3.0 PAST, PRESENT, AND REASONABLY FORESEEABLE DEVELOPMENT

This section presents a brief description of the industries evaluated in this study. Past and present and RFD coal and coal-related industries (e.g., railroads and power plants) are described below for both the Wyoming and Montana PRB study areas. Non-coal-related industries (e.g., oil and gas, etc.) only are described for the Wyoming PRB study area. Due to the concurrent development of the Miles City Resource Management Plan, only coal mine development and coal-related activities are included in this study for the Montana PRB study area.

A summary of the data sources that were used to define the past and present conditions and RFD scenarios is presented for each industry following the past and present and RFD descriptions. Where information relative to project-specific, impact-causing parameters was unavailable, industry-specific assumptions have been developed to assist in defining existing conditions (Task 1) and to facilitate preparation of the cumulative impact analyses (Task 3) of the PRB Coal Review. These industry-specific assumptions are summarized at the end of each of the following sections.

The impact-causing parameters have been tabulated in the supporting database for the Task 2 report. A summary of the impact-causing parameters associated with each Wyoming coal mine subregion under both the lower and upper production scenarios is presented in **Tables A-2** and **A-3**, respectively, in Appendix A. Impact-causing parameters associated with the Montana coal mine subregions under the lower and upper production scenarios are summarized in **Tables A-4** and **A-5**. **Tables A-7** and **A-8** summarize by subwatershed the impact-causing parameters associated with all past and present and RFD actions (including coal mining activity) in Wyoming. As discussed in Section 2.0, GIS data were used to facilitate the resource-specific disturbance acreage estimates for the Task 1D Report for the PRB Coal Review, Current Environmental Conditions (ENSR 2005). **Table A-1** summarizes the GIS-derived coal mine-related disturbance for the Wyoming PRB study area; **Table A-6** summarizes by subwatershed the GIS-derived disturbance acreages associated with all past and present actions.

3.1 Coal

3.1.1 Past and Present Development

3.1.1.1 Wyoming

The first coal mine in the Wyoming PRB was developed near Glenrock, in Converse County, in 1883 (Foulke et al. 2002). During the 1970s and early 1980s, the PRB emerged as a major coal production region. As a result, federal coal leasing became a high profile activity since the PRB's coal is over 90 percent federally owned. In 1982, the BLM temporarily halted further coal leasing; however, mining continued on existing leases. When leasing resumed, many of the mines were depleting their original reserves, so there was a need for maintenance leasing to provide reserves to enable existing mines to meet the expanding demand. The Powder River Regional Coal Team (PRRCT) decertified the region in 1990, allowing BLM to use the lease by application (LBA) process to meet this need.

The 12 currently operating and 1 temporarily inactive coal mines in the Wyoming PRB are grouped by subregion as shown in **Figure 3-1** and as described below. For purposes of this study, the mines in the Sheridan, Wyoming, area have been included in Subregion 4 (Sheridan/Decker), which is discussed in Section 3.1.1.2 of this report.

- Subregion 1 (North Gillette) – Buckskin, Dry Fork (which now includes the old Fort Union), Eagle Butte, Rawhide, and Wyodak mines.
- Subregion 2 (South Gillette) – Belle Ayr, Caballo, Coal Creek, and Cordero-Rojo mines.
- Subregion 3 (Wright) – Antelope, North Rochelle/Black Thunder, Jacobs Ranch, and North Antelope/Rochelle mines.

Of these operations, the Coal Creek Mine currently is inactive.

Other coal mines within the Wyoming PRB study area and their status are described below. Based on their status, these facilities are not analyzed further in this study.

- Clovis Point Mine – part of operating Wyodak and Dry Fork mines
- Izita – permitted dragline walkway from the Coal Creek Mine to the Black Thunder Mine
- KFx – haul road to supply coal from the Wyodak Mine to the adjacent KFx facilities located at old Fort Union Mine (now part of Dry Fork) area

