Appendix O.3

Reasonable Foreseeable Development

Summary

The Reasonable Foreseeable Development (RFD) Scenario is a long-term projection (scenario) of oil and gas exploration, development, production, and reclamation activity in the Upper Missouri River Breaks National Monument. The Monument Study Area (area in review) lies in the East Block of the Monument and encloses the 43 Federal leases that exist on Monument lands. The RFD projects a baseline scenario of activity assuming all potentially productive areas can be open under standard lease terms and conditions, except those areas designated as closed to leasing by law, regulation or executive order. It provides basic information that is analyzed in the National Environmental Policy Act (NEPA) document under various alternatives. In this case, the NEPA document is the Upper Missouri River Breaks National Monument Resource Management Plan - Environment Impact Statement. The complete RFD is available for review at the BLM Great Falls Oil & Gas Field Station, Lewistown Field Office, Montana State Office, and on the BLM website at http://www.blm.gov/mt/st/en/fo/lewistown_field_office/um_rmp_process.html.

The RFD Study Area (study area) lies in northcentral Montana, approximately 60 miles north of Lewistown, Montana, and 38 miles south of Chinook, Montana. The area contains three producing gas fields with 41 active gas wells that are completed in the Judith River or Eagle Formations. Of the 41 active wells, 21 are producing and 20 are shut in. Ten of the active wells are in the Monument. In addition, the BLM currently has three approved Applications for Permit to Drill (APDs) (undrilled), two within the Monument and one within 1/2 mile of the Monument. The greater portion of the study area is characterized by steep river breaks country with plateaus and narrow ridges caused by erosion.

The Bureau of Land Management (BLM) has received APDs from three federal lease holders in the study area in Blaine County, Montana. One APD has been received from Klabzuba Oil and Gas, Inc., one from Macum Energy, Inc., and one from Devon Energy. All three are pending approval based on the outcome of the Monument RMP/EIS. The three wells would be drilled from the following locations:

- Klabzuba Federal 31-25-20B
  SE¼NW¼ of Section 31, T. 25 N., R. 20 E.
- Macum Federal 23-10
  NE¼SW¼ of Section 10, T. 25 N., R. 20 E.
- Devon Federal 9-7
  SW¼NE¼ of Section 9, T. 26 N., R. 20 E.

The wells (Figure O.3-1) would develop known gas resources in three producing gas fields in the study area. The wells would not require the construction of any new roads. If the wells are productive, they would require the installation of 3.7 miles of new pipeline in the study area to connect into existing pipelines. If the wells are productive, they would require the installation of 3.7 miles of new pipeline in the study area to connect into existing pipelines.

The infrastructure related to natural gas surface operations, other than the access roads and pipelines, includes the following:

- Meter shed (8 feet long x 8 feet tall x 5 feet wide)
- Well head (can be enclosed within the meter shed depending on the operation)
- Gas meter run (enclosed within the meter shed)
- Glycol barrel (can be enclosed within the meter shed)
- Small water separator (normally enclosed within the meter shed depending on the well and the operation)
- Water pit sized depending on the operation, but can range from 20 feet x 20 feet x 8 feet to 40 feet x 40 feet x 10 feet)
- Gas compressor (Compressors typically do not accompany each well. Depending on the operation and the size of the compressor, one gas compressor could service 8-12 wells). Currently, no gas compressors are located within the study area; however, a skid-mounted 42 HP compressor has been approved by the State of Montana on the David Kincaid No. 1 private well (the compressor has not been installed as of the date of this document).

The study area is being addressed because of the potential for future exploration and development on lands with existing federal leases. All federal lands in the study area are considered to have moderate and high potential for oil and gas occurrence. Occurrence is based on structural geology and historic activity of the area. It is further confirmed using well information to identify the extents of reservoirs. The areas considered to have high potential are those lands in the 18 exploration/development areas (also referred to as exploration/production areas) where commercial volumes and moderate shows of natural gas were evident

at the time of well completion (Figure O.3-2). All other federal lands in the study area are considered to have moderate potential for oil and gas occurrence.

In conjunction with these proposed actions, a review was conducted to evaluate the geologic potential of the study area and determine the Reasonable Foreseeable Development (RFD) that could be expected. A total of 11 exploration/production areas were identified with RFD well projections, as shown in Table O.3-1.

Specific well locations are not identified because many wells are considered proprietary information.

In addition to the 15.9 miles of existing roads supporting natural gas operations, the RFD locations would require 34.1 miles of new roads both in the Monument and within 1/2 mile of the Monument.

In addition to the 52.2 miles of existing pipeline, assuming a 35% success rate and because pipelines will be mostly buried in the access road corridor, the length of road to each new well was used. The new miles of pipelines are estimated at 11.9 miles. Liquid hydrocarbon storage at each well site is typically not required for the wells in the study area because the gas in this region normally does not yield liquid hydrocarbon. As a result, the number of well site visits can be limited to only those necessary for routine maintenance as determined via remote well monitoring with radio telemetry.

Figure O.3-1

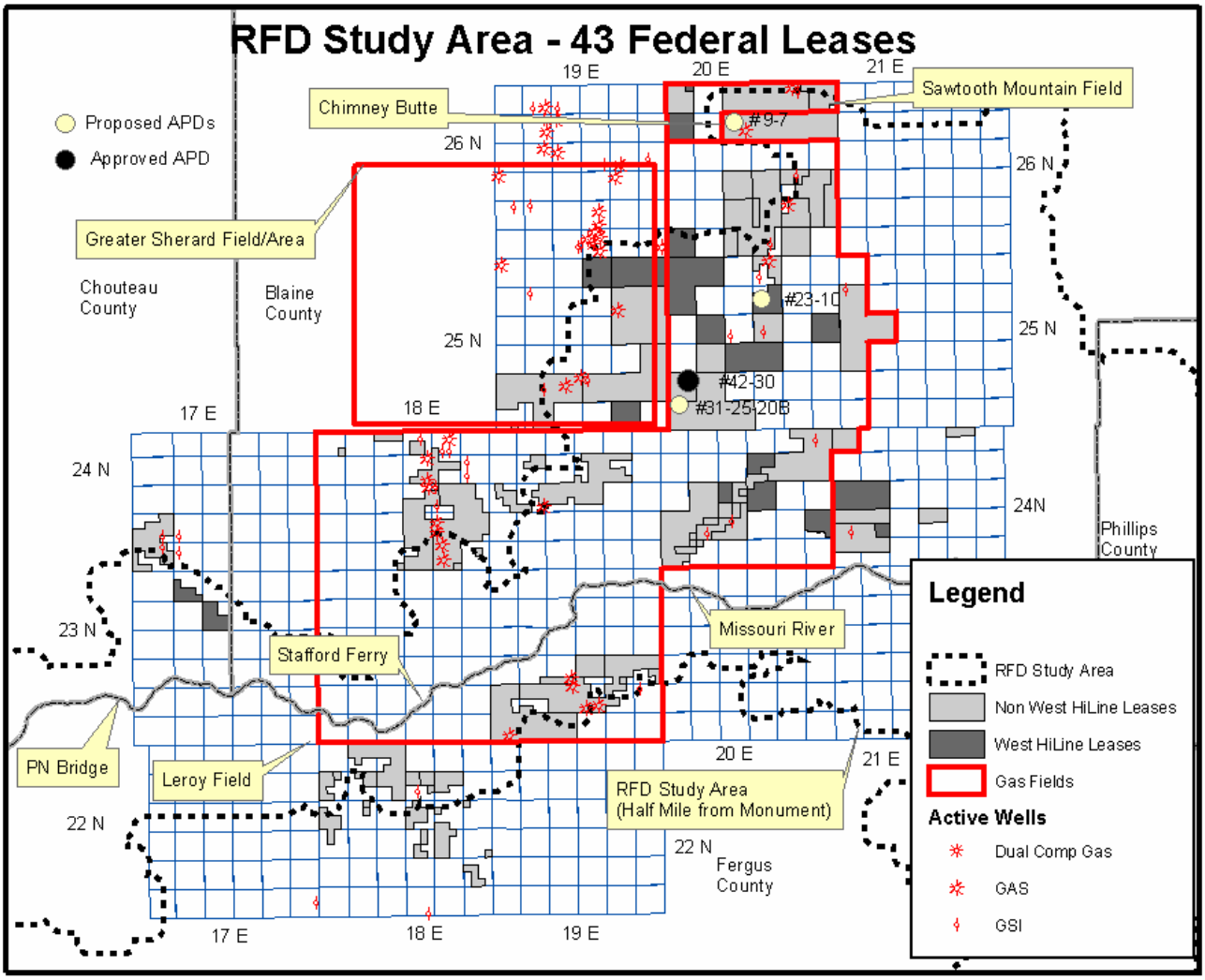
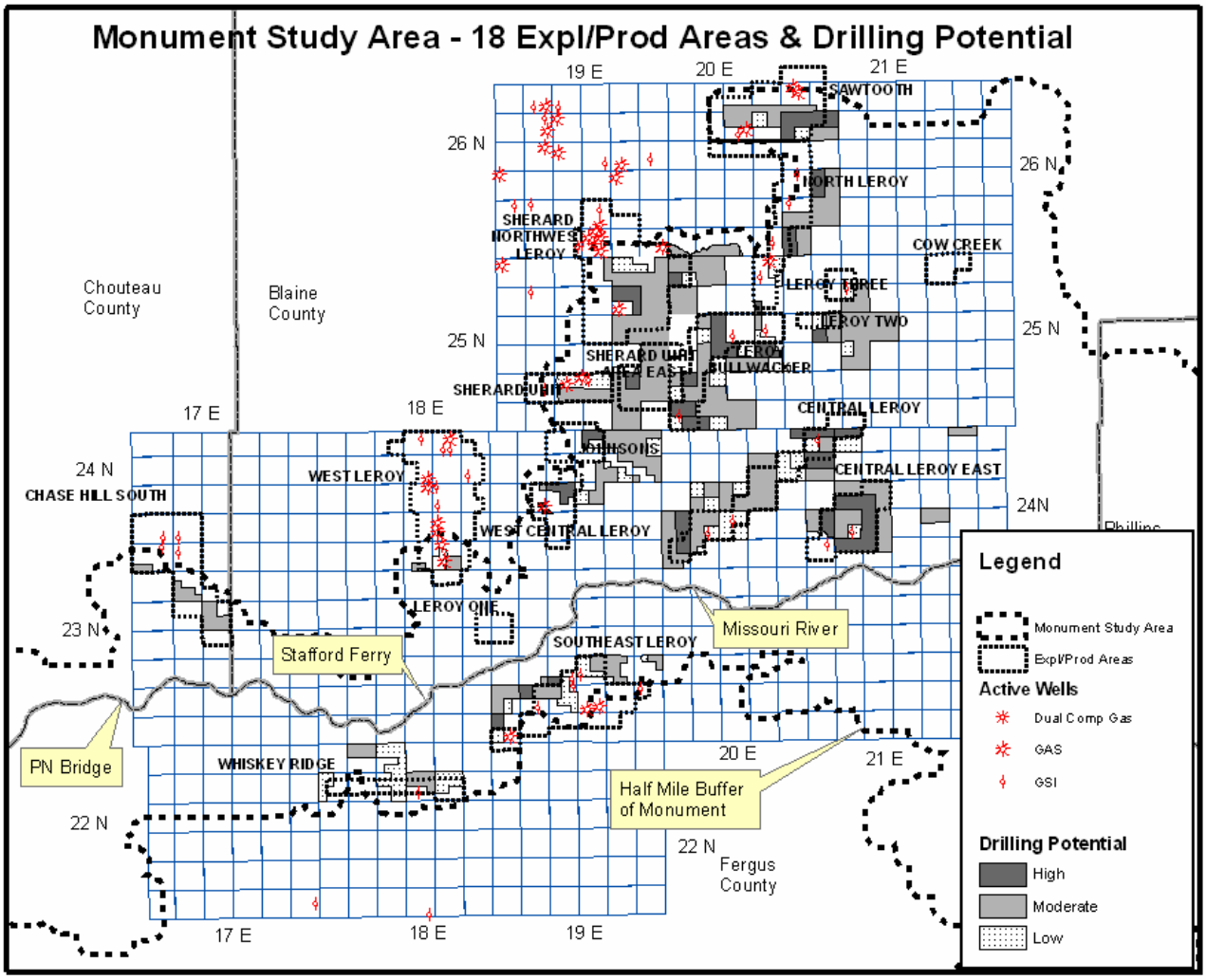


Table O.3-1 RFD Well Projections			
Exploration/Production Area	*Wells within 1/2 Mile of the Monument*	*Monument Wells*	*Total Wells*
North Leroy	4	1	5
Central Leroy	0	6	6
Central Leroy East	0	3	3
Leroy Bullwacker East	0	6	6
Sherard Northwest Leroy	7	8	15
West Leroy	1	0	1
South Sawtooth	13	4	17
Sherard Unit Area East	2	8	10
Southeast Leroy	1	1	2
Chase Hill	0	2	2
Sherard Unit	1	5	6
Total Wells in the 11 Areas	29	44	73

Figure O.3-2



RFD Study Area

The study area (study area) for this RFD is defined as the lands within the 43 federal oil and gas leases in the Monument and the lands which lie ½ mile outside of the Monument. This area is further described as being located approximately 60 miles north of Lewistown, Montana. The study area lies among three producing fields known as the Leroy, Sherard and Sawtooth Mountain Gas Fields. Geologically speaking, the study area lies at the southeastern extent of the Bearpaw Uplift in northcentral Montana. The study area can be geographically described as an area starting from a point four miles northeast/east of the PN Bridge and extending 31 miles to the northeast by 15 miles wide through the Bullwhacker area and continuing on up to the Chimney Butte/Al's Creek Drainage area (Figure O.3-1).

The study area includes 43 federal oil and gas leases issued between 1967 and 1999 and covers about 42,000 acres. Of the 43 leases, 12 were issued based on the 1988 West HiLine RMP (Table O.3-2). The remaining 31 leases are considered "non-West HiLine leases" and are shown in Table O.3-3.

In March 2000, the Montana Wilderness Association (MWA) filed suit challenging BLM's issuance of three leases that are now included in the Monument, alleging the BLM did not fully comply with the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) and National Historic Preservation Act (NHPA). In March 2004 the United States District Court for the District of Montana, Great Falls Division, ruled in favor of the Plaintiffs and ordered the BLM to:

- Prepare an EIS for the oil and gas leasing program that covers the three leases.
- Prepare a valid biological assessment of the oil and gas leasing program in conjunction with the EIS.
- Consult with all required entities.

Under the order, all surface-disturbing activity on the three leases is prohibited pending completion of the appropriate environmental reviews. In January 2006 the District Court enjoined activity on the three leases until BLM could demonstrate compliance with the directives set forth in the March 2004 order. The leases involved in the suit, as well as nine others in the Monument, were based on the BLM's 1988 West HiLine RMP. In light of the court's ruling, the BLM believes all 12 Monument leases based on the West HiLine RMP should be analyzed in the Monument RMP/EIS, which will consider the current stipulations that apply to the 12 leases issued under the West HiLine RMP, and the conditions of approval or mitigating measures that should be applied to surface occupancy and surface-disturbing activities associated with all 43 oil and gas leases in the Monument. To fully comply with the January 2006 court order the Monument RMP/EIS also addresses a no lease alternative for the 12 West HiLine leases. The no lease alternative is addressed as a subalternative, Alternative E_{NL} which would not allow surface disturbance or the processing of applications for permits to drill (APDs). The BLM will not process any further APDs on leases in the Monument until the Monument RMP/EIS is completed.

Past, Present and Future Oil and Gas Exploration and Development Activity in the Monument

Until the 1960s and 1970s drilling and exploration activity was relatively low within the study area. Although gas was known to exist, it was not a primary objective or target while industry was in search of oil, due to gas prices as low as 10¢/MCF and lack of pipeline infrastructure. With gas prices now ranging between $5 and $7/MCF and more infrastructure available, the economic incentive exists to further explore and develop natural gas resources in the Monument. The study area contains federal, state, and private leases that have a reasonable chance of being further developed for oil and gas (specifically gas, because oil has not been discovered in the Monument).

