Comments on the Revised Draft Supplemental Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project, Sublette County Wyoming

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The Revised Draft Supplemental Environmental Impact Statement (DSEIS) for the Pinedale Anticline Oil and Gas Exploration and Development Project, Sublette County, Wyoming discusses the proposed long-term development of natural gas on 198,034 acres, consisting of 158,000 acres of federal land, 9,800 acres of State of Wyoming land, and 29,800 acres of privately owned land. The DSEIS follows the Draft Supplemental Environmental Impact Statement (SEIS) and is, in many respects, identical to it. Under DSEIS, the proposed action (Alternative B) provides year-round drilling, completions, and production of up to 4,399 additional wells on up to 12,278 acres of new disturbance, including well pads, roads, pipelines, and other ancillary facilities within the PAPA. Alternative C consists of the same project components as Alternative B, but is spatially different. Alternative D is similar to Alternative C but includes additional mitigation and is the BLM Preferred Alternative. This Alternative allows up to 4,399 additional wells, with exploration and production related disturbances on 12,885 acres. Alternative E is similar to Alternative A but included additional wells and a longer development period to completely recover the natural gas resource. Alternative A is the no action alternative and is based on elements authorized by the Pinedale Anticline Production Area Record of Decision (PAPA ROD).

The following comments on the DSEIS focus on the weaker parts of the socioeconomic analysis. My comments fall into five major themes themes. First, BLM has focused on the socioeconomic benefits possibly associated with natural gas exploration and development, but has largely ignored the likely socioeconomic costs. Second, BLM has overemphasized the importance of the natural gas industry to the local economy and failed to consider the possible adverse effects of accelerated natural gas development on important parts of the local and regional economies. Further, it has mischaracterized some of the economic benefits of the oil and gas industry to the local, regional and state economies. Third, BLM has discussed some of the adverse environmental consequences resulting from accelerated natural gas development, but has failed to translate these consequences into estimated economic costs.

I. After reviewing the DSEIS, it is apparent that BLM has emphasized the economic benefits of natural gas development in the PAPA, but has failed to adequately address many of the economic costs likely associated with accelerated natural gas development and production, including the costs to local, county, and state governments.

DSEIS provides estimates of the tax revenues distributed to Sublette County from ad valorem and severance tax collections. In addition, DSEIS discusses a six-fold increase in Sublette County's assessed property valuation and Payment in Lieu of Taxes paid to state and county governments. However, there are large costs associated with natural gas development, and the associated increases in transient and residential

Exhibit 3

population and industrial activity, and BLM fails to discuss these costs. Governments in the PAPA are currently struggling with updating, expanding, and repairing the public infrastructure and are already experiencing some of these costs. Recent expenditures include[ii]: 1) Pinedale Sewage Lagoon- A new ultraviolet sewage treatment facility has been built in 2006 in order to handle increased and anticipated waste. Total Cost: ~$2 Million Dollars; 2) Pinedale 2005 water/sewer replacement project – Recently completed re-leveling and re-surfacing of Tyler Avenue, replacement of sewer and water lines under Tyler, and replacement of valley pans. Cost: ~$2M; 3) Pinedale Infrastructure Project- Water and sewer replacements and upgrades throughout the town to replace aging infrastructure and in anticipation of increased usage due to residential and commercial growth. Cost: $10.6 million; 4) Marbleton Curb and Gutter Project: Existing streets and subdivisions in town just completed (2006), several new subdivisions will require additional curb and gutter projects. Total Cost thus far: $2,110,000; 5) Marbleton water well to be drilled in Spring of 2007 to accommodate new residential and commercial units; 6) Pinedale Town Shop – New facility required for the increased maintenance associated with new town annexations – cost unknown at this time; 7)Sublette County Library Expansion – 5 Million Dollar expansion slated as library patronage has quadrupled in the past two to three years and the need for increased community meeting space has grown. Current community meeting space is inadequate to hold the various public meetings and hearings associated with energy development, not to mention the various private meetings held by energy firms; 7) Marbleton Town Hall –built in 2006 for $2.8M to accommodate larger town council meeting attendance and the growing need for a larger community meeting space; 8) New Rural Health Care Board (Special District) Medical Clinics in Pinedale and Marbleton – The number of monthly office visits in Pinedale has increased, especially roughly 2000 to 2005; 9) Sublette County Maintenance Buildings -- New county shop built for 5M due to increased maintenance demands from an expanding and deteriorating road system. Another example of increasing costs to county governments can be found in the SEIS (page 3-21) discussing Sublette County Sheriff's difficulty in hiring and retaining sufficient officers.