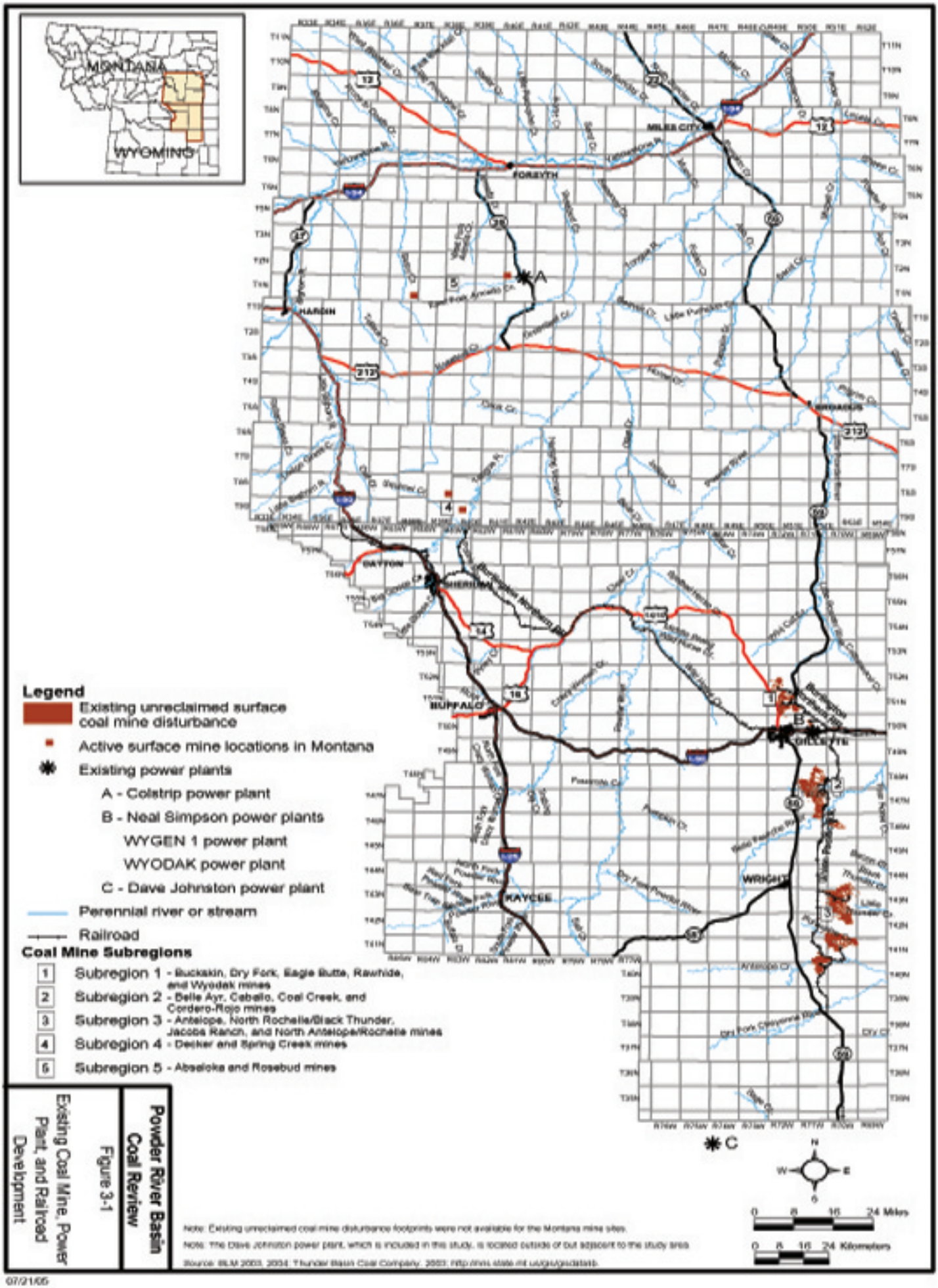
3.1.1.2 Montana

For purposes of this study, Subregion 4 encompasses the coal mining activities in the Sheridan, Wyoming, and Decker, Montana areas. Subregion 5 encompasses mining activity in the Ashland/Colstrip, Montana, area. The currently active mines in these subregions are shown in **Figure 3-1** and are identified below.

- Subregion 4 (Sheridan/Decker) – Decker (east and west pits) and Spring Creek mines.
- Subregion 5 (Ashland/Colstrip) – Absaloka and Rosebud mines.

Other coal mines in Subregions 4 and 5 and their status are described below. These mines are shown in **Figure 3-1**. Based on their status, these facilities are not analyzed further in this study.

- Big Horn Mine – in final reclamation and awaits final bond release
- Welch Mine – in final reclamation, for final bond release part of an exchange with the Pittsburg & Midway Coal Mining Company (P&M)
- Public Service Company of Oklahoma's (PSO) Ash Creek Mine – has been reclaimed and awaits final bond release



Note: Existing unreclaimed coal mine disturbance footprints were not available for the Montana mine sites.

