

**ENVIRONMENTAL ASSESSMENT  
MT-020-2008-310**

**for**

**Fidelity Exploration & Production Company  
Coal Bed Natural Gas**

**Tongue River - Deer Creek North Federal Project**

**Big Horn County, Montana**

**Prepared by:**

Bureau of Land Management  
Miles City Field Office

In cooperation with  
Montana Department of Environmental Quality

**September 2008**

# TABLE OF CONTENTS

Summary .....	iv
Glossary .....	vi
Abbreviations/Acronyms .....	viii
Chapter 1, Purpose of and Need for Action .....	1-1
Introduction .....	1-1
Purpose of and Need for Action .....	1-1
Conformance with the Applicable Land Use Plans .....	1-1
Decisions Required .....	1-2
Issue Identification .....	1-6
Federal, State and Local Permits or Required Consultation .....	1-6
Chapter 2, Alternatives Including the Proposed Action .....	2-1
Introduction .....	2-1
Development of Alternatives .....	2-1
Description of Alternatives .....	2-1
Cumulative Actions .....	2-9
Preferred Alternative Identification .....	2-13
Comparison of Alternatives .....	2-13
Chapter 3, Affected Environment .....	3-1
Introduction .....	3-1
Air Quality .....	3-1
Cultural Resources .....	3-5
Geology and Minerals .....	3-12
Hydrology .....	3-15
Indian Trust and Native American Concerns .....	3-24
Lands and Realty .....	3-24
Livestock Grazing .....	3-24
Recreation and VRM .....	3-24
Social and Economic Conditions .....	3-25
Soils .....	3-25
Vegetation .....	3-28
Wildlife and Fisheries/Aquatics .....	3-29
Chapter 4, Environmental Consequences .....	4-1
Introduction .....	4-1
Effects from Alternative A – No Action .....	4-1
Effects from Alternative B – Proposed Action .....	4-5
Effects from Alternative C – Agencies Preferred Alternative .....	4-35
Chapter 5, Consultation and Coordination .....	5-1
Preparers and Responsibility .....	5-1
Document Review .....	5-1
List of Agencies and Persons Consulted .....	5-2
References .....	5-3
<b>Appendices</b>	
A List of Proposed Well Locations .....	1
B Special Status Species Affects Determinations Summary Tables .....	3
C Social and Economic Assumptions .....	8
D POD Legal Descriptions .....	9
E Interim Procedures for Processing Coal Bed Natural Gas Applications .....	10
F Hydrology .....	12

G	Alternatives C Additional Mitigating Measures .....	19
H	Oil & Gas Lease Stipulations.....	25
I	Deer Creek North Federal Project Public Comment and Response .....	26

**Tables**

1.5-1	Emission Inventory – MAQP Determination – Exploration .....	1-7
2.3.2-1	Future Rate of CBNG Drilling .....	2-12
2.5-1	Fidelity Deer Creek North Federal Project – Comparison of Alternatives.....	2-14
2.5-2	Fidelity Deer Creek North Federal Project – Summary Comparison of Effects .....	2-19
3.0-1	Critical Elements Requiring Mandatory Evaluation .....	3-1
3.1-1	Summary of Existing Air Quality and Climate in the CX Field Region .....	3-1
3.1-2	National and Montana Ambient Air Quality Standards .....	3-3
3.2.3.1-1	Site and Impact Table Deer Creek North POD Inventory Area .....	3-8
3.3.3-1	Conventional Oil and Gas Wells .....	3-14
3.4.1-1	Historical Conditions .....	3-19
3.4.1-2	Modeled Existing Conditions.....	3-19
3.4.1-3	Surface Water Standards for the Tongue River.....	3-20
3.4.1-4	EC vs. flow for the Tongue River at the State Line .....	3-20
3.6-1	Deer Creek North Project Area Surface & Mineral (Oil & Gas) Ownership .....	3-24
4.1.4-1	Alternative A: No Action Direct Impacts.....	4-3
4.2.1-1	Emission Inventory – Alternative B – Exploration .....	4-6
4.2.1-2	Emission Inventory – Alternative B – Production.....	4-7
4.2.1-3	Ambient Air Quality Modeling Results - NO <sub>x</sub> .....	4-7
4.2.1-4	Class II Modeling Results - NO <sub>x</sub> .....	4-8
4.2.1-5	Class I Modeling Results - NO <sub>x</sub> .....	4-8
4.2.1-6	Ambient Air Quality Modeling Results - NO <sub>x</sub> .....	4-10
4.2.1-7	Class I Analysis for the Northern Cheyenne Indian Reservation - NO <sub>2</sub> .....	4-11
4.2.1-8	Class II Modeling Results - NO <sub>2</sub> .....	4-12
4.2.1-9	Impacts of Wyoming CBM Sources on the Montana Border.....	4-13
4.2.4-1	Alternative B: Proposed Action – Direct Impacts .....	4-16
4.2.4-2	Alternative B: Proposed Action – Cumulative Impacts .....	4-19
4.2.5-1	Expected Drawdown per Coal Zone .....	4-22

