

Chapter 4 ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

This chapter presents the potential environmental, social and economic effects from the actions described in each Alternative in Chapter 2. This chapter is organized first by Alternative, and then resource in the same sequence they were discussed in Chapter 3.

The duration of the possible effects is analyzed and described as either short-term or long-term. As defined in the MT FEIS, short-term is up to 5 years and long-term is greater than 5 years.

Cumulative effects analysis considers the possible effects from each Alternative in combination with other relevant cumulative activities presented in Section 2.3.

4.1 EFFECTS FROM ALTERNATIVE A— NO ACTION

4.1.1 Air Quality

Direct and Indirect Effects: No change would occur to air quality in and around the project area because no drilling or construction activities would take place. Air quality would be affected by emissions from existing sources.

Cumulative Effects: No additional cumulative effects to air quality would occur under this alternative. The emissions from the existing infrastructure and air emitting units would continue in compliance with the MDEQ approved permits for the existing field compressor sites; (CX24 Battery (MAQP #3036), CX25 Battery (MAQP #3037), CX19 Battery (MAQP #3118), CX35 Battery (MAQP #3122), and CX14 Battery (MAQP #3141), and the existing sales battery, (Symons Central Compressor Station (MAQP #3250-00)). The air quality standards and PSD increments and thresholds for the pollutant impact indicators would remain as identified in Chapter 3, section 3.1. The ambient air quality modeling that was required by MDEQ for the existing field compressor sites and the existing sales battery is discussed in Sections 3.1 and 4.2.1. The modeling, including the PSD Class I and Class II increment analysis would be the same for this alternative because the existing field compressor stations and the existing sales battery are currently used to process CBNG from wells, and are not new emission sources with the proposed

action.

4.1.2 Cultural Resources

Direct and Indirect Effects: There would be no impacts to cultural resources from no action of the proposed energy related development, nor would there be an action requiring BLM compliance with Section 106 of NHPA. Sites and areas of Traditional Native American concern would continue to be vulnerable to impacts from other non-energy-related developments. No TCPs were identified within the POD project boundary based on a site field visit on September 2, 2004.

Cumulative Effects: There would be no cumulative effects to cultural resources from no action of the proposed energy related development. BLM would need to take into account the impacts of previous development when approving future projects on adjacent Federal oil and gas leases and design projects to reduce impacts and/or develop appropriate mitigation strategies. The inventory results conducted for the Dry Creek POD would add to the state and BLM databases for the acres inventoried and sites located/recorded. No new sites would be added to the National Register of Historic Places.

4.1.3 Geology and Minerals

Direct and Indirect Effects to Coal Bed Natural Gas: Under Alternative A, the previous existing wells and the Dry Creek POD private and state wells have been drilled, completed and produced resulting in the recovery of substantial volumes of natural gas for several years. There would be potential mineral drainage situations as the result of private and state CBNG wells offsetting Federal oil and gas leases.

Direct and Indirect Effects to Coal: There would be no effect on the coal formations under the leases.

Cumulative Effects: This action will result in the production and sale of substantial volumes of natural gas, which would create revenue for State and county governments and contribute to overall energy resources for our country. Also, the potential for drainage of Federal leases would exist. Under this alternative, there would be no

revenue to the Federal government.

Methane Migration:

For the Cumulative No Action analysis, it is assumed that the existing 456 wells plus the 14 recently approved wells in the CX field (470 total) will be produced. The results of this analysis are shown in the Hydrology Appendix on Table Hydro-4. This results in the long term impact of drawdown extending approximately 4.79 miles from the CX Field. This potential drawdown area is shown on Map Hydro-2 in the Hydrology Appendix.

4.1.4 Hydrology

Direct and Indirect Effects to Surface Water-CBNG Water Discharge to Surface Waters:

Under the No Action alternative, no additional produced water would be discharged. The resultant surface water quality, which would result from the No Action Alternative, will be the same as the modeled existing conditions. These conditions are presented in Chapter 3 on Table 3.4.1-2. Due to the decreasing rate of discharge per well vs. time, the magnitude of these impacts would decrease over time.

Direct and Indirect Effects to Groundwater:

No additional wells would be drilled or produced under this alternative; therefore, no groundwater drawdown would directly result from this alternative.

Cumulative Effects to Hydrological Resources:

No direct or indirect impacts to either surface water or groundwater will result from the No Action alternative; therefore, this alternative will not contribute to cumulative impacts. The cumulative surface water quality would be the same as depicted in Table 3.4.1-3. The area projected to be contained within the 20 foot drawdown contour over 20 years will be the same as described in Section 3.4.2 and shown as the foreseeable drawdown area on Map Hydro-1.

4.1.5 Indian Trust and Native American Concerns

Direct and Indirect Effects:

There would be no impact to Indian Trust Assets. There would be no impact from exploration to air quality, and no produced CBNG waters from Federal wells would be discharged into the Tongue River. There would be no impact to cultural resources, plant or wildlife resources.

Cumulative Effects:

There would be no cumulative impacts created by the Fidelity Dry Creek project that could affect Indian trust assets. Concerns expressed by the Northern Cheyenne Tribe on regional CBNG development activities, and non-energy related development projects, would continue, as described in the MT FEIS.

4.1.6 Lands and Realty

Direct and Indirect Effects: There would be no direct or indirect effects from the No Action alternative. Surface and mineral ownership would remain the same. No change in ownership would occur as a result of implementing this alternative. There would be no affect to the intent of the KCLA Classification. A right-of-way would be issued to authorize the unauthorized “off-lease” facilities on two tracts of Federal surface within the POD area under this alternative.

The right-of-way would be granted under Section 28 of the Mineral Leasing Act of 1920, as amended (MLA) and the pipelines, powerline, and access road would be constructed, used, maintained and terminated in conformance with the company’s plan of development. The right-of-way would be subject to the Stipulations in Appendix D and to cost recovery and rental and would be issued for a term of twenty years and be renewable. The right-of-way would be monitored for construction, use, and reclamation.

Cumulative Effects: There would be no cumulative impacts, which would affect the land and mineral ownership in the Project area under this alternative. Right-of-Way Grant MTM93074 has been issued to Wolf Mountain Coal, Inc. for an overhead powerline across the NE¹/₄SE¹/₄, Section 13, T. 8 S., R. 39 E., for their proposed relevant reasonably foreseeable coal processing plant. This right-of-way, which is in the general vicinity will not be affected. A BLM issued right-of-way would be issued on two tracts of Federal land for existing facilities in the project area where there are currently no BLM issued rights-of-way. Future proposed projects may require the issuance of BLM issued rights-of-way.

4.1.7 Livestock Grazing

Direct and Indirect Effects: Potential water wells for the surface owner would not be available. Additional water would not be available for livestock which would continue to

affect where, when, and how much livestock grazing occurs.

Cumulative Effects: Lack of additional water wells and water for livestock would continue to affect where, when and how much livestock grazing occurs.

4.1.8 Recreation and VRM

Direct and Indirect Effects: Any recreational opportunities that may exist would not be affected by this alternative. Scenic resources would be unaffected as there would be no changes to the characteristic landscape.

Cumulative Effects: Not affected

4.1.9 Social and Economic Conditions

Direct and Indirect Effects: There would be no additional drilling or development, so there would be no direct or indirect effects from the No Action alternative.

Direct and Indirect Effects to Environmental Justice: There would be no additional drilling or development, so there would be no direct or indirect effects from the No Action alternative.

Cumulative Effects: There would be no additional drilling or development, so there would be no cumulative effects from the No Action alternative.

4.1.10 Soils

Direct and Indirect Effects: No wells will be drilled under the no action alternative; therefore, there will be no direct or indirect impacts from this action. There may be indirect impacts from incidental use from development activities of adjacent areas.

Cumulative Effects: Any effects from planning efforts or development on adjacent areas would not have cumulative effects to the soils of the area.

4.1.11 Vegetation

Direct and Indirect Effects to Vegetation: No surface disturbing activities would occur, no wells would be drilled and no additional vehicle traffic would occur and; therefore, no impacts would occur to vegetation.

Direct and Indirect Effects to Special Status Species: No surface disturbing activities would occur, no wells would be drilled and no

additional vehicle traffic would occur and; therefore, no impacts would occur to Montana Plant Species of Concern. Existing CBNG activity associated with a fee well has occurred in the same legal location where a Montana Plant Species of Concern was documented. It is unknown if Barr's milkvetch was affected. Barr's milkvetch can occur on slopes, gumbo knobs or hilltops. Wells are usually located in areas that are easily accessible to drilling rigs and other equipment.

Direct and Indirect Effects to Invasive Species: No changes to the existing community.

Cumulative Effects: No surface disturbing activities would occur, no wells would be drilled and no additional vehicle traffic would occur; therefore, no impacts would occur that would be cumulative.

4.1.12 Wildlife and Fisheries/Aquatics

Direct and Indirect Effects: There would not be any direct or indirect impacts to wildlife and fisheries/aquatics. Effects are analyzed on the proposed action in section 4.2.12.

Cumulative Effects Wildlife: There would not be any cumulative impacts to wildlife; however, effects to wildlife would occur from current CBNG production.

Cumulative Effects Fisheries/Aquatics: There would not be any cumulative impacts to fisheries/aquatic; however, the existing past and current activities would continue.

4.2 EFFECTS FROM ALTERNATIVE B— THE PROPOSED ACTION WITH ADDITIONAL MITIGATION (PREFERRED ALTERNATIVE)

4.2.1 Air Quality

Direct and Indirect Effects: A total of twenty four wells would be drilled under this alternative (see description of alternatives). Pollutant emissions would occur from the proposed action during drilling and construction activities, and these emissions would potentially impact air quality in the project area. The primary pollutants emitted would be particulate matter (TSP), particulate matter less than 10 microns in diameter (PM₁₀), particulate matter less than 2.5 microns in diameter (PM_{2.5}), nitrogen oxides (NO_x), volatile organic compounds (VOC), carbon monoxide (CO), and sulfur dioxide (SO₂).

TSP, PM₁₀ and PM_{2.5} emissions would be emitted from travel on access roads (unpaved roads), wind erosion at disturbed areas, and from the actual drilling of the wells. NO_x, VOC, CO, and SO₂ emissions would occur from drilling engine operations and testing service equipment. Air quality impacts at each well would be temporary - occurring during the two to three day well drilling activities for each well.

