining under Dunn Mountain in the

115 Bull Mountains. The recent EIS compiled by BLM appears to disregard this potential impact.

116 I implore you that no trade with Meridian Minerals proceed until an adequate understanding of ground water impact is developed. At the very least BLM should retain leasing control over these minerals to insure necessary public review if development proceeds. I would also encourage BLM to conduct an independent analysis of ground water impacts to insure a level of trust with the public and affected parties. Please don't relinquish your responsibility in this regard. Thank you for the opportunity to respond.

Respectfully,,

Bill Milton

Bill Milton
M/F Ranch
823 Hwy 87 North
Roundup, Montana 59072

BAR DIAMOND RANCH
2938 ROCKRIM LANE
BILLINGS, MONTANA 59102

OWNERS
VINCENT W. CARPENTER (MANAGER)
2938 ROCKRIM LANE
BILLINGS MONTANA 59102
PHONE 252-4516

JOHN M DIETRICH
2047 PRYOR LANE
BILLINGS, MONTANA 59102
PHONES 252-3667
252-3441

RANCH
"CAMP ONE"
252-5533

"CAMP TWO"
256-0697

Dec. 27, 1989

Bill Mathews
BLM
Miles City, Mont.

Dear Mr. Mathews,

I am writing to you to ask you to carefully think about long term effects of the proposed coal mining in the Bull Mountains. Our ranch would not be directly affected by this, but our area north of Billings historically speaking, has been plagued by poor water or no water. We just finished (I hope!) six years of drought which hurt our water situation even more. What this adds up to is that I can really understand the concerns of people who live and work in the Bull Mountains and below when they express their fears of loosing their water.

117 I believe there has to be an independent review of the proposed mining technique and what it has done to water in other parts of the country.

Sincerely,
Larry Carpenter
Larry Carpenter

James Phelps
Public Lands Chair
Montana Audubon Council
2110 Bradbrook Court
Billings, MT 59102

January 4, 1990

Bill Matthews
EIS Project Manager
Bull Mountains Exchange
Bureau of Land Management
P. O. Box 940
Miles City, MT 59301

Dear Sir:

Please consider this comment upon the "Bull Mountains Exchange" draft environmental impact statement (draft EIS) of your agency.

The Montana Audubon Council is the coordinating entity for the nine National Audubon Society chapters located within the State of Montana. As a broad-based conservation organization we believe all facets of developing our resources must be carefully evaluated.

118 One claim for development is the jobs that will come about. However, there is a good chance - if we read the EIS correctly - that the "long-wall" method of coal mining will be used. Long-wall is pretty much automated and the labor force needed will be small in relation to the amount of coal mined. We have learned that the

119 State Department of Public Lands, in an unpublished memorandum or statement, comes to a different conclusion than that of the draft EIS regarding impacts on groundwater will be minimal if the long-wall mining method is used.

It is disturbing to become aware of these differences of opinion. In matters of this kind, where possible destruction of water tables are likely, the permitting agency should proceed with great caution. We believe the BLM should conduct a water impact analysis independent of others made and should proceed on that basis.

120 We also fail to understand the pricing the BLM has placed upon this coal. It appears the agency wants to make the trade regardless. The jobs that will come about are not sufficient in number to overcome the losses the ranching community will take.

Very truly yours,
James Phelps
Public Lands Chair

Yellowstone Coal Co. Inc.
Billings, Montana

December 30, 1989

Mr. Bill Mathews
Project Manager-Bull Mountain Exchange
Bureau of Land Management
P. O. Box
Miles City, Montana

RE: Comment on Draft E.I.S.

Dear Mr. Mathews,

121 The following comment on the Draft E.I.S. of the proposed Bull Mountain Land Exchange is provided to you on behalf of Yellowstone Coal Company, a participant in this project which will be greatly affected by the impending decision made by your department.

Upon our review of the compilation and analysis of the environmental, wildlife, historical and socio-economical data contained in the "Draft E.I.S.", we are pleased with the findings of the authors, and concur with the accuracy and opinions of same.

Although we recommend that an exchange be made, the "mirror image" alternative is the only method by which equivalent logical mining units (L.M.U's.) can be assembled for the two separate mine operations of Yellowstone and Meridian. In this manner, the south block exchanged to Meridian ownership and the leasehold to be mined by Yellowstone will derive a payable royalty and the north block to be mined by Meridian will derive a royalty payable to BLM.

122 Both mine operations will be paying royalty on coal mined at an equal rate.

The surface lands offered by Meridian can still be obtained by the BLM as payment in lieu of lease sale proceeds, or utilized as an advance royalty payment.

The "mirror image" exchange can provide an "equal opportunity" for development while avoiding the creation of a distinct competitive advantage generated by the outright conveyance of coal ownership to one participant. The "mirror image" exchange will also provide for federal royalties, and subsequent revenue sharing by the local communities.

122 This preferred federal alternative creates and condones a competitive, non-discriminatory atmosphere for both large and small business, and eliminates any possible specter of anti-trust or monopoly.

Sincerely,
Terry A. Giese, President
Yellowstone Coal Co., Inc.

ROBERT PAASCH CATTLE CO.
2611 ARVIN ROAD
Billings, MONTANA 59102
(406) 656-5773

January 4, 1990

Mr. Bill Matthews
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Sir:

Regarding the proposed Bull Mountain Longwall Coal Mine, I is a rancher who has run cattle in the Bull Mountains for several years, definately am concerned as to the protection of the amount and quality of springs and well water in this area. The amount of water in this area is never over-abundant, and in a year like 1988, many springs dried up and were useless.

I ranched in an area at one time where bottoms of wells were on solid coal, and a fracturing of this base will definately cause water to be lost or diffused at a much lower level, and could easily tend to reduce the quality of the water we now have. Our whole system of watering, fencing, and grazing could easily be disrupted. Anyone who has made a living ranching and running livestock, knows these changes can be very costly as well.

123 I hope all facets will be explored before any decision will be made.

Very truly yours,
Robert Paasch
Robert Paasch

cc: Northern Plains Resource Council

JAN 04 1990

Sally Mueller
315 Skyline
Missoula, MT 59803
January 4, 1990

Bill Matthews, EIS Project Manager
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews,

124 I am concerned that the conclusion of the BLM EIS on a longwall coal mine under Dunn Mountain ignores impacts that development would have on water quality in the area. I urge the BLM to conduct an independent water impact analysis rather than depend on the analysis done by a company consultant.

125 In addition, every effort possible should be made to minimize the impact of the mining on the area. I believe that a public coal lease would offer more protection than a private trade.

Sincerely,
Sally Mueller
Sally Mueller

Jan. 5, 1990

Bill Matthews
EIS Project Manager
BLM District Office
P.O. Box 940
Miles City, Mt 59301

JAN 04 1990

Dear Mr. Matthews:

As a homeowner in the Bull Mountains I am especially concerned about the impacts of a large scale mining operation as proposed in the Bull Mountains Exchange - Draft EIS, Oct. 1989.

126 I strongly question BLM's conclusion (pg. 106) that "groundwater impacts are considered to be minimal" from a large scale longwall coal mine under Dunn Mountain. This conclusion ignores potential major impacts predicted by hydrologists from both the Montana Department of State Lands and Bureau of Mines.

I urge you not to grant the preferred exchange at this time and to do a complete hydrologic study of the Bull Mountain Coal seam before even considering any large scale mining operation.

Sincerely,
Elizabeth Woodson
P.O. Box 424
Roundup, MT 59072

1/3/90

Bill Matthews
BLM District Office
PO Box 940
Miles City Mt 59301

JAN 04 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dear Mr. Matthews:

127 I write concerning the EIS on the longwall mine in the Bull Mountains. The fantasy that there will be no groundwater impacts from a proposed mine is preposterous. The BLM cannot defend its reliance on a report with little or no technical evidence for support.

128 Groundwater impacts alone are reason enough to question this proposal. However, the clincher is the "have brained-ness" that will cost Montana schools millions of dollars in lost royalty revenues. Trading nationally owned natural resources in order to put together a hazardous project is nonsensical. Economics; costs that should be accounted for and internalized, weigh in heavily against this proposal.

Steve Doherty
1531 3rd Ave S.W. Great Falls, Mt. 59404

Bob & Joyce Egeler
3286 Hwy 87 South
Roundup, MT 59072

1/3/90

Dear Mr. Matthews,

129 The Meridian Minerals proposal of trading recreational land for coal in the Bull Mountains causes us to ask you if you have ever seen the ruins coal mining has left behind in Eastern states? Have you talked to families there whose water became unfit for consumption or depleted? Have you seen the homes, roads and land ruined by subsidence? Have you seen the once beautiful land turned barren and local people turn bitter when the companies promises were found to be untruths?

We urge you to say no to the swap because we have seen all of the above and we don't want to see this in the Bull Mountains.

Thank you for considering our thoughts on the matter.

Respectfully yours,

Mr.+Mrs. Bob Egeler
Mr.&Mrs. Bob Egeler

Bill Matthews,
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews:

My husband and I have a few questions regarding your EIS conclusion stating that "groundwater impacts are considered to be minimal" from longwall mining under Dunn Mountain.

130 Why wasn't an analysis done by someone other than a company hired man. Why aren't any facts or "predictions" from Montana Dept. of State Lands and Bureau of Mines considered as mentioned in your report. Surely the Bureau of Mines has a great deal of knowledge in this area.

131 Also, the BLM, have the power to protect the water resources. Who is going to be responsible for the wells and creeks that dry up. Who is going to be responsible for the degradation of the water in the future years if the water should not be fit for human consumption?

132 If you trade 54.5 millions of public coal for recreational tracts elsewhere, where or where is the $76.6 million in lost royalty revenue going to come from.

133 How do you feel this is going to benefit Roundup or Musselshell County's revenue - long term?

Thank you for your consideration.

Jo Ann and Carl Wones
37 Ambush Rd
Roundup, MT 59072

---

3 Jan 1990

Dear Sir:

134 Please do not trade the Bull Mtn Coal for other land.

If you have no compassion for the damage to the water of the Dunn Mtn residents please have some for my pocket book.

I am a retired navy enlisted man living in Musselshell county the loss of coal tax dollars to our school system has to partially comeout of my, now retirement check.

"BH", over the years, has made too much profit from the land given to it in the past.

Sincerely

Virgil Jones

JAN 04 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Vergil & Mary Jones
19 Placer Drive
Roundup, MT 59072
Phone 323-1535

Bob + Vicki GRAY
Box 345 Harshman Rd
Bull Mountains
Roundup, MT 59072

Bill Matthews
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Sir,

135 We live in the Bull Mountains and we are concerned about protecting our water resources and the beauty of these Mountains we live in.

Water is very hard to obtain in this area to begin with and now the possibility of losing it. It took three water well drillers "more than $10,000, four dry holes, one being as deep as 800ft, before we hit water. So our water is very precious to us, and we live northwest of the mine.

We go on record as opposing the mine in the Dunn Mountain. Living in the Bull Mountains we don't want to sacrifice our lands for the economy of the cities of Roundup and Billings

Sincerely
Bob + Vicki Gray

Pete R. Tully
75 Ranch Company
East Parriott Cr Rd
Roundup, Montana 59072

December 29, 1989

Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

Attn: Bull Mountains Project Manager

Re: Comments on Draft EIS on the Bull Mountain Exchange

I believe the preferred alternative taken by the BLM on the Draft EIS of the Bull Mountains Exchange should be either Alternative D-Leasing, or Alternative E-No action for the following reasons:

136 1. The BLM's valuation of the in-place Federal coal reserves included in the exchange application of 54.5 million tons having a fair market in-place value of only $730,000 is unclear. This is obviously merely an appraisal and not a market driven price on the coal. In my opinion, market affirmation is needed to place a fair and more appropriate value on the coal to be exchanged. The BLM should offer to lease this coal to the highest bidder with a minimum bid of $730,000 and use the market to affirm the valuation.

137 2. It is not clear to me how the BLM used the data in the appendix to determine their preferred alternative. I believe the BLM should have a legal obligation to show how they arrived at that decision. Also, I believe the BLM should be required to show a positive economic justification for their preferred alternative proving that they are indeed managing a public resource for the greatest public good.

138 3. I strongly believe the hydrology analysis and the subsidence ahalysis, which go hand in hand, are inadequate to fully protect the environment from highly probable adverse impacts as a result of mining. Since this is an "Evironmental Impact Statement" I feel that more emphasis should be placed on this segment of the EIS. I would strongly suggest to the BLM that they conduct a hydrology and subsidence impact analysis independent of the Meridian Minerals Company consultant's analysis on which the BLM bases their conclusions in this EIS. I would also suggest that this impact analysis be done by a consultant with experience in longwall

139 mining since this now seems to be the preferred scenario of Meridian Minerals Company. If this is not done, then the BLM should guarantee safeguards on the quantity and quality of the water in the entire area and write these guarantees into the Federal patent when and if minerals are exchanged.

140 4. Burlington Resources, a spin-off from Burlington Northern Railroad, now publicly intends to spin off its mineral holdings (coal and aggregate mining) next year and focus on oil and natural gas investments. I see no reason for the BLM to aid and abet Meridian Minerals Company, a subsidiary of Burlington Resources, in a scheme which may involve nothing more than resource enhancement made possible by the BLM's exchange contributing to

(4. contd)

140 Meridian's ability to monopolize a large coal field. In my opinion, the entire mining plan, including this exchange falls right in line with Burlington Resources liquidation of assets. Why is the BLM so intent on aiding Meridian to increase its equity in their coal resources if Meridian ultimately only uses this for greater borrowing power or sale to some foreign country? The public good will definitely not have been served if some Pacific Rim country winds up monopolizing an entire coal field in Montana with the help of the BLM through this exchange. Nor will the public good have been served if the BLM gives up all rights to royalties from this coal field to whom ever may mine it.

5. The BLM should be aware these land grant lands, which include the minerals (coal, etc.) may be subject to Congressional review. Congress could, as was done in 1929, direct the Attorney General to bring suit to determine judicially if the present holding company structure of Burlington Northern violates the terms and provisions of the land grants and events and pursue any of several other alternatives:

141 a. find that conditions of the land grants had been violoted and revest title to some or all of the lands in the United States;

b. declare that the land grants were intended to subsidize the continued operation of the railroad and that any action on the part of the Burlington Northern Railroad that results in the segregation of the income of the land grant assets or their liquidated value from the operating expenses of the lines (or from the operating of the company's railroad functions in general) is unlawful, and provide time limits within which the company must make necessary adjustments; or

c. provide in some other way for a link between the income from the land assets or their liquidated value and the company's railroad functions possibly by providing that certain percentage of such income or value must be shown by Burlington Northern Railroad as income and used in calculation their rates and demonstrating need for abandonment of various branches.

In conclusion, I firmly believe that this coal for land exchange application by Meridian Minerals Company is no alternative at all and should be considered a very damaging precedent for any future BLM exchange, particularly when Burlington Resources (i.e. Meridian) currently owns millions of acres of minerals in Montana.

Sincerely,

Pete R Tully

Peter R. Tully
75 Ranch Company
Bull Mountain Landowners Assoc. Pres.

RECEIVED
DEC 28 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dec 26, 1989
Terrine, Mont.

Mr. Bill Matthews
EIS Project Manager
BLM District Office
Miles City, Mont.

Dear Sir

I want to comment on the land swap between Meridian Coal & B.L.M. in the Bull Mts. My family and I are not in favor of a land trade. We will not get any thing out of trade. That coal has a great value, much more than the land is worth, we have more public land now than we need. The coal if sold to Meridian

142 has a great value to both County & State much more than the value of the land.

142 If they want the coal make them buy it.

There are many ways the Mine will affect us living in the area such as this, private and transporting the coal to the shipping point.

Water in the Bull Mts. is not to plentiful at best, we only have enough water to get by on now, this Mine could cause us to lose much of what we have now, it could change the flow of water in the country around. The cost of roads is another thing we don't need, there are many ways this Mine will affect us and none of them are good.

We are not in favor of this land swap.

143

Respectfully
Steve Stokes

Margaret MacDonald
John Smillie
4111 June Drive
Billings, MT 59106

January 4, 1990

Bill Matthews
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews:

We are writing to offer comments on the draft BLM EIS on the proposed exchange of Burlington Northern coal in the Bull Mountains for recreational lands elsewhere in the state. Specifically, we wish to express our dismay and amazement at the EIS conclusion that "groundwater impacts are considered to be minimal." Considerable, if not a preponderance of, evidence indicates that longwall mining beneath the Dunn Mountain clinker cap, an important "recharge" location for the entire area, will result in serious hydrologic impacts. Both water quality and quantity will be affected by this mining technology.

144 The Bull Mountains represent a unique prairie hill ecosystem in this area - one rich in wildlife and fauna, as well as excellent domestic stock grazing lands. They are an extraordinary resource in a semiarid state like Montana with their creeks and springs. Without this unique hydrologic balance, to which Dunn Mountain is essential, such a diversity of species of flora and fauna would be impossible to sustain.

Therefore, we urgently request that you conduct a further independent analysis of the hydrologic consequences of mining the coal proposed for exchange. Moreover, we hereby register our firm opposition to any exchange of coal, especially under the circumstances existing in the Bulls. If the coal is to be ultimately mined, it should only be under the most stringent and
145 rigorous conditions necessary to protect the valuable ecosystem of the area. This goal would require some of the important tools existing under the federal coal management program, and not available to state regulators.

146 Finally, as taxpayers, we object to the unnecessary giving away of valuable resources for far less than value. We are aware that the exchange would significantly reduce royalties to Montana schools in the long run. The coal market and coal production are all well below capacity now and in the foreseeable future. We see no sound logic behind rushing to exchange this valuable resource for a highly speculative project.

Sincerely,

Margaret E. MacDonald

John D. Smillie
4111 June Drive
Billings, MT 59106

---

936 Columbine
Billings, Mt. 59105
January 3, 1990

E & S Project Manager, Bill Matthews
BLM District Office
P.O. Box 940
Miles City, Mt. 59301

Dear Mr. Matthews,

The enclosed letter from Steve and Jeanne Charter calls attention to very important issues concerning a large-scale longwall coal mine under Dunn Mountain.

The Charters are a well-educated, environmental, athletic and active family, not only concerned about this over-intensive in the here-and-now but also about the future generation to be affected by the water resources.

147 I would appreciate your thoughtful consideration of the points raised in the Charter letter.

Thank you.

Yours truly,
Bette Childers
(Mrs. R. E. Childers)

RECEIVED
JAN 04 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Encl.

Wednesday, January 3, 1990
THE BILLINGS GAZETTE

Opinion

VOICE OF THE READER

Write BLM

Do you live in or care about the country downstream or downgrade of Dunn Mountain in the Bull Hills? If so, it is in your interest to write to the Bureau of Land Management strongly questioning their draft EIS' conclusion (page 106) that "groundwater impacts are considered to be minimal" from a large-scale longwall coal mine under Dunn Mountain.

a This conclusion was based on an analysis done by a company- hired consultant. It ignores potential major impacts predicted by dydrologists from both the Montana Department of State Lands and the Bureau of Mines. Longwall mining involves complete seam extraction where the ground collapses in behind the roofed longwall machine.

b An unpublicized State Lands memo to the BLM advises that "the possible severe fracturing and leakage of shallow alluvial or perched overburden groundwater into the deeper aquifer system could have a very significant impact on valley floor hydrology." The state memo advises that both spring loss and loss of flow in area creek drainages from mining induced fractures are "a major foreseeable impact."

b The EIS also ignores a state Bureau of Mines report which predicts longwall mining would seriously degrade water quality in wells downgradient (northwest) in the aquifer over time. The 1982 Thompson report finds the collapsed overburden would have a very high sodium content. As groundwater flows through the collapsed workings, it would pick up that sodium. The process would take many years, but

b eventually, the Thompson report predicts post-mining groundwater would not be fit for human use.

Through its public coal leasing procedures, the BLM has the power that only ownership provides to protect water resources. In Colorado, leases have restricted longwalling technology in areas where surface water would otherwise have been lost. If the coal is traded off, state reclamation regulations alone offer much weaker protection.

c The BLM should conduct a water impact analysis independent of the company. A public coal lease would protect surface, water and revenue values better than a private trade. Comments on these concerns should be directed to EIS Project Manager Bill Matthews, BLM District Office, P.O. Box 940, Miles City, Mont., 59301. Letters need to be postmarked by Jan. 5, 1990.

Steve and Jeanne Charter
Rt. 1, Shepherd

Rte 1 Box 2046
Forsyth, Mt. 59327
Jan. 3, 1990

RECEIVED
JAN 04 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Mathews
Project Manager
B.L.M. Offices
P. O. Box 940
Miles City, Mt. 59301

Re: Bull Mtn Exchange
Draft EIS

Dear Sir:

148 During the late '60's and early '70's, the Bureau of Land Management assured everyone that the coal veins of Montana would be mined only to alleviate a potential Energy Crisis, predicted for the northwestern United States.

149 Would you mind explaining how shipping coal to the Pacific Rim countries ~~will~~ will help the Energy program named above?

Considering that neither the Burlington Northern railroad nor the Bureau of Land Management were involved in the formation of the Bull Mountain coal veins, it must be regarded as a non-renewable resource. It has a purpose in the Bull Mountains which is far more important to the residents of that region than the money game. That is, the purifying of ground water to make it palatable for Human, Wildlife, and irrigation purposes. Without the coal to filter out the salts, that water flowing through the mined out veins becomes pure "waste" water. Can Montana and this nation afford such extravagance with the ground and surface waters of Montana, or any other state? Water, too, is a non-renewable resource.

150

The last sentence of paragraph one, page one, reads,

151 "Surface ownership of the coal lands would be unaffected by the exchange proposal."

Would you please send me the documents which support that statement, and it should definitely be a part of the Final EIS of the Bull Mountains Exhange?

Page 133, Hydrology Impacts: The last paragraph makes an extraordinary statement, as follows:

152 "The immediate and more wide spread application of the longwall method would result in environmental consequences that are more identifiable during actual mining. Thus hydrological impacts could be corrected immediately, and long term effects would not become a problem in the future."

Does the above statement mean there is a way already known to prevent the dumping of mine waste water on the property of downstream landowner?

152 Does that statement mean a way is known to salvage the salt laden ground water so that there need not be such deteriation of riparian vegetation along the alluviul valley floors downstream from the actual mine?

If the claim made on page 133 has any foundation in fact, it should be published immediately, not only in various EIS volumes, but in general news media.

Having lands which have been assaulted with mine waste water for the past number of years; having watched as hundreds of acres of fertile valley floors become saltgrass and alkilie flats, I urge an explanation:

If you know of any way which might thwart the degradation caused by mine waste water to the downstream landowner, please speak up immediately.

Very Sincerely,

Patty Kluver

January 5, 1990

Bill Matthews
EIS Project Manager
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews:

153 I am writing to express my concern about plans for longwall coal mining in the Bull Mountains north of Billings and the effects this mining will have on the area's groundwater supplies. The BLM EIS states that "groundwater impacts will be minimal," a conclusion that can hardly be supported by fact when considering impacts to aquifers caused by both current coal strip mines in Montana and longwall coal mining in other arid parts of the nation. In these regions, we are only just beginning to understand the massive impact coal mining is having on groundwater.

The Dunn Mountain area is a major recharge area for a large part of the Bull Mountains. Destruction of the underlying coal seam and the subsequent subsidence of the overlying layers of soil will certainly destroy many aquifers, and leave those streams and springs that still have a flow with high contents of TDS, sodium, minerals and other substances toxic to humans and animals. The end result will be many springs and creeks that totally dry up or carry water that is unfit for use.

154

The Bull Mountains area is unique, with rich pastureland for grazing and adequate shelter and food for numerous wildlife and game species. It is also an area that has precious few water resources. Destruction of such a vital part of this unique area could literally devastate both the ranching economy of the area and large wildlife populations. I ask that you please consider requiring further analysis of all potential water impacts by an independent firm.

155

Thank you, Mr. Matthews, for your further consideration of these concerns.

Sincerely,

Chuck Christiansen
P.O. Box 157
Billings, MT 59103

128 Hayden Rowe #2
Hopkinton, MA 01748

3 January 1990

Mr. Bill Matthews
EIS Project Manager
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews --

Once again, Montana's land and its people are for sale, in this case (as in so many before) to the coal interests. I am referring to the proposed longwall coal mine under Dunn Mountain and the Environmental Impact Statement that has been prepared for the Bull Mountains.

I have come to know many of the local citizens in the Bull hills in the past three years, and it has been quite an education for me, born and raised on the East Coast, to learn about the continuous battles that ranchers and farmers have to fight to keep their lands viable. In this case the cards appear to be stacked against them.

156 Can the Montana Bureau of Mines be wrong when it reports that water downgradient of a Dunn Mountain longwall mine would become so salinated as to be unfit for human consumption? Can the state Land Department be wrong when it reports that springs will dry up, some to nothing, because of rock fractures due to the mine? Why were these reports completely left out of the EIS? Could it be that the EIS was based on the work of a coal company consultant, who has a vested interest in saying that "groundwater impacts are considered to be minimal?" Why does that consultant really care, after all, if there is or isn't water, for stock, crops and people, in the Bull hills?

157 It is absurd and unconscionable that the people who are the backbone of the local economy, farmers and ranchers, might be deprived of their livelihoods so that outsiders can come in, defeat the land, take the money and run. It is the duty of the BLM to fairly serve all citizens, and therefore I urge the BLM to undertake its own water analysis -- without biased input. In addition, the federal water use and reclamation regulations that apply to the land in question ought not be circumvented by "trading" that land into private hands, where it would come under the jurisdiction of the weaker state laws.

158

I hope that you take this letter, and every other that you receive, into consideration when dealing with this matter. Those of us who care about the Bull Mountains' past, present and future depend on you to treat the area with the respect that it deserves.

Very sincerely,

Oren Helbok

Jan. 3 - 1990

EIS Project Manager
Bill Matthews

159 As we own & lease land in Sec.s 2-34-35 & 36 Twp. 7 N. R. 26 E, we are concerned about the impact, the proposed longwall coal mine will have on our wells & springs. We depend on these waters to fulfill our own human needs & our livestock's needs. Our wells are downgrade from the coal mine, about 2 miles. We would deeply appreciate your attention in this matter.

Thank You
Kenneth H. Gerger &
Shirley J. Gerger
10002 Bison Rd.
Shepherd, MT 59079

January 4, 1990
R.R. Box 16
Worden, Montana 59088

EIS Project Manager Bill Matthews
BLM District Office
P.O. Box 940
Miles City, Montana 59301

Dear Mr. Mathews:

The safety of preserving the groundflow water in Montana is very important to the people of this state.

Whenever this flow is broken, as it would be with longwall mining, the springs, wells, etc. of the area can dry up partially or completely. This happened to many ranches in eastern Montana from mining and even seismographing. We formerly owned a ranch east of Colstrip, so know from experience what we are talking about. Good springs went dry. Our soft water well for our house became very, very hard. Water tables as well as water quality, for hardness or saltiness, are definitely at risk. Once this is let happen, it will haunt future Montanana ever after. 160

This problem was addressed in the mining done at Colstrip, and as you know they were not allowed to stop the natural flow of underground waters.

In the first place, why trade the land with Burlington Northern and include 100% of the valuable coal rights which you know are there? It is worth millions and millions more then recreational land is worth. Why not retain 50% of the rights as is done when private sales are made? Burlington Northern never just included coal rights when individuals bought land from them. Those rights were purchased in addition to the price or were reserved completely years ago before coal was considered very valuable. Several sections of coal have a monetary value not to be taken lightly. 161

At any rate, we hope the groundflow water of Montana will not be endangered and lost by permitting practices such as long-wall mining or any other practice which stops the natural flow or ruins the quality of our water. We seek your help with this matter.

Sincerely,
Jane E. Nuffell
Walt Nuffell

P.O. Box 853
Roundup, Mt.
59072

Mr. Bill Matthews
E.I.S. Project Manager
P.O. Box 940
BLM District Office
Miles City, Mt. 59301

Dear Sir,

In regards to the BLM/Meridian Corporation land swap up for consideration by your office, I am not in favor of such a transaction. I believe such a deal with allow the the Meridian Corporation far too much leeway to abuse the natural resources found in the area. My main concern being the water tables in this area.

162 Hydrology reports, compiled by the Montana Department of Lands, the Bureau of Mines, as well as my own information obtained privately, all refute the findings compiled by Meridian in its own report contained in the Environmental Impact Study done of the area.

The report in the EIS, states that the known aquifers, will suffer minimal damage and if ruptered could be maintained to provide adequate water supplies to the wells in the area. I believe this statement to be false. The three opposing studies mentioned above also refute this statement made by Meridian. Both the Department of Lands and the Bureau of Mines' studies indicate large scale damage to the present aquifers. Furthermore, these studies show that in traveling to deeper water table levels, large amounts of sodium will be deposited into the aquifer system, thus making the water unusable to animals, not to mention human consumption. 163

If this land swap can not be stopped, I would recommend some type of restrictions be placed upon Meridian which would protect the rights of the tenants in the area. A lease agreement similar to the one with Colorado's Westmoreland Company would be an example. The lease C-37210 is the serial number pertaining to the Westmoreland Company agreement with BLM. Your consideration on this matter is greatly appreciated. 164

Sincerely,
Clay A. Brower
Clay S. Brower

Billings Montana 59105
P.O. Box 50305

Bill Matthews EIS Project Manager
Bureau of Land Management
P.O. Box 940
Miles City Montana 59301

RECEIVED
JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Gentlemen

165 I do not think this trade is in the public interest if the end results of the trade destroys the spring water in Sec 28, T 6N, R 27E Yellowstone County. There is no protection for water or assurance for water if long wasling takes place under SMACRE. If the Government wants this trade to take place, it should put it in the patent that the Coal Owner has to replace water for the surface owner with like kind and Quality.

Louise Pfister

RECEIVED
JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

P.O. Box 853
Roundup, MT 59072
January 2, 1990

Mr. Bill Matthews
E.I.S. Project Manager
P.O. Box 940
BLM District Office
Miles City, MT 59301

Dear Sir:

I am totally opposed to the BLM/Meridian Coal for Land swap which is presently being considered by your office. I live in the Bull Mountains north of the area Meridian is requesting in the exchange. As a landowner, I have consulted an hydrologist and have also studied several hydrology reports in addition to the one provided in the EIS by Meridian. To the best of my knowledge these reports indicate that the proposed Meridian operation will cause such trauma to the aquifers that I will lose most or all of my present water sources or, at best, the available water will become unfit for human or animal consumption.

166 My legal advisor informs me that BLM has been fully apprised by the Montana Department of Lands and by the Bureau of Mines of the adverse effects Meridian's operation will have on the water supply of West Parriott Creek where I reside and where I presently have a spring-fed stock pond, a house well, and a corral well.

There are over sixty family residences in the Fattig Creek, and Parriott Creek drainages whose water supplies should also be considered by BLM. Unfortunately most of these homeowners have not learned of the potential disaster to their water sources, thus are unlikely to be voicing their opposition to this trade.

167 If BLM would lease the coal lands, instead of relinquishing ownership, I feel my rights as a citizen and homeowner would be better protected. I urge BLM to consider only a lease agreement and to make the lease comparable to the one BLM used when leasing their coal lands to Colorado Westmoreland. For your reference the serial number of said lease is C-37210.

It is common knowledge that Burlington Northern/Meridian's track record in Montana leaves much to be desired, therefore, the U.S. government and BLM should retain every possible control over these companies to make sure they live up to their obligations as stewards of this nation's lands and resources.

Sincerely,

Mary F. Brower

Mary F. Brower

COMMENTS ON BULL MOUNTAINS EXCHANGE DRAFT EIS

When private enterprise functions responsibly, government should not intertere - but!

In the early seventies when we were working for responsible strip mine reclamation laws, a reporter, in our presence, asked a representative of Consolidation Coal Co. if they would reclaim the land (specifically in the Bull Mountain coal area) without laws to make them do it. We received a very candid reply. "No. It would not be economically feasible."

168 It is still not " economically feasible " for coal companies to protect the environment, and so it becomes the government's responsibility to help provide this protection and to enforce existing laws.

The Bull Mountains Exchange Draft EIS does not reflect such responsibility. This trade of coal for land is a classic example of the end (acquiring land) not justifying the means, for this trade would free the government from involvement. Unfortunately the bias of the EIS actually encourages the trade.

169 To rectify this, please include: 1. an unbiased water study not financed by the company involved; 2. BLM's participation in Long Wall Mining regulation and protective stipulations in leases in other parts of the country (specifically Utah and Colorado); 3. a review of the history of long wall mining during the past twenty years, its effect on water sources, land productivity and individual land owners, and how damages have or have not been rectified. At this point there should be in depth consideration of how any of the above would apply to the specific terrain of the Bull Mountain coal field.

Lastly, the Bull Mountains should be evaluated as a ranching, wildlife, recreation and retirement area. Such a unique area is seldom found so close to population centers.

Mrs. Boyd Charter

Mrs. Boyd Charter (Anne)

JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

P. O. Box 2361
Billings, Montana
59103
January 4, 1990

EIS Project Manager
BLM District Office
P. O. Box 940
Miles City, Mont.
59301

Dear Bill Matthews,

It has been brought to my attention that many feel an inadequate amount of research has been done concerning long term affects of ground-water flow from a large scale longwall coal mine under Dunn Mountain in the Bull Hills, out of Roundup. I live approximately 15-20 miles southwest of proposed mine site and depend upon springs and wells to water my pastures where my cattle graze. Also, we have quite potatable water at this time for our drinking, and in all wells etc. This ranch belongs to my mother, Madge Schultz, and I plan on spending the rest of my life here, cattle ranching. Good water is a must to be successful at this business, so it is of utmost concern that mining, although several miles from here might in time ruin fit water.

170 I, as many others, am hoping that more time shall be taken to do more thorough testing and research in this area, and consulting with other mine locations to see what some long term affects have surfaced with them.

Thank you very much for your consideration.

Yours Truly,

Margie Messer

Margie Messer

December 30, 1989

JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews
E.I.S. Project Manager
B.L.M. District Office
P.O. Box 940
Miles City, MT 59301

Dear Sir:

I would like to comment on the proposed longwall mining in the Bull Mountains.

#1-As a member of the POWER GROUP in the Roundup area, I am convinced there isn't anything as important to the future of this area as protecting the quantity and quality of the ground water.

The limited ground water in the Bull Mountains is in danger from greedy irregation farmers (Dead Man's Basin Water User's), and growth of the area is requiring more water than will be recharged.

This problem of protecting ground water is not limited to the Roundup area. The Bureau of Reclaimation people have their heads on straight and are looking for ways to artificially recharge lost ground water.

Any decision you make should be concerned with WATER FIRST, and industry profits last.

The proposed longwall method of mining is not needed when the big strip mines are cutting back production. Any market for that grade of coal can be filled by mines operating in Montana.

171 Longwall mining in any area should not be allowed where any water can be affected, and in that area longwalling damage cannot be truthfully predicted. A complete study of that type of mining should be done, and decisions made, by mining people from their knowledge and past experiences, not by some high paid consultant with no first hand experience.

2 - Kelly Stephenson
December 1989

#2-The exchange of public coal for recreational lands isn't protecting the interest of those people who can't testify (the unborn generations), who will really depend on today's decision for their very existence.

If the recreational lands are for sale, the public who are here to enjoy them today should be the ones that pay the cost, not public lands.

Your BLM Bureau should be working with the Bureau of Reclaimation on ground water studies to try and protect the people's interest, not to take part in big moneys "rape and run" policies.

Montana has seen too many mining operations that were never required to make a study of the future damaged that could and has taken place many years later. The cost of reclaimation from subsidies alone is going to amount to much more than the public ever received.

Let's not let this happen again. The future of Montana is going to depend on what we do now. We hope our decisions will be better than the ones of the past.

In other words, we cannot afford to ignore whatever complete, qualified information can be made available. We must have thoroughly researched details that set forth any major foreseeable impact that could make groundwater not fit for human use, rather than just the consultant's report.

Submitted by:

Kelly Stephenson

Kelly Stephenson, Past Chairman
of The Protective Organization for
Water and Environmental Resources

cc: Northern Plains

January 3,1990

Mr. Bill Matthews
BLM DisTRICT Office
P.O. Box 940
Miles City, Mt 59301

JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dear Sr:

I would like to give a few of my views on the proposed BLM / Meridian land for coal swap in the Bull Mountains.

I have been in the cattle business 16 miles northwest of the proposed site since 1960. I have over 35 stock water wells, 7 miles of Pattig Creek and numerous springs that water this ranch. Having heard arguments from both proponents and apponents of the swap and proposed mining project I am opposing the project for the following reasons:

172 1. Meridian is trying to sell all of their mining interests and are citing the great potential in " their Bull Mountain Coal Field". At this point they have nothing to sell until the swap is made and they are counting on the swap to make this a valuable property for them. I don't feel that to facilitate their sale and the profits from such a sale are in the best interest of the people of the United States.

173 2. Water in this area is scarce and precious. The loss or degradation of any waterwould adversely affect this area forever.

174 3. The proposed increase in road traffic cannot be born by the present road system. Any work on the present system will cost more than the coal income to the state will generate.

175 4. The infrastructure of Musselshell County will be harmed by this project. The history of coal mining in particular have shown that short term gains are followed by long term losses to the counties involved. Initially all services are overcrowded followed by overbuilding, followed by mine closings. This leaves the static population to clean up and live with unpaid for, partially utilized facilities.

176 5. The Bull Mountains are one of the few areas close to Billings that people can hunt and recreate in without a lot of traffic. 50 to 150 coal trucks per day will bring and end to that.

I can see the short term gains to some workers and area merchants and I am happy for them, however responsible people have to look at what a decision made now will do for this area through the years. I can see nothing that will accrue to the benefit of this County in the next fifty years that is worth the risk just to satisfy the bottom line for Meridian Minerals.

Sincerely

Henry D. Bedford
President
Kite Cattle Company

December 29, 1989

Bill Mathews, Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

Bill Mathews:

I oppose the exchange of federal coal lands in the Bull Mountains to Meridian Minerals Company for so-called "high-value recreational and wildlife" lands granted in the last century to Meridian's parent, the railroad that today is known as the Burlington Northern Corporation.

My reasons are both local and global, both environmental and economic. I will try to be concise in detailing them.

I see the overriding issue as water.

The coal seam in this region generally serves as the aquifer, where underground water is stored. A healthy, intact aquifer is vital to the local environment--it supplies water to springs and wells--and also is vital to the local economy of ranching, recreation (chiefly hunting, at this point) and rural residential development. Livestock and people--and to some degree, wildlife--depend on wells and developed springs for water.

177 Mine the aquifer, or mine coal seams underlying the aquifer, and you degrade the quality and diminish the quantity of underground water. Yet, when the value of a resource like coal is computed, invariably the computations address only what this resource is worth after it is extracted and burned, and not what it is worth intact, as is, in the ground. Thus, a very large part of the real value of the resource is ignored.

178 As the aquifer, coal in this region stabilizes and, to some extent, purifies subsurface water, and it is time that we factor this conserving and renewing function to be factored into the economic equation. How to assign a dollar value to an intact aquifer versus the dollar value of a one-time, non-renewable extract-and-burn operation? I don't know. It's an interesting challenge. But it's a challenge that must be taken up by an agency supposedly concerned with preserving the integrity and longterm value of public lands and resources.

(continued)

178 The renewable value of coal-as-aquifer may be a new concept to the BLM, so I can understand (if not condone) the BLM's ignoring this value. What I cannot understand is how the BLM can so grossly understate even the one-time, non-renewable, extract-and-burn value of this public resource. By my calculations, the BLM says the coal involved in this proposed "exchange" is worth about 1.3 cents per ton!

179 The low-sulfur sub-bituminous in this area is probably the best coal in the entire Fort Union region. Granted, it is only a little better than the coal at, say, Decker, Montana: only fractionally higher in BTU (energy) content, only fractionally lower in sulfur (though possibly considerably lower in sodium). But surely it is worth more than a penny and a fraction per ton! The coal at Decker is certainly worth more than that. At the moment, longer term contracts for Decker coal run between $10 and $20 per ton, while the "spot" coal market is lower, from $5 to $10 a ton. Let us take the very lowest "value" for Decker coal--$5 a ton. Even taking this lowest figure, it appears that the BLM is understating the value of Bull Mountain coal by something like 50,000%. Why?

Of course, one answer is that undeveloped coal is not worth as much as developed coal: it costs money to open a mine and extract the resource. And of course this is true. But this then leads me into the rather puzzling economics of this whole project. Let us use Decker again as a comparison. At Decker we have an open pit mine with a railroad directly to it. In the Bull Mountains, according to Burlington Northern/Meridian Minerals, we would have an underground mine with no railhead. This means that until a spur railroad were built into the hills from the main railroad in the Yellowstone Valley, the coal would have to be trucked. This is much more expensive--not to mention noisy, dusty and dangerous. And the proposed method of mining--underground--is also more expensive (though possibly less costly to the environment) than the open pit method.

180 It is not cheap to open a coal mine and I doubt that--unless the price for coal suddenly leaps upward to around $30 a ton--this Bull Mountain sub-bituminous will bring in enough to cover the start-up costs.

181 Moreover, the particular method of underground mining that BN/MM purportedly favors is not the old room and pillar method--which leaves pillars of coal to support the mine roof--but the so-called "highwall" method.

(continued)

181 Highwall mining does extract more of the resource--so it is "efficient" in that very limited sense--but it wreaks much more damage on the underground water and also on the land above, through wholesale subsidence.

182 I don't believe the BLM adequately addresses these very serious local environmental questions, and I am also concerned that the BLM takes such a short-sighted view of the global environment. The pollution (the acid rains, the carbon dioxide buildup) caused by coal-burning is now, at last, recognized as a worldwide problem. We need to find renewable and clean sources of energy, not just continue down the same old non-renewable and dirty energy path. BLM planners may believe that the main energy resource they have a hand in deciding about is coal, but in the long run they are sure to learn that the abundant solar and wind energy, in some areas geothermal energy, on BLM lands are the true, reliable energy sources of the future.

183 As for global economics, no one can claim that a strong market for coal exists now in the United States--the coal market here has been "soft" for years--so where is BN/MM saying it will market this coal? To the Orient: to Taiwan or Japan. It's a long haul to the Orient, so I find it exceedingly odd that Japan and Taiwan would wish to pay premium prices for U.S. coal when they have a much closer source of coal--albeit lower quality coal--in mainland China's vast reserves.

Perhaps one could make the case that China is too politically unstable to be counted upon as a source of coal. Perhaps. But it's still a long haul across the Pacific.

184 I think the true, underlying scenario is that Burlington Northern/ Meridian Minerals wishes to latch onto these federal coal lands--making in the meantime a minimal effort to establish what appears to be a working mine here--in order to put together an attractive "package" of contiguous (non-checkerboard-ownership) coal lands to sell to some outside buyer. To one of their customers from the Orient, perhaps? After all, Burlington Northern lately has been moving very fast to sell off its assets, not only minerals but, recently, much of its grazing lands.

Even if BN/MM does not plan to sell this property, it wants this exchange in order to gain competitive advantage over other coal companies in that fantasy future when the price of coals goes back up.

(continued)

185 The plain truth is, if BN/MM really wanted to mine coal now in the Bull Mountains it would not need this swap; the company could mine properties it now controls--and could apply to mine the federal coal later. Indeed, the loss of royalties to the federal government, and to the state (mainly in the form of less money for schools in Montana) is one of the biggest arguments against releasing this coal to private hands.

My other objections to this swap revolve around local impacts. In Roundup, where I live, people are anticipating a great economic boom from this proposed mine. They hope for lower property tax mill levies--don't we all!--and if the mine does actually open up, this could be one happy result. Other happy hoped-for results include a revival of our sagging Main Street retail trade economy and a boon for real estate and service industries.

But I've heard all this before--and have yet to see it happen--during the last three decades since the big underground coal mines around Roundup shut down. So forgive me if I entertain doubts that coal now will ride to our rescue. The mine, if it opens, will be 15 to 20 miles from Roundup. It will hire workers, yes, but coal-mining today is much more automated than it was even in the 1950s, and I strongly doubt that we will see the hundreds of jobs that BN/MM is dangling before our eyes.

186 How many of these mineworkers will live and shop in Roundup? How many, instead, will live nearer the mine in the Bull Mountains, or commute from the other direction, from Shepherd or the Heights, and do most of their shopping in Billings?

The coal itself won't flow toward Roundup, for there is no longer a railroad here, and I fear that along with the coal, most of the dollars will flow away from my local community. Certainly history shows us that the profits won't stay in Roundup, nor in Billings, nor in Montana. We are dealing with a giant, absentee corporation which has shown very little sensitivity to the problems and needs of this region, from which it has drawn so much of its wealth. Can the colony expect its colonizer to reinvest in the colony, or run away with the loot?

The same giant corporation that received the gift of these lands in the last century--in return for providing railway service it no longer deigns to provide--now demands another gift from the U.S. government. Will the government, this time, wise up and refuse to cave into that demand?

Sincerely,
Wilbur Wood
P.O. Box 12
Roundup, Montana 59072

Wilbur Wood

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

STATE OF MONTANA

STAN STEPHENS, GOVERNOR

LEE METCALF BUILDING
1520 EAST SIXTH AVENUE

DIRECTOR'S OFFICE (406) 444-6699
TELEFAX NUMBER (406) 444-6721

HELENA, MONTANA 59620-2301

December 22, 1989

Mr. Bill Mathews
Project Manager
Bull Mountains Exchange
Bureau of Land Management

Dear Mr. Mathews:

The following brief comments are made on behalf of the Department of Natural Resources and Conservation's Water Management Bureau. The Water Management Bureau provides technical guidance to DNRC's Water Rights Bureau on matters pertaining the ground-water rights. The WMB's interest in the proposed land exchange thus relates primarily to the resulting mine development in the Bull Mountains and the possibility of impacts on local water users.

187 Generally, the EIS does not provide the information necessary to assess the water rights impacts of mine development. The EIS does identify hydrologic effects of mine development that have the potential for interfering with water rights, including potentiometric changes due to mine dewatering and alteration of flow systems overlying the mammoth coal due to subsidence under longwall mining scenarios. Deleterious changes in water chemistry could also affect existing water uses and water rights.

The EIS takes the view that such effects would be transient in nature and unlikely to effect "overall availability of water for stock". Whether or not this view is correct, even temporary changes in ground-water availability over periods of months to years would create problems for ground-water users.

Given this probability, I think the EIS should present a thorough inventory of existing water uses and water rights in the vicinity of the proposed mine. Probable water quality changes, notably absent from the document's discussions of hydrologic impacts, should also be described.

Finally, the sources and means of development of replacement water supplies for disrupted wells and springs should be discussed.

CENTRALIZED SERVICES DIVISION (406) 444-6700 | CONSERVATION & RESOURCE DEVELOPMENT DIVISION (406) 444-6667 | ENERGY DIVISION (406) 444-6697 | OIL AND GAS DIVISION (406) 444-6675 | WATER RESOURCES DIVISION (406) 444-6601

Letter from Mark Shapley
December 22, 1989
Page 2

I realize that no actual mining plan has been submitted yet and that a thorough analysis of these issues is contingent on details that will probably only accompany a complete proposal. Nevertheless more could and should be said in this EIS regarding impacts on existing water use and water rights.

Thank you for considering my comments.

Sincerely,

Mark D. Shapley

Mark Shapley, Hydrogeologist
Water Management Bureau

MS:dw

12-21-89

Gentlemen:

For the record I'm opposed to any land swap between BLM and Meridian Minerals. I'm also opposed to any land that is in use by The Tully Ranch being disturbed in any way.

188

I don't feel that a few local jobs is much compensation for land that can never be replaced.

Thankyou!

Mitch L. Rech

P.O. Box 113
Roundup, Montana 59072
February 21, 1990

BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Bureau of Land Management
Attn: Bill Mathews
Miles City, Montana 59301

Dear Sir:

After further research on the controversial issue in reference to the Bureau of Land Management and Meridian Minerals land swap, I am retracting any previous statements.

I feel in that particular area it most certainly would be of great benefit to our community as a whole and will certainly help our tax base if the mine in question does materialize.

Sincerely yours,

Mitch Rech

Mitch Rech

cc: Musselshell County Commissioners

December 29, 1989
Roundup, Montana

Mr. Bill Mathews
BLM District Office
P.O. Box 940
Miles City, MT 59301

Dear Sir:

189 This letter is to express my concerns about the effects on the Bull Mountains by the "longwall" coalmine proposed by Meridian Minerals Company. The affects that concern me the most are the long term effects on our surface and groundwater.

The economy of Roundup, Musselshell County, the Bull Mountains and the surrounding area depends on farming and ranching. Smaller coal mines, the railroad, sawmills, the oilfields, all have been important also. However, before, during, in-between and after the farmers and ranchers supported the local government with their taxes. After Meridian has skimmed their profits and gone the way of the above mentioned shorter term boosts to our economy, the burden will again fall upon the farmer and rancher.

My concern is will our farmers and ranchers be able to exist after Meridian minerals has their way with our Bull Mountains? What about our water? What about the quality of our water?

Mr. Mathews the quality and quantity of the water available in the Bull Mountains is critical now! Water has always been a vital issue in this area. Our irrigation supply reservoirs have become inadequate for the demand. Alternative sources are being sought. Livestock as well as crops demand potable water. Last but not least, people require quality water supplies.

190 Meridian, B.N. and their sister companies have shown no concern for our ground water and surface water. I offer the issue of B.N.'s diesel spills and their reluctance over cleanups. Meridian's front man, Mr. Bob Moorehead, has promised the residents that if their well goes dry Meridian will restore it or solve their problem with a cistern or other means. Even if we were to believe this what gaurantees do we have for our aquifer systems that effect our springs and creeks? What about the quality of our ground water?

191 It has been brought to my attention that your agency is in possession of information from State Lands and the State Bureau of Mines that address these same concerns. I implore you to give these matters the consideration they deserve. We cannot allow Meridian to exploit our land for their profit and leave us with no useable water!

192 It is my opinion that no land exchanges should be considered. If Meridian were to obtain ownership of our public lands our valuable water supplies would loose too much protection! Once they are lost or contaminated what little benifit the people would see from any short term boost from the mine would be insignificant compared to our loss.

My recommendation is to lease the coal lands to Meridian. The public would retain ownership and BLM would have the power and accountability to protect our water resources.

Water, revenue and surface values would all be better protected by a public lease than with a private land exchange.

Thankyou for the opportunity to comment on this issue. I request a copy of the final EIS when it is available.

Sincerely,

E. M. Comly

E. M. Comly
167 Old Divide Road
Roundup, Montana 59072

Roundup Mt.
Dec 29, 1989

JAN 2 1990

B.L.M.
P.O. Box 36800
Billings Mt. 59107

Dear Sirs,

193 We are writing in regards to the Meridian Mine planned in the Bull Mtns. (We are sending you some excerpts of letter Bill Matthews did)

We do not agree with your (Bills) statement that the ground & water impact from a large scale longwall coal mine operation will be minimal. We agree with the hydrologists from both the Montana Dept. of State Lands and the Bureau of Mines, that the impact will be major. We also agree with the Bureau of Mines that the underground water could become unfit for human consumption due to the longwall mine operation.

194 Family ranches in this area have been dependent on ground water supply for their ranch business, from one generation to the next, since homestead days in the early 1900's. The protection of their rights to underground water use should be given priority over anything else.

195 We are opposed to a private land trade between B.L.M. and Meridian Coal Co. a public coal leasing procedure would better protect water, surface, and revenue values. The taxpayers of Montana do not need the added burden of additional taxes to cover the 50% royalties, lost by land trade, that would by law go to the Montana Schools.

196 We do not think a narrow, inferior highway like 87 between the mine proposed and the Billings area, should be considered for additional coal truck traffic. It will greatly increase the danger for regular traffic on a highway that has already had excessive injuries and deaths from auto accidents.

197 B.L.M. stated they see no "long term adverse impact" from a railroad spur across country. We and other land owners who could be directly affected by one proposed railway route see a great deal of "long term adverse impact" from it.

We don't feel that a permit for a longwall operation should be issued to Meridian Mine Co and a permit of any kind should be delayed until major concerns pertaining to the mining are resolved satisfactory.

Sincerely

George A. Carlson
Eleanor L. Carlson

JAN 03 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

1791 Goulding Creek Road
Roundup, Montana 59072
December 29, 1989

EIS Project Manager
Bill Mathews
BLM District Office
P. O. Box 940
Miles City, Montana 59301

Dear Sir:

We are hoping you will reconsider your decision on the EIS conclusion (page 106) that "Groundwater impacts are considered to be minimal" from longwall coal minning under Dunn Mountain.

198 Past history shows that any type of minning done in an area affects the water tables as to quality and quanity. The Bull Mountains does not have a surplus of water so does not need to have its waters tampered with in any form.

199 Transportation Impacts would be horrendous. The Meridan Minerals Co. would be traveling a public highway that is already a very dangerous thoroughfare. We dread the thought if trying to travel it when the coal trucks are using it.

Not only that, the highway would have to be under constant repair to take care of the damages done by these heavy laden trucks. Musselshell County does not need this added loss to their small revenue.

200 If a land trade is made the state would lose up to 76.6 million dollars in royalty revenues. Montana does not need to take it in the shorts so that some large company can get richer.

PLEASE, PLEASE, reconsider your decisions and help the people of this county and great state.

Sincerely,

Jerry Carlson
Della Carlson

Jerry and Della Carlson

cc: BLM, P. O. Box 36800, Billings, Montana 59072
Bull Mountain Landowners Association, 419 Stapleton Building, Billings, Montana 59101

RECEIVED
JAN 31 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

January 30, 1990

Mr. Bill Matthews
Bureau of Land Management
PO Box 940
Miles City, MT 59301

Dear Mr. Matthews;

I realize that the official comment period for the Bull Mountain Draft EIS (DEIS) is over. However, I hope that you will accept the comments contained in this letter.

As an individual, I do not oppose the exchange of coal for land. In fact, if it opens up more land for public use, particularly in eastern Montana, I will favor the exchange.

Environmental decisions must be based on logical arguments. I do not feel that the hydrologic sections of the DEIS provide the data necessary for rational decisions. My specific concerns are contained in the following section.

201 page 71:
DEIS: Tongue River Aquifer
Comment: Much time has been spent by many people defining the term "aquifer." Discussing the Tongue River Member of the Fort Union Formation as a single aquifer, rather than as an interbedded unit of aquifers and aquitards, sets a dangerous precedent.

202 page 106-107:
DEIS: 50%-70% of overburden is siltstone and shale
Comment: Lumping siltstone and shale together is somewhat unusual. Hydrologically, siltstone is closer to sandstone. During my own drilling experience near Roundup, I have found a much lower percentage of shale. Do the data exist to support the statement in the DEIS?

DEIS: Implied low transmissivity values of overburden section and the perched nature of source aquifers for springs insulates the springs from impacts associated with fractures.
Comment: No data is presented to indicate the aquifers are perched. Low transmissivity zones (aquitards) and perched aquifers (underlain by unsaturated zones) would seem to be much more susceptible to impacts from increased transmissivity (unhealed fractures) than would other strata. Due to the drastic change in transmissivity, and the ratio of high transmissivity fractures to the lower transmissivity skeleton material.

203 DEIS: No subsidence is apparent over older area underground mines.

Comments: The hydrologic balance is interrupted by fractures, not by subsidence. During drilling near Roundup, I have encountered fractures above room and pillar mines in the Roundup Coal bed. Further, fractures above rooms, and lack of fractures above pillars may create another dimension of unpredictable impacts.

page 121:

DEIS: subsidence related impacts are considered temporary.

Comment: Again, it is fractures (roof collapse, etc.) not subsidence that are the main concern to groundwater flow. Why are impacts considered temporary and what general time frame does temporary refer to?

DEIS: Refers to positive and negative impacts and enhanced recharge.

Comments: This implies the ability to improve upon nature. The term "alter" would be a better choice.

204 DEIS: Springs will: 1.) be unaffected, 2.) be created, 3.) produce increased flow or 4.) be temporarily shutdown.

Comment: Once again - fracturing and subsidence are different. Fracturing has been predicted by Meridian Minerals to extend as far as 800 feet above the mine. This could affect all springs in the mine area.

DEIS: Enhanced recharge due to fracturing.

Comment: Where does the extra water come from, especially considering the prediction that springs will not be impacted? When a mass balance equation is applied, what portion is losing water to allow for increased recharge? This statement appears to disagree with an earlier statement that indicates the fractures will heal at moderate depths.

page 133:

DEIS: Environmental consequences are more readily identified during mining and could be corrected at that time.

Comment: This statement essentially says that pre-disturbance environmental assessments and predictions are not beneficial.

204 Finally, one additional comment about fractures. They would increase both horizontal and vertical transmissivities.

There are obviously many unknowns concerning the environmental consequences of these mining schemes, making this a very difficult EIS to write. While many concerns were well handled, the hydrologic impacts deserve more attention and a more objective review than received in the DEIS.

Sincerely,

John Wheaton

John Wheaton
2935 Nye Lane
Billings, MT 59102

RECEIVED
JAN 03 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Huntley, Montana
December 31, 1989

Mr. Mat Millenbach
District Manager, BLM
Miles City, Mt. 59301-0940

Dear Mr. Millenbach:

Refer to your letter to me December 28.

205 Yes, I talked to Mr. Morehead the manager of Meridian Minerals Company and discussed my views concerning the proposed route to be used by the coal trucks. However, I did not get any satisfaction. In other words, his company will not consider alternate suggestions that I made.

I am enclosing some copies of letters I have been writing to various individuals who have some interest in the matter. You can get a better idea of what I thought should be done from reading these letters.

Yours truly,

E.J. Meehan

E.J.Meehan
1644 Heath Street
Huntley, Mt. 59037

CC Several letters.

Mr. Robert Morehead, Jr.
Meridan Minerals Co.
P.O.Box 776
Roundup, Montana 59072

Huntley, Montana
November 12, 1989

Dear Mr. Morehead, Jr:

I am concerned about your project to haul coal from the Roundup area to our town.

Quite some time ago I discussed this plan with a Mr. Swanson. He was here measureing ground water levels in town. From him, I learned your coal trucks would be routed through a residential part of the town using Heath street. This route was confirmed when I telephoned the individual at the BLM in Billings who was most involved in your project.

There are several private residences fronting this street and others nearby. Apparently no thought was given as to how the plan would affect us using this route. However, I did read that an environmental impact studyof some kind was made for the roundup area.

Anyway, in discussing the project with these two individuals I got the impression that little, if any, consideration was made of possible alternatives of other routes. I suggested that there is another road just east of Heath street that should be looked into. Better yet, I thought, the town of Huntley could be by-passed completely if the coal was trucked to the area where the Coor's warehouse is located-about one mile. Further, I wondered why the coal could not be hauled west on Highway No. 212 to where it crosses beneath the BN railway line running north to Great Falls. The mileage is shorter than to Huntley; the impact on roads less.

Unless this route is changed there is bound to be a devastating effect on our daily lives. How about noise levels? Those mammoth coal trucks will literally shake the ground when they rumble past our homes. Will one be able to sleep at night? What if a coal truck went out of control and off the street and into a home? That has happened elsewhere. It could happen here, too!

H ow about the safety of playing children? Won't their lives be endangered? Or, that of local inhabitants jogging along the street? Will your company be putting up a fence along the street to keep the children and their bikes off?

I was also surprised to learn from Mr. Swanson that coal would be stockpiled here in the town limits. Because he was measureing ground water levels there must be some concern that the coal would eventually seep into the ground water and pollute our drinking water. The town water system well is located not far awayon the riverbank. The ground water flows toward the river. In addition there is the danger of water leakage in town water system pipes. Vibration caused by the constant pounding on the streets by these heavy coal trucks will soon weaken the joints of the water pipes. In this regard, I know of one homeowner who is taking photographs of the walls of his home on the assumption there is a chance that this vibration will cause cracks.

As for the coal stockpile, it seems to me there is a possibilityof coal dust blowing about the town contaminating the very air we breathe.

Real estate values will drop I fear. No sane person would want to live along this street. Is your company prepared to purchase my home or that of others living on this route? Or, all the homes along this street so as to make it strictly a corridor for the coal trucks?

Please, don't use our street.

Yours truly,
E.J.Meehan
1644 Heath Street

E.J. Meehan

Huntley, Montana
April 14, 1989

Senator Esther G. Bengtson
8124 Clark Rd.
Shepherd, Montana 59079

Dear Senator Bengtson:

Concerning the attached newspaper clipping from the Gazette about the Bull Mountains coal mining plans of Meridan Minerals Company.

According to what information we have they plan to truck the coal to the town of Huntley. Here, it will be loaded on rail cars for shipment to various points.

There was nothing in the news as to how the town of Huntley would be affected by these plans. It seems clear to me this coal cannot be trucked through the main part of the town. Therefore the only other route is to come off highway 312 onto our resedential street which leads southto the railhead.

Our home faces this street as do others. To have coal trucks rumbling by nite and day is something we can do without. However, there is another route that I think should be given some consideration. That is, to have the trucks continue east of us to the area where Coors Beer Co. have their large warehouse. This route would eliminate a lot of problems as far as the town of Huntley is concerned.

Also, I think Meriden Minerals should give thought to transporting this coal entirely via rail. I understand they own the rail roadbed of the old Milwaukee railway. A rail line could be easily constructed west to where it would connect with the Burlington rail line that runs from Laurel to Great Falls. From here the coal could be taken into Laurel to the main line.

If handled by rail the impact on our highways would be removed. Highway construction and maintenance costs are high. Our gasoline taxes now are about the highest in the nation.

It is not too late to persuade Meridan make plans for alternative routes. I note in the article that they plan to begin operations by the end of this year. I was hoping your office might have some influence to change their plan to use Huntley for loading the coal onto rail cars.

Yours truly,

E.J.Meehan
1644 2nd Rd. North
Huntley, Mt 59037

Huntley, Montana
November 30, 1989

Senator Esther G. Bengtson
8124 Clark Road
Shepherd, Montana 59079

Dear Senator Bengtson:

Enclosed is a copy of a letter I wrote to you last April about coal hauling plans of Meridian Minerals Company.

I did not hear from you perhaps no doubt because we were gone most of the summer and you were unable to contact us.

Tuesday of this week there was a hearing by the BLM concerning the land exchange (swap) with Meridian Minerals Co. It looks like the exchange will go through and coal mining will be able to begin.

My letter to you explains how we feel about trucking this coal on the public highways to our town of Huntley. I wrote Meridian Minerals giving them our views and enclose a copy of that letter to you.

I also wrote the Yellowstone County Commissioners who seemed to think my views had merit. I talked to Commissioner Mr. Mathews at the hearing and seemed to be sympathetic to our concerns and said he would look into an alternate route I suggested. I am mailing a copy of the Commissioners letter they sent me to you. However I don't have a copy but will have it Xeroxed today in Billings.

There was much talk of jobs and taxes at the hearing last Tuesday that this project will generate. But, I ask, at what expense to the environment and cost to the County and State?

As for jobs, I favor promoting tourism and the small business that goes with it. These jobs may not pay as much but will be long lasting and much less impact on the environment.

Sincerely yours,

E.J.Meehan
1644 Heath Street
Huntley, Mt. 59037
(phone 1-348-3276)

cc: Yellowstone County Commissioners
Mr. Mathews
1 - My letter to Mr. Meehan

DEC 13 1989

Huntley, Montana
December 11, 1989

Bureau of Land Management
P.O.Box 36800
Billings, Montana 59107

Please enter this letter in the record. It refers to the public hearing by the BLM at Eastern Montana College in November about the land swap between the BLM and Meridian Minerals Company.

I am interested in how the coal mining as proposed by Meridian Minerals Company will affect our environment in the town of Huntley.

The information I have is that the coal will be transported to a railhead in the town of Huntley. The truck route into the town of Huntley as proposed follows a residential street (Heath Street) along which several homes are situated. The coal trucks using this route will have an adverse effect on the safety and health of the inhabitants and others living along and using this street.

I wrote Meridian Minerals Company voicing concerns about this route. I suggested alternatives be considered. However, I am skeptical if they will consider them. I havenÃt had a reply to my letter to them written a month ago.

Perhaps the first step to judge whether my concern is justified is to have the BLM and the Montana State Department of Lands make an EIS for the town of Huntley.

Please write and let me know if the BLM will consider my suggestion thatÃn an EIS be done.

Yours truly,

E.J.Meehan
1644 Heath Street
Huntley, Montana 59037

CC: Montana State
Department of Lands

Bureau of Land Management
P.O. Box 36800
Billings, Montana 59107

Please enter this letter in the record. It refers to the public hearing by the BLM at Eastern Montana College in November about the land swap between the BLM and Meridian Minerals Company.

I am interested in how the coal mining as proposed by Meridian Minerals Company will affect our environment in the town of Huntley.

The information I have is that the coal will be transported to a railhead in the town of Huntley. The truck route into the town of Huntley as proposed follows a residential street (Heath Street) along which several homes are situated. The coal trucks using this route will have an adverse effect on the safety and health of the inhabitants and others living along and using this street.

I wrote Meridian Minerals Company voicing concerns about this route. I suggested alternatives be considered. However, I am skeptical if they will consider them. I havenÃt had a reply to my letter to them written a month ago.

Perhaps the first step to judge whether my concern is justified is to have the BLM and the Montana State Department of Lands make an EIS for the town of Huntley.

Please write and let me know if the BLM will consider my suggestion thatÃn EIS be done.

Yours truly,

E.J.Meehan
1644 Heath Street
Huntley, Montana 59037

CC: Montana State
Department of Lands

FERGUS COUNTY
HUMAN SERVICES
Centennial Plaza • 300 First Ave. No. • Suite 201
Lewistown, Montana 59457
(406) 538-7468

December 15, 1989

RECEIVED
DEC 18 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Bill Matthews, Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301

Re: Draft EIP, Bull Mountains Exchange

Dear Bill:

206 I have reviewed the above draft, and it appears a lot of work has gone into the preparation of it. With regard to the Social Welfare segment, I would like to clarify our position. Could the third paragraph be revised as follows:

The current number of staff in Roundup can adequately dispense the required services. The highest caseload months are December, January and February. Personnel have been rotated from the offices within the six-county jurisdiction to assist during high caseload months if necessary (Boni Braunbeck, Director of Social Welfare Services, Lewistown, Montana. Personal communication June 24, 1988).

Sincerely,

Boni Braunbeck
Boni Braunbeck
County Director III

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Fish and Wildlife Enhancement
Federal Bldg., U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:
FWE-61130-Billings
M.02(I)

December 29, 1989

Mr. Bill Matthews, Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

RECEIVED
JAN 03 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dear Mr. Matthews:

The U.S. Fish and Wildlife Service (Service) has reviewed the draft Environmental Impact Statement on the Bull Mountains Exchange. The Service concurs with the Bureau of Land Management determinations that the preferred alternative for exchange of selected Federal coal lands for high-value recreational and wildlife offered lands will not affect the endangered bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), or black-footed ferret (*Mustela nigripes*).

207 Please note that on page 79 of the subject EIS that the bald eagle is incorrectly listed as a threatened species (listed as endangered).

Sincerely,

Donald Palawski
For Kemper M. McMaster
Field Supervisor
Montana/Wyoming Field Office

cc: Assistant Regional Director, FWE-60120, USFWS (Denver, CO)
Billings Suboffice, Fish and Wildlife Enhancement (Billings, MT)

DMC/dc/clh

"Take Pride in America"

NORTHERN PLAINS RESOURCE COUNCIL

Field Office
Box 858
Helena, MT 59624
(406) 443-4965

Main Office
419 Stapleton Building
Billings, MT 59101
(406) 248-1154

Field Office
Box 886
Glendive, MT 59330
(406) 365-2525

Bill Matthews, EIS Project Co-ordinator
Bureau of Land Management
Miles City District Office
PO Box 940
Miles City, Montana 59301

January 5, 1990

The following comments are on the proposed coal for land exchange in the Bull Mountains by the Northern Plains Resource Council (NPRC).

General Comments

The proposed exchange between the Bureau of Land Management and Meridian Minerals and its accompanying EIS has many problems. The document treats major portion of the environment in a very cursory manner. The Hydrology sections and the Subsidence sections are flawed and incomplete when examined closely.

208 We have major concerns with manner in which this project has been handled. By not running the payroll through the BLM the consultants received conflicting signals relative to the identity of their employers; the citizens of the United States through the BLM. The fact that Meridian directly paid the consultants who prepared this document is a major policy error. The management responsible had their authority usurped by using this method. It is very hard to believe the results of this document are "neutral" as a result of this policy. This is not to attack the credibility of the partied involved but is a statement about human nature: "he who is writing the paycheck" is going to get the attention. It has tainted the entire process and may very well have shaded the results.

The document had some good points but we feel the overall product was weak. By allowing Meridian to "drive" the process the BLM has done a disservice to the public whose resources they have been commissioned to protect. We are frustrated with our attempt to get information on the market analysis because everything seemed to be proprietary. While we understand the necessity to protect the interest of the corporation involved it does shut off an important aspect of analysis to the public.

The document seems to down play the value of the Bull Mountains as being some how not up to the quality of the offered lands. This flavor runs throughout the document and is very distasteful to the NPRC membership and a slap in the face to the people who live in that area. The EIS also consistently refuses to examine other methods for acquiring the offered lands. The BLM has exchange on the brain and the document reflects this thinking.

209 The NPRC is opposed to this exchange and would suggest either a leasing alternative or no action. When the value of the public's coal is put at a penny and one third we should look for other options than giving away our resources. The current structure of the exchange is unacceptable. The coal Meridians now controls was one give away (land grant) and we should be smart enough not to make the same mistake twice. A prudent agency should be able to just say no and find a better way to enhance resources and acquire lands.

The following are line by line comments:

210 In the abstract prior to page i the lands are described as "high value". It would seem that one of the things this document is trying to determine is the value of the land proposed for exchange? Where did the description "high value" originate?

Pg i

211 As noted during the hearings process the acreage noted in the EIS is now incorrect. It does point out the question of how the land was sold out from the exchange process? It further questions the reliability of the private party in the exchange and makes it hard to identify who is actually trading with who.

212 Within alternative A the implication is that there is no other way to acquire lands other than by exchange. What are the

213 other methods by which BLM can acquire lands? What is the BLM comprehensive plan for acquiring lands in the state of Montana?

Pg 1

214 At the time of the "spin off" there was an investigation by the Security and Exchange Commission about insider trading with regard to certain stockholders involved in the transaction resulting in the "spin off" of Burlington Resources Incorporated. Has the BLM looked into the ramifications of this investigation and how it would effect the exchange? Was the exchange initiated by Burlington Northern Holding Company including the Railroad or was it some other entity? What was the corporate structure when the trade was proposed and are there 2(c) implications?

215 YCC now appears to be completely out of the picture and document should reflect this change of events. The YCC stocking horse was the stated reason for beginning the exchange but are no longer a player in the game. The document should identify the change and what actions BLM will take as a result of this change.

216 BLM has stated in paragraph 4 that Meridian would exchange lands with "high recreation" values what is the definition of "high recreation" values? This is particularly true of priority land # 6. What is the current recreational use of those lands, in specific numbers?

Pg 2

217 Because of the sell off by another company the MPP for the Custer County area should no longer be considered or included in the document. Does BLM intend to identify lands to replace the lands sold off by "mistake"?

Pg 3

218 How much more recreation use can the Madison River stand? Access is not the only question that should be considered in the desirability of these lands.

219 Rapid development is not defined in the EIS. What is rapid development and what are the numbers to back up these assumptions?

220 Whether BLM wishes to slide out from under the question of monopoly, it does affect the exchange and the public concern as was indicated in the scoping comments. The BLM's own exchange manuals entire theme is geared to protecting the public interest so it is BLM who should look into the ramifications of the exchange creating monopoly and not leave it solely to a solicitor. The BLM has as good an understanding of the land ownership as any agency in the country and this portion of the monopoly cannot be ignored by the a responsible government agency. Is there a reason BLM refuses to take this responsibility?

Pg 4

221 Only the top 6 priorities have been appraised. Why was this done? Particularly with priority 4 removed from consideration other lands should now be appraised.

Pg 5

222 The recent decision by the coal team must be included in the document particularly the "special interest" motion to allow the current Bull Mountain proposal to treat the Bulls as a leasing alternative. (See Art Whittech motion in the PRCT transcripts from the October 31, 1989 meeting.) This action by the RCT definitely changes the priority of leasing as an alternative to exchange.

Pg 7

223 How was the decision made that surface owner consent does not apply to underground mining methods? There is no doubt that the surface will be impacted by subsidence. Does this not constitute a "taking of the surface" and therefore should come under the purview of surface owner consent?

Pg 11

224 The unsuitability criteria referred to in the 3rd appendix particularly 9-15 was not applied because there is no inventory. How can the Montana Fish and Game issue a specific number of permits for elk hunting, establish length of hunting seasons for upland game birds and bag limits? In every EIS that has been put out in recent years the wildlife inventory has been a crucial and indispensible part of the document. we would suggest an inventory be done.

225 BLM is touting the wildlife aspects of the "offered" land side of the exchange but glossing over the importance of one of the last if not the last prairie elk herd in the United States if not the world. This herd is located in the Bull Mountains. This aspect of the effect on the public interest as it relates to the exchange cannot be left to a mine plan, but must be addressed in this document. If a comprehensive inventory has not been done than one should be completed before any exchange takes place.

226 The document lacks consistency. When convinent the method referred for unsuitability is room and pillar yet huge portions of the EIS are dedicated to longwall mining. This document can not have it both ways. In order to protect the public interest the method of mining with the greatest impact must be the method used for establishing the use of unsuitability criteria. What was the logic behind using the lower impact possibility when all along Meridian has stated the operation would be a longwall mine? You must apply the greatest impact scenario or put stipulations in the EIS.

227 The stated reason for dropping the coal for coal exchange is there is not a proper inventory of the North end of the coal field. These lands have been explored to death by Consolidated Coal and Louisiana Land and there is no inventory available? The consistency is again lacking when we reference page i paragraph 16 and page 15. It states "if a larger operation began in the south tract it is likely their operation would eventually need to lease Federal coal in the North tract. Doesn't this point to a need for an inventory now, if none exists, for a good decision to be made for long term resource planning in the Bull Mountains?

Pg 13

228 If any dollar values are not equal what are the ramifications of a donation? If the result is a tax deduction, the overall cost to the public coffers would change and should be explained in the document so the public can analyze the true cost of the exchange.

Pg 15

229 Apparently the there is enough information to say there is a 19 year supply of coal to be mined but not enough information to consider the mirror exchange. Consolidated Coal and Louisiana Land conducted extensive exploration on te north side of the Bulls. With this back round in mind hasn't BLM dismissed this alternative without giving it serious consideration?

Pg 17

230 How can this alternative be dismissed when the appraisal is incomplete? This is not an even handed approach and the time lines for the appraisal seem not to be taken into account. This alternative was disregarded before it was analyzed.

Pg 19

231 Why is the time frame for lease by application singled out? I see no other time frames specificly mentioned relative to slowing up the process. For example the exchange time frame or the resources allocated was not mentioned in any of the same context as the leasing process. Wouldn't the fact that this document is now prepared reduce the "one year or longer" estimate? In fact wouldn't the process be enhanced by competition?

232 What are "sufficient reserves"? What is the BLM definition of reserve? This is a nebulous reference.

233 Under the denial of exchange the implication is there would be no development. Couldn't the coal still be leased?

Pg 22

234 Where are the federal revenues derived from? If the PILT payments are increase and the royalties are lost due to the exchange occurring where are these revenues? This presupposes a mine will result from the exchange rather than Meridian resource enhancement. The numbers used on the high employment scenario are just that high and therefore the payroll taxes are also high. If we are going to analyze these types of taxes as income to the government, surely we must we must look at depreciation and other deductions that will reduce this"addition to the federal coffers?

In the demographic portion the in-migration patterns are underestimated. Were the numbers of trained longwall miners and or miners with continuous mining method experience provided by Meridian? There is a minimum one year training period needed to learn to operate this type of equipment. (Donny Sams UMWA,Denver) Therefore the number of new people in-migrating will be larger than is reflected in this document. The County approach is also inadequate because the area most like to be impacted will be Shepherd and the capacity of a community that size absorbing any larger influx than is anticipated is not analyzed. Especially the transportation sector.

Pg 23

235 Under the Social analysis the "not all" should be changed to most.

236 The statement is made there will be no impact on agriculture. This assumtion is ridiculous. The areas that will be most effected are range lands. Why was there no one on the project with range economy or range management background? This exchange will effect the ranching operations in the area.

Pg 25

237 Where there is heavy machinery there will be hazardous wastes. What is the BLM definition of hazardous wastes?

Pg 26

238 To say there will be no impacts to water is unfounded. Any area that has seen longwall mining has seen impacts to the hydrology. See IC9007 Bureau of Mines Information Circular and other federal publications.

239 The same can be said of the subsidence impacts. The analysis of the strata above the coal seems inaccurate. According to the Thompson Report the strata is made up of different materials than the EIS has indicated. The make-up of the strata as well as the thickness correlate closely to subsidence and water impacts. Where did BLM get the strata information contained in the document and how was it verified?

240 The EIS makes it sound as if BLM is desperate to acquire this land. Is exchange the only method available to federal government to acquire land? Is the federal government incapable of purchasing land? Couldn't the coal be leased and the royalties used to purchase the lands?

Pg 31

241 BN had a major pull out and we would question the numbers used in the document as being dated. Why are 1985 numbers used in this portion?

PG 69

242 The study used to determine the white tail population is dated 1978 and yet in the same analysis the 1984 Hawk Creek fire is used in reference for wildlife analysis. Why the disparity? Isn't there a more up to date study?

Pg 74

243 Are these numbers validated by current field analysis? For example the conductivity numbers?

244 The coal to the Northwest is saturated with water. Won't flushing the spoils cause degradation in quantity and or quality of the water as it migrates?

245 The importance of surface water to wildlife is ignored in this section. Stock water is mentioned but there no mention of the value to wildlife. Isn't this also a prime source of water for wildlife?

246 There is no mention of the effect on alluvium by mining. Won't here be effects on the alluvium?

Pg 77

247 The spring data has inconsistencies in the Temperature for spring 009. There is no reference that can be found in the report cited. If Rioux and Dodge are the source then they borrowed the data from an earlier study.

248 What is the source of "limited opportunities" comment? On what data is this conclusion based? Potential for increased use is low? This has not been the case in the other areas of Montana with coal mining. This is a grossly underestimated impact resulting from the exchange.

Pg 85

249 The document seems to swoon over the upland game population in the offered lands but deemphasizes the Bull Mountain upland game population. Why is the Bull Mountain game population less of a priority?

250 A significant risk in this exchange is the possibility of a patent being issued on the minerals and the result is BLM has exchanged for recreation land that could be mined (conceivably by Meridian). Considering the history of the area (ie the mining) isn't this a tremendous risk to take with the public's resources? The 1872 Mining Law provides a huge risk for the public.

Pg 87

251 The cloak of potential endangered species on these lands is just that a cloak. As stated in the EIS no plants have been identified on the offered lands. Why has BLM tied the importance of these lands to the endangered plant species if none are found on the lands?

252 There is proven oil and gas in the area. Is BLM is betting that Meridian or some other company will not come in with oil rigs? Another strike against the exchange. The prime reason mentioned as a virtue for this tract is the deer habitat. How will drilling effect deer habitat? Doesn't BLM view the spliting the estate as devaluing the lands?

Pg 89

253 It was stated very early on the entire reason for the exchange request was to allow a small company to propose a mine. It has become obvious that YCC is out of the picture and the document should reflect this. The time frames listed are no longer valid.

