



## **INTRODUCTION**

EnCana Oil & Gas (USA), Inc. (“EnCana”) is proposing a 2-to 3-year program of oil and gas development on approximately 12,067 acres of public, split estate, and private lands located southeast of the Town of DeBeque, Colorado. This proposal, referred to as the Orchard II Master Development Plan (OMDP), encompasses approximately 6,640 acres previously developed under the Orchard Unit Geographic Area Plan (BLM 2005).

The proposal consists of constructing, drilling, completing and operating up to 95 new wells from up to 25 new well pads and one existing well pad. Ancillary facilities connected to the project include access roads, natural gas and water pipelines, and surface production equipment. Included in the proposal is a range of mitigation measures designed to minimize or eliminate impacts to surface and downhole resources.

The Department of the Interior, Bureau of Land Management, Glenwood Springs Energy Office (GSEO) and Grand Junction Field Office (GJFO) administer the federal mineral estate in the OMDP area. In compliance with the National Environmental Policy Act (NEPA), the GSEO and GJFO will jointly prepare an environmental assessment (EA) that will disclose the direct, indirect, and cumulative impacts of the proposal and a no action alternative and will determine whether significant environmental impacts necessitating an environmental impact statement (EIS) would occur.

### **Purpose and Need for Action**

The purpose of the action is to develop oil and gas resources on Federal leases COC 55198, COC 58674, COC 58675, COC 58676, COC 58678, COC 64189, COC 64191 and COC 64197 consistent with existing federal lease rights. The action is needed to increase the development of oil and gas resources for commercial marketing to the public.

### **THE PROPOSED ACTION**

The OMDP is intended to describe a future development strategy given current market conditions and company constraints. If fully developed, this proposal would result in up to 95 bottomhole locations drilled at 25 new well pads and one existing well pad. Pending approval, EnCana expects to drill up to 35 of the proposed wells in 2007 and an equal or greater number per year in subsequent years (i.e., up to a maximum of 95).

However, the rate of development would depend largely on factors such as advances in technology, economics (e.g., the productivity of wells, the price of natural gas and the cost of services), and limitations on development attached to the various leases (e.g., lease stipulations and notices).

In light of these factors, all or any combination of the following developments could ultimately be implemented:

- 25 new well pads:
  - Four split estate locations drilling 14 Federal bottom holes
  - 19 Federal surface locations drilling 71 Federal bottom holes
  - Two fee surface locations drilling six Federal bottom holes and one fee bottom hole
- 1 existing well pad:
  - One fee surface location drilling three Federal bottom holes

Associated with these developments would be the construction of up to 5.4 miles of new access roads and the improvement of 3.4 miles of existing two-track routes. Approximately 15.5 miles of pipelines are also proposed.

The OMDP area encompasses approximately 12,067 acres of Federal surface and mineral ownership within portions of Sections 4, 8-10, 13-21, 28-33, T8S, R96W; Sections 6 & 7, T9S, R96W; Sections 24, 35 & 36, T8S, R97W; and Sections 1, 12 & 13, T9S, R97W, Sixth Principal Meridian. Within the proposed development area, 9,454 acres are under the jurisdiction of the BLM (Glenwood Springs and Grand Junction Field Offices), 25 acres are under the jurisdiction of the Bureau of Reclamation, 56 acres are under the jurisdiction of the Forest Service, 1,760 acres are split estate (i.e., private surface with Federal mineral subsurface ownership), and 772 acres are private land with private mineral rights. As part of the proposed action, EnCana would apply for various BLM rights-of-way authorizing the construction of new access roads and pipelines to serve the proposed development, as appropriate.

Each major element of the proposed action is described below under the headings, **Development** (Construction/Drilling/Completion), **Production** (Operation and Maintenance), and **Abandonment and Reclamation**. Associated with these developments is a standard 13-Point Surface Use Plan (SUP) (Appendix A) and a 10-Point Drilling Plan (Appendix B). With the BLM's approval, all measures discussed in these plans would be implemented as part of the proposed action.

### **Development - Construction, Drilling and Completion**

During the course of development, numerous construction activities would be completed. All of these activities could occur simultaneously. The following is a description of construction methods proposed for well pads, access roads, and gas gathering and produced water pipelines.

The locations of the various developments reflect the results of onsite exams conducted by the BLM, the operator, and subcontractors to assess proposed pad and pit layout, proposed access routes, cuts and fills, topsoil stockpiling, erosion control, and reclamation potential. The primary purpose of the onsite inspections was to assess potential resource impacts associated with their construction. In some cases, revisions to the original proposal were made to minimize potential impacts.

### **Construction**

#### Proposed Well Pads

The proposed well pads would be constructed from the native soil and rock materials present using a bulldozer, grader, front-end loader, or backhoe. The pad would be constructed by

clearing vegetation, stripping and stockpiling topsoil, and leveling the pad area using cut-and-fill techniques. Cut slopes associated with pad construction would be “step cut” as necessary and left rough to provide a seed catchment surface. The tops of the cut banks and pad corners may be rounded to improve their appearance.

Initially, the size of the newly constructed pads would range from 3.1 to 12.1 acres (Table 1). The variation in the size of the pads is a function of topography and the number of bottomhole

| <b>Table 1. Disturbance Associated with Proposed Well Pads, Access Roads, and Pipelines.</b>  |                        |                                    |  |             |  |          |                                      |                                     |
|---|------------------------|------------------------------------|--|-------------|--|----------|--------------------------------------|-------------------------------------|
| (GJFO pads shown with gray shading; GSFO pads shown without shading)  |                        |                                    |  |             |  |          |                                      |                                     |
| Well Pad  | Mineral Lease          | Short-term Pad Disturbance (acres) | Length of Associated Road and Pipeline (miles) |             | Short-term Road and Pipeline Disturbance (acres) |          | Total Short-term Disturbance (acres) | Total Long-term Disturbance (acres) |
|   |                        |                                    | Road   | Pipeline    | Road   | Pipeline |                                      |                                     |
| ON6   | Unleased               | 4.9                                | 0.03   | 0.67        | 0.2  | 3.2      | 8.3                                  | 1.7                                 |
| J100UB  | COC-58674              | 4.1                                | 0.40   | 0.40        | 3.7  |          | 7.8                                  | 3.0                                 |
| OP13  | Fee Lease              | 6.9                                | 0.06   | 2.94        | 0.6  | 14.0     | 21.5                                 | 1.7                                 |
| F15OU   | COC-58674              | 4.5                                | 0.10   | 0.40        | 0.4  | 2.6      | 7.5                                  | 1.9                                 |
| C16OU   | COC-58674              | 4.5                                | 0.12   | 0.12        | 1.1  |          | 5.6                                  | 1.9                                 |
| M16OU   | COC-58674              | 4.7                                | 0.05   | 0.05        | 0.4  |          | 5.1                                  | 1.7                                 |
| J16OU   | COC-58674              | 4.1                                | 0.11   | 0.11        | 1.0  |          | 5.1                                  | 1.9                                 |
| G17OU   | COC-58675              | 5.0                                | 0.58   | 0.58        | 5.2  |          | 10.2                                 | 3.6                                 |
| F18OU   | COC-58675              | 4.6                                | 0.72   | 0.47        | 3.1  | 3.1      | 10.8                                 | 4.1                                 |
| K18OU   | COC-58675              | 4.1                                | 1.25   | 1.25        | 11.4   |          | 15.5                                 | 6.1                                 |
| J18OU   | COC-58675              | 5.4                                | 0.22   | 0.22        | 2.0  |          | 7.4                                  | 2.3                                 |
| B19OU   | COC-58675              | 5.2                                | 0.13   | 0.13        | 1.2  |          | 6.4                                  | 2.0                                 |
| H19OU   | COC-58675              | 4.6                                | 0.85   | 1.02        | 7.7  | 0.8      | 13.1                                 | 4.6                                 |
| L19OU   | COC-64191              | 5.0                                | 0.09   | 0.09        | 0.8  |          | 5.8                                  | 1.8                                 |
| H20OU   | COC-64191              | 5.4                                | 0.21   | 0.21        | 1.9  |          | 7.3                                  | 2.3                                 |
| K20OU   | COC-64191              | 5.3                                | 0.44   | 0.44        | 4.0  |          | 9.3                                  | 3.1                                 |
| A21OU   | COC-64191              | 5.6                                | 0.22   | 0.22        | 2.0  |          | 7.6                                  | 2.3                                 |
| K21OU   | COC-55198<br>COC-64191 | 4.3                                | 0.30   | 0.30        | 2.7  |          | 7.0                                  | 2.6                                 |
| D29OU   | COC-58676              | 4.9                                | 0.19   | 0.19        | 1.7  |          | 6.6                                  | 2.2                                 |
| K29OU   | COC-58676              | 12.1                               | 0.02   | 0.02        | 0.2  |          | 12.3                                 | 1.6                                 |
| G30OU   | COC-58678              | 5.6                                | 0.05   | 0.05        | 0.4  |          | 6.0                                  | 1.7                                 |
| J31OU   | COC-58678              | 3.1                                | 0.26   | 1.62        | 1.1  | 7.9      | 12.1                                 | 2.4                                 |
| D33OU   | COC-64189              | 5.8                                | 0.16   | 0.16        | 1.5  |          | 7.3                                  | 2.1                                 |
| OM35  | COC-64197              | 4.9                                | 1.24   | 2.27        | 5.2  | 11.0     | 21.1                                 | 6.0                                 |
| OM36  | COC-64197              | 4.9                                | 0.96   | 1.58        | 4.1  | 7.7      | 16.7                                 | 5.0                                 |
|   | Totals                 | 129.5 acres                        | 8.76 miles                                     | 15.51 miles | 113.9 acres                                      |          | 243.4 acres                          | 69.6 acres                          |
| <p><b>Short-term Disturbance Assumptions:</b><br/>Typically pipelines would be buried alongside proposed roads with total width of short-term disturbance for new road and pipelines estimated at 75 ft. In situations where pipelines would be buried alongside an existing field development road, short-term disturbance width of pipeline is estimated at 40 feet. Pipelines buried in separate corridor would have short-term disturbance area not to exceed 55 feet. Where only new road would be constructed, short-term disturbance width estimated at 35 feet.</p> <p><b>Long-term Disturbance Assumptions:</b><br/>For well pads, the long-term disturbance of the “working” area of each pad is estimated at 1.5 acres. Long-term disturbance width for proposed roads is estimated at 30 feet. Since pipelines would be reclaimed in their entirety, no long-term disturbance area for pipelines is calculated.</p> <p>The disturbance areas for proposed pads and associated roads and pipelines were taken from survey plats provided by Tri-State Land Surveying &amp; Consulting of Vernal, Utah in Jan-Aug., 2007.</p> |                        |                                    |  |             |  |          |                                      |                                     |

locations targeted. The construction of the 25 pads would result in an estimated 129.5 acres of new short-term surface disturbance. The working area of the pad would remain disturbed throughout the long-term production phase of development. Long-term disturbance is estimated at 1.5 acres per pad or a total of 37.5 acres.

