

**Wyoming Outdoor Council  
Upper Green River Valley Coalition  
Greater Yellowstone Coalition  
The Wilderness Society  
Jackson Hole Conservation Alliance  
National Wildlife Federation  
Center for Native Ecosystems**

April 9, 2005

Jonah Infill Drilling Project  
Bureau of Land Management  
Pinedale Field Office  
P.O. Box 768  
Pinedale, Wyoming 82941

**RE: Comments on February 2005 Draft Environmental Impact Statement for the Jonah Infill Draft Environmental Impact Statement**

Dear Prill,

I am writing to submit comments on the February 2005 Jonah Infill Draft Environmental Impact Statement (DEIS) prepared to comply with the National Environmental Policy Act (NEPA). I am writing on behalf of the Wyoming Outdoor Council, Greater Yellowstone Coalition, Upper Green River Valley Coalition, The Wilderness Society, Jackson Hole Conservation Alliance, National Wildlife Federation and the Center for Native Ecosystems.

The conservation community seeks responsible energy development in the Jonah Field in a manner where known environmental impacts are not only accurately disclosed but mitigated to the extent possible. The BLM has not yet disclosed all of the environmental impacts resulting from the proposed action and has not provided sufficient mitigation for those impacts that are disclosed.

The BLM must present the environmental impacts of the proposed project based on the most up-to-date information in the most consistent and clear way to facilitate public comment. Instead, the BLM published an analysis based on already outdated information in a document that is confusing and contradicts itself. As the Governor of Wyoming recently stated in his response to the draft Rawlins Resource Management Plan, clarity at the draft stage could save lawsuits and injunctions in the end.

NEPA's procedural requirements serve two central purposes. First, information provided under NEPA provides decision makers with detailed environmental disclosure to inform the decision of whether to proceed with the proposed project in light of its environmental impacts. Second, NEPA provides an opportunity for the public to become aware of and comment on the environmental impacts of proposed projects on their public lands.

The BLM has failed to comply with NEPA, and a final EIS should not be approved without first remedying the following violations of NEPA.

## **I. The BLM Failed to Properly Consider Alternatives as Mandated by NEPA**

A bedrock requirement of NEPA is the duty to consider a reasonable range of alternatives. NEPA requires that federal agencies provide an evaluation of each alternative to the proposed action in every environmental impact statement. 42 U.S.C. § 4332(C)(iii); 40 C.F.R. § 1502.14(a). A reasonable range of alternatives must be presented and analyzed in every EIS so that issues are “sharply defined” and the EIS provides “a clear basis for choice among options . . .” 40 C.F.R. § 1502.14. A cursory examination of alternatives is insufficient; each alternative must be evaluated in detail. *See Alaska Wilderness Recreation & Tourism v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995) (stating that “the existence of a viable but unexamined alternative renders an environmental impact statement inadequate”).

### **a. BLM failed to model air quality impacts for four alternatives, including the BLM’s own Preferred Alternative**

The BLM included nine alternatives in the DEIS, including Alternatives A through G, the Proposed Action and the BLM’s Preferred Alternative. DEIS at 2-8 to 2-27. However, of these nine different alternatives, air quality impacts from four alternatives were not reported because they were not modeled. AQTSD [Air Quality Technical Support Document] at 6-7. Surprisingly, the BLM’s own Preferred Alternative is one of the four alternatives not modeled in the DEIS. AQTSD at 6-7.

Clearly, the alternatives have different impacts—like number of wells permitted and the amount of surface disturbance from development—or they would not have been considered separate alternatives in the first place. DEIS at 2-8 to 2-27. In fact, the Preferred Alternative is the most different from the other alternatives because the BLM specifically states the percentage of surface disturbance based on location in the field, designates parent and satellite well pads, and requires additional mitigation, including at least seven different mitigation measures that impact air emissions. DEIS at 2-26. These differences likely affect the air quality effects of each individual alternative.

The ability to closely compare different alternatives to the Preferred Alternative is especially important in the air quality arena. The BLM provided only a range of air quality levels for its Preferred Alternative and the three other alternatives that were not modeled. DEIS at Appendix F. However, a range is insufficient because even small changes in emissions can have significant results. Small changes between the alternatives could cause a criteria pollutant to exceed the ambient air quality levels in one alternative and not in another. Because air quality analyses require a level of preciseness unlike other impacts, it is essential the BLM adequately model the Preferred Alternative.

### **b. BLM must provide for public comment on the model results**

Once the air quality modeling is finished for the Preferred Alternative, the BLM must release the modeling results to the public and provide for a sufficient public comment before the project progresses further. The BLM cannot simply include the modeling results for the Preferred Alternative in the final EIS and not provide for public comment. Air quality impacts are one of the biggest impacts of the Jonah Infill project. It is clear the BLM’s Preferred

Alternative impacts air quality differently than the other alternatives. The public must understand how the BLM's preferred plan of developing the Jonah Field will impact the air quality in the Pinedale area and beyond in comparison to the other alternatives.

**c. BLM failed to provide an alternative minimizing wildlife impacts**

Although the DEIS contains no fewer than eight alternatives, DEIS at 2-11 to 2-26, every one of these alternatives fails to meet the basic objective of avoiding excessive loss of wildlife habitat within the JIDPA [Jonah Infill Development Project Area]. With the exception of Alternative B, the alternatives fail to seriously consider the use of directional drilling from existing well pads as a means of minimizing negative direct and indirect impacts of drilling. The alternatives proposed also fail to give any consideration to structuring development over time (such as phased development, developing one part of the project area then moving to another only once reclamation is successful) as a means of reducing negative impacts.

In particular, the BLM fails to provide a justification for why its Preferred Alternative meets the ostensible purposes of this project any better than the other alternatives (particularly relatively less invasive alternatives, such as Alternative B).

**II. The BLM's Methodology for Air Quality Impacts is Flawed**

The BLM's air quality analysis is flawed in many respects that results in an inaccurate depiction of the level of impact from the proposed action. The BLM presented at best a blurry picture of air quality effects of Jonah development using outdated emission levels and unsupported assumptions that do not comport with the on-the-ground reality in the Jonah field. The BLM must remedy these problems to accurately disclose air quality impacts to the public and to facilitate appropriate mitigation measures based on the emissions reductions needed.

**a. Background assumptions are non-representative**

The BLM's air quality modeling is flawed due to the inadequate background levels used for the criteria pollutants. The BLM added emissions from the near-field analysis from the proposed action to background concentrations to determine conformance with the National Ambient Air Quality Standards/Wyoming Ambient Air Quality Standards (NAAQS/WAAQS). AQTSD at 27. However, because the background concentrations are non-representative of the existing situation in the Pinedale area, the BLM cannot adequately analyze whether or not the federal or state ambient levels are being violated.

The BLM assumed that existing sources are reflected in background concentrations of the pollutants measured. The BLM must not blindly rely on background levels as representing actual emissions without supporting its choice of a background level monitor. If the monitor is not properly placed or otherwise not reflective of existing source emissions, the background concentration received from such monitor will be useless. Background air monitoring data is usually combined with cumulative source modeling analysis to ensure all currently emitting sources are taken into account and to determine compliance with ambient levels. If the modeled source is not isolated, then modeling of existing sources is necessary to determine the potential contribution of background sources. See Section 9.2.1 of 40 C.F.R. Part 51, Appendix W.

An examination of the background levels the BLM chose for the Jonah DEIS shows that the BLM cannot support its decision to assume background concentrations accurately reflect the emissions of area sources. For background levels of CO, the BLM used nearly twenty year old data collected at Ryckman Creek by Amoco. AQTSD at 27, Table 31, Footnote 1. Clearly, significant changes in terms of natural gas development and population increases have occurred since the late 1970s in this area. For PM<sub>10</sub> and PM<sub>2.5</sub>, the BLM used background assumptions measured four years ago at the Emerson building in Cheyenne, over 300 miles from the Jonah Field. AQTSD at 64, Table 4.3. The BLM also used Emerson building data for PM<sub>10</sub> and PM<sub>2.5</sub> levels for far-field analysis. AQTSD at 64; Table 4.3. Cheyenne has different air quality levels due to different geographical location, different sources and emitters and different wind patterns. A background level from a location hundreds of miles away cannot estimate the level of background pollutants to the level of preciseness needed in this analysis.

The BLM did not adequately explain why it used the Amoco data or the Emerson building data. It could be the most convenient, the lowest level, or the best available to the BLM at this point. Only one statement in a footnote was given to explain the PM<sub>10</sub> and PM<sub>2.5</sub> levels. AQTSD at 27, Table 3.1, Footnote 4. Interestingly, the background levels of ozone—which are likely the most spatially and temporally representative of the background concentrations given—showed that 70% and 94% of the NAAQS/WAAQS are already consumed for 1-hour concentrations and 8-hour concentrations respectively.<sup>1</sup> AQTSD at 27.

In the final EIS, the BLM must explain its decision to use the background levels it chose. The BLM should also include a qualitative explanation of the differences and similarities between the background levels it included and the presumed Pinedale area levels. If the background levels cannot be supported, the BLM must prepare an emissions inventory of existing sources rather than relying on background concentrations.

If no better background level exists for Pinedale, the need to require baseline level monitoring for the Pinedale area is clear. To aid in future analyses, the BLM in cooperation with the state must ensure monitoring is included in the Jonah Infill DEIS as a required mitigation measure for all alternatives. The BLM cannot continue to operate without a clear understanding of how much degradation has already occurred and how much more the projects it is approving are contributing.

#### **b. Preferred Alternative and Proposed Action inappropriately allow more than 3,100 wells**

The air quality analysis is dependent, in large part, on the number of wells drilled and the pace of drilling. Wildlife and habitat impacts are also impacted by the level of surface disturbance from the number of wells approved. The BLM analyzed the impacts of the construction and production of 3,100 wells at a specific rate for the proposed action and the preferred alternative. DEIS at 2-8 to 2-27. Despite restricting its analysis to 3,100 wells and stating 3,100 is the limit throughout the DEIS, the BLM has inappropriately inserted language attempting to authorize more wells beyond 3,100.

For the Preferred Alternative, the BLM clearly states that 3,100 wells is not a limit and no particular pace will be required. DEIS at 2-26. For the Proposed Action, the BLM states that drilling would continue until “the total number of proposed wells have been drilled, the natural

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<sup>1</sup> Note that the BLM decided not to use the background ozone concentration it reported here in its near-field analysis. See Section II.d., *infra*.

gas resources in the field have been fully developed, or economic conditions are such that it is no longer profitable to drill additional wells.” DEIS at 2-10. “Or” is the operative word in this sentence; if more gas is recoverable after 3,100 wells are completed, more wells would be allowed.

NEPA requires the BLM to analyze the environmental impacts of its proposed actions, which is 3,100 wells in this situation. If further wells are needed beyond the 3,100 predicted now, additional NEPA documentation would be required to analyze the impacts of the additional wells. The BLM is seemingly attempting to constrict its air quality modeling to only the impacts of 3,100 wells while at the same time leaving enough ambiguity in the DEIS language to authorize more wells, if it is later deemed necessary. The BLM must clarify this section and set a specific limit for well numbers in order to have a meaningful air impacts section. Without a well limit, the air quality analysis is merely perfunctory and appropriate mitigation cannot be required because the true emissions of the proposed action are not known.

### **c. BLM uses inaccurate drill rig assumptions**

The BLM used inaccurate assumptions for drill rig engine emissions, engine horsepower and drilling pace when determining emissions in the DEIS. The flawed assumptions caused the BLM to drastically underestimate NO<sub>x</sub> emissions contrary to actual NO<sub>x</sub> emissions in the Pinedale Anticline Field Area. These inaccuracies impact in-field, near-field, visibility and the cumulative air quality analysis.

It is essential the BLM use the most up-to-date information on NO<sub>x</sub>, much of which was developed within the BLM Pinedale Field Office. The BLM must be consistent in its use of assumptions for drilling or if the assumptions are not correct for Jonah, to explain why different data were not used.

