APPENDIX A:

SCOPING STATEMENT

SCOPING STATEMENT

Rocktober Unit Project

Bill Barrett Corporation and Bureau of Land Management, Cody Field Office

Description of Project

Bill Barrett Corporation (BBC) has applied to the Bureau of Land Management (BLM) for authorization to drill two exploratory gas wells and associated facilities in the Rocktober Federal Unit. Five additional wells and facilities may also be proposed pending results of the first two.

This scoping notice encompasses the proposed analysis of the seven wells and associated facilities.

The seven wells, which may be drilled on BLM surface, include access roads, gas pipelines, water wells, a compressor station, and other facilities. The wells would be located based on geological information obtained during the Red Point Seismic Exploration project (EA No. WY-020-EA07-58/WYW-165810) approved by the BLM Cody Field Office in July 2007, and conducted during the fall of 2007. Produced gas would be routed to the south to an existing Colorado Interstate Gas pipeline for transport to market. Any well that does not produce commercial quantities of natural gas would be plugged and abandoned and the site reclaimed to BLM standards.

The proposed project area is situated on approximately 12 sections inside the Rocktober Federal Unit in the McCullough Peaks Area. The area is located 22 miles east of Cody, north of State Highway 14,16, 20, and occupying portions of Townships 52-53 North and Ranges 98-99 West, in Park County, Wyoming.

Known Resource Concerns

The proposed project lies within the McCullough Peaks Travel Management Area. Three of the seven wells are situated within the McCullough Peaks Herd Management Area (HMA). One of those three wells currently has an APD filed. Preliminary internal scoping by the BLM interdisciplinary team identified resource concerns including, but not limited to, sage grouse, cultural resources, paleontological resources, wild horses, recreation, and visual resources.

Relationship to Existing Plans and Documents

The Cody Resource Management Plan and Record of Decision, approved in 1990, direct management of federal lands in the project area.

National Environmental Policy Act (NEPA)

The BLM conducts environmental assessments in compliance with NEPA and regulations of the Council on Environmental Quality. Environmental analyses serve several purposes:

- provide information about potential environmental consequences of a project
- identify means to minimize or avoid environmental harm resulting from a project
- provide information to make an informed decision regarding the project

The document will be reviewed by an interdisciplinary team of BLM resource specialists.

Public scoping is an element of the NEPA process. Scoping activities are initiated early in the process to:

- identify reasonable alternatives to be evaluated in the analysis;
- identify environmental issues of concern related to the proposed project; and
- determine the depth of analysis for issues addressed in the environmental assessment.

This scoping statement has been prepared to enable governmental agencies, the general public, and other interested parties to participate in the analysis. Public input is important in establishing the scope of analysis for a NEPA document, and the BLM encourages public participation.

Scoping Meeting
A public meeting will be held to provide further information on the proposed project. The meeting will be conducted in open-house format with BLM specialists and representatives of the project proponent in attendance. Maps and documents will be available for review and comment forms will be provided. Written comments will be accepted at the meeting or may be mailed.

An open house is planned for:

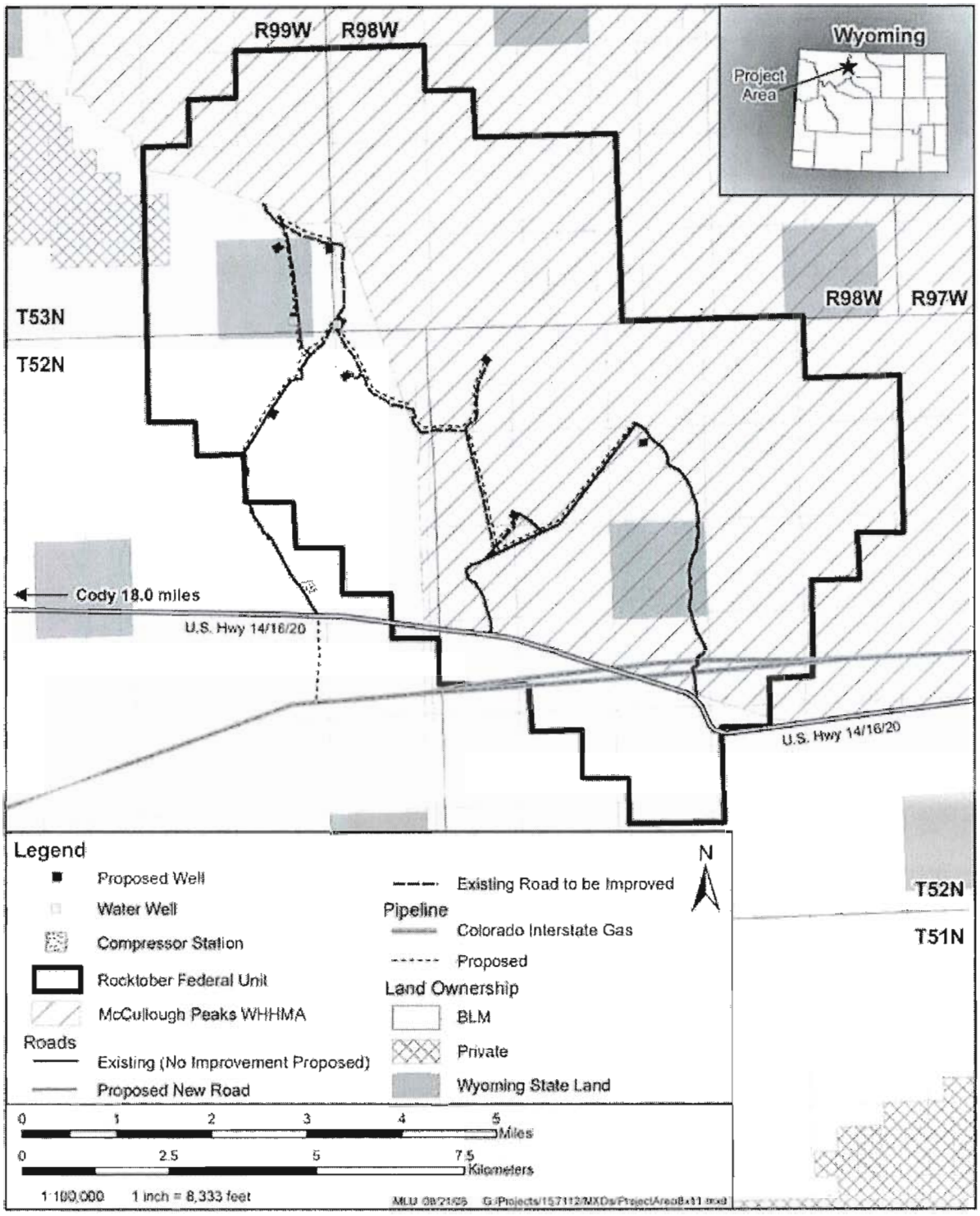
WEDNESDAY, SEPTEMBER 10 6 pm to 8 pm BIGHORN FEDERAL COMMUNITY ROOM 1701 STAMPEDE AVENUE CODY, WY

Timing Requirements
Comments are due by October 10, 2008 and should be submitted to:

Ann Perkins, Planning and Environmental Coordinator
BLM – Cody Field Office
PO Box 518
Cody, WY 82414

307.578.5928
E-mail: cody_wymail@blm.gov
Project documents and information can be found at:
http://www.blm.gov/wy/st/en/info/NEPA/cyfodocs/Rocktober.html

Mike Stewart
Field Manager, Cody
Bureau of Land Management
Cody Field Office
P.O. Box 518
Cody, WY 82414



Proposed Rocktober Unit Project Wells and Facilities

APPENDIX B:

KEY ISSUES AND CONCERNS IDENTIFIED
DURING THE SCOPING PERIOD

Table B.1 Response to Comments Received during Public Comment Period.

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
1	Karen Kemp Cedar Rapids, IA	Wild horses	Land is for wild horses, not oil and gas	The Rocktober Unit has already been leased for oil and gas development; Section 4.2.11 analyzes the impacts to wild horses
2	Clarence and Colleen Anderson Powell, WY	Oil/gas drilling	Favor implementing the proposed drilling	Thank you for your comments
3	Joe Reddick, Douglas, WY	Visual resources	Paint structures flat dark green	Sections 2.2.6 and 2.2.9
			Prohibit night lighting unless site is occupied	Sections 2.2.6 and 2.2.9
		Bats	Monitor bat mortality at compressor station stacks	There is no reason to believe that stacks at the compressor station would result in bat mortality; therefore, no monitoring is recommended
		Production pits	No production pits should be allowed	No production pits are proposed--just reserve pits for drilling/completion
		Water wells	Water wells should become property of Bureau of Land Management (BLM) rather than livestock allotment lessees	Section 2.2.10
		Wild horses	Wild horses will readily adjust to project activities; a horse may occasionally be involved with a collision with a vehicle; keep horses out of reserve pits	Section 4.2.11
		Cattle guards	Cattle guards are killers to wild horses	The cattle guards would be installed to separate livestock pastures from each other

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Fencing	Fence an area around each drill pad prior to drilling to keep wild horses out	During drilling and completion, the reserve pit would be fenced on three sides (see Section 2.2.3); the fourth side would be protected by the drill rig/completion equipment; fencing the entire pad would be unnecessary because human activity would keep wild horses away from the immediate area
4	Charise Demao [1]	Wild horses	Negative impacts	Section 4.2.11
		Wildlife	Negative impacts	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Potential National Natural Landmark	Negative impacts	There is no official proposal for the area to become a National Natural Landmark
5	Jessica Crowder, Wyoming Dept. of Agriculture, Cheyenne, WY	Project mailing list	Add to Wyoming Department of Agriculture to project mailing list	Done
6	The Rev. Daphne Grimes, Cody, WY	Wildlife and wild horses	Negative impacts to wild horses and wildlife	Sections 4.2.7, 4.2.8, 4.2.9, and 4.2.11
7	Ester Johansson Murray, Cody, WY	Roads and structures	Roads and structures destroy the pristine image of the area	Section 2.2.2; road access within the Rocktober Unit for project activities would include approximately 17.6 mi of existing roads, 4.5 mi of which would be improved to accommodate traffic safely; just 0.31 mi of new road would be constructed; also see Section 4.2.14
		Oil spills	Oil spills must be cleaned up	Section 2.2.13
		Wildlife	Pronghorn migration routes should not be disrupted	There are no pronghorn migration routes in the Rocktober Unit
8	Lowell Ray Anderson, Cody, WY	Oil/gas drilling	Favor implementing the proposed drilling	Thank you for your comments

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
9	John Etchepare, Director of Wyoming Dept. of Agriculture	Livestock grazing	Increased traffic resulting in increased livestock/vehicle collisions, damaged range improvements opened gates, and decreased palatability of forage from road dust	Sections 2.2.18 and 4.2.10
			Construction and improvement of roads	Section 2.2.2; road access within the Rocktober Unit for project activities would include approximately 17.6 mi of existing roads, 4.5 mi of which would be improved to accommodate traffic safely; just 0.31 mi of new road would be constructed
			Decrease in animal unit months	Section 4.2.10
		Noxious weeds	Spread of noxious weeds	Section 2.2.18
		Off-site mitigation	Negative impacts	No off-site mitigation would occur
		Reclamation	Lack of timely and successful reclamation	Section 2.2.17
		Federal Land Policy and Management Act of 1976 (FLPMA)	Compliance with FLPMA	Section 1.3
10	Robert J. Bessler, Powell, WY	Wildlife	Negative impacts	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Wild horses	Negative impacts	Section 4.2.11
11	David A. Burke and Nena C. Graham-Burke, Cody, WY	Wild horses	Negative impacts	Section 4.2.11
		Visual resources	Views of unique geological characteristics would be diminished	Section 4.2.14
12	Leslie McNeil, Cody, WY	Oil/gas drilling	Favor implementing the proposed drilling	Thank you for your comments

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
13	Bettye Dominick, Cody, WY (This letter was addressed to Governor Dave Freudenthal, with copies to various county, State, and federal officials, including U.S. Senator John Barrasso [see comment #79 below])	Cody Resource Management Plan (RMP)	The Cody RMP is out of date and does not include new techniques, equipment, and knowledge	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		Wild horse gather Environmental Assessment (EA)	The wild horse gather is not the answer to the wild horse population problem	This is not within the scope of the Rocktober Project EA; a separate EA is being prepared for the wild horse gather, and your comments will be considered there
14	John P. Machen, Ruxton, MD	Wildlife	Negative impacts	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Visual resources	Negative impacts, including those to scenic wilderness	The proposed project would not impact any wilderness area
15	Jacqueline Hajba-Miner, Cody, WY	Oil/gas drilling	Using best management practices, the Rocktober Project can be developed in a responsible manner	Thank you for your comments
16	Marilee Sorensen, Cody, WY	Wildlife	Negative impacts	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Wild horses	Negative impacts	Section 4.2.11
		Hazardous materials	Negative impacts to wildlife	Sections 2.2.12 and 4.2.7
		Invasive weeds	Spread of invasive weeds through the area	Sections 2.2.18 and 4.2.5
		Visual resources	Drilling in scenic areas or on ridgetops	Section 4.2.14

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
17	Marshall Dominick, President, Friends of a Legacy (FOAL) - McCullough Peaks Mustangs, Cody, WY	Cody RMP	The Cody RMP is out of date and does not include new techniques, equipment, and knowledge	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		Wild horses	Significant impacts to wild horses	Section 4.2.11
		Topography	Significant impacts from drilling	Section 2.2.16
		Water resources	Significant impacts from drilling and hydraulic fracturing	Section 4.2.3
		Air Quality	Significant project-specific and cumulative air quality impacts to health and safety of populations in and around the project area	Section 4.2.13
		Soils	Significant impacts to soils	Section 4.2.4
		Vegetation	Reclamation plans for the project must be developed prior to initiating the project	Section 2.2.17
		Cultural Resources	Baseline studies must be completed prior to project implementation; significant impacts to cultural resources would occur	Sections 2.2.18, 3.3.1, and 4.2.1
		Paleontological resources	Baseline studies must be completed prior to project implementation; significant impacts to paleontological resources would occur	Sections 2.2.18, 3.3.2, and 4.2.2
		Visual resources	Open spaces should be defined and an analysis of project impacts provided	Sections 3.3.14 and 4.2.14
		Best management practices	Best management practices as defined in the Gold Book must be implemented	Section 2.2.18
		Wildlife	Significant impacts to wildlife	Sections 3.3.14 and 4.2.14

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Baseline studies	Baseline studies needed for all the above resources	See individual resource descriptions in Chapter 3.0
18	Eric Hill, Cody, WY	Wild horses	Oil and gas will have negative impacts on wild horses; Bill Barrett Corporation (BBC) should be required to donate adjacent land of equal value and restore the land to its previous conditions upon completion of the project	Section 4.2.11
			Oppose removal of horses and thinks contraception is a better method	This is not within the scope of the Rocktober Project EA; a separate EA is being prepared for the wild horse gather, and your comments will be considered there
19	Len Fortunato, Cody, WY	Oil/gas drilling	Approve of the plans for the proposed project	Thank you for your comments
20	Carla Fortunato, Cody, WY	Oil/gas drilling	Favor the proposed project	Thank you for your comments
21	Comments withdrawn			
22	Terry and Sondra Dishong, Cody, WY	Monitoring	Hope that BLM would monitor the project so that the least amount of disruption would occur	Appendix D
23	Jeff Parsons, Cody, WY	Oil/gas drilling	Completely supportive of the proposed project	Thank you for your comments
24	Karen Ziech, Joliet, IL	Best management practices	Implement best management practices	Section 2.2.18
		Reclamation	Allocate funds and establish plans for restoration of the area to its original condition	Section 2.2.7 5
		Vegetation	Mitigate impacts to vegetation	Sections 2.2.18 and 4.2.5
		Cultural Resources	Preserve historical and archaeological integrity of the area	Sections 2.2.18, 3.3.1, and 4.2.1
		Paleontological resources	Preserve paleontological integrity of the area	Sections 2.2.18, 3.3.2, and 4.2.2

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Visual resources	Consider importance of viewscapes and open spaces	Sections 3.3.14 and 4.2.14
		Wildlife	Mitigate impacts to wildlife	Sections 3.3.14 and 4.2.14
		Baseline studies	Baseline studies needed for air, water, soils, and wildlife before project begins	See individual resource descriptions in Chapter 3.0
		Monitoring	Monitor operations and enforce laws and regulations	Appendix D
		Drilling techniques	Use directional drilling (multiple wells from a single well pad) to reduce number of wells	Section 2.4.1
		Economics	Weigh long-term economic benefits/detriments to the community against short-term profits for a few	Section 2.2.6
25	Ellen Fitxgerald, Denver, CO	Same as commenter #24	Same as commenter #24	Thank you for your comments
26	TJ Holmes, Mancos, CO	Same as commenter #24	Same as commenter #24	Thank you for your comments
		Wild horses	Negative impacts	Section 4.2.11
27	Morgan [2]	Same as commenter #24	Same as commenter #24	Thank you for your comments
28	Mary Ann Kennedy [1]	Oil/gas drilling	Opposes project	Thank you for your comments
29	Birney and Sally Holberg, Cody, WY	Best management practices	Best management practices must be updated and carried out	Section 2.2.18; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
30	Tom Nickoles [1]	Same as commenter #24	Same as commenter #24	Thank you for your comments
31	James Hillberry, Powell, WY	Multiple use	Believe in multiple use, and oil and gas recovery is necessary as a part of multiple use	Thank you for your comments

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Roads	The small amount of new road would not cause as much disturbance as the excess of wild horses	Thank you for your comment
		Visual resources	BBC will paint the equipment to blend into the surroundings	Section 4.2.14
		Wild horses	Horses will adapt to project activities, and water development may benefit them	Section 4.2.11
		Wildlife	Wildlife will adapt to project activities; deer occur even within the Cody city limits; sage grouse may also benefit from water development	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
32	Robert A. Swander, Cody, WY	Oil/gas driling	Favor drilling in the project area	Thank you for your comments
		Wildlife	Wildlife will adapt to oil/gas development	Thank you for your comments
33	Francie Audier, Cody, WY	Oil/gas drilling	Opposes drilling in Rocktober Unit; if drilling occurs, BLM must make sure all environmental safeguards are followed	Thank you for your comments
34	Tyler Henry [1]	General	Ensure that best management practices are used throughout project development	Section 2.2.18; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
35	Renee Tafoya, Cody, WY	General	Conduct baseline studies and protect all resources	See various sections of Chapter 3.0
36	Glenn French, Powell, WY	Oil/gas drilling	Favor drilling in the project area	Thank you for your comments
37	Mary Dominick Chivers [1]	Oil/gas drilling	Opposed to proposed project, but if approved, must adhere to all best management practices	Thank you for your comments

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
38	Bettie Marie Daniels, Cody, WY	Wild horses	Negative impacts	Section 4.2.11
		Wildlife	Negative impacts, especially to sage grouse	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Cultural resources	Negative impacts	Sections 2.2.18, 3.3.1, and 4.2.1
41	Robert Perrin, Inman, SC	General	Opposed to project	Thank you for your comments
42	Patricia A. Kenney, Cody, WY	RMP	Project should not be considered until a new RMP is in place so as to include current best management practices	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
43	Board of County Commissioners, Park County, WY. (These comments appear to have been based on a review of the Master Development Plan for the project)	General	The Board supports the proposed project assuming adequate environmental protection methods	Thank you for your comments
		Visual Resources	Consider mitigation to comply with current visual resource management (VRM) designations	Section 4.2.14
		Wildlife	Minimize impacts	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Wild horses	Minimize impacts	Section 4.2.11
		Road maintenance	Developer should maintain roads in a safe condition	Section 2.2.2
		Oil/gas drilling and completion	Use best available technology and best management practices	Sections 2.2.4 and 2.2.5
		Water resources	Encourage development of water resources for wild horses and wildlife	Sections 4.2.7 and 4.2.11

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Pipelines	Build pipelines with the capacity to carry future natural gas discoveries; question the need for a 50-ft construction right-of-way (ROW)	Section 2.2.8; pipelines would be sized to the gas production from the seven federal wells and two state wells; the width of the pipeline ROW would be minimized to the extent possible
		Compressor station	Locate the facility where it would be least visible	Section 4.2.14
		Water hauling	Would like to review any area outside the project area from which water would be hauled to assess and mitigate any impacts to county roads	Until water wells would be drilled and evaluated as to their adequacy to provide the required volumes of water, the exact source of water cannot be determined; if water hauling does require travel on county roads, the county would be notified for appropriate permits or other arrangements
		Traffic control and safety	Request a speed study and signage installed	Section 2.2.11; no speed study would appear to be necessary
			Provide turnouts for public's vehicles	Sections 2.2.2 and 2.2.11
		Hazardous materials	Request coordination with Park County Office of Homeland Security and submit a copy of the Spill Prevention, Control, and Countermeasures (SPCC) plan to that office before the project is approved	Section 2.2.3.13
			Should contact Park County officials in case of emergency situations	Park County would be notified in appropriate situation by the operator or BLM
		Worker housing	Request that the temporary trailers used during drilling and completion meet the Park County Development Standards and Regulations and all septic facilities be permitted through the Park County Planning development	Section 2.2.15

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Directional drilling (multiple wells from a single pad)	If future expansion is planned, drilling multiple wells from a single pad is encouraged to minimize surface disturbance	Section 2.4.1
		Reclamation bonding	Recommend adequate bonding	Section 2.2.17; BBC is bonded nationwide with BLM
		Unsuccessful reclamation	If reclamation is unsuccessful due to weather, BBC would ensure dust abatement measures until vegetative cover was successful	Section 2.2.18 states, in part, "Dust control measures, as approved by the BLM, would be implemented as appropriate"; both water and magnesium chloride would likely be considered as dust suppressants
		Noxious weeds	Request that developer obtain a release at final reclamation of disturbed surface that would determine that no noxious weeds were in need of treatment on developed areas	Section 2.2.17
			Language addressing noxious weed control is minimal	Section 2.2.18
		Dust abatement	Use magnesium chloride for dust abatement on project roads	Section 2.2.18 states, in part, "Dust control measures, as approved by the BLM, would be implemented as appropriate"; both water and magnesium chloride would likely be considered as dust suppressants
		Gold Book	Park County Engineer not familiar with Gold Book standards for road construction	Available on the web at: http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/oil_and_gas.Par.54908.File.dat/Gold%20Book%202007.doc