EnCana is considering the implementation of a closed loop drilling system that would recycle drilling fluids, thereby eliminating the need for a reserve pit. If this method is used, a system to separate fluids from drill cuttings would be used and a containment berm would be constructed on the pad to collect and further dry the cuttings. If the system is not used, a conventional reserve pit would be excavated.

Given the variation in the size and dimensions of the proposed well pads and the number of proposed wells that may be drilled at any given location, the size of the reserve pits would vary. In order to safely contain cuttings and drilling fluids, reserve pits would be constructed to allow for a minimum of two feet of free board between the maximum fluid level and the top of the pit's berm. In addition to the berm, catchments would be excavated around the pits to prevent the infiltration of storm water.

Under the conventional method, the fluids would be allowed to evaporate unless an alternative method of disposal is approved. Because multiple wells would be drilled at each pad, the pit would not be reclaimed until all wells have been drilled on each respective pad.

A fence would be constructed around each pit to protect domestic livestock. The fence would remain until all wells have been drilled and completed.

After all wells are drilled, completed, and production facilities are installed at each pad, interim reclamation activities would begin. Generally, cuts would be revegetated and fills would be recontoured to blend in with adjacent natural slopes and seeded to reestablish vegetative cover. These interim reclamation techniques would result in about a 70 percent reduction in surface disturbance that would remain over the long-term life of the project (i.e., 20 to 30 years).

#### Existing Well Pad

One existing well pad (F32OU) was constructed using the same general methodology as proposed for the new pads. The development of the three federal wells proposed for the F32OU location would not require new surface disturbance.

#### Proposed Access Roads

To provide access to the proposed surface locations, the construction of approximately 5.4 miles of new roads is proposed. In addition, 3.4 miles of existing two-track roads would be improved.

Three existing county road networks would be used to access the OMDP area - Mesa County Roads V.00 and V.50 and Garfield County Road 306 (CR306). The V.00 road would serve existing and proposed well pads along Horsethief Creek and would provide primary access to that portion of the project area administrated by the GJFO. The V.50 road would serve developments proposed on the DeBeque Wildlife Area (Bureau of Reclamation property) and Samson Mesa. The Creek Mesa and Little Alkali Creek areas of the project area would be served by CR306 south of the Una Bridge area.

The proposed roads would be constructed to meet standards for the anticipated traffic flow and

all-weather requirements. Roads and gathering pipelines would be constructed within a 75-foot disturbance corridor, which would be reduced to 20 foot finished road surface (including bar ditch) after interim reclamation (see Table 1). Bulldozers, trackhoes, and/or road graders would first clear vegetation and topsoil. The road would then be constructed using standard equipment and techniques approved by the BLM, which could include ditching, draining, crowning, surfacing, sloping, and dipping the roadbed as necessary.

The average road grade would be 10% or less, wherever possible. The 10% grade would only be exceeded in areas where physical terrain or unusual circumstances require it. Minimum horizontal curve radii would be 100 feet. Where terrain would not allow a 100-foot curve radius, the curve would be widened. Road and pipeline construction would result in approximately 113.9 acres of short-term ground disturbance. Following interim reclamation, the long-term surface disturbance associated with roads would be approximately 32.1 acres.

Where required, drainage crossings would be of the typical dry creek type. Crossings would be designed to minimize siltation and the accumulation of debris in the drainage crossing. Water diversions including cut-outs would be placed at frequent intervals along access roads to prevent the erosion of drainage ditches, as described in the *Surface Operating Standards for Oil and Gas Exploration & Development – The Gold Book* (BLM and USFS 2006).

The access roads would be inspected and maintained on a quarterly basis, at a minimum, and could include such actions as:

- grading of the road surface,
- cleaning relief ditches, culverts, and cattle guards,
- implementing supplemental erosion control measures,
- closing roads in periods of excessive soil moisture,
- implementing road and slope stabilization measures,
- conducting weed control, and
- applying dust abatement measures.

The operator would be required to obtain various right-of-way authorizations for its use of roads and pipelines outside the Orchard Unit and/or on segments that fall outside the operator's Federal leases.

#### Proposed Gas Gathering and Water Pipelines

A gas gathering and produced water pipeline network would be needed to gather and deliver gas offsite to existing trunk pipelines and transport produced water to centralized tank batteries within and outside the project area. The gathering system for the 25 proposed well pads would connect with the recently-installed West Orchard aka Sunnyside trunk pipeline (16" diameter), analyzed in NEPA document EA# CO140-07-055.

Approximately 15.5 miles of pipelines would be constructed to serve the proposed well pads. The majority of the gathering system (14.2 miles) would be buried alongside access roads within a 75-foot access road/pipeline right-of-way. Pipeline segments serving the F150U and F180U pads (totaling 0.9 mile)) would be buried in separate pipeline corridors with construction right-of-way width of 55 feet. Another 0.4 mile of surface pipeline (maximum 40 foot wide disturbance corridor) would be installed north from the OM36 to Horsethief Creek (CR V.00) Road to serve the OM35 pad. As shown in Table 1, there would be 113.9 acres of short-term disturbance calculated for roads and pipelines. No long-term disturbance area would be attributed to the

pipeline system assuming that all pipeline corridors would be reclaimed using best management practices.

All pipelines would be buried to a minimum depth of 4 feet from surface to top of pipe. The pipeline trench would be excavated mechanically; pipe segments would then be welded together and tested, lowered into the trench, and covered with excavated material. Generally, a mile of pipeline would be constructed in 4 to 7 days.

Each pipeline would be pressure tested with fresh water and/or nitrogen gas to locate any leaks. Fresh water or nitrogen used for testing would be obtained off-site and transported to the testing location by truck. After testing, the water would be disposed of at an existing offsite evaporation pond facility. Nitrogen would be vented to the atmosphere if used instead of water.

Most of the proposed access road and gathering lines serving the well pads within the Orchard Unit boundary would not be subject to BLM right-of-way authorizations because of regulations inherent with Federal units. However, the portion of the road and pipeline in T9S R97W, Section 1 serving the OM36 pad would require BLM right-of-way grant from Grand Junction Field Office. Portions of the proposed road and pipeline that would serve the OP13 would also require BLM right-of-way grant from Grand Junction Field Office for the pipeline segment falling within Sections 6, T9S R96W and Sections 12 and 13, T9S R97W. Furthermore, the OP13 road and pipeline crossing Section 6, T9S R96W would require a US Forest Service Road Use Permit for the road authorization and Special Use Permit for the pipeline.

#### Mitigation Common to All Construction Operations

All trees removed during construction activities would be cut to a maximum stump height of 6 inches, bucked into 4-foot lengths, and either stacked off location or windrowed to serve as silt catchments. Pinyon pine trees would be chipped, buried, or disposed to prevent the spread of the pinyon *Ips* beetle. Rootballs would be buried, placed offsite, or scattered over the disturbed area as part of final reclamation. Other vegetation, such as sagebrush and other shrubs, may be scattered offsite or placed on well pad fills to help screen the pads. Cleared and grubbed juniper trees could be windrowed along toe of pad or road fill slopes, and placed over pad and pipeline disturbances.

#### **Drilling and Completion**

Up to 95 vertically and directionally drilled wells would be developed as part of the proposed action. Table 3 provides surface and bottomhole locations for the proposed well pads and wells. The number of wells proposed for drilling in 2007 is 35. While the proposed number of wells per pad is well-established over much of the OMDP area, the drilling program in the southwest portion of the OMDP area is exploratory in nature. In this area, drilling would initially be limited to 1 to 2 wells per pad. Production results from these wells would be used to plan the 2008 and 2009 drilling programs. Fewer wells may be drilled than are proposed because of geologic and market uncertainties.

EnCana's drilling operations would be conducted in compliance with all Federal Oil and Gas Onshore Orders, and all applicable rules and regulations. The drilling operation would be conducted in two phases. The first phase may use a small drilling rig to drill to a depth of approximately 630-1,500 feet, or 50 feet below the base of any freshwater aquifers encountered. This surface hole would be cased with steel casing and cemented in place entirely from a depth of about 630-1,500 feet to ground level. This surface casing would serve the purposes of providing

protection for any freshwater aquifers present and to contain pressure that may be encountered while drilling deeper. The BLM would be notified in advance of running surface casing and cement in order to witness these operations. This part of the drilling operation would normally take 2 to 3 days to complete.

