

2.0 PREDICTED FUTURE CUMULATIVE IMPACTS

2.1 Topography, Geology, Minerals, and Paleontological Resources

2.1.1 Study Area

The cumulative effects study area for topography, geology, minerals, and paleontological resources includes the following subwatersheds in portions of Sheridan, Johnson, Campbell, and Converse counties: Upper Powder River, Little Powder River, Upper Belle Fourche River, Upper Cheyenne River, Antelope Creek, and Dry Fork Cheyenne River (**Figure 1-1**). It includes portions of the area administered by the BLM Buffalo and Casper field offices, and a portion of the TBNG, which is administered by the FS (**Figure 1-2**). Private lands comprise most of the surface ownership in the study area (**Figure 1-3**); the majority of the mineral ownership is federal (**Figure 1-4**). The State of Wyoming also owns a portion of the surface area (**Figure 1-3**), and generally owns the minerals where it owns the surface.

2.1.2 Cumulative Impacts

Based on the information in Appendices A and D of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities (ENSR 2005c), a total of approximately 220,688 acres (5 percent) of land area have been disturbed by development activities in the cumulative effects study area (as of 2003). Of the 220,688 acres of total cumulative disturbance, approximately 68,794 acres of disturbance (31 percent) were associated with coal mine development.

Of the 220,688 acres of total cumulative disturbance, approximately 111,786 acres (51 percent) have been reclaimed. The remaining 108,901 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 68,794 total cumulative acres of disturbance directly associated with coal mine development, approximately 21,238 acres (31 percent) have been reclaimed (as of 2003). Of the remaining 47,556 acres of disturbance, approximately 24,097 acres currently are not available for reclamation, as they are occupied by long-term facilities which are needed to conduct mining operations. These areas would be reclaimed near the end of each mine's life. Reclamation of the remaining 23,459 acres, which represent areas of active mining and areas where coal has been recovered but reclamation has not been completed, would proceed concurrently with coal mining. (Note: minor discrepancies in acreages are the result of rounding.)

The effects to topography, geology, minerals, and paleontological resources from development activities within the PRB study area under two production scenarios (lower and upper production scenarios) for the years 2010, 2015, and 2020 are presented below.

2.0 Predicted Future Cumulative Impacts

2.1.2.1 Year 2010 – Lower Production Scenario

Topography

Potential impacts to topography as a result of RFD activities in the cumulative effects study area would be similar to those described in the Task 1D Report for the PRB Coal Review, Current Environmental Conditions (ENSR 2005b). Under the lower production scenario, it is projected that an additional 119,224 acres would be disturbed by RFD activities by 2010, which would result in a total of approximately 339,912 acres of cumulative disturbance to topography. Of the 339,912 acres of disturbance (7.6 percent of the study area), it is projected that 98,662 acres (29 percent) would be altered as a result of coal mining activities.

Of the 339,912 acres of total cumulative land disturbance, approximately 205,113 acres (60 percent) would be reclaimed by 2010. The remaining 134,799 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 98,662 acres of total cumulative disturbance associated with coal mine development, it is estimated that approximately 44,938 acres (46 percent) would be reclaimed by 2010. Of the remaining 53,724 acres of coal mining-related disturbance, it is estimated that approximately 26,338 acres would be unavailable for concurrent reclamation due to the presence of long-term facilities which would be reclaimed near the end of each mine's life. Reclamation of the remaining 27,386 acres of disturbance would proceed concurrently with mining operations.

The disturbance associated with the majority of the RFD activities would result in the general leveling of the surface to accommodate facilities (e.g., well pads, power plants, etc.) and roads. Recontouring during reclamation to match approximate original contour as required by regulation would minimize the long-term impact to topography. Coal mining would have a greater impact on topography than other types of development through changes in slope, lowering the general land surface, and changing the physical nature of the surficial materials and overburden, even after reclamation.

Geology

Under the lower production scenario, there would be approximately 339,912 acres of cumulative disturbance in the study area by 2010 as a result of past and projected development activities. Approximately 98,662 acres of the cumulative disturbance would be directly related to coal mining activities. In the coal mine areas, the overburden and coal would be removed and the overburden replaced, resulting in a permanent change in the geology of the area and a permanent reduction of coal resources. The remainder of the projected disturbance generally would result in only surficial surface disturbance.

No cumulative impacts have been identified in association with geologic hazards.

Mineral Resources

Coal Resources. Under the lower production scenario, coal production in 2010 would increase to 411 million tons per year (mmtpy). This would be an increase of 48 mmtpy over current (2003)

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production levels. Ongoing production would result in the permanent reduction of coal resources available for future development in the study area.

