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: As no wells would be drilled and no additional compressor stations would be constructed, no additional impacts would be expected to air quality in this area.

Cumulative Effects: No wells would be drilled and no additional compressor stations would be constructed, so impacts from this action would not be cumulative.

4.1.2 Cultural Resources

Direct and Indirect Effects: No impacts would occur to cultural resources in the project area under this Alternative 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 activities that might be approved in the project area.

Cumulative Effects: No cumulative effects would occur to cultural resources because no activities would be authorized by BLM, MBOGC or DEQ under this Alternative. 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 Coal 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: No CBNG would be produced in the project area under this Alternative because no permits would be approved by BLM or MBOGC.

Direct and Indirect Effects to Coal: No impacts would occur to the coal formations in the project area under this Alternative.

Cumulative Effects: No CBNG would be produced from the project area under this Alternative. Additional CBNG would not be available for residential and industrial uses. No additional revenues would be generated by CBNG production to State, local and Federal governments under this Alternative. CBNG in certain parts of the project area could be drained by adjacent producing wells.

4.1.4 Hydrology

Direct and Indirect Effects to Surface Water: 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, would be the same as the modeled existing conditions. These conditions are presented in Chapter 3 on Table 3.4.1-2.

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 and flow would be the same as depicted in Table 3.4.1-3 for foreseeable conditions. The area projected to be contained within the 20 foot drawdown contour over 20 years will be the same as the foreseeable area described in Section

3.4.2 and shown as the foreseeable drawdown area on Map Hydro-2.

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 Coal Creek project that could affect Indian trust assets. The cumulative impact concerns expressed by the Northern Cheyenne Tribe for regional CBNG development activities and the non energy related development projects on trust assets 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 effect to the intent of the KCLA Classification.

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 NE¼SE¼, 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. Future proposed projects may require the issuance of BLM issued rights-of-way.

4.1.7 Livestock Grazing

Direct and Indirect Effects: There would be no change in the water available for livestock from CBNG-related activities.

Cumulative Effects: There would be no additional drilling or development, so there would be no cumulative effects.

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 (see Appendix C for Social and Economic Assumptions common to all alternatives).

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 would be drilled under the no action alternative, therefore, there would 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: There would not be any impacts to vegetation in the project area.

Direct and Indirect Effects to Special Status Species: No changes to the existing vegetation community.

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

Cumulative Effects: There would not be any cumulative effects to area vegetation.

4.1.12 Wildlife and Fisheries/Aquatics

Direct and Indirect Effects: There would be no impacts resulting from this alternative.

Cumulative Effects Wildlife: There would be

no impacts from this alternative.

Cumulative Effects Fisheries/Aquatics: The cumulative effects have been identified for current and past activities. Refer to Affected Environment: Chapter 3.12.7.

4.2 EFFECTS FROM ALTERNATIVE B—NO FEDERAL ACTION

4.2.1 Air Quality

Direct and Indirect Effects: Under this Alternative, 62 private wells and 16 state wells would be drilled. Pollutant emissions would occur during the exploration phase from construction and drilling activities. These emissions would potentially impact air quality in the project area though any impacts would be less than under Alternative C due to the fewer number of well sites disturbed and wells drilled. The primary pollutants emitted would be particulate matter (TSP), particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), oxides of nitrogen (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2). Pollutant emissions from the exploration portion of Alternative B would be short-term and localized in nature. Impacts would be minimized because, although an MAQP would not be required for the exploration portion of Alternative B, Fidelity would still 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).

TSP, PM_{10} 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 SO_2 emissions would occur from drilling engine operations and testing service equipment. Air quality impacts at each well would be temporary - occurring during the average 5 days of construction, drilling, and completion activities at each of the 78 wells.

The exploration portion of the project would result in a temporary increase in fugitive dust and gaseous emissions. The potential emissions of the exploration portion of this Alternative, 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 – Exploration

	Tons/Project						
Emission Source	*TSP*	PM_{10}	$PM_{2.5}$	NO_x	VOC	CO	SO_x
Drill Rig(s) – (Engine Emissions)	0.00	0.00	0.55	7.74	0.62	1.67	0.51
Drill Rig(s) – (Drilling Emissions)	0.82	0.82	0.82	0.00	0.00	0.00	0.00
Fugitive Dust – (Disturbed Acres)	2.81	2.81	2.81	0.00	0.00	0.00	0.00
Vehicle Traffic (non-paved roads)	4.10	1.85	1.85	0.00	0.00	0.00	0.00
Total	7.74	5.48	6.03	7.74	0.62	1.67	0.51

MDEQ determined that any air quality impacts from the exploration portion of Alternative B would be minor because of the relatively small amounts of pollutants that would be emitted and because the emissions would be intermittent and short-term. The wells to be drilled would be located in an unclassifiable/attainment area, which generally reflects good dispersion characteristics and the exploration portion of the project would not exceed MAQP thresholds. Therefore, MDEQ determined that emissions from the exploration portion of this Alternative would not cause or contribute to a violation of any ambient air quality standards. Impacts would be minimized because although an MAQP would not be required, Fidelity would still 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). The city of Lame Deer has been designated as a PM_{10} nonattainment area. However, only minor, if any impacts would occur to the Lame Deer PM_{10} nonattainment area because of the distance from the proposed project to the Lame Deer PM_{10} nonattainment area and because all PM emissions from the project would be intermittent and short-term.

Pollutant emissions would also occur from the

production portion of this Alternative during extraction and transmission of the CBNG, and these emissions would potentially impact air quality in the project area. The primary pollutants emitted would be PM_{10}, NO_x, CO, VOC, and SO_2. The two existing field compressor stations that would be used under this Alternative consist of the following: BCPL Visborg 25 Battery (MAQP #3302-00) and BCPL Montana State 36 Battery (MAQP #3303-00). The two permitted facilities that have not yet been constructed that would be used for this Alternative consist of the following: BCPL Rancholme 21 Battery (MAQP #3334-00) and BCPL Rancholme 29 Battery (MAQP #3335-00). The existing sales battery that would be used for this Alternative is the BCPL Symons Central Compressor Station (MAQP #3250-00). Emissions from this Alternative would be less than Alternative C because only four field compressor stations and the sales battery would be required due to the fewer number of wells that would be drilled. The Rancholme 28 Battery would not be constructed for this Alternative. Emissions from the 5 permitted compressor stations that would be used for Fidelity's Coal Creek POD under this Alternative are summarized in Table 4.2.1-2.

4.2.1-2 Emission Inventory – Alternative B-Production

	Tons/Year				
Facility	PM_{10}	NO_x	VOC	CO	SO_x
BCPL Visborg 25 Battery	0.08	24.07	11.63	12.39	0.06
BCPL Montana State36 Battery	0.08	24.07	11.63	12.39	0.06
BCPL Rancholme 21 Battery	0.54	16.22	16.22	32.46	0.04
BCPL Rancholme 29 Battery	0.54	16.22	16.22	32.46	0.04
BCPL Symons Central Compressor Station	4.40	115.00	74.87	228.46	0.28
Total	5.64	195.58	130.57	318.16	0.48

MDEQ requests that ambient air quality modeling be conducted for 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 requests that the modeling 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. To date, no CBNG facilities applying for a MAQP have been subject to PSD. MDEQ completed an independent review of the ambient air quality modeling that was conducted for each of the production facilities as part of the MAQP permitting process. In addition, although a PSD increment analysis was not required for any of the production facilities, the Department requested BCPL to conduct a PSD Class I and Class II NO_x increment analysis for the BCPL Symons Central Compressor Station and the Department requested BCPL to conduct a PSD Class II NO_x increment analysis for the four field compressor stations. The ambient air quality modeling results are summarized in Table 4.2.1-3.

4.2.1-3 Ambient Air Quality Modeling Results – NO_x

Facility Modeled	Avg. Period	NO_x Modeled Conc. ($\mu g/m^3$)	OLM/arm Adjusted to NO_2 ($\mu g/m^3$)	Background Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	MAAQS ($\mu g/m^3$)	% of NAAQS/ MAAQS
Visborg 25 Battery	1-hr	1459.8[a]	333.8	75	408.8	--------	564	N/A / 72.5
	Annual	18.2[b]	13.7	6	19.7	100	94	19.7 / 20.9
Montana State 36 Battery	1-hr	133.1[a]	201.1	75	276.1	--------	564	N/A / 49
	Annual	6.4[b]	4.8	6	10.8	100	94	19.7 / 11.5
Rancholme 21 Battery[c]	1-hr	599[a]	248	75	323	--------	564	57.3
	Annual	23[b]	17	6	23	100	94	23 / 24.5
Rancholme 29 Battery[c]	1-hr	242[a]	212	75	287	--------	564	50.9
	Annual	23[b]	17	6	23	100	94	23 / 24.5
Symons Central Compressor Station	1-hr	746.7[a]	262.5	75	339	--------	564	59.8
	Annual	31.5[b]	23.6	6	30	100	94	30 / 31.5

[a] Concentration calculated using OLM
[b] Applying arm with national default of 75%
[c] Rancholme 21, and 29 were modeled cumulatively with Rancholme 28, individual results would be lower

Each of the models demonstrated that neither the MAAQS nor the NAAQS would be violated. Because the modeling conducted for each of the production facilities that would be used for Alternative B are explained in detail in the proposed action alternative, refer to Section 4.3.1 of this EA to review the modeling methodology.

The Class II modeling results for each facility are summarized in Table 4.2.1-4.

4.2.1-4 Class II Modeling Results – NO_x

Facility Modeled	Avg. Period	Class II Modeled Conc. ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)	% Class II Increment Consumed
Visborg 25 Battery	Annual[a]	13.7	25	54.6
Montana State 36 Battery	Annual[a]	4.8	25	19.1
Rancholme 21 Battery[b]	Annual[a]	17	25	68
Rancholme 29 Battery[b]	Annual[a]	17	25	68
Symons Central Compressor Station	Annual[a]	22.6	25	88.8

[a] Concentration calculated using OLM
[b] Applying arm with national default of 75%
[c] Rancholme 21, and 29 were modeled cumulatively with Rancholme 28, individual results would be lower

The Class II increment analysis that was conducted as part of each MAQP application demonstrated compliance with the NO_x Class II increment. Because the modeling conducted for each of the production facilities that would be used for Alternative B are explained in detail in the proposed action alternative, refer to Section 4.3.1 of this EA to review the modeling methodology.

The Class I modeling results for the Symons Central Compressor Station are summarized in Table 4.2.1-5.

4.2.1-5 Class I Modeling Results - NO_x

Facility Modeled	Avg. Period	Class I Modeled Conc. ($\mu g/m^3$)	Class I Increment ($\mu g/m^3$)	% Class I Increment Consumed
Symons Central Compressor Station	Annual[a]	0.0029	2.5	0.1

[a] Applying the arm with national default of 75%

The Class I increment analysis that was conducted as part of the Symons Central Compressor Station MAQP application demonstrated compliance with the NO_x Class I increment. The modeling conducted for each of the production facilities that would be used for Alternative B are explained in detail in Alternative C, refer to Section 4.3.1 of this EA to review the modeling methodology.

In summary, the modeling that was conducted for each of the production facilities to determine compliance with the MAAQS/NAAQS demonstrated that neither the MAAQS nor the NAAQS would be violated. In addition, the PSD Class II NO_x increment analysis that was conducted for each of the production facility's demonstrated that the Class II NO_x increment would not be exceeded. Furthermore, the PDS Class I increment analysis that was conducted for the Symons Central Compressor Station demonstrated that the Class I NO_x increment would not be exceeded.

MDEQ currently maintains a modeling database to track CBNG production activity in Montana and the model is updated with each new NO_x emitting facility that locates in the area defined by the MT FEIS and that requires a MAQP. Each model that is run for a newly proposed facility includes the emissions from the modeling database. However, because the modeling that has been conducted typically demonstrates that the receptor displaying the highest impact is near the fence line of the facility that is being modeled and because CBNG development is not yet widespread in Montana, MDEQ has not conducted a cumulative impact model since the original modeling for the Badger Hills POD. That is, although the facilities being modeled includes all of the emissions from previously ran models, the subsequent models do not include the receptors from the previous models. MDEQ determined that the cumulative model that was conducted for the Badger Hills POD would still be a representative cumulative impact model because none of the CBNG facilities that have been subsequently modeled would significantly impact the receptor that demonstrated the highest impact from the Badger Hills POD cumulative impact model. The cumulative impact model that was completed for the Badger Hills POD is summarized in the following section, "Cumulative Effects", and discussed in detail in the cumulative effects section of Alternative C (Section 4.3.1) of this EA. MDEQ will continue to request MAQP applicants to model NO_x emitting units that locate in the area defined by the MT FEIS to ensure that the MAAQS and NAAQS, as well as the Class I and Class II NO_x PSD increments, are not exceeded. In addition, as CBNG development continues, or as CBNG facilities are proposed on properties closer to the Northern Cheyenne Indian Reservation, MDEQ will continue to request applicants to conduct NO_x PSD Class II increment analyses, as well as NO_x PSD Class I increment analyses. Further, as CBNG development becomes more prevalent in Montana, MDEQ will request sources conducting ambient air quality modeling for CBNG facilities to conduct a cumulative impact model. That is, MDEQ will request sources conducting modeling for CBNG facilities to include the receptors that showed the highest impacts from previous models.

Cumulative Effects: The MT FEIS analyzed cumulative air quality impacts at Class I and Class II areas from emissions sources across Montana, and in 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.

The most recent cumulative impact model was conducted by MDEQ as part of reviewing the Badger Hills POD. The cumulative impact model that was conducted for the Badger Hills POD is still representative of the cumulative impacts of the area defined by the MT FEIS because none of the CBNG facilities that have been subsequently modeled would significantly impact the receptor that demonstrated the highest impact from the Badger Hills POD cumulative impact model. Therefore, the cumulative effects associated with Alternative B would be the same as the cumulative effects associated with Alternative C. The cumulative effects associated with this Alternative would be the same as the cumulative effects associated with Alternative C, refer to the cumulative effects section contained in Section 4.3.1 of this EA to review the cumulative impact analysis.

4.2.2 Cultural Resources

Direct and Indirect Effects: Cultural resources on Federal surface or split estate lands (private surface/federal minerals) would not be impacted under this Alternative. No action requiring BLM compliance with Section 106 of NHPA would occur under this Alternative. Sites and areas of

Traditional Native American concern would continue to be vulnerable to impacts from CBNG and other development on private lands.

