

Chapter 3 AFFECTED ENVIRONMENT

3.0 INTRODUCTION

This Chapter describes the affected environment, including cultural, historical, social and economic conditions that would be affected by implementation of the Alternatives described in Chapter 2. Aspects of the affected environments described in this chapter focus on the relevant major issues presented in Chapter 2. Certain critical environmental components require analysis under BLM policy. These items are presented below in Table 3.0-1.

Table 3.0-1 Critical Elements Requiring Mandatory Evaluation

Mandatory Item	Not Present	No Impact	Potentially Impacted
Threatened and Endangered Species			X
Floodplains			X
Wilderness Values	X		
ACECs	X		
Water Resources			X
Air Quality			X
Cultural or Historical Values			X
Prime or Unique Farmlands	X		
Wild & Scenic Rivers	X		
Wetland/Riparian			X
Native American Religious Concerns			X
Hazardous Wastes or Solids		X	
Invasive, Nonnative Species			X
Environmental Justice		X	

3.1 AIR QUALITY

Under the Clean Air Act of 1970, EPA developed primary and secondary National Ambient Air Quality Standards (NAAQS) for each of the seven criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, fine particulate matter and sulfur dioxide. These standards establish pollution levels in the United States that cannot legally be exceeded during a specified time period.

Primary standards are designed to protect human health, including "sensitive" populations, such as people with asthma and emphysema, children, and senior citizens. Primary standards are designed for the immediate protection of public health, with an adequate margin of safety, regardless of cost.

Secondary standards are designed to protect public welfare, including soils, water, crops, vegetation, buildings, property, animals, wildlife, weather, visibility and other economic, aesthetic, and ecological values, as well as personal comfort and well-being. Secondary standards were established to protect the public from known or anticipated effects of air pollution.

Montana has adopted additional state air quality standards that are at least as stringent as the NAAQS. These Montana Ambient Air Quality Standards (MAAQS) establish statewide targets for acceptable amounts of ambient air pollutants to protect human health.

NAAQS and MAAQS establish upper limits for concentrations of specific air pollutants. Incremental increases in the ambient concentration of criteria pollutants are regulated under the New Source Review - Prevention of Significant Deterioration (PSD) program. The program is designed to limit the incremental increase of specific air pollutants from major sources of air pollution above a legally defined baseline level, depending on the classification of a location. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict. The project area and surrounding areas are classified as PSD Class II. The closest PSD Class I area, the Northern Cheyenne Indian Reservation, lies approximately 12.5 miles north of the project. The project area and adjacent areas are identified as PSD Class II, where incremental increases are not as restrictive when compared with the incremental increases allowed in PSD Class I areas.

NEPA analysis comparisons to PSD Class I and II increments are intended to evaluate a threshold of concern, and do not represent a regulatory PSD Increment consumption analysis. The determination of PSD increment consumption is an air quality regulatory agency responsibility.

Pollutants are limited within the project area, with only a few industrial facilities and residential sources in the small communities and isolated ranches. In addition, the good atmospheric dispersion conditions in the project area typically result in low concentrations of criteria air pollutants. These factors generally contribute to relatively low ambient air pollutant concentrations.

Although criteria air pollutants have not been monitored in the project area, background values measured in the region are well below the NAAQS and MAAQS. Table 3.1-1 summarizes the NAAQS and MAAQS.