254 With YCC out of the picture would the numbers used change if it was Meridian submitting the data?

Pg 90

255 There is no discussion of the waste burden the land will be carrying as a result of the exchange/mine and the potential effect on the public domain by this problem. Will BLM consider the waste problem in this document? There will be millions of tons of waste and the BLM should not leave to the mine plan as it will be a direct result of the exchange.

Pg 106

256 To state the effects on the hydrology will be minimal is way out of the realm of scientific certainty. The individual preparing this portion is obviously biased or uninformed. A consistent finding in areas of longwall mining is water loss or degradation. What independent information has the BLM gathered to substantiate this assertion? The BLM was certainly aware of the state hydrologists opinion about this finding yet chose to ignore the opinion of experts that are working in the field, in Montana every day. This should have raised a red flag to BLM right away. Why did BLM ignore this report? To quote the report " the possible severe fracturing and leakage of shallow alluvial or perched overburden could have a very significant impact on valley floor hydrology". It goes on to say there will be "major foresee able impact." The process is flawed when conclusions found in the EIS are allowd to appear in print. Frankly, it should have been reviewed before the release of the draft. This proposal will very like dewater or degrade water over a very large area. This is just too high a price to pay under any circumstance.

Pg 107 & 150-1

257 This document dedicates pages to employment but give little attention to subsidence. The purpose of this document is to see if there will substantial effect on the environment and if that effect is worth the risk of exchange. Subsidence will degrade the surface and for BLM to throw this responsibility on to the State regulatory agency is shirking the trust given to the BLM by the Citizens of the United States.This approach will short future generations. This type of mining has left a legacy of fissures, cracks and waste lands wherever it has reared its ugly head. A much more through and comprehensive study of the effects must be undertaken to get to the true effects caused by subsidence.

257 In Utah, Colorado and other states with deep mines the damage has been evident and everlasting. (See the Dunrud USGS 1976) Look at the available studies out there, THERE WILL BE DAMAGE FROM SUBSIDENCE, not minimal but major impacts. These impact will not be able to mitigated. This part of the document is unacceptable.

Pg 109

258 The estimates for employment are high according to UMWA figures. Has the BLM verified these employment numbers?

Pg 196-99

259 The royalty discount rate is too high. Many other agencies are currently using a much lower discount rate. The USFS is currently using rates in the 3 to 5 percent area. We would ask the BLM to investigate this calculation method.

Clyde Dailey
NPRC Staff

JAN 03 1990

COMMENTS II ON DRAFT EIS

BULL MOUNTAINS COAL EXCHANGE

January 4, 1990

By Ellen Pfister

926 Yale

Billings, Montana 59102

When Meridian Minerals Company filed its letter dated April 29, 1988 with the Bureau of Land Management requesting a land exchange proposal under 43 C. F.R. §2201.2, in the course of its discussion, it cited a case National Coal Ass'n v. Hodel, 617 F. Supp. 584 (D.D.C. 1985), aff'd F.2d 523 (D. C. Cir. 1987). The exchange in that case involved 2 branches of the Federal Government, Princeton University et al, and Rocky Mountain Energy Company, a wholly owned subsidiary of Union Pacific. The judge in passing mentioned that Rocky Mountain Energy, as an associated company of a land grant railroad was precluded from acquiring coal lands by federal lease, and that the standards set forth in the Federal Land Policy Management Act (FLPMA) did not require the consideration of monopolistic or anticompetitive aspects of a trade. It did require other considerations.

There has been a consistent denial by BLM personnel ever snce this trade has come up that Meridian Minerals Company is not part of the association of companies generated by and associated with Burlington Northern Railroad. I find the citation of that particular case by Meridian to be very interesting.

260 Is it a tacit admission by Meridian that they are in fact too closely associated with railroad ties to be eligible to go through the regular coal leasing process in light of 30 USCS §202? Is the only route open to them to acquire addtional coal reserves exchange of either coal or land? The determination of Meridian's elegibility to lease or not to lease does need to be made before this exchange is considered, because the public interest questions and considerations are different under each circumstance. If Meridian is indeed ineligible to lease, then the discussion of leasing in this draft exchange EIS is moot

260 unless Yellowstone Coal became the petitioner for a lease. In the last year Yellowstone Coal has been virtually invisible to all parties on the ground in Montana, so I think the only party that has to have status determined with leasing is Meridian.

The mine map that Meridian has shown around the country for the last year as its high production scenario map covers about 30 sections, approximately a 1/3 larger land area than that shown on page 9 of the draft EIS. Is this exchange proposal merely the first of several in order to complete this mine expansion? The Corral Canyon case talked about logical mining units. The map on page 8 conforms to the mining 261 unit that the YCC Kentuckians discussed with me in January 1988. The exchange that Meridian has applied for takes in about double what the YCC boys wanted, but not enough for Meridian's grand plan as evidenced by the attached copy of Meridian's map. I do not see how this exchange as applied for makes a logical mining unit as compared with this map.

Why do Meridian's high production maps not match in land area affected?

Does BLM know if the lands proposed for acquisition have been surveyed for locatable minerals? There is an outfit in Bountiful, Utah that is sending out people to survey the West bucketful by bucketful, analyzing the gravel collected and compiling a data base area by area of locatable minerals. They were in the Bull Mountain and North 262 Yellowstone County area in the summer of 1988. They have their information for sale to any one who wants to buy. I think it would be a poor payoff to trade this coal off for land that could be then removed from the Federal "protection" for a hundred dollars worth of work for a few years.

The ad valorem taxes on Tract #1 of the Madison River property are no higher than much of the dry land on the Northside of the Yellowstone in Yellowstone County, which does not rank it very highly as grazing land. Ted Turner paid $200.00 straight across for river frontage and range land. The access shown on the map to tract No.1 does not look very 263 good. It looks like the best access is from the waterside. I find it difficult to believe that comparable sales of raw, undevloped land in that large a tract are that high given the quality of the access that it appears to have. I think that straight across acreage pricing on that tract is poor policy.

I think that in this EIS BLM is soft pedalling pressures being brought to bear to reduce or eliminate food and fiber production on federal lands. It is probably realistic to expect that BLM will attempt to reduce or eliminate grazing on the acquired lands. It is hinted at around the edges, but the economic impact of reductions is not 264 discussed. There is an attitude within Federal agencies that individual ranchers can absorb economic blow after blow and no one has to account for it. I am attaching an article as Exhibit "B" regarding the purchase price of the Ted Turner property, it proposed removal from livestock production, and the possible effect on Madison County. BLM's tendency to reduce or eliminate livestock grazing will not help Madison County pay its bills.

BLM in this EIS portrays itself as a preservation agency, but all of these lands if acquired are still subject to oil and gas development 265 by Meridian--even along Blue Ribbon trout streams, and further open to mineral extraction upon entry under the 1872 Mining Law. I think that the only thing they are likely to be protected from is the lowly cow.

266 Why doesn't priority Tract No. 6 abut the National Forest. If the BLM is attempting efficient management of lands abutting the Forest, it does not make sense to leave a two mile buffer zone between acquired lands and the forest.

267 On pages 76 and 77, a Spring is listed as SP-009 and given a legal description of 06N27E17AAA. SP-009 is listed on Page 77 as having a complete chemical analysis done. Both tables extrapolate from Rioux and Dodge, published in 1980. However, when one checks Rioux and Dodge on page 45 on Chemical Analysis from Springs the legal description for the only spring in Section 17, T 6 N, R 27 E analysed is ABAB. That chemical analysis was done August 25, 1972. The Records of selected springs and measure field parameters appearing on p. 26 on which two springs in Section 17 appear were sampled November 14, 1977. The legal description of those two springs are AAA and ACC. Is it safe to say that the work on page 45 was not done by Rioux and Dodge? What spring did that researcher intend to analyse? How did the compiler of the table on page 77 of the EIS arrive at the conclusion that ABAB was the same legal description as AAA?

On page 77 below Table 3.43 there is a note that many known springs were dry on 8/5/88 due to lack of normal precipitation in the area. After that date we developed the sping SP-023, with a culvert, pipeline and tank; we dug small spring fed pits in Section 33, T 6 N, R 27 E; we developed a large spring fed pit in the NW¼ NW¼ Section 28, T 6 N, R 27 E (Bessie's Pit); We dug a small pit and got water at the High Basin Spring in Section 28. Fred Johnson developed two springs with culverts and tanks in Section 29. None of the springs that we use and depend on went dry in the summer of 1988. I would be interested to know

from the Table 3.43 which springs listed in that table actually went dry in the summer of 1988? I know that SP-012, SP-022, and SP-023 did not.

Within the Sections containing Federal Coal proposed for this trade there are at least six springs. Using elevation data for the springs and extrapolating the structure and elevation of the Mammoth coal as shown in Open-file Report MBMG 100, by Keith S. Thompson, dated August 1982, Figure 5., page 14, I have prepared the following table showing the spring by location, its elevation, and the approximate amount of overburden to the Mammoth coal seam.

All springs are in T 6 N, R 27 E, MPM

Spring	Sp. Elevation	Depth to Mammoth Sec. 18
Sec. 18 DDDD	4020	195
Sec. 20 AABB	4160	335
Sec. 20 BCCC	4090	240
Sec. 28 BCDD (Bull Spring)	4480	536
Sec. 28 BCDD (Big Dam on Top)	4370	426
Sec. 28 BBB (Bessie's Pit--not in Rioux and Dodge)	4300	356

Additonal extrapolations on other springs located within the life of the mine, but not over Federal coal are as follow:

Sec. 17 AAAA (Bussey Waters)	4020	215

Sec. 17 ABAB	4060 (approx.)	260
Sec. 17 ACCD	4075	275
Sec. 21 ADDB	4440	590
Sec. 21 BACA	4270	420
Sec. 21 BBAB	4220	370
Sec. 21 DAAD	4465	615
Sec. 29 AAAD	4260	360

(NOTE: there were two additional springs developed in this Section in August 1988.)

268 Most of these springs lie within the 200 to 400 foot range of overburden. Is that amount of overburden subject to compressional healing in the rubble zone of longwall mining?

Is compressional healing of the fracture zone a theory or has it been documented by coredrilling after the fact? If so, where and in what studies?

269 The amount of overburden for most of the springs in the area doesn't seem to be very preventive of dimunition or loss. A survey of literature regarding longwall mining, subsidence, and water turns up a lot of literature regarding subsidence, but not much connecting subsidence and specific waters. The hydrologists say the water level will reestablish itself, but do not say how long will be the period of restablishment. . . and particularly not for individual waters. Are there documented cases of spring recoveries in longwall mined areas? If so, in what publications are they documented?

270 How is the Tongue River member of the Fort Union Formation recharged in the area South and East of Dunn Mountain? If the shallow

270 waters on the North side of Dunn Mountain are damaged by longwall mining, and it causes more wells to be drilled into the Tongue River member below the Mammoth, would that increased water depletion cause water draw down in wells on the South side of Dunn Mountain?

271 In Keith Thompson's discussion of water and mining in the Bull Mountains, he indicates that either with strip mining or with longwall mining the levels of sulfates in the water would increase. Since January of 1979, the Bull Mountains have been in a prolonged period of sub-normal moisture with approximately four years of normal precipitation and the rest sub-normal to drought. In the last three years we have had cattle diagnosed with copper deficiency for the first time. According to the Veterinarians, it is due to an increase in sulfates in the well water. An unpumped test well at Colstrip upgradient from the strip mine showed the same increase in sulfates between the mid-70's when it was drilled and the mid-80's when it was next monitored. If this increased sulfate level is a permanent thing, then the addition of more sulfates from water permeating fractured shales could be even more serious than Thompson projects when he discusses longwall mining. At what point do sulfate levels in water become toxic to cattle and unmitigatable with copper shots?
Have there been studies done on the affects of high sulfate waters on deer, elk, or antelope? If so, what are they?

272 It has been stated publicly that Meridian is now the owner of 51% of Yellowstone Coal. Has that been verified by documentation from Meridian and Yellowstone Coal? If that statement is true, then Yellowstone Coal would come under scrutiny on the question of railroad control and federal coal leasing eligibility.

On page 77, recreation in the coal trade area is discussed. Did the BLM inventory the ranchers in the area to find out how many days of hunting and recreation were actually allowed on private lands in the area? Agriculture is probably the only business that is expected to be happy to allow any person off the street to come into the midst of its business operation and allow guns to be discharged in an unsupervised manner. The Montana Fish and Game Department does not have the personnel to supervise all the general public hunting at large. Many business in town have signs on their premises that most of a particular business is off limits to unauthorized personnel.

Trapping and varmint shooting are also allowed on private lands in the area. Government trappers have been unable to give consistent attention to coyote control. We have been able to work with private trappers over the years for their recreation and our benefit. As a further note: Deer number have never recovered to the numbers of the 1960's ever since the coyote population was allowed to increase in the late 60's and since. Trapping does not eradicate them, but merely controls the numbers. The Bull Mountains is not suitable for helicopter hunting of predators. Private landowners would probably allow more hunting if there were more deer, but with the coyote population, the excess deer are going to the coyotes not the hunters. It is also a matter of building relationships.

272

After the big fire of 1984, when we lost 90% of our grass and fences, there was not one single person who we had permitted to hunt who called up and said "What can I do to help you?". They called to find out if there were any deer left, but not to do anything that might help those deer come back. The hunter's hands were conspicuously clean of the dirt and soot of recovery.

An additional factor in the restricting of hunting is the closeness of this area to Billings. If the landowners allowed unrestricted hunting, it would soon be denuded of game, and the Fish and Game Department would then have to step in and restrict hunting because of population pressure to allow the game to recover. In the mean time it would be like living in a shooting gallery.

273

Have any of the preparers of this Draft EIS ever physically been on the ground of Section 28, 33, and 34, T 6 N, R 27 E? If so, who and when? Of the list of parties on pp. 138 and 139, I recognize only the name of Dennis Garnett who was there legitmately. John Taylor requested to come, but the one day he offered to come out, it was too muddy to get him in to the site. Was any on the ground archeological scouting actually done for the purposes of this EIS? It sounds like the archeological work is more like a statistical projection. The attitude is--well, there might be some sites there, but it's private surface, so who cares.

274

On Page 147 is a list of unsuitability criterion. What does it take to designate something a potential National Natural Landmark? I don't know the standards, but Dunn Mountain is certainly a pre-eminent viewing point. From its top are visible the following Mountain ranges:

The Snowys
The Sarpys
The Big Horns
The Pryors
The Beartooths
The Crazys

275

The same factors that make for a wonderful view from the top of Dunn

Mountain, also mak. it an excellent site for radio transmission. I don't think that any of the nameless people who evaluated Dunn Mountain on Criterias 5 and 8 were ever physically on the ground on Dunn Mountain. There has been a reluctance on the part of the current surface owners of Section 33 and 28 to permit additional devlopment of Dunn Mountain, because of the spectacular view. Three additional radio easement installations have been turned down in the last ten years. In addition, there has been no oil and gas leasing on Sections 33 and 28 because of fear of seismographic damages to springs in the area. There was some discussion of foregone economic opportunities in this EIS. Some of the surface owners in the area of this trade have turned down short-term economic windfalls such as oil and gas leases and seismic exploration requests, in the interest of protecting long-term water use.

275

The EIS gives almost no discussion to agriculture or to the affects of this action on ranches in the traded area, except to say that no affect is anticipated. If no affect is anticipated why did Meridian try to trade at least two if not three ranchers out of the coal area this summer? Did Meridian think that if it all ready had the surface over the coal that all questions of public interest and policy would then be moot in this exchange?

276

One of the reasons that this attempt at removal failed was Meridian et al's record as landowner. The railroad lands have consistently been managed with as little investment as possible for improvement by the landlord with leases that give the lessee a bare two months to remove themselves in the event of termination and with no incentive for the lessee to improve the land beyond the bare minimum needed for use. The railroad has evidenced no interest in the land

except for investment purposes--very much like the old British landlords who just wanted the rents. Absentee landlords are usually very poor landlords.

At present there is a land use exchange on the federal surface of Section 32 T 6 N, R 27 E, and the Federal portion of Section 4, T 5 N, R 27 E, under which I have used those areas. I have seen slides of areas in Utah which were closed to public use because of the hazard caused by longwall mining. Since most of the land longwalled in Utah is under public land, has there been any record kept of the trend in AUMs permitted on the Forest Service lands since longwalling began there in the mid-70's? Have the numbers trended up or down? What kind of investment has the Forest Service made in water developments in the longwall areas in those years?

277

Section 32 has large sandstone cliff and relatively shallow overburden on most of it. Would longwall mining under the Federal surface cause such instability of cliffs in the area that public access, including grazing, be prohibited during mining? If so, for how long afterward? Will there be enough of Section 32 left after mining to make it worthwhile to make the investment to change from user to permittee? Will there be a viable number of AUMs left on Section 32?

278

Will the user or permittee be forced into non-use during the mining process? At some point BLM as the manager of the surface of those lands should address this. The State's Mine Plan EIS has no jurisdiction to consider this. The Denver Office of the Bureau of Mines is supposed to be studying subsidence in the Western United States. They may have some answers as to timing and the amount of damage that may be expected in an area with shallow overburden and large sandstone cliffs.

279

12

280 The country on the South slope of Dunn Mountain tends to be late winter and spring range for elk. Gary Dusek did no wild life studies on the South side of Dunn Mountain. The elk have quite a traveling range, but for sheer privacy in the spring for calving, Dunn Mountain cannot be better. Charters usually do not move onto their summer range until June, and we do not turn out until May at the earliest. It also means that we are busy elsewhere and human intrusion is at a minimum.

281 On page 56 discussion is made of the fire protection in Yellowstone County. The EIS drafter must have gotten hold of a very new fire chief in Billings, because the fire protection information is inaccurate. The person to have gotten the fire information from with regard to County protection is Jim Kraft, Civil Defense Director. The Shepherd Volunteer Fire Department is responsible for fighting fires in the Shepherd area before the Huntley-Worden Department is called in. The State also keeps a pumper truck at the PK Ranch on the CA Road in the vicinity of Dunn Mountain. There is also various private equipment for fighting fire in the vicinity of the proposed mine.

p.66 The average frost free period in the Bull Mountains is maybe 100 days. Sweet clover on the South side of Dunn Mountain blooms about three weeks behind the Yellowstone Valley, and on the North side of Dunn Mountain, it blooms about three weeks behind the South side. The extrapolations of temperature and moisture from the nearest reporting stations do not fit the Bull Mouuntains too well because of elevation and moisture differences. On the South side of the Bulls, the winter temperatures usually average warmer than Billings by a degree to ten, but somehow in the spring because of the overall higher elevation, the ground and the temperatures are more reluctant to warm up.

13

There is an easement for an airstrip on top of Dunn Mountain. I understand that at least one plane crashed on it because of severe cross winds. Because of the rugged topography, one wind monitor would not give adequate data. There is almost always upper level wind, and sometime lower level winds that reach into the sheltered valleys.

282 Agriculture is discussed on page 67 and dismissed in two lines. I understand that Fred Johnson raises alfalfa and cuts hay in the valley in front of his house. Dunns farmed on the top of Dunn Mountain. The piles of rock they carried from the fields are still around the edges. The integral value of these lands to the ranches that share them is not grasped by the drafters of this EIS.

283 On page 68 mention is made of threatened and endangered species. My husband thinks he has seen a peregrin falcon after our chickens in Sec. 22 T 5 N, R 27 E twice in the last two years. We have also seen young eagles circling out in front of our house this fall. In the last twenty years a varmint called a Richardson's ground squirrel has spread in the country, and they are now in the valleys all across the South face of the Mountain. The drought has caused them to expand their range in the last year. I expect that coyotes and badgers are not the only ones hunting them.

284 On page 68 wilderness qualities are discussed. It should be noted that the roads are on the edges of the country in question, not through the heart of it. It is at least 7 miles as the crow flies from my house in Sec. 22 to Fred Johnson's in Section 18. That is the nearest neighbor to the North. It is 9 miles between my Mother's house and Nick Janich's by crow. It may not be wilderness, but it isn't downtown Billings either.

14

On page 69 under wildlife discussion--since 1984 on the South side of the Bulls there has been only one year that has resulted in abundant forage, 1989. 1985 was dry with a beginning grasshopper cycle. 1986 had normal moisture, but with a huge grasshopper explosion in the lower elevations and in certain areas under the Mountain. 1987 had subnormal moisture and huge numbers of grasshoppers, who apparently starved themselves to death before large number of them could multiply. In 1985, 1986, 1987 and 1988 there was a great deal of low level wind which swept down the longer valleys and prevented the grass from reestablishing itself very well without the shelter of the big white sage which also burned. In place of the grass came numbers of stick-tights without end. In places before the fire where we had stands of Western Wheatgrass, we had sticktights. The wind wicked the moisture out of the soil so badly that even the sage had to fight to come back. In 1988 the wind was less, but the winter grass crop grew two inches high due to the lack of moisture, and we fed hay until the first of May 1989. 1989 has been the first year since 1984 in which events have conspired "to release the forb grass understory" in any signifigant way. The elk and deer moved out looking for food, and we just barely hung on. 285 The elk were as far South as Section 36, T 5 N, R 27 E this spring in March, and it is real short of "thermal cover". They were looking for grass.

I think that it would be in the best interest of the public to lease these coal lands to Meridian rather than exchange, because at least there will be a guaranteed royalty payment to the Federal Government and a sharing of that payment with the State of Montana for the benefit of all its school children. If Meridian is able to lease, I

15

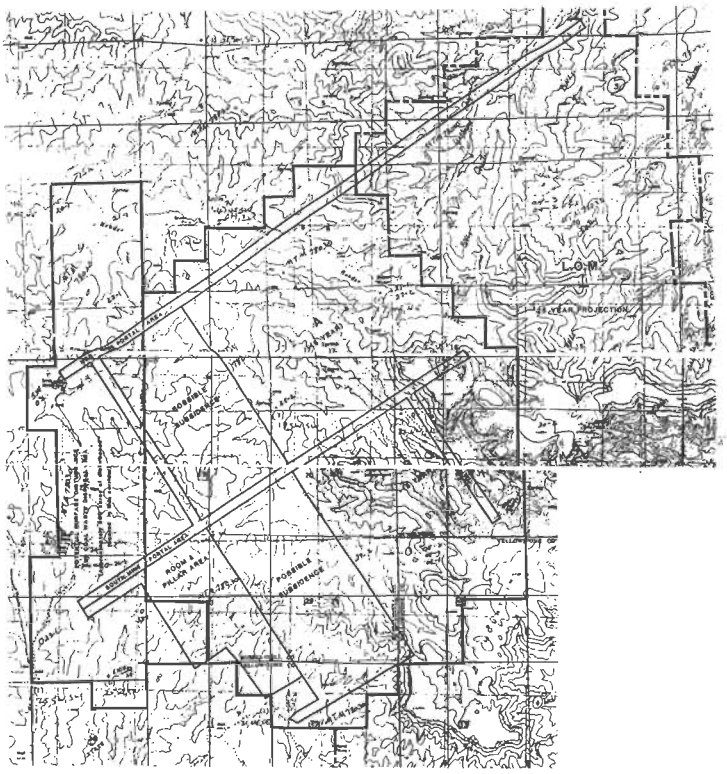
286 think it is the best route. Water stipulations can also be put into the leases, to reinforce water protection which in the face of underground mining is in a very uncertain position. The bulk of this exchange is for the benefit of a few fishermen. It will bring no determinable return of money for either the Federal Government or the State. It will increase the administration costs of BLM--hardly a desirable end in the light of Graham-Ruddman. It will likely result in a decrease of the production of food, if BLM proceeds along the lines it has indicated.

287 If it is determined under Corral Canyon that Meridian is ineligible to lease, i. e., being too closely tied to a land grant railroad, will Meridian be able to build and run a railroad to haul out its coal under the restraints of the Interstate Commerce Act?

288 If it is decided to make the proposed exchange, protections for water quantity and quality should be written into the restrictions of the patent in an effort to preserve the multiple-use aspect of the Federal Coal area.

289 I think it is time to begin the legislative process in Washington to clarify policy regarding the land grant railroads, their coal lands and the questions regarding exchange, lease, haulage, competition and anti-trust. As these coal reserves have been valued, it would be possible for the railroads to trade almost any old piece of ground and wind up with the lion's share of coal reserves in the West. I think this trade proposal is an effort to run it up the flagpole and see if it flies. The current laws and court cases have resulted in a number of catch twenty-two situations, especially since so many of the railroads in the Northern coal bearing areas have been consolidated into one.

Exhibit "A"



Exibit "B"

Big money buys prime agricultural lands for wildlife refuge

(This is the first of three parts about pressures on traditional agricultural land uses from scenic, wildlife and recreational demands in Montana.)

By Carl Rieckmann

Pictures a prime line of prize Montana cattle, standing upright with straw hats and canes, hoofing feverishly to the music as they still stage left.

If the folks at Walt Disney Studios were doing the imagery, that's how they might portray the beliefs of some observers that the century-old agricultural traditions of Montana farms and ranches with scenic, wildlife and recreational amenities may be exiting stage left.

They are federal and state governments, environmental foundations and well-heeled out-of-staters increasingly snapping up private properties, often at premium prices that necessarily make continued agricultural operations taken hazardous.

And once properties in particular areas sell for substantially higher prices than their agricultural use has supported in the past, they set precedents and patterns for other area land values that may affect remaining agricultural cost/return factors.

Much press has been given to cable television magnate Ted Turner's substantial Gallatin, Madison and Broadwater counties ranch purchases.

In his case, he had major financial clout to buy at good prices — a little over $200 an acre for the huge Flying D Ranch along the Madison River — and still the ranching functions on these lands apparently will pass into history.

Turner can afford to convert the lion's share of these holdings into wildlife refuge, as he has pledged he will, especially with the incentive of income-tax writeoffs.

Some livestock producers view that prospect with alarm, saying it will have substantial negative economic impacts on local communities through loss of cash flows from traditional agricultural operations.

Rancher Jess Kilgore, a neighbor to the Turner acreage on the Madison, estimates the loss could be as high as $4 million.

The trek of the rich and famous to scenic Montana ranchlands continues as NBC news anchorman Tom Brokaw acknowledged last week buying "with a couple of friends" a 4,000-acre ranch on the West Fork of the Boulder River — and he is talking about "some kind of conservation plan" for it.

Prices continue to work their way up in places like the Paradise Valley north of Yellowstone National Park.

Also last week, the way officially was cleared for Montana Department of Fish, Wildlife and Parks (FWP) to buy from the Nelson family 2,098 mountainous acres of grass range 14 miles north of the park's boundary for winter elk habitat — at about $705 an acre.

Montana Fish and Game Commission and the Board of State Land Commissioners have approved the purchase at the nearly-$1.5 million-appraised price.

Steve Knapp, FWP wildlife habitat bureau chief, says he is unsure about the basis the appraiser used for the property.

He notes the adjacent Dome Mountain Wildlife Management Area that FWP purchased in 1986 — about 2,600 acres for $843,000, or an average of $324 an acre.

The Dome Mountain property included a blend of irrigated hay land appraised at $1,200 an acre, non-irrigated hay land figured at $500 an acre and dryland grazing range figured at $250 an acre — for the $324-acre average.

Yet, other officials for FWP and Rocky Mountain Elk Foundation defend the $705 average for Nelson acres as comparable with and even less than other nearby sales for the same productive quality of grassland.

Knapp maintains the Nelson property is good elk habitat — open for winds to clear snows that might cover feeding growth for elk. Up to now, it has been used for livestock grazing.

And although he cannot say whether the state would manage the tract for other uses, Knapp notes FWP frequent includes other uses, including livestock grazing, on its wildlife management areas.

He points to the Wall Creek elk winter range in Madison County, enhanced by summer grazing, and to the Mount Haggen spread near Anaconda.

"Our property is in better shape because of it," he says of the livestock grazing at Mount Haggen.

Any notion that FWP routinely comes in and throws out livestock grazing and other uses on its wildlife ranges is not true, he asserts.

Earlier this month, the Rocky Mountain Elk Foundation, which also figured in the negotiations for the Nelson property, bought the historic OTO Ranch just north of the national park — 3,265 acres for $3.95 million, or nearly $1,210 an acre.

Intent is for its joint management by the U.S. Forest Service and FWP for elk until the foundation can sell it to the Forest Service.

Congress has appropriated $3.5 million toward purchase of winter range in the area, and some reportedly could go toward the OTO purchase.

One real estate broker, Duane Lindeman of Hockham & Lindeman Agency in Livingston, says the habitat-buying forays north of the park represent wild chapters in Montana's history of land values and uses.

"They're just buying acres — it's just crazy," he contends. "They're buying stuff on top the mountains and paying ungodly prices for it."

Next: More particulars on the magic of big money in the Nelson and Turner purchases.

BULL MOUNTAIN LANDOWNERS' ASSOCIATION
an affiliate of the Northern Plains Resource Council

January 5, 1990

Bill Matthews, EIS Project Co-ordinator
Bureau of Land Management
Miles City District Office
PO Box 940
Miles City, Montana 59301

Dear Bill,

Enclosed are our comments on the land for coal exchange proposed for the Bull Mountains. You will also be receiving further comments from individual members.

Sincerely,

Jeanne Charter

Jeanne Charter, Secretary
Bull Mountain Landowners' Association
Rte 1
Shepherd, Montana 59079

BULL MOUNTAIN LANDOWNERS' ASSOCIATION
an affiliate of the Northern Plains Resource Council

Comments on BLM Draft EIS on Proposed Bull Mountain Exchange:

290 1. The draft EIS lacks a clear analysis of the advantages of public coal leasing procedures over a private trade in protecting revenues, surface and water values, and competitive markets. Such an analysis is needed for the final EIS to be acceptable. The analysis must seriously address the precedents the proposed trade would set.

a. revenues:

291 The proposed trade would involve a major revenue loss--up to $100 million dollars--to the state of Montana when and if the coal is mined. The recreational tracts offer no serious financial return to us.

The draft EIS puts the upper limit on royalty returns at $76.6 million dollars. This assumes a sale price of $25 per ton and continuation of the 1989 Interior rule allowing deduction of state taxes and federal fees from royalties. There is a very good chance this rule will be reversed in 1990. In which case, total royalties would increase by about a third to over $100 million dollars.

292 By law, 50% of this lost revenue would go to the state of Montana to support the school system. 10% of the remainder goes to the federal government's general funds for administration. The remaining 40% goes into the Bureau of Reclamation's "reclamation fund" for water development projects. This money comes back in water project grants within the state of Montana; we almost always receive more in grant monies than we contribute in federal mineral royalties. (1)

293 This trade would also set an incredibly poor precedent for public coal valuation and revenue. The final EIS must address this serious precedent.

294 The trade would put a value on Bull Mountain coal--which, according to BN-Meridian, is some of the best coal in the state--at 1.3 cents per ton($730,000 divided by 54.5 million tons in the tract). The royalties now received from other public coal in the state averages $1.79 per ton (2).

BN-Meridian has a lot more surface to trade off and coal to block up in Montana. If this Bull Mountain exchange is approved, more trades will be proposed.

295 If BN-Meridian is allowed to mine coal and trade into control of a tract for 1.3 cents per ton--versus leasing and paying competitive royalties--they will never lease any coal. If this kind of deal is only offered to BN-Meridian, then only they will mine coal in Montana.

In the long run, the only fair policy will be to offer everyone public coal at the same price--including existing operations. If the government gives this kind of bargain to BN, they'll have to give it to everybody. Any mining firm should have the same right to purchase "high value" recreational tracts and trade them for coal reserves at a penny a ton... The coal industry won't rest until they all get the same deal. In fact, the Montana Coal Council is on record in favor of eliminating federal royalties altogether.

295 Through this trade, the BLM would be setting the stage to devalue all public coal to almost nothing. If the BLM values Bull Mountain coal at 1.3 cents per ton through this exchange, it will not have a leg to stand on in valuing any other coal reserves higher.

The future loss in cumulative coal royalty revenues to Montana and other western states would be staggering. The loss would not just be in the millions, but the billions.

296 For example, $36.8 million in federal coal royalties were generated in Montana in 1988 off 20.5 million tons of federal coal mined. $18.4 million dollars worth (50%) of royalties went to Montana schools and covered 8% of the school foundation budget. $3.8 million dollars (10%) went to the federal goverment's general fund. $14.7 million (40%) went into the Bureau of Reclamation's "reclamation fund" to underwrite western water projects. (1 & 2)

b. environmental protection:

297 By virtue of coal ownership, the BLM is in a unique position to protect surface and water resources. It is free to make lease stipulations creating buffer zones to protect water courses and steep slopes from the effects of longwall subsidence. Once the coal is traded into private ownership such protections become economically impractical. In the recent Whitney Benefits vs. the United States

298 case, the court ruled that environmental regulations that restrict development constitute a taking that must be compensated with monetary damages where the owner so desires. (3)

299 Under the 1975 coal leasing amendments, both the BLM and Forest Service can and have added stipulations to coal leases to prevent water loss and steep slope erosion from longwall subsidence. Our understanding is that such stipulations have been included in public coal leases in Colorado, Utah and New Mexico. (4)

300 The Montana BLM should consult with its colleagues in other western states to find out what kind of stipulations they have felt are in the public interest. A serious analysis of environmental stipulations in other public coal leases let for longwall mining is needed for a final EIS to be acceptable. Both federal personnel--such as Utah BLM director James Parker and Monte-LeSal Forest Supervisor George Morris--and state personnel--such as Diane Nelson of the Utah Department of Natural Resources--should be consulted. State

personnel have helped develop stipulations and do pre-subsidence surveys to establish buffer zones. (4)

300 A copy of the 1984 BLM coal lease to Colorado Westmoreland Inc. is attached as Appendix A. The lease stipulations in it were developed in co-operation with the Colorado state reclamation division. The significant stipulations call for: 1) replacement of water supplies, 2) water replacement plan in area drainages, 3) coal extraction to be limited in buffer zones along East Roatcap Creek and Steven's Gulch where overburden is 600 feet or less; the buffer zone to be sufficient to protect channels and alluvial fill and angle of draw, 4) a 1/8 mile buffer zone on each side of perennial, intermittent and ephemeral streams, 5) maintenance of water flows even after mining permit bond release, 6) compliance to be guaranteed through an increase in the period and amount of the BLM lease bond.

The BLM has an obligation to require that public coal be developed at least as carefully and conservatively in Montana as it does in other western states where longwall technology is employed.

301 If the pubilc coal is traded into private ownership, it would become largely impractical to protect land and water resources through regulation and creation of buffer zones. The cost to the public would be prohibitive. BN-Meridian would sue for just compensation under the fifth amendment and the 1989 Whitney Benefits vs the United States ruling. (3)

In the Whitney Benefits case, the court found that "the public at large, rather than a single owner, must bear the burden of an exercise of state power in the public interest." Most of Whitney Benefits' coal lies under an alluvial valley floor on Tongue River and the court found that the enactment of SMCRA took the plaintiff's property. The court found that a coal owner may reject a coal exchange and pursue a monetary award and is entitled to just compensation based on fair market value at the time of taking. Whitney Benefits was awarded $60 million dollars plus interest for 53.5 million tons of coal plus attorneys' fees and costs.

The final EIS needs to address the implications of the Whitney Benefits case for determining whether it is in the public interest to trade federal coal into private ownership. The assumption that federal influence is as strong through SMCRA regulations as through ownership and coal lease terms is invalid. There are likely to be major environmental and/or economic costs in a private trade situation that would not be at issue in a development through public lease.

As a footnote, there is a huge discrepancy between this court's $60 million dollar award for 53.5 million tons of undeveloped coal and the BLM's Northwest Regional Coal Evaluation Team's estimate that 54.5 million tons of undeveloped Bull Mountain coal (of similar BTU value) is only worth $730,000. This discrepancy needs to be addressed. It appears that the federal court has ruled against the draft EIS' method of minimizing of the value of undeveloped coal reserves.

c. fair competition:

302 The BLM is proposing to trade public coal to BN-Meridian for 1.3 cents per ton while it currently requires other Montana mining companies to pay an average of $1.79 per ton (2) for the right to mine public coal. In Utah and Colorado, the underground mines must be paying federal royalties in the neighborhood of $1.50 per ton. (4) It is not in the public interest for the government to grant one firm an unfair price advantage over its competitors.

303 Due to the 1864 Northern Pacific land grant, BN-Meridian's private coal holdings in Montana are massive. The map in appendix B illustrates the fact that BN-Meridian already controls close to half Montana's coal reserves. It was not chance that Congress made the railroad land grant in a checkerboard pattern. The reason they interspersed half the ownership in federal hands was to be able to limit the power of the big private interests. The logic is just as valid today as it was 100 years ago. One of the main pubilc interest objectives federal coal ownership serves in Montana is to ensure market competition when we have one private owner with such a large market share.

304 The Bull Mountain coal exchange is one attempt among many being made by BN-Meridian to establish major coal exchanges between the government and themselves as a legitimate federal activity. If this trade is approved, other proposals will follow. Adoption of an exchange policy that further increases BN-Meridian's power and resource empire in Montana would be economic folly, and certainly not in the public interest. Access to public coal coupled with their vast private holdings would guarantee this company domination of Montana's coal industry.

Section 2C of the federal Mineral Leasing Act has worked well to limit BN-Meridian's market power. 2C prohibits common carrier railroads and companies affiliated with them from acquiring federal leases. The Congress clearly intended to prevent the railroad interests from gaining monopolistic control of western coal development. Major exchanges to a railroad affiliate violate the intent of the law.

305 The draft EIS indicates the BLM plans to "pass the buck" to the Justice Department on whether the exchange would create unfair competition. A legal analysis is not enough. To be acceptable, the final EIS needs to include a serious economic analysis of how this and further exchanges with BN-Meridian would affect competition in Montana's coal industry. The precedent involved must be addressed. It is unacceptable for the BLM to develop a major exchange program incrementally rather than by deliberate policy.

The Justice Department has not enforced anti-trust laws anywhere in the economy in the last 10 years. They are very likely to sanction this kind of anti-competitive exchange as well. Lax enforcement by the Justice Department cannot be used to justify poor public policy in the Interior Department. The BLM needs to undertake its own economic

305 analysis of whether major exchanges with BN-Meridian are compatible with the public's interest in preserving highly competitive markets. This exchange would not become a good idea economically just because the Justice Department may not think it violates anti-trust statutes.

306 Interior regulations covering exchange decisions clearly require the BLM to consider basic economic concerns and not just monetary equality. The regulations read: "When considering public interest, full consideration will be given to better Federal land management and the needs of State and local people, including needs for lands for the economy...There must also be a finding that the values and and objectives which Federal lands and interests to be conveyed may serve if retained in Federal ownership are not more than the values of the non-Federal lands and interests and the public objectives they could serve if acquired. (emphasis added) (5)

2. The water impact analysis is inadequate.

307 We strongly question the Draft EIS water impact analysis' conclusion that "groundwater impacts are considered to be minimal" (p. 106) from a large-scale longwall mine. For the final EIS to be acceptable, a realistic water impact review needs to be done by someone independent of the company.

This minimal impact conclusion was based on an analysis done by a company-hired consultant. The job Marshall Corbett did is unacceptable. It ignores potential major impacts predicted by hydrologists from both the Department of State Lands and Bureau of Mines. It also ignores technical and case studies at other longwall developments which are contrary to his overly optimistic assessment.

308 An unpublicized State Lands memo (6) to the BLM advises that "the possible severe fracturing and leakage of shallow alluvial or perched overburden groundwater into the deeper aquifer system could have a very significant impact on valley floor hydrology." The state memo advises that both spring loss and loss of flow in area creek drainages from mining induced fractures are "a major forseeable impact". (emphasis is the author's)

The memo criticizes the company consultant's prediction that cracks would heal because his view is backed by no geotechnical analysis and contradicts observations made at underground mines all over the world. What can instead occur is "brittle failure, open fracture zones and the long-term loss of most or all of the perched aquifers overlying the mammoth coal seam."

309 The EIS also ignores a state Bureau of Mines report (7) which predicts longwall mining would seriously degrade water quality in wells downgradient (northwest) in the aquifer over time. The 1982 Thompson report finds the collapsed underground overburden would have a very high sodium content. As groundwater flows through the collapsed workings, it will pick up that sodium. The process would take many

years, but eventually, the Thompson report predicts post-mining groundwater would not be fit for human use. The Bureau of Mines report puts current sodium content in Bull Mountain well water at an average of 287 mg/L. It predicts post-mining sodium content would rise to 460-1840 mg/L--up to a 640% increase in sodium.

The EIS incorrectly maintains that fracturing and caving directly above the coal seam would be a "positive effect" (p. 121) since fractured material is more permeable. The permeable material at issue is also dangerously high in sodium, and groundwater quality would be very negatively affected.

The EIS' (and Corbett's) basic contention is that perched aquifers that supply local springs and recharge Dunn Mountain creek drainages will be "well insulated" (p. 107) from mining induced fracture development. The EIS claims enough of the overburden is comprised of shales and fine grained siltstones to prevent subsidence fractures from migrating much -more than 300 feet into water bearing layers and dewatering them.

These optimistic claims are not technically substantiated in Corbett's analysis and are contrary to evidence at other longwall mine sites.

309 The EIS claims 50-70% of the Bull Mountain coal overburden is comprised of shales and fine-grained siltstones (p.107). This claim is contradicted by the Thompson report (7) which shows the overburden to be only about 30% clay, shale and siltsones.

Dunrud (8) found in the Geneva mining area in central Utah that large tension cracks migrated to the surface 900 feet above the mine area and diverted all surface and groundwater flow. A geologic cross section shows about 40% of the overburden to be shale and mudstones, with some strong sandstones. Dunrud found in the Somerset mining area in Colorado that large tension cracks migrated to the surface up to 600 feet above the mine workings and diverted surface and groundwater flow into the cracks. A geologic cross sections shows over 75% of the overburden to be shale and mudstones with thin sandstones that pinch out. At the Oliver mine area in Colorado, springs and beaver ponds were dried up with an overburden of about 500 feet. 20 years later, the area was still dewatered.

Moebs and Barton (9) document a water well going dry with 950 feet of overburden to the centerline of a longwall panel. The geologic cross section shows about 50% of the overburden to be siltstone and clay.

In Franklin County, Illinois, the Old Ben Coal Company (a subsidiary of Standard Oil) longwall mines under 650 feet of overburden (10). The overburden includes a strong limestone bed up to 40 feet thick (11). The limestone bed tends to hang up for substantial distances from the face before caving creating heavy pressure at the face. Such a situation would tend to create more severe tension fracturing. Loss of well water, ponds and altered

drainage in the area have been documented by the Illinois South Project (12).

The EIS notes that Bull Mountain overburden includes massive beds of sandstone (p. 149) up to 60 feet in thickness. It fails to seriously address the influence of such beds on severity of fracture development and dewatering potential. Boreck (13) documents that thick sandstones do not cave well and tend to delay subsidence and make it much more violent when it finally happens. Adamek and Jeran (14) document that where resistant limestone and sandstone occur, the subsidence profile is much more extreme than with an homogenous overburden.

According to George Trevorrow of the Plateau Mining Company in Price, Utah (15), Cyprus mined through a stream buffer zone as an experiment. The stream dried up in the mined area and flows were reduced downstream. The overburden at the Cyprus mine averages 1700 feet thick (10).

The EIS fails to address the hydrologic impact of undermining the Dunn Mountain clinker beds. The EIS assumes (p. 121) this area will not be mined; that assumption is incorrect. The EIS' longwall mine plan on page 9 includes close to 2/3 of Dunn Mountain. The life of mine plan submitted to the Montana State Lands Department for baseline studies includes all of Dunn Mountain. A map locating the area to be
309 mined in relation to Dunn Mountain is included in Appendix C.

The EIS notes that the Dunn Mountain clinker cap is 80-90 feet thick (p. 73). It notes that the clinker beds are highly permeable and act as a temporary storage reservoir. It notes that the clinker cap is an important regional recharge source for local springs, area surface drainages and the deeper aquifer system. To be acceptable, the final EIS must seriously address the potential hydrologic consequences of longwall subsidence and fracture development under Dunn Mountain.

3. The BLM should conduct a realistic water impact analysis independent of the company.

We have reviewed the water impact analysis Marshall Corbett did for Meridian Minerals upon which the draft EIS totally depends. We find Mr. Corbett's analysis unprofessionally optimistic. It makes extreme and indefensible claims of minimal impact. It consistently belittles the Bull Mountains' water resources, which are in fact impressive relative to most of eastern Montana. A mapped inventory of water resources in the life of mine area is attached in Appendix D.

For the final EIS to be acceptable, a serious analysis of the potential effects of a major longwall mine on the Bull Mountains' hydrologic balance is needed. We feel Marshall Corbett has demonstrated himself unqualified to produce such an analysis. The BLM should contract with someone independent of the interested company who

is familiar with the impacts of longwall mining and the range of professional literature available.

An independent hydrologic analysis should answer the following questions: 1) What will happen to perched aquifers and related springs over the life of a major longwall mine? 2) What will happen to the quality and quantity of water in the aquifer downgradient of such a mine? 3) How will flows in Dunn Mountain drainages be
309 affected? There are a number of drainages to consider: Rehder-Halfbreed Creek, Fattig Creek, Railroad Creek, Razor Creek, Pompey's Creek and Parriot Creek. 4) How significant are the large clinker formations that cap Dunn Mountain as aquifer recharge areas? How would longwalling under them affect the hydrologic balance?

4. The life of mine plans in the draft EIS are incorrect and need to be updated as vital basic information for water and surface impact analyses. Appendix C shows the life of mine boundaries the State Lands Department is using for baseline studies. BN-Meridian is now talking about mining a much different area than originally outlined.

5. The subsidence analysis is inadequate.

The draft EIS merely notes that foreseeable surface subsidence
310 impacts include slope failure, surface fissures and altered drainage patterns (p. 151). For the final EIS to be acceptable, a serious analysis is needed of the likely occurence and severity of such impacts given the Bull Mountains' terrain, geology and precipitation patterns.

It is not acceptable to postpone such an analysis until a mine permit is approved. As was noted above, such a deferral is contrary to federal policy elsewhere in both the BLM and Forest Service. As an owner, the BLM is free to make specific lease stipulations (or patent restrictions in the case of a trade) in order to protect the environment where regulation of private coal development would
311 constitute a taking.

An adequate analysis needs to review remedies that are available to the BLM as an exercise of its property rights: including federal lease stipulation precedents, buffer zones, backstowing and other european mine design requirements.

The EIS' claim that "overall the landscape characteristics will exhibit little disruption" (p.121) is not supported by any technical evidence and is contradicted by experience in many other longwall mining areas.

David Smalldone of Utah Power and Light identifies problems with cracking, "spalling", sloughing and slope failure near steep slopes and escarpments (4). The Utah Power and Light mines have overburdens of 1500 feet and more over 9 foot seams (10).

As was noted earlier, existence of massive sandstones in overburden tends to make longwall subsidence more violent and caving profiles more extreme (13 and 14).

Dunrud (8) observed that the weight of ridges in rough country produces more tension fracturing than occurs in flat or rolling terrain. He observed large--some hundreds of feet long and up to as much as three feet in width--surface cracks migrating up from 900 foot deep mine subsidence.

In the east, large scale longwall mining has altered drainage patterns of entire watersheds and created serious erosion and drainage
311 problems. The Illinois South Project has documented such situations in Illinois, Ohio, Pennsylvania and the Appalachian states over mines with 500 to 900 foot thick overburdens (12) (10). Edward Hollop of the US Bureau of Mines Denver Research Center also has documented drainage impacts (4).

The Old Ben Coal Company mines in Franklin County, Illinois lie 650 feet below gently rolling farmland (10). Local landowners report longwall subsidence of up to four feet from a seven foot seam extraction, serious drainage disruption and field cracks that started 2-4 inches wide and grew to 12-15 inches wide (12).

Ingram's subsidence study provides photo documentation of severe sloughing, cracking and erosion over longwall panels in rough terrain in West Virginia (16).

According to Diane Nielson, director of Utah's Department of Natural Resources Mining Division, Utah has had subsidence areas on Forest Service and BLM lands posted and fenced to keep the public away from surface hazards (4). Overburden depths in Utah longwall mines is generally quite deep: 1500 feet or more (10)

6. The draft EIS contains no discussion whatsoever of mine waste disposal impacts. Mine wastes are recognized as a major environmental impact of deep mining.

For a final EIS to be acceptable, a serious analysis of mine waste impacts and disposal alternatives is needed. Disposal alternatives should include backstowing as a lease stipulation or patent restriction.

According to the State Lands Department (17), BN-Meridian
312 projects generation of approximately 25 million tons of coal processing wastes. The company plan calls for washing the coal mined, and projects a need for 400 gallons per of make-up water pumped from the Madison Formation. The surface and water quality impacts of disposal of all this water-saturated waste material has to be seriously analyzed.

7. The draft EIS predicts (p. 11) that Bull Mountain coal would not become economically feasible for development for up to 40 years. Appendix 11 provides a clear analysis of why development in the foreseeable future is unrealistic. Why does the draft EIS then proceed to assume near term development is feasible and imminent?

To be acceptable, the final EIS must resolve these contradictions. A serious examination of BN-Meridian's probable non-productive motives is needed, as well as an examination of the propriety of the government furthering a private speculative scheme with public resources.

313 Given the current glut of western coal already available for production, BN-Meridian's motives in promoting a Bull Mountain development need to be questioned. The recent history of "coal interest" in our area has been one elaborate charade after another whose real purpose was only to make resources appear more valuable so that they could be borrowed against or sold off. BN-Meridian's own term for this kind of non-productive activity is "resource enhancement" (18).

The BLM has no business helping BN-Meridian dupe some prospective lender or buyer into believing a big coal holding in the Bull Mountains is a valuable investment. The federal government has no business helping BN-Meridian "salt the mine"... Probably the greatest damage done is that it divides the local community and needlessly diverts people's energy from more productive pursuits.

The unnecessary polarization of local communities is a real and serious impact. People are making economic decisions in anticipation of real development. The final EIS should address the social, political and economic problems unrealistic speculation creates and consider ways to minimize, not exacerbate them.

8. The final EIS should investigate the legality of BN-Meridian's claim to ownership of the surface tracts and coal reserves under consideration for exchange.
The land and coal were originally granted to the Northern Pacific Railroad Company in the land grant act of 1864. The grant was made as a subsidy to and under condition of construction and continued operation of the railroad. There is a strong legal argument that
314 Burlington Resources--and its various subsidiaries--forfeited valid claim to their vast land and mineral holdings when Burlington Resources financially separated itself from the Burlington Northern railroad in December of 1988.

According to a Congressional Research Service analysis (19), the grant may be interpreted to have been made as a "fee simple determinable" in which case title automatically reverts to the federal government, or as a grant "on a condition subsequent", in which case Congress needs to take action to reassert title.

314 The original land grant language puts a serious cloud on BN-Meridian's property title.

9. We believe a serious legal analysis by the Justice Department will determine that the proposed exchange and the precedent it would set is in conflict with anti-trust laws and the intent of Section 2C of the Mineral Leasing act.

As was noted above, the BLM is proposing to trade public coal to BN-Meridian for 1.3 cents per ton while it currently requires other mining companies to pay up to $1.79 (2) (15) for the right to mine public coal. It is contrary to the general public interest and anti-trust provisions against overt price conspiracies and price discrimination for the government to grant one firm an unfair price advantage over its competitors (20).

Due to the 1864 Northern Pacific land grant, BN-Meridian's private coal holdings in Montana are massive. The map in Appendix B illustrates the fact that BN-Meridian already controls close to half Montana's coal reserves.

According to Connors (20), there is considerable statistical evidence and market experiments support the general finding that with a <u>four-firm</u> concentration above 40-60 percent, supranormal profits or
315 prices are generated. The economic and legal definition of market power is the ability to exercise some discretion over buying or selling prices; it is also the power to exclude would be sellers from entering a market.

The Bull Mountain coal exchange is one attempt among many being made by BN-Meridian to establish major coal exchanges between the government and themselves as a legitimate federal activity. If this trade is approved, other proposals will follow the precedent set.

Access to public coal reserves coupled with their vast private holdings would confer market power to BN-Meridian in Montana's coal industry. BN-Meridian would then be able to exercise some significant control over both price and entry conditions in Montana's coal field and markets. Such power in the hands of one firm is in conflict with basic anti-trust policy.

A specific Montana coal market is recognized to exist chiefly because of geographic advantages in transportation to the upper Midwest and theoretically to the West Coast. An anti-trust analysis must investigate BN-Meridian's potential market power in this regional coal market as well as larger western and national markets.

An anti-trust analysis needs to address conflicts between the proposed exchange and the intent of Section 2C of the federal Mineral Leasing Act. 2C prohibits common carrier railroads and companies affiliated with them from acquiring federal leases. The Congress clearly intended to prevent the railroad interests from gaining

monopolistic control of western coal development. Major exchanges to a railroad affiliate violate the intent of the law. In the past, the checkerboard pattern of federal coal ownership and enforcement of 2C have served to limit BN-Meridian's market power in Montana's coal industry. Major public coal exchanges would confer monopolistic market power on this company.

While Burlington Resources may have severed financial ties with Burlington Northern railroad in 1988, there are still very strong management ties between the two companies. In 1989 (21), Richard
315 Bressler was chairman and CEO of Burlington Resources, Inc; he was also chairman of the Board of Directors of Burlington Northern Inc. G. Grinstein was president and CEO of Burlington Northern Inc.; he was also on the Board of Directors of Burlington Resources, Inc. Nine other individuals served on both Boards of Directors: Z E Barnes, R P Cooley, D P Davison, M Garst, C M Harper, W P Hutchinson, T H O'Leary, G C Ryan and A R Weber. 11 out of 14 members of Burlington Resources' Board also served on BN's Board...

In the past 10 years, the federal Justice Department has been extremely lax in its enforcement of anti-trust laws. An adequate legal analysis must seriously consider the proposed trade and the precedent it would set in context of strict enforcement of laws against overt price conspiracies (cartels), price discrimination including predatory pricing, mergers, monopolizing regional markets and consumer protection.

SOURCES

(1) personal communication with Rod Samdol, Montana State Lands Department

(2) personal communication with Terry Cohea, Montana Superintendant of Public Instruction Office

(3) Whitney Benefits vs. the United States, US Claims Court, No. 499-832, filed October 13, 1989

(4) Subsidence Seminar, American Mining Congress, December 7 and 8, 1989, Salt Lake City, Utah: presentations and discussion

(5) BLM, Interior regulations: Exchanges, General Procedures, Objective, 43 CFR Chapter 11, 2200.0-2

(6) State Lands memo to BLM from Sandi Olsen, EIS co-ordinator

(7) Groundwater and Potential Coal Mining in the Bull Mountains, South Central Montana by Keith Thompson, Montana Bureau of Mines open file report 100, 1982

(8) Some Engineering Geologic Factors Controlling Coal Mine Subsidence in Utah and Colorado, C Richard Dunrud, US Geological Survey Professional Paper 969, 1976

(9) Mine Subsidence Control, Bureau of Mines Information Circular 9042, Short Term Effects of Longwall Mining and Shallow Water Sources, Noel Moebs and Timothy Barton, 1985

(10) Coal Age census of operating longwall installations in the United States, August, 1986

(11) Coal Age, January 1977

(12) Illinois South Project, Memorandum on Underground Mining Issues, Herrin, Illinois

(13) Thick Seam Mining in the Western United States, D L Boreck, Bureau of Mines Information Circular 9116, 1986

(14) Mine Subsidence Control, Bureau of Mines Information Circular 9042, Precalculation of subsidence over longwall panels in the Northern Appalachian Coal Region, Vladimir Adamek and Paul Jeran, 1985

(15) Appendix 11 of draft EIS puts underground coal prices in Colorado at $28.16. $28.16 * 6% less estimated deductions is $1.49

(16) David Ingram, Bureau of Mines Information Circular 9242

(17) personal communication with Steve Regie, Montana State Lands Department

(18) personal communication with Bob Moorehead, Chuck Rech of Meridian Minerals

(19) A Legal Analysis of the Land Grants of the Northern Pacific Railroad, Pamela Baldwin, October 1981, Congressional Research Service

(20) Competitive Issues in the Beef Sector, Hubert Humphrey Institute of Public Affairs, Report No 1, October 1989, Chapter V: Concentration Issues by John M Connor

(21) Standard and Poors, July 1989

Appendix A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COAL LEASE

Serial Number
C-37210

This lease, is entered into on APR 1 9 1984, by the United States of America, the lessor through the Bureau of Land Management, and

Colorado Westmoreland Inc.
P. O. Box "E"
Paonia, CO 81428

, the lessee, and shall become effective on MAY 1 1984, (effective date).

Sec. 1. STATUTES AND REGULATIONS — This lease is issued pursuant and subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. 181 et seq., hereafter referred to as the Act, and of the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. Section 1201 et seq., and the Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended, 30 U.S.C. 351 et seq. This lease is subject to all regulations of the Secretary of the Interior (including but not limited to 30 CFR Chapter VII and 43 CFR Group 3400) which are now in force or (except as expressly limited herein) hereafter in force, and all such regulations are made a part hereof.

WITNESSETH:

Sec. 2. RIGHTS OF LESSEE — The lessee, in consideration of any bonus paid (or to be paid if deferred), rents and royalties and other conditions hereinafter set forth, hereby grants and leases to the lessee the exclusive right and privilege to mine and dispose of coal recoverable by underground mining methods from the "D" Seam and any overlying seams in the following lands located in Delta County, Colorado:

T. 13 S., R. 91 W., 6th P.M.,

sec. 6, lots 5, 6, 7, SW¼NE¼, SE¼NW¼, E½SW¼, SE¼;
sec. 7, lots 1, 2, NE¼, E½NW¼, SE¼;
sec. 8, W½;
sec. 17, N½NW¼;
sec. 18, NE¼NE¼, N½NW¼NE¼, SE¼NW¼NE¼.

T. 13 S., R. 92 W., 6th P.M.,

sec. 1, S½;
sec. 2, SE¼;
sec. 10, lots 10, 11, 14, 15, 16;
sec. 11, E½, S½SW¼;
sec. 12, lots 1 to 8, inclusive, lots 10 to 14, inclusive, SW¼SW¼;
sec. 13, lots 2, 7 to 10, inclusive, NW¼;
sec. 14, (All);
sec. 15, lots 1, 2, 3, 6 to 11, inclusive, 14, 15, and 16;
sec. 22, lots 1, 2, 3, 6, 7, and 8;
sec. 23, lots 1 to 8, inclusive.

'84 APR 18 AM 10 :17

containing 4,998.85 acres, more or less and, subject to the conditions, limitations and prohibitions provided in this lease and in applicable acts and regulations, the right to construct all works, buildings, structures, equipment, and appliances which may be necessary and convenient for the mining and preparation of the coal for market, and, subject to the conditions herein provided, to use so much of the surface as may reasonably be required in the exercise of the rights and privileges herein granted for a period of 20 years and so long thereafter as the condition of continued operation is met.

Sec. 3. DILIGENT DEVELOPMENT AND CONTINUED OPERATION — The lessee shall engage in the diligent development of the coal resources subject to the lease. After diligent development is achieved, the lessee shall maintain continued operation of the mine or mines on the leased lands. The terms diligent development and continued operation are defined in the applicable regulations in Title 43 of the Code of Federal Regulations.

Sec. 4. BONDS — The lessee shall file with the appropriate Bureau of Land Management office a lease bond in the amount of $20,000.00 for the use and benefit of the United States, to insure payment of deferred bonus payments, rentals and royalties and to insure compliance with all other terms of this lease, the regulations and the Act (except for reclamation within the area covered by a surface mining permit issued under the permanent regulatory program by the regulatory authority) and, if appropriate, for the protection of the interests of the surface owners on the leased lands. An increase in the amount of the lease bond may be required by the lessor at any time during the life of the lease to reflect changed conditions.

Sec. 5. RENTAL — An annual rental of $3.00 for each acre or fraction thereof shall be paid in advance on or before each anniversary date of this lease. This section shall not be subject to revision except in the course of lease readjustment.

Sec. 6. PRODUCTION ROYALTY — The lessee shall pay a production royalty of 8 percent of the value of coal produced by underground mining methods. The value of coal shall be determined as set forth in 43 CFR 3480. Production royalties paid for a calendar month shall be reduced by the amount of any advance royalties paid under this lease to the extent that such advance royalties have not been used to reduce production royalties in a previous month. However, production royalties payable after the 20th year of the lease shall not be reduced by advance royalties paid during the first 20 years of the lease. Production royalties shall be payable the final day of the month succeeding the calendar month in which the coal is sold, unless otherwise specified in 43 CFR 3480. The royalty rates provided in this section shall not be subject to revision except in the course of lease readjustment.

Sec. 7. ADVANCE ROYALTY — Upon request by the lessee the Authorized Officer may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation consistent with the regulations in 43 CFR 3473 and 3480. The advance royalty shall be based on a percent of the value of a minimum number of tons which shall be determined in the manner established by the regulations in 43 CFR 3480.

Sec. 8. METHOD OF PAYMENTS — The lessee shall make rental payments to the appropriate Bureau of Land Management office until production royalties become payable. Thereafter, all rentals, production royalties and advance royalties shall be paid to the appropriate office of the United States Minerals Management Service.

Sec. 9. EXPLORATION PLAN — The lessee shall not commence any exploration, except casual use, on the leased lands without an approved exploration plan. Exploration plans for leased lands covered by an approved mining permit shall be submitted to the Regional Director of the Office of Surface Mining in accordance with the regulations in 30 CFR Chapter VII. Exploration plans for leased lands not covered by an approved mining permit shall be submitted to the Authorized Officer in accordance with the regulations in 43 CFR 3480.

Sec. 10. MINING PLAN — In accordance with the regulations in 43 CFR 3480 and 30 CFR Chapter VII, the lessee shall submit a mining and reclamation plan not more than three years after the effective date of this lease. Mining operations shall not commence until after the mining and reclamation plan is approved. The mining and reclamation shall be conducted in accordance with the approved mining and reclamation plan. Exploration activities which were not included in the approved mining and reclamation plan require submittal of exploration plans in accordance with Section 9 of this lease.

Sec. 11. LOGICAL MINING UNIT (LMU) — This lease is not automatically an LMU. At the request of the lessee or at the direction of the Authorized Officer, this lease shall become an LMU, subject to the provisions set forth in 43 CFR 3480. If the LMU of which this lease is a part is dissolved, the lease will not automatically be terminated unless requested in writing by the lessee to the appropriate office of the Bureau of Land Management or directed in writing by the Authorized Officer.

Sec. 12. OPERATIONS ON LEASED LANDS — (a) In accordance with conditions of this lease, the exploration and mining and reclamation plans, the permit issued pursuant to 30 CFR Chapter VII, and all applicable acts and regulations, the lessee shall exercise reasonable diligence, skill, and care in all operations on leased lands. (b) The lessee shall minimize to the maximum extent possible wasting of the coal deposits and other mineral and nonmineral resources, including, but not limited to, surface resources which may be found in, upon, or under such lands.

Sec. 13. SPECIAL STATUTES — The lessee shall comply with the provisions of the Federal Water Pollution Control Act (33 U.S.C. 1151-1175) and the Clean Air Act (42 U.S.C. 7401 et seq.)

Sec. 14. AUTHORIZATION OF OTHER USES AND DISPOSITION OF LEASED LANDS — (a) The lessor reserves the right to authorize other uses of the leased lands by regulation or by issuing, in addition to this lease, leases, licenses, permits, easements, or rights-of-way (including leases for the development of minerals other than coal under the Act. The lessor may authorize any other uses of the leased lands that do not unreasonably interfere with the exploration and mining operations of the lessee, and the lessee shall make all reasonable efforts to avoid interference with such authorized uses.

(b) The lessor reserves the right (i) to sell or otherwise dispose of the surface of the leased lands under existing law or laws hereafter enacted insofar as said surface is not necessary to the use of the lessee in the extraction and removal of the coal therein, or (ii) to dispose of any resource in such lands if such disposal will not unreasonably interfere with the exploration and mining operations of the lessee.

(c) If the leased lands have been or shall hereafter be disposed of under laws reserving to the United States the deposits of coal therein, the lessee shall comply with all conditions as are or may hereafter be provided by the laws and regulations reserving such coal.

Sec. 15. EQUAL OPPORTUNITY CLAUSE — The lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations and relevant orders of the Secretary of Labor.

Sec. 16. CERTIFICATION OF NONSEGREGATED FACILITIES — By entering into this lease, the lessee certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) lessee will obtain identical certifications from proposed contractors and subcontractors prior to award of contracts or subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that lessee will retain such certifications in lessee's files; and that lessee will forward the following notice to such proposed contractors and subcontractors (except where proposed contractor or subcontractor has submitted identical certifications for specific time periods): Notice to prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A *Certification of Nonsegregated Facilities*, as required by the May 9, 1967, order (32 F.R. 7439, May 19, 1967) on *Elimination of Segregated Facilities*, by the Secretary of Labor, must be submitted prior to the award of a contract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. Certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 17. EMPLOYMENT PRACTICES — The lessee shall pay all wages due persons employed on the leased lands at least twice each month in lawful money of the United States. The lessee shall grant all miners and other employees complete freedom to purchase goods and service of their own choice. The lessee shall restrict the workday to not more than 8 hours in any one day for underground workers, except in case of emergency. The lessee shall employ no person under the age of 16 years in any mine below the surface. If the laws of the State in which the lands are situated conflict with this paragraph, then the State laws apply.

Sec. 18. MONOPOLY AND FAIR PRACTICES — The lessor reserves full authority to promulgate and enforce orders and regulations under the provisions of Sections 30 and 32 of the Act (30 U.S.C. Sections 187 and 189) necessary to insure that any sale of the production from the leased lands to the United States or to the public is at reasonable prices, to prevent monopoly, and to safeguard the public welfare, and such orders and regulations shall upon promulgation be binding upon the lessee.

Sec. 19. TRANSFERS —

- [x] This lease may be transferred in whole or in part to any person, association or corporation qualified under 43 CFR 3472.1) to hold a lease.
- [ ] This lease may only be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of and for the use of the public body, or to a person for the limited purpose of creating a security interest in favor of a lender who agrees to be obligated to mine the coal on behalf of the public body. The transferee must be qualified under 43 CFR 3472.
- [ ] This lease may only be transferred in whole or in part to other small businesses qualifying under 13 CFR 121 and 43 CFR 3472.2 2(c)

Any transfer of this lease in whole or in part is subject to the procedures and requirements for approval in the relevant regulations in 43 CFR 3400. A transfer will become effective on the first day of the month following its approval by the authorized officer, or, if the transferee requests, the first day of the month of the approval.

Sec. 20. RELINQUISHMENT OF LEASE — The lessee may file a relinquishment of the entire lease, a legal subdivision or aliquot part thereof, but not less than 10 acres, or any bed of the coal deposits therein. The relinquishment shall be filed in triplicate with the authorized officer. Upon the determination by the authorized officer that the public interest shall not be impaired, that all accrued rentals and royalties have been paid and that all of the obligations of the lessee under the regulations and the lease terms have been met, the relinquishment shall be accepted effective the date filed.

Sec. 21. NONCOMPLIANCE — Any failure to comply with the conditions of this lease, the approved exploration and mining and reclamation plans, the regulations, or applicable acts shall be dealt with in accordance with the procedures set forth in the regulations.

Sec. 22. WAIVER OF CONDITIONS — The lessor reserves the right to waive any breach of the conditions contained in this lease, except the breach of such conditions as are required by the Act, but any such waiver shall extend only to the particular breach so waived and shall not limit the rights of the lessor with respect to any future breach, nor shall the waiver of a particular breach prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

Sec. 23. READJUSTMENT OF TERMS AND CONDITIONS — (a) The lease is subject to readjustment on the 20th year after the effective date and on each 10th year thereafter. In order that the lease may be readjusted as close as possible to the dates when it becomes subject to readjustment, the lessor may propose the terms of readjustment of any conditions of this lease, including rental and royalty rates, before the 20th year after the effective date and before each 10-year interval thereafter. The authorized officer shall notify the lessee whether he intends to readjust the terms and conditions of the lease and, if he intends to readjust, the nature of the readjustments in accordance with the regulations in 43 CFR 3451. Unless the lessee within 60 days after receipt of the proposed readjusted terms, files with the lessor an objection to the proposed readjusted conditions or relinquishes the lease as of the effective date of the readjustment, the lessee shall be deemed conclusively to have agreed to such conditions.

(b) If the lessee files objections to the proposed readjusted conditions, the existing conditions shall remain in effect until there has been an agreement between the lessor and the lessee on the new conditions to be incorporated in the lease, or until the lessee has exhausted his rights of appeal under Section 29 of this lease, or until the lease is relinquished, except that the authorized officer may provide in the notice of readjusted lease terms that the readjustment or any part thereof is effective pending the outcome of the appeal. If the readjusted royalty provisions are subsequently rescinded or amended, the lessee shall be permitted to credit any excess royalty payments against royalties subsequently due to the lessor.

Sec. 24. DELIVERY OF PREMISES — Upon termination of this lease for any reason, or relinquishment of a part of this lease, the lessee shall deliver to the lessor in good order and condition all or the appropriate part of the leased lands. Delivery of the leased lands shall include underground timbering and such other supports and structures as are necessary for the preservation of the mine or deposit, and shall be in accordance with all other applicable provisions of the regulations including 43 CFR 3480 and 30 CFR Chapter VII, for the completion of operations and abandonment.

Sec. 25. PROPRIETARY INFORMATION — Geological and geophysical data and information, including maps, trade secrets, and commercial and financial information which the lessor obtains from the lessee shall be treated in accordance with 43 CFR Part 2 and 3480 and other applicable regulations. Total lease reserve figures developed from this information will not be confidential.

Sec. 26. LESSEE'S LIABILITY TO LESSOR — (a) The lessee shall be liable to the United States for any damage suffered by the United States in any way arising from or connected with the lessee's activities and operations under this lease, except where damage is caused by employees of the United States acting within the scope of their authority.

(b) The lessee shall indemnify and hold harmless the United States from any and all claims arising from or connected with the lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damages occurred.

Sec. 27. INSPECTIONS AND INVESTIGATIONS — (a) All books and records maintained by the lessee showing information required by this lease or regulations must be kept current and in such manner that the books and records can be readily checked at the mine, upon request, by any Authorized Officer of the United States.

(b) The lessee shall permit any duly authorized officer or representative of the lessor at any reasonable time (1) to inspect or investigate the leased lands, the exploration and mining and reclamation operations, and all surface and underground improvements, works, machinery, and equipment, and all books and records pertaining to the lessee's obligations to the lessor under this lease and regulations and (2) to copy, and make extracts from any such books and records.

Sec. 28. UNLAWFUL INTEREST — No member of, or Delegate to, Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified and during his continuance in office, and no officer, or employee of the Department of the Interior, except as provided in 43 CFR 20.735-24(d), shall hold any share or part in this lease or derive any benefit therefrom. The provisions of Section 3741 of the Revised Statutes, as amended, 41 U.S.C. Section 22, and the Act of June 25, 1948, 62 Stat. 702, as amended, 18 U.S.C. Sections 431-433, relating to contracts, enter into and form a part of this lease insofar as they may be applicable.

Sec. 29. APPEALS — The lessee shall have the right of appeal (a) under 43 CFR Part 4 from an action or decision of any official of the Bureau of Land Management, (b) under 30 CFR Part 290 from an action, order, or decision of any official of the Minerals Management Service, or (c) under applicable regulation from any action or decision of any other official of the Department of the Interior arising in connection with this lease, including any action or decision pursuant to Section 23 of this lease with respect to the readjustment of conditions.

Sec. 30. DEFERRED BONUS — This lease is issued subject to the payment of by the lessee as a deferred bonus. Payment of the deferred bonus by the lessee shall be made on a schedule specified in Section 31 (Special Stipulations) of this lease.

Sec. 31 SPECIAL STIPULATIONS - In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following special stipulations. These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of this lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight. The lessor may amend these stipulations at any time without the consent of the lessee in order to make them consistent with any new federal or state statutes and the regulations promulgated under authority of new statutes.

Sec. 31 SPECIAL STIPULATIONS — (a) Cultural Resources (1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the authorized officer of the BLM or of the surface managing agency (if different) on portions of the mine plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archeologist, historian or historical architect, as appropriate), approved by the authorized officer of the surface managing agency (BLM if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Regional Director of the Office of Surface Mining (or the Authorized Officer of BLM if activities are associated with coal exploration outside an approved mining permit area) or the surface managing agency (if different). The lessee shall undertake measures, in accordance with instructions from the Regional Director (or the Authorized Officer of BLM if activities are associated with coal exploration outside an approved mining permit area), to protect cultural resources on the leased land. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Regional Director (or the Authorized Officer of BLM if activities are associated with coal exploration outside an approved mining permit area).

(2) The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Regional Director (or the Authorized Officer of BLM if activities are associated with coal exploration outside an approved mining permit area), or the authorized officer of the surface managing agency if the Regional Director, or Authorized Officer of BLM, as appropriate, is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Regional Director (or the Authorized Officer if activities are associated with coal exploration outside an approved mining permit area). Within two (2) working days of notification, the Regional Director (or the Authorized Officer if activities are associated with coal exploration outside an approved mining permit area) will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the authorized officer of the BLM or of the surface managing agency (if different).

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

(b) Paleontological Resources (1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall contact the Bureau of Land Management to determine whether the authorized officer will require the lessee to conduct a paleontological appraisal of the mine plan and adjacent areas, or exploration plan areas, that may be adversely affected by lease-related activities. If the authorized officer determines that one is necessary, the paleontological appraisal shall be conducted by a qualified paleontologist approved by the authorized officer of the surface managing agency (BLM if the surface is privately owned), using the published literature and, where appropriate, field appraisals for determining the possible existence of larger and more conspicuous fossils of scientific significance. A report of the appraisal and recommendations for protecting any larger and more conspicuous fossils of significant scientific interest on the leased lands so identified shall be submitted to the authorized officer of the surface managing agency (BLM if the surface is privately owned). When necessary to protect and collect the larger and more conspicuous fossils of significant scientific interest on the leased lands, the lessee shall undertake the measures provided in the approval of the mining and reclamation plan or exploration plan.

(2) The lessee shall not knowingly disturb, alter, destroy or take any larger and more conspicuous fossils of significant scientific interest, and shall protect all such fossils in conformance with the measures included in the approval of the mining and reclamation plan or exploration plan.

(3) The lessee shall immediately bring any such fossils that might be altered or destroyed by his operation to the attention of the Regional Director or the Authorized Officer, as appropriate. Operations may continue as long as the fossil specimen or specimens would not be seriously damaged or destroyed by the activity. The Regional Director or the Authorized Officer, as appropriate, shall evaluate or have evaluated such discoveries brought to his attention and, within five (5) working days, shall notify the lessee what action shall be taken with respect to such discoveries.

(4) All such fossils of significant scientific interest shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements will be provided to the Regional Director or the Authorized Officer, as appropriate.

(5) The cost of any required salvage of such fossils shall be borne by the United States.

(6) These conditions apply to all such fossils of significant scientific interest discovered within the lease area whether discovered in the overburden, interburden, or coal seam or seams.

Sec. 31. Special Stipulations (continued)

(c) The lessee shall replace in a manner consistent with state law the water supply of any owner of a vested water right which is proximately injured as a result of the mining activities.

(d) The lessee shall formulate a water replacement plan to replace the possible loss of water presently adjudicated and historically put to beneficial use in Coal Gulch, East Roatcap Creek, West Roatcap Creek, Stevens Gulch and Terror Creek. The water replacement plan for each respective drainage shall be developed after consultation with affected water right users, and federal and state authorities, and shall be approved by state authorities before mining in the particular drainage.

(e) As part of each water replacement plan the lessee shall furnish information, c. the BLM, which demonstrates its legal and physical ability to implement said plan. A source of replacement water may include, but is not limited to, the transfer of water rights,an augmentation plan, a long term water use lease, or compensatory storage.

(f) In the East Roatcap Creek watershed, an acceptable plan (submitted as part of the mine plan) prepared in consultation with affected water right users, and federal and state authorities, shall be for the lessee to re-route the water in East Roatcap Creek diverted from the Overland Ditch, around the coal lease tract. In addition, the plan shall show that protection can be provided through supplementation, improvement of conveyance systems, or other comparable means, for East Roatcap Creek surface runoff water presently adjudicated and put to beneficial use which is subject to potential injury resulting from coal mining. The re-routed water which is presently released into East Roatcap Creek from the Overland Ditch, will be diverted to West Roatcap Creek (via Overland Ditch) and delivered to the original points of use without causing injury to the water quality, quantity, or timing. The re-routing of water shall be carried out before any mining occurs in the watershed which the water is currently conveyed and in a manner which avoids interruption of water delivery.

(g) Coal extraction will be limited in buffer zones established along East Roatcap Creek and Stevens Gulch where the overburden is 600 feet thick or less in order to prevent all surface and subjacent disturbance to the overburden. If necessary, access entryways needed to extract the coal on the west side of these water courses will be permitted though the buffer zones. The buffer zones will include the above mentioned bank-full stream channels and the alluvial/colluvial fill associated with them. The angle of draw used to protect these areas from subsidence will be dictated by site-specific geologic and mining conditions (the estimated angle of draw for the Mesa Verde formation is 15 to 20 degrees).

(h) On the lease tract, the coal extraction process will be designed and conducted pursuant to the rules and regulation of the Colorado Mined Land Reclamation Board.

(i) The lessee, before issuance of the mine permit, will conduct and provide to BLM an inventory of all existing state adjudicated water rights in and adjacent to the lease tract which may be impacted by subsequent mining activities. At a minimum, this inventory will include: the water right holder, location, source, amount of decree, beneficial use, historical flow, and the appropriation and adjudication dates.

(j) Existing cross-tract and on-tract water flows shall be maintained by the lessee even following release of the permit bond by the Colorado State Mined Land Reclamati Board. Compliance with this mitigation shall be assured by an increase in the BLM administered lease bond for a monetary amount and for a time period to be determined in consultation with state and federal authorities, affected water users, and the lessees.

(k) State-of-the-art mining techniques (pillar and panel widths, rate of coal development and extraction, mine method, determining angle of draw, etc.) shall be used in areas identified in Unsuitability Criteria 2, 3, 14, and 19 (maps attached) to control subsidence. These techniques would provide for maximum coal removal while insuring that sufficient coal is left in place to prevent subsidence.

Sec. 31. Special Stipulations (continued)

(l) The lessee shall consult with all owners of occupied dwellings and maintain or, with the owner's consent, adjust the designated 300-foot buffer zone in order to mine near private dwellings located on the lease.

(m) With respect to the golden eagle nest sites, identified on this lease (maps attached) or any eagle nest sites discovered in the future:

(1) No permanent surface facilities or disturbances shall be located within a one-fourth mile radius buffer zone around each golden eagle nest site.

(2) No surface activities will be allowed within the eagle nest site buffer zones from March 1 to July 1.

(3) Any proposed activities in, or adjacent to the eagle nest site buffer zones will require approval from the BLM on a site-specific basis, after consultation with the U.S. Fish and Wildlife Service.

(n) A 1/8 mile buffer zone on each side of perennial, intermittent, and ephemera streams with riparian habitat will be protected from surface disturbance, excluding subsidence. If riparian habitat disturbance is unavoidable, it will be approved on a site specific basis by BLM after consultation with the Colorado Division of Wildlife and the U.S. Fish and Wildlife Service.

(o) A seasonal closure on surface activities, from December 1 to April 15, shall be imposed on all portions of the lease identified as "most critical big game winter range" (map attached). Where surface facilites must be located on these ranges, off-site habitat improvement or mitigation may be required. Such activities must be approved by the BLM after consultation with the Colorado Division of Wildlife.

(p) The lessee, prior to mining coal, will prepare a NEPA quality environmental analysis assessing alternative methods of transportation. The purpose of the assessment is to determine the most environmentally acceptable and least impacting route and/or means of hauling coal to the loadout facility. The assessment will consider all impacted resources.