Direct and Indirect Effects to Paleontological Resources: No direct or indirect effects would occur to paleontological resources under this Alternative.

Cumulative Effects: Cumulative impacts could occur to cultural resources under this Alternative if cultural resources located on private lands are damaged, destroyed or removed. The 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 Coal Creek POD would add to the state and BLM databases for the acres inventoried and sites located and recorded. No new sites would be added to the National Register of Historic Places as a result of the inventories conducted for the Coal Creek POD.

4.2.3 Geology and Minerals

Direct and Indirect Effects to Coal Bed Natural Gas: Under this Alternative, CBNG could potentially be produced from the additional 78 Coal Creek private and state wells. Production of these wells is estimated to last up to 15 years. Production of CBNG could be an 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.

No federal wells would be drilled under this Alternative, which could result in the drainage of CBNG in federal lease areas by adjacent producing private and state wells.

Methane Migration

Domestic water wells and springs completed in a coal bed producing CBNG within the minimum radius drawdown could experience an influx of natural gas. Domestic wells potentially affected are shown in Table 4.2.3-1.

4.2.3-1 Domestic Water Wells

Site name	Type	Township	Range	Sec	Tract	Depth
Munson Emmett (3.5 Miles NE Decker)	Well	09S	40E	22	NESE	170
Holmes Ranch (8.5 Miles E Decker)	Well	09S	41E	9	SWNE	28.7
Munson Mrs. Emmett	Well	09S	40E	22	NESE	30.1
Munson Mrs. Emmett	Well	09S	40E	22	NWSE	80
Munson Emmett	Well	09S	40E	24	NENW	140
Rancholme Cattle Co.	Well	09S	41E	28	NWNW	200
Johnston	Well	09S	41E	21	SWSW	200
Johnston	Well	09S	41E	21	SWSE	280
Munson Emmett	Well	09S	40E	26	NWNE	40
Munson Emmett (2.4 Miles NE Decker)	Well	09S	40E	22	SENE	169.4

Direct and Indirect Effects to Coal: Coal formations would be partially dewatered and the natural gas contained in the coal would be removed. No damage to the coal or the integrity of the formation would be expected by the removal of gas and water.

Cumulative Effects: Under this Alternative, the production and sale of natural gas would create revenue for State and county governments and contribute to overall energy resources for our country. The potential drainage of natural gas from federal lease areas could occur and there would be no revenue to the federal government. Production of natural gas from these private and state leases could lead to additional exploration and development projects in the future. At that time, potential for drainage of natural gas from federal lease areas would be mitigated by the drilling of federal wells.

Methane Migration: Under this Alternative, it is assumed that the existing 449 wells in the CX Field plus the 78 private and state wells be produced. This results in the long term impact of drawdown extending approximately 1.6 miles beyond the POD boundary. This potential drawdown area is shown on Map Hydro-2 in the Hydrology Appendix. The results of this analysis are shown in the Hydrology Appendix

in Table Hydro-4.

4.2.4 Hydrology

Direct and Indirect Effects to Surface Water: Under this alternative, the proposed 78 fee and state CBNG wells would be drilled and produced. The production of these wells would result in an increase in the volume of water discharged under Fidelity's existing MPDES permit (MT-0030457) from approximately 1,085 gpm to approximately 1,124 gpm. This is well below the permitted limit of 1,600 gpm. This additional discharge would be untreated water with an EC of approximately 2,248 µS/cm and an SAR of approximately 58.5. During LMM flows at Birney Day School, this discharge would directly cause SAR to increase by 0.5% and EC to increase by 0.1% over existing conditions (see Table 4.2.4-1).

The additional produced water would be managed via beneficial uses, including industrial uses in the Spring Creek Coal mine, drilling, construction, dust suppression, and for stock and wildlife water. As discussed in Chapter 3, these beneficial uses will not be analyzed in detail in this EA.

Following the methodology described in Chapter 3, and discussed in detail in the surface water modeling report prepared in support of this POD (Fidelity, 2004b), the resulting water quality in the Tongue River can be determined at 3 USGS stations, as shown on Table 4.2.4-1. A summary of the input for this scenario is provided in Table Hydro-3 in the Hydrology Appendix. 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 would be exceeded, and during 7Q10 flows the instantaneous maximum standards would not be 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. According to the water balance prepared in support of this project, after 5 years the rate of discharge to the Tongue River would be anticipated to be 147 gpm.

A complete analysis of all parameters for existing surface water quality criteria 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 gpm. Discharge at this volume and quality will protect all beneficial uses of the receiving water and comply with Montana water quality standards and nondegradation criteria." (MDEQ, 2000). Upstream and downstream monitoring associated with this permit indicates that the discharge which has occurred under this permit has not caused exceedances of water quality standards. As such, it is not anticipated that actions under this Alternative would directly impair the beneficial uses of the Tongue River.

Table 4.2.4-1: Direct Impacts; Modeled Existing Conditions vs. No Federal Action

	Flow Conditions	Existing Conditions (1085 gpm)			No Federal Action (1124 gpm)		
		Flow (cfs)	EC (µS/cm)	SAR	Flow (cfs)	EC (µS/cm)	SAR
Tongue River at State Line	7Q10	44.4	1302	1.49	44.5	1303	1.50
	LMM	180.4	700	0.81	180.5	701	0.82
	HMM	1672.4	261	0.30	1672.5	261	0.30
Tongue River Below Dam	7Q10	72.4	829	1.18	72.5	830	1.19
	LMM	181.4	660	0.92	181.5	661	0.92
	HMM	1431.4	394	0.53	1431.5	394	0.54
Tongue River at Birney Day School	7Q10	51.4	1126	1.77	51.5	1127	1.78
	LMM	175.4	726.4	1.2	175.5	727	1.17
	HMM	1121.4	376	0.60	1121.5	376	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 78 private and state CBNG wells would be produced which would result in the draw down of groundwater. Following the methods described in Chapter 3, and discussed in detail in the groundwater modeling report prepared in support of this POD (ALL, 2004), the production of these 78 wells would be expected, over the long term (20 years), to directly cause the coal seam aquifers to be drawn down by 20 feet or more over an area of 29.8 mi^2. The results of the drawdown analysis are shown in the Hydrology Appendix in Table Hydro-4, and the area of drawdown is shown on Map Hydro-1. Eleven domestic wells and 1 spring are located within this drawdown area. These wells and spring are listed in Table Hydro-5 and shown on Map Hydro-1.

Domestic and stock 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 anticipated to 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 geologic formations in which the domestic wells are completed, or from which the springs derive their water, are not included in the available datasets; therefore, it is difficult to determine with confidence which domestic wells and springs derive their water from the coal seam proposed for CBNG development. It is known that most of the springs in this area result from local flow systems, with infiltrated precipitation intersecting a low permeable unit and flowing to outcrop (Wheaton and Donato, 2004a and 2004b). As such, these domestic wells would not be affected by drawdown of the coal seam aquifers. Similarly, most domestic wells are "typically less than about 300 feet deep" (Wheaton and Donato, 2004c) since they are completed in the first (shallowest) formation which yields an adequate amount of water. Meanwhile, CBNG wells typically must be deeper in order to produce economic quantities of gas. It is not anticipated that many of the domestic wells contained within the drawdown area are finished in the coal seams to be developed.

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…" As such, 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.

The groundwater modeling conducted in support of the MT FEIS anticipated that, for a hypothetical CBNG field with 1,082 wells producing for 20 years, the produced coal seams

would recover 70% of their hydrostatic head within 5-12 years after the end of production. It is anticipated that the drawdown which results from this project would be of similar duration. The exact radius of the drawdown cone, and the time required for the head to recover, would depend on the site specific aquifer properties, the precise timing of the pumping of each of the wells, and the overall nature of CBNG development in this region. For additional general discussion of the anticipated drawdown related impacts, see pages 4-61 to 4-63 of the MT FEIS, and the associated groundwater modeling reports (Wheaton and Metesh, 2001, Wheaton and Metesh, 2002).

Cumulative Effects to Surface Water: Under this Alternative, the proposed 78 private and state CBNG wells would be drilled and produced. The production of these wells in addition to wells currently producing CBNG in the CX Field would result in an increase in the volume of water discharged under Fidelity's existing MPDES permit (MT-0030457) from 1,085 gpm to 1,124 gpm. This additional discharge would be untreated water with an EC of approximately 2,248 μS/cm and an SAR of approximately 58.5. During LMM flows at Birney Day School, this discharge would cumulatively cause SAR to increase by 0.5%and EC to increase by 0.06% over existing conditions (see Table 4.2.4-2).

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. 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). The treated water from PRG is anticipated to have an SAR of approximately 3.0 and an EC of approximately 742 μS/cm. The potential treated water discharge from Fidelity is anticipated to have an SAR of 2.8 and an EC of 438. A summary of the inputs for this scenario is provided in Table Hydro-3 in the Hydrology Appendix. 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 would be exceeded, and during 7Q10 flows the instantaneous maximum standards would not be exceeded. As such, the results of this analysis indicate that this alternative when combined with all other past, present and reasonably foreseeable activities would not 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 gpm. Discharge at this volume and quality will protect all beneficial uses of the receiving water and comply with Montana water quality standards and nondegradation criteria." (MDEQ, 2000).

Table 4.2.4-2: Cumulative Impacts; Foreseeable Conditions vs. No Federal Action

	Flow Conditions	Foreseeable Conditions (1085 gpm)			No Federal Action (1124 gpm)		
		Flow (cfs)	EC (µS/cm)	SAR	Flow (cfs)	EC (µS/cm)	SAR
Tongue River at State Line	7Q10	48.2	1258	1.52	48.3	1259	1.53
	LMM	184.2	694	0.84	184.3	695	0.84
	HMM	1676.2	261	0.30	1676.3	261	0.30
Tongue River Below Dam	7Q10	78.7	815	1.23	78.8	816	1.24
	LMM	187.7	658	0.96	187.8	659	0.97
	HMM	1437.7	397	0.55	1437.8	397	0.55
Tongue River at Birney Day School	7Q10	57.7	1112	1.82	57.8	1113	1.83
	LMM	181.71	724	1.21	181.80	725	1.22
	HMM	1127.7	379	0.62	1127.8	379	0.62

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

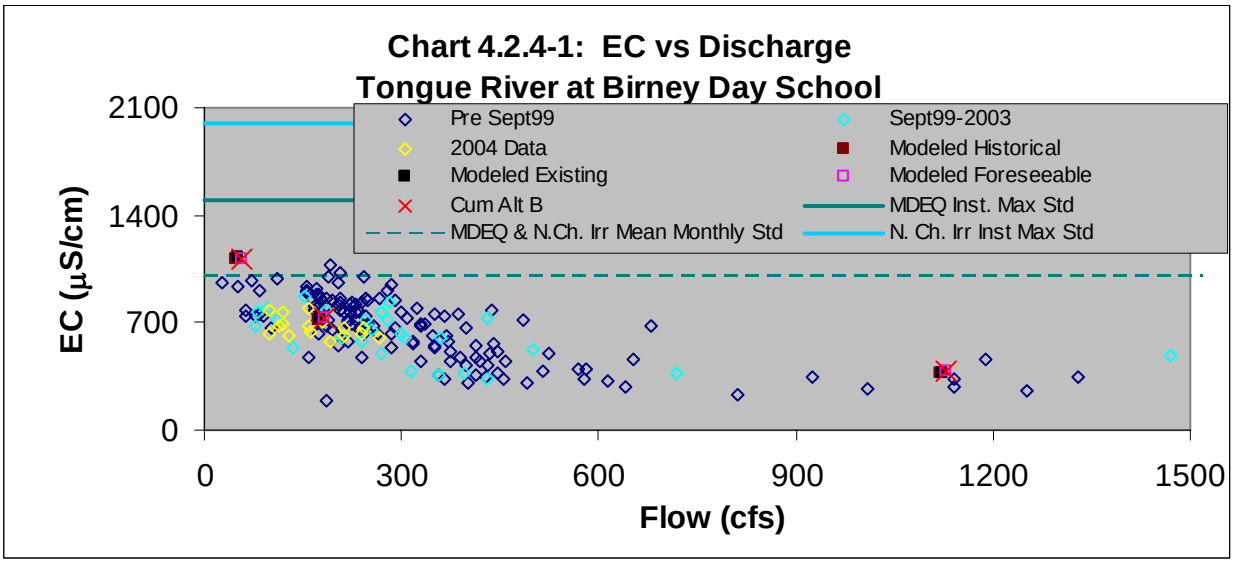

Chart 4.2.4-1: This graph shows flow (cfs) vs. EC (µS/cm) with observed data from before CBNG development (Pre Sept99), from Sept99-2003, and from 2004. Also included on this graph are the modeled results at HMM, LMM, and 7Q10 flows for the historical record (pre-Sept99), for the existing conditions, for the foreseeable conditions without this project, and the cumulative model results for the No Federal Action Alternative. Also displayed are the irrigation season EC standards developed by the MDEQ and the Northern Cheyenne.

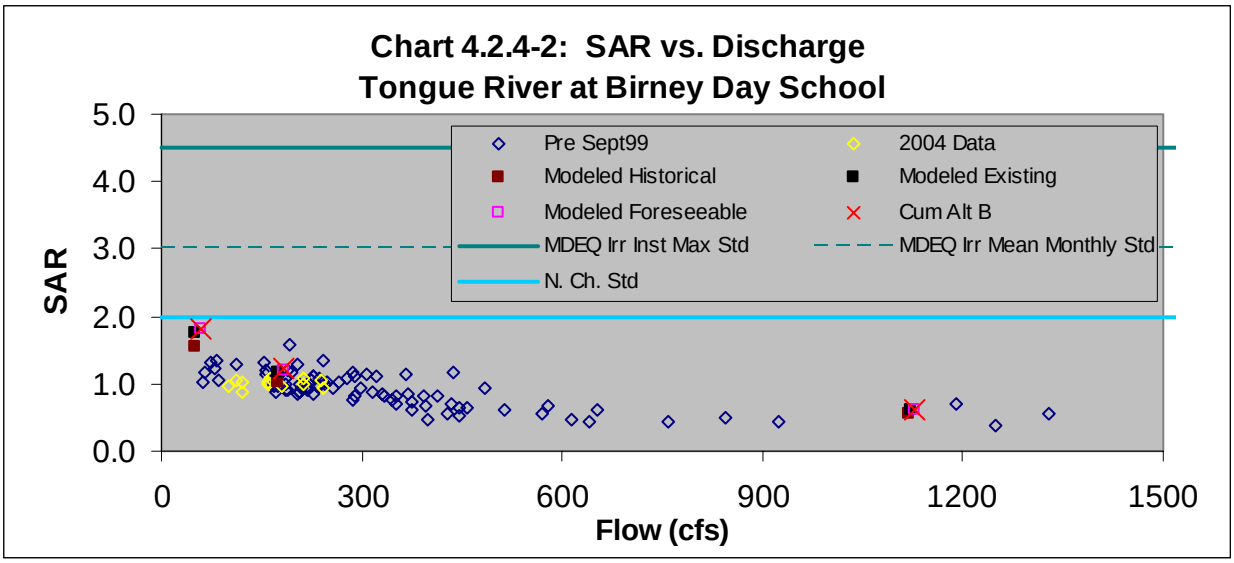

Chart 4.2.4-2: This graph shows flow (cfs) vs. SAR with observed data from before CBNG development (Pre Sept99), and from 2004. Also included on this graph are the modeled results at HMM, LMM, and 7Q10 flows for the historical record (pre-Sept99), for the existing conditions, for the foreseeable conditions without this project, and the cumulative model results for the No Federal Action Alternative. Also displayed are the irrigation season SAR standards developed by the MDEQ and the Northern Cheyenne.