Prior to drilling below the surface casing, a Blowout Preventer (BOP) would be installed on the surface casing, and both the BOP and surface casing would be tested for pressure integrity. The BOP and related equipment would meet the minimum requirements of Onshore Oil and Gas Order No. 2, and the BLM would be notified in advance of all pressure tests. Following the use of the surface-hole rig, if used, a larger drilling rig would be used to drill to target depths of about 7,200 to 10,000 feet. A downhole mud motor may be used to increase penetration rate. The rig would pump drilling fluids to drive the mud motor, cool the drill bit, and remove cuttings from the well bore.

| <b>Table 2. Surface and Bottomhole Locations of Proposed Wells.</b>  |   |                       |   |   |
|--|---|-----------------------|---|---|
| (GJFO pads shown with gray shading; GSFO pads shown without shading) |   |                       |   |   |
| <i>Lease</i>   | <i>Proposed Pad</i>   | <i>Proposed Wells</i> | <i>Surface Location</i>                                 | <i>Bottomhole Location</i>                |
| Currently Unleased pending 11/8/07 BLM Lease Sale                    | ON6 (Four wells)<br>Note: 4 wells will be drilled into adjacent existing BLM leases | Orchard Unit 31-14    | Lot 3, Section 6, T9S R96W                              | Section 31, T8S R96W<br>660 FSL 1980 FWL  |
|  |   | Orchard Unit 31-15    |   | Section 31, T8S R96W<br>660 FSL 1980 FEL  |
|  |   | Orchard Unit 7-3      |   | Section 7, T9S R96W<br>660 FNL 1980 FWL   |
|  |   | Orchard Unit 7-4      |   | Section 7, T9S R96W<br>660 FNL 660 FWL    |
| Fee Lease (Surface)  | OP13 (Four wells)   | Federal 18-12         | SE $\frac{1}{4}$ SE $\frac{1}{4}$ , Section 13 T9S R97W | Section 18, T9S R96W<br>1980 FSL 660 FWL  |
|  |   | Federal 18-13         |   | Section 18, T9S R96W<br>660 FSL 660 FWL   |
|  |   | Federal 18-14         |   | Section 18, T9S R96W<br>660 FSL 1980 FWL  |
|  |   | Federal 19-4          |   | Section 19, T9S R96W<br>660 FNL 660 FWL   |
| COC 58674  | J10OUB (Two wells)  | Orchard Unit 10-11    | NW $\frac{1}{4}$ SE $\frac{1}{4}$ , Section 10 T8S R96W | Section 10, T8S R96W<br>1980 FSL 1980 FWL |
|  |   | Orchard Unit 10-14    |   | Section 10, T8S R96W<br>660 FSL 1980 FWL  |
|  | F15OU (Five wells)  | Orchard Unit 15-3     | SE $\frac{1}{4}$ NW $\frac{1}{4}$ , Section 15 T8S R96W | Section 15, T8S R96W<br>660 FNL 1980 FWL  |
|  |   | Orchard Unit 15-4     |   | Section 15, T8S R96W<br>660 FNL 660 FWL   |
|  |   | Orchard Unit 15-6     |   | Section 15, T8S R96W<br>1980 FNL 1980 FWL |
|  |   | Orchard Unit 15-11    |   | Section 15, T8S R96W<br>1980 FSL 1980 FWL |
|  |   | Orchard Unit 15-12    |   | Section 15, T8S R96W<br>1980 FSL 660 FWL  |
|  | C16OU (Five wells)  | Keinath Federal 16-2  | NE $\frac{1}{4}$ NW $\frac{1}{4}$ , Section 16 T8S R96W | Section 16, T8S R96W<br>660 FNL 1980 FEL  |
|  |   | Keinath Federal 16-3  |   | Section 16, T8S R96W<br>660 FNL 1980 FWL  |
|  |   | Keinath Federal 16-4  |   | Section 16, T8S R96W<br>660 FNL 660 FWL   |
|  |   | Keinath Federal 16-6  |   | Section 16, T8S R96W<br>1980 FNL 1980 FWL |

**Table 2. Surface and Bottomhole Locations of Proposed Wells.**

(GJFO pads shown with gray shading; GSFO pads shown without shading)

| <i>Lease</i>      | <i>Proposed Pad</i> | <i>Proposed Wells</i>                    | <i>Surface Location</i>                              | <i>Bottomhole Location</i>                |
|-------------------|---------------------|--|--|---|
|                   |                     | Keinath Federal 9-15                     |  | Section 9, T8S R96W<br>660 FSL 1980 FEL   |
|                   | J16OU (Two wells)   | Keinath Fed 16-10                        | NW¼SE¼, Section 16<br>T8S R96W                       | Section 16, T8S R96W<br>1980 FSL 1980 FEL |
|                   |                     | Keinath Fed 16-11                        |  | Section 16, T8S R96W<br>1980 FSL 1980 FWL |
|                   | M16OU (Three wells) | Keinath Fed 16-13                        | SW¼SW¼, Section 16<br>T8S R96W                       | Section 16, T8S R96W<br>660 FSL 660 FWL   |
|                   |                     | Keinath Fed 16-14                        |  | Section 16, T8S R96W<br>660 FSL 1980 FWL  |
|                   |                     | Keinath Fed 17-16                        |  | Section 17, T8S R96W<br>660 FSL 660 FEL   |
| COC 58675         | G17OU (Four wells)  | Orchard Unit 17-6                        | SW¼NE¼,<br>NW¼SE¼ Section 17<br>T8S R96W             | Section 17, T8S R96W<br>1980 FNL 1980 FWL |
|                   |                     | Orchard Unit 17-7                        |  | Section 17, T8S R96W<br>1980 FNL 1980 FEL |
|                   |                     | Orchard Unit 17-2                        |  | Section 17, T8S R96W<br>660 FNL 1980 FEL  |
|                   |                     | Orchard Unit 17-10                       |  | Section 17, T8S R96W<br>1980 FSL 1980 FEL |
|                   | F18OU (Three wells) | Orchard Unit 18-4                        | SE¼NW¼, Section 18<br>T8S R96W                       | Section 18, T8S R96W<br>660 FNL 650 FWL   |
|                   |                     | Orchard Unit 18-5                        |  | Section 18, T8S R96W<br>1980 FNL 660 FWL  |
|                   |                     | Orchard Unit 24-1                        |  | Section 24, T8S R97W<br>660 FNL 660 FEL   |
|                   | J18OU (Three wells) | Keinath 18-10 (fee)                      | NW¼SE¼, NE¼SE¼<br>Section 18 T8S R96W                | Section 18, T8S R96W<br>1960 FSL 1960 FEL |
|                   |                     | Keinath Federal 18-9                     |  | Section 18, T8S R96W<br>1950 FSL 660 FEL  |
|                   |                     | Keinath Fed 18-15                        |  | Section 18, T8S R96W<br>660 FSL 1960 FEL  |
|                   | K18OU (Four wells)  | Orchard Unit 18-11                       | Lots 3, 4, NE¼SW¼,<br>SE¼SW¼, Section 18<br>T8S R96W | Section 18, T8S R96W<br>1970 FSL 1495 FWL |
|                   |                     | Orchard Unit 18-12                       |  | Section 18, T8S R96W<br>1970 FSL 415 FWL  |
|                   |                     | Orchard Unit 18-13                       |  | Section 18, T8S R96W<br>655 FSL 415 FWL   |
|                   |                     | Orchard Unit 18-14                       |  | Section 18, T8S R96W<br>655 FSL 1505 FWL  |
|                   | B19OU (Four wells)  | Orchard Unit 19-2                        | NW¼NE¼ Section 19<br>T8S R96W                        | Section 19, T8S R96W<br>650 FNL 1980 FEL  |
|                   |                     | Orchard Unit 19-3                        |  | Section 19, T8S R96W<br>650 FNL 1610 FWL  |
|                   |                     | Orchard Unit 19-6                        |  | Section 19, T8S R96W<br>1930 FNL 1520 FWL |
|                   |                     | Orchard Unit 19-7                        |  | Section 19, T8S R96W<br>1930 FNL 2030 FEL |
|                   | H19OU (Four wells)  | Orchard Unit 19-8                        | SE¼NE¼ Section 19<br>T8S R96W                        | Section 19, T8S R96W<br>1983 FNL 679 FEL  |
|                   |                     | Orchard Unit 19-9                        |  | Section 19, T8S R96W<br>1960 FSL 660 FEL  |
| Orchard Unit 20-5 |                     | Section 20, T8S R96W<br>1910 FNL 530 FWL |  |   |

**Table 2. Surface and Bottomhole Locations of Proposed Wells.**

(GJFO pads shown with gray shading; GSFO pads shown without shading)

| <i>Lease</i>           | <i>Proposed Pad</i> | <i>Proposed Wells</i> | <i>Surface Location</i>                  | <i>Bottomhole Location</i>                                   |
|------------------------|---------------------|-----------------------|--|--|
|                        |                     | Orchard Unit 19-1     |  | Section 19, T8S R96W<br>660 FNL 660 FEL                      |
| COC 64191              | L19OU (Three wells) | Orchard Unit 19-11    | Lot 3, Section 19<br>T8S R96W            | Section 19, T8S R96W<br>1960 FSL 1540 FWL                    |
|                        |                     | Orchard Unit 19-12    |  | Section 19, T8S R96W<br>2022 FSL 650 FWL                     |
|                        |                     | Orchard Unit 19-13    |  | Section 19, T8S R96W<br>665 FSL 650 FWL                      |
|                        | H20OU (Three wells) | Orchard Unit 20-8     | SE¼NE¼ Section 20<br>T8S R96W            | Section 20, T8S R96W<br>1980 FNL 660 FEL                     |
|                        |                     | Orchard Unit 20-1     |  | Section 20, T8S R96W<br>660 FNL 660 FEL                      |
|                        |                     | Orchard Unit 20-9     |  | Section 20, T8S R96W<br>1980 FSL 660 FEL                     |
|                        | K20OU (Five wells)  | Orchard Unit 20-10    | NE¼SW¼ Section 20<br>T8S R96W            | Section 20, T8S R96W<br>1960 FSL 1950 FEL                    |
|                        |                     | Orchard Unit 20-11    |  | Section 20, T8S R96W<br>1970 FSL 1890 FWL                    |
|                        |                     | Orchard Unit 20-12    |  | Section 20, T8S R96W<br>1980 FSL 630 FWL                     |
|                        |                     | Orchard Unit 20-13    |  | Section 20, T8S R96W<br>660 FSL 640 FWL                      |
|                        |                     | Orchard Unit 20-14    |  | Section 20, T8S R96W<br>660 FSL 1930 FWL                     |
|                        | A21OU (Four wells)  | Orchard Unit 21-1     | NE¼NE¼ Section 21<br>T8S R96W            | Section 21, T8S R96W<br>515 FNL 301 FEL<br>(vertical well)   |
|                        |                     | Orchard Unit 21-2     |  | Section 21, T8S R96W<br>660 FNL 1980 FEL                     |
|                        |                     | Orchard Unit 21-8     |  | Section 21, T8S R96W<br>1980 FNL 660 FEL                     |
|                        |                     | Orchard Unit 22-4     |  | Section 22, T8S R96W<br>660 FNL 660 FWL                      |
| COC 55198<br>COC 64191 | K21OU (Four wells)  | Orchard Unit 21-10    | SE¼NW¼,<br>NE¼SW¼ Section 21<br>T8S R96W | Section 21, T8S R96W<br>1980 FSL 1980 FEL                    |
|                        |                     | Orchard Unit 21-11    |  | Section 21, T8S R96W<br>1980 FSL 1980 FWL                    |
|                        |                     | Orchard Unit 21-12    |  | Section 21, T8S R96W<br>1980 FSL 660 FWL                     |
|                        |                     | Orchard Unit 21-14    |  | Section 21, T8S R96W<br>660 FSL 1980 FWL                     |
| COC 58676              | D29OU (Four wells)  | Orchard Unit 29-3     | NW¼NW¼ Section<br>29<br>T8S R96W         | Section 29, T8S R96W<br>660 FNL 1980 FWL                     |
|                        |                     | Orchard Unit 29-4     |  | Section 29, T8S R96W<br>660 FNL 660 FWL                      |
|                        |                     | Orchard Unit 29-5     |  | Section 29, T8S R96W<br>1980 FNL 660 FWL                     |
|                        |                     | Orchard Unit 30-1     |  | Section 29, T8S R96W<br>660 FNL 650 FEL                      |
|                        | K29OU (Six wells)   | Orchard Unit 29-11    | NE¼SW¼ Section 29<br>T8S R96W            | Section 29, T8S R96W<br>2249 FSL 1769 FWL<br>(vertical well) |
|                        |                     | Orchard Unit 29-6     |  | Section 29, T8S R96W<br>2030 FNL 1960 FWL                    |

