

**United States Department of the Interior  
Bureau of Land Management**

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**Environmental Assessment  
DOI-BLM-WY-020-EA10-74**

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**July 2010**

**November 2010, Lease Parcel #175**

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Cody Field Office  
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Cody, Wyoming 82414  
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<b>AFFECTED RESOURCES EA CHECKLIST .....</b>	<b>2</b>
<b>1.0 INTRODUCTION .....</b>	<b>4</b>
<b>1.1 PURPOSE AND NEED.....</b>	<b>4</b>
<b>1.2 CONFORMANCE WITH APPLICABLE LAND USE PLAN AND OTHER ENVIRONMENTAL ASSESSMENTS .....</b>	<b>5</b>
<b>1.3 LEASING:.....</b>	<b>5</b>
<b>1.4 FEDERAL, STATE OR LOCAL PERMITS, LICENSES OR OTHER CONSULTATION REQUIREMENTS.....</b>	<b>5</b>
<b>2.0 PROPOSED ACTIONS AND ALTERNATIVES.....</b>	<b>5</b>
<b>2.1 ALTERNATIVE A--NO ACTION: .....</b>	<b>5</b>
<b>2.2 ALTERNATIVE B--PROPOSED ACTION:.....</b>	<b>6</b>
<b>2.3 ALTERNATIVE C--FULL LEASE ISSUANCE: .....</b>	<b>6</b>
<b>3.0 DECSCRIPTION OF AFFECTED ENVIRONMENT.....</b>	<b>6</b>
<b>3.1 AIR QUALITY AND CLIMATE CHANGE.....</b>	<b>7</b>
<b>3.1.1 AIR QUALITY.....</b>	<b>7</b>
3.1.2 Climate.....	9
3.1.3 Visibility.....	11
<b>3.2 LANDS WITH WILDERNESS IN CHARACTER.....</b>	<b>13</b>
<b>4.0 ENVIRONMENTAL EFFECTS .....</b>	<b>14</b>
<b>4.1 AIR QUALITY AND CLIMATE CHANGE.....</b>	<b>14</b>
Alternative A: No Action.....	14
Alternative B: Proposed Action .....	15
Alternative C: Full Lease Issuance.....	16
Alternative A: No Action.....	17
Alternative B: Proposed Action .....	17
Alternative C: Full Issuance .....	17
<b>4.3 GREENHOUSE GAS EMISSIONS .....</b>	<b>17</b>
Alternative A: No Action.....	17
Alternative B: Proposed Action .....	18
Alternative C: Full Lease Issuance.....	18
Mitigation.....	20
<b>5.0 CUMULATIVE IMPACTS.....</b>	<b>21</b>
<b>6.0 CONSULTATION/COORDINATION .....</b>	<b>23</b>
<b>7.0 REFERENCES .....</b>	<b>23</b>
<b>8.0 AUTHORITIES .....</b>	<b>24</b>
<b>APPENDIX A .....</b>	<b>25</b>
<b>LEASE PARCEL AS PROPOSED .....</b>	<b>25</b>
<b>APPENDIX B .....</b>	<b>27</b>
<b>PORTION OF LEASE PARCEL TO BE DEFERRED .....</b>	<b>27</b>
<b>APPENDIX C .....</b>	<b>28</b>
<b>MAP OF PROPOSED LEASE .....</b>	<b>28</b>

## Affected Resources EA Checklist

Bureau of Land Management, Cody Field Office  
DOI-BLM-WY-020-EA10-74

November 2010 Lease Review for the Cody Field Office

Determination	Resource	Rationale for Determination
P	Air Quality	No affects associated with leasing. Affects from surface disturbing activities was analyzed in the Cody RMP/FEIS. New information about current air quality in the Bighorn Basin is available.
AA	Areas of Critical Environmental Concern	Chapman Bench – Deferral due to Mountain Plover and/or Curlew
NP	BLM Natural Areas	N/A
AA	Cultural Resources	(Appendix B Items 3, 5, and Summary Restrictions, Pages 61-64, Cody ROD, 11/8/1990)
P	Greenhouse Gas Emissions	No direct greenhouse gas emissions associated with leasing. New information on greenhouse gas emissions available.
NP	Environmental Justice	N/A
NP	Farmlands (Prime or Unique)	N/A
AA	Fish and Wildlife Excluding Federally Listed Species	Timing Lease Stipulations February 1 to July 31 and other Restrictions and Mitigations at locations below: <ul style="list-style-type: none"> <li>• (Appendix B, Item 2, Pages 60-61, Cody Field Office ROD, 11/8/1990).</li> </ul> (Summary of Restrictions or Mitigation Requirements for Surface Disturbing Activities in the Cody RMP Bighorn Basin, Page 63, 65, 66)
NP	Floodplains	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990
NP	Fuels/Fire Management	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990
AA	Geology/Mineral Resources/Energy Production	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990
AA	Hydrologic Conditions	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990
AA	Invasive Species/Noxious Weeds	The Cody Field Office, operates under INPS protocols as set forth in the following documents: Vegetation Treatment on BLM Lands in the Seventeen Western States FEIS and ROD (2007); Management Plan for Invasive Weeds in the Bighorn Basin of Wyoming (WY-010-EA4-34), Executive Order 13112-1999 provides guidance to federal agencies involving INPS; Cooperative agreements with weed and pest control districts: KA051028 (Big Horn County), and AA051026 (Park County).
AA	Lands/Access	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990
AA	Livestock Grazing	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
AA	Migratory Birds	The act of the proposed action (leasing) would have no affect on this resource. Site specific NEPA for proposed surface disturbing activities would further analyze affects and mitigation applied in compliance with the Migratory Bird Species-Interim Management Guidance Policy (included within Instruction Memorandum No. 2008-050)
AA	Native American Religious Concerns	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
AA	Paleontology	The act of the proposed action (leasing) would have no affect on this resource. Impacts from surface disturbing activities was analyzed in the Cody RMP/FEIS, Appendix B. November 8, 1990.

AA	Rangeland Health Standards	
AA	Recreation	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
AA	Socio-Economics	Affects from oil and gas activities was analyzed in the Cody RMP/FEIS.
NP	Soils	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
AA	Threatened, Endangered or Candidate Plant Species	Maintenance Action: IM-WYW-2007-020: Programmatic Biological Agreement (BA) Between the BLM and USFWS regarding the Ute's Ladies Tresses Orchid.
AA	Threatened, Endangered or Candidate Animal Species	Affects from surface disturbing activities was analyzed in the Cody RMP/FEI. New information and policy changes are discussed further in the EA.
NP	Wastes (hazardous or solid)	N/A
NP	Water Resources/Quality (drinking/surface/ground)	Affects from surface disturbing activities was analyzed in the Cody RMP/FEIS with appropriate mitigation measures attached to lease parcels.
AA	Wetlands/Riparian Zones	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
NP	Wild and Scenic Rivers	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
NP	Wilderness/WSA	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
AA	Woodland/Forestry	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
AA	Vegetation Excluding Federally Listed Species	Affects from surface disturbing activities was analyzed in the Cody RMP/FEIS with appropriate mitigation measures attached to lease parcels. In addition, based on site specific NEPA WY Reclamation Policy would be implemented if development were initiated.
AA	Visual Resources	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
NP	Wild Horses and Burros	Affects from surface disturbing activities was analyzed in the Cody Field Office RMP FEIS/ROD, Appendix B. November 8, 1990.
P	Areas with Wilderness Characteristics	Lands containing wilderness characteristics were analyzed, and the results contained in Section 4.2.