Table 3.1-1 National and Montana Ambient Air Quality Standards

Pollutant	Time Period	Federal (NAAQS)	Montana (MAAQS)
Carbon Monoxide	Hourly Average	35 ppm ^a	23 ppm ^a
	8-Hour Average	9 ppm ^a	9 ppm ^a
Fluoride in Forage	Monthly Average		50 µg/g ^b
	Grazing Season		35 µg/g ^b
Hydrogen Sulfide	Hourly Average		0.05 ppm ^a
Lead	90-Day Average		1.5 µg/m ³ ^b (rolling)
	Quarterly Average	1.5 µg/m ³ ^b (calendar)	
Nitrogen Dioxide	Hourly Average		0.30 ppm ^a
	Annual Average	0.053 mg/m ³	0.05 ppm ^b
Ozone	Hourly Average	0.12 ppm ^c	0.10 ppm ^a
PM-10 (existing)	24-Hour Average	150 µg/m ³ ^{d,j}	150 µg/m ³ ^{d,j}
	Annual Average	50 µg/m ³ ^e	50 µg/m ³ ^e
PM-10 (revised)	24-Hour Average	150 µg/m ³ ^{f,j}	
	Annual Average	50 µg/m ³ ^e	
PM-2.5	24-Hour Average	65 µg/m ³ ^{g,j}	
	Annual Average	15 µg/m ³ ^h	
Settleable Particulate	30-Day Average		10 g/m ² ^b
Sulfur Dioxide	Hourly Average		0.50 ppm
	3-Hour Average	0.50 ppm ^k	
	24-Hour Average	0.14 ppm ^{j,k}	0.10 ppm ^{a,j}
	Annual Average	0.03 ppm ^k	0.02 ppm ^k
Visibility	Annual Average		3 X 10 ⁻⁵ /m ^k

Source: http://www.deq.state.mt.us/AirQuality/Planning/Air_Standards/AIR_STANDARDS.pdf

- a. Federal violation when exceeded more than once per calendar year.
- b. Not to be exceeded (ever) for the averaging time period as described in the regulation.
- c. Not to be exceeded more than once per year averaged over 3-years.
- d. Violation occurs when the expected number of days per calendar year with a 24-hour average above this

- concentration is more than one.
- e. Violation occurs when the expected annual arithmetic mean concentration is above this concentration.
 - f. To attain this standard, the 99th percentile of the distribution of the 24-hour concentrations for one year, averaged over three years, must not exceed this concentration at each monitor within an area.
 - g. To attain this standard, the 98th percentile of the distribution of the 24-hour concentrations for one year, averaged over three years, must not exceed this concentration at each monitor within an area.
 - h. To attain this standard, the 3-year average of the annual arithmetic mean of the 24-hour concentrations from a single or multiple population oriented monitors must not exceed this concentration.
 - i. State violation when exceeded more than eighteen times in any 12 consecutive months.
 - j. The standard is based upon a calendar day (midnight to midnight).

The MDEQ under their EPA approved State Implementation Plan, is the primary air quality regulatory agency responsible for determining potential impacts from detailed development plans that exceed permitting thresholds. Each project that exceeds the permitting threshold would be subject to applicable air quality laws, regulations, standards, control measures and management practices. Therefore, MDEQ has the ultimate responsibility for reviewing and permitting the project prior to further development, should the project exceed permitting thresholds. Any MDEQ air quality permitting would be based on very site-specific, detailed engineering values, which would be assessed in the permit application review.

3.2 CULTURAL RESOURCES

The proposed project was included as part of a block inventory and linear survey of 695 acres (See BLM Cultural Resources Report MT-020-03-319a –Cooper and Drucker 2003). The block areas included wells, pipelines, powerlines, roads and outfall locations. The inventory located one prehistoric site and five isolated finds. An additional isolated historic cultural resource was recorded as a result of a BLM on-site inspection. The one site recorded is a prehistoric lithic scatter. The lithic scatter contained debris from making and using stone tools and six stone tools. The tools included a projectile point fragment that appears to date from the Later Archaic Period and five biface fragments.

The site was tested and recommended to be not eligible for listing on the National Register of Historic Places. None of the isolated finds were considered eligible to the National Register of Historic Places. The sites and isolates would be avoided by the proposed wells and associated infrastructure. The BLM has consulted with the Montana State Historic Preservation Office for this project. The SHPO had concurred on September 16, 2003, with BLM that there would be no effect to historic properties. However, in a letter to BLM on March 09, 2003, they suggest this might be premature in the absence of any input from tribal groups. BLM would again consult with the SHPO and include the results of consultation.

BLM has reviewed the existing lists of properties listed on the National Register of Historic Places. The two closest properties are the Wolf Mountain Battlefield and the Lee Homestead. The Wolf Mountain Battlefield is located approximately 7 miles north of the POD and the Lee Homestead is approximately 2 miles south. Neither location would be impacted by this project. The Tongue River Dam has been determined to be eligible for listing on the National Register of Historic Places under Criterion A. The dam is visible from portions of the POD area, however, the POD would not affect those characteristics, which make the dam eligible for listing on the National Register.

