REASONABLE FORESEEABLE DEVELOPMENT SCENARIO

for

OIL AND GAS DEVELOPMENT

CARIBOU NATIONAL FOREST AND CURLEW NATIONAL GRASSLAND

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SUMMARY

It is anticipated that making National Forest System lands on the Caribou portion of the Caribou-Targhee National Forest and Curlew National Grassland (the Caribou) available for oil/gas leasing would result in the drilling of four exploratory wells during the next 15 years, for a total surface disturbance of about 132 acres (4 acres/drill pad + 29 acres/access road = 33 acres/drill site x 4 drill sites = 132 acres). It is anticipated, based on the geology, the historical level of drilling activity and success rate, the near lack of infrastructure to support oil and/or gas development, and the lack of any historic or currently producing oil/gas wells/fields in southeast Idaho and surrounding area, that none of the four wells drilled would be capable of economic commercial production. It is anticipated that three geophysical exploration programs would occur, and that they would likely be at least partially helicopter supported, thereby producing minimal impacts to surface resource.

INTRODUCTION

This report, describing a Reasonable Foreseeable Development scenario (RFD), accompanies the Oil/Gas Potential Report (herein referred to as the Potential Report) prepared for the Caribou and describes the anticipated level of oil/gas exploration/development activity associated with proposed oil/gas leasing. These projections are necessary to assess the anticipated impacts of oil/gas related activity in an Environmental Impact Statement to determine which lands within the Caribou will be available for oil/gas leasing and what stipulations may be necessary to attach to leases in order to protect the surface resources. Figure 1 in the Potential Report shows the area to be addressed in this RFD. This assessment is based on the geologic information given in the Potential Report, oil/gas price projections (economics) developed by the Energy Information Administration, near lack of infrastructure to support oil/gas production, physical constraints (mostly topography), access, and historic drilling levels and success rates for southeast Idaho and the surrounding area. These anticipated impacts are for the National Forest System (NFS) lands described above during the next 15 years (2006-2021).

DESCRIPTION OF GEOLOGY

The geology of the Caribou is described in the Oil/Gas Potential Report prepared for the area. To summarize, the Caribou lies within two physiographic provinces: the Basin and Range (western part of the Caribou - essentially all of the Westside Ranger District and the Curlew National Grassland), and the Middle Rocky Mountain (eastern portion - Soda Springs and Montpelier Ranger Districts). The US Geological Survey (USGS) dividing line for the Wyoming Thrust Belt and Eastern Great Basin oil/gas provinces very closely corresponds to the line between the Middle Rocky Mountain and Basin and Range physiographic provinces; the USGS boundary will be used here for clarity and consistency (USGS, 2005). The terms Eastern Great Basin Oil/Gas Province and Great Basin Physiographic Province will be used

interchangeably in this report but refer to the same area. Correspondingly, the terms Wyoming Thrust Belt Oil/Gas Province and Middle Rocky Mountain Physiographic Province are used interchangeably in this report; they refer to the same area. The geologic structure of these two provinces is markedly different, yet many of the geologic formations present are the same or are time/stratigraphic equivalents. A generalized stratigraphic column for the eastern portion of Caribou is shown in Fig. 2 of the Potential Report. The Paleozoic units, or their lateral equivalents, are present in the western portion of the area (bond, 1978).

Basin and Range Province:

The general geologic structure of the Basin and Range Province is characterized by extensional forces that created major horsts and grabens with thousands of feet of displacement on the bounding faults. This faulting pattern gives rise to mountain ranges with broad intervening valleys. Rock units exposed at the surface in the Caribou portion of this province are generally confined to the mountain ranges and consist mostly of Paleozoic marine limestone, shale, and dolomite. Minor amounts of Precambrian metasedimentary rocks are sometimes present near the bases of the mountain ranges. Tertiary igneous rocks are often present in the valleys and sometimes found on the ranges as well (Pope, 2002). Unconsolidated Quaternary loess, alluvial, colluvial, and lacustrine sediments are generally present (usually thousands of feet thick) in the grabens. Subsurface rock units in the grabens are not well known because of the very sparse drill hole data. Mesozoic units are most likely present at depth in the grabens. Most of the rock units in this area are extensively broken up by faulting.

Potential source rocks in this area include some of the Paleozoic (generally Missisippian and/or Permian) marine carbonate units (Figure 2 in the Potential Report shows potential source and reservoir formations), which may also act as reservoir rocks. If Triassic rocks are present in the grabens, certain of these units may also be source and/or reservoir rocks. The very limited drill hole data in the area, and the presence of the nearby Snake River Plain (volcanically active in the recent geologic past), indicate excessive heat flow have been present, and has most likely detrimentally affected or over-matured (cooked) hydrocarbons that may have been present.