Cumulative Effects to Groundwater: Under this Alternative, the 78 private and state CBNG wells would be produced from the Dietz, Monarch and Carney coal seams. These wells would be in addition to the 456 producing CBNG wells in Montana, and the approximately 2,000 CBNG wells in Wyoming that are contiguous with this area and finished in these coal seams.

Following the methods discussed in Chapter 3, and discussed in detail in the ground water modeling report prepared in support of this EA (ALL, 2004), the production of these 78 wells would be expected, over the long term (20 years), to cumulatively cause the coal seam aquifers to be drawndown by 20 feet or more over an area of 352.2 mi^2. This is an increase of 7.4 mi^2 over the foreseeable drawdown from existing development. The results of the drawdown analysis are shown in the Hydrology Appendix on Table Hydro-4, and the area draw down is shown on Map Hydro-2. The expansion of this drawdown area causes 1 additional well to be added to the cumulative drawdown area, for a total of 65 wells and 6 springs in the drawdown area. These wells and spring are listed on Tables Hydro-7, Hydro-8 and Hydro-9 and are shown on Map Hydro-2.

Domestic and stock 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 domestic 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 Alternative C, it is not likely that many of the wells or springs within the drawdown area derive their water from the coal seams proposed for development. Also as discussed in the direct impacts section of Alternative C, it is anticipated that the water mitigation agreements required under MBOGC Order 99-99 would be effective at mitigating impacts from CBNG related drawdown.

The groundwater modeling conducted in support of the MT FEIS anticipated that, for a hypothetical CBNG field with 1,082 wells producing for 20 years, the produced coal seams

would recover 70% of their hydrostatic head within 5-12 years after the end of production. It is anticipated that the drawdown which results from this project would be of similar duration. The exact radius of the drawdown cone, and the time required for the head to recover, would depend on the site specific aquifer properties, the precise timing of the pumping of each of the wells, and the overall nature of CBNG development in this region. For additional general discussion of the anticipated drawdown related impacts, see pages 4-61 to 4-63 of the MT FEIS, and the associated groundwater modeling reports (Wheaton and Metesh, 2001, Wheaton and Metesh, 2002).

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. Emissions from engines and drill rigs would be within limits established by the State of Montana and would disperse quickly without impacting air quality visibility over the Crow and Northern Cheyenne Reservations. Compressors at two existing sites and compressors at two proposed sites as well as compressors at one sales site would be used to process gas produced by the private and state wells under this Alternative. The compressors at the five sites have been permitted by MDEQ. Emissions from the compressors at the five sites are displayed in the Tables found in Section 4.2.1 of this EA. 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. An additional 39 gpm of water produced with CBNG would be discharged into the Tongue River at existing discharge points. Discharge of additional produced water from wells in this Alternative 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.

Cumulative Effects: The actions under this Alternative would not contribute any 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 the same as Alternative A.

Cumulative Effects: The impacts would be the same as Alternative A.

4.2.7 Livestock Grazing

Direct and Indirect Effects: Disturbance to livestock operations could occur during construction and drilling activities if livestock are in the project area. Approximately 52 acres of vegetation would be removed during construction activities, which would reduce the amount of forage available to livestock equaling about 10 AUMs. Following reclamation and during the production phase, approximately 16 acres and 3 Animal Unit Months (AUMs) would be lost due to a permanent reduction in available forage. Existing livestock water sources affected by CBNG production would be repaired or replaced in accordance with agreements between Fidelity and the water source owner. Some of the water produced with CBNG would be made available for livestock and crop irrigation as described in the Water Management Plan submitted with the POD. 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 and replace the AUMs lost to production facilities.

Cumulative Effects: Cumulative effects from implementing this Alternative would be the long term (>5 years) of approximately 16 acres of forage and 3 AUMs. The loss of AUMs could result in a loss of income to the livestock operator if a replacement grazing area was not available. After completion of final reclamation in the project area and addition of livestock water, the forage would become available and the AUMs would be restored. 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. 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 operators during the mineral production phases.

4.2.8 Recreation and VRM

Direct and Indirect Effects: Development of the state and fee wells and all the associated support facilities would not curtail the recreational use of the area, due to limited public access and opportunity on private lands. Visual Resource Management requirements would not be imposed on these facilities, since no federal facilities would be approved.

Cumulative Effects: In this case, BLM does not control surface acreage to affect scenic values of the region. The BLM does not require mitigation of visual impacts on private surface, in areas where the land base for development is state or 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: Under this Alternative, 62 private wells and 16 state wells would be drilled and completed. Six private and two State wells might be dry holes. It is estimated that 21 Billion Cubic Feet (BCF) of CBNG could be produced from the 70 wells, having a gross value of 84 million dollars over the life of the wells. The private lessors (mineral owners) would receive 8.4 million dollars of royalties and pay 1.3 million dollars in taxes on the royalties. The State would receive 2.1 million dollars in royalties and collect 7.3 million dollars in production taxes. Drilling, production and abandonment activities for the 78 wells would provide 34 temporary jobs with an estimated income of 1 million dollars over the life of the wells, which would enhance the social well being of those receiving this income. Private surface owners would receive some form of compensation as agreed to with the operator for surface disturbance from project activities on their surface.

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 approximate sixteen percent increase in the number of wells in the producing CX Field and the proposed projects in southern Big Horn County. The employees needed for exploration 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 jobs would offset some of the mining jobs lost due to production declines at the Montana mines as contracts expire and productivity increases. The CBNG production taxes and royalties would also offset some of the reduced coal production taxes and royalties.

4.2.10 Soils

Direct and Indirect Effects: Under this Alternative, 62 private wells on 13 locations and 16 state wells on 4 locations would be drilled (see Table 2.5-2). One off-channel impoundment and one new off-channel impoundment would be used to store some of the water produced with natural gas under this Alternative.

Surface disturbance would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (approximate size of 6 feet wide x 15 feet long x 15 feet deep), and compaction from vehicles driving or parking at the drill site. Estimated disturbance associated with these wells would involve approximately one acre at each well site location for a total of 17 acres. Approximately one quarter of this acreage would remain after initial reclamation. Approximately 13 miles of existing and proposed two track trails would be used for access, and approximately 5 miles of proposed new roads would be established.

The majority of proposed pipelines (gas and water) would be located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. Approximately 12 miles of 15 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 removal of topsoil, soil compaction, mixing of soil 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.

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 affects 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. Compaction may return to natural conditions within a few years.

Soil horizon mixing may result where construction of impoundments, 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 floras 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 stabile soil structure. If soil structure is destroyed, surface infiltration by water and air may be effected. 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 will 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.

The existing impoundment (23-0299), located on private surface, 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. The Renohill and Winnett soil types have been mapped in the area of the impoundment. 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 of 20 to 40 inches. It would also be suitable for the impoundment due to the shallow depth to bedrock and moderate seepage potential.

The site of the proposed off-channel impoundment, 44-3490, which is located on private surface, is underlain by two, low-permeable clay materials. The two soil types that have been mapped in the area of the impoundment are the Thedalund and Midway soils. The Midway soil is a silty clay with a moderate shrink-swell potential and bedrock at a depth of 20 inches. The Thedalund soil is a clay loam with a low shrink-swell potential and bedrock at a depth of 20 to 40 inches. The surface and near surface clays at this site are anticipated to limit subsurface infiltration; however, the impoundment would be lined with impermeable clay to further prohibit infiltration of stored water.

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 8 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. Loss of 1/32 of an inch represents a 5 ton per acre soil loss.

Reclamation and mitigation measures for soil disturbances are described in the Plan of Development. These mitigation measures include: 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 (BMP's) 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; and cuts and fills for new roads would be sloped to prevent erosion and to promote revegetation.

Expedient reclamation of disturbed land with salvaged topsoil, proper seedbed preparation techniques, and appropriate seed mixes as determined by the surface owner or surface management agency, 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 would be regained in the shortest time frame. Mitigation measures would limit impacts from soil disturbances.

Cumulative Effects: Construction activities associated with implementing this Alternative would impact approximately 52 acres during the short term (<5 years) and approximately 16 acres during the long term (>5 years). These disturbed acres are part of the cumulative impact analysis found in the MT FEIS. 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. During the production phase, soils would be taken out of production and may require a longer period of

time to regain productivity than soils that are quickly reclaimed.

4.2.11 Vegetation

Direct and Indirect Effects to Vegetation: Disturbance caused from drilling and construction of access roads, pipeline corridors, and the compressor sites would remove vegetation from approximately 52 acres in the project 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. Seed mixtures used in reclamation would be determined by the surface owner or the surface management owner. It would be expected that approximately 15 acres of vegetation would remain disturbed during the production phase of the project.

Direct and Indirect Effects to Special Status Species: No impacts to Montana Species of Special Concern are expected from CBNG activity in the project area. Habitat for Nuttall's desert-parsley (*Lomatium nuttallii*) and Woolly twinpod *(Physaria didymocarpa* var. *lanata*) include open rocky slopes in pine woodlands. Barr's milkvetch (*Astragalus barrii*) can occur on slopes, gumbo knobs or hilltops. Wells are usually located in areas that are easily accessible to drilling rigs and other equipment. Where possible, pipeline corridors for water, power and gas would be located along existing two tracks.

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. Implementation of activities under this Alternative 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 in areas of surface disturbance. However, implementation of reclamation measures and measures proposed in the POD to control noxious weeds would ensure that potential impacts from noxious weeds and invasive plants would be minimal.

Cumulative Effects: Under this Alternative, following reclamation, 15 acres of vegetation would be disturbed in addition to acres disturbed by other activities in the CX Field and the Decker and Spring Creek coal mines. Species composition of some areas may be altered as a result of produced water becoming available to livestock operations. New sources of available water could provide opportunity to rest areas currently receiving constant use because it is the sole water source. The health and productivity of vegetation, and the vegetative community could be altered by grazing without adequate deferment in areas that are currently not grazed. According to the MT FEIS, approximately 74,000 acres could be disturbed as a result of future CBNG development.

4.2.12 Wildlife

Direct and Indirect Effects: Direct impacts to wildlife resources include loss of habitat through construction of CBNG infrastructure and facilities, and direct mortalities resulting from collisions with vehicles and power lines or electrocution from power lines. Indirect impacts would include habitat fragmentation and wildlife displacement related to CBNG infrastructure and construction, and human-related disturbance and activities.

This Alternative includes the construction of 5.3 miles of new, permanent all-weather roads, 13.34 miles of improved, existing 2-track trails, 11.74 miles of corridor to accommodate gas, water, and electrical lines (which will parallel the existing or new roads), and 17 well pad locations (mileage figures reflect only stretches of corridors which require a BLM right-of-way). This would result in the direct loss of about 47 acres of habitat (35.6 acres for roadways and gas/power line corridors; 1.3 acres for power lines outside the corridors, and 17 acres for well pads. All species of wildlife inhabiting the project area could be impacted by vehicle collisions because of new roads and increased traffic. Indirect impacts occur to 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). Examples of species that could be affected include sage grouse, sharp-tailed grouse, and mule deer. Invasive and non-native vegetation species would affect wildlife forage and habitat by changing vegetative conditions which occurred prior to disturbance.

Successful reclamation would stabilize disturbed sites and attempt to restore disturbed areas to

pre-disturbance conditions. Reclamation would not always recreate pre-disturbance values. Changing a shrub-grassland with intermingled forbs, to an environment characterized by a dominance of grasses, would affect those species of wildlife which are sagebrush obligates by reducing vital habitat and forage. Some species of passerine birds, some small mammals and reptiles, as well as sage grouse would be affected by this change. Due to the small number of acres impacted, this loss of habitat would not affect the long term viability of these species in the project area.

The increase in vehicle traffic because of new roads and trails, and the increased vehicle speeds on improved roads, would result in an increase in collision-related mortalities to all wildlife species. The most notable species impacted include deer, upland and passerine birds, small mammals and reptiles/amphibians. These additional mortalities would not have a noticeable impact on the local populations of the species affected.

Much of the wildlife habitat that currently is not impacted or lightly impacted by human activities would be impacted by the actions in this alternative. This would result in changes to traditional use and movement patterns, disruption to normal foraging and reproductive habits and increased energy expenditure by most wildlife species in the project area. The species most impacted by habitat fragmentation include those with larger home ranges, such as big game, upland game birds and raptors. Passerine and other neotropical birds are impacted by interruptions to preferred nesting habitat, improved habitat for undesirable competitors such as brown-headed cowbirds and increased predation factors.

As with any disturbance, some wildlife species and individuals, including big game, can and would acclimate to sustained and regular human contact providing that contact is not perceived as threatening.

4.2.12.1 Threatened, Endangered, and Special Status Species

As mentioned in Section 3.11.1, an active bald eagle nest is located about 1.6 miles from the project area along the banks of the Tongue River. Several human-related disturbances are located near the nest (i.e., roadway, traffic, power line). Bald eagles may be affected by the project in several ways including human disturbance, equipment noise, electrocution, collisions with power lines, and collision with vehicles. Wintering bald eagles are sensitive to disturbance at roost sites and during foraging activities. Although this eagle pair is habituated to this disturbance, BLM in consultation with USFWS, has determined this project is "likely to adversely affect" (see BLM's Biological Assessment). This determination was made considering the increased vehicle traffic and human disturbance. The USFWS's Biological Opinion concurs with BLM's assessment, which states, "It is the Services's biological opinion that the direct and indirect effects of the project, as proposed, fall within the effects analyzed in the programmatic biological opinion, and are not likely to jeopardize the continued existence of the bald eagle."