| <b>Table 2. Surface and Bottomhole Locations of Proposed Wells.</b>  |   |                       |   |  |
|--|---|-----------------------|---|--|
| (GJFO pads shown with gray shading; GSFO pads shown without shading) |   |                       |   |  |
| <i>Lease</i>   | <i>Proposed Pad</i>                             | <i>Proposed Wells</i> | <i>Surface Location</i>   | <i>Bottomhole Location</i>                                   |
|  |   | Orchard Unit 29-10    |   | Section 29, T8S R96W<br>2020 FSL 1970 FEL                    |
|  |   | Orchard Unit 29-12    |   | Section 29, T8S R96W<br>2050 FSL 660 FWL                     |
|  |   | Orchard Unit 29-14    |   | Section 29, T8S R96W<br>660 FSL 1980 FWL                     |
|  |   | Orchard Unit 29-7     |   | Section 29, T8S R96W<br>1980 FNL 1980 FEL                    |
| COC 58678  | G30OU (Four wells)                              | Orchard Unit 30-7     | SW $\frac{1}{4}$ NW $\frac{1}{4}$ , NE $\frac{1}{4}$ ,<br>Section 30 T8S R96W | Section 30, T8S R96W<br>2023 FNL 2037 FEL<br>(vertical well) |
|  |   | Orchard Unit 30-6     |   | Section 30, T8S R96W<br>2066 FNL 1538 FWL                    |
|  |   | Orchard Unit 30-8     |   | Section 30, T8S R96W<br>2064 FNL 661 FEL                     |
|  |   | Orchard Unit 30-10    |   | Section 30, T8S R96W<br>2038 FSL 1975 FEL                    |
|  | J31OU (One well)                                | Federal 31-10         | NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 31<br>T8S R96W                      | Section 31, T8S R96W<br>2159 FSL 1839 FEL<br>(vertical well) |
| Fee Lease<br>(Surface)   | <b>Existing Well Pad</b><br>F32OU (Three wells) | EnCana Federal 32-3   | SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 32<br>T8S R96W                      | Section 32, T8S R96W<br>680 FNL 2000 FWL                     |
|  |   | EnCana Federal 32-4   |   | Section 32, T8S R96W<br>680 FNL 660 FWL                      |
|  |   | EnCana Federal 32-5   |   | Section 32, T8S R96W<br>2060 FNL 670 FWL                     |
| COC 64189  | D33OU (Four wells)                              | Orchard Unit 33-4     | NW $\frac{1}{4}$ NW $\frac{1}{4}$<br>Section 33 T8S R96W                      | Section 33, T8S R96W<br>660 FNL 660 FWL                      |
|  |   | Orchard Unit 33-3     |   | Section 33, T8S R96W<br>660 FNL 1980 FWL                     |
|  |   | Orchard Unit 33-5     |   | Section 33, T8S R96W<br>1980 FNL 660 FWL                     |
|  |   | Orchard Unit 28-13    |   | Section 28, T8S R96W<br>660 FSL 660 FNL                      |
| COC 64197  | OM35 (Three wells)                              | Federal 35-13         | SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 35<br>T8S R97W                      | Section 35, T8S R97W<br>660 FSL 660 FWL                      |
|  |   | Federal 35-12         |   | Section 35, T8S R97W<br>1980 FSL 660 FWL                     |
|  |   | Federal 35-14         |   | Section 35, T8S R97W<br>660 FSL 1980 FWL                     |
|  | OM36 (Four wells)                               | Federal 36-13         | SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 36<br>T8S R97W                      | Section 36, T8S R97W<br>660 FSL 660 FWL                      |
|  |   | Federal 35-16         |   | Section 36, T8S R97W<br>660 FSL 660 FEL                      |
|  |   | Federal 36-12         |   | Section 36, T8S R97W<br>1980 FSL 660 FWL                     |
|  |   | Federal 36-14         |   | Section 36, T8S R97W<br>660 FSL 1980 FWL                     |

In order to achieve borehole stability, minimize possible damage to the formations, provide adequate viscosity to carry the drill cuttings out of the well bore, and reduce downhole fluid losses, various non-toxic chemicals and certain materials may need to be added to the mud system.

For the directional wells, an S-shaped directional design would be used to reach the targeted bottomhole locations. In general, a target radius of 200 feet would be used. Specific directional plans for each well will be included with the APDs. Downhole operations would be done with tools to facilitate proper direction and path of the well.

EnCana, depending on rig availability, intends to implement a closed-loop drilling system in the OMDP using a drill rig outfitted with special equipment designed to recycle drilling fluids and deposit the cuttings on location without the use of a conventional reserve pit. Cuttings are moved through a shaker system on the drill rig that captures drilling fluids from the cuttings. The cuttings are typically placed on the pad location within a containment berm until enough are collected to mix with Solibond to further dry and achieve a solid state. The solidified cuttings typically remain on the pad location and are spread on location during the interim reclamation phase of the pad when excavation equipment is used to reshape and contour the pad. If a drill rig with closed-loop system is not available when the proposed wells are scheduled for drilling, an open pit rig with an excavated reserve pit would be used to drill the wells. The drilling plan and survey plats included in the APDs submitted to the BLM would specify the planned drilling system (closed-loop or open pit). If open pit drilling method is used, a lined reserve pit to receive the drill cuttings from the well bore (e.g., shale, sand, and miscellaneous rock minerals) and to contain drilling fluids carried over with the cuttings would be constructed on the pad. No hazardous substances would be placed in the pit.

After drilling the hole to its final depth, logging tools would be run into the well to evaluate the potential hydrocarbon resource. If the evaluation indicates adequate hydrocarbon resources are present and recoverable, steel production casing would be run and cemented into place in accordance with the well design as approved by the BLM and any applicable Conditions of Approval (COAs). The proposed casing and cementing program would be designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. BLM approval is required prior to the use of any isolating medium other than cement.

After production casing has been cemented in place, the drilling rig would be removed, and a completion rig would be moved in. Well completion consists of running a Cement Bond log to evaluate cement integrity and to correlate the cased hole logs to the open hole logs. The casing is then perforated across the hydrocarbon producing zones, and the formation is stimulated to enhance the production of oil and gas. The typical method used for stimulation consists of a hydraulic fracture treatment in which sand and non-toxic fluids are pumped into the producing formation with sufficient pressure to fracture the rock formation. The sand serves as a propellant to keep the created fracture open, thereby allowing reservoir fluids to move more efficiently into the well bore.

A natural gas well in this GAP would require about 12-15 days to drill and approximately 30-45 days to complete. Pads with multiple well bores would be occupied for a more extended period of time, depending on the number of well bores. When possible, all well bores planned on individual pads would be drilled and completed within one drilling season and the pad reclaimed.

## **Production - Operation and Maintenance**

### **Surface Facilities**

Surface facilities at each well pad location would consist of wellheads, separation/dehydration

units, and aboveground condensate and produced water tanks with approximately 300- to 400-barrel capacities. Multi-well locations would share production equipment, whenever feasible, to minimize surface occupancy/disturbance. All production equipment would be painted to match the surrounding terrain and located to reasonably minimize visual impact. BLM would select the color for all facilities, including containment rings, at sites associated with Federal surface or with the development of Federal mineral estate.

The production equipment would be fenced to prevent contact with grazing livestock. Telemetry equipment would be used to remotely monitor well conditions after a reasonable level of development. The use of telemetry would minimize traffic to and from the well locations. A pumper truck will be required to visit the pads for tank gauging.

Tank batteries would be placed within secondary containment to prevent the offsite migration of accidentally spilled condensate or produced water. Secondary containment would consist of corrugated steel containment berms or earthen berms. Compaction and construction of earthen berms surrounding the tank batteries would be performed to prevent lateral movement of fluids through the utilized materials. Secondary containment would be sized to contain a minimum of 110 percent of the storage capacity of the largest tank within the berm. All loading lines would be placed inside the containment berm.

EnCana's existing Orchard Unit Compressor Facility located near Una Bridge would serve the well development planned for the OMDP. If production requirements make on-site compression necessary, a Sundry Notice (Form 3160) would be submitted for approval to the Authorized Officer detailing specifications prior to installation of compressors.

Produced water may be confined to the reserve pit for a period of 90 days after initial production. Produced water at well pads would be transported by truck or buried pipeline to EnCana's existing High Mesa water treatment facility in the South Parachute Field and/or trucked offsite to an approved disposal facility. Condensate would be transported to market by tanker trucks.

### **Interim Reclamation**

After completion activities, EnCana would reduce the size of the well pad to the minimum surface area needed for production facilities and future workovers, while providing for reshaping and stabilization of cut and fill slopes. In brief, interim reclamation would be accomplished by grading, leveling, and seeding, as recommended by the BLM. Interim reclamation would reduce the disturbed area at each pad to approximately 1.5 acres after well development.