The alternatives assessed will be determined by BLM (Montrose District) in consultation with the lessee, Delta County and the State of Colorado (Mined Land Reclamation Division and State Department of Transportation). The BLM, with the above consulting agencies will determine if the analysis meets NEPA requirements upon its completion. The most environmentally and economically acceptable and least impacting route and/or means of hauling coal to the loadout facility will be submitted by the lessee as part of the Colorado Mined Land Reclamation Division permit application. The assessment will be accompanied by a separate analysis of the economic feasability of each alternative assessed to be utilized in the decision making process.

(q) The mine permitting process will include, but not be limited to, the consideration of the following operational mitigating measures:

(1) Detailed geotechnical studies shall be conducted by the lessee prior to construction of a portal and associated facilities to determine if the area is compatible with the new portal site.

(2) A visual contrast analysis will be made by the lessee prior to construction of proposed surface modifications and reclamation efforts to assure minimum visual impact at all stages of tract development, and compliance with BLM's Visual Resource Management (VRM) policies.

(3) All coal transportation will be by conveyor or other permanent alternative method to avoid truck hauling on State Highway 133.

'84 APR 18 A10:17

Sec. 31. Special Stipulations (continued)

(r) Deferred Bonus Payment Schedule:

Total amount of bid: $9,542,041.21

One-fifth bonus in the amount of $1,908,408.25 was submitted on February 26, 1984. Balance is due and payable in equal annual installments on the first four anniversary dates of the lease:

$1,908,408.24 due on May 1, 1985
$1,908,408.24 due on May 1, 1986
$1,908,408.24 due on May 1, 1987
$1,908,408.24 due on May 1, 1988
$7,633,632.96

(s) See Division dated 8 22 87 re well improvements for 4 water monitoring wells drilled under exploration license C-33235.

THE UNITED STATES OF AMERICA

By Earl F. Ackard
(Signing Officer)

CHIEF, MINERAL LEASING SECTION
(Title)

APR 19 1984
(Date)

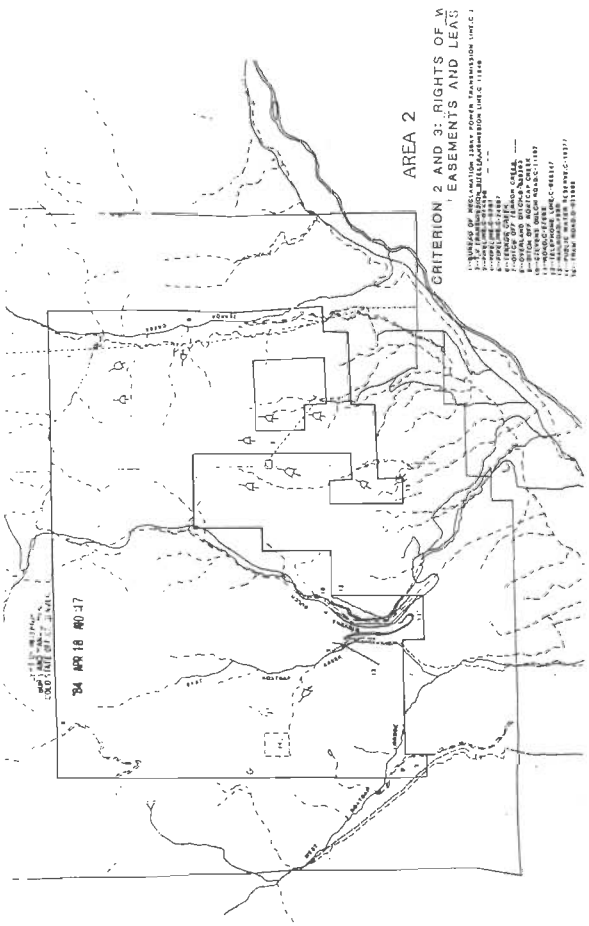
WITNESS TO SIGNATURE OF LESSEE

Barbara A. Quesenberry

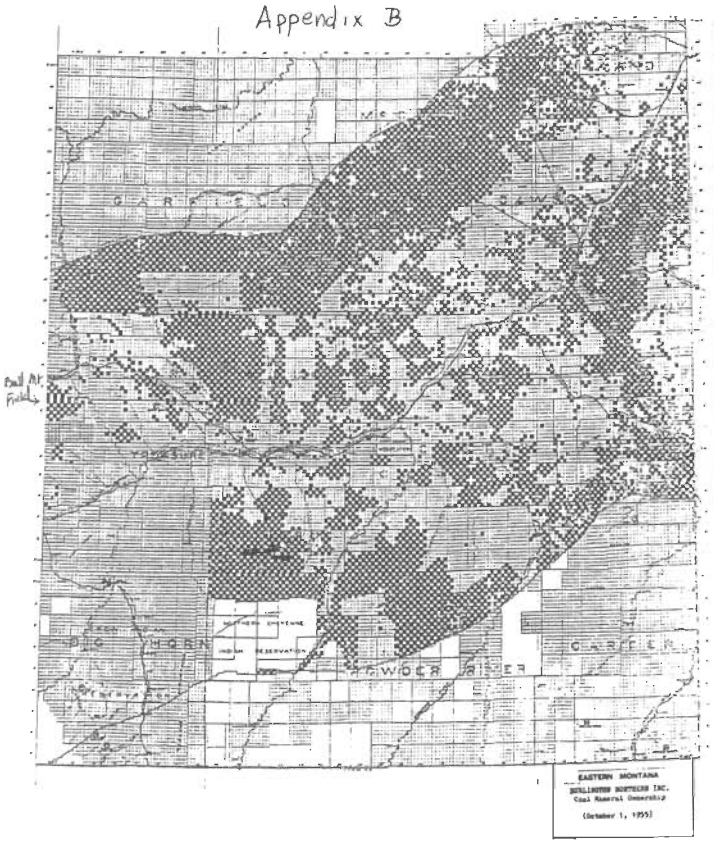
COLORADO WESTMORELAND, INC.

Christopher K. Salomon
(Signature of Lessee)
President

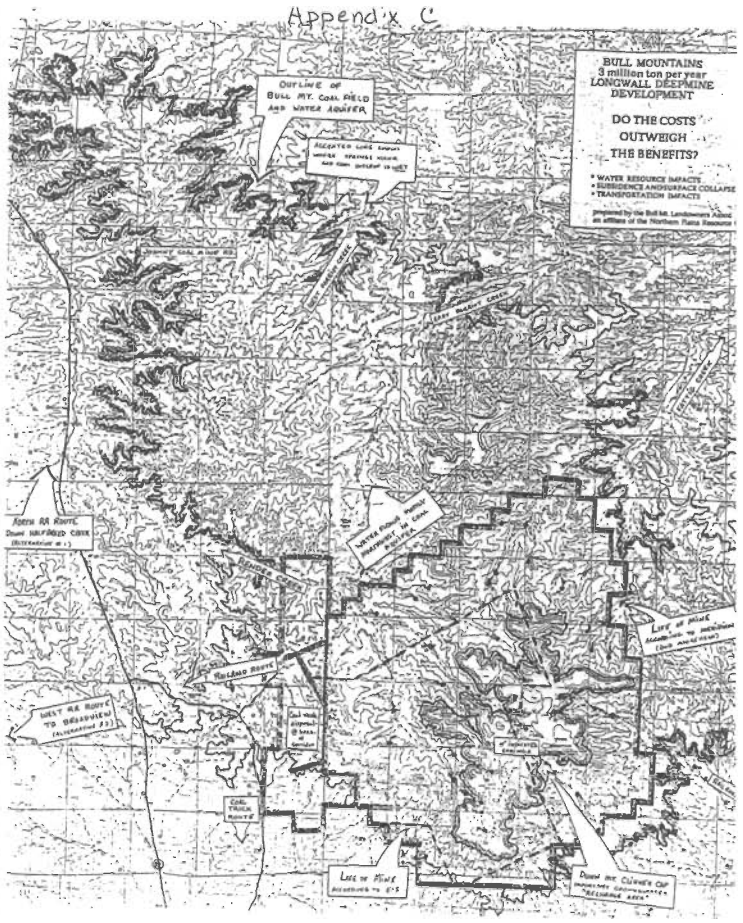
(Signature of Lessee)

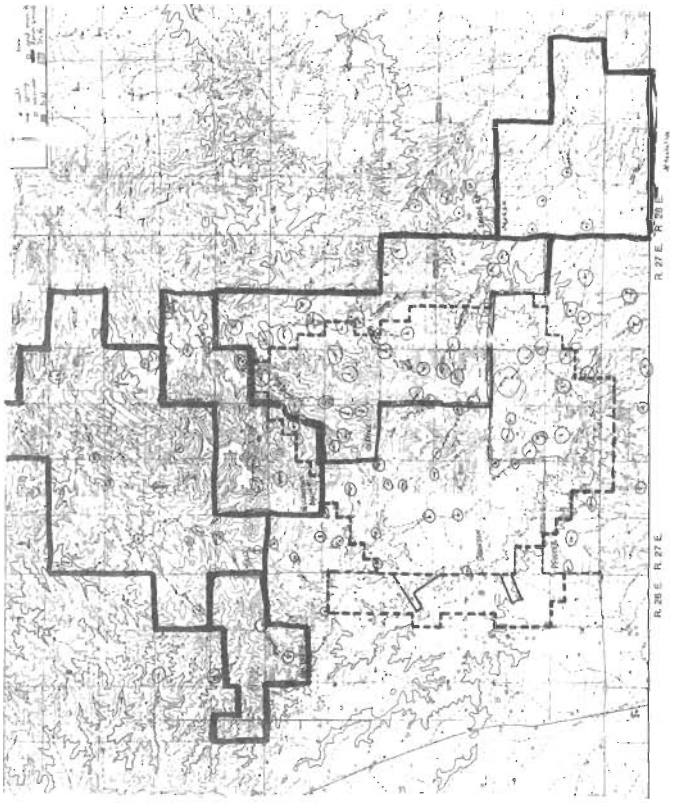


Appendix B



Appendix C





BULL MOUNTAIN LANDOWNERS' ASSOCIATION
an affiliate of the Northern Plains Resource Council

February 23, 1[illegible]

Mat Mattenson, District Manager
Bureau of Land Management
PO Box [illegible]
Miles City, MT 59301

B. Matthews

Dear Mat,

316 A local tax change has come to our attention that we were not aware of during the formal draft EIS comment period. According to Sue Olsen (Musselshell County Commissioner), the Montana legislature changed the gross proceeds law on oil, gas and coal to give the revenue to the state instead of the producing counties.

Therefore, the draft EIS estimates on gross proceeds revenue to Musselshell and Yellowstone counties are wrong. Sue's understanding is that local government would see none of this new revenue: it would all go to the state of Montana.

Don Norman is the Bureau Chief for natural resources taxation in the Montana Revenue Department. He should probably be able to clarify the current situation for you.

Sincerely,

Jeanne Charter
BLOA Secretary

DEPARTMENT OF STATE LANDS

STAN STEPHENS, GOVERNOR — CAPITOL STATION

STATE OF MONTANA

(406) 444-2074 — 1625 ELEVENTH AVENUE HELENA, MONTANA 59620

RECEIVED FEB 09 1990 BUREAU OF LAND MANAGEMENT MILES CITY, MT

February 8, 1990

Bill Matthews, Project Manager
BLM, Miles City District
PO Box 940
Miles City, MT 59301

Dear Mr. Matthews;

317 Enclosed please find a memo from Mr. Bob Bohman, a Reclamation Division geologist in our Billings office. Mr. Bohman's memo raises some points which I believe are pertinent to the Bull Mountain EIS and should be addressed by the BLM.

Please review the memo and contact me if you have any questions.

Sincerely,

Rod Samdahl

Rod Samdahl
Minerals Manager
Lands Administration Division

RS/jlh

Enclosure

"AN EQUAL OPPORTUNITY EMPLOYER"

DEPARTMENT OF STATE LANDS

STAN STEPHENS, GOVERNOR — CAPITOL STATION

STATE OF MONTANA

(406) 444-2074 — 1625 ELEVENTH AVENUE HELENA, MONTANA 59620

RECEIVED FEB 09 1990 BUREAU OF LAND MANAGEMENT MILES CITY, MT

February 8, 1990

MEMORANDUM

TO: Mr. Bill Matthews (BLM)

FROM: Robert Bohman, Geologist

RE: Bull Mountains Coal Exchange Draft EIS; Groundwater Impact Assessment

Several months ago, Nick Bugosh and I reviewed the groundwater hydrology report prepared for the Bull Mountains Exchange EIS by Marshall Corbett. Our evaluation was included in a letter to you from Sandi Olsen. As you may recall, we felt that the original report went to great lengths to downplay potential groundwater and surface water problems, and to emphasize alleged benefits.

I had hoped that the problems would be corrected for the Draft EIS. The EIS, however, still presents in my view a distorted assessment of potential hydrological impacts. It ignores or downplays the possibility of serious adverse impacts, while extolling alleged "benefits" to be expected from mine subsidence.

Other members of our Bureau staff have voiced concerns about the treatment of potential impacts in other areas....specifically Vegetation, Wildlife and Land Use (Agriculture). The optimistic treatment of potential hydrological problems has meant only cursory consideration of the attendant or related impacts in these other areas. There is, in fact, significant potential for impacts on vegetative communities, wildlife habitat, and agricultural and wildlife water supplies.

In my opinion, the Draft EIS does not provide a sound basis for rational environmental decision-making in these areas. My specific comments are:

1. I agree with the Draft's approach to predicting subsidence due to mining. Without a specific mining plan, etc., the best approach (at this point) is to do a generic prediction

"AN EQUAL OPPORTUNITY EMPLOYER"

of subsidence effects for both the room-and-pillar and longwall mining scenarios.[1]

The key hydrological issue, however, is not subsidence per se, but fracture propagation. Vertical displacement will vary from perhaps 6-7' to nil. Fractures, however, would probably penetrate to the surface over most of the longwall panels and adjacent areas....even in areas of negligible displacement.

2. The EIS (p.106-107) characterizes the overlying rocks as "50-70% siltstone and shale".[2] It therefore concludes that subsidence will not pose any hydrological problems because:

   (a) the rocks will undergo plastic failure rather than fracture, and/or

   (b) any fractures will "heal" due to high clay content.

   Other workers, however, suggest as much as 60 to 70% sandy or silty material. This material would produce a more blocky, open fracture pattern[3], and would be far less prone to "heal". The treatment of this area in the EIS is inadequate, and its conclusions unjustified.

3. Where open fractures penetrate an overlying aquifer, there would be two probable effects. Flow would be diverted from springs which are now laterally fed by these aquifers. This diverted flow would move downwards, towards or into the base of the fractured zone, the Mammoth seam.

   This diversion could increase the recharge of lower horizons, as the EIS suggests. The result, however, would be a shift in the groundwater balance....not a net "increase". The higher springs would be lost or diminished. "Benefits"

[1] A definitive prediction of subsidence and groundwater impacts will be included in DSL's evaluation of the actual mining permit application...and in an EIS for the proposed mine, should that be required.

[2] Lumping "siltstone" with "shale" may be misleading. Plastic deformation and healing both require significant clay content...but siltstone may be totally lacking in clays.

[3] Especially in zones of extensional stress, along the margins of longwall panels.

to any aquifer or horizon would be at the expense of other aquifers or horizons.[4]

4. Increased recharge of the Mammoth horizon might selectively benefit land-owners with Mammoth springs, but this might not occur during the life of the mine. If fractures did increase the infiltration and recharge rate into the Mammoth horizon, much of that water could end up being pumped back out of the mine....rather than contributing to groundwater flows.

5. On p.121, the EIS asserts that subsidence-related impacts will be "temporary" in nature. This is unsupported by fact. Indeed, the creation of open fractures could produce permanent, long-term, adverse impacts on groundwater and surface water supplies.

6. In discussing the possible impacts to springs, the EIS asserts that the fractures will be self-healing. Under "beneficial" aspects, however, it cites increased recharge to be expected from fracturing. This is an apparent contradiction.

7. Similarly, the EIS notes (p.121) the possibility of fracturing under alluvial aquifers like Rehder Creek and temporary (sic) effects on alluvial groundwater flow. It then suggests that this could also produce "local retention basins", and characterizes the alluvial impacts as "either positive or negative". If the latter statement is to be left in, it needs to be developed and supported.

8. On p.133, the EIS states that longwall mining "...would result in environmental consequences that are more readily identifiable during actual mining, thus hydrological impacts could be corrected immediately and long-term effects would not become a problem in the future."

   This is an absurd statement for an EIS. In effect, it says:

   (a) that we can't predict the hydrological consequences ahead of time,

   (b) that they're easier to identify when they happen,

   (c) that we could correct them "immediately"[5], and

[4] The hydrological version of the "No free lunch..." principle.

[5] Without any explanation of how...or if...this could be done.

(d) that there would be no long-term impacts[6].

9. Since it downplays or dismisses most of the potential direct hydrological impacts, the EIS pays very little attention to attendant impacts to Agriculture, Vegetation and Wildlife. For even the 3MM tpy case, the EIS treats these areas (on p.120) with terms like "little or no effect", "insignificant", and so on.

Equal consideration of adverse hydrological impacts, however, would yield a far different view. Loss of the springs above the Mammoth coal could eliminate naturally flowing water supplies in significant areas. This would mean a shift in vegetative habitat, attendant loss of wildlife habitat.... and the loss of both livestock and wildlife water sources over significant areas of present ranching operations.

I feel, in conclusion, that the groundwater and surface water impact assessment in the Draft EIS is strongly biased in favor of the proposed action. Whatever the cause, the EIS completely fails to consider the possibilities of adverse impacts. Its repeated (and often contradictory) assertions of alleged beneficial effects to groundwater are unfounded.

It is not, in my opinion, an objective analysis.

I am not suggesting, mind you, that the EIS predict a wholly negative hydrological outcome. That would be premature. There are geological and hydrological uncertainties which need more specific resolution before we can definitively predict the hydrological impacts.

An EIS, however, should recognize the uncertainties. It should consider the full range of possible outcomes, not just a select few. In this case, I think it means giving at least equal consideration to the possibility of some negative groundwater, surface water and related impacts. Only thus can it act as a balanced, rational basis for environmental decision-making.

---

[6] A very definitive statement, based on a very limited perspective.

MERIDIAN
Minerals Company

VIA FEDERAL EXPRESS

January 3, 1990

RECEIVED
JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301

RE: Bull Mountains Exchange Draft EIS

Dear Mr. Matthews:

Meridian Minerals Company (Meridian) has reviewed the Bull Mountains Exchange Draft EIS and has concluded that it is a detailed and comprehensive document which adequately addresses the proposed action, a reasonable set of alternatives to the proposed exchange, and a reasonable range of likely or possible development alternatives which could result from the exchange. We offer the following comments and suggestions for additional clarification. To ensure that our comments are clear, we have developed suggested narrative in many areas for your consideration in preparing the Final EIS.

318 First, as you pointed out during the DEIS hearings, one of the offered land parcels (a 640 acre parcel in Custer County identified as Priority Lands No. 4) has inadvertently been sold by Burlington Resources and is no longer available for the exchange. This parcel contributed only $19,200 to the total offered land value of $1,138,800. Since the subject coal resource has been valued at $730,000, the unavailability of the one parcel should not affect the exchange. The Final EIS should be corrected throughout by removing reference to, and discussion concerning, this parcel. We apologize for the error and assure you that all the other land parcels are being held until the exchange decision is final.

SUMMARY (page 1)

319 NEPA (40 CFR 1502.12) requires this section to summarize the entire EIS, including major conclusions, areas of controversy raised by the public, and issues to be resolved. With this in mind, we suggest modifying the Summary section to more thoroughly meet the NEPA requirements.

For example, the second paragraph of this section should be modified to further clarify what is addressed in this EIS. We suggest rewording the second paragraph and adding two additional paragraphs as follows:

3613 DTC Parkway
Englewood, Colorado 80111
303-796-8586
FAX: 930-9212

In addition to the proposed action and its alternatives, the indirect effects of subsequent development of the coal resource are analyzed by addressing impacts of reasonably foreseeable development alternatives. A small room and pillar underground mine producing 0.5 million tons of coal per year and an underground longwall mine producing 3.0 million tons per year, including a generic railroad to haul coal, are evaluated to provide a range of potential development scenarios.

BLM action on the exchange would not create an entitlement to development of the coal resources on the exchanged lands. State and (possibly) Federal approvals, including additional environmental analysis as required by the Montana Environmental Policy Act and NEPA, would be necessary prior to mine development. Not only would site-specific impacts of mine development need to be addressed in a new State and/or new or supplemental Federal EIS, but also construction of railroad lines and related aspects of the actual mine development proposal would be evaluated. (The Montana Department of State Lands (DSL), with the cooperation of the Office of Surface Mining (OSM) and the BLM, is preparing a joint State/Federal EIS on Meridian's proposed site-specific coal development in the Bull Mountains).

Significant issues and concerns identified in the scoping process were: a) Competition and anti-trust issues, public interest considerations, and equalized value determinations of the exchange proposal, and b) Economic benefits/impacts, transportation impacts, water quality and other resource concerns with potential subsequent mine development. These issues provided a basis for development of the alternatives to be addressed in this EIS.

320 After the NO ACTION (ALTERNATIVE E) (page 11) section, add the following new sections:

ENVIRONMENTAL CONSEQUENCES

The analyses of the proposed exchange, alternatives to the exchange, and subsequent reasonably foreseeable coal mine development which may be encouraged by the exchange does not identify significant direct or indirect adverse environmental impacts. Only beneficial environmental impacts are anticipated to result from the BLM accepting the offered high-value lands. Further, considerable socio-economic benefits would be realized by the Yellowstone-Musselshell County area as well as the State of Montana should this exchange encourage coal development. The BLM's economic analysis indicates that without the exchange mining the Federal coal in the Bull Mountains would likely not occur until well into the next century. While the exchange does not assure that mine development will occur, it consolidates resource ownership, thereby improving the opportunity for mine development in the near term. Subsequent

detailed environmental review of a site-specific coal mine development plan, that will be necessary prior to development, will discuss certain impacts in greater detail and consider any impacts not revealed during scoping and preparation of this document.

The exchange is consistent with the BLM's Billings Resource Management Plan (RMP) which recognizes the potential benefits of exchanges in the Bull Mountains and encourages the utilization of underground mining in this area. Meridian has agreed to stipulate that only underground mining will take place on the subject coal lands. Further, the Billings RMP requires that the proposed exchange be determined to accrue significant benefit to the public. Our evaluation of all affected resource values, the socio-economic benefits of the exchange (from coal mine development in the Bull Mountains) as well as the public benefits derived from returning the high value offered lands to the public domain shows that the proposed action (coal-for-land exchange) is the preferred alternative.

CHAPTER 1. PURPOSE AND NEED

Introduction (page 1)

321 The introduction to this chapter needs to recognize the probability of Meridian proceeding with mine development plans in addition to or instead of a YCC development. We suggest the following sentence be inserted after the last sentence of the third paragraph:

Meridian has announced plans to seek a state mining permit for a potential underground coal mine which would include coal lands in the proposed exchange area to the north of the area of YCC's interest.

Scoping Issues/Concerns (page 3)

322 The last sentence of paragraph three should be changed to read:

This high level of production is analyzed as a reasonable high production underground mining scenario.

The last paragraph of this section should be changed to read as follows:

323 Likewise, an in-depth analysis of building and operating a railroad is not fully assessed in this EIS. The impacts of construction and operation of a railroad proposed to be constructed to serve a new coal mine would need to be addressed in the State environmental review prior to issuance of a State mine operating permit pursuant to State laws and regulations. In addition, specific State and Federal permits or other approvals would likely be required prior to rail line construction depending on the specific route selected. For example, the railroad being proposed for construction as part of

323 Meridian's coal development will be addressed in the joint State/Federal site-specific EIS. Consequently, this analysis focuses on some of the more apparent or generic impacts that would be expected if a railroad was built, but it does not analyze specific routes.

Decision Factors/Process (Page 3)

324 The purpose and need section does not address why BLM chose to accept the exchange application and proceed with its processing. As the decision to proceed with exchange processing and NEPA review has entailed substantial effort on BLM's part, an explanation of that decision seems warranted. We suggest the following be inserted as a new section preceding "EIS PROCESS":

ACCEPTANCE OF EXCHANGE PROPOSAL AND DECISION TO PROCEED WITH NEPA REVIEW

At the time of Meridian's filing of an exchange application, BLM determined that the merits of the exchange proposal were sufficient to warrant the initiation of the exchange process, including the completion of NEPA review. The application could have been rejected outright had it been determined that the proposal had no apparent public interest merits. The decision to proceed was based on the following factors:

1) The high value lands offered appeared to be desirable for the furtherance of BLM land management objectives.

2) The exchange offered a mechanism for acquiring these lands not otherwise available to the BLM.

3) There appeared to be considerable interest in economic development in the Yellowstone/Musselshell County area.

4) Prior to the exchange proposal, no significant interest had been expressed for federal coal leases in the area by other potentially qualified parties.

5) Coal controlled by both the BLM and Meridian would be needed for reasonable coal mine development in the Bull Mountains area because of the checkerboard ownership.

6) Since the proposed exchange involved only a limited part of the total Federal coal reserves in the Bull Mountains, the development of a coal mine would tend to increase the value of the remaining Federal coal resource.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Introduction (page 7)

325 The parenthetical phrase in the second paragraph (maximum development, Figure 2.2) should be changed to (high production development, Figure 2.2).

326 Neither the "Purposes and Need" nor the "Alternatives Including the Proposed Action" chapters explain why the particular alternatives were chosen. We suggest additional paragraphs be added to the introduction as follows:

The proposed exchange (coal-for-land) offers land to the public that is highly desirable and of greater value than the estimated present value of the subject Federal coal. The two coal-for-coal alternatives were analyzed to allow a comparison of exchanging coal-for-coal to the coal-for-land proposal. One, exchanging Bull Mountains Federal coal for private coal owned by Meridian and leased to Peabody Coal Company, provides the Federal government with coal reserves in an existing mining unit with equal or higher probability of near-future royalty generation than the subject coal in the Bull Mountains. The second, coal-for-coal mirror image exchange, would allow consolidation of coal ownership in the Bull Mountains and assure the retention of a large block of Federal coal in the Bull Mountains for future competitive leases.

The leasing of the Bull Mountains Federal coal alternative is studied as a comparison to the exchange proposal because it allows for competitive bids and the retained Federal interest would generate royalty income to the Federal government at the time the coal is mined. Analysis of the no-action alternative is required by law and its selection would likely prevent coal development of any reasonable scale in the Bull Mountains in the near-term and foreclose public acquisition of the high value offered lands.

Coal Land Use Screens (page 11, second paragraph)

327 We believe that criterion No. 16, floodplains, was misapplied. Criterion No. 16, 43 C.F.R. 3461.1 reads as follows:

"(p)(1) **Criterion No. 16.** Federal lands in riverine, coastal and special floodplains (100-year recurrence interval) on which the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining."

Neither the Chapter 2 nor the Appendix explanation of the application of the criteria indicates that there is any substantial threat of loss of life or property to be expected as a result of subsidence because of longwall mining. We suggest that no such threat exists and, therefore, the lands in question are not unsuitable under Criterion No. 16.

327 For the above reasons we believe that the second paragraph on page 11, Chapter 2, should be modified as follows:

Within the same area, T.6N., R.27E., Section 18, N1/2N1/2, a floodplain along the upper reaches of Rehder Creek was identified. There would not appear to be any substantial threat of loss of life or property associated with potential subsidence of this floodplain. Therefore, this floodplain is not unsuitable under Criterion 16.

However, it should be noted that, although BLM makes an initial determination of the unsuitability criteria, the regulatory agencies (Montana Department of State Lands and the Federal Office of Surface Mining) make a final determination of unsuitability for mining after the company submits a mine plan. The regulatory agency has the authority to prohibit or condition mining techniques if it finds that Criterion 16 does, in fact, apply.

Peabody Coal-For-Coal Exchange (Alternative C) (page 17)

328 The potential royalties which would flow to the Federal government under this alternative should be presented in this section in at least as much detail as they are for the leasing alternative. As we understand it, the purpose of considering this alternative was not to deal with "equal value" but with the "royalties foregone" issue. BLM must receive equal value under the law and, indeed, the preferred exchange yields equal or greater value to the BLM. The primary attractiveness of the Peabody alternative is that it would provide the Federal government with a likely royalty stream in the future in exchange for a hypothetical royalty stream from any Bull Mountains development that may not be realized.

The estimated royalty stream should be calculated and discussed in the Final EIS.

Leasing (Alternative D) (page 17)

329 The Regional Activity Planning and Lease-By-Application sections should be revised to reflect the October 31, 1989 decision to allow the leasing alternative, if chosen, to proceed on a lease-by-application basis. An estimate of the time required to lease the Federal coal in the Bull Mountains should be included.

Other Federal Coal (page 19-20)

330 The last paragraph on page 19 and the first full paragraph on page 20 do not seem to fit well with the heading of this subsection. These two paragraphs should be moved to a new subheading possibly entitled "Lease Royalties." The royalty numbers in the second paragraph are based on $15/ton (Appendix 16 second table). This reference should be added for clarity.

331 The DEIS discussion in the second paragraph on page 20 implies that the royalty stream under a leasing scenario might actually accrue to the Federal government. The implication contradicts your evaluation and distorts the comparison of alternatives to those with a strong interest in the royalty issue.

Meridian's near-term development proposal is based on the completion of the exchange, not a lease. Your analysis shows, and Meridian concurs, that an underground mine in the Bull Mountains cannot be opened in the near future which carries an 8% production royalty.

If BLM decides to leave these development scenario numbers in the EIS, we suggest you add the following caveat at the end of the first full paragraph on page 20:

The above values represent an example for illustration only. BLM's internal analysis concluded that a mine based on this sales price and paying these royalties would not be economically feasible. It is unlikely that royalties could be collected in these time frames and amounts.

No Action (Alternative E) (page 20)

332 Just as BLM considers the impacts of potential future development associated with the proposed exchange, BLM should also consider future development on the offered lands that would likely occur if the No Action Alternative is selected. If the exchange does not occur, the offered lands will likely be sold by Meridian to any willing buyer. In the case of the Madison and Big Hole River tracts, this is likely to lead to subdivision of the land parcel and residential or vacation home development. In other words, land use of these parcels is likely to change with the No Action Alternative. We suggest the following sentence should be added to the end of the second paragraph:

The private lands would most likely be sold by the current resource company owner to other parties interested in more intensive use or development of that surface. This could result in adverse impacts to wildlife habitat and lessened availability for public access.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

Reasonably Foreseeable Development Scenarios:

0.5 Million Tons Annual Production: (page 90)

We suggest adding description to this development scenario to ensure that the necessary coal refuse area is included in the generic evaluation. Following the third paragraph in this section, please consider adding the following:

The refuse fill area for a small mine would be constructed near the coal processing facility and would require about 50 acres for a 25-year mine life. The disposal area would be constructed in accordance with State of Montana rules and regulations (which are required as minimum to comply with OSM standards) governing coal processing waste disposal.

3.0 Million Ton Annual Production: (page 91)

As with the description of the 0.5 million ton production scenario, this scenario should include a description of the necessary coal processing waste disposal area. We suggest the following paragraph be placed in this section after the third paragraph:

Coal processing waste from the beneficiation process will require about 350 acres of disposal area. This disposal area will be constructed in accordance with State of Montana rules and regulations which are designed to minimize the impact of such facilities on the environment. For Meridian's mine proposal, the refuse area requires the use of a parcel of BLM administered surface land (a portion of Section 12 is BLM surface) for which BLM will consider issuing a use permit as part of a specific mine plan review.

333 Table 4.4 should be corrected by adding the longwall mining equipment such as the shearer, roof support equipment, conveyor equipment, etc.

The Bull Mountains Railroad
Route and Design Characteristics

334 The first sentence of the second full paragraph on page 92 should be changed to read:

Various Federal and State permits for the construction of this railroad may be required and, in the case of Meridian's proposed development, the railroad will be evaluated as part of the joint Federal/State Environmental Impact Statement to be prepared on the site-specific mine development.

Delete the last sentence (BLM would only ....etc...) of this paragraph (second full paragraph on page 92) since BLM may be involved in the site-specific EIS because of other uses of land administered by BLM.

SELECTED FEDERAL COAL LANDS

0.5 Million Tons of Coal Per Year Mine (page 94)

Modify the first paragraph to read as follows:

Development of the selected Federal coal lands as an underground mine which produces 0.5 million tons coal per year is considered to

335 reasonably represent a small mine development that may occur in the Bull Mountains.

Vegetation (page 106)

We suggest adding to the brief statement as follows:

336 Vegetation will be unaffected by mining except at the entrance, air vents and associated surface facilities. Federal and State reclamation laws and regulations require revegetation of disturbed areas associated with coal mining at mine closure. There will be no long-term or significant impacts to vegetation as a result of mining.

Hydrology (page 106)

337 We suggest that, parallel to your other discussions on resource impacts, the word "significant" be inserted between "No" and "surface" in the first sentence.

3.0 Million Tons of Coal Per Year Mine (page 107)

The first sentence of this section should be changed to read as follows:

338 Development of the selected Federal coal lands as a longwall mine which produces 3.0 million tons of coal per year is considered to reasonably represent a high level of production from an underground mine in the Bull Mountains.

Cultural Resources (page 120)

339 The word "will" between "mining" and "create" and between "mine" and "damage" in the first and second sentences should be changed to "may". We don't believe the analysis of subsidence or the cultural resources survey is sufficiently detailed to allow such a definitive conclusion on the generic mine plans that are evaluated in this EIS. Furthermore, this issue will need to be addressed in detail in any site-specific mine plan review.

Vegetation (page 120)

340 As previously stated for the 0.5 million ton scenario, the surface facilities associated with a mine development should be discussed briefly here. We suggest modifying the paragraph as follows:

The type of vegetation would not be altered, but the distribution may be changed because of altered drainage patterns. Vegetation would be removed from those areas that are used for surface facilities associated with the longwall mine such as the coal processing waste area, the rail loop, the processing plant, and roads. Federal and State reclamation regulations require that areas which are disturbed

by coal mining activity be successfully reclaimed at mine closure. Therefore, there is not likely to be any long-term or significant impact to vegetation as a result of mine development.

Hydrology (page 121)

341 We suggest that the second paragraph of this section be deleted. The discussion of impacts should be kept at the generic mine level. Specifically addressing particular sections implies greater development specific evaluation than is appropriate for this document. This is also one of the few areas where the impact discussion focuses on a specific geographical area.

New Sections for Chapter 4. (page 135)

342 NEPA regulations at 40 C.F.R. §1502.16(e) call for a discussion of energy requirements and conservation potential of various alternatives and mitigation measures. Perhaps a new section which briefly compares energy requirements of the alternatives such as the following should be added to Chapter Four before the Mitigation Measures on page 135 such as the following:

Energy Requirements and Conservation Potential

There would be no particular difference between energy consumption and conservation among the exchange alternatives. If the selection of any of the alternatives resulted in mine development, there would be additional energy available for worldwide consumption. Longwall mining, possible at the higher production scenario, has the benefit of more complete coal extraction and, therefore, higher resource conservation than the room and pillar mine techniques expected to be employed for the lower production rates.

In addition, NEPA regulations at 40 C.F.R. §1502.16(f) require a discussion of natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures. While we believe this has, for the most part, been covered in the draft, some discussion summarizing this issue should be inserted as follows:

343 Natural or Depletable Resource Requirements and Conservation Potential

There would be no particular difference in depletable resource requirements between the exchange alternatives. Coal mine development which may result from the selection of development alternatives would result in the depletion of the coal resource in the Bull Mountains area at the coal production rate. Longwall mining of the coal resource, which is only likely at the higher production rates, allows for more complete recovery of the coal resource than the lower production rate of room and pillar mining techniques.

Mitigation Measures (page 135)

344 The second sentence of the first paragraph seems to contradict the contents of this chapter. The analysis does not identify any "significant" impacts to the environment as a result of the generic coal development. We suggest you modify this sentence to read as follows:

Further consideration of impacts in the site-specific mine development environmental reviews may identify impacts which may result in additional mitigation.

We appreciate the opportunity to comment on the Draft EIS and we would certainly be willing to answer any questions you may have on our comments at any time.

Sincerely,

T. L. Hanks
Vice President, Coal

c: L. A. Darling
C. R. Rech
R. Morehead

0104e/lad/cwr

MONTANA TRAPPERS ASSOCIATION

Working today for a tomorrow in trapping.
Furbearers are a RENEWABLE NATURAL RESOURCE.

Dear Sir:

as a director for the above named assoc I protest any mining in the Dunn Mt area of the Bull hills. In the study done on the area not one mention of the fur resource was mentioned myself and many others derive part or all of our income from that area and drainages that originate in the purposed mining area. We do not want any mining undertaken until the company in question includes the fur resource in any impact statement it issues in the future

345

Sincerely

Paul Schmid
Director for Dist 5
MTA.

P.S.
Mining alone destroys multiple use concept

DEC 03 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

DEPARTMENT OF STATE LANDS

STAN STEPHENS, GOVERNOR — CAPITOL STATION

STATE OF MONTANA

(406) 444-2074 — 1625 ELEVENTH AVENUE, HELENA, MONTANA 59620

January 5, 1990

JAN 09 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews, Project Manager
Bureau of Land Management
Miles City District Office
P. O. Box 940
Miles City, MT. 59301

RE: Bull Mountains Exchange Draft EIS

Dear Mr. Mathews:

The following comments primarily address the wildlife portions of the Bull Mountains Exchange Draft EIS.

AFFECTED ENVIRONMENT - Coal Lands

The wildlife portion of this section should be updated and expanded through consultation with Greystone's biologist (consultant currently conducting baseline study). The information presented is not sufficient to determine whether or not development resulting from the proposed action will impact the wildlife resource. At a minimum a species list should be included. There should also be more discussion of existing habitat types and seasonal use of those types, critical use areas (eg. winter/summer ranges and fawning/calving areas for big game, leks for sharp-tailed grouse), population dynamics, etc. There is no mention made of waterfowl or reptiles and amphibians although species in these groups are known to exist in the area.

346

AFFECTED ENVIRONMENT - Priority Lands

Most of this section discusses only game species. Non-game species should also be addressed so that the potential benefits of the exchange (discussed later) are fully realized.

It is also worth mentioning that there is no discussion of the visual resource in this section.

ENVIRONMENTAL CONSEQUENCES

There is some discussion here of the impacts to wildlife resulting from construction of a railroad spur; however, there was no discussion under the Affected Environment Section concerning wildlife populations present along either of the two alternative routes proposed for the railroad. There is also

"AN EQUAL OPPORTUNITY EMPLOYER"

no mention of the possible impact to wildlife resulting from disturbance of stream channels during construction. I would suggest contacting MT Natural Heritage Program in Helena for assistance in determining potentially impacted species along the proposed routes.

There is very little discussion of impacts to wildlife (positive or negative) relative to the proposed alternatives. Under the preferred alternative there is no discussion of which species will be displaced, which will be disturbed by haulroad activities and to what degree those species will be impacted. There is also very little discussion of the possible impacts to wildlife of subsidence and the potential dewatering of springs and wells.

346

The positive impacts to wildlife resulting from federal management of the offered private lands should be emphasized more than has been done.

On page 133, under Hydrology Impacts, reference is made to Federal Section 18; shouldn't this be Section 24?

I hope these comments are helpful.

Sincerely,

Shannon B. Heath
SHannon Heath
Wildlife Biologist
Coal and Uranium Bureau
Reclamation Division

nn

FC: 620.87

DEPARTMENT OF HIGHWAYS

STAN STEPHENS, GOVERNOR — 2701 PROSPECT AVE.

STATE OF MONTANA

HELENA, MONTANA 59620

October 30, 1989

RECEIVED
NOV 1 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mat Millenbach
District Manager
Attention: Bill Mathews
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301-0940

Subject: Draft of Bull Mountains
Exchange Environmental Impact Statement

Thank you for the opportunity to review the above referenced document. We feel that the following are corrections and/or clarifications that should be made to the text before the document is distributed for general review.

The Huntley Road, which is referenced in your text as US Highway 312, is NOT a designated "US" route. The US route designation was officially removed by action of the AASHTO signing committee on June 26,1979. Since that time, it has been locally designated by Yellowstone County officials as Highway 312. Therefore, the "US" should be eliminated in all references to this route. While this may appear to be a trivial distinction, "US" numbered routes are an integrated system of highways that were selected to facilitate travel on the main interstate lines and to provide the shortest routes and the best roads. The Huntley Road, of course, no longer fits this category and should not be referenced as such in the environmental document for this project. If you don't have the capability to locate the "US" entries through a word processing function, we have compiled a comprehensive list of pages in the draft where the error occurs.

347

A related error occurs on Map 9 where the obsolete US 10 route shield is being shown on Highway 312 (Huntley Road). We recommend eliminating this shield/number and hand drafting "Highway 312" on your map base.

Please refer to page 24 under the heading "Transportation", the last sentence. We feel that it is not a certainty that traffic accidents with children and school buses would increase. This is especially true if appropriate mitigation measures, such as those adopted by the company for the test pit proposal, are adopted. Therefore, we feel that this

AN EQUAL OPPORTUNITY EMPLOYER

sentence should be changed to read (old language lined-out, new language underlined): "Traffic accidents with children and school buses ~~would~~ could increase."

Please refer to page 62 under the heading "Road and Bridge Conditions" second paragraph, last sentence. In this sentence, the pavement condition rating is described as a system based on a scale of from 1 to 40 points. In fact, the pavement condition number ranges from 10 to 40 points. The scale's minimum rating of 10 indicates that service is being provided at some minimum level on all rated roadways. While it is not necessary to include the details of this rating system in the document's text, we feel that it is important to describe it accurately. Therefore, please change this sentence to read: "The pavement condition rating system is measured on a scale from ~~1~~ 10 to 40 points..."

Page 63 of your text shows a simplified map of construction/reconstruction projects and traffic counter locations in the study area. In order to keep this information consistent with the current MDOH construction schedule and consistent with other references in the text, some changes should be made as indicated on the attached sheet. If you are no longer in a position to have this map updated, we will be glad to make the changes and forward you a copy of the re-drafted map.

347 Please refer to page 65, the second column, third paragraph, first sentence. Information is reported in a different way for roads that are not on the Federal Aid System and in a consistent way for all Federal Aid Primary (FAP), Federal Aid Interstate (FAI), or Federal Aid Secondary (FAS) routes. Therefore, please change this sentence to read: "Because ~~US~~ Highway 312 is not on the ~~FAP~~ Federal Aid System, a comparable analysis of accident rates...."

Please refer to pages 100 and 113 under the heading "Fiscal - Local Government Costs", paragraph 1, sentence 3. The state provides maintenance only on US Highway 87 and Highway 312 (Huntley Road). Maintenance on Divide Road between the mine site and the junction with US 87 is accomplished by Musselshell County forces while the access roads into the load-out facility in Huntley (Heath Street and Secondary 522) are maintained by Yellowstone County. Therefore, we recommend that the following language be adopted: "The State of Montana provides maintenance on the highways between ~~the project site and the Huntley load out facility~~ the junction of US Highway 87 with Old Divide Road and the junction of Highway 312 with the local access road (Heath Street) into Huntley."

Please refer to pages 104 and 118 under the heading "Capacity", paragraph 4, sentence 4. This sentence states that it's difficult for the proposed trucks to accomplish the turning movement because of the geometry of the intersection. While this statement is based on

correspondence from this office, recent discussions on this topic with the MDOH Billings District Engineer indicate that trucks can physically accomplish the turn, but that the maneuver will be time consumptive. Therefore, we recommend the following change in the language of this sentence: "Furthermore, because of the geometry of the intersection, ~~it may be difficult~~ it will take a relatively long time for trucks of the proposed axle configuration ~~to accomplish this maneuver~~ to complete this turn."

Please refer to pages 105 and 119 under the heading "Safety", item (1). Since initial comments were submitted to the consultant in March '89, the MDOH Billings District Traffic Engineer has performed a field review of sight distance at this intersection. It is his opinion that there is adequate sight distance in both directions from the junction of Old Divide Road with US Highway 87. Therefore, please eliminate item (1) as a topic of special concern to MDOH.

Please refer to pages 105 and 119 under the heading "Safety", item (3), sentence 2. The curve referenced as near the "junction with the road to Shepherd" should be identified rather as the curve at the junction with Chicago Road which is also locally known as the 5-corners curve. Therefore, the following language change is recommended: "Of special concern is the curve near the ~~junction to Shepherd and the Shepherd~~ Chicago Road/5-Corners Junction as well as the junction itself."

347 Please refer to pages 105 and 119 under the heading "Roads and Bridges", paragraph 1, sentence 2. If you decide to update figure 3.1 to conform to current MDOH construction schedules, there will be four planned construction projects on US Highway 87 rather than three by 1993. Therefore, if figure 3.1 is updated the following change is recommended for consistency: "MDOH currently has ~~three~~ four construction projects scheduled for US Highway 87 between 1990 and ~~1993~~."

Lastly, the document identifies certain mitigation measures that "could" be required, with transportation addressed in the list of possible mitigations. The MDOH prefers that the BLM require the applicant to develop a transportation mitigation plan. If the following, or a similarly broadly written mitigation measure, is not adopted in the final EIS, the environmental document should include topic specific mitigations for the anticipated transportation impacts. Therefore, we encourage the adoption of the following language changes in number (4), page 136: "(4) The mining company ~~could~~ will be required to develop a transportation mitigation plan in consultation with MDOH prior to the initiation of coal haulage in order to offset the immediate impacts from hauling the coal by truck along the proposed haul route and the long term effect of building the proposed railroad."

We feel that these changes will strengthen the environmental document and provide the most current information to the reviewer. Consequently,

347 it's hoped that these changes will be made before the document is generally distributed.

Please call me if there are any questions.

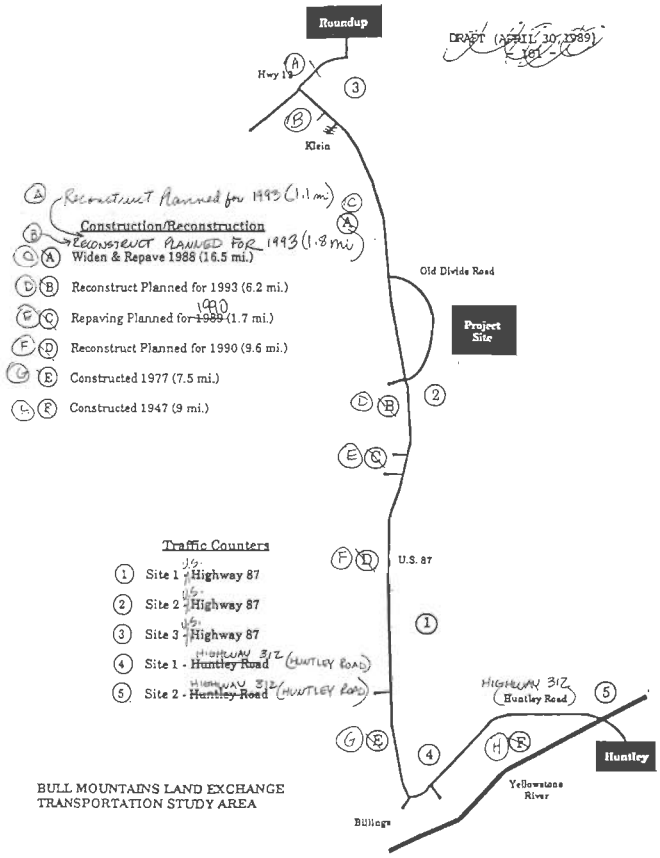
Don W. Cromer

Don W. Cromer, Supervisor
Rural Planning Section

DWC:SS:si:laa

Attachment

cc: Roy Ventura
Steve Kologi
Keenan Bingham



BULL MOUNTAINS LAND EXCHANGE
TRANSPORTATION STUDY AREA

Figure 3.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

Ref: 8MO

January 25, 1990

RECEIVED
JAN 31 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

Re: Bull Mountain Exchange Draft EIS

Dear Mr. Matthews:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Environmental Protection Agency's Region VIII Montana Office (EPA) has reviewed the referenced draft environmental impact statement (EIS). We appreciate the patience and cooperation of the Bureau in accommodating our delay in providing these comments.

The acquisition of the high quality recreational lands is described in the draft EIS has many desirable aspects. EPA concurs with the Bureau's stated contention that the a detailed assessment of mine development may not need to be addressed at this stage. However, the draft EIS appears to address the socio-economic analysis of full mine development at a level of detail
348 disproportionate to that allotted other aspects of the each alternative. This is particularly true concerning the environmental impacts and appropriate mitigation associated with such development. The imbalance in the treatment of the alternative analysis precludes a fair comparison of the full range of impacts of each of the alternatives under consideration.

The statement is made early in the document (page 3 column 2) that an EIS will be prepared for the railroad associated with mine development. It is stated only that environmental analysis and documentation will be prepared by the Montana Department of State Lands for the mine and recreation plan. The lack of commitment to development of a complete EIS for the mine is a concern. The lack of adequate evaluation of the full environmental impacts associated with the development of a mine in this draft EIS is also of concern, in view of the extensive emphasis on mine development for the socio-economic analysis. The absence of an equal level of assessment of the environmental impacts, mitigation and the associated costs also creates an inappropriate bias in the economic analyses in the draft.

If the BLM intends to defer assessment of the mine development to a future EIS, that decision should apply to the socio-economic impacts as well as the environmental. If the decision on this proposed land exchange will indeed be based on the economic value of the mine development, as indicated in this draft, then the environmental impacts need to be discussed in far greater detail. The economic and environmental impacts associated with the change in control and management of the lands proposed for acquisition by the BLM, should be discussed in similar scope and detail to the description of the coal bearing properties.

348 The disproportionate treatment of the environmental assessment in the draft EIS, in light of the emphasis on the positive economic impacts of mine development, preclude a realistic evaluation of the impacts associated with the proposed land exchange. Due to this imbalance in the draft EIS and the absence of a firm commitment to address the issues in an EIS for future mine development, as well as for the proposed railroad, we are rating this draft as EC-2, (Environmental concerns, insufficient information). The decision not to include a detailed discussion of mine development in the EIS would be appropriate, if it extended to all phases of the development. We feel that most of our concerns could be addressed by equalizing the scope and level of detail of the alternative analysis in the final EIS.

A copy of the criteria that EPA has established for rating draft environmental impact statements is attached. If you need any further EPA assistance, please feel free to contact Lee Shanklin of my staff at (406) 449-5486 or FTS 585-5486.

Sincerely,

John F. Wardell

John F. Wardell, Director
Montana Office

2

SUMMARY OF RATING DEFINITIONS

ENVIRONMENTAL IMPACT OF THE ACTION

LO--LACK OF OBJECTIONS

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--ENVIRONMENTAL CONCERNS

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--ENVIRONMENTAL OBJECTIONS

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--ENVIRONMENTALLY UNSATISFACTORY

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

CATEGORY 1--ADEQUATE

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

CATEGORY 2--INSUFFICIENT INFORMATION

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS

CATEGORY 3--INADEQUATE

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

Picchioni's IGA & Bakery

PICCHIONI'S, Inc.

10 - 9th Avenue West
Roundup, Montana 59072

Donald E. Picchioni
President

Wm. Frank Picchioni
Vice President

January 5, 1990

Mr. Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

349 Over the course of the last few months much concern has been voiced over the exchange of coal for lands between the BLM and Meridan Minerals. Some concerns are valid, but most are only a smokescreen sent up by a vocal minority to cloud and confuse the real issue.

This minority has tried to discredit experts whose findings were reported in the EIS, to question the integrity of BLM officials, and to create an emotional rather than logical approach to this exchange. I can only hope that these tactics are as shallow to everyone else as they are to me.

The real issue at stake is the effect on the general public of this exchange. At this point in time the public is not receiving any benefit from the coal in the Bull Mountains, nor will they in all probability if an exchange is not reached. They will however, receive a great benefit if the lands being offered by Meridan become public lands. This benefit can be enjoyed by all for generations to come.

The choice is clear. A decision to implement Alternative A in the EIS will serve the best interests of the public and should be made without hesitation.

Donald E. Picchioni
President

DEP/cr

December 28, 1989

NL

RECEIVED
DEC 29 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

Dear Mr. Matthews,

I have been a resident of Montana and Musselshell County for 38 years. I own property, pay taxes and run a business out of Roundup. I am writing this letter, to show support for the proposed Land Exchange in the Bull Mountains.

350 There can be NO doubt that the coal under the Bull Mountains will be mined, if not now, then 20 years from now, or even later. Sooner or later, it will be mines - this we know. The Nothern Plains Resource Council would like to get it stopped with their out of state funds and out of state support, but they do not have the best interest of the State of Montana or its people in mind -- only themselves. The best interest for Montana and its people, is a well thought out, long term business. In order for this to happen, we must help the company get a start and then watch their progress to assure that all enviromental policies are followed to help protect our beautiful state.

As I review the information on this Lan Exchange, I can see that it will not only benefit Meridian Minerals; but, it will definatly benefit the Bureau of Land Management in this area and in the other areas affected.

As I stated earlier in this letter, I am strongly in favor of the Land Exchange to help get a new business started in this county and state.

Thank you for your efforts,

Dennis D. Johnson
Senior Sales Engineer

NL Baroid/NL Industries, Inc.
P O Box 235, Roundup, Montana 59072

Gary G. Thomas
602 1st St. West
Roundup, Montana 59072

January 3, 1990

JAN 06 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews, EIS
Project Manager
BLM District Off.
P.O.Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

351 The opposition to this trade is coming from a very small group of individuals who are historically against anything of this nature. Their arguments against the exchange are erroneous and completely miss the point. We are not exchanging for a coal mine, but for the opportunity to develop a coal mine. Only if the mine plan passes the laws of the State of Montana will a mine become a reality. To my way of thinking, the only question we have here is whether this trade is good for the people of the U.S.

I believe the draft EIS was done in a professional manner and I support BLM's decision to make the exchange.

Cordially,

Gary G. Thomas

December 29, 1989
[illegible] Western Ave.
Roundup, Montana 59072

DEC 30 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
P. O. Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

I am writing to you as a very concerned citizen of Roundup and a native Montanan in regard to the proposed land-coal swap between Meridian Minerals and the Bureau of Land Management.

In my opinion, Roundup and the State of Montana are in a very critical economic situation and in dire need of a drastic change in our policies concerning industry in our town and state.

It is time for the environmentalists and the so-called friends of the earth to widen their tunnel vision and realize that people have to make a decent living to continue paying our continually rising taxes and to support our great state financially.

352 I am not one of those who believe in raping the land in exchange for monetary gains. I am one of those who has enough common sense and intelligence to know that we cannot build an environmental curtain around our state and survive strictly on trees, tourism, and the great outdoors. There is absolutely no reason that industry cannot thrive especially in the Bull Mountains, and still maintain our pristine beauty.

It is beyond my imagination that anyone could be ignorant enough to oppose the proposed land swap. The town of Roundup was born and thrived almost totally on coal mining and the fact of the matter is that 99% of our citizens would dearly love to see it reborn and thriving once again. I happen to be a businessman in Roundup and I can personally vouch for the depression we are mired in at this time. It is a constant struggle to keep our heads above the rising costs, unemployment, and welfare in our Community.

I personally do not know a solitary person among my customers who is against the proposed coal mine. The chosen few who feel they can bestow their radical views upon the majority evidently only climb out of their trees and out from under their rocks when there is a not-so-well publicized public meeting held 52 miles away in Billings.

It's time the radical minority realizes that by not allowing industry into our state that we are losing by far our greatest industry: OUR YOUNG PEOPLE.

I say to heck with them and full speed ahead. Thank you for your time.

Sincerely,

ALVIN E. [illegible], O.D.
ARCADE GUNS & SPORTING GOODS

JAN 07 1990
BUREAU OF LAND MANAGEMENT

Roundup, Mt.
Jan. 2, 1990

To All Concerned,

I am writing you Concerning this Mine that is starting up in the Bull Mts. near the P.M. Coal Mine. by the Meridian Mineral Co. First of all I want you to know, that my wife and I are 100% in favor of it. And we will support it in any way we can.

I cannot see why these Ranchers are against it. But some of them are. Guess they don't care wether the working class has a job. They got nothing to worry about, Cause the Goverment will give them a Loan if they get in a Bind.

One other reason they don't like to see another Coal Mine start up.

2.

It will raise the scale of wages. And the Farmers & Ranchers will have to Pay more if they hire anyone.

353 As for as ruining the water the P M Mine has operated in this Area for years, And it has not Affected the water. also they had several Mines over closer to Roundup about 25 or 30 years ago. And I didn't hear anyone say it affected the water or the Environment in them days. They surely can't Ruin the Environement where this Mine will be. As all these is over there where the Mine will be is Rocks and Burnt-Up Trees.

We have heard they have trouble getting there Permits. Which is probably the fault of the N.P.R.C. Enviremental People & Helena Bureaucrats among others, that are holding things up.

3

Have also heard they want to make a Wilderness ~~[illegible]~~ or Tourist State out of the State of Montana. One reason they are keeping all the Industry out. Therefore people have to go elsewhere to find work. We live on Old Divide Rd. about 1 Mile south of the Old Divide Coal Mine. If they get this going it would improve the Economy also put some people to work. And that is what this country needs.

Sincerely
Vern & Mary Rich

Dec. 6, 1989
365 Old Divide Rd.
Roundup, Mt.
59072

B. of L. M[illegible]
Billings,
Mt.

Sirs;

The live out on the road near the new mine site, and are very much in favor of the Coal mine that is about to go in.

354 This state and community needs some source of employment for the younger generation. We have four sons and two of them live out of state as there is no employment in Mont. One is in Construction and work has been very erratic, and the fourth one is in education. He has a teaching position this year, but is not sure about next year. There are many younger men and women that have left or are out of work. The lose all the tax revenue from these people that leave, not to mention what it does to the real estate business and every other business that depends on working people.

I think it is time for the bureaucrats, ranchers, farmers and all those that are against industry to come to terms with the fact that we need some source of industry or whatever to provide employment for our people and help improve the economy of our state, which seems to be a big factor in to-days work status.

You may count us in favor of the forthcoming Coal mine and our full support of it.

Sincerly,
Vern and Mary Rich

case IH Musselshell Valley Equipment Co.

418 Main Street Roundup, Montana 59072 (406) 323-2605

MR. BILL MATTHEWS
PROJECT MANAGER
BUREAU OF LAND MANAGEMENT
MILES CITY DIST. OFFICE
P.O. BOXX 940
MILES CITY, MT. 59301

DEAR SIR:

I AM IN FULL SUPPORT OF THE LAND EXCHANGE IN THE BULL HILLS CURRENTLY UNDER DISCUSSION WITH MERIDIAN MINERALS. THIS IS SOMETHING THAT MUST HAPPEN NOW. I DO NOT BELIEVE THAT WE CAN EXPECT THEM TO MAKE THE TYPE OF INVESTMENT THAT IT WILL TAKE FOR THIS PROJECT WITHOUT OWNERSHIP OF THOSE MINERALS.

I HAVE LOOKED AT THIS SITUATION FROM EVERY ANGLE THAT I CAN THINK OF AND I STILL COME UP WITH THE SAME CONCLUSION. IT MUST BE DONE.

AS A MEMBER OF THE BUSINESS COMMUNITY, I CAN TELL YOU THAT WE CAN USE THE PLUS BUSINESS THAT THIS MINE WILL GENERATE. AS ANYONE CAN TELL YOU THAT HAS VISITED ROUNDUP, WE HAVE DONE A GREAT DEAL TO MAKE ROUNDUP A BETTER PLACE TO LIVE AND RAISE OUR CHILDREN. WE HAVE SPENT MONEY AND A GREAT DEAL OF FREE LABOR TO MAKE THAT IMPROVEMENT. HOWEVER, THERE ARE STILL OPEN STORES ON OUR MAIN STREET.

NOT ONLY WILL THIS PROJECT EVENTUALLY HELP THE BUSINESS COMMUNITY OF OUR TOWN, IT WILL ALSO HELP THE STATE AS A WHOLE. SO MANY PEOPLE ARE LEAVING OUR STATE THAT WE ARE IN DANGER OF LOSING REPRESENTATION IN WASHINGTON, D.C. WE NEED THE POPULATION; WE NEED THE JOBS FOR OUR CHILDREN THAT THIS TYPE OF VENTURE WILL PROVIDE. OUR LEADING EXPORT RIGHT NOW IS OUR CHILDREN.

355 FROM AN ENVIRONMENTAL STAND POINT THIS IS A MOVE WE MUST MAKE. WITH THE AGREEMENTS THAT OUR GOVERNMENT HAS MADE WITH CANADA ALONE-ON THE CLEAN AIR ISSUE, WE NEED CLEANER COAL TO BURN. THINK OF THE RIVERS AND LAKES THAT THIS LOW SALT, LOW SULPHUR COAL COULD HELP IF IT WERE BURNING IN THE INDUSTRIAL FURNACES OF THE NORTH AND CANADA. BESIDES THE HUMAN FACTOR, WE ALSO HAVE TO CONSIDER THE FISH IN THE STREAMS AND THE WILDLIFE IN THE FORESTS OF THE NORTHERN TIER.

FINALLY, BESIDES THE JOBS THIS BUSINESS WILL EVENTUALLY GENERATE, IT WILL BE A FURTHER BOON TO OUR SECOND LEADING INDUSTRY, TOURISM. THE OPEN ACCESS TO THE AREAS MENTIONED IN THE EXCHANGE WILL GIVE THIS STATE AN IMMEDIATE LIFT FROM TOURIST BUSINESS.

THAT COVERS ABOUT ALL I WANT TO SAY EXCEPT FOR MAYBE- CAN WE PLEASE GET THIS PROJECT UNDERWAY AND SUPPORT IT?

SINCERELY YOURS,
JON FUNK
BOARD MEMBER
MUSSELSHELL VALLEY CHAMBER
MUSSELSHELL VALLEY DEVELOPMENT CORP.

ROUNDUP RECORD-TRIBUNE & WINNETT TIMES

Eric N. Rasmussen, Publisher — Mrs. Louise Rasmussen, Editor

P.O. Box 747
Roundup, Montana 59072

December 27, 1989

BLM District Office
Attn: Mr. Bill Matthews
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews:

356 I wish to reiterate my previously voiced support of the BLM/Meridian Minerals coal for land exchange. As a landowner on the Half Breed Creek drainage, I understand that there could be some influence on groundwater resources if coal development were to take place as a result of the exchange. However, I would gladly risk my eight wells and three springs for what I consider the broader benefit to the most people.

Thank you for this opportunity to comment.

Sincerely,

T.K. KUZARA

Monty L. Sealey
518 2nd St. East
Roundup, MT. 59072

January 5, 1990

Mr. Bill Matthews, EIS
Project Manager
BLM District Office
P.O.Box 940
Miles City, Montana 59301

RE: Draft EIS for Bull Mountain Exchange

Dear Mr. Matthews:

I have tried to keep abreast and involved in the total process surrounding the proposed coal development in the Bull Mountain area for the past two years. I have read all available information and documentation surrounding this project, from companies, agencies, special interest groups, hearings, meetings, etc. I feel through my personal research and job related participation I have a relatively broad knowledge of the many issues involved in mine development, resource stewardship, socio-economic conditions of the affected areas, public opinion, and economic and political reality. There is no doubt that support for the BLM draft EIS Preferred Alternative is overwhelming.

In light of poor recent economic conditions and the potential for favorable changes in the economic interia in this State, postitive action on an issue such as the exchange by BLM, is unquestionably necessary, and should lean toward encouragement of responsible development of our natural resource base. That action certainly is in the best interest of our citizens, for economic stability is the foundation to the success of our democratic system.

357 *I am very disappointed that although the Powder River Regional Coal Team has considered decertification of portions of Federal Coal Management areas; as of this date, no specific written clarification of the intent to allow Lease-By-Application without Regional Coal Planning Activity has been made public, concerning the Bull Mountain area. There is no indication when that clarification will be available, or what exactly the options will be.*

Add the above to the marginal economics of a mining venture as is suggested and the relatively small portion of the Federal coal holdings in the Bull Mountains being considered in the draft EIS; the BLM Preferred Alternative A is the only conceivable decision that could be made.

Sincerely,
Monty L. Sealey

January 4, 1990

Mr. Bill Matthews
Project Manager
U.S. Department of the Interior
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews:

I am writing to offer public comment on Meridian Minerals Company's proposed land exchange for coal development in the Bull Mountains near Roundup, Montana.

It is my opinion that proposed Alternative A (exchanging Federal coal lands in the Bull Mountains for various wildlife and recreation lands) is clearly a "win - win" situation for everyone.

358 The economic boost this project will give to Montana will carry forward well into the next century. Maybe, we can stop exporting Montana's talented, well-educated young men and women and start exporting coal. Rarely, is one allowed the opportunity to determine one's own destiny to the extent this project does for the state as well as for the entire Northwestern United States. The future of Montana can be considerably brightened, if the land exchange and subsequent mine development are allowed to proceed as planned.

I hope the Bureau of Land Management will approve proposed Alternative A, thereby allowing each citizen of Montana to benefit fully from Bull Mountain coal development.

Sincerely,
Derek D. Nelson
Derek D. Nelson

cc: Mr. Marvin LeNoue
State Director
U.S. Department of the Interior
Bureau of Land Management
P.O. Box 36800
Billings, MT 59107

Musselshell Valley Development Corporation
P.O. Box 246
Roundup, Montana 59072

January 4, 1990

Mr. Bill Matthews, EIS
Project Manager
BLM District Office
P.O.Box 940
Miles City, MT. 59301

RE: Bull Mountians Land Exchange Draft EIS

Dear Mr. Matthews:

We noted through examining the testimony given at the three public hearings for this draft EIS, representatives of Northern Plains Resource Council and the Bull Mountain Land Owners Association have expressed a few common concerns, which when taken in the proper context are valid. The Musselshell Valley Development Corp. (M.V.D.C.) believes these concerns can be addressed, and should not be used to scare up opposition.

Concerns:
1) Potential damage to springs
2) Effects on general groundwater
3) Credibility of professionals hired to author the EIS segments
4) Creation of a monopoly
5) Values of items being exchanged and the "removal of funds from the school children of Montana"
6) Maintaining Federal involvement in the process
7) Doing Business with Meridian Minerals-B.N.
8) Longwall Mining and Subsidence

359 1) The potential damage to springs is a possibility. However, it is generally agreed that a very limited amount of springs could possibly be affected. The company has offered to replace any lost water resource. This potential damage will be addressed in detail under the Montana Environmental Laws when the mine permit is applied for, and has no place in the debate in this EIS, the purpose of which is to determine whether to exchange land for coal, not whether and how to develop a coal mine.

2) The effects of a coal mine on water quality will also be studied in great detail in the mine permitting process and be in compliance with Montana Environmental Law, some of the strictest in the Country. It might be noted that even the water analysis cited by NPRC suggests that much of the water quality in the area is less than desirable at present. Again, this EIS is to evaluate the exchange of coal for land.

360 3) Several times NPRC and the Bull Mountain Land Owners Assoc. questions the credibility of the professionals hired by Meridian Minerals to study and write portions of the EIS. What is not being pointed out is that BLM did not have the funding to finance these portions of the EIS and Meridian Minerals paid for these professionals partly at the suggestion of NPRC. NPRC offers another professional opinion in rebuttal of the Hydrdogy issues in the EIS and yet their own testimony at the Billings hearing questions the conclusions by that professional; "I question Keith S. Thompson's conclusions drawn from his analysis of the data involved."

361 4) The question of whether this proposed exchange creates a monopoly or breaks anti-trust laws will be reviewed by the U.S. Attorney General when all comments, transcripts and documentation is sent for a 60 day review period, following the public comment period. It is interesting to note that because the coal is owned almost exclusively by Merdian Minerals and the Federal Government, control of the coal resource development is in their control at present. The exchange will not change that fact.

362 5) The value of the resources to be exchanged and the "removal of funds from the school Children of Montana". The M.V.D.C. is comfortable with the appraisal method used by BLM to determine the value of the resources. M.V.D.C. Directors gained confidence in the valuations when the current President of the Butte-Silver Bow Chamber of Commerce concurred with the appraisal method and said the value arrived at for the coal was not out of line with other valuations around the Country. The Chamber President is a mining engineer with a background of coal acquisition in other states for another dis-associated large corporation.

It is true that if this exchange occurs the 8% federal coal royalty, which would be assessed on leased federal coal, would not be applied to the approximately 5½ sections of exchanged coal. Approximately one-half of that federal royalty would be returned to the State Education Foundation. It is also true that for the centuries that Bull Mountain coal remains in the ground, no taxes or revenues of any kind will be available. Further, it is true that the State Education Foundation portion of the federal coal royalty is small compared to the revenue generated by all the other taxes that will be applied, whether exchanged or leased, i.e. severance taxes, RIT taxes, net proceed taxes, income taxes, property taxes, fuel taxes, etc. The Development Corporation recognizes that this mining venture is economically marginal and a savings of 8% on the recovered coal from the exchange can make or break the economic probability of a mine being developed. Sacrificing the federal coal royalty on just part of the resource is a small price to pay to gain many good paying jobs, improve related service business, higher county valuation, mega-tax dollars and advantageous balance of trade gains. The "removal of funds from the school children of Montana" is hard to conceive of if the funds are not there to begin with, and with such a narrow, penurious attitude, never will be.

363 6) NPRC spokespersons have, on numerous occasions, expressed the need to keep Federal involvement in the mine permitting process, suggesting that the Federal level of control would be completely lost if the exchange occurs. The Federal Government would lose the ability to offer the approximately 5½ sections of coal to bidders if the exchange occurs. However, the Montana Dept. of State Lands would still regulate the mine permitting process, offer review to the Federal Office of Surface Mining and the Federal Environmental Protection Agencey. The Development Corporation knows that Montana has some of the nation's strictest

363 environmental laws and will enforce them. The apparent desire to keep federal involvement through ownership, is to provide both a state and federal level at which appeals can be initiated to slow down and complicate the coal development process. The State of Montana is quite capable of enforcing it's environmental laws.

364 7) Doing business with Meridian Minerals Co., who was born of Burlington Northern Railroad, has been characterized as naive, a charade, and lacking common sense. The Development Corporation recognizes that Meridian Minerals Co. does in fact currently own half of the coal resource; is spending their own money to test market the coal and go through the costly environmental and mine permitting; is willing to take the risk of developing an economically feasible coal mining venture in the Bull Mountains; and is most likely the "only game in town." Would it make more sense to attempt to do business with Peabody to mine Meridian coal?

365 8) The possibility of using the longwall mining method and the potential for subsidence are viable concerns. Several things stand out when debating these issues. First, we have the benefit of many years of technological advances in mine engineering from other states where this mining method has been successful. The experience of those other states is being studied to avoid unnecessary mistakes. Secondly, subsidence can be engineered to be relatively controlled and predictable. Third, the mining company is willing to make specific assurances to mitigate potential subsidence damage. Fourth, and more to the point, the longwall mining method and subsidence are issues which have to be dealt with whether there is an exchange or not, and will be addressed in great detail in the mine permit process. Again, the EIS is designed to address the exchange, not the design of a mine.

The Musselshell Valley Development Corporation is a proponent of this project. We have concerns with environmental and social impacts that can occur with such a relatively large venture, but are confident that the Montana mine permit system is a good one if allowed to work. The draft EIS in our opinion is quite satisfactory, addresses those issues that are pertinent in sufficient detail and illustrates that this exchange would be in the best interest of the public. The Development Corporation supports the Preferred Alternative and encourages BLM to proceed with nogotiations for the exchange.

Sincerely,

Donald E. Picchioni, Pres.

State Historic Preservation Office
Montana Historical Society
Mailing Address: 225 North Roberts • Helena, MT 59620-9990
Office Address: 102 Broadway • Helena, MT • (406) 444-7715

November 24, 1989

Bill Matthews, Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

Re: Draft EIS: Bull Mountains Exchange

Dear Mr. Matthews:

Thank you for this opportunity to comment on the above cited document prepared to address the possible environmental consequences of the proposed exchange of selected BLM coal lands to Meridian Minerals Company for offered recreation and wildlife lands.

With respect to historic and archaeological resources, we find the document to be an accurate representation of the potential impacts which may occur with this undertaking. Based on our present knowledge of the area, numerous prehistoric and historic properties can be expected to exist in the study area. Further on-the-ground inventory is clearly warranted and we assume such inventory will be initiated soon or once the appropriate alternative is selected.

366

As noted in the document, the impact of subsidence on archaeological resources is a major concern and one which may prove difficult to fully evaluate prior to the initiation of the undertaking. We anticipate that a Memorandum of Agreement among the BLM, the Advisory Council on Historic Preservation, and our office will be necessary to address this potential effect, pursuant to 36CFR800, implementing regulations for Section 106 of the National Historic Preservation Act.

Thank you for consulting with us at this time. We have already had initial discussions of this project with your District cultural resource staff and look forward to further consultation in the future.

Sincerely,

Mark F. Baumler, Ph.D.
Deputy SHPO/Archaeologist

File: BLM/Miles City/Bull Mts Coal-Meridian

DEPARTMENT OF THE AIR FORCE
AIR FORCE REGIONAL CIVIL ENGINEER CENTRAL REGION
1114 COMMERCE STREET
DALLAS, TEXAS 75242-0216

21 DEC 1989

Mr. Marvin LeNoue, State Director
Bureau of Land Management
Montana State Office
222 North 32nd Street
Billings Montana 59107-6800

RECEIVED
DEC 29 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dear Mr. LeNoue

Thank you for providing us the opportunity to review the Draft Environmental Impact Statement for the Bull Mountains Exchange in Montana.

We support the BLM's efforts to develop management plans for lands under its control. The issue of primary interest to the Air Force regards the use of established military training areas and routes for aircraft which may traverse these areas. Currently, several Air Force flight training routes traverse a portion of the study area (See atch 1).

Military training routes and airspace requirements are subject to change, however, it is not anticipated that significant changes to these routes will occur in the immediate future. Mission requirements, fuel costs, and environmental constraints all contribute to decisions made in locating a military training activity. Because of general aviation and population pressures, low altitude, high speed flights are relegated to those areas least accessible and sparsely inhabited. Therefore, we request that you give full consideration to how planning and management decisions might adversely affect the use of low altitude airspace by the Air Force. We believe unrestricted military use of these routes is essential for training and combat effectiveness.

367

In the past, there have been no major problems between the Air Force and the BLM concerning military over flights of lands under your management. Should a conflict ever arise, we will be available to assist in establishing liaison between your office and the appropriate Air Force activities. We would appreciate your office forwarding future documents of this nature directly to our office as we will perform the review on behalf of the Air Force.

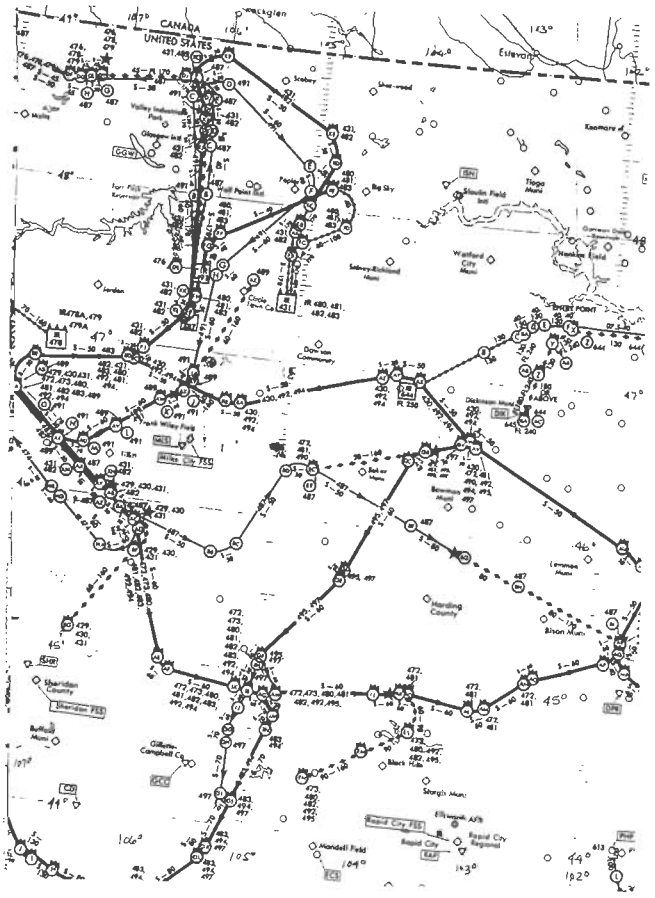
We hope this information is useful in your planning process. Thank you for the opportunity to review the documents provided. We look forward to working with your office again in the future. If additional information is needed, please contact Mr. Raymond Bruntmyer, (214) 653-3341.

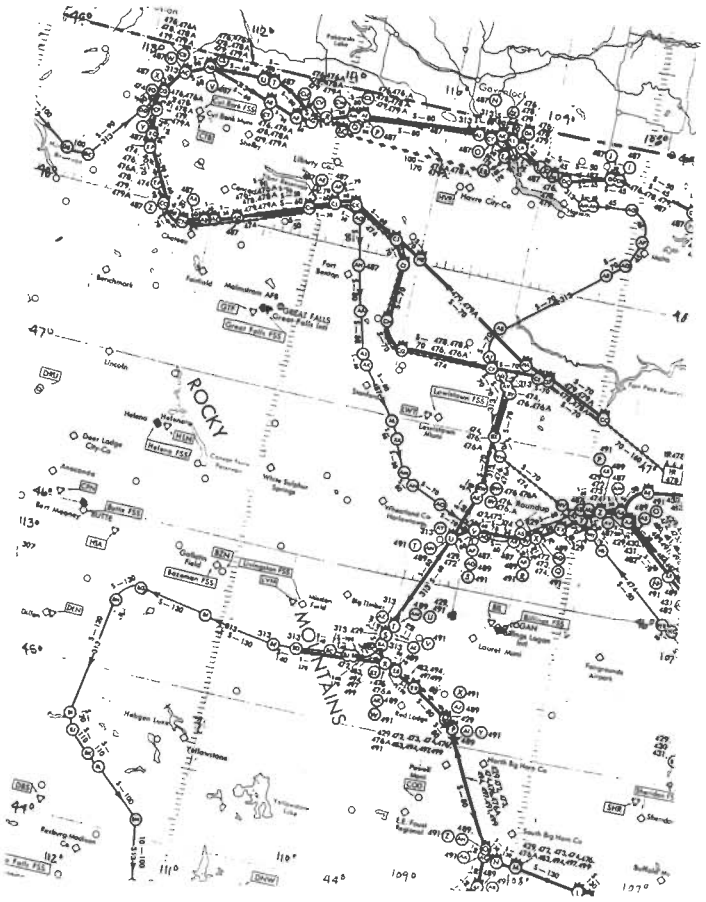
Sincerely

WILLIAM L. COX, Director
Environmental Planning Division

1 Atch
Two Flight Line Maps

Cy to: HQ USAF/LEEVM/LEEVX
BLM, EIS Project Mgr.
1 CEVG/RBDR
HQ SAC/DONA





DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO ATTENTION OF

November 22, 1989

Planning Division

RECEIVED NOV 28 1989 BUREAU OF LAND MANAGEMENT MILES CITY, MT

Mr. Bill Matthews
Bureau of Land Managcment
Miles City District Office
P.O. Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

We have reviewed the Bull Mountains Exchange Draft EIS, and offer the following comments.