Although prices of fluid minerals have fluctuated over the past 20 years, coal prices have been relatively stable in comparison. Coal production is expected to increase in spite of flat price projections to the year 2010 (Lyman 2005). Oil, natural gas, and CBNG are more sensitive to supply and demand fluctuations. As a result, the commodities are mutually exclusive with regard to one affecting the other. Ultimately, aggregate energy prices are related; however, development of oil, natural gas, and CBNG and related facilities (pipelines and compressor stations) would not be affected by coal leasing and production.

Conventional Oil and Gas Resources. By year 2010, annual oil production in the study area is projected to be approximately 13.8 million barrels of oil (MMBO), an increase of 2.4 MMBO over current (2003) production levels. The resulting cumulative oil production (1974 through 2010) from the study area would be 1.13 billion barrels of oil (BBO). Annual production of associated and conventional natural gas in 2010 is projected to be 33.9 billion cubic feet (BCF), resulting in a cumulative production (1974 through 2010) of 1.8 trillion cubic feet (TCF). (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.) Ongoing production would result in the permanent reduction of these resources in the study area.

CBNG. By year 2010, annual CBNG production in the study area is projected to be approximately 480 BCF, 196 BCF higher than current (2003) production levels. The resulting cumulative CBNG production (1974 through 2010) from the study area would be 4.0 TCF. (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.) Ongoing production would result in the permanent reduction of CBNG resources available for future development in the study area.

Coal production would have negligible impact on CBNG production. Most of the early CBNG development has occurred in shallower areas close to the outcrop and coal mining areas. Much of the CBNG may be depleted in these areas by 2010. There may be isolated areas where development of coal and CBNG would be in conflict; however, the effect on these resources would be very small.

Other Mineral Resources. Although sand, gravel, scoria, bentonite, and potentially uranium production are anticipated to continue in the study area, production levels cannot be determined based on current information. Ongoing production would result in the permanent reduction of these resources available for future development in the study area.

The development of other mineral resources with regard to coal production would be similar to the interaction with oil, natural gas, and CBNG as described under Coal Resources. Coal production levels are not likely to affect the development of other mineral resources in the study area. Sand and gravel resources are more likely to be affected to a greater degree by oil, natural gas, and CBNG development, due to the large quantity of these resources required for use in the construction of well field-related access roads and pads.

2.0 Predicted Future Cumulative Impacts

Paleontological Resources

Under the lower production scenario, it is projected that past and projected development-related impacts to the Wasatch and Fort Union formations by 2010 would include approximately 339,912 total cumulative acres of disturbance. Of the 339,912 acres, it is projected that 98,662 acres (29 percent) would be associated with coal mining activities.

Based on existing (2003) information, no significant or unique paleontological localities have been recorded in the PRB. However, the lack of localities in the PRB does not mean that no scientifically significant fossils are present, as much of the area within and surrounding the PRB has not been adequately explored for paleontological resources. As a result, RFD activities in the study area could adversely affect scientifically significant fossils, if present in or adjacent to disturbance areas. The potential for impacts to scientifically significant fossils would be greatest in areas where Class 3, 4, or 5 formations are present. (See Section 2.1.3.4 of the Task 1D Report for the PRB Coal Review, Current Environmental Conditions [ENSR 2005b] for classification definitions as presented in BLM [1998] guidance.) The Wasatch and Fort Union formations underlie the cumulative effects study area and are classified as Class 5 and Class 3 formations, respectively. Both surface and subsurface fossils could be damaged or destroyed during RFD-related ground-disturbing activities. The greatest potential impact to surface and subsurface fossils would result from disturbance of surface sediments and shallow bedrock during construction and/or operation, depending on the type of project. As only portions of the cumulative effects study area have been evaluated for the occurrence of paleontological resources, and discrete locations for RFD activities cannot be determined at this time, no accurate estimate can be made as to the number of paleontological sites that may be affected by development activities. Potential subsurface disturbance of paleontological resources (e.g., during drilling operations) would not be visible or verifiable.