DETERMINATION –

NP – Not Present: in the area impacted by the proposed or alternative actions

AA – Already Analyzed: present, but adequately analyzed in RMP/FEIS for leasing actions

P – Present to be analyzed in this EA, not analyzed in RMP/FEIS or new information requires further analysis in this EA

**BUREAU OF LAND MANAGEMENT  
CODY FIELD OFFICE  
ENVIRONMENTAL ASSESSMENT FOR  
NOVEMBER 2010 LEASE SALE REVIEW  
DOI-BLM-WY-020-EA10-74**

## **1.0 INTRODUCTION**

It is the policy of the Bureau of Land Management (BLM) as derived from various laws, including the Mineral Leasing Act of 1920, as amended [30 U.S.C. 181 *et seq.*] and the Federal Land Policy and Management Act of 1976, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

As required by 43 CFR 3120.1-2, the BLM Wyoming State Office conducts a quarterly competitive lease sale to sell available oil and gas lease parcels. A Notice of Competitive Lease Sale, which lists lease parcels to be offered at the auction, is published by the BLM State Office at least 45 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary, based on information available at the time, is made during the land use planning process. Surface management of non-BLM administered land overlaying federal minerals is determined by BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale the BLM-Wyoming State Office sends a draft parcel list to each field office where the parcels are located. Field Office staff then review the legal descriptions of the parcels to determine if they are in areas open to leasing; if appropriate stipulations have been included; if new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted, and if there are special resource conditions of which potential bidders should be made aware. Each Field Office confirms this review by preparing a Documentation of NEPA Adequacy (DNA) which supports BLM's decision that there have been no changed circumstances warranting further NEPA analysis. Once the draft parcel review and DNA is completed and returned to the State Office, a list of available lease parcels and stipulations is made available to the public through a Notice of Competitive Lease Sale (NCLS).

On rare occasions, additional information obtained after the publication of the NCLS, may result in withdrawal of certain parcels prior to the day of the lease sale.

The following Environmental Assessment (EA) documents the Cody Field Office review of the 1 parcel that was nominated. The parcel addressed in this EA is under the administration of the Cody Field Office. It serves to verify conformance with the approved land use plan, addresses new information, and provides the rationale for issuing parcels to be sold during the aforementioned lease sale.

### **1.1 Purpose and Need**

The purpose of this document is to analyze the impacts of issuing a lease for one parcel to be sold at the November 2010 competitive oil and gas lease sale to allow private individuals or companies to explore for and develop oil and gas resources on public lands. BLM has prepared this EA to analyze whether it remains appropriate to issue a lease for this nominated parcel.

The sale and issuance of oil and gas leases is needed to meet the growing energy needs of the United States public. Wyoming is a major source of natural gas for heating and electrical energy production in the lower 48 states, especially for markets in the Eastern United States. Continued sale and issuance of

lease parcels is necessary to maintain options for production as oil and gas companies seek new areas for production or attempt to develop previously inaccessible or uneconomical reserves.

## **1.2 Conformance with Applicable Land Use Plan and Other Environmental Assessments**

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Cody Resource Management Plan and Final Environmental Impact Statement (1990), and the Final Resource Management Plan was approved by a Record of Decision (ROD) signed November 1990.

According to the Cody RMP ROD, “This Resource Management Plan (RMP) provides the management direction for approximately 891,600 acres of public land surface and 1,508,200 acres of federal mineral estate administered by the Bureau of Land Management (BLM) in the Cody Resource Area.

### **1.3 Leasing:**

Analysis as required by the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, USC 4321 *et seq.*) was conducted by Field Office resource specialists who relied on personal knowledge of the areas involved and/or reviewed existing databases and file information to determine if appropriate stipulations had been attached to specific parcels prior to being made available for lease.

It is unknown when, where or if future well sites or roads might be proposed. Detailed site specific analysis of individual wells or roads would occur when a lease holder submits an Application for Permit to Drill (APD).

Issuance of leases would not be in conflict with any local, county, or state plans.

## **1.4 Federal, State or Local Permits, Licenses or Other Consultation Requirements**

Purchasers of oil and gas leases are required to obey all applicable federal, state, and local laws and regulations including obtaining all necessary permits required should lease development occur.

Cody Field Office wildlife biologist reviewed each parcel prior to them being offered for sale. They determined that leasing of all parcels would be in compliance with threatened and endangered species management guidelines as there are no documented T&E species, or their habitats, located within the parcels. No further consultation with the U.S. Fish and Wildlife Service is required at this stage.

## **2.0 PROPOSED ACTIONS AND ALTERNATIVES**

One lease parcel was nominated for the November 2010 sale. This section describes the alternatives considered for analysis.

### **2.1 Alternative A--No Action:**

The BLM NEPA Handbook (H-1790-1) states that for Environmental Assessments (EAs) on externally initiated proposed actions, the No Action Alternative generally means that the proposed action would not take place. In the case of a lease sale, this would mean that an expression of interest to lease (parcel nomination) would be denied or rejected, and a lease would not be issued for that parcel.

Under the No Action alternative, the BLM would not issue the lease that was nominated. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

It is not expected that demand for energy oil and gas will go down, and a decision to not issue this lease would not prevent future leasing in these areas consistent with land use planning decisions, and subject to appropriate stipulations, identified in the Resource Management Plan. Therefore, it is anticipated that this parcel may be nominated and leased at a future date. While future leases may contain more restrictive lease terms, it is reasonable to consider that a substantial portion of the development possible under current planning decisions will be possible under future leases.

## **2.2 Alternative B--Proposed Action:**

Alternative B analyzes the nominated lease parcel to determine if the State Director should issue the lease as modified in light of new resource information. As nominated, the parcel is approximately 849.09 acres. Based upon review, the Cody Field Office recommends the parcel be partitioned; resulting in a deferral of approximately 264.34 acres and the remaining approximate 584.75 acres would be offered for lease. Standard terms and conditions as well as special stipulations would apply. Lease stipulations (as required by Title 43 Code of Federal Registration 3131.3) would be added to the remaining parcel to be leased as identified by the Cody Field Office to address site specific concerns or new information not identified in the land use planning process.

Once sold, the lease purchaser has the right to use so much of the leased lands as is reasonably necessary to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (Title 43 Code of Federal Registration 3101.1-4).

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; ownership of the minerals leased revert back to the federal government and may be leased again.

Before a lease owner or operator conducts any surface disturbing activities on the lease, BLM must first approve an Application for Permit to Drill (APD) and a surface use plan specified in Title 43 Code of Federal Registration 3162.

Surface use restrictions, including timing limitation stipulations (TLS), NSO stipulations, and controlled surface use (CSU) stipulations, as well as unavailable for leasing designations, cannot be retroactively applied to valid, existing oil and gas leases or to valid, existing use authorizations (e.g., Application for Permit to Drill [APD]). Post-lease actions/authorizations (e.g., APDs, road/pipeline ROWs), however, could be encumbered by TLS and CSU restrictions on a case-by-case basis, as required through project-specific NEPA analysis or other environmental review.

## **2.3 Alternative C--Full Lease Issuance:**

Under Alternative C, nominated parcel #175 (approximately 849.09 acres) would be issued with the stipulations recommended at the time of nomination.

## **3.0 DESCRIPTION OF AFFECTED ENVIRONMENT**

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on relevant major resources and issues. Certain critical environmental components require analysis under BLM policy. Only those aspects of the affected environment that are potentially impacted are described in detail.

The proposed lease parcel is located in Park County, Wyoming. This environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Cody Resource Management Plan, November 1990.

In addition to the air quality information in the RMP cited above, new information about GHGs and their effects on national and global climate conditions has emerged since the RMPs were prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes.

This EA incorporates an analysis of the contributions of the proposed action to GHG emissions and a general discussion of potential impacts to climate.

### **3.1 Air Quality and Climate Change**

Air quality and climate are the components of air resources, which include applications, activities, and management of the air resource. Therefore, the BLM must consider and analyze the potential effects of BLM and BLM-authorized activities on air resources as part of the planning and decision making process.

#### **3.1.1 Air Quality**

The U.S. Environmental Protection Agency (EPA) established air quality standards (NAAQS) for criteria pollutants. Criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), and lead (Pb). Air pollutant concentrations greater than the NAAQS represent a risk to human health.

EPA has delegated regulation of air quality to the State of Wyoming and is administered by the Wyoming Department of Environmental Quality. Wyoming Ambient Air Quality Standards (WAAQS) and NAAQS identify maximum limits for concentrations of criteria air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health that, by law, require public safeguards be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive than federal standards, as allowed by the Clean Air Act.

The counties that lie within the jurisdictional boundaries of the Cody Field Office are classified as in attainment of all state and national ambient air quality standards as defined in the Clean Air Act of 1977, as amended. Modeling conducted to date by the WYDEQ does not indicate that air quality is likely to exceed any limits specified by the Clean Air Act in the near future.