368 While the exchange and/or lease of the Federal coal lands would cause relatively insignificant impacts, the development of the Federal coal may cause significant impacts. It appears that some of the project activities could take place in waterways or wetlands which are classified as waters of the United States and are therefore regulated under Section 404 of the Clean Water Act. If activities would involve the temporary or permanent placement of fill material into water of the United States, a Section 404 permit may be required. Before the development of any coal, an EIS should be written which would address the impacts to the surrounding areas, including any impacts to wetlands or streams. If it is found that impacts from the coal mining operation would affect any streams or wetlands, additional mitigation may be required.

If you have any questions, please contact Mrs. Jeannine Nauss of our staff at (402) 221-4594. Thank you for the opportunity to review this Draft EIS.

Sincerely,

Gerard E. Mick

Gerard E. Mick
Chief, Environmental
Analysis Branch
Planning Division

January 5, 1990

Mr. Bill Matthews
Project Manager
Bureau of Land Management
P.O. Box 940
Miles City, Mt. 59301

Dear Bill:

I feel I need to make a few personal comments on the land exchange between the Bureau of Land Management and Meridian Minerals.

369 The proposed exchange has good benefits for the county and the people living here. But,there will be major problems with the longwall mining process and these problems should not be made light of. The problems with the hydrology and the transportation of the coal are just two of them. These should be worked out during the mine permit process rather then the land exchange. A water bond might be a partial solution to the hydrology problem.

370 The exchange in my opinion involves the economics of trading land for coal and I have several suggestions. We do not havea crystal ball so we cannot look into the future to see if there will be a major role to be played by coal. All indications are- there will be. Therefore to say the coal has little value unless it is mined is not exactly correct. 20 years from now unmined coal may have a tremondous value or no value at all. We do not know which it will be. To be fair to both Meridian Minerals and to the taxpayers of Montana I feel there should be sliding scale on the royalties included with the exchange. Meridian should have several years to recover their start-up costs but after that time a 1% royalty should be put in effect and rise 1% each year until 4% is reached. Royalty payments would go no higher then 4%. This would seem fair to both sides.

371 There should be a time frame clause in the exchange for the mining to began. The land exchange should not be a permanent exchange unless Meridian starts mining with 5 years. If they don't intent to mine then the land should revert back to the Bureau to Land Management and no monopoly has been provided for Meridian Minerals.

Thank you.

Sincerely,

Sue M. Olson
Rancher, Bull Mountains

1792
M-76849

Memorandum

To: The File, M-76849

From: Bill Matthews

Subject: Bull Mountains EIS Comments

On January 2nd, Natalie Powell from the National Park Service in Denver called. Although I was in the office, she told the secretary that it was not necessary to speak to me. Her message was that the National Park Service, Denver Office, had no comments on the Bull Mountains Exchange EIS.

Bill Matthews
1-8-90

Matthews:djm:1/08/90:7

United States Department of Agriculture
Soil Conservation Service
Federal Building, Room 443
10 East Babcock Street
Bozeman, Montana 59715

December 7, 1989

RECEIVED DEC 13 1989 BUREAU OF LAND MANAGEMENT MILES CITY, MT

Mr. Bill Matthews
Bureau of Land Management
P.O. Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

SUBJECT: Bull Mountains Exchange Draft EIS

We have reviewed the above document and have no comments to offer.

Sincerely,

RICHARD J. GOOBY
State Conservationist

cc:
R. Batchelor, State Biologist

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MILES CITY DISTRICT OFFICE
P.O. BOX 940
MILES CITY, MONTANA 59301-0940

TAKE PRIDE IN AMERICA

IN REPLY TO:

1792
M-76849

Memorandum

To: The File, M-76849

From: Bill Matthews

Subject: Comments from U.S. Forest Service - Wise River, Montana

I returned Ed Leverts telephone call on January 9, 1990. Ed is the District Ranger for the U.S. Forest Service in Wise River, Montana.

Ed said that the Forest Service had been trying to get a right-of-way from Plum Creek Timber Company across the Big Hole River properties that were part of this exchange (Priority Lands No. 5). He said that they had put their right-of-way application on hold for the time being until a decision was made on the proposed exchange.

He said that the Forest Service would like to see BLM acquire the Big Hole River properties to provide public access to Sawlog Creek. I told him that I would write up our conversation and make it a part of the official comments. He asked if I would also call and keep him informed of the status of the exchange and the Big Hole River properties.

Bill Matthews
1-16-90

Matthews:djm:1/12/90:18

FERGUS ELECTRIC COOPERATIVE INC.
GILT EDGE ROUTE • LEWISTOWN, MT 59457 • PHONE (406) 538-3465

December 12, 1989

BLM MT (020)
DM
Asst DM
CID
Resources
Admin
Plan & Envir
DEC 15
Operations
Mineral Res
P. Asst R A
Bia Dry R A
S D R A
Rlnds R A
Al Dunnigan

Marvin LeNoue, State Director
Bureau of Land Management
Box 36800
Billings, Mt 59107

Dear Mr. LeNoue:

Fergus Electric Cooperative provides electrical service to rural communites and residents in 13 counties in Central Montana. We are a member-owned cooperative and are vitally concerned with the economic health and development in our service area as well as the entire state.

Our Board of Directors have supported and taken steps to assist a "grass roots" economic recovery effort being sponsored by the State of Montana. A keystone in that effort is the advocacy for the development of natural resources and for coal development in our service area.

We strongly support the Meridian exchange. Meridian has made a serious committment to develop a substantial mine. Their ownership of all or most of the coal resources proposed in the trade will greatly facilitate their efforts.

Fergus Electric stands to market as much as 14 MW of power to the mine. Other fringe services will develop and will add to the actual mine load. Assuming our preliminary studies are correct, significant satallite businesses will also develop as a direct result of the mine. This sort of activity is needed in the area.

We are pleased with the preferred alternative in the "draft" EIS and strongly recommend it be carried forward as the decision of BLM in the "final" EIS.

Sincerely,

DAVID H. SHULER
General MANAGER

DHS:VMc

"OWNED BY THOSE WE SERVE"

BOARD OF COUNTY COMMISSIONERS
LYLE E. STORTZ
WALTER J. MOORE
SUE M. OLSON

County of Musselshell
ROUNDUP, MONTANA

FRANCES L. DAWSON, Clerk & Recorder
MARGARET A. REIGHARD, Treasurer
Supt. of Schools
Assessor
BRIAN NEIDHARDT, Sheriff
FLOYD A. BROWER, County Attorney
DONA C. ROBSON, Clerk of District Court
JOHN RAE, Coroner
IRVING DODDS, Public Administrator
ROBERT E. MIHALOVICH, Justice of the Peace

January 3, 1990

Mr. Bill Matthews
Project Manager
Bureau of Land Management
P.O. Box 940
Miles City, Mt. 59301

Dear Bill:

The Board of County Commissioners of Musselshell County would like to go on record in support of the land transfer by the Bureau of Land Management and Meridian Minerals. We feel the B.L.M.'s Bull Mountain Exchange Draft EIS is Complete and has been done impartially.

Musselshell County has had a severe drop in taxable valuation in the past several years and the opening of the proposed mine can help stop this down trend. We realize there will be problems to be dealt with, but are confident we can work with Meridian Minerals to find mutually agreeable solutions to these problems.

The third member of our Board, Mr. Walter J. Moore, is on medical leave.He is in the hospital at the present time.

Thank you

Sincerely

MUSSELSHELL COUNTY COMMISSIONERS

Lyle E. Stortz, Chairman

Sue M. Olson, Member

GERALD BARTOW, President of Council
JOAN MINNIE, City Clerk
R. A. PAWELKO, Treasurer
GARY THOMAS, Commissioner of Public Works
ASK & PRATT, Attorney
ROBERT MIHALOVICH, Police Magistrate
LEONARD WALL, Fire Chief

Sally Armstrong,
XXXXXXXXXXXX Mayor

City of Roundup
Montana

ALDERMEN
JAY SWANSON, 1st Ward
GEORGE GRIEMSMAN, 1st Ward
GERALD BARTOW, 2nd Ward
ERNIE SATTERTHWAIT, 2nd Ward
JAMES DSCHAAK, 3rd Ward
SALLY ARMSTRONG, 3rd Ward
WILLIAM FUNK, 4th Ward
LARRY LEKSE, 4th Ward

January 4, 1990

Bill Matthews, EIS
Project Manager
BLM District Office
P.O.Box 940
Miles City, Montana 59301

Dear Mr. Matthews:

The Mayor and City Council of Roundup are in support of the Preferred Alternative A of the BLM draft EIS for the Bull Mountain Exchange. We feel the Socioeconomic section of the the draft EIS in particular, applies to the City of Roundup, and that it was well written and reflects an accurate summation of conditions and potential impacts from the proposed action.

Overall the draft EIS and public hearing series has allowed the public many opportunities to comment in this process. We encourage you to proceed with the identified, preferred Alternative. Thankyou for your consideration.

Sincerely,

Sally Armstrong

Sally Armstrong, Mayor

County of Yellowstone

SUPERINTENDENT OF SCHOOLS

BILLINGS, MONTANA

January 10, 1990

Mr. Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews,

This letter is to inform you that I, as County Superintendent of Yellowstone County, support the Bull Mountains Land Exchange, Alternative A.

It appears to me that this trade would be beneficial to Yellowstone County in general and specifically to District No. 24, Huntley Project, because of the enhancement of the tax base.

I visited with Ramona Stout, Superintendent of Huntley Project Schools, about impact on their schools if this exchange came about. She indicated she could see no negative effects on their school district. If future developments caused increased student enrollment this would be a gain for their schools. She also indicated there could be some local inconvenience with increased traffic to the area but thought it would be minimal.

I see potential taxable value growth from the exchange to be beneficial to all of us in Yellowstone County, not only to the two agencies I've previously mentioned.

This land would probably fall under the category of centrally assessed property and, if production ever comes about, would qualify for a subsidy from the recent Flat Tax legislation. This could be helpful to our county and school district because of increased revenue, thereby reducing the tax burden on local taxpayers.

I support the Bull Mountains Land Exchange.

Sincerely,

H. C. "Buzz" Christiansen

HCC/njb

Roundup Public Schools

MRS. SYLVIA SHELHAMER
District Clerk
Phone 323-1707

School Districts No. 55 and 55-H
P. O. Box 717
Roundup, Montana 59072

J. JAY ERDIE
Superintendent of Schools
Phone 323-1507

ROGER L. BREWER
High School Principal
Phone 323-2400

PAULETT PRATT
Elementary Principal
Phone 323-1515

GARY F. RAY
Activities Director
Phone 323-2400

December 28, 1989

RECEIVED
DEC 29 1989
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Matthews
Project Manager
Bureau of Land Management
Miles City District Office
P.O. Box 940
Miles City, MT 59301

Dear Mr. Matthews

This letter is to affirm the fact that the Board of Trustees, School Districts 55 and 55-H, Musselshell County, Roundup, Montana, went on record at their last stated meeting, December 11, 1989, in support of Bull Mountains Land Exchange, Alternative A.

In looking at the Draft EIS, October 1989, the survey addresses present and projected student enrollments (Table 3.26 and Appendix 9) with minimal impact to the existing buildings as the result of Alternative A.

Concern of one bus route, part of which parallels the proposed haul route, is noted in the EIS (pages 105 and 119).

In the discussion leading to the motion supporting Alternative A, the Trustees expressed some concern about the decreased tax base and increased mill levies that Musselshell County, in general, and School Districts 55 and 55-H in particular, has experienced in the last seven years. Table 3.16 identifies years 81 through 87 and yet, another major decline, in taxable valuation, was experienced for the current fiscal year, 1989-1990, and is not reflected in the Draft EIS.

Once again, the Trustees support Alternative A.

Thank you.

Sincerely

J. Jay Erdie, Superintendent
Roundup Public Schools

ACCREDITED BY THE MONTANA STATE DEPARTMENT OF PUBLIC INSTRUCTION AND THE NORTHWEST ACCREDITING ASSOCIATION

SKYLINE SPORTSMEN'S ASSOCIATION, INC.
P. O. BOX 173 BUTTE, MONTANA 59701

December 20, 1989

RECEIVED
JAN 04 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Mr. Bill Mathews, Project Manager
Miles City District BLM Office
P. O. Box 940
Miles City, Montana 59301

Dear Bill:

The Skyline Sportsmen's Club of Butte appreciates the opportunity to comment on the Bull Mountain land exchange. We would like to go on record in support of the land exchange and the draft EIS. The club feels that the lands along the Big Hole River and the Madison River are very valuable to all recreationists and should go into public ownership.

The Board of Directors discussed several concerns on the exchange with Meridian officials from Roundup, and we trust that the BLM will work with Meridian to reach satisfactory solutions. Our concerns dealt with ground water and springs in and around the mine, adequate royalty payments, and a fair market value for the coal. Wildlife impacts are very minimal because of the underground type mining, as well as conservation easements on the acquired lands and access.

Another concern that we feel very strongly about is including in the exchange a small piece of property on the lower Big Hole River. By acquiring this parcel, located on the north side of the river, recreationists would have another much needed access point, as well as excellent fishing (primarily during the famous salmon fly hatch), along with some goose and duck hunting, camping, picnicking, and boating. There is also some good whitetail habitat along the river, as well as mule deer and whitetail deer in the sagebrush draws above the river. The property description is Section 31, part of Lot 3, lying North of C/L of main channel N W 1/4.

If your office could negotiate this property in exchange for the section of BN property that was sold in Custer County, our club would offer any assistance necessary to acquire this valuable property.

The proposed parcels on the upper Bib Hole (Sawlog) and the properties along the Madison River are also excellent choices of land for public ownership. The Sawlog access, for example, is the only motorized access to adjoining Forest Service lands for several miles. This one access allows recreationists opportunities for elk, deer, moose, and bear hunting, as well as camping, boating, or picnicking.

The Madison River properties will give much needed river access for waterfowl hunting, fishing, boating, picnicking, and camping. Once these properties go into public ownership, they cannot be sub-divided or purchased by large out of State corporations and locked off to the public.

Please feel free to contact either Bob Carlson at 723-3144, Bill Holdorf at 494-6023, or myself at 782-1560, if you need further information or assistance. Thank you.

Respectfully,

Tony Schoonen, Secretary

TROUT UNLIMITED

GEORGE GRANT CHAPTER
P.O. Box 563
Butte, Montana 59703

January 2, 1990

Mr. Bill Matthews
Project Manager
U.S. Dept. of Interior
Miles City District Office
Miles City, Montana 59301

Dear Mr. Matthews:

I would urge you to favorably look at proposed Alternative A when looking at the land exchange for coal development in the Bull Mountains near Roundup, Montana.

Alternative A appears to me to present a win-win situation for Economic Development and sportsmen alike. As an avid hunter and fisherman in the Butte area, I am always in favor of creating more public access and publicly supervised lands along the Big Hole, Beaverhead, and Madison Rivers.

As a Montana Ambassador and Board Member of the Butte Local Development Corp., I have been very involved in trying to get Montana's economy going again. I believe Alternative A would certainly encourage the development of new coal mines that would create more new basic industry jobs. We all know the positive spin-off effects of basic industry jobs.

I would, therefore, strongly encourage you to pursue Alternative A and get this exciting new project creating new income for the many unemployed Montanans.

Sincerely,

R. V. Tilman
Past President of George Grant
Chapter of Trout Unlimited

RVT:db

Founded in 1959... Over twenty years of trout and salmon conservation
Washington, D.C. Headquarters • 118 Park Street, S.E. • Vienna, Virginia 22180 • (703) 281-1100

DEPARTMENT OF COMMERCE
LOCAL GOVERNMENT ASSISTANCE DIVISION

STAN STEPHENS, GOVERNOR

COGSWELL BUILDING — ROOM C 211
CAPITOL STATION

STATE OF MONTANA

(406) 444-3757

HELENA, MONTANA 59620-0522

RECEIVED
JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

January 2, 1990

Mr. Bill Mathews, Project Manager
Bull Mountain Exchange EIS
Bureau of Land Management
Miles City, MT. 59301

Dear Mr. Mathews:

The Montana Coal Board wishes to go on record as being supportive of responsible coal development in Montana.

Our conclusion, after review of your draft EIS, is that your preferred alternative is correct.

Please keep us informed as this proceeds through culmination of the exchange and into the mine permitting phases of the project.

Sincerely,

Jerry Feda, Chairman
Montana Coal Board

Alan Evans, Vice-Chairman
Montana Coal Board

cc: Coal Board Members

"AN EQUAL OPPORTUNITY EMPLOYER"

Roundup Public Schools

MRS. SYLVIA SHELHAMER
District Clerk
Phone 323-1907

School Districts No. 55 and 55-H
P. O. Box 717
Roundup, Montana 59072

J. JAY ERDIE
Superintendent of Schools
Phone 323-1307

ROGER L. BREWER
High School Principal
Phone 323-2402

PAULETT PRATT
Elementary Principal
Phone 323-1312

GARY F. RAY
Activities Director
Phone 323-2401

RECEIVED
JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

January 4,1990

Dear Mr. Matthews,

I support the BLM/Meridan Coal land swap.

My grandfather and uncles were coal miners at #3. I was born and raised in Roundup. Coal was the main source of employment for many years in Musselshell County. I hope to see the day when we once again grow and prosper as a county of full employment. I believe the land swap will help my school, my home town, and my family and relatives.

Sincerely,

Paulette Pratt

Paulette Pratt

ACCREDITED BY THE MONTANA STATE DEPARTMENT OF PUBLIC INSTRUCTION AND THE NORTHWEST ACCREDITING ASSOCIATION

The Big Sky Country

MONTANA HOUSE OF REPRESENTATIVES

REPRESENTATIVE ROBERT C. CLARK
HOUSE DISTRICT 31

HELENA ADDRESS:
CAPITOL STATION
HELENA, MONTANA 59620
PHONE: (406) 444-4800

HOME ADDRESS:
BOX 262
RYEGATE, MONTANA 59074
PHONE: (406) 568-2553

COMMITTEES:
NATURAL RESOURCES
HIGHWAYS & TRANSPORTATION

RECEIVED
JAN 05 1990
BUREAU OF LAND MANAGEMENT
MILES CITY, MT

Dear Sir:

I am writing in regard to the BLM/Meridian Coal for land swap which is being considered in the Bull Mountains south of Roundup. To me this transaction appears to be a win-win situation for everyone involved, from the Federal Government for increased tax revenues in several areas, the State of Montana for the same reasons, the people of Musselshell County for the positive economic impact, including jobs that it will create both directly and indirectly, and the sportsmen and recreationists in western Montana by opening more public land to them. For these reasons I ask that you please approve this coal/land swap.

Respectfully Yours,

Robert Clark

Rep. Robert Clark

State of Montana
Office of the Governor
Helena, Montana 59620
406-444-3111

STAN STEPHENS
GOVERNOR

January 5, 1990

Mr. Marv LeNoue, State Director
Bureau of Land Management
P.O. Box 36800
Billings, Montana 59107-6800

Dear Marv:

I would like to offer the following brief comments on the Draft Environmental Impact Statement concerning the proposal by Meridian Minerals Company to exchange their private surface lands for certain federal coal tracts in the Bull Mountains. As a general rule, I am concerned about trading royalty producing coal tracts with non-revenue producing surface lands. Even though the offered surface tracts have obvious public interest values, (i.e., recreation) the State of Montana has a greater preference for revenue producing lands at the present time.

However, the Bull Mountain mine project poses a unique situation. It has been stated that if the normal leasing process is required, the Bull Mountain project would not be able to be developed due to various factors, including time requirements, pricing and market conditions. If this is true, the state of Montana and the federal government must seriously consider the application for exchange.

The State of Montana's primary goal is to encourage the start up and development of the Bull Mountain project as soon as possible, with the eventual aim to follow the normal leasing procedures (and consequent royalties). Therefore, if necessary, the state is willing to forego some initial royalty revenue, if the benefits of the Bull Mountain project development (i.e., increased employment, state and local production taxes, payroll taxes, etc.) are forthcoming in a timely manner.

Mr. Marv LeNoue
January 5, 1990
Page Two

To this end, I encourage you to tailor your decision on the exchange to meet the above enumerated goals. The immediate start up of the Bull Mountain mine, with its immediate economic benefits, and the eventual payment of federal royalties during full production, are in the best interest of the state of Montana. I leave the difficult choices on how to structure the exchange and provide for the necessary incentives up to your able discretion.

As you are well aware, my support for the development of the mine in no way affects the necessity for any mine developer to comply with all state and federal environmental and reclamation laws. The eventual development would obviously have to meet all Montana Department of State Lands permit requirements, as well as federal requirements.

Thank you for the opportunity to comment on the Draft Environmental Impact Statement.

Sincerely,

STAN STEPHENS
Governor

cc: Dennis Casey, Director
Department of State Lands

THE WESTERN COAL TRAFFIC LEAGUE
1224 Seventeenth Street, N.W.
Washington, D.C. 20036

(202) 659-1445

Bill Matthews

Officers

Ronald G. Wasson
Kansas City Power and Light Co
Kansas City, Missouri
President

Gregory A. Berwick
Department of Utilities
Colorado Springs, Colorado
Vice President

Executive Board

Ronald G. Wasson
Kansas City Power and Light Co.
Kansas City, Missouri

Gregory A. Berwick
Department of Utilities
Colorado Springs, Colorado

Robert A. Hewlett
Arizona Electric Power Coop.
Benson, Arizona

Thomas N. Anderson
Minnesota Power
Duluth, Minnesota

Richard B. Dauphin
Utility Fuels, Inc.
Houston, Texas

Dean F. Stoll
Iowa Public Service Co.
Sioux City, Iowa

Frank C. McCamant
Fayette Power Project
Austin, Texas

December 18, 1989

Mat Millenbach
District Manager
Bureau of Land Management
P.O. Box 940
Miles City, Montana 59301

Re: Bull Mountains Exchange, Draft EIS

Dear Mr. Millenbach:

372 Please accept this letter as the comments of the Western Coal Traffic League ("WCTL") in connection with the Bull Mountains Exchange Draft Environmental Impact Statement ("Draft EIS") issued in October of 1989. The Western Coal Traffic League is an organization comprised of utilities who purchase coals mined west of the Mississippi River. WCTL's combined coal purchases exceed 50 million tons annually, a substantial portion of which comes from coal mined on federal coal leases. WCTL has been actively involved in a number of Department of Interior actions involving federal coal lands, including the Coal Product Valuation Proceeding.

The Draft EIS addresses the various proposals whereby Meridian Minerals Company ("Meridian") would obtain an interest in federal coal reserves now owned by the United States government. The Bureau of Land Management ("BLM") preferred alternative calls for the proposed exchange of 3,674.36 acres of federal coal for 9,800.49 acres of wildlife lands offered by Meridian. Under this alternative (Alternative A), Meridian would not be required to pay any federal coal royalties as the transaction would be on a fee-for-fee basis with Meridian exchanging non-coal land BLM values at $1,138,000. A separate alternative (Alternative D) involves leasing the

---

Mat Millenbach
December 18, 1989
Page 2

372 federal reserves. Under Alternative D, BLM estimates that the leased lands could generate up to $76,622,000 in royalty collections.

Meridian has been an active participant in the Coal Product Valuation proceeding. In this proceeding, Meridian has consistently expressed its concerns that various valuation proposals forwarded by the coal and utility industries should be rejected because of their alleged negative impact on federal royalty collections. Having gone on record as being concerned with federal coal royalty collections, WCTL believes it is only fair that if Meridian is going to engage in federal coal land acquisitions, any interest it obtains in these lands should be contingent upon Meridian's obligation to pay the federal coal royalty. If in fact Meridian was required to pay this royalty, it might be more sympathetic to the concerns raised by other coal companies and utilities who purchase coal mined on federal coal leases. In addition, Meridian's payment of federal coal royalties on mined coal would add to the nationwide royalty collections and therefore be in accord with Meridian's stated interest in maximizing federal coal royalty collections.

43 U.S.C. § 1716 allows land exchanges if BLM first "determines that the public interest will be well served by making that exchange..." Id. Here, the public interest will best be served if the government structures any arrangements it enters into with Meridian or others to preserve its right to collect the $76+ million in royalties BLM projects might accrue if the Bull Mountains property was leased (Alternative D).

Sincerely yours,

Ronald G. Wasson

Ronald G. Wasson
President

THE WESTERN COAL TRAFFIC LEAGUE
1224 Seventeenth Street, N.W.
Washington, D.C. 20036

(202) 659-1445

Bill Matthews

Officers

Ronald G. Wasson
Kansas City Power and Light Co.
Kansas City, Missouri
President

Gregory A. Berwick
Department of Utilities
Colorado Springs, Colorado
Vice President

Executive Board

Ronald G. Wasson
Kansas City Power and Light Co.
Kansas City, Missouri

Gregory A. Berwick
Department of Utilities
Colorado Springs, Colorado

Robert A. Hewlett
Arizona Electric Power Coop.
Benson, Arizona

Thomas N. Anderson
Minnesota Power
Duluth, Minnesota

Richard B. Dauphin
Utility Fuels, Inc.
Houston, Texas

Dean F. Stoll
Iowa Public Service Co.
Sioux City, Iowa

Frank C. McCamant
Fayette Power Project
Austin, Texas

December 18, 1989

Mat Millenbach
District Manager
Bureau of Land Management
P.O. Box 940
Miles City, Montana 59301

Re: Bull Mountains Exchange, Draft EIS

Dear Mr. Millenbach:

Please accept this letter as the comments of the Western Coal Traffic League ("WCTL") in connection with the Bull Mountains Exchange Draft Environmental Impact Statement ("Draft EIS") issued in October of 1989. The Western Coal Traffic League is an organization comprised of utilities who purchase coals mined west of the Mississippi River. WCTL's combined coal purchases exceed 50 million tons annually, a substantial portion of which comes from coal mined on federal coal leases. WCTL has been actively involved in a number of Department of Interior actions involving federal coal lands, including the Coal Product Valuation Proceeding.

The Draft EIS addresses the various proposals whereby Meridian Minerals Company ("Meridian") would obtain an interest in federal coal reserves now owned by the United States government. The Bureau of Land Management ("BLM") preferred alternative calls for the proposed exchange of 3,674.36 acres of federal coal for 9,800.49 acres of wildlife lands offered by Meridian. Under this alternative (Alternative A), Meridian would not be required to pay any federal coal royalties as the transaction would be on a fee-for-fee basis with Meridian exchanging non-coal land BLM values at $1,138,000. A separate alternative (Alternative D) involves leasing the

federal reserves. Under Alternative D, BLM estimates that the leased lands could generate up to $76,622,000 in royalty collections.

Meridian has been an active participant in the Coal Product Valuation proceeding. In this proceeding, Meridian has consistently expressed its concerns that various valuation proposals forwarded by the coal and utility industries should be rejected because of their alleged negative impact on federal royalty collections. Having gone on record as being concerned with federal coal royalty collections, WCTL believes it is only fair that if Meridian is going to engage in federal coal land acquisitions, any interest it obtains in these lands should be contingent upon Meridian's obligation to pay the federal coal royalty. If in fact Meridian was required to pay this royalty, it might be more sympathetic to the concerns raised by other coal companies and utilities who purchase coal mined on federal coal leases. In addition, Meridian's payment of federal coal royalties on mined coal would add to the nationwide royalty collections and therefore be in accord with Meridian's stated interest in maximizing federal coal royalty collections.

43 U.S.C. § 1716 allows land exchanges if BLM first "determines that the public interest will be well served by making that exchange..." Id. Here, the public interest will best be served if the government structures any arrangements it enters into with Meridian or others to preserve its right to collect the $76+ million in royalties BLM projects might accrue if the Bull Mountains property was leased (Alternative D).

Sincerely yours,

Ronald G. Wasson

Ronald G. Wasson
President

RESPONSES TO PUBLIC COMMENTS

1 At the time the Draft EIS was prepared (March 1989), the 1988 fiscal data for Musselshell County were unavailable. Your comments are noted.

2 See "Socioeconomics" sections in chapter 4 for priority lands 1,2,3,5,6 and replacement lands. The local economies should benefit from expenditures from increased recreational use attributable to the proposed exchange.

3 Decertification is re-addressed in "Alternative C Leasing" in chapter 2 based on decertification approval by Director of BLM dated January 3, 1990.

4 Projected royalty income that might be derived by the federal government if the coal were to be leased rather than exchanged, must be discounted to a present value before valid comparisons can be made. The EIS contains specific assumptions to calculate the present value of future royalty streams. See appendix 16. A 0.5 million ton per year mine, starting in 1991 producing coal with a gross selling price of $15 per ton over a 41-year mine life, would produce $7,985,628 of royalty revenue. After discounting at 10 percent per year, the present value of that royalty stream is $1,676,763. A 3.0 million ton per year mine producing coal with the same sale price and start date over a 36-year mine life would produce $45,773,000 in royalties with a discounted value of $9,554,192.

A 0.5-million ton per year mine starting in 2020 producing coal with a gross selling price of $25 per ton over a 40-year mine life would produce $13,367,592 of royalty revenue with a discounted value of $176,941. A 3.0 million ton per year mine producing coal with the same sale price and start date over a 35-year mine life would produce $76,622,000 in royalties with a discounted value of $1,008,208.

If the proposed exchange was BLM's final decision, BLM would exchange $730,000 worth of federal coal in the Bull Mountains for $1,149,700 worth of offered lands, based on appraised values.

5 Royalty revenues collected from public land leases are distributed directly to states or paid into special funds or the General Fund of the U.S. Treasury.

States, other than Alaska, receive 50 percent of all royalties, rents, and bonuses collected from any public land leases located within a state's boundaries. These revenues do not include Windfall Profit Tax on crude oil, which is deducted before any allocation is made. Forty percent of the remaining mineral revenues from public land leases is deposited in the Reclamation Fund, and 10 percent is directed to the General Fund of the U.S. Treasury.

Receipts from acquired lands, other than U.S. Forest Service acquired lands, are deposited in a general treasury account. The funds, in some instances, revert to the agency that has administrative jurisdiction over the land. This information was obtained from Mineral Revenues: The 1988 Report on Receipts from Federal and Indian Leases (USDI, Minerals Management Service 1988).

6 See response 4.

7 Value is 1.67 cents per ton of coal. Mineral appraisals are based on recoverable reserves.

8 See responses 4 and 5.

9 In a telephone conversation (January 3, 1990) with Jim Mockler of the Montana Coal Council, he stated they were on record as supporting the deduction of severance tax, black-lung tax, and other taxes as legitimate business expenses prior to payment of royalties. He also said that they support the payment of royalties on extracted coal and always have.

10 See response 4.

11 The coal appraisal was conducted in accordance with A Guide to Federal Coal Property Appraisal, 1986 edition (Bureau of Land Management Handbook). BLM is not aware of any pending regulations affecting the methods used to appraise coal. There has been some consideration given to changing the way royalty payments are calculated; however, no decision has been made regarding this issue.

12 See response 4.

13 As was explained in the EIS, the average price of underground coal for Colorado and Utah in 1987 was $28.16 and $25.70 per ton respectively. It was stated that those prices may reflect older, more lucrative contract prices and a higher BTU product compared to the Bull Mountains coal. The average coal sale price dropped to $26.39 per ton for Colorado and to $22.42 for Utah in 1988. The average sale price figures for 1989 are not available. This information was obtained from the Energy Information Administration Coal Production Report, 1988 (U.S. Department of Energy 1977-1987). The average sale price for Montana surface-mined coal was $10.06 per ton for 1988.

14 The $25 per ton sale price was used to project royalty revenues for 0.5 million and 3.0 million ton per year mine with a 2020 start-up date. This sale price and start date is an average of the $20-$30 sale price and the 20-40 years in the future when coal market conditions improve and future development should occur. See appendix 11.

15 See response 5.

16 See response 3. Alternative C-Leasing is fully addressed in the EIS. Factors which influence the development of the coal are shown in appendix 11.

17 Several consulting firms were used to prepare selected portions of the EIS. This was done at BLM's request, to share the costs of the project more equitably with Meridian as the BLM specialists with expertise in these areas

were busy with other projects. The consultants and their credentials used in preparation of the EIS are listed in the EIS under "List of Preparers." None of the consulting firms, nor their employees, had even met or worked for Meridian or BLM prior to this project. The consulting firms hired were selected based on their qualifications, recommendations from others, and the companies' reputations. Mr. Dennis Garnett of LETEC served as the EIS liaison for the consulting firms, BLM, and Meridian. His job was to coordinate the work between the consulting firms and BLM, resolve problems as needed, and recommend approval of payment by Meridian to the consulting firms.

Contracted work completed by the consulting firms was reviewed and accepted by BLM specialists prior to payment to the consulting firm. The hydrology report completed by Dr. Marshall Corbett,an employee of Chen-Northern, Inc. was reviewed by Mr. Dex Hight, BLM district hydrologist for Miles City and Mr. Peter Bierbach, BLM state office hydrologist and program leader.

Since the public hearing, Dr. Corbett's hydrology report has been reviewed by Mr. Wayne Van Voast of the Montana Bureau of Mines and Geology, two hydrologists from the U.S. Geological Survey, BLM personnel from the Craig District Office and the White River Resource Area in Colorado and Utah State Office personnel where they have several operating longwall mines. None of the reviews noted serious problems with the hydrology impacts.

Dr. Corbett also met with Northern Plains Resource Council in a special meeting (January 10, 1990) to address their concerns with hydrology.

Dr. Corbett's credentials and experience are impeccable, having served as Professor of Geology at Idaho State University for 20 years. He has extensive experience relating geochemical and geophysical principles to hydrogeologic investigations and was a Senior Hydro-geologist for Chen-Northern, Inc. The remarks regarding Dr. Corbett's, or any of the other consultants' work are unfounded and unjustified.

17a See response 25.

18 Impacts from longwall mining are addressed in chapter 4 and appendix 5. The commentor emphasized subsidence and hydrologic impacts. The actual impacts would occur during the longwall mining technique. With room and pillar, such impacts may be delayed for up to 50 years or more, especially for impacts associated with sinkhole subsidence. As a result, the early recognition permits immediate response and mitigation steps can be initiated at the time the responsible party is active. Controlled impacts are considered preferable to those that are uncontrolled. Subsidence is allowed under controlled conditions during longwall extraction, not just temporarily prevented. Mitigation and/or remedial efforts become an integral part of the extraction process, not an after-the-fact response to a negative condition which shows up years later.

19 The remainder of paragraph references reader to appendix 5 for an in-depth discussion of the predictions of subsidence.

20 The hydrologic impact discussion from longwall mining in chapter 4 has been revised to address these concerns. An omitted section has been added to address water quality impacts. Recent tests by MDSL indicate that Bull Mountains coal is not acid-forming.

21 Most of the private surface lands in this area were patented under the Stock-Raising Homestead Act. The federal government reserved coal and mineral rights to the patented lands under this act and the right to enter and mine coal or other mineral deposits.

Since the coal will be mined by underground methods, the surface owner consent provisions of the Surface Mining Control and Reclamation Act do not apply.

Impacts to agriculture from subsidence are expected to be minimal.

22 The propriety of exchanges between BLM and Meridian and the issue of compliance with section 2 (C) of the Mineral Leasing Act was decided by the Court in the Northern Plains Resource Council et al. v. Hodel et al. (Circle West Exchange).

23 See "Consultation with the "Attorney General" in chapter 1. The Department of Justice will advise BLM if the proposed exchange will create or maintain a situation inconsistent with the federal antitrust laws.

The meaning of these comments are unclear. The information referenced was obtained through the survey of Bull Mountains residents.

24 BLM analyzed the life of mine based upon the exchange information and application submitted by the company. Other possible mine plan scenarios were reviewed by BLM during EIS preparation but were not considered to be substantially more accurate or more likely to occur. Therefore, they were not analyzed.

25 The BLM, MDSL, and their consultant are in agreement on the probable hydrologic impacts from mining. The text has been revised in chapters 3 and 4 to reflect this agreement. Specific geotechnical analysis have been conducted and were considered in the text.

26 State regulations for coal mining are equal to or more stringent than federal regulations and are more than adequate to protect the resources.

27 The federal government has appealed the Whitney Benefits case and the final decision regarding the amount of compensation will not be known for several years.

28 See response 17.

29 YCC withdrew their involvement with the project (letter in casefile dated March 3, 1990 from Meridian to Mr. Zoia).

30 A water quality impact section has been added and the hydrologic impacts revised to reflect the consensus among MDSL, BLM, and their consultants. The preparers of the EIS used all available relevant, professional papers.

31 See "Mitigation Measures" in chapter 4. Most of the mitigation measures listed are standard mitigation measures which the mining company would probably be required to comply with because of the various federal, state, and county laws and regulations. A decision on these and other mitigation measures that could be implemented is normally made by the administrative and regulatory agencies as part of the mine plan approval process. Additional mitigation measures could also be part of the State Director's final decision on the proposed exchange.

32 See response 17.

33 President Roosevelt withdrew public lands from agricultural entry and settlement primarily because of speculation and fraudulent acquisition of coal lands in 1906.

34 Meridian is also pursuing marketing this coal to other foreign and domestic utilities.

35 See response 26.

36 See response 25.

37 See response 34.

38 These lands are privately owned by several different landowners other than Meridian and were not available for selection as part of this exchange. Proposed exchanges are evaluated on a case-by-case basis, in accordance with the Billings Resource Area RMP "Land Tenure Adjustment" section in chapter 1. Future exchanges in this area will be evaluated accordingly.

39 Comment beyond the scope of this EIS.

40 Operators are responsible for replacing water supplies impacted by mining under state regulations.

41 See "Replacement Lands" section in chapter 2.

42 The decision to do an EIS was made because of the controversial nature of the project and past experiences with similar projects.

43 This proposal was abandoned by BN several years ago because of local opposition.

44 The Chrome Corporation Refinery proposal is an entirely separate project which will be addressed and monitored by the responsible state regulatory agency.

45 The load-out facility was addressed in an Environmental Assessment (October 8, 1989) prepared by the MDSL. The facility was approved and permitted on November 7, 1989.

46 See "Roads and Bridge Conditions" section in chapter 4. The MDOH is not upgrading the roads because of any needs of Meridian. These projects are routine, scheduled highway improvements.

47 Major projects and their impacts are addressed in environmental documents by the respective federal and/or state agencies responsible for the action. A decision to proceed is made after the impacts and concerns of the project are addressed.

48 Recreational opportunities on private land are controlled by the private landowner; whereas, on public land the recreational opportunities for the public are controlled and managed by state or federal agencies, depending upon jurisdiction. The management and control is normally based upon public input and budget constraints. This is not the case on privately owned land. Several local landowners were called regarding whether they and other landowners in this area allow the general public to recreate on their private lands. BLM was informed that many of the landowners do allow public access to their lands; however, it varies by landowner as to whom they allow access and for what purpose. See changes to "Recreation" sections in chapters 3 and 4.

49 This issue is beyond the scope of this project and one that Congress and the Department of Justice would have to address.

50 The impacts of future mining are analyzed because the exchange, mine development, and transportation are interdependent related actions which are part of the overall project. These issues will be addressed in a mine plan and mine plan EIS in greater detail at a later date.

51 See response 3.

52 This exchange is a legitimate exchange proposal. The proposed exchange is with Meridian not BN. See response 4.

53 See response 11.

54 The $682,500,000 figure is the total projected revenue that the mining company would derive for a 3.0 million tons per year mine starting in 1991 and mining coal until 2027. This figure is derived by multiplying the $15 sale price that the consumer (utility company) would pay the mining company for 45.5 million tons of coal over a 36 year period. The mining company has to pay production costs such as labor, capital costs, taxes, etcetera out of the $682,500,000 to mine the coal and stay in business. See response 4 and appendix 16 for specific assumptions used to calculate revenues and royalties. The appraised value of the coal is $730,000.

55 See response 4 and appendix 11 for market conditions and sale prices. The $7-$12 sale price that is referred to is a F.O.B. sale price. Comparing the F.O.B. sale price and the in-the-ground value of the coal is totally invalid.

56 Split estates for resources has been around ever since these lands were homesteaded. In this exchange proposal, BLM selected recreational and wildlife lands and Meridian selected coal. The exchange proposal was based upon these premises.

57 Mineral values were assessed and addressed in the land appraisals.

58 All public lands are open to mineral entry in accordance with the 1872 mining law, unless withdrawn from mineral entry for specific purposes, such as wilderness, etcetera.

59 See response 38. Lands selected for priority 6 lands block up public lands in this allotment.

60 BLM has addressed a mirror image coal-for-coal exchange

in the Bull Mountains as Alternative B. Any newly-proposed exchanges and acquisitions would be evaluated by BLM on a case-by-case basis.

61 BLM cannot develop alternatives to protect the recreational values of privately owned land.

62 See response 17.

63 The value of the federal coal in the proposed exchange is $730,000.

64 The 10 percent discount rate is the standard discount rate used by business in assessing economic ventures. It is not the rate of inflation. Likewise, the $15 sale price is the figure used for calculations; however the actual value of the $15 sale price some 36 years later will probably be much higher. The discounted royalty payments and total payments value take this into account.

65 See "Consultation with Attorney General" section in chapter 1.

66 See "Subsidence", "Hydrology", "Wildlife", and "Recreation" changes in Final EIS.

67 All exchanges must be equal value exchanges in accordance with regulations in 43 CFR 2201. See response 4.

68 Since the public meeting, the Skyline Sportsmen Club has reversed their position and written a letter of support.

69 The Notice of Intent to prepare an EIS and hold Scoping Meetings was published in the Federal Register May 16, 1988. Public meetings were held in Roundup (May 25, 1988) and Ennis, Montana (May 26, 1988). Notices of the scoping meetings also appeared in local newspapers and were announced on local radio and television stations. The Notice of Availability for the Draft EIS was published in the Federal Register on November 3, 1989. Beginning October 23, 1989, a copy of the Draft EIS was sent to everyone on the mailing list. A press release on the Draft EIS availability was sent to the Montana media on November 1, 1989. Thereafter, newspaper articles and radio and television announcements appeared. An article was published in Butte's Montana Standard December 1, 1989. Two weeks prior to the public hearing, the Butte District Manager met with the Skyline Sportsmen Club and distributed copies of the Draft EIS.

70 See response 68.

71 See response 69.

72 A comparison of the fiscal impacts of the proposed action and the leasing alternative is provided in chapter 2 and appendix 17. The in-place value of the coal was determined using standard appraisal techniques. See response 11.

73 Alternative A is identified as the preferred alternative because CEQ guidelines and federal regulations require selection of a preferred alterative. A decision regarding the proposed exchange will be made after completion of the Final EIS.

74 The total royalty payments over the 40-year mine life must be discounted to determine a present value of the total royalty payments for comparison purposes. The discounted values for the total royalty payments are displayed in appendix 16.

The sale price of $15 per ton F.O.B. mine was used for all socioeconomic calculations, except the royalty payments calculations for 2020 mine start-up date. Appendix 11 gives a more in-depth discussion of sale prices and market conditions which were used to determine this Keenan price. The $15 per ton F.O.B. mine sale price was used because this figure was the minimum value that the coal would have to be sold for to compete in the present coal market. Meridian's production economic figures were also examined to determine if the company could mine the coal at this price and remain competitive. Additional analyses and tables are shown in chapter 2 and appendix 17 for the $25 per ton lease alternative.

75 See response 13.

76 See response 11. A copy of the coal appraisal, less proprietary information, was provided to your office under separate cover. In both the lands and minerals appraisals, the comparable sales approach was used whereby sales of other lands and/or minerals are compared to these lands and a value is determined.

77 The foregone royalty value has been fully considered in the analysis. See appendix 16.

78 BLM would acquire all minerals, except oil and gas rights, on any lands acquired in the proposed exchange. Likewise, BLM would retain the oil and gas rights on the federal coal lands that Meridian would acquire in the proposed exchange.

79 See responses 13, 73, 74, and 76.

80 The priority lands that BLM would acquire in the proposed exchange provide excellent wildlife habitat. Priority lands 5 are considered critical habitat for moose, elk, and mule deer. The other priority lands were selected for their overall resource values, such as recreation, wildlife, etc.

81 Public lands are managed under the multiple use concept. Any acquired lands would be managed under this concept. A site-specific management plan would be developed after acquisition with specific management objectives for priority lands acquired from the proposed exchange. It is BLM's policy not to allow unsuitable lands to be broken for agriculture purposes (farming), nor would BLM allow these lands to be developed for residential use. Most conservation easements address these two issues.

82 See responses 4 and 73.

83 The more costly and extreme coal mining techniques cannot be supported by the coal market Montana currently feeds. This applies to the foreseeable future as well. These techniques include underground thin seam extraction and the mining of deeper beds. While those methods work under eastern coal field economics, they do not relate to the modern Montana situation. While there are several coal beds in this area, only the Mammoth bed is of sufficient thickness to be considered an underground

minable resource in the project area. See text changes in chapter 3.

84 Appendix 11 provides an in-depth discussion of the factors which influence the development of the Bull Mountains coal and the speculative nature of this project. See ownership maps for clarification of ownership.

85 See responses 17 and 25.

86 See responses 17, 25, 30, and 40.

87 Meridian does not own half the coal in Montana. The federal government owns most of the minerals in Montana. These minerals are administered by the BLM and most of the revenues derived from these minerals are ultimately returned to the state.

88 The Leasing alternative is analyzed in the EIS.

89 See responses 26, and 31.

90 See response 20.

91 See responses 4 and 73.

92 See responses 17 and 25.

93 See response 17.

94 See response 25.

95 See response 17.

96 See response 34.

97 See responses 25 and 30.

98 See responses 26 and 31. BLM is fully aware of our responsibility for the balanced management of public lands, minerals, and other resources in a manner that best serves the need of the American public. Your comments will be considered.

99 See response 17.

100 See responses 4 and 73.

101 See response 11.

102 Agricultural impacts from the proposed development of the coal will be minimal. Considerable land in the project area is either owned or controlled by Meridian Minerals company. See Bull Mountain Surface Ownership map and agricultural impacts (chapter 4).

103 See responses 26 and 31.

104 See response 67.

105 See responses 25 and 31.

106 See response 80.

107 See response 38.

108 See response 49.

109 See response 34.

110 See responses 17 and 25.

111 See responses 17 and 25.

112 BLM was not aware of a report prepared by the Bull Mountains Landowners Association; however, if you are referring to the articles which appeared in the Roundup Record and Billings Gazette, this information is not correct.

113 See responses 17 and 25.

114 See response 17.

115 See responses 17 and 25.

116 See responses 26 and 31.

117 See response 17.

118 See "Socioeconomic" impacts in chapter 4 for the estimate of jobs.

119 See responses 17 and 25.

120 See responses 11 and 73.

121 See text change. YCC is no longer involved with the project.

122 Comments are noted.

123 See response 73.

124 See responses 17 and 25.

125 See responses 26 and 31.

126 See responses 17 and 25.

127 See responses 17 and 25.

128 See response 73.

129 See responses 26 and 31.

130 See responses 17 and 25.

131 See responses 26 and 31.

132 See responses 4 and 73.

133 Socioeconomic impacts to Roundup and Musselshell counties are addressed in the EIS.

134 See response 25.

135 See responses 26 and 31.

136 See appendix 11 for an in-depth discussion of coal market conditions which influence the development of the Bull Mountains coal. See responses 11 and 36.

The coal appraisal reflects the current coal market conditions and the speculative nature of the development of the Bull Mountains coal.

Leasing is a viable alternative and is considered in the EIS.

Coal leasing procedures are contained in 43 CFR 3420. If BLM's final decision is to lease the federal coal, these procedures will be followed. A fair market value appraisal and maximum economic recovery report would be prepared for the proposed offered tract(s).

137 See response 73.

138 See response 17. The "Subsidence" section was done by Mr. Bob Giovanini, mining engineer for BLM, Montana State Office, Billings Montana. His work was reviewed by other BLM geologists and mining engineers in the Branch of Solid Minerals. Since the public meeting, Mr. Giovanini has visited with BLM personnel from Colorado and Utah regarding the subsidence issue. His work was reviewed by BLM personnel from the Craig District Office and the White River Resource Area in Colorado and the Utah State Office. None of the additional reviews noted serious problems with the subsidence impacts predicted by Mr. Giovanini.

139 See responses 26 and 31.

140 See antitrust review under "Consultation with the Attorney General." No decision has been made by BLM regarding the proposed exchange, nor will a decision be made until at least 30 days after the Final EIS is published.

Meridian advised BLM that BRI has made a decision to sell their gold mining company; however, they were not aware of any decision to sell their coal and aggregate mineral resources or companies.

141 See antitrust review under "Consultation with the Attorney General" and response 49.

142 The coal would be exchanged, not sold, to Meridian for priority lands addressed in the EIS.

143 "Hydrology" and "Transportation" impacts are discussed in detail in Chapter 4 of the EIS.

144 See responses 17, 20, and 25.

145 See responses 26 and 31.

146 See responses 4, 73, and 136.

147 (a) See response 17.

(b) The memo that is referenced is a review of the Preliminary Draft EIS by MDSL. This memo, telefax copy dated June 16, 1989 followed up with an official copy dated June 19, 1989, is part of the official casefile. It is, and always has been,public information. The review was followed up with a meeting between Dr. Corbett and Mr. Bugosh from MDSL to address their hydrology concerns. Dr. Corbett made some changes to the Draft EIS based on this meeting and responded to the areas where he disagreed with MDSL (letter in official casefile dated July 5, 1989, public information). Since then, the hydrology impacts have been subjected to many reviews and differences of opinion with MDSL have been resolved.

(c) See response 17.

148 BLM is not aware of any such commitment regarding Montana coal. In fact this would be contrary to the BLM coal management program and objectives, i.e., the orderly development of coal resources in an environmentally responsible manner.

149 See response 34 and 148.

150 "Hydrology" impacts are discussed in Chapter 4 of the EIS.

151 Present surface owners of the coal lands will still be the surface owners of these coal lands after a decision is made by BLM regarding the proposed exchange. Deeds showing private ownership and property rights are the documents that support this.

152 Any discharge to surface or groundwater will be in accordance with the Montana Pollution Discharge Elimination System (MPDES).

153 See response 25.

154 An omitted discussion concerning water quality impacts has been added to chapter 4 and text revisions have been made.

155 See response 17.

156 See response 25.

157 See response 17.

158 See responses 26 and 31. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) gives OSM primary responsibility to administer programs that regulate surface coal mining operations on federal lands and the surface effects of underground coal mining operations on these same lands. Pursuant to Section 503 of SMCRA, MDSL developed, and the Secretary of the Interior approved, a permanent program authorizing MDSL to regulate surface coal mining operations and surface effects of underground coal mining on non-federal lands within the State of Montana. In April 1981, pursuant to Section 523(c) of SMCRA, MDSL entered into a cooperative agreement with the Secretary of the Interior authorizing MDSL to regulate surface coal mining operations and surface effects of underground mining on federal lands within the state. In accordance with the Cooperative Agreement between OSM and MDSL, a new mine will be permitted by each agency. It should be noted that the state regulations are equal to or more stringent than the federal regulations.

159 The text has been revised in chapter 4 to include impacts on downgradient water.

160 Comments concerning water quality are addressed in chapter 4. See revisions.

161 See responses 7, 11, 73, and 136.

162 See responses 17, 25, and 160.

163 See response 25.

164 See responses 26, 31, and 138.

165 See responses 26 and 31.

State law requires that water supplies affected by mining be replaced by the operator.

166 See response 25.

167 See responses 26, 31, and 138.

168 See responses 26, 31, and 158.

169 See responses 17, 25, and 138.

The coal exchange does not free the federal government from regulatory involvement because of the Cooperative Agreement between the OSM and MDSL. The EIS has been revised by MDSL, BLM, and their consultants who agree that the document adequately describes the impacts on water resources from mining for an exchange proposal.

170 See responses 17, 25, and 138.

171 See responses 17, 25, and 138.

172 See responses 84 and 140.

173 See responses 20, 25, 26, and 31.

174 The amount of truck traffic on these roads depends upon the extent of coal development by the company. "Transportation" impacts are addressed in chapter 4 of the EIS.

175 Tables 4.16 and 4.34 show the net fiscal impact to the federal, state and local governments. "Socioeconomic" impacts are addressed in chapter 4 of the EIS.

176 "Recreation" impacts are addressed in chapter 4 of the EIS. Recreational impacts would be insignificant.

177 The water quality and quantity issues were considered in preparing and revising the text.

See responses 20 and 30.

178 Comments are noted.

179 See responses 7, 11, 13, 74, and 76.

180 BLM is fully aware of the speculative nature of this project. See appendix 11 for a more in-depth discussion of these factors which influence the development of the Bull Mountains coal.

181 Longwall mining and subsidence are discussed in chapter 4 and appendix 5 of the EIS.

182 BLM is reacting to an exchange proposal for federal coal in the Bull Mountains. One of the reasons that Meridian has indicated that they were willing to pursue the exchange in spite of the speculative nature of the development is they believe that the Clean Air Bill will eventually be passed. In turn, there would be increased demand for low-sulfur coal. See Bob Morehead's comments in the public hearings transcripts.

183 See response 34.

184 See responses 84 and 140.

185 See response 73.

186 Tables 4.13, 4.14, 4.31, and 4.32 show employee distribution. "Socioeconomic" impacts are discussed in chapter 4 of the EIS.

187 The text has been revised to include impacts on existing water uses. In addition, the site specific inventory of existing water uses will be part of the mine permit application and the resulting Mine Plan EIS.

188 Lands in the Tully Ranch are not in the project area.

189 Comments were considered in "Hydrology" text revision.

190 See response 40.

191 See responses 17, 25, and 138.

192 See responses 26, 31, and 158.

193 See response 25.

194 See responses 26 and 31.

195 See response 73.

196 "Transportation" impacts are addressed in chapter 4 of the EIS.

197 Since a specific route for the railroad has not been selected, only the more apparent environmental issues and impacts are discussed in the EIS. After a specific route is selected, Meridian would be required to apply for a permit from the Interstate Commerce Carlson Commission. An environmental analysis of the proposed route alternative routes and an EIS would be required before the company could build the railroad spur. MDSL and OSM will analyze a specific proposed route for the railroad in the mine plan EIS.

198 See response 25.

199 "Transportation" and "Socioeconomic" impacts are addressed in chapter 4 of the EIS.

200 See response 73.

201 The basis for the terminology found in this document is used in USGS Water Resources Investigations Report 80-336 (Hotchkiss and Levings 1986).

202 These concerns have been addressed by revising the "Hydrology" impact text in chapter 4. Evidence indicates that some perched aquifers exist (Thompson 1982).

203 Subsidence exists over portions of very shallow underground mines in the Roundup area. See the "Subsidence" impacts in chapter 4.

204 Comments are noted and the "Hydrology" text in chapter 4 has been revised to address these concerns.

205 Transportation concerns for the ongoing Meridian test burn were addressed in the associated Environmental Assessment prepared by the MDSL. The test burn permit and associated transportation route was Meehan approved after public comment and review of the Environmental Assessment. The Yellowstone County Surveyor, MDOH, OSM and BLM were consulted and/or provided input to the transportation route.

The route is a public road that has been used for many years by farmers to haul beets to the same load-out facility. Granted, this haul route was not used to the extent that the coal trucks will be using it; however, this issue will be revisited again at the mine plan EIS stage by the regulatory agencies. They will determine the route and amount of coal-truck traffic that will be permitted at that time.

206 Text revised accordingly.

207 Text revised accordingly.

208 See response 17.

209 See responses 7, 11, and 73.

210 The term "high-value" was used to describe the priority lands selected by BLM as part of the exchange. These priority lands have high resource values, such as recreation, wildlife, and watershed other than grazing lands. As a result, they were referred to as high-value.

211 See "Replacement Lands."

212 The "Summary" is a brief report of the various alternatives. See text for a more in-depth discussion of Alternative A. Four other alternatives were considered besides Alternative A.

213 The Supplement to State Director's Guidance for Resource Management Planning in Montana and the Dakotas. Supplement to Land Pattern Review and Land Adjustment (USDI 1984b) provides guidance for all major types of land adjustment.

214 See responses 22, 23, 52,and 140.

215 See response 29. Text reflects this change.

216 See response 210.

Recreation use is estimated at 150 user days, although there is excellent potential to increase this use considerably.

217 The text has been revised to reflect this. See "Replacement Lands."

218 See Madison River Corridor Study (Shouse 1983). This study, a joint project by Madison County, MDFWP, BLM, and the U.S. Forest Service addresses management objectives along the Madison River.

219 Rapid development is used to define the development trend of more and more people purchasing these lands for homesites, cabins and vacation homes as opposed to the traditional use as grazing lands. Although specific numbers are not readily available, most of the real estate sales along the Madison River are for small tracts to be used as second/retirement homes.

220 The Department of Justice has this responsibility. The Attorney General serves as the legal advisor to federal government agencies regarding these matters.

221 Only the top six priority lands were appraised because this value was higher than the appraised value of the coal lands. See "Replacement Lands."

222 The text has been revised accordingly.

223 The federal regulations (43 CFR 3427.0-7b) explicitly state that "the surface owner consent provisions of the SMCRA do not apply if the split estate coal is to be mined by underground mining techniques."

224 The unsuitability criteria 7 and 9-15 were not applied in the Billings Resource Area RMP, which was completed in 1984. These criteria were applied to the exchange area in appendix 4. Data adequacy is discussed in appendix 10.

225 We have updated our wildlife section and added appendix 18, "Listing of Wildlife Species." The Bull Mountains elk herd is probably not any more unique than the elk herd that occurs in the Missouri Breaks as it relates to "prairie" habitat.

226 Federal coal lands to be mined by underground room-and-pillar mining method are exempt from the application of unsuitability criteria. Federal coal lands to be mined by the underground longwall mining method are not exempt because this method causes surface impacts incident to mining. See "Coal Land-Use Screens."

227 Exploration on the lands on the north end was done on private surface/private coal. The drilling logs are Consolidated Coal and Louisiana Land's privileged information and was not made available to BLM. BLM does not have the budget to fund an extensive drilling program in the Bull Mountains.

228 Meridian's financial records and statements are privileged information and not available to BLM nor the public to examine. How the company treats the donation is a decision that the company will have to make. If the company claims a tax deduction, the Internal Revenue Service will decide whether it is a legitimate deduction or not.

229 See response 227.

230 The "Peabody Coal-for-Coal Exchange Alternative" and "Leasing Alternative C" were both viable alternatives and analyzed in the Draft EIS.

231 The timeframe for regional activity planning is stated on the previous page as well as the timeframe for emergency leasing.

The leasing section has been revised to reflect the partial decertification approval of the Powder River Coal Production Region. See response 136.

232 "Sufficient reserves" are coal reserves that are sufficient to maintain and/or expand the mining company's future operation, usually 20 years or so. "Reserves" refers to the coal in the Mammoth seam.

233 Leasing is a viable alternative.

234 Sources for federal revenues are detailed in the text under each alternative. Employment and payroll data, as well as local hire ratios, were supplied by Meridian.

235 "Not all" is the appropriate wording.

236 See chapter 4 for impacts. In BLM'S opinion agriculture impacts would be low. The "Agriculture" and "Vegetation" sections were prepared by Mr. David Jaynes with assistance from Mr. Tom Voss. David has a B.S. in Range Management and a M.S. in Soil Science from Texas Tech University; Tom has a B.S. in Agriculture Production from Montana State University. Other BLM specialists that worked on the project are equally qualified.

237 "Hazardous wastes" are waste products which poison our water, air, and land. People, animals, and plants may be jeopardized by poisoning, burns, or genetic damage from

exposure to these products. Wastes are considered hazardous if: they contain toxic chemicals, they are a fire hazard, they are corrosive or caustic, they may explode, they react violently with water or air, they generate toxic gases, they are biologically viral or they are radioactive.

238 See response 20.

239 See revised hydrology impacts in chapter 4. The geology information used in the EIS was from published reports (Thompson 1982), and industry information (logs, etc.).

240 See response 213. Your comments are noted.

241 Numbers for 1985 were used for convenience. The percent breakdown of employment would not change appreciably from year to year.

242 The highest recorded white-tailed deer populations in Montana occur in riparian habitats along our major river systems. The Bull Mountains provide principally ponderosa pine habitat which is not normally considered prime white-tailed deer habitat.

243 The measurements of conductivity were all field collected values from previous studies. (Rioux and Dodge 1980; Thompson 1982).

244 See response 20.

245 See text revisions for hydrology and wildlife.

246 The revised text discusses probable hydrology impacts on alluvial aquifers.

247 The spring temperature data has been corrected.

248 See response 48.

249 Upland game bird populations do occur in the Bull Mountains; however, pheasant and sharp-tailed grouse populations are not considered very high. This area is not prime habitat for these species. The wild turkey population is considered good as the Bull Mountains area is good turkey habitat.

250 See response 58.

251 The Meeteetse Spires, somewhat north of these lands was established to protect shoshonea, an endangered plant species. By acquiring these lands, along with other public lands in the area, a large portion of the area in and around the Meeteetse Spires Preserve would be in public ownership and could be managed to insure that shoshonea was protected.

252 BLM will be afforded surface property owner rights prior to any development. If drilling were to occur, these actions and their impacts would be addressed in an environmental document at that time. See response 56.

253 See response 29.

254 YCC's figures represent a reasonably foreseeable development of the coal by a small mining company. However, it is doubtful that any two mining companies would submit the same figures for development. The figures that were submitted by YCC were reasonable.

255 Waste disposal will be in accordance with state and federal laws and regulations.

256 See response 25.

257 See response 138.

258 Employment numbers were provided by Meridian. See response 254.

259 See response 64.

260 See responses 22, 29, 121, and 140. According to the information that BLM received, Meridian is an operating company of BRI. BRI was formed in May 1988. On July 7, 1988, 13 percent of the stock of BRI was sold at a public offering. On December 31, 1988, the remaining 87 percent of BRI stock held by BN was distributed to BN stockholders of record. The stock of BRI has continued to be publicly traded. The largest single stockholder now owns approximately 8 percent of BRI stock and that stockholder is not BN.

261 See response 24. The offered lands have low mineral development potential.

262 See response 57.

263 See responses 76 and 219. Existing access to the tracts are discussed in chapter 3 of the EIS.

264 Currently, 4,200 grazing permittees in Montana are afforded livestock grazing privileges on 7,967,260 acres out of 8,070,658 acres of public lands (98.7%). This is hardly a concerted effort on BLM's part to eliminate livestock grazing on public lands.

265 See response 252.

266 See response 38.

267 The earlier listings in table 3.43 are by Rioux and Dodge. In table 2 of their report which is a record of measured field parameters for selected springs, they list spring 06N27E17AAA. This is the same listing shown in table 3.43 which also is a table of field parameters. However, in their table 4, Rioux and Dodge provide a complete chemical analysis of two springs in Section 17. One of these, 06N27E17ABAB, is for a location approximately 3/8 miles west of Busse Spring and, as described, lies on the hillside across Rehder Creek where no actual spring exists. For this reason, we felt that a location error had been made, for the analysis was for Busse Spring. Therefore, it was listed as SP-009 in table 3.45. Thompson, in his later study, simply included the springs listed in both of Rioux and Dodge's tables without distinguishing between field parameters and chemical analyses. SP-009 is shown as separate springs in his table 2 (06N27E17AAA and 06N27E17ABAB) when in fact they are one and the same. Differences in T/C and SP etc., are due to field versus lab measurements and November versus August readings.

268 See text revisions in chapter 4 for discussion of compressional healing in the fracture zone. No site-specific core drilling has been done. Consultation with BLM personnel in Colorado and Utah indicates fracturing has not been significant.

269 A large body of literature exists that documents a wide range of impacts from longwall mining. No specific studies relate to the Bull Mountains.

270 The Tongue River aquifer is recharged through the outcrop from precipitation. Replacement wells into the deep aquifer would pump a minimal amount of water so the effects on wells on the south side of Dunn Mountain would not be substantial. To date, residential wells or the southwest side of the Bull Mountains do not appear to have impacted one another.

271 Sulfate levels are not expected to increase because of mining in the Bull Mountains.

According to Nutrients and Toxic Substances in Water for Livestock and Poultry (National Academy of Sciences 1974) 100 mg/liter of sulfates in water caused lost weight, decreased water intake by 30% and creatine excretion by 12% in cattle. At 3,590 mg/liter, cattle weakened and died. However, much of this is dependent upon the type of sulfates and total salt load in the water.

A study in Nevada showed that when a solution of sodium chloride and a mixture of salts (sodium chloride, magnesium sulfate, and sodium sulfate) of 7,000 and 10,000 mg/liter was offered to heifers and steers, neither level of the sodium chloride or mixed salts caused the severely toxic effects found with sodium sulfate, but the higher level of each caused reduced weight gains. Both levels of sodium chloride caused an increase in water intake not found at either level of the mixed salts.

No studies were found on the effects to wildlife. A veterinarian could best answer the question regarding copper shots and sulfates.

272 See response 29 and "Consultation with the Attorney General" (antitrust review).

273 See response 48.

274 Billings Resource Area specialists are familiar with the area and have been out on-the-ground with ranchers to assess projects, grazing problems, etcetera. Much of the area was assessed for resource values by BLM specialists during the Billings Resource Area RMP.

On-the-ground inventory work was done by BLM in 1982 which sampled portions of the affected area to assess cultural resource diversity. In 1983 portions of the affected area were inventoried for a proposed mine site. In consultation with SHPO, it was determined that this provided a realistically reliable sample for EIS purposes. As part of the mine plan approval process, all areas will be inventoried. The first inventory for this process took place in October 1989.

275 Unsuitability criteria, exceptions, and exemptions are defined in 43 CFR 3461.5. The application of unsuitability criteria 5 and 8 was completed as part of the Billings Resource Area RMP in 1984.

276 See response 84. Agreements between private interest parties are private and it is our policy not to get involved with private interest matters. Should Meridian acquire the private surface, it does not affect BLM's final decision, as surface ownership in the area would be unaffected by the exchange.

277 See response 264. Range improvements are normally ranked by priorities by the management agency in consultation with a grazing advisory board made up of grazing permittees. The number of projects that are built depend upon the range improvement budget which is ultimately tied to the amount of grazing receipts that the agency collects.

278 Site-specific impacts, such as these, are addressed in detail as part of the mine plan approval process. Normally, surface coal lands are closed to the general public for safety purposes during mining operations (state law). The regulatory agencies will make a final decision on whether grazing will be allowed on this area since underground mining and the impacts are different than surface mining.

279 See response 278. The grazing impacts should be insignificant.

280 Comments are noted.

281 Information was based on a personal interview with Larry McCann, Fire Marshall of Billings. Chapter 3 of the EIS describes equipment of the Bull Mountains Volunteers for firefighting purposes.

282 See response 236.

283 Peregrine falcons are known to migrate through the proposed exchange area periodically. However, there is no evidence to indicate that they spend a great deal of time in the area.

284 Most of the surface lands are privately owned. BLM has no authority to designate large blocks of privately owned lands as potential wilderness areas.

285 Your comments are noted.

286 See responses 26 and 31.

287 See response 197.

288 See responses 26 and 31.

289 See responses 22, 49, and 140. See "Consultation With the Attorney General" (antitrust review).

290 See responses 26, 31, and 158.

291 See responses 4, 14, and 73.

292 See response 5.

293 See response 73.

294 See responses 7, 55, and 73.

295 See responses 9, 11, and 73.

296 See response 5.

297 See responses 26 and 31.

298 See response 27.

299 See response 26, 31, and 138. BLM checked on the Colorado lease that is referenced. This lease was atypical of most leases in the area and was designed to protect irrigated orchards over that particular underground mine. This situation does not appear comparable to the Bull Mountains area.

300 See responses 17, 26, 31, and 138.

301 See response 27.

302 See responses 7, 55, and 73.

303 See responses 49 and 87.

304 See response 22 and "Consultation with the Attorney General" (antitrust review).

305 See response 220.

306 See response 73.

307 See response 17.

308 See response 25.

309 See responses 17, 20, and 25.

310 The subsidence analysis has been reviewed by BLM offices in Colorado and Utah where longwall mining is occurring. They concur with the conclusions made and consider the analysis to be adequate.

311 See responses 17, 26, 31, 223, and 310.

312 Coal washing and waste is beyond the scope of this exchange proposal. It will be addressed in the Mine Plan Permit EIS.

313 See responses 73, 136, and 180.

314 See response 49.

315 See responses 22, 87, and 260, and "Consultation with the Attorney General" (antitrust review).

316 According to Sherryl Heen, Revenue Agent for the Natural Resource and Corporate Tax Division of the Montana Department of Revenue, although the revenue from the gross proceeds would be calculated differently (contract sales price times 5 percent), the distribution of the revenue would remain the same. Therefore, no changes are recommended for distribution.

317 The EIS has been modified to reflect these concerns. A consensus was reached by MDSL, BLM, and their consultants concerning the probable hydrology impacts.

318 See "Replacement Lands."

319 The "Summary" has been revised to reflect changes with the project since publication of the Draft EIS.

320 The "Alternative D No Action" was revised to reflect BLM's position.

321 See responses 29 and 84.

322 BLM analyzed the 3.0 million tons of coal per year longwall mine as the high level of production based upon information submitted by Meridian.

323 BLM addressed the more apparent, generic impacts of building a railroad as there were two possible routes; each approximately 40 miles long and ten miles wide. Given this area to work with, BLM could only address the generic impacts.

324 See response 73.

325 See response 322.

326 See response 73.

327 This criteria was applied during the Billings Resource Area RMP. To change the criteria from unsuitable to suitable for mining would require an RMP amendment or concurrence by the regulatory agencies at the mine plan permit approval stage that these lands can be mined by the longwall method without substantial threat of loss of life or property.

328 The Peabody Coal-for-Coal Exchange Alternative has been dropped from further consideration.

329 Text revised accordingly.

330 Section renamed.

331 See responses 4, 73, 74, 136, and 180. BLM's analysis was based on existing market conditions and the sale price of the coal.

332 See "Alternative D No Action" (chapter 4).

333 Table 4.4 has been revised.

334 See responses 47, 197, and 323.

335 See responses 29 and 121.

336 Text revised accordingly.

337 The word "significant" is inserted.

338 See response 322.

339 The word "may" is inserted.

340 Text revised accordingly.

341 The paragraph has been modified. This section has the shallowest overburden so some discussion of impacts is warranted.

342 Text revised to address these concerns.

343 Text revised to address these concerns.

344 Text revised to address these concerns.

345 All furbearers known to occur in the exchange area are identified on the wildlife species lists in appendix 17. Underground mining should have little or no effect on furbearer populations.

346 We have updated and expanded our wildlife writeups through reference to the most current baseline study (Meridian Mine Plan 1990). If underground mining does in fact cause the dewatering of springs in the mine area,

there will likely be a certain amount of adverse impact on resident wildlife species. Less mobile species may experience a reduction in population numbers and more mobile species will likely shift their distribution patterns.

347 The text has been revised and updated with most of the changes suggested by MDOH. The last comment of mitigation measures was not incorporated as specific mitigation measures that will be adopted are part of the decision process. Specific mitigation measures to be adopted for transportation would fall within the state approval process of the mine plan permit.

348 The text and resource concerns sections have been revised accordingly, per telephone conversation with Lee Shanklin of your staff.

349 Resource concerns, primarily hydrology and subsidence, are valid and have been reevaluated and changes made as needed.

350 See appendix 11, "Summary of Coal Market Conditions" for a more in-depth discussion of the factors which influence development of the Bull Mountains coal.

351 See response 349.

352 See response 349.

353 See response 349.

354 See "Socioeconomics" sections (chapters 3 and 4), which discusses the present status of the affected area and future impacts for a more in-depth discussion of the project.

355 Impacts are beyond the scope of the EIS.

356 See response 349.

357 See response 3.

358 See response 34

359 See response 349.

360 See response 17.

361 See responses 22, 87, and 260.

362 See response 73.

363 See responses 158 and 169.

364 See responses 22 and 29. Although YCC is no longer involved with the project, other mining companies could become involved depending upon BLM's final decision and Meridian's willingness to lease their private coal.

365 See response 349.

366 On-the-ground inventory of culture resources was done as part of the mine plan permit process and is addressed in greater detail in volume I of the mine plan submitted to MDSL in March 1990.

367 Comments are noted.

368 Comments are noted.

369 See responses 40 and 349.

370 Comments are noted.

371 Comments are noted.

372 Comments are noted.

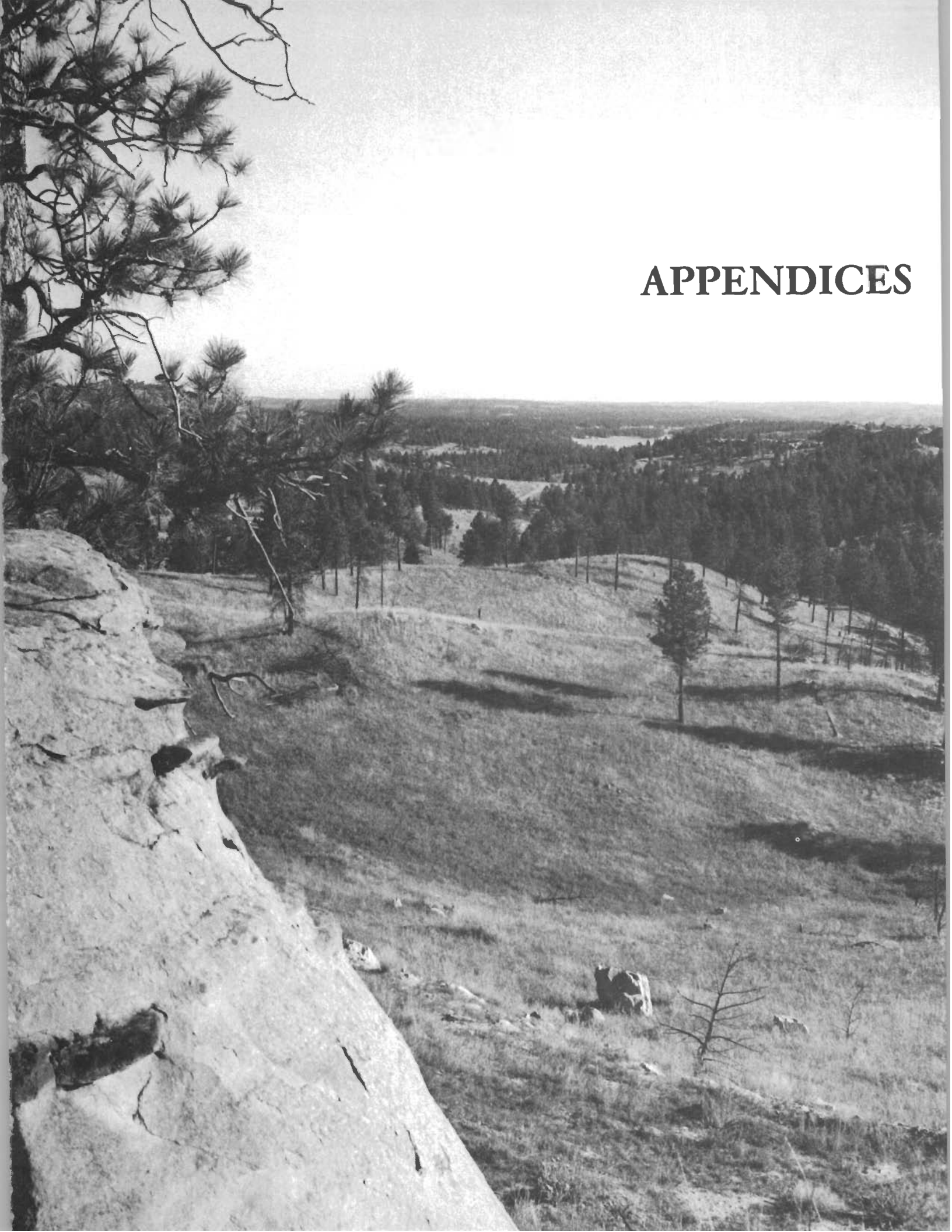
Letters Expressing Support For The Land Exchange

Edward G. Adolph
Deborah Adolph
Dorothy L. Adolph
Barry Adolph
Rich Adolph
Byran W. Adolph
Phyllis J. Adolph
Oscar G. Adolph
Rolan T. Albright
Dorothy F. Albright
Duane L. Alexander
Beverly A. Alexander
Dale R. Alger
Sharon Anderson
Pat Anderson
Ronald D. Anderson
Harold Anderson *
Robert & Donna Balich
Michael Balich
John Barlean
John Barthule
Gerald C. Bartow
Mrs. Gerald Bartow
Daisy Basinger
Sylvan R. Basinger
Susan Baxter
Zelma A. Beadle
Georgia M. Bellew
Philip Bender
Henry Bianchi
Kathy Bilant
Rob D. Bilant
Mary Lynn Bilyeu
Anne Blazina
Jean Bly
Bruce Bly
Cory Bohlman
William N. Breen
Juanita Brewer
M. D. Brewer
Lloyd R. Brown
Raymond & Wendy Bumgarner
Rev. Sigurd E. Burch
Nina M. Burns
Flora Burt
LaVern F. Carpenter
Irene Carpenter
Pamela Jo Carter
Judy J. Carter
Duane L. Carter
Hedred M. Cartwright
Roy Cartwright
Bill Casper
John W. Cebull
Stanely R. Cebull
Harold P. Charlton
Wink Charlton
Mary Cockagne
Mr. & Mrs. Guy Collins
Bill Cook
Charles A. Crouse
Diana Crowley
James A. Curlee
Rodney M. Dahl
Mrs. Dan Davis
Frances L. Dawson
Debora L. DeJorlaw
Jeanette Devine
Amy C. Devine
William J. Dodds
Unice M. Dodds
J. A. "Frenchy" Dupree
Elizabeth B. Easelein
Vivian M. Edwards
Colene S. Eiselein
F. W. Eliasson
Evelyn Eliasson
Carl T. Eliasson
Fred W. Eliasson
Ivy Eliasson
Donald J. Eliasson
Gregory A. Erickson
Mr. & Mrs. Alan Evans
Harlen T. Farley
Darlene Farley
Don Fawcett
Cliff Fawcett
Dale Feivch
Wagner Ferguson
Josephine Ferguson
Kay Fisher
Joseph B. Fisher
Jeremy Flesch
Shelley Foard
Kim Foard
Kowalski-Forney Rentals — Kenneth D. Forney
Kenneth D. Forney
Ruth Fuller
Bill Funk
Donna Funk
William R. Funk
LaVerna Funk
P. G. Funk
Brenda Lorraine Furrow
William E. Gantner
Jane Garnett
Dennis Garnett
Harry & Lila Gaskell
Ken Gear
Darlene M. Gebhardt
Michael Gecho
Shirley B. Gecho
Kelly Gelhardt
Ray E. Giebel
Patti K. Gilreath
David L. Goffena
Christine M. Gordon
Ronald Gordon
Dorothy Gracey
Gary G. Graves
Sheryl J. Graves
Rick Griffith
Henry J. Hagstrom
Tom Hagstrom
David E. Hagstrom
Robert L. Hagstrom
Rich Hagstrom
Amelia Hamilton
Nancy Hammett
E. Wally Hammett
Debbi Hannum
Archie A. Hansen
Diane Haugsdal
Karen Hayes
Derinda Hazelton
Vincent Hazelton
Dianna J. Hermann
Gene D. Hermann
Roy H. Hetrick
Betty Hickey
Ray Hickey
Frank Higgins
Michael P. Hill
Myrtle Hledik
Fay L. Hoffman
Theodore Hoffman
Tami J. Hoiland
Roma Jean Hoiland
Dan Holliday
Frank Holliday
Vaughn R. Homeland
John T. Hopkins
Carol J. Hopkins
Thomas F. Hopkins
Ivan B. Horton
Neil Hough
Robin Hoveland
Dean Howell
Daisy M. Hurt
Charles C. Hurt
Marcus Crowley III
Mrs. Pat Iverson
Norma Jeffery
Alvin W. Jensvold
Emelie G. Jensvold
Vivian L. Johnson
Denise L. Johnson
Dan Johnson
John A. Albert, Jr.
George F. Junior
Jerry Justice

William H. Kachner
Naoma Kapphan
Eugene P. Kayper
Kathy Kemper
Richard W. Kemper
Mike Kilby
William Klansek
Richard D. Klinger
Michael D. Klinger
Carol S. Klinger
Mr. & Mrs. Arnold Knutson
Tami Kombol
Terry Kombol
Audrey Kowalczyk
Harry Kowalczyk
Florence Krank
James E. Krank
Edward T. Krank
David Kuzura
J. R. Kuzura
Frenchy LaFont
Al Landbery
Ned Lang
Matt Lar
John Larsen
Katherine L. Lavoie
Michael A. Lavoie
Warren K. Lear
Barry W. Lee
Ellen J. Lee
Larry Lekse *
Mary L. Lekse
Julie Lekse
Adolphina Lekse
Ken Lekse
Jason K. Lekse
Anton J. Lekse
Geny Lekse
Lila L. Lekse
Brenda L. Lekse
Eva Lennon
Monty Lesh
Glory B. Lewis
Ken Likse
Robert Lind
Dr. John T. Lowry
Mary Ann Lutz
Art Magnuson
Gilbert J. Majerus
Antony A. Mang
Jane E. Mang
Brenda K. Mang
Dale Marsh
Donna Marsh
Rose M. Martin
Ronald L. Martin
Joe A. Martinez
Connie Mattfield
Gregory J. Mattfield
Sandra L. May
Emil May
Ruth Mayo *
Marlene J. McCamey
Sean M. McCleary
Debra McCleary
Thomas J. McCleary
Sara McCleary
Richard L. McGarvey
Debra K. McGrath
Paige McNeill
Miss Deborah McTeir
Anna McWorster
April Melton
Shamarie L. Melton
Shannon M. Mevfeld
James C. Michel
Richard V. Mihalovich
Susan L. Mikkelson
Rodney D. Mikkelson
Robert E. Milhalovich
Alice Mills
Jo Ann E. Mills
Mrs. Joan Minnie
Walter J. Moore
Almeda F. Moore
Stephen P. Moore
Patricia A. Moseman
Dorothy Murphy
Angie Naber
Dick Nault
Mary C. Nelson
Joan Nelson
Ike Newman
Allen C. Nielson
Daniel A. Nielson
Violet Olsen
Jodi M. Olson
Kevin Olson
Marian Olson
Wanda Olson
Dave Osborne
Harvey L. Ostermiller
Joseph R. Palagyi
Mike Palagyi
Mike Perrella
Sharon Phifer
William F. Picchioni
Marianne R. Picchioni
Lyle J. Piel
John J. Plinger
Mrs. Ethel Polich
Tony Potts
Allan Pratt
Wendy Racki
Steve Racki
John Racki
Joe Ramsey
Mary Ellen Rasmussen
Eric N. Rasmussen
Louise G. Rasmussen
Eric N. Rasmussen
Chuck Ratkovich
Ruby E. Ray
Doug Reighard
Margaret A. Reighard
Toreen Rich
Corinne Rieker
Mark Rieker
Mrs. Herschel M. Robbins
Saralynn Robbins
Hershel M. Robbins
Jerry Robertson
Mr. & Mrs. Gary G. Robson
Karen Romich
Milton Romick
Chuck Romick
LaVonne & Ed Rook
James P. Roscoe
Carol Rosin
John P. Rouane
Robert D. Samuels
Peggy & Harold Sandman
John R. Sanner
Kenneth R. Sanner
Steve Sanner
Mrs. Mildred I. Sanner
Diane Sarmiento
Dan Schwab
Jill Scott
Leroy D. Scott
Terry L. Sealey
Steve Semion
Steve & Diana Sessions
Kathleen Shipp
Robin L. Sibley
Lon Sibley
T. L. Simondi
Karen M. Skagen
Ralph Skagen
Mr. & Mrs. Miklos Skrapits
Alice Smith
Daniel J. Smith
Pamela M. Smith
George D. Smith
C. Paul Smith
Luther G. Smith
Roberta Snider
Richard D. Snider
Gary Snortland
Linda L. Soeberg
Gwen Soennichsen
Sherry Steffans Soennichsen
Florin J. Soennichsen
Tommy Soennichsen
Michael Solborg
Michelle Soponya
John Standish
William J. Steel
Hazel M. Steen
Connie Stevens
Cathy Stewart
Mrs. Eileen B. Stortz
Diana Swain
Jay Swanson
Rebecca M. Swanson
Scott W. Sweeney

George & Ruthmary Thomas
Peggy J. Toombs
Shawn Tripp
Robert L. Tull
Blaine Tull
Cynthia A. Tull
Delores F. Tull
Dale A. Turley
David D. Turley
Tim Vaira
Judy VanDyke
David L. VanDyke
Janet VanDyke
Kip E. VanDyke
Francis E. Vargo
Louis M. Vidic
Donald L. Vorse
Steve Vranish
David A. Vyain
Florence Wacker
Jean Wacker
Janet Wagner
Linda & Rodney Wajahn
Robert Waltz
Butch Waltz
Maxine Waltz
Laura Waltz
Richard L. Waltz
Alfred Waltz
Denise Watkins
Toni M. Webby
Robert E. Wegmann
Blanche L. Weigum
Michele E. Weitzel
Anne Wiggs
Jean Anne Wilkins
Steve Wimpfheimer
Bonnie Witzleben
Rev. & Mrs. Raymond E. Worner
Robert V. Yates
Keith A. Zieske
Tammy L. Zieske
Jack L. Zimmerman
Emil Zimmerman
Anne & Joe Zupee
12 letters, unable to read handwriting

* Sent two separate letters



APPENDICES

APPENDIX 1

SUMMARY OF PUBLIC COMMENTS AND CONCERNS

Public comments were individually categorized and tabulated. Thirty separate categories of concern were identified. These are listed below under four major issue groups, with the number of comments each received.