#### **i. Drill rig engines**

The BLM assumes that of 20 drill rigs operating per year in JIDPA, ten will have Tier I engines and ten will have Tier II engines. AQTSD at 52-53, Table 4.2, Footnote 5. This is slated to begin when drilling begins in 2005. DEIS at 2-10. However, this is impossible since Tier II drill rig engines are not even available on the market. Pers. Comm. Pinedale BLM, 3/15/05. Also, currently most operators in Jonah use standard diesel engines and only some use Tier I drill rig engines. Pers. Comm. Pinedale BLM, 3/15/05. The Environmental Protection Agency, recognizing the Tier II unavailability on the market, is not requiring operators to use Tier II drill rig engines until 2008.

The difference in NO<sub>x</sub> emissions from Tier II engines and standard engines is significant and completely ignored by the BLM in the DEIS. For a 1,000 horsepower drill rig engine, there was a 489 tons/year net reduction in NO<sub>x</sub> emission using a Tier II rig engine instead of a standard drill rig engine. Questar Year-Round Drilling Proposal Environmental Assessment (Questar EA) at 4-26, Table 4-1. There will likely be several years of drilling before Tier II engines are implemented, which translates into thousands of tons of additional NO<sub>x</sub> per year that has not been accounted for in the DEIS.

The EPA requirements for Tier I and Tier II engines and the current standard drill rig engine used on the Jonah Field were obvious and available to the BLM prior to the release of the Jonah DEIS. If the BLM is requiring cleaner engines before they are publicly available and before they are mandatory for the Jonah Field, the details of this requirement should be made

clear in the FEIS and be legally enforceable. The BLM cannot assume operators will voluntarily implement Tier II engines before 2008. While we encourage the BLM to pursue requiring Tier II engines earlier than mandated by the EPA, we are assuming that the BLM is instead drastically understating the level of NO<sub>x</sub> emissions from the Jonah Field drilling rigs.

The BLM must revise their assumptions to reflect that several years of the use of standard diesel engines will occur before Tier II engines are required and report the air quality results of that difference.

#### **ii. Pace of drilling**

The BLM assumes 20 drill rigs will be operating per year in the Jonah Field. AQTSD at 51. It is not clear whether this pace is based on current activity in the Jonah Field or if it is an estimate. The BLM recently determined that in the Pinedale Anticline Project Area in the summer of 2004, four times as many drill rigs were actually operating beyond that anticipated. Questar EA at 3-20. With a higher number of drilling rigs operating than anticipated, the NO<sub>x</sub> levels were significantly higher. Questar EA at 3-20.

The BLM should not make the same mistake with Jonah. The BLM should ensure that the 20 drill rig assumption is correct for the Jonah Field on the ground. If the drill rig pace is higher than 20 on the ground, the NO<sub>x</sub> levels in the DEIS should be altered accordingly.

#### **iii. Engine Horsepower**

The BLM assumes operators will use two drill rig engines at 800 horsepower and one at 500 horsepower in the Jonah field. AQTSD at B-11, Table B.1.7. However, the BLM recently stated that the usual power of drill rig engines is 3,000-5,000 horsepower. Questar EA 3-20. The use of higher horsepower engines drastically increases the level of NO<sub>x</sub> emitted; emissions of NO<sub>x</sub> are triple between a 1,000 horsepower engine and a 3,000 horsepower engine. Questar EA, 4-26, Table 4-1.

For Jonah, the BLM should acknowledge the new information from the Questar EA and ensure that the 800 horsepower assumption it is making for the Jonah Field is accurate. If the 3,000-5,000 horsepower engine is the typical engine used in Jonah, the BLM must revise its analysis accordingly.

#### **d. BLM failed to support its conclusions regarding ozone**

Ozone, a criteria pollutant, is formed as a result of a photochemical reaction involving VOCs and NO<sub>2</sub> in a 21.6 ratio. AQTSD at 38-39. The ozone background levels alone—without taking into account any new emissions from the Jonah Field—are 70% and 94% of the NAAQS/WAAQS for 1-hour concentrations and 8-hour concentrations respectively. AQTSD at 27. This leaves very little room to add new emissions from Jonah without violating the state and federal ambient standards.

With the other criteria pollutants, the BLM added the expected emissions from Jonah to the background concentration to determine if ambient standards would be violated.<sup>2</sup> With ozone, that approach would have left only 10 µg/m<sup>3</sup> for 8-hour concentration and 66 µg/m<sup>3</sup> for the 1-hour concentration for Jonah emissions before ambient levels would violate the NAAQS/WAAQS. AQTSD at 27.

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<sup>2</sup> The problems with this approach are highlighted in Section II.a., *supra*.

However, with ozone, the BLM used the Scheffe method to calculate the ozone emissions from Jonah development and relied on a significantly lower background concentration than it reported in Table 3.1 in the AQTSD. The reported ozone background levels in Table 3.1 were  $169 \mu\text{g}/\text{m}^3$  for 1-hour and  $147 \mu\text{g}/\text{m}^3$  for 8-hour concentrations. AQTSD at 27, Table 3.1. The BLM instead used  $75.2 \mu\text{g}/\text{m}^3$  as background for both 1-hour and 8-hour in the Scheffe method, approximately 50% lower than the reported background concentrations. AQTSD at 40.

With the much lower background level of  $75.2 \mu\text{g}/\text{m}^3$ , the Jonah proposed action avoids violating the NAAQS/WAAQS by a mere  $3.5 \mu\text{g}/\text{m}^3$ . AQTSD at 40, Table 3.7. If the Table 3.1 background levels were used, both 1-hour and 8-hour concentrations of ozone would have clearly violated the NAAQS/WAAQS. AQTSD at 27, Table 3.1; AQTSD at 39.

The BLM stated that it used the  $75.2 \mu\text{g}/\text{m}^3$  background level to avoid overestimating the level of ozone in the Scheffe model. AQTSD at 39. However, further explanation is needed due to the fact the NAAQS/WAAQS are not violated by an extremely small margin. Because exceeding levels of NAAQS/WAAQS is an important threshold, the BLM should more clearly explain why Table 3.1 background levels were not used and why the much lower background level was used instead.

Problems with the BLM's treatment of ozone may be further exacerbated by its underestimation of  $\text{NO}_x$  as described above. See Section II.c, *supra*. Because ozone is, in part, dependent on  $\text{NO}_x$  for formation, higher  $\text{NO}_x$  levels may translate into higher ozone levels. The BLM should redo its  $\text{O}_3$  analysis to incorporate any changes in  $\text{NO}_x$  emissions predictions based on using the accurate drill rig engine emissions and appropriate engine horsepower assumptions discussed above.

#### **e. BLM must correct inconsistencies within the DEIS**

The BLM must ensure the discussion of air quality is consistent. The narrative in the DEIS often does not match the AQTSD. The BLM must make the DEIS in its entirety consistent and understandable in order for clear management and less confusion down the road.

For instance, the BLM states that all well pads must be less than 7 acres. DEIS at 2-27. However, some of the alternatives exceed this limit. DEIS at 2-13. NEPA does not allow for analysis of impossible alternatives, and the BLM must clarify that the 7 acre limitation will be exceeded for certain alternatives. Second, BLM states that all the mitigation measures described in the DEIS may not match those in Appendix A of the DEIS. DEIS at 2-30. To avoid confusion as to the mitigation measures required, the BLM must clarify the differences and make Appendix A and the DEIS consistent with one another. Also, the BLM states that flareless completions will be required unless proven unsafe on a case-by-case basis. DEIS at 2-27. However, the air quality modeling specifically took into account well flaring and the resulting emissions. AQTSD at 52-53. The BLM included varying estimates of the time required for development operations and total life-of-field (LOF). In the AQTSD, development operations were from 5-42 years and total LOF from 43-85 years. AQTSD at 5. However, later in the AQTSD, the BLM estimated 4-28 years for drilling and 30-50 for LOF. AQTSD (Air Quality Impact Assessment Protocol) at 4.

The BLM must ensure the DEIS is consistent with itself and with its supporting documents like the AQTSD. An inconsistent document will cause confusion in the future and does not provide clear direction for management of the Jonah Field.

### **III. Cumulative Emissions Inventory is Flawed**

NEPA requires that an EIS include an analysis of the cumulative impacts of the proposed action. Cumulative impacts “can result from individually minor but collectively significant actions taking place over a period of time.” 40 C.F.R. § 1508.7. The cumulative emissions inventory is a critical part of the Jonah Infill air quality analysis because it determines the impact of Jonah development along with other development in the area. The cumulative impacts analysis must be more than perfunctory and must provide a useful analysis of the cumulative impacts of past, present and future projects. *See Klamath-Siskiyou Wildlands Center v. BLM*, 387 F. 3d 989 (9<sup>th</sup> Cir. 2004).

The BLM failed to prepare an appropriate cumulative emissions inventory by failing to accurately look at the emissions from Jonah in combination with other sources in the area. The BLM failed to delineate an appropriate modeling domain and did not acknowledge the current state of air quality in the area. The BLM did not include the appropriate regional sources and emissions levels in its cumulative or regional emissions inventory. The BLM also underestimated the reasonably foreseeable development of the area.

#### **a. The BLM used an inappropriate modeling domain**

The Council on Environmental Quality (CEQ) regulations require the BLM to define the context of the action in order to properly determine the significance of the project’s effects. 40 C.F.R. 1508.27(a). An element of context is geographic scope. *Id.* For the Jonah Infill, the BLM failed to delineate an appropriate geographic scope in its modeling domain resulting in flawed air quality far-field, cumulative and visibility analyses.

The BLM did not extend the modeling domain far enough to encompass all sources relevant to the air quality levels resulting from Jonah development. EPA guidance states that the analysis should include sources at least 50 to 80 km beyond both the receptors (i.e. Class I areas) and sources being modeled. AQTSD at 54. This distance is even greater with large sources such as coal-fired power plants that could be located up to 300 km away but still have a significant impact on the Pinedale Field Office area.

By delineating a small modeling domain, the BLM did not capture all the sources impacting the same areas as the Jonah Field development. The Class I Washakie and Fitzpatrick Wilderness Areas are receptors affected by the Jonah Field development but the modeling domain does not appear to extend the requisite 50-80 km beyond the areas. AQTSD at 3, Map 1.2. For instance, both Class I areas are significantly impacted by development in the Powder River Basin, but the modeling domain includes only a sliver of the Powder River Basin development area. DEIS at 4-23; AQTSD at 3, Map 1.2. Also, sources in Utah, Montana and elsewhere in Wyoming are likely to impact these areas but were not included in the modeling domain. *See also*, Section III.c., *infra*.

The BLM includes several sentences about how a qualitative discussion of the impacts of the Powder River Basin development will be included in the FEIS. However, many other sources are also excluded in the modeling domain and all must be quantitatively analyzed. Since it is clear sources beyond those included in the modeling domain are impacting the Bridger Wilderness Area and other Class I areas, the BLM must extend the modeling domain used in the DEIS.

**b. The BLM used inappropriate dates for the cumulative emissions inventory**

The BLM included only sources permitted between January 1, 2001 and June 30, 2003 in its cumulative emissions inventory. The start date of 2001 was chosen as the base year without sufficient explanation in the DEIS. The BLM selected the end date because it was—at that time—contemporary with the air quality report published in October of 2003. AQTSD (Air Quality Impact Assessment Protocol) at 9. The 2003 report stated that “if significant schedule changes occur as the analysis progresses, the cutoff dates will be adjusted to ensure that no data is unreasonably excluded from the analysis.” AQTSD (Air Quality Impact Assessment Protocol) at 9.

Since 2003, there have been several years of maximum drilling in the Pinedale area. Drill rigs on the Pinedale Anticline have averaged 32 per year rather than the 8 per year anticipated just three years earlier. Drilling in the Jonah field has continued at full throttle. Rampant development in the Powder River Basin has continued. Several large coal-fired power plants for Wyoming and Utah have been proposed and permits are in process. Despite that the 2003 end date does not include these sources, the BLM has not altered the cutoff date of the cumulative emissions inventory. The BLM must alter its analysis to include these new sources and others since 2003 in order to present a full picture of air quality in the Pinedale area.