4.2.12.2 Big Game Species

Mule deer would be impacted by this project from habitat disturbance and habitat fragmentation. CBNG development, especially along the eastern edge of the project area, would affect mule deer use and access to crucial winter range in that area. Deer would likely reduce their use of this area in the short term, from CBNG well and infrastructure development because of direct habitat loss, and habitat avoidance. As the project goes into the production phase and the level of human activity is reduced, mule deer will likely become more habituated to the activity and begin to use the area again.

Because pronghorn antelope and elk occupy the project area in very low numbers, disturbance to the animals and their habitat would be minimal, and would not affect the long term viability of either species.

4.2.12.3 Upland Game Birds

Sharp-tailed grouse would be impacted by this project from habitat disturbance and fragmentation. Roads, vehicles, structures, noise levels, and human activity during the breeding season, would hinder, and may reduce breeding activity, displace some grouse nesting activity, and reduce habitat availability for brood rearing. Mortality would increase as a result of collisions with vehicles. Sharp-tailed grouse can be found throughout the project area, and would be more affected than sage grouse. Much of the suitable sage grouse nesting habitat is in the eastern half of the project area, while much of the sagebrush

in the western portion has been converted to grassland.

Compressor facilities for this project have been authorized by the MDEQ. Actual measured decibel levels from similar compressor facilities in the CBNG development south of the project area are within the decibel limits established in the MT FEIS to effectively reduce impacts of noise to susceptible wildlife species (most notably sage and sharp-tailed grouse).

4.2.12.4 Raptors

Several human-related disturbances are located either within or near the project area, including roadways, power lines, vehicle traffic, and agricultural- and mineral-related human activities. The additional impacts from the CBNG activity would cause habitat fragmentation, bring increased human disturbance, and increase the levels of stress raptors would experience, especially during the breeding season.

Raptor use of the project area is limited by vegetation and available prey; however, aerial power lines would be constructed by following strict raptor protection guidelines throughout the complete project area regardless of surface/mineral ownership. These guidelines (from the APLIC publication, "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996"), are designed to deter raptors from perching where electrocutions could occur. However, raptor mortalities do occur even with properly installed raptor protection devices on new or retrofitted existing poles, and could occur under this alternative. Even following the strictest of construction guidelines and providing state-of-the-art mitigation, aerial power lines provide an element of risk to raptors. Aerial power lines also pose a collision hazard to all avian species, especially raptors and upland game birds. The number of mortalities of raptor prey species would increase (e.g., prairie dogs and grouse) because perch opportunities provided by aerial power infrastructure would increase, allow raptors to be more efficient and potentially drawing additional raptors into the project area.

Approximately 18 miles of power lines would be buried, thereby reducing the potential for raptor collisions. The anticipated ground disturbance may encourage a larger and more wide-spread small mammal population, which might attract more raptors to the area. However, the increased human presence and the fragmentation of the habitat may discourage raptors from using the area. The Wildlife Monitoring and Protection Plan (WMPP) would help to identify and quantify the responses of raptors to the level of disturbance expected within and adjacent to the project area.

4.2.12.5 Migratory Bird Species

Waterfowl, especially migrants, would be impacted by actions under this Alternative primarily from direct human disturbance and increased traffic. This would be a minimal impact as the project area that lies next to the Tongue River is small and the birds have considerable alternative habitat which to use. These migrant populations seem to habituate to local disturbance factors in the area.

As discussed in Section 3.11.6, there are at least 104 species of birds known to use this area of southeastern Montana. With the resultant CBNG-related infrastructure (i.e., roads), habitat fragmentation and increased human disturbance, it is reasonable to assume there would be impacts to nesting and migrating neotropical bird species. The primary impacts to these species would be disturbance of preferred nesting habitats, the improved habitat for undesirable competitors such as brown-headed cowbirds, and increased vehicle collisions.

4.2.12.6 BLM Sensitive Species

Current data suggests that those sensitive species that could be in the project area either occur in very low numbers or have not been documented in recent surveys. Impacts to sensitive species would be associated with habitat fragmentation, mortality related to CBNG infrastructure construction/maintenance and increase human activity, and habitat conversion from a sagebrush/grassland/forb community to a grassland dominated vegetative community. Due to the small numbers, or the absence of sensitive species, the loss of habitat and the increased disturbance would not affect the long term presence of these species in the project area.

4.2.12.7 Fisheries/Aquatics

Direct and Indirect Effects to Fisheries and Aquatics: Potential impacts to aquatic species include: increased erosion from road, pipeline, reservoirs 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.

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

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 volume of water discharged would increase by 39 gpm and would not exceed the current amount permitted by MDEQ.

Effects from increased streamflows would be minor and not detrimental. The water discharged (.09 cfs above current amount of discharge) 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 increased discharge would only constitute .2 percent of the flow.

Only a slight potential exists for activities under this Alternative to affect the flow rates for the 1 spring out of the 6 springs which are currently contained within the drawdown area from existing development. Reduced flow rates could affect the amount of habitat available for aquatic invertebrates and amphibians. However, it is not likely that this spring is receiving its water from the coal seams being developed, thus it 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 MDEQ 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 increased discharge would only constitute .2 percent of the flow. (3) Mitigation measures that are designed to reduce potential erosion and ensure adequate water quality for aquatic life. (4) No on-drainage impoundments (reservoirs) would be constructed with this project. (5) 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.

4.2.12.8 West Nile Virus

The potential to increase mosquito habitat exists under this Alternative if impoundment 44-3490 is constructed. Construction of this impoundment would add one more area of standing water in the vicinity of the project area. Instances of West Nile Virus (WNV) could increase. However, many other factors also affect the spread of the disease, such as irrigation of crops, natural wetlands, stock water impoundments and environmental influences. State and /or county health and human service and/or public pest management agencies could require some form of mosquito control.

Cumulative Effects to Wildlife: Construction of roads, production well pads and compressor sites would result in the long term (>5 years) loss of habitat and forage on approximately 15 acres in the project area under this Alternative. This would be in addition to acres disturbed and not reclaimed for production activities in the CX Field along with acres disturbed by the Decker and Spring Creek coal mines. Additional mortalities to wildlife would occur from collisions with vehicles and powerlines because of additional roads and increased vehicle traffic, and additional aerial powerlines. Indirect impacts would occur from habitat disturbance, human presence and possible diminished water quality. A ½ mile area around well sites, compressor sites and along access roads was used to calculate the acres indirectly affected by implementing actions under this Alternative. Approximately 4,000 acres would be indirectly affected because human activities would disturb or inhibit wildlife in these areas, and render them

less suitable to wildlife. Essentially, the indirect impacts of infrastructure development and human disturbance would encompass about ½ of the project area. Additionally, between 100,000 to 200,000 acres of wildlife habitat are indirectly impacted by existing CBNG and coal mine developments within the project vicinity in Wyoming and Montana. As new CBNG development occurs, direct and indirect impacts would continue to stress wildlife populations, most likely displacing the larger, mobile animals into adjacent habitat, and increasing competition with existing local populations. Non-mobile animals would be affected by increased habitat fragmentation, interruptions to preferred nesting habitats, and increased potential for predation.

Certain species are localized to the area in and around the project area and rely on very key habitat areas during critical times of the year. These species include mule deer, sage grouse, eagles and spiny softshell turtles. Disturbance or human activities that would occur in winter range for big game, nesting and brood rearing habitat for grouse and raptors, and the Tongue River corridor for aquatic species could displace some or all of the species using a particular area or disrupt the normal life cycles of species. Wildlife and aquatic species and habitats in and around the project would be influenced to different degrees by various human activities. Some species, such as mule deer, are able to adapt to these human influences over the long term.

Cumulative effects to Fisheries/Aquatic life within the Tongue River Drainage: Potential Cumulative effects could occur from the relevant past, present and relevant foreseeable actions. These actions include: Decker Coal Mine, Spring Creek Coal Mine, Montana and Wyoming CBNG development, gravel/scoria pits, CX Field proposals (Dry Creek, Coal Creek, Pond Creek, Deer Creek, Yates Petroleum, and Powder River Gas), Wolf Mountain Coal, Inc. proposal, Tongue River Railroad proposal, livestock grazing, agriculture/irrigation, Tongue River dam and reservoir, residential areas, existing roads and road (re)construction/maintenance (refer to Chapter 2 and Alternative A for more detailed descriptions). The past and current actions are discussed above in Alternative A. The above actions occur in various degrees throughout the 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 activities have the potential to affect water quality, erosion and streamflows. 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 the 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 (approximately 5 percent of the flow at the low monthly 7Q10 (70 cfs) below the dam**).** Implementation of Alternative C for the Powder River Coal Creek POD would amount to a total of one cfs. Another 1.5 cfs of treated water is proposed in the foreseeable future. In addition, 3.87 cfs of treated water is proposed under another permit. The existing discharges are approved by MDEQ and are designed to 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) may occur with MDEQ approval.

The Tongue River Railroad proposal would involve constructing a railroad adjacent to the Tongue River. The railroad would be approximately 300 feet or greater from the Tongue River for the majority of its length. If approved, the proposed Western Alignment section would cut through the Tongue River Canyon from the Tongue River dam downstream to Four Mile Creek. Fill material needed in the side drainages to construct the railroad bed could erode. In a catastrophic event, a large amount of sediment could enter the Tongue River. This activity could have potential effects on habitat or populations.

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 and soil composition also influence water quality, streamflows, and erosion. The amount of future CBNG development, discharges into

the Tongue River, the amount of water withdrawal for irrigation purposes, when or if the Tongue River Railroad is actually constructed are other factors that influence the degree of cumulative effect.

4.3 EFFECTS FROM ALTERNATIVE C—THE PROPOSED ACTION

4.3.1 Air Quality

Direct and Indirect Effects: A total of 210 wells would be drilled under this alternative. Pollutant emissions would occur from the exploration portion of the proposed action during construction and drilling activities, and these emissions would potentially impact air quality in the project area. The primary pollutants emitted would be TSP, PM_{10}, $PM_{2.5}$, NO_x, CO, and SO_2. Pollutant emissions from the exploration portion of the project would be short-term and localized in nature. Impacts would be minimized because although an MAQP would not be required for the exploration portion of the proposed action, Fidelity would still 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).

TSP, PM_{10} 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 SO_2 emissions would occur from drilling engine operations and testing service equipment. Air quality impacts at each well would be temporary - occurring during the average 5 days of construction, drilling, and completion activities at each of the 210 wells.

The exploration portion of the project would result in a temporary increase in fugitive dust and gaseous emissions. The potential emissions of the exploration portion of Alternative C, 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 4.3.1-1.

4.3.1-1 Emission Inventory – Alternative C – Exploration

	Tons/Project						
Emission Source	*TSP*	PM_{10}	$PM_{2.5}$	NO_x	VOC	CO	SO_x
Drill Rig(s) – (Engine Emissions)	0.00	0.00	1.48	20.83	1.66	4.49	1.38
Drill Rig(s) – (Drilling Emissions)	2.22	2.22	2.22	0.00	0.00	0.00	0.00
Fugitive Dust – (Disturbed Acres)	25.20	25.20	25.20	0.00	0.00	0.00	0.00
Vehicle Traffic (non-paved roads)	6.91	3.11	3.11	0.00	0.00	0.00	0.00
Total	34.33	30.53	32.01	20.83	1.66	4.49	1.38

MDEQ determined that any air quality impacts from the exploration portion of the proposed action would be minor because of the relatively small amounts of pollutants that would be emitted and because the emissions would be intermittent and short-term. The wells to be drilled would be located in an unclassifiable/attainment area, which generally reflects good dispersion characteristics and the exploration portion of the project would not exceed MAQP thresholds. Therefore, MDEQ determined that emissions from the exploration portion of Alternative C would not cause or contribute to a violation of any ambient air quality standards. Impacts would be minimized because although an MAQP would not be required, Fidelity would still 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). The town of Lame Deer has been designated as a PM_{10} nonattainment area. However, only minor, if any impacts would occur to the Lame Deer PM_{10} nonattainment area because of the distance from the proposed project to the Lame Deer PM_{10} nonattainment area and because all PM emissions from the project would be intermittent and short-term.

Pollutant emissions would also occur from the production portion of the proposed action during extraction and transmission of the CBNG, and these emissions would potentially impact air quality in the project area. The primary pollutants emitted would be PM_{10}, NO_x, CO, VOC, and SO_2. All of the production facilities that would be used in this Alternative (i.e. 5 field

compressor stations and 1 sales compressor station) are facilities that have applied for and received MAQPs from MDEQ, although 3 of the facilities have not been constructed. The existing field compressor stations that would be used in this Alternative consist of the BCPL Visborg 25 Battery (MAQP #3302-00) and BCPL Montana State 36 Battery (MAQP #3303-00). The permitted facilities that would be used in this Alternative that have not been constructed consist of the BCPL Rancholme 21 Battery (MAQP #3334-00), BCPL Rancholme 29 Battery (MAQP #3335-00), and BCPL Rancholme 28 Battery (MAQP #3337-00). The existing sales battery that would be used in this Alternative is the BCPL Symons Central Compressor Station (MAQP #3250-00). Emissions from the 6 permitted production facilities that would be used for Fidelity's Coal Creek POD are summarized in Table 4.3.1-2.

4.3.1-2 Emission Inventory – Production

	Tons/Year				
Facility	PM_{10}	NO_x	VOC	CO	SO_x
BCPL Visborg 25 Battery	0.08	24.07	11.63	12.39	0.06
BCPL Montana State36 Battery	0.08	24.07	11.63	12.39	0.06
BCPL Rancholme 21 Battery	0.54	16.22	16.22	32.46	0.04
BCPL Rancholme 29 Battery	0.54	16.22	16.22	32.46	0.04
BCPL Rancholme 28 Battery	0.54	16.22	16.22	32.46	0.04
BCPL Symons Central Compressor Station	4.40	115.00	74.87	228.46	0.28
Total	6.18	211.80	146.79	350.62	0.52

MDEQ requests that ambient air quality modeling be conducted for 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 requests that the modeling 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. To date, no CBNG facilities applying for a MAQP have been subject to PSD. MDEQ completed an independent review of the ambient air quality modeling that was conducted for each of the permitted facilities as part of the MAQP permitting process. In addition, although a PSD increment analysis was not required for any of the production facilities, the Department requested BCPL to conduct a PSD Class I and Class II NO_x increment analysis for the BCPL Symons Central Compressor Station and the Department requested BCPL to conduct a PSD Class II NO_x increment analysis for the 5 field compressor stations.

