



World Class Gas Play and Wildlife – Finding a Balance

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Abstract

The Rocky Mountain region is home to one of the fastest growing natural gas developments in the United States. The Rockies are also home to wildlife ranging from mule deer and antelope to sage grouse. Questar Exploration & Production operates a field in northwestern Wyoming that lies entirely within protected winter range habitat for mule deer as well as sage grouse breeding areas. These areas can be off limits for drilling and completion activities for over eight months per year depending on weather conditions and nesting patterns.

Because of these restrictions, Questar rig counts can vary from no rigs in the winter to 15 rigs during the summer while drilling wells to measured depths of 14,500' in over-pressured, directional wellbores. Questar, with input from the local community and regulatory agencies, has developed a year-round drilling plan to minimize the long term impact to wildlife while reducing the current cyclical employment swings in the local community. The proposal includes tracking deer migration patterns with GPS, allowing regulatory agencies to determine winter drilling locations, designing multiple-rig pads, and performing flareless completions.

This proposal has been chronicled in the national television media and in major newspapers including the LA Times and Wall Street Journal. This paper will illustrate the process Questar undertook in an effort to gain year round access to drill in this severely restricted area.

Introduction

Questar Exploration & Production (QEP) operates a portion of a gas field that is located primarily on Bureau of Land Management (BLM) acreage outside of the town of Pinedale, WY known as the Pinedale Anticline. Within the Pinedale Anticline is an area known as "the Mesa" which serves as a migration route for antelope, a wintering area for mule deer herds, and a nesting and breeding area for sage grouse. QEP's Pinedale acreage falls entirely on this Mesa. Reserves on the Pinedale Anticline have been estimated at greater than 20 TCF.

The BLM stipulated several years ago that winter access to the Mesa would be restricted due to the mule deer wintering patterns and that no activities would occur there each year from November 15 until May 1.

Additionally, sage grouse activity restrictions begin March 1 each year and can continue until July 31. There are also potential restrictions related to plover from April 15 through July 15 though none have been seen on QEP acreage.

The results of this restricted access have included an annual "boom and bust" cycle for the energy industry and the local communities, inefficiencies and associated higher costs to drill and complete wells, and concerns related to training and safety of industry personnel.

QEP utilized the following process to attempt to gain year round access to the Mesa. One of the first steps was to dedicate personnel and monetary resources to identifying concerns for the Company, regulatory agencies and the local community relating to restricted access versus year round operations. This effort began in 2001 when QEP first requested and was denied a single winter drilling pad.

As issues and concerns for all affected parties were identified, QEP developed a detailed mitigation plan designed to reduce or maintain the net impact of year round drilling versus the restricted, seasonal access. The mitigation plan was developed in 2003.

Finally, QEP embarked on an aggressive campaign which engaged groups as diverse as local governmental agencies, civic organizations, conservation groups, the local community and the media to discuss the specific components of the proposed plan. The plan was formally proposed to the BLM in April 2004.

Defining the Concerns

The keys to defining the concerns of all affected parties were to first identify these parties and then to engage them in a meaningful dialog. The affected parties included governmental agencies at the local, state and federal levels. They also included conservation groups that the energy industry historically has not engaged as well as civic organizations and individuals.

Company concerns related to the restricted access to this acreage included manpower and equipment shortages, safety of the operation, and the distinct inefficiencies of training new personnel annually on downhole operations. The QEP Pinedale drilling program encompasses S-Curve directional drilling in a multi-well, multi-rig pad environment, invert mud systems, and over-pressured reservoirs approaching 17

ppg reservoir pressure.

Many of these concerns came to fruition during the summer of 2004 when the QEP rig count went from one rig over the winter to 15 rigs during the summer in order to drill just 30 wells. QEP struggled to source these rigs during an industry-wide "boom" which resulted in one-third of these rigs coming out of yard refurbishments with no active crews. Stability and training of crews was a worry throughout the drilling season. Active rigs drilled their wells an average of nearly 13 days faster than rigs that came out of yard refurbishments.

Community/regulatory concerns with proposed year round drilling included surface disturbances for well pads which would temporarily reduce vegetation areas for wildlife, a fear of overall disruption of wildlife during the harsh winter months, increased noise during sage grouse strutting in early spring and increased winter time emissions.

Community concerns related to operating within the current seasonal restrictions included increased summer traffic and dust during the peak of tourist season, visual impacts of well pads and associated equipment, and strains on the local infrastructure (hotels and restaurants) due to seasonal operations.

Developing a Mitigation Plan

With the primary concerns identified, QEP developed a detailed year round drilling proposal to mitigate those issues. It should be noted that the QEP winter drilling proposal was a site specific solution which may or may not apply to other areas.