Structural traps in the area that could contain reservoirs of hydrocarbons include pinchouts and fault truncations. Stratigraphic traps could also be present, though unlikely. Most of the rock units in this area are extensively broken up by faulting, which could have effectively breached many of the traps that were present and allowed the hydrocarbons present to escape to the surface (Kaldenbach, 1990).

There are 10 small oil fields in the Eastern Great Basin Province; all of these are in east central Nevada. These fields are in the Unconformity “A” play (play 1901) described by the USGS (Peterson and Grow, 1994). This play includes land in the western portion of the Caribou. In this play, graben fill material acts as a seal for oil that has pooled in Paleozoic carbonate beds and Tertiary lacustrine and volcanic rock units. The hypothetical Late Paleozoic Play described by the USGS (play 1902) also covers the western part of the

Caribou. This hypothetical play also is dependent on graben fill to seal in hydrocarbons (Peterson and Grow, 1994). The effectiveness of these graben seals has not been demonstrated in southeast Idaho.

The USGS 2005 assessment of oil/gas potential puts the entire Eastern Great Basin Province in the Paleozoic-Tertiary Total Petroleum System, with three assessment units: Neogene Basins, Ranges and Other Structures, and the Sevier Thrust System present (USGS, 2005). The Curlew National Grassland (NG) lies in the Neogene Basins and Ranges and Other Structures Assessment Units (AU). Most of the Westside Ranger District lies within the Sevier Thrust System AU. Thrust fault structures similar to those of the recently discovered Covenant field in central Utah (Moulton and Pinnell, 2006) have not been found in the Sevier Thrust System AU in Idaho; only one small, isolated segment of a thrust fault has been documented on the Westside RD.

Wyoming Thrust Belt Province:

While the geologic structure of the Eastern Great Basin Province has been greatly influenced by extensional forces, the geologic structure of the Wyoming Thrust Belt was predominantly created by compressional forces associated with the Sevier Orogeny (Late Jurassic thru the Cretaceous and into early Tertiary time), and is characterized by extensive folding and thrust faulting. Because of some overlap in the Basin and Range structure and the Wyoming Thrust Belt, some Basin and Range type faulting has been overprinted on the western-most portion of the Wyoming Thrust Belt (i.e. the Bear River Range portion of the Montpelier RD – Kaldenbach, 1990)).

A generalized stratigraphic column for the Wyoming Thrust Belt province which shows the major potential source and reservoir rock units for the area is shown in Figure 2 of the Potential Report. The Late Cretaceous and Tertiary rock units shown in the figure have not been identified in outcrop on the Caribou. The Paleozoic reservoirs are more likely to produce gas and condensates, while the Mesozoic units have produced oil and/or gas. Thermal maturation of hydrocarbons in the area has generally been favorable. Chidsey (1984) reported color alteration index numbers for conodonts in the Bear River Range in southeast Idaho at 3.0, which is near optimum for hydrocarbon generation. However, drill hole data for oil/gas exploratory wells drilled to the north and west of the northern portion of the Caribou showed bottom-hole temperatures significantly higher than optimum for hydrocarbon generation/preservation (McLeod, 1993).

The geologic structure of the area is characterized by numerous folds and thrust faults, with numerous normal faults as well. The thrust sheets have overridden one another, with the oldest (first emplaced) to the west. Younger thrusts then carry previously emplaced thrust sheets piggy-back fashion to the east (Holm, 1987). The individual major thrust sheets moved from the west to the east at rates of 0.02 – 1.0 cm/year (Wiltschko and Dorr, 1983) with total displacements generally from 10 to 30 miles (Chidsey, 1984). There are four major thrust fault systems present in the Wyoming Thrust Belt. From west to east they include the Willard-Paris, Crawford-Meade, Absaroka, and the Prospect-Darby-Hogsback

thrust systems (ISGS, 2004). These major thrust faults are often associated with numerous smaller ancillary thrusts (Anschutz, 1983). Only the Willard-Paris and the Crawford-Meade thrusts crop out on or adjacent to the Caribou (see Figure 3 in the Potential Report). The trailing edge of a small portion of the Absaroka thrust sheet is present at depth in the northern portion of the Caribou (Banerjee and Mitra, 2005).

Each thrusting event had the potential to distort the beds above and below the thrust plane, thus potentially creating structures that can act as traps for the accumulation of hydrocarbons. The uplifts created by the thrusts provided a source of sediment for the foreland basin(s) that developed to the east of the uplift (Wiltschko and Dorr, 1983).