The following is a summary of interim reclamation activities that would take place immediately after well completion:

- The well location and surrounding areas(s) would be cleared of all debris, materials, and trash not required for production. Other waste and spoil materials would be disposed of at a local landfill.
- All pits, cellars, rat holes and other bore holes not necessary for further lease operations, excluding the reserve pit, would be back-filled immediately to conform to surrounding terrain. Pits, cellars, and/or boreholes required for further lease operations would be fenced.

- Any hydrocarbons in the reserve pit would be removed in accordance with 43 CFR 3162.7. The reserve pit would then be completely dried and all cans, barrels, pipe, etc. would be removed. The accessible portion of pit liner would be removed to the local landfill and the remaining buried part of liner would be backfilled in place with native soils and materials. The backfilling of the reserve pit would be done in such a manner that the mud and associated solids would be confined to the pit and not squeezed out and incorporated into the surface materials. The backfilled pit would be covered with a minimum of 3 feet of overburden. When work is complete, the pit area would support heavy equipment without sinking.
- Areas not necessary for production and future workovers would be reshaped to resemble the original landscape contour. Stockpiled topsoil would be redistributed and disked on the area to be reclaimed and reseeded according to BLM recommendations. In the case of private surface and mineral locations, a seed mixture would be recommended to the landowner.

Interim reclamation would be completed within 90 days from the date of well completion, weather permitting. Dry or non-producing well locations would be plugged, abandoned and reclaimed within 90 days of well completion, weather permitting.

Some locations would require special reclamation practices. These practices could include hydromulching, straw mat application, fertilizing, seedbed preparation, contour furrowing, watering, terracing, water barring, and topsoil replacement. In order to prevent grazing pressure, pads would be fenced for the first two growing seasons or until the seeded species have established.

### **Workovers or Recompletion**

Periodically, the workover or recompletion of a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the well bore equipment (casing, tubing, rods, or pump) the wellhead, or the production facilities. These repairs would usually be completed during daylight hours; however, at times it may be necessary because of restrictions to complete repairs during the night. The frequency of this type of work cannot be accurately projected because workovers vary well by well; for a period of seven to 10 days. In the case of multi-well pads, space for equipment would usually be limited to the “working” (i.e., disturbed) area of the surface location, although it is possible that interim reclamation could be delayed by workover operations.

### **Abandonment and Reclamation**

#### **Well and Pipeline Plugging and Abandonment**

Upon abandonment, each borehole would be plugged, capped, and its related surface equipment removed. Subsurface pipelines would be plugged at specific intervals. A Sundry Notice would be submitted by the operator to the BLM that describes the engineering, technical, or environmental aspects of final plugging and abandonment. This notice would describe final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. The BLM and Colorado Oil & Gas Conservation Commission (COGCC) standards for plugging would be followed. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore (e.g., cementation) would be included in the Sundry Notice.

## **Final Reclamation**

All surface disturbances would be recontoured and revegetated in accordance with the GSRA reclamation policy, including control of noxious weeds (USDI 1999b). One of EnCana's goals is to accomplish as much reclamation during the life of the well as possible, even on those pads with a large final reclamation or "in use" area. Unreclaimed areas or reclaimed areas that do not meet the objective of 3-to-4 years of sustained reclamation (i.e., operator complete) would undergo the reclamation retreatment measures described in the 13-Point Surface Use Plan.

EnCana would restore the well locations and access roads to approximately their original contours. During reclamation of these sites, fill material would be pushed into cuts and over the backslope. No depressions would be left that would trap water or form ponds. Upon completion of backfilling, leveling and recontouring, the stockpiled topsoil would be evenly spread over the reclaimed areas(s). All disturbed surfaces would be reseeded with a seed mixture approved or recommended by the BLM. The seedbed would then be prepared by disking and roller packing following the natural contours. Seed would be drilled on contours at a depth no greater than 0.5 inch. In areas that cannot be drilled-seeded, seed would be broadcast-seeded at double the seeding rate and harrowed into the soil. All seeding would be conducted after September 1 and prior to ground frost. Spring seeding would be conducted after the frost leaves the ground but no later than May 15. If the seeding is unsuccessful, EnCana may be required to make subsequent seedings.

Reclamation would be considered successful when the objectives described in the local BLM office reclamation policy are achieved. To summarize these objectives, revegetation would be considered successful when the following objectives are met:

- *Immediate short term:* Establishment of desirable perennial vegetation by end of the second growing season, capable of renewing itself.
- *Acceptable establishment:* Acceptable level of desirable vegetation by the end of the fifth growing season.
- *Long-term establishment:* Level of revegetation approximates the original undisturbed condition, in terms of canopy cover and species composition.

## **THE NO ACTION ALTERNATIVE**

Under the no action alternative, the Applications for Permit to Drill (APDs) associated with the proposed action would be denied and none of the proposed pads, access roads, or pipelines would be developed, and the various rights-of-way required to gain legal access to the area would not be granted.

However, the selection of the no action alternative would not preclude the development of facilities that have already been approved. A substantial amount of the OMDP project area has or is currently undergoing development activities that were approved under the Orchard Unit Geographic Area Plan (BLM 2005) and other NEPA documents. There are currently 21 existing wells pads and 72 existing wells in the project area. An additional pad and 6 associated wells have been approved but not yet developed. Under the no action alternative, production and maintenance of the existing wells will continue into the foreseeable future and the remaining pad and proposed wells will be developed.

## SUMMARY OF LEASE AND GRANT STIPULATIONS

Each of EnCana's Federal oil and gas leases include stipulations intended to protect natural resource values. Table 3 provides a summary of lease and grant stipulations that would apply to the proposed action.

| <b>Table 3. Lease Stipulations Applicable to the OMDP</b>   |  |  |
|---|--|--|
| <i>Lease Number</i>   | <i>Description of Lands</i>  | <i>Stipulations</i>  |
| <b>COC 55198</b><br>(1993)  | T8S R96W<br>Section 20: S½SW¼  | <b>Controlled Surface Use:</b> Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.   |
|   | ALL LANDS within lease   | <b>Lease Notice:</b> Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required.<br><b>Lease Notice:</b> An inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approve by the Authorized Officer.  |
| <b>COC 58674</b><br>(1995)<br><b>Proposed Pad</b><br>C16OU<br>F15OU<br>J10OUB<br>J16OU<br>M16OU                 | T8S R96W<br>Section. 9: SW¼SW¼   | <b>Timing Limitation:</b> Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days of the closure.  |
|   | T8S R96W<br>Section 13: E½NE¼,<br>SW¼NE¼<br>Section 14: NW¼SW¼                                 | <b>Controlled Surface Use:</b> Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.   |
|   | ALL LANDS within lease   | <b>Lease Notice:</b> Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required.<br><b>Lease Notice:</b> An inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approve by the Authorized Officer.  |
| <b>COC 58675</b><br>(1995)<br><b>Proposed Pad</b><br>B19OU<br>F18OU<br>G17OU<br>H19OU<br>J18OU<br>K18OU<br>P8OU | ALL LANDS within lease   | <b>No Surface Occupancy:</b> No surface use is allowed during 2/ 1 – 8/15 to protect raptors (including golden eagles, all accipiters, falcons [except kestrels], all buteos and owls) nesting and fledgling habitat during usage for ¼ mile around the nest site. Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15 or once the young have fledged and dispersed from the nest.<br><b>No Surface Occupancy:</b> To protect raptor nests within a 1/8 mile radius from the site. Exception may be granted depending on current usage or on the geographical relationship to topographic barriers and vegetation screening.<br><b>Controlled Surface Use:</b> Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.<br><b>Timing Limitation:</b> Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days of the closure.<br><b>Lease Notice:</b> Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required. |
|   | T8S R96W<br>Section 18: LOTS 3, 4<br>Section19: LOTS 1, 2                                      | <b>Controlled Surface Use:</b> Operations proposed within the area of an approved surface or underground coal mine will be relocated outside the area to be mined or to accommodate room and pillar mining operations. Exception criteria available.   |
| <b>COC 58676</b><br>(1995)<br><b>Proposed Pad</b><br>D29OU<br>K29OU   | T8S R96W<br>Section 13: E½SW¼,<br>SW¼SW¼<br>Section. 28: W½NW¼,<br>SE¼NW¼,SW, W½SE¼,<br>SE¼SE¼ | <b>Controlled Surface Use:</b> Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.   |