Well Status and Production Terms

The following terms are used throughout the RFD:

ABD-GW	Abandoned gas well (depleted producer)
BBL	Barrels
BCF	Billion cubic feet
D&A	Drilled and abandoned
Dual Comp Gas	Dually completed gas well (completed in two separate zones from the same well)
GAS	Producing gas well
GSI	Shut in gas well
MCF	Thousand cubic feet
MCFPD	Thousand cubic feet per day
MCFPM	Thousand cubic feet per month
MMB	Million barrels
MMCF	Million cubic feet

Table O.3-2
Federal Oil and Gas Leases in RFD Study Area
West HiLine Leases

Lease No.	*Lease Effective Date*	*Lease Location by Section*[1]	*Township and Range*	*County*	*Lease Acreage in the Monument*	*Lease Acreage outside the Monument*	*Total Lease Acreage*
MTM84559*	11/1/1995	5 6 7	25N/20E	Blaine	1,880	0	1,880
MTM84560*	11/1/1995	6 7 31	26N/20E	Blaine	134	1,119	1,253
MTM87212*	9/1/1997	3	25N/19E	Blaine	122	528	650
MTM87658*	2/1/1998	25	24N/20E	Blaine	485	0	485
MTM89082*	5/1/1999	1 2	25N/19E	Blaine	1,131	167	1,298
MTM89452**	11/1/1999	5 9	23N/17E	Chouteau	800	0	800
MTM89469*	11/1/1999	35	25N/19E	Blaine	640	0	640
MTM89473***	11/1/1999	15 21 22	24N/20E	Blaine	1,240	0	1,240
MTM89474***	11/1/1999	10	25N/20E	Blaine	80	480	560
MTM89475*	12/1/1999	13 17	25N/20E	Blaine	1,280	0	1,280
MTM89476*	12/1/1999	21 22	25N/20E	Blaine	1,120	160	1,280
MTM89482***	11/1/1999	19 20 29	24N/21E	Blaine	1,416	0	1,416
Total					**10,328**	**2,454**	**12,782**

[1] Many leases do not take up the full section.

* Leases are under lease suspension caused by the Monument RMP/EIS – Lease suspension granted on October 14, 2004.

** Lease was segregated on October 14, 2004 for those minerals not within the Monument.

*** Leases are under lease suspension caused by the lawsuit – Lease suspension granted on September 1, 2000. Lease suspensions add time to the life of a lease due to administrative actions.

Table O.3-3
Federal Oil and Gas Leases in RFD Study Area
Non-West HiLine Leases

Lease No.	*Lease Effective Date*	*Lease Location by Section*[1]	*Township and Range*	*County*	*Lease Acreage in the Monument*	*Lease Acreage outside the Monument*	*Total Lease Acreage*
MTM1565	5/1/1967	24 25 26 27	25N/19E	Blaine	2,560	0	2,560
MTM1568	5/1/1967	11 12 13 14	25N/19E	Blaine	2,320	240	2,560
MTM1578	5/1/1967	28 29 30 31 32	25N/19E	Blaine	575	1,988	2,563
MTM1885	6/1/1967	1 2	26N/20E	Blaine	40	611	651
MTM1886	6/1/1967	9 10 11 12	26N/20E	Blaine	1,920	640	2,560
MTM1888	6/1/1967	2 3 4 6	26N/20E	Blaine	480	1,982	2,462
MTM1903	6/1/1967	23 24 25 35	26N/20E	Blaine	1,360	200	1,560
MTM1903B	6/1/1967	26	26N/20E	Blaine	320	240	560
MTM1914	6/1/1967	15	25N/20E	Blaine	200	440	640
MTM2060	7/1/1967	15 21 22 28 29 32	24N/20E	Blaine	640	0	640

Table O.3-3
Federal Oil and Gas Leases in RFD Study Area
Non-West HiLine Leases

Lease No.	*Lease Effective Date*	*Lease Location by Section*[1]	*Township and Range*	*County*	*Lease Acreage in the Monument*	*Lease Acreage outside the Monument*	*Total Lease Acreage*
MTM2061	7/1//1967	21 28 29 31 32	24N/20E	Blaine	640	0	640
MTM13816	11/1/1969	7 11 12 13 14 15	24N/21E 24N/20E	Blaine	2,533	0	2,533
MTM13818	11/1/1969	20 21 28 29 30 31	24N/20E	Blaine	2,532	0	2,532
MTM13821A	11/1/1969	29 30 31 32	24N/21E	Blaine	1,099	0	1,099
MTM13827	11/1/1969	11 27 29 30	24N/21E	Blaine	1,156	0	1,156
MTM16098	9/1/1970	14 15 17 19 20 21 22	24N/19E	Blaine	1,240	1,280	2,520
MTM16102	9/1/1970	3 20 30	25N/20E	Blaine	1,506	163	1,669
MTM16103	9/1/1970	22 27 28 33 34	26N/20E	Blaine	13	2,507	2,520
MTM16327	10/1/1970	9 10 11 14 15 22 23 27 34	24N/18E	Chouteau	80	2,358	2,438
MTM16458	10/1/1970	21 23 24 25 27 33	26N/20E	Blaine	688	1,272	1,960
MTM16461	10/1/1970	29 31 32 33	25N/20E	Blaine	2,547	0	2,547
MTM16617	11/1/1970	7 8 10 17 18 19 22 25	22N/18E	Fergus	490	929	1,419
MTM16618	11/1/1970	23 24 25 26 35 36	24N/18E	Chouteau	320	2240	2,560
MTM16939	12/1/1970	7 17 18 19	25N/21E	Blaine	2,530	0	2,530
MTM17376	2/1/1971	7 33 35	24N/18E	Chouteau	40	80	120
MTM18274	7/1/1971	4 5 9 10 13 14 15 17 22 23 24	22N/18E	Fergus	1,367	1,160	2,527
MTM18282	5/1/1973	29 30 31 32 33	23N/19E	Blaine	851	1,680	2,531
MTM18283	5/1/1973	22 23 24 26 27 28 29	23N/19E	Blaine	1,240	1,320	2,560
MTM19446	9/1/1971	30 31	24N/17E	Chouteau	110	1,113	1,223
MTM53751	6/1/1982	20 21 22 23 24	23N/19E	Blaine	680	160	840
MTM89460	11/1/1999	7 11	22N/18E	Fergus	400	40	440
Total					**32,477**	**22,463**	**55,120**

[1] Many leases do not take up the full section.

Historical Geophysical and Chemical Surveys

Natural gas was discovered in the study area through direct and indirect exploration methods. Exploration within the region surrounding the Monument began in the early 1920s near Winifred, Montana. The industry utilized direct methods to explore for gas by conducting geologic surveys of rock outcrops, gas seeps, drilling wells to test their theories and data achieved from newly drilled wells (even though there were very few at that time) to further understand the subsurface geology and then creating early renditions of geologic maps of the area. Between 1920 and the early 1970s, natural gas was not the primary product that industry sought. Oil was the primary target. Exploration in this area remained at relatively low levels, until a sizeable discovery was made in 1971 just to the north of the study area. The discovery sparked more interest in the area to a point to where the maximum number of wells drilled in the area now included in the Monument peaked in 1974 at 26 wells. This and continued drilling efforts eventually led to the discovery of more commercial natural gas deposits and further infrastructure was built in and around the Monument (see New Field and Reservoir Discoveries). Not until the late 1970s and early 1980s had seismic technology been used to gain a more thorough understanding of the area's subsurface geologic structure. Further improvements in seismic technology, such as 3-D seismic surveys and data processing techniques continued to enhance the understanding of the area's subsurface geology.

Even though seismic data is limited throughout the Monument, 2-D surveys of the fringe areas of the Monument have been made. Seismic surveys were conducted in the late 1980s in the Sherard Area and it is estimated that 25 miles of seismic line were shot over what is now Monument land in that area. More recently, in 2002 and 2003, additional 2-D type surveys were shot in the north part of the Monument (South Sawtooth Field). It is estimated that six miles of seismic line were shot over Monument land in that area. This combined with recent well activity is being used to gain a better understanding of the area's complicated subsurface. Further improvements in seismic technology such as 3-D seismic surveys and data processing techniques continue to enhance the understanding of the area's subsurface geology. No 3-D surveys have been shot in the Monument, however it is understood there is interest in conducting a 3-D survey on some of the lands in the Sherard area of the Monument in the near future. This could further define the extent of prospects that operators may want to develop.

Exploratory/Development Drilling

The following discussion regards historic drilling activities adjacent to and within the study area. The narrative also discusses potential that specific areas contain for future drilling and the potential for oil and gas to occur. The areas identified under this narrative are based on well information (drilling and electric logs), reservoir data, industry's geologic interpretation, historical production data and information provided by industry indicating plans to explore and develop natural gas in the Monument and adjacent areas. The identified areas exclude the potential for oil and gas to be discovered on state and private lands intermingled with or adjacent to the Monument. Should industry desire to explore for oil and gas on state or private lands, the environmental document to address that activity would be outside of this document and left to the private and state landowner/manager's discretion.

The majority of the oil and gas exploration and development activities in the region surrounding and inside the study area (namely 35 townships covered by T21-27N, R17-21E) occurred prior to the Monument. Exploration for oil and gas in the region began in 1917 (the date the first well was drilled). A total of 869 wells have been drilled within these 35 townships prior to the Monument.

The first well in the study area was drilled in 1939. Since then, 138 wells have been drilled in the Monument with an additional 86 wells (224 wells total) drilled within 1/2 mile of the Monument. Some activity falls outside of the study area because of a federal lease, federal Communitization Agreement (CA), or federal unit. The majority of the historic drilling in the study area occurred in the 1970s and 1980s following trends with respect to natural gas pricing and infrastructure (Figure O.3-3). Table O.3-4 describes the currently active wells with an APD in the Monument or within 1/2 mile of the Monument.

A total of 17 wells have tested/produced commercial quantities of gas for a success rate of 12.2% in the Monument. The overall success rate increases to 18% when wells within the study area are added, or 40 out of 224 wells. The success rates have improved in more recent years as knowledge of the area improves including additional seismic information, reprocessed seismic data and well information. Using the previous 20 years of drilling history, the overall success rate improves from 18% to 35%.

Although it is difficult to predict the size and the frequency of future discoveries with certainty, it can be estimated based on historical records that the average discovery will yield 390,000 MCF (0.39 BCF). This information is based on an average of ultimate recovery figures generated by production decline curve analysis of the 40 wells within the study area.

New Field and Reservoir Discoveries

Outside of the Judith River, Eagle and Carlile Formations within the study area there is limited chance for new fields and reservoir discoveries based on historical drilling patterns. It is not known if operators of the federal leases will perform exploratory drilling into deeper horizons prior to the expiration of the leases. Once a lease expires, no further oil or gas activity will occur on the lease. Other than the mentioned formations, no other discoveries have been made in other formations in the vicinity of the study area.

Exploration of the region began in the early 1920's in the Sherard and Winifred areas. The first study-area well was drilled in the Whiskey Ridge area. The area is considered the southernmost exploration area common to the Monument and lies approximately three miles south and west of the McClelland/Stafford Ferry. The Mauland No. 2 well was the Monument area's first exploration well. It was drilled in October 1939 by E & M Oil and Gas Company at a location in the SE 1/4 SE 1/4 of Section 4, T. 22 N., R. 18 E., Fergus County. The well was drilled to a total depth (TD) of 635 feet and reached the Eagle Sandstone at 424 feet. The well was drilled as a dry hole and was subsequently plugged and abandoned.

The discovery well for the Leroy Gas Field (the first commercially productive well within the Monument) was drilled about a mile north of the Missouri River and approximately three miles downstream of the McClelland/ Stafford Ferry (see Section 4.2.7, Leroy One Exploration/Production Area). The Bearpaw Federal No. 1-18 well was spud in October 1968 by El Santo Petroleum Corp. & Royal Crest Oil Corp. at a location in the NW¼NW¼NW¼ of Section 18, T. 23 N., R. 19 E., Blaine County. The well was completed in November 1968 as a producing gas well and later produced 476,996 MCF of natural gas between December 1980 and May 1991 before it was plugged and abandoned on June 1, 1996 as a depleted producer. Note that the well was idle (shut-in) for nearly twelve years before pipeline infrastructure was introduced to the area in 1980. Although this well was considered the first commercially productive well within the Monument, two other successful wells were drilled in the Monument prior to the above-referenced well but were never produced.

Figure O.3-3

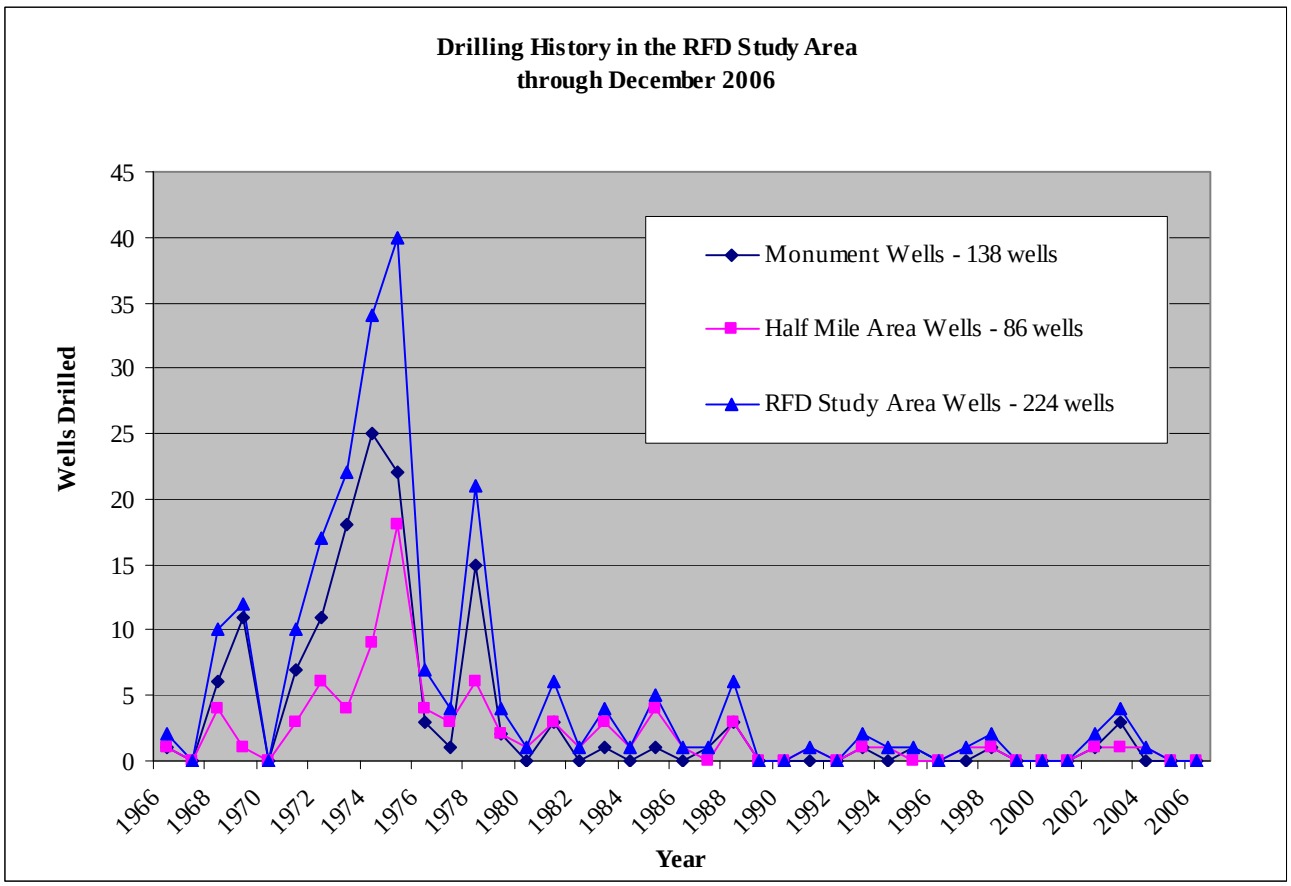


Table O.3-4
Active Wells or Wells with a Permit to Drill in the Monument, On any Part of a Lease where the Lease is Contained within the Monument or the Well(s) are within 1/2 Mile of the Monument (as of 2/21/2007)