Although the Wyoming Thrust Belt has produced large quantities of oil and gas, to date there has been no production in southeast Idaho. Major production has generally come from anticlinal hanging wall structures located near the leading edge of major thrust sheets, generally the Absaroka, Prospect, Darby, and Hogsback thrusts. Thrust sheets where the potential reservoir beds are in contact with organic rich Cretaceous source rocks (either directly or via a thrust fault) have been the most productive. Holm (1987) reports that these Cretaceous rocks generally decrease in organic content to the west (the Caribou occupies the western portion of the thrust belt). Chidsey (1984) indicated that the Cretaceous source rocks are altogether missing from the hanging and foot walls of the Crawford and possibly the Meade thrust plates below the Parris-Willard thrust, thus greatly reducing the potential for hydrocarbon accumulation beneath the Bear River Range portion of the Caribou.

The Wyoming Thrust Belt province contains seven plays, as described by the USGS in their 1995 oil and gas assessment (Powers, 1994). Only two of these plays, the hypothetical Crawford-Meade Thrust Play (3602) and the Absaroka Thrust Gas play (3604) are present on the Caribou.

Concerning the Crawford-Meade thrust play, Powers (1994) stated the following:

> "A few wells drilled in the northwestern one-third of the play had recorded elevated bottom-hole temperatures, indicating that higher geothermal gradients exist here in proximity to volcanics of the Snake River Plain of Idaho. This type of setting could be a deterrent to exploration. Any significant potential in the play, particularly for gas, would remain in the footwall Cretaceous section of the Crawford Thrust Plate in the southern half of the play."

It should be noted that the southern half of the play is in Utah and Wyoming, not in Idaho. This coupled with the statement by Chidsey (1984) that the Cretaceous section is missing from the foot and hanging walls in the Idaho portion of the Crawford-Meade thrust, tends to diminish the potential for the accumulation of hydrocarbons in the Idaho portion of this play.

The Absaroka Thrust Gas play also includes lands in the Caribou. However, all production in this play is from Wyoming and Utah, not Idaho. Production comes from anticlinal hanging wall structures from near the leading edge of the thrust sheet (Gauthier and Varnes, 1992). Although the outcrop of the Absaroka thrust does continue into Idaho, it is several

miles north of the northern most part of the Caribou. The leading edge is separated from the Caribou by the Grand Valley Fault graben, which has several thousand feet of displacement in this area (Pampeyan, *et al.*, 1967). The Wyoming Thrust Belt is a large easterly directed salient in the Cordilleran fold belt. Current production in the salient is the leading edge and the southern portion of the belt. That part of the thrust belt where the Absaroka Thrust crops out in Idaho is along the northern edge of the salient, the 'lateral' portion of the salient. Large structures like the ones that are so productive in Utah and Wyoming were apparently not developed, at least not to the extent seen in Wyoming and Utah, in this salient 'lateral' portion of the thrust in Idaho (see Figure 3 in the Potential Report).

PAST AND PRESENT OIL AND GAS EXPLORATION ACTIVITY

The first oil/gas exploratory wells drilled in southeast Idaho were completed in the 1920s, the most recent one in 1988. Figure 4 in the Potential Report shows the location of the wells drilled in southeast Idaho and adjacent parts of Utah and Wyoming. Eleven wells have been drilled on the Soda Springs and Montpelier RDs, with an additional 43 drilled within 20 miles of the Caribou in Idaho. Thirty one more wells were drilled in Wyoming (Wyoming Oil and Gas Conservation Commission on-line data bases, 2006) within 20 miles of the Caribou, and an additional 40 in Utah (Utah Division of Oil, Gas and Mining on-line data bases, 2006). All of these drill holes were plugged and abandoned as dry holes after drilling, except for two wells in northern Utah that were apparently shut-in gas wells (apparently drilled more than 30 years ago with very incomplete drill data) and a single gas well in the Hogback Ridge field in northern Utah (located about 20 miles southeast of the Caribou) that produced gas for about 3 years before it was abandoned in 1982 due to reserve depletion (Kaldenbach, 1990). It was the only well completed for production on or within 20 miles of the Caribou. Offset wells for the Hogback Ridge field did not encounter economic hydrocarbon reserves and were plugged and abandoned.

Some of the exploration wells drilled on or near the Caribou did have oil and/or gas shows. In one well on the Forest, a test reportedly initially produced about 265 mcf/d but flow declined rapidly and the well was dead in less than one hour (Idaho State Journal, 1978). Another well on Big Elk Mountain (on the Forest) apparently had a flow of about 5 mmcfg/d when initially tested, but was abandoned. When the well was reentered about 13 years later, it was "junked and abandoned" (based on incomplete data). A few of the wells drilled, mainly in the north and west parts of the area, reportedly had over-mature or dead oil shows. Of the wells drilled in Idaho, available records indicated that nine wells encountered oil and/or gas shows: four of the wells encountered shows of sour gas (H2S), two had CO2 shows, five had gas shows, and four had oil shows (Stout, personal communication, 2006).