Physical Resource/Environment	
Water Quality	21
Air Quality	3
Environmental	6
Other Resource Concerns	18
Threatened or Endangered Species	2
Land Use	1
Cultural Inventory & Compliance	2
Reclamation	3
Data Adequacy	3

BLM Policy/Management	
Public Interest	48
Leasing	8
Planning	5
Management Benefit	1
Management Policy	13
Land Access	11
Lessee Protection	4
Alternative Proposals	32
Procedures	13
No Substantive Comment (Comment Noted)	47

Economic/Business	
Monopoly	57
Equalized Values	31
Economic Benefits/Impacts	44
Employment	4
Mining Operations	11
Mining History	1

Infrastructure/Social	
Road Deterioration	1
Road Condition	1
Safety	11
Social Change	8
Transportation	22

APPENDIX 2

MAJOR FEDERAL, STATE AND COUNTY AUTHORIZING ACTIONS

Federal Government

Department of the Interior
Bureau of Land Management
Nature of Action: Grant federal coal lease or exchange federal coal lands.
Office of Surface Mining
Nature of Action: Approves the federal mining permit on the proposed mining operation should one be required.
Fish and Wildlife Service
Nature of Action: Issue a biological opinion on threatened, endangered, or proposed species of fish, wildlife or plants as part of section 7 of the Endangered Species Act of 1973.
Mine Safety and Health Administration
Nature of Action: Issue permit that covers roof control, ventilation and other aspects of operational safety.

Department of the Treasury
Bureau of Alcohol, Tobacco and Firearms
Nature of Action: Issue permit(s) to purchase, store and use explosives.
Federal Communications Commission
Nature of Action: License to operate industrial radio service.

STATE OF MONTANA

Department of State Lands
Commissioner, Department of State Lands
Nature of Action: Issue underground mining permit.
Board of Land Commissioners
Nature of Action: Grant State coal lease.

Department of Health and Environmental Sciences
Air Quality Bureau
Nature of Action: Issue Air Quality Permit for Sources of Air Pollution.
Nature of Action: Issue Open Burning Permit.
Water Quality Bureau
Nature of Action: Issue Montana Pollutant Discharge Elimination System (MPDES) permit.
Solid Waste Management Bureau
Nature of Action: Issue Nonhazardous Solid Waste Management System license.
Occupational Health Bureau
Nature of Action: Issue Noise permit.

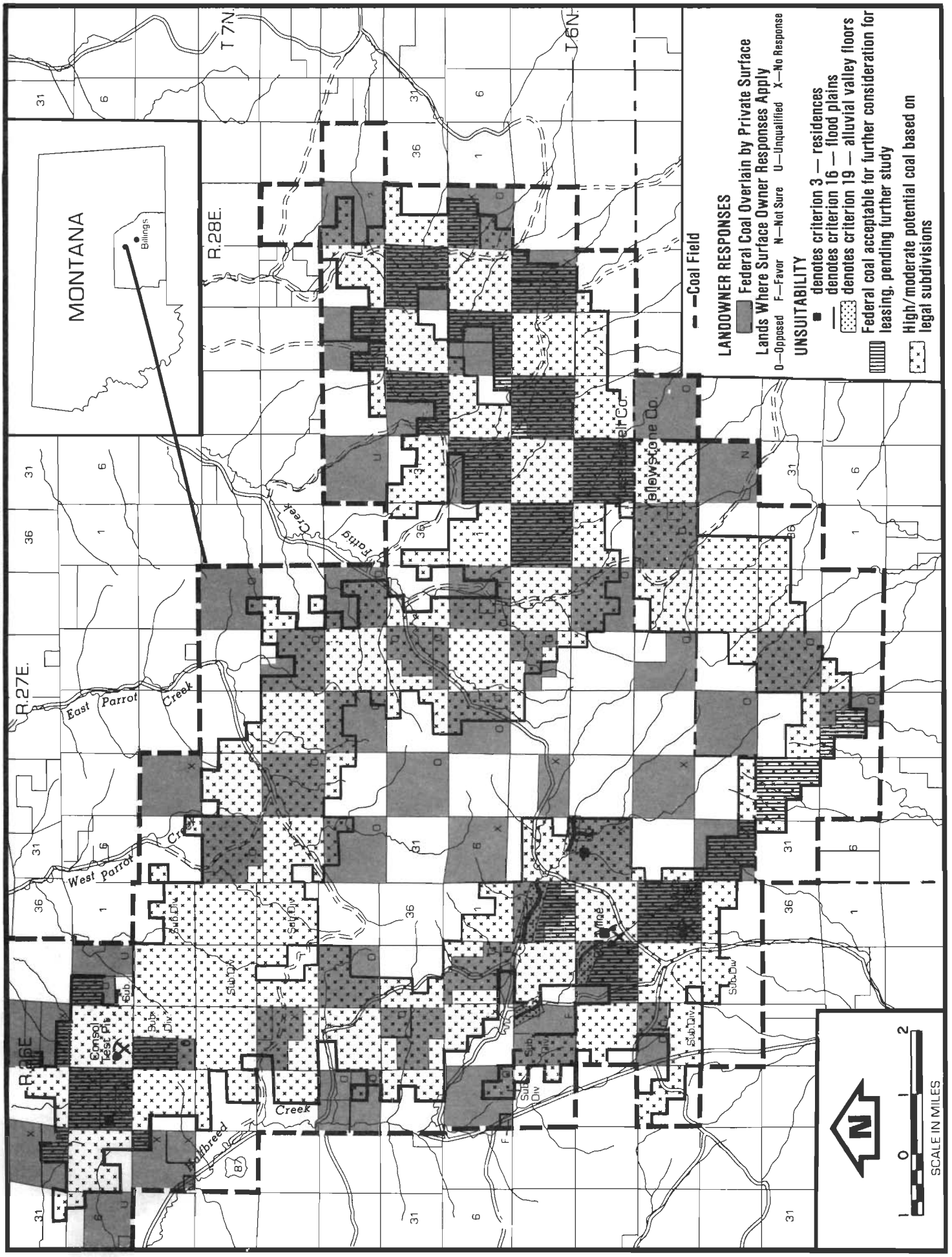
Department of Highways
Field Maintenance Bureau
Nature of Action: Issue Road Approach permit

Department of Natural Resources and Conservation
Water Resources Division, Engineering Bureau
Nature of Action: Approve dam design.

Montana Historical Society
State Historic Preservation Officer
Nature of Action: Issue Montana Antiquities Act permit.

LOCAL

Yellowstone/Musselshell County
Nature of Action: Issue road relocation permit.
Nature of Action: Issue building permits.



Source: USDI-BLM, Billings, RMP, 1984

Note: Coal planning screens applied in Billings RMP for surface coal mining.

APPENDIX 4

APPLICATION OF UNSUITABILITY CRITERIA — BULL MOUNTAINS COAL FIELD

Source: USDI, Billings Resource Area RMP (1984).

Criterion 1: There are no deposits of federal coal which lie within the Federal Land Systems described in 43 CFR 3461.1(a)(1) (100 percent reliability).

Criterion 2: There is no federally-owned surface encumbered by rights-of-way or easements within the strippable coal area (100 percent reliability).

Criterion 3: Several miles of county maintained roads cross federal lands. These rights-of-way and the appropriate buffer zones are considered unsuitable; no exceptions were applied. Several occupied dwellings lie on federal land. These dwellings and appropriate buffer zones are considered unsuitable; no exceptions were applied (100 percent reliability).

Criterion 4: There are no deposits of strippable federal coal which lie within designated wilderness study areas (100 percent reliability).

Criterion 5: There are no federal lands within the coal field which have been designated by Visual Resource Management Analysis as being Class I (100 percent reliability).

Criterion 6: There are no federal lands within the coal field which have been permitted for use for scientific study (100 percent reliability).

Criterion 7: Due to lack of adequate inventory, this criterion has not been applied (inadequate data).

Criterion 8: There are no designated or potential National Natural Landmarks within the coal field (100 percent reliability).

Criteria 9 through 15: Due to lack of adequate inventory, these criteria were not applied.

Criterion 16: The USGS has identified several drainages which flow through federal lands, portions of which qualify as special floodplains. These areas are considered unsuitable; no exceptions were applied (100 percent reliability).

Criterion 17: There are no federal lands which have been committed for use as municipal watersheds (100 percent reliability).

Criterion 18: There are no National Resource Waters within the coal field (100 percent reliability).

APPENDIX 4 — TABLE 1
APPLICATION OF UNSUITABILITY CRITERIA — BULL MOUNTAINS COAL FIELD
(20:1 Stripping Ratio)

Unsuitability Criterion	Acres Unsuitable	Tonnage
1	N/A	0
2	N/A	0
3	0 miles of road; 3 buildings; 24 acres	350,000
4	N/A	0
5	N/A	0
6	N/A	0
7	(1)	
8	N/A	0
9	(1)	
10	(1)	
11	(1)	
12	(1)	
13	(1)	
14	(1)	
15	(1)	
16	2½ miles: 96 acres	1,500,000
17	N/A	0
18	N/A	0
19	5 miles: 298 acres	0 (2)
20	N/A	0
TOTAL	120 acres	1,850,000 tons

Source: Billings Resource Area RMP (USDI 1984).

Notes: Application of unsuitability criteria applied for surface coal mining during Billings RMP. Assume 11 feet of coal for Mammoth-Rehder; 8 feet of coal McCleary bed; 1,711 tons/acre foot.

(1) Criteria which have not been applied due to lack of available inventory.
(2) Final determination of alluvial valley floors by State of Montana and Office of Surface Mining not completed; no coal eliminated.

APPENDIX 4 — TABLE 2
APPLICATION OF COAL UNSUITABILITY CRITERIA — BULL MOUNTAINS COAL FIELD
(10:1 Stripping Ratio)

Criterion	Acres Unsuitable	Tonnage
1	N/A	0
2	N/A	0
3	2 occupied dwellings; 16 acres	240,000
4	N/A	0
5	N/A	0
6	N/A	0
7	(1)	
8	N/A	0
9	(1)	
10	(1)	
11	(1)	
12	(1)	
13	(1)	
14	(1)	
15	(1)	
16	1.2 miles: 50 acres	750,000
17	N/A	0
18	N/A	0
19	1.2 miles: 180 acres	0 (2)
20	N/A	0
TOTAL	17 acres	1,000,000

Source: Billings Resource Area RMP (USDI 1984).

Notes: Application of unsuitability criteria applied for surface coal mining during Billings RMP. Assume 11 feet of coal for Mammoth-Rehder; 8 feet of coal McCleary bed; 1,711 tons/acre foot.

(1) Criteria which have not been applied due to lack of available inventory.
(2) Final determination on alluvial valley floors by State of Montana and Office of Surface Mining not completed; no coal eliminated.

Criterion 19: BLM has identified several miles of preliminary alluvial valley floors. These areas will not be considered unsuitable until a final determination is made by the OSMRE and the state of Montana (data preliminary).

Criterion 20: No state proposed criteria have been developed and adopted by the Secretary.

APPLICATION OF REMAINING UNSUITABILITY CRITERIA

Criterion 1: There are no deposits of federal coal which lie within the Federal Land Systems described in 43 CFR 3461.1 (100 percent reliability).

Criterion 2: Approximately 1.3 acres of federal coal would be unsuitable for longwall mining in T. 6 N., R. 27 E., Section 32, S½NE¼ and NW¼SE¼ for the Fergus Electric Cooperative power line right-of-way. An exception was applied based on a written agreement between Fergus Electric Cooperative and Meridian to relocate the right-of-way.

Criterion 3: Approximately 1.5 acres would be unsuitable for longwall mining in T. 6 N., R. 27 E., Section 18, NW¼NW¼ for the Fattig Creek Road. An exception was applied based on consent and approval from the Musselshell County Commissioners to relocate the road. Approximately six acres would be unsuitable for longwall mining in T. 6 N., R. 27 E., Section 18, NW¼ for an occupied dwelling. An exception will require consent and approval from the owners of this home.

Criterion 4: There are no deposits of strippable federal coal which lie within designated wilderness study areas (100 percent reliability).

Criterion 5: There are no federal lands within the coal field which have been designated by Visual Resource Management Analysis as being Class I (100 percent reliability).

Criterion 6: There are no federal lands within the coal field which have been permitted for use for scientific study (100 percent reliability).

Criterion 7: This criterion will be addressed at the mine plan permit stage.

Criterion 8: There are no designated or potential National Natural Landmarks within the coal field (100 percent reliability).

Criterion 9: There was no known critical habitat for federal threatened and endangered species within the federal coal lands.

Criterion 10: There was no known critical habitat for state threatened and endangered species within the federal coal lands.

Criterion 11: There were no known bald or golden eagle nests within the federal coal lands.

Criterion 12: There were no known bald or golden eagle roost and concentration areas within the federal coal lands.

Criterion 13: There were no known falcon cliff nesting sites within the federal coal lands.

Criterion 14: There was no known high priority habitat for migratory bird species of high federal interest within the federal coal lands.

Criterion 15: There was no known critical habitat for state resident fish and wildlife species within the federal coal lands.

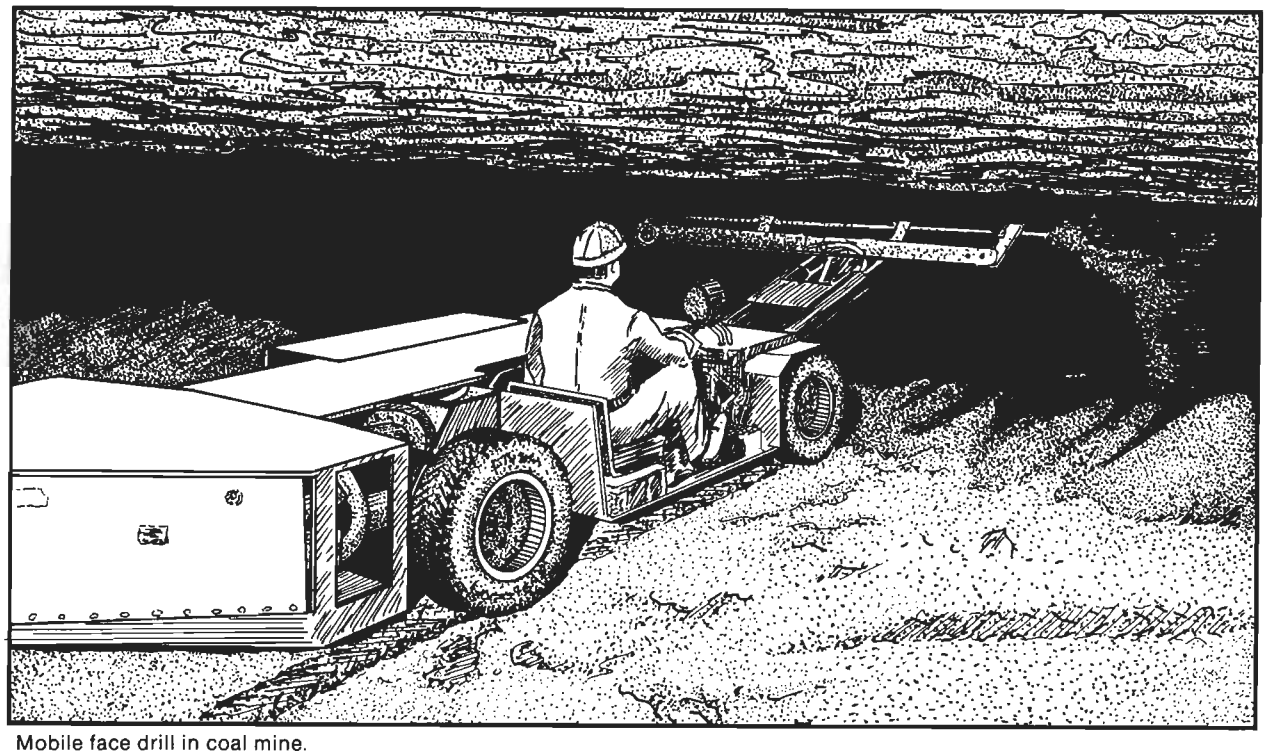
Criterion 16: Approximately 24.5 acres would be unsuitable for longwall mining in T. 6 N., R. 27 E., Section 18, NW¼NW¼, for the floodplain along the upper reaches of Rehder Creek. No exceptions were applied.

Criterion 17: There are no federal lands which have been committed for use as municipal watersheds.

Criterion 18: There are no National Resource Waters within the coal field.

Criterion 19: Approximately 24.5 acres were identified as a preliminary alluvial valley floor (data preliminary) in T. 6 N., R. 27 E., Section 18, NW¼NW¼. The area was not considered unsuitable for longwall mining until a final determination is made by the OSMRE and the state of Montana. These same lands were excluded as unsuitable for longwall mining by unsuitability criterion 16.

Criterion 20: No state proposed criteria have been developed and adopted by the Secretary.



Mobile face drill in coal mine.

APPENDIX 5

PREDICTION OF SUBSIDENCE CAUSED BY UNDERGROUND MINING IN THE BULL MOUNTAINS

REGULATORY ASPECTS

Subsidence is defined as a lowering of surface elevations over an underground mine caused by loss of support and subsequent settling or caving of strata lying above the mine (43 CFR 3480.0-5(36)). Subsidence and other surface effects of underground coal mining operations are regulated by Public Law 95-87 (U.S. Congress 1977). Pursuant to SMCRA, rules and regulations have been promulgated by OSMRE and by MDSL by which an underground mining plan will be permitted and operator compliance will be judged. All coal which is proposed for mining in Montana, regardless of ownership status, is subject to this law and these regulations.

In regard to subsidence, section 516(b)(1) of SMCRA states that "... a mine operator shall be required to adopt measures consistent with known technology in order to prevent subsidence causing material damage to the extent technologically and economically feasible, maximize mine stability, and maintain the value and reasonably foreseeable use of such surface lands, except in those instances where the mining technology used requires planned subsidence in a predictable and controlled manner."

The only absolute prohibition in SMCRA against subsidence can be found in section 516(c) which states, "In order to protect the stability of the land, the regulatory authority shall suspend underground coal mining under urbanized areas, cities, towns, and communities, and adjacent to industrial buildings, major impoundments or permanent streams if he finds imminent danger to the inhabitants of the urbanized areas, cities, towns, and communities. In addition, 43 CFR 3461.2(a) states that "Where underground mining will include surface operations and surface impacts on federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless the surface management agency finds that a relevant exception or exemption applies."

Concerning subsidence affecting the hydrologic system, section 516 (b)(9) of the Act states that "... a mine operator shall minimize the disturbance of the prevailing hydrologic balance at the minesite and in associated offsite areas and to the quantity of water in surface groundwater systems both during and after coal mining operations and during reclamation...". Although required for surface mines, SMCRA and the current federal regulations do not require underground coal mine operators to provide alternate sources of water to replace those adversely affected by such mining. The state of Montana by Applied Rules of Montana 26.4.648 does require replacement of adversely affected water supplies by both surface and underground coal mining permittees.

Subsidence is an important factor in designing an underground mine and can be more accurately predicted and, if necessary, mitigated when the completed mining and reclamation plan is reviewed and evaluated by the regulatory authority. As a part of that process, another environmental impact statement will be prepared prior to determining if a mining permit will be issued.

GEOLOGIC FACTORS

The coal in the Bull Mountains is in the Tongue River Member of the Fort Union Formation (Paleocene). The Tongue River Member consists of fine- to medium-grained massive sandstone and siltstone interbedded with a large proportion of shale, silty shale, and carbonaceous shale. Numerous coal seams are also present in the Tongue River Member. In general the Bull Mountains area lies in a broad syncline with an east-west trend. The regional structure dips one to four degrees. Locally, within the area of interest, the structural trend is a 0.8 degree dip to the north. There are no known major faults in the area.

As noted above there are numerous coal seams in the area but only the Mammoth seam is of sufficient thickness, within the tract, to be considered minable. It ranges from 8 to 15 feet in thickness, and averages about 10 feet thick. In general, the Mammoth seam is thinner to the west and thicker to the east as a result of merging with the overlying Rehder seam. The interburden between these two seams is thicker to the west and thinner to the east.

The overburden above the Mammoth generally consists of interbedded shales, sandstones, and siltstones. Sandstones account for approximately 40 percent of the total thickness. Much of the sandstones are massive beds, some approaching 60 feet in thickness. In particular there is a massive bed of sandstone immediately over the Mammoth seam and another one about 100 feet above the Mammoth. Both of which will be very important in regard to subsidence and mine roof stability in that when they do fracture, they become more bulky. Immediately beneath the Mammoth seam is generally a thin bed of shale underlain by more sandstone.

ENGINEERING FACTORS

Among the many factors which have a bearing upon the probability and extent of subsidence, the most important are width of coal extraction, depth and nature of the overburden, and the thickness of coal to be removed. The width of coal extraction depends entirely on the mining method being employed. Two different mining methods being considered in regard to the return of underground coal mining in the Bull Mountains are the standard room-and-pillar and longwall mining methods.

One of the mining methods being considered to underground mine the Mammoth-Rehder seam of southern Musselshell and northern Yellowstone counties is the standard room-and-pillar

mining method utilizing continuous mining machines and shuttle car/conveyor belt haulage to move the coal to the surface. In the room-and-pillar system of mining, a partial extraction method, less than 50 percent of the coal is recovered by two intersecting sets of parallel entries, usually perpendicular to one another. The result is a checkerboard-like array of coal pillars which will remain in place to support the roof strata.

Access to the coal seam will be by a set of main headings, usually five or seven, being driven on 70-foot centers with mining widths of 18-20 feet depending on local roof conditions. This method will leave coal pillars 50-52 feet wide to support the roof over the main entries. These headings which contain the conveyor belt, air courses, utilities, and mantrip/supply routes will be driven from the portal site on the western edge of the coal field to the eastern limit of the mine. Blocks of coal will be left as barrier pillars 300-feet wide between the main entries and the mining panels as a safety measure. The mining panels will then be developed southward from the main entries on 50-foot centers. Room widths will remain at 18-20 feet while coal pillars are reduced to 30-32 feet to increase resource recovery. There are no current plans for additional second mining, (i.e.,pillar robbing, which would further increase room widths). Pillar robbing is a measure used to increase resource recovery. It would also tend to increase subsidence.

The other mining method being considered in regard to underground mining in the Bull Mountains is the longwall method which can recover up to 85 percent of the coal resource. Access to the coal seam under the longwall scenario will be much the same as the room- and-pillar mine previously described except that the main entries will be directed more to the northeast to take advantage of the regional rock jointing pattern for subsidence purposes. The longwall mining panels will then be developed on both sides of the main entries to the southeast and northwest.

In longwall mining a block or panel of coal approximately 600 feet wide is isolated by two sets of parallel entries driven by continuous mining machines. The lengths of the panels are variable, but usually determined by geologic or engineering considerations. The longwall mining equipment consists of a plow or shearer which is used to break the coal from the mining face; a face conveyor belt to transport the coal away from the face; and mobile roof support system. The longwall mining equipment is initially located at the far end of the longwall panel and the coal is mined in retreat, towards the panel entries. The roof support system temporarily supports the overlying strata as the coal is being severed from the face. It also retreats allowing the roof to cave behind the longwall equipment. Planned subsidence is an integral and necessary part of longwall mining.

PROBABILITY OF SUBSIDENCE

The makeup of the overburden in the Bull Mountains is generally favorable for the room-and-pillar method of underground mining. The presence of the massive sandstone directly above the Mammoth seam will provide a very stable roof when supported by the coal pillar system previously described. Most of the underground mines in the Bull Mountains used this room-and-pillar mining method with very good success 30-50 years ago.

Underground coal mining in the Bull Mountains became prominent during the period 1906-1907 with the arrival of the Chicago, Milwaukee, St. Paul, and Pacific Railroad. The Bull Mountains coal field became one of the major fuel sources for this railroad. The arrival of the railroad also enabled Bull Mountains coal to compete with other coals in the state's industrial coal market. Coal production from the area peaked during the war years 1943-45 when approximately 1.1 million tons of coal were produced annually from a total of one dozen active mines. Production dropped off dramatically with the advent of diesel powered locomotives.

Sinkhole type subsidence in the west is often associated with room-and-pillar mining where it has taken place under 200 feet of overburden (Dunrud 1978). If any surface expression of subsidence as a result of room-and-pillar mining in the Bull Mountains were to become noticeable, it would be in the form of "sinkholes" located between the coal cropline and the 200-foot overburden line. The MDSL Abandoned Mine Lands Program reports that of 35 mine site repair projects in the Bull Mountains only two involved repair of surface subsidence damage (Mundie 1989). The surface damage needing repair occurred over mined areas where the overburden ranged from 30 to 40 feet thickness. These sinkholes were reportedly on the order of 20 to 30 feet in diameter and about 15 feet deep.

At this point it may be helpful to the reader to review the theoretical processes which are believed to occur when a portion of the coal seam is mined in an underground coal mine. When an underground opening is established, the original equilibrium is disturbed with resultant stress concentrations. While many factors are involved in the stability of the opening, the width of the span is one of the most important. Assuming it is rather small, the overlying rock strata can bridge across the opening with little movement or convergence of the top or bottom. As the span increases, a point is reached where the stress in the overlying rock strata exceeds some strength value of the rock and the overlying strata breaks loose and begins to fill the void left by the coal mining (Cummins 1973). How far above the mined opening the actual caving occurs depends upon the width and height of the void and the depth and nature of the overburden. Breaking and caving above mine openings are extensive where height-to-width ratios are near one; whereas, the overlying strata may only break one to three mining thicknesses above mine openings with very small height-to-width ratios. Above the caving, the rock strata commonly flex downward into mine openings as more or less continuous units only a few mining heights above mine openings with very small height-to-width ratios. The fragmented debris below is then recompressed by the subsided overburden (Dunrud 1978).

It has been found that maximum subsidence, expressed as a percentage of the extracted coal seam thickness, is a function of the ratio of the width of the underground excavation to the depth of the excavation (National Coal Board of Great Britain 1975). This function was the result of observations made by the National Coal Board of Great Britain covering a variety of mining conditions. From the following graph (Figure 1) the ratio of width to depth (W/D) can be used to estimate maximum subsidence for the room-and-pillar mining scenario previously described.

Because of the range of widths and depths used in the construction of the curve, this method is more accurately applied to areas

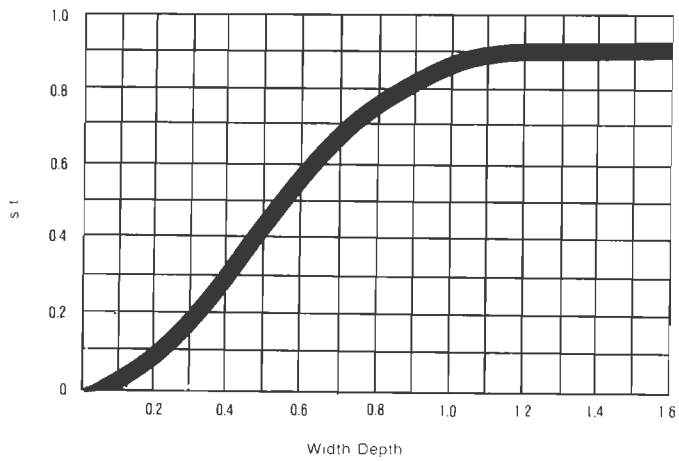


Figure 1 — Subsidence as a function of W/D for full caving

of deeper overburden. In a case where mining is occurring at a depth of 200 feet, the W/D ratio would be 0.1 (20 foot rooms/200 foot overburden depth). Reading the curve from the above graph, for this case, the subsidence would be approximately 10 percent of the extracted coal seam thickness or one foot (0.1 X 10 foot seam). The Mining Engineering Handbook states that as long as the W/D ratio is below 0.25, subsidence and surface damage are negligible. It can be seen that deeper overburden, 400 feet for example, would result in even lesser subsidence (20/400 = 0.05 or one-half foot).

There have not been many studies of subsidence of room-and-pillar mines in the west. The U.S. Geological Survey (USGS) (Dunrud 1978) undertook a study concerning the effects of underground room-and-pillar coal mining in the Sheridan, Wyoming and Beulah, North Dakota areas. This study corroborates the problems encountered when room-and-pillar mining under shallow overburden. It is difficult to apply any more of the results of that study to the Bull Mountains area because of the variations in geological conditions and overburden material properties. It is more reliable to apply the results of past mining in the Bull Mountains to estimate what subsidence future mining may cause.

Past mining and empirical estimates show that subsidence over most of the proposed room-and-pillar mining areas in the Bull Mountains will not be a noticeable problem. There is some chance that room-and-pillar mining under shallow overburden (less than 40 feet) will result in sinkhole subsidence necessitating repair. There has been instances in Utah, which has similar mining conditions, where subsided areas over room-and-pillar mines had to be fenced as a mitigating safety measure (Nelson 1990).

The other mining method being analyzed here, is the longwall mining system. Over the past 20 years of longwall mining in the United States, there have been several studies completed where the mining conditions are similar enough that the results can be applied to the longwall subsidence question of the Bull Mountains. Recent studies of longwall subsidence over mines in Colorado and Utah are applicable to this area because of similarities in geology and overburden material. In these areas the maximum subsidence factors have ranged from 0.33 to 0.70. There has not been any longwall mining experience in the Bull Mountains from which to draw any direct conclusions.

In contrast to the room-and-pillar mining previously discussed, subsidence will definitely occur as a result of longwall mining. Given the fact subsidence will occur, the only determination left to make is the extent and possible damages to the surface. Again, the decisive factors involved in subsidence are width of the coal extraction area, the coal thickness extracted, and depth and nature of the overburden.

The surface expression of a single subsided longwall panel is in the form of a broad trough with the maximum lowering of the surface elevations over the center of the panel. From the maximum subsidence at the panel center, the lowering of surface elevations tapers to zero at a point outside the boundaries of the panel. This effect produces a gradual slope towards the center of the panel. Figure 2 is an illustration of this process. Subsidence will be at its maximum if the width of the excavation is at its "critical" value. Subcritical widths are too narrow for maximum subsidence to occur; while, supercritical widths allow maximum subsidence to occur at more than one point. For instance the National Coal Board of Great Britain has found the critical width there to be 1.4 times the depth of the seam. A recent Bureau of Mines study in Utah found the critical width to be nearly 1.6 times the depth.

As the minimum dimension of the extraction exceeds the critical width and becomes "supercritical", the subsidence profile assumes a characteristic flat-bottomed shape with more than a single point reaching maximum possible subsidence (Allgaier 1988). This would be the case when adjacent longwall panels are mined or a single panel mined under lesser overburden. Pillars between adjacent longwall panels can cause humps in the subsidence profile if they are not designed to crush under the weight of the collapsing roof.

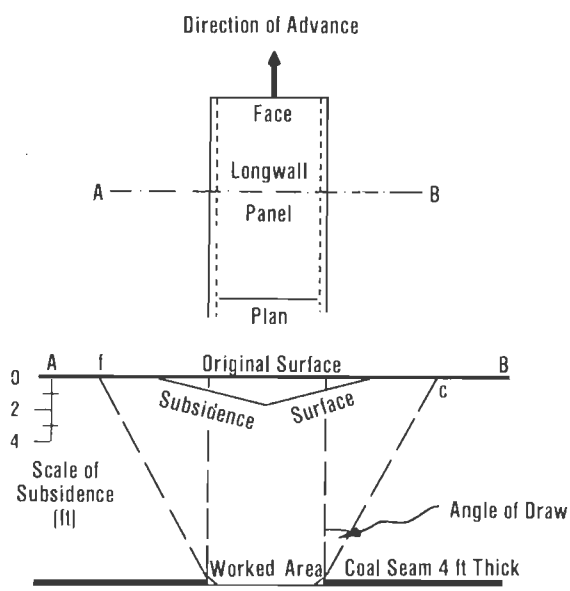


Figure 2 — Subsidence over a longwall face

Assuming that critical or supercritical excavation widths are achieved, the maximum surface subsidence for a longwall mine in the Bull Mountains may approach 0.70 of the extracted coal thickness. This number is near the high end of the range of values experienced for longwall coal mines in the west. Therefore, with a coal thickness of 10 feet, the maximum surface subsidence will be approximately 7 feet (0.70 X 10 feet) over the longwall panels.

Accompanying the subsidence process are tensile (+E) and compressive (-E) strains. Strain is defined as change in length per unit of original ground length. Excessive tensile strains can cause surface fissures, while compressive strains can cause buckling.

Over the years specific relationships have been discovered among strain, the subsidence profile, and the mined opening. Tensile strain occurs on both sides of the subsidence profile; whereas, compressive strain is located around the center. The transition from tension to compression coincides with the point of one-half maximum subsidence. The maximum tensile strain is located directly above or near but outside the edge of the mined opening. The maximum compressive strain is located either above the center or near but inside of the edge of the mined opening. Maximum possible tensile strain is found in subcritical openings, while maximum possible compressive strain is found in supercritical openings (Peng 1978). In the Bull Mountains longwall case, the final mined openings will always be supercritical. As a result fissure causing tensile strains will always be supercritical. Consequently, fissure causing tensile strains will always be at their minimums. The maximum strain (E) is related to maximum subsidence (S) and depth (h) by the equation $E = K\ S/h$. The proportional constant K3 for any value of the ratio W/D can be determined from figure 3.

As can be seen from figure 3, as the mined opening reaches its supercritical width of 1.4 times the depth, K3 factors for tensile and compressive strains are 0.65 and 0.53, respectively. By inserting a variety of overburden depths with the maximum subsidence previously calculated with the K3 factor for the supercritical case, one may make some assumptions where the maximum strains will occur. The following table illustrates that both the maximum tensile and compressive strains for a given subsidence in the supercritical case are at the lesser overburden depths.

The areas most likely to be affected by surface cracking will be around the periphery of the mine where overburden depths are down near two hundred feet or less. Experience in Utah has shown that these surface cracks often heal themselves in about six months (Clawson 1990).

CONCLUSIONS

Underground mines do, to some extent, impact the surface. Some possible adverse impacts from underground mining which could occur are slope failures in areas of steep terrain, rock falls from sandstone outcrops, surface fissures over mine boundaries, and altered drainage patterns. Good mining practices, such as crushable pillars, where feasible, and rapid and complete coal extraction which reduce surface tensile strain should reduce the possibility of severe surface damages. Prior to the approval of a mining permit, the regulatory authority will determine if subsidence will cause material damage or diminution of value or foreseeable use of the land and prescribe measures necessary to mitigate the damage.

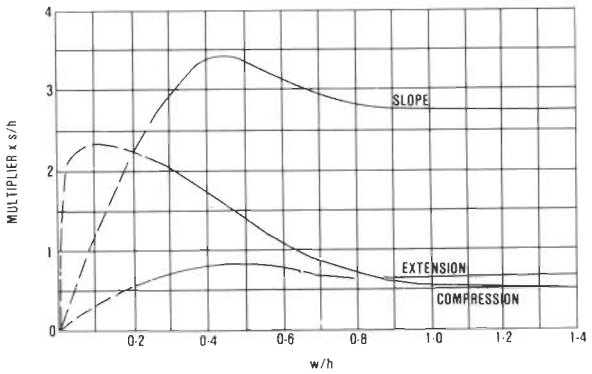
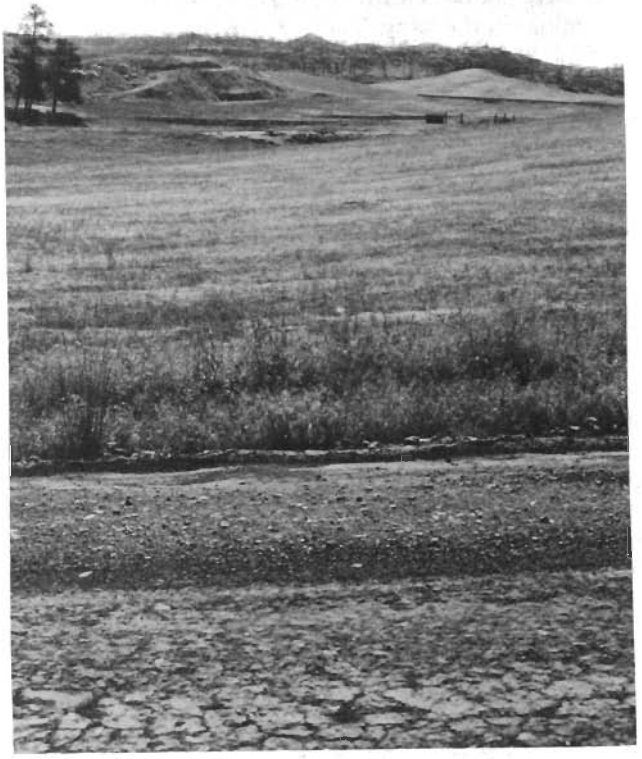


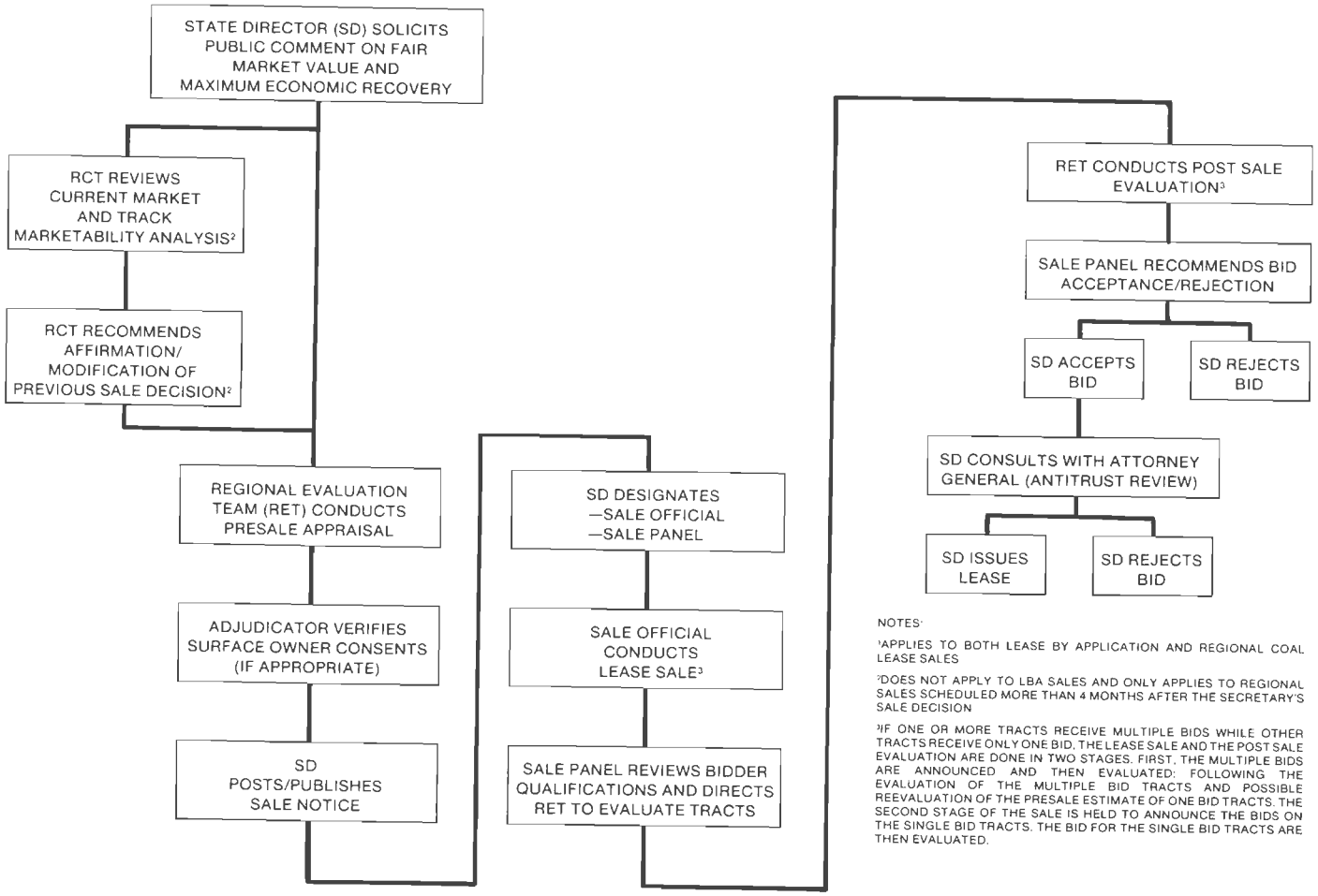
Figure 3 — Graph for predicting maximum slope and strain



Reclaimed land at PM Mine.

APPENDIX 6

COAL LEASE SALE PROCEDURES FLOW CHART[1]



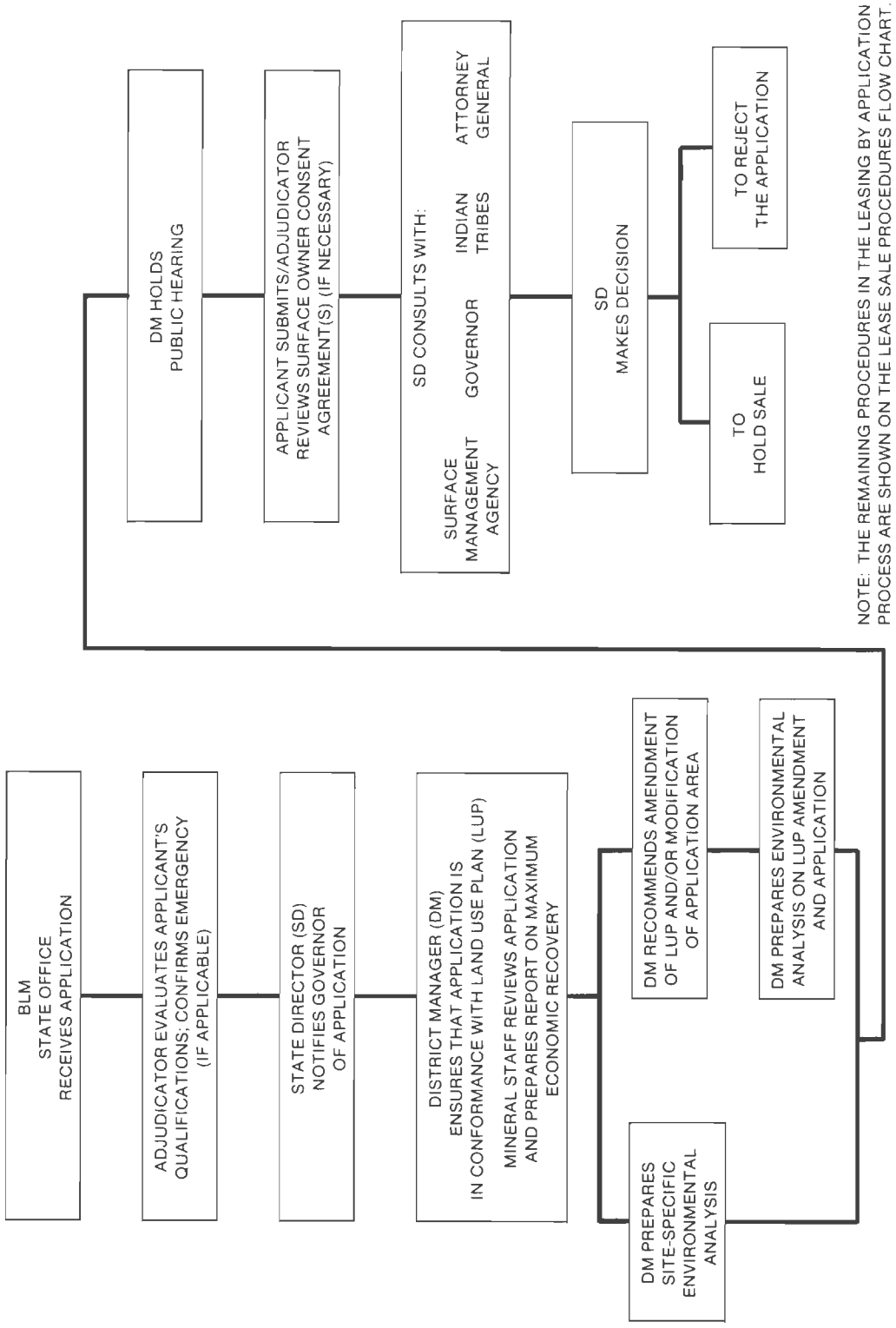
NOTES:

[1]APPLIES TO BOTH LEASE BY APPLICATION AND REGIONAL COAL LEASE SALES

[2]DOES NOT APPLY TO LBA SALES AND ONLY APPLIES TO REGIONAL SALES SCHEDULED MORE THAN 4 MONTHS AFTER THE SECRETARY'S SALE DECISION

[3]IF ONE OR MORE TRACTS RECEIVE MULTIPLE BIDS WHILE OTHER TRACTS RECEIVE ONLY ONE BID, THE LEASE SALE AND THE POST SALE EVALUATION ARE DONE IN TWO STAGES. FIRST, THE MULTIPLE BIDS ARE ANNOUNCED AND THEN EVALUATED; FOLLOWING THE EVALUATION OF THE MULTIPLE BID TRACTS AND POSSIBLE REEVALUATION OF THE PRESALE ESTIMATE OF ONE BID TRACTS, THE SECOND STAGE OF THE SALE IS HELD TO ANNOUNCE THE BIDS ON THE SINGLE BID TRACTS. THE BID FOR THE SINGLE BID TRACTS ARE THEN EVALUATED.

COAL LEASING BY APPLICATION FLOW CHART



NOTE: THE REMAINING PROCEDURES IN THE LEASING BY APPLICATION PROCESS ARE SHOWN ON THE LEASE SALE PROCEDURES FLOW CHART.

APPENDIX 7

METHODOLOGY FOR ECONOMIC AND DEMOGRAPHIC PROJECTIONS

Foreword

The projections presented in this report were developed by the National Planning Association Data Services, Inc. (NPA). The NPA model uses economic information developed by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA) (June 1988a) to project income and employment by BEA economic areas, states, and counties. A cohort-survival model, in conjunction with the economic projections, was then utilized to project population by age and sex for the BEA economic areas, the state, and the counties. A further breakdown of the population to white and nonwhite is available from NPA.

NPA Methodology

The following excerpt provides a brief description of the economic and demographic methodologies (NPA 1989).

Content and Design of the Regional Economic Data Base

The data content and arrangement used in the economic data base of the 1987 Regional Economic Projections Series (REPS) follows the data base of the Regional Economic Measurement Division, BEA of the U.S. Department of Commerce, from which most of the historical data for the period 1967-1984, were obtained. Historical estimates for 1985-1987 and annual projections for the years 1988-2010 were prepared by the NPA. A complete list of the variables in the REPS economic data base is given in table 1.

Geographic Units

There are a total of 3,657 United States geographic areas in the REPS data base, including 3,096 counties or county equivalents, 50 states and the District of Columbia, 317 metropolitan statistical areas, 183 economic areas, nine census regions, and the United States totals.

Where possible, county or county equivalent geographic definitions were used. In Virginia, special county definitions were necessary for some areas to include independent cities, and in five other states county combinations were required involving in most cases recently created counties for which sufficient historical data is not available to permit separate projections.

The REPS data base includes 317 metropolitan statistical areas reflecting the 1986 Office of Management and Budget definitions. This data base also includes 183 economic areas defined in 1977 by the BEA. There are a total of 8.4 million data points in the REPS regional economic data base.

Population

Total population in the regional data base includes the results of the 1980 Census of Population and mid-year estimates for July 1 made by the U.S. Bureau of the Census for subsequent years through 1986 by county and through 1987 by state. The intercensus years (1971 to 1979) have been reestimated by the Census Bureau for consistency with the 1970 and 1980 census results. The population data for the census years 1970 and 1980 has been rebased forward from the April count to July. Hence, the population figures in the REPS data base for these years differ from the many published census results by the amounts of population change between April and July. Population data is expressed in thousands of persons.

Employment

The employment concept used in the REPS economic data base is job counts, measured in thousands of proprietors and wage and salary workers. For wage and salary workers the number of full-time and part-time employees are used with no attempt to convert to full-time equivalents. Accordingly, a person with more than one job would be counted more than once. This employment series is greater than employment measured by the number of persons employed. Because of differences in coverage, in particular of the military, employees of households, students employed by state universities and elected state and local government officials, the BEA employment totals for nonagricultural wage and salary workers differ from, and generally are larger, than the corresponding Bureau of Labor Statistics data.

For the second year now the number of proprietors reflects the changed definitions adapted by the BEA in 1986. These definitions are based on the number of sole proprietors and partners (excluding limited partnerships) as determined from the income tax records. The new concept yields a considerable higher estimate of the number of proprietors than the previously used survey-based data which counted only proprietors whose primary occupations was the conduct of their unincorporated businesses. In the present data set the secondary self-employment jobs are treated symmetrically with the secondary wage and salary jobs, and the data for proprietors income and for the number of proprietors are derived from the same sources.

The national employment series is residence based. United States citizens employed outside the country are not included. The regional employment series used here is based on place of work and not on place of residence; thus, a commuter living outside of the center city county but working there would be counted as employed in the center city county.

The county data obtained from the BEA contains cells in private nonfarm wage and salary sectors that were withheld because of federal information disclosure policies. To estimate the missing

APPENDIX 7 — TABLE 1

THE ECONOMIC DATA BASE OF THE REGIONAL ECONOMIC PROJECTIONS SERIES, REPS(tm)

Variable Description
Employment — Total, All Industries
Employment — Proprietors, All Industries
Employment — Proprietors Farm
Employment — Proprietors Nonfarm
Employment — Wage and Salary Workers, All Industries
Employment — Farm
Employment — Nonfarm
Employment — Private Nonfarm (PNF)
Employment — PNF Other (Agricultural services, Forestry, Fisheries)
Employment — PNF Mining
Employment — PNF Construction
Employment — PNF Manufacturing
Employment — PNF Transportation, Communications, and Public Utilities
Employment — PNF Trade Wholesale
Employment — PNF Trade Retail
Employment — PNF Finance, Insurance, and Real Estate
Employment — PNF Services
Employment — PNF Government
Employment — PNF Government Federal Civilian
Employment — PNF Government Federal Military
Employment — PNF Government State and Local
Income — Wage and Salary, All Industries
Income — Other Labor Income, All Industries
Income — Proprietors, All Industries
Income — Proprietors Farm
Income — Proprietors Nonfarm
Income — Earnings Farm
Income — Earnings Nonfarm
Income — Earnings Private Nonfarm
Income — Earnings PNF Other (Agricultural services, Forestry, Fisheries)
Income — Earnings PNF Mining
Income — Earnings PNF Construction
Income — Earnings PNF Manufacturing
Income — Earnings PNF Transportation, Communications, and Public Utilities
Income — Earnings PNF Trade Wholesale
Income — Earnings PNF Trade Retail
Income — Earnings PNF Finance, Insurance, and Real Estate
Income — Earnings PNF Services
Income — Earnings Government
Income — Earnings Government Federal Civilian
Income — Earnings Government Federal Military
Income — Earnings Government State and Local
Income — Earnings Labor and Proprietors Total
Income — Social Insurance Contributions
Income — Earnings Labor and Proprietors by Place of Work
Income — Residence Adjustment
Income — Earnings Labor and Proprietors by Place of Residence
Income — Dividends, Interest, and Rent
Income — Income — Transfers

data for specific areas in an industry, the data for omitted years was interpolated from existing yearly data. If all or most years, for given areas in an industry were withheld, state distributions or distributions within the county were used to estimate the missing area values. For example, if most of the yearly data for mining employment in a given county was withheld, the share of mining employment relative to total employment in the county for the reported years of mining employment would be used to estimate the missing years. If all the years were missing for mining employment in a given county, then the available data for share of total county employment relative to state employment was used as the starting point to estimate the missing county data.

The interpolated cells, were then constrained to county employment totals and aggregated to economic area and state totals. The constraining procedure is noniterative with respect to the state totals. Thus, the state data for series with missing data change with aggregation.

Earnings

Earnings of one-digit Standard Industrial Classification industries are the sum of wage and salary income, other labor income, and of proprietor's income as defined by the National Income and Product Accounts (NIPA). The earnings figures are in thousands of 1982 dollars deflated by the personal consumption expenditure deflator. As with the employment series, earnings are residence-based nationally so that United States citizens employed outside of the country are not included; and again, regionally, the earnings series are reported by place of work and not of residence.

Personal Income

Personal income by type of income is also defined as in the NIPA. The first four components (wages and salaries, other labor income, farm, and nonfarm proprietor's income) sum to earnings. Dividends, interest, and rental income of persons are the sum of the corresponding three NIPA accounts. Transfer payments to persons are also included in personal income. Personal contributions to social insurance are subtracted from the sum of the other parts of personal income in calculating personal income.

Residence adjustment is the net amount of personal income earned in a geographic area that is earned by people not residing in the area. A negative residence adjustment implies that workers commute into an area to earn income but do not reside there; similarly, a positive residence adjustment implies that on the balance the area "exports" labor.

For county income data containing cells for private nonfarm earnings which were withheld because of federal information disclosure policies, the procedures used to estimate these cells were the same as those used to estimate missing employment values. Personal income and its components are in thousands of 1982 dollars as deflated by the personal consumption expenditure deflator.

Economic Growth Assumptions

The United States economic growth assumptions underlying the 1987 REPS are basically those contained in the National Economic Projections Series (NPA 1986), which project an economy characterized by rising labor force participation rates but also by a long-term slowing down in the rate of growth in population and labor force, relatively high rates of capital formation and moderately high growth in productivity and hourly earnings. This projection was further modified somewhat to reflect the data that were available for 1987 in October 1987.

The main economic variable in the REPS is real personal income. Movements in the real personal income closely parallel changes in Gross Natioal Product (GNP). The personal income series used in REPS is consistent with the personal income total for the United States in the BEA county level regional data tape. Because of the difference in the residence concept and in the deflation procedure, this series differs somewhat from some of the published United States total series for personal income.

Methods of Projection

The basic method used to generate the REPS economic projection can be described as a "regional growth accounting model" which disaggregates a national forecast into consistent subnational forecasts. The national forecasts of total population, employment by industry, earnings by industry, and personal income are generated by the economic growth model of the United States (see National Economic Projections Series, 86-N-1, 86-N-2, 86-N-3).

The national projections are first allocated to the economic areas and then to counties within these areas through a two-step disaggregation process utilizing relative growth rate differential and multiplier analyses. The county estimates are then aggregated into state, regional, and metropolitan statistical area totals.

The economic area forecast begins by projecting employment in each industry for each area based on area historical growth rate differentials. The base period between the average of 1969, 1971, and 1973 and the average of 1984 to 1986 values of the individual employment series is used to calculate the difference between the national growth rate and the area growth rate for each of the employment sectors. Military employment is assumed to remain constant at the base period level for the entire projection period.

The calculated area growth rate differentials for each industry are assumed to decay over the projection horizon. A decay series of X^t, $0<X<1.0$, (where X is industry specific and is derived from historical experience and t takes the values 1 through 23 for the projection years 1988 to 2010) was applied to each area's observed historical differential yielding an initial estimate of area projected growth rate differentials. Adding these values to the projected national growth rates, multiplying by prior year employment, and constraining the area values to national controls yielded the final estimates of projected area employment.

The next stage in the projection process is population, which is assumed to follow total employment opportunities. The area specific ratios to population in the base period reflect the long-term structural differences among areas in age composition of population, in employment rates, in labor force participation, and in interarea commute flows. The projected employment-population ratios of the individual economic areas are constrained to move in proportion to changes in the employment population ratio projected for the United States.

Finally, personal income projections are developed by using a series of multiplier calculations. For each sector, earnings per job multiplier changes are calculated for the historical periods as above. The national/area differentials are assumed to decay over the projection horizon, and the area earnings estimates are constrained to sum the national controls, yielding total labor and proprietor's earnings by area.

Estimates of total wages and salaries, other labor income, and contributions to social insurance are projected using a per job multiplier calculation. The non-earnings components of personal income (transfers and dividends, interest and rent) are projected using a per capita multiplier. Summing earnings by sector, subtracting personal contributions to social insurance, and adding the residence adjustment, transfers, and property income (dividends, interest, and rent) yielded per capital income.

County Projections

In general, the projection methods developed for the Economic Area projections are also used for county level projections. In this case, economic areas act as the control areas, and the growth rate and multiplier differentials are calculated relative to the economic area growth rates.

Population is treated differently at the county level. In this case, growth rate differentials are used instead of multipliers. Thus, county level population shares are not directly related to employment changes since intra area commutation is common, and the residential patterns follow their own trends.

Demographic Projection Techniques

The following excerpt provides a brief description of the demographic projection techniques (NPA 1989).

Population

The 1988 REPS demographic projection was based on a projection of closed population at the economic area and at the county level of geographic detail and on corresponding migration analyses. The closed population was projected by the cohort component method which used regional age-and-race specific birth rates and age, sex, and race specific survival rates to project the natural increase (excluding migration) of population of each area. Total net migration was given as the difference between this "closed" population and an externally derived estimate of total "open" population obtained from the REPS economic model. Distribution of the total net migration by age, sex, and race yields the final estimates of projected "open" population by age, sex, and race.

The estimating process was first applied at the economic area level, with the projected United States estimates acting as control values. The 1988 REPS demographic projections begin with the actual detailed (by age, sex and race) county population data for 1980, 1982, 1984, and 1986, from the Bureau of the Census and its interpolation for the intervening years. Population for the census years was shifted to July 1 base. Data for 1987 and 1988 was adjusted to match the reported state totals.

For each area, a matrix of five-year birth rates by age-and-race of mother is multiplied by the female cohort estimates in the childbearing age groups, yielding total five-year birth rates by age and race for the area. Multiplying these estimates by a sex ratio yields births by sex and race.

Next, the population in each five-year cohort is multiplied by age, sex, and race specific five-year survival rates. This yields estimates of the "closed" population. Subtracting total closed population figures from the total "open" population estimates obtained from the REPS economic model yields an estimate of total implicit net migration for each area.

The 1975-1980 census migration data by age, race, and sex for each area are then used to distribute the total net migration by these groups. The migration rates are adjusted to smooth out the sampling fluctuations, to reflect specific local population characteristics, such as military population, and for consistency with the observed changes in the distribution of population between 1980 and 1985, given birth and survival rates.

This process was applied to 1985, 1990, 1995, 2000, and 2005 yielding estimates for 1990, 1995, 2000, 2005, and 2010 estimates. Data for the years 1986 to 1988 was also consistent with the already available census estimates, including full county detail for 1986. Finally, data for the intervening years (1989, 1991 to 1994, 1996 to 1999, 2001 to 2004, 2006 to 2009) were calculated by interpolation between the 1985, 1990, 1995, 2000, 2005, and 2010 values. Data for the years 1986-1988 was also made consistent with the available census estimates.

The entire estimating process was then repeated at the county level of detail with the projected economic area estimates acting as control values for the county projections in the respective economic areas. The county data for 1986 were given by the census estimates and the data for 1987 to 1988 were adjusted to conform with the demographic information available for the states.

Households

The number of households by county was estimated for 1985 by Dr. George S. Masnick of the Joint Center for Housing Studies of Harvard University and Massachusetts Institute of Technology using the Bureau of the Census county and state data for 1970 and 1980, the state data for 1985, and the NPA county demographic data for 1980 and 1985. These estimates were extended by the NPA using essentially the same approach and the available state totals for 1986-1988, interpolated for the years 1981-1984 and 1971-1979, extrapolated back for 1967-1969 and projected for 1989 and subsequent years to 2010.

Adjustments to Projections

The NPA services sector employment and income data for Musselshell County were both adjusted downward. The original employment data for the services sector in Musselshell County was projected to increase to 700 persons by the year 2010. Since the other sectors in the Musselshell County economy were showing little or no growth and the services sector to the remainder of employment ratio was growing faster than the state ratio, the services sector employment sector in Musselshell County was constrained to slightly less than the state services sector employment to remainder of employment ratio. The state ratio in 2010 was 0.48 (services sector to remainder of employment) and the original Musselshell County ratio was 0.51 in 2010. The Musselshell ratio used to constrain this growth rate was 0.45 (620 jobs/1,370 jobs) in 2010. Thus, the services sector employment was allowed to increase from 470 employees in 1990 (services to remainder ratio = 0.33) to 620 employees in 2010 (services to remainder ratio = 0.45).

Services sector earnings were also constrained. First, earnings per employee was calculated and the new employment figures derived from the services sector adjustment were used to project new services sector earnings. A further constraint was placed on earnings in the services sector in that earnings were not allowed to increase at a faster rate than the earnings per employee for the remaining industry groups.

APPENDIX 8
QUALITY OF LIFE SURVEYS

Interviews were conducted with residents within the Musselshell County study area concerning their perceptions of the quality of life in their area. The sample was stratified based on the geographic location of the respondent's residence; those persons who reside in the Bull Mountains within five miles of the PM Coal Mine were considered "Bull Mountains" respondents and those persons who reside in the Roundup three-digit prefix exchange and not within five miles of the PM Coal Mine were considered "Roundup area" respondents.

The primary purpose of the quality of life survey was to investigate and identify attitudes of Roundup area residents toward the potential land exchange and subsequent mine development. The following discussion on error rates of proportional estimates relates only to the Roundup area survey.

For the Roundup area respondents, a random sample size of 99 was selected using the current telephone directory for Roundup. The universe for the survey was the estimated 1,300 households in the Roundup area listed in the Roundup telephone directory. For proportional estimates in the survey, a 95 percent confidence interval would be estimated by:

$$Pr \pm .095 \qquad \text{(Normal approximation)}$$

This implies that 95 percent of the time the true population proportion would fall within the interval $Pr \pm .095$.

Sources utilized to obtain telephone numbers of Bull Mountains residents within five miles of the PM Coal Mine that were included in the survey were the local telephone directory, Musselshell County Clerk and Recorder office, and Bull Mountains informants. Forty-one people were interviewed from the Bull Mountains area.

The survey instrument consisted of 40 questions utilizing both open-ended and close-ended questions (i.e., those in which answer categories are provided). Telephone interviews were conducted between February 17 and 28, 1989, and on March 2, 1989. Calls were made during day and evening hours, seven days a week to ensure that each potential respondent had an opportunity to participate in the survey.

An item-by-item tabulation of close-ended questions (frequency distributions) is presented in the following section for both the Bull Mountains informants and Roundup area informants. Percents do not include responses not within the defined answer categories (don't knows). The constant "n" equals the number of responses that were included in tabulation (responses such as "don't know" were not included).

QUALITY OF LIFE SURVEY
(BULL MOUNTAINS AREA RESIDENTS)

Q-1 Do you live within 10 miles of the PM Coal Mine off the Old Divide Road?

1) YES -- Approximately how many miles do you live from the mine?

2) NO _____ MILES

Q-2 I am going to read a list of services which are available in most towns and I would like you to rate the services presently available in your area. Using the ratings of above average, average, or below average, how would you rate:

	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE
1) POLICE PROTECTION	7.5%	75.0% n = 40	17.5%
2) STREETS/HIGHWAYS	12.2%	51.2% n = 41	36.6%
3) FIRE PROTECTION	50.0%	22.5% n = 40	27.5%
4) TELEPHONE SERVICE	53.7%	46.3% n = 41	0.0%
5) HOSPITALS	40.0%	37.1% n = 35	22.9%
6) WATER SUPPLY	0.0%	40.9% n = 22	59.1%
7) SEWER SYSTEM	16.7%	83.3% n = 6	0.0%
8) SOCIAL SERVICES	6.4%	83.9% n = 31	9.7%
9) SCHOOL SYSTEM	51.3%	41.0% n = 39	7.7%
10) COUNTY GOVERNMENT	2.5%	65.0% n = 40	32.5%
11) CITY GOVERNMENT	0.0%	88.9% n = 18	11.1%
12) HOUSING	2.8%	72.2% n = 36	25.0%

Q-3 In what city do you shop most often for articles such as clothing, small appliances, or kitchenware?

1) BILLINGS	82.9%
2) ROUNDUP	17.1%
3) OTHER	

n = 41

Q-4 In what city do you most often shop for major purchases such as cars, furniture, or appliances?

1)	BILLINGS	72.5%
2)	ROUNDUP	27.5%
3)	OTHER	
		n = 40

Q-5 When you shop in Roundup, what do you consider to be the best feature?

1)	SELECTION OF GOODS AND SERVICES	0.0%
2)	STORE HOURS	2.9%
3)	CREDIT AVAILABILITY	2.9%
4)	CLOSE TO PLACE OF RESIDENCE, OR	91.4%
5)	LOW PRICES	2.9%
		n = 35

Q-6 What do you consider to be the worst feature?

1)	SELECTION OF GOODS AND SERVICES	46.0%
2)	STORE HOURS	5.4%
3)	CREDIT AVAILABILITY	2.7%
4)	HIGH PRICES	46.0%
		n = 37

Q-7 What do you like MOST about the area in which you live?

Q-8 What do you like LEAST about the area?

Q-9 Would you say the local residents have an opportunity to participate in the decision-making process of the county government?

1)	YES	65.9%
2)	NO -- Why not?	34.1%
		n = 41

Q-10 Do you feel your comments or suggestions are considered:

1)	ALL THE TIME	5.0%
2)	MOST OF THE TIME	30.0%
3)	SOMETIMES	37.5%
4)	VERY LITTLE, OR	17.5%
5)	NEVER	10.0%
		n = 40

Q-11 How often do you participate in government activities? Would you say:

1)	ALWAYS	12.5%
2)	MOST OF THE TIME	20.0%
3)	SOMETIMES	27.5%
4)	VERY LITTLE, OR	37.5%
5)	NEVER	2.5%
		n = 40

Q-12 Which ONE of the following groups do you think has the most power in deciding about the future of the area?

1)	COUNTY COMMISSIONERS	42.5%
2)	SMALL BUSINESSES	2.5%
3)	LARGE CORPORATIONS	22.5%
4)	GENERAL PUBLIC	12.5%
5)	ENVIRONMENTAL GROUPS	17.5%
6)	OTHER:	2.5%
		n = 40

Q-13 a) Would you describe the local economy as:

1)	GROWING	2.4%
2)	STABLE, OR	4.9%
3)	DEPRESSED	92.7%
		n = 41

b) Why do you think it is _____?

Q-14 Do you think young people have an opportunity to work at an occupation in the area?

1)	YES	12.2%
2)	NO -- Why not?	87.8%
		n = 41

Q-15 a) What do you see as social problems in your area? (HINT: Alcoholism, crime, teenage pregnancy) If NONE, Skip to Q-16!

b) How is the community responding to these problems?

Q-16 In your opinion, are there different social classes of people in Roundup?

1) YES	70.0%
2) NO	30.0%
	n = 40

Q-17 Which groups or individuals have the most economic and political power in Roundup?

Q-18 Do you think it is easy, about average, or difficult to get to know people in your area?

1) EASY	58.5%
2) ABOUT AVERAGE, OR	31.7%
3) DIFFICULT	9.8%
	n = 41

I am going to read you a short list of statements and I would like you to tell me whether you agree or disagree with each of them.

	AGREE	DISAGREE
Q-19 People in the area are proud of their mining heritage.	94.9%	5.1%
	n = 39	
Q-20 Families in the area spend a lot of time together after working hours.	80.6%	19.4%
	n = 36	
Q-21 Groups or organizations from outside the Roundup area have a great influence on the area.	42.5%	57.5%
	n = 40	
Q-22 It is difficult to organize help for families who have suffered hardships.	5.3%	94.7%
	n = 38	
Q-23 Church activities are important to most of the people in Roundup.	91.4%	8.6%
	n = 35	

Q-24 Do you think there is a lot of community-oriented activities in Roundup?

1)	YES -- What are they?	82.1%
2)	NO	17.9%
		n = 39

Q-25 Do you or your spouse belong to an organized civic or recreational group?

1)	YES -- Which ones?	46.3%
2)	NO	53.7%
		n = 41

Q-26 Do members of your household engage in outdoor recreational activities?

1)	YES	85.4%
2)	NO	14.6%
		n = 41

Q-27 Do you have any concerns about the land exchange ITSELF, <u>not</u> including the proposed mine?

1)	YES -- What are those concerns?	41.0%
2)	NO	59.0%
		n = 39

Q-28 What are the most important <u>positive</u> effects that the mine would have on the area?

Q-29 What are the most important <u>negative</u> effects that the mine would have on the area?

Q-30 Which <u>ONE</u> of the following statements best describes how you feel about newcomers moving into your area?

1)	I WOULD WELCOME THEM	75.0%
2)	I PROBABLY WOULDN'T NOTICE THEM, <u>OR</u>	17.5%
3)	I WOULD PREFER NOT TO HAVE THEM MOVE IN	7.5%
		n = 40

Q-31 Do you think it would be easy for newcomers to become an active member in the community?

1) YES	92.7%
2) NO -- Why not?	7.3%
	n = 41

Q-32 If up to 25 new families were to move into the Roundup area, do you think they would have a positive, harmful, or no effect on the following services?

	POSITIVE	HARMFUL	NO EFFECT
1) POLICE PROTECTION	20.0%	12.5%	67.5%
		n = 40	
2) STREETS AND HIGHWAYS	17.1%	12.2%	70.7%
		n = 41	
3) FIRE PROTECTION	30.0%	10.0%	60.0%
		n = 40	
4) HOSPITALS	73.7%	2.6%	23.7%
		n = 38	
5) PUBLIC WATER SUPPLY	7.7%	28.2%	64.1%
		n = 39	
6) SEWER SYSTEM	15.0%	0.0%	85.0%
		n = 20	
7) SOCIAL SERVICES	36.4%	12.1%	51.5%
		n = 33	
8) SCHOOL SYSTEM	73.2%	9.8%	17.0%
		n = 41	
9) COUNTY GOVERNMENT	50.0%	2.5%	47.5%
		n = 40	
10) CITY GOVERNMENT	29.1%	4.2%	66.7%
		n = 24	
11) ORGANIZED RECREATION	69.2%	0.0%	30.8%
		n = 39	
12) SHOPPING FACILITIES	68.3%	2.4%	29.3%
		n = 41	
13) COMMUNITY ORGANIZATIONS	67.6%	2.7%	29.7%
		n = 37	
14) PRICE OF HOUSING	64.9%	5.4%	29.7%
		n = 37	

Q-33 Would the increased opportunity for more jobs created by the mine be important to you?

1) YES	68.3%
2) NO	31.7%
	n = 41

Q-34 Would you be willing to work at the mine if you were in need of a job?

1) YES	70.7%
2) NO -- Why not?	29.3%
	n = 41

Q-35 What, if any, are your concerns about the mine operating in the Bull Mountains?

Q-36 Do you consider the largest proportion of the people residing in the area to be long-time residents of the area?

1) YES	47.5%
2) NO	52.5%
	n = 40

Q-37 How long have you lived there?

_____

If LIFETIME - Skip to Q-39

Q-38 Why did you move there?

Q-39 Do you own or rent your home?

1) OWN	92.7%
2) RENT	7.3%
	n = 41

Q-40 Are you satisfied with your home location and the condition as it is today?

1) YES	90.2%
2) NO -- WHY NOT?	9.8%
	n = 41

SEX OF RESPONDENT:

MALE	58.5%
FEMALE	41.5%
	n = 41

Is there anything else that you would like to add about the land exchange or the proposed mine?

QUALITY OF LIFE SURVEY
(ROUNDUP AREA RESIDENTS)

Q-1 Do you live within 10 miles of the PM Coal Mine off the Old Divide Road?

1) YES -- Approximately how many miles do you live from the mine?

_____ MILES

2) NO

Q-2 I am going to read a list of services which are available in most towns and I would like you to rate the services presently available in your area. Using the ratings of above average, average, or below average, how would you rate:

	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE
1) POLICE PROTECTION	18.4%	69.4% n = 98	12.2%
2) STREETS/HIGHWAYS	12.1%	52.5% n = 99	35.4%
3) FIRE PROTECTION	75.3%	20.6% n = 97	4.1%
4) TELEPHONE SERVICE	58.6%	38.4% n = 99	3.0%
5) HOSPITALS	48.4%	43.2% n = 95	8.4%
6) WATER SUPPLY	26.3%	48.7% n = 76	25.0%
7) SEWER SYSTEM	25.5%	72.7% n = 55	1.8%
8) SOCIAL SERVICES	20.6%	68.5% n = 92	10.9%
9) SCHOOL SYSTEM	52.1%	43.6% n = 94	4.3%
10) COUNTY GOVERNMENT	9.5%	64.2% n = 95	26.3%
11) CITY GOVERNMENT	16.4%	67.1% n = 73	16.5%
12) HOUSING	11.3%	75.3% n = 97	13.4%

Q-3 In what city do you shop most often for articles such as clothing, small appliances, or kitchenware?

1) BILLINGS	74.8%
2) ROUNDUP	22.2%
3) OTHER	

n = 99

Q-4 In what city do you most often shop for major purchases such as cars, furniture, or appliances?

1) BILLINGS	60.6%
2) ROUNDUP	39.4%
3) OTHER	
	n = 99

Q-5 When you shop in Roundup, what do you consider to be the best feature?

1) SELECTION OF GOODS AND SERVICES	8.7%
2) STORE HOURS	3.3%
3) CREDIT AVAILABILITY	7.6%
4) CLOSE TO PLACE OF RESIDENCE, OR	77.2%
5) LOW PRICES	3.2%
	n = 92

Q-6 What do you consider to be the worst feature?

1) SELECTION OF GOODS AND SERVICES	68.5%
2) STORE HOURS	3.2%
3) CREDIT AVAILABILITY	1.1%
4) HIGH PRICES	27.2%
	n = 92

Q-7 What do you like MOST about the area in which you live?

Q-8 What do you like LEAST about the area?

Q-9 Would you say the local residents have an opportunity to participate in the decision-making process of the county government?

1) YES	73.2%
2) NO -- Why not?	26.8%
	n = 97

Q-10 Do you feel your comments or suggestions are considered:

1) ALL THE TIME	5.2%
2) MOST OF THE TIME	28.1%
3) SOMETIMES	40.6%
4) VERY LITTLE, OR	22.9%
5) NEVER	3.2%
	n = 96

Q-11 How often do you participate in government activities? Would you say:

1)	ALWAYS	3.0%
2)	MOST OF THE TIME	19.2%
3)	SOMETIMES	33.3%
4)	VERY LITTLE, OR	31.3%
5)	NEVER	13.2%
		n = 99

Q-12 Which ONE of the following groups do you think has the most power in deciding about the future of the area?