The Northern Cheyenne Tribe is aware of this project. BLM hosted a meeting with the Tribe on October 15, 2003. The tribe expressed interest in the area, but did not comment on whether there were any Traditional Cultural Properties or culturally sensitive area in the project area. BLM has also provided a copy of the report to the Tribal Historic Preservation Officer (THPO). The THPO did not feel the report was adequate since it lacked Northern Cheyenne input.

The Ethnographic Overview of Southeast Montana (Peterson and Deaver 2002) identifies water and a number of site types as culturally sensitive. It does not include lithic scatters specifically. It does, however, urge avoidance of all sites where feasible. The Northern Cheyenne Tribal Document (NCT 2002) also identified a number of site types as being culturally sensitive to the tribe. This includes large ring sites, isolated fasting beds, rock art sites and large diameter fasting structures such as medicine wheels. The cultural resource inventory did not identify any such sites. One potentially sensitive area is a spring located near Well 11-6. Both the Ethnographic Overview, Crow and Northern Cheyenne Tribal Document show that such areas are culturally sensitive. Hydrological analysis should be demonstrated if the well would adversely affect the spring.

Additionally, the Southeast Montana Ethnographic Overview shows a number of culturally sensitive areas in the Tongue River Canyon, but does not identify specific areas to a legal location. The areas identified in the report include ceremonial areas, a Crow/Sioux Battle, and a Northern Cheyenne Plant collecting area. These require locating the areas on the ground and assessing effects of the POD to their National Register Eligibility.

3.3 GEOLOGY AND MINERALS

3.3.1 Coal Bed Natural Gas

Coal Bed Natural Gas is held in the coal beds by hydrostatic pressure within the bed. A drawdown of the pressure as the result of pumping water from the coal bed causes the gas to move to the lower pressure in the well bore.

3.3.2 Coal

Surface geology in the study area consists of alluvial and colluvial deposits. Although many of the regional geologic maps of the area identify relatively extensive alluvial deposits, site-specific mapping in the Carbone mine area indicates that a portion of landforms mapped as alluvium are probably colluvial deposits covered by a relatively thin veneer of alluvial material. These colluvial-alluvial deposits are associated with existing surface water swales and drainages, and are on the order of 30 feet thick. These deposits are characterized as poorly sorted sand, silt, clay, and gravel.

Outcropping bedrock in the area consists of Tertiary-age Fort Union Formation. The Fort Union Formation is underlain by Cretaceous-age Hell Creek Formation and is overlain by the Wasatch Formation. The Fort Union Formation is locally broken into three members (from youngest to oldest): Tongue River, Lebo, and Tullock. The oldest member, Tullock, is composed of light-colored sandstone, sandy shale, carbonaceous shale, clay, and locally thin, non-continuous coal beds. The middle Lebo Member consists of dark shale, mudstone, carbonaceous shale, siltstone, argillaceous sandstone, and coal.

The Tongue River Member contains mineable coal units within the Fort Union Formation and consists of sandstone, interbedded siltstone, shale, and thick coal beds. Local depositional environments of the coal seams resulted in formation of several distinct coal beds within the Tongue River Member.

The Tongue River Member of the Fort Union Formation was deposited in a low-lying coastal or near-coastal area, mainly as fluvial and over-bank mud, and back-swamp peat. This depositional setting formed rock types that change markedly over short distances, making it difficult to characterize the nature of overburden or inter-burden intervals.

Where sufficient thickness of coal was deposited and conditions were right, the coal burned. The resulting heat baked and fused the overlying material into a brittle resistant reddish rock, locally called "clinker" or "scoria" deposits (Cole, 1980).

Following coal deposition, the general area was faulted, resulting in displacement of coal seams. Faults in the area are generally oriented northwest and northeast (USDI, 2000).