The project activities would cause a temporary increase in fugitive dust and gaseous emissions. The potential emissions of Alternative B, including secondary emissions that are not included in making a permit determination and considerations of the length of the project (hrs), are summarized in Table 4.2.1-1.

4.2.1-1 Emission Inventory –Alternative B

Tons/Project							
<i>Emission Source</i>	<i>TSP</i>	<i>PM₁₀</i>	<i>PM_{2.5}</i>	<i>NO_x</i>	<i>VOC</i>	<i>CO</i>	<i>SO_x</i>
Drill Rig(s) – (Engine Emissions)	0.00	0.00	0.65	9.23	0.74	1.99	0.61
Drill Rig(s) – (Drilling Emissions)	0.16	0.16	0.16	0.00	0.00	0.00	0.00
Fugitive Dust – (Disturbed Acres)	13.20	13.20	13.20	0.00	0.00	0.00	0.00
Vehicle Traffic (non-paved roads)	17.30	7.78	7.78	0.00	0.00	0.00	0.00
Total	30.65	21.14	21.79	9.23	0.74	1.99	0.61

MDEQ determined that any air quality impacts from the proposed action, including any impacts to the Lame Deer PM₁₀ non-attainment area, would not exceed MAQP thresholds because of the relatively small amounts of pollutants that would be emitted and because the emissions would be temporary and short-term. The wells to be drilled would be located in an unclassifiable/attainment area, which generally promotes good dispersion characteristics. Therefore, MDEQ determined that emissions from Alternative B would not cause or contribute to a violation of any ambient air quality standards. Impacts would be minimized because operations would need to comply with opacity requirements contained in ARM 17.8.304 (20% opacity averaged over 6 consecutive minutes) and reasonable precaution requirements contained in ARM 17.8.308 (applying water and/or chemical dust suppressant as necessary to comply with opacity requirements). In addition, Alternative B is designed to reduce fugitive dust emissions for a reduction of impacts. The dust reduction effectiveness objectives are included as part of the measures that would be required under this alternative. Page AIR-32 in the MT FEIS Air Quality Modeling Appendix discloses the effectiveness of various dust control measures. The mitigation measures imposed under this alternative would achieve up to a 65% reduction in uncontrolled dust emissions. Particulate matter concentrations would be in compliance with MAAQS and NAAQS, and PSD increments.

Cumulative Effects: The MT FEIS analyzed cumulative air quality impacts at Class I and Class II areas from emission sources across Montana, particularly in southeastern Montana. The analysis used an approach that included the modeling of existing and proposed regional sources at permitted and planned emission rates.

Prior to the decision to conduct an EIS for CBNG activities in Montana, MDEQ issued several MAQPs for CBNG compressor stations. Once the FEIS was issued, MDEQ determined that ambient air quality monitoring would be conducted for all CBNG facilities that exceed the 25 tons per year MAQP threshold, regardless of the PTE of the facility, to demonstrate compliance with the MAAQS/NAAQS. In addition, MDEQ determined that the modeling must include a NO_x PSD increment analysis to demonstrate compliance with the Class I NO_x increment and the Class II NO_x increment, regardless of whether or not PSD applies to the facility. The existing field compressor facilities: CX24 Battery (MAQP #3036), CX25 Battery (MAQP #3037), CX19 Battery (MAQP #3118), CX35 Battery (MAQP #3122), and CX14 Battery (MAQP #3141) that would be used to process the CBNG from the proposed wells received MAQP's prior to the decision to conduct an EIS for CBNG activities in Montana; therefore, no ambient air quality modeling was conducted for those stations at that time. However, MDEQ required ambient air quality modeling to demonstrate compliance with the

MAAQS/NAAQS for the sales battery (i.e. Symons Central Compressor Station (MAQP #3250-00), which included emissions from all of the previously permitted CX Battery Sites. In addition, although a PSD increment analysis was not required for the Symons Central Compressor Station MAQP, the MDEQ required a PSD increment analysis to be conducted. Finally, additional modeling for the adjacent Badger Hills POD was completed in 2004 and factored in all past, current and foreseeable future

development (including emissions from the existing field compressors used for the Dry Creek POD gas processing and the Symons Central Compressor).

The air quality modeling for the Symons Central Compressor Station demonstrated that neither the MAAQS nor the NAAQS would be violated. The model results are summarized in Table 4.2.1-2 (see Appendix G for modeling specifics).

4.2.1-2 Ambient Air Quality Modeling Results								
Pollutant	Avg. Period	NO _x Modeled Conc. (µg/m ³)	OLM/arm Adjusted to NO ₂ (µg/m ³)	Background Conc. (µg/m ³)	Ambient Conc. (µg/m ³)	NAAQS (µg/m ³)	MAAQS (µg/m ³)	% of NAAQS/MAAQS
NO ₂	1-hr	746.7 ^a	262.5	75	339	-----	564	N/A / 59.8
	Annual	31.5 ^b	23.6	6	30	100	94	30.0 / 31.5

^a Concentration calculated using OLM

^b Applying arm with national default of 75%

4.2.1-3 Class I and Class II Modeling Results							
Pollutant	Avg. Period	Class II Modeled Conc. (µg/m ³)	Class II Increment (µg/m ³)	% Class II Increment Consumed	Class I Modeled Conc. (µg/m ³)	Class I Increment (µg/m ³)	% Class I Increment Consumed
NO _x	Annual ^a	22.6	25	88.8	0.0029	2.5	0.1

The Class I/Class II increment analysis that was conducted demonstrated compliance with the Class I and Class II increments. The Class I and Class II modeling results are summarized in Table 4.2.1-3.

In summary, the modeling that was conducted for the Symons Compressor Station to determine compliance with the MAAQS/NAAQS demonstrated that neither the MAAQS nor the NAAQS would be violated. In addition, the PSD increment analysis for NO_x demonstrated that neither the Class I NO_x increment nor the Class II NO_x increment would be exceeded.

Visibility impairment was estimated for the MT FEIS. In that study, the MT FEIS No Action Alternative assumed 515 producing coal bed natural gas wells in Montana. Since Alternative B would consist of a similar number of wells and would be in a nearby location, the MT FEIS findings are representative of the level of impairment expected under this alternative. The MT FEIS reported no visibility impairment with

the refined analysis at any Class I or Class II PSD areas except for 2 days visibility impairment greater than 1 dV at the Crow Reservation, a federal Class II PSD area.

Atmospheric deposition was estimated for the MT FEIS. In that study, the MT FEIS No Action Alternative assumed 515 producing coal bed natural gas wells in Montana. Since Alternative B would consist of a similar number of wells and would be in a nearby location, the MT FEIS findings are representative of the level of atmospheric deposition expected under this alternative. The MT FEIS reported atmospheric deposition well below established thresholds.

As referenced in Chapter 3, section 3.1, the modeling for the Badger Hills POD determined annual total NO₂ cumulative concentrations in the project area are well below Montana and federal air quality standards (MAAQS, NAAQS). Total concentrations from coal bed natural gas operations in Montana and Wyoming and coal operations at the Spring Creek and

Decker Mines are less than 32% of applicable ambient air quality standards.

One hour total NO₂ cumulative concentrations in the project area are in compliance with applicable MAAQS and NAAQS. Total concentrations from coal bed natural gas operations in Montana and Wyoming and coal operations at the Spring Creek and Decker Mines are less than 60% of applicable ambient air quality standards.

Modeled NO₂ cumulative concentrations in the Northern Cheyenne Reservation are 21% of the PSD Class I increment. Modeled NO₂ cumulative concentrations in the project area are 90% of the PSD Class II increment.

All of the direct and indirect impacts from Alternative B are negligible for these impact indicators, resulting in negligible contributions to overall cumulative impacts. The emissions from the existing infrastructure and air emitting units would continue in compliance with the MDEQ approved permits for the existing field compressor sites: CX24 Battery (MAQP #3036), CX25 Battery (MAQP #3037), CX19 Battery (MAQP #3118), CX35 Battery (MAQP #3122), and CX14 Battery (MAQP #3141), and the existing sales battery, Symons Central Compressor Station (MAQP #3250-00). The cumulative impacts from Alternative B would be in compliance with all of the air quality standards and PSD increments and thresholds for the pollutant impact indicators for mandatory federal Class I PSD areas and sensitive lakes. This conclusion is based on the modeling completed for the MT and WY FEISs, and the results of the cumulative impact modeling for the Badger Hills POD, completed for the pollutant considered most likely to violate any ambient air quality standard or increment.

See Appendix G for additional modeling information, MDEQ future air quality analysis and modeling efforts.

4.2.2 Cultural Resources

Direct and Indirect Effects to Cultural Resources: Cultural resource inventories identified twelve sites determined to be within the Area of Potential Environmental Effect and area of direct impact from the proposed facility development. These sites include 24BH1030, 24BH1033, 24BH1957, 24BH1959, 24BH2095, 24BH2109, 24BH2117, 24BH2120, 24BH2173,

24BH2239, 24BH2986 and 24BH3162. All are adjacent to or within the area of direct impact for the proposed facility development. Indirect effects to sites would include the increased potential for damage, vandalism or artifact collection activity and unanticipated discoveries made during construction of the infrastructure for the project.

The following is a site by site Determination of Effect:

Site 24BH1030, a previously recorded lithic scatter site, containing a hearth feature, has been determined eligible for the National Register of Historic Places under Criterion D by the Keeper of the National Register because of the presence of the hearth. The site is considered eligible for the National Register because charcoal and other substances associated with fire hearths can contribute meaningful information to the understanding of prehistory. Although the site is not in the direct or primary impact area and would not be directly affected by the development of the corridor between Well 22C, M-2399 and the battery in Section 24 that would pass adjacent to the site, the company moved the corridor in Section 23 100 to 150 feet further to the south, in order to avoid the site. Consequently, the site would not be directly impacted or affected by the undertaking.

Site 24BH1033, a previously recorded lithic scatter and cairn site, is considered eligible for the National Register of Historic Places under Criterion A and D because of the presence of a cairn. The site is considered eligible for the National Register because, through Native American consultation, the presence of cairns was identified as significant to Native Americans and may be possible grave sites. The company moved the corridor in Section 14, between Well 32M, C-1599 and the battery in Section 14, by moving the corridor nearly 150 feet to the north, in order to completely avoid the site. Consequently, the site would not be directly impacted or affected by the undertaking.