RFD activities which involve federally-owned surface and/or minerals would be subject to federal guidelines and regulations protecting paleontological resources. Protection measures, permit conditions of approval, and/or mitigation measures would be determined on a project-specific basis at the time of permitting to minimize potential impacts to paleontological resources as a result of RFD activities. Specifically, the BLM's policy for paleontological resources is to manage them for their scientific, educational, and recreational values, and to mitigate adverse impacts to them. Data on the occurrence or potential for the occurrence of fossils is essential to land managers for compliance with the policy. For paleontological resources, the land-use planning process includes:

- Identifying areas and geological units (i.e., formations and members containing paleontological resources);
- Evaluating the potential of areas to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils;
- Developing management recommendations (including mitigation measures in specific locations) to promote the scientific, educational, and recreational uses of fossils on public lands and mitigate resources conflicts; and
- Developing strategies to regularly monitor public lands where important paleontological localities have been identified.

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If no federal ownership (land or mineral) is involved, federal permits would not be required. In this case, protection measures for paleontological resources might not be mandated by the landowners or monitored as closely. Unprotected paleontological resources potentially could be disturbed, damaged, destroyed, or removed from the site, losing much or all of their preserved scientific information.

2.1.2.2 Year 2010 – Upper Production Scenario

Topography

Potential impacts to topography in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 3,786 additional acres of land would be disturbed. Under this scenario, past and projected activities in the study area are projected to result in the total cumulative disturbance of approximately 343,698 acres of land (disturbance to 7.7 percent of the study area) by the year 2010. Of the 343,698 acres, it is projected that 102,448 acres (30 percent) would be associated with coal mining activities.

Of the 343,698 acres of total cumulative disturbance, approximately 206,946 acres (60 percent) would be reclaimed by 2010. The remaining 136,752 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 102,448 acres of disturbance associated with coal mining, it is projected that approximately 46,771 acres (46 percent) would be reclaimed by 2010. Of the remaining 55,677 acres of coal mining-related disturbance, it is estimated that approximately 25,688 acres would be unavailable for concurrent reclamation due to the presence of long-term facilities which would be reclaimed near the end of each mine's life. Reclamation of the remaining 29,989 acres of disturbance would proceed concurrently with mining operations.

Geology

The effects on geology as a result of RFD activities in the study area would be the same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, approximately 3,786 additional acres of disturbance associated with increased coal production would occur, resulting in an increased impact on geology.

Mineral Resources

Coal Resources. Impacts to coal resources in the study area would be the same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, coal production in 2010 is projected to be approximately 479 mmtpy, 68 mmtpy higher than production under the lower scenario in 2010.

Conventional Oil and Gas Resources. Under this scenario, impacts to conventional oil and gas resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

CBNG. Under this scenario, impacts to CBNG resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

2.0 Predicted Future Cumulative Impacts

Other Mineral Resources. Under this scenario, impacts to other mineral resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

Paleontology

Potential impacts to paleontological resources in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 3,786 additional acres would be disturbed. Under this scenario, past and projected development activities in the study area would result in the total cumulative disturbance of approximately 343,698 acres of land by the year 2010. Of the 343,698 acres, it is projected that 102,448 acres (30 percent) would be associated with coal mining activities.

2.1.2.3 Year 2015 – Lower Production Scenario

Topography

Potential impacts to topography in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 86,172 additional acres of land would be disturbed. Under this scenario, past and projected development activities would result in the total cumulative disturbance of approximately 426,084 acres of land (disturbance to 9.5 percent of the study area) by year 2015. Of the 426,084 acres, it is projected that 117,236 acres (27 percent) would be associated with coal mine development.

Of the 426,084 acres of total cumulative disturbance, approximately 286,614 (67 percent) would be reclaimed by 2015. The remaining 139,472 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. (Minor discrepancies in total acreages are the result of rounding.) Of the 117,236 acres of disturbance associated with coal mining, it is projected that approximately 61,188 (52 percent) would be reclaimed by 2015. Of the remaining 56,048 acres of coal mining-related disturbance, it is estimated that approximately 27,549 acres would be unavailable for concurrent reclamation due to the presence of long-term facilities which would be reclaimed near the end of each mine's life. Reclamation of the remaining 28,499 acres of disturbance would proceed concurrently with mining operations.

Geology

The effects on geology as a result of RFD activities in the study area would be same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, approximately 86,172 additional acres of disturbance would occur, of which 22 percent would be related to coal mining.

Mineral Resources

Coal Resources. Impacts to coal resources in the study area would be the same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, coal

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production in 2015 is projected to be approximately 467 mmtpy, 56 mmtpy higher than production in 2010.