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Cattle guards	All cattle guards must meet Wyoming Department of Transportation specifications	Cattle guards would be built to BLM standards
		Reserve pits	Concern for wild horses and wildlife if reserve pits fenced on three sides only prior to completion operation	During drilling and completion, the reserve pit would be fenced on three sides (see Section 2.2.3); the fourth side would be protected by the drill rig/completion equipment; fencing the entire pad would be unnecessary because human activity would keep wild horses away from the immediate area
		Storage tank containment	Containment should be adequate to contain 110% of volume of tank	Corrected in Section 2.2.5
		Disposal site	Where is an approved disposal site?	Section 2.2.6
		Noise and lights	Noise levels and lighting not addressed	Sections 2.2.6, 2.2.9, 3.3.15, and 4.2.15
		Seed mix for reclamation	Should be specifically approved by BLM and others	The appropriate surface management agency will select the seed mix (Section 2.2.17)
		Appendix B	Appendix B not included in Master Development Plan	Appendix B is an appendix in the Cody RMP and can be found either on the internet or at the Cody Field Office
		Greater sage-grouse	Greater sage-grouse leks not addressed	Section 4.2.8
44	Conelia G. Keller, Cody, WY	General	Conduct baseline studies	See individual resource descriptions in Chapter 3.0
			Use best management practices	
45	Bettye Dominick, Cody, WY	RMP	Revise/update the RMP	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Baseline studies	Require baseline studies for water quality, air quality, recreational use, cultural and paleontological resources, and vegetation	See individual resource descriptions in Chapter 3.0
		Wildlife	Require monitoring of season aspects of nesting of sage grouse, raptors, and other avian sagebrush obligates, as well as deer and pronghorn	Sections 2.2.18, 4.2.7, 4.2.8, and 4.2.9
		Wild horses	Re-establish boundaries of Wild Horse Herd Management Area (WHHMA) so that horses are not directly impacted by gas field development; should be comparable to historic WHHMA	Section 4.2.11; the re-establishment of WHHMA boundaries is beyond the scope of this EA
46	Neil O. and Jennifer S. Miller, Basin, WY	RMP	Delay project until new RMP is approved	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		EIS	An EIS should be completed for the project	Section 1.1
		Greater sage-grouse	Safeguard sage grouse leks with a 2-mi buffer	Sections 2.2.18 and 4.2.8
		Wild horses	Keep development out of WHHMA	The portion of the Rocktober Unit has already been leased for oil and gas development; see Section 4.2.11 for impacts
		Baseline surveys	Conduct baseline surveys for water quality, air quality, cultural resources, paleontological resources, recreation, and visual resources	See individual resource descriptions in Chapter 3.0

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Visual resources	Retaining quality of visual resources should be one of most important concerns	Sections 3.3.14 and 4.2.14
		Wildlife	Retaining quality of wildlife resources should be one of most important concerns	Sections 4.2.7, 4.2.9, and 4.2.9
		Noise	Reduce compressor station noise with earthen berms	Section 2.2.9 and 4.2.15
		Directional drilling (multiple wells from a single pad)	Drill multiple wells from a single pad	Section 2.4.1
		Produced water	Truck all produced water out of area and put to beneficial use if possible	Section 2.2.10
		Air quality	Do not allow deterioration of air quality	Section 4.2.13
47	Erik Molvar, Biodiversity Conservation Alliance, Laramie, WY	Greater sage-grouse	Current BLM season and distance restrictions are not adequate to protect sage grouse	Section 4.2.8
		Big game and wild horses	Development on crucial ranges and migration routes should be avoided	There are no crucial ranges or migration routes for big game or wild horses in the Rocktober Unit
		Cultural resources	A survey must be completed to avoid cultural resources	Sections 2.2.18, 3.3.1, and 4.2.1
		Paleontological resources	A survey must be completed to avoid paleontological resources	Sections 2.2.18, 3.3.2, and 4.2.2
		Visual resources	Visual resources must be minimized	Sections 3.3.14 and 4.2.14
		BLM-sensitive animal species	Habitat fragmentation should be analyzed and minimized	Section 4.2.7

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Well spacing	Well density should never exceed one well/mi^2	Seismic exploration suggests the most likely locations of natural gas resources, and these areas can be confirmed only by drilling; the Proposed Action includes no more than one well in any one section; seven sections have one well each, whereas the remaining 30+ sections, or portions thereof, contain no wells
		Compressor station	The compressor station should be located south of U.S. Highway 14/16/20 to reduce visual impacts	The compressor station has been moved to a location south of the highway
		Exploratory well numbers	BLM should consider approving fewer exploratory wells, or requiring that wells be drilled in a phased manner, with a limit on how many wells can be drilled or in production at any one time	Section 2.4.2
		Full-field development	An EIS should be required because full-field development could result in the drilling of more than 100 wells	There are no plans at present for full-field development; even the development of all of the exploratory wells is dependent upon the successful discovery of commercial quantities of natural gas
		RMP	The proposed project could foreclose options otherwise available to BLM in the revised RMP	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		General	BLM should proceed with great caution in approving oil and gas development in the McCullough Peaks area	Thank you for your comments
48	Ginger Mielke [1]	General	Want to see conservation start immediately in the project plans	Thank you for your comments

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
49	Hope Ryden, New York City, NY	General	Oppose the project	Thank you for your comments
50	Monika Courtney, Evergreen, CO	General	Oppose the project	Thank you for your comments
51	Pam Nickoles, Golden, CO	Same as commenter #2	Same as commenter #2	Thank you for your comments
		Wild horses	Wild horse numbers should not be reduced	This is not within the scope of the Rocktober Project EA; a separate EA is being prepared for the wild horse gather, and your comments will be considered there
52	Linda Raynolds, Cody, WY	RMP	The RMP must be amended before the proposed project is considered	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		Baseline surveys	Baseline surveys for resources to be degraded by the proposed project must be completed	See individual resource descriptions in Chapter 3.0
		Public access/road construction	Temporarily close secondary roads in the project area to the public	There is no reason to close secondary roads in the project area to the public; roads in the project area will continue to be managed under the McCullough Peaks Travel Management Plan and Off-Road (ORV) Route Designations (BLM 2004)
			Do not permit the disturbance of existing two-track roads that are not already crowned, bermed, and graveled	Section 2.2.2

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Well access	Close all access from Federal 12-1 to Federal 43-7 during the exploratory phase to reduce disturbance to wildlife	Such an action would increase total miles traveled in the project area, especially during production, and result in more disturbance to wildlife
			Require remote monitoring of wells	
		Monitoring	Establish ongoing monitoring and enforce compliance	Appendix D
		Greater sage-grouse	Do not allow ground disturbing activities during sage grouse lek use or nesting	Sections 2.2.18 and 4.2.8
		Wildlife water sources	Require the operator to provide alternative water sources for wildlife displaced by project activities	Mitigation of this kind will be considered in the EA
		Noise	Restrict noise from compressor station	Sections 2.2.9 and 4.2.15
		Odors	Restrict allowable "smell pollution"	Section 4.2.15
		Lighting	Restrict light pollution	Sections 2.2.6 and 2.2.9
		Reclamation	Establish a time line for prompt reclamation of well pads, especially reserve pits	Section 2.2.17
			Study and reclaim abandoned Husky well sites that were poorly reclaimed to gain knowledge of the best reclamation techniques	BBC is not responsible for previous surface disturbance caused by other operators in the Rocktober Unit
		Raptors	Do not allow disturbing activities during the raptor nesting season	Sections 2.2.18 and 4.2.8
		Federal 32-6 well	Incorporate extra safeguards to protect the headwaters of the Red Point watershed	Sections 4.2.3, 4.2.4, 4.2.5, and 4.2.6

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Signage	Require the operator to install informational signage about the natural resources of the area along developed gravel roads	BBC's business involves meeting the U.S. demand for energy while observing regulations to protect the environment; interpretive signage regarding natural resources can be provided by BLM or private organizations such as the wild horse interpretive center proposed by FOAL
53	John Emmerich, Deputy Director, Wyoming Game and Fish Department, Cheyenne, WY	Greater sage-grouse	Adhere to Core Area stipulations as much as possible	Section 4.2.8
		Reclamation	Reclamation should re-establish native vegetation	Section 2.2.17
54	Cindy MacDonald, North Las Vegas, NV	NEPA	An EIS should be required for the project	Section 1.1
		BLM responsibilities	Recent accusations of conflict of interest issues involving the oil and gas industry and Department of Interior employees	This is not within the scope of the Rocktober Project EA
		Wild horses	Population levels are too low to sustain a healthy herd	This is not within the scope of the Rocktober Project EA; a separate EA is being prepared for the wild horse gather, and your comments will be considered there
55	John Osgood, Cody, WY	NEPA	An EIS should be required for the project	Section 1.1
		Baseline studies	Conduct baseline surveys for each resource	See individual resource descriptions in Chapter 3.0

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		RPM	Revise existing RMP because current RMP is out of date	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		Best management practices	Project should include current best management practice	Section 2.2.18
		Water resources	Use no toxic substances during fracturing	Section 2.2.5
56	John Nickle, President, and Matthew Dillon, Director, Pryor Mountain Wild Mustang Center, Lovell, WY	RMP	The RMP must be updated before the proposed project is considered	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
		Monitoring	Establish ongoing monitoring and enforce compliance	Appendix D
57	Don and Beverly Kurtz, Cody, WY	Monitoring	Establish ongoing monitoring and enforce compliance	Appendix D
		Best management practices	Project should include current best management practice	Section 2.2.18
		Baseline studies	Conduct baseline surveys for each resource	See individual resource descriptions in Chapter 3.0
58	Ann MacAdam, Canton, MA	Wild horses	No wells should be drilled within the WHHMA; wells drilled outside the WHHMA should be well regulated	The portion of the Rocktober Unit has already been leased for oil and gas development; see Section 4.2.11 for impacts
59	Marshall Dominick, Cody, WY	Baseline studies	Conduct baseline surveys for each resource	See individual resource descriptions in Chapter 3.0

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Drilling techniques	Limit well pads to 3 acres in size	Section 2.2.3
			Require drilling multiple wells from a single pad	Section 2.4.1
			Require wooden mats to reduce impacts to vegetation and soils	The cost associated with the use of wooden mats is not justified; impacts to soils and vegetation would be negligible without the use of such mats
		Compressor station	Move compressor station to south of U.S. Highway 14/16/20	The compressor station has been moved to a location south of the highway
			Mitigate for noise, odor, and visual impacts	Sections 2.2.9 and 4.2.14
		Road construction	Do not permit the disturbance of existing two-track roads that are not already crowned, bermed, and graveled	Section 2.2.2
		Gold Book	Require strict adherence to Gold Book standards	Section 2.2.18
		Well locations	Move Federal wells 41-36, 14-31, 12-1, and 32-6 away from ridgelines; move Federal well 4307 away from Red Point	Section 4.2.14
		Reclamation	Require adequate reclamation bonding.	Section 2.2.17; BBC has a nationwide reclamation bond with the BLM
			Require on-going reclamation of present and past disturbances in the area	BBC is not responsible for reclamation of prior disturbance in the project area
		Traffic	Minimize traffic by using a shuttle system for workers	The number of workers and volume of traffic anticipated for the project does not justify a shuttle system
			Monitor wells remotely	The number of wells and projected traffic to monitor the wells does not justify remote monitoring

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Lighting	Minimize the use of lights	Sections 2.2.4 and 2.2.9
		Monitoring	Establish ongoing monitoring and enforce compliance	Appendix D
60	Susanne Prodehl Forst, Cody, WY	Same as commenter #24	Same as commenter #24	Thank you for your comments
		Oil/gas drilling	Allow no oil and gas development in the Cody area	Thank you for your comments
61	James Revels [1]	Oil/gas drilling	Allow no oil and gas development any place near Yellowstone	Thank you for your comments
62	Rudolf A. Forst, Cody, WY	Air quality	Protect air quality	Section 4.2.13
		Best management practices	Project should include current best management practice	Section 2.2.18
63	Ryan Lance, Deputy Chief of Staff, Office of the Governor, Cheyenne, WY	Air quality	Collect background air quality information	Section 3.3.13
		Water quality	Collect background water quality information, including from domestic wells in the area	Section 3.3.3
		Greater sage-grouse	Incorporate conservation measures recently employed by the BLM, Buffalo Field Office and become acquainted with the Governor's recently issued Executive Order regarding sage grouse	Sections 2.2.18 and 4.2.8
		NEPA	EA should include full-field development	Full field development is not proposed at this time and is not evaluated in this EA; if full-field development were proposed, it is likely that an EIS would be required
		RMP	The proposed project could be delayed until the new RMP is completed	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
64	Hap Ridgway, Cody, WY	Supports comments by Mr. Marshall Dominick (see comment #59)	See comment #59	Thank you for your comments
65	Deborah K. Thomas, Organizer, Powder River Basin Resource Council, Clark, WY	NEPA	Full-field development over an area much larger than the Rocktober Unit must be evaluated	The EA is limited to project impacts and reasonably foreseeable future actions within the Rocktober Unit; there is no proposal for full-field development
		Air quality	Impacts must be evaluated and mitigation applied	Section 4.2.13
		Electricity	Must identify how electricity will be provided	No electric power will be provided to the field
		Monitoring	Monitoring must occur to ensure compliance with best management practices	Appendix D
		Drilling methods	Close systems should be used rather than open reserve pits	There is no reason to believe that reserve pits cannot be successfully reclaimed; therefore, closed systems are unnecessary
		Visual resources	All permanent structure and tanks must be low profile to protect viewsheds	Sections 3.3.14 and 4.2.14
		Pipelines	Pipelines must be sized to accommodate full-field development; all pipelines must be buried; pipeline testing methods must be identified	Section 2.2.8
		Noise	Mitigation must be identified	Sections 2.2.9 and 4.2.15
		Light	Mitigation must be identified	Sections 2.2.6 and 2.2.8
		Water resources	Sources and uses of water must be identified	Section 2.2.10
		Traffic/safety	Traffic control and safety concerns are not adequately addressed	Section 2.2.11

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Workovers	More detail is required regarding traffic, manpower, and chemicals used in workovers	Section 2.2.12 adequately describes workovers
		Emergency notification	A plan for notification of first responders and emergency response personnel must be identified	Such notification requirements would be included in the SPCC Plan
		Health Impact Assessment	A Health Impact Assessment must be implemented in Park County	No such requirement exists in Park County
66	Birney and Sally Holberg, Cody, WY	Duplicate submission; see comment #29	See comment #29	Thank you for your comments
67	Arthur and Shirley Bales	General	Supports proposed project and believes it can be done in an environmentally safe way	Thank you for your comments
68	Mary Schock, Cody, WY	General	Don't need any more gas wells in the area	Thank you for your comments
69	Patricia A Kenney, Cody, WY	RMP	RMP is outdated and project should be delayed until the new RMP is approved and includes current best management practices	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
70	Mike and Michele Hemry, Cody, WY	General	Careful consideration must be given to all natural resources; support a cautious, thoughtful, and considered approach to the proposed project	Thank you for your comments
71	John and Lynn Dominick, Ketchum, ID	RMP	Defer development until the new RMP is approved	Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Well numbers	Development of 128 wells would have a huge impact on the area	Nine wells are proposed--two on State land and seven on federal surface
		Monitoring	Monitoring needs to occur to prevent adverse impacts to resources	Appendix D
72	Daniel F. Heilig, Attorney, Western Resource Advocates, Lander, WY	Greater sage-grouse	Adverse impacts due to development; must incorporate conservation strategies included in Governor's Executive Order	Sections 4.2.7, 4.2.8, and 4.2.9
73	Marshall Dominick, President, Friends of a Legacy (FOAL), Cody, WY	RMP	Submitted a petition to amend the RMP prior to releasing any decisions on future projects	BLM respectfully disagrees with your conclusion that the approved Cody RMP provides little discussion regarding the development of oil and gas resources. The NEPA documentation supporting the approved Cody RMP discusses the potential for oil and gas exploration and development consistent with BLM policy. The analysis used the assumption that 40 to 50 exploratory wells and 620 to 630 development wells would be drilled under the plan. These projections were for planning purposes only, and the projections may be exceeded. However, this reasonably foreseeable development has not been exceeded in the Cody District. The leases proposed for exploration in the Rocktober Unit are consistent with the Cody RMP that some exploratory natural gas wells will be drilled in the planning area.

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
73 (Continued)				Appendix K of the Final EIS for the Cody RMP describes the general manner in which oil and gas development is expected to occur in the planning area. Although the development of tight gas sands is not specifically mentioned in the Final EIS, the formations likely to require tight sand gas development are listed. BLM believes that it is premature to say whether or not full-field development will eventually occur in the Rocktober Unit. However, the exploratory proposal is in conformance with the Cody RMP that allows wildcat drilling. Should exploratory activities proposed in the Rocktober Unit project result in the discovery of an economic natural gas play and Bill Barrett Corporation decides to fully develop the resource, the BLM will determine whether the proposal conforms to the Cody RMP and the level of NEPA documentation required. With regard to the petition, an EIS level amendment that would be necessary to analyze the issues you brought forward would require a time commitment similar to the ongoing Cody RMP revision and would take place concurrently with the RMP revision. Therefore, the effort would be duplicative and unnecessarily expensive. However, the comments and concerns raised in the petition will be considered during current RMP revision.

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
73 (Continued)				Until a new RMP is approved, the Cody Field Office is required to follow the existing RMP; current best management practices can be applied without a revised RMP and will be applied to the extent necessary
74	Bruce Pendery, Staff Attorney and Director of Public Lands, Wyoming Outdoor Council, Lander, WY	Greater sage-grouse	BLM must comply with the State of Wyoming's sage-grouse protection Executive Order	Sections 4.2.7, 4.2.8, and 4.2.9.
			BLM must comply with the Western Governors' Association migration corridors initiative	There are no migration corridors or crucial habitats in the Rocktober Unit
		RMP	BLM must assure compliance with the Cody RMP	Section 1.4
		Extension of the McCullough Peaks Wilderness Study Area (WSA)	BLM should recognize and seek to protect the lands that the Biodiversity Conservation Alliance (BCA) has said have wilderness characteristics and should receive special management	BLM's authority to designate new WSAs has expired. The BCA wilderness proposal is north of the project area. BLM will be looking at wilderness character in the RMP revision now in progress.
		NEPA	Must consider full-field development	The EA is limited to project impacts and reasonably foreseeable future actions within the Rocktober Unit; there is no proposal for full-field development
		General	BLM has adequate retained rights that allow it to condition the Rocktober Unit in a way that ensures environmental protection	The EA recognizes these rights and will manage the Rocktober Unit under a multiple use mandate
		NEPA	A primary purpose of an EA is to determine the need for an EIS	Section 1.1

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		NEPA	BLM must consider a reasonable range of alternatives	Section 2.4
		Oil/gas drilling	Drilling multiple wells from a single pad should be considered	Section 2.4.1
		Oil/gas drilling	Phase or pace the development of wells over time rather than all at once	Section 2.4.2
		Oil/gas drilling	Do not cause unnecessary or undue degradation	See appropriate sections in Chapter 4.0
		Wildlife resources	BLM must ensure its analysis of impacts to wildlife considers direct, indirect, connected, related, long-term, and cumulative impacts	Sections 4.2.7, 4.2.8, and 4.2.9
		Water quality	Comply with the *Clean Water Act*	Section 1.5 and Table 1.2
		Noxious weeds	Comply with Executive Order 13112	Section 2.2.18
		Noise	Address noise impacts	Section 4.2.15
		Cultural resources	Conduct predisturbance surveys and comply with all laws and regulations	Sections 2.2.18, 3.3.1, and 4.2.1
		Paleontological resources	Conduct predisturbance surveys and comply with all laws and regulations	Sections 2.2.18, 3.3.2, and 4.2.2
75	David A. Flitner, Greybull, WY	General	Strongly support the proposed project	Thank you for your comments
76	Lynn Whitmer [1]	General	Concerned that roads will disturb wild horses and wildlife and the fragile environment unless BLM is cautious in approving the project	Sections 2.2.18, 4.2.7, 4.2.8, 4.2.9, and 4.2.11
77	Bettye Dominick, Cody, WY	Wild horses	There should be a moratorium on all wild horse gathers	This is not within the scope of the Rocktober Project EA; a separate EA is being prepared for the wild horse gather, and your comments will be considered there

Table B.1 (Continued)

Comment Number	Commentor	Issue	Brief Description of Issue	Response/Where the Issue is Addressed in the EA
		Wild horses	BLM should consider temporary removal of the wild horses from the project area until drilling is completed	Section 4.2.11
		Baseline studies	Baseline studies on water quality, vegetation, soils, and habitat should be completed before the project begins	See individual resource descriptions in Chapter 3.0
78	Unsigned and marked up copy of article (Company plans exploratory drilling near Cody) in Casper Tribune, October 3, 2008	General	The markup of the article indicated that the commenter was not in favor of the proposed project	Thank you for your comments
79	U.S. Senator John Barrasso, in a letter to Mike Stewart, Cody Field Office Manager	General	Requested that the comments be carefully reviewed and that the Senator be provided with a copy of the response	A response letter from Robert A. Bennett, BLM Wyoming State Director, was sent to Senator Barrasso on October 30, 2008, assuring the Senator that a new RMP is being prepared, that the Rocktober Project will be adequately analyzed, and explaining some of the challenges BLM faces in managing wild horses
80	Matt Steinmetz, Cody, WY	General	BLM needs to do a much better job of protecting the public's resources by taking a more critical look at oil and gas projects	Thank you for your comments
81	Unnamed, Powell, WY	General	Against drilling in the Rocktober Unit or anywhere in the area	Thank you for your comments
82	Unnamed, Powell, WY (This comment sent to BLM State Director Robert Bennett; the comments were almost word for word compared to comment #81)	General	Against drilling in the Rocktober Unit or anywhere in the area	Thank you for your comments

[1] Comment received with no city of origin indicated.
[2] Comment received with no first name or city of origin indicated.