Aspen Consulting & Engineering (Aspen) conducted the air quality modeling for each of the production facilities as part of each of the MAQP applications. The Environmental Protection Agency (EPA) approved Industrial Source Complex (ISC3) model and 5 years of meteorological data (1984 and 1987 through 1990) were utilized for each of the air quality models. The surface data was collected from Sheridan, Wyoming, and the upper air data was collected at the Lander Hunt Field, Wyoming site. The receptor grid elevations were derived from digital elevation model (DEM) files using the United States Geological Survey (USGS) 7.5-minute series (1:24,000 scale) digitalized topographic maps. The Decker, Holmes Ranch, and Pearl School Montana quadrangles, as well as the Acme, Bar N Draw, and Cedar Canyon Wyoming quadrangles were used to determine the receptor grids for the Visborg 25 model, the Montana State 36 model, and the Symons Central Compressor Station model. The Decker, Holmes Ranch, Lacey Gulch, Pine Butte School, and Spring Gulch Montana quadrangles and the Cedar Canyon, Bar N Draw, and OTO Ranch Wyoming quadrangles were used to determine the receptor grids for the Rancholme 21 model, the Rancholme 28 model, and the Rancholme 29 model. The receptors were placed along the fence line at 50-meter (m) intervals, from the fence line to 1 kilometer (km) beyond the fence line at 100-m intervals, from 1 km beyond the fence line to 3 km beyond the fence line at 250-m intervals, and from 3 km beyond the fence line to 10 km beyond the fence line at 500-m

intervals. In addition, for the Symons Central Compressor Station model, receptors were placed on the Northern Cheyenne Indian Reservation to determine compliance with the PSD Class I Increment. Building downwash was calculated using the EPA Building Profile Input Program (BPIP). The building corner coordinates and peak roof heights were provided by a company plot plan submitted as part of each of the MAQP applications and were used to determine the appropriate direction-specific building dimension parameters to use for each emission source evaluated in each of the models.

For each model, all NO_x emitting units from the facility being modeled, as well as area NO_x sources (modeling database) in Montana and Wyoming were input into the model. The modeling database was constructed as part of the air quality modeling that MDEQ conducted for the Badger Hills POD. The modeling database is updated with each CBNG facility that applies for a MAQP. For each of the models, the total NO_x emissions ($NO + NO_2$) from the facility being modeled was assumed as the basis for the model. Once the highest concentrations (one-hour high-second-high and annual high) were determined, the Ozone Limiting Method (OLM) was applied to the one-hour high-second-high NO_x concentration and the arm was applied to the annual high NO_x concentration to convert the total modeled NO_x emissions to NO_2 for comparison to the MAAQS and NAAQS. Each of the models demonstrated that neither the MAAQS nor the NAAQS would be violated. The ambient air quality modeling results are summarized in Table 4.3.1-3.

4.3.1-3 Ambient Air Quality Modeling Results – NO_x

Facility Modeled	Avg. Period	NO_x Modeled Conc. ($\mu g/m^3$)	OLM/arm Adjusted to NO_2 ($\mu g/m^3$)	Background Conc. ($\mu g/m^3$)	Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	MAAQS ($\mu g/m^3$)	% of NAAQS/ MAAQS
Visborg 25 Battery	1-hr	1459.8[a]	333.8	75	408.8	--------	564	N/A / 72.5
	Annual	18.2[b]	13.7	6	19.7	100	94	19.7 / 20.9
Montana State 36 Battery	1-hr	133.1[a]	201.1	75	276.1	--------	564	N/A / 49
	Annual	6.4[b]	4.8	6	10.8	100	94	19.7 / 11.5
Rancholme 21 Battery[c]	1-hr	599[a]	248	75	323	--------	564	N/A / 57.3
	Annual	23[b]	17	6	23	100	94	23 / 24.5
Rancholme 28 Battery[c]	1-hr	785[a]	266	75	341	--------	564	N/A / 60.5
	Annual	27[b]	20	6	27	100	94	27 / 28.7
Rancholme 29 Battery[c]	1-hr	242[a]	212	75	287	--------	564	N/A / 50.9
	Annual	23[b]	17	6	23	100	94	23 / 24.5
Symons Central Compressor Station	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 / 31.5

[a] Concentration calculated using OLM
[b] Applying arm with national default of 75%
[c] Rancholme 21, 28, and 29 were modeled cumulatively, individual results would be lower

The Class II increment analysis that was conducted as part of each MAQP application demonstrated compliance with the NO_x Class II increment. The Class II modeling results for each facility are summarized in Table 4.3.1-4.

4.3.1-4 Class II Modeling Results- NO_x

Facility Modeled	Avg. Period	Class II Modeled Conc. ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)	% Class II Increment Consumed
Visborg 25 Battery	Annual[a]	13.7	25	54.6
Montana State 36 Battery	Annual[a]	4.8	25	19.1
Rancholme 21 Battery[b]	Annual[a]	17	25	68
Rancholme 28 Battery[b]	Annual[a]	20	25	80
Rancholme 29 Battery[b]	Annual[a]	17	25	68
Symons Central Compressor Station	Annual[a]	22.6	25	88.8

[a] Applying the arm with national default of 75%
[b] Rancholme 21, 28, and 29 were modeled cumulatively, individual results would be lower

The Class I increment analysis that was conducted as part of the Symons Central Compressor Station MAQP application demonstrated compliance with the NO_x Class I increment. The Class I modeling results for the Symons Central Compressor Station are summarized in Table 4.3.1-5.

4.3.1-5 Class I Modeling Results - NO_x

Facility Modeled	Avg. Period	Class I Modeled Conc. ($\mu g/m^3$)	Class I Increment ($\mu g/m^3$)	% Class I Increment Consumed
Symons Central Compressor Station	Annual[a]	0.0029	2.5	0.1

[a] Applying the arm with national default of 75%

In summary, the modeling that was conducted for each of the production facilities to determine compliance with the MAAQS/NAAQS demonstrated that neither the MAAQS nor the NAAQS would be violated. In addition, the PSD Class II NO_x increment analysis that was conducted for each of the production facility's demonstrated that the Class II NO_x increment would not be exceeded. The PDS Class I increment analysis that was conducted for the Symons Central Compressor Station demonstrated that the Class I NO_x increment would not be exceeded.

MDEQ currently maintains a modeling database to track CBNG production activity in Montana and the model is updated with each new NO_x emitting facility that locates in the area defined by the MT FEIS and that requires a MAQP. Each model that is run for a newly proposed facility includes the emissions from the modeling database. However, because the modeling that has been conducted typically demonstrates that the receptor displaying the highest impact is near the fence line of the facility that is being modeled and because CBNG development is not yet widespread in Montana, MDEQ has not conducted a cumulative impact model since the original modeling for the Badger Hills POD. That is, although the facilities being modeled includes all of the emissions from previously ran models, the subsequent models do not include the receptors from the previous models. MDEQ determined that the cumulative model that was conducted for the Badger Hills POD would still be a representative cumulative impact model because none of the CBNG facilities that have been subsequently modeled would significantly impact the receptor that demonstrated the highest impact from the Badger Hills POD cumulative impact model. The cumulative impact model that was completed for the Badger Hills POD is summarized in the following section, "Cumulative Effects". MDEQ will continue to request MAQP applicants to model NO_x emitting units that locate in the area defined by the MT FEIS to ensure that the MAAQS and NAAQS, as well as the Class I and Class II NO_x PSD increments, are not exceeded. In addition, as CBNG development continues, or as CBNG facilities are proposed on properties closer to the Northern Cheyenne Indian Reservation, MDEQ will continue to request applicants to conduct NO_x PSD Class II increment analyses, as well as NO_x PSD Class I increment analyses. As CBNG development becomes more prevalent in Montana, MDEQ will request sources conducting ambient air quality modeling for CBNG facilities to conduct a cumulative impact model. That is, MDEQ will request sources conducting modeling for CBNG facilities to include the receptors that showed the highest impacts from previous models.

Cumulative Effects: The MT FEIS analyzed cumulative air quality impacts at Class I and Class II areas from emissions sources across Montana, and in 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.

The most recent cumulative impact model was conducted by MDEQ as part of reviewing the Badger Hills POD. As previously mentioned, the cumulative impact model that was conducted for the Badger Hills POD is still representative of the cumulative impacts of the area defined by the MT FEIS because none of the CBNG facilities that have been subsequently modeled would significantly impact the receptor that demonstrated the highest impact from the Badger Hills POD cumulative impact model.

MDEQ conducted the modeling for the Badger Hills POD using the EPA approved Industrial Source Complex Short Term Version (ISCST3) model, version 02035. This model is a refined dispersion model that uses detailed information regarding the region's meteorology, terrain, and local emissions sources to estimate ambient air pollutant concentrations. The ISCS3 model is used extensively for permitting and regulatory analyses and it is appropriate for use in estimating ground level ambient air concentrations resulting from non-reactive buoyant emissions from stationary sources with transport distances less than 50 km. The modeling analyses used the ISCST3 model in the regulatory default mode and EPA approved modeling options. Each emission source identified at all of the CBNG compressor stations was included in the air dispersion model as point sources. The coordinates of the emission sources are in UTM coordinates and the Montana and Wyoming sources included in the analysis are located in UTM zone 13. The stack exit height, temperature, velocity, and diameter data for each of the modeled emission sources was input into the ISCST3 model. The permitted allowable emissions were used in the model for all of the Montana and Wyoming sources, rather than the actual emissions. Typically, NAAQS/MAAQS demonstrations are conducted using permitted allowable emissions whereas PSD increment analyses are conducted using actual emissions. Actual emissions for these sources were not available, the Class I/Class II increment analysis was conducted using permitted allowable emissions instead of actual emissions. Therefore, the Class I/Class II increment analysis results would be considered conservative because the model provides a worst-case scenario.

The receptor, building, and source elevations were determined using data obtained from the USGS in the form of DEMs. The 14 Wyoming Quadrangles used in the analysis included the following: Acme; Bar N Draw; Cedar Canyon; Hultz Draw; Jones Draw; Monarch; OTO Ranch; Ranchester; Roundup Draw; Sheridan; Shuler Draw; SR Springs; Wolf; and Wyarno. The 14 Montana Quadrangles used in the analysis included the following: Bar V Ranch; Bar V Ranch NE; Decker; Folks Ranch; Half Moon; Holmes Ranch; Kid Creek; Lacey Gulch; Little Bear Creek; Pearl School; Pine Butte School; Spring Gulch; Stroud Creek; and Tongue River Dam. Five years (1984, and 1987 through 1990) of meteorological data were obtained from Sheridan, Wyoming (Met Station #24029) and the upper air data was obtained from Lander, Wyoming (Met Station #24021). Wind roses for this data set show that the predominant wind comes from the northwest. Building downwash was included using the EPA approved Schulman-Scire method. The EPA approved BPIP program was used to calculate the projected building widths and heights for the following Montana sources: Severn Brothers 35 Battery; Consul 27 Battery; and the Symons Central Compressor Station. Building downwash information for other Montana or Wyoming sources was not available. A Cartesian receptor grid consisting of 15,413 receptors was used in this analysis. The southwest corner of 324,000E, 4,958,000N and northeast corner of 385,000E, 5,010,000, encompassed the entire grid that consisted of 3172 km^2. Receptors were spaced at approximately 50-meters along the identified fence lines of the Severn Brothers 35 Battery, the Consul 27 Battery, and the Symons Central compressor station. The remaining receptors were spaced at 100-m spacing from the southwest corner of 345,000E, 4,983,000N and northeast corner of 361,000E, 4,989,000 to encompass all of the Montana Stations at 250-m spacing from the southwest corner of 344,000E, 4,982,000N and northeast corner of 362,000E, 4,990,000, at 500-m spacing from the southwest corner of 335,000E, 4,975,000N and northeast corner of 371,000E, 5,000,000 and at 1,000-m spacing from the southwest corner of 315,000E,

4,950,000N and northeast corner of 385,000E, 5,025,000. In addition, a receptor grid consisting of 250 receptors was previously developed using USGS maps for the Northern Cheyenne Indian Reservation. The receptors were placed at an approximate spacing of 100-m.

The pollutant of concern for this analysis was NO_x. It has been found that the NO_x emissions are the limiting pollutant from the compressor stations (i.e. the most likely pollutant to violate any ambient standard or increment). Thus, only NO_x emissions were examined. The emissions of total NO_x (N) +NO_2) from each source were assumed as the basis for the model. The model was run for the years 1984 and 1987-1990. The highest modeled NO_x annual concentration and the high-second high 1 hour concentration were determined. Once the highest NO_x concentrations were determined, the arm and OLM were applied to the NO_x modeled concentrations in order to convert to NO_2 concentrations for comparison against the NAAQS/MAAQS and PSD increments. These two methods take into account the complexity of the chemistry affecting the formation of NO_2. The air dispersion modeling results are in terms of annual and high-second-high 1-hour results for NO_2. The results include the total modeled concentration as well as the Montana and Wyoming individual source contributions. The annual NAAQS for NO_2 is 100 µg/m^3 while the annual MAAQS is 94 µg/m^3. The 1- hour standard for NO_2 is 564 µg/m^3. The ambient air quality modeling results are summarized in Table 4.3.1-6.