Site 24BH1957, a previously recorded lithic scatter site in Section 18, would only be minimally impacted and affected by development. The site is situated on a narrow finger ridge that has an existing bladed road/trail extending out the ridge and passing through the boundaries of the site. The site was re-recorded and found to lie on both sides of the existing

bladed access road. The proposed corridor, between Wells 13D, M, C-1890 and Wells 12D, M, C-1990 in Sections 18 and 19, that includes the access road, buried pipeline, flowlines and water lines will pass through the site. The corridor would be located on the east side of the road, within the bladed road profile and would only minimally impact the site by disturbing the arrangement and placement of artifacts, since the site has already been impacted by the blading of the road through the site. Thus, little to no additional disturbance would occur to the site from the additional proposed development over the disturbance created from the original blading of the road. The site is located on private surface and the bladed road has been in existence for several years. The site was tested and evaluated and found to be not eligible for the National Register. Since the site is considered not eligible, no mitigation or further work is being recommended for this site.

Site 24BH1958/1959 consists of a previously recorded lithic scatter and several cairns. The site, in Section 18, is situated on a high flat ridge top and extends down onto the gently sloping side slopes and open flat benches and terraces below the ridge top on the ridge's north and east side. An existing bladed road/trail follows along the edge of the ridge cuts into the side slope below the ridge top. The road passes through the boundaries of the site. The site was re-recorded and found to lie on both sides of the existing bladed access road extending through the site. The site extends down slope from the higher ridge top crossing the road to the east on the east side of the site. The proposed corridor, between Wells 13D, M, C-1890 and Wells 12D, M, C-1990 in Sections 18 and 19, contains the access road, buried pipeline, flowlines and water lines. This corridor would run through a portion of the site. The corridor would be located on the east side and east edge of the road on the opposite side of the road from the main body of the site, and the corridor would be kept within the bladed road profile.

The site is considered eligible for the National Register of Historic Places under Criterion A and D because of the presence of the cairns. The site is considered eligible for the National Register because through Native American consultation the presence of cairns was identified as significant to Native Americans as they may represent possible grave sites. The lithic scatter portion of the site in the vicinity of the corridor

was tested and evaluated and this area of the lithic scatter portion of the site was found to be not eligible for the National Register.

The site is located on private surface and the bladed road through the site has been in existence for some years. Thus, the site has already sustained direct impacts as a result of the blading of the road through the site. Consequently, there would be little additional disturbance of the arrangement and placement of artifacts that would occur to the site from the additional proposed development over the already existing disturbance created from the original blading of the road.

Although the site is considered eligible for the National Register because of the presence of cairns that Native Americans have identified as significant and as possible grave sites, the portion of the site that would be affected by the corridor and developments within the corridor is considered a non-contributing element of the site's eligibility. Consequently, there would be no direct impacts or effects to the eligible portion of the site, the cairns, and no mitigation or further work is being recommended for this site.

Site 24BH2095, a previously recorded lithic scatter site in Section 26, was originally thought to be within the direct or primary impact area of the corridor and primary Area of Potential Environmental Effect between Wells 22C, M-2399 and Well 24C-2399 in Section 23. Through subsequent inventory, the site was re-recorded and found to lay outside of the direct or primary impact area and 400 foot wide survey corridor along the proposed development corridor and, consequently, would not be impacted or affected by the undertaking. The National Register eligibility of this site remains undetermined at this time.

Site 24BH2109, a previously recorded lithic scatter site in Section 23, is located on a high flat ridge top and was originally located within the direct or primary impact area and primary Area of Potential Environmental Effect of Well 24C-2399 in Section 23. In order to avoid impact to the site, the company moved the well approximately 320 feet to the south in order to avoid the site. Consequently, the site would not be directly impacted or affected by the undertaking. The National Register eligibility of this site remains undetermined at this time.

Site 24BH2117, a previously recorded lithic scatter site in Section 22, was originally thought to be within the primary impact area of the corridor and primary Area of Potential Environmental Effect between Wells 22C, M-2399 and Well 24C-2399 in Section 23. Through subsequent inventory, the site was re-recorded and found to lay some 250 feet outside of the direct or primary impact area and just outside of the 400 foot wide survey corridor along the proposed development corridor. Consequently, the site would not be directly impacted or affected by the undertaking. The National Register eligibility of this site remains undetermined at this time.

Site 24BH2120, a previously recorded lithic scatter site in Section 23, was originally thought to be within the direct or primary impact area of the corridor and primary Area of Potential Environmental Effect between Wells 22C, M-2399 and Well 24C-2399 in Section 23. Through subsequent inventory, the site was re-recorded and found to lay some 500 feet outside of the direct or primary impact area and about 150 feet outside of the 400 foot wide survey corridor along the proposed development corridor. Consequently, the site would not be directly impacted or affected by the undertaking. The National Register eligibility of this site remains undetermined at this time.

Site 24BH2173, a previously recorded lithic scatter site in Section 24, was originally thought to be within the direct or primary impact area of the corridor within the Area of Potential Environmental Effect for a produced water disposal pipeline between Wells 12M, C-1990 and a produced water disposal outfall or impoundment site in Section 24. Through subsequent inventory, the site was re-recorded and found to lay some 100 feet outside of the direct or primary impact area and just outside of the 400 foot wide survey corridor along the proposed development corridor. Consequently, the site would not be impacted or affected by the undertaking. The National Register eligibility of this site remains undetermined at this time.

Site 24BH2239, a previously recorded lithic scatter site in Section 18, would only be secondarily and minimally impacted and affected by development. The site is situated on a high flat to undulating ridge top. The site is located adjacent to the existing bladed road/trail extending out this ridge and passing adjacent to

the site boundaries. The site was initially re-recorded and found to lie on both sides of the existing bladed access road and proposed corridor that includes the access road, buried pipeline, flowlines and water lines between Wells 42C, M-1399 and Wells 13D, M, C-1890 in Sections 13 and 18. Subsequent re-recording of the site found that the site lays entirely on the south side of the road adjacent to the proposed corridor. The corridor would be located on the north side of the road, within the bladed road profile and would only indirectly or minimally and secondarily impact or affect the site. The site may already have been impacted to some unknown degree by the initial blading of the road adjacent to the site. Little to no additional disturbance would occur to the site from the additional proposed development over disturbance created from the original blading of the road. The site is located on BLM administered surface. However, the bladed road has been in existence for some years. The site was tested and evaluated and found to be not eligible for the National Register. Since the site is considered not eligible, no mitigation or further work is being recommended for this site.

Site 24BH2986, a newly recorded lithic scatter site in Section 23, was found to lay some 30 feet outside of the direct or primary impact area within the 400 foot wide survey corridor along the proposed development of the access road corridor and primary Area of Potential Environmental Effect between Wells 22C, M-2399 and Well 24C-2399 in Section 23. Consequently, the site would not be directly impacted or affected by the undertaking. The National Register eligibility of this site remains undetermined at this time.

Due to underground flowlines and low visual impact of the proposed development, there would also be no direct or indirect impacts or effects on the three sites determined eligible for the National Register, sites 24BH1949, a lithic scatter site, 24BH1950, a lithic scatter and rock art site, and 24BH2125, the historic Powers Ranch, that are located and recorded within the POD and Area of Potential Environmental Effect but located outside of the area of direct impact, nor would there be direct or indirect impacts or effects on the one additional site, 24BH2128, the CX Ranch, located within the POD and Area of Potential Environmental Effect within the area of indirect impact, that may be considered eligible for the National Register but whose eligibility

status remains undetermined at this time. There would also be no direct or indirect impacts or effects on the two sites determined eligible for the National Register. In sections surrounding the Dry Creek POD area, site 24BH1001, a kill site, located in adjacent Section 31, T. 9 S., R.40 E. and site 24BH1975, a lithic scatter site, located in adjacent Section 29, T. 9 S., R. 40 E.

In addition, there would be no direct or indirect impact or effect to any defined or established Cultural Landscape. None of the four types of landscapes considered eligible for the National Register exist in or around the project area. Presently, no Historic Districts exist within the project area and none would be impacted or affected by the proposed undertaking. The project area generally retains its original unmodified and rural character and there is no evidence for the presence of a planned, designed or developed landscape. No Historic Designed Landscapes exist within the project area and none would be impacted or affected by the proposed undertaking. No Rural Historic Landscapes exist with the project area. The project area and greater landscape are not associated with specific significant historic events or persons. Therefore, no potential for a Rural Historic Landscape exists and none would be impacted or affected by the proposed undertaking. Finally, although the area has been and is important to Native American cultures, there are no characteristics that define the area as an ethnographic landscape. No ethnographic landscapes or Traditional Cultural Properties exist in the project area and none would be impacted or affected by the proposed undertaking.

In addressing Native American Consultation issues, the Northern Cheyenne and Crow Tribes, as well as other Tribes in the region, were made aware of the project by letter dated August 3, 2004. BLM also hosted and conducted an on-site inspection and field tour of the POD area with a representative of the Northern Cheyenne Tribe on September 2, 2004. At the conclusion of the field tour, the Northern Cheyenne Tribal representative did not express an interest in the area and commented that there were no Traditional Cultural Properties or culturally sensitive areas within the POD area. In addition, there were no known plant or mineral collecting areas identified during the September 2, 2004, field visit.

BLM's summary of the findings, and comments it received during the September 2, 2004 field tour, concluded that: no TCPs or TCP issues were found in the Dry Creek POD area; site testing and subsequent facility construction should avoid disturbance of known rock cairns identified with several sites; and a monitor from the Northern Cheyenne Tribe should be present during excavation work by the company. Actions BLM proposes to take were summarized in a letter to the Northern Cheyenne dated November 23, 2004. In that letter BLM proposed mitigation measures based on the results of the field tour.

Since review of the project area by the Northern Cheyenne THPO on September 2, 2004, did not identify any TCPs in the project area, none would be impacted or affected. Unanticipated discoveries found during construction of roads and buried infrastructure would be addressed through the condition of approval to monitor surface disturbing actions.

The one major recommendation made by the Northern Cheyenne Tribal Historic Preservation Officer was to have a tribal representative present during all surface disturbing activities that might occur as a result of POD development; acting as a tribal monitor as there may still be indirect effects to culturally sensitive areas, sites or localities considered important or significant to Native American interests.