Note: The Dave Johnston power plant, which is included in this study, is located outside of but adjacent to the study area.

Source: BLM 2003, 2004; Thunder Basin Coal Company, 2003; http://mrs.state.mt.us/gis/gisdatab.

Powder River Basin Coal Review

Figure 3-1

Existing Coal Mine, Power Plant, and Railroad Development

07/21/05

- Big Sky Mine – idle and in final reclamation stages

- Other historic underground mines - Many square miles of historic underground workings exist to the south-southwest of the historic Welch Mine lands. These mines were closed and sealed off in 1953. Subsequent roof collapses over one of these mines (the Acme Mine No. 42) led to the development of underground coal fires in the Monarch and possibly Carney coal beds, which may have spread to other overlying coal beds (i.e., Dietz 2 and Dietz 3). These fires may have been the cause of the 5,207-acre Thunder Child Range Fire in 2001, although the actual cause has not been determined. The WDEQ/Abandoned Mine Land Division has conducted a number of reclamation and emergency rehabilitation projects in recent years in attempts to extinguish the underground coal bed fires; however, based on BLM's 2003 site visit, the fires continue to burn (BLM 2003b). Due to the lack of information relative to the extent of the underground burn area and the uncertainty of the cause of the Thunder Child Range Fire, these historic workings have been eliminated from further analysis in this study.

3.1.2 Reasonably Foreseeable Development

Due to the variables associated with future coal production, two coal production levels (an upper and a lower production level) were projected for the PRB Coal Review to bracket the most likely foreseeable regional coal production level and to provide a basis for quantification of associated impact-causing parameters (see **Figures A-1** through **A-6** in Appendix A). The basis for the projected production ranges included: 1) an analysis of historic PRB production levels in comparison to the gross domestic product (GDP) and national coal demand; 2) an analysis of current PRB coal market forecasts that model the impact of GDP growth, potential regulatory changes affecting coal-fired power plants, and mining and transportation costs on PRB coal demand; 3) the availability, projected production cost, and quality of future mine-specific coal reserves within the PRB region; and 4) the availability of adequate infrastructure for coal transportation. The projected upper and lower production levels subsequently were allocated to coal mine subregions in the PRB and to individual mines based on past market shares. Individual mine production levels were reviewed relative to potential future production constraints (e.g., loadout capacities), permitted production levels, mining costs, and coal quality.

The methodology used to develop the future coal mine projections for both the lower and upper production scenarios is summarized below.

- The upper end of the range of total PRB mine production was increased from the MWH Coal Planning Estimates Report of March 2003 to bracket higher production forecasted by the Hill and Associates PRB Coal Demand Study of 2003. The Hill and Associates 2003 data were not available at the time of the MWH study.

- The upper end of the production range by mine closely resembles the Hill and Associates 2003 study, with the exception that mine production was not curtailed in the latter years of the study. This adjustment was made to account for a published "glitch" in the Hill and Associates modeling technique ("caused by the fact that we used reserves listed in the state mining permit applications… In many cases, the coal producer simply lists enough reserves to satisfy his 20-year mine plan in the permit application [instead of true geologic reserves] [Hill and Associates 2003].")

- The lower end of the range of total PRB mine production was decreased slightly from the MWH Coal Planning Estimates Report of March 2003 to bracket Platts data and better account for a potential downward market adjustment forecasted in the Hill and Associates 2003 study resulting from possible clean air regulatory changes in 2009.

- Wright area mines were not increased above current WDEQ air quality permit levels due to recent air quality monitoring data exceedences.

- Specific mine loadout capacities were estimated from BNSF railroad reports and mine permit data. Some mines are forecasted to produce above these estimated capacities.

- The South Gillette and Wright subregion mines (Subregions 2 and 3, respectively) are served by Wyoming State Route (SR) 59 and the North Gillette subregion is serviced by U.S. Highway 14/16. Numerous spur roads, tied to these main highways, serve as access roads into the mines in the Wyoming PRB region. The acreages associated with the access roads have been accounted for in the mine-specific acreages for this study.

- The existing road infrastructure provides access to all existing mines and proposed development projects in Subregion 4. It is assumed that only minor upgrades to portions of these routes would be required to address possible increases in traffic and capacity of the routes.