Mineral Ownership	Lease, CA or Unit	Operator	Well Name	API Well No	Well Type	Well Status	Field Name	Well Within Monument Area? (see footnotes below)	Location (T-R)	Sec	Spot	County	Exploration/Production Area	E/P Area No.	Total Depth
FEDERAL	MTM16102/MTM93244	Macum Energy Inc.	Macum Federal 31-3	25-005-22897-00-00	Gas	Producing	Leroy	Yes	25N-20E	3	NW NE	Blaine	North Leroy	2	1802
FEDERAL	MTM13816	Macum Energy Inc.	Federal 1-12	25-005-21542-00-00	Gas	Shut In	Leroy	Yes	24N-20E	12	NE SW	Blaine	Central Leroy	3	1847
FEDERAL	MTM2060/CA-NRM1213	Macum Energy Inc.	Federal 29-15	25-005-21712-00-00	Gas	Shut In	Leroy	Yes	24N-20E	29	NW SW SE	Blaine	Central Leroy	3	1680
FEDERAL	MTM2060	Macum Energy Inc.	Macum Federal 22-28	25-005-22895-00-00	Gas	Shut In - WOPL	Leroy	Yes	24N-20E	28	SE NW	Blaine	Central Leroy	3	1836
FEDERAL	MTM13821-A/CA-NRM1764	Macum Energy Inc.	Federal 30-1	25-005-21333-00-00	Gas	Shut In - WOPL	Wildcat Blaine	Yes	24N-21E	30	NE SW SE	Blaine	Central Leroy East	4	1400
FEDERAL	MTM16102	Macum Energy Inc.	Macum Federal 42-30	25-005-22899-00-00	Gas	Permit to Drill	Leroy	Yes	25N-20E	30	SE NE	Blaine	Leroy/Bullwacker - APD	5	
FEDERAL	MTM84559	Klabzuba Oil & Gas, Inc.	Federal 6-25-20B	25-005-22921-00-00	Gas	Permit to Drill	Leroy	Yes	25N-20E	6	SE SW	Blaine	Sherard/Northwest Leroy	8	
FEDERAL	MTM16618/CA-NRM944	Klabzuba Oil & Gas, Inc.	35-24-18A	25-005-21724-00-00	Gas	Producing	Leroy	Yes	24N-18E	35	SE NE SW	Blaine	West Leroy	10	1505
FEDERAL	MTM16939	Macum Energy Inc.	Federal 1-7	25-005-21565-00-00	Gas	Shut In	Leroy	Yes	25N-21E	7	SE NW NW	Blaine	Leroy Three	15	1694
FEDERAL	MTM1578/UA-Sherard PA E	Devon Energy Corp.	U.S. 6-28	25-005-21718-00-00	Gas	Producing	Sherard, Area	Yes	25N-19E	28	SE NW	Blaine	Sherard Unit	17	1595
FEDERAL	MTM1565/Sherard PA E	Devon Energy Corp.	U.S. 4-27	25-005-21872-00-00	Gas	Shut In	Sherard, Area	Yes	25N-19E	27	SE NW NW	Blaine	Sherard Unit	17	1621
FEDERAL	MTM1578/UA-Sherard PA E	Devon Energy Corp.	U.S. 28-1	25-005-23044-00-00	Gas	Producing	Sherard, Area	Yes	25N-19E	28	NE NE	Blaine	Sherard Unit	17	1800
STATE	N/A	Macum Energy Inc.	State 1	25-005-21652-00-00	Gas	Shut In	Leroy	No 6	25N-20E	16	NE SW SW	Blaine	Leroy/Bullwacker	5	1795
FEDERAL	MTM16618	Klabzuba Oil & Gas, Inc.	26-24-18	25-005-21692-00-00	Gas	Producing	Leroy	No 5	24N-18E	26	SE NW SW	Blaine	West Leroy	10	1649
FEDERAL	MTM1888/CA-NRM972	Devon Energy Corp.	U.S. 2-3	25-005-23245-00-00	Gas	Producing	Sawtooth Mountain	No 5	26N-20E	2	NE NW	Blaine	Sawtooth	11	1480
FEDERAL	CA - NRM997	Klabzuba Oil & Gas, Inc.	26-24-18B	25-005-21730-00-00	Gas	Producing	Leroy	No 4	24N-18E	26	NE SW NW	Blaine	West Leroy	10	1612
PRIVATE	CA - NRM996	Klabzuba Oil & Gas, Inc.	23-24	25-005-21748-00-00	Gas	Shut In	Leroy	No 4	24N-18E	23	NE SW SW	Blaine	West Leroy	10	1702
PRIVATE	CA - NRM1167	Klabzuba Oil & Gas, Inc.	22-24	25-005-21849-00-00	Gas	Producing	Leroy	No 4	24N-18E	22	SW NE NE	Blaine	West Leroy	10	1644
PRIVATE	CA - NRM1240	Klabzuba Oil & Gas, Inc.	Bleha 10-24-18	25-005-22366-00-00	Gas	Shut In	Leroy	No 4	24N-18E	10	S2 W2 NE	Blaine	West Leroy	10	1840
FEDERAL	MTM16327/ CA - NRM995	Klabzuba Oil & Gas, Inc.	P-15-24-18N	25-005-22404-00-00	Gas	Producing	Leroy	No 4	24N-18E	15	W2 SE SE	Blaine	West Leroy	10	1579
PRIVATE	CA - MTM69515	Klabzuba Oil & Gas, Inc.	D-23-24-18-N	25-005-22405-00-00	Gas	Shut In	Leroy	No 4	24N-18E	23	NW NW	Blaine	West Leroy	10	1641
PRIVATE	CA - NRM1176	Klabzuba Oil & Gas, Inc.	BROWN 30-24-17	25-015-21371-00-00	Gas	Shut In - WOPL	Sherard, Area	No 4	24N-17E	30	NE SW SE	Chouteau	Chase Hill South	14	1435
FEDERAL	MTM16618	Klabzuba Oil & Gas, Inc.	35-24-18	25-005-21739-00-00	Gas	Producing	Leroy	No 3/5	24N-18E	35	W2 NE NW	Blaine	West Leroy	10	1530
FEDERAL	MTM1886	Devon Louisiana Corporation	U.S. 9-9	25-005-23309-00-00	Gas	Producing	Wildcat	No 3/5	26N-20E	9	NE SE	Blaine	Sawtooth	11	1800
FEDERAL	MTM18282	Klabzuba Oil & Gas, Inc.	31-23-19	25-027-21102-00-00	Gas	Producing	Leroy	No 3/5	23N-19E	31	NE SW SE	Fergus	Southeast Leroy	13	1830
FEDERAL	MTM18283	Klabzuba Oil & Gas, Inc.	N 27-23-19-B	25-027-21197-00-00	Gas	Producing	Leroy	No 3/5	23N-19E	27	NE SE SW	Fergus	Southeast Leroy	13	1850
FEDERAL	MTM18283	Klabzuba Oil & Gas, Inc.	Federal A-28-23-19-N	25-027-21206-00-00	Gas	Producing	Leroy	No 3/5	23N-19E	28	NW NE NE	Fergus	Southeast Leroy	13	1900
FEDERAL	MTM53751/CA-MTM69544	Klabzuba Oil & Gas, Inc.	P21-23-19N	25-027-21208-00-00	Gas	Producing	Leroy	No 3/5	23N-19E	21	SE SE	Fergus	Southeast Leroy	13	1722
FEDERAL	MTM1578	Devon Energy Corp.	U.S. 29-10	25-005-22633-00-00	Gas	Shut In	Sherard, Area	No 3/5	25N-19E	29	NW SE	Blaine	Sherard Unit	17	1600
FEDERAL	MTM16103/CA-NRM1191	Macum Energy Inc.	Federal 34-1	25-005-21369-00-00	Gas	Shut In	Leroy	No 3/4	26N-20E	34	N2 NW SE	Blaine	North Leroy	2	922
FEDERAL	MTM16458/CA-NRM768	Klabzuba Oil & Gas, Inc.	FED 23-26-20	25-005-21656-00-00	Gas	Shut In	Leroy	No 3/4	26N-20E	23	SW NW NE	Blaine	North Leroy	2	1775
FEDERAL	MTM18283/CA-NRM1512	Klabzuba Oil & Gas, Inc.	FEDERAL 27-23-19	25-027-21115-00-00	Gas	Producing	Leroy	No 3/4	23N-19E	27	SE SE	Fergus	Southeast Leroy	13	1837
PRIVATE $#	Sherard PA A	Devon Energy Corp.	34-15	25-005-22574-00-00	Gas	Producing	Sherard Area	No 3	26N-19E	34	SWSE	Blaine	Sherard/Northwest Leroy	8	1800
STATE $#	N/A	Klabzuba Oil & Gas, Inc.	State 36-26-19	25-005-22784-00-00	Gas	Producing	Wildcat Blaine	No 3	26N-19E	36	NE SE	Blaine	Sherard/Northwest Leroy	8	1900
PRIVATE $#	N/A	Macum Energy Inc.	Osburnsen 2	25-027-21046-00-00	Gas	Shut In	Leroy	No 3	23N-19E	25	SE NW NW	Fergus	Southeast Leroy	13	1980
FEDERAL	MTM89474	Macum Energy Inc.	Macum Federal 23-10	25-005-22898-00-00	Gas	Permit to Drill	Leroy	No 2/3/5	25N-20E	10	NE SW	Blaine	North Leroy -APD	2	
FEDERAL	MTM1914	Macum Energy Inc.	Federal 15-1	25-005-21109-00-00	Gas	Shut In	Leroy	No 2/3/5	25N-20E	15	W2 NE SW	Blaine	Leroy/Bullwacker	5	1987
FEDERAL	MTM1568	Klabzuba Oil & Gas, Inc.	11-25-19 FED	25-005-22453-00-00	Gas	Producing	Sherard, Area	No 2/3/5	25N-19E	11	NE SW SW	Blaine	Sherard/Northwest Leroy	8	1803
FEDERAL	MTM19446/CA-NRM1185	Klabzuba Oil & Gas, Inc.	USA 31-24-17-1	25-015-21352-00-00	Gas	Shut In - WOPL	Sherard, Area	No 1/3/5	24N-17E	31	SW NW NE	Chouteau	Chase Hill South	14	1580
PRIVATE	CA-NRM1739	Macum Energy Inc.	Manuel 1	25-027-21043-00-00	Gas	Shut In - WOPL	Wildcat Fergus	No 1/3	22N-18E	10	SE NE SW	Fergus	Whiskey Ridge	1	1879
PRIVATE	NRM1560	Macum Energy Inc.	D. Kincaid 1	25-005-21456-00-00	Gas	Shut In	Leroy	No 1/3	25N-20E	3	W2 SW	Blaine	North Leroy	2	1893
FEDERAL	MTM1903-B/CA-NRM1196	Devon Energy Corp.	FEDERAL 21X-26	25-005-21467-00-00	Gas	Producing	Sawtooth Mountain	No 1/3	26N-20E	26	SW NE NW	Blaine	North Leroy	2	1948
FEDERAL	MTM1888/CA-NRM972	Devon Energy Corp.	FEDERAL 1-2	25-005-21238-00-00	Gas	Shut In	Sawtooth Mountain	No 1/3	26N-20E	2	W2 SW NE	Blaine	Sawtooth	11	1339
PRIVATE	NCR269	Klabzuba Oil & Gas, Inc.	Bleha P 20-24-19-N	25-005-22185-00-00	Gas	Producing	Leroy	No 1/3	24N-19E	20	NE SE SE	Blaine	West Central Leroy	16	1805

1 - Well lies within a CA that is both in and outside the Monument.
2 - Well lies within a narrow finger protruding in the Monument.
3 - Well lies within a half mile of the Monument.
4 - Well lies within a CA that includes a Federal lease that also lies within the Monument.
5 - Well lies within a Federal lease that is both in and outside the Monument.
6 - Well lies within a State land section intermingled with the Monument.

$# - No Bearing on Federal Mineral Interest

Past and Present Oil and Gas Development Activity and Comparisons to Development Activity Located Outside the Monument

Leasing Activity, Unit Descriptions, Spacing Requirements, and Well Location by Class and Type

The study area currently includes 43 federal oil and gas leases (42,805 acres) and 3 state oil and gas leases (1,918 acres). The majority of the federal leases lie partially outside the Monument and can occur in a non-contiguous manner. Private land (surface and mineral ownership) in the area may also include oil and gas leases. The majority of the leased federal lands are in Blaine County (92% north of the river) and the remainder lie in Fergus and Chouteau Counties (5% and 3% respectively). None of the existing federal leases in the Monument are in Phillips County.

A summary of historical natural gas exploration and development in the Monument is shown in Table O.3-5.

A lease in the Monument may also be part of a Communitization Agreement (CA) and/or Unit Agreement. The agreements provide for an administrative method to develop the gas resources and allow a fair and equitable allocation of well production back to specific leases tied to the agreements, based on acreage within the agreements. The CAs are necessary to protect the various mineral interests (federal, state and private) involved in spacing units where normally only one well is allowed. Currently, 11 CAs are both in and outside the Monument. Another 10 CAs lie outside of the Monument, yet are common to the Monument because a portion of the lease is common to both the CA and the Monument. The CAs are formed based on standard state spacing requirements for gas wells (one well per 640 acres, statewide well spacing) and state-approved Board of Oil and Gas Conservation orders allowing reduced spacing, or one well per 320 acres to sufficiently develop the gas resource (State Board Order Nos. 19-75 and 31-87).

In addition to leases contained in the mentioned CAs, two federal leases are also located in a Unit within the Monument known as the Sherard Eagle Participating Area (PA) "E." PA "E" of the Sherard Unit was formed after the discovery of a geologic feature in Sections 27 and 28 of T. 25 N., R. 19 E., Blaine County, by drilling the U.S. No. 6-28 well in late 1974. The 1280-acre PA currently contains three active wells located in the Monument producing from the Eagle Formation.

Outside of the leased federal lands in the Monument, the chance of further oil and gas discovery is remote. Since the Proclamation withdrew all federal land in the Monument (unleased federal minerals totaling 348,824 acres), and no commercially productive oil or gas discoveries have been made within the confines of Monument lands west of McClelland/Stafford Ferry (federal, state or private), or east of the confluence of Bullwhacker Creek and the Missouri River, future exploration outside of the referenced geographic area is unlikely. Although there is no chance of further oil and gas discovery on unleased federal lands in the described area, there is potential for future exploration and development on the state and private minerals within the described lands and other state and private lands intermingled with the Monument.

Leroy Gas Field

The majority of the existing federal Monument leases lie within the Leroy Gas Field. The field was discovered in November 1968 by the Federal 1-18 well drilled by El Santo Petroleum Corp in the NW¼NW¼ NW¼ of Section 18, T. 23 N., R. 19 E.

Following the well which led to the discovery of the Leroy Gas Field in 1968, 40 additional wells were drilled on lands now in the Monument. Twenty-nine were abandoned as dry holes. Twelve were completed (11 to production and one shut-in without a pipeline). Of these twelve, six were eventually plugged (including the discovery well); leaving six active Leroy Gas Field wells in the Monument. Per State Board Order Nos. 19-75 and 31-87, the Leroy Gas Field is allowed to be developed on 320-acre spacing units for the Judith River and Eagle/Virgelle Formations with each unit consisting of half sections lying in a north-south or east-west direction. Two active wells currently produce natural gas. Combined production from the two wells through December 2006 is 0.85 BCF. Another four wells remain shut-in awaiting the outcome of the Monument RMP/EIS. Combined production from the four wells through December 2006 is 0.23 BCF.

Sixteen peripheral wells within 1/2 mile of the Monument produce from the Leroy Gas Field. They have produced 2.5 BCF through December 2006.

Another 11 wells, outside the Monument yet within the Leroy Gas Field and associated with Communitization Agreements, have produced 5.1 BCF. Of these 11 wells, four have been plugged.

Sawtooth Mountain Gas Field

The Sawtooth Mountain Gas Field lies at the very north edge of the Monument's east section. It is common to the Monument because two federal leases overlap the Monument and the Sawtooth Mountain Gas Field. Currently, no active Monument wells are within the Sawtooth Mountain Gas field leases; however, two wells lie adjacent to the Monument (less than 1/2 mile away) and are contained in a lease and CA both in and outside the Monument. The wells were drilled in the mid-1970s

and continue to produce. Geologic characteristics of the Sawtooth Mountain Gas Field are similar in nature to those of the Leroy Gas Field as they are adjacent to one another near the northern edge of the Monument.

Currently no federal wells are active in the Monument in the Sawtooth field. Two active wells currently produce natural gas within 1/2 mile of the Monument. Combined production from the two wells through December 2006 was 1.4 BCF.

Sherard Unit Area

Six of the leases in the Monument fall within the Sherard Unit Area. The first successful well in this area was drilled in December 1974 and continues to produce. Geologic characteristics of the Sherard Unit Area in the Monument are similar in nature to those of the Leroy Gas Field as a relatively short distance separates the two fields.

The Sherard Unit Area allows for one well per section with numerous well density and location exceptions. Because the area is so broken with fault blocks, there is a need to drill additional wells. For example, if one section of land contains ten individual fault blocks, it is highly likely that the BLM and the Montana Board of Oil and Gas Conservation would be petitioned by industry to allow wells to be drilled into each discrete fault block in order to produce the natural gas resource from each fault block.

Three federal wells are currently active in the Sherard Unit Area of the Monument. Two of the wells continue to produce and the other well is to be plugged and abandoned. Combined production from the three wells through December 2006 was 4.0 BCF.

Wells Outside Field Boundaries

In addition to the wells discussed above, two additional wells were drilled in the Monument, but outside of the described gas fields. The Federal 30-1 well was drilled east of the Leroy Gas Field and is currently shut in waiting on a pipeline. See further discussion regarding this well in Section 4.2.4 Central Leroy East Exploration/ Development Area. The Cow Creek Federal No.1 well was drilled and completed in 1968; however, because of a lack of market for the gas, this well was plugged and abandoned in 1978.

Table O.3-6 shows current natural gas activity in the Monument.