The target coal seams are the Flowers-Goodale from 1,109 feet to 1,462 feet and the Wall at 201 feet to 551 feet. Four federal and four private wells are planned for the Flowers-Goodale coal and four federal and four private wells are planned for the Wall coal. One private well in each of the two coal seams are currently drilled and located in the SW ¼ NW ¼, Section 7, location 5-7 of the Coal Creek POD.

3.4 HYDROLOGY

In addition to the analysis contained in this document a technical report for hydrology was also prepared for this project. This will be referred to as the PRG-Coal Creek–Hydrology Technical Report. This document is available on the BLM’s CBNG internet site (<http://www.mt.blm.gov/mcfo/cbng/EAEIS.html>) or by request from the BLM’s Miles City Field Office.

3.4.1 Surface Water

All of the proposed well sites are located in the Upper Tongue River 4th Order Watershed. This reach of the Tongue River is not listed on the MDEQ’s current (2002) 303(d) list for impaired streams under the Clean Water Act (CWA), nor has it been identified on the Draft 2004 303(d) list. It was listed on the 1996 303(d) list. Further downstream, from the diversion dam just above Pumpkin Creek (12-mile diversion dam for the TY irrigation ditch) to the mouth, the Tongue River has been listed as impaired. The MDEQ has identified flow alteration as the probable cause of the impairment, and dam construction and flow regulation/modification as the probable sources of impairment along this downstream reach. The Tongue River is the only perennial river in the project area. None of the ephemeral tributaries to the Tongue River in this area have been listed as impaired. The TMDL process for the Tongue River watershed is currently underway.

The proposed action for the PRG Coal Creek Project includes one discharge into the Tongue River downstream from the Tongue River Reservoir Dam. There is a USGS Gaging Station located just upstream of this discharge point and below the Tongue River Dam. Data from this station should be representative of this reach of the Tongue River. Electrical Conductivity (EC) and Sodium Adsorption Ratio (SAR) are the parameters most likely to be affected by CBNG development (MDEQ, 2003), therefore, the discussion in this document will focus on these parameters.

There are currently 3 existing or proposed CBNG discharge permits to the Tongue River. These discharges are summarized below. The one existing permit (MT0030457) is for untreated discharge, while the draft permit for this project (MT0030660), and the pending application (MT0030724) are both for treated discharges. The Fidelity discharges are, or are proposed to be, located upstream of the Tongue River Reservoir.

Table 3.4.1-1: CBNG Tongue River Discharge Permits

Permit Number	Owner/Operator	Permit Status	Volume (gpm)	Treated (Y/N)
MT0030660	Powder River Gas, LLC	Draft	1,600	Y
MT0030457	Fidelity Exploration & Production Company	Issued	1,600	N
MT0030724	Fidelity Exploration & Production Company	Application Pending	1,700	Y

The historical Pre-CBNG water quality, as measured by EC and SAR, at the Tongue River station below the dam, and at Birney Day School are shown in the table below. This historical water quality data was determined based upon historical USGS data and the analysis contained in the MDEQ’s Statement of Basis for the MPDES permit (see Appendix B of the PRG-Coal Creek–Hydrology Technical Report). These Pre-CBNG data do not accurately represent the existing conditions however, since an existing untreated CBNG discharge (MT0030457) is occurring upstream from the reservoir. For this reason, the effects of this discharge are modeled as described in the PRG-Coal Creek–Hydrology Technical Report, to depict existing conditions. A comparison of historical conditions to modeled existing conditions is provided in the table below.

Table 3.4.1-2: Comparison of Historical Surface Water Conditions to Modeled Existing Conditions

		Historical Conditions ⁺			Modeled Existing Conditions*		
	Flow Conditions	Discharge (cfs)	EC (µS/cm)	SAR	Discharge (cfs)	EC (µS/cm)	SAR
Tongue River Below Dam	7Q10	70.0	809	0.97	73.6	832	1.27
	LMM	179.0	646	0.78	182.6	664	0.98
	HMM	1429.0	392	0.49	1432.6	398	0.55
Tongue River at Birney Day School	7Q10	49.0	1134	1.56	52.6	1157	1.87
	LMM	173.0	719	1.02	176.6	737	1.23
	HMM	1119.0	377	0.56	1122.6	383	0.62

+ The historical conditions for the station Below the Dam were determined from USGS data collected from 1975-1998. Birney Day School historical conditions were determined from USGS data collected from 1978-1998.