SE-1

EG-1-EX3-1

BLM has failed to adequately address many of the economic costs likely associated with accelerated natural gas development and production, including the costs of compromised air quality, water quality, reduced populations of wildlife, threats to endangered species, increased noise, and others. These effects are discussed in SEIS (p. 4-16), but SEIS makes no effort to quantify these recognized effects. However, peer reviewed methods for quantifying both the non-market and market costs of changing environmental quality have been developed by economists and are readily applicable to the present case. For a catalog of these methods see Freeman (2003). For a complete socioeconomic analysis, BLM should adapt these methods to conditions in the PAPA area to obtain a complete catalog of estimates of the economic consequences of the various alternatives.

SE-2

EG-1-EX3-2

II. In the DSEIS, BLM has emphasized the importance of the energy extraction industries, to the apparent exclusion of other industries and other sources of income. However, this emphasis is not supported by the data. In the last 30 years, economies in the West have evolved from being highly dependent on extractive industries to being much more diverse, relying on a variety of economic sectors for stability and growth. (Bennett and McBeth, 1998). A recent study by the Sonoran Institute examining the impact of public land on economic well being in eleven western states found that only three percent of western counties could be classified as resource-extraction dependent (Rasker, et al., 2004). The secondary nature of the resource extraction sectors is also true in Lincoln, Sublette, and Sweetwater counties, those likely to be the most heavily impacted by Alternatives B and C. For example, in Table 3.5-3 or the SEIS, entitled "Employment and Earnings Associated with Natural Gas Development from 2000 to 2005," BLM estimates that total production and development earnings in 2004 were $303,539,123 and $14,300,972, respectively. The total of the two represents 16 percent of total personal income Lincoln, Sublette, and Sweetwater counties.

More importantly, natural gas earnings are dominated by other important sources of personal income, including transfer payments ($221,706,000), dividends and rents ($358, 839,000), and proprietors income ($183,635,000) (U.S. Department of Commerce, 2006). In Lincoln, Sublette, and Sweetwater counties these sources of income represented 40, 49, and 35 percent of personal income, respectively.

SE-3

EG-1-EX3-3

BLM has also mischaracterized the economic importance of the oil and gas industry by ignoring obvious connections between the rapid pace of oil and gas exploration and development and inflation and higher cost of living. In DEIS, Chapter 3, p. 3-12, BLM asserts "In 2005, the average wages per job in Sublette and Sweetwater counties exceeded the Wyoming average…", while Table 3.5-10 asserts that per capital income is higher in Sublette and Sweetwater counties. BLM appears to asset that oil and gas development is largely responsible for higher wages in those parts of Wyoming where it is concentrated. However, this assertion fails to account for higher inflation and higher cost of living associated with accelerated oil and gas exploration and development. BLM acknowledges that inflation in SW Wyoming has exceeded the Wyoming and U.S. inflation rate every quarter since the 4th quarter of 2004 (Table 3.5-2), but does not acknowledge that the likely cause of this is accelerated oil and gas development. Further, once adjusted for costs of living, Sublette and Sweetwater county have lower per capital incomes and wages per job that the Wyoming average. As Table 1 (below) shows, wages per job are lower than the average in Wyoming after adjusting for inflation, while per capita incomes are lower in both Sublette and Sweetwater counties after adjusting for inflation.