During the 1970s and early 1980s, hundreds of miles of seismic lines were run on the Caribou and surrounding areas. However, there have been no geophysical surveys run in the area in the past 15-20 years (Horsburgh, personal communication, 2006; Gabardi, personal communication, 2006).

PAST AND PRESENT OIL AND GAS DEVELOPMENT ACTIVITY

No oil/gas discoveries, production wells, or fields are on or within 15 miles of the Caribou. The Caribou, though the eastern part of it lies within the Wyoming Thrust belt, is not on trend with any past or present discovery or development activity.

During the 1970s and 1980s, almost the entire Caribou (and surrounding Federal and State lands) were leased for oil/gas. By the end of 1992, there were only five oil/gas leases left on the Caribou; by 1995 they had all expired or were terminated.

The following Federal leasing history (as of July, 2006) for the past 10 years for southeast Idaho was provided by the Idaho State Office of the BLM (Cron, personal comm., July 2006):

1) An expression of leasing interest (EOI) was received in February, 1998 for a total of 3,975 acres on the Caribou and surrounding area. A lease sale was held in November, 1998, with no parcels sold. One after-sale non-competitive 40 acre lease was issued effective February 1, 2000. This lease is still active (not on NFS lands).

2 An EOI for 10,605 acres of NFS lands (Targhee portion of the Caribou-Targhee NF) was received in October, 2000. No leases were sold at the subsequent August 2002, lease sale, but one after-sale lease for 1,495 acres was issued non-competitively, effective September 2002. This lease was terminated one year later for non-payment of rental.

3 An EOI for 14,298 acres of BLM lands was received in January, 2001. No parcels were sold at the subsequent lease sale, but two after-sale leases for 2,549 and 1,754 acres were issued non-competitively in April, 2002. The larger was terminated two years later for non-payment of rental; the other is still in effect.

4 An EOI for 2,830 acres of BLM land was received in April, 2002. No parcels sold at the sale, but a 671 acre non-competitive after-sale lease was issued, with an effective date of February 1, 2003. That lease was terminated three years later for non-payment of rental.

5 An EOI for about 230,000 acres of mostly NFS lands was received in August, 2005. No lease sale with any of these lands has occurred yet – a Forest Service leasing EIS must be completed for most of these lands prior to them being offered in a lease sale. In October, 2006, the BLM returned most of the nomination to the proponent for further prioritization and parceling.

6 Three EOIs for a total of 7,430 acres were received in early 2006 for BLM administered lands and areas where Federal minerals are overlain by privately owned lands. No lease sale has been held yet for these lands.

As can be seen by the above history, there has been very little leasing interest in southeast Idaho for the past 10 years, with the exception of the one large request received in late 2005. Most of

the lands in the large EOI are on the Caribou portion of the Caribou-Targhee NF, for which there is no current Forest Plan direction or decision to allow oil/gas leasing.

The State of Idaho held an oil/gas lease sale on September 19, 2006. Included in that sale were two parcels totaling 1,280 of State lands in Bonneville County. Both of the tracts were bid on and leases were issued. One tract is a State section lying just inside the National Forest boundary, and the other is a State section lying immediately outside the Forest boundary. Both of the lease tracts are inside or adjacent to the Caribou on the northwestern corner of the Soda Springs Ranger District (Idaho Department of Lands, Bureau of Surface and Mineral Resources web site, 2006). There are no other existing oil/gas leases on State lands in southeastern Idaho (Murray, personal communication, August, 2006). There could be individual agreements for private lands/minerals in the area, but data are not available.

Infrastructure to accommodate oil/gas development is greatly lacking in the area of the Caribou. Northwest Pipeline Corporation, a subsidiary of the Williams Companies, does have a gas pipeline that runs through southeast Idaho. In southeast Idaho, there are two parts of this line: a 22 inch line and a parallel 24 inch line. The Williams pipeline is rather unique in that it is a two-way gas transmission line (Barry Orgil, personal communication., 2006). Gas is input into the pipeline in the San Juan Basin, New Mexico and in British Columbia; it is then distributed to various points in between.

The Williams pipeline is a common carrier, so it is required to accept gas input from various sources as long as quality standards can be met. Currently, there appears to be space available in the system, at least seasonally. If producible quantities of gas were discovered on the Caribou, it could theoretically be added to the system during the high demand seasons, provided it met the carrier's standards for gas quality (Larry Larsen, personal communication, 2006). There are no other existing gas lines in the southeast Idaho area. One small (8 inch) pipeline operated by Chevron Corp. transmits refined liquid petroleum products from the Salt Lake City, Utah area into southern Idaho (Pocatello, ID), where the line then somewhat parallels the Williams pipeline to the west (Ben Marconi, personal communication, 2006). Since this line is for refined liquid products, it would not be available for wellhead oil or gas condensate products.