4.3.1-6 Ambient Air Quality Modeling Results - NO_x

NO_x Average	Source Group	Rank	Modeled Conc. (µg/m^3)	UTM East (x) (m)	UTM North (Y) (m)	OLM[a]/arm[b] (µg/m^3)	Background (µg/m^3)	Ambient Conc. (µg/m^3)	% of NAAQS	% of MAAQS
1984										
ANNUAL	ALL	1ST	28.6	357800	4984100	21.4	6	27.4	27.4	29.2
ANNUAL	MT_SRC	1ST	26.8	357800	4984100	20.1	6	26.1	26.1	27.8
ANNUAL	WY_SRC	1ST	22.0	352000	4978500	16.5	6	22.5	22.5	23.9
1HR	ALL	2ND	578.8	357500	4984000	245.7	75	320.7	----	56.9
1HR	MT_SRC	2ND	578.8	357500	4984000	245.7	75	320.7	----	56.9
1HR	WY_SRC	2ND	498.5	353500	4981000	237.7	75	312.7	----	55.4
1987										
ANNUAL	ALL	1ST	27.0	357800	4984100	26.2	6	32.2	32.2	34.3
ANNUAL	MT_SRC	1ST	25.2	357800	4984100	24.9	6	30.9	30.9	32.8
ANNUAL	WY_SRC	1ST	22.9	352000	4978500	23.2	6	29.2	29.2	31.0
1HR	ALL	2ND	627.8	357400	4984000	325.6	75	400.6	----	71.0
1HR	MT_SRC	2ND	627.8	357400	4984000	325.6	75	400.6	----	71.0
1HR	WY_SRC	2ND	497.9	353500	4981000	312.6	75	387.6	----	68.7
1988										
ANNUAL	ALL	1ST	30.0	357800	4984100	28.5	6	34.5	34.5	36.7
ANNUAL	MT_SRC	1ST	28.4	357800	4984100	27.3	6	33.3	33.3	35.4
ANNUAL	WY_SRC	1ST	20.8	352000	4978500	21.6	6	27.6	27.6	29.4
1HR	ALL	2ND	627.6	357400	4984000	325.6	75	400.6	----	71.0
1HR	MT_SRC	2ND	627.6	357400	4984000	325.6	75	400.6	----	71.0
1HR	WY_SRC	2ND	487.2	353500	4981000	311.6	75	386.6	----	68.5
1989										
ANNUAL	ALL	1ST	25.7	357800	4984100	25.2	6	31.2	31.2	33.2
ANNUAL	MT_SRC	1ST	24.0	357800	4984100	24.0	6	30.0	30.0	31.9
ANNUAL	WY_SRC	1ST	22.2	352000	4978500	22.6	6	28.6	28.6	30.5
1HR	ALL	2ND	570.0	357500	4984000	319.8	75	394.8	----	70.0
1HR	MT_SRC	2ND	570.0	357500	4984000	319.8	75	394.8	----	70.0
1HR	WY_SRC	2ND	486.4	352000	4978500	311.5	75	386.5	----	68.5
1990										
ANNUAL	ALL	1ST	26.4	357800	4984100	31.8	6	31.8	31.8	33.9
ANNUAL	MT_SRC	1ST	24.8	357800	4984100	30.6	6	30.6	30.6	32.5
ANNUAL	WY_SRC	1ST	22.0	352000	4978500	28.5	6	28.5	28.5	30.3
1HR	ALL	2ND	706.9	357400	4983900	408.5	75	408.5	----	72.4
1HR	MT_SRC	2ND	706.9	357400	4983900	408.5	75	408.5	----	72.4
1HR	WY_SRC	2ND	489.5	353500	4981000	386.8	75	386.8	----	68.6

[a] Concentration calculated using the Ozone Limiting Method
[b] Applying the arm with National Default of 75%

The annual high NO_2 concentration occurred in 1988 approximately 150-m southeast of the Symons Central Compressor Station, while the second high 1-hour modeled NO_2 concentration occurred in 1990 approximately 300-m southwest of the Symons Central Compressor Station. The modeled concentrations are well below the NAAQS/MAAQS even with the added background concentrations. The background concentrations used in the analysis are the concentrations which Montana uses as default values for areas where no significant sources exist, such as in this case.

The Class I/Class II PSD increment analysis was conducted using the same sources as previously identified with the same emission rates. Class I/Class II increment analyses are normally modeled using the actual emissions from each individual source. This analysis may be considered conservative because allowable emissions were used in lieu of actual emissions for the Montana sources. It is assumed that all the sources are increment consuming-sources. The results of the Class I analysis for the Northern Cheyenne Indian Reservation are shown in Table 4.3.1-7.

4.3.1-7 Class I analysis for the Northern Cheyenne Indian Reservation

Source Group	Modeled Conc. ($\mu g/m^3$)	UTM East (X) (m)	UTM North (Y) (m)	Elevation (m)	arm[a] ($\mu g/m^3$)	Class I Increment ($\mu g/m^3$)	% of Class I Increment
1984							
ALL	0.66	343855	5023989	1189	0.5	2.5	19.8
MT_SRC	0.14	344275.3	5023993	1137	0.1	2.5	4.3
WY_SRC	0.55	343855	5023989	1189	0.4	2.5	16.4
1987							
ALL	0.70	343855	5023989	1189	0.5	2.5	21.0
MT_SRC	0.16	344275.3	5023993	1137	0.1	2.5	4.7
WY_SRC	0.58	343855	5023989	1189	0.4	2.5	17.4
1988							
ALL	0.69	344275.3	5023993	1137	0.5	2.5	20.8
MT_SRC	0.15	344275.3	5023993	1137	0.1	2.5	4.4
WY_SRC	0.57	343855	5023989	1189	0.4	2.5	17.1
1989							
ALL	0.70	344275.3	5023993	1137	0.5	2.5	20.9
MT_SRC	0.15	344275.3	5023993	1137	0.1	2.5	4.5
WY_SRC	0.57	343855	5023989	1189	0.4	2.5	17.0
1990							
ALL	0.66	343855	5023989	1189	0.5	2.5	19.7
MT_SRC	0.15	344275.3	5023993	1137	0.1	2.5	4.4
WY_SRC	0.55	343855	5023989	1189	0.4	2.5	16.4

[a] Concentration calculated using the Ozone Limiting Method
[b] Applying the arm with National Default of 75%

As demonstrated by the above table, the modeling demonstrated that the Wyoming sources are the major contributor to the modeled Class I increment. The results of the Class II modeling are shown in Table 4.3.1-8.

4.3.1-8 Class II Modeling Results

Source Group	Modeled Conc. ($\mu g/m^3$)	East (X) (m)	North (Y) (m)	Elevation (m)	arm[a]	Class II Increment ($\mu g/m^3$)	% of Class II Increment
1984							
All	28.6	357800	4984100	1085	21.4	25	85.7
MT	26.8	357800	4984100	1085	20.1	25	80.5
WY	22.0	352000	4978500	1132	16.5	25	65.9
1987							
All	27.0	357800	4984100	1085	20.2	25	80.9
MT	25.2	357800	4984100	1085	18.9	25	75.5
WY	22.9	352000	4978500	1132	17.2	25	68.7
1988							
All	30.0	357800	4984100	1085	22.5	25	89.9
MT	28.4	357800	4984100	1085	21.3	25	85.2
WY	20.8	352000	4978500	1132	15.6	25	62.4
1989							
All	25.7	357800	4984100	1085	19.2	25	77.0
MT	24.0	357800	4984100	1085	18.0	25	71.9
WY	22.2	352000	4978500	1132	16.6	25	66.6
1990							
All	26.4	357800	4984100	1085	19.8	25	79.3
MT	24.8	357800	4984100	1085	18.6	25	74.4
WY	22.0	352000	4978500	1132	16.5	25	66.0

[a] Concentration calculated using the Ozone Limiting Method

The peak-modeled concentration for the Class II increment occurred in 1988 approximately 150 meters southeast of the Symons Central Compressor Station, which is the same receptor where the peak modeled ambient concentration was observed.

As the Badger Hills POD modeling analysis demonstrates, CBNG development currently complies with the MAAQS/NAAQS and the PSD Class I/Class II increments. The peak modeled concentrations are close to individual developments.

4.3.2 Cultural Resources

Direct and Indirect Effects to Cultural Resources: Cultural resource inventories identified and recorded totals of only 6 sites within the POD area and Area of Potential Environmental Effect for this undertaking. The 6 sites to have been identified and recorded within the POD area include 3 lithic scatter sites, 24BH1557 (private surface-previously recorded), 24BH1558 (private surface-previously recorded) and 242BH1559 (State surface-previously recorded) and 3 historic homestead sites, 24BH1750 (Private/BLM surface-previously recorded), 24BH3072 (private surface-newly recorded) and 24BH3197 (private surface-newly recorded). Of these 6 recorded sites within the POD area, all are determined to be located adjacent to and outside the area of direct impact from the proposed facility development. None of the sites have been determined or are considered eligible for the National Register of Historic Places. Due to the underground nature of most of the proposed infrastructure and low visual impact of the proposed development, there would be no direct or indirect visual impacts to the sites located within the POD project area.

There would also be no direct or indirect impacts to the 2 sites determined eligible for the National Register located and recorded in the sections surrounding the Coal Creek POD area, sites 24BH2271 (historic structure), located in adjacent Section 14, and 24BH2613 (kill-processing site), located in adjacent Section 27, in T. 9 S., R. 40 E.

There would be no impact to the historic or Cultural Landscape. None of the 4 types of landscapes that may be considered for eligibility under National Historic Preservation Act were identified within or surrounding the project area (POD). Although the area has been important for Native American cultures in the past, 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 by the proposed undertaking.

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. Unanticipated discoveries found during construction of roads and buried infrastructure would be addressed through the condition of approval to monitor surface disturbing actions.

Direct and Indirect Effects to Traditional Cultural Values: *Native American Consultation*: The BLM contacted 15 Tribal groups by letter dated August 3, 2004, seeking Native American input on this project. The letter summarized the proposed undertaking and solicited Tribal input on the proposed development.

A field tour of the project area was conducted for the Northern Cheyenne Tribe on December 20, 2004. However, no substantive comments were received. BLM's Miles City Field Office's consultation effort was conducted in good faith by providing the Northern Cheyenne and the other Tribal interest's opportunity to comment.

In the absence of specific comments, BLM actions would proceed under this alternative based on previous comments received from Northern Cheyenne Tribe for the Powder River Gas Coal Creek POD and the Dry Creek POD. Consultation and field tours of these 2 PODs did not identify any areas of significance or concern to the Northern Cheyenne, nor did the areas contain any traditional cultural properties.

However, because previous consultations identified that there may still be indirect effects to culturally sensitive areas, sites or localities considered important or significant to Native American interests, the Northern Cheyenne Tribal Historic Preservation Officer recommended tribal monitoring of surface disturbance that will occur in the vicinity of sites as a result of POD development. In the absence of specific comments on the Coal Creek POD project area, BLM would apply a similar Condition of Approval as was applied to the previous PODs. Therefore, BLM would incorporate into the Conditions of the Approval (COA) a statement identifying the need for the company to conduct monitoring of sites during the construction phase. The following Conditions of Approval have been prepared that would become part of the Record of Decision and would be part of approved federal APDs issued for the Coal Creek POD.

CULTURAL RESOURCES SUPPLEMENTAL CONDITIONS OF APPROVAL FOR FIDELITY COAL CREEK FEDERAL WELLS and ASSOCIATED DEVELOPMENTS:

The operator shall notify BLM (406-232-7001) at least 48 hours before beginning construction activities. BLM shall immediately notify the Northern Cheyenne Tribe about construction activities. The company shall have its consulting archaeologist or an archaeologist holding a valid BLM Cultural Resources Permit available should the need to conduct monitoring occur as a result of prehistoric sites being discovered during construction. The operator shall provide the opportunity to the Northern Cheyenne Tribe for a qualified Tribal cultural resources specialist to monitor construction of the Federal portion of the Coal Creek Coal Bed Natural Gas Plan of Development (POD) Area. The results of any monitoring shall be reported in writing by the Consulting Archaeologist and Tribe to BLM within 14 days after completion of monitoring activities.

The purpose of the monitoring is to identify any cultural resources that may be discovered by construction activities. The archaeologist or cultural resources specialist may temporarily halt construction within 300 feet (100 meters) of the find until it can be evaluated by a BLM Cultural Resources Specialist. The operator shall immediately notify BLM (406-232-7001) upon the discovery of cultural resources. The BLM authorized officer shall respond to the operator within the five working days as per Condition of Approval No. 3. The same conditions in Condition of Approval No. 3 would apply for buried cultural resources encountered during monitoring.

Condition of Approval No. 3:

If any cultural values (sites, artifacts, human remains, etc.) are observed

during operation of this lease/permit/right-of-way, they are to be left intact and the Miles City Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials and contact the authorized BLM officer. Within five working days, the AO will inform the operator as to:

- Whether the materials appear eligible for the National Register of Historic Places;
- The mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- A time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

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

Cumulative Effects: The MT FEIS identified the potential for 5,135 cultural sites to be discovered or identified in the CBNG 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 will add to the total cumulative number of sites identified in the region. There would be little or no cumulative direct or indirect affect on cultural resources and no sites determined eligible for the National Register would be impacted or affected by the proposed undertaking.

4.3.3 Geology and Minerals

Direct and Indirect Effects to Coal Bed Natural Gas: Under this Alternative, CBNG could potentially be produced from the 210 private, state and federal wells completed for production. Production of these wells is estimated to last up to 15 years. Production of CBNG could be an 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.

Methane Migration

Domestic water wells and springs completed in a coal bed producing CBNG within the minimum radius drawdown could experience an influx of natural gas. This alternative adds one well and one spring that may be affected by methane migration as compared to alternative B. Domestic wells potentially affected are shown in Table 4.3.3-1.

4.3.3-1 Domestic Water Wells and Springs

Site name	Type	Township	Range	Sec	Tract	Depth
Munson Emmett (3.5 Miles NE Decker)	Well	09S	40E	22	NESE	170
Holmes Ranch (8.5 Miles E Decker)	Well	09S	41E	9	SWNE	28.7
Munson Mrs. Emmett	Well	09S	40E	22	NESE	30.1
Munson Mrs. Emmett	Well	09S	40E	22	NWSE	80
Munson Emmett	Well	09S	40E	24	NENW	140
Rancholme Cattle Co.	Well	09S	41E	28	NWNW	200
Johnston	Well	09S	41E	21	SWSW	200
Johnston	Well	09S	41E	21	SWSE	280
Munson Emmett	Well	09S	40E	26	NWNE	40
Munson Emmet (2.4 Miles NE Decker)	Well	09S	40E	22	SENE	169.4
Munson Vada	Well	09S	41E	31	SWSE	257
44 Magnum	Spring	09S	41E	34	SWNW	0

Direct and Indirect Effects to Coal: Same as Alternative B.

Cumulative Effects: Producing the 210 federal, state, and private wells would remove an estimated 56.7 BCF of CBNG, which would be in addition to gas produced by the existing 449 wells in the CX Field. Production of CBNG could be an 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. Revenue for state, county and federal governments will be generated by the sales of gas.

Drainage of CBNG from areas without producing wells could be drained by adjacent producing wells. Additional wells would have to be drilled in the vacant areas or compensatory agreements established to eliminate the actual drainage or to compensate for the loss of the gas.