Although various state and federal agencies monitor air pollutant concentrations, visibility, and atmospheric deposition throughout Wyoming, at present there are only two air quality monitors near the Cody Field Office boundaries; found in Park County. Table 3.1 lists the available air quality monitoring sites in the Bighorn Basin and relevant sites nearby. The Wyoming Department of Environmental Quality (DEQ) operates a PM<sub>10</sub> monitor as part of the State and Local Monitoring Site (SLAMS) network in Cody, Wyoming (Park County). Additional SLAMS and Special Purpose

Monitoring (SPM) sites operate in nearby counties. Nearby monitoring sites include several IMPROVE monitors and BLM administered sites that are part of the Wyoming Air Resource Monitoring System (WARMS). Atmospheric deposition (wet) measurements of ammonium, sulfate, and various metals are taken at the Sinks Canyon, South Pass and Yellowstone Park sites, which the BLM operates as part of the National Acid Deposition Program (NADP).

**Table 3.1 Available Air Quality Monitoring Sites**

County	Site Name	Type of Monitor	Parameter	Operating Schedule	Location	
					Longitude	Latitude
Park	Cody	SLAMS	PM <sub>10</sub>	1/6	-109.073	44.532
	North Absaroka (managed by USFS)	IMPROVE	PM <sub>2.5</sub> , NO <sub>3</sub> , Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3	-109.382	44.745
Fremont	Lander	SLAMS	PM <sub>2.5</sub>	1/3	-108.733	42.833
Campbell	Thunder Basin	SPM	Ozone, Nitrogen Oxides & Met	Hourly	-105.300	44.672
	Thunder Basin	IMPROVE	PM <sub>2.5</sub> , NO <sub>3</sub> , Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3	-105.287	44.663
Johnson	Buffalo	WARMS	PM <sub>2.5</sub> , NO <sub>3</sub> , Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3 (PM <sub>2.5</sub> ) & 1/7 (others)	-106.019	44.144
	Cloud Peak	IMPROVE	PM <sub>2.5</sub> , NO <sub>3</sub> , Ammonium, Nitric Acid, Sulfate, Sulfur Dioxide & Meteorology	1/3	-106.956	44.333
Sheridan	Sheridan - Highland Park	SLAMS	PM <sub>10</sub> & PM <sub>2.5</sub>	1/3 (PM <sub>10</sub> ); 1/3 & 1/6 (PM <sub>2.5</sub> )	-107.000	44.806
	Sheridan - Police Station	SLAMS	PM <sub>10</sub> & PM <sub>2.5</sub>	1/1 (PM <sub>10</sub> ) & 1/3 & 1/6 (PM <sub>2.5</sub> )	-107.000	44.833
	Sheridan (managed by BLM)	WARMS	PM <sub>2.5</sub> , NO <sub>3</sub> , Ammonium, Nitric Acid, Sulfate & Sulfur Dioxide	1/3 (PM <sub>2.5</sub> ) & 1/7 (others)	-106.847	44.933

Source: REF 6151; REF 6150; REF 6152; REF 6153; REF 6154; REF 6149  
 BLM Bureau of Land Management  
 IMPROVE Interagency Monitoring of Protected Visual Environments  
 NO<sub>3</sub> Nitrate  
 PM Particulate Matter  
 SLAMS State and Local Monitoring Site  
 SPM Special Purpose Monitoring  
 USFS United States Forest Service  
 WARMS Wyoming Air Resource Monitoring System

With only two air quality monitors in the Bighorn Basin (Cody/PM10 and North Absaroka/IMPROVE), it is difficult to accurately assess existing air quality conditions throughout the area. However, as noted above, air quality, visibility, and atmospheric deposition are monitored throughout Wyoming, including adjacent planning areas. Therefore, the BLM assessed recent air quality conditions in the Bighorn Basin by examining data collected at the two monitors in the area, supplemented by various monitors in neighboring planning areas, as summarized in Table 3.2. The examination of these data indicates that the current air quality for criteria pollutants in the Resource area is considered good overall. Based on measurements in the area, visibility in the Resource area is considered excellent.

Table 3.2 Summary of Air Quality in the Big Horn Basin

Pollutant	Averaging Time	NAAQS			WAAQS			Representative Concentrations		
		(ppm)	(ppb)	( $\mu\text{g}/\text{m}^3$ )	(ppm)	(ppb)	( $\mu\text{g}/\text{m}^3$ )	(ppm)	(ppb)	( $\mu\text{g}/\text{m}^3$ )
Carbon Monoxide	1 hour <sup>1</sup>	35	35000	40,000	35	35000	40,000	1.7	1730	1,979
	8 hour <sup>1</sup>	9	9000	10,000	9	9000	10,000	0.8	814	931
Nitrogen Dioxide	Annual <sup>2</sup> (Arithmetic Mean)	0.053	53	100	0.053	53	100	0.002	2	3.4
Ozone	8 hour <sup>3</sup>	0.075	75	147	0.075	75	147	0.078	78	153
PM <sub>10</sub>	24 hour <sup>4</sup>	N/A	N/A	150	N/A	N/A	150	N/A	N/A	91
PM <sub>2.5</sub>	24 hour <sup>5</sup>	N/A	N/A	35	N/A	N/A	65	N/A	N/A	11.7
	Annual <sup>6</sup>	N/A	N/A	15	N/A	N/A	15	N/A	N/A	7.6
Sulfur Dioxide	24 hour <sup>7</sup>	0.140	140	365	0.099	99	260	0.001	0.57	1.48
	Annual <sup>7</sup> (Arithmetic Mean)	0.031	31	80	0.023	23	60	0.0003	0.25	0.66

<sup>1</sup>Not to be exceeded more than once per year. Data collected at Yellowstone National Park during 2005.

<sup>2</sup>Thunder Basin data, 2008.

<sup>3</sup>To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 75 ppb. Measured fourth highest concentration for 2008 for the Thunder Basin site.

<sup>4</sup>Not to be exceeded more than once per year on average over 3 years. Maximum 24-hour average for 2008 at Cody SLAMS site.

<sup>5</sup>To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor in an area must not exceed 35  $\mu\text{g}/\text{m}^3$ . Maximum 24-hour average for 2006 for the North Absaroka IMPROVE site.

<sup>6</sup>To attain this standard, the 3-year average of the weighted annual mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 15.0  $\mu\text{g}/\text{m}^3$ . Annual average for 2008 for the Lander SLAMS site (waiting for new data from North Absaroka).

<sup>7</sup>Maximum 24-hour and annual averages for 2008 for the Sheridan WARMS site.

N/A	Not Applicable	PM <sub>10</sub>	particulate matter less than 10 microns in diameter
NAAQS	National Ambient Air Quality Standards	$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
WARMS	Wyoming Air Resource Monitoring System	ppm	parts per million
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in diameter	ppb	parts per billion
WAAQS	Wyoming Ambient Air Quality Standards		

### 3.1.2 Climate

Climate change refers to any significant change in measures of climate (e.g., temperature or precipitation) lasting for an extended period of time (decades or longer). Climate change may result from natural processes, such as changes in the sun's intensity; natural processes within the climate system (such as changes in ocean circulation); human activities that change the atmosphere's composition (such as burning fossil fuels) and the land surface (such as urbanization) (IPCC 2007).

Greenhouse gases that are included in the US Greenhouse Gas Inventory are: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). CO<sub>2</sub> and methane (CH<sub>4</sub>) are typically emitted from combustion activities or are directly emitted into the atmosphere. On-going scientific research has identified the potential impacts of greenhouse gas emissions (including CO<sub>2</sub>; CH<sub>4</sub>; nitrous oxide (N<sub>2</sub>O), water vapor; and several trace gasses) on global climate. Through complex interactions on at regional and global scales, these greenhouse gas emissions cause a net warming effect of the atmosphere (which making makes surface temperatures suitable for life on Earth), primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although greenhouse gas levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO<sub>2</sub> concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO<sub>2</sub> concentrations also lead to preferential fertilization and growth of specific plant species.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Data indicates that northern latitudes (above 24° N) have exhibited temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970 alone. It also shows temperature and precipitation trends for the conterminous United States. For both parameters we see varying rates of change, but overall increases in both temperature and precipitation. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change.

In 2001, the Intergovernmental Panel on Climate Change indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer model predictions forecasts indicate that increases in temperature will not be evenly or equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures.

Currently, the WDEQ-AQD does not have regulations regarding greenhouse gas emissions, although these emissions are regulated indirectly by various other regulations.

Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The primary greenhouse gases that enter the atmosphere as a result of anthropogenic activities include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These synthetic gases are powerful GHGs that are emitted from a variety of industrial processes.

Ongoing scientific research has identified the potential impacts of anthropogenic greenhouse gas (GHG) emissions and changes in biological sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO<sub>2</sub> concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20<sup>th</sup> century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years. In contrast, black carbon is a relatively short-lived pollutant, as it remains in the atmosphere for only about a week. It is estimated that black carbon is the second greatest contributor to global warming behind CO<sub>2</sub> (Ramanathan and Carmichael, 2008).

The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to air quality due to climate change are

likely to be varied. Several activities occur within the planning area that may generate greenhouse gas emissions: oil, gas, and coal development, large fires, livestock grazing, and recreation using combustion engines which can potentially generate CO<sub>2</sub> and methane.

Some activities within the Planning Area generate greenhouse gas (GHG) emissions. Oil and gas development activities can generate carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). CO<sub>2</sub> emissions result from the use of combustion engines, while methane can be released during processing. Wildland fires also are a source of other GHG emissions, while livestock grazing is a source of methane. Other activities in the Resource Area with the potential to contribute to climate change include soil erosion from disturbed areas and fugitive dust from roads, which have the potential to darken snow-covered surfaces and cause faster snow melt. A description of the potential greenhouse gas emissions associated with the proposed leasing activities is included in Section 4.

**Table 3.3 Climate data for Cody**

Climate Component	Cody, WY
Mean maximum summer temperatures (June, July, August)(degrees Fahrenheit)	75.6; 82.9, 81.4
Mean minimum winter temperatures (December, January, February, degrees Fahrenheit)	16.7; 14.5; 18.9
Mean annual temperature (degrees Fahrenheit)	46.2
Mean annual precipitation (inches)	9.95
Mean annual snowfall (inches)	39.7
Mean annual wind speed (miles per hour)	7.7
Prevailing wind direction	Northerly/Westerly

### 3.1.3 Visibility

There are several National Parks, National Forests, recreation areas, and wilderness areas in or adjacent to the Big Horn Basin. Table 3.4 lists areas designated as Class I or Class II airsheds. National Parks, Monuments and some state designated Wilderness Areas are designated as Class I. The Clean Air Act “declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas . . . from manmade air pollution.” 42 U.S.C. § 7491(a)(1).25. Under the BLM Manual Section 8560.36, BLM lands, including wilderness areas not designated as Class I, are managed as Class II, which provides that moderate deterioration of air quality associated with industrial and population growth may occur.

**Table 3.4 Class I or Class II areas**

<b>Area Type</b>	<b>Area Name</b>	<b>Closest Distance to the Big Horn Basin (miles)</b>	<b>Direction from the Big Horn Basin</b>	<b>Clean Air Act Status of the Area</b>
National Park	Wind Cave National Park	200	East	Class I
	Yellowstone National Park	Adjacent	West	Class I
Recreation Area	Bighorn Canyon National Recreation Area	In		Class II
Wilderness Area	Cloud Peak Wilderness Area	In		Class II
	North Absaroka Wilderness Area	In		Class I
	Washakie Wilderness Area	In		Class I
	Fitzpatrick Wilderness Area	30	Southwest	Class I
	Popo Agie Wilderness Area	50	South	Class II
	Bridger Wilderness Area	35	Southwest	Class I
	Teton Wilderness Area	Adjacent	Southeast	Class II
National Forest	Bighorn National Forest	In		Class II
	Thunder Basin National Grassland	75	East	Class II

Estimates of visibility in the Big Horn Basin are primarily derived from air quality and meteorological measurements taken at the North Absaroka IMPROVE site. To supplement these measurements, the BLM used recent data collected at the nearby Cloud Peak IMPROVE monitor to assess regional visibility conditions.

Figure 3.2 shows visibility estimates for the North Absaroka site for 2002 through 2006. The data indicate excellent visibility conditions, with no real trends in this limited period. Figure 3.3 shows visibility data for the Cloud Peak IMPROVE site for 2003 through 2007. The data for the Cloud Peak site are consistent with the North Absaroka site, reflecting excellent visibility conditions.

Figure 3.2 Annual Visibility (SVR) for the North Absaroka IMPROVE site

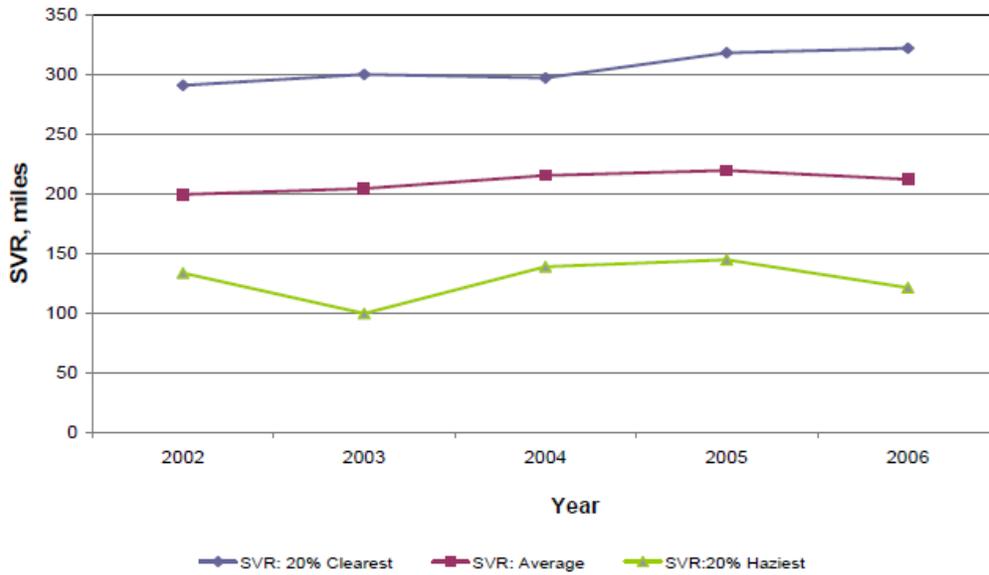
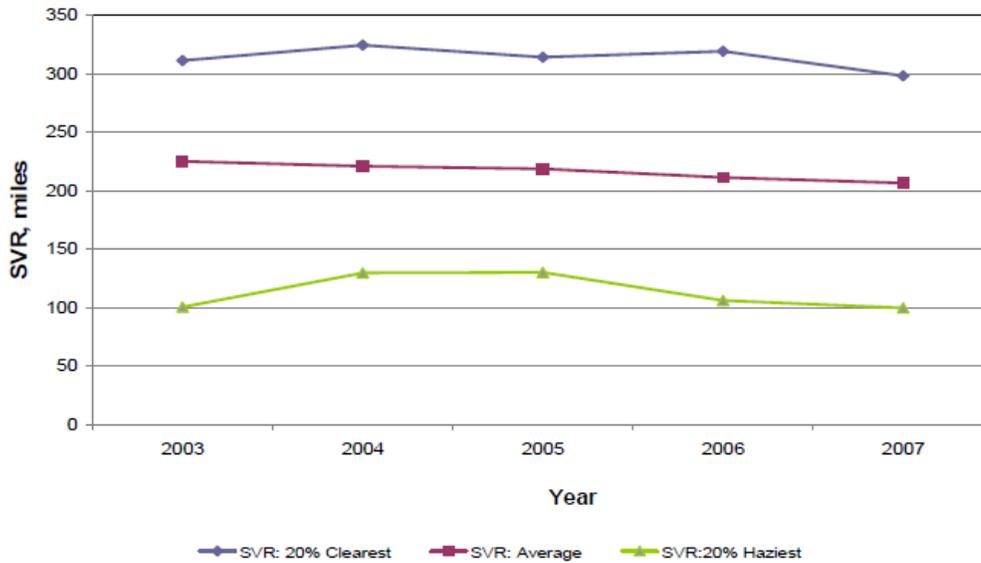


Figure 3.3 Annual Visibility (SVR) for the Cloud Peak IMPROVE site



### 3.2 Lands with Wilderness in Character

As part of the current planning effort, the Cody Field Office performed an inventory of lands in the Resource area in 2009 to determine if any BLM-administered lands had wilderness characteristics. Wilderness characteristics are resource values that include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations of sufficient size (approximately 5,000 acres) to be practical to manage for these characteristics. Smaller areas are considered if they are contiguous with designated Wilderness or WSAs, or in rare circumstances, are of a manageable size in accordance with FLPMA.