Due to the lack of a response to several letters to the Northern Cheyenne, BLM proposes mitigation measures based on the results of the field tour of September 2, 2004, and has incorporated the comments received from the field tour into the environmental document. As a result, Conditions of Approval have been developed that would impose some restrictions on the Company following the approval and signing of the Decision Record for this action. A statement has been incorporated into the Conditions of Approval (COA) as a mitigation measure for the project, identifying the need for the company to conduct monitoring and to restrict the location of several corridors in order to avoid certain areas of sites (see Appendix F.8 for specific Conditions of Approval).

Cumulative Effects: The MT FEIS identified the potential for 5,135 cultural sites to occur in the CBM areas of Montana, resulting in 515 to 735 sites that could be eligible for listing on the National Register of Historic Places. Most of the

sites would be expected to be prehistoric sites that contain dateable deposits in a buried context and would be eligible under Criterion D of 36 CFR 60.4. The inventory results from this project would add to the total cumulative number of sites identified in the region. There would be little or no cumulative direct or indirect effect on cultural resources as no sites determined eligible for the National Register would be impacted or affected by the proposed undertaking.

Direct and Indirect Effects to Paleontological Resources: There would be no direct or indirect effects to Paleontological Resources as a result of the proposed undertaking.

Cumulative Effects: There would be no cumulative effects to paleontological resources.

4.2.3 Geology and Minerals

Direct and Indirect Effects to Coal Bed Natural Gas: Production of CBNG from federal leases would represent the irreversible and irretrievable removal of the resource. The gas would be transported through pipelines to markets where it would be put to beneficial residential and industrial uses.

The potential for drainage of federal leases by adjacent private and state wells within the project area would be reduced or eliminated by production of gas from federal leases.

Direct and Indirect Effects to Coal: Coal formations would not be damaged by the removal of groundwater and gas; however, a small amount of coal would be permanently removed from the formations by drilling. This very small amount of coal would be of no importance compared to the vast amount of coal resources in the area.

Cumulative Effects: Gas produced from federal leases would be transported through pipelines to markets. The gas from federal leases would contribute to the total amount of gas available to consumers. Revenue for state, county and federal governments would be generated by the sales of gas from federal leases. Drainage of federally owned CBNG would occur in other areas where producing private and state wells are located within the radius of drainage adjacent to federal leases without production. This situation would exist with federal minerals located outside of and adjacent to the Dry Creek project area.

Methane Migration:

Following the methods discussed under the No Action alternative, the production of these 495 wells would be expected to directly cause the 20 foot drawdown contour to extend approximately 4.79 miles from the well field. The results of this analysis are tabulated in the Hydrology Appendix on Table Hydro-5. This is no increase over the No Action Alternative. This potential drawdown area is shown on Map Hydro-2 in the Hydrology Appendix.

The methane migration effects under this alternative would be the same as the “No Action” alternative and that described in section 3.3.2.

4.2.4 Hydrology

Direct and Indirect Effects to Surface Water-CBNG Water Discharge to Surface Waters: Under this alternative, the proposed 24 federal CBNG wells would be drilled and produced. Additionally, one existing federal well would be hooked up for production. The production of these 25 additional wells would result in an increase in the volume of water discharged under Fidelity’s existing MPDES permit (MT0030457) from approximately 1,138 gpm to approximately 1,313 gpm. This is well below the permitted limit of 1,600 gpm. This additional discharge would be untreated water with an EC of approximately 1,987 $\mu\text{S}/\text{cm}$ and an SAR of approximately 53.8. During LMM flows at Birney Day School, this discharge would cause EC to increase by 0.4% and SAR to increase by 1.7% over existing conditions.

Following the methodology described in Chapter 3, the resulting water quality in the Tongue River can be determined at 3 USGS stations, as shown on Table 4.2.4-1. Comparison of the resultant water quality values to the MDEQ and Northern Cheyenne standards for SAR and EC (see Table 3.4.1-4) shows that during HMM and LMM flows, none of the mean monthly standards are exceeded, and during 7Q10 flows the instantaneous maximum standards are not exceeded. The results of this analysis indicate that this alternative would not directly cause the beneficial uses of the Tongue River to become impaired due to either SAR or EC. Due to the decreasing rate of water discharge per well vs. time, these impacts would decrease with time and be primarily short term in nature. A complete analysis of all parameters for which surface water quality criteria existed was

conducted prior to the issuance of the existing MPDES permit (MT-0030457) by MDEQ. The EA for this permit states that "The total volume of produced water authorized by the discharge permit will not exceed 1,600 gallons per minute

(gpm). Discharge at this volume and quality will protect all beneficial uses of the receiving water and comply with Montana water quality standards and non-degradation criteria." (MDEQ, 2000).

Table 4.2.4-1: Direct Impacts; Modeled Existing Conditions vs. Proposed Action Alternative

	Flow Conditions	Modeled Existing Conditions (1138 gpm)			Modeled Resultant Proposed Action (1313 gpm)		
		Flow (cfs)	EC (µS/cm)	SAR	Flow (cfs)	EC (µS/cm)	SAR
Tongue River at State Line	7Q10	44.5	1307	1.53	44.9	1312	1.60
	LMM	180.5	702	0.82	180.9	705	0.85
	HMM	1672.5	261	0.30	1672.9	261	0.30
Tongue River Below Dam	7Q10	72.5	841	1.21	72.9	844	1.24
	LMM	181.5	664	0.93	181.9	667	0.95
	HMM	1431.5	395	0.53	1431.9	396	0.54
Tongue River at Birney Day School	7Q10	51.5	1138	1.80	51.9	1141	1.83
	LMM	175.5	730	1.18	175.9	733	1.20
	HMM	1121.5	377	0.60	1121.9	378	0.61

Note: Values in parentheses represent the rate of untreated CBNG Discharge via permit MT-0030457

Direct and Indirect Effects to Groundwater:

Under this alternative, the proposed 24 federal CBNG wells would be produced in addition to the one existing federal CBNG well; therefore, groundwater would be drawn down as a direct result of this alternative. Following the methods described in Chapter 3, the production of these 25 wells would be expected, over the long term (20 years), to directly cause the 20 foot drawdown contour to extend, on average, approximately 6 feet further than it would reach under existing conditions. The results of this analysis are shown in the Hydrology Appendix on Table Hydro-5. The expansion of the 20 foot drawdown contour by approximately 6 feet would not cause any additional wells or springs to be added to the drawdown area.

Domestic water wells that are completed in the produced coal seam and are located within the potential drawdown area would be anticipated to have decreased yields as a result of CBNG related drawdown. Those springs which emit from the developed coal seam and are located within the potential drawdown area would be anticipated to have decreased yields as a result of CBNG related drawdown. The greater the

magnitude of drawdown (such as that within the producing field), the greater the decreases in yield would be. Those wells which are not finished within the produced coal seam would not be affected by the CBNG pumping since the coal seams are confined aquifers. Similarly, the springs which do not emit from the developed coal seam would not be affected by the CBNG production. The wells and springs that would be within the 20 foot drawdown contour are listed in the Hydrology Appendix on Tables Hydro-8 and Hydro 9. It is not anticipated that many of these wells or springs receive their water from the coal seams to be developed (see section 3.4.2).

The operator has certified that water mitigation agreements have been reached with all potentially affected owners of wells and springs in accordance with the requirements of MBOGC Order No. 99-99. This Order requires that operators offer water mitigation agreements to owners of water wells or natural springs within one mile of a CBNG field, or within the area that the operator reasonably believes may be impacted by CBNG production, whichever is greater, and to extend this area one-half mile

beyond any adversely affected water source. This order applies to all wells and springs, not just those which derive their water from the developed coal seams. This Order requires "...prompt supplementation or replacement of water from any natural spring or water well adversely affected by the CBM project..." These agreements would apply to those wells which experience an impact to their use whether it is due to decreased yields, the migration of methane or a change in water quality. Although the terms of water mitigation agreements are to be "under such conditions as the parties mutually agree upon" (Order 99-99), the replacement of water required by these agreements is anticipated to take the form of reconfiguring existing wells, re-drilling wells or drilling new wells. These measures would be effective for replacing water sources since the major drawdown from CBNG activity is anticipated to be confined to the coal seam aquifers producing CBNG and only minimally affect other aquifers (such as sandstones) within the Tongue River Member of the Fort Union Formation. Any lost or diminished water sources would be anticipated to be replaced with a permanent source before the termination of the agreement.

Cumulative Effects to Surface Water-CBNG Water Discharge to Surface Waters: Under this alternative, the proposed 24 federal CBNG wells would be drilled and produced in addition to the one existing federal CBNG well. The production of these additional wells would result in an increase in the volume of water discharged under Fidelity's existing MPDES permit (MT0030457). This additional discharge would be untreated water with an EC of approximately 1,987 $\mu\text{S}/\text{cm}$ and an SAR of approximately 53.8. During LMM flows at Birney Day School, this discharge would cause EC to increase by 0.7% and SAR to increase by 4.0% over existing conditions.