APPENDIX C:

LETTER FROM U.S. FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

In Reply Refer To:
ES-61411/W.02 /WY08SL0162

MAY - 1 2008

Mr. Roger Schoumacher
TRC
605 Skyline Drive
Laramie, WY 82070

Dear Mr. Schoumacher:

Thank you for your letter, dated March 31, 2008 and received in our office on April 1, regarding the Rocktober Project for seven proposed exploratory gas wells located in all or portions of the following: T52N, R98W, Sec. 2-11, 14-22, and 28-29; T52N, R99W, Sec. 1-3 and 11-13; T53N, R98W, Sec. 19-20 and 28-33; and T53N, R99W, Sec. 23-26 and 35-36, in Park County, Wyoming. TRC is preparing an environmental assessment for the Bureau of Land Management Cody Field Office. You requested the U.S. Fish and Wildlife Service (Service) provide you with a threatened and endangered species list and any other concerns.

In response to your request, my staff reviewed your information pursuant to the Endangered Species Act (Act) of 1973 as amended, (16 U.S.C. 1531 *et seq.*), Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, and the Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. 668. Other fish and wildlife resources are considered under the Fish and Wildlife Coordination Act and the Fish and Wildlife Act of 1956, as amended, 70 Stat. 1119, 16 U.S.C. 742a-742j. Based on the site locations for the proposed wells, my staff has determined that no threatened, endangered, or candidate species are likely to occur in the area. However, we are providing comments on migratory birds, greater sage-grouse, and mountain plover, which could occur on the site, and the potential impacts of exploratory drilling on migratory birds.

Migratory Birds
The MBTA, enacted in 1918, prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations and does not require intent to be proven. Section 703 of the MBTA states, "Unless and except as permitted by regulations ... it shall be unlawful at any time, by any means or in any manner, to ... take, capture, kill, attempt to take, capture, or kill, or possess ... any migratory bird, any part, nest, or eggs of any such bird..." The BGEPA, prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing.

Work that could lead to the take of a migratory bird including an eagle, their young, eggs, or nests (for example, if you are going to construct new power lines in the vicinity of a nest), should be coordinated with our office before any actions are taken. Removal or destruction of such

nests, or causing abandonment of a nest could constitute violation of one or both of the above statutes. Removal of any active migratory bird nest or nest tree is prohibited. For golden eagles, inactive nest permits are limited to activities involving resource extraction or human health and safety. Mitigation, as determined by the local Service field office, may be required for loss of these nests. No permits will be issued for an active nest of any migratory bird species, unless removal of an active nest is necessary for reasons of human health and safety. Therefore, if nesting migratory birds are present on, or near the project area, timing is a significant consideration and needs to be addressed in project planning.

If nest manipulation is proposed for this project, the project proponent should contact the Service's Migratory Bird Office in Denver at 303-236-8171 to see if a permit can be issued for this project. No nest manipulation is allowed without a permit. If a permit cannot be issued, the project may need to be modified to ensure take of a migratory bird or eagle, their young, eggs or nest will not occur.

Greater Sage-grouse

The Service is currently conducting a review to determine if the greater sage-grouse (*Centrocercus urophasianus*) warrants listing. Greater sage-grouse are dependent on sagebrush habitats year-round. Habitat loss and degradation, as well as loss of population connectivity have been identified as important factors contributing to the decline of greater sage-grouse populations rangewide (Braun 1998, Wisdom *et al.* 2002). Therefore, any activities that result in loss or degradation of sagebrush habitats that are important to this species should be closely evaluated for their impacts to sage-grouse. If important breeding habitat (leks, nesting, or brood rearing habitat) is present in the project area, the Service recommends no project-related disturbance March 1 through June 30, annually. Minimization of disturbance during lek activity, nesting, and brood rearing is critical to sage-grouse persistence within these areas. Likewise, if important winter habitats are present (Doherty *et al.* 2008), we recommend no project-related disturbance November 15 through March 14, annually.

We recommend you contact the Wyoming Game and Fish Department to identify important greater sage-grouse habitats within the project area, and appropriate mitigative measures to minimize potential impacts from the proposed project. The Service recommends surveys and mapping of important greater sage-grouse habitats where local information is not available. The results of these surveys should be used in project planning, to minimize potential impacts to this species. No project activities that may exacerbate habitat loss or degradation should be permitted in important habitats. Additionally, unless site-specific information is available, greater sage-grouse habitat should be managed following the guidelines by Connelly *et al.* 2000 (also known as the WAFWA guidelines).

In Wyoming, information suggests that greater sage-grouse populations are negatively affected by energy development activities, especially those that degrade important sagebrush habitat, even when mitigative measures are implemented (Braun 1998, Lyon 2000, Naugle *et al.* 2006). Greater sage-grouse populations can repopulate areas developed for resource extraction after habitat reclamation for the species (Braun 1987). However, there is no evidence that populations attain their previous levels and reestablishment of sage-grouse in a reclaimed area may take 20 to 30 years, or longer (Braun 1998). Therefore, this project should be carefully evaluated for long-term and cumulative effects on the greater sage-grouse, since reclamation may not restore

populations to pre-activity levels. The Bureau of Land Management should ensure this activity does not exacerbate greater sage-grouse declines on either a local or range-wide level.

Mountain Plover

The Service has withdrawn the proposal to list the mountain plover (*Charadrius montanus*) and we will no longer be reviewing project impacts to this species under the Act. We do, however, encourage continued protection for this species as it remains protected under the MBTA. Measures to protect the mountain plover from further decline may include (1) avoidance of suitable habitat during the plover nesting season (April 10 through July 10), (2) prohibition of ground disturbing activities in prairie dog towns, and (3) prohibition of any permanent above ground structures that may provide perches for avian predators or deter plovers from using preferred habitat. Suitable habitat for nesting mountain plovers includes grasslands, mixed grassland areas and short-grass prairie, shrub-steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms, and prairie dog towns.

Reserve Pits

The Service recommends pitless (closed-loop) drilling or the immediate closure of reserve pits after well completion. Pitless drilling has been found to reduce the amount of drilling waste, recycles drilling fluids, and reduces drilling costs (Rogers et. al. 2006a and b). Pitless drilling can reduce the volume of waste by 60 to 70 percent (Rogers et. al. 2006b). Pitless drilling also conserves water and prevents soil contamination. The use of earthen pits to contain drilling muds and fluids can contaminate soil, groundwater, and surface water with metals and hydrocarbons if not managed and closed properly. Caustic soda, rig wash, diesel fuel, waste oil from machinery, and other refuse could be placed in reserve pits either deliberately or inadvertently. Reis (1996) states that "improper reserve pit management practices have created sources of benzene, lead, arsenic, and fluoride, even when these contaminants were not detected or were not present in the drilling mud system."

The complete elimination of earthen pits for drilling waste disposal is the key to the effectiveness of pitless drilling. Disposal of drill cuttings into an earthen pit defeats the purpose of pitless drilling systems. Earthen pits used for disposal of drill cuttings will collect rainwater and or snowmelt and thus pose a risk to migratory birds and other wildlife as do conventional reserve pits. Additionally, soil and groundwater contamination can occur by disposing of drill cuttings into earthen pits. Drill cuttings separated from the drilling mud in pitless drilling systems should be collected in tanks and then transferred to pads constructed of compacted clay soil over a synthetic liner. The stacked drill cuttings are piled, mixed and allowed to dry on the pad (Rogers et. al. 2006b).

Typical reserve pit closure involves leaving the pit in place after well completion to allow the fluids to dry. Typically, oil operators are allowed one year after well completion to close a reserve pit. If the reserve pit contains oil or oil-based products (i.e. oil-based drilling fluids), the pit can entrap and kill migratory birds and other wildlife. Birds, including hawks, owls, and songbirds, are attracted to reserve pits by mistaking them for natural bodies of water. Reserve pits also can attract bats, insects, small mammals, and big game. Songbirds and mammals may approach oil-covered reserve pits to drink and can fall into the pits or they can become entrapped if the banks of the pits are oiled. Insects entrapped in the oil can also attract songbirds, bats, and small mammals. Hawks and owls in turn become victims when they are attracted by the

struggling birds or small mammals. The sticky nature of oil entraps birds in the pits and they die from exposure and exhaustion. Birds that do manage to escape die from starvation, exposure or the toxic effects of oil ingested during preening. Birds ingesting sublethal doses of oil can experience impaired reproduction.

If reserve pits must be used, cost-effective technology exists to solidify pit fluids immediately following well completion. Solidification can add to the waste volume but prevents mobilization of potential contaminants into the soil and/or groundwater (EPA 2000).

Thank you for your efforts to ensure the conservation of threatened, endangered, and other species in Wyoming. If you have further questions regarding this letter, please contact Ann Belleman at the letterhead address or phone (307) 772-2374 ext. 232.

Sincerely,

Scott Hicks

for Brian T. Kelly
Field Supervisor
Wyoming Field Office

cc: BLM, Field Manager, Cody, WY (M. Stewart)
WGFD, Non-game Coordinator, Lander, WY (B. Oakleaf)
WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (V. Stelter)

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APPENDIX D:

MONITORING PLAN

APPENDIX D

ROCKTOBER UNIT PROJECT MONITORING PLAN

Overview and Administration

Monitoring is conducted to ensure that stipulations and mitigation/protection measures discussed and analyzed in the EA as part of the proposed action (e.g., project design features, stipulations and/or terms and conditions of NOI approval) are implemented in the field.

Monitoring is also helpful for BBC in that it would allow for on-site communication with the BLM on a regular basis should questions arise concerning the practical application of any stipulation or mitigative/protection measure.

The following monitoring measures would be undertaken as a framework for compliance during the exploratory drilling project.

1. At least one BLM designated representative would perform monitoring duties at their discretion until project completion and rehabilitation is completed.

2. Monitoring would be at the discretion of the Authorized Officer (AO) and based on project status and resource risk.

3. While performing monitoring duties, each BLM designated representative would retain a copy of the Project Design Features from the EA, as well as the Decision Record.

4. Each BLM-designated representative performing monitoring would write a monitoring report for the administrative file for each day they monitor. The report would describe daily observations, problems, solutions, and any other items of note.

5. A BLM uniform will be worn by the BLM-designated representative while performing field monitoring.

6. A qualified BLM-approved paleontological resources monitor would be onsite during all road/turnout and well pad construction, as well as during pipeline and compressor station and all related construction during the project.

Monitoring Goals

Goals of project monitoring are geared towards: 1) operator compliance, 2) protection of public land resources, and 3) the improvement of future decision making. Monitoring would also serve to foster innovative approaches for the resolution of operational issues should any develop during project operations.

Goals are as follows.

1. BLM would maintain adequate communication and coordination with BBC and its contractors to ensure immediate correction of any unacceptable performance during project operations.

2. The BLM-designated representative would be familiar with the project manager, permit agent and/or company representative. They would also have knowledge of the project area, access roads, restricted areas, and potential problem areas by requiring a brief on-the-ground tour of the project area prior to the start of operations.

3. The BLM-designated representative would be in attendance and participate in planning/safety meetings during project operations.

4. The BLM-designated representatives would follow the same rules (terms and conditions of the DR) as the operator.

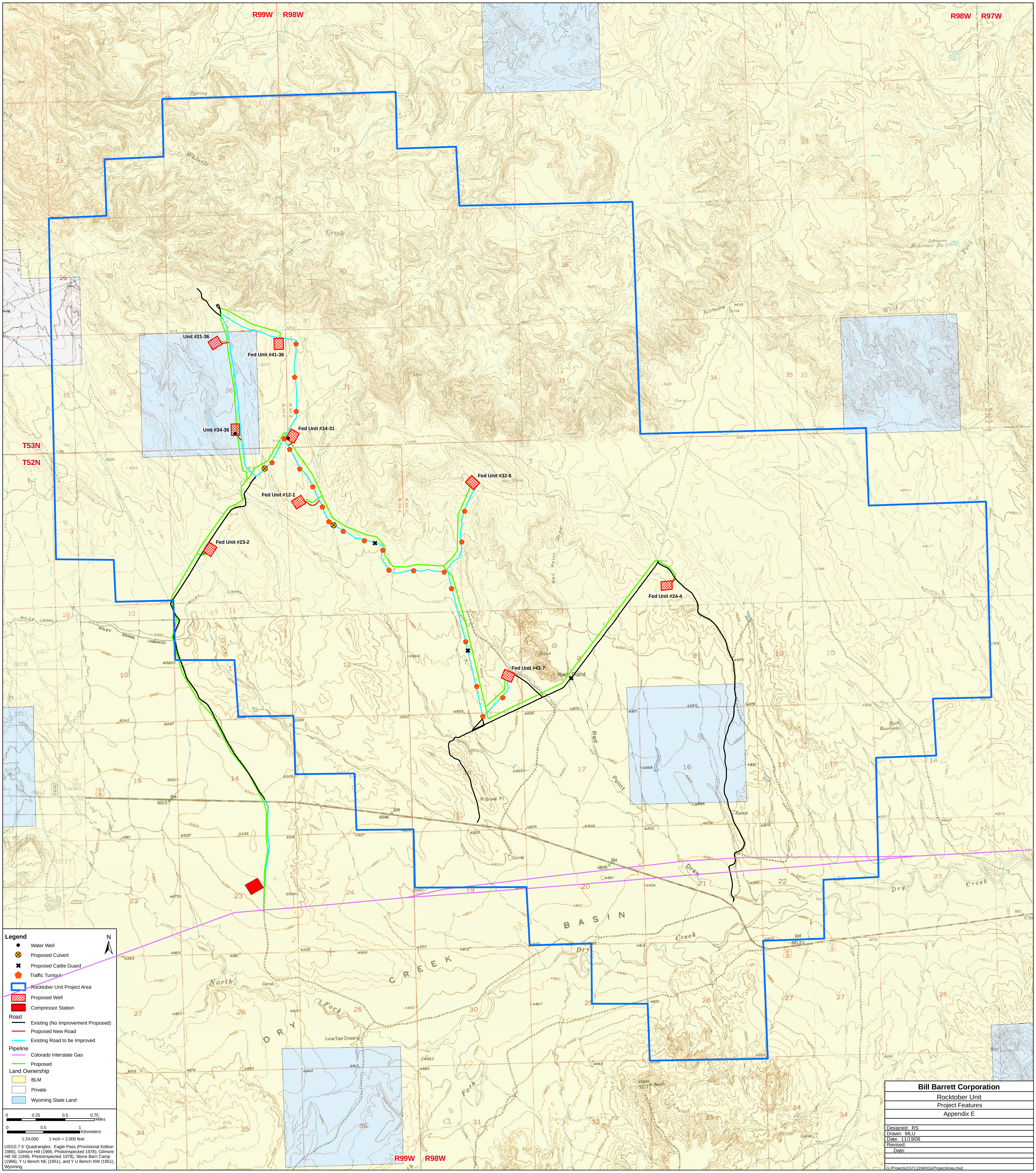
5. The seven greater sage-grouse leks in and adjacent to the Unit would be monitored annually throughout the LOP.

6. Impacts to the wild horses would be monitored throughout the LOP to strive to reduce adverse impacts to the wild horses.

7. Water wells drilled by BBC would be monitored annually by BBC for a period of 3-5 years after drilling. This will measure draw-down on the aquifer and water quality.

APPENDIX E:

MAP OF BBC'S PROPOSED DEVELOPMENT PLAN


R99W R98W
R98W R97W
T53N
T52N
Unit #21-36
Fed Unit #41-36
Unit #34-36
Fed Unit #14-31
Fed Unit #32-6
Fed Unit #12-1
Fed Unit #23-2
Fed Unit #24-4
Fed Unit #43-7
Red Point
Gilmore Hill
Johnson Reservoir No 2
West Fork
Spring
Whistle
Creek
Red Point Draw
Wiley Canal
Rock Reservoir
Gravel Pit
Corral
Lone Tree Crossing
North Fork
DRY CREEK
BASIN
Dry Creek
Draw
R99W R98W
Legend
Water Well
Proposed Culvert
Proposed Cattle Guard
Traffic Turnout
Rocktober Unit Project Area
Proposed Well
Compressor Station
Road
Existing (No Improvement Proposed)
Proposed New Road
Existing Road to be Improved
Pipeline
Colorado Interstate Gas
Proposed
Land Ownership
BLM
Private
Wyoming State Land
0 0.25 0.5 0.75 Miles
0 0.5 1 Kilometers
1:24,000 1 inch = 2,000 feet
USGS 7.5' Quadrangles: Eagle Pass (Provisional Edition 1985), Gilmore Hill (1966, Photoinspected 1978), Gilmore Hill SE (1966, Photoinspected 1978), Stone Barn Camp (1966), Y U Bench NE (1951), and Y U Bench NW (1951), Wyoming
Bill Barrett Corporation
Rocktober Unit
Project Features
Appendix E
Designed: RS
Drawn: MLU
Date: 11/19/08
Revised:
Date:
G:/Projects/157112/MXDs/ProjectArea.mxd

APPENDIX F:

AIR QUALITY EMISSIONS INVENTORY

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

1. Well Pad/Access Road/Pipeline Construction Fugitive Dust Emissions

Assumptions:

Pieces of Equipment	Hours of Construction	
- 1 Backhoe	20	hours per well pad
- 1 Dozer/Crawler Tractor	100	hours per well pad

Watering Control Efficiency 50 percent (Chapter 2)

Soil Moisture Content 7.9 percent (AP-42 Table 11.9-3, 10/98)

Soil Silt Content 6.9 percent (AP-42 Table 11.9-3, 10/98)

PM10 Multiplier 0.75 * PM15 (AP-42 Table 11.9-1, 10/98)

PM2.5 Multiplier 0.105 * TSP (AP-42 Table 11.9-1, 10/98)

Equations: From AP-42 tables 11.9-1 and 11.9-3 for
Bulldozing Overburden Emissions, Western Surface Coal Mining, 10/98
As specified by AP-42 Table 13.2.3-1 Recommended Emission Factors for Construction Operations

Emissions (TSP lbs/hr) = 5.7 * (soil silt content %)^1.2 * (soil moisture content %)^-1.3* Control Efficiency

Emissions (PM15 lbs/hr) = 1.0 * (soil silt content %)^1.5 * (soil moisture content %)^-1.4 * Control Efficiency

Emissions = 1.97 lbs TSP/hour/piece of equipment

Emissions = 0.50 lbs PM15/hour/piece of equipment

	Fugitive Dust Emissions [a]		
	lbs/hr/ machine	**tons/well**	**tons/yr [b]**
TSP	1.97	0.1182	0.83
PM15	0.50	0.0301	0.21
PM10	0.38	0.0226	0.16
PM2.5	0.21	0.0124	0.09

[a] Backhoe emissions are conservatively estimated as equivalent to Bulldozing emissions.

[b] Assumes construction rate specified by Proponen

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

2. Well Pad/Road Construction Emissions (Grader)

Assumptions:

Grading Length	3.98	0.04 miles/road x 3 plus 3.97 miles on 420' x500' pad (10 ft swath for 500 ft * 42 lengths) = 21,000 ft = 3.97 miles
Hours of Construction	10	day grading per well pad and road (Estimate)
	10	hours/day
...	100	hours per well pad
Watering Control Efficiency	50	percent (Chapter 2)
Average Grader Speed	7.1	mph (Typical value AP-42 Table 11.9-3, 10/98)
Distance Graded	3.98	miles
PM10 Multiplier	0.6 * PM15	(AP-42 Table 11.9-1, 10/98)
PM2.5 Multiplier	0.031 * TSP	(AP-42 Table 11.9-1, 10/98)

Equations: From AP-42 tables 11.9-1 and 11.9-3 for
Grading Emissions, Western Surface Coal Mining, 10/98
As specified by AP-42 Table 13.2.3-1 Recommended Emission Factors for Construction Operations

Emissions (TSP lbs) = $0.040 * (\text{Mean Vehicle Speed})^{2.5} * \text{Distance Graded} * \text{Control Efficiency}$

Emissions (PM15 lbs) = $0.051 * (\text{Mean Vehicle Speed})^{2.0} * \text{Distance Graded} * \text{Control Efficiency}$

Emissions = 10.68 lbs TSP/well

Emissions = 5.11 lbs PM15/well

	Grader Construction Emissions			
	lbs/well	**lbs/hr/well**	**tons/well**	**tons/yr [a]**
TSP	10.68	0.11	0.0053	0.04
PM15	5.11	0.05	0.0026	0.02
PM10	3.07	0.03	0.0015	0.01
PM2.5	0.33	0.003	0.0002	0.00

[a] Assumes maximum development scenario

3. Interim Reclamation Fugitive Dust Emissions

Assumptions:

Hours of Reclamation	2	days per well pad (Estimate)
	12	hours/day
	24	hours per well pad
Pieces of Equipment	1	- Dozer
Watering Control Efficiency	50	percent (Assumption)
Soil Moisture Content	7.9	percent (AP-42 Table 11.9-3, 10/98)
Soil Silt Content	6.9	percent (AP-42 Table 11.9-3, 10/98)
PM10 Multiplier	0.75 * PM15	(AP-42 Table 11.9-1, 10/98)
PM2.5 Multiplier	0.105 * TSP	(AP-42 Table 11.9-1, 10/98)

Equations: From AP-42 tables 11.9-1 and 11.9-3 for
Bulldozing Overburden Emissions, Western Surface Coal Mining, 10/98
As specified by AP-42 Table 13.2.3-1 Recommended Emission Factors for Construction Operations

Emissions (TSP lbs/hr) = 5.7 * (soil silt content %)^1.2 * (soil moisture content %)^-1.3* Control Efficiency

Emissions (PM15 lbs/hr) = 1.0 * (soil silt content %)^1.5 * (soil moisture content %)^-1.4 * Control Efficiency

Emissions = 1.97 lbs TSP/hour/piece of equipment

Emissions = 0.50 lbs PM15/hour/piece of equipment

	Fugitive Dust Emissions		
	lbs/hr	tons/well	tons/yr [a]
TSP	1.97	0.0236	0.17
PM15	0.50	0.0060	0.04
PM10	0.38	0.0045	0.03
PM2.5	0.21	0.0025	0.02

[a] Assumes maximum construction rate specified by Proponent

Buys & Associates, Inc.
Environmental Consultants

Project: Rocktober Unit Proposed Action Inventory
Date: 3/3/2009

4. Development - Unpaved Road Fugitive Dust Emissions

Calculation from AP-42, Chapter 13.2.2 November 2006
E (PM10) / VMT = 1.5 * (S/12)^0.9 * (W/3)^0.45 * (365-p)/365)
E (PM2.5) / VMT = 0.15 * (S/12)^0.9 + (W/3)^0.45 * (365-p)/365)