* The modeled existing conditions include historical values, plus modeled effects from the existing 3.57 cfs discharge of untreated CBNG water upstream from the Tongue River Reservoir.

The Montana Board of Environmental Quality has established surface water standards for EC and SAR. These standards have been reviewed and approved by the EPA, and therefore have Clean Water Act standing. The Northern Cheyenne Tribe has also adopted surface water quality standards for EC and SAR. The Northern Cheyenne Tribe has not been granted “Treatment as a State” status by the EPA, and therefore the EPA has not reviewed these standards. As such, the Northern Cheyenne numerical standards do not have Clean Water Act standing; however, they do set out the Tribe’s considered determination of the water quality needed to protect irrigated agriculture on the Reservation (Northern Cheyenne Tribe, 2002). Therefore, the Northern Cheyenne standards provide reasonable criteria against which to compare the resulting water qualities. These standards were developed to protect the agricultural uses of the Tongue River, which has been determined to be the most sensitive beneficial use of the Tongue River (BLM,2003a). As such, any changes in EC and SAR that do not cause these standards to be exceeded would not be anticipated to impair the beneficial uses of the Tongue River. These various standards are summarized in the table below.

Table 3.4.1-3: Surface Water EC and SAR Standards for the Tongue River

	Monthly Mean SAR	Inst. Max SAR	Monthly Mean EC (µS/cm)	Inst. Max EC (µS/cm)
MDEQ Irrigation Season ¹ Standards	3.0	4.5	1000	1500
MDEQ Non-Irrigation Season ¹ Standards	5.0	7.5	1500	2500
Northern Cheyenne Irrigation Season ¹ Standards; Southern Boundary	---	2.0	1000	2000
Northern Cheyenne Non-Irrigation Season ¹ Standards; Southern Boundary	---	2.0	---	2000

1: The Irrigation Season specified by the MDEQ is from March 1st to October 31st while the Irrigation Season specified by the Northern Cheyenne is from April 1st to November 15th.

For the purposes of this impact analysis, the high mean monthly and low mean monthly results will be compared to the mean monthly standards, while the 7Q10 result will be compared to the instantaneous maximum standards. This is appropriate since the 7Q10 is the lowest flow that would be expected to occur for 7 consecutive days over any 10 year period. It should be noted that this approach is being used for this impact analysis, however, the same approach would not be used for a regulatory determination. The reason for this difference is that it is felt that this impact analysis will more closely depict the actual impacts that would be anticipated.

For more information regarding surface water, please refer to the MT FEIS Chapter 3, Affected Environment, pages 3-22 through 3-31 (BLM, 2003), the Water Resources Technical Report (ALL, 2001), and the Surface Water Quality Analysis Technical Report (SWQATR) (Greystone and ALL, 2003). Real time and historical monitoring data for the Tongue River are also available from the USGS at <http://tonguerivermonitoring.cr.usgs.gov/index.htm>.

3.4.2 Groundwater:

The wells to be drilled under this proposal are to be between approximately 250 and 1500 feet into the Wall and Flowers-Goodale coal zones. Eight new wells would be completed in each of the coal seams, one well is currently completed in each coal seam. The Wall and the Flowers-Goodale coal zones are contained within the Tongue River Member of the Fort Union Formation. In this area, the top of the Wall coal is at approximately 3,200 feet above mean sea level (ft-amsl) and it is approximately 55 feet thick. The top of the Flowers-Goodale coal is at approximately 2,300 ft-amsl and it is approximately 20 feet thick.

Based upon water analysis from the 2 existing CBNG wells in the POD area, the SAR of the raw CBNG water is expected to be approximately 53.2, and the EC is expected to be 1,355 $\mu\text{S}/\text{cm}$. This water will be treated using the Higgins Loop ion exchange method developed by EMIT Technology such that the effluent EC will be approximately 493 $\mu\text{S}/\text{cm}$ and the SAR approximately 0.03. The treated water would then be mixed with untreated water, resulting in the discharged water having an EC less than 1,000 $\mu\text{S}/\text{cm}$ and SAR less than 3.0.