Table 1: Cost of Living Adjusted Income and Wages in Selected Wyoming Counties

	Cost of Living Index (4th quarter 2006)	Per Capita Income Unadjusted	Per Capita Income Adjusted	Wages Per Job Unadjusted	Wages Per Job Adjusted
Lincoln	92	28,632	31,122	31,071	33,773
Sublette	117	42,181	36,052	36,807	31,459
Sweetwater	107	38,039	35,550	41,907	39,165
Wyoming	100	37,305	37,305	33,069	33,069

The higher cost of living and inflation rates adversely affect local residents in areas of accelerated oil and natural gas exploration and development. Especially hard hit will be retired and disabled residents with income sources which do not adjust to local increases in living costs.

Further weakening BLM's assertion that oil and gas exploration and production improve the economic well-being of local and regional residents is the likely composition of wages in these economic sectors. Economic theory demonstrates that workers must be compensated with high wages for taking jobs in industries with high risks of death and/or injury (Loomis et al. 2007). The Bureau of Labor Statistics reports the risk of death in the mining industry is 25 per 100,000 workers, versus 1.8 per 100,000 in the leisure and hospitality industry. The extremely risky nature of working in the Wyoming oil and gas industry was recently documented in Ring (2007). Wage differentials to compensate for high death and injury risk amounted to over $140 billion in 1990, nearly 5% of total wages. In high risk industries, such as oil and gas, the wage premium is likely much higher (Loomis et al. 2007).

SE-4

EG-1-EX3-4

In the SEIS, BLM acknowledges that "Changes in employment and income trigger impacts on community services, social structures, and lifestyles (p. 4-30)." But BLM fails to make a connection between this recognition and serious discussion of the potential economic costs of these likely consequences of accelerated natural gas development. One consequence apparently has been an increase in crime rates and arrests, largely related to increases in drug use. A report

by the Sublette County and Prosecuting Attorney finds that crime rates and arrests increased at an annual rate of 15 percent from 2000-2004, but accelerated to 30 percent from 2004-2005. The total index of crimes is "highly statistically correlated with gas and oil field activity", as illustrated in the graph below (Barnhart 2006).

The report also finds that "drug use among gas industry employees …has been identified as a significant and growing problem (p. 3)" but also that "there is a 'trickle-down' effect that has become an overwhelming problem…(p. 3)." This effect is being seen in an increase in the number of juveniles in the criminal justice system, growing strain on law enforcement officers, and increased drug use. The economic costs of crime related to drug use in the U.S. has been estimated at over $100 billion (National Institute of Drug Abuse, 1992). The quantification methods are relatively straightforward and could be adapted to conditions in PAPA.

SE-5 EG-1-EX3-5

In the SEIS, BLM acknowledges that "Changes in employment and income trigger impacts on community services, social structures, and lifestyles (p. 4-30)" But again there is a failure to make a connection between this recognition and serious discussion of the consequences for the economic well-being of long-time local residents. One set of likely consequences is social, cultural, economic, and environmental disruptions viewed unfavorably by local residents. (See, for example, Fuller 2007).

SEIS analysis focuses on increasing wages as an indicator of improved economic well-being. However, this focus ignores the fact that rapid growth will change the character of the local community and that these changes will be seen differently by original residents and in-migrants. Economic theory provides a cogent argument that original residents and businesses are likely to suffer deteriorating economic well-being as a consequence of rapid natural gas development (Bartik 1991). In-migrants will be those that find community changes most attractive or least unattractive. Local wage increases will be sufficient to attract workers who view the changes as favorable. Conversely, original residents will view the changes unfavorably and the wage adjustments needed to attract in-migrants will be insufficient to compensate them for the qualitative changes to the local community because of substantial mobility costs. Similar types of losses may be experienced by local businesses, especially if their production technologies are linked to resources that deteriorated in quality or quantity as growth continues. The likelihood of declining well being for original residents has led a leading economist specializing in local economic development to conclude:

"The possible loss of the special characteristics of a unique place is an argument for economic development policies that only prevent decline of a local area, and against economic development policies that cause rapid growth. Preventing the loss of a sense of place is a possible benefit of only preventing the decline of an area. The loss of a sense of place is a possible cost of encouraging rapid job growth in an area (Bartik, p. 76)"