Electric transmission lines are present near the Caribou, and some even cross the Forest. Some of these lines provide power to local communities in southeast Idaho, but could possibly be used to bring electrical power needed for hydrocarbon processing facilities if such facilities were ever to be developed in southeast Idhao. Large power needs may require supplemental or new lines to be constructed.

Most of the Caribou does not currently have roads that would support oil/gas exploratory or development drilling needs. Much of the Forest is relatively steep and rugged, and road construction could be very costly. Highways suitable for truck transportation of oil or liquefied gas products are present in the area, but are limited in number and distribution. Railroad lines are also present in a few areas near the Caribou that could be used for liquid hydrocarbon product transportation, but they, too, are limited in number of lines and areas served.

As would be expected, the power lines generally follow or roughly parallel the highways, as do the railroads and the Williams gas transmission line. These facilities generally do not cross the rougher terrain of the Caribou, but traverse the flatter, gentler areas that are closer to the population centers. These locations are generally not on NFS lands, but go between or around the mountain ranges (NFS lands). These characteristics would make oil/gas exploration and especially development/processing on or near the Caribou much more expensive than areas where the necessary infrastructure already exists.

OIL AND GAS OCCURRENCE POTENTIAL

Most of the Caribou has a low potential for the occurrence/accumulation of hydrocarbons, as displayed and described in Figure 5 and discussed in the accompanying text in the Potential Report. Plays and geologic conditions are summarized in the "Description of Geology" section of this report. The "Assessment of Oil/Gas Potential" section of the Potential Report will be summarized here.

Those lands of the Caribou that lie within the Eastern Great Basin Oil and Gas Province (the Curlew NG and all of the Westside RD except the northeast block) all have a low potential for the accumulation/occurrence of hydrocarbons. Much less drilling and exploration have occurred in these areas. Many of the areas, especially the mountain ranges, are broken up considerably by faulting, thus potentially liberating any hydrocarbons that may have been present. The area is also known for its higher heat flows, as evidenced by the presence of volcanic rocks at the surface and its proximity to the Snake River Plain. This high heat flow also reduces the potential for preservation of hydrocarbon reserves. This area also lacks the more productive Cretaceous source rocks present in parts of the Wyoming Thrust Belt. The low potential rating for this part of the Caribou matches that developed by Stout (2005) for the BLM Pocatello Field Office area for the Curlew NG and the western two blocks of the Westside RD (low), but differs from that assessment for the two eastern blocks of the Westside RD, which the BLM report lists as moderate potential. The northeastern block of the Westside RD is also considered to have a low occurrence potential for oil/gas for the reasons listed above, even though it lies within the Wyoming Thrust Belt Province.

Because of the lack of drilling data in the Westside RD and Curlew NG area, a lower confidence level (2) for the potential is assigned.

The western part of the Montpelier RD (Bear River Range) also has a low potential for the accumulation of hydrocarbons because of its location in the western portion of the Wyoming Thrust belt; all known production comes from the eastern and southern portions. This mountain range is a large, plunging synclinal structure that has been overprinted by Basin and Range type normal faults with significant displacements that may have may bled off existing hydrocarbons. No wells have been drilled on this section of the Caribou, so the subsurface (sub-thrust) geology is not as well understood as the eastern portion of the Caribou. Drilling records and data from the wells drilled just east of this part of the Bear River Range did not contain records of hydrocarbon shows or indicate penetration of subsurface thrust faults. This low potential rating

matches that derived for the Wasatch-Cache NF immediately south of the Caribou across the Utah-Idaho state line (Kaldenbach, 1990). Stout (2005) gave this area a high potential for the occurrence of oil/gas.

The certainty rating for this area of the Montpelier RD (C-2) is a little better than the Westside RD and Curlew NG, but the lack of drill hole data on this section of the Forest and very limited drill holes nearby make the confidence lower than the northeast part of the Caribou.

The Soda Springs RD and the eastern part of the Montpelier RD are considered to have a moderate potential for the accumulation of hydrocarbons. The surface trace of the Meade thrust is present in the southern part of the area (USGS, 2004), and part of the trailing edge of the Absaroka thrust is reportedly present in the subsurface in the northern part of the Caribou (Banerjee and Mitra, 2005). However, it is hanging-wall anticlinal structures near the leading edge of the eastern thrusts (Absaroka, Darby, Hogsback and Prospect) that are producing oil and/or gas in Utah and Wyoming. The presence of the outcrop trace of the Absaroka and Darby thrusts in Idaho to the north and east of the Caribou is along the lateral edge of the Wyoming salient, not the productive frontal portion found in Wyoming and Utah. The northeastern part of the Caribou has also been subjected to some Basin and Range type faulting (the Grand Valley Fault graben is adjacent, or very close, to the northeast boundary of the Caribou). The northwestern part of the Caribou has also been subjected to higher than average heat flows (McLeod, 1993), as indicated by the presence of volcanic rocks on the surface, the intrusive rocks at Caribou Mountain (Rains and Federspiel, 1993), and the area's proximity to the Snake River Plain. The certainty rating for this area is higher than the other portions of the Caribou based on the exploratory drill data available on the Forest (12 wells on the Caribou) and surrounding area (see Figure 4 in the Potential Report).