Exploration/Production Areas

Each of the fields includes productive areas that are referred to as exploration/production areas. Eighteen areas within the study area are used to describe historic, current and future exploration and development. In two of the areas (Cow Creek and Leroy One) no federal leases occur or ever will occur because of the Monument Proclamation. They are included for historical purposes to indicate the trend for oil and gas exploration and development of the area. The 18 areas are common to the Monument and are mostly contained within the Monument; however, some of the areas are both in and outside the Monument.

In addition to the wells drilled within the exploration/production areas, numerous other exploratory wells were drilled and abandoned outside of these areas because the wells had no shows of natural gas. Valuable information was gained from the abandoned wells because they further identified the subsurface resource. In some cases they are also included for informational purposes only and are referred to as Identification Wells in the tables which follow for each exploration/production area.

The potential for future drilling in each area was rated from low to high. The criteria were based on whether another well could be drilled in an already productive spacing unit or whether the spacing unit had a dry hole drilled previous to this report. The spacing units without wells drilled and adjacent to productive areas received a high potential for drilling. The spacing units with either a dry hole or a productive well received a low potential for drilling another well. Due to the complex structural geology and the possibility of drilling a producing gas well within a few acres of dry holes, exceptions could occur in the low potential drilling areas. All other areas were given a moderate potential for drilling another well (see Figure O.3-4).

It is reasonably foreseeable that natural gas wells could be drilled in 11 of the 18 exploration/production areas. Table O.3-7 presents each of the exploration areas by the chronological order in which the area was explored. Also see Figures O.3-4 and O.3-5 for the location of each exploration/production area.

Drilling and Completion Statistics

A summary of drilling in the 18 Exploration/Production areas described above is shown in Table O.3-8. Refer also to the information in the previous Exploratory/ Development Drilling section.

Production Statistics

Table O.3-9 provides a compilation of well summaries per area and cumulative production data for all of the wells drilled around the Monument study area as summarized below.

Table O.3-5
Historical Natural Gas Exploration and Development in the Monument

Natural Gas Wells	*Leroy Gas Field*	*Sawtooth Mountain Gas Field*	*Sherard Unit Area*	*Outside of Existing Fields*	*Total*
Drilled	41	2	12	83	138
Dry Holes (Abandoned)	29	2	9	81	121
Completed	12	0	3	2	17
Production	11	0	3	0	14
Shut-In without Pipeline	1	0	0	2	3
Completed Wells Plugged	6	0	0	1	7
Completed Wells Active	6	0	3	1	10
Production (BCF)	1.7	0	4.0	0	5.7

Table O.3-6
Current Natural Gas Activity in the Monument

Natural Gas Wells	*Leroy Gas Field*	*Sawtooth Mountain Gas Field*	*Sherard Unit Area*	*Outside of Existing Fields*	*Total*
Active Wells	6	0	3	1	10
Currently Producing	2	0	2	0	4
Shut-In with Pipeline	3	0	1	0	4
Shut-In without Pipeline	1	0	0	1	2

Table O.3-7
Exploration/Production Areas

Exploration/ Production Area (date 1st well drilled)	*Field Name*	*Area Description*	*General Remarks*
1 - Whiskey Ridge (October 1939)	Wildcat (not part of a field within the Monument)	SE¼NW¼, NE¼SW¼, S½NE¼, N½SE¼ Section 7; S½N½, N½S½ Section 8; S½N½, N½S½ Section 9; S½N½, N½S½ Section 10; S½N½, S½ Section 11; T. 22 N., R. 18 E. (1,660 acres)	Approximately a three square mile area where ten wells have been drilled including one active well (one shut-in gas well). Area approximately 40% in the Monument. Active federal leases are in the Monument in this area.

Table O.3-7
Exploration/Production Areas

Exploration/ Production Area (date 1st well drilled)	*Field Name*	*Area Description*	*General Remarks*
2 - North Leroy (March 1968)	Leroy	N½, SW¼, W½SE¼ Section 3; NW¼, W½NE¼, N½SW¼, NW¼SE¼; Section 10; T. 25 N., R. 20 E.; Section 14; N½ Section 15; N½ Section 16; NE¼ Section 17; E½SE¼ Section 22; Sections 23 and 26; E½E½ Section 27; E½ Section 34; W½W½ Section 35; T. 26 N., R. 20 E. (4,460 acres)	Approximately six and a half square mile area where 14 wells have been drilled including eleven active wells (two shut-in gas wells and nine producing gas wells). Area approximately 15% in the Monument. Active federal leases are in the Monument in this area.
3 - Central Leroy (July 1968)	Leroy	Section 12; N½N½ Section 13; N½, SW¼, W½SE¼ Section 14; S½ Section 15; SE¼ Section 21; Section 22; NE¼, W½ Section 28; Section 29; SE¼SE¼ Section 30; NE¼, E½NW¼, N½SE¼, NE¼SW¼ Section 31; NW¼ Section 32; T. 24 N., R. 20 E.; N½ Section 7; T.24 N., R. 21 E.; SE¼ Section 36; T. 25 N., R. 20 E.; SW¼, W½SE¼ Section 31; T. 25 N., R. 21 E. (4,500 acres)	Approximately seven and a half square mile area where nine wells have been drilled including three active wells (two producing gas wells and one shut-in). Area all in Monument. Active federal leases are in the Monument in this area.
4 - Central Leroy East (August 1968)	Leroy/ Wildcat	E½ Section 25; N½, N½S½ Section 36; T. 24 N., R. 20 E.; S½ Section 19; Section 20; W½ Section 29; Section 30; N½ Section 31; NW¼ Section 32; T. 24 N., R. 21 E. (3,150 acres)	Approximately five square mile area where two wells have been drilled including two active wells (two shut-in gas wells). Area all in Monument. Active federal leases are in the Monument in this area.
5 - Leroy-Bullwacker (August 1968)	Leroy	Sections 15, 16 and 17; E½SE¼ Section 18; E½E½ Section 19; W½, NE¼ Section 20; NW¼NW¼ Section 21; W½W½ Section 29; E½ Section 30; Section 31; T. 25 N., R. 20 E. (3,800 acres)	Approximately six square mile area where nine wells have been drilled including three active wells (one producing gas well and two shut-in gas wells). Area approximately 90% in the Monument. Active federal leases are in the Monument in this area.
6 – Cow Creek (September 1968)	Wildcat	NW¼ Section 2; Section 3; T. 25 N., R. 21 E. (820 acres)	Approximately one square mile area where one well was drilled as an active gas well and later plugged because the well did not justify a pipeline. Area all in Monument. No active federal leases within described area.
7 - Leroy One (Discovery well of the Leroy Gas Field – October	Leroy	SE¼ Section 12; NE¼ Section 13; T. 23 N., R. 18 E.; SW¼, W½SE¼ Section 7; NW¼, W½NE¼ Section 18; T. 23 N., R. 19 E. (620 acres)	Approximately one square mile area where four wells were drilled. The first of the four wells drilled in this area was the

Table O.3-7
Exploration/Production Areas

Exploration/ Production Area (date 1st well drilled)	*Field Name*	*Area Description*	*General Remarks*
1968)			discovery well for the Leroy field. The other three wells were drilled and abandoned. Area all in the Monument. No federal active leases within described area.
8 – Sherard/ Northwest Leroy (May 1969)	Sherard & Leroy	Sections 1, 2, 3, 10, 11, 12; N½ Section 13; N½, SW¼ Section 14; Section 15; T. 25 N., R. 19 E.; W½, W½E½ Section 6; T. 25 N., R. 20 E.; S½ Section 26; Section 27; E½E½ Section 33; Sections 34, 35; S½ Section 36; T. 26 N., R. 19 E. (8,590 acres)	Approximately twelve and a half square mile area where twenty-one wells were drilled including eight active wells (seven producing gas wells and one shut-in gas well). Area approximately 55% in the Monument. Active federal leases within approximately 85% of the area.
9 - Leroy Two (June 1969)	Leroy	N½ Section 13; NE¼ Section 14; T. 25 N., R. 20 E. (470 acres)	Approximately one square mile area where two wells have been drilled, including one well that was drilled as an active gas well and later plugged because the well did not justify a pipeline. The other well was drilled and abandoned. Area all in Monument. Active federal lease in the Monument in Section 13.
10 – West Leroy (July 1969)	Leroy	N½ Section 2; T.23 N., R. 18 E. SE¼ Section 9; Sections 10 and 11; SW¼ Section 12; W½, W½E½ Section 13; Section 14; N½NW¼, E½ Section 15; E½W½, E½ Section 22; Section 23; W½, W½SE¼ Section 24; W½ Section 25; Section 26; E½ Section 27; E½ Section 34; Section 35; W½W½ Section 36; T. 24 N., R. 18 E. (7,120 acres)	Approximately eleven and a half square mile area where 40 wells have been drilled including nine active wells (six producing gas wells and three are shut-in). Area approximately 10% in the Monument. Active federal leases are in the Monument in this area.
11 - Sawtooth (June 1971)	Sawtooth Mountain	W½ Section 1; Section 2; Section 3, S½ Section 4; SE¼ Section 5, E½ Section 8; Section 9; Section 10; Section 11; NW¼ Section 12; T. 26 N., R. 20 E.; S½ Section 35; SW¼ Section 36; T. 27 N., R. 20 E.; T. 26 N., R. 20 E. (4,990 acres)	Approximately eight square mile area where eleven wells have been drilled including four active wells (producing gas wells). Area approximately 40% in the Monument. Active federal leases are in the Monument in this area.
12- Sherard Unit Area East (September 1971)	Sherard & Leroy	S½SE¼, SE¼SW¼ Section 23; Sections 24 and 25; E½, E½W½ Section 26; N½NE¼, NE¼NW¼ Section 35; N½N½ Section 36; T. 25	Approximately four square mile area where three wells have been drilled. Area includes no active wells. Area all in Monument.

Table O.3-7
Exploration/Production Areas

Exploration/ Production Area (date 1st well drilled)	*Field Name*	*Area Description*	*General Remarks*
		N., R. 19 E.; NW¼ Section 19; T. 25 N., R. 20 E. (2,330 acres)	Area is held by production based on the Sherard Unit Production (allocated production). Active federal leases are in the Monument in this area.
13 - Southeast Leroy (August 1972)	Leroy	N½N½ Section 6; T. 22 N., R. 19 E.; SE¼ Section 21; Section 22; NW¼ Section 25; Sections 26, 27 and 28; E½ Section 29; S½ Section 31; N½, N½S½ Section 32; N½ Section 33; N½ Section 34; NW¼ Section 35; T. 23 N., R. 19 E. (5,380 acres)	Approximately eight square mile area where 21 wells have been drilled including eight active wells (five producing gas wells and three are shut-in). Area approximately 25% in the Monument. Active federal leases are in the Monument in this area.
14 - Chase Hill South (July 1973)	Wildcat	SW¼ Section 4; Section 5; N½ Section 8; Section 9; N½ Section 16; T. 23 N., R. 17 E.; Sections 29, 30, 31 and 31; T. 24 N., R. 17 E. (5,230 acres)	Approximately eight square mile area where six wells have been drilled including four active wells (four are shut-in). Area approximately 25% in the Monument. Active federal leases are in the Monument in this area.
15 - Leroy Three (August 1973)	Leroy	SE¼ Section 1; NE¼ Section 12; T. 25 N., R. 20 E.; SW¼ Section 6; NW¼ Section 7; T. 25 N., R. 21 E. (650 acres)	Approximately one square mile area where three wells have been drilled including one active well (one shut-in gas well). Area all in Monument. Active federal lease in Section 7.
16 - West Central Leroy (November 1974)	Leroy	SW¼SW¼ Section 15; SE¼ Section 16; E½ Section 20; Section 21; NW¼NW¼ Section 22; N½, SW¼, W½SE¼ Section 28; N½NE¼ Section 29; N½NW¼, NW¼NE¼ Section 33; T. 24 N., R. 19 E. (1,950 acres)	Approximately three square mile area where nine wells have been drilled including three active wells (two producing gas wells and one shut-in). Area approximately 35% in Monument. Active federal leases are in the Monument in this area.
17 - Sherard Unit (December 1974)	Sherard	Sections 27, 28 and 29; T. 25 N., R. 19 E. (1,910 acres)	Approximately three square mile area where eight wells have been drilled including four active wells (two producing gas wells and two shut-in gas wells). Area approximately 65% in Monument. Active federal leases are in the Monument in this area.
18 – Johnsons (July 1975)	Leroy/Sherard	Sections 9 and 10; N½N½ Section 15; N½N½ Section 16; T. 24 N., R. 19 E.; S½S½ Section 33; S½SW¼	Approximately two and a half square mile area where seven wells have been drilled including

Table O.3-7 Exploration/Production Areas			
Exploration/ Production Area (date 1st well drilled)	***Field Name***	***Area Description***	***General Remarks***
		Section 34; T. 25 N., R. 19 E. (1,620 acres)	two wells that were drilled as active producing gas wells and later plugged because of depleted production. The other five wells were drilled and abandoned. Area approximately 20% in Monument. No active federal leases within described area.