Following the methodology described in Chapter 3, the resulting water quality in the Tongue River can be determined at 3 USGS stations, as shown on Table 4.2.4-2 below. This analysis also includes the proposed treated discharge from the Powder River Gas-Coal Creek project downstream from the Tongue River Dam (1,122 gpm; MT-0030660), and the proposed treated discharge by Fidelity above the reservoir (1,700 gpm; MT-0030724). This treated water would

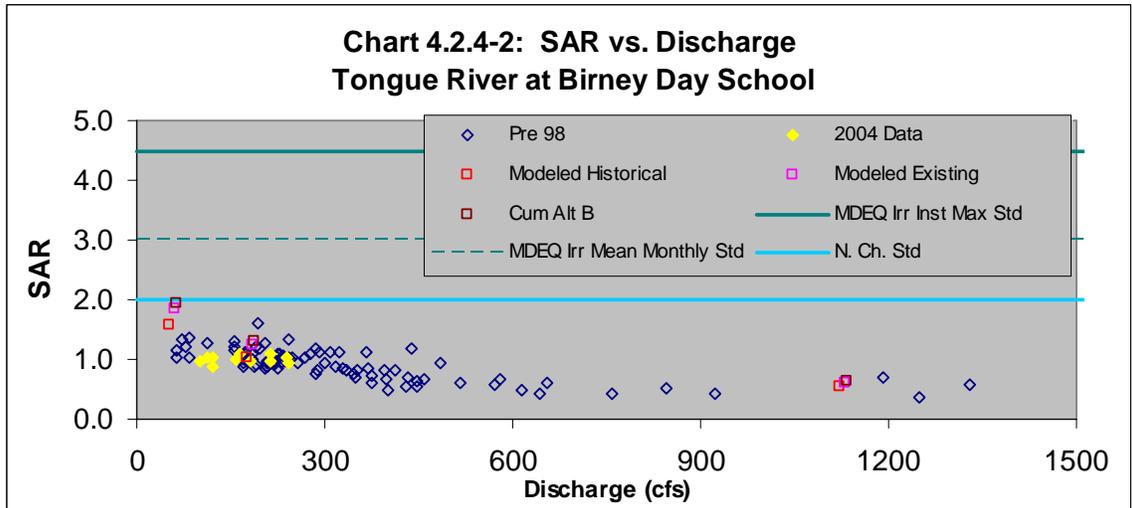
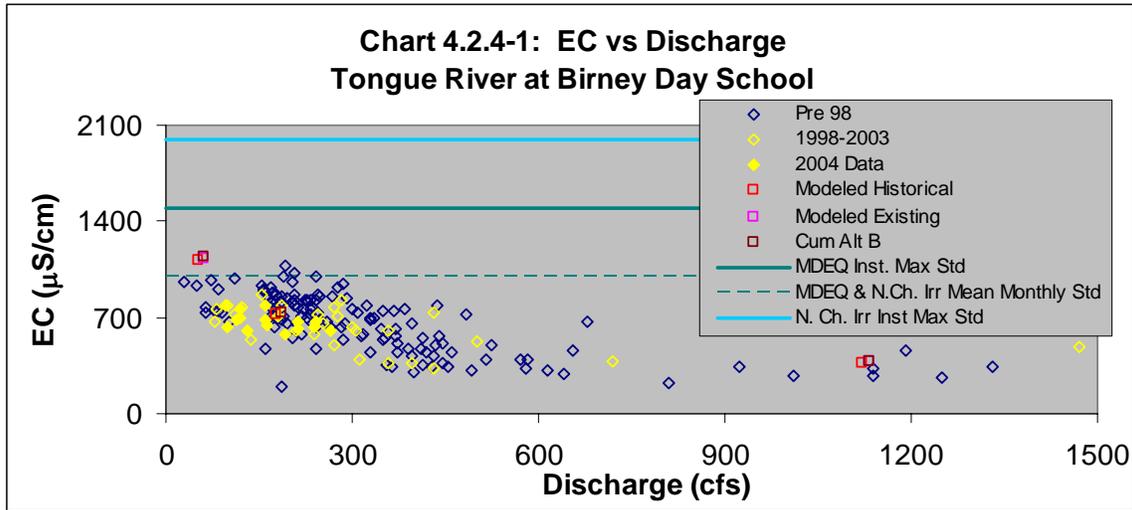
have an SAR of approximately 3.0 and an EC of approximately 742 $\mu\text{S}/\text{cm}$. Comparison of the resultant water quality values to the MDEQ and Northern Cheyenne standards for SAR and EC shows that during HMM and LMM flows, none of the mean monthly standards are exceeded, and during 7Q10 flows, the instantaneous maximum standards are not exceeded. The results of this analysis indicate that this alternative would not directly cause the beneficial uses of the Tongue River to become impaired due to either SAR or EC. Due to the decreasing rate of water discharge per well vs. time, these impacts would be primarily short term in nature. These model results are also compared graphically to the MDEQ and Northern Cheyenne Standards, and to historical data on Charts 4.2.4-1 and 4.2.4-2.

A complete analysis of all parameters for which surface water quality criteria existed was conducted prior to the issuance of the existing MPDES permit (MT-0030457) by MDEQ. The EA for this permit states that "The total volume of produced water authorized by the discharge permit will not exceed 1,600 gallons per minute (gpm). Discharge at this volume and quality will protect all beneficial uses of the receiving water and comply with Montana water quality standards and non-degradation criteria." (MDEQ, 2000).

Table 4.2.4-2: Cumulative Impacts; Projected Conditions vs. Proposed Action Alternative (includes other foreseeable projects inputs)

	Flow Conditions	Modeled Projected Conditions (1138 gpm)			Modeled Resultant Proposed Action (1313 gpm)		
		Flow (cfs)	EC (μS/cm)	SAR	Flow (cfs)	EC (μS/cm)	SAR
Tongue River at State Line	7Q10	48.3	1282	1.60	48.7	1302	1.79
	LMM	184.3	703	0.87	184.7	712	0.94
	HMM	1676.3	262	0.31	1676.7	262	0.32
Tongue River Below Dam	7Q10	78.8	835	1.27	79.2	843	1.36
	LMM	187.8	667	0.99	188.2	673	1.04
	HMM	1437.8	398	0.55	1438.2	400	0.57
Tongue River at Birney Day School	7Q10	57.8	1132	1.86	58.2	1140	1.95
	LMM	181.8	733	1.24	182.2	739	1.29
	HMM	1127.8	380	0.62	1128.2	382	0.64

Note: Values in parentheses represent the rate of untreated CBNG Discharge via permit MT-0030457



Cumulative Effects to Groundwater: Under this alternative, the 25 federal CBNG wells would be produced from the Dietz, Monarch and Carney coal seams. These wells would be in addition to the 463 existing and permitted CBNG wells within Montana, the approximately 2,000 CBNG wells in Wyoming that are contiguous with this area, and the foreseeable 210 CBNG wells in Fidelity's Coal Creek POD.

Following the methods discussed in Chapter 3, the production of these wells would be expected to cause the 20 foot drawdown contour to extend approximately 4 feet further than would be anticipated from the existing and foreseeable CBNG wells. The results of this analysis are tabulated in the Hydrology Appendix on Table Hydro-7. No additional wells or springs are added to the cumulative drawdown area as a result of the Proposed Action. Those wells and springs listed in the Hydrology Appendix on Tables Hydro-8, Hydro-9, and Hydro-10, would be included in the potential cumulative drawdown area. It is not anticipated that many of these wells or springs receive their water from the coal seams to be developed (see section 3.4.2).

Domestic wells that are completed in the coal seam producing CBNG, and are located within the potential drawdown area, would be anticipated to have decreased yields as a result of CBNG related drawdown. Those springs which emit from the developed coal seam and are located within the potential drawdown area would be anticipated to have decreased yields as a result of CBNG related drawdown. The greater the magnitude of drawdown (such as that within the producing field), the greater the decreases in yield would be. Those wells, which are not finished within the produced coal seam would not be affected by the CBNG pumping since the coal seams are confined aquifers. Similarly, the springs which do not emit from the developed coal seam would not be affected by the CBNG production. As discussed under the direct impacts section of the Proposed Action alternative, it is anticipated that the water mitigation agreements required under MBOGC Order 99-99 will be effective at mitigating impacts from CBNG related drawdown.

4.2.5 Indian Trust and Native American Concerns

Direct and Indirect Effects: Fugitive dust from

construction activities and vehicle traffic would be dispersed quickly without impacting air quality or visibility over the Crow and Northern Cheyenne Reservations. Five existing compressors permitted by MDEQ would be used to process gas from the federal wells in the project area. Emissions from these compressors would continue to be monitored to determine compliance with approved permits and air quality standards, including Class I and Class II airsheds. No additional emissions or emission sources would be added to the CX Field for the Dry Creek project. Some of the produced water would be discharged into the Tongue River at existing discharge points. Discharge of additional produced water from the Dry Creek project would be done under Fidelity's existing MPDES permit. The quality of the water in the Tongue River after mixing with produced water would be in compliance with the Northern Cheyenne water quality standards and the State of Montana water quality standards.

The combination of the geology in the area of the CX Field, and the distance from CBNG wells in the project area to minerals owned by the Crow and Northern Cheyenne, would preclude Indian owned gas from being drained by producing CBNG wells in the project area. A study completed by the Reservoir Management Group of the Casper BLM office indicated that the pressure would have to decline between 10 to 40 percent before gas would begin to desorb from the coals in the Powder River Basin. The Dietz formation in this POD ranges from 253 feet to 537 feet. The initial pressure in the Dietz coal (the shallowest being tested) would be approximately 109 psi to 232 psi. This means that the pressure in the Dietz would have to be reduced by at least 10.9 psi and possibly as much as 23.2 psi before gas might begin to desorb. The depths of the Monarch ranges from 424 feet to 707 feet. The Monarch formation would have an initial pressure of 183 psi to approximately 306 psi. This formation would have to be drawn down at least 18.3 psi and as much as 30.6 psi before gas might desorb. The depths of the Carney ranges from 565 feet to 837 feet. The Carney formation would have an initial pressure of 245 psi to approximately 362 psi. This formation would have to be drawn down at least 24.5 psi and as much as 36.2 psi before gas might desorb. The 20 foot drawdown

radius within the beds being tested in this POD would extend 1.3 miles in the long term. This would result in a pressure decline of approximately 8.6 psi at 1.3 miles. This would not be enough reduction to cause gas to desorb from any of the coals being tested. Because the nearest Northern Cheyenne lands are over 4 miles away and the nearest Crow lands are over 3 miles away, drainage of methane gas from Indian lands would not occur as a result of CBNG production from the project.

Considering all production in the CX field (449 wells), the 20 foot drawdown radius would extend 3.9 miles. Based on the FEIS for the Decker Mines, the mines are mining the Dietz 1 and Dietz 2 coal beds. Therefore, only the Dietz 3 would extend under the West Decker mine and underlie the Northern Cheyenne minerals. The minimum drawdown to cause gas to desorb from the Dietz 3 (the shallowest coal not mined at Decker and the lowest pressure coal) is 53 feet. The 53 foot drawdown contour for the whole CX field extends approximately 1.64 miles. Because the nearest Northern Cheyenne lands are over 4 miles away, drainage of methane gas from these lands would not occur. At 3.9 miles, the pressure drawdown in the Dietz 1 coal would only be 8.66 psi. This would not be enough to cause methane to desorb. The nearest Crow lands are over 3 miles away, drainage of methane gas from these Indian lands would not occur as a result of CBNG production from the project.

Cumulative Effects: The actions associated with drilling and producing the federal wells in the project area would not contribute cumulative impacts to either the Crow or Northern Cheyenne Reservations, resources owned by the Tribes or services provided by the Tribes.