The BLM Land Use Planning Handbook (H-1601-1) states that the BLM must consider the management of lands with wilderness characteristics during the land use planning process. The criteria used to identify

these lands are essentially the same criteria used for determining wilderness characteristics for WSAs. However, the authority set forth in Section 603(a) of FLPMA to complete the three-part wilderness review process (inventory, study, and report to Congress) expired on October 21, 1993; therefore, FLPMA does not apply to new WSA proposals and consideration of new WSA proposals on BLM-administered public lands is no longer valid. The BLM is still required to inventory lands to determine whether they possess wilderness characteristics.

As the basis for the 2009 inventory, the BLM reviewed comments made during public scoping for the Bighorn Basin RMP revision, and recommendations developed during an internal review of multiple-use lands in the Resource area. In addition, the lands considered included areas recommended as part of the “Wilderness at Risk: Citizens’ Wilderness Proposal for Wyoming BLM-administered Lands” submitted to the BLM by the Wyoming Wilderness Association in February 2004. The Citizens’ Wilderness Proposal promoted the designation of approximately 1.1 million acres of BLM-administered lands for wilderness statewide, of which approximately 283,709 acres are in the Resource area. In addition to the Citizens’ Wilderness Proposal, the BLM considered a Biodiversity Conservation Alliance proposal for a formal wilderness inventory of lands in the McCullough Peaks area.

The BLM analyzed the areas with potential for wilderness characteristics to determine which, if any, lands met the definition. As part of the analysis, the BLM evaluated whether the areas were of a sufficient size, were in a natural condition, possessed outstanding opportunities for solitude, and presented opportunities for primitive and unconfined recreation. The inventory identified 13 areas in the Resource area. The final evaluation forms are available for public review at the CYFO.

At present, no specific management has been developed for these areas.

### **3.3 Sage-grouse**

Version 3 for Sage-grouse core area screening was used for this lease parcel. In the screening it was determined there were no Sage-grouse leks and the nominated parcel was not within the Version 3 core area. Therefore, Sage-grouse will no longer be evaluated in this EA.

## **4.0 ENVIRONMENTAL EFFECTS**

### **4.1 Air Quality and Climate Change**

#### **Alternative A: No Action**

Under the no action alternative no development would occur. Due to demand for oil and gas, it is expected that this parcel may be re-nominated in the future; consistent with appropriate land use planning decisions, and would be offered for sale with additional stipulations. There is no way to accurately predict what level of restrictions future leasing may require, but it can be assumed that a substantial portion of the development that would have been authorized under the leases currently sold would still be permitted under future leases. Nominations of parcels for lease under future land use plans and decisions would be screened for consistency with the land use plan in effect at the time, and the appropriate environmental analysis would be conducted to determine associated air quality impacts. Impacts to air quality from leases issued from any future sales would be analyzed in the appropriate environmental documents for those sales. Analysis of air quality impacts is also required at the time an application for a permit to drill is submitted.

A decision to not issue the lease for nominated parcel would support continued current uses of these parcel. These uses are primarily associated with grazing, with some dispersed recreation such as hunting and hiking. These uses typically entail vehicle travel for access, and would be expected to continue at current rates.

### **Alternative B: Proposed Action**

Issuing the subject lease would have no direct impacts to air quality. Any potential effects to air quality would occur if and when the lease was developed. Alternative B analyzes the nominated lease parcel to determine if the State Director should issue the lease as modified in light of new resource information. This would include issuing a portion of parcel #175 as nominated containing approximately 584.75 acres administered by the Cody Field Office; and modifying the nomination boundary of the parcel, thereby deferring approximately 264.34 acres. Standard terms and conditions as well as special stipulations would apply. Lease stipulations (as required by Title 43 Code of Federal Registration 3131.3) would be added to the remaining parcel to be leased as identified by the Cody Field Office to address site specific concerns or new information not identified in the land use planning process.

The parcel for Alternative C, as modified, is listed in Appendix B with the parcel number, acreage, lease number, location and stipulations.

Potential impacts of development could include increased air borne soil particles associated with the construction of new well pads, pipelines, or roads, exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, as well as potential releases of GHG and volatile organic compounds during drilling or production activities. The amount of increased emissions cannot be quantified at this time since it is unknown how many wells might be drilled, the types of equipment needed if a well were to be completed successfully (e.g. compressor, separator, dehydrator), or what technologies may be employed by a given company for drilling any new wells. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs. Emissions of all regulated pollutants (including GHGs) and their impacts will be quantified and evaluated at the time that a specific development project is proposed.

In May 2009, the BLM Wyoming State Office Reservoir Management Group produced a draft Reasonably Foreseeable Development Scenario for Oil and Gas (RFD) document for the Cody Field Office Planning Area RMP revision. This document demonstrates that approximately 1,865 conventional wells and 150 coalbed natural gas wells could be drilled between 2008 and 2027 on Federal minerals within the Bighorn Basin planning area. As many as 175 of the conventional wells could be deep wells (greater than 15,000 feet in depth) located in the central portion of the Bighorn Basin. (The petroleum resources specific to these leases in the Proposed Action are not known whether they are gas or oil or a combination thereof; however the RFD does indicate that they have very low or no potential for CBNG development). The absolute density of drilling depends upon the technology available (vertical, directional, or horizontal) and the geology of the hydrocarbon-bearing zone. As a result, it is unknown the specific numbers of wells that could potentially be drilled under a full field development scenario as a result of issuing the leases. However, the RFD takes these assumptions into account, and on a Field Office wide basis, is still valid.

Subsequent development of any leases issued, would contribute a small incremental increase in overall hydrocarbon emissions, including GHGs. When compared to total national or global emissions, the amount released as a result of potential production from the proposed lease tracts would not have a measurable effect.

#### **GREENHOUSE GASES PREFERRED ALTERNATIVE:**

The issuance of leases in itself would not result in any direct greenhouse gas emissions. However, in regard to future development, the assessment of GHG emissions and climate change is in its formative phase. While it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing, some general assumptions however can be made: issuing the proposed tracts may contribute to drilling new wells.

The Center for Climate Strategies (CCS) prepared the Wyoming Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Inventory) for the Wyoming Department of Environmental Quality (WYDEQ) through an effort of the Western Regional Air Partnership (WRAP). This inventory report presents a preliminary draft greenhouse gas (GHG) emissions inventory and forecast from 1990 to 2020 for Wyoming. This report provides an initial comprehensive understanding of Wyoming's current and possible future GHG emissions. The information presented provides the State with a starting point for revising the initial estimates as improvements to data sources and assumptions are identified.

The inventory report discloses that activities in Wyoming accounted for approximately 56 million metric tons (MMt) of *gross* carbon dioxide equivalent (CO<sub>2</sub>e) emissions in 2005, an amount equal to 0.8% of total US gross GHG emissions. These emission estimates focus on activities in Wyoming and are *consumption-based*; they exclude emissions associated with electricity that is exported from the State. Wyoming's gross GHG emissions increased 25% from 1990 to 2005, while national emissions rose by only 16% from 1990 to 2004. Annual sequestration (removal) of GHG emissions due to forestry and other land-uses in Wyoming are estimated at 36 MMtCO<sub>2</sub>e in 2005. Wyoming's per capita emission rate is more than four times greater than the national average of 25 MtCO<sub>2</sub>e/yr. This large difference between national and State per capita emissions occurs in most of the sectors – Wyoming's emission per capita significantly exceed national emissions per capita for the following sectors: electricity, industrial, fossil fuel production, transportation, industrial process and agriculture. The reasons for the higher per capita intensity in Wyoming are varied but include the State's strong fossil fuel production industry and other industries with high fossil fuel consumption intensity, large agriculture industry, large distances, and low population base. Between 1990 and 2005, per capita emissions in Wyoming have increased, mostly due to increased activity in the fossil fuel industry, while national per capita emissions have changed relatively little.