1)	COUNTY COMMISSIONERS	58.8%
2)	SMALL BUSINESSES	10.3%
3)	LARGE CORPORATIONS	4.1%
4)	GENERAL PUBLIC	17.5%
5)	ENVIRONMENTAL GROUPS	7.2%
6)	OTHER:	2.1%
		n = 97

Q-13 a) Would you describe the local economy as:

1)	GROWING	2.0%
2)	STABLE, OR	15.2%
3)	DEPRESSED	82.8%
		n = 99

b) Why do you think it is _____?

Q-14 Do you think young people have an opportunity to work at an occupation in the area?

1)	YES	11.2%
2)	NO -- Why not?	88.8%
		n = 98

Q-15 a) What do you see as social problems in your area? (HINT: Alcoholism, crime, teenage pregnancy) If NONE, Skip to Q-16!

b) How is the community responding to these problems?

Q-16 In your opinion, are there different social classes of people in Roundup?

1) YES	62.6%
2) NO	37.4%
	n = 99

Q-17 Which groups or individuals have the most economic and political power in Roundup?

Q-18 Do you think it is easy, about average, or difficult to get to know people in your area?

1) EASY	64.6%
2) ABOUT AVERAGE, OR	28.3%
3) DIFFICULT	7.1%
	n = 99

I am going to read you a short list of statements and I would like you to tell me whether you agree or disagree with each of them.

	AGREE	DISAGREE
Q-19 People in the area are proud of their mining heritage.	98.0%	2.0%
	n = 99	
Q-20 Families in the area spend a lot of time together after working hours.	62.9%	37.1%
	n = 89	
Q-21 Groups or organizations from outside the Roundup area have a great influence on the area.	36.0%	64.0%
	n = 89	
Q-22 It is difficult to organize help for families who have suffered hardships.	8.1%	91.9%
	n = 99	
Q-23 Church activities are important to most of the people in Roundup.	91.7%	8.3%
	n = 96	

Q-24 Do you think there is a lot of community-oriented activities in Roundup?

1) YES -- What are they?	84.5%
2) NO	15.5%
	n = 97

Q-25 Do you or your spouse belong to an organized civic or recreational group?

1) YES -- Which ones?	34.3%
2) NO	65.7%
	n = 99

Q-26 Do members of your household engage in outdoor recreational activities?

1) YES	66.7%
2) NO	33.3%
	n = 99

Q-27 Do you have any concerns about the land exchange ITSELF, <u>not</u> including the proposed mine?

1) YES -- What are those concerns?	23.7%
2) NO	76.3%
	n = 97

Q-28 What are the most important <u>positive</u> effects that the mine would have on the area?

Q-29 What are the most important <u>negative</u> effects that the mine would have on the area?

Q-30 Which <u>ONE</u> of the following

APPENDIX 9
ENROLLMENT PROJECTIONS

The procedures for developing school enrollment projections by grade was separated into three distinct steps; development of birth survival ratios; development of grade retention ratios; and applications of the above ratios to birth and enrollment data to make the actual projections.

Development of Birth Survival Ratios

Birth survival ratios are defined as the rate at which births "survive" to a given school grade. For example, birth survival ratios for the first grade in Musselshell County are the actual county enrollments in the first grade for any given year divided by the number of births that occurred during the school year 6 years before. The algorithm for computing birth survival ratios is given as:

$$BSR^k_j = SE^k_j / B^{j-6}$$

where:

BSR^k_j = Birth survival rate for the kth grade during the jth school year

SE^k_j = School enrollment for the kth grade during the jth school year

B_{j-6} = Births corresponding to the jth school year 6 years earlier

As an example, the birth survival ratio for the first grade in Musselshell County for school year 1987/1988 is given as:

$$BSR^1_{1987-1988} = SE^1_{1987-1988} / B_{1981-1982}$$
$$= 61/82$$
$$= .744$$

Since the number of births is reported by calendar year, it is necessary to adjust these births by developing an estimate of school year births. This is accomplished by taking three-fourths of the births for any given year and adding that figure to one-fourth of the resident births that occurred the previous year.

The equation for estimating Musselshell County school year births is:

$$SYB_j = 1/4 * Bi + 3/4 * B_{i+1}$$

where:

SYB_j = Births for school year j

B_i = Births in calendar year i

B_{i+1} = Births in calendar year i+1 where school j spans calendar years i and i+1

For instance, the number of school year births for 1981-1982 would be:

$$SYB_{1981-1982} = 1/4 * B_{1981} + 3/4 * B_{1982}$$
$$= 1/4 * 82 + 3/4 * 82$$
$$= 82$$

$SYB_{1981-1982}$ would correlate to school year 1988-89 when developing birth survival rates. Birth survival rates would then be calculated as follows:

$$BSR^k_j = SE^k_j / SYB_{j-7}$$

Development of Grade Retention Rates

Development of grade retention ratios is a straightforward process. The enrollment for a given grade in any one year is divided into the number of students in the following grade one year later. These are called "forward" grade retention rates. Backward grade retention rates are computed by dividing the enrollment for a given grade in any one year into the number of students in the previous grade during the prior year. Backward grade retention rates are usually developed for kindergarten, which allows one to project backwards from grade 1 to kindergarten.

The algorithms for computing retention rates are given as:

Forward Retention Rates

$$RR^{k,k+1}_{j,j+1} = SE^{k+1}_{j+1} / SE^k_j$$

where:

$RR^{k,k+1}_{j,j+1}$ = Retention rate from grade k in school year j to grade k+1 in school year j+1

SE^{k+1}_{j+1} = School enrollment in grade k+1 during school year j+1

SE^k_j = School enrollment in grade k during school year j+1

Backward Retention Rates

$$RR^{k,k-1}_{j,j-1} = SE^{k-1}_{j-1} / SE^k_j$$

As an example, the forward retention rate for Musselshell County for grade five to grade six from school year 1986/1987 to school year 1987/1988 would be:

$$RR^{5,6}_{1986-87} = SE^6_{1987-88} / SE^5_{1986-87}$$
$$= 76/72$$
$$= 1.056$$

As previously stated, the fact that the retention rate is less than one is an indication of student dropouts, retardation, net out-migration, or a combination of these three. Retention rates greater than one are indicative of in-migration, retardation, and student dropouts.

Retention rates were developed for years 1980 through 1988. To compute an average retention rate, a forward weighting system was used where the most recent year (1987/1988) retention rate was given the highest weight.

Development of Enrollment Projections

Once the birth survival rates were computed and the retention rates were developed, these ratios were applied to the birth and enrollment data for the county and school district enrollments. Birth data for the district were estimated using district enrollment to county enrollment ratios and applying the figures to the county birth data.

APPENDIX 10
DATA ADEQUACY

Powder River Region Data Adequacy Standards (PRDAS) were developed for the Powder River Coal Production Region in November 1987. Their purpose is to define the general data base necessary for coal leasing and mitigation decisions in the region (USDI 1987c). Decision-makers use these standards to determine whether their coal leasing decisions and recommendations have a solid data foundation on whether:

(1) to lease a delineated coal tract;
(2) to make a determination on fair market value for a given tract; and
(3) to make a determination of the special set of lease stipulations for a proposed lease tract (USDI 1987c).

Several things merit discussion on these standards and their applicability to this project. To begin with, these data adequacy standards were developed to guide coal leasing decisions for surface coal strip mine operations; only one underground Federal coal mine (Divide/Storm King) exists in the entire Powder River Coal Production Region (Brabson pers. com. 1989). The standards serve as the starting point for determining whether sufficient data exists to lease coal; resource specialists and decision-makers must use professional discretion in making any data adequacy determination (USDI 1987c).

BLM is making a decision on a proposed coal-for-land exchange as the proposed action and analyzing coal-for-coal exchanges, leasing coal and no action as alternatives. The proposed development of the coal lands is an underground coal mine operation, not surface strip mining. Based on this, BLM has determined that sufficient justification exists for variation from these standards. Resource information and its comparability to data adequacy standards is listed below:

	Resource Data	Comparability[a]	Adequacy[b]
1.	Geology	Exceeds standards	Excellent
2.	Soils/Reclamation	Meets standards	Very good
3.	Hydrology	Meets standards	Very good
4.	Wildlife	Does not meet all standards	Adequate
5.	Air Quality	Meets standards	Very good
6.	Cultural	Does not meet all standards	Adequate
7.	Socioeconomics	Meets standards, except I/O Model	Very good
8.	Vegetation and Land Use	Meet standards	Very good

[a]Comparability — comparison of existing data and information used for this EIS and how it compares to the PRDAS.

[b]Adequacy — adequacy of the data and information used in this EIS for making a decision on whether to exchange or lease these Federal coal lands.

APPENDIX 11

SUMMARY OF COAL MARKET CONDITIONS AFFECTING DEVELOPMENT OF THE BULL MOUNTAINS PROPERTY

Prepared by: Northwest Regional Evaluation Team

The property being considered for the proposed Bull Mountains exchange is located on the northwestern edge of the Powder River Basin. As a result, the near and long-term coal market conditions affecting the Powder River Basin would have a direct influence on the marketability of coal from a proposed underground mine on the Bull Mountains property.

Background

The Powder River Basin is about 90 miles wide and more than 200 miles long and encompasses an area of about 20,000 square miles in both northeastern Wyoming and southeastern Montana. It contains the Nation's largest surface coal mines, the thickest coal beds and vast reserves of low sulfur coal (U.S. Department of Energy 1986). As a result, this area has been the fastest growing coal producing region over the last decade and currently produces approximately half the coal mined in the western United States.

Coal mined from the Powder River Basin is subituminous in grade, and the calorific content generally ranges from 15 to 19 million BTUs per ton. This heating value is approximately 75 percent of the thermal energy contained in bituminous coal; but the lower energy content of Powder River Basin coal is more than offset by its low sulfur content, which usually averages less than one half percent, and the relatively low mining costs.

Before the enactment of clean air standards for sulfur dioxide, Powder River coals were generally bypassed in favor of higher quality bituminous coals that were generally higher in sulfur content and located closer to consumers. However, many of the low sulfur bituminous coal deposits have already been mined or must be mined by more expensive underground mining methods (U.S. Department of Energy 1986). The result is an increase in demand for Powder River Basin coal due to both its low sulfur content and low mining costs.

Coal Demand and Supply Relationships

Coal development began in the Powder River Basin in the 1960s, but it was not until the 1970s that significant interest in the Basin emerged. One major event that fueled this growth was the 1973 Arab oil embargo which fostered rapidly increasing petroleum prices and a renewed interest in the use of coal for new electric power generation facilities. As a result, much of the interest in new coal production was focused on western coal fields, especially the Powder River Basin which is known for its thick coal seams and low production costs.

This sparked new capital investment targeted for large scale mining operations in the Powder River Basin and coal production from the Powder River Basin grew at an accelerated rate during the 1970s and early 1980s.

Figure 1 illustrates the phenomenal growth occurring in the Basin between 1970 and 1986. The production from the Basin was slightly over seven million tons in 1970. Production had grown to over 162 million tons per year by 1987. This is an average increase of more than 128 percent per year for the 17-year period.

Private research firms and the U.S. Government projected large increases in domestic coal demand (mostly from utilities) during the 1980 to 1990 period. For example, demand for Powder River Basin coal was forecast to increase from ten million tons per year in 1970 to 180 million tons per year in 1985 (Boulder Exploration Group Incorporated 1983). However, these coal demand expectations did not fully materialize due to a soft demand for electricity.

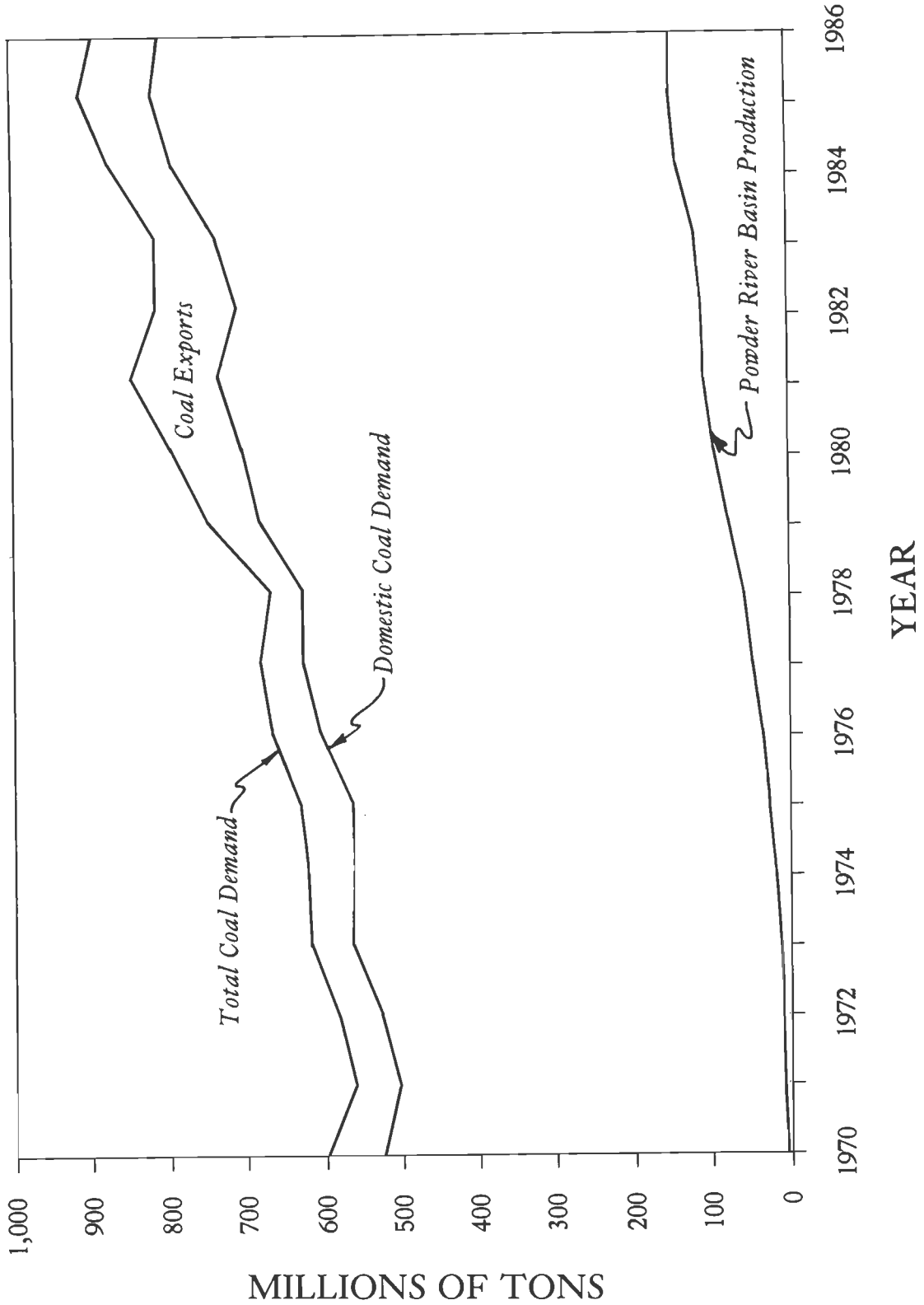
Data Resources Incorporated (1989) forecasts future Powder River Basin production. This forecast of production is based on the allocation of national coal demand to the Powder River Basin and represents projected future demand for Basin coal. Their recent demand projections for domestic and Powder River Basin coals are much less optimistic than earlier forecasts, but nonetheless they show a slow steady upward expansion in coal demand. For example, their projections indicate that coal demand from the Basin will increase from 173 million tons per year in 1989 to 226 million tons per year in 2005. This represents an average annual growth rate of 1.9 percent.

The Data Resources Incorporated forecast shows Powder River Basin coal demand growing faster than domestic demand, which is projected to grow at an average annual rate of 1.6 percent over the same period. As a result, the Basin's share of the coal market is expected to increase. For example, 19.4 percent of domestic coal consumption was produced from the Powder River Basin in 1987 as compared to a projected 21.1 percent market share in 2005.

There were 24 major operating coal mines in the Powder River Basin in 1987. Six of the mines are located in Montana and the remaining 18 mines are located in Wyoming. Of the 18 located in Wyoming most are in and around the Gillette area.

The Boulder Exploration Group Incorporated (1988) estimates the current capacity of these 24 operations at approximately 221 million tons per year and the full capacity rating is slightly over 294 million tons per year (Table 1). At the present time, only one of the Powder River Basin mines has capacity in excess of 20 million tons per year and six of the mines in the Basin are rated with a capacity of 15 million tons per year or more. However, at

FIGURE 1
UNITED STATES COAL DEMAND AND POWDER RIVER BASIN SUPPLY



SOURCE: U.S. Department of Energy, Energy Information Administration, 1988.
State of Wyoming, State Inspector of Mines, 1970 to 1987.
State of Montana, Department of Revenue and Corporate Tax, 1970 to 1987.

APPENDIX 11 — TABLE 1

POWDER RIVER BASIN MINE SUPPLY CAPABILITY

Mine Name	Mine Status	Mine Location	Current Capacity (1,000 Tons)	Full Capacity (1,000 Tons)	1986 Coal Production (1,000 Tons)	1987 Coal Production (1,000 Tons)	Current Capacity Less 1987 Production	Full Capacity Less 1987 Production
Absaloka	Operating	Montana	9,000	15,000	2,030	1,671	7,329	13,329
Big Sky	Operating	Montana	4,600	4,600	2,595	3,235	1,365	1,365
Colstrip	Operating	Montana	15,000	15,000	12,079	12,063	2,938	2,938
East Decker	Operating	Montana	10,000	8,000	5,400	4,516	5,484	3,484
Spring Creek	Operating	Montana	7,000	7,000	4,664	6,557	443	443
West Decker	Operating	Montana	10,000	8,000	6,760	5,653	4,347	2,347
Subtotal-Montana			55,600	57,600	33,529	33,695	21,905	23,905
Antelope	Operating	Wyoming	3,000	12,000	1,710	2,554	446	9,446
Belle Ayr	Operating	Wyoming	16,000	16,000	12,146	13,330	2,670	2,670
Big Horn	Operating	Wyoming	4,500	4,500	1,361	1,201	3,299	3,299
Black Thunder	Operating	Wyoming	24,000	25,000	21,868	19,273	4,727	5,727
Buckskin	Operating	Wyoming	4,500	8,000	3,996	5,738	(1,238)	2,262
Caballo	Operating	Wyoming	12,000	24,000	7,273	11,684	316	12,316
Caballo Rojo	Operating	Wyoming	7,500	15,000	3,990	6,490	1,010	8,510
Clovis Point	Idled	Wyoming	4,200	4,200	1,435	1,509	2,691	2,691
Coal Creek	Operating	Wyoming	6,000	12,000	1,111	2,362	3,638	9,638
Cordero	Operating	Wyoming	12,000	24,000	11,314	11,943	57	12,057
Dave Johnston	Operating	Wyoming	3,700	3,700	3,051	2,547	1,153	1,153
Eagle Butte	Operating	Wyoming	15,000	26,000	12,000	12,977	2,023	13,023
Fort Union	Operating	Wyoming	1,200	1,200	219	394	806	806
Jacobs Ranch	Operating	Wyoming	18,000	15,000	12,051	11,159	6,841	3,841
North Antelope	Operating	Wyoming	6,000	6,000	5,690	5,338	663	663
Rawhide	Operating	Wyoming	16,000	24,000	12,404	10,673	5,327	13,327
Rochelle	Operating	Wyoming	2,000	11,000	3,570	6,436	(4,436)	4,564
Wyodak	Operating	Wyoming	10,000	5,000	2,600	2,976	7,024	2,024
Subtotal-Wyoming			165,600	236,600	117,789	128,583	37,017	108,017
Total			221,200	294,200	151,318	162,278	58,922	131,922

Source: Boulder Exploration Group, Inc. (1988).

full capacity, there would be five mines with capacity in excess of 20 million tons per year and 10 mines with a capacity rating of 15 million tons per year or more.

Coal from the Powder River Basin was consumed by utilities in 19 states in 1987, including Montana and Wyoming (U.S. Department of Energy 1988b). The states receiving coal from the Powder River Basin ranged from the Pacific northwest to the upper Midwest and south to the states of Texas and Louisiana. Texas represented the largest consumer of Powder River coal at about 29.4 million tons annually. Oregon and Washington are the smallest consumers with a total combined annual consumption of about 450 thousand tons.

Approximately 159 million tons of coal out of the 162 million tons produced in the Powder River Basin in 1987 were delivered to utilities with a generating capacity of 50 megawatts or more. Total 1987 coal production from the Powder River Basin represents only 73 percent of current capacity and 55 percent of full productive capacity.

The projected growth in coal demand predicted in the late 1970s did not fully materialize; and as a result, the current productive capacity of the Basin far exceeds present demand. To illustrate this point, Data Resources Incorporated projects the production from the Powder River Basin is forecast to increase to 226 million tons per year by the year 2005 (Data Resources Incorporated 1989). Although this forecast indicates a substantial growth in Powder River Basin demand by the year 2005, the projections are only slightly above the current capacity estimate of 221 million tons per year. More importantly, the 2005 forecast demand for the Basin is less than 77 percent of full capacity for existing mines.

Coal Prices

The average price of bituminous coal and lignite sold in the United States was increasing on a nominal dollar basis up through 1982, and has steadily decreased since that time. However, on a real dollar basis (corrected for inflation), the average price of bituminous coal and lignite has declined since 1978. In comparison, the average price of coal sold from Campbell County, Wyoming and Big Horn County, Montana showed a steady increase in nominal terms through 1982 and 1984, respectively; but real coal prices started to decline in both Campbell and Big Horn counties after 1982.

The average price of coal sold from Powder River Basin mines located in Big Horn County, Montana and Campbell County, Wyoming peaked at $17.02 per ton in 1984. Since 1984, the average coal prices in Montana and Campbell County, Wyoming have shown a steady decline and were reported at $12.43

and $7.83 per ton, respectively, in 1987 (U.S. Department of Energy 1977-1987). It should be noted that these average coal prices represent a composite price of all coal sales including long-term contacts as well as short-term and spot coal sales.

Since the early to mid-1980s, the spot market price for coal has fallen far below the average price for all coal sales. For example, the current spot price reported in Coal Week (McGraw-Hill Incorporated 1989) for Montana and Wyoming coal is $5.06 per ton (9,300 BTUs per pound) and $4 per ton (8,500 BTUs per pound) respectively. In the recent past, spot coal prices for Wyoming Powder River Basin coal have been reported at or below $3 per ton.

Lower open market prices are a reflection of the current soft coal market in the Powder River Basin. This is due to the slower than expected growth in coal demand coupled with the huge excess in supply capacity of mines in the Basin. These lower spot coal sales prices have produced a downward pressure on coal prices for new contracts and the result is a declining average coal price for mines in the Basin.

To further exacerbate this problem, electric utilities have, within the legal confines of their existing contracts, reduced their coal acquisition costs by minimizing the deliveries of higher cost contract coal and making up the balance of their coal demand from lower cost open market coal purchases. In some instances, utilities have taken legal action to break or force renegotiation of older high cost fuel supply contracts.

The price of Powder River Basin coal is projected to remain low until the growth in demand absorbs some of the excess productive capacity in the Basin. Data Resources Incorporated projects marginal mine mouth prices for low sulfur Powder River Basin coal at $7.93 and $8.38 per ton (1988 dollars) in the years 2000 and 2005, respectively. As a comparison, the forecast price for the year 2005 is only $0.27 per ton higher than the real 1987 average price for coal in Campbell County, Wyoming (1988 dollars).

New Mine Development

The Bull Mountains coal tract must compete with existing coal mines and other undeveloped coal properties in the Powder River Basin in order to capture a share of the coal market. Some of the factors that influence the competitiveness of the Bull Mountains tract in comparison to existing mines and other undeveloped coal properties are: the minimum economic selling price of coal from the property (break even price), location of the coal property in relation to potential markets, and transportation access to the property and coal quality.

The minimum economic selling price for a proposed mining operation on the Bull Mountains property is important in determining the competitiveness of this proposed mining venture compared with other developed and undeveloped mining operations in the region. It should be noted that the minimum selling price for a new mining operation is generally higher compared to an existing mine because the coal sales price must cover all the capital and operating costs of the mine in addition to paying a sufficient rate of return on investment capital necessary to finance mine development. Therefore, most of the existing mines in the Basin which have been in operation for a number of years, have recovered all or a major portion of their up front investment costs. As a result, the existing mining operations can sell coal and make a profit at prices close to their cash costs of production.

Given the current excess productive capacity in the Basin, competition among existing producers for new coal sales opportunities is very keen. Therefore, new coal properties like the Bull Mountains tract will find it extremely difficult to compete with existing mines until some of the excess capacity in the Basin is absorbed. As discussed above, there is already sufficient capacity in the Basin to meet projected demand through the year 2000. This means that the existing mines have the potential to expand their individual production and provide the supply capacity to meet demand requirements well into the next century.

In general, it is more expensive to produce coal underground than it is to produce coal from surface mines. Therefore, even though comprehensive underground mining cost data are not readily available, it is safe to conclude that all other things being equal, an underground mine is less competitive than a surface mine. Furthermore, given the intense competition in the coal industry, the coal sale price provides an excellent indicator of production costs and more specifically a proxy for the minimum selling price requirement. For instance, in 1987 there were 5.6 million tons of underground coal produced in Colorado at a price of $28.16 per ton and 16.5 million tons produced in Utah at an average price of $25.70 per ton. Based on these prices for underground mined coal in Colorado and Utah, a $20 to $30 per ton minimum selling price for underground mined coal on the Bull Mountains property would seem reasonable. Existing underground coal prices in Colorado and Utah may reflect some older more lucrative contract prices, but these prices also represent a higher BTU product as compared to coal in the Bull Mountains area; so this range of prices provides a reasonable indicator of the expected minimum selling price for underground coal produced from the Bull Mountains property.

As stated earlier, the ability for a new mine to compete for new coal markets is a function of the delivered coal cost at a specific market which is directly linked to the minimum selling price at the mine and the transportation cost to market. For the Bull Mountains property, the closest coal markets would be in the northern tier states, upper midwestern states and possibly exports to far east nations should that market develop. However, there is more than 20 million tons of excess capacity already available in Montana Powder River Basin mines. In addition, there are other existing mines and undeveloped coal tracts in both Montana and Wyoming that could potentially outcompete the Bull Mountains property for new sales.

Summary and Conclusion

Future development of the Bull Mountains property is directly affected by the coal market conditions in the Powder River Basin. Coal market conditions in the Basin are currently very soft as a result of the oversupply capacity built during the rapid expansion that occurred in the late 1970s and early 1980s and slower than expected growth in coal demand.

Coal prices have declined since the peak of the early 1980s, and prices are expected to remain weak until some of the surplus supply capacity is absorbed. Given the forecast for future growth in demand, Powder River Basin coal supply and demand may not achieve an equilibrium balance until well into the next century. These factors coupled with the higher cost of underground mined coal could delay development of coal reserves in the Bull Mountains region by as much as 20 to 40 years in the future.

APPENDIX 12

METHODOLOGY FOR GRAVITY MODEL ALLOCATION

The number of expected non-local (in-migrating) workers for the two scenarios (0.5 million tons and 3.0 million tons) was estimated using local hire ratios supplied by the mining companies (Table 1). Non-local workers were then distributed to sub-areas or communities within the study area using a residential predication gravity model. Sub-areas used in the allocation process were the city of Billings, the municipality of Roundup, rural Roundup, the Bull Mountains area (part of the Klein census division), north rural Yellowstone County (part of North Yellowstone census division), the Shepherd census division, and the Huntley area.

The gravity model for the distribution scheme was of the form:

$$IW_i = \frac{X_i}{X} * TIW$$

where:

IW_i = Number of in-migrating workers settling in sub-area i

X_i = Attractiveness of sub-area

X = The sum of the attractiveness of the sub-areas

TIW = Total number of in-migrating workers required for each scenario

Variables used to develop estimates of the attractiveness (Xi) of each sub-area were the 1980 population of the sub-area (a proxy for the measure of services and size of potential labor force) and distance from the sub-area to the project site. The distance from each of the sub-areas to the regional trade center (Billings) was also used to define the attractiveness of each of the sub-areas. In summary, the attractiveness of each of the sub-areas can be stated as:

$$X_i = \frac{P_i}{D_{ij}^{b} \; D_{it}^{c}}$$

where:

X_i = Attractiveness of sub-area

P_i = Population of sub-area

D_{ij} = Distance between sub-area i and project j

D_{it} = Distance between sub-area i and trade center t

b = Distance elasticity which measures the responsiveness of non-local workers to distance from project

c = Distance elasticity which measures the responsiveness of non-local workers to distance from regional trade center

Estimates of the distance elasticity have been developed and published in various studies of operating and construction workers in power plant and coal mine developments in North Dakota, Wyoming, and Montana (Wieland, et al., 1977).

Three separate gravity models were utilized to develop distribution estimates for the aforementioned sub-areas. The results from these models were then averaged to develop one distribution scheme. The principal reason for averaging the model was that there was no apparent advantages or disadvantages in using one model or another. The three models used the following distance elasticities.

Model 1:	b = 1.079	
	c = 0.181	(Wieland, et al., 1977)
Model 2:	b = 1.098	
	c = 0	(Wieland, et al., 1977)
Model 3:	b = 0.849	
	c = 0	(Mountain West Research, Inc., no date)

Table 2 lists the results of the three gravity models applied to respective population and distance data. The population of each of the sub-areas is actual 1980 census data or estimated census data. The distance from each of the sub-areas to the project site was estimated using a road map.

Since the distribution for some sub-areas was minor (i.e., small number of in-migrants), the areas were accumulated into larger geographical areas; principally, rural Yellowstone County, rural Musselshell County, the municipality of Roundup, and the city of Billings (including Billings Heights). The final average distribution for these areas was Roundup (13 percent), Billings (74 percent), rural Yellowstone County (7 percent), and rural Musselshell County (6 percent). The distribution results imply that if 100 workers moved into the study area due to the project, one could reasonably expect that 74 workers would move to Billings, 13 workers would move to Roundup, six workers would reside in rural Musselshell County, and seven workers would live in rural Yellowstone County.

Several factors may influence where the workers decide to establish residence that are not necessarily addressed in the gravity model. One factor is the availability of housing. Ample housing is most likely available in Billings to accommodate the 74 percent distribution; however, the opposite may be true for rural Yellowstone and Musselshell counties. The gravity model also assumes that all roads to the project site are similar in construction and maintenance. This factor may be important when one community has an interstate highway connecting it to the project site and another community has a county road linking it with the project site. In the present setting, the road factor should not be a prevalent problem since most roads to the project site are similar in design and construction. Nevertheless, the results of gravity models should be used with some caution as they are the simple mathematical manipulation of indicators, not necessarily the forecast of actual occurrence.

APPENDIX 12 — TABLE 1

LOCAL HIRE RATIOS
(Quarterly)

Category	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
0.5 Million Tons Mine																						
Mine Construction	0.89	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mine Operations	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Loading Facility Construction	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Loading Facility Operations	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Transportation	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3.0 Million Tons Mine																						
Mine Construciton	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Mine Operations	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Loading Facility Construction	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Loading Facility Operations	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Transportation Construction	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Transportaiton Operations	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

Source: USDI (1989); Yellowstone Coal Company and Meridian Minerals Company development estimates.

APPENDIX 12 — TABLE 2

BULL MOUNTAINS STUDY AREA — GRAVITY MODEL ALLOCATION

Model/Sub-Area	Population	Average Distance to Trade Center	Average Distance to Project	Distribution
Model 1 (b=1.079, c=-.181)				
Rural Musselshell County	200	45	10	.02
Roundup Town	2,119	52	10	.19
Klein Division	400	35	5	.07
North Yellowstone	1,000	20	20	.03
Shepherd Division	2,556	8	35	.04
Huntley Project	1,000	11	40	.01
Billings (Including Heights)	75,278	1	45	.64
Model 2 (b=1.098, c=0)				
Rural Musselshell County	200	45	10	.01
Roundup Town	2,119	52	10	.11
Klein Division	400	35	5	.05
North Yellowstone	1,000	20	20	.02
Shepherd Division	2,556	8	35	.03
Huntley Project	1,000	11	40	.01
Billings (Including Heights)	75,278	1	45	.76
Model 3(b=0.849, c=0)				
Rural Musselshell County	200	45	10	.01
Roundup Town	2,119	52	10	.08
Klein Division	400	35	5	.03
North Yellowstone	1,000	20	20	.02
Shepherd Division	2,556	8	35	.03
Huntley Project	1,000	11	40	.01
Billings (Including Heights)	75,278	1	45	.81

Source: Economic Consultants Northwest (1989b).

APPENDIX 13

ASSUMPTIONS FOR LOCAL GOVERNMENT FINANCES

Gross Proceeds

Gross proceeds were estimated using the projected production figures presented in the text and a coal price of $15 per ton. Mill levies in 1987/88 were used to develop estimates of revenue for each local government (64.37 mills for Musselshell County and 61.79 for local school districts).

Mine and Employment

For the low scenario (0.5 million tons production) in Musselshell County, the market valuation for Class IV property (40-year life) was $500,000 in 1991 dollars. This was depreciated at a rate of 2.5 percent per year. The Class VIII property (20-year life) was valued at $500,000 and the Class IX property (10-year life) was valued at $1,000,000. Class X property (7-year life-trucks) was valued at $75,000 per truck/trailer combination. In addition, in Yellowstone County, the loading facility was valued at $250,000.

For the high scenario (3.0 million tons production), the market valuation for Class IV property was estimated to peak at $23.2 million in Musselshell County and $0.5 million in Yellowstone County. Class VIII property (mining equipment) was projected to peak at $23.2 million for Musselshell County (1995) and $9.5 million for Yellowstone County (1997). These valuations were apportioned to counties depending upon production. The Class X property (trucking) was allocated to Musselshell County and valued at $75,000 per truck/trailer combination. Trucking was assumed to commence in 1991 and end in 1993 when the railroad spur is finished. The railroad (Class XV property) was valued at $11.0 million, with $6.0 million apportioned to Musselshell County and $5.0 million apportioned to Yellowstone County. Valuation for the railroad was estimated at $70 per foot for a distance of 30 miles. Mill levy rates for 1987/88 were used to determine the amount of taxes to be paid in Musselshell and Yellowstone counties.

State of Montana Revenues

The coal revenue tax and the resource indemnity trust tax were estimated using $15 per ton coal. Diesel fuel taxes were estimated assuming the number of trips presented in the transportation section of the text, a $0.20 per gallon tax rate, and a 5-mile per gallon usage. Property taxes were estimated using the aforementioned taxable valuation figures and the 1987/88 mill levies for Musselshell and Yellowstone counties.

Federal Revenues

Individual payroll taxes were estimated using a tax rate of 9.2 percent and the projected payroll figures presented in the text. Diesel fuel taxes were estimated in the same manner as the state diesel fuel revenues, except a tax rate of $0.151 per gallon was used. The abandoned mine tax used was $0.15 per ton and the black lung tax rate was assumed to be 4.4 percent.

APPENDIX 14
IN-MIGRATION DISTRIBUTION BACKGROUND

APPENDIX 14 — TABLE 1

PROJECTED MIGRATION — ROUNDUP (0.5 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ROUNDUP CUMULATIVE MIGRATION																						
Construction Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Children — Total	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
K-8	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CUMULATIVE MIGRATION	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
ROUNDUP NET MIGRATION																						
Construction Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K-8	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 2

PROJECTED MIGRATION — BILLINGS (0.5 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
BILLINGS CUMULATIVE MIGRATION																						
Construction Workers	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Indirect Workers	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spouses	0	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
Children — Total	0	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5
K-8	0	1	1	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3
9-12	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not in School	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL CUMULATIVE MIGRATION	1	9	9	8	9	9	9	9	9	9	13	13	13	13	13	13	13	13	13	13	13	13
BILLINGS NET MIGRATION																						
Construction Workers	1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
K-8	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
9-12	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	1	8	0	-1	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 3

PROJECTED MIGRATION — RURAL MUSSELSHELL COUNTY (0.5 MILLION TONS MINE PRODUCTION SCENARIO) (Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
RURAL MUSSELSHELL COUNTY CUMULATIVE MIGRATION																						
Construction Worker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CUMULATIVE MIGRATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RURAL MUSSELSHELL COUNTY NET MIGRATION																						
Construction Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 4

PROJECTED MIGRATION — RURAL YELLOWSTONE COUNTY (0.5 MILLION TONS MINE PRODUCTION SCENARIO) (Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
RURAL YELLOWSTONE COUNTY CUMULATIVE MIGRATION																						
Construction Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CUMMLATIVE MIGRATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RURAL YELLOWSTONE COUNTY NET MIGRATION																						
Construction Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K-8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 5

PROJECTED MIGRATION — BULL MOUNTAINS STUDY AREA (0.5 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
TOTAL BULL MOUNTAINS STUDY AREA CUMULATIVE MIGRATION																						
Construction Workers	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	3	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5
Indirect Workers	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spouses	0	2	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Children — Total	0	3	4	4	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6	6	6
K-8	0	1	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4
9-12	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not in School	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL CUMULATIVE MIGRATION	1	9	12	11	12	12	12	12	12	12	16	16	16	16	16	16	16	16	16	16	16	16
TOTAL BULL MOUNTAINS STUDY AREA NET MIGRATION																						
Construction Workers	1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	3	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	2	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	3	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
K-8	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
9-12	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	1	8	3	-1	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 6

PROJECTED MIGRATION — ROUNDUP (3.0 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ROUNDUP CUMULATIVE MIGRATION																										
Construction Workers	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	1	4	4	4	4	4	4	4	4	6	6	9	9	7	7	7	7	7	7	7	7	7	7	7	7
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Spouses	0	1	3	3	3	3	3	3	3	3	5	5	7	7	6	6	6	6	6	6	6	6	6	6	6	6
Children — Total	0	1	5	5	5	5	5	5	5	5	7	7	11	11	9	9	9	9	9	9	9	9	9	9	9	9
K-8	0	1	3	3	3	3	3	3	3	3	4	4	6	6	4	4	4	4	4	4	4	4	4	4	4	4
9-12	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Not in School	0	0	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
TOTAL CUMULATIVE MIGRATION	0	3	12	12	12	12	12	12	12	12	18	19	28	28	23	23	23	23	23	23	23	23	23	23	23	23
ROUNDUP NET MIGRATION																										
Construction Workers	1	0	0	0	-1	0	0	0	0	0	1	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	1	3	0	0	0	0	0	0	0	2	0	3	0	-2	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	1	2	0	0	0	0	0	0	0	2	0	2	0	-1	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	1	4	0	0	0	0	0	0	0	2	0	4	0	-2	0	0	0	0	0	0	0	0	0	0	0
K-8	0	1	2	0	0	0	0	0	0	0	1	0	2	0	-2	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	0	3	9	0	0	0	0	0	0	0	6	1	9	0	-5	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 7

PROJECTED MIGRATION — BILLINGS (3.0 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
BILLINGS CUMULATIVE MIGRATION																										
Construction Workers	6	6	6	5	3	3	3	3	3	3	5	5	6	6	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	7	20	20	20	20	20	20	20	20	36	36	49	49	40	40	40	40	40	40	40	40	40	40	40	40
Indirect Workers	0	0	1	3	3	3	3	4	4	4	4	7	7	9	9	7	7	7	7	7	7	7	7	7	7	7
Spouses	3	9	19	20	18	18	18	19	19	19	34	36	46	47	37	36	36	36	36	36	36	36	36	36	36	36
Children — Total	3	12	29	29	28	28	28	29	29	29	50	51	69	70	56	55	55	55	55	55	55	55	55	55	55	55
K-8	1	6	13	13	13	13	13	13	13	13	22	23	32	32	25	26	26	26	26	26	26	26	26	26	26	26
9-12	1	2	6	6	5	5	5	6	6	6	10	10	13	13	11	10	10	10	10	10	10	10	10	10	10	10
Not in School	1	4	10	10	10	10	10	10	10	10	18	18	24	25	20	19	19	19	19	19	19	19	19	19	19	19
TOTAL CUMULATIVE MIGRATION	12	34	75	77	72	72	72	75	75	75	129	135	177	181	142	138	138	138	138	138	138	138	138	138	138	138
BILLINGS NET MIGRATION																										
Construction Workers	6	0	0	-1	-2	0	0	0	0	0	2	0	1	0	-6	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	7	13	0	0	0	0	0	0	0	16	0	13	0	-9	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	1	2	0	0	0	1	0	0	0	3	0	2	0	-2	0	0	0	0	0	0	0	0	0	0
Spouses	3	6	10	1	-2	0	0	1	0	0	15	2	10	1	-10	-1	0	0	0	0	0	0	0	0	0	0
Children — Total	3	9	17	0	-1	0	0	1	0	0	21	1	18	1	-14	-1	0	0	0	0	0	0	0	0	0	0
K-8	1	5	7	0	0	0	0	0	0	0	9	1	9	0	-7	1	0	0	0	0	0	0	0	0	0	0
9-12	1	1	4	0	-1	0	0	1	0	0	4	0	3	0	-2	-1	0	0	0	0	0	0	0	0	0	0
Not in School	1	3	6	0	0	0	0	0	0	0	8	0	6	1	-5	-1	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	12	22	41	2	-5	0	0	3	0	0	54	6	42	4	-39	-4	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 8

PROJECTED MIGRATION — RURAL MUSSELSHELL COUNTY (3.0 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
RURAL MUSSELSHELL COUNTY CUMULATIVE MIGRATION																										
Construction Worker	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	1	2	2	2	2	2	2	2	2	3	3	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	1	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2
Children — Total	0	1	2	2	2	2	2	2	2	2	3	3	5	5	3	3	3	3	3	3	3	3	3	3	3	3
K-8	0	1	2	2	2	2	2	2	2	2	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1
9-12	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not in School	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL CUMULATIVE MIGRATION	1	4	6	6	6	6	6	6	6	6	8	8	12	12	8	8	8	8	8	8	8	8	8	8	8	8
RURAL MUSSELSHELL COUNTY NET MIGRATION																										
Construction Workers	1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	1	1	0	0	0	0	0	0	0	1	0	1	0	-1	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	1	1	0	0	0	0	0	0	0	0	0	1	0	-1	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	1	1	0	0	0	0	0	0	0	1	0	2	0	-2	0	0	0	0	0	0	0	0	0	0	0
K-8	0	1	1	0	0	0	0	0	0	0	-1	0	2	0	-2	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	1	3	2	0	0	0	0	0	0	0	2	0	4	0	-4	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 9

PROJECTED MIGRATION — RURAL YELLOWSTONE COUNTY (3.0 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	33	4	1	2	3	4	1	2	3	4	1	2	3	4
RURAL YELLOWSTONE COUNTY CUMULATIVE MIGRATION																										
Construction Workers	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	1	2	2	2	2	2	2	2	2	3	3	5	5	4	4	4	4	4	4	4	4	4	4	4	4
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	1	2	2	2	2	2	2	2	2	2	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3
Children — Total	0	1	2	2	2	2	2	2	2	2	3	3	6	6	5	5	5	5	5	5	5	5	5	5	5	5
K-8	0	1	2	2	2	2	2	2	2	2	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9-12	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Not in School	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL CUMULATIVE MIGRATION	1	4	7	6	6	6	6	6	6	6	8	8	15	15	12	12	12	12	12	12	12	12	12	12	12	12
RURAL YELLOWSTONE COUNTY NET MIGRATION																										
Construction Workers	1	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	1	1	0	0	0	0	0	0	0	1	0	2	0	-1	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spouses	0	1	1	0	0	0	0	0	0	0	0	0	2	0	-1	0	0	0	0	0	0	0	0	0	0	0
Children — Total	0	1	1	0	0	0	0	0	0	0	1	0	3	0	-1	0	0	0	0	0	0	0	0	0	0	0
K-8	0	1	1	0	0	0	0	0	0	0	-1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
9-12	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in School	0	0	0	0	0	0	0	0	0	0	1	0	1	0	-1	0	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	1	3	3	-1	0	0	0	0	0	0	2	0	7	0	-3	0	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 14 — TABLE 10

PROJECTED MIGRATION — BULL MOUNTAINS STUDY AREA (3.0 MILLION TONS MINE PRODUCTION SCENARIO)
(Quarterly)

	1990		1991				1992				1993				1994				1995				1996			
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
TOTAL BULL MOUNTAINS STUDY AREA CUMULATIVE MIGRATION																										
Construction Workers	9	9	8	6	3	3	3	3	3	3	6	6	7	7	0	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	10	28	28	28	28	28	28	28	28	48	48	67	67	54	54	54	54	54	54	54	54	54	54	54	54
Indirect Workers	0	0	1	3	3	3	3	4	4	4	4	8	8	10	10	8	8	8	8	8	8	8	8	8	8	8
Spouses	3	12	26	27	25	25	25	26	26	26	43	45	60	61	48	47	47	47	47	47	47	47	47	47	47	47
Children — Total	3	15	38	38	37	37	37	38	38	38	63	64	91	92	73	72	72	72	72	72	72	72	72	72	72	72
K-8	1	9	20	20	20	20	20	20	20	20	28	29	44	44	33	34	34	34	34	34	34	34	34	34	34	34
9-12	1	2	7	7	6	6	6	7	7	7	13	13	17	17	15	14	14	14	14	14	14	14	14	14	14	14
Not in School	1	4	11	11	11	11	11	11	11	11	22	22	30	31	25	24	24	24	24	24	24	24	24	24	24	24
TOTAL CUMULATIVE MIGRATION	14	45	100	101	96	96	96	99	99	99	163	170	232	236	185	181	181	181	181	181	181	181	181	181	181	181
TOTAL BULL MOUNTAINS STUDY AREA NET MIGRATION																										
Construction Workers	9	0	-1	-2	-3	0	0	0	0	0	3	0	1	0	-7	0	0	0	0	0	0	0	0	0	0	0
Mine Workers	0	10	18	0	0	0	0	0	0	0	20	0	19	0	-13	0	0	0	0	0	0	0	0	0	0	0
Indirect Workers	0	0	1	2	0	0	0	1	0	0	0	4	0	2	0	-2	0	0	0	0	0	0	0	0	0	0
Spouses	3	9	14	1	-2	0	0	1	0	0	17	2	15	1	-13	-1	0	0	0	0	0	0	0	0	0	0
Children — Total	3	12	23	0	-1	0	0	1	0	0	25	1	27	1	-19	-1	0	0	0	0	0	0	0	0	0	0
K-8	1	8	11	0	0	0	0	0	0	0	8	1	15	0	-11	1	0	0	0	0	0	0	0	0	0	0
9-12	1	1	5	0	-1	0	0	1	0	0	6	0	4	0	-2	-1	0	0	0	0	0	0	0	0	0	0
Not in School	1	3	7	0	0	0	0	0	0	0	11	0	8	1	-6	-1	0	0	0	0	0	0	0	0	0	0
TOTAL NET MIGRATION	14	31	55	1	-5	0	0	3	0	0	64	7	62	4	-51	-4	0	0	0	0	0	0	0	0	0	0

Source: Economic Consultants Northwest (1989b).

APPENDIX 15

PAYMENT IN LIEU OF TAXES ACT

Explanation of Act

The following excerpt provides a brief description of the Federal payments in lieu of taxes (PILT) Act (U.S. Department of the Interior, Bureau of Land Management, State Office, Billings, Montana, October 1988).

This paper briefly discusses the Payments in Lieu of Taxes Act of 1976, as amended. It describes eligibility for "in-lieu" payments, gives examples of how the payments are computed, and summarizes "entitlement" acres.

The Act authorizes the Secretary of the Interior to make two types of annual payments to eligible units of local government. The Secretary has delegated the responsibility for administering the Act to the Bureau of Land Management.

In October 1976, Congress passed Public Law 94-565, commonly referred to as the "Payments in Lieu of Taxes Act". This Act provides for payments to local units of government containing certain Federally-owned lands. These payments are designed to supplement other Federal land receipt sharing payments local governments may be receiving. Payments received under the Act may be used by the recipients for any governmental purpose. The Act was repealed in September, 1982 and recodified at Chapter 69, 31 U.S.C.

On July 30, 1983, the PILT Act (31 U.S.C.) was amended by P.L. 98-63 which refined the definition of "unit of general local government" and added a new section (31 U.S.C. 6907) that authorized State governments to enact legislation to reallocate PILT payments in whole or in part to other smaller units of general purpose government. The amendment further provides that where States enact such legislation, the PILT funds would be paid to State governments for redistribution to the appropriate unit of general local government. The State of Wisconsin is presently the only State to enact legislation (Wisconsin Act 470) under section 6907.

Section 6902 "Entitlement Land" Payments

Section 6902 authorizes payments to local units of government (generally counties, or the equivalent) under one of two alternatives, based on the number of acres of "entitlement lands" within the county. "Entitlement lands" consist of lands in the National Forest System and the National Park System, lands administered by the Bureau of Land Management, and lands dedicated to the use of Federal water resource development projects. Also included are dredge disposal areas under the jurisdiction of the Army Corps of Engineers, National Wildlife Reserve Areas withdrawn from the public domain, inactive and semi-active Army installations used for non-industrial purposes, and certain lands donated to the United States Government by State and local governments. The Act specifically prohibits payments for tax exempt lands (but not donated lands) acquired from State and local governments.

The amount to be paid to each unit of local government is the higher of:

A. Seventy-five cents for each acre of "entitlement land" within the boundaries of the unit of government, reduced by the amount of certain Federal land payments that were received by the unit of government in the preceding fiscal year.[1]

-OR-

B. Ten cents for each acre of "entitlement land" within the unit of government. Here, no deductions are made for the Federal land payments received by the unit of government in the preceding fiscal year.

Entitlement land payments to each unit of general local government are subject to population payment limitations or ceilings. Payment ceilings are based on a sliding scale, starting at $50 per capita (for population under 5,000) and rising to a maximum of $1,000,000. Under Alternative A, if the total calculated payment (75 cents x entitlement acres) exceeds the ceiling, deduction for other Federal land payments received are made from the ceiling, not from the 75 cents per acre figure.

The following examples show how the section 1 payment is computed.

Example 1 — Payment Alternative A Greater than B:

Population limitations (19,000 x $28)	$532.000
A. 88,442 acres x 75 cents per acre	66,332
Deduction for prior years payments	-36,435
Payment to county — Alternative A	$29,897
B. 88,442 acres x 10 cents per acre	$8,844
No deduction under this alternative	-0
Payment to county — Alternative B	$8,844

In this case, $29,897 would be the payment to the county. If the population limitation had been $50,000, the payment calculated under Alternative A would be $13,565 ($50,000 - $36,435).

Example 2 — Payment Alternative B greater than A:

Population limitations (12,000 x $33)	$396,000
A. 81,391 acres x 75 cents per acre	61,043
Deduction for prior year payments	-62,792
Payment to county — Alternative A	$0
B. 81,391 acres x 10 cents per acre	$8,139
No deduction under this alternative	-0
Payment to county — Alternative B	$8,139

In this case, $8,139 would be the payment to the county.

Example 3 — ceiling in effect — payment limited to population ceiling:

Population limitations ($3,000 x $50)	$150,000
A. 1,700,000 acres x 75 cents per acre	$1,275,000
Population ceiling limit	150,000
Deduction for prior year payments	-$750,000
Payment to county — Alternative A	$0
B. 1,700,000 acres x 10 cents per acre	$170,000
No deduction under this alternative	-0
Payment to county — Alternative B	$170,000
Payment to county — allowed by ceiling	$150,000

In the case of this county with high Federal land ownership and a small population, the ceiling is applied to both alternatives with that ceiling amount being paid to the county under Alternative B.

PILT Payments in Priority Counties

Table 1 lists the entitlement acreage, population, payment ceiling, and the estimated PILT payment for priority counties in FY 1988. As indicated in Table 1, most priority counties involved in the proposed land exchange are well below their limit or ceiling in PILT payments.

APPENDIX 15 — TABLE 1

PILT PAYMENT TO PRIORITY COUNTIES

County	Entitlement Acreage	Population	Payment Ceiling	Estimated PILT Payment	Percent of Ceiling
Anaconda/ Deer Lodge	183,993	11,000	$374,000	$123,978	33
Beaverhead	2,049,394	9,000	342,000	226,353	66
Carbon	560,714	9,000	342,000	322,913	94
Custer	339,857	13,000	416,000	241,057	58
Madison	1,055,943	6,000	282,000	217,956	77

Source: USDI (1988c).

APPENDIX 16
HYPOTHETICAL FEDERAL ROYALTY CALCULATIONS
1991 and 2020

APPENDIX 16 — TABLE 1

BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION
0.5 MILLION TONS PER YEAR SCENARIO, YEAR 1991 STARTUP

Project Year	Calendar Year	Price	Federal Production	Total Revenue	Royalty Payments	Discounted Royalty Payments
1	1990		0	$0	$0	$0
2	1991	$15	0	$0	$0	$0
3	1992	$15	84,000	$1,260,000	$84,504	$69,838
4	1993	$15	126,000	$1,890,000	$126,756	$95,234
5	1994	$15	168,000	$2,520,000	$169,008	$115,435
6	1995	$15	210,000	$3,150,000	$211,260	$131,176
7	1996	$15	210,000	$3,150,000	$211,260	$119,251
8	1997	$15	210,000	$3,150,000	$211,260	$108,410
9	1998	$15	210,000	$3,150,000	$211,260	$98,554
10	1999	$15	210,000	$3,150,000	$211,260	$89,595
11	2000	$15	210,000	$3,150,000	$211,260	$81,450
12	2001	$15	210,000	$3,150,000	$211,260	$74,045
13	2002	$15	210,000	$3,150,000	$211,260	$67,314
14	2003	$15	210,000	$3,150,000	$211,260	$61,194
15	2004	$15	210,000	$3,150,000	$211,260	$55,631
16	2005	$15	210,000	$3,150,000	$211,260	$50,574
17	2006	$15	210,000	$3,150,000	$211,260	$45,976
18	2007	$15	210,000	$3,150,000	$211,260	$41,797
19	2008	$15	210,000	$3,150,000	$211,260	$37,997
20	2009	$15	210,000	$3,150,000	$211,260	$34,543
21	2010	$15	210,000	$3,150,000	$211,260	$31,402
22	2011	$15	210,000	$3,150,000	$211,260	$28,548
23	2012	$15	210,000	$3,150,000	$211,260	$25,952
24	2013	$15	210,000	$3,150,000	$211,260	$23,593
25	2014	$15	210,000	$3,150,000	$211,260	$21,448
26	2015	$15	210,000	$3,150,000	$211,260	$19,498
27	2016	$15	210,000	$3,150,000	$211,260	$17,726
28	2017	$15	210,000	$3,150,000	$211,260	$16,114
29	2018	$15	210,000	$3,150,000	$211,260	$14,649
30	2019	$15	210,000	$3,150,000	$211,260	$13,318
31	2020	$15	210,000	$3,150,000	$211,260	$12,107
32	2021	$15	210,000	$3,150,000	$211,260	$11,006
33	2022	$15	210,000	$3,150,000	$211,260	$10,006
34	2023	$15	210,000	$3,150,000	$211,260	$9,096
35	2024	$15	210,000	$3,150,000	$211,260	$8,269
36	2025	$15	210,000	$3,150,000	$211,260	$7,517
37	2026	$15	210,000	$3,150,000	$211,260	$6,834
38	2027	$15	210,000	$3,150,000	$211,260	$6,213
39	2028	$15	210,000	$3,150,000	$211,260	$5,648
40	2029	$15	210,000	$3,150,000	$211,260	$5,135
41	2030	$15	210,000	$3,150,000	$211,260	$4,668
Total			7,938,000	$119,070,000	$7,985,628	$1,676,763

APPENDIX 16 — TABLE 2

BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION
3.0 MILLION TONS PER YEAR SCENARIO, YEAR 1991 STARTUP

Project Year	Calendar Year	Price	Federal Production	Total Revenue	Royalty Payments	Discounted Royalty Payments
1	1990		0	$0	$0	$0
2	1991	$15	200,000	$3,000,000	$201,200	$182,909
3	1992	$15	400,000	$6,000,000	$402,400	$332,562
4	1993	$15	500,000	$7,500,000	$503,000	$377,911
5	1994	$15	500,000	$7,500,000	$503,000	$343,556
6	1995	$15	1,000,000	$15,000,000	$1,006,800	$624,647
7	1996	$15	1,200,000	$18,000,000	$1,207,200	$681,433
8	1997	$15	1,200,000	$18,000,000	$1,207,200	$619,484
9	1998	$15	1,200,000	$18,000,000	$1,207,200	$563,168
10	1999	$15	1,200,000	$18,000,000	$1,207,200	$511,971
11	2000	$15	1,200,000	$18,000,000	$1,207,200	$465,428
12	2001	$15	1,620,000	$24,300,000	$1,629,720	$571,207
13	2002	$15	1,620,000	$24,300,000	$1,629,720	$519,279
14	2003	$15	1,620,000	$24,300,000	$1,629,720	$472,072
15	2004	$15	1,620,000	$24,300,000	$1,629,720	$429,156
16	2005	$15	1,620,000	$24,300,000	$1,629,720	$390,142
17	2006	$15	980,000	$14,700,000	$985,880	$214,556
18	2007	$15	980,000	$14,700,000	$985,880	$195,051
19	2008	$15	980,000	$14,700,000	$985,880	$177,319
20	2009	$15	980,000	$14,700,000	$985,880	$161,199
21	2010	$15	980,000	$14,700,000	$985,880	$146,545
22	2011	$15	740,000	$11,100,000	$744,440	$100,597
23	2012	$15	740,000	$11,100,000	$744,440	$91,451
24	2013	$15	740,000	$11,100,000	$744,440	$83,138
25	2014	$15	740,000	$11,100,000	$744,440	$75,580
26	2015	$15	740,000	$11,100,000	$744,440	$68,709
27	2016	$15	2,040,000	$30,600,000	$2,052,240	$172,194
28	2017	$15	2,040,000	$30,600,000	$2,052,240	$156,540
29	2018	$15	2,040,000	$30,600,000	$2,052,240	$142,309
30	2019	$15	2,040,000	$30,600,000	$2,052,240	$129,372
31	2020	$15	2,040,000	$30,600,000	$2,052,240	$117,611
32	2021	$15	2,000,000	$30,000,000	$2,012,000	$104,823
33	2022	$15	2,000,000	$30,000,000	$2,012,000	$95,293
34	2023	$15	2,000,000	$30,000,000	$2,012,000	$86,630
35	2024	$15	2,000,000	$30,000,000	$2,012,000	$78,755
36	2025	$15	2,000,000	$30,000,000	$2,012,000	$71,595
Total			45,500,000	$682,500,000	$45,773,000	$9,554,192

• not fully developed as alternative becomes available not secure economically

PROPOSED BULL MOUNTAINS EXCHANGE
FEDERAL ROYALTY CALCULATION FOR MONTANA,
YEAR 1991 STARTUP

Royalty Calculation		Parameters	
FOB Mine Price/Ton	15.000	Royalty Rate	0.080
—Black Lung	0.632	Contract Sale Price	11.713
—Federal Rec.	0.150	Severance Rate	0.040
—Resource Indemnity	0.053	Mill Levy	0.214
—Gross Proceeds	1.128		
—Severance Tax	0.469		
Royalty Price	12.569		
X Royalty Rate	8.00%		
Federal Royalty/Ton	1.006		

The following assumptions were utilized in this analysis:

1. Coal production from the mining operations would begin in the year 1991 and follow the scenarios provided by the Montana State Office.
2. The discount rate is 10 percent.
3. The base year for discounting is 1990.
4. The coal selling price is $15 per ton FOB mine.
5. Federal royalties are calculated using the regulations issued January 13, 1989, (*Federal Register*, Vol. 54, No. 9). These regulations allow deductions for Black Lung Tax, Federal Reclamation Fee, Montana Severance Tax, Montana Gross Proceeds Tax, and Montana Resource Indemnity Trust Tax. This results in an undiscounted royalty of $1.006 per ton.
6. The Severance Tax rate was assumed to be 4 percent and the county mill levy was set at 214.0 which is the rounded average of the current mill levy rates for Musselshell (160.735) and Yellowstone (267.530) Counties.

APPENDIX 16 — TABLE 3

BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION
0.5 MILLION TONS PER YEAR SCENARIO, YEAR 2020 STARTUP

Project Year	Calendar Year	Price	Federal Production	Total Revenue	Royalty Payments	Discounted Royalty Payments
1	2020	$25	0	$0	$0	$0
2	2021	$25	84,000	$2,100,000	$141,456	$7,370
3	2022	$25	126,000	$3,150,000	$212,184	$10,050
4	2023	$25	168,000	$4,200,000	$282,912	$12,181
5	2024	$25	210,000	$5,250,000	$353,640	$13,842
6	2025	$25	210,000	$5,250,000	$353,640	$12,584
7	2026	$25	210,000	$5,250,000	$353,640	$11,440
8	2027	$25	210,000	$5,250,000	$353,640	$10,400
9	2028	$25	210,000	$5,250,000	$353,640	$9,455
10	2029	$25	210,000	$5,250,000	$353,640	$8,595
11	2030	$25	210,000	$5,250,000	$353,640	$7,814
12	2031	$25	210,000	$5,250,000	$353,640	$7,103
13	2032	$25	210,000	$5,250,000	$353,640	$6,458
14	2033	$25	210,000	$5,250,000	$353,640	$5,871
15	2034	$25	210,000	$5,250,000	$353,640	$5,337
16	2035	$25	210,000	$5,250,000	$353,640	$4,852
17	2036	$25	210,000	$5,250,000	$353,640	$4,411
18	2037	$25	210,000	$5,250,000	$353,640	$4,010
19	2038	$25	210,000	$5,250,000	$353,640	$3,645
20	2039	$25	210,000	$5,250,000	$353,640	$3,314
21	2040	$25	210,000	$5,250,000	$353,640	$3,013
22	2041	$25	210,000	$5,250,000	$353,640	$2,739
23	2042	$25	210,000	$5,250,000	$353,640	$2,490
24	2043	$25	210,000	$5,250,000	$353,640	$2,263
25	2044	$25	210,000	$5,250,000	$353,640	$2,058
26	2045	$25	210,000	$5,250,000	$353,640	$1,871
27	2046	$25	210,000	$5,250,000	$353,640	$1,700
28	2047	$25	210,000	$5,250,000	$353,640	$1,546
29	2048	$25	210,000	$5,250,000	$353,640	$1,405
30	2049	$25	210,000	$5,250,000	$353,640	$1,278
31	2050	$25	210,000	$5,250,000	$353,640	$1,161
32	2051	$25	210,000	$5,250,000	$353,640	$1,056
33	2052	$25	210,000	$5,250,000	$353,640	$960
34	2053	$25	210,000	$5,250,000	$353,640	$873
35	2054	$25	210,000	$5,250,000	$353,640	$793
36	2055	$25	210,000	$5,250,000	$353,640	$721
37	2056	$25	210,000	$5,250,000	$353,640	$656
38	2057	$25	210,000	$5,250,000	$353,640	$596
39	2058	$25	210,000	$5,250,000	$353,640	$542
40	2059	$25	210,000	$5,250,000	$353,640	$493
Total			7,938,000	$198,450,000	$13,367,592	$176,941

APPENDIX 16 — TABLE 4

BULL MOUNTAINS HYPOTHETICAL FEDERAL ROYALTY CALCULATION
3.0 MILLION TONS PER YEAR SCENARIO, YEAR 2020 STARTUP

Project Year	Calendar Year	Price	Federal Production	Total Revenue	Royalty Payments	Discounted Royalty Payments
1	2020	$25	200,000	$5,000,000	$336,800	$19,302
2	2021	$25	400,000	$10,000,000	$673,600	$35,094
3	2022	$25	500,000	$12,500,000	$842,000	$39,879
4	2023	$25	500,000	$12,500,000	$842,000	$36,254
5	2024	$25	1,000,000	$25,000,000	$1,684,000	$65,916
6	2025	$25	1,200,000	$30,000,000	$2,020,800	$71,908
7	2026	$25	1,200,000	$30,000,000	$2,020,800	$65,371
8	2027	$25	1,200,000	$30,000,000	$2,020,800	$59,428
9	2028	$25	1,200,000	$30,000,000	$2,020,800	$54,026
10	2029	$25	1,200,000	$30,000,000	$2,020,800	$49,114
11	2030	$25	1,620,000	$40,500,000	$2,728,080	$60,277
12	2031	$25	1,620,000	$40,500,000	$2,728,080	$54,797
13	2032	$25	1,620,000	$40,500,000	$2,728,080	$49,815
14	2033	$25	1,620,000	$40,500,000	$2,728,080	$45,287
15	2034	$25	1,620,000	$40,500,000	$2,728,080	$41,170
16	2035	$25	980,000	$24,500,000	$1,650,320	$22,641
17	2036	$25	980,000	$24,500,000	$1,650,320	$20,583
18	2037	$25	980,000	$24,500,000	$1,650,320	$18,712
19	2038	$25	980,000	$24,500,000	$1,650,320	$17,011
20	2039	$25	980,000	$24,500,000	$1,650,320	$15,464
21	2040	$25	740,000	$18,500,000	$1,246,160	$10,615
22	2041	$25	740,000	$18,500,000	$1,246,160	$9,650
23	2042	$25	740,000	$18,500,000	$1,246,160	$8,773
24	2043	$25	740,000	$18,500,000	$1,246,160	$7,976
25	2044	$25	740,000	$18,500,000	$1,246,160	$7,251
26	2045	$25	2,040,000	$51,000,000	$3,435,360	$18,171
27	2046	$25	2,040,000	$51,000,000	$3,435,360	$16,519
28	2047	$25	2,040,000	$51,000,000	$3,435,360	$15,017
29	2048	$25	2,040,000	$51,000,000	$3,435,360	$13,652
30	2049	$25	2,040,000	$51,000,000	$3,435,360	$12,411
31	2050	$25	2,000,000	$50,000,000	$3,368,000	$11,061
32	2051	$25	2,000,000	$50,000,000	$3,368,000	$10,056
33	2052	$25	2,000,000	$50,000,000	$3,368,000	$9,142
34	2053	$25	2,000,000	$50,000,000	$3,368,000	$8,311
35	2054	$25	2,000,000	$50,000,000	$3,368,000	$7,555
Total			45,500,000	$1,137,500,000	$76,622,000	$1,008,208

PROPOSED BULL MOUNTAINS EXCHANGE
FEDERAL ROYALTY CALCULATION FOR MONTANA,
YEAR 2020 STARTUP

Royalty Calculation		Parameters	
FOB Mine Price/Ton	25.000	Royalty Rate	0.080
—Black Lung	1.054	Contract Sale Price	19.515
—Federal Rec.	0.150	Severance Rate	0.040
—Resource Indemnity	0.088	Mill Levy	0.214
—Gross Proceeds	1.879		
—Severance Tax	0.781		
Royalty Price	21.049		
X Royalty Rate	8.00%		
Federal Royalty/Ton	1.684		

The following assumptions were utilized in this analysis:

1. Coal production from the mining operations would begin in the year 2021 and follow the scenarios provided by the Montana State Office.
2. The discount rate is 10 percent.
3. The base year for discounting is 1990.
4. The coal selling price is $25 per ton FOB mine.
5. Federal royalties are calculated using the regulations issued January 13, 1989, (*Federal Register*, Vol. 54, No. 9). These regulations allow deductions for Black Lung Tax, Federal Reclamation Fee, Montana Severance Tax, Montana Gross Proceeds Tax, and Montana Resource Indemnity Trust Tax. This results in an undiscounted royalty of $1.684 per ton.
6. The Severance Tax rate was assumed to be 4 percent and the county mill levy was set at 214.0 which is the rounded average of the current mill levy rates for Musselshell (160.735) and Yellowstone (267.530) Counties.

APPENDIX 17

FISCAL COMPARISON OF ALTERNATIVE A AND ALTERNATIVE C

APPENDIX 17 - TABLE 1

HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE A, 0.5 MILLION TON PER YEAR SCENARIO
(Thousands of dollars)

Project	Calendar	REVENUES					COSTS					NET FISCAL IMPACT				
Year	Year	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total
1	1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1991	153	136	92	222	603	0	0	2	0	2	153	136	90	222	601
3	1992	236	239	151	222	848	49	192	2	0	243	187	47	149	222	605
4	1993	334	349	209	222	1114	70	213	2	0	285	264	136	207	222	829
5	1994	429	457	268	222	1376	92	235	2	0	329	337	222	266	222	1047
6	1995	515	561	359	222	1657	113	256	2	0	371	402	305	357	222	1286
7	1996	515	554	487	222	1778	113	256	2	0	371	402	298	485	222	1407
8	1997	515	553	485	222	1775	113	256	2	0	371	402	297	483	222	1404
9	1998	515	583	562	222	1882	113	256	2	0	371	402	327	560	222	1511
10	1999	515	589	578	222	1904	113	256	2	0	371	402	333	576	222	1533
11	2000	515	596	597	222	1930	113	256	2	0	371	402	340	595	222	1559
12	2001	515	592	587	222	1916	113	256	2	0	371	402	336	585	222	1545
13	2002	515	588	578	222	1903	113	256	2	0	371	402	332	576	222	1532
14	2003	515	585	570	222	1892	113	256	2	0	371	402	329	568	222	1521
15	2004	515	582	560	222	1879	113	256	2	0	371	402	326	558	222	1508
16	2005	515	609	632	222	1978	113	2206	2	0	2321	402	-1597	630	222	-343
17	2006	515	613	643	222	1993	113	256	2	0	371	402	357	641	222	1622
18	2007	515	617	653	222	2007	113	256	2	0	371	402	361	651	222	1636
19	2008	515	615	657	222	2009	113	256	2	0	371	402	359	655	222	1638
20	2009	515	609	632	222	1978	113	256	2	0	371	402	353	630	222	1607
21	2010	515	604	618	222	1959	113	256	2	0	371	402	348	616	222	1588
22	2011	515	629	686	222	2052	113	256	2	0	371	402	373	684	222	1681
23	2012	515	632	692	222	2061	113	256	2	0	371	402	376	690	222	1690
24	2013	515	634	699	222	2070	113	256	2	0	371	402	378	697	222	1699
25	2014	515	630	689	222	2056	113	256	2	0	371	402	374	687	222	1685
26	2015	515	623	670	222	2030	113	256	2	0	371	402	367	668	222	1659
27	2016	515	617	653	222	2007	113	256	2	0	371	402	361	651	222	1636
28	2017	515	641	717	222	2095	113	256	2	0	371	402	385	715	222	1724
29	2018	515	642	720	222	2099	113	256	2	0	371	402	386	718	222	1728
30	2019	515	644	725	222	2106	113	256	2	0	371	402	388	723	222	1735
31	2020	515	639	712	222	2088	113	256	2	0	371	402	383	710	222	1717
32	2021	515	631	691	222	2059	113	256	2	0	371	402	375	689	222	1688
33	2022	515	624	673	222	2034	113	256	2	0	371	402	368	671	222	1663
34	2023	515	648	736	222	2121	113	256	2	0	371	402	392	734	222	1750
35	2024	515	647	737	222	2121	113	256	2	0	371	402	391	735	222	1750
36	2025	515	650	741	222	2128	113	256	2	0	371	402	394	739	222	1757
37	2026	515	644	726	222	2107	113	256	2	0	371	402	388	724	222	1736
38	2027	515	636	705	222	2078	113	256	2	0	371	402	380	703	222	1707
39	2028	515	628	685	222	2050	113	256	2	0	371	402	372	683	222	1679
40	2029	515	652	747	222	2136	113	256	2	0	371	402	396	745	222	1765
41	2030	515	652	747	222	2136	113	256	2	0	371	402	396	745	222	1765
	TOTAL	19692	23374	24069	8880	76015	4279	11806	80	0	16165	15413	11568	23989	8880	59850
	PRESENT VALUE	3893	4376	3959	1974	14200	821	2398	18	0	3237	3072	1978	3941	1974	10964

Note: Negative figures in project year 16 are attributed to costs of major highway reconstruction.

The following assumptions were used in the analysis:

1. Coal production from the mining operations begin in the year 1991.
2. The discount rate is 10 percent.
3. The base year for discounting is 1990.
4. The coal selling price is $15 FOB mine.
5. Federal revenues = payroll, diesel fuel, abandoned mine land and black lung taxes (Table 4.18), and the Taylor Grazing fees.
   State revenues = severance, RIT, payroll, diesel fuel, and property taxes (Table 4.18) and the Taylor Grazing fees.
   Local revenues = gross proceeds, and mine/equipment/RR taxes (Table 4.17), and PILT.
   Recreation = net economic value (willingness to pay).
6. Federal costs = forgone federal royalties (50%) (App. 16) and PILT.
   State costs = forgone federal coal royalties (50%) (App. 16), highway maintenance and reconstruction costs.
   Local costs = forgone property taxes.
   Recreation = none.

APPENDIX 17 - TABLE 2

HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE C, 0.5 MILLION TON PER YEAR SCENARIO
(Thousands of dollars)

Project	Calendar	REVENUES					COSTS					NET FISCAL IMPACT				
Year	Year	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total
1	2020	0	0	0	0	0	0	0	0	222	222	0	0	0	-222	-222
2	2021	266	263	124	0	653	0	150	0	222	372	266	113	124	-222	281
3	2022	428	467	220	0	1115	0	150	0	222	372	428	317	220	-222	743
4	2023	605	677	317	0	1599	0	150	0	222	372	605	527	317	-222	1227
5	2024	780	886	415	0	2081	0	150	0	222	372	780	736	415	-222	1709
6	2025	910	1053	566	0	2529	0	150	0	222	372	910	903	566	-222	2157
7	2026	910	1043	781	0	2734	0	150	0	222	372	910	893	781	-222	2362
8	2027	910	1043	778	0	2731	0	150	0	222	372	910	893	778	-222	2359
9	2028	910	1072	855	0	2837	0	150	0	222	372	910	922	855	-222	2465
10	2029	910	1078	872	0	2860	0	150	0	222	372	910	928	872	-222	2488
11	2030	910	1085	891	0	2886	0	150	0	222	372	910	935	891	-222	2514
12	2031	910	1081	881	0	2872	0	150	0	222	372	910	931	881	-222	2500
13	2032	910	1078	871	0	2859	0	150	0	222	372	910	928	871	-222	2487
14	2033	910	1074	863	0	2847	0	150	0	222	372	910	924	863	-222	2475
15	2034	910	1071	853	0	2834	0	2100	0	222	2322	910	-1029	853	-222	512
16	2035	910	1099	926	0	2935	0	150	0	222	372	910	949	926	-222	2563
17	2036	910	1102	936	0	2948	0	150	0	222	372	910	952	936	-222	2576
18	2037	910	1107	947	0	2964	0	150	0	222	372	910	957	947	-222	2592
19	2038	910	1104	940	0	2954	0	150	0	222	372	910	954	940	-222	2582
20	2039	910	1098	926	0	2934	0	150	0	222	372	910	948	926	-222	2562
21	2040	910	1093	912	0	2915	0	150	0	222	372	910	943	912	-222	2543
22	2041	910	1119	979	0	3008	0	150	0	222	372	910	969	979	-222	2636
23	2042	910	1121	985	0	3016	0	150	0	222	372	910	971	985	-222	2644
24	2043	910	1124	992	0	3026	0	150	0	222	372	910	974	992	-222	2654
25	2044	910	1120	982	0	3012	0	150	0	222	372	910	970	982	-222	2640
26	2045	910	1113	963	0	2986	0	150	0	222	372	910	963	963	-222	2614
27	2046	910	1106	947	0	2963	0	150	0	222	372	910	956	947	-222	2591
28	2047	910	1131	1010	0	3051	0	150	0	222	372	910	981	1010	-222	2679
29	2048	910	1132	1013	0	3055	0	150	0	222	372	910	982	1013	-222	2683
30	2049	910	1134	1018	0	3062	0	150	0	222	372	910	984	1018	-222	2690
31	2050	910	1129	1005	0	3044	0	150	0	222	372	910	979	1005	-222	2672
32	2051	910	1121	985	0	3016	0	150	0	222	372	910	971	985	-222	2644
33	2052	910	1114	967	0	2991	0	150	0	222	372	910	964	967	-222	2619
34	2053	910	1138	1029	0	3077	0	150	0	222	372	910	988	1029	-222	2705
35	2054	910	1138	1031	0	3079	0	150	0	222	372	910	988	1031	-222	2707
36	2055	910	1139	1034	0	3083	0	150	0	222	372	910	989	1034	-222	2711
37	2056	910	1134	1020	0	3064	0	150	0	222	372	910	984	1020	-222	2692
38	2057	910	1125	999	0	3034	0	150	0	222	372	910	975	999	-222	2662
39	2058	910	1118	978	0	3006	0	150	0	222	372	910	968	978	-222	2634
40	2059	910	1141	1040	0	3091	0	150	0	222	372	910	991	1040	-222	2719
TOTAL		33929	40971	33851	0	108751	0	7800	0	8880	16680	33929	33171	33851	-8880	92071
PRESENT VALUE		395	462	338	0	1195	0	103	0	124	227	395	359	338	-124	968

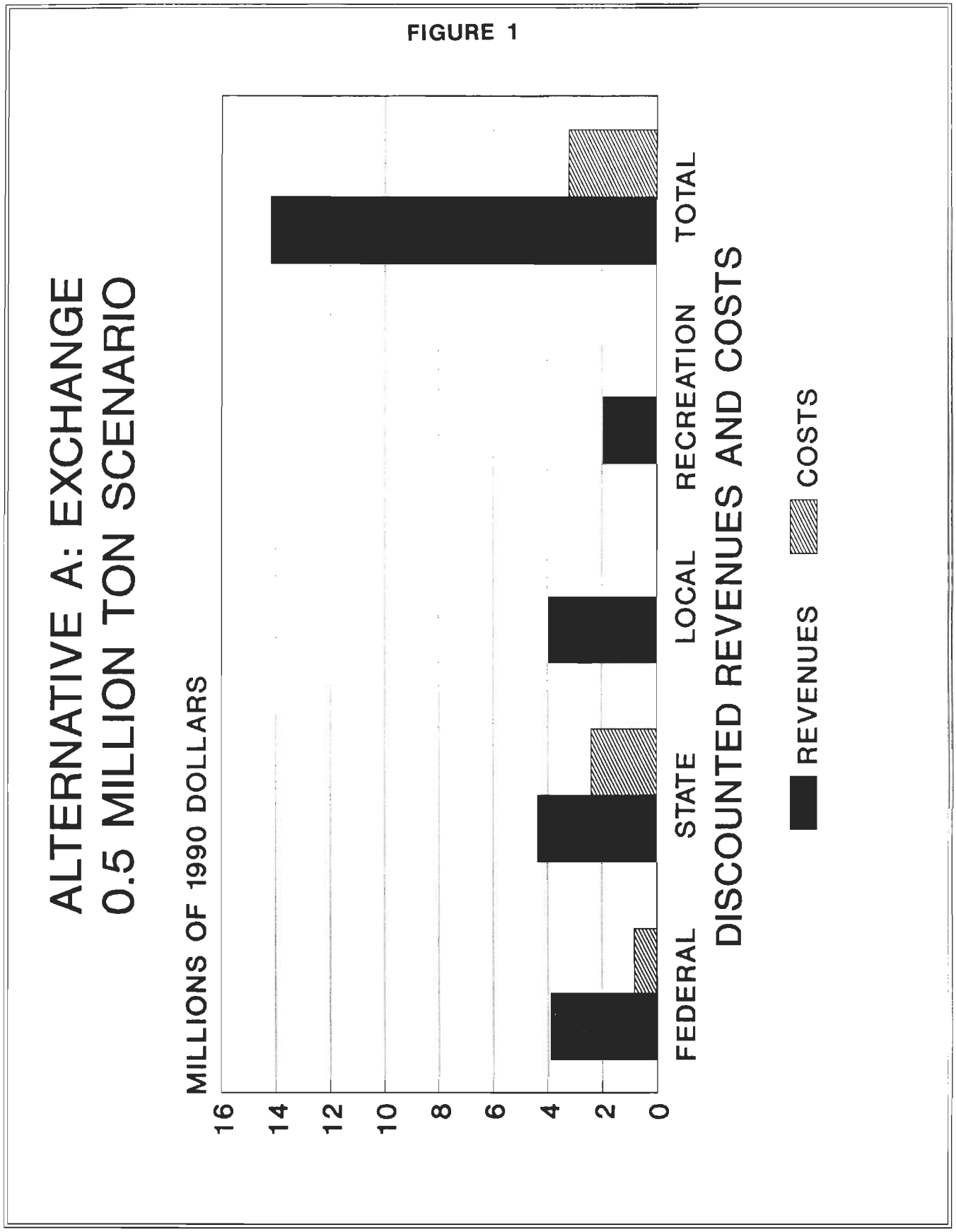
Note: Negative figures in project year 15 are attributed to costs of major highway construction.