4.2.6 Lands and Realty

Direct and Indirect Effects: The impacts would be similar to Alternative A, except that the BLM issued right-of-way would also include proposed “off-lease” facilities and would affect four tracts of Federal surface instead of two.

The right-of-way would be granted under Section 28 of the Mineral Leasing Act of 1920, as amended (MLA) and the pipelines, powerline, and access road would be constructed, used,

maintained and terminated in conformance with the company’s plan of development. The right-of-way would be subject to the Stipulations in Appendix D and to cost recovery and rental and would be issued for a term of twenty years and be renewable. The right-of-way would be monitored for construction, use, and reclamation.

Cumulative Effects: The impacts would be similar to Alternative A, except that the BLM issued right-of-way would authorize additional proposed facilities and affect four tracts of Federal surface instead of two.

4.2.7 Livestock Grazing

Direct and Indirect Effects: Approximately 26 acres of vegetation would be removed by construction activities for buried flowlines and power lines. This would be a short term (< 5 years) loss of vegetation. Vegetation would be reestablished by successful reclamation in the disturbed areas. Approximately 6 acres of vegetation would be removed by construction activities for new roads and well sites. This would be a long term (> 5 years) loss of vegetation which would result in the loss of less than 1 Animal Unit Month (AUM) during the production phase.

Produced water would become available to the surface owner and livestock operator for watering livestock. Additional water and water sources would provide more flexibility for livestock use and distribution in the project area. Additional water could improve weight gains and health for calves. Better distribution of livestock and season of use would improve the vegetation available to livestock.

Cumulative Effects: Cumulative effects from implementing the Proposed Action would be the long term loss of approximately 6 acres of vegetation and less than 1 AUM. After completion of final reclamation in the project area, the vegetation would be restored and the 1 AUM would be restored. According to the MT FEIS, over the next 20 years, disturbances from CBNG development, conventional oil and gas development and surface coal mining activities could result in approximately 6,904 AUMs becoming unavailable to livestock during the production phase.

4.2.8 Recreation and VRM

Direct and Indirect Effects: Full development of the POD and all the associated support

facilities would not curtail the recreational use of the area. CBNG development would place production facilities on the landscape; however, under a Class IV Management Objective, changes would be acceptable. Visual impacts such as color contrasts from facilities and exposed soil would be reduced through use of standard environmental colors, minimizing surface disturbance and reclaiming disturbed areas with vegetative species native to the area.

Cumulative Effects: In this case, BLM does not control enough surface acreage to affect scenic values of the region. Because BLM does not require mitigation of visual impacts on private surface, in areas where the land base for development is predominantly private, the characteristic landscape is expected to be altered over time from a rural, natural setting to a developed setting.

4.2.9 Social and Economic Conditions

Direct and Indirect Effects: The 24 federal wells would be drilled and 1 previously drilled federal well, placed into production. According to assumptions in the MT FEIS, 2 federal wells potentially would be dry holes. The 23 wells would produce 6.9 BCF of CBNG having a gross value of 27.6 million dollars over the life of the wells. The Federal royalties would be 3.4 million dollars. The State would collect 2.4 million in production taxes, and receive 50 percent of the Federal royalties, 1.7 million dollars. Drilling, production and abandonment of the 25 wells would provide temporary jobs with an estimated income of 322 thousand dollars over the life of the wells, which would enhance the social well being of those receiving this income. The affected private surface owner would be compensated for surface disturbing activities or damage to crops and improvements in accordance with the surface use agreement.

Direct and Indirect Effects to Environmental Justice: Employees needed for project activities would likely come from Sheridan, Wyoming, although local residents could be hired for project jobs. Project employees would travel north from Sheridan and would not have to travel across either the Crow or Northern Cheyenne Reservations. The project operator proposes to use emergency services from Sheridan. The project would not require employees to move into the area near the project. Therefore, no adverse human health or environmental effects would be expected to fall

disproportionately on minority or low income populations from this alternative.

Cumulative Effects: The project would be an incremental addition of an approximately eight percent increase in the number of wells, to the producing CX Field and the proposed projects in southern Big Horn County. The temporary development and production jobs, and the related supplies required to service the wells over the life of the projects would likely come from the Sheridan and Gillette, Wyoming areas. The economic effects would be within the scope of the analysis found in the MT FEIS (2003) pages 4-116 to 4-123. The CBNG production taxes and royalties would also offset some of the reduced coal production taxes and royalties from the mines in the Decker area as high priced long-term contracts expire and lower mining ratio coal reserves are mined out.

4.2.10 Soils

Direct and Indirect Effects: The soils in the area are moderately susceptible to wind and water erosion. Runoff potential is high for soils in this area. Rutting hazard is high due to low soil strength. This combination of characteristics suggests that off road vehicle traffic may be particularly damaging to the soil surface under high soil moisture conditions and potentially lead to accelerated water erosion during runoff events.

Surface disturbance would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (approximate size of 15 feet x6 feet x15 feet), and compaction from vehicles driving or parking at the drill site. Estimated disturbance associated with these wells is summarized in Table 2.6-2

The majority of proposed pipelines (gas and water) would be located in “disturbance corridors”, which involve placing two or more utility lines (water, gas, power) in a common trench, usually along access routes. Approximately 12 acres of fifteen foot corridor would be disturbed. This practice results in less surface disturbance and overall environmental impacts.

Direct and indirect effects resulting from well pad, access roads, pipelines, powerlines and other activities may include soil compaction, mixing of horizons, exposure of soil, loss of soil productivity, and increased susceptibility of the

soil to wind and water erosion. Soil productivity would be eliminated along improved roads and severely restricted along two track trails.

Soil compaction by vehicle traffic results in the collapse of soil pores reducing the transmissivity of water and air. Compaction decreases infiltration thus increasing runoff and hazard of water erosion. The potential for compaction is greatest when soils are wet. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery.

The discharge points into the Tongue River are located near the main channel in areas with low channel gradients. Each outfall structure consists of a riprap pad surrounding the discharge pipe with a narrow riprap lined trench sloping into the channel area to prevent eroding the channel bank.

The off-channel impoundment is enclosed in a basin underlain by low-permeable clay materials. The surface and near surface clays observed at this location are anticipated to limit subsurface infiltration. There are two soil types that have been mapped in the area of the impoundment, Renohill and Winnett. The Renohill soil is a silty clay with a high shrink-swell potential and bedrock at a depth of 20 to 40 inches. The silty clay texture and shallow bedrock would be an asset for the impoundment underlain with this soil, because these characteristics would tend to limit seepage. The Winnett soil is a clay soil with a high shrink-swell potential and shallow depth to bedrock (20 to 40 inches). It would also be suitable for the impoundment due to the shallow depth to bedrock and moderate seepage potential.

Reduction of water and air movement in the soil will limit plant uptake of water and nutrients and affect above ground plant health and growth. Available water capacity is reduced due to decreased pore space. Reduction of water and air availability will affect soil flora and fauna in the same manner and may ultimately affect above ground plant growth and health. Compaction effects soil temperature, affecting the activity of soil organisms, their rate of decomposition of soil organic matter, and subsequent release of nutrients.

The persistence of soil compaction is determined

by the depth at which it occurs, the shrink-swell potential of the soil, and the climate. As the depth of compaction increases, compaction will be more persistent. The type and amount of clay determines the shrink-swell potential. The greater the shrink-swell potential and number of wet - dry cycles, the lower the duration of compaction. Freeze - thaw cycles also decrease duration of compaction.

In some cases, as along heavily used two track trails, compaction will severely restrict soil transmissivity. Compaction in these areas may be reduced by remedial action, such as plowing or ripping. Compaction may be released naturally over decades of climatic cycles.

Compaction in other areas, such as a few passes of vehicle traffic may collapse near surface soil pores, but leave deeper soils unaltered. Compacted soils may return to natural conditions within a few years.

Soil horizon mixing may result where construction of roads, pipelines or other activities occur. Mixing of horizons may result in moving organic matter and nutrients at depths out of reach of surface plants. Mixing may also bring soluble salts or unweathered material to the surface affecting soil and plant health. Soil flora and fauna may be displaced out of their living zone or exposed to unfavorable conditions and not survive. Surface flora are often dependent on conditions created by soil organisms and their health and survivability may be impacted. Species composition, above and below ground, may be altered.

Horizon mixing may bring soil texture and structure to the surface that are more susceptible to wind and water erosion. Organic and inorganic compounds that hold soil structures together may be exposed to conditions that destroy these compounds or decrease their effectiveness to create stable soil structure. If soil structure is destroyed, surface infiltration by water and air may be affected. When topsoil is salvaged, mechanical displacement will damage soil structure. Salvage and storage of topsoil will allow further breakdown of structure and exposure of the material to wind and water erosion. Soil organic matter may be destroyed due to exposure with a loss of available nutrients. Inorganic compounds, such as carbonates and other salts, may be brought to the surface, which effect seed germination, plant

health and viability.

Mixing or disturbance of horizons or removal of vegetation would modify the spectral reflectance of a site. This may result in lighter materials being brought to or exposed on the surface resulting in greater reflectance of solar radiation and decreased soil temperature. This would affect soil organism activity, their rate of decomposition of soil organic matter, and subsequent release of nutrients. Decreased temperatures may result in later germination of plants and reduction in plant growth and production with a reduction in soil protection from erosive forces. Species composition, above and below ground, would be altered due to changes in soil temperature.

Soil erosion would affect soil health and productivity. The soils in the area are moderately susceptible to wind and water erosion. The Revised Universal Soil Loss Equation, version 2 was used to examine potential erosion in the area. Erosion rates are site specific and are dependent on soil, climate, topography, and cover. Examining one of the common soils upon which activities would occur, the Thedalund soil, erosion rates on eight percent 200 foot slopes, covered by cool season grasses is calculated at 0.0013 tons per acre per year (t/ac/yr) and could be considered a natural rate of erosion. Erosion rates on the same slope under bare ground conditions calculates to a loss of 3.2 t/ac/yr. It is not expected that any activities would result in bare ground exposed for this distance. Thedalund has a T value of 3, which means that the soil can sustain soil loss at a rate of 3.0 t/ac/yr and still maintain a medium for plant growth. It is not expected that the proposed activities would result in totally bare ground. Loss of 1/32 of an inch represents a 5 ton per acre soil loss.