Due to the common clay rich layers in the Tongue River member of the Fort Union formation, the vertical hydraulic conductivity in these units is very low. Based upon the results of 370 aquifer tests, (Wheaton and Metesh 2002) have calculated that the geometric mean horizontal hydraulic conductivity values of the coal seam aquifers in the Fort Union Formation is 1.1 feet per day. Mean storativity values of these coals are approximately 9×10^{-4} (storativity is unitless) (Wheaton and Metesh, 2002).

The Montana Bureau of Mines and Geology (MBMG) maintains the Groundwater Information Center (GWIC) database of known wells, springs, and borings in Montana. Under current Montana law, drillers are required to provide well logs for all wells drilled to MBMG, or indirectly to DNRC, within 60 days of drilling the well. This database is used to determine the wells or springs, which are located within the potential drawdown area. Those wells that are finished within the coal seams being developed, and are located within the potential drawdown area would be anticipated to be impacted by groundwater drawdown. Those springs which emit from the developed coal seam and are located within the potential drawdown area would be anticipated to be impacted by groundwater drawdown.

The Operator has certified that for each well "All potentially affected landowners having existing water wells within the circle of influence for the proposed well will be offered a Water Well Agreement." This is in compliance with the requirements of the Powder River Basin Controlled Groundwater Area (MT-BOGC, 1999).

For additional general information on groundwater, please refer to the MT FEIS (BLM, 2003), Chapter 3, Affected Environment pages 3-22 through 3-39 (ground water), the 2D modeling report (Wheaton and Metesh, 2001) and the 3D modeling report (Wheaton and Metesh, 2002). Groundwater monitoring information relating to CBNG (CBM) development is also available by signing in to MBMG's online GWIC database at <http://mbmggwic.mtech.edu/> and using the Ground-Water Projects link.

3.5 INDIAN TRUST AND NATIVE AMERICAN CONCERNS

Indian Trust Assets are defined as “lands, natural resources, money, or other assets held by the federal government in trust or that restricted against alienation for Indian Tribes and individual Indians (DM 302, 2.5). No Indian lands or Indian owned leases are present in the project area. The Northern Cheyenne Tribe has a Class I PSD Airshed for the reservation and has water rights under the Winters Doctrine on the Tongue River. BLM has a Trust responsibility to ensure that these are not impaired by the proposed developments. Additionally, the Miles City Field Office met with the Northern Cheyenne Tribe on October 15, 2003 to discuss this project. The Northern Cheyenne Tribe expressed concerns with impacts to Air Quality, Water Quality, Impacts to Cultural Resources and Impacts to Wildlife. The concerns raised by the Northern Cheyenne Tribe are addressed in the Air Quality, Cultural Resources, Hydrology and Wildlife Sections of this EA.

3.6 LIVESTOCK GRAZING

Livestock grazing is the principal economic use of the land in the project area. There are three surface landowners/lessees in the project area. All three are either in the livestock business or are leasing to a livestock operator, including the BLM administered land. Currently, the livestock operations within the project area run approximately 250 to 300 cow/calf pairs. The livestock season of use varies depending on each operation. Water is limiting to all livestock operations and affects when the grazing land in the project area is used.

3.7 SOCIAL AND ECONOMIC CONDITIONS

The project area is located in the southeastern corner of Big Horn County, just north of the Tongue River Reservoir dam, and adjacent to the southwest corner of Rosebud County. It is ten miles east of the Crow Reservation, approximately 12.5 miles south of the Northern Cheyenne Reservation and thirty-five miles by paved road from Sheridan, Wyoming, the nearest community. A description of the social, economic and fiscal conditions on the Reservations and Big Horn and Rosebud Counties are found in the Affected Environment, Chapter 3 and the Socioeconomic Appendix of the MT FEIS. The proposed action is to drill and test the Flowers-Goodale and Wall coal zones. The MBOGC reported natural gas production in Big Horn county in 2002 was 9,679,910 MCF (DNRC Annual Review 2002, Page 19), approximately 11 percent of total statewide production. However, Oil & Gas production taxes contributed less than one-tenth of one percent of County revenues in FY 1999 (MT FEIS 2003, Socioeconomics Appendix, Table SEA-1). The Minerals Management Service reported Big Horn County Federal gas production of 258,209 MCF in FY2001, latest data available, with royalty payments of \$118,646.