Figure O.3-4

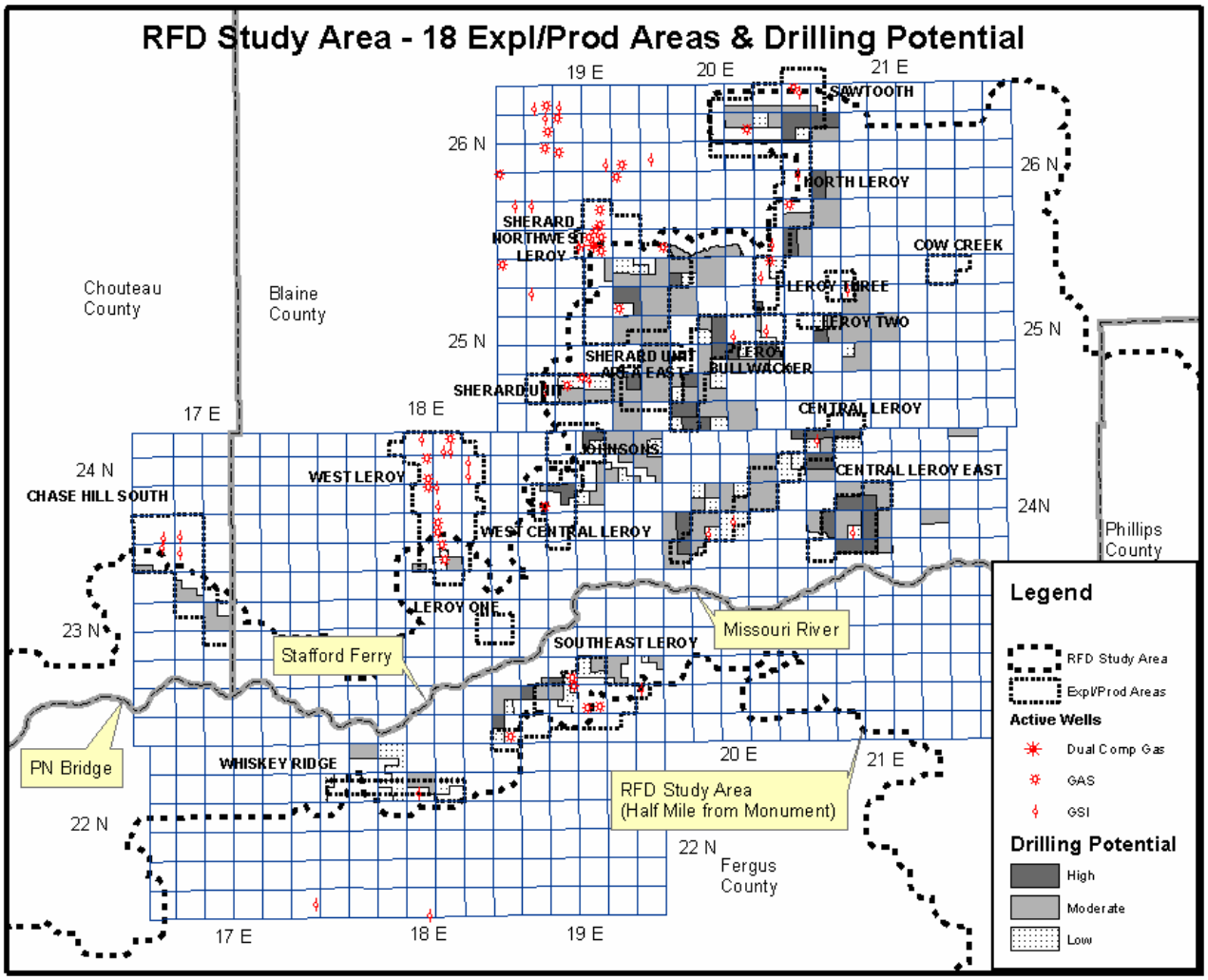


Figure O.3-5
West HiLine and Non-West HiLine Leases

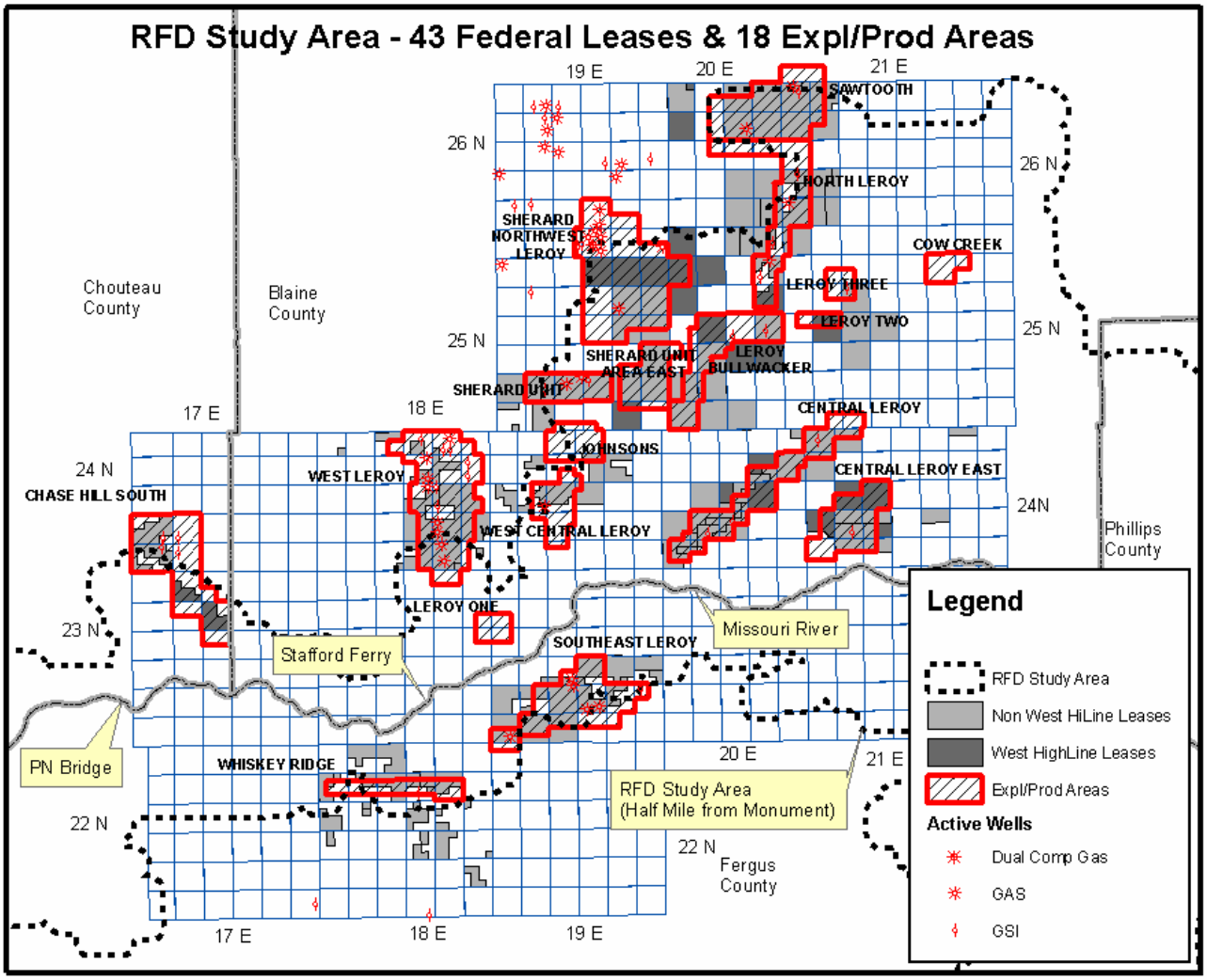


Table O.3-8 Exploration/Production Area Summary					
Exploration/Production (E/P) Area	***Monument Wells in E/P Area***	***Study Area Wells in E/P Area***	***Wells Outside Study Area but in E/P Area***	***Total Wells in E/P Area***	***Identification Wells Not Part of Total Wells***
1 - Whiskey Ridge	3	4	0	7	4
2 - North Leroy	2	10	2	14	4
3 - Central Leroy	8	1	0	9	10
4 - Central Leroy East	1	1	0	2	2
5 - Leroy Bullwacker	3	3	0	6	9
6 - Cow Creek	1	0	0	1	4
7 - Leroy One	4	0	0	4	1
8 - Sherard Northwest Leroy	6	10	11	27	14
9 - Leroy Two	2	0	0	2	0
10 - West Leroy	3	3	33	39	3
11 - Sawtooth	2	6	3	11	0
12 - Sherard Unit Area East	2	0	0	2	1
13 - Southeast Leroy	4	14	6	24	6
14 - Chase Hill South	0	1	6	7	1
15 - Leroy Three	3	0	0	3	1
16 - West Central Leroy	3	6	1	10	6
17 - Sherard Unit	5	2	1	8	2
18 - Johnsons	2	4	2	8	1
Total	54	65	65	184	69

Table O.3-9
Summary of Well Production and Activity by Exploration/Production Area
(through December 2006)

Area	*Field/ Reservoir*	*Wells Produced **	*Gas Production Cumulative (BCF) **	*Water Production Cumulative (BBLs)*	*Initial Pressure (psi)*	*Current Pressure (psi)*	*Comment ***
1 - Whiskey Ridge	Wildcat Eagle	1 completed 0 w/production	0	0	210	210	1 well remains shut-in and waiting on pipeline. No 1st production.
2 - North Leroy	Leroy Eagle	5 completed 5 w/production	0.502	0	200-560	Unknown	5 wells remain. 2 wells currently producing and 3 shut-in. 1st production 9/1994.
3 - Central Leroy	Leroy Eagle	3 completed 2 w/production	0.215	0	220-300	Unknown	3 wells remain. 2 wells are shut-in and 1 well is waiting on pipeline. 1st production 6/1996.
4 - Central Leroy East	Leroy/Wildcat Eagle	2 completed 0 w/production	0	0	160-320	160-320	1 well remains shut-in and waiting on pipeline. No 1st production.
5 - Leroy-Bullwacker	Leroy Eagle	3 completed 3 w/production	0.127	27,352	240-530	Unknown	2 wells remain and they are all shut-in. 1st production 12/1999.
6 – Cow Creek	Wildcat Eagle	1 completed 1 w/production	0.001	0	275	275	Tested 1 well with an IP of 500 MCFPD. Plugged for lack of market. 1st production 10/1968.
7 - Leroy One	Leroy Eagle	1 completed 1 w/production	0.477	0	382	Unknown	No wells remain. Well was plugged. 1st production 12/1980.
8 – Sherard/Northwest Leroy	Sherard & Leroy Eagle	3 completed 3 w/production	1.446	284	390-550	Unknown	11 wells remain and 8 wells are currently producing and 3 shut-in. 1st production 1/1974 (non study area well), 1st production 5/1998 (study area well).
9 - Leroy Two	Leroy Eagle	0 completed 0 w/production	0	0	143	151	Tested 1 well with an IP of 189 MCFPD. Plugged for lack of market. No 1st production.
10 – West Leroy	Leroy Eagle	2 completed 2 w/production	1.017	131	430	Unknown	15 wells remain and 8 wells are currently producing and 7 shut-in. 1st production 6/1978.
11 -Sawtooth	Sawtooth Mountain Eagle	3 completed 3 w/production	1.831	21	400-530	Unknown	3 wells remain and 3 wells are currently producing and 1 shut-in. 1st production 10/1976.

Table O.3-9
Summary of Well Production and Activity by Exploration/Production Area
(through December 2006)

Area	*Field/ Reservoir*	*Wells Produced **	*Gas Production Cumulative (BCF) **	*Water Production Cumulative (BBLs)*	*Initial Pressure (psi)*	*Current Pressure (psi)*	*Comment ***
12- Sherard Unit Area East	Sherard & Leroy Eagle	0 completed 0 w/production	0	0	0	0	No productive wells exist in this structure. Area based on geologic potential. No 1st production.
13 - Southeast Leroy	Leroy Eagle	10 completed 10 w/production	1.920	0	100-600	Unknown	6 wells remain and 5 wells are currently producing and 1 shut-in. 1st production 11/1983.
14 - Chase Hill South	Wildcat Eagle	0 completed 0 w/production	0	0	240	Unknown	4 wells remain shut-in and waiting on pipeline. No 1st production.
15 - Leroy Three	Leroy Eagle	1 completed 1 w/production	0.019	0	500	Unknown	1 well remains shut-in and waiting on well service. 1 st production 6/1995.
16 - West Central Leroy	Leroy Eagle	5 completed 5 w/production	0.728	0	340-415	Unknown	1 well remains as an active producing well. 1 st production 6/1978.
17 - Sherard Unit	Sherard Eagle	6 completed 5 w/production	4.314	2,780	110-440	Unknown	4 wells remain and 2 wells are currently producing and 2 shut-in. 1st production 9/1975.
18 – Johnsons	Leroy/Sherard Eagle	2 completed 2 w/production	0.039	0	300-460	Unknown	No wells remain. Wells were plugged. 1st production 6/1978.
Total		48 completed 43 w/production	12.6 BCF RFD study area wells. 5.7 BCF Monument wells only.	30,568	N/A	N/A	29 wells currently producing. 29 wells shut-in of which 7 are waiting on pipeline.

* Wells and production counted on Monument lands and within 1/2 mile of Monument lands.
** Includes all wells within the Exploration/Production areas that are currently active.

Horizontal/Deviated Drilling Practices

The practice of using horizontal and or deviated drilling has not customarily been used on previous wells drilled in the study area. The practice is, however, being used with success on similar Eagle/Judith River wells adjacent to the study area in the Sawtooth Mountain Field. It is believed that many of the future wells drilled in the Monument may use this technology to allow further development of areas not accessible to vertical drilling technology because of unstable soils or steep slopes, and to reduce the effects on Monument resources.

Oil and Gas Production Fluid Properties

No oil or gas condensate has been produced from the Monument. The gas produced from the Monument is a dry sweet gas that does not yield condensate. No hydrogen sulfide gas (H2S) is contained in the gas produced from the Monument. As shown in Figure O.3-6, production of gas from the Monument began in September 1975 and continues to date. As of December 2006, 12.6 BCF had been produced from the 14 Monument wells and 28 wells within 1/2 mile of the Monument, and 5.7 BCF was produced from Monument wells only.

Oil and Gas Pricing

Exploration and development in the study area is highly dependent upon gas pricing. Initial development of the fields in the late 1960s took place at a time when gas prices were low (Figure O.3-7). Initial production from the study area occurred in late 1975 and participated in relatively good prices for fourteen years. The excess gas supply in North America, sometimes called the "gas bubble" of the late1980s and throughout the 1990s, depressed natural gas prices during the later stages of production in the study area with only a few wells being drilled each year through the late 1980s and 1990s. (Also see Figure O.3-3 for comparison.)

Recent events indicate that the "gas bubble" no longer exists and natural gas prices have exceeded $3/MCF in the Montana. Current commodity prices provide a very positive economic incentive for oil and gas operators to explore and develop natural gas prospects in the study area. For the purpose of analyzing the economics for exploring and developing natural gas in the study area, the following prices were used:

Untreated Natural Gas $2.50/MCF to $8.50/MCF

Since it is believed that volatility remains for natural gas pricing and natural gas is the primary revenue stream for wells in the study area, a sensitivity analysis was conducted whereby the gas price was varied from $2.50/MCF up to $8.50/MCF for untreated natural gas. Per the Department of Energy projections out to 2025, natural gas prices are projected to decline form the 2004 levels down to $3.64 per MCF in 2010 and then increase to $4.79 per MCF in 2025.

Finding and Development Costs

Given the varying degrees of reservoir sizes in the study area, production profile "type curves" were generated for a reservoirs that varied in size from 26 million cubic feet (MMCF) of natural gas up to reservoirs with greater than 500 MMCF (0.5 BCF). The productivity of each producing well was varied depending on the size of reservoir based on data from the study area. For reservoirs within the study area, three ranges were used to determined economics. The ranges were:

- 0 - 100 MMCF, and it was determined that production for wells in this range had average exponential decline rate of 47%;
- 100 – 500 MMCF, and it was determined that production for wells in this range had an average exponential decline rate of 26%; and
- 500 MMCF and greater and it was determined that production for wells in this range had an average exponential decline rate of 14%.

Holding well costs, monthly operating costs, economic limits, severance taxes, discount rates and royalty rates constant, and varying the price of gas and the size of the reservoir under each of the three ranges, yields economics for wells in the study area as shown in Table O.3-10 and Figures O.3-8 through O.3-10. The assumed constants in this review are the following:

Well Cost	$120,000
Monthly Operating Cost	$1,000
Economic Limit – MCFPM	60
Severance Tax - %	9.3
Discount Rate - %	11.25
Royalty Rate - %	12.5
Well Decline rates varied between the ranges	47%, 26%, and 14%

Based on the information presented in Figures O.3-8 through O.3-10, it is evident that the diagrams are for the purpose of evaluating wells with small reservoir potential (i.e., 100 MMCF or less). Using the information in Figure O.3-8, a well with 34.5 MMCF would be considered a break even well, if the price of gas remained at $6.50/MCF. If the price fell below the $6.50/MCF a well with 34.5 MMCF would become subeconomic. For wells with reserves of 100 MMCF and greater the necessary price of natural gas to break even is significantly below current gas prices ($2.60/MCF, $4.00/MCF and $4.60/MCF) for each respective case.

Figure O.3-6

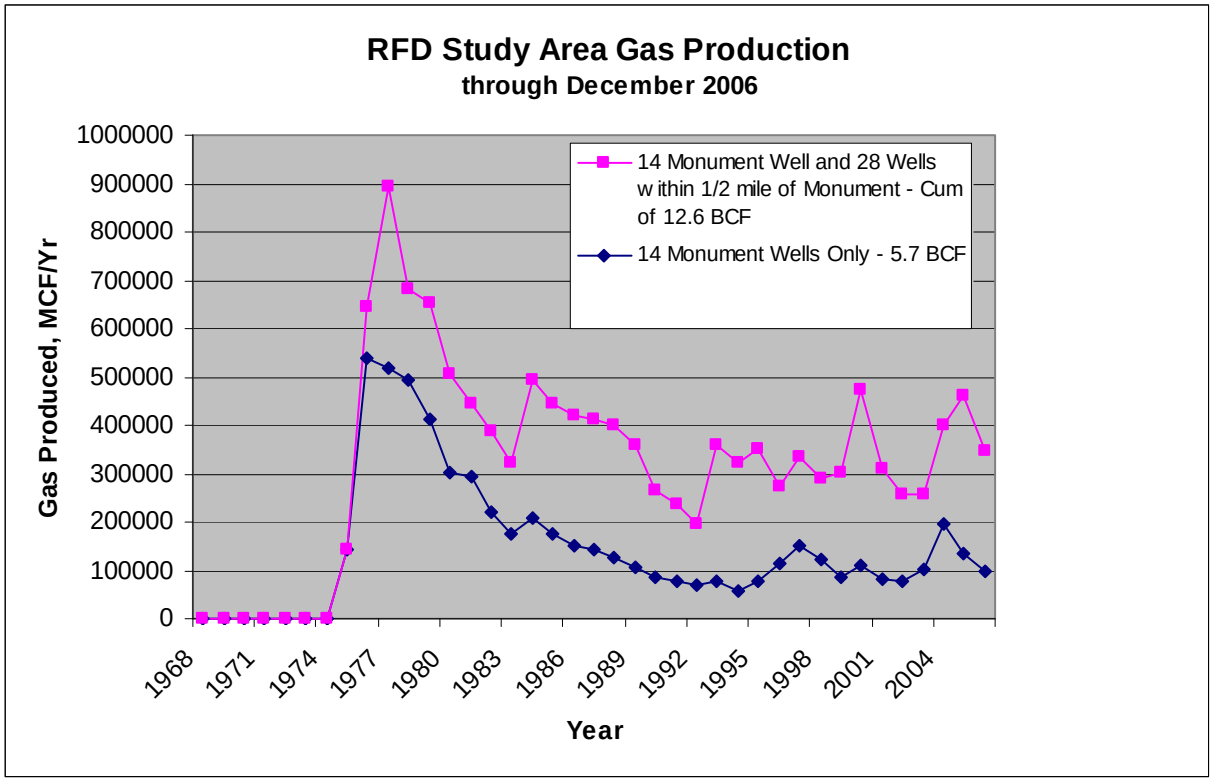
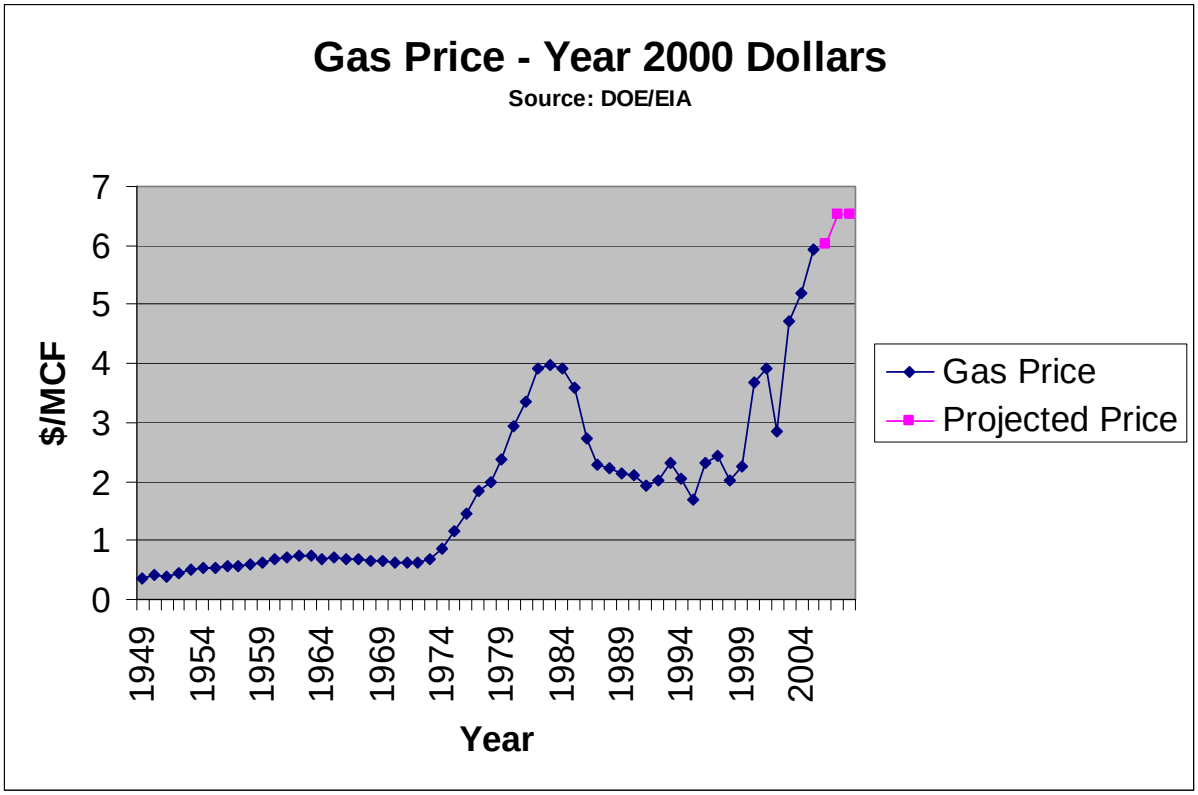