|   |  |  |
|---|--|--|
|   | Section 29: ALL  |  |
|   | ALL LANDS within lease   | <p><b>Lease Notice:</b> Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required.</p> <p><b>Lease Notice:</b> An inventory of fossil resources in Class I and II paleontological areas must be performed by an accredited paleontologist approve by the Authorized Officer.</p>   |
| <p><b>COC 58678</b><br/>(1995)<br/><b>Proposed Pad</b><br/><i>G30OU</i><br/><i>J31OU</i></p>  | ALL LANDS within lease   | <p><b>Controlled Surface Use:</b> Protection of fragile soils with submittal of plan of development demonstrating performance objectives and standards.</p> <p><b>Lease Notice:</b> Special biological and/or botanical inventory and special mitigative measures to reduce impacts of surface disturbance to the sensitive plant or animal species may be required.</p>   |
| <p><b>COC 64189</b><br/>(2000)<br/><b>Proposed Pad</b><br/><i>D33OU</i></p>   | T8S R96W<br>Section 33: N½NE¼  | <p><b>No Surface Occupancy:</b> To protect threatened or endangered species habitat. Exception Criteria: surface occupancy may be authorized pending Section 7 consultation with USFWS or CDOW (if state-listed). The Authorized Officer will consider the type and amount of surface disturbance, plant frequency and density, relative abundance of habitat, species and location, topography, and other related factors.</p> <p><b>No Surface Occupancy:</b> To protect 14 seclusion areas that provide high wildlife value. Exceptions may be granted based on approval by Authorized Officer of a mitigation plan that suitably addresses the wildlife seclusion values at risk.</p> <p><b>No Surface Occupancy:</b> To protect slopes over 30% with high visual sensitivity in the Interstate 70 viewshed. Exception would be granted if protective measures can be designed to accomplish VRM Class II objectives, namely that the overall landscape character would be retained.</p> <p><b>Controlled Surface Use:</b> For those species listed as sensitive by BLM and for significant natural plant communities, special design, construction and implementation measures, including relocation of operations by more than 200 meters may be required.</p> <p><b>Controlled Surface Use:</b> To protect erosive soils and slopes greater than 30%, special design, construction and implementation measures will be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to ensure successful reclamation.</p> |
|   | T8S R96W<br>Section 33: NE¼  | <p><b>No Surface Occupancy:</b> No surface use is allowed to protect slopes over 30% with high visual sensitivity in the I-70 viewshed (lands within 5 miles of the interstate). Exception would be granted if protective measures can be designed to accomplish VRM Class II objectives.</p> <p><b>No Surface Occupancy:</b> No surface use is allowed on steep slopes greater than 50% to maintain site stability and site productivity. This NSO does not apply to pipelines. Exception may be granted if lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures will protect the public interest.</p> <p><b>Timing Limitation:</b> Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.</p>   |
| <p><b>COC 64191</b><br/>(2000)<br/><b>Proposed Pad</b><br/><i>A21OU</i><br/><i>H20OU</i><br/><i>K20OU</i><br/><i>K21OU</i><br/><i>L19OU</i></p> | T8S R96W<br>Section 20: N½NW¼,<br>SE¼NW¼, SW¼NE¼,<br>NW¼SE¼<br>SEC. 21: N½ | <p><b>No Surface Occupancy:</b> To maintain proper function of riparian zones, activities associated with oil and gas exploration and development are restricted to an area beyond the outer edge of riparian vegetation. Exception may be granted (a)if Authorized Officer. Authorized Officer determines that activity will cause no loss of riparian vegetation, or that the vegetation lost van be replaced within 3-5 years with vegetation of like species and age class OR (b) within the riparian vegetation, an exception is permitted for stream crossings, if an area analysis indicates that no suitable alternative is available.</p>   |

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|--|--|--|
|  | T8S R96W<br>Section 21: NE¼, NE¼SE¼  | <b>No Surface Occupancy:</b> To protect 14 seclusion areas that provide high wildlife value. Exceptions may be granted based on approval by Authorized Officer of a mitigation plan that suitably addresses the wildlife seclusion values at risk.   |
|  | T8S R96W<br>Section 20: S½NE¼, NE¼SE¼, NE¼NW¼, SE¼NW¼, NW¼SE¼<br>Section 21: E½NW¼ | <b>No Surface Occupancy:</b> No surface use is allowed on steep slopes greater than 50% to maintain site stability and site productivity. This NSO does not apply to pipelines. Exception may be granted if lessee demonstrates that operations can be conducted without causing unacceptable impacts and that less restrictive measures will protect the public interest.   |
|  | T8S R96W<br>Section 20: N½, N½S½<br>Section 21: SW¼NW¼                             | <b>No Surface Occupancy:</b> To protect threatened or endangered species habitat. Exception Criteria: surface occupancy may be authorized pending Section 7 consultation with USFWS or CDOW (if state-listed). The Authorized Officer will consider the type and amount of surface disturbance, plant frequency and density, relative abundance of habitat, species and location, topography, and other related factors.<br><b>Controlled Surface Use:</b> For those species listed as sensitive by BLM and for significant natural plant communities, special design, construction and implementation measures, including relocation of operations by more than 200 meters may be required.   |
|  | T8S R96W<br>Section 21: E½NW¼  | <b>No Surface Occupancy:</b> No surface use is allowed to protect slopes over 30% with high visual sensitivity in the I-70 viewshed (lands within 5 miles of the interstate). Exception would be granted if protective measures can be designed to accomplish VRM Class II objectives.   |
|  | T8S R96W<br>Section 20: N½, N½S½<br>Section. 21: N½                                | <b>Controlled Surface Use:</b> To protect erosive soils and slopes greater than 30%, special design, construction and implementation measures will be required to limit the amount of surface disturbance, to reduce erosion potential, to maintain site stability and productivity, and to ensure successful reclamation.   |
|  | T8S R96W<br>Section 20: N½NW¼, SE¼NW¼, NE¼   | <b>Controlled Surface Use:</b> Within 500 feet of the outer edge of riparian or wetland vegetation, activities associated with oil and gas exploration and development may require special design, construction and implementation measures, including relocation of operations beyond 200 meters, in order to protect the values and functions of riparian and wetland zones.   |
|  | T8S R96W<br>Section 19: E½SW¼, SE¼, Lots 3 and 4                                   | <b>Timing Limitation:</b> Big Game Winter Habitat (12/1 - 4/30). Exception may be granted under mild winter conditions for the last 60 days after consultation with CDOW.  |
| <b>COC 64197<br/>(2000)<br/>Proposed Pad<br/>OM35<br/>OM36</b> | T8S R97W<br>Section 35: N½S½, S½SW¼, SW¼SE¼  | <b>Scenic &amp; Natural Values:</b> Special design and reclamation measures may be required to protect the outstanding scenic and natural landscape value of the Highway Corridor. Such measures may include transplanting trees and shrubs, fertilization, mulching, special erosion control structures, irrigation, site recontouring to match the original contour, buried tanks and low profile equipment, and painting to minimize visual contrasts. Surface disturbing activities may be denied in sensitive areas, such as unique geologic features and rock formation, visually prominent areas, and high recreation use areas. This stipulation may be waived or reduced in scope if circumstances change, or if lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concerns identified. |

|  |   |  |
|--|---|--|
|  | T8S R97W<br>Section 35: NE $\frac{1}{4}$ SE $\frac{1}{4}$ ,<br>SW $\frac{1}{4}$ SE $\frac{1}{4}$<br>Section 36: NW $\frac{1}{4}$ SW $\frac{1}{4}$ | <b>Steep Slope:</b> In order to avoid or mitigate unacceptable impacts to soil, water, and vegetation resources on land with greater than 40 percent slopes, special design practices may be necessary and higher than normal costs may result. Where impacts cannot be mitigated to the satisfaction of Authorized Officer, no surface-disturbing activities shall be allowed. This stipulation may be waived or reduced in scope if circumstances change, or if lessee can demonstrate that operations can be conducted without causing unacceptable impacts on the concerns identified. |
|--|---|--|

## Appendix A

### **13-Point Surface Use Plan Submitted by EnCana Oil & Gas (USA) Inc.**

## 1. EXISTING ROADS

- A. The proposed wellsite is staked and reference stakes are present as shown on attached Topo maps.
- B. Access Roads – refer to Topo maps “A” and “B”.
- C. Access Roads within a one-mile radius – refer to Topo map “B”.
- D. The existing roads will be maintained in the same or better condition as existed prior to the commencement of operations and said maintenance will continue until final abandonment and reclamation of the well location. Excessive rutting or other surface disturbance will be avoided. Operations will be suspended temporarily during adverse weather conditions if excessive rutting is occurring when access routes are wet, soft, or partially frozen.

## 2. PLANNED ACCESS ROAD

All proposed access roads are shown on Topo map “B”.

- A. Width maximum – 30 feet overall right-of-way with an 18-foot road running surface, crowned and ditched and/or sloped and dipped.
- B. Construction standard: The road will be constructed to meet the standards of the anticipated traffic flow and all weather requirements. Construction will include ditching, draining, crowning and capping or sloping and dipping the roadbed as necessary to provide a well-constructed and safe road.

Prior to construction/upgrading the roadway shall be cleared of any snow cover and allowed to dry completely.

Traveling off of the thirty (30) foot right-of-way will not be allowed.

Road drainage crossings shall be of the typical dry creek drainage crossing type. Crossings shall be neither designed so they will not cause siltation or the accumulation of debris in the drainage crossing nor shall the drainages be blocked by the roadbed. Diverting water off at frequent intervals by means of cutouts shall prevent erosion of the drainage ditches by runoff water.

Upgrading shall not be allowed during muddy conditions. Should mud holes develop, they will be filled in and detours around them avoided.

- C. Maximum grade – the average grade will be 10% or less, wherever possible. The 10% grade will only be exceeded in areas where physical terrain or unusual circumstances require it.
- D. Drainage design – the access road will be crowned and ditched or sloped and dipped, and water turnouts installed as necessary to provide proper drainage along the access road route.
- E. Turnouts will be constructed along the access route as necessary or required to allow for the safe passage of traffic.
- F. Culverts – none will be required unless otherwise specified during the onsite inspection.
- G. Surface materials – surfacing materials will consist of native soil. If any additional surfacing materials are required they will be purchased from a local contractor having a permitted source of materials in the area. None are anticipated at this time.
- H. Gates, cattle guards or fence cuts – none required unless specified during the onsite inspection.

- I. Road maintenance – during both the drilling and production phase of operations, the road surface and shoulders will be kept in a safe and legal condition and will be maintained in accordance with the original construction standards. The access road right-of-way will be kept free of trash during operations.
- J. The proposed access road has been centerline flagged.
- K. Dust will be controlled on the roads and locations during construction and drilling by periodic watering of the roads and locations.

**3. LOCATION OF EXISTING WELLS WITHIN A ONE MILE RADIUS**

Please refer to Topo Map “C”.

**4. LOCATION OF EXISTING AND/OR PROPOSED FACILITIES**

- A. At each drill location, surface disturbance will be kept to a minimum. Each drill pad will be leveled using cut and fill construction techniques as noted in the attached survey.
- B. Should drilling result in established commercial production the following will be shown:
  - 1. Proposed location and attendant lines, by flagging, if off well pad.
  - 2. Dimensions of facilities.
  - 3. Construction methods and materials.
  - 4. Protective measures and devices to protect livestock and wildlife.
  - 5. All buried pipelines will be buried to a depth of 3 feet, except at road crossing where they will be buried to a depth of 4 feet.
  - 6. Construction width of the right-of-way/pipeline route shall be restricted to 60 feet of disturbance.
  - 7. Pipeline location warning signs shall be installed within 90 days after construction is completed.
  - 8. EnCana shall condition pipeline right-of-ways in a manner to preclude vehicular travel upon said rights-of-way, except for access to pipeline drips and valves.
  - 9. Pipeline right-of-way will be requested on the APD. ROW request is for 60’ for construction of working surface during construction. After construction is complete 30’ is to be rehabilitated leaving a 30’ working surface. In the event production is established this well will be tied-in to an existing pipeline as shown in Topo map “D”.
  - 10. The area used to contain the proposed production facilities will be built using native materials. If these materials are not acceptable, arrangements will be made to acquire appropriate materials from private sources.
  - 11. A dike will be constructed completely around any production facilities which contain fluids (i.e. production tanks, produced water tanks, etc.) These dikes will be constructed of compacted subsoil, be impervious, hold 110% of the capacity of the largest tank, and be independent of the back cut.
  - 12. All permanent (onsite for six months or longer) above-the-ground constructed or installed, including pumping units, will be painted a flat non-reflective, earthtone color to match one of the standard environmental colors as determined by the five State Rocky Mountain Interagency committee. All production facilities will be painted within six months of installation. Facilities that are required to comply with Occupation Health and Safety Act Rules and Regulations will be excluded from this painting requirement.
  - 13. The production (emergency) pit will be 8 feet in diameter and 8 feet deep. It will be lined with corrugated steel with a steel mesh cover.
  - 14. If different production facilities are required, a sundry notice will be submitted.