3.7.1 Environmental Justice

(All data is based on the 2000 Census)

Big Horn and Rosebud Counties include Indian reservations with substantial Native American populations. In Big Horn County, where the project is located, the population is 60 percent Native American. This county includes most of the Crow Reservation and part of the Northern Cheyenne Reservation. Slightly over thirty percent of Rosebud County is Native American. This county is located north of the project area and includes the part of the Northern Cheyenne Reservation not located in Big Horn County. In 2000, over 5,000 Native Americans lived on the Crow Reservation and over 4000 Native Americans lived on the Northern Cheyenne Reservation.

In 2000, 24% of the population living in Big Horn County and 17% of the population in Rosebud County had incomes below the poverty level. These figures compare to a state figure of 13% and reflect the relatively large numbers of persons on the reservations living in poverty.

3.8 SOILS

The soils in the project area have developed in colluvium and residuum derived from the Tongue River Member of the Tertiary Fort Union Formation and the Eocene Wasatch Formation. Lithology of these units consists light to dark yellow and tan siltstone and sandstones with coal seams in a matrix of shale. In some areas, the near-surface coals have burned, baking the surrounding rock, producing red, hard fragments (see geology section of Soils Technical Report). Differences in lithology have produced the topographic and geomorphic variations seen in the area. Higher ridges and hills are often protected by an erosion-resistant cap of clinker (porcellanite) or sandstone.

Soil units in the project area are the Kim loam, 4 to 15 percent slopes, Thedalund-Wibaux stony loams, hilly and Thedalund-Wibaux complex, very steep. These soils commonly have surface and subsurface textures of loam and clay loam with occasional sandy loam or channery surface (see Soils Technical Report). Kim soils are very deep, moderately permeable, well drained soils developed on alluvial fans with slopes up to 15 percent. Thedalund soils are moderately deep, well drained, moderately permeable soils developed on hills and ridges with slopes up to 30 percent. Wibaux soils are very deep, well drained soils formed in colluvium and alluvium derived from clinker developed on hills and ridges with slopes up to 75 percent. Slopes in the project area range up to 40 percent, though actions will occur on the lower end of this range.

Hydrologic groups range from A to C indicating low runoff potential, however rutting hazard is high due to low soil strength (see Soils Technical Report).

There is no prime or import farmland in the project area, or hydric soils. There is no flooding or ponding hazard for these soils.

3.9 VEGETATION

The majority of the project area is an upland community dominated by grasses but includes shrubs and trees. Dominant upland species include bluebunch wheatgrass (*Agropyron spicatum*), western wheatgrass (*Agropyron smithii*), green needlegrass (*Stipa viridula*), blue grama (*Bouteloua gracilis*), needle and thread (*Stipa comata*), prickly pear cactus (*Opuntia spp.*), big sagebrush (*Artemisia tridentata*), Ponderosa pine (*Pinus ponderosa*), Rocky Mountain juniper (*Juniperus scopulorum*). The planning area also comprises a small amount of riparian vegetation along the Tongue River. Dominant species include plains cottonwood (*Populus deltoides*) and Prairie cordgrass (*Spartina pectinata*) along with sedges and rushes. Differences in dominant species within the project area vary with soil type, aspect and topography.

There are no known threatened or endangered plant species in the project area. However, three plant species identified on the Montana Plant Species of Concern list have been recorded in outlying areas (Barton & Crispin 2003). Two species Barr's milkvetch (*Astragalus barrii*) and Nuttall's desert-parsley (*Lomatium nuttallii*) are both identified as Montana Species of Concern and regional endemics and are designated Watch Species by the BLM in Montana. The third plant species, Woolly twinpod (*Physaria didymocarpa* var. *lanata*), is a regional endemic. The habitats where these three species have been recorded consist of sparse vegetation, which includes Ponderosa pine, Rocky Mountain juniper, blue bunch wheatgrass, western wheatgrass, big sagebrush and rabbitbrush (*Chrysothamnus spp.*) Typically, these species are found on rocky slopes of sandstone, siltstone, or clayey shale, in open pine woodlands.