Expedient reclamation of disturbed land with salvaged topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with use of erosion control measures (e.g., waterbars, water wings, silt fences, culverts, rip-rap, gabions, etc.) would ensure soil productivity and stability will be regained in the shortest time frame. Mitigation measures would minimize impacts from soil disturbances.

Overall impacts to soils from surface disturbance would be short term (<5 years) and not affect the long term health and productivity of soils based

on the operator's plans and BLM mitigation measures. Soil disturbances would be short term, and have minor impacts with expedient, successful reclamation and site stabilization. Mitigation includes: in areas of construction, topsoil would be stockpiled separately from other material and be reused in reclamation of the disturbed areas; construction activities would be restricted during wet or muddy conditions; construction activities would be designed following Best Management Practices (BMPs) to control erosion and sedimentation; erosion control measures would be maintained and continued until adequate vegetation cover is re-established; vegetation would be removed only when necessary; sensitive habitat areas would not be used for topsoil storage; topsoil piles may be required to be seeded following the BLM seeding policy; and cuts and fills for new roads would be sloped to prevent erosion and to facilitate revegetation.

Cumulative Effects: Construction activities associated with the Proposed Action would impact approximately 26 acres during the short term (<5 years) and approximately 6 acres in the long term (>5 years). The MT FEIS estimated that during the next 20 years, disturbances from CBNG development, conventional oil and gas development, coal mining, and other projects considered under the cumulative effects analysis would result in the short-term disturbance of about 132,000 acres of soil. These disturbances would be reduced to about 92,200 acres during the production phase of CBNG, conventional oil and gas activities and coal mining. Cumulative effects would result in lowered soil productivity and decreased soil health on these disturbed areas. In much of this acreage, soils would be taken out of production or require long periods before they can regain productivity.

4.2.11 Vegetation

Direct and Indirect Effects to Vegetation: Disturbance caused from drilling, construction of access roads and pipeline corridors would temporarily remove vegetation from approximately 26 acres in the POD area. Removal of this vegetation would remove the soil cover in these disturbed areas and reduce the amount of vegetation available to livestock and wildlife. Compaction by equipment traffic would damage vegetation and affect productivity. Vegetative productivity would be restored through reclamation and elimination of vehicle travel.

Direct and Indirect Effects to Special Status

Species: No additional impacts are expected to occur from the CBNG activity associated with the federal wells.

Direct and Indirect Effects to Invasive

Species: Surface disturbance associated with construction of proposed access roads, pipelines and water management facilities would present opportunities for weed invasion and spread. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants, such as salt cedar, Canada thistle, leafy spurge and perennial pepperweed. Implementation of the operator's weed management plan, part of the POD, would minimize or eliminate the introduction and spread of weeds.

Cumulative Effects: According to the MT FEIS, approximately 74,000 acres could be disturbed as a result of future CBNG development.

4.2.12 Wildlife and Fisheries/Aquatics

The types and extent of impacts to wildlife species and habitats from CBNG development are discussed in detail in the MT FEIS (Chapter 4, pages 4-160 to 4-196). Those discussions apply directly to this project and provide a basis for the site specific assessment of impacts to individual species as well as groupings of species that would occur from the Fidelity Dry Creek POD.

The proposed action requires the Wildlife Monitoring and Protection Plan (WMPP) to be implemented, which requires additional monitoring, mitigation and stipulations on development activities to minimize impacts on wildlife species.

Direct and Indirect Effects to Threatened and Endangered Species:

Most bald eagle activity occurs within and immediately adjacent to the Tongue River corridor, with some use occurring in adjacent outlying areas. The Dry Creek POD is located primarily outside of the core use area for bald eagles, therefore, potential impacts to bald eagles from POD development would be anticipated to be minimal. Direct impacts include the addition of new roads and increased vehicle traffic, which may result in the injury or potential mortalities of bald eagles resulting from collisions with vehicles. About 0.5 miles of new

overhead powerlines would be constructed. Overhead powerlines would be constructed according to APLIC (Avian Power Line Interaction Committee-1996) guidelines, as well as additional guidelines offered by the USFWS. Installation of raptor protection devices would minimize the number of potential electrocutions to bald eagles, although the potential for electrocution and collision would still exist. BLM determined this action "is likely to adversely effect" bald eagles in the project area (BA to FWS, dated October 25, 2004, BLM files). Mitigation measures to protect bald eagles are outlined in the Biological Opinion offered by the USFWS to the MT FEIS (MT FEIS, Volume II, Wildlife Appendix) and to this specific project (November 8, 2004).

Indirect impacts to bald eagles include habitat fragmentation and human disturbance to potential winter roost and foraging areas resulting from the increase in CBNG infrastructure, operations, and maintenance activities.

BLM determined this action is "not likely to adversely affect" black-footed ferrets in the project area (BA to FWS, dated October 25, 2004, BLM files). No direct or indirect impacts to ferrets are anticipated due to the extremely low likelihood of black-footed ferret occupation of black-tailed prairie dog towns within the Dry Creek project area.

Direct and Indirect Effects to General Wildlife Species and Habitats:

Direct impacts to wildlife species include the loss of habitat from the construction of CBNG infrastructure. The construction of 24 wells on 11 locations, 9 on private surface and 2 on BLM, would result in a total of approximately 2.63 miles of new disturbance, (corridors and new two track trails) which would remove approximately 4 acres of habitat.

Although bladed corridors would be reclaimed after the facilities are constructed, some changes in vegetation would occur along the reclaimed areas. Reclamation is an attempt to restore disturbed areas to pre-disturbed conditions, although reclamation does will not always mimic pre-disturbance conditions and offer the same habitat values to wildlife species. Sagebrush obligates, including some species of songbirds and sage grouse, would be most affected by this change. However, due to the small amount of

disturbance, these impacts alone are not expected to threaten the long term viability of the wildlife species found within this area.

Direct impacts also include wildlife mortalities related to collisions with vehicles. Additional CBNG wells and infrastructure would require an increase in vehicle traffic, and the potential for vehicle/wildlife collisions would also increase. Species including deer, birds, reptiles and small mammals would be most likely affected.

Constructing approximately 0.5 miles of overhead powerlines would be constructed with strict raptor protection guidelines, and would minimize potential electrocution areas, as well as deterring raptors from perching where electrocution may occur. However, raptor mortalities occur even with properly installed raptor protection devices. Aerial powerlines also pose a collision hazard to all avian species, especially raptors and upland game birds.

Indirect impacts may include increased displacement of wildlife species that are sensitive to human activities, require large blocks of uniform cover, or are displaced by other species (MT FEIS, pages 4-164, 172, and 173), which may include sage grouse, some songbird species, and mule deer. Vegetative changes from the previous conditions would also affect wildlife forage and habitat, and would displace wildlife species to areas with preferred habitat.

The additional 11 well site locations and associated infrastructure analyzed under this alternative would be adjacent to previously authorized CBNG development, at distances ranging from 0.2 to 0.8 miles from existing development. Depending on proximity to existing disturbance and species tolerance, wildlife species within these areas would either have acclimated to the surrounding conditions, previously been displaced by construction activities, or may be caused to be displaced to other areas with preferred habitat.

All-weather county road access, as well as access to wells in the form of two-tracks within the previously authorized CBNG field, has been established across four occupied black-tailed prairie dog towns within the Dry Creek POD. Three of these towns would also be crossed to access the additional well sites planned under the proposed action, and vehicle traffic in these areas is expected to increase. Additionally, a utility

corridor would be constructed through one town located on private surface to provide service to a federal well. This corridor is proposed on an existing two-track that would also be used to access this well. Another well site and servicing facilities would be placed immediately adjacent to another active black-tailed prairie dog town located on both private and federal surface. Mortalities to prairie dogs may occur as a result of collisions with vehicles.

Since associated species, such as burrowing owls and mountain plovers have not been observed on these habitats after several years of surveys, (Hayden Wing, unpublished), no direct impacts to these species are expected. Indirectly, the increase in vehicle disturbance may add to the factors that currently suggest these prairie dog towns as unsuitable for occupation by burrowing owls and/or mountain plovers.

Noise impacts to susceptible wildlife species should be minimal, since no additional compressor facilities would be built.

Seven federal well sites are located in grouse nesting habitat within 2 miles of an active sage grouse lek (BI-11). This lek is located approximately 1.5 miles to the west of the nearest well site. Sage grouse may be affected by this project by habitat disturbance and/or fragmentation. Roads, vehicles, structures and human activity may displace some grouse nesting activity and reduce habitat availability for brood rearing. Mortality would increase as a result of collisions with vehicles. However, application of the Construction Timing Condition of Approval should minimize disturbance during the breeding, nesting, and brood rearing time periods during the construction phase.

A sage grouse lek (BI-12) believed inactive at this time, is located approximately 0.8 miles southwest of the nearest federal well. This lek was last reported as being active in 1988. BLM has surveyed this lek from 2001 to 2003 and has not observed birds any of those years.

Another sage grouse lek (BI-10A) is located approximately 1.9 miles north of the nearest federal well. This lek is located on private surface/private minerals, and has been monitored every year since 2001. Between the summer of 2001 and the spring of 2002, excess water produced from authorized wells in the CX field

was discharged into a natural depression, creating a playa pond located approximately 0.14 miles from this strutting ground (BLM files). Attendance by sage grouse at this lek dropped from 20-30 birds in 2001 to 0 in 2002, 6 in 2003, and 11 in 2004. It is unknown if the drop in attendance of sage grouse at this lek is related to the creation of the playa pond. Several factors can determine sage grouse attendance at leks, as well as survival rates between years.

The 24 wells constructed under the proposed action may produce water that would be discharged into the playa pond. The playa pond is one of four water management options that are currently being used. The direct effects of the existing playa pond on attendance at the BI-10A sage grouse lek are unknown (Brett Walker, personal communication), as is the potential for this pond to attract predators of sage grouse to this area. Predators may result in sage grouse abandoning or “flushing” from the lek when alarmed. This may interfere with sage grouse’s ability to successfully breed at this location. Also, the potential of this pond attracting waterbirds and their relationship to WNV is unknown.