**c. Current sources affecting air quality were not properly analyzed**

The BLM did not include all sources that are currently affecting air quality in the Pinedale area and affecting the same Class I areas as development in the Jonah Field. The BLM analyzed only the change in emissions between 2001 and 2003 rather than analyzing actual emissions. The BLM left out many sources without justification, and new information was not taken into account. The BLM provided little explanation supporting its decision to model the air quality cumulative impacts in this manner and did not adequately explain how the emissions levels were determined.

Using the change in emissions rather than actual emissions, the BLM drastically lowered the emissions levels analyzed. This method results in many sources that are emitting the same level of emissions from year to year to be excluded from the analysis. For instance, in Wyoming only 34 sources were included in the regional inventory summary and 693 were excluded. AQTSD at 24, Table 2.4. Only seventeen sources were included from Colorado and Idaho and 126 from Utah. AQTSD at 24, Table 2.4.

The few sources that are included in the inventory have surprisingly low emissions and in several cases like PM<sub>10</sub>, even negative emissions are reported. AQTSD, page 24, Table 2.4. The BLM cited to an appendix in support of the source determination but the appendix simply listed the individual source without explaining the negative emissions and other emissions numbers. AQTSD at 24, C-11, C-12.

Even with the small number of sources the BLM included, it did not gather accurate and up-to-date emission levels. Emissions information from 2004 shows that there were permitted increases of 371 tons per year of NO<sub>x</sub> at Solvay Chemicals in Sweetwater County and 350 tons per year of NO<sub>x</sub> at compressor stations located in Sublette County. Southwest Wyoming NO<sub>x</sub> Emission Tracking Report, 12/6/2004. These permitted increases should have been included in the emissions inventory, and there were likely other increases as well.

The BLM failed to include appropriate levels of emissions for the Pinedale Anticline in the current source emissions inventory. In November of 2004 in the Questar EA, the BLM showed an increase in NO<sub>x</sub> emissions over twice that authorized in the Pinedale Anticline EIS. DEIS at 4-23. This EA was published more than three months before the Jonah Infill EIS was released. The BLM did not take the Pinedale Anticline emissions into account because “air quality is complex and time consuming” and therefore it “was not possible to quantify potential impacts of these increased NO<sub>x</sub> emissions in this DEIS.” DEIS at 4-23. However, the BLM had over three months to incorporate this data into its air quality analysis. This information is essential to include in the modeling because the Anticline will impact many if not all of the same areas as development in Jonah. The information was readily available as it was prepared by the Pinedale Field Office.

The BLM excluded many sources as “developed” and therefore did not separately include those emissions in the Jonah Infill cumulative analysis. AQSTD, page 24, Table 2.4; AQSTD at 22. The BLM states that the developed portions of these projects are assumed to be reflected in the monitored ambient background or the state-permitted source inventory. AQSTD at 22.

For instance, part of the Jonah Infill II project not elsewhere taken into account was considered “developed” in the emissions inventory. AQSTD at C-40, Table C.12. In other words, the BLM believed that PM<sub>10</sub> emissions from hundreds of wells in the Jonah Field did not need to be considered because the background levels from Cheyenne from two years ago adequately account for all the emissions. This is illogical on its face. The background emissions are clearly non-representative and not substantiated in any way, *See* Section II.a., *supra*, and so necessarily cannot account for the emissions of developed projects, especially projects like the Jonah field and the Pinedale Anticline that are relatively recent and progressing at an unprecedented rate, and which in the case of Jonah are the subject of this very DEIS.

Alternatively, the BLM believed that the emissions from “developed” projects like part of the Jonah Infill project were accounted for in the state-permitted source inventory. However, the state-permitted source inventory contained only 34 sources total for all of Wyoming. AQSTD at 24, Table 2.4. The Jonah Field wells at issue alone exceed 34 sources, much less the addition of all other sources in Wyoming that should be included in the state-permitted inventory. The logic used by the BLM for “developed” sources is facially inadequate and is not satisfactorily explained in the DEIS.

The BLM excluded other sources with “low” emissions. Hundreds of sources with emissions less 3 tons per year were excluded in the DEIS. AQSTD at C-24 to C-35, Table C.8. Some of these sources were producing wells and were excluded because the BLM assumed the emissions would be encompassed in the Wyoming Oil and Gas Conservation Commission (WOGCC) emission levels. AQSTD at C-35. However, the WOGCC information only included wells permitted as of 2002, nearly three years before the Jonah DEIS was prepared. AQSTD at C-3. During the past three years, drilling in Wyoming has continued at full throttle but these wells are not accounted for in the emissions inventory.

As a result of inappropriately excluding sources and improperly accounting for emissions that were included, the BLM’s emissions inventory underestimated emissions for its cumulative analysis. The BLM must revisit the emissions inventory and include all appropriate sources and use accurate assumptions when determining emissions levels for the sources.

**d. BLM failed to include appropriate sources considered Reasonable Foreseeable Development and Reasonable Foreseeable Future Action**

NEPA requires the BLM to consider not only current emissions but also emissions from sources that are expected in the near future in the region—otherwise known as “reasonable foreseeable development” or RFD. 40 C.F.R. § 1508.7. Cumulative air quality analyses must include RFD in order to have an accurate picture of air quality. An accurate RFD determination for Jonah must include all sources that affect the same areas affected by Jonah development. BLM failed to include the proper sources within and outside of Wyoming in its RFD determination.

In the Jonah DEIS, the BLM defined RFD as Wyoming industrial sources that are NEPA-approved projects but not yet developed or not yet authorized NEPA projects for which air quality analyses were in progress. AQTSD at 22, C-5. The BLM defined reasonable foreseeable future action (RFFA) as the undeveloped portions of already permitted sources. AQTSD at 14, 22.

For the RFD, the BLM included only Wyoming sources and arbitrarily excluded *all* sources from Utah, Colorado, Idaho and Montana. AQTSD at 22. All sources from those states are excluded despite the fact such sources may impact the same areas as the development in Jonah. For example, the BLM excluded significant sources in the Vernal, Utah area, the Price, Utah area, the Colorado Roan Plateau area and the Powder River Basin sources in Montana. Other major sources were also excluded, including the proposed Unit 2 at the Bonanza power plant in northeast Utah and the proposed Unit 4 at the Hunter power plant in Utah both of which will likely impact southwestern Wyoming. The permitted Roundup power plant and the Hardin Generating Station, both in southeastern Montana, were also not included but may affect similar Class I areas as Jonah development.

The BLM’s exclusion of non-Wyoming sources is inconsistent with its current inventory source determination. The BLM admitted that sources in Utah, Colorado and Idaho impact the same area as Jonah because it included sources from these states in its inventory of current sources. AQTSD at 24, Table 2.4. If these sources did not affect the same areas as Jonah, the BLM would have excluded them from the current source inventory. The BLM must expand the RFD to include those projects in other states that will affect the same areas as development in Jonah.

The inventory for RFD for sources within Wyoming is also flawed. The BLM included only 47 sources as RFFA and 42 sources as RFD. AQTSD at 24, Table 2.4. Many potential NEPA projects that should have been considered as RFD—like the Atlantic Rim Project EIS and the Seminoe Road project—were excluded because no emissions were quantified. AQTSD at C-40, Table C.12. Also, the BLM did not include the proposed Two Elk power plant to be located in the Powder River Basin of Wyoming, which was reissued a permit in May of 2003. The inventory should have also included those sources which submitted complete PSD permit applications but which have not yet been permitted.

The BLM cannot so easily avoid its duty under NEPA to analyze the cumulative impacts of Jonah development. The BLM cannot simply avoid including sources because full emissions studies are not completed or exclude sources without justification. For both Atlantic Rim and Seminoe, the scoping notices gave some estimates of the levels of development, which could have been used for at least a qualitative estimate of emissions. The BLM gave no indication why it excluded the other sources like the Two Elk power plant.

NEPA requires the BLM to include relevant information unless the costs of obtaining it are “exorbitant.” 40 C.F.R. § 1502.22(a). Here, the BLM made no claim regarding the efforts it

would take to obtain the information or that the cost was exorbitant. The BLM has not properly rationalized its decision to exclude these sources and it must take the time to gather the appropriate information and include it in a revised RFD and RFFA determination.

**e. BLM must acknowledge current information already showing impact to air quality**

The BLM must conduct its cumulative air quality analysis in the context of the current air quality situation in the Pinedale area. The BLM failed to adequately acknowledge previous air quality analyses and information showing that air quality in Wyoming is already being significantly affected from current rates of development in Wyoming. *See also* Section II, *supra*. The BLM even deemphasized the information in the DEIS that showed significant impacts to visibility in its No Action analysis. The BLM must acknowledge the state of air quality in the Pinedale area and contemporary information showing unanticipated levels of certain pollutants and significant impacts.

The BLM should consider the Jonah development in light of already existing air quality impairment. The Record of Decision for the Pinedale Anticline Project Area (PAPA ROD) states that if caps on NO<sub>x</sub> emissions from PAPA are exceeded, additional cumulative air quality review is necessary. PAPA ROD at 16. In November of 2004, the BLM published NO<sub>x</sub> levels showing the current levels nearly triple the PAPA ROD NO<sub>x</sub> caps. Questar EA at 3-20—3-21; 4-26. It also showed visibility impairment to Class I areas in the Bridger-Teton National Forest. The BLM did not take this information into account in the Jonah DEIS. Clearly, the BLM cannot use the Jonah cumulative air quality analysis to satisfy its PAPA ROD responsibility to undergo a new air quality review because the Jonah DEIS does not even include the increased NO<sub>x</sub> levels that triggered the need for new review in the first place.

The BLM, in an agreement with the DEQ and other agencies signed after the PAPA ROD, committed itself to track NO<sub>x</sub> emissions in the Pinedale area. However, the BLM failed to abide by its agreement until this fall when the levels of NO<sub>x</sub> were suddenly found to be triple that authorized in the PAPA ROD. Questar EA at 3-20—3-21; 4-26. Clearly, if the BLM had adhered to its agreement to track NO<sub>x</sub>, the increasing levels of NO<sub>x</sub> would have been discovered before this fall. It is our understanding that the BLM is currently retroactively compiling the data for NO<sub>x</sub> tracking from 2000 to 2005. We encourage the completion of that compilation and urge the BLM to remain current with its NO<sub>x</sub> tracking responsibilities from now on. The BLM does not acknowledge this tracking responsibility in the Jonah DEIS but the need for accurate tracking remains and should be acknowledged and reaffirmed in the Jonah DEIS.

Two years ago, with hundreds less wells in the Pinedale area, the BLM was considering closing the Jonah Field to the public due to harmful air emissions. Now, the BLM is considering allowing 3,100 more wells but analyzing the impacts in the context of starting with clean air. The BLM must acknowledge that not approving the Jonah Infill DEIS would still allow for visibility impairment of several Class I areas. The No Action Alternative in the Jonah DEIS shows visibility impairment from cumulative emissions at the Bridger Wilderness and the Wind River Roadless Area. AQTSD at F-295, Table F.10.19. In other words, even when **no** wells from the Jonah Infill proposed action are developed, there is still significant impairment to visibility. The BLM must incorporate this information into its determination of appropriate mitigation measures and consider its actions in the context of already impaired air quality.

**f. The BLM did not adequately analyze PM<sub>10</sub> emissions**

The BLM failed to include any measurement of production and construction PM<sub>10</sub> emissions in far-field emissions determination. AQTSD at 68. Only PM<sub>2.5</sub> emissions were included. AQTSD at 68. The BLM supported this decision with documentation that suggested PM<sub>10</sub> particles would tend to settle out near the emissions source. AQTSD at 68. However, the supporting documentation does not state that *all* PM<sub>10</sub> particles settle out. Therefore, the BLM most likely underestimated the level of PM<sub>10</sub> emissions at far-field locations. This would affect visibility levels as well as compliance with NAAQS/WAAQS.

**IV. BLM Failed to Include Adequate Mitigation Measures for Air Quality**

NEPA requires that an EIS “shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.” 40 C.F.R. § 1502.1. NEPA also requires that “means to mitigate adverse environmental impacts” be included in EIS. 40 C.F.R. § 1502.16(d). A “perfunctory description” of mitigation options is inadequate to satisfy BLM’s duty under NEPA. *See Neighbors of Cuddy Mountain v. United States Forest Service*, 137 F.3d 1372, 1380 (9<sup>th</sup> Cir. 1998). The BLM must describe the mitigation measures in sufficient detail; mere listing is insufficient. *Id.*

The BLM failed to comply with NEPA by not adequately describing mitigation measures for Jonah development. The BLM must consider mitigation measures like limiting activities that contribute to emissions, requiring emission controls on sources or requiring the off-setting of emissions to ensure the net emissions remain below applicable a certain thresholds. The BLM fails to adequately consider any of these types of mitigation.