3.1.2.1 Wyoming

Based on the analysis conducted for this study, the forecasted upper production range for the coal mines in the Wyoming PRB study area would mirror the Hill & Associates (2003) forecast, with a strong period of growth through 2007, at which point production is projected to be 490 million tons per year (mmtpy). Coal production subsequently would flatten in response to new environmental regulations scheduled to take effect in 2008 that would further limit electric power plant emissions. The projected growth in coal production would resume in 2010 and continue through 2020, at which point production is projected to be 625 mmtpy. The forecasted lower production level would mirror the more conservative forecasts by Platts (2004) and Global Insight (2004) and the lower production level identified by MWH (2003). Under the projected lower production level, a production of 490 mmtpy would not be realized until 2015, and production in 2020 would be 531 mmtpy. The resulting 2 percent annualized growth rate for the lower production level and 3 percent annualized growth rate for the upper production level through 2020 compare conservatively to the historic 6.8 percent annualized growth rate for the prior 20 years in the Wyoming PRB.

Following the projection of individual mine production levels for the upper and lower production scenarios, likely reserve and mining sequence layouts were developed based on geologic information, 2003 mine pit progressions and projected mine reserve sequence maps on file with the WDEQ/Land Quality Division, and recovery information provided by the PRB operators. The mapped areal extent of mine reserves subsequently were projected in 5-year increments and provided to the PRB coal operators for review and comment. Future coal mining in the Wyoming PRB through 2020 is considered certain/highly likely based on the anticipated production rates in relation to the available economic reserves.

Mine-related capital investment under both the projected lower and upper production scenarios is presented in **Table 3-1**.

Table 3-1
Coal Mine Total Capital Investment by Year
(million dollars)

Mine Subregion	Year					
	Lower Production Scenario			Upper Production Scenario		
	2010	2015	2020	2010	2015	2020
Mobile Equipment						
Subregion 1 – North Gillette	18	56	6	56	89	9
Subregion 2 – South Gillette	35	89	31	68	91	50
Subregion 3 – Wright	110	140	150	150	153	129
Subregion 4 – Sheridan/Decker	32	0	0	34	7	0
Subregion 5 – Ashland/Colstrip	0	0	0	15	39	2
Subtotal	**195**	**276**	**187**	**323**	**379**	**190**
Rail Loadout Facilities[2]						
Subregion 1 – North Gillette	0	0	0	0	5	0
Subregion 2 – South Gillette	0	0	0	0	10	10
Subregion 3 – Wright	5	10	5	20	5	5
Subregion 4 – Sheridan/Decker	20	0	0	20	0	0
Subregion 5 – Ashland/Colstrip	0	0	0	20	20	0
Subtotal	**25**	**10**	**5**	**60**	**40**	**15**
Highway Transportation[3]						
Subregion 1 – North Gillette	0	5	0	0	5	0
Subregion 2 – South Gillette	0	0	5	0	0	5
Subregion 3 – Wright	0	0	0	0	0	0
Subregion 4 – Sheridan/Decker	0	0	0	0	0	0
Subregion 5 – Ashland/Colstrip	0	0	0	0	0	0
Subtotal	**0**	**55**	**5**	**0**	**5**	**5**
Total	**215**	**291**	**197**	**383**	**424**	**210**

[1] Calculate in 2003 dollars at $0.85 per bank cubic yard annual capacity.
[2] Calculate in 2003 dollars at $1.00 per ton annual capacity.
[3] Calculate in 2003 dollars at $5 million per mile relocated excluding land acquisition costs.

Other impact-causing parameters associated with Wyoming coal mine operations are summarized in **Tables A-2** and **A-3** in Appendix A of this report.

3.1.2.2 Montana

The projected upper and lower production trends for the coal mines in the Montana PRB study area would parallel those described in Section 3.1.2.1 for the mines in the Wyoming PRB study area.

Based on the analysis conducted for this study, it is estimated that the current (2003) production of 36.1 mmtpy of coal in the Montana PRB study area would increase to 56.0 mmtpy under the lower production scenario and to 83.0 mmtpy under the upper production scenario by 2020. Production at currently operating mines is projected to continue throughout the study period. In addition, three

potential new developments (i.e., P&M Ash Creek Mine, Otter Creek Mine, and Kinsey Mine) have been identified in the Montana PRB study area. Under the lower production scenario, it is projected that production at the P&M Ash Creek Mine would be initiated by 2010; the Otter Creek and Kinsey mines would not be developed. Under the upper production scenario, it is projected that production would be initiated by 2010 at both the Otter Creek and P&M Ash Creek mines and by 2015 at the Kinsey Mine. Development of these mines would be dependent on markets for the coal and may be tied to development of infrastructure including the Tongue River Railroad and/or power plants. It is assumed that development of the Otter Creek Mine would require construction of Tongue River Rail Company's (TRRC's) proposed Tongue River Railroad and a power plant near Miles City, Montana. However; at this time, no application has been filed for a new power plant at this location. It is assumed that the Kinsey Mine would be developed in response to construction of a mine-mouth power plant; however, an application for a new power plant at this location has not been filed at this time.