Silt Content (S)	8.4	Mean value Table 13.2.2-1 for haul roads
Round Trip Miles =	21	Proponent Data
Precipitation Days (p)	50	days per year (average WRCC data for Cody and Emblem, WY 1911-2008

Construction (days/pad and road) =	**10**								
	Vehicle Type	**Average Weight (W) (lbs)**	**Round Trips per Well [a]**	**PM_{10} (lb/VMT)**	**PM_{10}/Pad (lbs)**	**PM_{10}/Pad (lb/day)**	**$PM_{2.5}$/Pad (lbs)**	**$PM_{2.5}$/Pad (lb/day)**
	Haul Trucks	70,000	10					
	Water Trucks	60,000	10					
	Light Trucks	8,000	40					
	Mean Vehicle Weight	27,000	60	1.8477	2328.2	232.8	232.8	23.3
					PM_{10}		**$PM_{2.5}$**	
		Construction Emissions (ton/yr) =			8.1		0.8	
Drilling, Downhole (days/well) =	**65**								
	Vehicle Type	**Average Weight (W) (lbs)**	**Round Trips per Well [a]**	**PM_{10} (lb/VMT)**	**PM_{10}/Pad (lbs)**	**PM_{10}/Pad (lb/day)**	**$PM_{2.5}$/Pad (lbs)**	**$PM_{2.5}$/Pad (lb/day)**
	Haul Trucks	80,000	70					
	Logging/Mud Trucks	70,000	10					
	Water Trucks	60,000	50					
	Light Trucks	8,000	1560					
	Mean Vehicle Weight	12,888	1690	1.3247	47012.4	723.3	4701.2	72.3
					PM_{10}		**$PM_{2.5}$**	
		Drilling, Downhole Emissions (ton/yr) =			164.5		16.5	
Completion (days/well) =	**90**								
	Vehicle Type	**Average Weight (W) (lbs)**	**Round Trips per Well [a]**	**PM_{10} (lb/VMT)**	**PM_{10}/Pad (lbs)**	**PM_{10}/Pad (lb/day)**	**$PM_{2.5}$/Pad (lbs)**	**$PM_{2.5}$/Pad (lb/day)**
	Heavy Trucks	60,000	720					
	Light Trucks	8,000	1350					
	Mean Vehicle Weight	26,087	2070	1.8194	79087.8	878.8	7908.8	87.9
					PM_{10}		**$PM_{2.5}$**	
		Completion Emissions (ton/yr) =			**276.8**		**27.7**	
Interim Reclamation (days/well) =	**2**								
	Vehicle Type	**Average Weight (W) (lbs)**	**Round Trips per Well [a]**	**PM_{10} (lb/VMT)**	**PM_{10}/Pad (lbs)**	**PM_{10}/Pad (lb/day)**	**$PM_{2.5}$/Pad (lbs)**	**$PM_{2.5}$/Pad (lb/day)**
	Heavy Trucks	60,000	4					
	Light Trucks	8,000	8					
	Mean Vehicle Weight	25,333	12	1.7955	452.5	226.2	45.2	22.6
					PM_{10}		**$PM_{2.5}$**	
		Interim Reclamation Emissions (ton/yr) =			1.6		0.2	
					PM_{10}		**$PM_{2.5}$**	
	Development Traffic Fugitive Dust Emissions (tons/year) =				**451**		**45**	

[a] Traffic Estimates are based on Proposed Action

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

5. Wind Erosion Fugitive Dust Emissions

Assumptions

Threshold Friction Velocity U_t^* 1.02 m/s (2.28 mph) for well pads (AP-42 Table 13.2.5-2 Overburden - Western Surface Coal Mine
1.33 m/s (2.97 mph) for roads (AP-42 Table 13.2.5-2 Roadbed material)

Initial Disturbance Area 98.1 acres total initial disturbance for roads/pipelines (Proposed Action)
397,194 square meters total initial disturbance for roads/pipelines

56 acres total initial disturbance for well pads and other facilities (Proposed Action)
225,418 square meters total initial disturbance for well pads and other facilities

154 acres total disturbance

Exposed Surface Type Flat

Meteorological Data 2002 Grand Junction (obtained from NCDC website)

Fastest Mile Wind Speed U_{10}^+ 20.1 meters/sec (45 mph) reported as fastest 2-minute wind speed for Grand Junction (2002)

Number soil of disturbances 2 for well pads and facilities (Assumption, disturbance at construction and reclamation)
Constant for dirt roads

Development Period 1 year (Proposed Action)

Equations

Friction Velocity $U^* = 0.053\ U_{10}^+$

Erosion Potential P (g/m^2/period) = $58*(U^*-U_t^*)^2 + 25*(U^*-U_t^*)$ for $U^*>U_t^*$, P = 0 for $U^*< U_t^*$

Emissions (tons/year) = Erosion Potential(g/m^2/period)*Disturbed Area(m^2)*Disturbances/year*(k)/(453.6 g/lb)/2000 lbs/ton/Develop Perioc

Particle Size Multiplier (k)		
30 um	**<10 um**	**<2.5 um**
1.0	0.5	0.2

Maxium U_{10}^+ Wind Speed (m/s)	**Maximum U* Friction Velocity m/s**	**Well U_t^* Threshold Velocity[a] m/s**	**Well Pad Erosion Potential g/m^2**	**Road U_t^* Threshold Velocity[a] m/s**	**Road Erosion Potential g/m^2**
20.12	1.07	1.02	1.28	1.33	0.00

Wind Erosion Emissions

Particulate Species	**Wells (tons/year)**	**Roads/Pipelines (tons/year)**
TSP	0.64	0.00
PM10	0.32	0.00
PM2.5	0.13	0.00

6. Construction Tailpipe Emissions

Assumptions:

Average Round Trip Distance 57.0 miles (Estimated from project area and existing road system)

Hours of Construction 100 hours per site (Proposed Action)

Number of Heavy Diesel Truck Trips 20 (Proposed Action)

Number of Pickup Trips 40 (Proposed Action)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{\# Trips} * \text{Trip Distance (miles)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ \text{(S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Construction Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
Criteria Pollutants & VOC								
NO_x	8.130	0.204	0.010	3.030	0.152	0.008	0.357	0.125
CO	17.090	0.430	0.021	33.640	1.691	0.085	2.120	0.742
VOC [c]	4.600	0.116	0.006	4.646	0.234	0.012	0.349	0.122
SO_2	0.321	0.008	0.000	0.214	0.011	0.001	0.019	0.007
Greenhouse Gases								
CH_4 [e]	0.230	0.006	0.000	0.184	0.009	0.000	0.015	0.005

a AP-42 Append. H Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95
b AP-42 Append. H Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95
c Emission factor is for total Hydrocarbons - Methane Offset
d Assumes construction rate specified by Proponent
e AP-42 Append. H Tables 7.10A.2 and 4.10A.2 H.D. Methane Offsets, High Altitude, 1986+ and 1988+ Vehicle Year

7. Drilling Tailpipe Emissions

Assumptions:

Average Round Trip Distance 57.0 miles (Estimated from project area and existing road system)

Hours of Operation 1560 hours per site (Proposed Action)

Number of Heavy Diesel Truck Trips 130 (Proposed Action)

Number of Pickup Trips 1560 (Proposed Action)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \#\text{ Trips} * \text{Trip Distance (miles)}}{453.6\text{ (g/lb)} * 2000\text{ (lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\text{ (g/lb)} * \text{Fuel Sulfur Content} * 2\text{ (S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Drilling Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
Criteria Pollutants & VOC								
NO_x	8.13	0.085	0.066	3.03	0.381	0.297	0.466	2.544
CO	17.09	0.179	0.140	33.64	4.227	3.297	4.406	24.058
VOC [c]	4.600	0.048	0.038	1.656	0.208	0.162	0.256	1.399
SO_2	0.32	0.003	0.003	0.21	0.027	0.021	0.030	0.165
Greenhouse Gases								
CH_4 [e]	0.230	0.002	0.002	0.184	0.023	0.018	0.026	0.139

[a] AP-42 Append. H Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)

[b] AP-42 Append. H Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)

[c] Emission factor is for total Hydrocarbons - Methane Offset

[d] Assumes construction rate specified by Proponent

[e] AP-42 Append. H Tables 7.10A.2 and 4.10A.2 H.D. Methane Offsets, High Altitude, 1986+ and 1988+ Vehicle Year

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

8. Completion Tailpipe Emissions

Assumptions:

Average Round Trip Distance 57.0 miles (Estimated from project area and existing road system)

Hours of Operation 900.00 hours per site (Proposed Action)

Number of Heavy Diesel Truck Trips 720 (Proponent)

Number of Pickup Trips 1350 (Proponent)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \#\text{ Trips} * \text{Trip Distance (miles)}}{453.6\text{ (g/lb)} * 2000\text{ (lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\text{ (g/lb)} * \text{Fuel Sulfur Content} * 2\text{ (S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Completion Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
Criteria Pollutants & VOC								
NO_x	8.13	0.817	0.368	3.03	0.571	0.257	1.388	4.374
CO	17.09	1.718	0.773	33.64	6.341	2.853	8.059	25.386
VOC [c]	4.600	0.462	0.208	1.656	0.312	0.140	0.775	2.440
SO_2	0.32	0.032	0.015	0.21	0.040	0.018	0.073	0.229
Greenhouse Gases								
CH_4 [e]	0.230	0.023	0.010	0.184	0.035	0.016	0.058	0.182

a AP-42 Append. H Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)
b AP-42 Append. H Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)
c Emission factor is for total Hydrocarbons - Methane Offset
d Assumes construction rate specified by Proponent
e AP-42 Append. H Tables 7.10A.2 and 4.10A.2 H.D. Methane Offsets, High Altitude, 1986+ and 1988+ Vehicle Year

Buys & Associates, Inc. Environmental Consultants	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

9. Interim Reclamation Tailpipe Emissions

Assumptions:

Average Round Trip Distance 57.0 miles (Estimated from project area and existing road system)

Hours of Operation 60 hours per site (Assumption)

Number of Heavy Diesel Truck Trips 4 (Assumption)

Number of Pickup Trips 8 (Assumption)

Diesel Fuel sulfur content 0.05 % (Typical value)

Diesel Fuel density 7.08 lbs/gallon (Typical value)

Heavy Haul Diesel Fuel Efficiency 10 miles/gallon (Typical value)

Heavy Duty Pickup Fuel Efficiency 15 miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{\# Trips} * \text{Trip Distance (miles)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ \text{(g/lb)} * \text{Fuel Sulfur Content} * 2\ \text{(S / SO2)}}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Development Vehicles	Heavy Haul Trucks			Heavy Duty Pickups			Total [d]	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr/well)	Emissions (lb/hr)	Emissions (tons/yr)
Criteria Pollutants & VOC								
NO_x	8.13	0.068	0.002	3.03	0.051	0.002	0.119	0.025
CO	17.09	0.143	0.004	33.64	0.564	0.017	0.707	0.148
VOC [c]	4.600	0.039	0.001	1.656	0.028	0.001	0.066	0.014
SO_2	0.32	0.003	0.000	0.21	0.004	0.000	0.006	0.001
Greenhouse Gases								
CH_4 [e]	0.230	0.002	0.000	0.184	0.003	0.000	0.005	0.001

a AP-42 Append. H Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95
b AP-42 Append. H Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95
c Emission factor is for total Hydrocarbons - Methane Offset
d Assumes construction rate specified by Proponent
e AP-42 Append. H Tables 7.10A.2 and 4.10A.2 H.D. Methane Offsets, High Altitude, 1986+ and 1988+ Vehicle Year

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10. Construction Heavy Equipment Tailpipe Emissions

Assumptions:

Hours of Operation 100 hours/site (Proposed Action)

Development Rate 7 new pads per year (Proposed Action)

Load Factor 0.4 (Assumed typical value)

Backhoe Size 89 hp (mid-sized Typical value

Dozer/Crawler Tractor 686 hp (largest D6 series+Class 988)

Motor Grader Size 158 hp (largest D12 series)

Equations:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Rated Horsepower (hp)} * \text{Operating Hours (hrs)} * \text{Load Factor (Dimensionless)}}{453.6\ \text{(g/lb)} * 2000\ \text{(lb/tons)}}$$

Heavy Const. Vehicles	Backhoe			Dozer/Crawler Tractor			Grader		
	E. Factor [a] (g/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)	E. Factor [a] (g/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)	E. Factor [b] (g/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)
NO_x	8.15	0.640	0.224	8.15	4.930	1.726	7.14	0.995	0.348
CO	2.28	0.179	0.063	2.28	1.379	0.483	1.54	0.215	0.075
VOC [c]	0.37	0.029	0.010	0.37	0.224	0.078	0.36	0.050	0.018
PM_{10} [d]	0.5	0.039	0.014	0.5	0.302	0.106	0.63	0.088	0.031
$PM_{2.5}$ [d]	0.5	0.039	0.014	0.5	0.302	0.106	0.63	0.088	0.031
SO_2	0.22	0.017	0.006	0.22	0.133	0.047	0.22	0.031	0.011
Formaldehyde	0.22	0.017	0.006	0.22	0.133	0.047	0.12	0.017	0.006

Heavy Const. Vehicles	Total	
	Emissions (lb/hr)	Emissions [e] (tons/yr)
NO_x	6.565	2.298
CO	1.773	0.620
VOC [c]	0.303	0.106
PM_{10} [d]	0.429	0.150
$PM_{2.5}$ [d]	0.429	0.150
SO_2	0.181	0.063
Formaldehyde	0.167	0.058

Pipelayer - 240hp		
E. Factor [a] (g/hp-hr)	Emissions (lb/hr)	Emissions [e] (tons/yr)
8.15	1.725	0.604
2.28	0.483	0.169
0.37	0.078	0.027
0.5	0.106	0.037
0.5	0.106	0.037
0.22	0.047	0.016
0.22	0.047	0.016

[a] AP-42 Volume II, Mobile Sources, Nonroad Vehicles, Table 11-7.1 Off-highway truck

[b] AP-42 Volume II, Mobile Sources, Nonroad Vehicles, Table 11-7.1 Motor Grader

[c] Emission Factor represents total Hydrocarbon Emissions

[d] All emitted particulate matter assumed to be PM2.5

[e] Assumes construction rate specified by Proponent

11. Drill Rig Engine Emissions

Assumptions:

Hours of Operation 1560 hours/ well (Proposed Action)

Development Rate 7 total wells in max year (Proposed Action)

Load Factor 0.4 (Assumed typical value)

Rig Size 1000 hp (Estimate - drill rig)
2500 hp (Estimate - mud rigs)
3500 hp (total hp)

Diesel Fuel Sulfur Content 0.05 % (typical value)

Equations:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (lb/hp-hr)} * \text{Rated Horsepower (hp)} * \text{Operating Hours (hrs)} * \text{Load Factor (Dimensionless)}}{\text{2000 (lb/tons)}}$$

SO_2 E. Factor (lb/hp-hr) = Fuel sulfur content * 0.00809

Species	Drill Rig Emissions		
	E. Factor (lb/hp-hr)	Emissions (lb/hr)	Emissions [h] (tons/yr)
Criteria Pollutants & VOC			
NOx [a]	0.024	33.600	183
CO [a]	5.50E-03	7.700	42
VOC [a,b]	7.05E-04	0.987	5.4
PM_{10} [a,c]	5.75E-04	0.805	4.4
$PM_{2.5}$ [a,d]	4.81E-04	0.673	3.7
SO_2 [a]	4.05E-04	0.566	3.1
Hazardous Air Pollutants			
Benzene [e]	1.97E-06	0.003	1.51E-02
Toluene [e]	7.15E-07	0.001	5.47E-03
Xylenes [e]	4.91E-07	6.88E-04	3.75E-03
Formaldehyde [e]	2.01E-07	2.81E-04	1.53E-03
Acetaldehyde [e]	6.41E-08	8.98E-05	4.90E-04
Acrolein [e]	2.01E-08	2.81E-05	1.53E-04
Naphthalene [f]	3.31E-07	4.63E-04	2.53E-03
Total PAH [f,g]	5.40E-07	7.55E-04	4.12E-03
Greenhouse Gases			
CO_2 [a]	1.16	1624	8,867
CH_4 [a,b]	7.05E-04	0.987	5.4

[a] AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-1 Diesel Fuel, 10/96

[b] Emission Factor represents total Hydrocarbon Emissions

[c] Total particulate emission factor is 0.0007, PM10 fraction determined from Table 3.4-2

[d] Total particulate emission factor is 0.0007, PM2.5 fraction determined from Table 3.4-2

[e] AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-3, 10/96 converted using boiler conversion factor from Appendix A

[f] AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-4, 10/96 converted using boiler conversion factor from Appendix A

[g] PAH (Polycyclic Aromatic Hydrocarbons) includes naphthalene

[h] Assumes maximum development scenario

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12. Well Fracturing Pump and Generator Engines

Assumptions:

Average Hours of Operation 3 Hours/Well (Proponents)

Development Rate 7 wells per year (Proposed Action)

Load Factor 0.5 (typical value)

Frac Pump Engine Horsepower 5,000 Horsepower (typical)
Temporary Generator Horsepower 75 Horsepower (typical)

Diesel Fuel Sulfur Content 0.05 % (typical value)

Equations:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (lb/hp-hr)} * \text{Rated Horsepower (hp)} * \text{Operating Hours (hrs)} * \text{Load Factor (Dimensionless)}}{\text{2000 (lb/tons)}}$$

SO2 E. Factor (lb/hp-hr) = Fuel sulfur content * 0.00809

Species	Frac Pump Engine Emissions		
	E. Factor (lb/hp-hr)	Emissions (lb/hr)	Emissions[i] (tons/yr)
Criteria Pollutants & VOC			
NOx[a]	0.024	60.000	0.630
CO[a]	5.50E-03	13.750	0.144
VOC[a,b]	7.05E-04	1.763	0.019
PM_{10}[a,c]	5.73E-04	1.433	0.015
$PM_{2.5}$[a,d]	4.79E-04	1.198	0.013
SO_2[a]	4.05E-04	1.011	0.011
Hazardous Air Pollutants			
Benzene[e]	1.97E-06	4.94E-03	0.000
Toluene[e]	7.15E-07	1.79E-03	0.000
Xylenes[e]	4.91E-07	1.23E-03	1.29E-05
Formaldehyde[e]	2.01E-07	5.02E-04	5.27E-06
Acetaldehyde[e]	6.41E-08	1.60E-04	1.68E-06
Acrolein[e]	2.01E-08	5.01E-05	5.26E-07
Naphthalene[f]	3.31E-07	8.27E-04	8.69E-06
Total PAH[f]	5.40E-07	1.35E-03	1.42E-05
Greenhouse Gases			
CO_2[a]	1.16	2,900	30.5
CH_4[a]	7.05E-04	1.763	0.019

Species	Generator Engine Emissions		
	E. Factor (lb/hp-hr)	Emissions (lb/hr)	Emissions[i] (tons/yr)
Criteria Pollutants			
NOx[g]	0.031	1.163	0.01
CO[g]	6.68E-03	0.25	0.00
VOC[b,g]	2.47E-03	0.09	0.00
PM_{10}[g]	2.20E-03	0.08	0.00
$PM_{2.5}$[g]	2.20E-03	0.08	0.00
SO_2[g]	2.05E-03	0.08	0.00
Hazardous Air Pollutants			
Benzene[h]	2.37E-06	8.90E-05	9.35E-07
Toluene[h]	1.04E-06	3.90E-05	4.10E-07
Xylenes[h]	7.25E-07	2.72E-05	2.86E-07
Formaldehyde[h]	3.00E-06	1.13E-04	1.18E-06
Acetaldehyde[h]	1.95E-06	7.32E-05	7.69E-07
Acrolein[h]	2.35E-07	8.83E-06	9.27E-08
1,3-Butadiene[h]	9.95E-08	3.73E-06	3.92E-08
Naphthalene[h]	2.16E-07	8.09E-06	8.50E-08
Total PAH[h]	4.28E-07	1.60E-05	1.68E-07
Greenhouse Gases			
CO_2[g]	1.15	2,875	30
CH_4[b,g]	2.47E-03	6.175	0.06

[a] AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-1, 10/96

[b] Emission Factor represents total Hydrocarbon Emissions

[c] Total particulate emission factor is 0.0007, PM10 fraction determined from Table 3.4-2

[d] Total particulate emission factor is 0.0007, PM2.5 fraction determined from Table 3.4-2

[e] AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-3, 10/96 converted using boiler conversion factor from Appendix A

[f] AP-42 Volume I, Large Stationary Diesel Engines Table 3.4-4, 10/96 converted using boiler conversion factor from Appendix A

[g] AP-42 Table 3.3-1, Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines, 10/96

[h] AP-42 Table 3.3-2 Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines, 10/96 converted using boiler conversion factor from Appendix A

[i] Assumes maximum development scenario

13. Completion Flare Emissions

Assumptions

Hours of Operation 2 days (Typical

Amount of Gas Flared 5 MMscf/well (Assumption

Average Gas Heat Content 1200 Btu/scf (Wellsite Gas Composition

Average Gas VOC Content 0.283 weight % (Wellsite Gas Composition

Average Mole Weight 23.7 lb/lb-mole (Wellsite Gas Composition

Development rate 7 gas wells per yea

Equations

NOx/CO Emissions (lb/well) = Emission Factor (lb/MM Btu) * Gas Amount (MMscf/well) * Heat Content (Btu/sc

PM/HAP Emissions (lb/well) = Emission Factor (lb/MMscf) * Gas Amount (MMscf/wel

$$\text{Flare Gas Wt. (lb/well)} = \frac{\text{Flare Gas Volume (MMscf/well)} * 1^{6}\text{ (scf/MMscf)} * \text{Mole Weight (lb/lb-mole}}{379.49\text{ (scf/mole}}$$

VOC Emissions (lb/well) = Flare Gas Wt. (lb/well) * VOC wt. % * 0.02 (Assumes 98% destruction Efficienc