The BLM briefly described operator-proposed compensatory mitigation in the DEIS. DEIS at 4-152. However, the specifics of the proposal are not final and only tentative mitigation measures were included in the DEIS. For the Proposed Action, the BLM listed the mitigation measures but does not quantify the emissions reduction. DEIS at 5-1 to 5-7; 2-25. The BLM also did not commit the mitigation measures listed in Chapter 5 to any particular alternative and instead only states that “any of the listed actions may be required or recommended under any alternative.” DEIS at 5-1. Without quantification of emissions reduction, there is no way the decisionmaker can determine whether one alternative will safeguard air quality better than another.

The BLM failed to consider the possibility of phased development in Jonah as a potential mitigation measure. Because visibility impairment is already occurring in Class I areas that will also be impacted by Jonah, *see* Section III.e., *supra*, the BLM should analyze the possibility of delaying further development until currently emitting sources are completed. The BLM should also consider the possibility of a cap on certain emissions that would avoid further visibility impairment of Class I areas and acid deposition in sensitive watersheds. The cap on emissions increases would provide a threshold beyond which only offsets for new emissions would be allowed.

The BLM should reevaluate the mitigation measures in the DEIS and quantify the air quality benefits of each proposed measure. The BLM should consider the implementation of a cap on emissions increases necessary to safeguard visibility of Class I areas and sensitive lakes.

Mitigation measures in the DEIS are especially important because the BLM is approving the Jonah Infill project at a time where air quality values in the Pinedale area and beyond are already impaired.

## **V. The BLM Failed to Prevent Undue and Unnecessary Degradation in the DEIS**

The Federal Land Policy and Management Act (FLPMA) requires the BLM to “take any action necessary to prevent unnecessary or undue degradation of the [public] lands.” 43 U.S.C. § 1732(b) (emphasis added). This specific, mandatory, non-discretionary standard requires BLM to ensure that both unnecessary degradation and undue degradation of the public lands does not occur due to the oil and gas drilling. See Mineral Policy Center v. Norton, 292 F.Supp.2d 30, 41-43 (D.D.C. 2003). While the “unnecessary” prong of this twofold requirement may relate to the economics of oil and gas drilling and industry standard practices, the “undue” degradation prong relates to impacts that are environmentally excessive. See id. at 41.

As noted, the unnecessary or undue degradation clause of FLPMA imposes a specific, mandatory duty on the BLM to do whatever is necessary to protect the public lands from excessive environmental degradation. Because this duty is mandatory, BLM is not required to permit surface disturbance as proposed or desired by a lessee; it retains authority—and indeed an obligation—to condition development so as to prevent both unnecessary degradation or undue degradation. 43 C.F.R. § 3101.1-2.

The unnecessary or undue degradation clause of FLPMA must serve as a bedrock for all analyses in the Jonah DEIS. It is crucial to recognize that unnecessary or undue degradation must be prevented; the DEIS must provide that both prongs of this standard are met. Clearly, the BLM bears a heavy responsibility before it can authorize activities that may degrade the public lands.

BLM’s duty to prevent unnecessary or undue degradation (“UUD”) under FLPMA is mandatory, and BLM must, at a minimum, demonstrate compliance with the UUD standard. See Sierra Club v. Hodel, 848 F.2d 1068, 1075 (10<sup>th</sup> Cir. 1988) (the UUD standards provide the “law to apply” and “imposes a definite standard on the BLM.”). In this case, and in the context of BLM’s decision to allow additional development in the Jonah Field, the agency is under a statutory obligation to demonstrate compliance with the UUD standard and show that impacts from oil and gas development will be mitigated and therefore not cause undue or unnecessary degradation to important and protected resources contained in the Jonah Field. See *e.g.*, Kendall’s Concerned Area Residents, 129 IBLA 130, 138 (1994) (“If unnecessary or undue degradation cannot be prevented by mitigation measures, BLM is required to deny approval of the plan.”).

BLM has not adopted these methods to avoid degradation of the environment and has not demonstrated how UUD will otherwise be prevented for the Jonah Field with the drilling of thousands of new wells and the creation of new roads, pipelines and other surface impacts from gas development. The agency’s failure to demonstrate compliance with FLPMA’s UUD standards is arbitrary, capricious, and an abuse of discretion.

## **VI. BLM Must Clarify the Responsibilities of a Jonah Infill Working Group**

If the BLM’s preferred alternative is chosen, a working group made up of citizens, government experts and industry representatives will be established to make recommendations

for the Jonah Infill project. DEIS at 2-24. It appears the Jonah working group will be similar to the Pinedale Anticline Working Group (PAWG), and if the PAWG is functioning effectively, the PAWG would take over responsibility for the Jonah Field in 2006. DEIS at 2-24.

Before the BLM approves a working group for the Jonah Infill project, it must evaluate the effectiveness of the PAWG. First, funding has been a persistent issue with the PAWG as it is unclear who is paying for the mitigation measures the PAWG recommends. For Jonah, the BLM seems to have further confused the issue. It states that the Jonah Infill working group will “make every effort to develop innovative funding sources for monitoring activities....including use of volunteers, seed money/matching funds, grants, etc. [The working group] will not depend solely on the JIDPA oil and gas Operators for funding.” DEIS at D-5. It is unreasonable to assume that significant monitoring and mitigation funding can be “raised” by members of working groups. The BLM should have mitigation and monitoring funding available and be supplemented with funding from the Operators who are causing the need for mitigation in the first place.

The BLM must determine whether the Pinedale Anticline Working Group will be able to handle the additional workload of the Jonah Infill. While the industry and government agency members of the working groups are being paid to attend the meetings, the citizen members are not. In order to avoid an unbalanced advisory committee, the BLM must ensure that adequate representation on the task groups and working group can be achieved. The BLM must provide further details regarding the Jonah Infill working group in the FEIS.

## **VII. Pinedale Resource Management Plan Should Be Amended**

The BLM stated that no amendment was necessary for the Pinedale Resource Management Plan (RMP) for the Jonah Infill proposed development. DEIS at 1-5. The BLM determined this despite the fact it admits that the Jonah Infill project would add more wells than included in the reasonably foreseeable development projection in the Pinedale Anticline amendment to the Pinedale RMP. DEIS at 1-5.

The BLM further justifies its determination that an amendment is not necessary by stating surface disturbance levels are below those in the Anticline amendment to the Pinedale RMP, which was 6,300 acres. DEIS at 1-5. However, the surface disturbance of both the proposed action and the BLM’s preferred alternative appear to exceed the 6,300 limit for RFD surface disturbance in the RMP amendment. DEIS at 2-6, Table 2.1; DEIS at 1-5.

Also, the BLM states that all “existing RMP objectives would be met” with the Jonah Infill development obviating the need for a RMP amendment. DEIS at 1-5. However, as shown in Sections I-III above, the DEIS showed significant and unavoidable impacts to air quality values like visibility and sensitive watersheds, which are not objectives included in the RMP.

The Jonah Infill project represents a major change to the existing Pinedale RMP and an amendment to the Pinedale RMP is necessary.

## **VIII. The BLM Failed to Adequately Disclose Impacts to Wildlife and Wildlife Habitat**

The Jonah Infill Project Area provides important habitat for a number of wildlife species. Most significant for purposes of recreation as well as project-related impacts are pronghorn antelope and greater sage grouse. While the Jonah Infill DEIS unequivocally reflects very high levels of negative impacts to their respective habitats—levels that exceed the maximum

thresholds recommended by the Wyoming Game and Fish Department (WGFD)—the DEIS fails to provide adequate information to understand the true extent of those impacts, fails to adopt recommended measures to alleviate them, and, most puzzlingly given the extent of the impacts, recommends foregoing any commitment of resources for compensatory mitigation.

The BLM must also take into account new information on the impact of natural gas development on wildlife. The Wilderness Society’s new report—“Wildlife at a Crossroads”—provides up-to-date and relevant information the BLM should incorporate into its assessment of wildlife and wildlife habitat impact analyses for the Jonah project. The report investigates the transportation network in the Pinedale Field Area and analyzes the impact of roads on sage grouse and other wildlife. The BLM should confirm in the FEIS that it utilized this report in its analysis for the Jonah Field.

**a. BLM failed to adequately analyze impacts to pronghorn and pronghorn habitat**

The JIDPA is located at the core of the north sub-unit of the Sublette Herd Unit for pronghorn antelope. DEIS at 3-56. This herd is already below 85% of WGFD’s population objective, and has been adversely affected in recent years by low fawn/doe ratios and drought conditions and low forage production. *Id.* Although federal land management action cannot eliminate drought, it directly influences other important factors that contribute to pronghorn habitat condition, behavior, and population levels. 2.5% of this herd unit’s crucial range has already been directly disturbed. *Id.* BLM, however, fails to provide any information as to (a) what proportion of this crucial habitat’s effectiveness has been lost, given that the impact of disturbance on pronghorn extends beyond the immediate footprint of development, or (b) what this loss of crucial habitat means for the behavior of pronghorn or crucial factors relating to population trends, including fawning rates and fawn survival.

With a population already below objective and under stress from drought, BLM now proposes an extraordinarily dense level of development directly in the path of documented pronghorn migration routes (DEIS at 3-57, Map 3.13). Based on scoping, BLM identifies the problem:

Current developments in the region were identified as already having adversely affected the historic migrations of the Sublette antelope herd. Continued development within the JIDPA and at other locations within the Sublette herd unit area were identified as potentially cumulatively affecting pronghorn antelope seasonal migrations. Hunters, wildlife enthusiasts, and wildlife management agencies all consider the maintenance of existing migratory corridors extremely important to pronghorn population maintenance.

DEIS at 2-3 (emphasis added). Unfortunately, the DEIS neither provides adequate scientifically credible information with which to assess the effects of this development, nor adequately provides for mitigation (either on-site or off-site) of this impact. BLM, for example, fails to discuss the recommendations of the Wyoming Game and Fish Department, the supporting science behind those recommendations, or the Department’s refutation of BLM’s accepted myths regarding wildlife “adaptation” to development in migration corridors:

Long-term displacement of wildlife from preferred habitats and disruption of migration routes could, in the extreme case, extirpate “migration memory” that required several thousand years to evolve. Each successive cohort of young ungulates learns the locations of suitable winter habitats and migration routes from older, experienced females that lead them (e.g., Baker 1978, Mackie et al. 1998:44). Extended disruptions of migration or habitat use can result in loss of learned behavior from entire cohorts of young animals, breaking the tradition of migration to the most suitable winter habitats.

Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands 8 (Sept. 10, 2004). The Jonah Infill DEIS plainly involves extreme levels of development within and immediately adjacent to documented pronghorn migration routes. The DEIS, however, despite acknowledged existing stresses on the Sublette herd, fails to provide adequate scientifically credible data about the potential extent of this phenomenon, or, most importantly, how its long-term effect might be alleviated, if that is even possible.

**b. BLM failed to adequately analyze impacts to Greater Sage Grouse and sage grouse habitat**

As BLM acknowledged in the DEIS, the greater sage grouse has been extirpated from two states, and is in serious decline across its range. DEIS at 3-63. Central and western Wyoming, including the JIDPA, represent one of the species’ “last strongholds.” *Id.* Nevertheless, the species has experienced regional declines as high as 73% in Wyoming as well. *Id.* “Changes in the sagebrush-dominated areas where birds typically reside,” including “fire, plant invasions, land conversions, urbanization, livestock grazing, energy development, noise, and others,” are principal factors in this decline. *Id.* Unfortunately, the Jonah Infill Project continues this trend of eliminating habitat for a declining population, while failing to ameliorate this destruction through protection or restoration of habitat. As the DEIS acknowledges:

Data from the JIDPA and for the entire Green River Basin show declines in male greater sage-grouse attendance at leks. Additionally, declines appear to be occurring at a faster rate in areas with oil and gas development (WGFD unpublished data; personal communication, December 2004, with Dean Clause, WGFD Biologist). Declines in lek attendance likely indicate a reduction in the regional population. . . . Site-specific surveys of the JIDPA conducted over the last few years indicate that while the area is still used for nesting and summer and winter foraging, use of the area by greater sage-grouse continues to decline. This decline is likely due in part to the increased loss of habitat resulting from oil and gas development.