Wyoming's gross GHG emissions are expected to continue to grow to 69 MMtCO<sub>2</sub>e by 2020, 56% above 1990 levels. As shown in Figure ES-3 of the Inventory, demand for electricity is projected to be the largest contributor to future emissions growth, followed by emissions associated with transportation. Although GHG emissions from fossil fuel production had the greatest increase by sector in the period 1990 to 2005, the growth from this sector is projected to decline due to assumption of decreased carbon dioxide emissions from venting at processing plants.

As of 2008, the Inventory indicates that there over 33,000 oil and gas wells in the State.

There are approximately 2,900 existing Federal oil and gas wells in the Cody Field Office, which account for approximately 8 percent of the total Federal wells in Wyoming. Therefore, GHG emissions from all wells within the field office amount to approximately 1.57 metric tons annually (mt) (19.6 mt X 0.08 = 1.568 mt) assuming steady production and emission venting.

Based on this emission factor, each potential well that may be drilled on these parcels, if issued, could emit approximately 0.00059 mt of CO<sub>2</sub>e. It is unknown what the drilling density may be for these parcels, if they were to be developed; therefore, it is impossible to predict what level of emissions could occur from development at this stage under the proposed action.

### **Alternative C: Full Lease Issuance**

Under this alternative, the lease would be issued with the stipulations attached at the time of nomination. However, due to the larger acreage under this Alternative potentially subject to surface disturbing activities, drilling and production, the potential for impacts are similar to, but have a higher probability of occurring in larger amounts, as under Alternative B.

## 4.2 Lands with Wilderness Characteristics

### Alternative A: No Action

In the No-Action Alternative, this lease would not be issued. Management of these areas with wilderness characteristics would be preserved for analysis and decision in an appropriate planning document. Future leasing decisions would be consistent with that document.

### Alternative B: Proposed Action

An inventory of areas identified as containing wilderness characteristics was performed in the Cody Field Office in 2009. No wilderness in character lands were identified for this parcel. As a result, a portion of this parcel lies with an area where CYFO is considering new management objectives in the Bighorn Basin RMP revision alternatives. Alternative B analyzes the nominated lease parcel to determine if the State Director should issue the lease as modified in light of new resource information. This would include issuing a portion of parcel #175 as nominated containing approximately 584.75 acres administered by the Cody Field Office; and modifying the nomination boundary of the parcel, thereby deferring approximately 264.34 acres. Standard terms and conditions as well as special stipulations would apply. Lease stipulations (as required by Title 43 Code of Federal Registration 3131.3) would be added to the remaining parcel to be leased as identified by the Cody Field Office to address site specific concerns or new information not identified in the land use planning process.

The parcel for Alternative C, as modified, is listed in Appendix B with the parcel number, acreage, lease number, location and stipulations.

Under this alternative, one lease would be issued as nominated, and a deferral of issuance of a portion of lease parcel, containing approximately 264.34 acres of lands would be deferred until management direction could be instituted in the RMP Record of Decision. If the decision was made not to issue the lease, this parcel would not be subject to development but could potentially be made available at another time.

### Alternative C: Full Issuance

Under this alternative, the lease would be issued with the stipulations as detailed in Appendix A. However, due to the larger acreage under this Alternative potentially subject to surface disturbing activities, the potential for impacts are similar to, but have a higher probability of occurring, as under Alternative B. Regardless, issuance of the lease, especially due to a portion of the lease being in an area containing wilderness characteristics could cause adverse environmental impacts and preclude alternative formulation under the Bighorn Basin RMP revision which could potentially violate NEPA policy.

## 4.3 Greenhouse Gas Emissions

### Alternative A: No Action

A decision to not issue the lease would preclude oil and gas development that could contribute greenhouse gas emissions from this lease. However, as discussed previously under the no action alternative, this would not preclude future nomination, leasing, and development consistent with land use planning decisions at that time. Based on demand for oil and gas, it is expected that this parcel would be nominated in the future; consistent with appropriate land use planning decisions, and would be offered for sale with appropriate stipulations. There is no way to accurately predict what level of restrictions future leasing may require, but it can be assumed that a substantial portion of the development that would have been authorized under the leases currently sold would still be permitted under future leases. This would result in a postponement of development, and the possibility of the development occurring with increased restriction on greenhouse gas emissions. The levels and types of restrictions would be determined at the time of lease, and submittal of development activities for approval, but are expected to allow for at least moderate development of areas open to leasing. Therefore, the no-action alternative would likely delay,

and not prevent, greenhouse gas emissions. The no-action alternative may also result in reduced levels of emissions associated with future expanded restrictions.

See Section 5.0 for a discussion of the impacts of these potential greenhouse gas emissions on global climate change.

### **Alternative B: Proposed Action**

Alternative B analyzes the nominated lease parcel to determine if the State Director should issue the lease as modified in light of new resource information. This would include issuing a portion of parcel #175 as nominated containing approximately 584.75 acres administered by the Cody Field Office; and modifying the nomination boundary of the parcel, thereby deferring approximately 264.34 acres. Standard terms and conditions as well as special stipulations would apply. Lease stipulations (as required by Title 43 Code of Federal Registration 3131.3) would be added to the remaining parcel to be leased as identified by the Cody Field Office to address site specific concerns or new information not identified in the land use planning process.

The parcel for Alternative C, as modified, is listed in Appendix B with the parcel number, acreage, lease number, location and stipulations.

See Section 5.0 for a discussion of the impacts of these potential greenhouse gas emissions on global climate change.

### **Alternative C: Full Lease Issuance**

The issuance of leases in itself would not result in any direct greenhouse gas emissions. However, in regard to future development, the assessment of GHG emissions and climate change is in its formative phase. While it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing, some general assumptions however can be made: issuing the proposed tracts may contribute to drilling new wells.

The Center for Climate Strategies (CCS) prepared the Wyoming Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Inventory) for the Wyoming Department of Environmental Quality (WYDEQ) through an effort of the Western Regional Air Partnership (WRAP). This inventory report presents a preliminary draft greenhouse gas (GHG) emissions inventory and forecast from 1990 to 2020 for Wyoming. This report provides an initial comprehensive understanding of Wyoming's current and possible future GHG emissions. The information presented provides the State with a starting point for revising the initial estimates as improvements to data sources and assumptions are identified.

The inventory report discloses that activities in Wyoming accounted for approximately 56 million metric tons (MMt) of *gross* carbon dioxide equivalent (CO<sub>2</sub>e) emissions in 2005, an amount equal to 0.8% of total US gross GHG emissions. These emission estimates focus on activities in Wyoming and are *consumption-based*; they exclude emissions associated with electricity that is exported from the State. Wyoming's gross GHG emissions increased 25% from 1990 to 2005, while national emissions rose by only 16% from 1990 to 2004. Annual sequestration (removal) of GHG emissions due to forestry and other land-uses in Wyoming are estimated at 36 MMtCO<sub>2</sub>e in 2005. Wyoming's per capita emission rate is more than four times greater than the national average of 25 MtCO<sub>2</sub>e/yr. This large difference between national and State per capita emissions occurs in most of the sectors – Wyoming's emission per capita significantly exceed national emissions per capita for the following sectors: electricity, industrial, fossil fuel production, transportation, industrial process and agriculture. The reasons for the higher per capita intensity in Wyoming are varied but include the State's strong fossil fuel production industry and other

industries with high fossil fuel consumption intensity, large agriculture industry, large distances, and low population base. Between 1990 and 2005, per capita emissions in Wyoming have increased, mostly due to increased activity in the fossil fuel industry, while national per capita emissions have changed relatively little.