Methane Migration: Under this Alternative, it is assumed that the existing 449 wells in the CX Field plus the 210 private, state and federal wells would be produced. This results in the long term impact of drawdown extending approximately 1.6 miles beyond the POD boundary. This potential drawdown area is shown on Map Hydro-5 in the Hydrology Appendix. The results of this analysis are shown in the Hydrology Appendix in Table Hydro-4.

4.3.4 Hydrology

Direct and Indirect Effects to Surface Water: Under this Alternative, the proposed 210 federal, private and state CBNG wells would be drilled and produced. The production of these wells would result in an increase in the volume of water discharged under Fidelity's existing MPDES permit (MT-0030457) from approximately 1,085 gpm to 1,600 gpm which is the maximum volume of discharge allowed by the permit. This additional discharge would be untreated water with an EC of approximately 2,248 μS/cm and an SAR of approximately 58.5. During LMM flows at Birney Day School, this discharge would directly cause SAR to increase by 6.0% and EC to increase by 0.9% over existing conditions (see Table 4.3.4-1).

The produced water that would not be discharged into the Tongue River would be managed via beneficial uses, including industrial uses at the Spring Creek coal mine, drilling and construction activities, dust suppression, and for livestock and wildlife. The produced water would also be stored in the existing off drainage impoundment 23-0299, and, if needed, stored in off drainage impoundment 44-3490 which was authorized in the Badger Hills POD. During the irrigation season, the produced water would be applied to the managed irrigation areas authorized in the Badger Hills POD. As discussed in Chapter 3, these beneficial uses, impoundments and irrigation areas were analyzed in detail in the Badger Hills POD EA and Dry Creek POD EA and will not be analyzed in detail in this EA.

Following the methodology described in Chapter 3, and discussed in detail in the surface water modeling report prepared in support of this POD (Fidelity, 2004b), the resulting water quality in the Tongue River can be determined at 3 USGS stations, as shown on Table 4.3.4-1. A summary of the inputs for this scenario are provided on

Table Hydro-3 in the Hydrology Appendix. 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 would be exceeded, and during 7Q10 flows the instantaneous maximum standards would not be 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 discharged per well vs. time, these impacts would decrease with time and be primarily short term in nature. According to the water balance prepared in support of this project, after 5 years, the rate of discharge to the Tongue River would be anticipated to be 338 gpm.

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 nondegradation criteria." (MDEQ, 2000). Upstream and downstream monitoring associated with this permit indicates that the discharge which has occurred under this permit has not caused exceedances of water quality standards. As such, it is not anticipated that actions in this Alternative would directly impair the beneficial uses of the Tongue River.

Table 4.3.4-1: Direct Impacts; Modeled Existing Conditions vs. Proposed Action

	Flow Conditions	Existing Conditions (1085 gpm)			Proposed Action (1600 gpm)		
		Flow (cfs)	EC (µS/cm)	SAR	Flow (cfs)	EC (µS/cm)	SAR
Tongue River at State Line	7Q10	44.4	1302	1.49	45.6	1314	1.70
	LMM	180.4	700	0.81	181.6	708	0.90
	HMM	1672.4	261	0.30	1673.6	262	0.31
Tongue River Below Dam	7Q10	72.4	829	1.18	73.6	837	1.28
	LMM	181.4	660	0.92	182.6	667	0.99
	HMM	1431.4	394	0.53	1432.6	397	0.56
Tongue River at Birney Day School	7Q10	51.4	1126	1.77	52.6	1134	1.87
	LMM	175.4	726	1.17	176.6	733	1.24
	HMM	1121.4	376	0.60	1122.6	379	0.63

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 210 federal, private and state CBNG wells would be produced which would result in groundwater drawdown. Following the methods described in Chapter 3, and discussed in detail in the groundwater modeling report prepared in support of this POD (ALL, 2004), the production of these 210 wells would be expected, over the long term (20 years), to directly cause the coal seam aquifers to be drawndown by 20 feet or more over an area of 38.8 mi^2. The results of the drawdown analysis are shown in the Hydrology Appendix on Table Hydro-4, and the drawdown area is shown on Map Hydro-1. Thirteen wells and 1 spring are located within this drawdown area. This is an increase of 2 wells compared to Alternative B. These wells and spring are listed on Table Hydro-5 and shown on Map Hydro-1.

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 in the direct impacts section of Alternative B, it is not anticipated that many of the wells or springs within the drawdown area derive their water from the coal seams proposed for CBNG development. Also, as discussed in the direct impacts section of Alternative B, it is anticipated that the water mitigation agreements required under MBOGC Order 99-99 would be effective at mitigating impacts from CBNG related drawdown.

The groundwater modeling conducted in support of the MT FEIS anticipated that, for a hypothetical CBNG field with 1,082 wells producing for 20 years, the produced coal seams would recover 70% of their hydrostatic head within 5-12 years after the end of production. It is anticipated that the drawdown which results from this project would be of similar duration. The exact radius of the drawdown cone, and the time required for the head to recover, would depend on the site specific aquifer properties, the precise timing of the pumping of each of the wells, and the overall nature of CBNG development in this region. For additional general discussion of the anticipated drawdown related impacts, see pages 4-61 to 4-63 of the MT FEIS, and the associated groundwater modeling reports (Wheaton and Metesh, 2001, Wheaton and Metesh, 2002).

Cumulative Effects to Surface Water: Under this Alternative, the proposed 210 federal, private and state CBNG wells would be drilled and produced. The production of these wells in addition to producing wells in the CX Field would result in an increase in the volume of water discharged under Fidelity's existing MPDES permit (MT-0030457) from 1,085 gpm to 1,600 gpm. This additional discharge would be untreated water with an EC of approximately 2,248 μS/cm and an SAR of approximately 58.5. During LMM flows at Birney Day School, this discharge would cumulatively cause SAR to increase by 5.7% and EC to increase by 0.8% over existing conditions (see Table 4.3.4-2).

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. 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). The treated water from PRG is anticipated to have an SAR of approximately 3.0 and an EC of approximately 742 μS/cm. The treated water from Fidelity's treated discharge is anticipated to have an SAR of 2.8 and an EC of 438. A summary of the inputs for this scenario is provided on Table Hydro-3 in the Hydrology Appendix. 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 would be exceeded, and during 7Q10 flows the instantaneous maximum standards would not be exceeded. As such, the results of this analysis indicate that this alternative would not, when combined with all other past, present and reasonably foreseeable activities, 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 4.3.4-1 and 4.3.4-2.

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 nondegradation criteria." (MDEQ, 2000).

Table 4.3.4-2: Cumulative Impacts; Foreseeable Conditions vs. Proposed Action

	Flow Conditions	Foreseeable Conditions (1085 gpm)			Proposed Action (1600 gpm)		
		Flow (cfs)	EC (µS/cm)	SAR	Flow (cfs)	EC (µS/cm)	SAR
Tongue River at State Line	7Q10	48.2	1258	1.52	49.4	1270	1.72
	LMM	184.2	694	0.84	185.4	703	0.93
	HMM	1676.2	261	0.30	1677.4	262	0.32
Tongue River Below Dam	7Q10	78.7	815	1.23	79.9	822	1.33
	LMM	187.7	658	0.96	188.9	664	1.03
	HMM	1437.7	397	0.55	1438.9	399	0.57
Tongue River at Birney Day School	7Q10	57.7	1112	1.82	58.9	1119	1.92
	LMM	181.7	724	1.21	182.86	730	1.28
	HMM	1127.7	379	0.62	1128.9	381	0.64

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

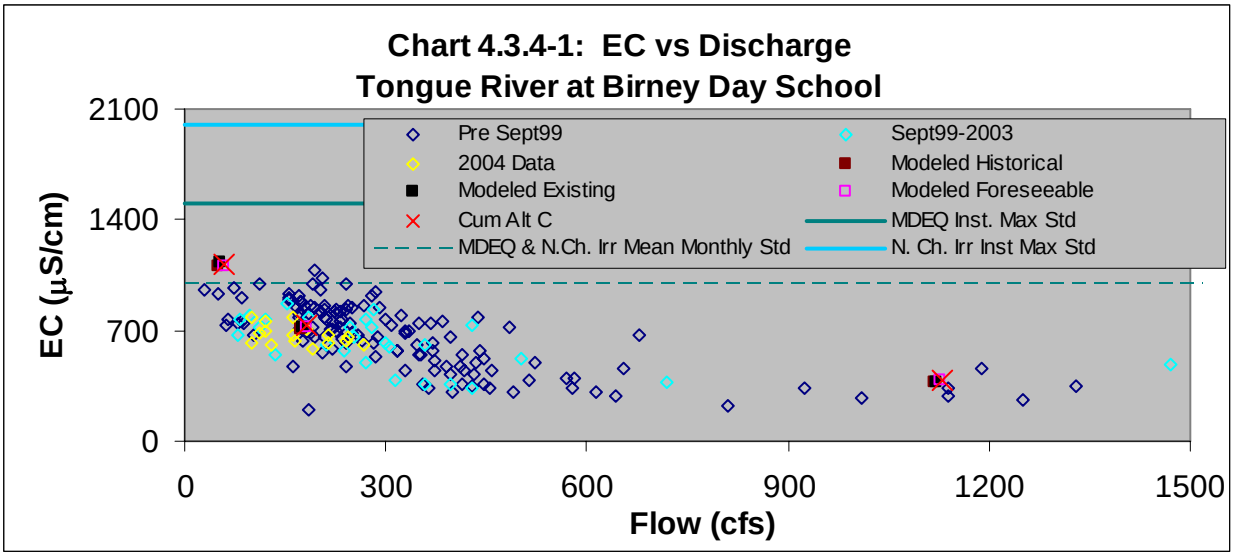

Chart 4.3.4-1: This graph shows flow (cfs) vs. EC (µS/cm) with observed data from before CBNG development (Pre Sept99), from Sept99-2003, and from 2004. Also included on this graph are the modeled results at HMM, LMM, and 7Q10 flows for the historical record (pre-Sept99), for the existing conditions, for the foreseeable conditions without this project, and the cumulative model results for the Proposed Action Alternative. Also displayed are the irrigation season EC standards developed by the MDEQ and the Northern Cheyenne.

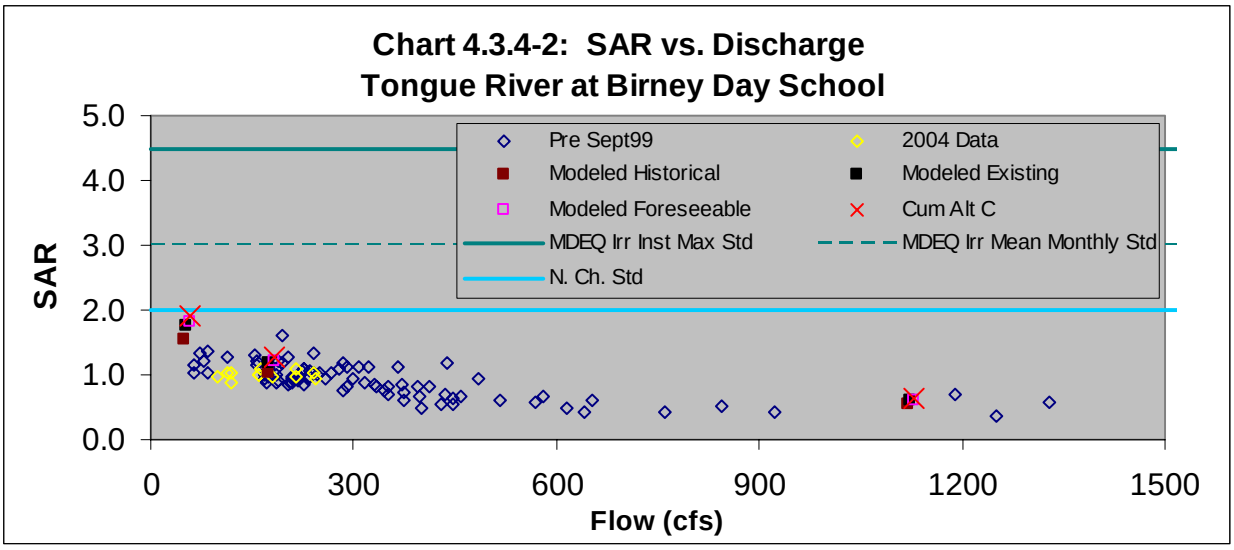

Chart 4.3.4-2: This graph shows flow (cfs) vs. SAR with observed data from before CBNG development (Pre Sept99), and from 2004. Also included on this graph are the modeled results at HMM, LMM, and 7Q10 flows for the historical record (pre-Sept99), for the existing conditions, for the foreseeable conditions without this project, and the cumulative model results for the Proposed Action Alternative. Also displayed are the irrigation season SAR standards developed by the MDEQ and the Northern Cheyenne.

Cumulative Effects to Groundwater: Under this Alternative, the 210 federal, private and state CBNG wells would be produced from the Dietz, Monarch and Carney coal seams. These wells would be in addition to the 456 producing CBNG wells within Montana, and the approximately 2,000 CBNG wells in Wyoming that are contiguous with this area and finished in these coal seams.

Following the methods discussed in Chapter 3, and discussed in detail in the ground water modeling report prepared in support of this EA (ALL, 2004), the production of these 210 wells would be expected, over the long term (20 years), to cumulatively cause the coal seam aquifers to be drawn down by 20 feet or more over an area of 355.8 mi^2. This is an increase of 3.6 mi^2 over the foreseeable drawdown from the No Federal Action Alternative. The results of the drawdown analysis are shown in the Hydrology Appendix on Table Hydro-4, and the area drawn down is shown on Map Hydro-2. The expansion of this drawdown area causes 1 additional well to be added to the cumulative drawdown area, for a total of 66 wells and 6 springs in the drawdown area. These wells and spring are listed on Tables Hydro-7, Hydro-8, Hydro-9 and Hydro-10, and are shown on Map Hydro-2.

Domestic and stock 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 would be the decreases in yield. Those domestic 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 in the direct impacts section of Alternative B, it is not anticipated that many of the wells or springs within the drawdown area derive their water from the coal seams proposed for development. Also as discussed in the direct impacts section of Alternative B, it is anticipated that the water mitigation agreements required under MBOGC Order 99-99 would be effective at mitigating impacts from CBNG related drawdown.