DEIS at 3-63 (emphasis added). Despite this acknowledgment, the BLM’s preferred alternative only accelerates this habitat loss, and inexplicably rejects any commitment of resources for

measures that might compensate for this loss by protecting or restoring other habitat for the species.

Like many other BLM projects, the Jonah Infill project employed BLM's standard state-wide lease stipulations and conditions of approval for sage grouse habitat: a buffer zone of a mere 0.25 mile around occupied leks, and seasonal limitations on initial drilling within two miles of a lek and in breeding, nesting, and wintering areas. As BLM acknowledges, however, "these [timing] stipulations do not preclude exploration and development from occurring in nesting and wintering habitat outside of the timing restriction dates, and therefore, habitat is not protected from development." DEIS at 3-66 to 3-67 (emphasis added). With admirable candor, BLM admits that "[g]iven the noted decline in greater sage-grouse use of the JIDPA, existing protection measures within the JIDPA appear to be inadequate." DEIS at 3-67. Unfortunately, this candor is not matched by a commitment to either (a) minimize impacts from further drilling within the JIDPA, such as might arguably be achieved through Alternative B; or (b) compensate for the decline within the JIDPA by ensuring added protection and/or restoration of other sage grouse habitat.

**c. The BLM Failed to Provide Essential Information Regarding Baseline Environmental Conditions and the Impact of the Proposed Action on Wildlife and Wildlife Habitat**

Although NEPA does not require BLM to achieve complete certainty regarding the environmental impact of a proposed project, the Act does require all federal agencies to make every reasonable effort to obtain the requisite information to make an informed and environmentally sound decision. 42 U.S.C. § 4332(2)(C). CEQ's regulations implementing NEPA expressly mandate that "[i]f . . . incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement." 40 C.F.R. § 1502.22(a) (emphasis added). The agency is excused from gathering information only if "the overall costs of obtaining it are exorbitant or the means to obtain it are not known." In that case, the regulations require disclosure of the missing information, its relevance, a description of existing information, and the agency's evaluation of that existing information. 40 C.F.R. § 1502.22(b).

The Jonah Infill DEIS, while reflecting to some extent information obtained during monitoring associated with past and ongoing operations in the field, still does not provide the basic information about habitat resources needed for an informed evaluation of the costs of the extraordinary density of proposed development. With respect to sage grouse habitats apart from leks, for example, the proposed operating measures provide that "Operators would inventory greater sage-grouse seasonal habitats within the JIDPA not already inventoried by BLM or WGFD within one year of the ROD for this project; GIS data would be provided to BLM, WGFD, and the JIWF with FGDC-compliant metadata." DEIS at 2-29. Similarly, the DEIS provides that "Important greater sage-grouse wintering habitat within the Jonah and Anticline Fields and surrounding areas currently is being identified by the BLM in cooperation with WGFD. Identification of sage-grouse wintering areas will be based, at least in part, on aerial winter sage-grouse surveys." DEIS at 3-67. The time for this information, under CEQ's NEPA's regulations, is not after sage grouse habitat is developed at levels of 19% to 34% total ground disturbance. NEPA requires that BLM acquire at least a basic understanding of the

resources at stake before taking action. Here, particularly given the high yields of the Jonah Field to date, BLM has not even begun to make a showing that the costs of obtaining the information are exorbitant, particularly relative to the benefits already reaped by lessees. Moreover, the existence of concrete measures to obtain the necessary information after the fact clearly indicates that the means to obtain it are known; simply the will to obtain it in time to do anything with it is lacking.

The Jonah Infill DEIS also fails to provide useable information regarding the efficacy of the mitigation measures it does rely upon (save for the acknowledgment that existing measures have already to date been unsuccessful in stemming sage grouse declines). “It is assumed that the application of identified mitigation and protection measures would reduce impact levels; however, the efficacy of many mitigations is unknown. Therefore, no quantitative variation in impact levels based upon the application of variable mitigations is provided.” DEIS at 4-2. Although NEPA and its implementing regulations certainly do not require quantitative certainty in all cases, this concession reflects the basic problem with BLM’s approach here. BLM is rushing ahead to authorize unique densities of development, without understanding the effect to which its standard mitigation measures can alleviate impacts even from lesser levels of development.

**d. The BLM’s Preferred Alternative Failed to Meet Plan Objectives or to Preserve Multiple Use of Resources on the Public Lands**

As BLM noted, governing federal and State land use plans establish, the following objectives for wildlife and fisheries:

“To maintain, improve, or enhance the biological diversity of all plant and wildlife species while ensuring healthy ecosystems;

To conserve and develop recreational resources for the benefit of present and future generations;

To consider wildlife migration corridors, crucial winter ranges, and other important habitats when evaluating land use proposals”

Jonah Infill DEIS at 4-75. The proposed action will confound each one of these objectives. By authorizing extreme levels of disturbance to sagebrush ecosystems, pronghorn migration corridors, and sage grouse crucial habitats, it will impair native ecosystems without any reliable guarantee of adequate reclamation, eliminate entirely a significant recreation resource for the foreseeable future, and fail entirely to ensure the viability of pronghorn migration corridors and important sage grouse habitats. This extreme level of impact implicates BLM’s duty to prevent unnecessary and undue degradation of the Jonah Field. *See* Section V., *supra*.

Presumably in response to the exceptionally high levels of negative environmental impact, and the exceptional profitability, of the Jonah Field, the fields operators have themselves proposed resources for compensatory (including off-site) mitigation of environmental impacts. “Operators have committed to various mitigation measures . . . and proposed to establish a Cumulative Impacts Mitigation Fund to mitigate potential adverse impacts in the JIDPA. While details are emerging, one form of financing the fund could be to deposit a particular dollar

amount for every acre of new initial surface disturbance in the JIDPA above a certain acreage threshold.” DEIS at 2-8. Although we are hesitant to endorse offsite mitigation as a cure-all for impacts that could otherwise reasonably be avoided, we recognize that, under certain circumstances, full exploitation of one resource (i.e., the gas resources underlying the Jonah Field) may result in unavoidable and excessive damage to other resources (here, wildlife habitat and recreational opportunity). Under such circumstances of extreme impact, WGFD recommendations expressly call for compensatory mitigation as a means of reducing net, if not onsite, impact. Where, as here, extreme impact thresholds for sage grouse are to be exceeded, WGFD recommends as follows:

Opportunities may exist to partially offset the loss of nesting and brood-rearing habitat by implementing habitat treatments in appropriate locations outside the well field. This type of mitigation is exceedingly difficult and expensive to accomplish effectively, and should not be looked upon as a prescriptive solution to authorize high-density well fields in important sage grouse habitat. The most effective strategy is to avoid high-density developments. Only if this is not reasonable, plan effective habitat treatments in locations that minimize the loss of habitat function for the grouse population affected by the field development.

Minimum Recommendations at 22 (emphasis added).

Inexplicably, however, BLM prefers to reject any concrete commitment of resources for compensatory mitigation. “In lieu of the proposed Cumulative Impacts Mitigation Fund, the BLM Preferred Alternative recommends that, where appropriate and consistent with BLM policy, Operators voluntarily seek BLM-approved CM projects aimed at alleviating on-site mitigation concerns.” DEIS at 2-31. Given the cost and complexity of effective offsite mitigation, a vague suggestion that operators may, at some undefined future point, voluntarily seek approval for undefined future measures, is no substitute whatsoever for a concrete commitment of resources to fund an independently-supervised compensatory mitigation fund.

### **VIII. BLM’s Preferred Alternative is Inconsistent With State Plans and Policies Regarding Wildlife**

FLPMA requires that BLM land use plans be consistent with officially approved resource-related plans of State, local, and tribal governments. 43 U.S.C. § 1702(c)(9); *see also* 43 C.F.R. § 1610.3-2. Site-specific actions, such as the Jonah Infill Drilling Project, must in turn be consistent with BLM land use plans. 43 U.S.C. § 1732(a); 43 C.F.R. § 1610.5-3(a). The Jonah Infill Drilling Project, however, is inconsistent with two important resource-related state policies.

First, the Jonah Infill Drilling Project, particularly without guaranteed compensatory mitigation, plainly violates Wyoming’s official “no net habitat loss policy.” It is the official policy of the Wyoming Game and Fish Commission that crucial habitat for wildlife species within the State should be managed to prevent “any loss of habitat function.” Wyoming Game and Fish Commission Policy No. VII H (April 28, 1998) at 138. Some modification of crucial habitat is permitted but only if “habitat function is maintained (i.e., the location, essential features, and species supported are unchanged).” As BLM acknowledges in the DEIS, identified

pronghorn migration corridors and essential sage grouse habitat will be significantly and adversely affected by the Jonah Infill project.

Second, the proposed Jonah Infill project is inconsistent in a great many respects with WGFD's recent Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands (Sept. 10, 2004) ("Minimum Recommendations").

WGFD's Minimum Recommendations, relying on extensive scientific literature and agency expertise, catalogue a number of crucial and important habitats, and establish three levels of impact thresholds (moderate, high, and extreme) based on the specific factors relevant to the functions of each type of crucial or important habitat. The Jonah Infill project will affect two important categories of priority habitat: (1) identified pronghorn migration corridors (DEIS at 3-56 to 3-57); and (2) sage grouse leks, nesting and brood-rearing complexes, and winter habitat (DEIS at 3-63, 3-67).

WGFD's Minimum Recommendations determine the "impact thresholds" for these habitats based on two "quantitative measures—density of well locations and cumulative acres of disturbance per section." Minimum Recommendations at 9. For sage grouse habitat, the "extreme impact" threshold is met by densities of greater than 16 wells, or 80 acres of disturbance, per 640-acre section. Although BLM's description of varying alternatives using different measures obscures direct comparison, it quickly becomes evident that the majority of the alternatives, including the BLM Preferred Alternative, fall well above the threshold for "extreme impact." Under the BLM Preferred Alternative, even the least-impacted of the three designated areas of impact, the "19% disturbance area," will see levels of direct disturbance of 118 acres/section—well above the 80-acre threshold for "extreme impact." DEIS at 2-22 to 2-24.

The DEIS was inconsistent with WGFD's recommendations in the following instances:

**a. Occupied Sage Grouse Habitats Generally**

WGFD recommends that new power lines be buried and that existing lines be retrofitted by being buried or by installing perch guards to prevent their use as raptor perches. Minimum Recommendations at 17. There does not appear to be a BLM practice responsive to this recommendation.

**b. Occupied Sage Grouse Leks**

WGFD recommends avoiding human and vehicular activity between 8:00 p.m. and 8:00 a.m. from March 1 through May 15 within a quarter mile of an occupied lek. Minimum Recommendations at 18. There does not appear to be a BLM practice responsive to this.

WGFD recommends that, in order to avoid disturbing auditory displays, anthropogenic sources of continuous or frequently intermittent noise should be limited from March 1 through May 15. Minimum Recommendations at 18. There is no BLM requirement on this matter. BLM, however, acknowledges that "[i]t is likely that noise already has contributed to the apparent decrease in wildlife use on and adjacent to the JIDPA (see Section 4.2.2.), with observed decreases in raptor nesting activity and productivity, male greater sage-grouse lek attendance and sage-grouse nesting within the

JIDPA having been reported over the past several years (TRC Mariah 1999, 2001a, 2001b, 2002, 2004a). Data also suggest that noise may contribute to disturbance and/or departure of greater sage—grouse from area leks.”) DEIS at 4-63.

### **c. Sage Grouse Nesting and Early Brood Rearing Habitats**

WGFD recommends limiting, to the extent reasonable, anthropogenic sources of continuous or frequently intermittent noise from March 15 to July 15. Again, BLM does not directly address noise limitations.