Regarding the concern over surface disturbances, QEP proposed to develop the field with expansions to many existing pads plus only nine new well pads versus the 98 additional well pads which are allowed based on the EIS. This will be accomplished by utilizing directional drilling off multi-well pads in a manner more normally seen with an offshore program. Self-skidding rigs with an umbilical system will also be utilized in order to place well surface locations in non-conventional positions.

QEP also gained approval in 2004 to reduce well spacing from 40 to 20 acres now (before most of the 40 acre wells are drilled) so that all of these wells can be included in the planning for surface locations. Since only 75 wells have been drilled thus far out of a possible 430 BHLs, this proposal will have an immediate impact on pad and well design as well as surface disturbances.

To address the concern of disruption of wildlife, QEP volunteered to continue funding its Deer Study in conjunction with the Wyoming Game & Fish Department and the University of Wyoming. This study has tracked deer migration patterns with GPS over the winter in relation to the single drilling pad exception that QEP had been granted in 2002 and 2003. This is a long term study designed to determine if winter drilling impacts the deer population level. Preliminary findings support QEP's proposal of reducing the development footprint to

maximize habitat. QEP also volunteered to allow regulatory agencies to determine its winter drilling locations to minimize the effects on wildlife.

QEP committed to build pipelines for condensate and produced water to minimize year round trucking of liquids coming off the Mesa. These pipelines will eliminate approximately 25,500 tanker trips per year at the peak of QEP's production which is estimated to be in 2008 or 2009. Installing these pipelines will also eliminate the need for tanks on locations thereby reducing visual impact as well as reducing NOx emissions from production equipment by 40% per well. QEP experimented with flareless completions over the 2003 and 2004 seasons and has committed to continue that process which will further reduce both emissions and visual impacts.

If granted winter drilling, QEP also pledged to bus in rig crews over the winter which would further reduce traffic and wildlife disruption. Traffic will be avoided near active sage grouse strutting areas from 8PM until 8AM which will result in modified crew change times for the rigs.

Incorporating all of these mitigating items, QEP submitted the following winter drilling proposal in April 2004: three well pads with two rigs each per winter, extensive use of directional drilling, installation of two liquids pipelines, funding of habitat improvements and accelerated reclamation of well pads and pits.

Consensus Building

QEP initiated and utilized a "Neighbor-2-Neighbor" program in late 2003 to communicate with any party that was interested in discussing the proposed year round access. QEP representatives met with over 500 people in this process. These discussions allowed QEP to both understand others' concerns with the proposal and to explain the mitigation reasoning.

Communicating the details of the proposal enabled QEP to demonstrate other positive aspects related to year round operations including the ability to make capital investments in new rig equipment that would be under long term contracts and which could further reduce impact on the environment. Self-skidding rigs with umbilical systems, better rig mufflers and cleaner burning engines are examples of this.

Affected parties were able to understand that year round access would reduce the anticipated field development phase from 18 years down to nine.

Conclusions

The process outlined in this paper was successful in developing a plan which gained approval from the BLM in November 2004 (pending installation of the proposed liquids pipelines). This plan received support from groups as diverse as the Wyoming Game and Fish Department, US Fish and Wildlife Service, North American Grouse Partnership, and Trout Unlimited as

well as local county commissioners, the Mayor of Pinedale and the Governor of Wyoming.

This support was earned based on the reduction of total environmental impact even with year round access for drilling operations. QEP committed to nearly \$210 million worth of mitigating efforts to make this happen. Project impact reductions are summarized in Figure 1.

	Permitted by EIS	Questar Proposal
Surface Disturbance	1474 Ac	533 Ac
Surface Disturbance (new well pads)	150 Pads (98 new well pads)	61 Pads total (9 new well pads)
Semi-Truck Trips Annually	25,467	0
Emissions	133 TPY	116 TPY
Duration of drilling	18 yrs	9 yrs
Mitigation Cost	\$37.5MM	\$209.5MM

Fig. 1 – Total Project Impact Reduction

The process of identifying of concerns, developing a detailed mitigation plan and communicating with affected groups that was used in Pinedale may be a blueprint for compromise in other areas where energy development

and wildlife habitat overlap.

This is especially critical in the Rocky Mountains region since it is the most underdeveloped natural gas producing area in the continental United States with an estimated 41% of the proven and potential gas reserves in the country. Much of the Rocky Mountains resource potential is located on federal lands with many of the same access restrictions as are currently in place on the Mesa area of the Pinedale Anticline.

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Nomenclature

Define symbols used in the text here unless they are explained in the body of the text. Use units where appropriate.

Lek = sage grouse mating and breeding area

GPS = global positioning system

BCF = billion cubic feet

EMW = equivalent mud weight

EIS = environmental impact statement

BHL = bottom hole location

NOx = Nitrous Oxide emissions due to combustion

TPY = tons per year

ppg = pounds per gallon