Species	Emission Factor (lb/MMBtu)	Well Emissions (lb/well)	Well Emissions (lb/hr/well)	Total Emissions [e] (tons/yr)
Criteria Pollutants & VOC				
NO_x [a]	0.068	408.2	8.50	1.43
CO [a]	0.37	2220.9	46.27	7.77
VOC	N.A.	17.7	0.37	0.06
SO_x [b]	0.00	0.0	0.00	0.00
TSP [c]	7.6	38	0.792	0.133
PM_{10} [c]	7.6	38	0.792	0.133
$PM_{2.5}$ [c]	7.6	38	0.792	0.133
Hazardous Air Pollutants				
Benzene [d]	0.0021	0.0105	0.0002	3.68E-05
Toluene [d]	0.0034	0.017	0.0004	5.95E-05
Hexane [d]	1.8	9	0.1875	0.032
Formaldehyde [d]	0.075	0.375	0.0078	1.31E-03
Greenhouse Gases				
CO_2 [c]	120,000	600,000	12,500	2,100
CH_4 [a]	0.14	840.3	17.51	2.94

[a] AP-42 Table 13.5-1, Emission Factors for Flare Operations, 9/5

[b] Assumes produced gas contains no sulfu

[c] AP-42 Table 1.4-2, Emission Factors for Natural Gas Combustion, 3/98 (All Particulates are PM1

[d] AP-42 Table 1.4-3, Emission Factors for Organic Compounds from Natural Gas Combustion, 3/

e Assumes proposed development rat

14. Well Development Emissions Summary

Species	Well Development Emissions (tons/year)[a]				Wind Erosion	Total [a] (tons/yr)
	Construction	Drilling	Completion	Interim Reclamation		
Criteria Pollutants & VOC						
NO_x	2.4	186	5.0	0.02		193
CO	1.36	66	26	0.15		93
VOC	0.23	6.8	2.5	0.01		9.6
SO_2	0.07	3.3	0.2	0.00		3.6
PM_{10}	8.5	169	277	1.6	0.3	456
$PM_{2.5}$	1.1	20	28	0.18	0.1	49
Hazardous Air Pollutants						
Benzene		0.02	8.95E-05			0.02
Toluene		0.01	7.87E-05			0.01
Xylenes		3.75E-03	1.32E-05			3.8E-03
n-Hexane			0.032			0.03
Formaldehyde	0.06	1.53E-03	1.32E-03			0.06
Acetaldehyde		4.90E-04	2.45E-06			4.9.E-04
Acrolein		1.53E-04	6.19E-07			1.5.E-04
1,3-Butadiene			3.92E-08			3.9.E-08
Naphthalene		2.53E-03	8.77E-06			2.5E-03
Total PAH, POM 1 [b]		4.12E-03	1.43E-05			4.1E-03
Total HAPs	0.06	0.03	0.03	0.0	0.0	0.1
Greenhouse Gases						
CO_2		8,867	2,161			11,028
CH_4	0.01	5.5	3.2	0.00		

[a] Emissions for Peak Field Developmer

[b] Polycyclic Aromatic Hydrocarbons (PAH), Polycyclic Organic Matter (POI

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15. Average Produced Gas Characteristics
Sellers Draw #1 Meter Run Sample Date 9/15/2007

Gas Heat Value: 1200.5 Btu/scf

C1-C2 Wt. Fraction:	0.6499
VOC Wt. Fraction:	0.2828
Non-HC Wt. Fraction:	0.0674
Total:	1.0000

COMPONENT	MOLE PERCENT	COMPONENT MOLE WEIGHT (lb/lb-mole)	NET MOLE WEIGHT (lb/lb-mole)	WEIGHT FRACTION	GROSS HEATING VALUE (BTU/scf)	NET DRY HEATING VALUE (BTU/scf)	LOWER HEATING VALUE (BTU/scf)	NET LOW HEATING VALUE (BTU/scf)
Methane	69.1360	16.043	11.091	0.468	1010.000	698.274	910.000	629.138
Ethane	14.3560	30.070	4.317	0.182	1769.800	254.072	1618.000	232.280
Propane	7.5460	44.097	3.328	0.140	2516.200	189.872	2316.000	174.765
i-Butane	1.8660	58.123	1.085	0.046	3252.100	60.684	3005.000	56.073
n-Butane	1.8230	58.123	1.060	0.045	3262.400	59.474	3013.000	54.927
i-Pentane	0.6220	72.150	0.449	0.019	4000.900	24.886	3698.000	23.002
n-Pentane	0.3800	72.150	0.274	0.012	4008.800	15.233	3708.000	14.090
Hexanes	0.2430	86.177	0.209	0.009	4756.200	11.558	4404.000	10.702
Heptanes	0.0750	100.204	0.075	0.003	5502.500	4.127	5100.000	3.825
Methylcyclohexane	0.0650	98.186	0.064	0.003	1865.455	1.213	1729.000	1.124
Octanes	0.0330	114.231	0.038	0.002	6249.100	2.062	1695.970	0.560
2,2,4-TMP	0.0000	114.220	0.000	0.000	0.000			0.000
Nonanes	0.0000	128.258	0.000	0.000	6996.400			0.000
Decanes	0.0000	142.285	0.000	0.000	7743.200	0.000		0.000
Benzene	0.0211	78.120	0.016	0.001	3715.500	0.784		0.000
Toluene	0.0220	92.130	0.020	0.001	4444.600	0.978		0.000
Ethylbenzene	0.0010	106.160	0.001	0.000	5191.500	0.052		0.000
Xylenes	0.0090	106.160	0.010	0.000	5183.500	0.467		0.000
n-Hexane	0.0880	86.177	0.076	0.003	4756.200	4.185		0.000
Helium	0.0060	4.003	0.000	0.000	0.000	0.000	0.000	0.000
Nitrogen	0.2280	28.013	0.064	0.003	0.000	0.000	0.000	0.000
Carbon Dioxide	3.4830	44.010	1.533	0.065	0.000	0.000	0.000	0.000
Oxygen	0.0010	32.000	0.000	0.000	0.000	0.000	0.000	0.000
Hydrogen Sulfide	0.0000	34.080	0.000	0.000	637.100	0.000	588.000	0.000
TOTAL	100.00		23.71	1.00		1327.92		1200.49

Relative Mole Weight (lb/lb-mole) = [Mole Percent * Molecular weight (lb/lb-mole)] / 100

Weight Fraction = Net Mole Weight / Total Mole Weight

HAP Fractions estimated from GRI Published Factors

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16. Wellsite Separator Heater Emissions

Assumptions

Separator Heater Size	500	Mbtu/hr (Typical size)
Tank heater Size	500	Mbtu/hr (Typical size)
Wells Requiring Separators:	7	wells at Peak Production
Firing Rate	6,480	hours/year (Typical operation)
Fuel Gas Heat Value	1200	Btu/scf (Gas Analyses from Riverbend well)
Fuel Gas VOC Content	0.283	by weight (Gas Analyses from Riverbend Facility)

Equations

Fuel Consumption (MMscf/yr) = $\frac{\text{Heater Size (MBtu/hr)} * 1{,}000\ (\text{Btu/MBtu}) * \text{Hours of Operation (hrs/yr)}}{\text{Fuel Heat Value (Btu/scf)} * 1{,}000{,}000\ (\text{scf/MMscf})}$

NOx/CO/TOC Emissions (tons/yr) = $\frac{\text{AP-42 E.Factor (lbs/MMscf)} * \text{Fuel Consumption (MMscf/yr)} * \text{Fuel heating Value (Btu/scf)}}{2{,}000\ (\text{lbs/ton}) * 1{,}000\ (\text{Btu/scf - Standard Fuel Heating Value})}$

VOC Emissions (tons/yr) = TOC Emissions (tons/yr) * VOC wt. fraction

Species	Wellsite Heater Emissions - Separators		
	Emission Factor (lb/MMscf)	Well Emissions (lb/hr/well)	Total Emissions (tons/yr)
Criteria Pollutants & VOC			
NO_x [a]	100	0.042	1.9
CO [a]	84	0.035	1.6
TOC [c]	11	0.005	0.2
VOC [c]	5.5	0.002	0.10
SO_x [b]	0.00	0.000	0
TSP [c]	7.6	0.003	0.1
PM_{10} [c]	7.6	0.003	0.1
$PM_{2.5}$ [c]	7.6	0.003	0.1
Hazardous Air Pollutants			
Benzene [d]	0.0021	8.7E-07	1.98E-05
Toluene [d]	0.0034	1.4E-06	0.00
Hexane [d]	1.8	7.5E-04	0.02
Formaldehyde [d]	0.075	3.1E-05	0.00
Dichlorobenzene [d]	1.2E-03	5.0E-07	1.13E-05
Naphthalene [d]	6.1E-04	2.5E-07	5.76E-06
POM 2 [d,e,f]	5.9E-05	2.5E-08	5.57E-07
POM 3 [d,g]	1.6E-05	6.7E-09	1.51E-07
POM 4 [d,h]	1.8E-06	7.5E-10	1.70E-08
POM 5 [d,i]	2.4E-06	1.0E-09	2.27E-08
POM 6 [d,j]	7.2E-06	3.0E-09	6.80E-08
POM 7 [d,k]	1.8E-06	7.5E-10	1.70E-08
Greenhouse Gases			
CO_2 [c]	120,000	49.98	1,134
CH_4 [c]	2.3	0.001	0.02

[a] AP-42 Table 1.4-1, Emission Factors for Natural Gas Combustion, 7/98

[b] Assumes produced gas contains no sulfur

[c] AP-42 Table 1.4-2, Emission Factors for Natural Gas Combustion, 7/98 (All Particulates are PM10)

[d] AP-42 Table 1.4-3, Emission Factors for Organic Compounds from Natural Gas Combustion, 7/98

[e] - POM (Particulate Organic Matter) grouped according to subgroups described at EPA's Technology Transfer Network website for the 1999 National-Scale Air Toxics Assessment at http://www.epa.gov/ttn/atw/nata1999/nsata99.html

[f] - POM 2 includes: Acenaphthene, acenaphtylene, anthracene, 2-Methylnaphthalene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[g] - POM 3 includes: 7,12-Dimethylbenz(a)anthracene.

[h] - POM 4 includes: 3-Methylchloranthrene.

[i] - POM 5 includes: Benzo(a)pyrene and dibenzo(a,h)anthracene.

[j] - POM 6 includes: Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene.

[k] - POM 7 includes: Chrysene.

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17. Wellsite Condensate Storage Tank Flash/Working/Standing Emissions

Assumptions:

Average Wellsite Condensate Production Rate: 20.0 bbls condensate per day (Estimate based on proponent data)
Number of Active Wells: 7 wells at Peak Production

Separator Conditions : 140 psi and 76 F (Sellars Draw sample)
API Gravity: 49.2
Reid Vapor Pressure: 7.108

Calculations:

Condensate tank flashing/working/breathing emissions estimated with E&P Tanks 2.0 Run Date 6/16/08
-values adjusted to reflect per well liquid production
Sellers Draw Liquid Sample Dated 9/15/07
Assume 98% control

Emissions:

Component	Wellsite Flash/Work/Breathing (lb/hr/well)	Wellsite Flash/Work/Breathing (tons/year/well)	Wellsite Emissions (tons/yr)	Total Combined Wellsite Emissions (tons/yr)
Total VOC	0.686	3.006	3.01	21.05
Hazardous Air Pollutants				
Benzene	0.001	0.006	0.01	0.04
Toluene	0.002	0.014	0.01	0.06
Ethylbenzene	0.000	0.010	0.00	0.00
Xylenes	0.001	0.005	0.00	0.02
n-Hexane	0.008	0.034	0.03	0.24
Greenhouse Gases				
CO_2	1.450	6.351	6.35	44.46
CH_4	0.029	0.125	0.13	0.88

Data from Construction Permit Application, BBC, Red Point Compressor Station, WDEQ, June 20

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

18. VOC Emissions from Truck Loading Operations

Condensate Truck Loading Calculation

Condensate Loading Losses = 12.46 x S x P x M/T (lb /1,000 gallons)

Where	Saturation Factor, S =	0.6	Submerged Loading, Dedicated Service
	True vapor pressure of liquid, P =	2.3	lb/in^2 Crude oil, RVP = 5 at 50° F
	Molecular Weight of Tank Vapors, M =	50	lb/in^2 Crude oil, RVP = 5 at 50° F
	Temperature of Bulk Liquid, T =	509.67	° R
	Loading loss =	1.69	lb/1000 gallons
	Throughput =	200	bbls/day
	Throughput =	3.066.000	gallons/yr
	Condensate Truck Loading Emissions =	**2.59**	tons/year VOC

NGL Truck Loading Connection Configuration

	Load Line		
Load Line Connection Diameter =	0.17	ft	(Assumed typical value)
Load Line Length between Valves =	1.5	ft	(Assumed typical value)
Connection Volume =	0.033	ft^3	
Annual Connection Volume Vented =	60	ft^3	
NGL Density =	5.6	lbs/gal	(Assumed typical value)
NGL Density =	40.5	lbs/ft^3	
Annual Wt. NGL Vented =	2.418.8	lbs/year	
NGL VOC Content =	100.0%	by weight	
Assumed Maximum Number of NGL Truck loads/year =	1.825		
NGL Truck loading VOC Emissions =	**1.21**	tons/year VOC	

Example Calculations

Connection volume = Pi * ($Diameter^2$/4 * Length

Annual Volume Vented (f^3/year) = Connection Volume (ft^3) * Number Truck Loads per year (1/year)

Density (lbs/ft^3) = Density (lbs/gal) * 7.48 gal/f^3

Vented NGL Weight (lbs) = Volume Vented (f^3) * NGL Density (lbs/ft^3)

VOC Emissions (tons/year) = Annual NGL Vented (lbs/year) * NGL VOC wt. % / 100 / 2000 (lbs/ton)

Data from Construction Permit Application, BBC, Red Point Compressor Station, WDEQ, June 2008

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

19. Operations Vehicle Tailpipe Emissions

Assumptions:

Number of New Pumpers:	1	(Proposed Action)
Pumper Mileage:	2,245	miles/pumper/month (Based on traveling all project roads and round trip from Cody daily)
Total Annual New Pumper Mileage:	26,940	miles/year
Number of Condensate Haul Truck Round Trips:	4	trips per day (Based on Proposed Action initial production)
Average Round Trip Mileage for Condensate Transport:	57	miles (from Cody)
Total Annual Condensate Truck Mileage:	83,220	miles/year
Number of Water Haul Truck Round Trips:	0.9	trips per day (Based on Proposed Action initial production)
Average Round Trip Mileage for Water Transport:	57	miles (from Cody)
Total Annual Water Truck Mileage:	18,725	miles/year
Number of NGL Haul Truck Round Trips:	5	trips per day (Based on Proponent data)
Average Round Trip Mileage for NGL Transport:	57	miles (from Cody)
Total Annual NGL Truck Mileage:	104,025	miles/year
Daily Hours of Operation:	12	hours per day (Assumption)
Annual Hours of Operation:	4368	hours per year
Fuel sulfur content	0.05	% (Typical value)
Fuel density	7.08	lbs/gallon (Typical value)
Heavy Duty Pickup Fuel Efficiency	15	miles/gallon (Typical value)
Heavy Haul Diesel Fuel Efficiency	10	miles/gallon (Typical value)

Equations:

For NOx, CO and VOC:

$$\text{Emissions (tons/year)} = \frac{\text{Emission Factor (g/mile)} * \text{Vehicle Miles Traveled (miles/yr)}}{453.6\ (\text{g/lb}) * 2000\ (\text{lb/tons})}$$

The NOx, CO and VOC emission factors for the above equation are from AP-42, while the SO2 emissions are calculated on a mass balance basis utilizing the following equation:

$$\text{SO2 E. Factor (g/mi)} = \frac{\text{Fuel Density (lb/gal)} * 453.6\ (\text{g/lb}) * \text{Fuel Sulfur Content} * 2\ (\text{S / SO2})}{\text{Vehicle Fuel Efficiency (miles/gal)}}$$

Pumper Vehicles	Heavy Duty Pickups			Heavy Haul Trucks			Total	
	E. Factor [a] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr)	E. Factor [b] (g/mile)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (lb/hr)	Emissions (tons/yr)
Criteria Pollutants & VOC								
NO_x	3.03	0.041	0.090	8.13	0.845	1.846	0.886	1.936
CO	33.64	0.457	0.999	17.09	1.777	3.880	2.234	4.879
VOC [c]	1.656	0.023	0.049	4.600	0.478	1.044	0.501	1.094
SO_2	0.21	0.003	0.006	0.32	0.033	0.073	0.036	0.079
Greenhouse Gases								
CH_4 [d]	0.184	0.003	0.005	0.230	0.024	0.052	0.026	0.058

[a] AP-42 Append H Table 4.1A.2 - H.D. Gasoline Vehicles, High Altitude, 1991 - 1997 Vehicle Year, 50,000 miles (6/95)

[b] AP-42 Append. H Table 7.1.2 - H.D. Diesel Powered Vehicles, High Altitude, 1991 - 1997 Model Year, 50,000 miles (6/95)

[c] Emission factor is for total Hydrocarbons - Methane Offset

[d] AP-42 Append. H Tables 7.10A.2 and 4.10A.2 H.D. Methane Offsets, High Altitude, 1986+ and 1988+ Vehicle Year

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

20. Operations Traffic Fugitive Dust Emissions

Calculation AP-42, Chapter 13.2.2
November 2006

365 days (Estimate)

Vehicle Type	Ave. Weight (lbs)[a]	Round Trips per Day[b]
Pickup Truck: Crew	7,000	1
Haul Truck: Oil	48,000	4
Haul Truck: Water	48,000	0.9
Haul Truck: NGL	48,000	5
Mean Weight	44,239	11

Unpaved Roads

E (PM10) / VMT = 1.5 * (S/12)^0.9 * (W/3)^0.45 * (365-p)/365)
E (PM2.5) / VMT = 0.15 * (S/12)^0.9 + (W/3)^0.45 * (365-p)/365)
Silt Content (S) 8.4 Mean value Table 13.2.2-1 for haul roads
W = average weight in tons of vehicles traveling the road
Precipitation Days (P) 50 days per year[c]
Avg. Round Trip Miles 21 miles on unpaved roads[d]

Paved Roads

E (PM10) / VMT = 0.016 * (sL/2)^0.65 * (W/3)^1.5 - 0.00047 * (1-(p/(365*4
E (PM10) / VMT = 0.0024 * (sL/2)^0.65 * (W/3)^1.5 - 0.00036 * (1-(p/(365*4)
Silt Loading (sL) 0.33 grains/square foot
W = average weight in tons of vehicles traveling the road
Precipitation Days (P) 50 days per year[c]
Round Trip Miles 36 miles of paved road From Cod[d]

	PM_{10} (lb/VMT)	Total PM_{10} (lbs/yr)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/VMT)	Total $PM_{2.5}$ (lbs/yr)	$PM_{2.5}$ (lb/day)
Unpaved	2.31	192,787	528	0.23	19,279	53
Paved	0.10	13,645	37	0.01	2,007	5
Total		206,432	566		21,285	58

Annual Operations Traffic Fugitive Dust Emissions (tons/year	**103**			**11**	

[a] Average weight of haul trucks assumes no load one way and loaded one w.

[b] round trips per day at initial production (Proposed Actio

[c] average WRCC data for Cody and Emblem, WY 1911-2008 http://www.wrcc.dri.e

[d] Section 2.2.2.

21. Well Production Summary

Species	Storage Tanks (tons/yr)	Well Site Heaters (tons/yr)	Operations Vehicle (tons/yr)	Total Well Production [g] (tons/yr)
Criteria Pollutants & VOC				
NO_x		1.9	1.9	3.8
CO		1.6	4.9	6.5
VOC	3.0	0.1	1.1	4.2
SO_2		0.0	0.1	0.1
PM_{10}		0.1	103.2	103.4
$PM_{2.5}$		0.1	10.6	10.8
Hazardous Air Pollutants				
Benzene	0.006	0.00		0.01
Toluene	0.008	0.00		0.01
Ethylbenzene	0.000			0.00
Xylene	0.003			0.00
n-Hexane	0.034	0.02		0.05
Formaldehyde		0.00		0.00
Dichlorobenzene		1.13E-05		1.13E-05
Naphthalene		5.76E-06		5.76E-06
POM 2[a]		5.57E-07		5.57E-07
POM 3[b]		1.51E-07		1.51E-07
POM 4[c]		1.70E-08		1.70E-08
POM 5[d]		2.27E-08		2.27E-08
POM 6[e]		6.80E-08		6.80E-08
POM 7[f]		1.70E-08		1.70E-08
Total HAPs	0.05	0.02	0.00	0.07
Greenhouse Gases				
CO_2	6	1,134		1,140
CH_4	0	0.02	0.06	0

[a] - POM (Particulate Organic Matter) 2 includes: Acenaphthene, acenaphtylene, anthracene, 2-Methylnaphthalene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[b] - POM 3 includes: 7,12-Dimethylbenz(a)anthracene.

[c] - POM 4 includes: 3-Methylchloranthrene.

[d] - POM 5 includes: Benzo(a)pyrene and dibenzo(a,h)anthracene.

[e] - POM 6 includes: Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene.

[f] - POM 7 includes: Chrysene.