WGFD recommends avoiding surface disturbing activities and geophysical surveys in nesting and early brood-rearing habitat (within or without a two-mile buffer surrounding a lek) from March 15 through July 15. Minimum Recommendations at 18. Operators would “avoid optimal greater sage-grouse nesting habitats, where practical.” DEIS, Appendix B, at B-16. Table A.3 indicates a standard stipulation of “no surface-disturbing activity” within suitable nesting habitat or within a two-mile buffer surrounding a lek. DEIS, Appendix A, at A-11. However, “[g]iven the noted decline in greater sage-grouse use of the JIDPA, existing protection measures within the JIDPA appear to be inadequate.” DEIS at 3-67.

Similarly, the WGFD recommends that sites for construction be selected such that they will not disturb “suitable nest cover or brood-rearing habitats” within two miles of an occupied lek, or identified nesting and brood-rearing habitats outside of the two mile perimeter. The BLM does not mention construction sites specifically, and BLM’s two-mile timing restriction for initial construction fails to protect disturbance of nest cover or brood-rearing habitat from destruction by construction during periods not covered by the timing stipulation.

### **d. Sage Grouse Winter Habitat**

WGFD recommends avoiding placement of well pads, roads and other well field facilities on mapped winter habitats, or within a 200 meter buffer surrounding such habitat. Human and equipment activity is to be avoided in and within 200 meters of such habitat between November 15 and March 14. Minimum Recommendations at 19. Table A.3 indicates a restriction of “no surface-disturbing activity” from November 15 to March 14 *within* identified winter habitat. DEIS at A-11. No mention is made of a buffer.

### **e. BLM failed to include additional prescriptions based upon impact thresholds reached in sage-grouse habitats**

The WGFD also provides additional prescriptions depending upon the impact threshold reached in a habitat area. We focus here on the prescriptions specified for “highly” and “extremely” impacted areas of sage-grouse habitat, including leks and their two-mile buffers and nesting and brood-rearing habitat outside of the two-mile buffer zone. These prescriptions do not apply to winter habitat, because there is a blanket prohibition on wells et al. in or within 200 meters of such habitat, regardless of impact threshold. In “high impact” areas, the WGFD additionally recommends:

- Directional drilling, to the extent reasonable, in order to reduce the density of well locations and roads and associated activity. Minimum Recommendations at 20. In the DEIS, operators commit to “utilize directional drilling to access resources beneath the 0.25-mile active greater sage-grouse lek buffers if reserves beneath these locations are deemed economic” and to “utilize directional drilling to access resources beneath the 600-ft wide (or tall sagebrush-dominated) buffer associated with the Sand Draw protection areas if deemed economic.” DEIS at B-16 (emphasis added). These operator-committed practices thus seem to be radically more limited than being applied “to the extent reasonable.” They do not commit operators to utilizing directional drilling within the two mile buffer zone surrounding leks.
- Clustered development, by locating well pads, facilities and roads together in the least sensitive areas. Minimum Recommendations at 20. The EIS does not appear to address such “clustered development,” except to say vaguely that operators are committed to locate and design well pads, roads, pipelines and other facilities “to minimize disturbances to areas of high wildlife habitat value.” DEIS at B-11.
- Condensate removal. The Minimum Recommendations, at 20, recommend removal of condensate by piping, rather than trucking offsite, and provides recommendations for timing of truck traffic, if necessary, within sage grouse habitat. The DEIS does not appear to address these recommendations at all.
- Remote monitoring in order to cut down on travel by persons and vehicles for the purpose of manually inspecting and reading instruments. Minimum Recommendations at 20. The DEIS fails to address remote monitoring.
- Development of a travel plan that minimizes frequency of trips on well field roads. Minimum Recommendations at 20. The DEIS fails to provide for such a travel plan.
- Gating and closing of all newly constructed roads to public travel. Minimum Recommendations at 20. This does not appear to be addressed in the EIS.

The WGFD also recommends as a kind of “worst-case” alternative the use of the kind of off-site mitigation measures and development of a mitigation trust account discussed briefly in the DEIS but rejected, without explanation, by BLM.

In “extreme impact” areas, the WGFD recommends, in addition to all of the management practices and mitigation prescriptions applicable to “high impact” areas, the following measures:

- Developing well fields in smaller, incremental phases.
- Implementing habitat treatments outside the well field.

It is with regard to these two key recommendations for ameliorating the effects of extreme impact that the Jonah Infill DEIS, as discussed above, fails most glaringly short of state policies. Contrary to WGFD recommendations, the BLM does not consider any type of phased or incremental development for the field in its alternatives, and its preferred alternative inexplicably rejects any commitment of resources that would ensure beneficial habitat preservation or treatment outside the affected well field.

**f. Big Game Migration Corridors**

The WGFD recommends that for migration corridors of less than half a mile in width, there should be “no surface occupancy,” while for broader migration corridors, further constriction should be avoided and well-field density should not exceed four well locations per section. Minimum Recommendations at 23. No plan in the EIS contemplates density of less than 16 wells per section. The EIS is evasive on the degree to which the pronghorn migration corridor in the JIDPA might be affected. The EIS notes that the corridor is greater than a mile wide and contends it will not be disturbed. DEIS at 4-83. However, it also says in the same section that movements of pronghorn through the JIDPA “are likely to be hindered under most, if not all, of the development alternatives.” *Id.* In plain fact, the BLM simply lacks adequate scientific data to determine with any certainty the probable effect on migration corridors, and is simply embarking on an uncontrolled, unmonitored experiment on the existing pronghorn population.

We strongly urge BLM, prior to approving any further drilling within the already heavily-impacted Jonah Field, to work closely with WGFD as well as other interested parties to incorporate, to the maximum extent possible, all WGFD recommendations for preventing or, where necessary, alleviating impacts to high-value habitats such as pronghorn migration corridors and sage grouse essential habitats. Only by actively and fully implementing these measures, including compensatory mitigation as well as practices within the field, can BLM avoid inconsistency with state policy and unnecessary and undue degradation of federal resources.

**IX. BLM’s Analysis Concerning Reductions in Recoverable Reserves due to Directional Drilling is Flawed<sup>3</sup>**

A stated BLM objective concerning the further development of the Jonah Field is to “optimize natural gas recovery”. Public presentation by BLM staff, Carol Kruse, Pinedale, 3/23/05. To the degree that any of the Alternatives analyzed in the Draft EIS are shown to have a significant negative impact on gas recovery, they will be considered undesirable from the standpoint of this objective.

The Draft EIS recognizes that the use of directional drilling in the Jonah Field will reduce the amount of new ground disturbance required by EnCana’s Proposed Action by as much as 80%.<sup>4</sup> DEIS, page 2-33, Table 2.12. However, based largely on “information” provided by

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<sup>3</sup> See also attached slides.

<sup>4</sup> To determine the amount of “new” disturbance for any Alternative, subtract the “No Action” surface disturbance from the surface disturbance stated for the Alternative of interest.

EnCana, the Draft EIS also concludes that directional drilling will have a significant negative impact on natural gas recovery in the Jonah Field. The Draft EIS concludes that each of the Alternatives evaluated will result in “Unrecovered (Gas) Volumes” proportional to the percentage of directional wells. Appendix G, page 14, Table 2.3.

The Draft EIS cites two factors that cause directional drilling to reduce recoverable reserves:

**Factor #1** – Production from the lower 1,000 feet of the Lance formation will be lost on 10% of the directional wells because those wells will not reach their planned total depth.

**Factor #2** – An unspecified number of the 3,100 planned wells assumed to be in the “lower EUR / Well population”<sup>5</sup> will remain “undeveloped” because the incremental costs of directional drilling will make them “uneconomic”. Appendix G, page 14, Table 2.3, footnote #3.

It is impossible that these two factors could cause the “Unrecovered Gas Volumes” claimed in the Draft EIS. This fact will be clearly demonstrated in the following sections with analysis that incorporates comparisons between Encana’s Proposed Action and Alternative E.

The Draft EIS Alternative E will permit EnCana to drill all their planned wells from well pads spaced 40 acres apart. Alternative E will reduce new surface disturbance that would result from EnCana’s proposed action by over 60%. Jonah Infill Drilling Project Evaluation of Directional Drilling. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc. at 10. Under Alternative E, approximately 95% of the future wells will be directionally drilled.

The Draft EIS erroneously concludes that the gas recovery from all future wells drilled under Alternative E will be 36% less than from all future wells drilled under EnCana’s Proposed Action.<sup>6</sup> DEIS, page 2-33, Table 2.12

#### **a. Analysis of Factor #1**

The basis of Factor #1 is the assumption that 10% of all directional wells that might be drilled as part of the Jonah Infill Drilling Project (JIDP) will be unsuccessful in setting production casing at a depth that is within 1,000 feet of the planned total depth of the well. This assumption is contrary to the overwhelming experience of the oil and gas industry, and is presented in the Draft EIS without supporting documentation<sup>7</sup>. However, for the sake of demonstrating the gross errors in the Draft EIS conclusions regarding the impact of directional drilling on recoverable gas reserves, we will assume here that the underlying assumptions of Factor # 1 are reasonable.

Within the Jonah Field, the depth of the top of the Lance Formation (which is the formation containing the gas), ranges from 3,200 ft. to 5,100 ft. Jonah Infill Drilling Project

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<sup>5</sup> Jonah Infill Drilling Project Evaluation of Directional Drilling at 10. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc.

<sup>6</sup> To determine the gas recovery from future JIDP infill wells, for any Alternative, subtract the “No Action” gas recovery from the gas recovery stated for the Alternative of interest.

<sup>7</sup> The casing stuck off bottom scenario is discussed (and misrepresented) in pgs.19 and 20, Jonah Infill Drilling Project Evaluation of Directional Drilling. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc. Here, it states that on 30% of the directional wells drilled in Jonah to date, casing was set high by an average of 124 feet. Any analysis of the effect of this problem on recoverable reserves must also quantify the frequency with which the problem occurs on vertical wells. The referenced report concludes erroneously that setting casing 124 feet high will result in loss of production from the lower 275 feet of Lance.

Evaluation of Directional Drilling. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc. at 8. Therefore, the average thickness of the Lance is 4,150 ft.

If the loss of recoverable reserves was directly proportional to the ratio of the thickness of the Lance Formation lost on the 10% of the wells assumed to be impacted by Factor #1 (1,000 ft.) to the total average thickness of the Lance (4,150 ft.), then the expected loss would be 24.1% of the resources on 10% of the directional wells.

$$1,000 / 4150 = 24.1\%$$

The actual loss is somewhat greater however. This is because the amount of gas per foot of Lance Formation increases with depth. This happens because pressure in the formation increases with depth and natural gas is compressible. Therefore, losing production from the lowest 1,000 feet of Lance Formation is more detrimental than losing 1,000 ft. of production higher in the formation.

Using Jonah formation pressure data from a document that is referenced by the BLM in the Draft EIS, basic engineering calculations were used to estimate the effect of Lance formation pressure on recoverable gas volumes. Jonah Infill Drilling Project Evaluation of Directional Drilling. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc. at 17. These calculations indicate the actual loss of recoverable reserves to be approximately 44% per well on the 10% of the directional wells assumed to be subject to Factor #1.

In conclusion, if 95% of the future wells in Jonah were directionally drilled (as in Alternative E), and if 10% of those directional wells experienced a loss of 44%, the overall loss of the entire Jonah Infill Drilling Project due to Factor #1 would be 4.2% of the recoverable reserves that would otherwise be recovered under EnCana's Proposed Action.

$$44\% \times 10\% \times 95\% = 4.2\%$$

A report authored by an EnCana consultant and referenced in the Draft EIS recognizes that when casing is stuck off bottom, remedial actions can be taken that will allow much of the otherwise lost gas to be recovered. Jonah Infill Drilling Project Evaluation of Directional Drilling. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc. at 19. Although the report concludes that these remedial actions may not be economically feasible in all cases, it is reasonable to assume that the remedial actions would be taken on a significant percentage of the wells subject to Factor #1. Therefore, even assuming that the underlying assumptions of Factor #1 are reasonable, but as noted they are highly suspect, it is likely that the actual losses would be significantly less than 4.2%.