OIL AND GAS DEVELOPMENT POTENTIAL

The overall probability of discovering and developing a producing oil and/or gas field on the Caribou is considered to be low, including that portion of the Forest that has been given a moderate potential for the accumulation/occurrence of hydrocarbons. This rating is consistent with that developed by Stout (2005a) for adjacent BLM lands in southeast Idaho. The rating for the Caribou is based on the following factors:

1) There has been a general lack of oil/gas industry interest in southeast Idaho as demonstrated by the meager leasing activity in the area during the past 15 years.

2) No oil/gas seismic geophysical surveys have been conducted in southeast Idaho in the past 15 years on FS, BLM, or State administered lands.

3) Exploratory drilling has been very sparse for such a large area, with no wells drilled since 1988, further indicating industry's lack of confidence in the area.

4) No wells capable of economic production have been drilled on or within 15 miles of the Caribou; all wells drilled have been plugged and abandoned as dry holes.

5) There are no demonstrated oil/gas reserves on the Caribou or adjacent areas.

6) There is a general lack of infrastructure to support field development in southeast Idaho.

7) The topography of much of the Caribou (exclusive of the Curlew NG) is steep and rugged, and would be costly to drill/develop.

8) Much of the Caribou is not roaded, or has only low-standard roads, and may require extensive construction/reconstruction work to support exploration/development drilling or production.

9) The Energy Information Administration (Annual Energy Outlook 2006 with projections to 2030) projects the average wellhead price for crude oil in the lower 48 states will drop from $50.33/barrel in the year 2006 to $43.92 in 2011, then rise slightly to $45.08 by 2016, and to $48.23 by 2021 (still 4% below 2006 prices). They also project average gas wellhead prices in the lower 48 states will drop from $6.85/thousand cubic feet in 2006 to $4.78 in 2011, and further to $4.46 by 2016, and only rebound slightly to $5.03 (28% below the 2006 level) by 2021 (all prices are in constant 2004 dollars).

Although energy consumption per capita for the US is expected to rise faster from 2006 to 2021 than it has in the recent past, and production of oil, and to a lesser extend gas, is also expected to increase over the same time period, forecasts by the Energy Information Administration (Annual Energy Outlook 2006) predict an overall lower average wellhead price for domestic (lower 48 states) oil and gas.

The Reasonable Foreseeable Development Scenario (RFD) developed for the adjacent NFS lands to the south on the Bear River Range (Wasatch-Cache NF) projected the remote possibility of one exploratory well (with no production) in the general area (Kaldenbach, 1991); no drilling took place within the 15 year projection.

The Oil/Gas Potential report prepared for the Bridger-Teton NF in western-most Wyoming, just across the Wyoming-Idaho state line from the Caribou showed the western part of the area (that closest to the Caribou) as having a moderate potential for the occurrence of oil/gas resources, with the remainder of the Forest having a high potential. Concerning the development potential of the area, the report (Holm, 1987) stated that because of geologic complexity and the inaccessibility of the Forest as a whole, exploration and development drilling would occur in a slow and methodical manner. That part of the Forest that included the moderate potential area projected no exploratory drilling. The last well drilled within 20 miles of the Caribou was in 1986; all wells drilled were plugged and abandoned.

Horsburgh (1992), in the Reasonable Foreseeable Development Scenario for the Targhee NF, which lies adjacent to the Caribou to the north, projected that seven wells would be drilled in the Palisades area (just north and east of the Caribou) and an additional two wells on the west side of Teton Valley or south of Palisades Reservoir within 15 years. The Targhee NF oil/gas leasing EIS and accompanying decision (completed in February, 2000) made much of the area described by Horsburgh unavailable for leasing and placed very restrictive lease stipulations on most of the rest of the area where Horsburgh predicted exploration drilling would occur. Most of the areas that were available for leasing could only be leased with a No Surface Occupancy (NSO) lease stipulation. Because the NSO blocks are large, and sometimes adjacent to no lease areas, that part of the Forest becomes, in effect, "no leasing" because surface occupancy, required for drilling, is not allowed. Now, almost 15 years later, there are no remaining oil/gas leases on the Targhee NF (one lease was issued on the west side of Teton Valley but it was terminated one year later for failure to pay the annual rental fee) and no additional wells have been drilled.