[g] Emissions for Peak Field Developmen

Buys & Associates, Inc. Environmental Consultants	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

22. Average Produced Gas Characteristics
Sellers Draw #1 Meter Run Sample Date 9/15/2007

Gas Heat Value : 1200.5 Btu/scf

Sample Temperature: 77 F
Sample Pressure: 132 psi

C1-C2 Wt. Fraction: 0.6499
VOC Wt. Fraction: 0.2828
Non-HC Wt. Fraction: 0.0674
Total: 1.0000

COMPONENT	MOLE PERCENT	COMPONENT MOLE WEIGHT (lb/lb-mole)	NET MOLE WEIGHT (lb/lb-mole)	WEIGHT FRACTION	GROSS HEATING VALUE (BTU/scf)	NET DRY HEATING VALUE (BTU/scf)	LOWER HEATING VALUE (BTU/scf)	NET LOW HEATING VALUE (BTU/scf)
Methane	69.136	16.043	11.091	0.468	1010.000	698.274	910.000	629.138
Ethane	14.356	30.070	4.317	0.182	1769.800	254.072	1618.000	232.280
Propane	7.546	44.097	3.328	0.140	2516.200	189.872	2316.000	174.765
i-Butane	1.866	58.123	1.085	0.046	3252.100	60.684	3005.000	56.073
n-Butane	1.823	58.123	1.060	0.045	3262.400	59.474	3013.000	54.927
i-Pentane	0.622	72.150	0.449	0.019	4000.900	24.886	3698.000	23.002
n-Pentane	0.380	72.150	0.274	0.012	4008.800	15.233	3708.000	14.090
Hexanes	0.243	86.177	0.209	0.009	4756.200	11.558	4404.000	10.702
Heptanes	0.075	100.204	0.075	0.003	5502.500	4.127	5100.000	3.825
Methylcyclohexane	0.065	98.186	0.064	0.003	1865.455	1.124	1729.000	1.124
Octanes+	0.033	114.231	0.038	0.002	6249.100	2.062	1695.970	0.560
2,2,4-TMP	0.000	114.220	0.000	0.000	0.000			0.000
Nonanes	0.000	128.258	0.000	0.000	6996.400			0.000
Decanes	0.000	142.285	0.000	0.000	7743.200	0.000		0.000
Benzene	0.021	78.120	0.016	0.001	3715.500	0.784		0.000
Toluene	0.022	92.130	0.020	0.001	4444.600	0.978		0.000
Ethylbenzene	0.001	106.160	0.001	0.000	5191.500	0.052		0.000
Xylenes	0.009	106.160	0.010	0.000	5183.500	0.467		0.000
n-Hexane	0.088	86.177	0.076	0.003	4756.200	4.185		0.000
Helium	0.006	4.003	0.000	0.000	0.000	0.000	0.000	0.000
Nitrogen	0.228	28.013	0.064	0.003	0.000	0.000	0.000	0.000
Carbon Dioxide	3.483	44.010	1.533	0.065	0.000	0.000	0.000	0.000
Oxygen	0.001	32.000	0.000	0.000	0.000	0.000	0.000	0.000
Hydrogen Sulfide	0.000	34.080	0.000	0.000	637.100	0.000	588.000	0.000
TOTAL	100.00		23.71	1.00		1327.83		1200.49

Relative Mole Weight (lb/lb-mole) = [Mole Percent * Molecular weight (lb/lb-mole)] / 100

Weight Fraction = Net Mole Weight / Total Mole Weight

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

23a. Central Compressor Station Engines
Four (4) Cat 3608 - WDEQ Permit Application - Option 1
(NOx and Formaldehyde modeled for WDEQ application)
Assumptions:

Max New Compression: 8,900 Horsepower (Proposed Action)

Equations:

$$\text{Emissions (tons/yr)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Power (hp)} * 8760 \text{ (hrs/yr)}}{453.6 \text{ g/lb} * 2000 \text{ (lbs/ton)}}$$

Pollutant	Emission Factor[6] (lb/MMBtu)	Emission Factor (g/hp-hr)	8,900 hp Station Emissions (lbs/hr)	8,900 hp Compressor Emissions (tons/yr)
Criteria Pollutants & VOC				
NOx[1]		0.7	13.73	60.2
CO[1]		0.3	4.91	21.5
VOC[1]		0.5	9.81	43.0
PM10[2,3]	9.95E-03	0.037	0.73	3.20
PM2.5[2,3]	9.95E-03	0.037	0.73	3.20
SO_2[8]	5.88E-04	0.000	0.00	0.0
Hazardous Air Pollutants[7]				
Benzene[2]	4.40E-04	6.727E-04	1.32E-02	0.06
Toluene[2]	4.08E-04	6.238E-04	1.22E-02	0.05
Ethylbenzene[2]	3.97E-05	6.070E-05	1.19E-03	5.22E-03
Xylenes[2]	1.84E-04	2.813E-04	5.52E-03	2.42E-02
n-Hexane[2]	1.11E-03	1.697E-03	3.33E-02	0.15
Formaldehyde[1]		0.07	1.37	6.02
Acetaldehyde[2]	8.36E-03	1.278E-02	0.25	1.10
Acrolein[2,11]	5.14E-03	7.858E-03	0.15	0.68
Methanol[2]	2.50E-03	3.822E-03	7.50E-02	0.33
1,1,2,2-Tetrachloroethane[2]	4.00E-05	6.115E-05	1.20E-03	5.26E-03
1,1,2-Trichloroethane[2]	3.18E-05	4.862E-05	9.54E-04	4.18E-03
1,3-Dichloropropene[2]	2.64E-05	4.036E-05	7.92E-04	3.47E-03
1,3-Butadiene[2]	2.67E-04	4.082E-04	8.01E-03	0.04
2,2,4-Trimethylpentane[2]	2.50E-04	3.822E-04	7.50E-03	3.28E-02
Biphenyl[2]	2.12E-04	3.241E-04	6.36E-03	2.79E-02
Carbon Tetrachloride[2]	3.67E-05	5.611E-05	1.10E-03	4.82E-03
Chlorobenzene[2]	3.04E-05	4.648E-05	9.12E-04	3.99E-03
Chloroform[2]	2.85E-05	4.357E-05	8.55E-04	3.74E-03
Ethylene Dibromide[2]	4.43E-05	6.773E-05	1.33E-03	5.82E-03
Methylene Chloride[2]	2.00E-05	3.058E-05	6.00E-04	2.63E-03
Naphthalene[2]	7.44E-05	1.137E-04	2.23E-03	9.78E-03
Phenol[2]	2.40E-05	3.669E-05	7.20E-04	3.15E-03
Styrene[2]	2.36E-05	3.608E-05	7.08E-04	3.10E-03
Tetrachloroethane[2]	2.48E-06	3.792E-06	7.44E-05	3.26E-04
Vinyl Chloride[2]	1.49E-05	2.278E-05	4.47E-04	1.96E-03
PAH -POM 1[2,4]	2.69E-05	4.113E-05	8.07E-04	3.53E-03
POM 2[2,4,5]	5.93E-05	9.074E-05	1.78E-03	7.80E-03
Benzo(b)fluoranthene/POM6[2,4]	1.66E-07	2.538E-07	4.98E-06	2.18E-05
Chrysene/POM7[2,4]	6.93E-07	1.059E-06	2.08E-05	9.11E-05
Greenhouse Gases				
CO2[2]	110	411	8,068	35,337
CH4[2]	1.25	4.67	91.7	402

[1] - Max from Permit Application Inventory

[1] - Manufacturer data with control (same for all options)

[2] - AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines, 7/00

[3] - PM = sum of PM filterable and PM condensable

[4] - POM (Particulate Organic Matter) grouped according to subgroups described at EPA's Technology Transfer Network website for the 1999 National-Scale Air Toxics Assessment at http://www.epa.gov/ttn/atw/nata1999/nsata99.html

[5] - POM 2 includes: Acenaphthene, acenaphtylene, 2-Methylnaphthalene, benzo(e)pyrene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[6] - Conversion from lb/MMBtu to g/hp-hr assumes an average heat rate of 6,741 Btu/hp-hr

[7] - HAP emission estimates reduced by 50% to reflect reduction by oxidation catalyst (except formaldehyde)

[8] - Gas analysis indicates no sulfur compounds, see Central Gas Composition page.

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

23b. Central Compressor Station Engines
Four (4) Waukesha 7044 GSI - Worst Case Option, (Carbon Monoxide, Benzene)
(Carbon Monoxide and Benzene Model Inputs)
Assumptions:

Max New Compression: 6,720 Horsepower (Proposed Action)

Equations:

$$\text{Emissions (tons/yr)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Power (hp)} * 8760 \text{ (hrs/yr)}}{453.6 \text{ g/lb} * 2000 \text{ (lbs/ton)}}$$

Pollutant	Emission Factor [6] (lb/MMBtu)	Emission Factor (g/hp-hr)	6,720 hp Station Emissions (lbs/hr)	6,720 hp Compressor Emissions (tons/yr)	Per Engine Emissions (tons/yr	Per Engine Emissions (g/s)
Criteria Pollutants & VOC						
NOx [1]		0.7	10.37	45.4		
CO [1]		2.0	29.63	129.8	**32.44**	**0.93333**
VOC [1]		0.5	7.41	32.4		
PM10 [2,3]	9.95E-03	0.037	0.73	2.4		
PM2.5 [2,3]	9.95E-03	0.037	0.73	2.4		
SO_2 [8]	5.88E-04	0.000	0.00	0.0		
Hazardous Air Pollutants [7]						
Benzene [2]	1.58E-03	2.788E-03	4.13E-02	1.81E-01	**0.045**	**0.00130106**
Toluene [2]	5.58E-04	9.846E-04	1.46E-02	6.39E-02		
Ethylbenzene [2]	2.48E-05	4.376E-05	6.48E-04	2.84E-03		
Xylenes [2]	1.95E-04	3.441E-04	5.10E-03	2.23E-02		
n-Hexane [2]	-					
Formaldehyde [1]		0.05	7.41E-01	3.24E+00		
Acetaldehyde [2]	2.79E-03	4.923E-03	7.29E-02	3.19E-01		
Acrolein [2,11]	2.63E-03	4.641E-03	6.88E-02	3.01E-01		
Methanol [2]	3.06E-03	5.399E-03	8.00E-02	3.50E-01		
1,1,2,2-Tetrachloroethane [2]	2.53E-05	4.464E-05	6.61E-04	2.90E-03		
1,1,2-Trichloroethane [2]	1.54E-05	2.709E-05	4.01E-04	1.76E-03		
1,3-Dichloropropene [2]	1.13E-05	1.994E-05	2.95E-04	1.29E-03		
1,3-Butadiene [2]	6.63E-04	1.170E-03	1.73E-02	7.59E-02		
2,2,4-Trimethylpentane [2]	0.00E+00	0.000E+00	0.00E+00	0.00E+00		
Biphenyl [2]	0.00E+00	0.000E+00	0.00E+00	0.00E+00		
Carbon Tetrachloride [2]	1.77E-05	3.123E-05	4.63E-04	2.03E-03		
Chlorobenzene [2]	1.29E-05	2.276E-05	3.37E-04	1.48E-03		
Chloroform [2]	1.37E-05	2.417E-05	3.58E-04	1.57E-03		
Ethylene Dibromide [2]	2.48E-05	4.376E-05	6.48E-04	2.84E-03		
Methylene Chloride [2]	4.12E-05	7.270E-05	1.08E-03	4.72E-03		
Naphthalene [2]	9.71E-05	1.713E-04	2.54E-03	1.11E-02		
Phenol [2]	0.00E+00	0.000E+00	0.00E+00	0.00E+00		
Styrene [2]	1.19E-05	2.100E-05	3.11E-04	1.36E-03		
Tetrachloroethane [2]	0.00E+00	0.000E+00	0.00E+00	0.00E+00		
Vinyl Chloride [2]	7.18E-06	1.267E-05	1.88E-04	8.22E-04		
PAH -POM 1 [2,4]	1.41E-04	2.488E-04	3.69E-03	1.61E-02		
POM 2 [2,4,5]	5.93E-05	1.047E-04	1.55E-03	6.80E-03		
Benzo(b)fluoranthene/POM6 [2,4]	0.00E+00	0.000E+00	0.00E+00	0.00E+00		
Chrysene/POM7 [2,4]	0.00E+00	0.000E+00	0.00E+00	0.00E+00		
Greenhouse Gases						
CO2 [2]	110	411	6,092	35,337		
CH4 [2]	0.23	0.86	12.7	402		

[1] - Max from Permit Application Inventory

[1] - Manufacturer data with control (same for all options)

[2] - AP-42 Table 3.2-3 Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines, 7/00

[3] - PM = sum of PM filterable and PM condensable

[4] - POM (Particulate Organic Matter) grouped according to subgroups described at EPA's Technology Transfer Network website for the 1999 National-Scale Air Toxics Assessment at http://www.epa.gov/ttn/atw/nata1999/nsata99.html

[5] - POM 2 includes: Acenaphthene, acenaphtylene, 2-Methylnaphthalene, benzo(e)pyrene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[6] - Conversion from lb/MMBtu to g/hp-hr assumes an average heat rate of 7,780 Btu/hp-hr

[7] - HAP emission estimates reduced by 50% to reflect reduction by oxidation catalyst (except formaldehyde)

[8] - Gas analysis indicates no sulfur compounds, see Central Gas Composition page.

24. Red Point Compressor Station Optional Refrigeration Engine
(Cat 3516TALE)

Assumptions:

Optional New Refrigeration: 1,340 Horsepower

Equations:

$$\text{Emissions (tons/yr)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Power (hp)} * 8760 \text{ (hrs/yr)}}{453.6 \text{ g/lb} * 2000 \text{ (lbs/ton)}}$$

Pollutant	Emission Factor [6] (lb/MMBtu)	Emission Factor (g/hp-hr)	1,340 hp Refrigeration Emissions (lbs/hr)	1,340 hp Refrig Emissions (tons/yr)
Criteria Pollutants & VOC				
NOx [1]		1.5	4.43	19.4
CO [1]		0.5	1.48	6.47
VOC [1]		0.5	1.48	6.47
PM10 [2,3]	9.95E-03	3.42E-02	0.10	0.44
PM2.5 [2,3]	9.95E-03	3.42E-02	0.10	0.44
SO_2 [8]	5.88E-04	2.02E-03	0.0	0.0
Hazardous Air Pollutants [7]				
Benzene [2]	4.40E-04	7.561E-04	2.23E-03	0.01
Toluene [2]	4.08E-04	7.011E-04	2.07E-03	0.01
Ethylbenzene [2]	3.97E-05	6.822E-05	2.02E-04	8.83E-04
Xylenes [2]	1.84E-04	3.162E-04	9.34E-04	4.09E-03
n-Hexane [2]	1.11E-03	1.907E-03	5.64E-03	0.02
Formaldehyde [1]		7.000E-02	2.07E-01	0.91
Acetaldehyde [2]	8.36E-03	1.437E-02	4.24E-02	0.19
Acrolein [2]	5.14E-03	8.833E-03	2.61E-02	0.11
Methanol [2]	2.50E-03	4.296E-03	1.27E-02	0.06
1,1,2,2-Tetrachloroethane [2]	4.00E-05	6.874E-05	2.03E-04	8.89E-04
1,1,2-Trichloroethane [2]	3.18E-05	5.465E-05	1.61E-04	7.07E-04
1,3-Dichloropropene [2]	2.64E-05	4.537E-05	1.34E-04	5.87E-04
1,3-Butadiene [2]	2.67E-04	4.588E-04	1.36E-03	0.01
2,2,4-Trimethylpentane [2]	2.50E-04	4.296E-04	1.27E-03	5.56E-03
Biphenyl [2]	2.12E-04	3.643E-04	1.08E-03	4.71E-03
Carbon Tetrachloride [2]	3.67E-05	6.307E-05	1.86E-04	8.16E-04
Chlorobenzene [2]	3.04E-05	5.224E-05	1.54E-04	6.76E-04
Chloroform [2]	2.85E-05	4.898E-05	1.45E-04	6.34E-04
Ethylene Dibromide [2]	4.43E-05	7.613E-05	2.25E-04	9.85E-04
Methylene Chloride [2]	2.00E-05	3.437E-05	1.02E-04	4.45E-04
Naphthalene [2]	7.44E-05	1.279E-04	3.78E-04	1.65E-03
Phenol [2]	2.40E-05	4.124E-05	1.22E-04	5.34E-04
Styrene [2]	2.36E-05	4.056E-05	1.20E-04	5.25E-04
Tetrachloroethane [2]	2.48E-06	4.262E-06	1.26E-05	5.51E-05
Vinyl Chloride [2]	1.49E-05	2.561E-05	7.56E-05	3.31E-04
PAH -POM 1 [2,4]	2.69E-05	4.623E-05	1.37E-04	5.98E-04
POM 2 [2,4,5]	5.93E-05	1.020E-04	3.01E-04	1.32E-03
Benzo(b)fluoranthene/POM6 [2,4]	1.66E-07	2.853E-07	8.43E-07	3.69E-06
Chrysene/POM7 [2,4]	6.93E-07	1.191E-06	3.52E-06	1.54E-05
Greenhouse Gases				
CO2 [2]	110	378	1117	4,892
CH4 [2]	1.25	4.30	12.7	56

[1] - Manufacturer's data Cat 3516 TALE with oxidation catalyst

[2] - AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines, 7/00

[3] - PM = sum of PM filterable and PM condensable

[4] - POM (Particulate Organic Matter) grouped according to subgroups described at EPA's Technology Transfer Network website for the 1999 National-Scale Air Toxics Assessment at

[5] - POM 2 includes: Acenaphthene, acenaphtylene, 2-Methylnaphthalene, benzo(e)pyrene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[6] - Conversion from lb/MMBtu to g/hp-hr assumes an average heat rate of 7,577 Btu/hp-hr

[7] - HAP emission estimates reduced by 50% to reflect reduction by oxidation catalyst (except formaldehyde).

[8] - Gas analysis indicates no sulfur compounds, see Central Gas Composition page.

25. Optional Cummins Generato

Assumptions:

Total New Generation: 286 Horsepower (Proposed Action)

Equations:

$$\text{Emissions (lbs/hr)} = \frac{\text{Emission Factor (g/hp-hr)} * \text{Power (hp}}{453.6 \text{ g/lb}}$$

Pollutant	Emission Factor [5] (lb/MMBtu)	Emission Factor (g/hp-hr)	Emissions (lb/hr)	Emissions 286 hp Station (tons/yr)
Criteria Pollutants & VOC				
NOx [1]		1.0	0.63	2.8
CO [1]		1.0	0.63	2.8
VOC [1]		0.5	0.32	1.4
PM10 [2,3]	1.94E-02	7.24E-02	0.05	0.20
PM2.5 [2,3]	1.94E-02	7.24E-02	0.05	0.20
SO_2	5.88E-04	2.19E-03	0.00	0.01
Hazardous Air Pollutants				
Benzene [2]	1.58E-03	2.947E-03	1.86E-03	8.14E-03
Toluene [2]	5.58E-04	1.041E-03	6.56E-04	2.87E-03
Ethylbenzene [2]	2.48E-05	4.626E-05	2.9E-05	1.28E-04
Xylenes [2]	1.95E-04	3.637E-04	2.3E-04	1.00E-03
n-Hexane [2]	1.11E-03	2.070E-03	1.31E-03	5.72E-03
Formaldehyde [1]	5.28E-02	9.848E-02	6.21E-02	2.72E-01
Acetaldehyde [2]	2.79E-03	5.204E-03	3.28E-03	1.44E-02
Acrolein [2]	2.63E-03	4.905E-03	3.09E-03	1.35E-02
Methanol [2]	3.06E-03	5.708E-03	3.60E-03	1.58E-02
1,1,2,2-Tetrachloroethane [2]	2.53E-05	4.719E-05	2.98E-05	1.30E-04
1,1,2-Trichloroethane [2]	1.53E-05	2.854E-05	1.80E-05	7.88E-05
1,1-Dichloroethane [2]	1.13E-05	2.108E-05	1.33E-05	5.82E-05
1,2-Dichloroethane [2]	1.13E-05	2.108E-05	1.33E-05	5.82E-05
1,2-Dichloropropane [2]	1.30E-05	2.425E-05	1.53E-05	6.70E-05
1,3-Dichloropropene [2]	1.27E-05	2.369E-05	1.49E-05	6.54E-05
1,3-Butadiene [2]	6.63E-04	1.237E-03	7.80E-04	3.42E-03
Carbon Tetrachloride [2]	1.77E-05	3.301E-05	2.08E-05	9.12E-05
Chlorobenzene [2]	1.29E-05	2.406E-05	1.52E-05	6.64E-05
Chloroform [2]	1.37E-05	2.555E-05	1.61E-05	7.06E-05
Ethylene Dibromide [2]	2.13E-05	3.973E-05	2.50E-05	1.10E-04
Methylene Chloride [2]	4.12E-05	7.685E-05	4.85E-05	2.12E-04
Naphthalene [2]	9.71E-05	1.811E-04	1.14E-04	5.00E-04
Styrene [2]	1.19E-05	2.220E-05	1.40E-05	6.13E-05
Vinyl Chloride [2]	7.18E-06	1.339E-05	8.44E-06	3.70E-05
PAH -POM 1 [2,4]	1.41E-04	2.630E-04	1.66E-04	7.26E-04
Greenhouse Gases				
CO2 [2]	110	410	258.73	1133
CH4 [2]	0.23	0.86	0.54	2.37

[1] - Cummins GTA855 Manufacturer Dat

[2] - AP-42 Table 3.2-3 Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines, 7/0

[3] - PM = sum of PM filterable and PM condensabl

[4] - Defined as a HAP because it is POM (Particulate Organic Matter)

[5] - Conversion from lb/MMBtu to g/hp-hr assumes an average heat rate of 8.224 Btu/hp-h

26. Central TEG Dehydrator Emissions

Assumptions

Peak Field Production Rate: 40 MMscf/day
7 Active Wells at Peak Production

Gas Composition: Sellers Draw Gas Analysis Dated September 2007

Inlet Gas Conditions: Inlet gas saturated at 864.7 psia and 120 F

Glycol Circulation Rate: 4.89 gallons/ lb of water

Calculations

Dehydrator emissions were simulated using GRI GlyCalc version 4.0

Controls

Flare > 95% Control Efficiency in order to meet Federal MACT Standards
Condenser Operating Conditions: 86 deg. F, 834.7 psia

Emissions note: emissions are routed from dehydrator to flare stack

Species	Central Dehydrator Emissions 20MMscfd Station (tons/year)	Central Dehydrator Emissions 20MMscfd Station (tons/year)	Total Project Emissions (tons/year)
Total VOC	2.91	2.91	5.8
Hazardous Air Pollutants			
Benzene	0.34	0.34	0.68
Toluene	0.66	0.66	1.3
Ethylbenzene	0.04	0.04	0.09
Xylenes	0.51	0.51	1.0
n-Hexane	0.03	0.03	0.07
Total HAP Emissions	1.6	1.6	3.2
Greenhouse Gases			
CH_4	0.07	0.07	0.1

27. Central EG Dehydrator Emissions

Assumptions

Peak Field Production Rate: 40 MMscf/day
7 Active Wells at Peak Production

Gas Composition: Sellers Draw Gas Analysis Dated September 2007

Inlet Gas Conditions: Inlet gas saturated at 864.7 psia and 120 F

Glycol Circulation Rate: 4.69 gallons/ lb of water

Calculations

Dehydrator emissions were simulated using GRI GlyCalc version 4.0

Controls

Flare 98% Control Efficiency in order to meet Federal MACT Standards
Condenser Operating Conditions: -25 deg. F, 840 psig