#### **b. Factor #1 Conclusion**

The Draft EIS projects that gas recovery from future wells drilled under Alternative E will be 36% less than under EnCana's Proposed Action. The analysis just presented demonstrates that a loss of no more than 4.2% can be attributed to Factor #1.

$$36\% - 4.2\% = 31.8\%$$

The remaining 31.8 % loss of gas reserves projected by the Draft EIS under Alternative E must be attributed to Factor #2.

#### **c. Analysis of Factor #2**

The analysis of Factor #2 will involve the investigation of two questions:

**Question #1** – In order to produce a 31.8% reduction in recoverable gas reserves, what percentage of the vertical wells planned under EnCana’s Proposed Action would be assumed to become uneconomical under the directional drilling requirements of Alternative E?

**Question #2** – Given the economics of the Jonah Field, is the answer to Question #1 reasonable, or even possible?

**d. Investigation of Question #1 related to Factor #2**

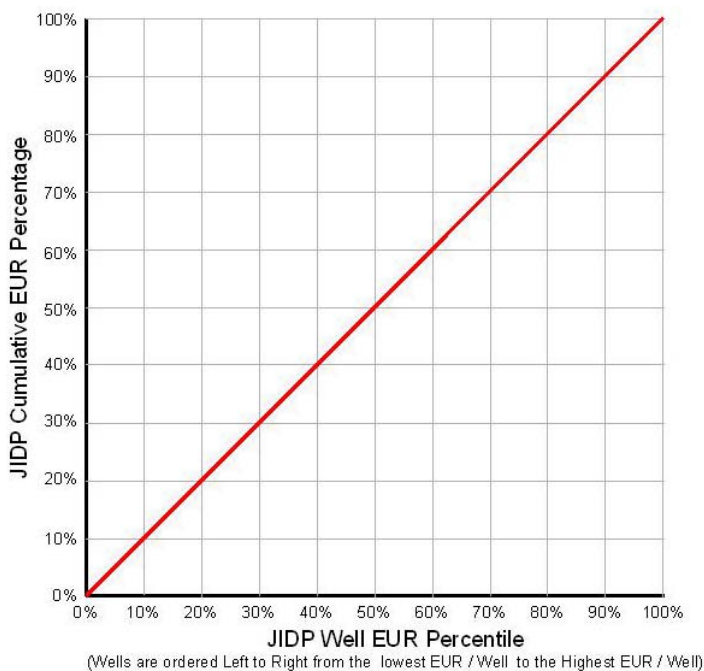
To answer Question #1, it is necessary to estimate how the overall population of future wells will contribute to the total gas recovery from the Jonah Infill Drilling Project (JIDP).

The amount of gas that a well is expected to produce throughout its lifetime is called the well’s Expected Ultimate Recovery or “EUR”. The Draft EIS projects that the total EUR from all future wells drilled under EnCana’s Proposed Action is 4,581 BCF<sup>8</sup>. DEIS at 2-33, Table 2.12. Assuming that this production will come from 3,100 wells (EnCana’s projected maximum number of wells), the average well EUR under the Proposed Action is 1.477 BCF / well.

$$\text{Average JIDP well EUR (Proposed Action)} = 4,581 \text{ BCF} / 3,100 \text{ wells} = 1.477 \text{ BCF/ well}$$

When infill drilling within an oil or gas field, a wide range of well performance can be expected. However, most wells will have EUR’s that are relatively close to the average EUR. Relatively few wells will have EUR’s that are either significantly higher or significantly lower than the average EUR.

To answer Question #1, a graph was made of “JIDP Well EUR Percentile” versus “JIDP Cumulative EUR Percentage”. To create this graph, all the JIDP wells were ordered according to their Expected Ultimate Recovery. If a well has EUR Percentile of 72.6%, that means its EUR is greater than 72.6% of all the wells.

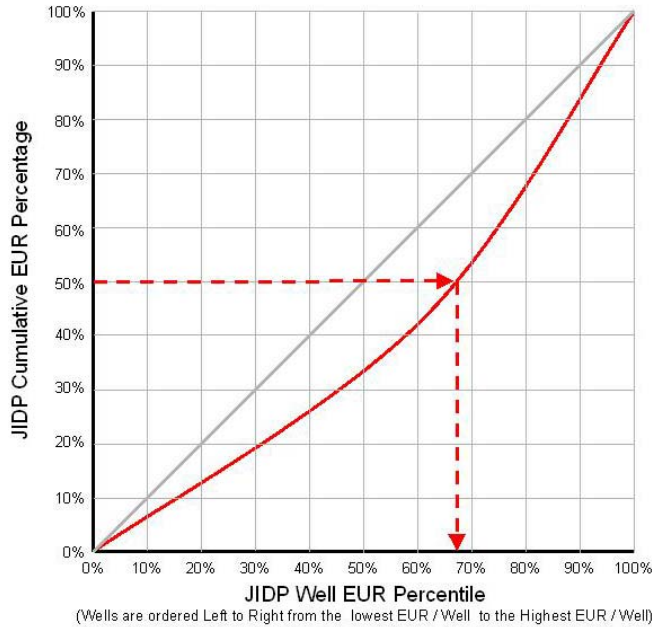


If all the JIDP wells had EUR’s that were nearly equal, then the wells in lowest 10 percentile (i.e. 0% to 10%) would contribute nearly the same percentage to the “JIDP Cumulative EUR” as the wells in the highest 10 percentile (i.e. 90% to 100%), and the graph would resemble a straight line as shown in **Figure 1**.

Figure 1

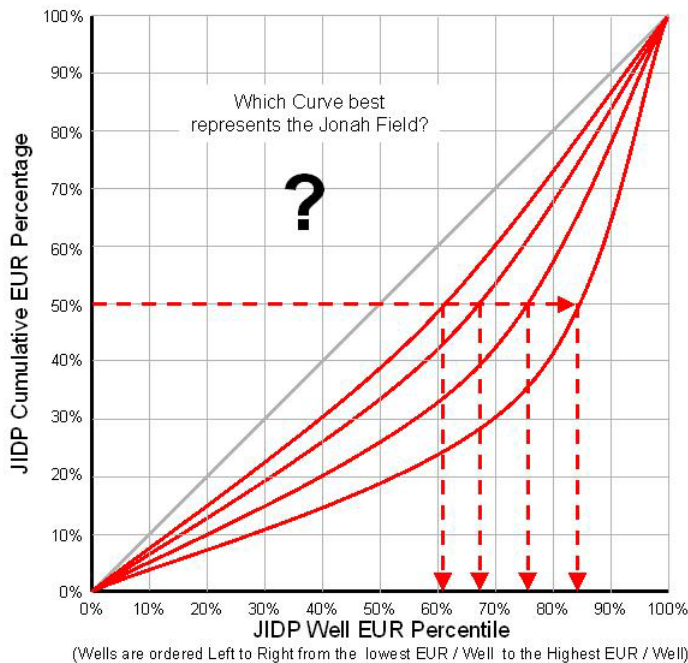
<sup>8</sup> To determine the gas recovery from future JIDP infill wells, for any Alternative, subtract the “No Action” gas recovery from the gas recovery stated for the Alternative of interest.

However, as discussed above, the JIDP wells can be expected to have a wide range of EUR's. Therefore, a curve with a shape similar to the one shown in Figure 2 is more realistic.



The curve in **Figure 2** represents the case where the lowest performing two thirds (i.e. 66 percentile and lower) of the well population is contributing only 50% of the total JIDP gas recovery.

Figure 2



Because the Draft EIS does not contain sufficient information to support its conclusions, an educated guess must be made as to the exact shape of the curve that best represents the expected EUR performance from the JIDP wells under EnCana's Proposed Action.<sup>9</sup> This uncertainty is illustrated by **Figure 3**.

Figure 3

<sup>9</sup> No analysis can be made concerning the effect of well economics on recoverable reserves without analyzing the range of well EUR's in a manner similar to the one presented here. However, no evidence of such an analysis is presented in the DEIS.

This analysis will assume that the most representative curve is the one shown in Figure 1. The answer to Question #1 can now be determined by reading the graph as shown in **Figure 4**.

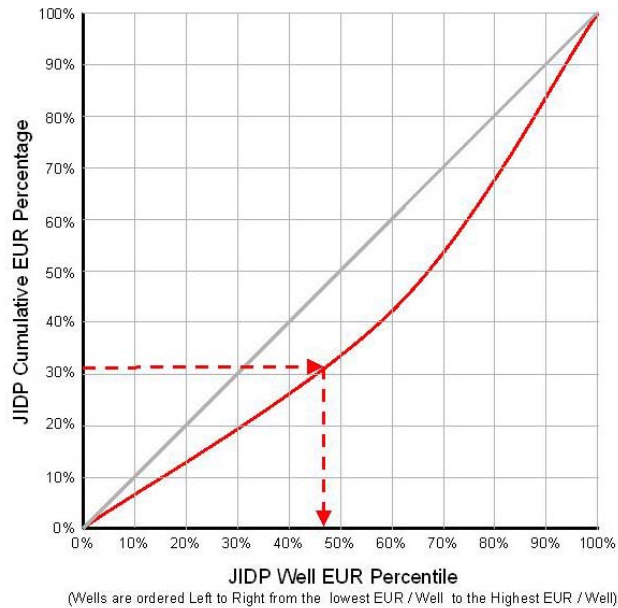


Figure 4

**e. Answer to Question #1 related to Factor #2**

In order to produce the 31.8% reduction in recoverable gas reserves, approximately 47% of the vertical wells planned under EnCana’s Proposed Action would have to be assumed to become uneconomical under the directional drilling requirements of Alternative E.

**f. Investigation of Question #2 related to Factor #2**

Question #2 can now be restated to be more specific:

*“Given the economics of the Jonah Field, is it reasonable, or even possible, that approximately 47% of the wells planned under EnCana’s Proposed Action could be assumed uneconomic if subjected to the directional drilling requirements of Alternative E?”*

To answer Question #2, it is necessary to evaluate the economics of the Jonah Infill Drilling Project. The project economics were evaluated for two scenarios using cost data provided in the Draft EIS:

- 1.) EnCana’s Proposed Action
- 2.) Alternative E

These evaluations are summarized in Table 1 and Table 2 respectively. See *infra* at 34-35.

To the degree possible, the economic evaluations are based on the assumptions or data provided in the Draft EIS. DEIS at 411, 412; Tables 4.12, 4.13. The evaluations indicate that the vertical average well profitability under EnCana’s Proposed Action will be approximately \$4.5 million per well. If the wells are drilled directionally in accordance with Alternative E, the average well profitability is predicted to be approximately \$4.0 million per well.

The predicted difference in well profitability between the two scenarios is approximately \$500,000 per well. Therefore, if a vertical well to be drilled under EnCana's Proposed Action was predicted to produce a profit margin of \$500,000 or less, then it would also be predicted to be "uneconomical" if subjected to the directional drilling requirements of Alternative E.

Based upon the results of the economic analysis, Question #2 can be restated once again:

*"Given that the average well profitability under EnCana's Proposed Action is approximately \$4.5 million, is it reasonable, or even possible, that approximately 47% of the wells could have a profit margin of \$500,000 or less?"*

Although the average profitability of wells drilled under EnCana's Proposed Action is estimated to be approximately \$4.5 million, the profitability of individual wells will fall within a range that is centered on this average number. The range of well profitability results from varying gas recovery per well and differences in costs incurred in drilling and completing each well. Most wells will produce a profit that is relatively close to the estimated average well profit. Relatively few wells will have profits that are either significantly higher or significantly lower than the average well profit. This distribution of well profitability is illustrated by **Figure 5**.