- C. EnCana Oil & Gas (USA) Inc. shall protect all survey monuments, witness corners, reference monuments and bearing trees in the affected areas against disturbance during construction, operation, maintenance and termination of the facilities authorized herein.

EnCana Oil & Gas (USA) Inc. shall immediately notify the authorized officer in the event that any corners, monuments or markers are disturbed or are anticipated to be disturbed. If any monuments, corner or accessories are destroyed, obliterated or damaged during construction, operation or maintenance, EnCana shall secure the services of a Registered Land Surveyor to restore the disturbed monuments, corner or accessories, at the same location, using surveying procedures found in the Manual of surveying Instructions for the Survey of the public Lands of the United States, latest edition. EnCana shall ensure that the Registered Land Surveyor properly records the survey in compliance with the Colorado Revised Statutes 38-53-101 through 38-53-112 (1973) and shall send a copy to the authorized officer.

- D. During drilling and subsequent operations, all equipment and vehicles will be confined to the access road right-of-way and any additional areas as specified in the approved Application for Permit to Drill.
- E. Reclamation of disturbed areas no longer needed for operation will be accomplished by grading, leveling and seeding as recommended by the Bureau of Land Management.

EnCana Oil & Gas (USA) Inc. will be responsible for road maintenance from the beginning to completion of operations.

## **5. LOCATION AND TYPE OF WATER SUPPLY**

- A. Water to be used for the drilling of these wells will be hauled by truck over the roads described in item #1 and item #2, from the nearest water supply. Water volume used in drilling operation is dependent upon the depth of the well and any losses that might occur during drilling.

## **6. SOURCE OF CONSTRUCTION MATERIALS**

- A. All access roads crossing Federal land are described under Item #2, and shown on the Orchard II Unit GAP Map.
- All construction material for these location sites and access roads shall be borrowed material accumulated during the construction of the location sites and access roads. No additional construction material from other sources is anticipated at this time. If in the future it is required, the appropriate actions will be taken to acquire it from private sources.
- A. All trees on the locations, access road, and proposed pipeline routes shall be disposed of by one of the following methods:
1. Trees shall be cut with a maximum stump height of six inches (6") and cut to 4-foot lengths and stacked off location. Trees will not be dozed off the location or access road, except on private surface where trees may be dozed. Trees may also be dozed on pipeline routes and then pulled back onto right-of-way as part of final reclamation.
  2. Limbs may be scattered off location, access road or along the pipeline, but not dozed off.

Rootballs shall be buried or placed off location, access road, or pipeline route to be scattered back over the disturbed area as part of the final reclamation.

## **7. METHODS OF HANDLING WASTE MATERIALS**

### **A. Cuttings.**

- a) If a closed loop system is used, cuttings will be moved through a shaker system on the drill rig that captures drilling fluids from the cuttings. The cuttings are typically placed on the pad location within a containment berm until enough are collected to mix with Solibond to further dry and achieve a solid state. The solidified cuttings typically remain on the pad location and are spread on location during the interim reclamation phase of the pad when excavation equipment is used to reshape and contour the pad. If a drill rig with closed-loop system is not available when the proposed wells are scheduled for drilling, an open pit rig with an excavated reserve pit would be used to drill the wells. The drilling plan and survey plats included in the APDs submitted to the BLM would specify the planned drilling system (closed-loop or open pit).
  - b) If a closed loop system is not available and a reserve or production pit is required, it will be constructed on the existing location and will not be located in natural drainages where a flood hazard exists or surface runoff will destroy or damage the pit walls. All pits will be constructed so as not to leak, break, or allow the discharge of liquids there from.
- B. Produced fluids – liquid hydrocarbons produced during completion operations will be placed in test tanks on the location. Produced wastewater will be confined to a lined pit (reserve pit) or storage tank for a period not to exceed ninety (90) days after initial production. During the permanent disposal method and location, along with the required water analysis shall be submitted for the Authorized Officer’s approval. Failure to file an application within the time frame allowed will be considered an incidence of noncompliance.**
- C. Sewage- self-contained, chemical toilets will be provided for human waste disposal. Upon completion of operations, or as needed, the toilet holding tanks will be pumped and the contents thereof disposed of in the nearest, approved, sewage disposal facility.**
- D. Garbage and other waste material – garbage, trash and other waste materials will be collected in a portable, self-contained and fully – enclosed trash cage during drilling and completion operations. Upon completion of operations (or as needed) the accumulated trash will be disposed of at an authorized sanitary landfill. No trash will be burned on location or placed in the reserve pit.**
- E. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash cage will be cleaned up and removed from the well location. No adverse materials will be left on the location. Any open pits will be maintained until such time as the pits are backfilled.**
- F. Any spills of oil, gas, salt water or other potentially hazardous substances will be reported immediately to the BLM, and other responsible parties, and will be mitigated immediately, as appropriate, through clean up or removal to an approved disposal site.**

## **8. ANCILLARY FACILITIES**

Self-contained travel-type trailers may be used on site during drilling operations. Standard drilling operation equipment to be on location will include: drilling rig with associated equipment; living facilities for company representative, tool pusher, mud logger, directional driller; toilet facilities and trash containers.

Facilities other than those described in this surface use plan to support drilling operations will be submitted to the Authorized Officer via a sundry notice (form 3160-5) for approval prior to commencing operations.

## **9. WELLSITE LAYOUT**

- A. The attached location plat specifies the drill site layout as staked. Cross sections have been drafted to visualize the planned cuts and fills across the location. An average minimum of six (6) inches of topsoil will be stripped from the location (including the areas of cut, fill and/or subsoil storage) and stockpiled for future reclamation of the well site. The stockpiled soil will be seeded within 48 of completion of the pad.
- B. A production schematic showing the proposed production facility layout is attached.
- C. The reserve pit and blooie pit will be constructed as a combination pit capable of holding approximately four times the TD hole volume. The pits were combined, as these are gas wells and there will be no danger of the accumulation of hydrocarbons that could result in a potential safety hazard. The blooie pit might be used for testing, but only after the drilling is completed and the drilling equipment and personnel are off the well site location. In the event that drilling fluid (mud) will have to be used then this pit will also serve as the reserve pit. The reserve pit will be lined to prevent seepage.

This requirement may be waived by the Bureau of Land Management upon receipt of additional information from EnCana Oil & Gas (USA) Inc. concerning the location of fresh water aquifers and potential flow rates, chemical analyses of waters from the aquifers, and information concerning both the mechanics and nature of the air mist drilling system including any additives used therein.

- D. Prior to the commencement of drilling operations, the reserve pit will be fenced on three (3) sides using three strands of barbed wire according to the following minimum standards:
  - 1. Corner posts shall be cemented and/or braced in such a manner to keep the fence tight at all times.
  - 2. Standard steel, wood, or pipe posts shall be used between the corner braces. The maximum distance between any two (2) posts shall be no greater than sixteen (16) feet.
  - 3. All wire shall be stretched using a stretching device before it is attached to the corner posts.

The fourth side of the reserve pit will be fenced immediately upon removal of the drilling rig and the fencing will be maintained until the pit is backfilled.

- E. Any hydrocarbons on the pit will be removed from the pit as soon as possible after drilling operations are completed.
- F. Operator will notify the Authorized Officer at least three (3) working days prior to construction of the well pad and/or related facilities and within two (2) working days after completion of the well pad.

#### **10. PLANS FOR RECLAMATION OF THE SURFACE:**

The BLM will be contacted prior to commencement of any reclamation operations.

- A. Production
  - 1. Immediately upon well completion, the well location and surrounding areas(s) will be cleared of all debris, materials, trash and junk not required for production.
  - 2. Immediately upon well completion, any hydrocarbons in the pit shall be removed in accordance with 43CFR 3162.7-1.
  - 3. Before any dirt work to restore the location takes place, the reserve pit will be completely dry and all cans, barrels, pipe, etc. will be removed.

Other waste and spoil materials will be disposed of immediately upon completion of drilling and workover activities.

4. The reserve pit and that portion of the location and access road not needed for production facility/operations will be reclaimed within ninety (90) days from the date of well completion, weather permitting.
5. If the well is a producer, EnCana will upgrade and maintain access roads as necessary to prevent soil erosion, and accommodate year round traffic. Areas unnecessary to operations will have areas reshaped. Topsoil will be redistributed and disked. All areas outside the work area will be re-seeded according to the Bureau of Land Management recommendations for seed mixture.
6. If the well is abandoned or a dry hole, EnCana will restore the access road and location to approximately the original contours. During reclamation of the site, fill material will be pushed into cuts and up over the backslope. No depressions will be left that will trap water or form ponds. Topsoil will be distributed evenly over the location and seeded according to the recommended seed mixture. The access road and location shall be ripped or disked prior to seeding. Perennial vegetation must be established. Additional work shall be required in case of seeding failures, etc.

Seedbed will be prepared by disking then roller packing following the natural contours. Seed will be drilled on contours at a depth no greater than one-half inch (1/2). In areas that cannot be drilled, seed will be broadcast at double the seeding rate and harrowed into soil. Certified seed will be used whenever available.

Fall seeding will be completed after September 1, and prior to prolonged ground frost. To be effective, spring seeding will be completed after the frost has left the ground and prior to May 15<sup>th</sup>.