The groundwater modeling conducted in support of the MT FEIS anticipated that, for a hypothetical CBNG field with 1,082 wells producing for 20 years, the produced coal seams would recover 70% of their hydrostatic head

within 5-12 years after the end of production. It is anticipated that the drawdown which results from this project would be of similar duration. The exact radius of the drawdown cone, and the time required for the head to recover, would depend on the site specific aquifer properties, the precise timing of the pumping of each of the wells, and the overall nature of CBNG development in this region. For additional general discussion of the anticipated drawdown related impacts, see pages 4-61 to 4-63 of the MT FEIS, and the associated groundwater modeling reports (Wheaton and Metesh, 2001, Wheaton and Metesh, 2002).

4.3.5 Indian Trust and Native American Concerns

Direct and Indirect Effects: Impacts would be similar to those identified in Alternative B. 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. Compressors at 3 proposed sites and 2 existing sites along with compressors at the existing sales sites permitted by MDEQ would be used to process gas from the wells under this Alternative. 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. An additional 476 gpm of produced water would be discharged into the Tongue River at existing discharge points under this Alternative compared to Alternative B. Discharge of additional produced water from the Coal 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 projects 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 depth 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 depth of the Caney ranges from 565 feet to 837 feet. The Carney formation would have 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 2.1 miles after 20 years. This would result in a pressure decline of approximately 8.6 psi at 2.1 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 CBNG production from all wells (449) in the CX Field, the 20 foot drawdown radius would extend 3.6 miles from the edge of the CX Field. Based on the MT FEIS for the Decker Mines, only the Dietz 1 and Dietz 2 coal beds are being mined. Therefore, only the Dietz 3 underlies the West Decker mine and would extend under the Northern Cheyenne minerals located within 2 miles northeast of the mine. The minimum drawdown to cause gas to desorb from the Dietz 3 (the shallowest coal and the lowest pressure coal) is 53 feet. The 53 foot drawdown contour for the whole CX Field extends approximately 1.64 miles. The nearest Northern Cheyenne lands are over 4 miles away and the nearest Crow lands are over 3 miles away from the areas of CBNG production. Drainage of CBNG from Indian lands would not occur as a result of CBNG production from this project.

Cumulative Effects: Cumulative impacts would be similar to those identified in Alternative B. Where appropriate, BLM would develop mitigation measures to eliminate or lessen impacts to resources of concern to the Northern Cheyenne Tribe. 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.

4.3.6 Lands and Realty

Direct and Indirect Effects: BLM would issue 3 rights-of-way for actions occurring on BLM surface under this Alternative. The rights-of-way would authorize improvement of existing roads, construction of new roads, and installation of power lines, gas lines and water lines. The acres disturbed and the types of impacts from construction activities are described in Sections 4.3.10, 4.3.11 and 4.3.12.

Cumulative Effects: BLM issued rights-of-way under this Alternative would be in addition to 3 existing BLM issued rights-of-way. The acres disturbed and the types of impacts from construction activities for the 3 rights-of-way issued under this Alternative would be in addition to other acres of disturbance as described in Sections 4.3.10, 4.3.11 and 4.3.12. Land and mineral ownership would not change as a result of implementing this Alternative.

4.3.7 Livestock Grazing

Direct and Indirect Effects: Disturbance to livestock operations could occur during construction and drilling activities if livestock are in the project area. Approximately 126 acres of vegetation would be removed during construction activities, which would reduce the amount of forage available to livestock equaling about 25 AUMs. Following reclamation and during the production phase, approximately 25 acres and 5 Animal Unit Months (AUMs) would be lost due to a permanent reduction in available forage. Existing livestock water sources affected by CBNG production would be repaired or replaced in accordance with agreements between Fidelity and the water source owner. Some of the water produced with CBNG would be made available for livestock and crop irrigation as described in the Water Management Plan submitted with the POD. 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 and replace the AUMs lost to production facilities.

Cumulative Effects: Cumulative effects from implementing this Alternative would be the long term (>5 years) of approximately 25 acres of forage and 5 AUMs. The loss of AUMs could result in a loss of income to the livestock operator if a replacement grazing area was not available. After completion of final reclamation in the project area and addition of livestock water, the forage would become available and the AUMs would be restored. 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. 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 operators during the mineral production phases.

4.3.8 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, due to limited opportunity and access through private lands. 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 access or accessible surface acreage to affect scenic values of the region. The 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.

4.3.9 Social and Economic Conditions

Direct and Indirect Effects: Under this Alternative, 132 federal wells, 62 private wells and 16 state wells would be drilled. Thirteen federal, 6 private and 2 state wells might be dry holes. If production occurs, 56.7 BCF of CBNG

would be produced from these 189 wells, having a gross value of $226.8 million dollars over the life of the wells. The private mineral owners would receive $8.4 million dollars of royalties and pay $1.3 million dollars in taxes on the royalties. The federal royalties would be $17.9 million dollars. The state would receive $2.1 million dollars in royalties, and collect $19.7 million dollars in production taxes, and receive 50 percent of the federal royalties, $8.9 million dollars. Drilling, production and abandonment of the 210 wells would provide 92 temporary jobs with an estimated income of $2.8 million dollars over the life of the wells, which would enhance the social well being of those receiving this income (see Appendix C for Social and Economic Assumptions common to all alternatives). Private surface owners would receive some form of compensation as agreed to with the operator for surface disturbance from project activities on their surface.

Direct and Indirect Effects to Environmental Justice: Same effects for Alternative B.

Cumulative Effects: The project would be an incremental addition, approximately 42 percent increase in the number of wells, to the existing 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 jobs would offset some of the mining jobs lost due to production declines at the Montana mines as contracts expire and productivity increases. The CBNG production taxes and royalties would also offset some of the reduced coal production taxes and royalties.

4.3.10 Soils

Direct and Indirect Effects: Under this Alternative, 62 private wells on 13 locations, 16 state wells on 4 locations and 132 federal wells on 27 locations would be drilled (see Table 2.5-2). One off-channel impoundment and one new off-channel impoundment would be used to store some of the water produced with natural gas under this Alternative.

Surface disturbing activities would disturb approximately 126 acres under this Alternative. Effects to soils would be the same as Alternative B.

Cumulative Effects: Construction activities associated with implementing this Alternative would impact approximately 126 acres during the short term (<5 years) and approximately 25 acres during the long term (>5 years). These disturbed acres are part of the cumulative impact analysis found in the MT FEIS. 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. During the production phase, soils would be taken out of production and may require a longer period of time to regain productivity than soils that are quickly reclaimed.

4.3.11 Vegetation

Direct and Indirect Effects to Vegetation: Disturbance caused from drilling and construction of access roads, pipeline corridors, and the compressor sites would remove vegetation from approximately 126 acres in the project 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. Seed mixtures used in reclamation would be determined by the surface owner or the surface management owner. It would be expected that approximately 25 acres of vegetation would remain disturbed during the production phase of the project.

Direct and Indirect Effects to Special Status Species: Same as Alternative B.

Direct and Indirect Effects to Invasive Species: Same as Alternative B.

Cumulative Effects: Under this Alternative, following reclamation, 25 acres of vegetation would be disturbed in addition to acres disturbed by other activities in the CX Field and the Decker and Spring Creek coal mines. The

addition of acres disturbed by actions under this Alternative would be below the approximately 74,000 acres predicted in the MT FEIS that could be disturbed by CBNG development.

4.3.12 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 Coal Creek POD.

Direct and Indirect Effects to Wildlife: Impacts to aquatic and wildlife resources from this Alternative are essentially the same as those described in Alternative B, however, the scope of the impacts are more widespread because of the increased development associated with this Alternative. The number of acres disturbed and the number of miles of roads and utility corridors under this Alternative would be more than under Alternative B. A comparison of Alternative B and this Alternative shows 58.2 acres of lost habitat versus 169.3 acres of lost habitat, 14.25 miles of road versus 36.91 miles of roads and utility corridors; however, the increases would not be enough to warrant additional analysis. The direct impacts are not substantively greater under this Alternative, but the indirect impacts affect essentially all of the project area under this Alternative as opposed to about ½ of the project area Alternative B.

Under this Alternative, both overhead and buried power lines would be installed in the project area. The figures presented in Table 2.5-1 for overhead and buried power lines reflect the stretches of the power lines which require rights-of-way. Throughout the project area; however, 12.35 miles of overhead power lines (2.97 miles federal; 1.52 miles state; 7.86 miles private), 14.67 miles of underground power lines (6.21 miles federal; 1.30 miles state; 7.16 miles private), and 3.16 miles of underground high voltage power line (1.81 miles federal; 0 miles state; 1.35 miles private) would be constructed and installed. There are approximately 1.8 miles of overhead power line existing within the project area, along the County road which runs along the north edge of the project area. Under this Alternative, overhead power lines would increase from the existing 1.8 miles to 12.35 miles. Almost 18 miles of power line would be buried and 12.35 miles will be overhead. While approximately 60% of the proposed miles of power lines would be underground, the potential for collision mortality is increased because of the increased presence of the overhead power lines. Adherence to the Avian Power Line Interaction Committee (1996) guidelines as proposed in the POD would reduce the potential for electrocution.

In order to ensure the maximum protection to wildlife habitat, this Alternative requires a Wildlife Monitoring and Protection Plan (WMPP) be implemented. As required in this plan, key wildlife species would be monitored annually throughout the life of the project, power lines would be built to standards identified by the Avian Power Line Interaction Committee (1996), and to additional standards outlined in the Biological Opinion: signing, speed limits, or speed bumps would be placed on all project access roads to reduce mortality and disturbance caused by vehicle traffic and temporary and permanent access roads would be avoided on south-facing slopes within big game winter range.

4.3.12.1 Threatened, Endangered and Special Status Species
The types of impacts to threatened, endangered and special status species would be the same as identified under Alternative B. However, because of the increase in the miles of above ground power lines, the potential for collisions with aerial power lines or electrocution would be greater than in Alternative B. Approximately 60% of the proposed miles of power lines would be underground. Adherence to the Avian Power Line Interaction Committee (1996) guidelines would reduce the potential for electrocution for those the remainder of the power lines which will be above ground.

4.3.12.2 Big Game Species
The types of impacts to big game species and their habitats would be the same as identified under Alternative B. However, because of the additional development, the level of impacts would be greater and would cover most of the POD area. There are two federal well sites under Alternative C which are within crucial winter range for mule deer (Holmes Federal 41-2191, Holmes Federal 14-2291). The application of the Timing Condition of Approval (no surface use from December 1 through March 31) would

prevent disturbances such as road building, well drilling, pipeline construction, etc., during the most crucial time of the year for mule deer.

4.3.12.3 Upland Game Birds

The types of impacts to upland game birds and their habitats would be the same as identified under Alternative B. However, because of the additional development, the level of impact would be much greater, covering the entire project area. Under Alternative C, 27 federal well sites would be located within 2 miles of an active sharp-tailed grouse or inactive sage grouse lek. The 2-mile nesting area surrounding the leks, essentially includes all federal wells. 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, the application of the Timing Condition of Approval (March 1 through June 15) would minimize disturbance during the critical breeding, nesting, and brood-rearing period.

4.3.12.4 Raptors

The types of impacts to raptors and their habitats would be the same as identified under Alternative B. However, because of the additional development, the level of impacts would be greater. Under Alternative C, there are 5 federal well sites that are within ½ mile of raptor nests (Visborg Federal 44-2490 in T. 9 S., R. 40 E., Section 24, SE ¼; Holmes Federal 42-2091 in T. 9 S., R. 41 E., Section 20, NE¼; Holmes Federal 21-2991 in T. 9 S., R. 41 E., Section 29, NW¼; Holmes Federal 14-2291 in T. 9 S., R. 41 E., Section 22, SW¼;, and Holmes Federal 12-2791 in T. 9 S., R. 41 E., Section 27, NW¼). As with grouse, roads, vehicles, structures and human activity may displace raptors into adjacent nesting habitat, or increase mortality from vehicle collisions. The application of the Timing Condition of Approval (no surface use from March 1 through August 1 within ½ mile of the nest) for active raptor nests would prevent surface disturbing activities and associated disturbances around active raptor nests during the nesting period.

4.3.12.5 Migratory Bird Species

The types of impacts to migratory bird species would be the same as identified under Alternative B. The impacts to waterfowl would be similar to the impacts described in Alternative B, but the impacts to upland species would be greater because of more habitat fragmentation anticipated with Alternative C. The application of the Timing Condition of Approval for sage and sharp-tailed grouse (which covers the entire POD area), would help to protect species of migratory birds which inhabit the sagebrush/grassland communities which dominate the project area.

4.3.12.6 BLM Sensitive Species

The types of impacts to any BLM sensitive species would be the same as identified under Alternative B. Due to the small numbers, or the absence of sensitive species in the POD area, the level of impacts are not expected to be greater under Alternative C than under Alternative B.

4.3.12.7 Fisheries/Aquatics

Direct and Indirect Effects to Fisheries/Aquatics: Potential impacts from Alternative C would be similar to Alternative B. There would be a slight potential for increased erosion, changes in water quality and streamflows and drawdown effects on springs (has the potential to affect the flow rates for 1 of the 6 springs which are currently contained within the drawdown area from existing development). The potential for a slight change in impacts is attributed to constructing additional access roads, pipelines, and well pads; and the amount of discharge of CBNG produced water into the Tongue River (A total of 1.06 cfs increase over Alternative B). At the low monthly 7Q10 (35 cfs upstream of the dam at the state line), the increased discharge would only constitute 3 percent of the flow. The water discharged will not exceed the current amount permitted by Montana DEQ (total of 1600 gpm (3.56cfs)).

4.3.12.8 West Nile Virus

There is a potential to increase mosquito habitat with this alternative through the use of two impoundments for storage of proposed water. 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 will permit such actions to occur.

Cumulative Effects to Wildlife: The types of impacts to wildlife resources from cumulative impacts in this alternative would be similar as described in Alternative B (see Wildlife 4.2.12), but with fewer impacts that Alternative B due to the application of mitigation measures. The construction of roads, production well pads and compressor sites would result in the long term (>5 years) loss of habitat and forage on approximately 25 acres in the project area under this Alternative.

Cumulative Effects to Fisheries/Aquatics: The only difference from Alternative B and this alternative is the 1.06 cfs of discharged water; the (re) constructing additional access roads, pipelines, and well pads; and the drawdown effects on springs (associated with the federal portion of the proposed project). As a result, there is a slight increased potential for cumulative effects on aquatic species and habitat above those identified in Alternative B.