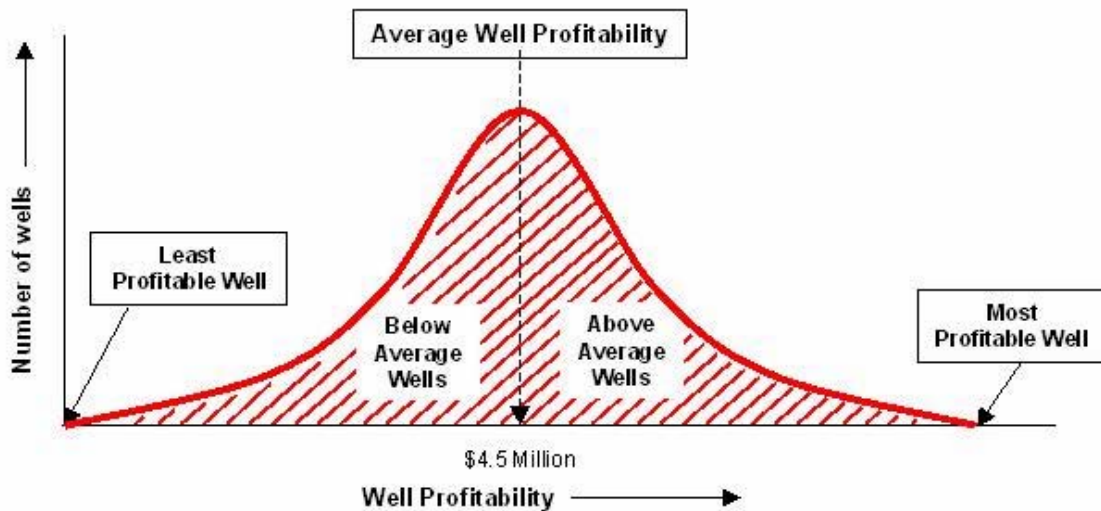


Figure 5  
Distribution of Individual Well Profitability under EnCana's Proposed Action

Given this normal distribution of well profitability, only a very small percentage of the wells drilled under EnCana's Proposed Action could be expected to have a profitability of \$500,000 or less. The probability of any given well having a profitability equal to, or less than, a particular dollar amount is proportional to the ratio of the area under the curve and left of the dollar amount

to the total area under the curve. In Figure 6, it can be seen that the shaded area to the left of \$500,000 is very small in relation to the total area under the curve.

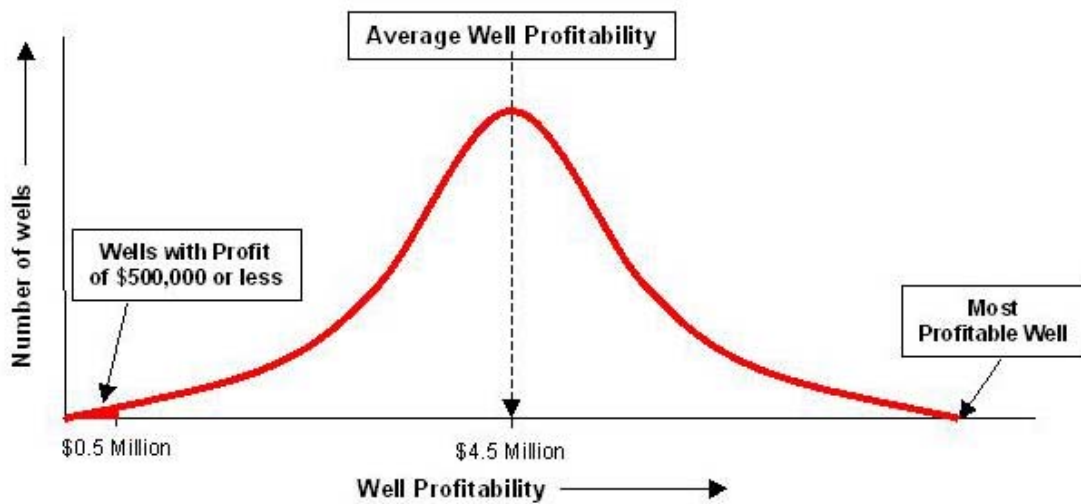


Figure 6

**g. Answer to Question #2 related to Factor #2**

It is statistically impossible that more than a couple percent of the wells planned under EnCana's Proposed Action could be expected to have a profit margin of \$500,000 or less.

**h. Factor #2 Conclusion**

No more than about 2% of the 3,100 wells planned under EnCana's Proposed Action can be reasonably projected to have a profit margin low enough (\$500,000 or less) to cause them to become uneconomical under the directional drilling requirements of Alternative E. Because these uneconomical wells will be from the "lower EUR / well population", the resulting loss of gas reserves will be even less than 2%. Jonah Infill Drilling Project Evaluation of Directional Drilling. Prepared for EnCana Oil and Gas (U.S.A.) Inc., by Reservoir Management Services Inc. at 10.

**i. Over-all conclusion regarding recoverable resources**

This analysis demonstrated the following facts:

- 1.) The DEIS conclusions concerning reductions in recoverable reserves due to directional drilling are grossly inaccurate.
- 2.) The DEIS claim that two factors (a frequent inability to drill and case the lower 1,000 feet of Lance formation and well economics) will cause Alternative E to lose 36% of the gas reserves that would otherwise be recoverable under EnCana's "Proposed Action" is statistically impossible.
- 3.) In no case could these two factors result in a loss of more than about 6.5% and even that number is a significant stretch.
- 4.) Because BLM has a responsibility to take "any" action necessary to prevent unnecessary or undue degradation of the public lands, and since the public lands will clearly be severely degraded under BLM's preferred alternative, and since Encana and other operators in the

JIDPA will reap very large profits from their operations even if directional drilling is used, BLM must require and maximize the use of directional drilling in the JIDPA so as to meet its duties under the FLPMA.

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The BLM must take into account the comments described above in order to comply with NEPA. To correct these problems, we request that BLM supplement the DEIS. We request that no further drilling be approved by the BLM for the Jonah Field during this period of analysis.

Sincerely,

Marisa Martin, on behalf of Wyoming Outdoor Council

Bruce Pendery, Staff Attorney and Public Lands Director  
Wyoming Outdoor Council

Lauren McKeever  
Upper Green River Valley Coalition

Lloyd Dorsey, Wyoming Representative  
Greater Yellowstone Coalition

Tom Darin, Public Lands Director  
Jackson Hole Conservation Alliance

Michael Saul, Associate Counsel  
National Wildlife Federation

Peter Aengst, Northern Rockies Associate  
The Wilderness Society

Erin Robertson, Staff Biologist  
Center for Native Ecosystems

**Table 1**  
**Jonah Infill Drilling Project**  
**Economic Evaluation<sup>1</sup> under EnCana's Proposed Action**

	Total JIDP under Proposed Action	Average Well under Proposed Action (assuming 3100 wells)	Draft EIS Reference or Assumptions
<b>Income</b>			
Gross Natural Gas Production	4,581 BCF	1.477 BCF	Table 2.12 (7947 BCF - 3,366 BCF= 4,581 BCF)
Net Natural Gas Production (after Royalty)	4,008 BCF	1.293 BCF	12.5% Federal Royalty
Gross Condensate Production	44 million bbls	14,194 bbl	Table 2.12 (76 mmbbls - 32 mmbbls = 44 mmbbls)
Net Condensate Production (after Royalty)	38.5 million bbls	12,419 bbl	12.5% Federal Royalty
Natural Gas Income	\$23.807 Billion	\$7,679,677	Assumed \$5.40 / mmbtu and 1.1 mmbtu/mcf (\$1 less than current Opal prices)
Condensate Income	\$1.540 Billion	\$496,774	Assumed \$40.00 per Barrel (\$15 less than current prices)
<b>Total Income</b>	<b>\$25,347,000,000</b>	<b>\$8,176,452</b>	
<b>Direct Costs (Vertical Well)</b>			
Drilling	\$2,026,079,400 <sup>2</sup>	\$653,574 <sup>2</sup>	Table 4.13
Completion	\$4,752,641,000	\$1,533,110	Table 4.13
<b>Total Direct Costs</b>	<b>\$6,778,720,400</b>	<b>\$2,186,684</b>	
<b>Production Costs</b>			
\$.32 per mcf	<b>\$1,282,560,000</b>	<b>\$413,729</b>	From Table 4.12 (includes the cost of producing the associated condensate)
<b>Plug, Abandon &amp; Reclamation</b>			
Plug and abandon well	<b>\$93,000,000</b>	<b>\$30,000</b>	Plug, Abandon & Reclamation costs are estimated - no costs provided in the DEIS
Land surface reclamation	<b>\$162,000,000</b>	<b>\$52,258</b>	Esitimated at \$10,000 per acre of new disturbance (16,200 acres under "Proposed Action" <sup>3</sup> )
<b>Taxes &amp; Royalties</b>			
Wyoming Mineral Severance Tax	<b>\$1,520,820,000</b>	<b>\$490,645</b>	6 % of Production Value (net of Royalties)
Sublette County Property Tax	<b>\$1,495,473,000</b>	<b>\$482,258</b>	5.9% of Production Value (net of Royalties)
<b>Net Earnings Before Income Tax</b>	<b>\$14,014,426,600</b>	<b>\$4,520,783</b>	

**Notes:**

- 1 Using Draft EIS data for production volumes, new surface disturbance acreage, and drilling, completion and production costs
- 2 Assumed "Conventional Well" (i.e. "vertical well") drilling cost from Draft EIS Table 4.13
- 3 From Table 2.12 (Proposed Action Disturbance Acreage minus No Action Disturbance Acreage)

**Table 2**  
**Jonah Infill Drilling Project**  
**Economic Evaluation<sup>1</sup> under Alternative E**

	Total JIDP under Alternative E	Average Well under Alternative E (assuming 3100 wells)	DEIS Reference or Assumptions
<b>Income</b>			
Gross Natural Gas Production	4,389 BCF	1.416 BCF	Assumes that Production is decreased by 4.2% due to "Factor #1" <sup>2</sup>
Net Natural Gas Production (after Royalty)	3,840 BCF	1,239 BCF	12.5% Federal Royalty
Gross Condensate Production	42.2 million bbls	13,613 bbl	Assumes that Production is decreased by 4.2% due to "Factor #1" <sup>2</sup>
Net Condensate Production (after Royalty)	36.9 million bbls	11,903 bbl	12.5% Federal Royalty
Natural Gas Income	\$22,800 Billion	\$7,354,839	Assumed \$5.40 / mmbtu and 1.1 mmbtu/mcf (\$1 less than current Opal prices)
Condensate Income	\$1.476 Billion	\$476,129	Assumed \$40.00 per Barrel (\$15 less than current prices)
<b>Total Income</b>	<b>\$24,276,000,000</b>	<b>\$7,830,968</b>	
<b>Direct Costs (Directional Well)</b>			
Drilling	\$2,781,270,400 <sup>3</sup>	\$897,184 <sup>3</sup>	Table 4.13
Completion	\$4,752,641,000	\$1,533,110	Table 4.13
<b>Total Direct Costs</b>	<b>\$7,533,911,400</b>	<b>\$2,430,294</b>	
<b>Production Costs</b>			
\$.32 per mcf	<b>\$1,228,800,000</b>	<b>\$396,387</b>	From Table 4.12 (includes the cost of producing the associated condensate)
<b>Plug, Abandon &amp; Reclamation</b>			
Plug and abandon well	<b>\$93,000,000</b>	<b>\$30,000</b>	Plug, Abandon & Reclamation costs are estimated - no costs provided in the DEIS
Land surface reclamation	<b>\$63,860,000</b>	<b>\$20,600</b>	Estimated at \$10,000 per acre of new disturbance (6,386 acres under Alternative E <sup>4</sup> )
<b>Taxes &amp; Royalties</b>			
Wyoming Mineral Severance Tax	<b>\$1,456,560,000</b>	<b>\$469,858</b>	6 % of Production Value (net of Royalties)
Sublette County Property Tax	<b>\$1,432,284,000</b>	<b>\$462,027</b>	5.9% of Production Value (net of Royalties)
<b>Net Earnings Before Income Tax</b>	<b>\$12,467,584,600</b>	<b>\$4,021,802</b>	

**Notes:**

1 Using Draft EIS data for new surface disturbance acreage, and drilling, completion and production costs

2 Decrease is relative to the "Proposed Action" production. "Factor #1" is based on the unsubstantiated Draft EIS assumption that 10% of all directional wells will lose production from the lower 1,000 ft. of Lance formation

3 Assumed "Directional Well" drilling cost from Draft EIS Table 4.13

4 From Table 2.12 (Alternative E Disturbance Acreage minus No Action Disturbance Acreage)