Conventional Oil and Gas. Impacts to conventional oil and gas resources in the study area as a result of RFD activities would be the same as described under the 2010 – Lower Production Scenario, with the following exceptions. Under this scenario, annual oil production is projected to be approximately 12.5 MMBO. The resulting cumulative oil production (1974 through 2015) would be 1.20 BBO. Annual associated and conventional natural gas production is projected to be 30.9 BCF, with cumulative production (1974 through 2015) reaching 1.96 TCF. (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

CBNG. Under this scenario, impacts to CBNG resources in the study area are projected to be the same as described under the 2010 – Lower Production Scenario, with the following exception. Annual CBNG production is projected to be approximately 500 BCF, resulting in 6.4 TCF of cumulative production (1974 through 2015). (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

Other Mineral Resources. Under this scenario, impacts to other mineral resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

Paleontology

Potential impacts to paleontological resources in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 86,172 additional acres of land would be disturbed. Under this scenario, it is projected that past and projected development activities would result in the total cumulative disturbance of approximately 426,084 acres by the year 2015. Of the 426,084 acres, it is projected that 117,236 acres (27 percent) would be associated with coal mining activities.

2.1.2.4 Year 2015 – Upper Production Scenario

Topography

Potential impacts to topography in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 93,480 additional acres of land would be disturbed. Under this scenario, past and projected development activities are projected to result in the total cumulative disturbance of approximately 433,392 acres of land (disturbance to 9.6 percent of the study area) by 2015. Of the 433,392 acres, it is projected that 124,545 acres (29 percent) would be associated with coal mine development.

Of the 433,392 acres of total cumulative disturbance, approximately 290,822 (67 percent) would be reclaimed by 2015. The remaining 142,570 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 124,545 acres of disturbance associated with coal mining, it is estimated that

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approximately 65,396 (53 percent) would be reclaimed by 2015. Of the remaining 59,149 acres of coal mining-related disturbance, it is estimated that approximately 27,009 acres would be unavailable for concurrent reclamation due to the presence of long-term facilities which would be reclaimed near the end of each mine's life. Reclamation of the remaining 32,140 acres of disturbance would proceed concurrently with mining operations.

Geology

The effects on geology as a result of RFD activities in the study area would be same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, approximately 93,480 additional acres of disturbance would occur, of which 29 percent would be related to coal mining.

Mineral Resources

Coal Resources. Impacts to coal resources in the study area would be the same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, coal production in 2015 is projected to be approximately 543 mmpy, 132 mmpy higher than production in 2010.

Conventional Oil and Gas. Impacts to conventional oil and gas resources in the study area as a result of RFD activities would be the same as described under the 2015 – Lower Production Scenario, with the following exceptions. Under this scenario, annual oil production (1974 through 2015) is projected to be approximately 12.5 MMBO. The resulting cumulative oil production would be 1.20 BBO. Annual associated and conventional natural gas production is projected to be approximately 30.9 BCF, with cumulative production (1974 through 2015) reaching 1.96 TCF. (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

CBNG. Under this scenario, impacts to CBNG resources in the study area are projected to be the same as described under the 2010 – Lower Production Scenario, with the following exception. Annual CBNG production is projected to be approximately 500 BCF, resulting in 6.4 TCF of cumulative production (1974 through 2015). (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

Other Mineral Resources. Under this scenario, impacts to other mineral resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

Paleontology

Potential impacts to paleontological resources in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 93,480 additional acres of land would be disturbed. Under this scenario, it is projected that past and projected development activities in the study area would result in the total cumulative disturbance of

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approximately 433,392 acres by the year 2015. Of the 433,392 acres, it is projected that 124,545 acres (29 percent) would be associated with coal development activities.

2.1.2.5 Year 2020 – Lower Production Scenario

Topography

Potential impacts to topography as a result of RFD activities in the study area would be similar to those described under the 2010 – Lower Production Scenario, except approximately 163,173 additional acres of land would be disturbed. Under this scenario, past and projected development activities are projected to result in the total cumulative disturbance of approximately 503,085 acres of land (disturbance to 11.2 percent of the study area) by 2020. Of the 503,085 acres, it is projected that 137,443 acres (27 percent) would be associated with coal mine development.

Of the 503,085 acres of total cumulative land disturbance, approximately 367,999 (73 percent) would be reclaimed by 2020. The remaining 135,085 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 137,443 acres of disturbance associated with coal mining, it is projected that approximately 79,463 (58 percent) would be reclaimed by 2020. Of the remaining 57,979 acres of coal mining-related disturbance, it is estimated that approximately 28,797 acres would be unavailable for concurrent reclamation due to the presence of long-term facilities which would be reclaimed near the end of each mine's life. Reclamation of the remaining 29,182 acres of disturbance would proceed concurrently with mining operations.