**Maps**

1.3-1	Vicinity Map .....	1-3
1.3-2	Project Area Map .....	1-4
1.3-3	CBM Area Map.....	1-5

## SUMMARY

Fidelity Exploration & Production Company (Fidelity) submitted two Coal Bed Natural Gas (CBNG) Plans of Development (PODs) for its Deer Creek North project area; the Deer Creek North and Deer Creek North Amendment PODs. Attached are the Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for these PODs, called the Tongue River-Deer Creek North Federal Project. The Fidelity Tongue River-Deer Creek North Federal Project analysis is being prepared by the Bureau of Land Management (BLM), in cooperation with the Montana Department of Environmental Quality (MDEQ). The project area is located within the CX Field (approved by the MBOGC), Big Horn County of southeastern Montana, T. 9 S., R. 41 E.

Fidelity filed the Tongue River - Deer Creek North POD and Applications for Permit to Drill (APD's) for 170 wells (71 federal, 99 fee) with the BLM on January 31, 2005. Prior to the BLM completing an analysis of the POD, the Federal District Court issued an Order, April 5, 2005, allowing the BLM to approve a limited number of CBNG permits within a defined geographic area under specific conditions. This Order and other matters were subsequently appealed to the United States Court of Appeals for the Ninth Circuit. On May 31, 2005, the Ninth Circuit issued an injunction forbidding the BLM from approving any CBNG production projects in the Powder River Basin of Montana. This injunction was issued pending disposition of the appeal, or until further Order of the Court. Development of fee and State leases, associated with the Deer Creek North POD, has occurred under approvals from MBOGC while the injunctions were in effect upon BLM.

Fidelity then filed the Tongue River - Deer Creek North Amendment POD and APD's for an additional 178 wells (66 federal, 108 fee and 4 state) with the BLM on April 4, 2006. This amendment was required due to Fidelity modifying their well spacing from approximately 160 acres/well to around 80 acres/well. Development of fee and State leases, associated with the Deer Creek North Amendment POD, has occurred under approvals from MBOGC while the injunctions were in effect upon BLM.

On October 29, 2007, the 2005 Ninth Circuit Court injunction was lifted by the Ninth Circuit Court of Appeals, thus allowing BLM to process and approve PODs and APDs based on the April 5, 2005 Order. As a result, Fidelity and BLM reviewed the two individual PODs, which share the same geographic area, and concurred that they required modification from their "original" proposals. This determination was made due to the several years lapse from their submittal, much of the infrastructure had been constructed in association with the fee and State wells and Fidelity changed its well completion to the "monobore" technology (a total of 137 individual coal seam wells vs. 34 monobore wells). Fidelity resubmitted the Deer Creek North and Deer Creek North Amendment PODs into one project; the Tongue River-Deer Creek North Federal Project, on May 7, 2008.

Fidelity's Deer Creek North Federal Project includes the construction, drilling, production, and reclamation of 34 Federal CBNG wells, construction of new infrastructure and use of existing infrastructure that is located on private, State and BLM administered surface. The use of existing infrastructure results from the fee and state wells/infrastructure, within the project area, already developed and in production. The Federal project includes access roads, pipelines for water and gas, overhead and underground power lines, existing compressor facilities, produced water management using existing Montana Pollution Discharge Elimination System permits, and interim/final reclamation. The average production life of the project wells is expected to be 10-20 years with final reclamation to be completed 2 to 3 years after plugging of the wells.

Water produced by the Deer Creek North project area is proposed for disposal by the following water management options: (1) beneficially used for industrial uses (dust suppression) in the Spring Creek and Decker Coal Mines; (2) beneficially used by Fidelity for CBNG drilling, construction and dust suppression; (3) beneficially used by livestock and wildlife; (4) treated via ion exchange and discharged to the Tongue River using Fidelity's existing MDEQ discharge permit for treated water (MT0030724); and (5) discharged to the Tongue River using Fidelity's existing MDEQ direct discharge permit (MT0030457).