Emissions note: emissions are routed from dehydrator to flare stack

Species	EGG Dehydrator Emissions 40MMscfd Station (lbs/hr)	Total Project Emissions (tons/year)
Total VOC	2.5697	2.5697
Hazardous Air Pollutants		
Benzene	0.3738	0.3738
Toluene	0.6890	0.6890
Ethylbenzene	0.0239	0.0239
Xylenes	0.3658	0.3658
n-Hexane	0.0197	0.0197
Total HAP Emissions	1.4722	1.4722
Greenhouse Gases		
CH_4	0.6263	0.6263

28. Central Facility Heater Emissions

Assumptions

Dehydrator Reboiler Heater	750	Mbtu/hr (Ch 2)
Tank Heater	750	Mbtu/hr (Ch 2)
Total Heater Requirmement Facility Option 1	6,530	Mbtu/hr (2-DehyReboiler @750,1-NGL Reboiler Heater @1280, 5 tank heaters@750)
Total Heater Requirmement Facility Option 2	5,250	Mbtu/hr (2-Dehydrator Reboiler Heaters @750, 5 tank heaters@750)
Firing Rate	45	minutes/hour on average for entire year (Typical value)
	6570	hours/year
Fuel Gas Heat Value	1200	Btu/scf (Gas Analyses from Sellars Draw)
Fuel Gas VOC Content	0.283	by weight (Gas Analyses from Sellars Draw)

Equations

$$\text{Fuel Consumption (MMscf/yr)} = \frac{\text{Heater Size (MBtu/hr)} * 1{,}000\ \text{(Btu/MBtu)} * \text{Hours of Operation (hrs/yr)}}{\text{Fuel Heat Value (Btu/scf)} * 1{,}000{,}000\ \text{(scf/MMscf)}}$$

$$\text{NOx/CO/TOC Emissions (tons/yr)} = \frac{\text{AP-42 E.Factor (lbs/MMscf)} * \text{Fuel Consumption (MMscf/yr)} * \text{Fuel heating Value (Btu/scf)}}{2{,}000\ \text{(lbs/ton)} * 1{,}000\ \text{(Btu/scf - Standard Fuel Heating Value)}}$$

$$\text{VOC Emissions (tons/yr)} = \text{TOC Emissions (tons/yr)} * \text{VOC wt. fraction}$$

Species	Central Heater Emissions - Option 1			Central Heater Emissions - Option 2			Max Total Emissions (tons/yr)
	Emission Factor (lb/MMscf)	Emissions (lb/hr)	Emissions (tons/yr)	Emission Factor (lb/MMscf)	(lb/hr)	(tons/yr)	
Criteria Pollutants & VOC							
NO_x [a]	100	0.653	2.145	100	0.525	1.725	2.15
CO [a]	84	0.549	1.802	84	0.441	1.449	1.80
TOC [c]	11	0.072	0.236	11	0.058	0.190	0.24
VOC [e]	5.5	0.036	0.118	5.5	0.029	0.095	0.12
SO_x [b]	0.00	0.000	0.000	0.00	0.000	0.000	0.00
TSP [c]	7.6	0.050	0.163	7.6	0.040	0.131	0.16
PM_{10} [c]	7.6	0.050	0.163	7.6	0.040	0.131	0.16
$PM_{2.5}$ [c]	7.6	0.050	0.163	7.6	0.040	0.131	0.16
Hazardous Air Pollutants							
Benzene [d]	2.1E-03	1.4E-05	4.5E-05	2.1E-03	1.1E-05	3.6E-05	4.50E-05
Toluene [d]	3.4E-03	2.2E-05	7.3E-05	3.4E-03	1.8E-05	5.9E-05	7.29E-05
Hexane [d]	1.8E+00	1.2E-02	3.9E-02	1.8E+00	9.5E-03	3.1E-02	3.86E-02
Formaldehyde [d]	7.5E-02	4.9E-04	1.6E-03	7.5E-02	3.9E-04	1.3E-03	1.61E-03
Dichlorobenzene [d]	1.2E-03	7.8E-06	2.6E-05	1.2E-03	6.3E-06	2.1E-05	2.57E-05
Naphthalene [d]	6.1E-04	4.0E-06	1.3E-05	6.1E-04	3.2E-06	1.1E-05	1.31E-05
POM 2 [d,e,f]	5.9E-05	3.9E-07	1.3E-06	5.9E-05	3.1E-07	1.0E-06	1.27E-06
POM 3 [d,g]	1.6E-05	1.0E-07	3.4E-07	1.6E-05	8.4E-08	2.8E-07	3.43E-07
POM 4 [d,h]	1.8E-06	1.2E-08	3.9E-08	1.8E-06	9.5E-09	3.1E-08	3.86E-08
POM 5 [d,i]	2.4E-06	1.6E-08	5.1E-08	2.4E-06	1.3E-08	4.1E-08	5.15E-08
POM 6 [d,j]	7.2E-06	4.7E-08	1.5E-07	7.2E-06	3.8E-08	1.2E-07	1.54E-07
POM 7 [d,k]	1.8E-06	1.2E-08	3.9E-08	1.8E-06	9.5E-09	3.1E-08	3.86E-08
Greenhouse Gases							
CO_2 [c]	120,000	783.60	2,574.13	120,000	630.00	2,069.55	2574
CH_4 [c]	2.3	0.015	0.049	2.3	0.012	0.040	0.05

[a] AP-42 Table 1.4-1, Emission Factors for Natural Gas Combustion, 7/98

[b] Assumes produced gas contains no sulfur

[c] AP-42 Table 1.4-2, Emission Factors for Natural Gas Combustion, 7/98 (All Particulates are PM1.0)

[d] AP-42 Table 1.4-3, Emission Factors for Organic Compounds from Natural Gas Combustion, 7/98

[e] - POM (Particulate Organic Matter) grouped according to subgroups described at EPA's Technology Transfer Network website for the 1999 National-Scale Air Toxics Assessment at http://www.epa.gov/ttn/atw/nata1999/nsata99.html

[f] - POM 2 includes: Acenaphthene, acenaphtylene, anthracene, 2-Methylnaphthalene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[g] - POM 3 includes: 7,12-Dimethylbenz(a)anthracene.

[h] - POM 4 includes: 3-Methylchloranthrene.

[i] - POM 5 includes: Benzo(a)pyrene and dibenzo(a,h)anthracene.

[j] - POM 6 includes: Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene.

[k] - POM 7 includes: Chrysene.

29. Central Facility Condensate Storage Tank Flash/Working/Standing Emissions

Assumptions:

Average Condensate Production Rate : 200 bbls condensate per day (Proponent data)

Separator Conditions : 140 psi and 76 F (Sellars Draw sample)
API Gravity: 73.01

Calculations:

Condensate tank flashing/working/breathing emissions estimated with E&P Tanks 2.0 Run Dated 6/16/08
Sellers Draw Liquid Sample Dated 9/15/07
Controlled 98% efficiency

Emissions:

Component	Red Point CS Flash/Work/Breathing (tons/yr)
Total VOC	30.07
Hazardous Air Pollutants	
Benzene	0.06
Toluene	0.08
Ethylbenzene	3.00E-03
Xylenes	0.03
n-Hexane	0.34
Greenhouse Gases	
CO_2	63.50
CH_4	1.25

30. Flare Emissions

Production Option 1: Maximum Emissions Input Process Description	NOx[1] Emissions (tons/yr)	CO[1] Emissions (tons/yr)	VOC[2] Emissions (tons/yr)	Benzene[2] Emissions (tons/yr)
20 MMscfd TEG Dehy Still Vent & Flash Tank	2.61	0.65	2.91	0.68
20 MMscfd TEG Dehy Still Vent & Flash Tank	2.61	0.65	2.91	0.68
EG Dehy Still Vent	0.55	0.14	2.57	0.37
Condensate Storage Tank Vents	4.35	1.09	30.07	0.06
Pilot Gas	0.01	0.00	0.00	0.00
Total Flare Emissions	10.13	2.53	38.5	1.8

[1] Based on Proposed action and WDEQ permit application, Red Point Compressor Station

[2] VOC and Benzene emissions based on Dehydrator calculations

Buys & Associates, Inc. **Environmental Consultants**	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

31. Fugitive Emissions

Facility Name: Red Point Compressor Station
Facility Location: Park County, WY

Gas VOC Weight Fraction: 0.28275255 (Gas Analysis from Sellars Draw)
Liquid VOC Weight Fraction: 0.99449 (Gas Analysis from Sellars Draw)

EQUIPMENT TYPE AND SERVICE	NUMBER [1] OF UNITS	HOURS OF OPERATION (hours/yr)	VOC WEIGHT FRACTION	EMISSION FACTOR * (kg/hr-unit)	EMISSION FACTOR (lb/hr-unit)	VOC EMISSIONS (tons/yr)
Valves - Gas	550	8760	0.2828	4.50E-03	9.95E-03	6.77
Valves - Light Oil	200	8760	0.9945	2.50E-03	5.53E-03	4.81
Valves - Heavy Oil	10	8760	0.9945	8.40E-06	1.86E-05	8.09E-04
Valves - Water/Lt. Oil	0	8760	0.9945	9.80E-05	2.17E-04	0.00
Pump Seals - Gas	0	8760	0.2828	2.40E-03	5.30E-03	0.00
Pump Seals - Light Oil	5	8760	0.9945	1.30E-02	2.88E-02	0.63
Pump Seals - Water/Lt. Oil	0	8760	0.9945	2.40E-05	5.30E-05	0.00
Connectors - Gas	1500	8760	0.2828	2.00E-04	4.42E-04	0.82
Connectors - Light Oil	550	8760	0.9945	2.10E-04	4.64E-04	1.11
Connectors - Heavy Oil	22	8760	0.9945	1.10E-04	2.43E-04	0.02
Connectors - Water/ Lt. Oil	0	8760	0.9945	1.10E-04	2.43E-04	0.00
Open-Ended Lines - Gas	250	8760	0.2828	2.00E-03	4.42E-03	1.37
Open-Ended Lines - Light Oil	80	8760	0.9945	1.40E-03	3.10E-03	1.08
Open-Ended Lines - Heavy Oil	5	8760	0.9945	1.41E-04	3.11E-04	0.01
Open-Ended Lines - Water/Lt. Oil	0	8760	0.9945	2.50E-04	5.53E-04	0.00
Flanges - Gas	300	8760	0.2828	3.90E-04	8.62E-04	0.32
Flanges - Light Oil	100	8760	0.9945	1.10E-04	2.43E-04	0.11
Flanges - Heavy Oil	3	8760	0.9945	3.00E-06	6.63E-06	0.00
Flanges - Water/Lt. Oil	0	8760	0.9945	2.80E-06	6.19E-06	0.00
Other - Gas	20	8760	0.2828	8.80E-03	1.94E-02	0.48
Other - Light Oil	0	8760	0.9945	7.50E-03	1.66E-02	0.00
Other - Heavy Oil	0	8760	0.9945	3.10E-05	6.85E-05	0.00
Other - Water/Lt. Oil	0	8760	0.9945	1.40E-02	3.09E-02	0.00
TOTAL EMISSIONS (tons/yr)					**0.1277**	**17.54**

* API average emission factors for oil and gas production operations - approved by EPA August 1995.
Emission Factor (lb/hr-unit) = Emission Factor (kg/hr-unit) * 2.21 (lb/kg)

$$\text{VOC Emissions (tons/yr)} = \frac{\text{Emission Factor (lb/hr)} * \text{Number of Units} * \text{Hours of Operation (hrs/yr)} * \text{VOC Wt. Fraction}}{\text{2,000 lbs/ton}}$$

[1] Based on Proposed action and WDEQ permit application, Red Point Compressor Station

Heavy Oil < 20 API Gravity, Light Oil >= 20 API Gravity

Other Equipment Includes compressors, diaphrams, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, and vents.

Buys & Associates, Inc. Environmental Consultants	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

32a. Central Facility Emission Summary

Red Point Compressor Station Option 1--emissions based on Maximum horsepowe

Pollutant	Central Compression Emissions 8,900 hp (tons/year)	Central Dehydrator Emissions 40 MMscfd (tons/year)	Central Heater Emissions 6,530 MBtu/hr (tons/year)	Central Condensate Tank Emissions 200 bbl/d (tons/year)	Red Point Refrigeration Emissions 1,340 hp/ 40MMscfd (tons/year)	Central Generator Emissions 286 hp (tons/year)	Flare Emissions (tons/year)	Truck loading Emission (tons/year)	Fugitive Emissions (tons/year)	Total Facility Emissions (tons/year)
Criteria Pollutants & VOC										
NO_x	60.2		2.15		19.4	2.8	10.13			94.6
CO	21.5		1.45		6.5	2.8	2.53			34.7
VOC	43.0		0.12		6.5	1.4	38.5	3.8	17.54	110.7
SO_x	0.00		0.00		0	0.0				0.0
PM_{10}	3.20		0.16		0.4	0.2				4.0
$PM_{2.5}$	3.20		0.16		0.4	0.2				4.0
Hazardous Air Pollutants										
Benzene	0.06	0.34	4.50E-05	0.06	3.8E-01	8.1E-03	1.8			0.85
Toluene	0.05	0.66	7.29E-05	0.08	7.0E-01	2.9E-03				1.50
Ethylbenzene	5.22E-03	0.04		3.00E-03	2.5E-02	1.3E-04				0.08
Xylene	2.42E-02	0.51		0.03	3.7E-01	1.0E-03				0.93
n-Hexane	0.15	0.03	0.04	0.34	4.4E-02	5.7E-03				0.61
Formaldehyde	6.0		1.61E-03		9.1E-01	2.7E-01				7.20
Acetaldehyde	1.10				1.9E-01	1.4E-02				1.30
Acrolein	0.68				1.1E-01	1.4E-02				0.80
Methanol	0.33				5.6E-02	1.6E-02				0.40
1,1,2,2-Tetrachloroethane	5.26E-03				8.9E-04	1.3E-04				0.01
1,1,2-Trichloroethane	4.18E-03				7.1E-04	7.9E-05				4.96E-03
1,1-Dichloroethane[2]						5.8E-05				5.82E-05
1,3-Dichloropropene	3.47E-03				5.9E-04	6.5E-05				4.12E-03
1,3-Butadiene	0.04				5.9E-03	3.4E-03				0.04
2,2,4-Trimethylpentane	3.28E-02				5.6E-03					0.04
Biphenyl	2.79E-02				4.7E-03					0.03
Carbon Tetrachloride	4.82E-03				8.2E-04	9.1E-05				0.01
Chlorobenzene	3.99E-03				6.8E-04	6.6E-05				4.74E-03
Chloroform	3.74E-03				6.3E-04	7.1E-05				4.45E-03
Dichlorobenzene			2.57E-05							2.57E-05
Ethylene Dibromide	5.82E-03				9.9E-04	1.1E-04				0.01
Methylene Chloride	2.63E-03				4.4E-04	2.1E-04				3.28E-03
Naphthalene	9.78E-03		1.31E-05		1.7E-03	5.0E-04				0.01
Phenol	3.15E-03				5.3E-04					3.69E-03
Styrene	3.10E-03				5.2E-04	6.1E-05				3.69E-03
Tetrachloroethane	3.26E-04				5.5E-05					3.81E-04
Vinyl Chloride	1.96E-03				3.3E-04	3.7E-05				2.33E-03
PAH -POM 1[4]	3.53E-03				6.0E-04	7.3E-04				0.00
POM 2[4]	7.80E-03		1.27E-06		1.3E-03					0.01
POM 3[4]			3.43E-07							3.43E-07
POM 4[4]			3.86E-08							3.86E-08
POM 5[4]			5.15E-08							5.15E-08
Benzo(b)fluoranthene/POM6[4]	2.18E-05		1.54E-07		3.7E-06					2.57E-05
Chrysene/POM7[4]	9.11E-05		3.86E-08		1.5E-05					1.07E-04
Total HAPs	8.56	1.6	0.04	0.51	2.81	0.34				13.8
Greenhouse Gases										
CO_2	35,337		2,574	63.50	4,892	1,133				44,000
CH_4	402	0.07	0.05	1.25	55.6	2.37				461

Buys & Associates, Inc. Environmental Consultants	Project: Rocktober Unit Proposed Action Inventory Date: 3/3/2009

32b. Central Facility Emission Summary

Red Point Compressor Station Option 2 -- No NGL equipment installed

Pollutant	Central Compression Emissions 8,900 hp (tons/year)	Central Dehydrator Emissions 40 MMscfd (tons/year)	Central Heater Emissions 5,030 MBtu/hr (tons/year)	Central Condensate Tank Emissions 200 bbl/d (tons/year)			Flare Emissions (tons/year)	Truck loading Emission (tons/year)	Fugitive Emissions (tons/year)	Total Facility Emissions (tons/year)
Criteria Pollutants & VOC										
NO_x	60.2		1.72				10.13			72.0
CO	21.5		1.45				2.53			25
VOC	43.0	0.00	0.09				35.88	2.59	17.54	99.1
SO_x	0.0		0.00							0.00
PM_{10}	3.2		0.13							3.33
$PM_{2.5}$	3.2		0.13							3.33
Hazardous Air Pollutants										
Benzene	0.058	0.34	3.62E-05	0.06			1.41			0.46
Toluene	0.054	0.66	5.86E-05	0.08						0.8
Ethylbenzene	0.005	0.04		3.00E-03						0.05
Xylene	0.024	0.51		0.03						0.56
n-Hexane	0.146	0.03	0.03	0.34						0.6
Formaldehyde	6.016		1.29E-03							6.0
Acetaldehyde	1.098									1.10
Acrolein	0.675									0.68
Methanol	0.328									0.33
1,1,2,2-Tetrachloroethane	0.005									0.01
1,1,2-Trichloroethane	0.004									4.18E-03
Biphenyl	0.003									0.00
Carbon Tetrachloride	0.035									0.04
Chlorobenzene	0.033									3.28E-02
Chloroform	0.028									2.79E-02
Dichlorobenzene			2.07E-05							2.07E-05
Ethylene Dibromide	0.004									0.00
Methylene Chloride	0.004									3.74E-03
Naphthalene	0.000		1.05E-05							0.00
Phenol	0.006									5.82E-03
Styrene	0.003									2.63E-03
Tetrachloroethane	0.010									9.78E-03
Vinyl Chloride	0.003									3.15E-03
PAH -POM 1[a]	0.003									3.10E-03
POM 2[a]	0.000		1.02E-06							0.00
POM 3[a]			2.76E-07							2.76E-07
POM 4[a]			3.10E-08							3.10E-08
POM 5[a]			4.14E-08							4.14E-08
Benzo(b)fluoranthene/POM6[a]	0.000		1.24E-07							2.19E-05
Chrysene/POM7[a]	0.000		3.10E-08							9.11E-05
Total HAPs	8.564	1.6	0.03	5.08E-01						8.4
Greenhouse Gases										
CO_2	35337		2,070	63.50						37,470
CH_4	402	0.07	0.04	1.25						403

33. Total Project Production Related Emissions Summary

Pollutant	Well Production Emissions (tons/year)	Red Point Option 1 Emissions (tons/year)	Red Point Option 2 Emissions (tons/year)	Total Option 1 Production Emissions [h] (tons/year)	Total Option 2 Production Emissions [i] (tons/year)
Criteria Pollutants & VOC					
NO_x	4	95	72	98	75.8
CO	6	35	25	149	140
VOC	4	111	99	115	103
SO_2	0.08	0.01	0.00	0.1	0.1
PM_{10}	103	4.00	3.33	107	107
$PM_{2.5}$	11	4.00	3.33	14.8	14.1
Hazardous Air Pollutants					
Benzene	0.0	0.85	0.46	0.9	0.5
Toluene	0.0	1.5	0.8	1.5	0.8
Ethylbenzene	0.00	0.08	0.05	0.1	0.1
Xylene	0.0	0.93	0.56	0.9	0.6
n-Hexane	0.1	0.6	0.6	0.7	0.6
Formaldehyde	0.00	7.2	6.0	7.2	6.0
Acetaldehyde	0	1.30	1.10	1.3	1.1
Acrolein	0	0.80	0.68	0.8	0.7
Methanol	0	0.40	0.33	0.4	0.3
1,1,2,2-Tetrachloroethane	0	6.28E-03	5.26E-03	6.3E-03	5.3E-03
1,1,2-Trichloroethane	0	4.96E-03	4.18E-03	5.0E-03	4.2E-03
Biphenyl	0	3.26E-02	3.47E-03	3.3E-02	3.5E-03
Carbon Tetrachloride	0	5.73E-03	3.51E-02	5.7E-03	3.5E-02
Chlorobenzene	0	4.74E-03	3.28E-02	4.7E-03	3.3E-02
Chloroform	0	4.45E-03	2.79E-02	4.4E-03	2.8E-02
Dichlorobenzene	1.13E-05	2.57E-05	2.07E-05	3.7E-05	3.2E-05
Ethylene Dibromide	0	6.92E-03	3.99E-03	6.9E-03	4.0E-03
Methylene Chloride	0	3.28E-03	3.74E-03	3.3E-03	3.7E-03
Naphthalene	5.76E-06	0.01	0.00	1.2E-02	1.6E-05
Phenol	0	3.69E-03	5.82E-03	3.7E-03	5.8E-03
Styrene	0	3.69E-03	2.63E-03	3.7E-03	2.6E-03
Tetrachloroethane	0	3.81E-04	9.78E-03	3.8E-04	9.8E-03
Vinyl Chloride	0	2.33E-03	3.15E-03	2.3E-03	3.2E-03
PAH -POM 1[a]	0	4.86E-03	3.10E-03	4.9E-03	3.1E-03
POM 2[b]	5.57E-07	0.01	0.00	9.1E-03	3.3E-04
POM 3[c]	1.51E-07	3.43E-07	2.76E-07	4.9E-07	4.3E-07
POM 4[d]	1.70E-08	3.86E-08	3.10E-08	5.6E-08	4.8E-08
POM 5[e]	2.27E-08	5.15E-08	4.14E-08	7.4E-08	6.4E-08
Benzo(b)fluoranthene/POM6[f]	6.80E-08	2.57E-05	2.19E-05	2.6E-05	2.2E-05
Chrysene/POM7[g]	1.70E-08	1.07E-04	9.11E-05	1.1E-04	9.1E-05
Total HAPs	0	13.8	10.7	13.8	10.7
Greenhouse Gases					
CO_2	1,140	44,000	37,470	45,140	38,610
CH_4	0	461	403	461.1	403.1

a Polycyclic Aromatic Hydrocarbons (PAH), Polycyclic Organic Matter (POM

b - POM 2 includes: Acenaphthene, acenaphtylene, anthracene, 2-Methylnaphthalene, benzo(e)pyrene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[c] - POM 3 includes: 7,12-Dimethylbenz(a)anthracene.