Figure O.3-7



Source: Annual Energy Outlook with Projections to 2025, Energy Information Administration, Annual Energy Review 2005. www.eia.doe.gov/oiaf/aeo/gas

Table O.3-10 Well Economics			
Natural Gas Price $/MCF	***0-100 MMCF Break Even Reserve at the Given Gas Price***	***100-500 MMCF Break Even Reserves at the Given Gas Price***	***500 MMCF and Greater Break Even Reserves at the Given Gas Price***
	Decline of 47%	Decline of 26%	Decline of 14%
$2.50	106,800 MCF	146,200 MCF	191,100 MCF
$4.50	55,600 MCF	78,200 MCF	101,600 MCF
$6.50	34,500 MCF	63,000 MCF	67,800 MCF
$8.50	25,800 MCF	39,000 MCF	46,100 MCF
	Figure O.3-8	Figure O.3-9	Figure O.3-10

Figure O.3-8

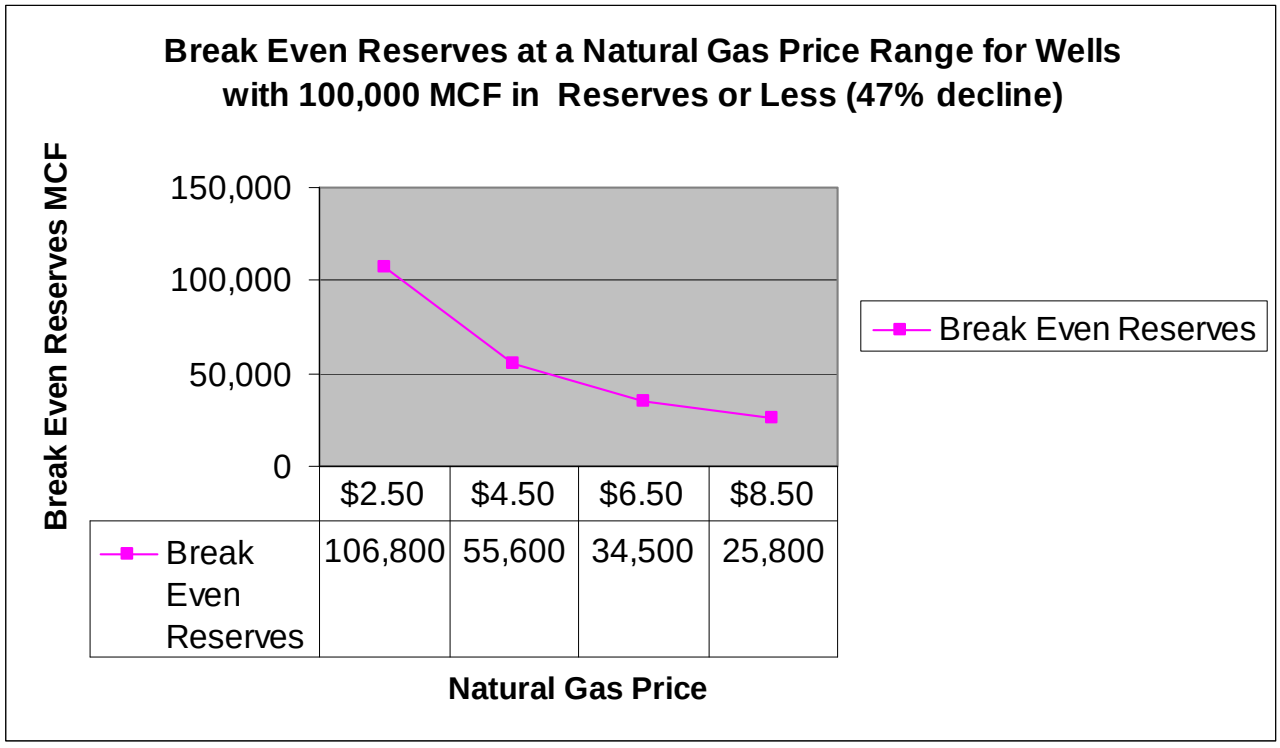


Figure O.3-9

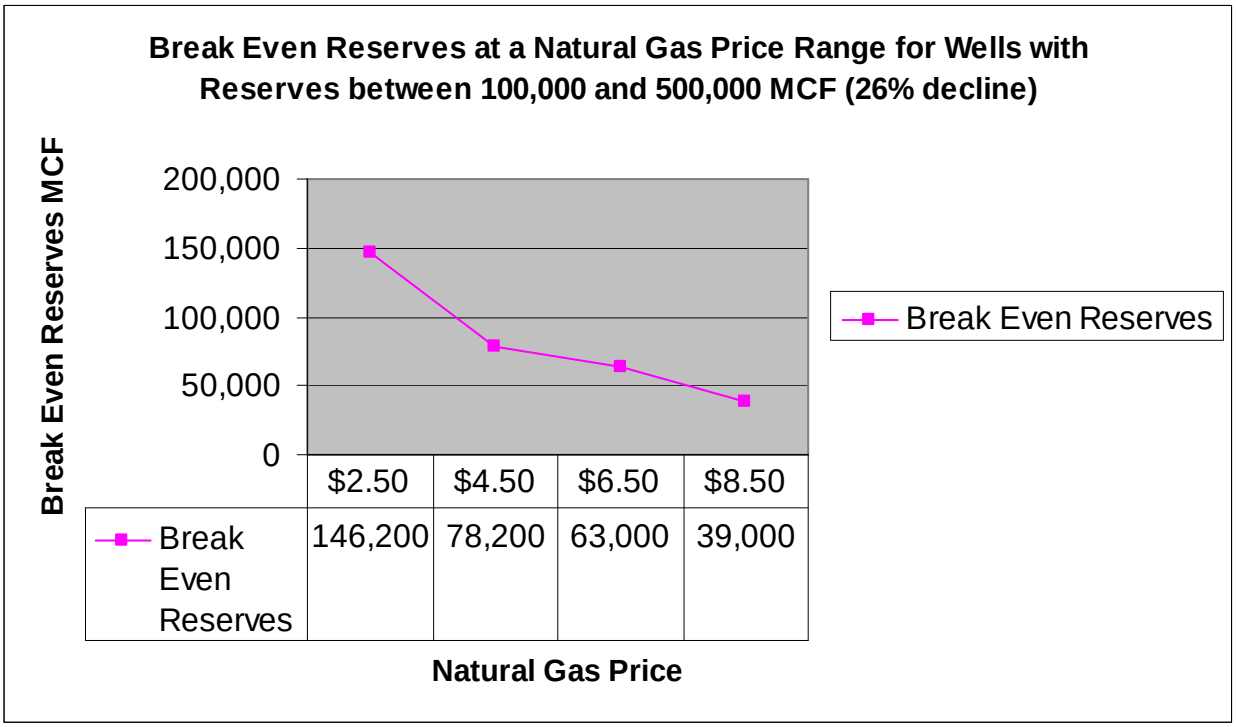
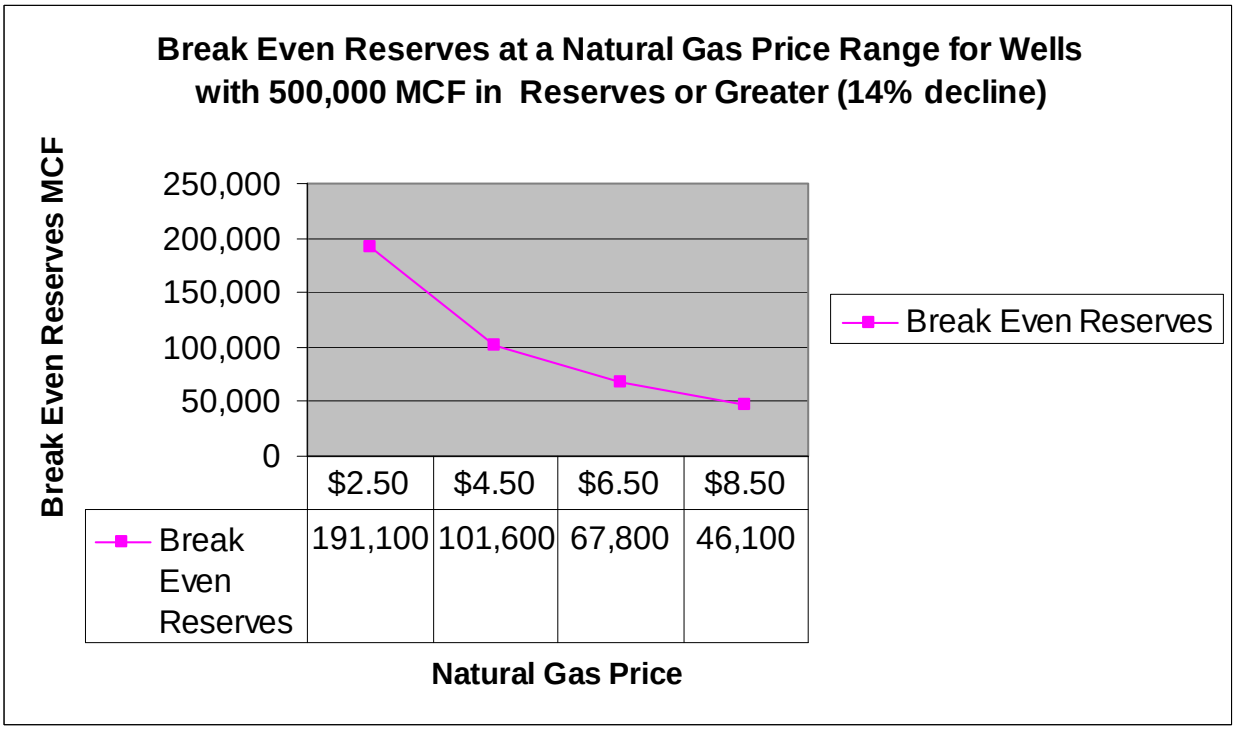


Figure O.3-10



Reasonable and Foreseeable Oil and Gas Operations

Geophysical Exploration Methods

Oil and gas can be discovered by either direct or indirect exploration methods, such as geologic surface mapping, seeps, well data, and remote sensing data. In many cases, indirect methods, such as seismic, gravity, and magnetic surveys, are required to delineate subsurface features that may contain oil and gas. Geophysical exploration provides information that increases the chances of drilling a discovery well, as well as information that may discourage drilling and the associated surface disturbance. A more sophisticated geophysical technique, such as a three-dimensional (3-D) seismic survey, is an intensive data acquisition and computer synthesis system used to analyze and three-dimensionally depict subsurface geologic structures/stratigraphy. This technique is capable of locating and displaying unknown subsurface pools or pockets that potentially could contain producible hydrocarbons. Data obtained through 3-D geophysical data acquisition should enable wells to be drilled with a much greater probability of locating producible hydrocarbons than is attainable via previous methods, such as two-dimensional (2-D) seismic data and wildcat wells. This should result in fewer "dry holes" in the future, minimizing the need for drilling and associated environmental disturbance.

Gravity Surveys

Gravitational prospecting detects micro-variations in gravitational attraction caused by the differences in the density of various types of rock. Gravity data are used to generate anomaly maps from which faults and general structural trends can be interpreted. These surveys generally are not considered definitive because of the many corrections required (e.g., terrain, elevation, latitude, etc.) and the poor resolution of complex subsurface structures. The instrument used for gravity surveys is a small portable device called a gravimeter. Generally, measurements are taken at many points along a linear transect. The gravimeter is transported either by backpack, helicopter, or off-road vehicle. The only surface disturbance associated with gravity prospecting is that which is caused by a vehicle, if used.

Magnetic Surveys

Magnetic prospecting most commonly is used for locating metallic ore bodies. It is used to a limited extent in oil and gas exploration. Magnetic surveys use an instrument called a magnetometer to detect small magnetic anomalies caused by mineral and lithologic variations in the Earth's crust. These surveys can detect trends in basement rock and the approximate depth to basement rocks but, in general, they provide little specific data to aid in petroleum exploration. Many corrections are required to obtain reliable information. The generated maps lack high resolution and provide rudimentary views of subsurface geology. Magnetometers vary greatly in size and complexity and, in general, most magnetic surveys are conducted from the air by suspending a magnetometer under an airplane. Magnetic surveys conducted on the ground are nearly identical to gravity surveys; surface disturbance is minimal to nonexistent.

Seismic Reflection Surveys

Seismic prospecting is the best and most popular indirect method used for locating subsurface structures and stratigraphy that may contain hydrocarbons. Seismic energy (shock waves) is induced into the earth using one of several methods, typically shot holes or vibrators. As these waves travel downward and outward, they encounter various rock strata, each having a different seismic velocity characteristic. As the wave energy encounters the interface between rock layers where the lower layer is of lower seismic velocity, some of the seismic energy is reflected upward. Sensing devices, commonly called geophones, are placed on the surface to detect these reflections. The geophones are connected to a recording truck that stores the data. The time required for the shock waves to travel from the shot point down to a given reflector and back to the geophone is related to depth. This value is mapped to give an underground picture of the geologic structure.

Many methods exist today that an explorationist can use to induce the initial seismic energy into the earth. All methods require preliminary surveying and laying of geophones. The thumper and vibrator methods pound or vibrate the earth to create a shock wave. Usually, large trucks are used, each equipped with vibrator pads (about 4-feet square). The pads are lowered to the ground, and vibrators on all trucks are triggered electronically from the recording truck. Information is recorded, and then the trucks move forward a short distance and the process is repeated. Less than 50 square feet of surface area is required to operate the equipment at each test site. The trucks are equipped with large flotation-type tires, designed to further spread the weight of the truck on the surface, which reduces the impact of driving over undisturbed terrain.