The following assumptions were used in the analysis:

1. Coal production from the mining operations begin in the year 2020.
2. The discount rate is 10 percent.
3. The base year for discounting is 1990.
4. The coal selling price is $25 FOB mine.
5. Federal revenues = payroll, diesel fuel, abandoned mine land and black lung taxes (Table 4.18), and one-half the federal coal royalties (App. 16).
   State revenues = severance, RIT, payroll, diesel fuel, and property taxes (Table 4.18) and one-half the federal coal royalties (App. 16).
   Local revenues = gross proceeds, and mine/equipment/RR taxes (Table 4.17).
   Recreation = none.
6. Federal costs = none.
   State costs = highway maintenance and reconstruction costs.
   Local costs = none.

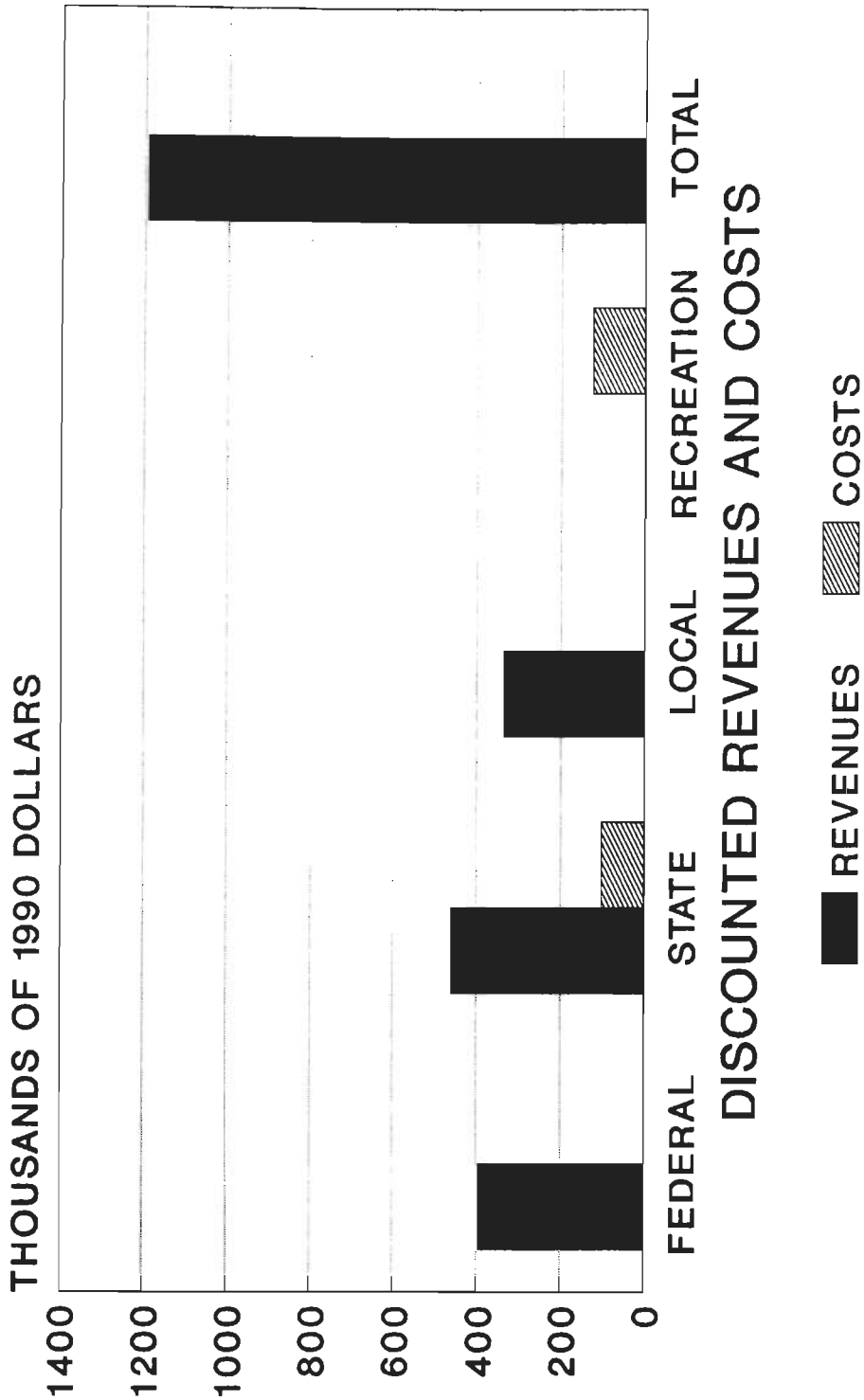
Recreation costs = net economic value (willingness to pay).

FIGURE 1



Source: Appendix 17.

FIGURE 2



Source: Appendix 17.

APPENDIX 17 — TABLE 3

BULL MOUNTAINS EXCHANGE/LEASE COMPARISON
(Thousands of dollars)

ALTERNATIVE A
(Exchange federal coal for recreational property, 0.5 mmt/y mine, $15/ton, start date-1991)

	ACTUAL VALUES			*DISCOUNTED		
	Total Revenues	Total Costs	Total Net	Total Revenues	Total Costs	Total Net
Federal	19692	4279	15413	3893	821	3072
State	23374	11806	11568	4376	2398	1978
Local	24069	80	23989	3959	18	3941
Recreation	8880	0	8880	1974	0	1974
Totals	76015	16165	59850	14202	3237	10965

ALTERNATIVE C
(Lease federal coal without exchange for recreational property, 0.5mmt/y mine, $25/ton, start date-2020)

	ACTUAL VALUES			*DISCOUNTED		
	Total Revenues	Total Costs	Total Net	Total Revenues	Total Costs	Total Net
Federal	33929	0	33929	395	0	395
State	40971	7800	33171	462	103	359
Local	33851	0	33851	338	0	338
Recreation	0	8880	-8880	0	124	-124
Totals	108751	16680	92071	1195	227	968

*Values discounted to 1990.

APPENDIX 17 - TABLE 4

HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE A, 3 MILLION TON PER YEAR SCENARIO
(Thousands of dollars)

Project	Calendar	REVENUES					COSTS					NET FISCAL IMPACT				
Year	Year	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total
1	1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1991	690	733	505	222	2150	108	251	2	0	361	582	482	503	222	1789
3	1992	1097	1269	955	222	3543	208	351	2	0	561	889	918	953	222	2982
4	1993	2298	2730	2044	222	7294	259	402	2	0	663	2039	2328	2042	222	6631
5	1994	2932	3573	2663	222	9390	259	252	2	0	513	2673	3321	2661	222	8877
6	1995	2926	3534	2664	222	9346	511	504	2	0	1017	2415	3030	2662	222	8329
7	1996	2926	3501	2642	222	9291	611	604	2	0	1217	2315	2897	2640	222	8074
8	1997	2926	3465	2791	222	9404	611	604	2	0	1217	2315	2861	2789	222	8187
9	1998	2926	3505	2871	222	9524	611	604	2	0	1217	2315	2901	2869	222	8307
10	1999	2926	3526	2916	222	9590	611	604	2	0	1217	2315	2922	2914	222	8373
11	2000	2926	3655	3176	222	9979	611	604	2	0	1217	2315	3051	3174	222	8762
12	2001	2926	3627	3370	222	10145	822	815	2	0	1639	2104	2812	3368	222	8506
13	2002	2926	3621	3353	222	10122	822	815	2	0	1639	2104	2806	3351	222	8483
14	2003	2926	3584	3277	222	10009	822	815	2	0	1639	2104	2769	3275	222	8370
15	2004	2926	3560	3226	222	9934	822	815	2	0	1639	2104	2745	3224	222	8295
16	2005	2926	3579	3268	222	9995	822	815	2	0	1639	2104	2764	3266	222	8356
17	2006	2926	3553	3754	222	10455	500	493	2	0	995	2426	3060	3752	222	9460
18	2007	2926	3666	3836	222	10650	500	493	2	0	995	2426	3173	3834	222	9655
19	2008	2926	3656	3715	222	10519	500	493	2	0	995	2426	3163	3713	222	9524
20	2009	2926	3617	3622	222	10387	500	493	2	0	995	2426	3124	3620	222	9392
21	2010	2926	3599	3660	222	10407	500	493	2	0	995	2426	3106	3658	222	9412
22	2011	2926	3573	3926	222	10647	379	372	2	0	753	2547	3201	3924	222	9894
23	2012	2926	3577	3938	222	10663	379	372	2	0	753	2547	3205	3936	222	9910
24	2013	2926	3586	3965	222	10699	379	372	2	0	753	2547	3214	3963	222	9946
25	2014	2926	3689	4235	222	11072	379	372	2	0	753	2547	3317	4233	222	10319
26	2015	2926	3674	4196	222	11018	379	372	2	0	753	2547	3302	4194	222	10265
27	2016	2926	3630	4085	222	10863	1033	1026	2	0	2061	1893	2604	4083	222	8802
28	2017	2926	3612	4039	222	10799	1033	1026	2	0	2061	1893	2586	4037	222	8738
29	2018	2926	3592	3988	222	10728	1033	1026	2	0	2061	1893	2566	3986	222	8667
30	2019	2926	3593	3992	222	10733	1033	1026	2	0	2061	1893	2567	3990	222	8672
31	2020	2926	3600	4006	222	10754	1033	1026	2	0	2061	1893	2574	4004	222	8693
32	2021	2926	3740	2808	222	9696	1013	1006	2	0	2021	1913	2734	2806	222	7675
33	2022	2926	3723	2778	222	9649	1013	1006	2	0	2021	1913	2717	2776	222	7628
34	2023	2926	3677	2701	222	9526	1013	1006	2	0	2021	1913	2671	2699	222	7505
35	2024	2926	3657	2667	222	9472	1013	1006	2	0	2021	1913	2651	2665	222	7451
36	2025	2926	3636	2631	222	9415	1013	1006	2	0	2021	1913	2630	2629	222	7394
	Total	97723	120112	112263	7770	337868	23135	23340	70	0	46545	74588	96772	112193	7770	291323
	Present Value	22006	26668	23152	1946	73773	4407	4684	18	0	9108	17600	21984	23134	1946	64664

The following assumptions were used in the analysis:

1. Coal production from the mining operations begin in the year 1991.
2. The discount rate is 10 percent.
3. The base year for discounting is 1990.
4. The coal selling price is $15.00 FOB mine.
5. Federal revenues = payroll, diesel fuel, abandoned mine land and black lung taxes (Table 4.36), and the Taylor Grazing fees.
   State revenues = severance, RIT, payroll, diesel fuel, and property taxes (Table 4.36) the Taylor Grazing fees.
   Local revenues = gross proceeds, and mine/equipment/RR taxes (Table 4.35), and PILT.
   Recreation = net economic value (willingness to pay).
6. Federal costs = forgone federal royalties (50%) (App. 16), and PILT.
   State costs = forgone federal coal royalties (50%) (App. 16), highway maintenance costs for the first 3 years.
   Local costs = forgone property taxes.
   Recreation = none.

APPENDIX 17 - TABLE 5

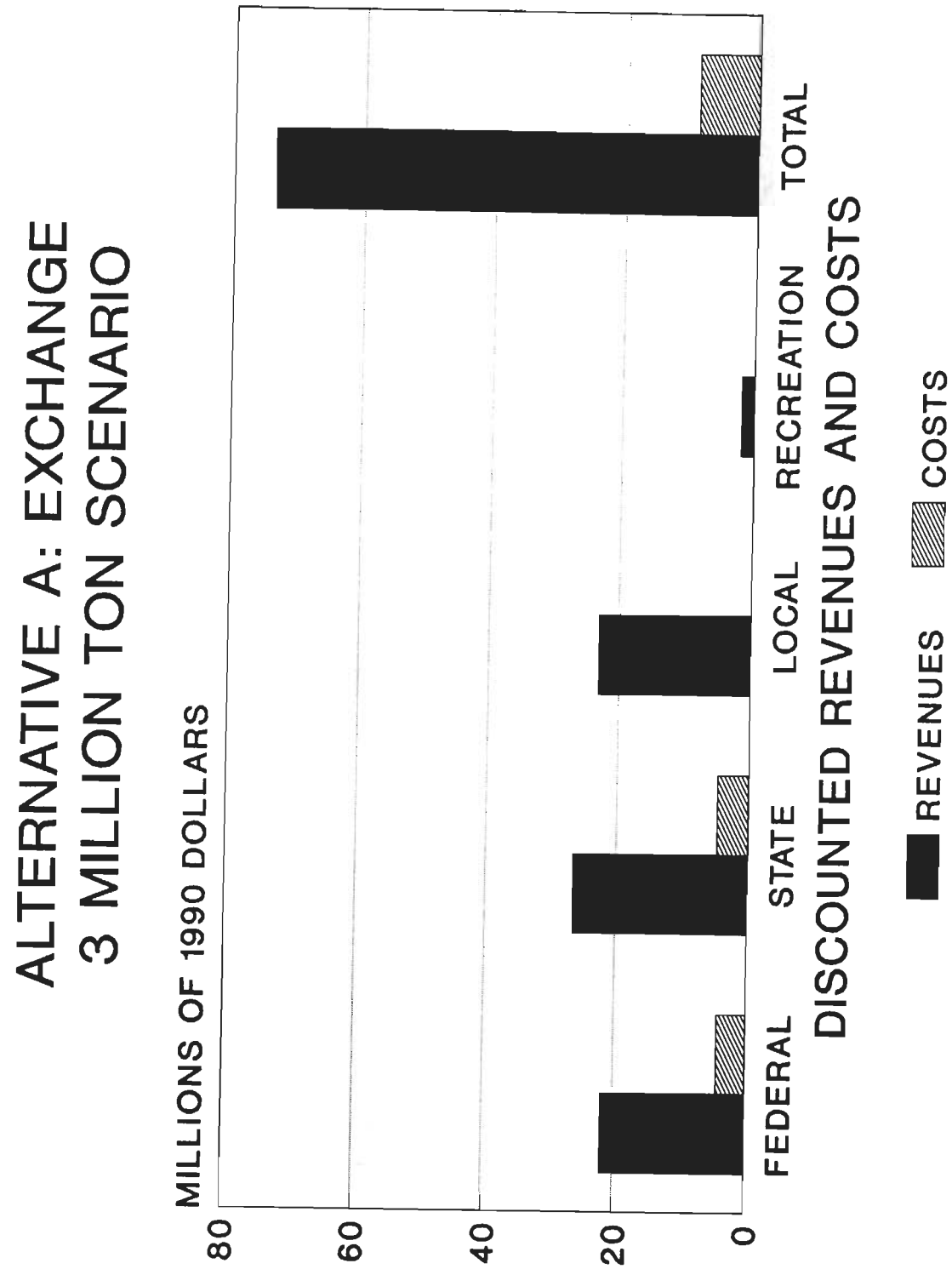
HYPOTHETICAL FISCAL IMPACT ANALYSIS: ALTERNATIVE C, 3 MILLION TON PER YEAR SCENARIO
(Thousands of dollars)

Project Year	Calendar Year	REVENUES					COSTS					NET FISCAL IMPACT				
		Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total	Federal	State	Local	Recreation	Total
1	2020	1088	1240	715	0	3043	0	150	0	222	372	1088	1090	715	-222	2671
2	2021	1871	2252	1401	0	5524	0	150	0	222	372	1871	2102	1401	-222	5152
3	2022	3641	4512	2907	0	11060	0	150	0	222	372	3641	4362	2907	-222	10688
4	2023	4671	5941	3872	0	14484	0	0	0	222	222	4671	5941	3872	-222	14262
5	2024	5086	6321	3908	0	15315	0	0	0	222	222	5086	6321	3908	-222	15093
6	2025	5255	6456	3906	0	15617	0	0	0	222	222	5255	6456	3906	-222	15395
7	2026	5255	6415	4166	0	15836	0	0	0	222	222	5255	6415	4166	-222	15614
8	2027	5255	6455	4216	0	15926	0	0	0	222	222	5255	6455	4216	-222	15704
9	2028	5255	6477	4293	0	16025	0	0	0	222	222	5255	6477	4293	-222	15803
10	2029	5255	6604	4549	0	16408	0	0	0	222	222	5255	6604	4549	-222	16186
11	2030	5608	6926	4858	0	17392	0	0	0	222	222	5608	6926	4858	-222	17170
12	2031	5608	6918	4842	0	17368	0	0	0	222	222	5608	6918	4842	-222	17146
13	2032	5608	6883	4767	0	17258	0	0	0	222	222	5608	6883	4767	-222	17036
14	2033	5608	6859	4714	0	17181	0	0	0	222	222	5608	6859	4714	-222	16959
15	2034	5608	6878	4758	0	17244	0	0	0	222	222	5608	6878	4758	-222	17022
16	2035	5070	6303	5498	0	16871	0	0	0	222	222	5070	6303	5498	-222	16649
17	2036	5070	6419	5490	0	16979	0	0	0	222	222	5070	6419	5490	-222	16757
18	2037	5070	6411	5026	0	16507	0	0	0	222	222	5070	6411	5026	-222	16285
19	2038	5070	6371	5235	0	16676	0	0	0	222	222	5070	6371	5235	-222	16454
20	2039	5070	6353	5307	0	16730	0	0	0	222	222	5070	6353	5307	-222	16508
21	2040	4867	6118	5722	0	16707	0	0	0	222	222	4867	6118	5722	-222	16485
22	2041	4867	6122	5734	0	16723	0	0	0	222	222	4867	6122	5734	-222	16501
23	2042	4867	6131	5760	0	16758	0	0	0	222	222	4867	6131	5760	-222	16536
24	2043	4867	6235	6032	0	17134	0	0	0	222	222	4867	6235	6032	-222	16912
25	2044	4867	6219	5993	0	17079	0	0	0	222	222	4867	6219	5993	-222	16857
26	2045	5962	7270	5881	0	19113	0	0	0	222	222	5962	7270	5881	-222	18891
27	2046	5962	7252	5835	0	19049	0	0	0	222	222	5962	7252	5835	-222	18827
28	2047	5962	7231	5785	0	18978	0	0	0	222	222	5962	7231	5785	-222	18756
29	2048	5962	7233	5788	0	18983	0	0	0	222	222	5962	7233	5788	-222	18761
30	2049	5962	7240	5809	0	19011	0	0	0	222	222	5962	7240	5809	-222	18789
31	2050	5928	7373	3952	0	17253	0	0	0	222	222	5928	7373	3952	-222	17031
32	2051	5928	7356	3923	0	17207	0	0	0	222	222	5928	7356	3923	-222	16985
33	2052	5928	7310	3846	0	17084	0	0	0	222	222	5928	7310	3846	-222	16862
34	2053	5928	7291	3812	0	17031	0	0	0	222	222	5928	7291	3812	-222	16809
35	2054	5928	7269	3776	0	16973	0	0	0	222	222	5928	7269	3776	-222	16751
Total		179807	222644	162076	0	564527	0	450	0	7770	8220	179807	222194	162076	-7770	556307
Present Value		2458	3040	2117	0	7616	0	21	0	123	144	2458	3019	2117	-123	7472

The following assumptions were used in the analysis:

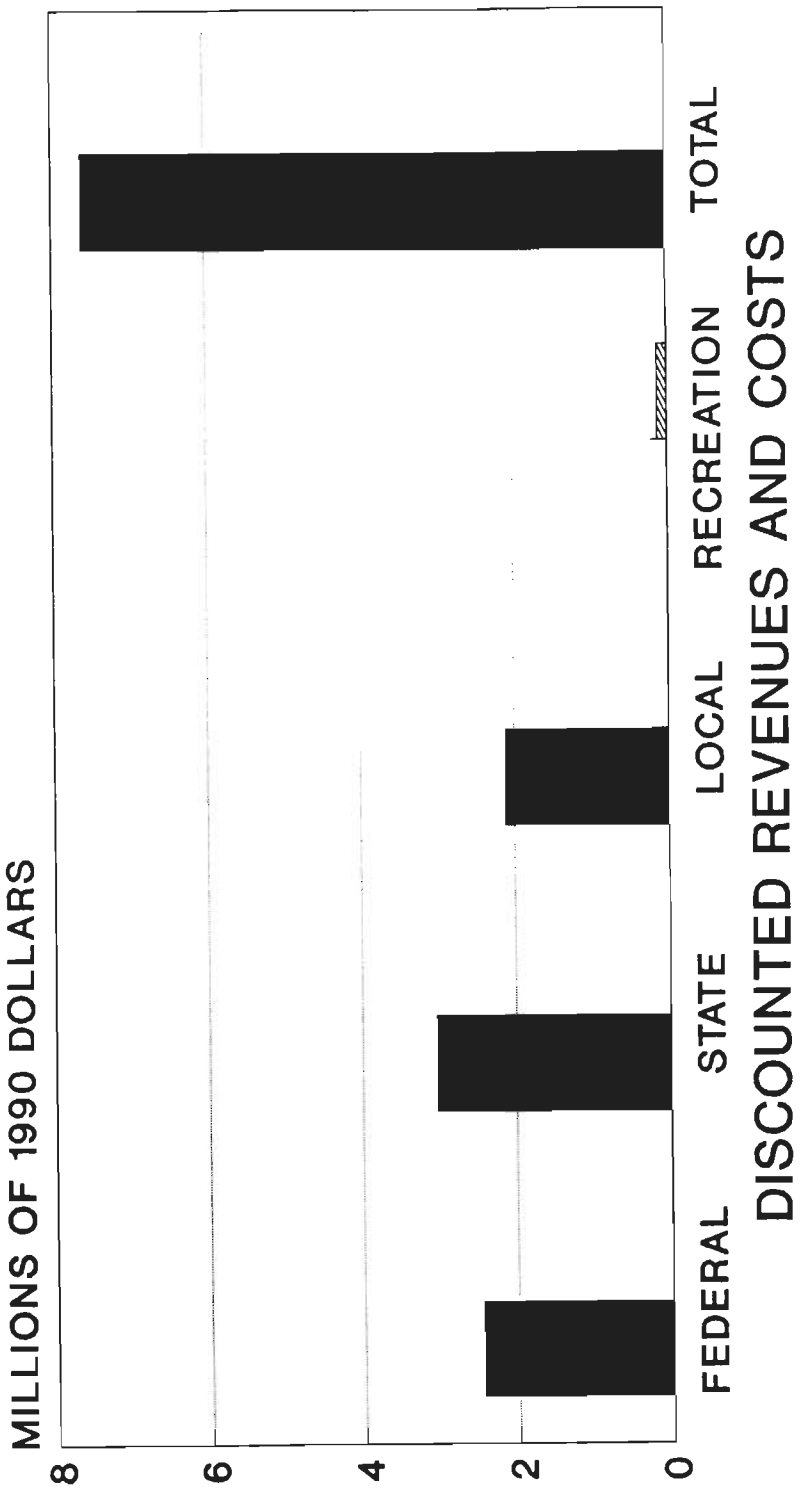
1. Coal production from the mining operations begin in the year 2020.
2. The discount rate is 10 percent.
3. The base year for discounting is 1990.
4. The coal selling price is $25 FOB mine.
5. Federal revenues = payroll, diesel fuel, abandoned mine land and black lung taxes (Table 4.34), and one-half of the federal coal royalties (App. 16).).
   State revenues = severance, RIT, payroll, diesel fuel, and property taxes (Table 4.34), and one-half the federal coal royalties (App. 16).
   Local revenues = gross proceeds, and mine/equipment/RR taxes (Table 4.33).
   Recreation = none.
6. Federal costs = none.
   State costs = highway maintenance costs for the first 3 years.
   Local costs = none.
   Recreation costs = net economic value (willingness to pay).

FIGURE 3



Source: Appendix 17.

FIGURE 4



Source: Appendix 17.

APPENDIX 17 - TABLE 6

BULL MOUNTAINS EXCHANGE/LEASE COMPARISON
($000)

ALTERNATIVE A
(Exchange federal coal for recreational property, 3 mmt/y mine, $15/ton, start date-1991)

	ACTUAL VALUES			*DISCOUNTED		
	Total Revenues	Total Costs	Total Net	Total Revenues	Total Costs	Total Net
Federal	97723	23135	74588	22006	4407	17600
State	120112	23340	96772	26668	4684	21984
Local	112263	70	112193	23152	18	23134
Recreation	7770	0	7770	1946	0	1946
Totals	337868	46545	291323	73772	9109	64664

ALTERNATIVE C
(Lease federal coal without exchange for recreational property, 3 mmt/y mine, $25/ton, start date-2020)

	ACTUAL VALUES			*DISCOUNTED		
	Total Revenues	Total Costs	Total Net	Total Revenues	Total Costs	Total Net
Federal	179807	0	179807	2458	0	2458
State	222644	450	222194	3040	21	3019
Local	162076	0	162076	2117	0	2117
Recreation	0	7770	-7770	0	123	-123
Totals	564527	8220	556307	7615	144	7471

*Values discounted to 1990.

APPENDIX 18
LISTINGS OF WILDLIFE SPECIES

APPENDIX 18 — TABLE 1

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Aquatic	
Tiger salamander	*Ambystoma tigrinum*
Amphibians	
Boreal chorus frog	*Pseudacris triseriata*
Great plains toad	*Bufo cognatus*
Northern leopard frog	*Rana pipiens*
Plains spadefoot	*Scaphiopus bombifrons*
Woodhouse's toad	*Bufo woodhousii*
Birds	
American avocet	*Recurvirostra americana*
American bittern	*Botaurus lentiginosus*
American black duck	*Anas rubripes*
American coot	*Fulica americana*
American crow	*Corvus brachyrhynchos*
American dipper	*Cinclus mexicanus*
American goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
American white pelican	*Pelecanus erythrorhynchos*
American wigeon	*Anas americana*
American woodcock	*Scolopax minor*
Anna's hummingbird	*Calypte anna*
Baird's sandpiper	*Calidris bairdii*
Bald eagle	*Haliaeetus leucocephalus*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Barrow's goldeneye	*Bucephala islandica*
Bay-breasted warbler	*Dendroica castanea*
Belted kingfisher	*Ceryle alcyon*
Black tern	*Chlidonias niger*
Black-and-white warbler	*Mniotilta varia*
Black-bellied plover	*Pluvialis squatarola*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Black-billed magpie	*Pica pica*
Black-capped chickadee	*Parus atricapillus*
Black-crowned night-heron	*Nycticorax nycticorax*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-necked stilt	*Himantopus mexicanus*
Black-throated blue warbler	*Dendroica caerulescens*
Black-throated gray warbler	*Dendroica nigrescens*
Blackburnian warbler	*Dendroica fusca*
Blackpoll warbler	*Dendroica striata*
Blue grosbeak	*Guiraca caerulea*
Blue grouse	*Dendragapus obscurus*
Blue jay	*Cyanocitta cristata*
Blue-winged teal	*Anas discors*
Bobolink	*Dolichonyx oryzivorus*
Bohemian waxwing	*Bombycilla garrulus*
Bonaparte's gull	*Larus philadelphia*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Broad-winged hawk	*Buteo platypterus*
Brown creeper	*Certhia americana*
Brown thrasher	*Toxostoma rufum*

APPENDIX 18 — TABLE 1 (continued)

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Brown-headed cowbird	*Molothurs ater*
Buff-breasted sandpiper	*Tryngites subruficollis*
Bufflehead	*Bucephala albeola*
Burrowing owl	*Athene cunicularia*
California gull	*Larus californicus*
Calliope hummingbird	*Stellula calliope*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Canyon wren	*Catherpes mexicanus*
Caspian tern	*Sterna caspia*
Cassin's finch	*Carpodacus cassinii*
Cassin's kingbird	*Tyrannus vociferans*
Cattle egret	*Bubulcus ibis*
Cedar waxwing	*Bombycilla cedrorum*
Chestnut-collared longspur	*Calcarius ornatus*
Chestnut-sided warbler	*Dendroica pensylvanica*
Chimney swift	*Chaetura pelagica*
Chipping sparrow	*Spizella passerina*
Chukar	*Alectoris chukar*
Cinnamon teal	*Anas cyanoptera*
Clark's nutcracker	*Nucifraga columbiana*
Clay-colored sparrow	*Spizella pallida*
Cliff swallow	*Hirundo pyrrhonota*
Common barn-owl	*Tyto alba*
Common goldeneye	*Bucephala clangula*
Common grackle	*Quiscalus quiscula*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phalaenoptilus nuttallii*
Common raven	*Corvus corax*
Common redpoll	*Carduelis flammea*
Common snipe	*Gallinago gallinago*
Common tern	*Sterna hirundo*
Common yellowthroat	*Geothlypis trichas*
Connecticut warbler	*Oporornis agilis*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Dickcissel	*Spiza americana*
Double-crested cormorant	*Phalacrocorax auritus*
Downy woodpecker	*Picoides pubescens*
Dunlin	*Calidris alpina*
Dusky flycatcher	*Empidonax oberholseri*
Eared grebe	*Podiceps nigricollis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern phoebe	*Sayornis phoebe*
Eastern screech-owl	*Otus asio*
European starling	*Sturnus vulgaris*
Evening grosbeak	*Coccothraustes vespertinus*
Ferruginous hawk	*Buteo regalis*
Field sparrow	*Spizella pusilla*
Forster's tern	*Sterna forsteri*
Fox sparrow	*Passerella iliaca*
Franklin's gull	*Larus pipixcan*
Gadwall	*Anas strepera*
Golden eagle	*Aquila chrysaetos*
Golden-crowned kinglet	*Regulus satrapa*
Grasshopper sparrow	*Ammodramus savannarum*
Gray catbird	*Dumetella carolinensis*
Gray jay	*Perisoreus canadensis*
Gray partridge	*Perdix perdix*

APPENDIX 18 — TABLE 1 (continued)

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Great horned owl	*Bubo virginianus*
Greater scaup	*Aythya marila*
Greater white-fronted goose	*Anser albifrons*
Greater yellowlegs	*Tringa melanoleuca*
Green-tailed towhee	*Pipilo chlorurus*
Green-winged teal	*Anas crecca*
Gyrfalcon	*Falco rusticolus*
Hairy woodpecker	*Picoides villosus*
Hammond's flycatcher	*Empidonax hammondii*
Harris' sparrow	*Zonotrichia querula*
Hermit thrush	*Catharus guttatus*
Herring gull	*Larus argentatus*
Hoary redpoll	*Carduelis hornemanni*
Hooded merganser	*Lophodytes cucullatus*
Horned grebe	*Podiceps auritus*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Hudsonian godwit	*Limosa haemastica*
Indigo bunting	*Passerina cyanea*
Killdeer	*Charadrius vociferus*
Lapland longspur	*Calcarius lapponicus*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Lazuli bunting	*Passerina amoena*
Le Conte's sparrow	*Ammodramus leconteii*
Least flycatcher	*Empidonax minimus*
Least sandpiper	*Calidris minutilla*
Lesser golden-plover	*Pluvialis dominica*
Lesser scaup	*Aythya affinis*
Lesser yellowlegs	*Tringa flavipes*
Lewis' woodpecker	*Melanerpes lewis*
Lincoln's sparrow	*Melospiza lincolnii*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Long-eared owl	*Asio otus*
Macgillivray's warbler	*Oporornis tolmiei*
Magnolia warbler	*Dendroica magnolia*
Mallard	*Anas platyrhynchos*
Marbled godwit	*Limosa fedoa*
Marsh wren	*Cistothorus palustris*
Mccown's longspur	*Calcarius mccownii*
Merlin	*Falco columbarius*
Mockingbird	*Mimus polyglottos*
Mountain bluebird	*Sialia currocoides*
Mountain chickadee	*Parus gambeli*
Mountain plover	*Charadrius montanus*
Mourning dove	*Zenaida macroura*
Nashville warbler	*Vermivora ruficapilla*
Northern flicker	*Colaptes auratus*
Northern goshawk	*Accipiter gintilis*
Northern harrier	*Circus cyaneus*
Northern hawk-owl	*Surnia ulula*
Northern oriole	*Icterus galbula*
Northern pintail	*Anas acuta*
Northern pygmy-owl	*Glaucidium gnoma*
Northern rough-winged swallow	*Stelgidopteryx serripennis*

APPENDIX 18 — TABLE 1 (continued)

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Northern saw-whet owl	*Aegolius acadicus*
Northern shoveler	*Anas clypeata*
Northern shrike	*Lanius excubitor*
Northern waterthrush	*Seiurus noveboracensis*
Oldsquaw	*Clangula hyemalis*
Olive-sided flycatcher	*Contopus borealis*
Orange-crowned warbler	*Vermivora celata*
Orchard oriole	*Icterus spurius*
Osprey	*Pandion haliaetus*
Ovenbird	*Seiurus aurocapillus*
Palm warbler	*Dendroica palmarum*
Pectoral sandpiper	*Calidris melanotos*
Peregrine falcon	*Falco peregrinus*
Pied-billed grebe	*Podilymbus podiceps*
Pine grosbeak	*Pinicola enucleator*
Pine siskin	*Carduelis pinus*
Pine warbler	*Dendroica pinus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Prairie falcon	*Falco mexicanus*
Purple finch	*Carpodacus purpureus*
Purple martin	*Progne subis*
Pygmy nuthatch	*Sitta pygmaea*
Red crossbill	*Loxia curvirostra*
Red knot	*Calidris canutus*
Red-breasted merganser	*Mergus serrator*
Red-breasted nuthatch	*Sitta canadensis*
Red-eyed vireo	*Vireo olivaceus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-necked grebe	*Podiceps grisegena*
Red-necked phalarope	*Phalaropus lobatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Redhead	*Aythya americana*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Ring-necked pheasant	*Phasianus colchicus*
Rock dove	*Columba livia*
Rock wren	*Salpinctes obsoletus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ross' goose	*Chen rossii*
Rosy finch	*Leucosticte arctoa*
Rough-legged hawk	*Buteo lagopus*
Ruby-crowned kinglet	*Regulus calendula*
Ruddy duck	*Oxyura jamaicensis*
Ruddy turnstone	*Arenaria interpres*
Ruffed grouse	*Bonasa umbellus*
Rufous hummingbird	*Selasphorus rufus*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Rusty blackbird	*Euphagus carolinus*
Sage grouse	*Centrocercus urophasianus*
Sage thrasher	*Oreoscoptes montanus*
Sanderling	*Calidris alba*
Sandhill crane	*Grus canadensis*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Scissor-tailed flycatcher	*Tyrannus forficatus*
Semipalmated plover	*Charadrius semipalmatus*
Semipalmated sandpiper	*Calidris pusilla*
Sharp-shinned hawk	*Accipiter striatus*
Sharp-tailed grouse	*Tympanuchus phasianellus*
Short-eared owl	*Asio flammeus*

APPENDIX 18 — TABLE 1 (continued)

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Smith's longspur	*Calcarius pictus*
Snow bunting	*Plectrophenax nivalis*
Snow goose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Snowy owl	*Nyctea scandiaca*
Snowy plover	*Charadrius alexandrinus*
Solitary sandpiper	*Tringa solitaria*
Solitary vireo	*Vireo solitarius*
Song sparrow	*Melospiza melodia*
Sora	*Porzana carolina*
Spotted sandpiper	*Actitis macularia*
Sprague's pipit	*Anthus spragueii*
Steller's jay	*Cyanocitta stelleri*
Stilt sandpiper	*Calidris himantopus*
Summer tanager	*Piranga rubra*
Surf scoter	*Melanitta perspicillata*
Swainson's hawk	*Buteo swainsoni*
Swainson's thrush	*Catharus ustulatus*
Swamp sparrow	*Melospiza georgiana*
Tennessee warbler	*Vermivora peregrina*
Three-toed woodpecker	*Picoides tridactylus*
Townsend's solitaire	*Myadestes townsendi*
Townsend's warbler	*Dendroica townsendi*
Tree sparrow	*Spizella arborea*
Tree swallow	*Tachycineta bicolor*
Trumpeter swan	*Cygnus buccinator*
Tundra swan	*Cygnus columbianus*
Turkey vulture	*Cathartes aura*
Upland sandpiper	*Bartramia longicauda*
Varied thrush	*Ixoreus naevius*
Veery	*Catharus fuscescens*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*
Virginia rail	*Rallus limicola*
Warbling vireo	*Vireo gilvus*
Water pipit	*Anthus rubescens*
Western flycatcher	*Empidonax difficilis*
Western grebe	*Aechmophorus occidentalis*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western sandpiper	*Calidris mauri*
Western tanager	*Piranga ludoviciana*
Western wood-pewee	*Contopus sordidulus*
Whimbrel	*Numenius phaeopus*
White-breasted nuthatch	*Sitta carolinensis*
White-crowned sparrow	*Zonotrichia leucophrys*
White-faced ibis	*Plegadis chibi*
White-rumped sandpiper	*Calidris fuscicollis*
White-throated sparrow	*Zonotrichia albicollis*
White-throated swift	*Aeronautes saxatalis*
White-winged crossbill	*Loxia leucoptera*
White-winged scoter	*Melanitta fusca*
Whooping crane	*Grus americana*
Wild turkey	*Meleagris gallopavo*
Willet	*Catoptrophorus semipalmatus*
Willow flycatcher	*Empidonax traillii*
Wilson's phalarope	*Phalaropus tricolor*
Wilson's warbler	*Wilsonia pusilla*
Wood duck	*Aix sponsa*
Wood stork	*Mycteria americana*
Wood thrush	*Hylocichla mustelina*

APPENDIX 18 — TABLE 1 (continued)

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Yellow rail	*Coturnicops noveboracensis*
Yellow warbler	*Dendroica petechia*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-billed cuckoo	*Coccyzus americanus*
Yellow-breasted chat	*Icteria virens*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow-rumped warbler	*Dendroica coronata*
Yellow-throated warbler	*Dendroica dominica*
Fish	
Black crappie	*Pomoxis nigromaculatus*
Brassy minnow	*Hybognathus hankinsoni*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Burbot	*Lota lota*
Channel catfish	*Ictalurus punctatus*
Common carp	*Cyprinus carpio*
Cutthroat trout	*Salmo clarki*
Emerald shiner	*Notropis atherinoides*
Fathead minnow	*Pimephales promelas*
Flathead chub	*Hybopsis gracilis*
Goldeye	*Hiodon alosoides*
Longnose dace	*Rhinichthys cataractae*
Longnose sucker	*Catostomus catostomus*
Mountain sucker	*Catostomus platyrhynchus*
Mountain whitefish	*Prosopium williamsoni*
Paddlefish	*Polyodon spathula*
Plains minnow	*Hybognathus placitus*
Rainbow trout	*Oncorhynchus mykiss*
River carpsucker	*Carpiodes carpio*
Sauger	*Stizostedion canadense*
Shorthead redhorse	*Moxostoma macrolepidotum*
Stonecat	*Noturus flavus*
Walleye	*Stizostedion vitreum*
Western silvery minnow	*Hybognathus argyritis*
White sucker	*Catostomus commersoni*
Mammals	
Badger	*Taxidea taxus*
Beaver	*Castor canadensis*
Big brown bat	*Eptesicus fuscus*
Black bear	*Ursus americanus*
Black-tailed prairie dog	*Cynomys ludovicianus*
Bobcat	*Lynx (felis) rufus*
Bushy-tailed woodrat	*Neotoma cinerea*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Desert cottontail	*Sylvilagus audubonii*
Fox squirrel	*Sciurus niger*
Heather vole	*Phenacomys intermedius*
Hoary bat	*Lasiurus cinereus*
House mouse	*Mus musculus*
Least chipmunk	*Tamias minimus*
Least weasel	*Mustela nivalis*
Little brown myotis	*Myotis lucifugus*
Long-eared myotis	*Myotis evotis*
Long-legged myotis	*Myotis volans*
Long-tailed vole	*Microtus longicaudus*
Long-tailed weasel	*Mustela frenata*
Lynx	*Felis lynx*
Meadow vole	*Microtus pennsylvanicus*
Mink	*Mustela vison*

APPENDIX 18 — TABLE 1 (continued)

VERTEBRATE SPECIES IN MUSSELSHELL AND YELLOWSTONE COUNTIES, MONTANA

Common Name	Scientific Name
Mountain lion	*Felis concolor*
Mule deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*
Northern grasshopper mouse	*Onychomys leucogaster*
Northern pocket gopher	*Thomomys talpoides*
Olive-backed pocket mouse	*Perognathus fasciatus*
Ord's kangaroo rat	*Dipodomys ordii*
Porcupine	*Erethizon dorsatum*
Prairie vole	*Microtus ochrogaster*
Pronghorn	*Antilocapra americana*
Raccoon	*Procyon lotor*
Red fox	*Vulpes vulpes*
Richardson's ground squirrel	*Tamiasciurus hudsonicus*
River otter	*Lutra canadensis*
Silver-haired bat	*Lasionycteris noctivagans*
Snowshoe hare	*Lepus americanus*
Spotted bat	*Euderma maculatum*
Striped skunk	*Mephitis mephitis*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Townsend's big-eared bat	*Plecotus townsendii*
Water shrew	*Sorex palustris*
Western harvest mouse	*Reithrodontomys megalotis*
Western jumping mouse	*Zapus princeps*
White-footed mouse	*Peromyscus leucopus*
White-tailed deer	*Odocoileus virginianus*
White-tailed jack rabbit	*Lepus townsendii*
Yellow-bellied marmot	*Marmota flaviventris*
Reptiles	
Bull snake	*Pituophis melanoleucus*
Common garter snake	*Thamnophis sirtalis*
Eastern short-horned lizard	*Phrynosoma douglassii*
Milk snake	*Lampropeltis trangulum*
Painted turtle	*Chrysemys picta*
Plains garter snake	*Thamnophis radix*
Racer	*Coluber constrictor*
Sagebrush lizard	*Sceloporus graciosus*
Snapping turtle	*Chelydra serpentina*
Spiny softshell	*Apalone spinifera*
Western hognose snake	*Heterodon nasicus*
Western rattlesnake	*Crotalus viridis*
Western terrestrial garter snake	*Thamnophis elegans*

Source: Montana Natural Heritage Program (1990).

APPENDIX 18 — TABLE 2

SUMMARY OF TERRESTRIAL AND SEMI-AQUATIC WILDLIFE SPECIES OCCURRENCE WITHIN THE BULL MOUNTAINS STUDY AREA

Common Name	Scientific Name
Mammals	
White-tailed jackrabbit	*Lepus townsendii*
Nuttall's cottontail	*Sylvilagus nuttallii*
Least chipmunk	*Tamias minimus*
Yellow-bellied marmot	*Marmota flaviventris*
Richardson's ground squirrel	*Spermophilus rechardsonii*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Red squirrel	*Tamiasciurus hudsonicus*
Northern pocket gopher	*Thomomys talpoides*
Deer mouse	*Peromyscus maniculatus*
Northern grasshopper mouse	*Onychomys leucogaster*
Meadow vole	*Microtus pennsylvanicus*
Porcupine	*Erithizon dorsatum*
Coyote	*Canis latrans*
Raccoon	*Procyon lotor*
Badger	*Taxidea taxus*
Striped skunk	*Mephitis mephitis*
Bobcat	*Felis rufus*
Elk	*Cervus elaphus*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Pronghorn	*Antilocapra americana*
Birds	
Canada goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Turkey vulture	*Cathartes aura*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentilis*
Swainson's hawk	*Buteo swainsoni*
Red-tailed hawk	*Buteo jamaicensis*
Ferruginous hawk	*Buteo regalis*
Rough-legged hawk	*Buteo lagopus*
Golden eagle	*Aquila chrysaetos*
American Kestrel	*Falco sparverius*
Prairie falcon	*Falco mexicanus*
Sharp-tailed grouse	*Tympanuchus phasianellus*
Wild turkey	*Meleagris gallopavo*
Killdeer	*Charadrius vociferus*
Stilt sandpiper	*Calidris himantopus*
Common snipe	*Gallinago gallinago*
Rock dove	*Columba livia*
Mourning dove	*Zenaida macroura*
Great horned owl	*Bubo virginianus*
Common nighthawk	*Chordeiles minor*
Common poorwill	*Phaleanoptilus nuttallii*
White-throated swift	*Aeronautes sextalis*
Belted kingfisher	*Ceryle alcyon*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Northern flicker	*Colaptes auratus*
Western wood pewee	*Contopus sordidulus*
Eastern wood pewee	*Contopus virens*
Least flycatcher	*Empidonax minimus*
Western flycatcher	*Empidonax difficilis*
Eastern phoebe	*Sayornis phoebe*
Say's phoebe	*Sayornis saya*

APPENDIX 18 — TABLE 2 (continued)

SUMMARY OF TERRESTRIAL AND SEMI-AQUATIC WILDLIFE SPECIES OCCURRENCE WITHIN THE BULL MOUNTAINS STUDY AREA

Common Name	Scientific Name
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Horned lark	*Eremophila alpestris*
Violit-green swallow	*Tachycineta thalassina*
Bank swallow	*Riparia riparia*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
Pinyon jay	*Gymnorhinus cyanocephalus*
Clark's nutcracker	*Nucifraga columbiana*
Black-billed magpie	*Pica pica*
American crow	*Corvus brachyrhynchos*
Black-capped chickadee	*Parus atricapillus*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Rock wren	*Salpinctes obsoletus*
House wren	*Troglodytes aedon*
Mountain bluebird	*Sialia currucoides*
Swainson's thrush	*Catharus ustulatus*
American robin	*Turdus migratorius*
Bohemian waxwing	*Bombycilla garrulus*
Cedar waxwing	*Bombycilla cedrorum*
Loggerhead shrike	*Lanius ludovicianus*
European starling	*Sturnus vulgaris*
Solitary vireo	*Vireo solitarius*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Common yellowthroat	*Geothlypis trichas*
Western tanager	*Piranga ludoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*
Evening grosbeak	*Hesperiphona vespertina*
Rufous-sided towhee	*Pipilo erythrophthalumus*
Chipping sparrow	*Spizella passerina*
Lark bunting	*Chondestes grammacus*
Savannah sparrow	*Passerculus sandwichensis*
Song sparrow	*Ammordramus savannarum*
Dark-eyed junco	*Junco hyemalis*
Chestnut-collared langspur	*Calcarius ornatus*
Snow bunting	*Plectrophenax nivalis*
Red-winged blackbird	*Agelaius phoenicius*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Common grackle	*Quiscalus quiscula*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
Northern oriole	*Icterus galbula*
Rosy finch	*Leucosticte arctoa*
Pine grosbeak	*Pinicola enucleator*
Cassin's finch	*Carpodacus cassinii*
Red crossbill	*Loxia curvirosta*
Common redpoll	*Acanthus flammea*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tristis*
House sparrow	*Passer domesticus*

APPENDIX 18 — TABLE 2 (continued)

SUMMARY OF TERRESTRIAL AND SEMI—AQUATIC WILDLIFE SPECIES OCCURRENCE WITHIN THE BULL MOUNTAINS STUDY AREA

Common Name	Scientific Name
Reptiles	
Sagebrush lizard	*Sceloporus graciosus*
Bullsnake	*Pituophis melanoleucus*
Racer	*Coluber constrictor*
Western Rattlesnake	*Crotalus viridis*
Garter snake	*Thamnophis sp.*
Amphibians	
Blotched tiger salamander	*Ambystoma tigrinum melanosticum*
Chorus frog	*Pseudacris triseriata*
Northern leopard frog	*Rana pipiens*

Source: Meridian (1990).

APPENDIX 18 — TABLE 3

MACROINVERTEBRATE SPECIES LIST

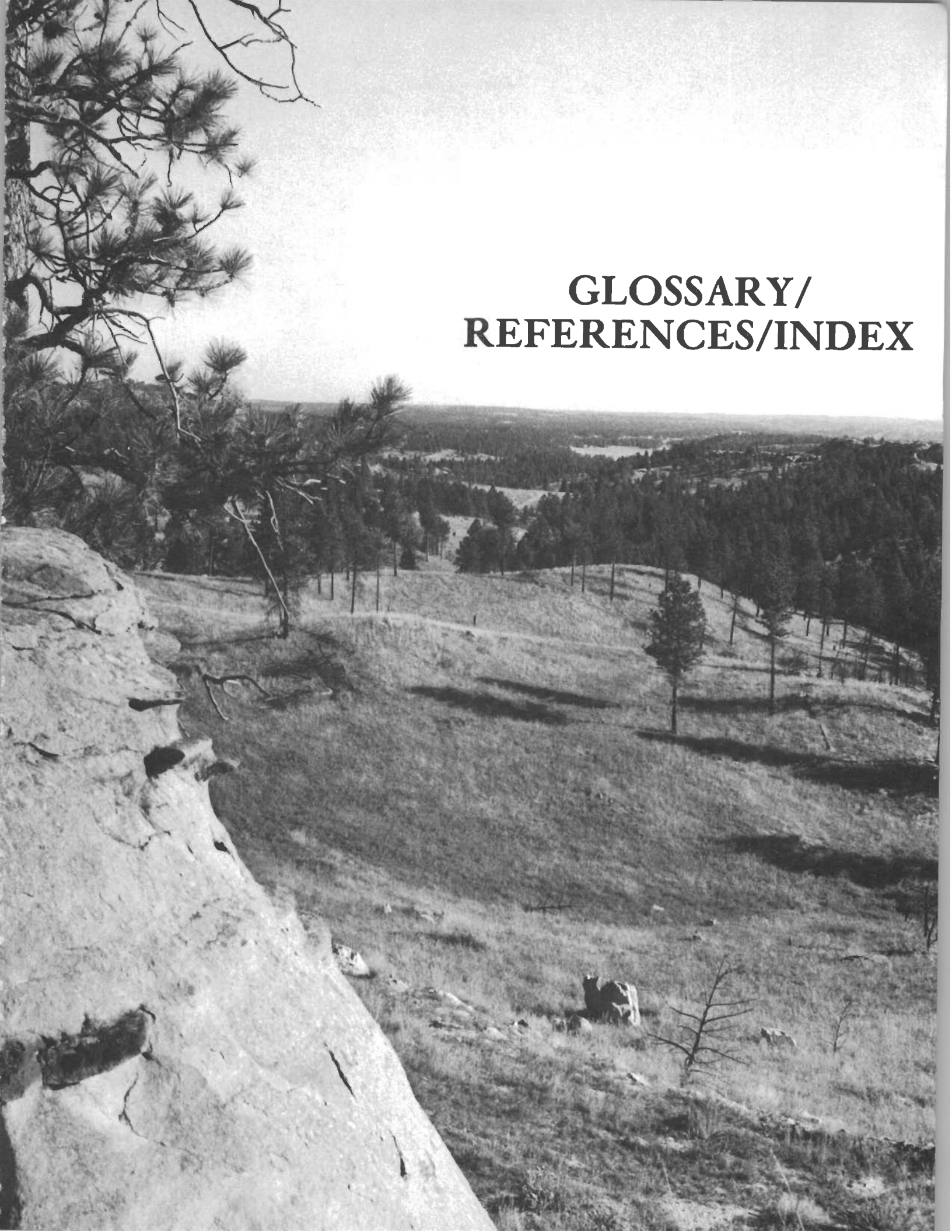
Common Name	Scientific Name
Roundworms	*Nematoda*
Horsehair worms	*Nematophora*
Segmented worms	*Oligochaeta*
Leeches	*Hirudinea*
Snail leeches	*Glossiphonidae*
	Helobdella elongata
	Helobdella stagnalis
	Theromyzon rude
Seed shrimps	*Ostracoda*
Scuds	*Amphipoda*
Scuds	*Talitridae*
	Hyalella azteca
Mayflies	*Ephemeroptera*
Small mayflies	*Baetidae*
	Baetis tricaudatus
	Callibaetis
Small mayflies	*Caeinidae*
	Caenis
Dragonflies and Damselflies	*Odonata*
Narrow-winged damselflies	*Coenagrionidae*
	Argia
	Chromagrion
	Zoniagrion
Darners	*Aeshnidae*
	Anax
Common Skimmers	*Libellulidae*
	Belonia
True bugs	*Hemiptera*
Water boatmen	*Corixidae*
	Sigara
Backswimmers	*Notonectidae*
	Notonecta
Water striders	*Gerridae*
	Gerris
Caddis flies	*Trichoptera*
Micro-caddisflies	*Hydroptilidae*
	Hydroptila
Northern caddisflies	*Limnephilidae*
Beetles	*Coleoptera*
Predaceous diving beetles	*Dytiscidae*
	Agabus
Crawling water beetles	*Haliplidae*
	Haliplus
Water scavenger beetles	*Hydrophilidae*
	Berosus peregrinus
	Berosus stylifer
	Cymbiodyta vindicata
	Enochrus
	Hygrotus
Flies	*Diptera*
Phantom midges	*Chaoboridae*
	Chaoborus
Black flies	*Simuliidae*
	Cnephia
	Simulium
Biting midges	*Ceratopogonidae*
Horse and deer flies	*Tabanidae*
	Chrysops
Muscid flies	*Muscidae*

APPENDIX 18 — TABLE 3 (continued)

MACROINVERTEBRATE SPECIES LIST

Common Name	Scientific Name
Midges	*Chironomidae*
	Apsectrotanypus
	Chironomus
	Conchopelopia
	Cricotopus (Isocladius) sylvestris
	Diamesa
	Micropsectra
	Orthocladius
	Orthocladius
	(Euorthocladius)
Dance flies	*Empididae*
Snails	*Gastropoda*
Pouch snails	*Physidae*
	Physella
Orb snails	*Planorbidae*
	Gyraulus deflectus
	Planorbella (Pierosoma)
	trivolvis trivolvis
Clams, mussels	*Pelecypoda*
Fresh water mussels	*Sphaeriidae*

Source: Meridian (1990).



GLOSSARY/ REFERENCES/INDEX

GLOSSARY

ACCIPITER — Any hawk of the genus Accipiter having short, rounded wings and a long tail. Feeds chiefly on small mammals and birds.

ALLUVIAL VALLEY FLOORS — The definition of this phrase as used for surface mining control and reclamation as stated in Public Law 95-87, August 3, 1977 [section 701(1)] is:

> "Alluvial valley floors" means the unconsolidated stream land deposits holding streams where water availability is sufficient for subirrigation or flood irrigation agriculture activities but does not include upland areas which are generally overlain by a thin veneer of colluvial deposits composed chiefly of debris from sheet erosion, deposits by unconcentrated run-off or slope wash, together with talus, other mass movement accumulation and wind-blown deposits.

ALLUVIUM — Soil and rock debris deposited by streams.

ANIMAL UNIT MONTH (AUM) — A standardized measurement of the amount of forage necessary for the complete sustenance of one animal for one month; also the measurement of the privilege of grazing one animal for one month.

ANION — A negatively charged atom or ion attracted to an anode in electrolysis.

AQUATIC — Living or growing in or on the water.

AQUIFER — A rock formation, group of rock formations or part of a rock formation that contains enough water-saturated permeable material to yield water to a spring or well.

AUTOTROPHIC — A rivers ability to maintain its ecological system (plants, animals) on its own. Supplies own food for organisms living within. In this case the river is not stocked.

BATHOLITH — A large body of igneous rock believed to have crystallized at a considerable depth below the earth's surface.

BITUMINOUS COAL — A soft, dark brown to black coal that burns with a smoky flame; contains more than 14 percent volatile matter and has a calorific value of more than 11,500 BTU/lb.

BTU (British Thermal Unit) — The amount of heat required to raise the temperature of one pound of water one degree.

BUNCHGRASS — Any variety of grass growing in distinct clumps.

BUTEOS — Any hawk of the genus Buteo with broad rounded wings and soaring flight.

C — Categorization of grazing allotments and rangeland areas used for livestock grazing. The "C" or custodial category refers to livestock grazing allotments that will be monitored and improved at a low level of management.

CALORIFIC (value) — For solid and liquid fuels of low volatility, the amount of heat produced by combustion of a specified quantity under specified conditions.

CATION — A positively charged atom or ion attracted to a cathode in electrolysis.

CHANNEL — An open conduit either naturally or artificially created which periodically or continuously contains moving water or forms a connecting link between two bodies of water.

CHANNEL STABILITY — A relative term describing erosion or movement of the channel walls or bottom due to waterflow.

CHARACTERISTIC LANDSCAPE — The established landscape in an area, not necessarily a natural area. It could refer to a farming community, urban area or any other landscape which has an identifiable character.

CLAYEY — A soil containing more than 35 percent clay. The textural classes are sandy clay, silty clay, clay and clay loam and silty clay loam.

CLAYPAN — A dense, compact layer in the subsoil having a much higher clay content than the overlying material from which it is separated by a sharply defined boundary.

CLIMAX — The highest ecological development of a plant community capable of perpetuation under the prevailing climatic and soil conditions.

COMPACTION — The process of packing firmly and closely together; the state of being so packed, e.g., mechanical compaction of soil by livestock or vehicular activity. Soil compaction results from particles being pressed together so that the volume of the soil is reduced. It is influenced by the physical properties of the soil, moisture content and the type and amount of compactive effort.

CONDUCTANCE (CONDUCTIVITY) — The ability of a substance to transmit an electrical current.

CRATON — A relatively stable, immobile area of the earth's crust that has been little deformed for a long time and forms the nuclear mass of a continent.

CRITICAL WILDLIFE HABITAT — The area of land, water and airspace required for the normal needs and survival of an endangered species.

CRUCIAL WILDLIFE HABITAT — Parts of the habitat necessary to sustain a wildlife population at critical periods of its life cycle. This is often a limiting factor on the population, such as breeding habitat, winter habitat, etcetera.

CULTURAL RESOURCES — A term that includes items of historical, archeological or architectural significance which are fragile, limited and nonrenewable portions of the human environment.

CULTURAL SITE — Any location that includes prehistoric and/or historic evidence of human use.

DECERTIFY — To withdraw certification.

DETACHMENT — To become detached. In this case a stream or river channel detaches itself from the old channel and forms a new one.

DISPOSAL ZONE — An area defined by the BLM's Land Pattern Review and Land Adjustment Plan where BLM would attempt to dispose of its many small scattered public land parcels by exchange. Also within this area BLM would not normally acquire lands.

DRAINAGE (INTERNAL SOIL) — The property of a solid that permits the downward flow of excess water. Drainage is reflected in the number of times and in the length of time water stays in the soil.

E — Maximum compressive stress that under gradually applied load to given solid material will sustain without fracture.

+E — Maximum tensile strain is located directly above or near but outside the edge of the opening.

-E — Maximum compressive strain is either at the center or near, but inside the edge of the opening.

ENDANGERED SPECIES — Determined for plants and animals by one or a combination of the following factors:

1. The present threatened destruction, modification or curtailment of a species habitat or range.

2. Over-utilization of a species for commercial sporting, scientific or educational purposes.

3. Disease or predation of the species.

4. The inadequacy of existing regulatory mechanisms.

5. Other natural or human caused factors affecting a species' continued existence.

ENVIRONMENTAL ASSESSMENT — A concise public document for which a federal agency is responsible that serves to:

1. Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact.

2.—Aid an agency's compliance with the National Environmental Protection Act when no environmental impact statement is necessary.

3.—Facilitate preparation of a statement when one is necessary. Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(e) of the National Environmental Protection Act, of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted.

ENVIRONMENTAL ASSESSMENT/LAND REPORT — A document usually prepared by BLM's Realty Specialists containing the required elements of both an Environmental Assessment and Land Report.

ENVIRONMENTAL IMPACT STATEMENT (EIS) — A detailed written statement as required by section 102(2)(C) of the National Environmental Protection Act analyzing the impacts to the environment of a proposed major undertaking (e.g., a grazing program).

EPHEMERAL STREAM — A stream that flows only after rain or during snowmelt.

EROSION — The wearing away of the land surface by running water, wind, ice or other geological agents.

EXCHANGE — A simultaneous process whereby BLM conveys property it administers from the United States to a second party for property belonging to the second party which is conveyed to the United States.

FACULTATIVE LAGOON SYSTEM — A wastewater treatment system which has both aerobic (aerated) and anaerobic (nonaerated) treatment capabilities.

FELSIC — A term applied to igneous rock having abundant light-colored minerals.

FLAT-LIMBED SYNCLINE — A syncline with the area of the fold being nearly level.

F.O.B. — Free on board: without charge to the buyer for placing goods on board a carrier at the point of shipment.

GEOMORPHIC — Pertaining to the form of the earth or its surface features.

GOB — The broken waste or filling left or placed in mine workings.

GROUND COVER — Vegetation, mulch, litter, rock, etcetera.

GROUNDWATER — Water contained in pore spaces of consolidated and unconsolidated surface material.

HABITAT — A specific set of physical conditions that surround a species, group of species, or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover and living space.

HEAD — The elevation to which water rises at a given point as a result of reservoir pressure.

HETEROGENEITY — The quality or state of being heterogeneous; composition from dissimilar parts.

HUNTER DAY — One person hunting during any part of one day.

HYDROLOGY — The science dealing with the behavior of water as it occurs in the atmosphere, on the surface, and underground.

IMPACTS — An influence or effect on something.

INFILTRATION — The penetration of water into the soil surface through pores of the soil. The rate and amount of infiltration is limited by the size and abundance of pores, organic matter content and the water absorption capacity of the soil.

INTERMITTENT STREAM — A stream which flows most of the time but occasionally is dry or reduced to pool stage.

KINEMATICS — The branch of mechanics that deals with pure motion, without reference to the masses of forces involved.

LAND REPORT — A written document detailing and substantiating the environmental impacts and decisions on a proposed land or right-of-way action. It fulfills the environmental analysis and decision document requirements of 40 CFR 1500-1508.

LAND TENURE (PATTERN) ADJUSTMENT — The BLM plan to rearrange its landownership pattern by disposing of small scattered tracts of unmanageable public lands and blocking up (acquire) lands in areas where large blocks of public lands already exist.

LEASABLE MINERALS — Minerals subject to lease by the federal government including oil, gas and coal.

LEK — An assembly area where birds, especially grouse, carry on display and courtship behavior.

LEGUME — The fruit or seed of leguminous plants, i.e., peas or beans; any of a large family of dicotyledonous herbs, shrubs or trees having leguminous fruits bearing nodules on the roots that contain nitrogen-fixing bacteria; Native legume-one that is indigenous to the local area.

LIGNITE — A brownish-black coal, intermediate in rank between peat and subituminous coal with a calorific value less than 8300 BTU/lb.

LOCATABLE MINERALS — Generally the metallic (hard rock) minerals, e.g. gold and silver, subject to development specified in the Federal Mining Law of 1872; includes bentonite, gypsum, uranium minerals.

LONGWALL MINING — A method of mining in which the faces are advanced from the shaft toward the boundary, and the roof is allowed to cave in behind the miners as work progresses.

M — Categorization of grazing allotments and rangeland areas used for livestock grazing. The "M" or maintain category refers to livestock grazing allotments that will be monitored to maintain the present satisfactory conditions at a modest level of management.

MAFIC — A term applied to igneous rock having primarily dark ferromagnesium minerals.

MANAGEMENT FRAMEWORK PLAN (MFP) — A planning decision document that establishes for a given area, land-use allocations, coordination guidelines for multiple use or protection. It is a BLM land-use plan. An MFP is prepared in three steps: (1) resource recommendations, (2) impact analysis and alternative development and (3) decision making.

MESIC — Pertaining to or adapted to an environment having a moderate amount or a balanced supply of moisture.

METASEDIMENT — A sediment or sedimentary rock that shows evidence of having been subjected to metamorphosis.

MHO — A unit of electrical conductance; the reciprocal of an ohm.

MINERAL ENTRY — The location of mining claims by an individual to protect his right to a valuable mineral.

MITIGATION MEASURES — Methods or procedures for reducing or lessening the impacts of an action.

MONOCULTURE — The cultivation of a single product to the exclusion of other land uses.

MULTIPLE USE — Balanced management of the various surface and subsurface resources, without permanent impairment of the productivity of the land, that will best meet present and future needs.

OFF-ROAD VEHICLE (ORV) — Any motorized track or wheeled vehicle designed for cross-country travel over any type of natural terrain.

PERCHED AQUIFERS — An aquifer containing unconfined groundwater separated from an underlying main body of groundwater by an unsaturated zone.

PERENNIAL STREAM — A stream which flows nine or more months out of a year.

PLUTON — An igneous rock intrusion formed at great depth.

PORCELLANITE — A dense siliceous rock having the texture, dull luster and general appearance of unglazed porcelain. It is less hard, dense and vitreous than chert. The term, used here, refers to a baked clay or shale found in the roof or floor of burned-out coal seams. Widely used by prehistoric peoples for manufacturing tools.

POTENTIOMETRIC HEAD (SURFACE) — An imaginary surface representing the total head of groundwater and defined by the level to which water will rise in a well. The water table is a particular potentiometric surface.

PREFERENCE RIGHT LEASE — A noncompetitive coal lease granted to an applicant that has demonstrated the discovery of commercial quantities of coal within their prospecting permit area.

PRODUCTIVE FOREST LAND — Forest land that is capable of yielding at least 20 cubic feet of wood per acre per year of any tree species.

PUBLIC-BODY AND SMALL BUSINESS SET-ASIDE LEASING — A special type of lease, reserved by the Secretary of the Interior, open only to a restricted class of bidders. The Secretary can reserve a reasonable number of lease tracts for special leasing opportunities for small businesses or publicly-owned and nonprofit organizations and corporations.

PUBLIC LANDS — Any land and interest in land (outside of Alaska) owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management.

PUBLIC PARTICIPATION — Part of BLM's planning system that provides the opportunity for citizens as individuals or groups to express local, regional and national perspectives and concerns in the rule making, decision making, inventory and planning processes for public lands. This includes public meetings, hearings or advisory boards or panels that may review resource management proposals and offer suggestions or criticisms for the various alternatives considered.

RAPTOR — Bird of prey with sharp talons and strongly curved beaks, e.g., hawks, owls, vultures, eagles.

RECORD OF DECISION — A separate and concise public record which links the decisionmaker's or manager's decision to the analysis presented in the EIS and shows how environmental impacts and other factors were considered in the decisionmaking process.

RECREATIONAL OPPORTUNITY — Those outdoor recreation activities which offer satisfaction in a particular physical, social and management setting in the EIS areas. These activities are primarily hunting, fishing, wildlife viewing, photography, boating and camping.

RESOURCE MANAGEMENT PLAN (RMP) — A land-use plan, as described by the Federal Land Policy and Management Act, which establishes in a written document a step-by-step process for considering multiple resource values, resolving conflicts and making resource management decisions. Approval of an RMP is considered a major federal action significantly affecting the quality of the human environment, necessitating the development of an EIS.

RETENTION ZONES — Areas where BLM intends primarily to retain or enhance its existing public land holdings.

RIPARIAN AREA — A specialized form of wetland with characteristic vegetation restricted to areas along, adjacent to or contiguous with rivers and streams, also, periodically, flooded lake and reservoir shore areas, as well as lakes with stable water levels.

RIVER MANAGEMENT PLAN — A developed plan specifying management actions along or within a river corridor.

ROOM-AND-PILLAR TYPE UNDERGROUND MINING — A mining method in which a portion (generally 50 percent) of the coal is left in place to support mine roof after the excavation of the other portion of the coal. The coal left in place resembles large supporting pillars.

ROYALTY — Compensation or portions of the proceeds paid to the owner of a right for the use of it.

SALEABLE MINERALS — High-volume, low-value mineral resources including common varieties of rock, clay, decorative stone, sand and gravel.

SALINITY — A measure of the mineral substances dissolved in water.

SANDY — A soil containing a large amount of sand. Textural classes are sands and loamy sands.

SCENIC QUALITY — The degree of harmony, contrast and variety within a landscape.

SCOPING — A process by which an agency responsible for developing an EIS conducts public meetings to consider the range of actions, alternatives and impacts to be considered in an EIS.

SCORIA (CLINKER) — Baked and fused rock resulting from the in-place burning of coal deposits.

SEDIMENT — Soil, rock particles and organic or other debris carried from one place to another by wind, water and gravity.

SEDIMENTATION — The action or process of deposition of material borne by water, wind or glacier.

SERAL STAGE — One of a series of ecological communities that succeed one another in the biotic development of an area.

SHRUB — A low, woody plant, usually with several stems, that may provide food and/or cover for animals.

SIGNIFICANT IMPACTS — Significant impacts are defined by their context and intensity. Generally, impacts are identified in the context of the project area, and the extent these impacts are perceptible beyond the project area. Intensity relates to the degree of the affect on public health, safety and unique characteristics of the area, and the degree of controversy or risk. Impacts may be insignificant individually but significant when added together. An impact which violates a law imposed for the protection of the environment is generally significant.

SUBITUMINOUS COAL — A black coal, intermediate by rank between lignite and bituminous coal; distinguished from lignite by higher carbon and lower moisture content; further classified by its calorific value.

SURFACE OWNER CONSENT — On split estate lands where the surface is owned by a qualified surface owner, coal deposits that will be mined by other than underground mining techniques shall not be included in a lease sale without evidence of written consent from the qualified surface owner allowing entry and commencement of surface mining operations.

SWALE — A small depression.

SYNCLINE — A trough-shaped or concave upward fold in the underlying geologic structure.

TESTBURN — Excavation of a given amount of coal from a test pit for determining the marketability of the coal for prospective customers.

THREATENED SPECIES — A species that the Secretary of the Interior has determined to be likely to become endangered within the foreseeable future throughout all or most of its range.

TOPOGRAPHY — The exact physical features and configuration of a place or region; the detailed and accurate description of the landforms of a place or region.

TOTAL DISSOLVED SOLIDS — The dry weight of dissolved material, organic and inorganic, contained in water.

TRANSMISSITIVITY — The ratio at which water of the prevailing kinematic viscosity is transmitted through a unit width of an aquifer under a unit hydraulic gradient.

TURBIDITY — An interference to the passage of light through water due to insoluble particles of soil, organics, microorganisms and other materials.

UNSUITABILITY CRITERIA — A list of criterium, published in the Code of Federal Regulations, regarding the unsuitability of federal lands for all or certain stipulated methods of coal mining.

VISCOSITY — The property of a substance to offer internal resistance to flow; its internal friction.

VISUAL RESOURCES — The land, vegetation and animals that comprise the scenery of an area.

VISUAL RESOURCE MANAGEMENT CLASSES — The degree of acceptable visual change within a characteristic landscape. A class is based upon the physical and sociological characteristics of any given homogeneous area and serves as a management objective.

CLASS I areas (preservation) provide for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers and other similar sites where landscape modification activities should be restricted.

CLASS II (retention of the landscape character) includes areas where changes in any of the basic elements (form, line, color or texture) caused by management activity may be evident in the characteristic landscape.

CLASS III (partial retention of the landscape character) includes areas where changes in the basic elements (form, line, color or texture) caused by management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

CLASS IV (modification of the landscape character) includes areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

CLASS V (rehabilitation or enhancement of the landscape character) includes areas where change is needed. This class applies to areas where the landscape character has been so disturbed that rehabilitation is needed. This class would apply to areas where the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other classes can be reached through rehabilitation or enhancement.

VOLATILITY (VOLATILE MATTER) — In coal, those substances, other than moisture, that are given off as gas and vapor during combustion.

WATER QUALITY — The chemical, physical and biological characteristics of water with respect to its suitability for a particular use.

WATERSHED — All lands which are enclosed by a continuous hydrologic drainage divide and lie upslope from a specified point on a stream.

WATERSHED COVER — The material (vegetation, litter, rock) covering the soil and providing protection from, or resistance to, the impact of raindrops and the energy of overland flow, and expressed in percent of the area covered.

WELL-BEING — Condition of human happiness and health, measured objectively by socioeconomic indicators or subjectively with individual perceptions.

WETLANDS — Permanently wet or intermittently flooded areas where the water table (fresh, saline or brackish) is at, near or above the soil surface for extended intervals, where hydric wet soil conditions are normally exhibited and where water depths generally do not exceed two meters.

WILDERNESS — An area formally designated by Congress as a part of the National Wilderness Preservation System.

PLANT AND ANIMAL SCIENTIFIC NAMES

Common Name	Scientific Name
PLANTS	
Grasses	
Alkali sacaton	*Sporobolus airoides*
Basin wildrye	*Elymus cinereus*
Big bluestem	*Andropyron spicatum*
Bluebunch wheatgrass	*Agropyron spicatum*
Blue grama	*Bouteloua gracilis*
Bluegrass	*Poa spp.*
Bottlebrush squirreltail	*Sitanion hystrix*
Green needlegrass	*Stipa viridula*
Idaho fescue	*Festuca idahoensis*
Inland saltgrass	*Distichlis stricta*
Kentucky bluegrass	*Poa pratensis*
Little bluestem	*Andropogan scoparius*
Needle and thread	*Stipa comata*
Pinegrass	*Calamagrostis rubescens*
Plains reedgrass	*Calamagrostis montanensis*
Prairie junegrass	*Koeleria cristata*
Prairie sandreed	*Calamovilfa langifolia*
Redtop	*Agrostis alba*
Richardson needlegrass	*Stipa richardsoni*
Rough fescue	*Festuca scabrella*
Sandberg bluegrass	*Poa secunda*
Slender wheatgrass	*Agropyron trachycaulum*
Sideoats grama	*Bouteloua curtipendula*
Thickspike wheatgrass	*Agropyron dasystachyum*
Timothy	*Phleum pratense*
Western wheatgrass	*Agropyron smithii*
Grasslike Plants	
Rushes	*Juncus spp.*
Sedges	*Carex spp.*
Threadleaf sedge	*Carex filifulai*
Forbs	
Canada thistle	*Cirsium arvense*
Clover	*Trifolium spp.*
Fringed sagewort	*Artemisia frigida*
Lupine	*Lupinus humicola*
Milkvetch	*Astragalus spp.*
Phlox	*Phlox spp.*
Prairie coneflower	*Ratibida Columnifera*
Scurfpea	*Psoralea spp.*
Shoshonea	*Shoshonea pulvinata*
Spotted knapweed	*Centaurea maculosa*
Umbrella plant (Wild Buckwheat)	*Eriogonum spp.*
Vetches	*Vicia spp.*
Wild strawberry	*Fragaria spp.*
Shrubs	
Bebb willow	*Salix bebbiana*
Big sagebrush	*Artemisia tridentata*
Black sagebrush	*Artemisia arbusoula nova*
Bud sagebrush	*Artemisia spinescens*
Common chokecherry	*Prunus virginiana*
Dwarf huckleberry	*Vaccinium caespitosum*
Firmleaf willow	*Salix boothii*
Greasewood	*Sarcobatus vermiculatus*
Grouse whortleberry	*Vaccinium scoparium*
Kinnikinnick	*Aretostaphylos uva-ursi*
Nuttall saltbush	*Atriplex nuttallii*
Shadscale saltbush	*Atriplex confertifolia*
Shrubby cinquefoil	*Potentilla fruiticosa*
Silver sagebrush	*Artemisia cana*
Skunkbush sumac	*Rhus trilobata*
Slinder willow	*Salix exigua*
Sumac	*Rhus spp.*
Twinflower	*Linnaea borealis*
Water birch	*Batula occidentalis*
Western snowberry	*Symphoricarpos occidentalis*
Willows	*Salix spp.*
Winterfat	*Eurotia lanata*
Trees	
Aspen (Quaking)	*Populus tremuloides*
Cottonwood	*Populus spp.*
Douglas fir	*Pseudotsuga menziesii glauca*
Green ash	*Fraxinus pennsylvanica*
Junipers	*Juniperus spp.*
Lodgepole pine	*Pinus contorta latifolia*
Ponderosa pine	*Pinus ponderosa*
Rocky mountain juniper	*Juniperus scopulorum*
Subalpine fir	*Abies lasiocarpa*
ANIMALS	
Mammals	
Antelope (Pronghorn)	*Antilocarpa americana*
Black bear	*Ursus americanus*
Black-footed ferret	*Mustela nigripes*
Elk	*Cerrus canadensis*
Lynx (Canada lynx)[1 2]	*Lynx canadensis*
Moose	*Alces alces*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Wolverine[1 2]	*Gulo luscus*
Birds	
Bald eagle[1 2]	*Haliaetus leucocephalus*
Blue grouse	*Dendragupus obscurus*
Brewer's Sparrow[2]	*Spizella pusilla*
Canada goose (giant)	*Branta canadensis*
Cinnamon teal	*Anas cyanoptera*
Coopers hawk[2]	*Accipiter cooperil*
Ferruginous hawk[1 2]	*Buteo regalis*
Flickers (common)	*Colaptes auratus*
Franklin grouse (spruce goose)	*Dendragapus canadensis*
Gadwall	*Anas strepera*
Golden eagle[2]	*Aquila chrysaetos*
Great grey owl[2]	*Strix nebulosa*
Hawks	*Accipitridae*

PLANT AND ANIMAL SCIENTIFIC NAMES (continued)

Common Name	Scientific Name
Kestrel (American)	*Falco sparverius*
Long-billed curlew[1 2]	*Numenius americanus*
Merlin[2]	*Falco columbarius*
Mountain plover[1 2]	*Charadrius montanus*
Northern goshawk[2]	*Accipiter gentilis*
Northern harrier	*Circus cyaneus*
Northern pygmy owl[2]	*Glaucidium gnoma*
Olive-sided flycatcher[2]	*Contopus borealis*
Owls	*Strigidae*
Osprey[2]	*Pondion naliaetus*
Peregrine falcon	*Falco peregrinus*
Pheasant (ring-necked)	*Phasianus colchicus*
Prairie falcon[1 2]	*Falco mexicanus*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
Ruffed grouse	*Bonasa umbellus*
Sage grouse	*Centrocercus urophasianus*
Sharp-shinned hawk	*Accipiter striatus*
Sharp-tailed grouse	*Tympanachus phasianellus*
Swainson's hawk[1 2]	*Buteo Swainsoni*
Widgeon	*Anas americanus*
Wild turkey	*Meleagris gallopavo*
Woodpeckers	*Picidae*
Fish	
Artic grayling[1 2]	*Thymallus arcticus*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Mountain whitefish	*Prosopium williamsoni*
Rainbow trout	*Salmo gairdneri*

[1]Federal sensitive species (includes threatened and endangered species).
[2]State species of special concern.

REFERENCES

Allgaier, F.K. 1988. *Surface Subsidence Over Longwall Panels in the Western United States-Final Results at the Deer Creek Mine*. Utah Bureau of Mines, Information Circular 9194.

AMAX, Inc. 1980. *Stack Test Data. Emissions Testing at Henderson Mine and Mill*. Collected by Stearns-Roger Engineering Corporation, Denver, Colorado.

Beck, Ray 1989. Personal communication. Administrator, Conservation Districts Division, Montana Department of Natural Resources and Conservation, Helena, Montana.

Billings Gazette June 5, 12, 19 and 26, 1988. Classified section. Billings, Montana.