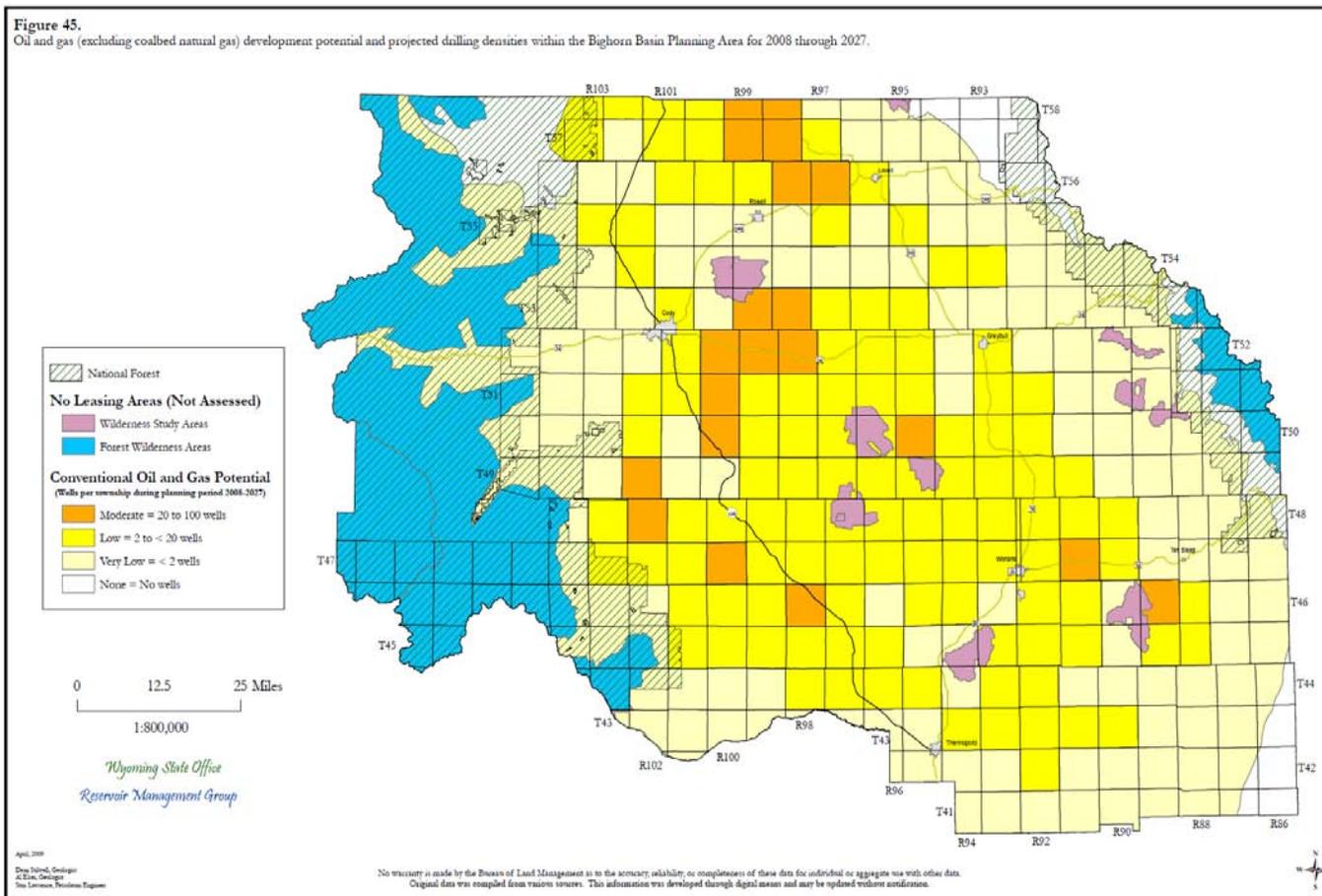
Wyoming's gross GHG emissions are expected to continue to grow to 69 MMtCO<sub>2</sub>e by 2020, 56% above 1990 levels. As shown in Figure ES-3, demand for electricity is projected to be the largest contributor to future emissions growth, followed by emissions associated with transportation. Although GHG emissions from fossil fuel production had the greatest increase by sector in the period 1990 to 2005, the growth from this sector is projected to decline due to assumption of decreased carbon dioxide emissions from venting at processing plants.

As of 2008, the Inventory indicates that there over 33,000 oil and gas wells in the State.

There are approximately 2,900 existing Federal oil and gas wells in the Cody Field Office, which account for approximately 8 percent of the total Federal wells in Wyoming. Therefore, GHG emissions from all wells within the field office amount to approximately 1.57 metric tons annually (mt) ( $19.6 \text{ mt} \times 0.08 = 1.568 \text{ mt}$ ) assuming steady production and emission venting.

Areas defined as having Moderate Potential for Oil and Gas development in the May 2009 Draft Reasonably Foreseeable Development (RFD) Scenario Document produced by the WY State Office Reservoir management Group for the Bighorn Basin RMP revision process, estimate an average of 20 to 100 wells per township. Additionally, in the Low Potential area, it is estimated an average of 2 to <20 well per township. The potential number of wells to be drilled per township in these areas is shown above in Figure 45 taken from the May 2009 draft RFD Scenario document.

**Figure 45.** Oil and gas (excluding coalbed natural gas) development potential and projected drilling densities within the Bighorn Basin Planning Area for 2008 through 2027.



See Section 5.0 for a discussion of the impacts of these potential greenhouse gas emissions on global climate change.

### Mitigation

The BLM holds regulatory jurisdiction over portions of natural gas and petroleum systems, identified in the EPA Inventory of US Greenhouse Gas Emissions and Sinks document. Exercise of this regulatory jurisdiction has led to development of “Best Management Practices (BMPs)” designed to reduce emissions from field production and operations. Analysis and approval of future development on the lease parcels would include applicable BMPs as conditions of approval (COAs) in order to reduce or mitigate GHG emissions. Additional measures developed at the project development stage would be incorporated as COAs in the approved APD or with a programmatic EIS, which are binding on the operator.

Such mitigation measures may include, but are not limited to:

- Flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion through the use of multi-chamber combustors;

- “Green” (flareless) completions,

- Water dirt roads during periods of high use in order to reduce fugitive dust emissions;

- Require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored;

- Installation of liquids gathering facilities or central production facilities to reduce the total number of sources and minimize truck traffic,

- Use of natural gas fired or electric drill rig engines,

- The use of selective catalytic reducers on diesel-fired drilling engines; and,

- Re-vegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads.

The EPA Inventory data show that adoption by industry of the Best Management Practices proposed by the EPA's Natural Gas Energy Star program has reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). The Cody Field Office will work with industry to facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

## 5.0 Cumulative Impacts

There are approximately 2,900 Federal producing wells in the Cody Field Office, which are predominately oil and gas production wells.

Analysis of cumulative impacts for reasonably foreseeable development (RFD) of oil and gas wells on public lands in the Cody Field Office is presented in the 1990 Cody Resource Management Plan (RMP). Potential development of all available federal minerals in the field office, including those in the proposed lease parcel, was included as part of the analysis.

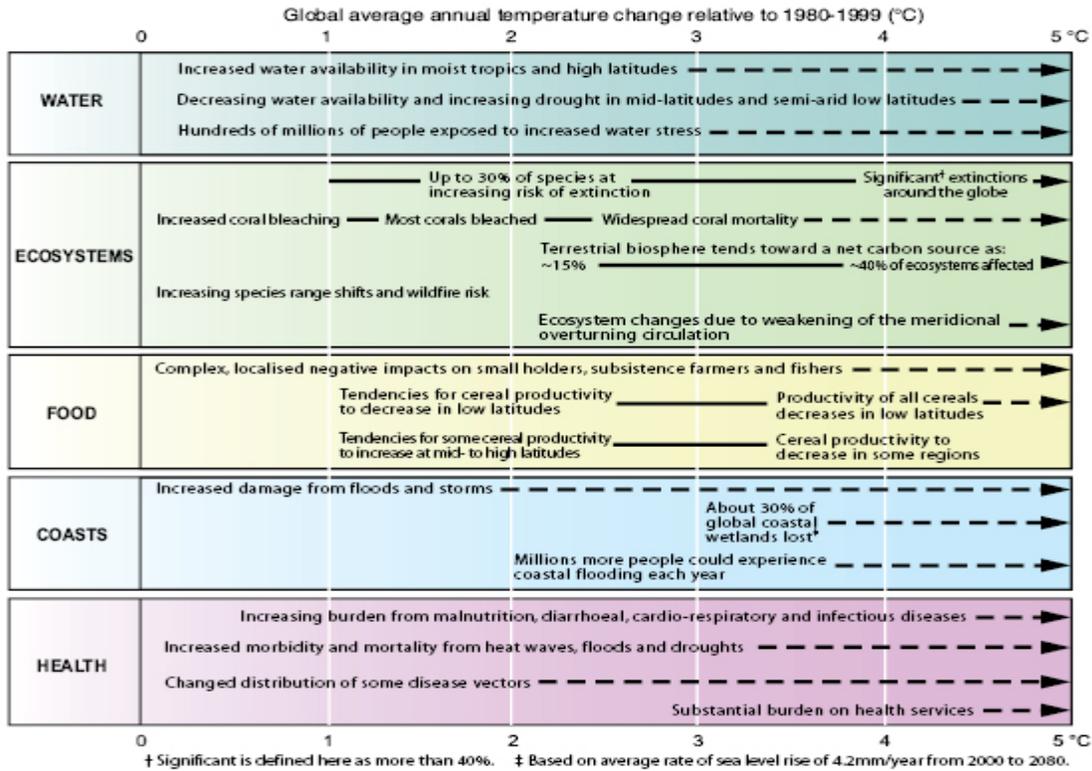
As described in the analysis of environmental consequences, the proposed action and/or the alternative may contribute to the effects of climate change to some extent through GHG emissions. However, it is not currently possible to associate any of these particular actions with the creation of any specific climate-related environmental effects. The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts.