BLM ignores the substantial evidence from the economics literature that an overemphasis on mineral extraction can lead to reduced economic growth (see Davis and Tilton 2005 and the references therein). The evidence in support of this so-called "resources curse" is not unanimous, but it provides substantive evidence that, under some conditions, "mining economies are found to grow more slowly and have higher levels of poverty and corruption after controlling [for the usual determinants of growth]" (Davis and Tilton 2005, p. 233). Further, Larson (2005) suggests that the resources curse is not confined to underdeveloped nations, but may also affect developed economies such as states within the United States. Several avenues by which the "resources curse" may take hold appear to apply to the PAPA:

- Accelerated mineral exploration and production (in this case oil and gas) increase the demand for workers and result in rising wages. This harms local businesses, impedes diversification, and increases the dependence of the local and regional economies on volatile mineral markets;
- Accelerated exploration and production impede economic diversification and expose the local economy to the boom and bust cycle characteristic of commodity markets. Price variations in many mineral markets (including oil and gas) are commonly as high as 30% within a year or two (Davis and Tilton 2005, p.236);
- When the boom is over, other resources have been adversely impacted. This increases adjustments costs to other industries. In the case of the PAPA, accelerated oil and gas exploration and production is likely to irrevocably damage some natural resources which will make a return to an amenity-based and/or agricultural economy impossible. Also in the case of the PAPA, year round-round development is more likely to permanently damage wildlife resources, which are an important input for the fishing and hunting industries;
- The labor force for mining (including oil and gas) largely comes from outside the local area and will leave when the boom ends. The use of labor from outside the local area will be more likely the faster the pace of development;
- The external costs of mining (including oil and gas) will largely be borne locally, but the associated public revenues will accrue to governments of broader jurisdictions. In the case of Wyoming, only a small percentage of oil and gas revenues are retained by, or potentially returned to, the local governmental entity to be used to remediate the damage caused by exploration and production or to pay for capital improvements made necessary by accelerated, year-round development or to aid in the economic transitions necessary when oil and gas is fully exploited. Of the approximately $82,000 in federal royalties generated per PAPA well, less than 50% is returned to the State of Wyoming (DSEIS 4-16). However, the State of Wyoming retains at lease 86.5 % of these funds for dispersal throughout the state. Of the $40,341 of state severance taxes generated per PAPA well, $37,356 is retained by the State of Wyoming in its general fund, budget reserve account, and permanent mineral trust fund (DSEIS Table 4.3-7). Little of this is likely to be spent specifically to remediate the damage cause by accelerated oil and gas exploration and production. Finally, of the $42,400 in ad valorem tax revenue per PAPA well, only 50 percent is retained explicitly by governmental or public school entities in Sublet County. The remaining 50 percent is transferred to the State School Foundation for use throughout the State of Wyoming (DSEIS 4-18);
- Rents (i.e. revenues exceeding the costs of production) are often poorly spent or not invested in physical or human capital projects which will sustain the local economy after the minerals have been extracted. Poorly planned investments are more likely if the pace of development is accelerated and communities have neither the time nor information needed for making wise investment decisions. In addition, accelerated development makes adaptive management strategies much more difficult to implement.

SE-6

EG-1-EX3-6

III. In the DSEIS, BLM has emphasized the importance of the energy extraction industries and some of the likely adverse consequences for environmental and social quality, but has failed to make the economic connection between the two. There is a vast and growing body of research evidence suggesting that environmental and social amenities, which are likely to be compromised by natural gas development and production, are important determinants of economic growth in western economies (Johnson and Rasker, 1993; Johnson, 2001, Crompton, et al., 1997; Deller, et al, 1998, Lorah, 2000; Marcouiller and Deller, 1996; Power and Barrett 2001).

The evidence in this body of research suggests that, even if the estimates of short term economic benefits contained in the SEIS are taken as accurate, the long run effect of natural gas development could be to place

Lincoln, Sublette, and Sweetwater counties at an economic disadvantage, because their environmental and social amenities have been compromised. Indeed, a recent study by the USDA has found that counties pursuing a strategy of economic growth based on recreation have enjoyed greater economic growth, lower poverty rates, higher labor force participation rates, and greater improvements in other social indicators than other counties (Reeder and Brown 2005).