Following the development of individual mine production levels for the two scenarios, individual mine reserves and mining sequence layouts were developed based on geologic information and 2003 mine pit progressions on file with the MDEQ. Reserves beyond the current mine permit boundaries and existing mine lease boundaries (e.g., potential developments including P&M Ash Creek, Otter Creek, and Kinsey mines) were sequenced based on strip ratio and proximity to past mining. The mapped areal extent of mine reserves subsequently were projected in 5-year increments (**Figures A-3** and **A-4** in Appendix A). Future coal mining in the Montana PRB study area is considered certain/highly likely based on the anticipated production rates in relation to the available economic reserves. However, the likelihood for both the Otter Creek and Kinsey mines is considered low under the upper production scenario due to their inter-dependency on other developments. These two mines would not be developed under the lower production scenario.

Three additional properties (CX Ranch, Young's Creek, and North Ashland) were identified by Hill and Associates (2003) as potential coal mine sites. However, based on the lack of information for these potential mine sites, their likelihood for development is currently unknown. As a result, they have been eliminated from further analysis in this study.

Mine-related capital investment under both the projected lower and upper production scenarios is presented in **Table 3-1**.

3.1.3 Data Sources

Public information in the form of permit documents, annual reports, permit applications, LBAs, EISs, correspondence, and articles was obtained from the WDEQ (Land Quality and Air Quality divisions), MDEQ, BLM Casper Field Office and Wyoming State Office, BLM Montana State Office and Miles City Field Offices, Wyoming State Mine Inspector's Office, USDOE, STB, Federal Energy Regulatory Commission (FERC), and numerous trade and industry publications.

Proprietary economic reports forecasting regional coal market activity from Hill and Associates Inc., Platts, Global Insight, and proprietary industry input from the individual coal mine operators in the Wyoming and Montana PRB study area, also were used in the preparation of the coal resources sections of this report.

3.1.4 Assumptions

In addition to the information obtained from the identified data sources, the following assumptions were used to define specific impact-causing parameters for coal mines:

Past and Present Development:

- Existing operations are not part of the abandoned mine lands programs.

RFD:

- It is assumed that Ash Creek and the other Decker area mines would obtain new WDEQ- and MDEQ-approved air quality permits, as applicable, consistent with their forecasted production levels.

- Consistent with historical trends, it is assumed that currently idle mines would be brought back into production during periods of high growth in the projected upper end of the production range.

- Under the lower production scenario, it is assumed that the P&M Ash Creek Mine would initiate production by 2010; the Otter Creek and Kinsey mines would not be developed. Under the upper production scenario, it is assumed that production would be initiated by 2010 at both the Otter Creek and P&M Ash Creek mines and by 2015 at the Kinsey Mine. However, development of the TRRC's proposed rail line and construction of a power plant near Miles City would be required for the Otter Creek Mine to become operational. Development of the Kinsey Mine would be dependent on construction of a mine-mouth power plant. No permits have been submitted at this time for power plants in either of these locations.

- It is assumed that production from the P&M Ash Creek Mine in Wyoming would be serviced by existing capacity in the BNSF rail line operating in Sheridan, Wyoming.

- It is anticipated that TRRC's construction of 130 miles of new rail line between Miles City and Decker, Montana, would be completed and operational by 2010; however, construction of the rail line would be dependent on the development of the Otter Creek Mine, which only would be developed under the upper production scenario. The new rail line would have a capacity of approximately 100 mmtpy.

- No major state or interstate highways would be impacted by future mining activities in Montana.

- Construction of the proposed DM&E rail line is estimated to be completed between 2010 and 2014 (or when production in the Wyoming PRB approaches 450 mmtyp); operation is assumed starting with the 2015 time period. The rail line would add approximately 100 mmtpy of rail transportation capacity for the Wright and South Gillette subregion mines.

- Projections for groundwater production beyond 2002 assume that groundwater production rates under both the low and high production scenarios would remain the same as during the period between 2000 and 2002.