[d] - POM 4 includes: 3-Methylchloranthrene.

[e] - POM 5 includes: Benzo(a)pyrene and dibenzo(a,h)anthracene.

[f] - POM 6 includes: Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene.

[g] - POM 7 includes: Chrysene.

[h] Emissions for Peak Field Development with maximum equipmer

[i] Emissions for Peak Field Development without optional equipmer

34. Total Project Emissions Summary

Pollutant	Project Emissions (tons/year)						Total Emissions [i] (tons/year)
	Construction	Drilling	Completion	Interim Reclamation	Wind Erosion	Project Production	
Criteria Pollutants & VOC							
NO_x	2.4	186	5	0.02	0	98	292
CO	1.4	66	26	0.15	0	149	242
VOC	0.23	6.8	2.5	0.01	0	115	124
SO_2	0.07	3.3	0.24	0.00	0	0.09	4
PM_{10}	8.5	169	277	1.6	0.32	107	564
$PM_{2.5}$	1.1	20	28	0.18	0.13	15	64
Hazardous Air Pollutants							
Benzene	0	0.02	8.95E-05	0	0	0.9	1
Toluene	0	0.01	7.87E-05	0	0	1.5	2
Ethylbenzene	0	0	0.00E+00	0	0	0.1	0.1
Xylene	0	3.75E-03	1.32E-05	0	0	0.9	1
n-Hexane	0	0	0.03	0	0	0.7	0.7
Formaldehyde	0.06	1.53E-03	1.32E-03	0	0	7.2	7
Acetaldehyde	0	4.90E-04	2.45E-06	0	0	1.30	1.3
Acrolein	0	1.53E-04	6.19E-07	0	0	0.80	0.8
Methanol	0	0	0	0	0	0.40	0.4
1,1,2,2-Tetrachloroethane	0	0	0	0	0	0.01	6.E-03
1,1,2-Trichloroethane	0	0	0	0	0	0.00	5.E-03
Carbon Tetrachloride	0	0	0	0	0	0.01	6.E-03
Chlorobenzene	0	0	0	0	0	0.00	5.E-03
Chloroform	0	0	0	0	0	0.00	4.E-03
Dichlorobenzene	0	0	0	0	0	3.71E-05	4.E-05
Ethylene Dibromide	0	0	0	0	0	0.01	7.E-03
Methylene Chloride	0	0	0	0	0	0.00	3.E-03
Naphthalene	0	0.00	8.77E-06	0	0	0.01	1.E-02
Phenol	0	0	0	0	0	0.00	4.E-03
Styrene	0	0	0	0	0	0.00	4.E-03
Tetrachloroethane	0	0	0	0	0	3.81E-04	4.E-04
Vinyl Chloride	0	0	0	0	0	2.33E-03	2.E-03
PAH -POM 1 [a]	0	0.00	1.43E-05	0	0	0.00	9.E-03
POM 2 [b]	0	0	0	0	0	0.01	9.E-03
POM 3 [c]	0	0	0	0	0	4.94E-07	5.E-07
POM 4 [d]	0	0	0	0	0	5.56E-08	6.E-08
POM 5 [e]	0	0	0	0	0	7.42E-08	5.E-03
Benzo(b)fluoranthene/POM6 [f]	0	0	0	0	0	2.57E-05	3.E-05
Chrysene/POM7 [g]	0	0	0	0	0	1.07E-04	1.E-04
Total HAPs	0.06	0.03	0.03	0	0	14	14
Greenhouse Gases							
CO_2	0	8,867	2,161	0	0	45,140	56,168
CH_4	0.01	5.5	3.2	0.0	0.0	461	470

[a] Polycyclic Aromatic Hydrocarbons (PAH) defined as a HAP by Section 112(b) of the Clean Air Act because it is Polycyclic Organic Matter (POM) AP42 Table 1.4-3 footnotes.

[b] - POM grouped according to subgroups described at EPA's Technology Transfer Network website for the 1999 National-Scale Air Toxics Assessment at http://www.epa.gov/ttn/atw/nata1999/nsata99.html

[c] - POM 2 includes: Acenaphthene, acenaphtylene, anthracene, 2-Methylnaphthalene, benzo(e)pyrene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene, and pyrene.

[d] - POM 3 includes: 7,12-Dimethylbenz(a)anthracene.

[e] - POM 4 includes: 3-Methylchloranthrene.

[f] - POM 5 includes: Benzo(a)pyrene and dibenzo(a,h)anthracene.

[g] - POM 6 includes: Benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene.

[h] - POM 7 includes: Chrysene.

[i] Emissions for Peak Field Development Option 1

APPENDIX G:

CONDITIONS OF APPROVAL

APPENDIX G:

CONDITIONS OF APPROVAL

This list of Conditions of Approval (COAs) is not intended to be all inclusive.

It is the responsibility of the operator to ensure that ALL surface disturbing activities and operations comply with the following: 43 CFR 3101.1-2; 3101.1-3; 43 CFR 3160, Onshore Oil and Gas Orders Nos. 1, 2, 6 & 7, Notice to Lessees (NTL's) 2-B, 3-A, 4-A, and the BLM-USGS-USFS brochure, "Surface Operating Standards for Oil and Gas Exploration and Development" (Gold Book) and appropriate, current State of Wyoming standards regarding storm water discharge requirements of Section 401 Water Quality Division of the Wyoming Department of Environmental Quality, Section 404 of the Clean Water Act with the U.S. Army Corps of Engineers and any/all county, state and federal regulations that may be applicable.

Point Source Primary Contacts:

Leah Krafft, Permitting Supervisor
307-777-7093
lkraff@state.wy.us

Brian Lovett, Inspection/Compliance Supervisor
307-777-5630
blovet@state.wy.us

http://deq.state.wy.us/wqd/WYPDES_Permitting/index.asp

Non-point Source Primary Contact:

Barb Sahl, Program Coordinator
307-777-7570
bsahl@state.wy.us
http://deq.state.wy.us/wqd/WYPDES_Permitting/WYPDES_Storm_Water/stormwater.asp

WY DEQ Water Quality Division Contact Information:

DEQ/Water Quality Division
122 West 25th Street
Herschler Building, 4th Floor-West
Cheyenne, Wyoming 82001
307-777-7781
http://deq.state.wy.us/wqd/

Wyoming USACE Contact Information:

US Army Corps of Engineers
Wyoming Regulatory Office
2232 Dell Range Boulevard, Suite 210
Cheyenne, Wyoming 82009-4942
Telephone: (307) 772-2300, Fax: (307) 772-2920

Program Manager: Matthew A. Bilodeau
Senior Project Manager: Chandler J. Peter
Other Project Managers: Michael A. Burgan, Thomas B. Johnson
https://www.nwo.usace.army.mil/html/od-rwy/Wyoming.htm

1. The Operator is responsible for inspection of the construction area for the presence of both surface and subsurface utility facilities. Wyoming State Law requires that contractors and landowners contact the Wyoming One-Call Center before any excavation begins (811 or 1-800-849-2476, www.onecallofwyoming.com). The Operator will use extra safety precautions when working near or around pipelines, power lines, underground cables, or other utility installations.

2. No cross-country travel would be permitted.

3. No vehicles would be operated during periods of saturated soil conditions when surface ruts greater than 4 inches would occur along travel routes.

4. Vehicles would be instructed to travel at speeds not to exceed 25 mph to limit dust and to minimize the potential for collisions with wildlife, livestock, wild horses, pedestrians, and other vehicles.

5. Project employees and contractors would not be allowed to drive off-road (other than for authorized survey work).

6. All equipment would be cleaned to remove weed seeds and soil (soil may contain weed seeds) prior to arrival on public lands within the project area. BBC would control invasive and noxious weeds on all areas disturbed by project activities, using mechanical, chemical, or other methods approved by the AO, would comply with Executive Order 13112, and any mulch used would be certified weed-free.

7. All seed applied to public land will comply with current BLM seed policy (IM-2006-073) and other related PDFs/stipulations specified by the BLM; would utilize the percent PLS by seed species to calculate the seeding rate; would be stored in a manner that best preserves the viability of each plant species; be applied in the fall after October 15th and before the soil freezes or in the spring after the soil thaws and before April 15th, and would be applied within 3 months of the latest viability test. If seed is not applied within 3 months of the latest viability test each species will be retested for viability and the most current viability test results will be used to calculate the seeding rate based on the new PLS values. The seed mixes would contain no cheatgrass (*Bromus tectorum*) seed.

8. BBC would coordinate with the Wyoming Department of Environmental Quality, Water quality Division, to obtain any required Storm Water Discharge Permits and would comply with the provisions of the permit including provisions contained in the permits. BBC would provide copies of documentation to the BLM.

9. Surface water would not be used for surface applications including the power washing of equipment used in drilling, completion, production, or reclamation activities, herbicide mixtures, dust management, etc., unless from an adjudicated source.

10. Water wells would be protected from contamination from surface water, spills, and other sources.

11. BBC would comply with any seasonal closures for greater sage-grouse, raptors, and mountain plover, and conduct any surveys, using qualified biologists and BLM survey standards, necessary with regard to such closures.

12. Project personnel would be subject to the following requirements: no harassing or shooting of wildlife or wild horses, no dogs or firearms on the project area, no littering, and no feeding of wildlife or wild horses.

13. All gates within the project area would be left as they are found (i.e., open gates would be left open, closed gates would be closed).

14. Damage to existing fences and other range improvements would be repaired immediately.

15. Gates or cattle guards would be used for crossing fences whenever possible. If a fence crossing is required at a location without a gate, the fence would be cut and H-braces would be installed to support the existing fence. If livestock or wild horses are present, a temporary gate would be installed to restrict livestock and wild horses to appropriate pastures. Upon termination of activities, the temporary opening or gate would be permanently repaired to its original or better condition. All cattle guards, fences, and other range improvements would be constructed to meet BLM, county, or WYDOT standards.

16. Well pads would be fenced if wild horses, wild life, or cattle begin to wander onto the pad. Notification to the BLM of any incident regarding wild horses, wild life, or cattle would be required within 3 days of the incident. Fencing would be on all four sides of the pad and would be to BLM standards. The temporary fence would be completed by the 10th day after the incident.

17. Removal or alteration of existing range improvements would be prohibited unless prior approval is obtained from BLM.

18. Permitted archaeologists would complete a Class III survey for cultural resources on all areas to be disturbed by the proposed project prior to any surface disturbance of those areas. This includes all new roads, road improvements, pipelines, well pads, cattle guards, etc.

    If any cultural values [sites, artifacts, human remains] are observed during operation of this lease/permit/rights-of-way, they will be left intact and the Cody Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized BLM officer (AO) within five working days the AO will inform the operator as to:
    - Whether the materials appear eligible for the National Register of Historic Places;
    - The mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
    - A time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

19. If cultural resources are found during project operations, all work in the immediate vicinity of the resource would cease and BBC would notify the AO immediately. BBC would implement those

measures requested by the AO to protect the resource until a permitted archaeologist could adequately evaluate it. Further work at the archaeological site would not commence until authorized by the AO.

20. Before commencement of operations, all BBC employees and contractors would be informed that any disturbance to, defacement of, or removal of archaeological, historical, or sacred material would not be permitted. Violation of the laws that protect these resources would be treated as law enforcement/administrative issues.

21. Individual paleontological site surveys for each well pad and associated disturbance will be required.

22. A qualified paleontological monitor, holding an active BLM consulting permit issued through Dale Hanson of the BLM – Wyoming State Office, will be present during all surface excavation, especially during reserve pit construction. Prior to project startup, the consultant/monitor hired by BBC should work with Dale Hanson to devise a plan for handling any Willwood fossils that are encountered, as in; how will they be collected, and where will they be kept (repository).

23. For each pad/site excavated, the BLM will require a site-specific report from the consultant/monitor, summarizing any vertebrate or other significant paleontological finds that are encountered during said excavation. When all excavation concludes, a final report should be submitted summarizing all finds, and how they were collected and reposited.

24. A paleontological site survey would be conducted prior to any surface disturbing activities, including road and pad construction and any other new surface disturbance. Paleontological monitoring would be required during all surface disturbing activities conducted under the Proposed Action in accordance with the "Request For Paleontological Resources Potential Review For Surface Disturbing Activities: BLM CYFO" prepared for the surface-disturbing activity. Vertebrate or other scientifically significant paleontological resources found during surface disturbance would be properly collected, identified, catalogued, and held in a BLM-approved repository by the approved paleontological consultant. In addition, the following measures would be taken to protect paleontological resources.
    Collecting: The project proponent/Operator would be responsible for informing all persons associated with this project, including employees, contractors and subcontractors under their direction, that they would be subject to prosecution for damaging, altering, excavating, or removing any vertebrate fossils or other scientifically significant paleontological resources from the project area. Collection of vertebrate fossils (bones, teeth, turtle shells) or other scientifically significant paleontological resources would be prohibited without a permit.
    Discovery: If vertebrate or other scientifically significant paleontological resources (fossils) are discovered on BLM-Administered land during operations, the Operator would suspend operations that could disturb the materials, stabilize and protect the site, and immediately contact the BLM CYFO Manager (AO). The AO would arrange for evaluation of the find within an agreed timeframe and determine the need for any mitigation actions that would be necessary. Any mitigation would be developed in consultation with the Operator, who would be responsible for the cost of site evaluation and mitigation of project effects to the site. If the operator could avoid disturbing a discovered site, there would be no need to suspend operations; however, the discovery would be immediately brought to the attention of the AO.
    Avoidance: All vertebrate or scientifically significant paleontological resources found as a result of the project/action would be avoided during operations. Avoidance means "No action or disturbance within a distance of at least 50 feet of the outer edge of the paleontological locality."

The contracted paleontologist would submit a report to the BLM CYFO paleontologist at the end of each days monitoring.

25. Dust control measures, as approved by the BLM, would be implemented as appropriate.

26. All vehicles and construction equipment would be properly maintained to minimize exhaust emissions and would be properly muffled to minimize noise.

27. All surface-disturbing activities would be supervised by a qualified company representative to ensure the terms and conditions of the APDs and SUPs are complied with.

28. When drilling has begun prior to a seasonal closure date (e.g., greater sage-grouse, raptors), BBC could request a variance to the seasonal closure so that drilling and completion would be allowed to continue so long as those operations are continuous. BBC would consider drilling and completion to be continuous if completion begins within 72 hours after the drilling rig has been moved out.

29. BBC would coordinate with the U. S. Army Corps of Engineers if any water feature would receive fill as a consequence of implementing the Proposed Action to determine if a water of the U. S. or jurisdictional wetland would be affected and whether a 404 Permit would be required. BBC would obtain and comply with any permits/BMPs required by the U. S. Army Corps of Engineers.

30. BBC would sample Dry Creek at three locations downstream from disturbed areas to other pre-development data on water quality. This sampling would be coordinated with the BLM.

31. BBC would also comply with all federal, state, and local permits, including those presented in Table 1.2.

32. If any of the wells would prove to be incapable of producing natural gas in commercial quantities, they would be plugged and abandoned and the location reclaimed according to state BLM standards.

33. All new and upgraded access roads would be built as outlined in the *Surface Operating Standards for Oil and Gas Exploration and Development - The Gold Book (Fourth Edition, Revised 2007)* (Gold Book) and BLM's Manual 9113-Roads Manual.

34. Any gravel from outside sources would be permitted by the BLM. The gravel would be weed-free and of a color to blend with the existing environment.

35. Low profile tanks would be used at locations 32-6 and 43-7 where visual resources would be an issue.

36. All permanent structures constructed or installed would be painted a flat nonreflective standard environmental color as determined by the AO. Facilities would be painted prior to installation or within 30 days of installation. Some equipment may be excluded from this painting for safety considerations as required by the Occupational Safety and Health Administration (OSHA), such as safety barricades and devices.

37. Well sites would not be lighted during production operations.

38. Wherever possible, pipeline ROWs would take advantage of road corridors to minimize surface disturbance, provide access for installation and maintenance operations, and facilitate visual inspections.

39. If water would be used for pressure testing, the water would be collected and disposed of at an approved disposal site. It would not be discharged onto any public lands.

40. The facility would be fenced for safety and security, and portions outside the compressor station proper would likely be graveled or otherwise treated to keep flammable vegetation away from the station. All permanent structures would be painted a flat nonreflective standard environmental color as determined by the AO. Facilities would be painted prior to installation or within 30 days of installation, weather permitting. Some equipment, such as safety barricades and devices, may be excluded from this painting for safety considerations as required by OSHA.

41. The station would include the minimum number of lights necessary for safety and security. Low pressure sodium lamps would be used where practical. Lights would be appropriately screened and directed to minimize any offsite glare, with an emphasis on avoiding glare towards the highway. When unoccupied, the only lights at the compressor station would be those necessary to gain safe access to the locked gate and to the control box for other lights. No new power lines would be constructed.

42. Compressors would be housed and equipped with hospital grade mufflers to minimize noise.

43. Placement of the proposed pipeline from the Federal No. 12-1 well along the west side of the McCullough Peaks road would avoid a cultural site recommended as eligible to the NRHP.

44. Placement of the proposed pipeline from the Federal No. 23-2 well in the borrow ditch of the existing road, for a distance of 0.25 mile on each side (north and south) of the Wiley Ditch crossing, would minimize further impacts to the ditch.

45. Placement of the topsoil pile on the south side of the Federal 23-2 well site would further obscure the well site from the Wiley Ditch.

46. There would be a no surface disturbance seasonal stipulation for migratory bird nesting if surface disturbance would occur during the nesting season from April 15th to July 15th is the migratory bird nesting period. If BBC proposes surface disturbance during this period, a nesting survey by a BLM-approved wildlife biologist would be periodically conducted (at least every 10 days) during the nesting season for the area disturbed to avoid any take of migratory birds or any violation of the *Migratory Bird Treaty Act*. A report documenting the survey and results would be submitted for approval by the Field Manager before any surface disturbance occurs.

47. Colors other than orange or white should be used for silt fencing if possible.

48. A 25 mile-an-hour speed limit would be observed during construction and operation to reduce impacts to wild horses.

Drilling/Downhole Conditions of Approval

A COPY OF THESE CONDITIONS OF APPROVAL SHOULD BE FURNISHED TO YOUR FIELD REPRESENTATIVE TO INSURE COMPLIANCE

All lease and/or unit operations are to be conducted in such a manner that full compliance is made with the applicable laws, regulations (43 CFR Part 3160), and this approved Application for Permit to Drill including Surface and Downhole Conditions of Approval. The operator is considered fully responsible for the actions of his subcontractors. A copy of the approved APD must be on location during construction, drilling, and completion operations.

1. There shall be no deviation from the proposed drilling, completion, and/or workover program as approved. Safe drilling and operating practices must be observed. All wells, whether drilling, producing, suspended, or abandoned, shall be identified in accordance with 43 CFR 3162.6. There shall be a sign or marker with the name of the operator, lease serial number, well number, and surveyed description of the well. **Any changes in operation must have prior approval from the BLM, Worland Field Office Petroleum Engineer.**

   Verbal approval may be obtained, but such approval does not waive the written report requirement.

2. The spud date and time shall be reported verbally to Worland Field Office 24 hours prior to spudding and a follow-up with 3160-5 Sundry report.

3. **Notify Worland Field Office Petroleum Engineer (Gary Peterman) at least 24 hours in advance of casing cementing operations and BOPE & casing pressure tests.**
   - Office Phone: (307) 347-5246
   - Cell Phone: (307) 388-0035
   - Home Phone: (307) 864-5696

4. Blowout prevention equipment (BOPE) shall remain in use until the well is completed or abandoned. Closing unit controls must remain unobstructed and readily accessible at all times. Choke manifolds must be located outside of the rig substructure.

   All BOPE components shall be inspected daily. Components shall be operated and tested, including a 5 minute low/10 minute high test, as required by Onshore Oil and Gas Order No. 2 to insure good mechanical working order. All BOPE pressure tests shall be performed by a test pump with a chart recorder and **NOT** by the rig pumps.

   All drilling operations, as listed below, shall be recorded in the [1]***legal drilling document** and available for inspection.

   a. Surface casing, (number of joints, size, weight, grade, and depth set).
   b. Number of centralizers.
   c. Type of cement (number of sacks or barrels, volume discharged to pit, include 1" top off operations).
   d. BOP Test- include pressure and time per test for pipe, blind rams and all valves (i.e. 5 minute low, 10 minute high), annular, and casing.
   e. Mud equivalent test, if applicable.
   f. Mud tests every 24 hours after mud up.

g. Slow pump speed daily after mud up.
h. BOP drill every crew each week (tripping and on bottom).
i. Activate Annular once a week.
j. Activate pipe rams and blind rams each trip (not more than once a day).
k. Surveys (depth, degree and direction, if applicable).
l. Production casing, (number of joints, size, weight, grade, and depth set, type of cement, number of sacks or barrels).
m. Daily Inspections.

BOP drills shall be initially conducted by each drilling crew within 24 hours of drilling out from under the surface casing and weekly thereafter as specified in Onshore Oil and Gas Order No. 2.

Casing pressure tests are required before drilling out from under all casing strings set and cemented in place.

No aggressive/fresh hard-banded drill pipe shall be used within casing.

5. All shows of fresh water and minerals will be reported and protected. All oil and gas shows will be adequately tested for commercial possibilities, reported, and protected.

6. No location will be constructed or moved, no well will be plugged, and no drilling or workover equipment will be removed from a well to be placed in a suspended status without prior approval of the BLM, Worland Field Office. If operations are to be suspended for more than 30 days, prior approval of the BLM, Worland Field Office must be obtained and notification given before resumption of operations.

7. When total drilling depth is reached or drilling is suspended for greater than 15 days, a status report outlining plans for completion or abandonment shall be filed within 5 days with the BLM Worland Field Office in Sundry or letter form.

[1]***The legal drilling document may be an IADA/Drillers Log Book, Morning Status Report, Daily Drilling Report, or an Electronic Drilling Log (i.e. Pason) capable of printing.**