The assessment of greenhouse gas (GHG) emissions and climate change is still in its formative phase; therefore, it is not yet possible to know with confidence the net impact on climate. However, the Intergovernmental Panel on Climate Change (IPCC 2007) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations.” As the temperatures of the land and sea change, environmental factors such as weather patterns, sea levels, precipitation rates, the timing of the seasons, desert distribution, forest cover, and ocean salinity will also change. These changes influence the world’s climate systems and will have different impacts to different areas. Some agricultural regions may become more arid while others become wetter; some mountainous areas will experience greater summer precipitation, yet experience disappearing snowpack.

The average number of oil and gas wells drilled annually in the Field Office and probable GHG emission levels, when compared to the total GHG emission estimates from the total number of Federal oil and gas wells in the State, represent an incremental contribution to the total regional and global GHG emission levels. This incremental contribution to global GHG gases cannot be translated into incremental effects on climate change globally or in the area of these site-specific actions. As oil and gas production technology continues to improve in the future, one assumption is that it may be feasible to further reduce GHG emissions.

Based on research compiled for the International Panel on Climate Change Fourth Assessment Report, 2007, potential effects of climate change on resources in the affected environment are likely to be varied. Figure 4.1, taken from the Fourth Assessment Report indicates varying responses of the natural world to increasing temperatures as a result of increasing global temperatures.

Figure 4.1: Examples of impacts associated with global average temperature change (Impacts will vary by extent of adaptation, rate of temperature change and socio-economic pathway)



Within North America, the report specifically forecasts that: Warming in western mountains is projected to cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources; in the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20%, but with important variability among regions; major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources; cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts and coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Specific modeling and/or assessments of the potential effects for the Cody Field Office and for the State of WY currently do not exist.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) pointed out that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels (IPCC 2007). The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer model forecasts indicate that increases in temperature will not be evenly or equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures.

Regarding the linkage between climate change related warming and associated impacts, an assessment of the IPCC states that difficulties remain in attributing observed temperature changes at smaller than continental scales. Therefore, it is currently beyond the scope of existing science to predict climate change on regional or local scales resulting from specific sources of GHG emissions. Emissions of all

regulated pollutants (including GHGs) and their impacts will be quantified and evaluated at the time that a specific development project is proposed.

IPCC also discloses that significant uncertainties remain with respect to the estimates of the current level of emissions and projections of future production of fossil fuels as the oil and gas industry is difficult to forecast with the mix of drivers: economics, resource supply, demand, and regulatory procedures. The assumptions used for the projections, based on recent trends or State production trends in the near-term, and AEO2006 growth rates through 2020, do not include any significant changes in energy prices, relative to today's prices. Large price swings, resource limitations, or changes in regulations could significantly change future production and the associated GHG emissions. Other uncertainties include the volume of GHGs vented from gas processing facilities in the future, any commercial oil shale or coal-to-liquids production, and potential emissions-reducing improvements in oil and gas production, processing, and pipeline technologies.

Based on a 0.00059 mt/well emission factor, an RFD of 20 - 100 wells drilled and produced per year would result in approximately 0.0118 – 0.059 mt of CO<sub>2</sub>e, potentially being added to the current levels associated with oil and gas development in the Buffalo Field Office. It is unknown what the drilling density may be for these parcels, if they were to be developed; therefore, it is impossible to predict what level of emissions could occur from development at this stage under the proposed action. Additionally, this assumes that each well produces at the same volumes, with the same emission factor. Coalbed methane wells, due to higher methane content, may emit greenhouse gas emissions at a higher or lower level than convention oil and gas wells.

There are currently no proposals for renewable energy projects in the Cody Field Office that could potentially contribute additional GHG emissions.

## 6.0 Consultation/Coordination

Cody Field Office BLM Staff  
David Seward, Natural Resource Specialist

Wyoming State Office BLM Staff  
Christopher Carlton, Planning and Environmental Coordinator  
Merry Gamper, Physical Scientist

## 7.0 References

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U.S. Department of the Interior, Bureau of Land Management. 1990. Cody Resource Management Plan and Final Environmental Impact Statement. Cody, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 1990. Cody Approved Resource Management and Plan Record of Decision. Cody, Wyoming.

## **8.0 Authorities**

Code of Federal Regulations (CFR) 3100

40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of July 1, 2001.

43 CFR, All Parts and Sections inclusive - Public Lands: Interior. Revised as of October 1, 2000.

U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.

# APPENDIX A

## Lease Parcel as Proposed

WY-1011-175 849.090 Acres  
T.0482N, R.1030W, 06th PM, WY  
Sec. 033 LOTS 1;  
034 LOTS 1-4;  
035 LOTS 1-4;  
T.0490N, R.1030W, 06th PM, WY  
Sec. 034 LOTS 1,3,4,8-11;  
034 NENE,E2SE;  
035 LOTS 4,5;  
035 NWNW,SW;

Park County

Cody FO

Formerly Lease No.

Stipulations:

Lease Notice No. 1

Lease Notice No. 2

Lease Notice No. 3

Special Lease Stipulation

TLS (1) May 1 to Jun 30; (2) as mapped on the Cody Field Office GIS database; (3) protecting big game during parturition.

TLS (1) Nov 15 to Apr 30; (2) as mapped on the Cody Field Office GIS database; (3) protecting big game on crucial winter range.

TLS (1) Feb 1 to Jul 31; (2) as mapped on the Cody Field Office GIS database; (3) protecting nesting Raptors.

CSU (1) Surface occupancy or use within the Carter Mountain Area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Cody Field Office GIS database; (3) protecting steep slopes, visual resources, recreational, watershed, cultural, and wildlife values.

CSU (1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Cody Field Office GIS database; (3) protecting Class I and/or Class II Visual Resource Management Areas.

CSU (1) The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation; (2) as mapped on the Cody Field Office GIS database; (3) protecting *Ursus arctos horribilis* (Grizzly bear).

CSU (1) Surface occupancy or use within 500' of surface water and(or)riparian areas will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Cody Field Office GIS database; (3) protecting watershed, water quality, and riparian-aquatic habitat.

CSU (1) Surface occupancy or use may be restricted or prohibited if paleontological sites exist unless paleontological sites are avoided or the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts; (2) as mapped on the Cody Field Office GIS database; (3) protecting significant Bighorn Basin paleontological resources.

TLS (1) May 1 - June 30; (2) as mapped on the Cody Field Office GIS database; (3) Protecting elk calving areas.

CSU (1) Surface-disturbing and other disruptive activities will be controlled to avoid or mitigate adverse effects on about 1,300 acres of active prairie dog colonies within the area identified as black-footed ferret essential habitat. This requirement will remain in effect until completion of a site-specific activity plan being prepared to manage ferrets in this area. The restriction will then be reassessed for its continued appropriateness. This restriction applies to such things as leasable minerals exploration and development, geophysical exploration (except casual use), and construction activities; (2) as mapped on the Cody Field Office GIS database; (3) protecting black-footed ferret essential habitat.

TLS (1) Nov. 15 - April 30; (2) as mapped on the Cody Field Office GIS database; (3) Protecting important big game winter range.

## APPENDIX B

### Portion of Lease Parcel to be Deferred

T.0490N, R.1030W, 06th PM, WY  
Sec. 034 LOTS 1,3,4,8-10;  
034 NENE;  
035 NWNW.

# APPENDIX C

## Map of Proposed Lease