WNV has recently been attributed to a 25 percent decline in survival rates among four populations of radiomarked greater sage grouse across Alberta, Wyoming, and Montana in 2003. (Walker, et al., print in progress, 2004) This playa pond may have the characteristics to support the mosquitoes that carry or spread the WNV. There is potential to increase mosquito habitat with this alternative through the continued use of the impoundment for storage. As a result, West Nile Virus could increase (see further discussion on WNV below in this section). It is also unknown if sage grouse would use this playa pond as a watering source. Only conflicting evidence on the importance of “free water” to sage grouse is available, and this data has not been widely documented or quantified. Although some have suggested that distribution of open water is important to sage grouse, studies of radio-marked grouse in central Montana and southeastern Idaho failed to demonstrate the importance of open water to grouse, even during dry years. (Management Plan and Conservation Strategies for Sage Grouse in MT, 2003) However, it has also been noted that sage grouse will use existing watering sources in late summer if it is available (Connelly et al. 2000b).

Four active raptor nests are located within 2 miles of the Dry Creek POD area. One active red-tailed hawk nest is located 0.75 miles from two proposed federal wells. This nest was reported active in 2003 and inactive in 2004. A great horned owl nest is located approximately 0.4 miles from a proposed federal well. An osprey nest is located approximately 1.8 miles from the nearest proposed federal well, and a golden eagle nest is located approximately 1.0 mile from the nearest proposed federal well. All four nests are exposed daily to varying degrees of disturbance from CBNG activities and vehicle traffic from the existing CX field, as well as other activities. It is assumed that these breeding pairs of raptors have acclimated to ongoing activities and disturbances, and can tolerate this level of disturbance. However, the threshold for tolerance to additional disturbance and vehicle traffic or human activities as a result of the completion of additional federal wells is unknown. The Condition of Approval for active raptor nests would prevent surface disturbing activities and associated disturbance around active nests during nesting periods.

Several nests which have been reported as inactive for the last two years or more are also located within the Dry Creek POD (see chapter 3). No mitigation is required to protect inactive nests. Depending on species tolerance to disturbance (prairie falcon vs. red-tailed hawk), the opportunity may or may not exist to re-use these nesting substrates in the future.

Crucial winter range for mule deer and use of the winter range by the deer would also be protected by application of a lease stipulation that prohibits construction and drilling activities from December 1 through March 31. The purpose of the stipulation is to protect the winter range from disturbance during the winter use season, and to facilitate long-term maintenance of wildlife populations.

An exception to this stipulation may be granted by BLM if the operator submits a plan, which demonstrates that impacts from the proposed action are acceptable or can be adequately mitigated. Many variables determine use of the winter range on a micro-site. Site specific assessments would be conducted in the area for which the exception is requested to determine potential impacts from granting an exception. Mule deer crucial winter range would not be affected by granting an exception to the

stipulation by following an approved plan under identified conditions. Conditions (see Appendix H), which would be assessed include:

- Previous, current, and forecasted weather conditions
- Topography
- Proximity to adjacent activities and disturbances
- Vegetative components/habitat attributes associated with species requirements
- Proposed duration of activities
- Current year's growing season and climatic conditions
- Other conditions specific to determining winter range suitability

Direct and Indirect Effects to Fisheries and Aquatic: Potential impacts to aquatic species include: increased sedimentation from road, pipeline, and well pad construction; changes in water quality and streamflows due to the discharge of produced CBNG water into the Tongue River and drawdown effects on springs. There would be "no effect" to the endangered pallid sturgeon (Biological Opinion to the BLM 2004). This is due to: (1) No habitat present in the project area (nearest habitat is located within the Yellowstone River, which is approximately 185 miles downstream) and (2) The low amount of discharged flow and drainage area affected when compared to the flow and drainage area of the Yellowstone River.

Increased erosion: Effects on aquatic species from increased erosion would be minor due to no on-drainage impoundments (reservoirs), design criteria for road, pipeline construction and mitigation measures that are designed to reduce erosion.

Changes in water quality: Effects from changes in water quality would be minor and not detrimental. The EC, SAR, and other water quality parameters (such as water temperature, bicarbonate, Ammonia and Total Dissolved Solids) would meet state water quality standards within the Tongue River (refer to Section 3.41 Hydrology). This would be accomplished by using a mixing zone within the Tongue River, which would provide protection and limit effects to aquatic life. The water discharged would not exceed the current amount permitted by MDEQ.

Increased streamflows: Effects from increased streamflows would be minor and not detrimental. The amount of water discharged from the implementation of this alternative (which would be within the current 1,600 gpm allocated by MDEQ) would consist of 0.40 cfs. This amount is minor when compared to the flows in the Tongue River (At the low monthly 7Q10 (35 cfs upstream of the dam at the state line), the discharge would only constitute 1 percent of the flow).

Springs: There is a slight potential for this project to affect the flow rates for the same 17 springs, which are currently contained within the projected drawdown area from existing development. Reduced flow rates could affect the amount of habitat available for aquatic invertebrates and amphibians. However, it is not anticipated that many of these 17 springs are receiving their water from the coal seams being developed, thus they would not be impacted by this drawdown (See section 3.4.2).

Impacts to aquatic species that inhabit these areas would be minor for the following reasons. (1) Any water discharged directly into the Tongue River would not exceed the current 1,600 gpm (3.56 cfs) approved by MDEQ. (2) The total amount of water permitted for discharge under the current Montana DEQ permit is not expected to influence water quality parameters due to the amount of discharged flow when compared to the flows in the Tongue River (at the low monthly 7Q10 (35 cfs upstream of the dam at the state line), the discharge would only constitute 10 percent of the flow). (3) The amount of water produced from implementing this alternative would only consist of 1 percent of the low monthly 7Q10 flow. (4) Mitigation measures that are designed to reduce potential erosion and ensure adequate water quality for aquatic life. (5) No on-drainage impoundments (reservoirs) would be constructed with this project. (6) It is not anticipated that many springs are receiving their water from the coal seams being developed, thus they would not be impacted by drawdown.

West Nile Virus

There is a potential to increase mosquito habitat with this alternative through the use of the impoundment for water storage. As a result, instances of West Nile Virus (WNV) could increase. However, many other factors also affect the spread of disease, such as irrigation

adjacent to the Tongue River, natural wetlands, stock water impoundments, and environmental influences. In the event that the state and/or county health and human service and/or public pest management agencies indicate that mosquito control is needed, the BLM would require appropriate mitigation measures as part of approved permits.

Cumulative Effects to Wildlife: Additional impacts to wildlife resources from cumulative impacts would be the same or similar as described, above. There would be direct habitat loss from construction activities, roads and other facilities. Mortalities would occur from vehicle and power line collisions. Certain species that depend on a specific geographic site or area that is lost by long term (> 5 years) surface disturbance may suffer from a population decline. Wildlife mortalities would increase as the size and level of disturbance increases. Indirect impacts would occur from habitat disturbance, human presence and possible diminished water quality. Some wildlife species would be indirectly impacted as far away as two miles from an activity (MT FEIS, page 4-173). Between 2,560 and 20,480 acres could indirectly be impacted by this project, using ½ and 2 mile perimeters around the area of activity. Additionally, between 100,000 to 200,000 acres of certain wildlife habitat could be indirectly impacted by existing CBNG and coal mine developments within the project vicinity in Wyoming and Montana.

Local populations of certain wildlife species groups may be impacted by the cumulative effects of current and foreseeable developments in this area. These would include species such as mule deer, sage grouse, eagles. These species use certain habitats in or near the area and rely on very key habitat areas during critical times of the year. This may include winter range for big game, nesting and brood rearing habitat for grouse and raptors.

Although difficult to quantify in numerical terms, it is reasonable to assume that, with the cumulative development in this area, some impacts to most wildlife species residing in the area cannot be avoided.

Cumulative Effects to Fisheries/Aquatics: Potential cumulative effects could occur from the past, present and foreseeable actions. These actions include: Decker Coal Mine, Spring

Creek Coal Mine, Montana and Wyoming CBNG development, gravel/scoria pits, CX Field expansion, Powder River Gas Coal Creek, livestock grazing, agriculture/irrigation, Tongue River dam and reservoir, existing roads and road (re)construction/maintenance (refer to Section 3.12.7 for more detailed descriptions). The above actions occur in various degrees throughout the Tongue River drainage, which influences the degree at which aquatic life is affected. Water quality, erosion and streamflows are identified as parameters that could be changed or impacted and subsequently result in potential effects to aquatic life.

CBNG development: CBNG has the potential to affect water quality, erosion, streamflows, and spring discharge. CBNG development in Montana currently encompasses 35,840 acres (1% of the Tongue River drainage). It has the potential to expand to 143,600 - 392,000 acres (based on MT FEIS 3,500 - 9,800 wells predicted over the next 20 years (a calculation of 16 wells per 640 acres was used), which is between 4 and 11 percent of the Tongue River Drainage (this does not include Wyoming activity). Currently, there is a discharge permit of 1,600 gpm (3.56 cfs) for CBNG produced untreated water (approx. 5 of the flow at the low monthly 7Q10 (70 cfs) below the dam and 10% (7Q10 of 35 cfs) upstream of the dam). Implementation of Alternative B for this project would amount to .40 cfs of discharged flow within the above permit. Another 1 cfs of treated water is proposed for the Powder River Coal Creek POD with the potential of an additional 1.94 cfs in the foreseeable future. In addition, 3.77 cfs of treated water is proposed under another permit. All of the current and future discharges are approved by MDEQ and will meet state water quality standards. Future discharges, which could equal up to 30 cfs (approx. 43% at the low monthly 7Q10 flow below the dam (MT FEIS)) may occur in the future. The discharge of CBNG water could have potential effects on habitat or populations. Cumulative effects are possible.

There is a slight potential for this project to affect the flow rates for the same 17 springs, which would be foreseen to be contained within the projected cumulative drawdown area from foreseeable CBNG development. Reduced flow rates could affect the amount of habitat available for aquatic invertebrates and amphibians. However, it is not anticipated that many of these

17 springs are receiving their water from the coal seams being developed, thus they would not be impacted by this drawdown (see section 3.4.2).

The degree of cumulative effects from the combination of the above activities within the Tongue River drainage depends on a variety of factors. Some of which are natural. Drought conditions have affected aquatic habitat and populations within the drainage for the past several years. Local geology, severe wildfire, soil composition also influence water quality, streamflows and erosion. The amount of future CBNG development, amount of water withdrawal for irrigation purposes, etc. are other factors that influence the degree of cumulative effect.