The general economics of oil/gas for the past 15 years, costs of exploration in this rugged and remote area of the Targhee NF, lack of infrastructure to facilitate oil/gas development or production, the very complex geology, large areas of no-lease, and the restrictive lease stipulations required by the Targhee NF oil/gas leasing EIS decision apparently were enough to make industry turn their oil/gas leasing and exploration interests/dollars to other areas. Assuming the existing condition on the Targhee NF remains the same for the next 5-10 years (essentially unavailable for exploration or development drilling) will probably have a dampening effect on the development potential for the adjacent Caribou lands.

RFD BASELINE SCENARIO ASSUMPTIONS AND DISCUSSION

The following assumptions for oil/gas exploration/development on the Caribou during the next 15 years are based on the oil/gas development potential described above, the regional geology, the historical drilling activity for southeast Idaho and surrounding area, topography, and the existing access situation:

> Three geophysical exploration programs will be conducted to help refine potential exploration drilling targets. These will generally be conducted, at least partially, with helicopter support because of the possible lack of access in areas of steep terrain. Impacts from such exploration will be minimal and temporary.
>
> Four exploration wells will be drilled on the Caribou. Three of these will be on the Soda Springs and/or eastern part of the Montpelier RDs and the other on the Bear River Range (western) portion of the Montpelier RD. Each of these wells would be analyzed, most likely individually, through the NEPA process, separate from the leasing analysis. The wells would probably not be drilled at the same time.

Wildcat wells that discover only limited reserves of oil and/or gas will not be economically viable because of the lack of existing infrastructure, and will be plugged and abandoned.

Wells drilled would be 10,000 – 14,000 feet deep.

None of the exploratory wells will encounter hydrocarbons in sufficient quantity to justify production expenses and will be plugged and abandoned.

The average size of an exploratory drill pad will be four acres.

Access to the drill pads will require about six miles of construction/reconstruction. Access roads would require a 20 feet wide graveled running surface, with an average disturbance width of 40 feet (4.85 acres/mile). Disturbance from six miles of road would equal about 29 acres.

Drilling operations would typically take from 4 to 14 months to complete; reclamation would be completed within three years from when drilling is completed (all wells are assumed to be non-productive).

There would be very little local economic impact from the exploration drilling. Road and drill pad construction could utilize local contractors, and some drill crew members could be local residents. The purchasing of food for workers and fuel for their vehicles would also slightly affect the local economy.

Drilling generally requires about 5,000 to 15,000 gallons of water per day, depending on down-hole conditions. Depending on the well locations, water sources on the Caribou could be sought/applied for. Some wells make water, and disposal could become an issue if the water is saline.

SURFACE DISTURBANCE DUE TO OIL AND GAS ACTIVITY

Total surface disturbances associated with the anticipated oil/gas related activity on the Caribou as a result of making the lands available for lease equal about 132 acres during the next 15 years. This figure is based on a drill pad (about 4 acres) + access road (about 29 acres) = 33 acres per drill site, x 4 wells = 132 acres. All of this disturbance would be of a temporary nature. Drilling would take an estimated 4-14 months depending on well depth and drilling conditions encountered. Assuming that no production will take place, it is estimated that reclamation would be completed within three years. The wells would not be drilled at the same time, but randomly spaced out over the area during the next 15 years. It is anticipated that three geophysical survey programs would be completed during this time frame. Because these surveys would be helicopter supported in remote or inaccessible areas, disturbance to surface resources would be minimal.

REFERENCES

Anschutz Corp., 1983. Unpublished Geologic Map, Palisades Area, Idaho and Wyoming.

Banerjee, S. and S. Mitra, 2005. Fold-thrust Styles in the Absaroka Thrust Sheet, Caribou National Forest area, Idaho-Wyoming Thrust Belt. Journal of Structural Geology, v. 27, p. 51-65.

Bond, J.G., 1978. Geologic Map of Idaho, Idaho Department of Lands, Bureau of Mines and Geology. One oversize map.

Breckenridge, R.M., 1982. Oil and Gas Exploration in Idaho. Idaho Department of Lands, Bureau of Mines and Geology. Oversize map with minimal drill data.

Chidsey, T.C., Jr., 1984. Hydrocarbon Potential Beneath the Paris-Willard Thrust of Utah and Idaho. Oil and Gas Journal, November 19, 1984, p. 169-175.

Cron, T., 2006. Personal communication with BLM Idaho State Office adjucator Tracy Cron, Boise, Idaho, July, 2006.

Energy Information Administration, 2006. Annual Energy Outlook 2006 with Projections to 2030, Report #DOE/EIA-0383(2006).

Gabardi, J., 2006. Personal communication with USFS geologist Jeff Gabardi, Twin Falls, ID,August, 2006.

Gautier, D.L. and K.V. Varnes, 1993. Plays for Assessment of Region IV, Rocky Mountains and Northern Great Plains as of October 4, 1993. US Geological Survey Open File Report 93-596-D, 34 p.