Bohman, Robert 1989. Personal communication. Geologist, Montana Department of State Lands, Billings, Montana.

Botsford, Bruce 1989. Personal communication.

Boulder Exploration Group Incorporated 1983. *The Powder River Basin, Basin Analysis*. BXG Incorporated. Boulder, Colorado.

_____ 1988. *The Powder River Basin, 1988 Update, Coal Supply and Demand*. BXG Incorporated, Boulder, Colorado.

Brabson, Don 1989. Personal communication. Project Manager, Powder River Coal Production Region, Bureau of Land Management, Wyoming State Office.

Branch, Kristi, James Thompson, James Creighton and Douglas Hooper 1982. *The Bureau of Land Management Social Effects Project-Guide to Social Assessment*. Prepared by Mountain West Research-North, Inc., Billings, Montana, in association with Western Research Corporation, Laramie, Wyoming. Contract No. AA851-CTD-46.

Braunbeck, Boni 1988. Personal communication. Director of Social Welfare Services, Lewistown, Montana.

Bull Sheet 1989. "Labels Are Making Me Crazy". Roundup, Montana.

Burns, Jerry 1988. Personal communication. Environmental Program Manager, Water Quality Bureau, Montana Department of Health and Environmental Sciences, Billings, Montana.

Cater, Russ 1989. Personal communication. Chief Legal Council, Directors Office, Office of Legal Affairs, Montana Department of Social and Rehabilitation Services, Helena, Montana.

Christensen, Trish and Kirt 1988. Personal communication. Owners, Highland Trailer Court, Roundup, Montana.

Churchill, Susie 1988. Personal communication. Realtor, XL Realty, Roundup, Montana.

Clawson, Jeff 1990. Personal Communication. Bureau of Land Management, Utah State Office, Salt Lake City, Utah.

Collins, C.A. 1979. Memorandum. *Fugitive Dust Emission Factors*. Wyoming Department of Environmental Quality, Cheyenne, Wyoming.

Connor, C.W. 1981. *Cross Sections, Mammoth Coal Bed and Rehder Split of Mammoth Coal Bed, Bull Mountain Coal Field, Montana*. U.S. Geological Survey, Open-File Report 81-190, 3 plates.

_____ 1988. Maps Showing Outcrop, Structure Contours, Cross Sections and Isopachs of Partings-Mammoth Coal Bed, Paleocene Tongue River Member of the Fort Union Formation, Bull Mountain Coal Field, Southcentral Montana. U.S. Geological Survey, Coal Investigations Map C-126-A, 2 plates.

Connor, C.W. and J.K. Griffith 1980. *Mammoth Coal Bed, Paleocene Fort Union Formation*. Bull Mountains, Musselshell, and Yellowstone Counties, Montana. U.S. Geological Survey, Open-File Report 80-711.

Cromer, Don 1989. Personal communications. Rural Planning Section Supervisor, Planning and Statisitics Bureau, Program Development Division, Montana Department of Highways, Helena, Montana.

Cummins, A.B. and I.A. Given 1973. *Mining Engineering Handbook*. Society of Mining Engineers, vol.1.

Data Resources Incorporated 1989. *Coal Review, Forecast Summary*, vol. 10, no. 4, Winter 1988/1989.

DesJarlais, Delores 1989. Personal communication. Secretary, Musselshell Chemical Dependency Center/Musselshell County Mental Health Center, Roundup, Montana.

Driscoll, P. 1986. Written and telephone correspondence with James W. Gelhaus.

Dunrud, C.R. 1976. *Some Engineering Geologic Factors Controlling Coal Mine Subsidence in Utah and Colorado*. U.S. Geological Survey, Professional Paper 969.

Dunrud, C.R. and F.W. Osterwald 1978. ST2Effects of Coal Mining Subsidence in the Western Powder River Basin, Wyoming. U.S. Geological Survey, Open-File Report 78-473.

Dusek, Gary L. 1978. *Bull Mountains Coal Field Study Final Report*.

Economic Consultants Northwest 1989a. Unpublished Data. *Quality of Life Survey*. Survey conducted for Noranda Minerals Corporation, Helena, Montana.

_____ 1989b. *Bull Mountains Land Exchange Environmental Impact Statement*, "Socioeconomic" and "Transportation" sections, Draft. Unpublished manuscript on file at Bureau of Land Management, Miles City District office, Miles City, Montana. Parts of this document were used to develop sections of the Bull Mountains Exchange EIS.

Erdie, Jay 1989. Personal communication. Superintendent, School District 55, Roundup, Montana.

Farmer, Pat 1989. Personal communication. Consulting Wildlife Biologist, Westech Technological and Engineering, Inc., Helena, Montana.

Fejes, A.J. 1986. *Surface Subsidence Over Longwall Panels in the Western United States-Monitoring Program and Final Results at the Price River Coal Company No. 3 Mines*, Utah Bureau of Mines, Information Circular 9099.

Ferguson, Marion 1988. Personal communication. Volunteer, Musselshell County Ambulance Service, Roundup, Montana.

_____ 1989. Personal Communication.

Frissell, Sidney 1978. *Nongame Wildlife Inventory*. Montana Forest and Conservation Experiment Station, University of Montana, Missoula, Montana.

Gelhaus, James M. 1989. *Bull Mountain Exchange Project Environmental Impact Statement, Air Quality Impact Analysis*. Unpublished manuscript on file at Bureau of Land Management, Miles City District Office, Miles City, Montana. Parts of this document were used to develop sections of the Bull Mountains Exchange EIS.

GeoWest, Inc. 1981. *Subsidence Evaluation Bull Mountains Coal Project, Musselshell County, Montana*. Report to Louisiana Land and Exploration Co., Lakewood, Colorado.

Gilmore, J.S., D. Hammond, K.D. Moore and J.F. Johnson (Denver Research Institute) and D.C. Coddington (Bortz & Coddington) 1982. *Socioeconomic Impacts of Power Plants*. Prepared for Electric Power Research Institute, Palo Alto, California. EA-2228, Research Project 1226-4.

Gold, Raymond L. 1985. *Ranching, Mining and the Human Impact of Natural Resource Development*. Transportation Books, New Brunswick, New Jersey.

Griffith, Lt. Col. Robert 1988. Personal communication. Field Force Bureau Chief, Highway Patrol Division, Montana Department of Justice, Helena, Montana.

_____ 1989. Personal communication.

Hall, C.M. and C.S. Howard 1929. *Groundwater in Yellowstone and Treasure Counties*, Montana. U.S. Geological Survey Water Supply Paper 599.

Hittman and Associates, Inc. 1980. *Effects of Subsidence from Thick Seam Coal Mining on Hydrology*. Report prepared for the Bureau of Mines, Washington, D.C.; National Technical Information Service, U.S. Department of Commerce.

Hotchkiss, W.R. and J.F. Levings 1986. *Hydrogeology and Simulation of Water Flow in Strata Above the Bearpaw Shale and Equivalents of Eastern Montana and Northeastern Wyoming*. U.S. Geological Survey Water Resources Investigations Report 85-4281.

Huestis, Earl 1988. Personal communication. Field Representative, Insurance Service Organization, Great Falls, Montana.

Intermountain Planners, Inc. 1973. *Comprehensive Plan, Musselshell County, 1973-1993*. Billings, Montana.

Johnston, Dennis 1988. Personal communication. Owner, Big Sky Haul-Away, Billings, Montana.

Klein, Laura 1989. Personal communication. Billings Board of Realtors Multiple Listing Service, Billings, Montana.

Lee, R.W. 1980. *Geochemistry of Water in the Fort Union Formation of the Northern Powder River Basin, Southeastern Montana*. U.S. Geological Survey Water Resource Investigations Open-File Report 80-336.

Lee, R.W. 1981. *Geochemistry of Water in the Fort Union Formation of the Northern Powder River Basin, Southeastern Montana*. U.S. Geological Survey Water Supply Paper 2076.

Leholm, A.G., F.L. Leistritz and J.S. Wieland 1975. *Profile of North Dakota's Coal Mine and Electric Power Plant Operating Work Force*. North Dakota Agricultural Experiment Station, Agricultural Economics Report No. 100. Fargo, North Dakota.

Lehr, Jay 1989. "What's All the Fuss About Longwall Mining?" Editorial, *Water Well Journal*. National Water Well Association.

Leiter, Jim 1988. Personal communication. Environmental Engineer, Water Quality Bureau, Montana Department of Health and Environmental Sciences, Helena, Montana.

Lythgoe, Gary 1989. Personal communication. Montana Job Service, Billings, Montana.

Maleki, H.N. 1987a. *Prediction of Subsidence in the Bull Mountains*. J.F.T. Agapito and Associates, Inc., Grand Junction, Colorado.

_____ 1987b. *Preliminary Rock Mechanics Evaluations for the Bull Mountain Project*. J.F.T. Agapito and Associates, Inc., Grand Junction, Colorado.

Marvin & Associates 1985. *Yellowstone County Traffic Safety Improvement Study*.

McCann, Larry 1988. Personal communication. Fire Marshall, City of Billings, Billings, Montana.

McCann, Steve A. 1976. *Nongame Mammals of Musselshell County, Montana with Special Reference to the Effects of Reclamation*.

McLeary, Mike 1988. Personal Communication. Manager (temporary), Big Sky Motel, Roundup, Montana.

McGraw-Hill Incorporated 1989. *Coal Week*, vol. 15, no. 21.

McLeod, Robert 1988. Personal communication. Realtor, Wagon Wheel Real Estate, Roundup, Montana.

Meridian Minerals Company, 1988. ST2Mining Plan Maps for 0.5 to 3.0 Million Tons Per Year Annual Production Under The Longwall Mine Scenario, Exchange and Lease Alternatives.

Meridian Minerals Company, 1990. *Bull Mountains Mine No. 1 Permit Application*. Musselshell County, Montana. vol. 14. Englewood, Colorado.

Mikkelson, Fern 1988. Personal communication. Administrator, Roundup Memorial Hospital and Nursing Home, Roundup, Montana.

_____ March 1989. Personal communication.

Montana Board of Crime Control, Criminal Justice Data Center 1984, 1985, 1986 and 1987. *Crime in Montana-Annual Report*. Helena, Montana.

Montana Bureau of Mines and Geology and U.S. Geological Survey 1978. *Groundwater in the Fort Union Coal Region, Eastern Montana*. Montana Bureau of Mines and Geology Special Publication 80.

Montana Department of Commerce, Local Government Services Division. *Annual Financial Reports*. Helena, Montana.

Montana Department of Commerce, The Census and Economic Information Center 1985. *County Profiles*. Helena, Montana.

Montana Department of Fish, Wildlife and Parks 1978. *Bull Mountain Coal Field Study*. Final Report. Sponsored by Consolidated Coal Company, Helena, Montana.

——— 1987. *The Net Economic Value of Fishing in Montana*. Prepared by John Duffield, John Loomis, Rob Brooks, with research assistance provided by Joe Holliman and Joe Cooper.

——— 1988. *The Net Economic Value of Deer Hunting in Montana*. Prepared by Rob Brooks.

Montana Department of Health and Environmental, Sciences Water Quality Bureau 1986. *Field Investigation, Roundup Public Works*. Billings, Montana.

——— Bureau of Records and Statistics 1986, 1987 and 1988. Vital Statistics Helena, Montana.

——— Food and Consumer Safety Bureau 1988. Helena, Montana.

——— 1988. *Montana Health and Data Book and Medical Facilities Inventory*. Helena, Montana.

Montana Department of Highways 1983. *Montana Primary Highway Sufficiency Ratings*.

——— Bridge Bureau and Planning and Statistics Bureau, in cooperation with U.S. Department of Transportation, Federal Administration 1985. *Montana Bridges*. Helena, Montana.

Montana Department of Highways, Program Development Division, Planning and Statistics Bureau. Unpublished data. Helena, Montana.

Montana Department of Justice, Highway Patrol Division, Accident Records Bureau. Unpublished data. Helena, Montana.

——— Highway Traffic Safety. Helena, Montana.

Montana Department of Labor and Industry, Research and Analysis Bureau 1987. *Employment and Wage Survey, Third Quarter*. Helena, Montana.

——— 1988. Unpublished data. Helena, Montana.

Montana Department of Natural Resources and Conservation, Oil and Gas Conservation Division, No date. *Annual Review for the Year 1986 Relating the Oil and Gas*, vol. 30. Helena, Montana.

Montana Department of Revenue and Corporate Tax 1970-1987. *Coal Severance Tax Collections*.

Montana Department of State Lands 1985. *Final Environmental Impact Statement on the Stillwater Mining Company Stillwater Project*.

Montana Natural Heritage Program 1990. Unpublished data. Helena, Montana.

Montana Office of Public Instruction, Annual reports. Helena, Montana.

Montana Secretary of the State, State and County Elected Officials. Helena, Montana.

Montana Tax Foundation, Inc., Annual reports. Helena, Montana.

Morehead, Bob 1989. Personal communications. Bull Mountains Project Manager, Meridian Minerals Company, Roundup, Montana.

Mosbaugh, Keith 1989. Personal communication.

——— 1990. Personal communication.

Mountain West Research, Inc. 1975. Construction Worker Profile (Washington, D.C.: Old West Regional Commission).

——— No date. In: Wieland, J.S., F.L. Leistritz and S.H. Murdock. 1977. *Characteristics and Settlement Patterns of Energy Related Operating Workers in the Northern Great Plains*. North Dakota Agricultural Experiment Station, Fargo, North Dakota. Agricultural Economics Report No. 123.

——— 1979. *A Guide to Methods for Impacts Assessment of Western Coal/Energy Development*. Prepared for the Missouri River Basin Commission, Omaha, Nebraska and Resource and Land Investigations Program, Reston, Virginia.

Mountain West Research-North, Inc. 1983. *Big Horn and Decker Mine Worker Survey Report*. Prepared for the Montana Department of State Lands, Billings, Montana.

Mundie, Ben 1989. Personal communication. Reclamation Specialist, Abandoned Mine and Reclamation Bureau, Montana Department of State Lands, Helena, Montana.

Musselshell Valley Historical Museum 1974. *Roundup on the Musselshell*. Roundup, Montana.

National Academy of Sciences, Washington, D.C. 1974. *Nutrients and Toxic Substances in Water for Livestock and Poultry*. A report of the subcommittee on nutrient and toxic elements in water.

National Coal Board 1975. *Subsidence Engineer's Handbook*.

National Economic Projections Series 1986. vol. 2 and 3.

National Planning Association Data Services, Inc. 1986. National Economic Projection Series. vols.2-3. Washington, D.C.

National Planning Association Data Services, Inc., Washington, D.C. February 1989. Unpublished data.

Neidhardt, Brian 1988. Personal communication. Sheriff, Musselshell County Sheriff's Department, Roundup, Montana.

——— 1989. Personal communication.

Neidhardt, Chris 1988. Personal Communication. Owner/Manager, Sage Motel, Roundup, Montana.

Nelson, Diane 1990. Personal Communication. Utah Department of Natural Resources.

Newell, Bill 1989. Personal communication. Dispatch Coordinator, Deaconess Medical Center, Billings, Montana.

Northern Engineering and Testing Inc. 1988. *Bull Mountain Land Exchange Environmental Impact Statement*, "Hydrology" section. Parts of this document used to develop sections of the Bull Mountains Exchange EIS. Unpublished manuscript on file at the Bureau of Land Management, Miles City District Office, Miles City, Montana.

Peng, S.S. 1978. *Coal Mine Ground Control*, John Wiley & Sons.

Picchioni, Donald 1988. Personal communication. Assistant Fire Chief, Musselshell County Fire Department, Roundup, Montana.

_____ 1989. Personal communication.

Pinkstaff, Robin 1989. Personal communication. Crew Chief, Arrow Medical Services, Billings, Montana.

Rehm, B.W., G.H. Groenwold and K.A. Morin 1980. *Hydraulic Properties of Coal and Related Materials, Northern Great Plains: Groundwater*. vol. 18, no. 6, 551-561.

Rioux, R.P. and K.A. Dodge, 1980. *Hydrologic Data from the Bull Mountains area, Southcentral Montana*. U.S. Geological Survey, Montana Bureau of Mines and Geology and Bureau of Land Management.

Rodman, Bob 1989. Personal communication.

Rognlie, Norman 1989. Personal communication. Chief, Bridge Bureau, Engineering Division, Montana Department of Highways, Helena, Montana.

Rood, Ronald 1989. *Results of a Class I and Class III Archaelogical Survey for Meridian Minerals Co. Bull Mountains Mine No. 1, Bull Mountains, Montana*. Metcalf Archaeological Consultants, Inc., Box 899, Eagle, Colorado 81631.

Rose, Don 1989. Personal communication. Owner, Rose Apartments, Roundup, Montana.

Roundup Record-Tribune, April 1983. Roundup, Montana.

_____ August 10, 1988a. Editorial (opinion) by J.K. Kuzara.

_____ August 24, 1988b. "Melstone Area Residents Claim County Commissioners Caused Emergency."

_____ September 1988c through February 1989. Classified section.

_____ November 16, 1988d. "Roundup Wools, A Busy Cottage Industry."

_____ November 23, 1988e. "About 200 Attend Local Land-Use Regulation Protest Meeting."

_____ December 7, 1988f. "Bed/Breakfast & Workshop is Successful."

_____ December 14, 1988g. "State Sues Musselshell County Over Welfare Budget Cuts."

Schafer, Mike 1988. Personal communication. Sheriff, Yellowstone County Sheriff's Department, Billings, Montana.

Shouse, Joel A., P.E., and Terry C. Johnson 1983. *The Madison River Corridor Study*. Resource Conservation Service, Bozeman, Montana.

Smith, JoAnne 1989. Personal communication. Volunteer, Bull Mountains Volunteers, Roundup, Montana.

Sonderegger, John L., Brenda R. Sholes, Takeshi Ohguchi 1989. *Arsenic Contamination of Aquifers Caused By Irrigation With Diluted Geothermal Water*. Headwaters Hydrology, American Water Resources Association.

Sorg, Marlene 1989. Personal communication. Flight Nurse, St. Vincent Hospital, Billings, Montana.

State of Wyoming, State Inspector of Mines 1970-1987. *Annual Report of the State Inspector of Mines of Wyoming*. Office of State Inspector of Mines, Rock Springs, Wyoming.

Stoner, J.D. and B.D. Lewis 1980. *Hydrogeology at the Fort Union Coal Region, Eastern Montana*. U.S. Geological Survey Miscellaneous Investigations Series Map I-1236.

Sysum, Sandy 1988. Personal communication. Realtor, Floberg Realty, Roundup, Montana.

Taylor, Richard 1989. Personal communication. Owner, Billings Ambulance Service, Billings, Montana.

Thomas, Gary 1988. Personal communication. Director of Public Works, Roundup, Montana.

_____ 1989. Personal communication.

Thompson, K.S. 1982. *Groundwater and Potential Coal Mining in the Bull Mountains, Southcentral Montana*. Montana Bureau of Mines and Geology Open-File Report 100.

Thompson, K.S. and W.A. Van Voast 1981. *Hydrology at the lower Squirrel Creek drainage, Southeastern Montana, with special reference to surface coal mining*. Montana Bureau of Mines and Geology Open-File Report 84.

Travis, R.G., and Turnbull, L.A. 1950. *Coal Mining Methods and Practices and Electric Power Requirements In The Bull Mountains Coal Field, Montana*. U.S. Bureau of Mines, Report of Investigations 4684, 27 pp.

Tull, Cindy 1988. Personal communication. Manager, Ideal Motel and Trailer Court, Roundup, Montana.

U.S. Congress 1977. Public Law 95-87. *Surface Mining Control and Reclamation Act of 1977*. 95th Cong.

U.S. Congress Public Law 94-565, amended by Public Law 98-63. *Payment in Lieu of Taxes Act of 1976*, as amended 1983.

U.S. Department of Agriculture, Soil Conservation Service, U.S. Department of the Interior, Bureau of Indian Affairs and Montana Agricultural Experiment Station 1972. *Soil Survey of Yellowstone County, Montana*.

_____ Soil Conservation Service and Forest Service 1975. *Soil Survey Carbon County Area Montana*.

_____ Forest Service, Custer National Forest and U.S. Department of the Interior, Bureau of Land Management, Miles City District 1989. *Ruby A Federal No. 1-9 Exploratory Oil/Gas Well Draft Environmental Impact Statement*.

U.S. Department of Commerce, Bureau of the Census 1940 to 1980. Census of the Population.

——— 1980. Census of Population and Housing.

——— 1986. *County Business Patterns*.

——— 1987. Current population reports.

U.S. Department of Commerce, Bureau of Economic Analysis, 1985. OBERS BEA 1985 Regional Projections.

——— 1988a. Data Series.

——— 1988b. Unpublished data.

U.S. Department of Energy 1977-1987. *Coal Production*. 0118 (87) and prior issues.

——— Energy Information Administration 1986. Coal Distribution. January-June 1986, 0125 (86-2).

——— 1988a. Annual Energy Review 1987, 0384(87). Released for printing May 1988.

——— 1988b. *Cost and Quality of Fuels for Electric Utility Plants 1987*. 0191 (87), July 1988.

U.S. Department of the Interior, Bureau of Land Management, 1979. *Dillon Resource Area Management Framework Plan*. Butte District Office, Butte, Montana.

——— 1984a. *Billings Resource Management Plan and associated Record of Decision*. Miles City District Office, Miles City, Montana.

——— 1984b. *State Director's Guidance for Resource Management Planning in Montana and the Dakotas. Supplement to Land Pattern Review and Land Adjustment*. Montana State Office, Billings, Montana.

——— 1985. *Upper Big Hole River Management Plan*. Butte District Office, Butte, Montana.

——— 1986. *A Guide to Federal Coal Property Appraisal*. BLM Handbook H-307001.

——— 1987a. *Code of Federal Regulations Title 43-Public Lands: Interior (Parts 1000-3999)*. U.S. Government Printing Office, Washington, D.C.

——— 1987b. *Lower Big Hole River Management Plan*. Butte District Office, Butte, Montana.

——— 1987c. *Powder River Region Data Adequacy Standards*. Wyoming State Office, Cheyenne, Wyoming.

——— 1988a. *National Environmental Policy Act Handbook*. BLM Handbook H-1790-1.

——— 1988b. *Powder River Regional Coal Team Charter*.

——— 1988c. Unpublished data. Montana State Office, Billings, Montana.

——— January 1989. *Bull Mountains Exchange Preparation Plan*. Miles City District Office, Miles City, Montana.

——— In press. *Miles City District Oil and Gas EIS Amendment*.

U.S. Department of the Interior, Minerals Management Service 1988. *Mineral Revenues: The 1988 Report on Receipts from Federal and Indian Leases*.

U.S. Environmental Protection Agency 1975. *National Interim Primary Drinking Water Standards*. Federal Register, vol. 40, no. 248.

——— 1978. *Compilation of Air Pollutant Emission Factors*. AP-42 (various supplements).

Walker, Loren 1989. Personal communication. Rural Services Supervisor, Mental Health Center, Billings, Montana.

Wegman, Robert 1989. Personal communication. Musselshell County Soil Survey Party Leader, Soil Conservation Service, Roundup, Montana.

Western Analysis No date. *Socioeconomic Baseline Study, Kootenai Falls Hydroelectric Project*. vol. 1. Draft report submitted to Northern Lights, Inc., Sandpoint, Idaho. Helena, Montana.

Wieland, J.S., F.L. Leistritz and S.H. Murdock 1977. *Characteristics and Settlement Patterns of Energy Related Operating Workers in the Northern Great Plains*. North Dakota Agricultural Experiment Station, Fargo, North Dakota. Agricultural Economics Report No. 123.

Williams, R.L. 1979. Written correspondence. U.S. Environmental Protection Agency, Region VIII, Denver, Colorado.

Wolverton, Harry September 1988. Personal communication. Assistant Yellowstone County Supervisor, Billings, Montana.

Woolsey, L.H., R.W. Richards and C.T. Lupton 1917. *The Bull Mountain Coal Field, Musselshell and Yellowstone Counties, Montana*. United States Geological Survey Bulletin 647.

Yellowstone Coal Company 1988. *Mining Plan Map for 0.5 Million Tons Per Year Annual Production Under the Room-and-Pillar Mine Scenario, Exchange Alternative*.

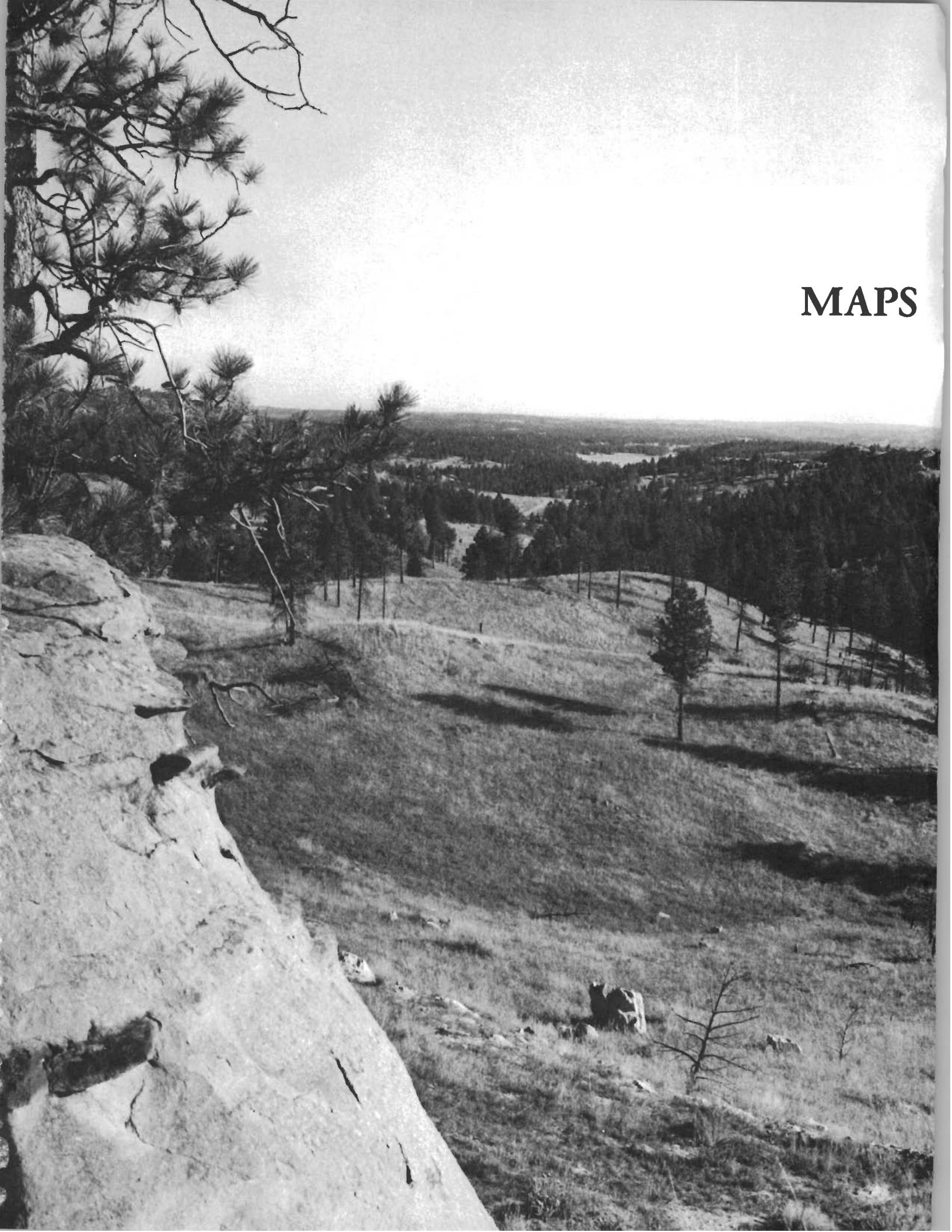
Zimmerman, E.A. 1956. *Preliminary Report on the Geology and Groundwater Resources of Parts of Musselshell and Golden Valley Counties, Montana*. Montana Bureau of Mines and Geology Information Circular 15.

INDEX

Agriculture 68,79,82,87,93,94,122,125,128,130
Air Quality 67,79,82,86,93,106,121,125,127,129,285
Alternative A (Coal-for-Land Exchange-Proposed and Preferred Action) i,12,18,19,20,21,29,94
  Description 12
  Impacts 22
Alternative B (Mirror Image Coal-for-Coal Exchange) i,12,22,14,17,132
  Description 12
  Impacts 22
Alternative C (Leasing) ii,16,22,18,19,20,21,29,133
  Description 16
  Impacts 22
Alternative D (No Action) ii,18,22,141
  Description 18
  Impacts 22
Alternatives Considered but Dismissed or Not Analyzed 11
Alternatives Considered in Detail 12
Ambulance Service 56
Areas of Critical Environmental Concern 79,82,86,130
Attitudes and Concerns 53
Authorizing Actions 6,251
Billings RMP 1
Bull Mountains Railroad 92
  Design 92
  Impacts 93
Butte District Plans 2
  Dillon MFP 2
  Upper and Lower Big Hole River Management Plan 2
  Madison River Management Plan 3
Climate 66,106,121
Coal Land-Use Screens 7
Comment Procedures 6
Community Organizations 47
Community Resources 52
Community Services 54,82,104,119,133,137,138,141
Coordination and Consultation 145
Consultation with Attorney General 4
Cultural Resources 67,79,86,93,107,122,125,128,130
Current Management 30,81,86
Data Adequacy 77,285
Definition of Transportation Study Area 62
Definition of Social Study Area 40
Dillon MFP 2
Decision Factors and Process 4
Economic Environment 94,109,132,133,134,137,265
Economic Evaluation and Appraisal 4
Education 54
EIS Process 4
Employment 31,90,91,95,109,132,134,137,141,293,297
Fiscal Conditions 37,99,115,132,133,134,137,141,309
Fire Protection 56
Floodplains 68,79,82,87,93,126,128
Geology 81,86,88,108,124
Government Finances 38,39,40,41,42
Governor's Consultation 5
Hazardous Wastes 68,79,82,87
History (Social) 45
Hospital and Long-Term Care 57

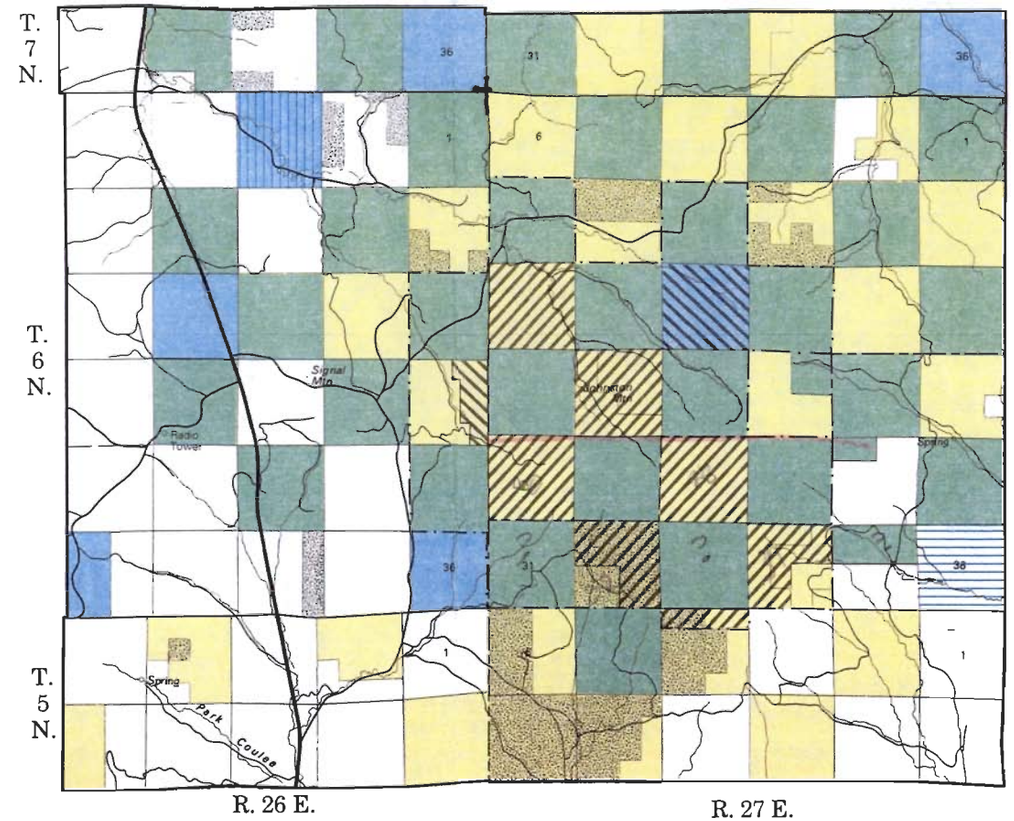
Housing 58,104,119,133,137,138,141
Hydrology 72,80,85,93,108,123,126,129,131,141
Groundwater 72,81,85,88
Surface Water 76,80,85,88
Water Quality 76,78,81,85,88,124
Water Supply 57
Wells and Springs 74,76
Income 32,99,113,134,137,141
Industrial Composition 30
Law Enforcement 55
Land-Use Plans 1
Lease-by-Application ii,16,263
Likely Future of the Coal 142
Likely Future of the Offered Lands 142
Local Physicians 57
Longwall Mining 9,10,92
Madison River Management Plan 3
Miles City District Plans 1
Billings RMP 1
Minerals
Coal 70,88
Oil and Gas 70,80,85,88
Mineral Materials 70,85
Locatable Minerals 70
Mining Claims 80
Mobile Home Parks 60,61
Modes of Transportation 62
Motels 62
Native American Religious Concerns 68,79,82,87,126,128,130
Notice of Lease Sale 6
Notice of Realty Action 6
Offered Private Lands 15,125
Priority Lands 1,2,3 5,78,125,142
Priority Lands 4 5
Priority Lands 5 5,81,127,142
Priority Lands 6 5,86,129,142
Opportunities Foregone 142
Other Consultations 6
Other Federal Coal ii,18
Ownership-Coal Lands 29
Payment-In-Lieu of Taxes 23,125,127,129,131,303
Peabody Coal-for-Coal Exchange ii
Public Comments and Concerns 249
Real Estate for Sale 58
Reasonable Foreseeable Future Development Scenarios 89
0.5 Million Tons Per Year Mine 90,94,132,133,305,309
3.0 Million Tons Per Year Mine 91,108,133,137,305,309
Record of Decision 6
Recreation 76,81,86,88,94,108,124,126,129,131
Regional Coal Team Consultations 4
Replacement Lands 5,58,131,142
Revenues (0.5 Million Tons Mine)
Local Government 100,101,135,295
State Government 102,103,136,140,295
Federal Government 102,103,136,140,295
Revenues (3.0 Million Tons Mine)
Local Government 115,116,295
State Government 115,117,295
Federal Government 115,117,295
Road and Bridge Conditions 62,106,121
Room-and-Pillar Mining 8,91
School Bus Transportation Routes 65,106

Scoping Issues 3
Social Environment 40,102,117,133,134,138,141
Social Life 43,104,118,133,137,138,141
Scoping Process 53
Social Welfare 58
Social Well-Being 52
Socioeconomics 30,78,82,86,88,93,94,109,125,127,129,131,133,134,137,141
Socioeconomic Survey Results 54
Soils 68,79,87,93,107,123,126,128,131
Solid Waste 58
State Coal Status ii,16
Stratigraphy 77,81,86,88,108,124
Subsidence 77,108,124,259
Supplement to the State Directors Guidance for Resource Management Planning in Montana and the Dakotas for Land Pattern Review and Land Adjustment 2
Testburn 1
Threatened and Endangered Species 68,79,82,87,128,130
Topography 68,79,83,87,93,107,123,126,128,131
Traffic Conditions 64
Transportation 62,90,93,105,120,127,130
Unsuitability Criteria Application 7,255
Upper and Lower Big Hole River Management Plans 2
Vegetation 69,80,83,87,93,107,123,126,128,131
Waste Water Treatment 57
Wetland/Riparian Zones 68,79,82,93,126,131
Wilderness 68,79,83,87
Wildlife 69,93,107,123,126,128,321
Big Game Species 69,80,87
Black Bear 84
Elk 84
Fisheries 80,85
Moose 84
Mule Deer 84
Nongame Species 70,80,85,87
Raptors 84
Upland Game Birds 85
Waterfowl 80,84
Macroinvertebrates 70,309
Wild and Scenic Rivers 68,79,83,87,128



MAPS

Bull Mountains Coal Lands



Project Area

Federal Coal Ownership

Federal Coal Requested for Exchange

State Surface — Coal Ownership

Additional Lands Considered for Leasing

Meridian Minerals Coal Ownership

Bureau of Land Management Surface Ownership

Private Surface — State Coal Ownership

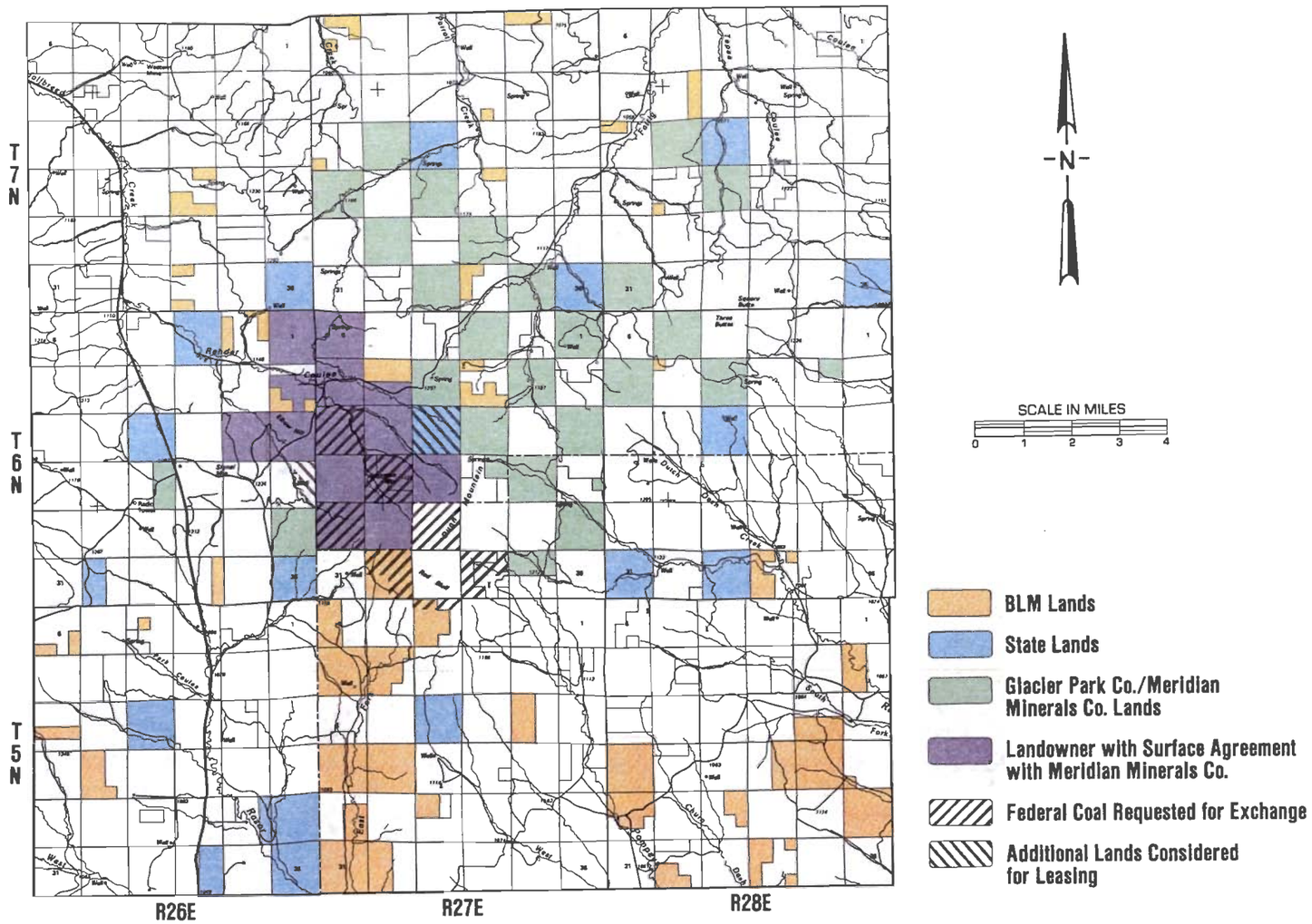
State Surface — Oil & Gas and Other Federal Coal/Iron Ownership

0 1 2 3 4 Miles

0 1 2 3 4 5 Kilometers

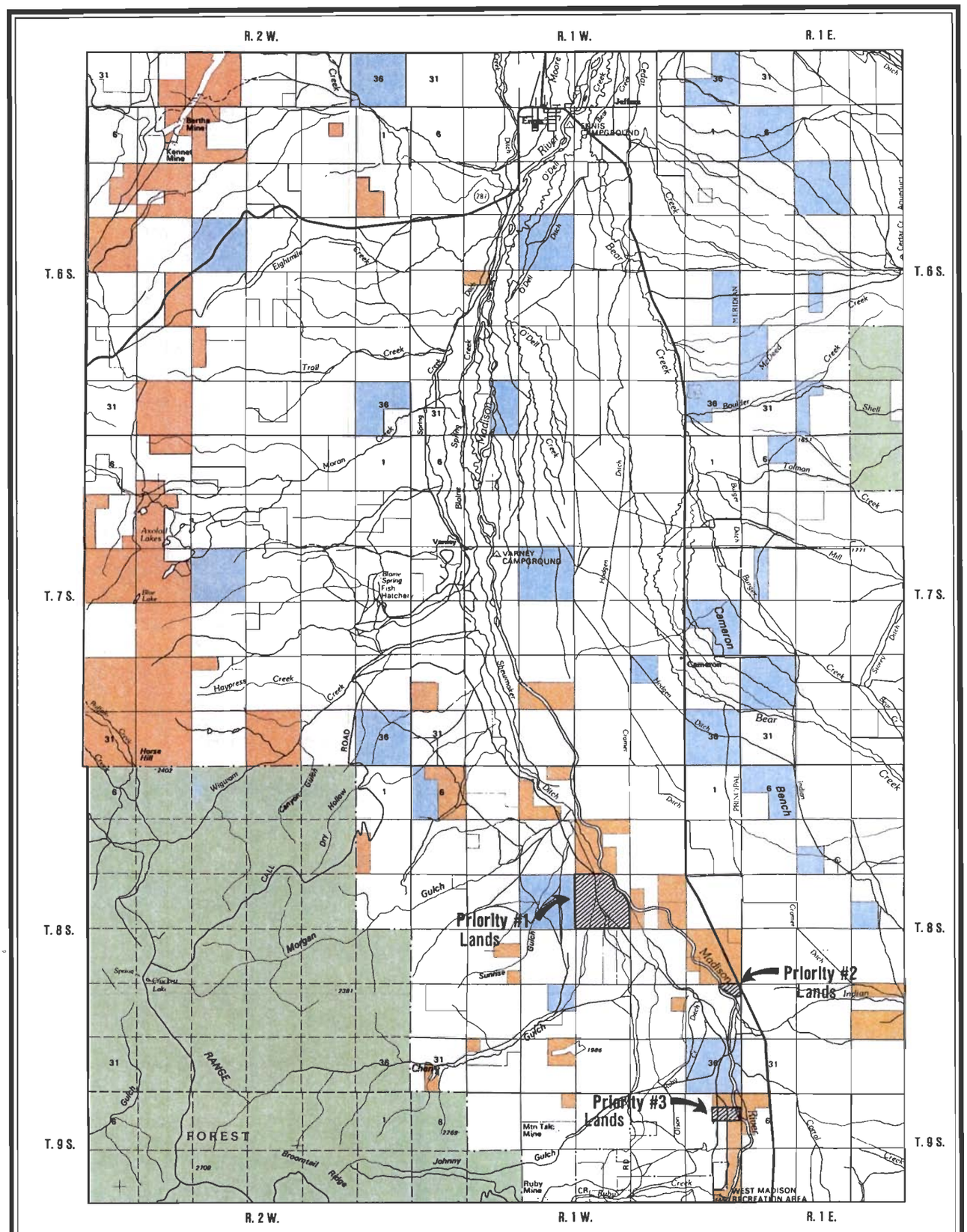
Scale
1:100,000

N



Bull Mountains Surface Ownership

Map 2



LEGEND

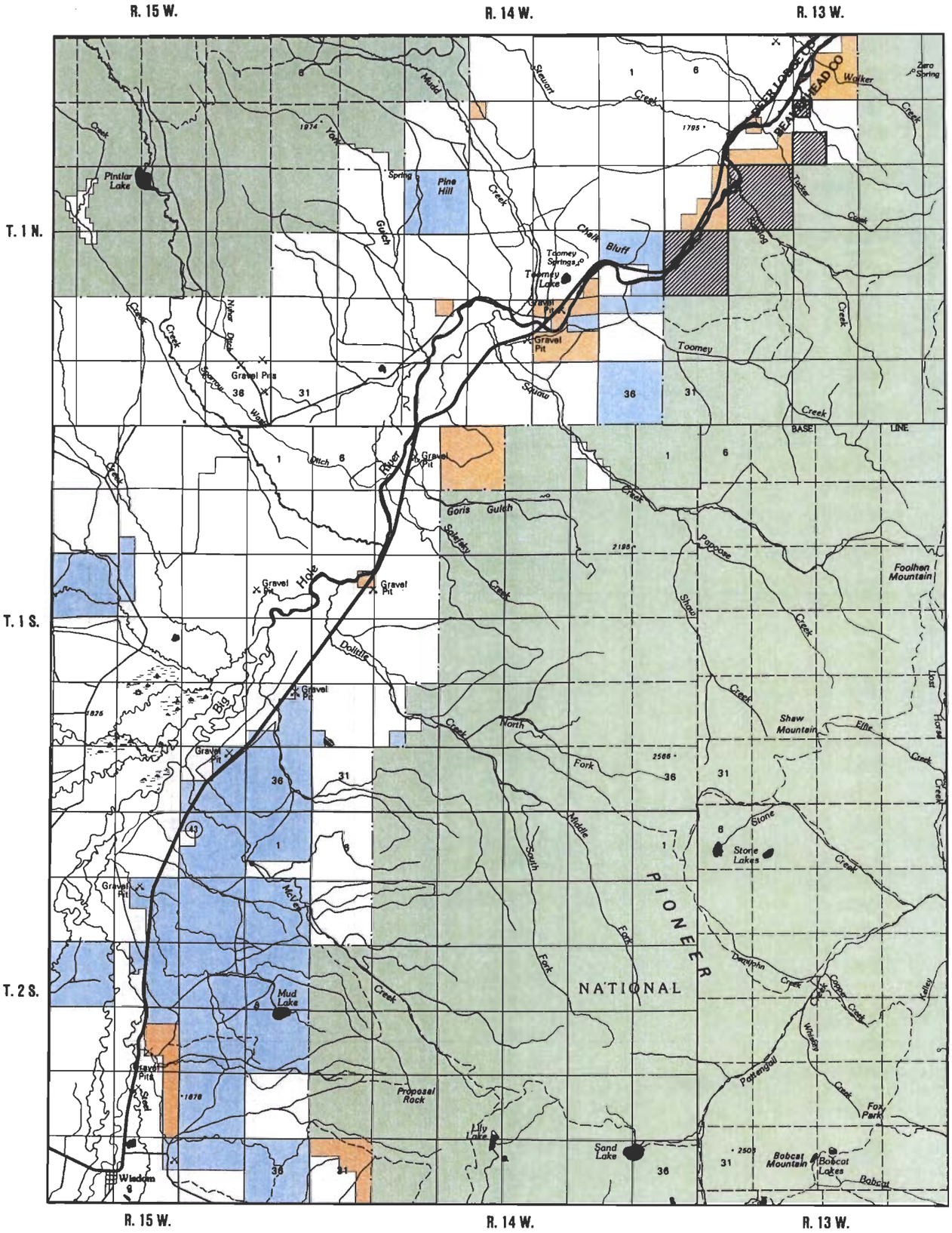
- Bureau of Land Management Surface Ownership
- National Forest
- State Lands
- Offered Private Lands
- Private

Bull Mountains Coal Exchange Priority Lands #1,2,3

-N-

Scale

Map 3



R. 15 W. R. 14 W. R. 13 W.

LEGEND

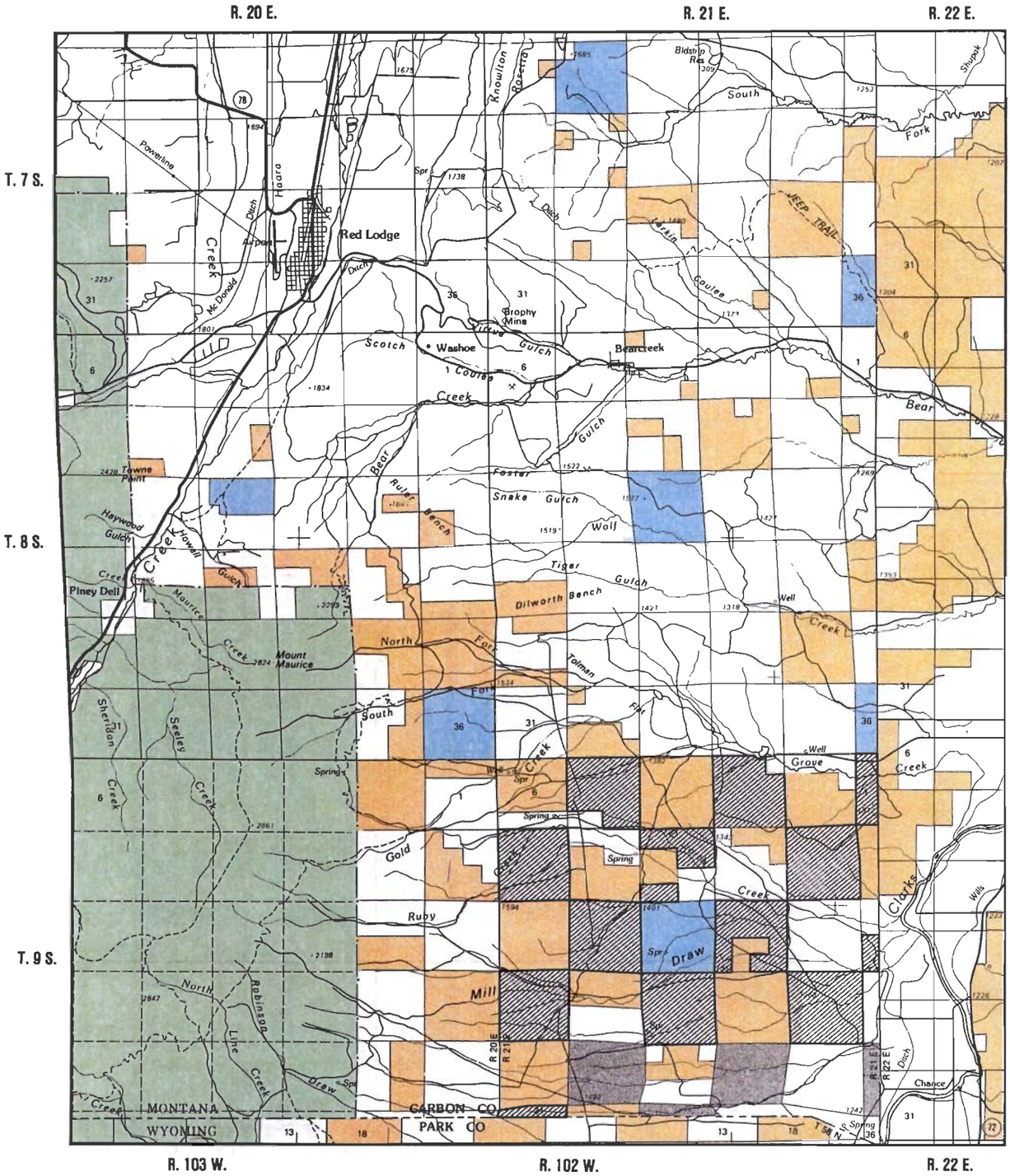
- Bureau of Land Management Surface Ownership
- National Forest
- State Lands
- Offered Private Lands
- Private

-N-

Bull Mountains Coal Exchange Priority Lands #5

Scale

Map 4



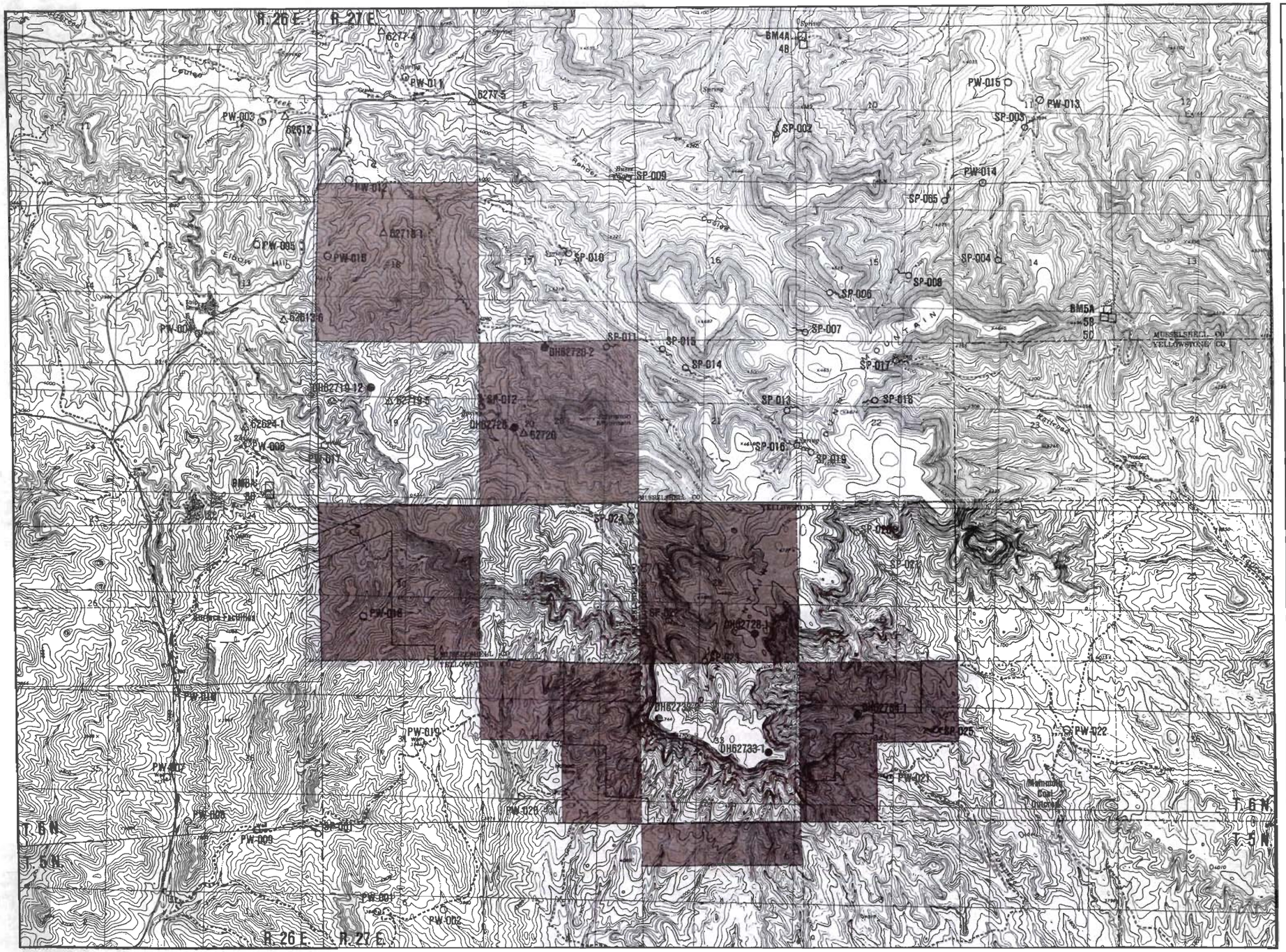
LEGEND

- Bureau of Land Management Surface Ownership
- National Forest
- State Lands
- Offered Private Lands (Priority Lands #6)
- Private
- Replacement Lands

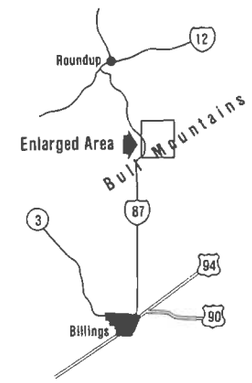
Bull Mountains Coal Exchange Priority Lands #6 and Replacement Lands

Scale

Map 5



LOCATION MAP



- Private Wells
- LL&E Observation Wells
- MBMG Observation Wells
- Meridian Test Holes
- Springs

N

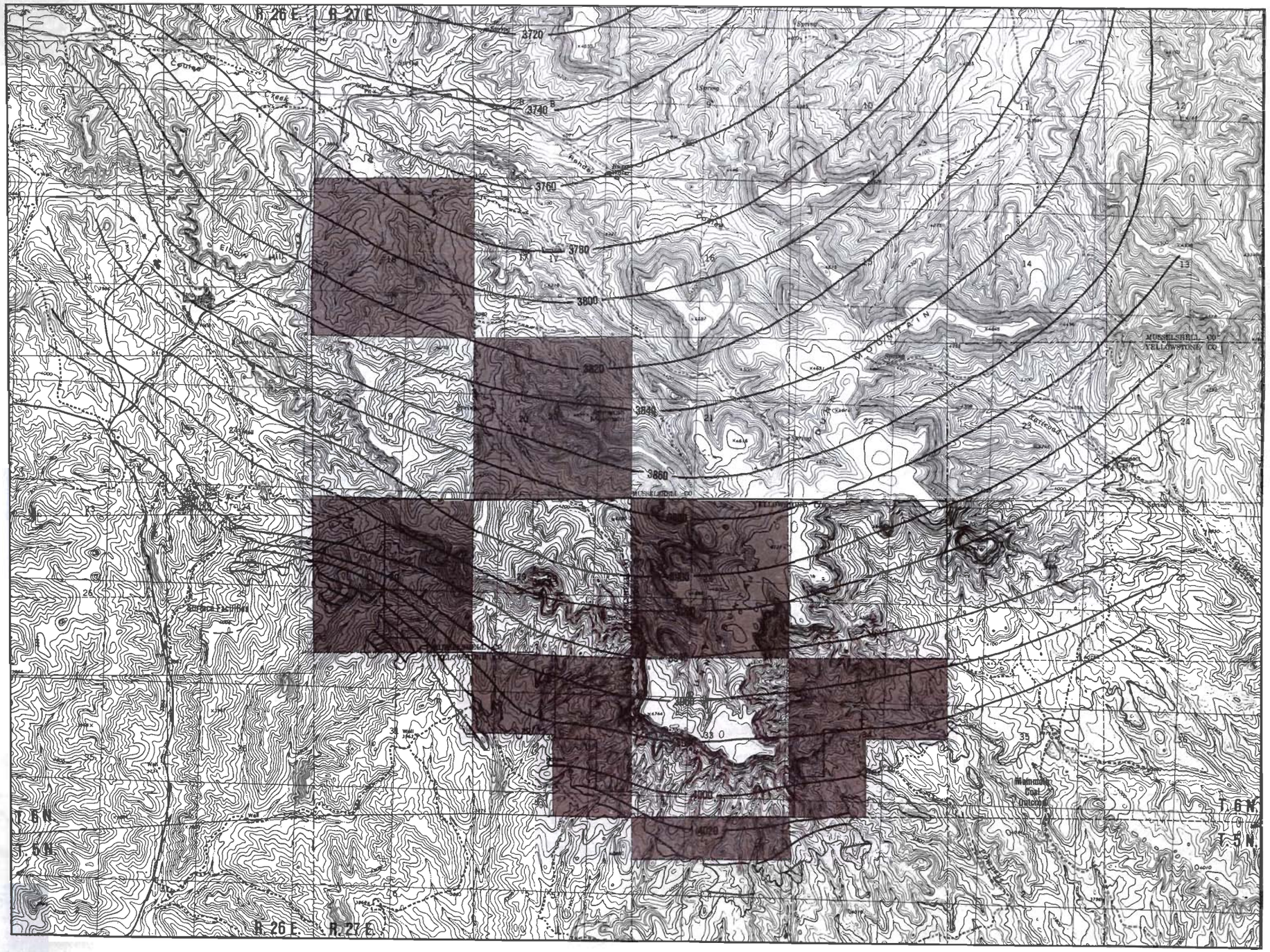
0 2000 Feet

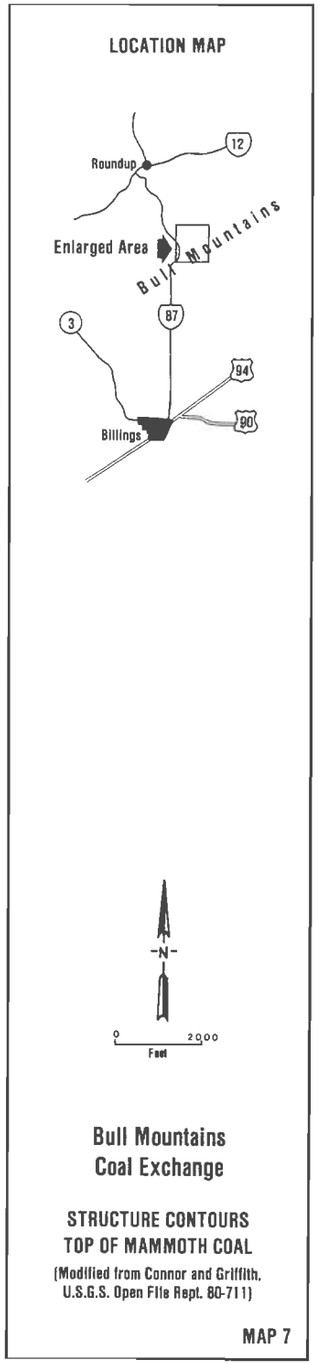
Bull Mountains Coal Exchange

WELL AND SPRING LOCATIONS

MAP 6

Source: Northern Engineering and Testing, 1988.





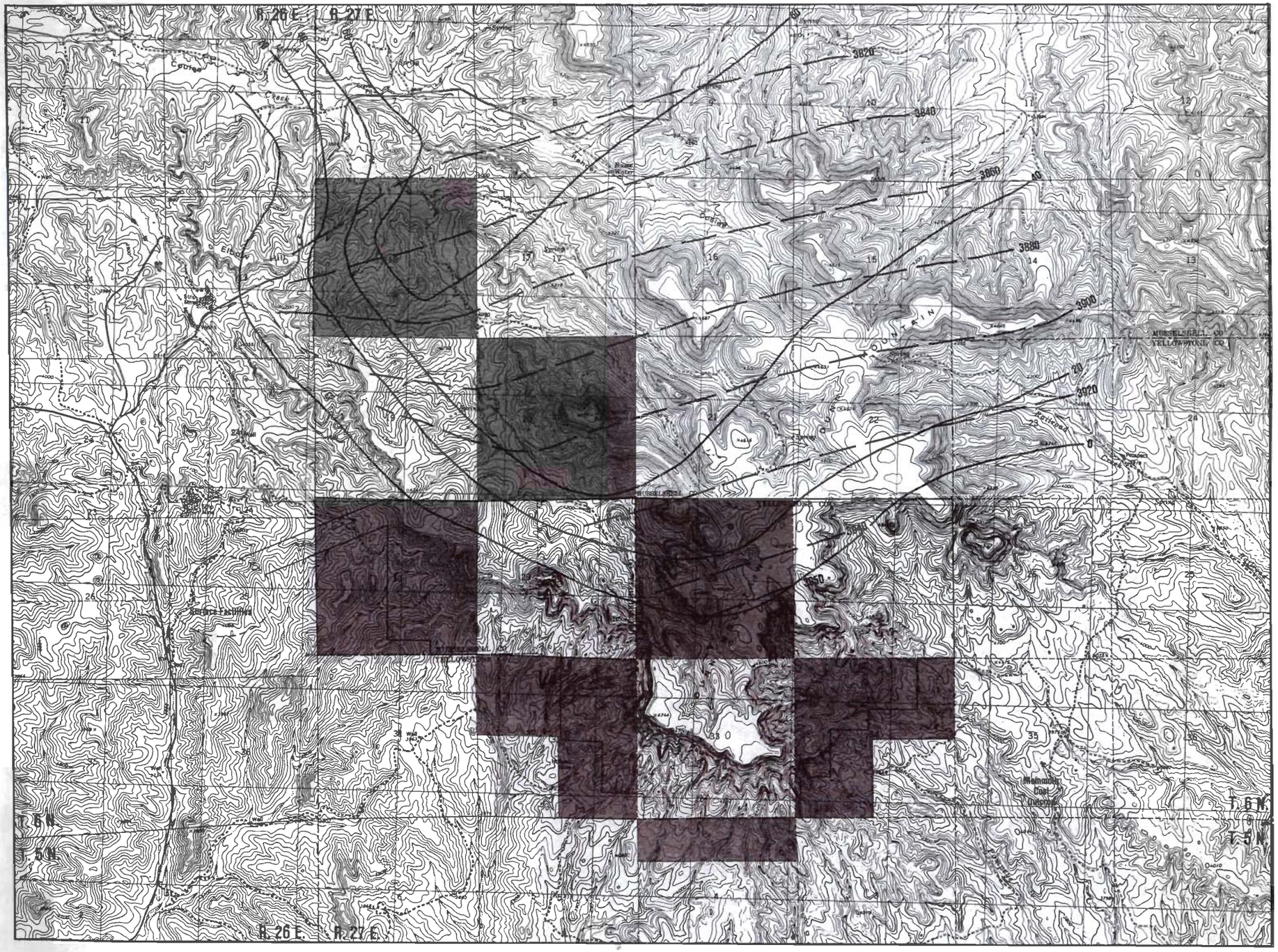
Bull Mountains Coal Exchange

STRUCTURE CONTOURS TOP OF MAMMOTH COAL

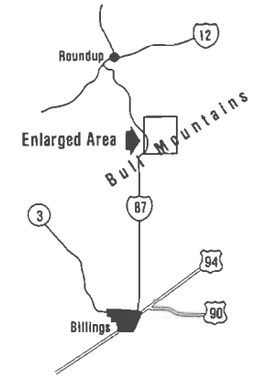
(Modified from Connor and Griffith, U.S.G.S. Open File Rept. 80-711)

MAP 7

Source: Northern Engineering and Testing, 1988.

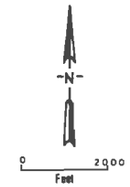


LOCATION MAP



Line of equal hydraulic head above the base of the Mammoth coal.

Potentiometric contours of the Mammoth coal.



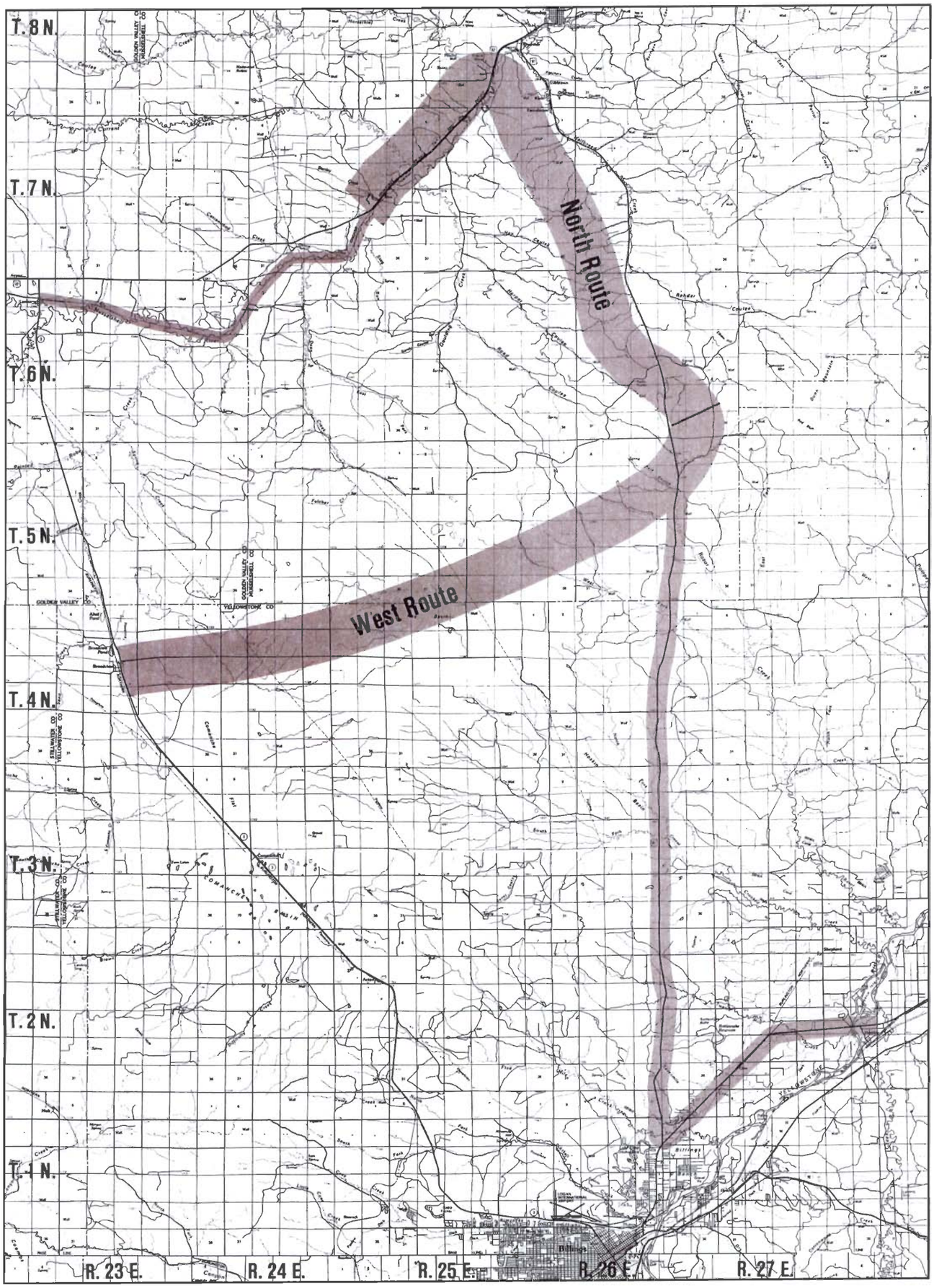
Bull Mountains Coal Exchange

HYDROGEOLOGIC DATA

(Modified from Roma, Spectrum Engineering, Billings, MT)

MAP 8

Source: Northern Engineering and Testing, 1988.



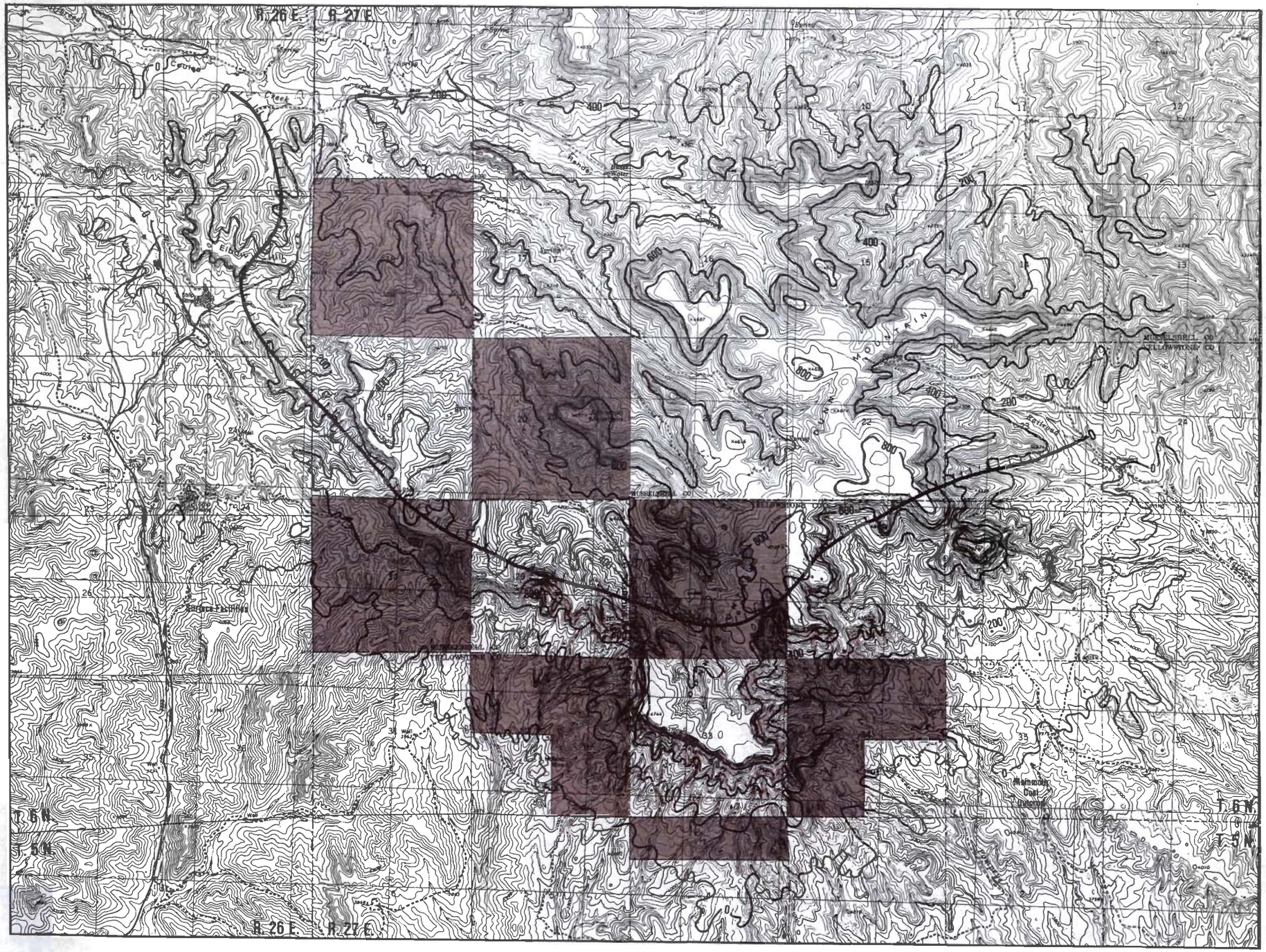
Proposed Railroad Routes and Truck Haul Route to Huntley

Proposed Railroad Right-of-Way Corridor

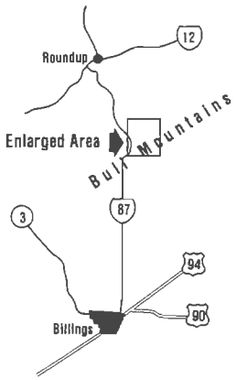
Truck Haul Route

-N-

Map 9

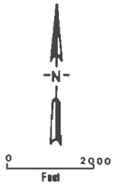


LOCATION MAP



Depth contour, thickness of Mammoth overburden.

Zero static water level, base of Mammoth coal.

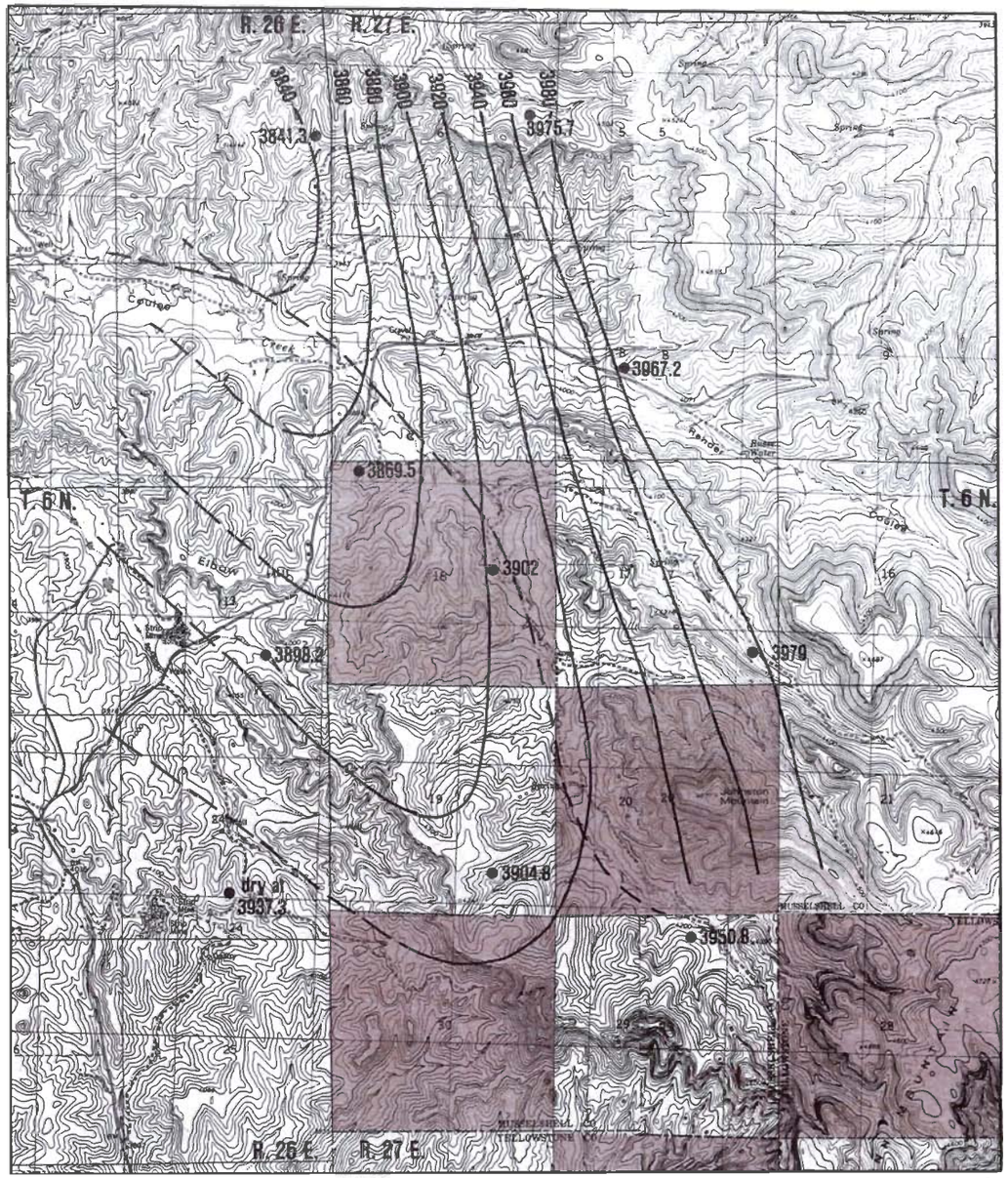


Bull Mountains Coal Exchange

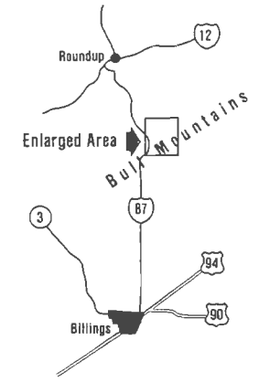
DEPTHS TO MAMMOTH COAL

MAP 10

Source: Northern Engineering and Testing, 1988.



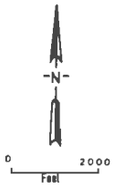
LOCATION MAP



Approximate Hydrologic Boundary

Potentiometric Contours

Static water level elevation in overburden wells.



Bull Mountains Coal Exchange

POTENTIOMETRIC SURFACE
MAMMOTH OVERBURDEN

MAP 11

Source: Northern Engineering and Testing, 1988.