In SEIS, BLM states it will violate the Clean Air Act by allowing activity that will cause the exceedance of air quality standards (increments) in Class II airsheds. The NO2 Class II increments will also be exceeded in and near the Pinedale Anticline field. SEIS Tables M-1, M.15, M.29. PM10 Class II increments will also be exceeded at least during the initial stages of development. SEIS Tables M.15, M.29. From the standpoint of socioeconomic impacts, SEIS conclusion that "...there would be no violations to applicable federal and state air quality standards (SEIS vi)" is not salient. This is because the impacts of many common forms of air pollution, including NO2,Ozone,and PM10 have no known thresholds below which these pollutants do not adversely impact human health (except zero) and "adverse health effects can occur at pollution levels lower than ambient standards (p. 376)" (Tietenberg 2006). In other words, the additional pollution resulting from accelerated PAPA development is very likely to adversely affect the health of area residents, workers, and visitors. DSEIS forecasts 40 to 45 days of significant visibility impairment in the Bridger Wilderness Class I area until approximately 2013 and 10 days of impairment even after Phase II mitigation is implemented. Also, DSEIS forecasts exceedance of the increment for nitrogen dioxide and PM10 (DSEIS, Tables 16.8, 16.9, 16.11, 16.12, 18.15,18.29, 18.16, 18.30, 18.18, and 18.32).

It is well established that PM is associated with premature mortality, chronic illness, hospital emissions, and respiratory symptoms/illness, while ozone- related adverse health consequences include chronic illness, hospital admissions, and symptons/illnesses not requiring hospitalization (Akeson, et al., 1999, Exhibits 4-1.and 4.2).

Moreover, the science of quantifying the economic consequences of air pollution (and air pollution control) is one of the most well developed topics in environmental economics. The methodologies used are well established, peer-reviewed, and used by other federal agencies. For example, the cost of avoiding illness (COI) is often used as a lower bound estimate for peoples' willingness to pay to avoid illnesses. COI estimates for respiratory illnesses range from $6,300 (Burnett, et al. 1999) to $12,000 (Schwartz 1994) per incident.

In addition to impacts on air quality, accelerated oil and gas exploration and development is likely to have adverse impacts on fish and wildlife resources in PAPA. BLM acknowledges that "Lost habitat and diminishing function may eventually lead to population declines..." in the case of antelope (DSEIS 4-149) and "Available information...indicates that mule deer populations on the Pinedale Mesa steadily declined from 5000 animals in 2002 to less than 3000 in 2004-2005" (DSEIS 4-149). In addition, BLM acknowledges that surface disturbance of antelope habitat will be up to three times greater under Alternatives B,D, and D, and 2.5 times greater under Alternative E as under Alternative A (DSEIS Table 4.20-2). Similarly, disturbance of mule deer habitat and moose will increase as much as 300 % (DSEIS Table 4.20-3 and Table 4.20-4).

Given the importance of big game hunting in Wyoming, BLM's failure to incorporate the likely economic losses due to decreased hunting opportunities represents a serious omission. Expenditures by Wyoming deer in 2004 exceeded $37 million, while antelope and moose hunters spent over $34 million (Richards 2005). These expenditures represent important sources of revenue for local businesses. In addition, Bhat et al. (1998) estimate that Wyoming big game hunters value their time in the field at $14 million more than they actually spent (based on 918,000 hunter days and estimates from Bhat et al. 1998).

SE-7
EG-1-EX3-7

A more complete analysis of the various alternatives requires that BLM adapt extant methodologies to conditions in and around PAPA to produce quantitative estimates of the economic costs resulting from the adverse health effects of air quality deterioration and likely adverse economic impacts due to deteriorating hunting opportunities.

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[ii] The project descriptions and costs were provided by Jeffrey Jacquet, Sublette County Socioeconomic Analyst, March 27, 2007.