Issues of concern include the following:

- Air quality effects from CBNG development activities including drill rig emissions (exhaust emissions as well as dust generated by drilling the wells) and fugitive dust (construction activities as well as road dust) and compliance with all applicable air quality rules and standards, including ambient air quality standards
- Cumulative Impacts of this action when considered with past, present and reasonably foreseeable future actions
- Noxious weed introduction and proliferation
- Effects to springs and wells due to groundwater drawdown (pumping water out of coal seams) and effectiveness of Water Mitigation Agreements
- Habitat fragmentation and disturbance effects to wildlife habitat, particularly sage grouse
- Public Health and Safety
- Potential for methane migration and methane drainage
- Disturbance and reclamation activities associated with the PODs
- Surface water quality degradation
- Cultural Resource impacts
- Coal Mine/CBNG conflicts (ground water recovery and overlap in development areas)

The environmental analysis of this EA and other related environmental analyses, provides basis for the BLM decision. The BLM must decide whether or not to approve the individual wells and associated infrastructure on or for the benefit of leases associated with the proposed projects. Various actions and management options are proposed to be analyzed in the alternatives. The BLM identified Alternative C as its preferred alternative.

## GLOSSARY

**ANIMAL UNIT MONTH (AUM):** The amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month.

**APPLICATION FOR PERMIT TO DRILL, DEEPEN OR PLUG BACK (APD):** The Department of Interior permit application form needed to authorize oil and gas drilling activities on federal minerals.

**BENEFICIAL USES:** Beneficial uses of the Tongue River include agriculture, drinking water, and industrial and recreational uses.

**COAL BED NATURAL GAS (aka COAL BED METHANE):** A clean-burning natural gas found inside and around coal seams. The gas has an affinity to coal and is held in place by pressure from groundwater. Producing coal bed natural gas involves drilling into coal seams and reducing the hydrostatic pressure on the coal by producing the groundwater thus releasing the gas.

**CRITERIA POLLUTANTS:** carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, fine particulate matter and sulfur dioxide.

**CUMULATIVE EFFECT:** The effect on the environment that results from the positive or negative impacts of an action when added to other past, present and reasonable foreseeable future actions, regardless of what agency or person performed such action(s).

**CONDITION OF APPROVAL (COA):** Requirements imposed on the applicant under which an Application for a Permit to Drill (APD) or Sundry Notice is approved.

**EPHEMERAL STREAM:** An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

**INTERMITTENT STREAM:** An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

**KEYWAY:** When constructing dams or dikes for pits or impoundment with fill embankment, a keyway or core trench 10 to 12 feet wide should be excavated to a minimum depth of 2 to 3 feet below the original ground level. The core of the embankment is then constructed with compacted, water-impervious material.

**LEASE:** 1) An oil and gas lease is a contract that grants the lessee the rights to drill for and remove oil and gas deposits in the leased lands, subject to the terms and conditions incorporated in the lease. 2) The tract of land, on which a lease has been obtained, where producing wells and production equipment are located.

**LEK:** A traditional breeding area for grouse species where territorial males display and establish dominance.

**MINERAL DRAINAGE:** An offsetting producing well that removes oil or gas from a federal or Indian lease.

**MITIGATION MEASURES:** Methods or procedures developed for the purpose of reducing or eliminating the impacts of an action. Mitigation may be built into the proposed project or required in an alternative as a condition of approval.

**PRIMARY STANDARDS:** NAAQS standards designed to protect human health, including "sensitive" populations, such as people with asthma and emphysema, children, and senior citizens. Primary standards

are designed for the immediate protection of public health, with an adequate margin of safety, regardless of cost.

**PREVENTION OF SIGNIFICANT DETERIORATION (PSD) PROGRAM:** Incremental increases in the ambient concentration of criteria pollutants are regulated under the New Source Review - Prevention of Significant Deterioration (PSD) program. The program is designed to limit the incremental increase of specific air pollutants from major sources of air pollution above a legally defined baseline level, depending on the classification of a location. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

**PROPOSED ACTION:** An individual action or a combination of actions proposed on or to affect federal leases.

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

**SPLIT ESTATE:** Surface and minerals of a given area in different ownerships. Frequently, the surface is privately-owned while the minerals are federally-owned.