Geology

The effects on geology as a result of RFD activities in the study area would be same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, approximately 163,173 additional acres of disturbance would occur, of which 24 percent would be related to coal mining.

Mineral Resources

Coal Resources. Impacts to coal resources in the study area would be the same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, coal production in 2020 is projected to be approximately 495 mmtpy, 84 mmtpy higher than production in 2010.

Conventional Oil and Gas. Impacts to conventional oil and gas resources in the study area as a result of RFD activities would be the same as described under the 2010 – Lower Production Scenario, with the following exceptions. Under this scenario, annual oil production is projected to be approximately 11.3 MMBO. The resulting cumulative oil production (1974 through 2020) would be 1.26 BBO. Annual associated and conventional natural gas production is projected to be approximately 28 BCF, with cumulative production (1974 through 2020) reaching 2.1 TCF. (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

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CBNG. Under this scenario, impacts to CBNG resources in the study area are projected to be the same as described under the 2010 – Lower Production Scenario, with the following exception. Annual CBNG production is projected to be approximately 443 BCF, resulting in 8.8 TCF of cumulative production (1974 through 2020). (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

Other Mineral Resources. Under this scenario, impacts to other mineral resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

Paleontology

Potential impacts to paleontological resources in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 163,173 additional acres of land would be disturbed. Under this scenario, it is projected that past and projected development activities would result in the total cumulative disturbance of approximately 503,085 acres by the year 2020. Of the 503,085 acres, it is projected that 137,443 acres (27 percent) would be associated with coal mining activities.

2.1.2.6 Year 2020 – Upper Production Scenario

Topography

Potential impacts to topography as a result of RFD activities in the study area would be similar to the 2010 – Lower Production Scenario, except approximately 174,820 additional acres of land would be disturbed. Under this scenario, past and projected development activities would result in the total cumulative disturbance of approximately 514,732 acres of land (disturbance to 11.5 percent of the study area) by 2020. Of the 514,732 acres, it is projected that 149,089 acres (29 percent) would be associated with coal mining activities.

Of the 514,732 acres of total cumulative disturbance, approximately 374,732 (73 percent) would be reclaimed by 2020. The remaining 139,998 acres of disturbance would be reclaimed incrementally or following a project's completion, depending on the type of development activity and permit requirements. Of the 149,089 acres of disturbance associated with coal mining, it is projected that approximately 86,196 (58 percent) would be reclaimed by 2020. Of the remaining 62,890 acres of coal mining-related disturbance, it is estimated that approximately 28,345 acres would be unavailable for concurrent reclamation due to the presence of long-term facilities which would be reclaimed near the end of each mine's life. Reclamation of the remaining 34,545 acres of disturbance would proceed concurrently with mining operations.

Geology

The effects on geology as a result of RFD activities in the study area would be same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, approximately 174,820 additional acres of disturbance would occur, of which 29 percent would be related to coal mining.

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Mineral Resources

Coal Resources. Impacts to coal resources in the study area would be the same as described under the 2010 – Lower Production Scenario, with the following exception. Under this scenario, coal production in 2020 is projected to be approximately 576 mmtpy, 165 mmtpy higher than production in 2010.

Conventional Oil and Gas. Impacts to conventional oil and gas resources in the study area as a result of RFD activities would be the same as described under the 2010 – Lower Production Scenario, with the following exceptions. Under this scenario, annual oil production is projected to be approximately 11.3 MMBO. The resulting cumulative oil production (1974 through 2020) would be 1.26 BBO. Annual associated and conventional natural gas production is projected to be approximately 28 BCF, with cumulative production (1974 through 2020) reaching 2.1 TCF. (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

CBNG. Under this scenario, impacts to CBNG resources in the study area are projected to be the same as described under the 2010 – Lower Production Scenario, with the following exception. Annual CBNG production is projected to be approximately 443 BCF, resulting in 8.8 TCF of cumulative production (1974 through 2020). (See Appendix E of the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities [ENSR 2005c] for information on the methodology and assumptions used for oil and gas projections in this study.)

Other Mineral Resources. Under this scenario, impacts to other mineral resources in the study area would be the same as described under the 2010 – Lower Production Scenario.

Paleontology

Potential impacts to paleontological resources in the study area as a result of RFD activities would be similar to those described under the 2010 – Lower Production Scenario, except approximately 174,820 additional acres of land would be disturbed. Under this scenario, it is projected that past and projected development activities would result in the total cumulative disturbance of approximately 514,732 acres by the year 2020. Of the 514,732 acres, it is projected that 149,089 acres (29 percent) would be associated with coal development activities.