3.9.1 Invasive Species

No state-listed noxious weeds and invasive/exotic plant infestations were discovered by a search of inventory maps and/or databases or during subsequent field investigation by the proposed project proponent. However, Leafy spurge is common in the area and is spreading rapidly, especially in areas slightly south of the project area. While not currently occupying the site, it is reasonable to expect this species could occur in the project area in the near future.

3.10 WILDLIFE

Powder River Gas has contracted with Western Land Services (WLS) of Sheridan, Wyoming to develop a Wildlife Monitoring and Mitigation Plan (WMPP) for the project area. In accordance with requirements set forth in the WMPP, wildlife surveys were conducted by WLS to identify wildlife occurrences and values in the project area. Additionally, BLM biologists have evaluated the area for wildlife values. The following discussion identifies the wildlife values on the project area as a result of those investigations.

3.10.1 Big Game Species

Mule deer are found year-round in the project area and the area is considered important, although not "critical" winter range. White-tailed deer are commonly found along the Tongue River corridor. Antelope use the benchlands and more open topography located along the western edge of the project area. Other big game, including elk, black bear and mountain lion, use the area as transitory habitat as they travel between more preferred habitats.

3.10.2 Upland Game Birds

The project area is considered good sharp-tailed grouse habitat, although the closest known lek is several miles away. Sage grouse, a Montana BLM Special Status Species (SSS), maybe found along the western edge of the project, although nearly all of the sagebrush in the area has been removed as a result of extensive spraying by the landowner thus greatly reducing habitat values for this species. Wild turkeys are year-round residents and nest throughout adjacent ponderosa pine uplands and riparian areas.

3.10.3 Raptors

There is an active bald eagle nest within ½ mile of the project area located along the banks of the Tongue River. The existing county road is located about 100 yards from this nest. The roadway climbs a small hill at this point, which puts it nearly on the same elevational gradient as the nest. Additionally, the existing powerline passes within 100 yards of the nest as it proceeds downriver. There are several power poles that offer perch opportunities for eagles in this area. Bald eagles commonly migrate through the Tongue River valley and will winter in the river corridor as long as open water and forage remains available. Although the area is considered good habitat for a number of raptor species, no active nests or nesting territories have been located at this time.

3.10.4 Fisheries/Aquatics

The Tongue River below Tongue River Dam supports a major recreational fishery. Key species include smallmouth bass, sauger, walleye, rainbow trout and channel catfish. The Montana FWP identified 27 fish species in one sample reach near the project location (FWP, 1980). The Northern Leopard Frog, spiny softshell and aquatic invertebrates are common in and along the Tongue River and many of its tributaries.

3.10.5 Bird Species

The Montana Natural Heritage Program identified 104 species of birds inhabiting this portion of Southeast Montana and another 55 species as probable/possible inhabitants (Carlsen and Cooper, 2003). BLM commissioned 2 breeding bird surveys in the area of the project in 2002 and 2003. Ten transects recorded 62 species of which western meadowlarks, lark/vesper/clay-collared/Brewer's sparrows and Brewer's blackbirds and brown-headed cowbirds were the most common species represented. There are many Montana bird species of special concern that may occur in the area. These either are in very low numbers or simply have not been documented at this time. These may include, but not limited to, Swainson's hawk, hairy woodpecker, loggerhead shrike, etc.

The Tongue River is important habitat for waterfowl. Canada geese, wood ducks, gadwall and mallards commonly nest along the river corridor. The river serves as an important migration corridor for waterfowl during early winter and spring and will support large numbers of ducks, especially mallards, until covered by ice.

3.10.6 BLM Sensitive Status Species

There are several BLM Sensitive Status Species of mammals that may occur in the area, but they are extremely rare and/or documentation is nearly non-existent (Foresman, 2001). These include Preble's and Merriam's shrews and spotted and Townsend's big-eared bats. Refer to the table in Appendix B for an accounting of all Montana BLM SSS-listed species.