The drilling method uses truck-mounted and buggy-mounted drills that drill small-diameter holes to depths of 5 to 20 feet. Four to 12 holes are drilled per mile of line. Usually, a 30-pound charge of explosives is placed in the hole, covered, and then detonated. The detonated explosive sends a shock wave below the earth's surface that subsequently is reflected back to the surface from various subsurface rock layers. In rugged topography, a buggy-mounted drill is used or a portable drill is carried in by helicopter or by foot. Charges are placed in the hole as is done in a truck-mounted operation. In remote areas where there is little known subsurface data, a series of

short seismic lines may be required to determine the subsurface geology. Subsequently, more extensive seismic lines are arranged to obtain the greatest amount of geologic information. Seismic information can be obtained in 2-D or 3-D configurations. To obtain 3-D seismic information, the seismic sensors and energy source are located along lines in a grid pattern. This type of survey differs from the more common 2-D surveys because of the large volume of data and the intensive computerization of the data. The results are expensive to obtain but give a more detailed and informative subsurface picture. T he orientation and arrangement of the components in 3-D seismic surveys are less tolerant of adjustments to the physical locations of the lines and geophones, but they are also more compact in the area they cover. Although alignment can be fairly critical, spacing of the lines often can be changed to increase the information collected. The depth of the desired geologic information will dictate the spacing of the grid lines, with smaller spacing detailing shallower formations. The 3-D surveys are very expensive and usually conducted after 2-D surveys or drilling has delineated a geologic prospect that will justify the extra cost. Extensive computer processing of the raw data is required to produce a useable seismic section from which geophysicists can interpret structural relationships to depths of 30,000 feet or more. The effective depth of investigation and resolution are determined to some degree according to the method used.

A typical drilling seismic operation can use 10 to 15 men operating five to seven trucks. Under normal conditions, three to five miles of line can be surveyed each day using the explosive method. The vehicles used for a drilling program include several heavy truck-mounted drill rigs, water trucks, a computer recording truck, and several lightweight pickup trucks for the surveyors, shot-hole crew, geophone crew permit person, and party chief. Helicopters are used to lay out and pick up recording equipment.

Public roads, existing private roads, and vehicle routes can be used. Off-road travel may be necessary to carry out tasks. Motor graders and/or dozers may be required to provide access to remote areas. Concern about unnecessary surface disturbance has prompted government and industry personnel to plan surveys more carefully. As a result, earth-moving equipment is now rarely used in seismic exploration work. Several trips a day are made along a seismograph line. The repeated movement back and forth along the line (particularly by the lightweight pickup trucks) usually establishes a well-defined two-track vehicle route. Spreading vehicles out so that vehicle routes are not straight and vehicles do not retrace the same route has, in some cases, prevented the establishment of new vehicle routes, thus reducing impacts. Drilling water, when needed, usually is obtained from private landowners.

Each of the foregoing exploration methods has inherent strengths and weaknesses, and explorationists must decide which method will produce the most useful information, while being practical in regard to surface constraints (such as topography). Economics and past information also play a role in determining which method should be used. Reconnaissance-type gravity and geomagnetic surveys can be conducted in areas where little information is available with the attendant lower costs and fewer impacts. More expensive and higher impact seismic surveys are conducted when more detailed information is required.

Geophysical Management (Permitting Process)

Geophysical exploration on BLM public lands is covered under the regulations at 43 CFR 3150 – Onshore Oil and Gas Geophysical Exploration. Geophysical operations can be done prior to the issuance of a lease. More specifically, regarding potential geophysical work to be done in the Monument, it would likely be done in or near (within 1/2 mile of) an existing lease whether that lease be private, state or federal and follow the conditions of approval as stated in the Monument RMP/EIS. Because the Monument Proclamation withdrew future leasing from lands in the Monument, this removed a major part of the reason for conducting future pre-oil and gas lease geophysical work on the unleased federal lands in the Monument. Off-lease seismic operations or seismic operations on BLM land with unleased federal minerals may be permitted for the purpose of defining the limits of the federal lessee's interests or for the purpose of exploring state and private oil and gas minerals. Seismic operations planned off of existing roads must demonstrate that proposed transportation and exploration methods will minimize the potential for creating new roads or trails.

Twelve of the leases in the Monument were leased under the West HiLine RMP and are being reviewed under Alternative E where no surface-disturbing or disruptive activities would be allowed and Alternative E (No Lease) where the leases would not have been allowed. Under Alternative E, it is likely that no on-lease geophysical operations would take place because under this alternative, no wells are allowed to be drilled. Since the alternative removes the incentive to conduct seismic in the first place, the seismic would likely not occur. Also under this alternative, seismic operations could be permitted on federal lands for the purpose of exploring state and private oil and gas minerals; however, it is also believed under this alternative that oil and gas companies would forego this opportunity too because by removing the majority of the potential resource from the table, they would be less likely to conduct geophysical surveys for a smaller piece of the pie. Under Alternative E (No Lease), there would be very little difference from Alternative E, since again all of the incentives are removed to do geophysical work. Alternative E (No Lease) applies only to the 12 West HiLine leases.

The responsibilities of the geophysical operator and the BLM are as follows:

Geophysical Operator – An operator is required to file with the appropriate BLM office a "Notice of Intent to Conduct Oil and Gas Geophysical Exploration Operations" (Notice of Intent). The Notice of Intent shall include a map showing the location of the line(s), all access routes, and ancillary facilities. The party filing the Notice of Intent shall be bonded. A copy of the bond or other evidence of satisfactory bonding must accompany the Notice of Intent. For geophysical operation methods involving surface disturbance, a cultural resources survey also is required. A pre-work field conference may be conducted. Earth-moving equipment shall not be used without prior approval. Upon completion of operations, including required reclamation, the operator is required to file a "Notice of Completion of Oil and Gas Geophysical Exploration Operations". If an operator/lessee planned on completing seismic activity as part of a lease activity, a Sundry Notice would be required to be filed along with a Notice of Intent and appropriate National Environmental Policy Act (NEPA) documentation would be need to completed prior to approval.

BLM – The BLM must contact the operator after the Notice of Intent is filed and apprise the operator of the practices and procedures to be followed prior to commencing operations on BLM-administered lands. After the operations are completed, as specified by the Notice of Completion, the BLM shall complete a final inspection and notify the operator if the terms and conditions of the Notice of Intent have been met or that additional action is required. Consent to release the bond or termination of liability shall not be granted until the terms and conditions have been met.

State Standards

In Montana, the operator is required to register with the Montana Department of Natural Resources and Conservation (MT-DNRC). MT-DNRC standards for plugging shot holes, personnel safety, and so on, would be followed as specified in the State Permit.

Mitigation

Seasonal restrictions are imposed to reduce conflicts with wildlife, watershed damage, and hunting activity.

The most critical management practice is compliance monitoring during and after seismic activity. Compliance inspections during the operation ensure that stipulations are being followed. Compliance inspections upon completion of work ensure that the seismic lines are free of trash and the drill holes are plugged properly.

Drilling Permit Process

The federal lessee or operating company selects a drill site based on spacing requirements, subsurface and surface geology, geophysics, topography, and economic considerations. Statewide spacing regulations are established by the Montana State Board of Oil and Gas Conservation and are generally as follows:

> Gas Wells: One well per 640 acres unless covered by one of the existing gas fields or Board orders. Exceptions to spacing requirements involving federal lands may be granted after a BLM review.

Notice of Staking (NOS)

Once the company makes the decision to drill, they must decide whether to submit a Notice of Staking (NOS) or apply directly for a permit to drill. The NOS is an outline of what the company intends to do, including a location map and sketched site plan. The NOS is used to review any conflicts with Monument resources. The BLM utilizes information contained in the NOS and obtained from the onsite inspection to develop stipulations to be incorporated into the APD. Under the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (Reform Act of 1987), upon receipt of an NOS the operator/company name, well name/number, well location and a map showing the drill site must be posted in a public place for a minimum of 30 days prior to approving the APD.

Application for Permit to Drill (APD)

The operator may or may not choose to submit an NOS; in either case, an APD must be submitted. An APD consists of two main parts: the 13-point surface plan that describes any surface disturbances and is reviewed by resource specialists, and the eight-point plan that details the drilling program and is reviewed by the petroleum engineer and geologist. For the APD option the onsite inspection is used to assess possible impacts and develop conditions of approval to minimize these impacts. During the onsite inspection and selection of the potential drill site, it is feasible to see four to six vehicles present. The people at the onsite function will typically include representatives of the company and the BLM, along with the private land owner (if applicable), dirt contractor, drilling contractor representative, and contract archaeologist. If the NOS option is not utilized the 30-day posting period, as required by the Reform Act of 1987, will commence upon receipt of the APD by the BLM. Regardless of whether the NOS option or APD option is followed, an onsite inspection is conducted for every federal well proposed.

For oil and gas activity involving surface-disturbing operations, an archaeological clearance is required.

However, there may be exceptions to this policy on a case-by-case basis. Additionally, the BLM must prepare any site-specific environmental documentation required by NEPA and develop mitigation measures necessary to protect Monument resources. The BLM approves all wells drilled on federal minerals regardless of surface ownership, which would include private lands intermingled with the Monument that have federal mineral ownership. For privately owned surfaces it is the responsibility of the operator to obtain a surface owner agreement.

Drilling Phase

Once the APD is approved, the operator may begin construction activities. When a site is chosen that necessitates the construction of an access road, it is usually planned over the shortest feasible route and would attempt to avoid steep slopes. Best Management Practices (BMPs) will be followed. In some cases BMPs or a landowner's wishes may dictate a longer route.

During this first phase the operator moves construction equipment over existing roads to the point where the access road begins. Depending upon the type of terrain, equipment may include dozers (track-mounted and rubber-tired), scrapers and graders. Existing roads and trails often require improvement in places and occasionally culverts and cattle guards are installed. Because of the topography and the shallow depth of wells (1,500 to 2,200 feet) they can be drilled using a truck-mounted rig, which oftentimes means very little or no access road work is necessary and this phase of construction requires very little time.

The second phase is the construction of the drilling pad or platform. Much of the study area has steep slopes and some dirt work will be is necessary to prepare a safe drill pad (usually it takes less than a day to construct the road and the well pad). In some cases no disturbance is required other than a mud (reserve) pit and cellar. If surface disturbance is necessary, soil material suitable for plant growth is removed and stockpiled in a designated area, to be used later for reclamation. Drilling sites on ridge tops and hillsides are constructed by cutting and filling portions of the location after the topsoil has been removed. The excess cut material is stockpiled in an area that would allow recovery for reclamation.

The amount of level surface required for safely assembling and operating a drilling rig varies with the type of rig, but is usually 200 feet by 250 feet for typical wells of 1,500 to 2,200 foot depths. Deeper wells may require larger pads because of the rig size and associated equipment. When construction of a drilling location requires cut and fill, the foundation of the drilling derrick is usually placed on a cut surface ensuring that it rests on solid ground, thereby preventing it from leaning or toppling due to settling of uncompacted soil.

In addition to the drill pad, a reserve pit may be constructed to contain drilling fluids and drill hole cuttings. It is usually square or oblong, but is sometimes constructed in other shapes to accommodate topography. Generally, the reserve pit is 6 to 12 feet deep by 15 to 20 feet wide by 40 to 50 feet in length. For air drilling, smaller reserve pits are used, usually less than 10 feet by 10 feet and approximately 6 to 10 feet in depth. In some instances steel tanks are utilized which eliminate the need for a pit.

Depending on how the drill site is located relative to a natural drainage, it may be necessary to construct water bars or diversions to control surface runoff and erosion. The area disturbed for construction and the potential for successful revegetation depends largely on topography, soil type, climate and the degree of disturbance.

Typical equipment used for drilling well in the Monument includes the following:

Drill Pad Construction:

- Cat-type dozer and backhoe. Two semi-loaded trailers used to transport these pieces of equipment.
- Two 3/4-ton pickup trucks can also be used as support vehicles.

Drilling Operations Equipment:

- Drill rig (including a 55-86 foot freestanding mast) either truck-mounted or trailer-mounted and elevated anywhere from five to nine feet above ground level, powered by a diesel engine with a power rating from 280 to 420 horsepower.
- Mud pump, powered by a diesel engine with a power rating from 350 to 600 horsepower.
- Diesel electric generator for lights and other electrical equipment with a power rating from 150 to 400 horsepower.
- Other support equipment such as a mud and chemical trailer, dog house, drill pipe racks, water tanks, mud tanks, fuel tanks, two to three camp trailers, and a portable latrine.

Eight to ten semi-loads are required to move in and rig up an operation with up to six additional 3/4-ton pickup trucks for support.

During casing and cementing operations a semi-type cement bulk truck, cement pump truck and 3/4-ton truck could come on to location twice during the operation: once for running and cementing the surface casing, and another time for running and cementing the production casing operations if a successful well is drilled.

Some drilling operations may require that the well safety equipment (blowout preventer equipment, or BOPE) be tested by a third party rather than the equipment at the drill rig. This would require the need for a one-ton type truck at the location for a minimum of four hours.

A 4-ton truck is required to perform a petrophysical survey (formation evaluation) of the well bore. This is normally conducted after the well reaches total depth.

Once the well is cased with pipe and cemented back to the surface, the drill rig and support equipment rig down and move on to the next location, usually within a half day after the decision to move. If the well is determined to not be a commercial well, it will be plugged while the drill rig is on location (see Plugging and Abandonment of Wells).

Drilling Operations

Water for drilling is hauled or piped to the rig storage tanks or reserve pit from rivers, wells, reservoirs or private sources. The volumes of water required for drilling wells in the Monument is 200 to 300 barrels (BBLs). Occasionally, water supply wells are drilled on or close to the drill site. Bentonite, a type of clay, is mixed with the water to form the main constituent of the drilling mud. A wide variety of other materials and chemicals may be added to enhance the mud properties. Drilling mud performs several important functions; it cools the bit, reduces the drag of the drill pipe on the sides of the bore hole and seals off any porous zones, aids in preventing an uncontrolled release of formation fluids, and carries the cuttings to the surface.

High pressure air is sometimes used in place of mud. The use of mud or air is largely dependent upon the target formation, drilling depth and type of completion desired. The drilling mud or air is circulated through the drill pipe to the bottom of the hole, through the bit and up the well bore. At the surface the mud and rock cuttings are returned to the reserve pit where gravity separates the two or they are mechanically separated through a screen. The mud is recycled and returned to the system for further use. When drilling with air, the cuttings are blown into another pit called the blooie pit, where compressed air and cuttings leave the drill system. By regulation, this pit or discharge point is to be located no closer than 100 feet to the well bore. Drilling muds are not allowed to contain any hazardous or toxic substances.

The actual commencement of the drilling is referred to as spudding in. Initially, the drilling usually proceeds rapidly due to the unconsolidated nature of shallow formations.

Drilling is accomplished by rotating special bits bearing a controlled portion of the drill string weight. The rig structure and associated hoisting equipment bear the remainder of the drill string's weight. The weight on the bit is controlled to maintain as vertical a hole as possible or deviate from vertical when desired, and to prevent rapid wearing of the drill bit.

The combination of rotary motion, hydraulic jet action of mud through the bit and weight on the bit causes rock to be chipped away at the bottom of the hole. As mentioned earlier, these chips are then transported to the surface via the mud or compressed air where they are disposed of in the reserve pit or blooie pit.

The rotary motion is created either by a square or hexagonal rod, called a kelly, which fits through a square or hexagonal hole in a large turntable, called a rotary table or a top drive hydraulic unit that turns the drill pipe. The rotary table sits on the drilling rig floor and as the hole is deepened the kelly descends. When the kelly has gone as deep as it can, it is raised and a piece of drill pipe about 30 feet in length is attached to the drill pipe in the hole. The drill pipe is then lowered, the kelly is raised and attached to the top of it, and drilling recommences. By adding more and more drill pipe the hole is steadily deepened.

Eventually, the bit becomes worn and must be replaced. To change bits, the entire string of drill pipe must be pulled from the hole. Once the bit is replaced the drill string is reassembled, lowered into the hole and drilling is started again.

Drilling operations are continuous, 24 hours a day, seven days a week. The crews usually work three 8-hour shifts or two l2-hour shifts a day. Typical wells in the area require three to four days to reach total depth. At periodic intervals BLM personnel, usually petroleum engineering technicians, will conduct inspections of the drilling rig and operations to ensure compliance with the approved plans in the APD and regulations.

Completion Operations

Upon completion of drilling, the well is tested to determine its capability to produce oil and gas. If oil or gas is found in commercial quantities the well is completed as a producer. Completion operations can begin as early as one week after the drill rig moves off location, but they normally occur within two to three weeks.

The typical equipment used for completing a well in the Monument includes the following:

- Wire line truck and mast trailer (~30 tons combined) used to determine the depth of the zone of interest and perforate the well (to expose the formation with natural gas in it to the well bore)
- 3/4-ton support truck
- Workover unit (semi-mounted mast) used to hoist tubing in and out of the well
- Stand-alone air compressor unit
- Supply trailer
- Tubing trailer
- Two 3/4-ton trucks

Or, in place of the workover unit, a semi-mounted coiled tubing unit which includes the following:

- Air compressor
- Coil tubing
- Reel and injector head
- Catch tank trailer to catch any formation water or make up water that is blown off the well
- Two 3/4-ton support trucks

It normally takes about a day to perforate the well and run tubing. Depending on the well, the operator will flow test the well up to three days and then perform a pressure build up test that will last up to five days. This information is invaluable in determining the extent of the reservoir.