Holm, M.R., 1987. Assessment of Oil and Gas Potential, Bridger-Teton National Forest, Lincoln, Sublette, Teton, and Fremont counties, Wyoming. Unpublished Forest Service report, 24 p.

Horsburgh, C., 1992. Oil and Gas Potential Report, prepared for the Targhee National Forest. Unpublished report, 14 p.

Horsburgh, C., 2006. Personal communication with BLM geologist Chuck Horsburgh, Idaho Falls, ID, July, 2006.

Idaho Department of Lands, Bureau of Surface and Mineral Resources web site, 2006. Oil and Gas Lease Tract List (Parcels Auctioned September 19, 2006) [pdf]. http://www.idl.idaho.gov/bureau/smr/oilgas/tractlist_sept06.pdf

Idaho State Journal (Mark Mendiola), 1978. Elk Valley Drillers Find Gas. Newspaper article, May 3, 1978.

Kaldenbach, T., 1990. Oil and Gas Potential report, Wasatch-Cache National Forest, Utah and Wyoming. Unpublished Forest Service report, 40 p.

Larsen, L., 2006. Personal communication with Northwest Pipeline Corporation manager Larry Larsen, Salt Lake City, UT, October, 2006.

Marconi, B., 2006. Personal communication with Intermountain Gas Co. Operations Manger Ben Marconi, October, 2006.

McLeod, J.D., 1993. The Search for Oil and Gas in Idaho. Idaho Geological Survey, GeoNote 21, 2 p.

Moulton, F.C. and M.L. Pinnell, 2006. A Stunning Utah Oil Discovery Has Uncovered a New Oil and Gas Province. Unpublished report, 18 p.

Murray, S., 2006. Personal communication with Sharon Murray, Idaho Department of Lands, August and September, 2006.

Pampeyan, E.H., M.L. Schroeder, E.M. Schell, and E.R. Cressman, 1967. Geologic Map of the Driggs Quadrangle, Bonneville and Teton Counties, Idaho and Teton County, Wyoming. USGS Mineral Investigations Field Studies Map MF – 300.

Peterson, J.A. and J.A. Grow, 1994. Eastern Great Basin Province (019). US Geological Survey 1995 National Assessment of Oil and Gas, 12 p.

Pope, A.D., 2002. Geology of the Wakley Peak, Idaho, 7.5 minute Quadrangle: Multiple Phases of Late Miocene to Pliocene Extension and Relations to the Southern Hawkins Basin Volcanic Center. Unpublished Master's thesis, Idaho State University Geology Department, 123 p.

Powers, R.B., 1983. Petroleum Potential of Wilderness Lands in Wyoming-Utah-Idaho Thrust Belt. US Geological Survey Circular 902-N, 14 p.

Powers, R.B., 1994. Wyoming Thrust Belt Province (036), US Geological Survey, National Assessment of Oil and Gas, 14 p.

Rains, R.L. and F.E. Federspiel, 1993. Mineral Resource Investigations of the Caribou City-Stump Creek Study Area, Bonneville and Caribou Counties, Idaho. US Bureau of Mines, Mineral Land Assessment, Open-File report 15-93, 60 p.

Sandberg, C.A., 1983. Petroleum Potential of Wilderness Lands in Idaho, *in*, Petroleum Potential of Wilderness Lands in the Western United States. US Geological Survey Circular 902-F, 6p.

Stout, B., 2005. Oil and Gas Potential Map, BLM Pocatello Field Office. Preliminary Draft Resource Management Plan/EIS.

Stout, B., 2005a. Appendix Q: Oil and Gas Resources, Reasonable Foreseeable Development Scenario. BLM Pocatello Field Office Preliminary Draft Resource Management Plan/EIS.

Stout, B., 2006. Personal communication with BLM Pocatello Field Office geologist Bill Stout, at various times between February and November, 2006.

US Geological Survey, 2004. Assessment of Undiscovered Oil and Gas Resources of the Wyoming Thrust Belt Province, 2003. US Geological Survey Fact Sheet 2004-3007, 2 p.

US Geological Survey, 2005. Assessment of Undiscovered Oil and Gas Resources of the Eastern Great Basin Province, 2005. US Geological Survey Fact Sheet FS-2005-3053, 2 p.

Utah Divison of Oil, Gas, and Mining web site, 2006. Online Oil and Gas Information System Oil and Gas Well Locator. http://ogm.utah.gov/oilgaswells2/viewer.htm

Wiltschko, D.V. and J.A. Dorr, Jr., 1983. Timing of Deformation In Overthrust Belt and Foreland of Idaho, Wyoming and Utah. AAPB Bulletin, v. 67, no. 8, p. 1304 – 1322.

Wyoming Oil and Gas Conservation Commission web site, 2006. Well Files, Plot Nine Section Area. http://wogcc.state.wy.us/AllsecNew.cfm