## ABBREVIATIONS/ACRONYMS

2D	Two-dimensional
3D	Three-dimensional
7Q10	Lowest flow for 7 consecutive days over any 10 year period
amsl	Above mean sea level
AO	Authorized Officer
APD	Application for Permit to Drill
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
ARM	Administrative Rules of Montana
AUM	Animal Unit Month
BCF	Billion Cubic Feet
BCPL	Bitter Creek Pipelines, LLC
BGEPA	Bald and Golden Eagle Protection Act
BGS	Below Ground Surface
BLM	Bureau of Land Management
BMP	Best Management Practice
CBNG	Coal Bed Natural Gas
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
COA	Conditions of Approval
CWA	Clean Water Act
D1	Dietz 1 Coal (Anderson)
D2	Dietz 2 Coal (Upper Dietz)
D3	Dietz 3 Coal (Lower Dietz)
DCN	Deer Creek North
DEM	Digital Evaluation Model
dh	Change in head
DNRC	Montana Department of Natural Resource Conservation
EA	Environmental Assessment
EC	Electrical Conductivity
EPA	Environmental Protection Agency
ESA	Endangered Species Act
Fidelity	Fidelity Exploration and Production Company
FLPMA	Federal Land Policy Management Act
ft	Feet
ft-amsl	Feet above mean sea level
FWS	U.S. Fish and Wildlife Service
GLO	General Land Office
GPM	Gallons per minute
GWIC	Groundwater Information Center
HCl	Hydrochloric acid
HMM	High Mean Monthly
hp	horsepower
HWA	Hayden-Wing Associates
K	Hydraulic Conductivity (units = ft/day)
KCLA	Known Coal Leasing Area
LBA	Lease by Application
LMM	Low Mean Monthly
MAAQs	Montana Ambient Air Quality Standards
MAQP	Montana Air Quality Permit
MBEWG	Montana Bald Eagle Management Plan
MBMG	Montana Bureau of Mines and Geology
MBOGC	Montana Board of Oil and Gas Conservation

MCA	Montana Codes Annotated
MCF	Million cubic feet
MCFO	Miles City Field Office
MDEQ	Montana Department of Environmental Quality
MEPA	Montana Environmental Policy Act
mg/L	Milligrams per Liter
mi	Miles
mi <sup>2</sup>	Square Miles
MLA	Mineral Leasing Act
MPDES	Montana Pollution Discharge Elimination System
MT FEIS	Montana Statewide Final Environmental Impact Statement (2003)
MTFWP (FWP)	Montana Fish, Wildlife and Parks
NAAQS	National Ambient Air Quality Standards
NASIS	National Soils Information System
NCT	Northern Cheyenne Tribe
NEPA	National Environmental Policy Act
NHD	National Hydrology Database
NHPA	National Historic Preservation Office
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OZM	Ozone Limiting Method
PAPA	Pinedale Anticline Project Area
PET	Potential to Emit
POD	Plan of Development
ppm	Parts per million
PRG	Powder River Gas
PSD	Prevention of Significant Deterioration
BPIP	Building Profile Input Program
psi	Pounds per square inch
RM	River Miles
RMP	Resource Management Plan
ROW	Right-of-way
RTI	Renewable Technologies Incorporated
S	Storativity (unitless)
SAR	Sodium Adsorption Ratio
SCC	Spring Creek Coal Company
SEIS	Supplement to Montana Statewide Oil and Gas Final Environmental Impact Statement and Amendment of the Powder River and Billings RMPs
SHPO	State Historic Preservation Office
SOB	Statement of Basis
SSS	Special Status Species
SWPPP	Storm Water Pollution Prevention Plan
t/ac/yr	tons per acre per year
T/E	Threatened/Endangered
TAC	Technical Advisory Committee for the Powder River Basin Controlled Groundwater Area
TD	Total Depth
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Load
TRRC	Tongue River Railroad Company
uS/cm	Microseamens per centimeters (a measure of EC)
USGS	United States Geological Survey
WMP	Water Management Plan
WMPP	Wildlife Monitoring and Protection Plan
WNV	West Nile Virus

WOGCC Wyoming Oil and Gas Conservation Commission  
WQA Water Quality Act  
WY FEIS Wyoming Environmental Impact Statement (2003)  
yrs Years