Depending on the geological issues, some of the wells in the Monument (mainly in the northern part – Sawtooth Mountain Gas Field) may need to be stimulated with an artificially induced fracture (well frac). In those cases the following pieces of equipment would be required to perform this work:

- Blender truck (a semi-type truck)
- Chemical van (lab and chemicals) (semi type truck)
- Data van (computer monitoring equipment) (similar sized truck to a wire line truck)
- Liquid pump truck (semi type truck)
- One to two nitrogen pump trucks (semi type trucks)
- Iron truck (semi-type truck carrying surface pipe supplies)
- Sand storage unit (semi-type truck)
- One 400 BBL water holding tank on location (transported via semi-type truck)
- One 250 BBL flowback tank (semi-type truck)
- Up to four 3/4-ton trucks for support

The frac operation typically takes less than a half day and on average the frac operation/post operation (flowback and well clean-up) lasts up to four days. The well is then put on line if the pipeline has been constructed.

Production Operations

Installation of production facilities generally requires little additional surface disturbance beyond that necessary for drilling and completion; however, additional disturbance could result from pipeline and gathering line installations if they are installed across undisturbed areas. If pipelines follow existing access roads, no appreciable additional surface disturbance is necessary to hook the well up to production. The typical equipment used for installing production equipment to a well includes the following:

- Pipe trailer transported via semi-type truck or poly pipe that is spooled off a coiled tubing reel trailer pulled by a 3/4-ton truck

- Excavator or a trenching piece of equipment brought into the site via a semi-type tractor trailer or a large goose neck trailer pulled by a 3/4-ton truck

Equipment that would stay with the well during its life includes the following:

- Well head, a gas meter house which is usually a 10-by-10-by-8 feet skid-mounted steel shed

- Pumpjacks which are sometimes used if water is produced with the gas, and the gas reservoir pressure declines to a level that is not adequate to overcome the hydrostatic pressure created by a column of water in the well. Pumpjacks are usually 8 to 10 feet in height, require a slightly larger surface area than a gas shack, and may or may not be skid-mounted. They are powered by either electric motors or natural gas/propane internal combustion engines.

The gas meter house and/or pumpjack are usually situated over the well head on the same area where the drill rig was set up. The installation of the pipeline and the meter house can last up to two days.

If liquid hydrocarbons (condensates) are produced with the gas, a separator and storage facility are necessary. Gas wells which produce water require a disposal pit for evaporation or to catch the water and later be hauled away by truck. A barrel of glycol is necessary to treat the water in the gas stream which prevents freeze-ups and removes water. The pit generally fits within the boundaries of the drilling pad and the final disturbed area necessary for production operations. After the production facilities are fully installed, the remaining drilling disturbances are reclaimed back to an area 100-by-100 feet. Liquid hydrocarbon storage at each well site is typically not required for the wells in the study area because the gas in this region normally does not yield liquid hydrocarbon.

Typically, the wells in the Monument are "sweet gas" wells, that is, they contain no hydrogen sulfide gas (H2S); therefore, no H2S facilities would be necessary for producing gas in the Monument. As the wells produce in an area, pressures eventually become depleted and they require an artificial method to lower the pressure of the gathering system to allow production to continue. Once this occurs, the operator will design and install a compressor station that further enables the production of natural gas from the wells. Currently, no compressor stations reside in the Monument and the closest compressor station to the Monument is located approximately four miles to the northwest. One compressor has been proposed and approved to be located within 1/2 mile of the Monument on a private well (the compressor has not been installed as of this document).

During the production phase, BLM monitors and approves field activities needed for well and field operations. Many operations, such as plugging, completion in a different zone, deepening, etc., require prior approval. Others, such as acidizing and fracturing, do not require prior approval but a subsequent report of operations describing the operation in detail must be filed.

Plugging and Abandonment of Wells

The purpose of plugging and abandoning a well is to prevent fluid migration between zones, protect minerals from damage, and restore the surface area. Each well must be handled individually due to a combination of factors, including geology, subsurface well design, and specific rehabilitation concerns. Therefore, only minimum requirements can be established, and these must be modified for individual wells.

The first step in the plugging process is filing a Notice of Intent to Abandon with the BLM. The notice must be filed and approved prior to plugging a past producing well. Verbal plugging instructions can be given for plugging current drilling operations, but a notice must be filed after the work is completed. If usable fresh water was encountered while the well was being drilled, the BLM may, if interested, assume future responsibility for the well and the operator will be reimbursed for the attendant costs. This assumption of responsibility becomes effective after the deeper zones are plugged back to the usable water zone. Usually, the operator is more than satisfied to remove the surface reclamation liability and will not charge for the remaining well equipment.

The operator's plan for securing the hole is reviewed. The minimum requirements as stated in Onshore Order No. 2, are as follows: In open hole situations, cement plugs must extend at least 50 feet above and below zones that have fluid with the potential to migrate, zones of lost circulation (this type of zone may require an alternate method to isolate it), and zones of potentially valuable minerals. Thick zones may be isolated using cement plugs across the top and bottom of the zone. In the absence of productive zones and minerals, long sections of open hole may be plugged with cement plugs placed every 3,000 feet. In cased holes, cement plugs must be placed opposite perforations and extending 50 feet above and below except where limited by plug back depth. The length of the plug is 100 feet plus 10 percent per 1,000 feet (i.e., at 10,000 feet the plug will be 200 feet long). Typical wells in the Monument range between 1,500 and 2,200 feet in depth.

Cement plugs could be replaced with a cement retainer, if the retainer is set 50 feet above the open perforations and the perforations are squeezed with cement. A bridge plug may also be used to isolate a producing zone and must be capped, if placed through tubing, with a minimum of 50 feet of cement. If the cap is placed using a dump bailer, a minimum of 35 feet of cement is required. A dump bailer is an apparatus run on wire line to convey the cement to the bottom of the hole. In the event that the casing has been cut and recovered, a plug is placed 50 feet within the casing stub, and the 100 feet plus 10 percent per 1,000 feet rule is used for the space above the cutoff point. In all cases, a plug is set at the bottom of the surface casing that has a volume of cement using the 100 feet plus 10 percent per 1,000 feet rule. This may require perforating the casing and circulating or squeezing cement behind the production casing if that casing is not removed. Annular space at the surface will be plugged with 50 feet of cement using small-diameter tubing or by perforating and circulating cement.

If the integrity of a plug is questionable or the position is extremely vital, it can be tested with pressure or by tagging the plug with the tubing or drill string. Tagging the plug involves running pipe into the hole until the plug is encountered and placing a specified amount of weight on the plug to verify its placement and competency. The surface plug within the casing must be a minimum of 50 feet. The interval between plugs must be filled with mud that will balance the subsurface pressures. If this balance point is unknown, a minimum of nine pounds per gallon is specified. After the casing has been cut off below the ground level, any void at the top of the casing must be filled with cement. A metal plate is welded over the top of the casing with a weep hole in the plate and the well identity and location permanently inscribed.

Typical equipment associated with plugging operations include a well workover/pulling unit, cement bulk truck, cement pump truck, water hauling truck (all semi-type trucks) and two to three, 1/2 to 3/4-ton pickup trucks. Depending on the depth of the well, the plugging operation can last up to three days. Typical plugging operations in the Monument last for one to two days.

Disturbance from plugging operations is usually contained within the existing disturbed area used to drill or produce the well, whichever the case may be. If the well to be plugged is a depleted producer, it is customary that the operator will dig a small catch pit (10 feet long by 10 feet wide by 8 feet deep) to contain any fluids pumped in and out of the well. Typical fluids that may come out of the well and put into the catch pit are formation water, drilling mud and cement. These fluid materials are removed from the pit within 48 hours of the well being plugged. Within a week of plugging the well, initial reclamation (dirt work) begins depending on the time of year the well is plugged.

The BLM is responsible for establishing and approving methods for surface reclamation and determining when this reclamation has been satisfactorily accomplished. When that determination is made a Subsequent Report of Abandonment is approved and the well bond is released.

Existing Oil and Gas Infrastructure

With the exception of county roads in the Monument (e.g., Cow Island Road) an estimated 13.0 miles of access roads (6.1 miles of right-of-way access) service the existing 14 gas wells (federal, state and private) within the Monument and an estimated 9.8 miles of access roads (4.2 miles of right-of-way (ROW) access) service 19 gas wells (federal, state and private) within 1/2 mile of the Monument. Many of the access roads are resource roads (two-track type roads) that allow well service vehicles and company personnel to visit the wells and facilities on a scheduled basis. The resource roads are not all-weather type surfaces so operators would use their best judgment to determine when the roads are passable. Many of the roads that access gas wells are also currently open for public use.

Of the 14 wells in the Monument, pipelines service 10 federal and one state well (three wells do not have pipeline service). The estimated length of pipelines in the Monument supporting the 11 wells is 31.1 miles (25.8 miles are covered by ROWs). Pipelines also service the 18 peripheral wells within 1/2 mile of the Monument (one well does not have pipeline service). The estimated length of pipe supporting the 18 peripheral wells is 21.1 miles (13.1 miles are covered by ROWs). An estimated 1/4 of the total pipeline length follows access roads; the remaining 3/4 does not. The total length of pipelines discussed above is 52.2 miles of pipeline and is best described by separating the pipelines into 10 separate sections. Table O.3-11 describes the pipelines in the study area.

Table O.3-11
Pipelines in the Study Area

Pipeline Section	*Well(s) PL Services*	*Legal Location*	*Pipeline Length*	*Remarks*
Butch Camp	Fed No. 1-7*	Sec 7, T25N R21E to Sec 3, T25N R20E	4.8 miles (4.6 miles of ROW)	4" poly pipe
Robinson/N. Bullwhacker	Fed No 1-12* Fed No 15-1 David Kincaid No 1 Fed No 31-3* State No 1 Fed No 34-1	Sec 12, T24N R21E, Sec 15, T24N R20E, Sec 3, T25N R20E, Sec 3, T25N R20E, Sec 16, T25N R20E Sec 34, T26N R20E, Leaving the Monument in Sec 4, T25N R20E	12.9 miles (9.1 miles of ROW)	2" steel and 4" poly pipe
W. Bullwhacker[1]			5.1 miles (4.5 miles of ROW)	
W. Coal Ridge	Fed No 35-24-18A* Fed No. 35-24	Sec 35, T24N R18E, Sec 35, T24N R18E, leaving the Monument in Sec 35, T24N R18E	1.3 mile (0.3 miles of ROW)	
Sherard "E" PA	US 4-27*[2] US 6-28* US 28-1*	Sec 27, T25N R19E, Sec 28, T25N R19E, Sec 28, T25N R19E, leaving the Monument in Secs 27 & 28, T25N	2.5 miles (1.6 miles of ROW)	

Table O.3-11 Pipelines in the Study Area				
Pipeline Section	***Well(s) PL Services***	***Legal Location***	***Pipeline Length***	***Remarks***
		R19E		
Southeast Leroy[3]	Fed No P21-23-19N Fed No N27-23-19B Fed No A28-23-19N Fed No 31-23-19 Osburnsen 29-23-19	Sec 21, T23N R19E, Sec 27, T23N R19E, Sec 28, T23N R19E, Sec 31, T23N R19E, Sec 29, T23N R19E, Sec 22, T23N R19E, leaving the Monument in Sec 14, T23N R18E	12.5 miles (8.4 miles of ROW)	Pipeline crosses the Missouri River
Johnson/Ervin Ridge	Fed 29-15*	Sec 29, T24N R20E, leaving the Monument in Sec 15, T24N R19E	8.5 miles (8.0 miles of ROW)	Pipeline mainly buried in the access road
Sherard/Northwest Leroy	Fed 11-25-19 US 29-10 34-15 State 36-26-19	Sec 11, T25N R19E, Sec 29, T25N R19E, Sec 34, T26N R19E, Sec 36, T25N R19E, Leaving the study area in Sec 11, T25N R19E, Sec 29, T25N R19E and Sec 34, T26N R19E	3.5 miles (2.1 miles of ROW)	
North Leroy	Fed 23-26-20 Fed 21X-26	Sec 23, T26N R20E, Sec 26, T26N R20E, leaving the study area in Secs 23 & 26, T26N R20E	0.4 miles (0.0 miles of ROW)	
Sawtooth	Fed 1-2 US 9-9 Fed 15-9	Sec 2, T26N R20E, Sec 9, T26N R20E, Sec 9, T26N R20E, Leaving the study area in Secs 2 & 4, T26N R20E	0.7 miles (0.0 miles of ROW)	
Total	27 wells		52.2 miles (38.8 miles of ROW)	

* Monument well (8 wells). Another 19 wells are outside the Monument but are serviced by the overall natural gas pipeline system in the area.

[1] Fed No 31-25-20 was plugged and abandoned on October 26, 2005. The referenced pipeline was allowed to remain in place because the BLM has an APD to be drilled in the vicinity of this pipeline/well that was plugged and abandoned.

[2] A notice of intent to plug and abandon the US 4-27 well has been approved and the well likely will be plugged during the 2007 field season (spring or summer).

[3] Fed L22-23-19N was plugged and abandoned on June 14, 2006.

The infrastructure related to natural gas surface operations, other than the access roads and pipelines, includes the following:

- Meter shed (8 feet long x 8 feet tall x 5 feet wide)
- Well head (can be enclosed within the meter shed depending on the operation)
- Gas meter run (enclosed within the meter shed)
- Glycol barrel (can be enclosed within the meter shed)
- Small water separator (normally enclosed within the meter shed depending on the well and the operation)
- Water pit sized depending on the operation, but can range from 20 feet x 20 feet x 8 feet to 40 feet x 40 feet x 10 feet)
- Gas compressor (Compressors typically do not accompany each well. Depending on the operation and the size of the compressor, one gas compressor could service 8-12 wells). Currently, no gas compressors are located within the study area; however, a skid-mounted 42 HP compressor has been approved by the State of Montana on the David Kincaid No. 1 private well (the compressor has not been installed as of this document).

Reasonable Foreseeable Development Baseline Scenario Assumptions and Discussion

The study area is being addressed because of the potential for future exploration and development on lands with existing federal leases. All federal lands in the study area are considered to have moderate and high potential for oil and gas occurrence. Occurrence is based on structural geology and historic activity of the area. It is further confirmed using well information to identify the extents of reservoirs. The areas considered to have high potential are those lands in the 18 exploration/production areas where commercial volumes and moderate shows of natural gas were evident at the time of well completion (Figures O.3-4 and O.3-5). All other federal lands in the study area are considered to have moderate potential for oil and gas occurrence.

In conjunction with these proposed actions, a review was conducted to evaluate the geologic potential of the study area and determine the Reasonable Foreseeable Development (RFD) that could be expected. A total of 11 exploration/production areas were identified with RFD well projections, as shown in Table O.3-12.

Specific well locations are not identified because many wells are considered proprietary information.

In addition to the 15.9 miles of existing roads supporting natural gas operations, the RFD locations would require 34.1 miles of new roads both in the Monument and within 1/2 mile of the Monument.

In addition to the 52.2 miles of existing pipeline, assuming a 35% success rate and because pipelines will be mostly buried in the access road corridor, the length of road to each new well was used. The new miles of pipelines are estimated at 11.9 miles. As a result, the number of well site visits can be limited to only those necessary for routine maintenance as determined via remote well monitoring with radio telemetry.

Proposed Actions

The BLM has received APDs from three federal lease holders in the study area in Blaine County, Montana.

One APD has been received from Klabzuba Oil and Gas, Inc., one from Macum Energy, Inc., and one from Devon Energy. All three are pending approval based on the outcome of the Monument RMP/EIS. The three wells would be drilled from the following locations:

- Klabzuba Federal 31-25-20B
  SE¼NW¼ of Section 31, T. 25 N., R. 20 E.
- Macum Federal 23-10
  NE¼SW¼ of Section 10, T. 25 N., R. 20 E.
- Devon Federal 9-7
  SW¼NE¼ of Section 9, T. 26 N., R. 20 E.

The wells would develop known gas resources in three producing gas fields in the study area. The wells would not require the construction of any new roads. If the wells are productive, they would require the installation of 3.7 miles of new pipeline in the study area to connect into existing pipelines.

Table O.3-12 RFD Well Projections			
Exploration/Production Area	***Wells within 1/2 Mile of the Monument***	***Monument Wells***	***Total Wells***
North Leroy	4	1	5
Central Leroy	0	6	6
Central Leroy East	0	3	3
Leroy Bullwacker East	0	6	6
Sherard Northwest Leroy	7	8	15
West Leroy	1	0	1
South Sawtooth	13	4	17
Sherard Unit Area East	2	8	10
Southeast Leroy	1	1	2
Chase Hill	0	2	2
Sherard Unit	1	5	6
Total Wells in the 11 Areas	29	44	73