7. Upon completion of backfilling, leveling and recontouring, the stockpiled topsoil will be evenly spread over the reclaimed areas(s). Prior to reseeded, all disturbed surfaces will be scarified and left with a rough surface. No depressions will be left that would trap water and form ponds. All disturbed surfaces will be re-seeded with a seed mixture to be recommended by the BLM.

Seed will be drilled on the contour to approximately a depth of one-half (1/2) inch. All seeding will be conducted after September 1 and prior to ground frost. Spring seeding will be done after the frost leaves the ground and no later than May 15<sup>th</sup>. If the seeding is unsuccessful, EnCana may be required to make subsequent seedings.

#### B. DRY HOLE/ABANDONED LOCATIONS

- A. On lands administered by the BLM, abandoned well sites, roads or other disturbed areas will be restored to near their original condition.  
This procedure will include:
  1. Re-establishing irrigation systems where applicable,
  2. Re-establishing soil conditions in irrigated field in such a way as to ensure cultivation and harvesting of crops and,
  3. Ensuring revegetation of the disturbed areas to the specification of the BLM at the time of abandonment.
- B. All disturbed surfaces will be recontoured to the approximate natural contours and re-seeded according to BLM specifications. Reclamation of the well pad and access road will be performed as soon as practical after final abandonment and

reseeding operations will be performed in the fall or spring following completion of reclamation operations.

## **11.SURFACE OWNERSHIP**

Surface ownership may be either Fee or Federal and is noted on the APD.

## **12. OTHER INFORMATION**

- a. A Class III Cultural Resource Inventory of the proposed drill sites, access roads and other facilities on Federal lands has been conducted and a report filed with the appropriate BLM office.
- b. If archaeological, historical or vertebrate fossil materials are discovered during the course of any construction activities, EnCana will suspend all operations that further disturb such materials and immediately contact the appropriate BLM office. Operations in the area of discovery will not resume until written authorization to proceed has been issued by the BLM Authorized Officer (AO).
- c. EnCana will be fully responsible for the actions of their subcontractors. A copy of the approved APD and Conditions of Approval will be on location during drilling and completion operations.
- d. Any construction activity in the areas shall be done with awareness that many natural gas pipelines are buried. Some are apparent as to location; some have grown over with weeds and brush. It is suggested that the contractor contact the operators in the area to locate all lines before digging.

## **13. REPRESENTATIVES AND CERTIFICATION**

- A. Representative:  
RuthAnn Morss  
EnCana Oil & Gas (USA) Inc.  
370 17<sup>th</sup> Street, Suite 1700  
Denver, CO 80202  
(720)-876-5060

All lease and/or unit operations will be conducted in such a manner that full compliance is made with all applicable laws, regulations, Onshore Oil and Gas Orders, the approved Plan of Operations, and any applicable Notice to Lessees.

The Operator will be fully responsible for the actions of its subcontractors. A complete copy of the approved Application for Permit to Drill will be furnished to the field representatives to ensure compliance and shall be on location during all construction and drilling operations.

- B. Representative Certification:

I hereby certify that I, or persons under my supervision, have inspected the proposed drill site and access route, and I am familiar with the conditions that currently exist; that the statements made in this plan are, to the best of my knowledge, true and correct and the work associated with the operations proposed herein will be performed by the Operator, its contractors, and subcontractors conformity with this plan and the terms and conditions under which is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.



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RuthAnn Morss  
EnCana Oil & Gas (USA) Inc.  
(720) 876-5060  
January 22, 2007  
(Revised December 12, 2007)

## Appendix B

### **10-Point Drilling Plan Submitted by EnCana Oil & Gas (USA) Inc.**

All lease and/or unit operations will be conducted in such a manner that full compliance is made with applicable laws, regulations (43CFR3100), Onshore Oil and Gas Orders No. 1 and No. 2 and the approved Plan of Operations. The Operator is fully responsible for the actions of its subcontractors. A copy of the Conditions of Approval will be furnished to the field representatives to ensure compliance.

EnCana Oil & Gas (USA) Inc. will be operating under its Nationwide Bond # RLB0004733.

**1. Estimated Tops of Important Geologic Markers**

- a. Formations and depths will be submitted with the site specific APD.

**2. Estimated Depths of Anticipated Water, Oil Gas or Mineral Formations**

- a. The proposed casing and cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use.

The surface casing shall be cemented back to surface either during the primary cement job or by remedial cementing.

**3. Pressure Control Equipment**

- a. Minimum working pressure on rams and BOPE will be 3,000 psi.
- b. Function test and visual inspection of the BOP will be conducted daily and noted in the IADC Daily Drilling Report.
- c. Both high and low pressure tests of the BOPE will be conducted.
- d. The Annular BOP will be pressure tested to a minimum of 50% of its rated working pressure.
- e. Blind and Pipe Rams/BOP will be tested to a minimum of 100% of rated working pressure (against a test plug)
- f. BOP testing procedures and testing frequency will conform to Onshore Order No. 2.
- g. BOP remote controls shall be located on the rig floor at a location readily accessible to the driller. Master controls shall be on the ground at the accumulator and shall have the capability to function all preventors.
- h. The kill line shall be 2" minimum and contain two kill line valves, one of which shall be a check valve.
- i. The choke line shall be 3" minimum and contain two choke line valves (3" minimum).
- j. The choke and manifold shall contain two adjustable chokes.
- k. Hand wheels shall be installed on all ram preventors.
- l. Safety valves and wrenches (with subs for all drill string connections) shall be available on the rig floor at all times.
- m. Inside BOP or float sub shall also be available on the rig floor at all times.
- n. Upper Kelly cock valve (with handle) shall be available at all times.

Proposed BOP and Choke Manifold arrangements are attached.

| <b>Casing</b>        | <b>Depth</b>            | <b>Hole Size</b> | <b>Size</b> | <b>Weight</b> | <b>Grade</b>         | <b>Cement Volume</b>   |
|----------------------|-------------------------|------------------|-------------|---------------|----------------------|--|
| Conductor            | 0-40'                   | +/- 24"          | 16"         | 0.25"<br>Wall | X42                  | +/- 5 yds ready mix (to surface)                                       |
| Surface              | Surface to 630' - 1500' | 12 1/4"          | 8 5/8"      | 24#           | J-55, STC<br>All New | ± 450 sks - ± 1060sks<br>Class (G)<br>15.8ppg 1.17 ft <sup>3</sup> /sx |
| Production Option #1 | 0' - 6300'              | 7-7/8"           | 5 1/2"      | 17#           | I-80, LTC<br>All New | 450 - 650 sx TXI<br>13.5 ppg 1.26 ft <sup>3</sup> /sx                  |
| Production Option #2 | 0' - 6300'              | 7 7/8"           | 4 1/2"      | 11.6#         | I-80 LTC<br>New      | 550 - 750 sx TXI<br>13.5 ppg 1.26 ft <sup>3</sup> /sx                  |

#### **4. Proposed Casing and Cementing Program**

- a. The specific casing setting depths will vary depending on well location and drilling conditions. The depths listed in the table give the approximate anticipated setting depth.
- b. The contingency string will be in situations in which severe drilling conditions are encountered. Hazards such as severe lost circulation or hole stability problems would warrant the use of a contingency string.
- c. The proposed casing and cementing program shall be conducted as approved to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. Determination of casing setting depth shall be based on all relevant factors, including: presence/absence of hydrocarbons, fracture gradients, usable water zones, formation pressures, lost circulation zones, other minerals or other unusual characteristics.
- d. All casing, except conductor casing, shall be new or reconditioned and tested. Approval will be obtained from the Authorized Officer prior to using reconditioned casing. Used casing shall meet or exceed API standards for new casing.
- e. The surface casing shall be cemented back to surface either during the primary cement job or by remedial cementing. Cement volumes based on 100% excess above annular volume; or as required based on field experience to ensure cement is circulated to surface. If drive pipe is used, it may be left in place its total length is less than twenty feet below the surface. If the total length of the drive pipe is equal to or greater than twenty feet, it will be pulled prior to cementing surface casing, or it will be cemented in place.
- f. Surface casing shall have centralizers on the bottom three joints, with a minimum of one centralizer per joint.
- g. Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a suitable pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud being displaced ahead of the cement slurry.
- h. All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string length or to 1500 psi, whichever is greater, but not to exceed 70% of the minimum internal yield. If pressure declines more than 10% in 30 minutes, corrective action shall be taken.
- i. Casing design is subject to revision based on geologic conditions encountered.

**5. Proposed Casing and Cementing Programs:**

a. Surface casing @ 1500' MD; 8-5/8" 24# J-55 STC

Purpose: Protect shallow fresh water and contain MASP to TD

Maximum anticipated mud weight at surface casing depth: = 9.0 ppg

Maximum anticipated mud weight at TD: = 9.0 ppg

Maximum anticipated equivalent formation pressure at TD = 7.7 ppg

| Casing String |                |        |            | Casing Strength Properties |             |                   | Minimum Design Factors |       |         |
|---------------|----------------|--------|------------|----------------------------|-------------|-------------------|------------------------|-------|---------|
| Size          | Weight (lb/ft) | Grade  | Connection | Collapse (psi)             | Burst (psi) | Tensile (1000 lb) | Collapse               | Burst | Tension |
| 8-5/8"        | 24             | J/K-55 | STC        | 1370                       | 2950        | 244               | 1.00                   | 1.10  | 1.50    |

**Collapse Design:**

Evacuated 8-5/8" 24# J-55 casing with 9.0 ppg drilling fluid density:

Load =  $9.0 \times 0.052 \times 1500'$  = 702 psig

Rating: = 1370

S.F. = 1.9

**Burst Design:** Assume kick with partially evacuated hole and an influx gradient of 0.22 psi/ft.

8-5/8" 24# J-55

MASP (Load) =  $6300' \times (0.4 - 0.22)$  psi/ft = 1134 psig

Rating: = 2950 psig

S.F. = 2.6

**Tensile Design:** Designed on Air Weight \* Buoyancy + overpull margin

8-5/8" 24# J-55

Rating: = 372,000 lbs

Load:  $1500' \times 24# \times 0.862 + 100,000$  lbs (OPM) = 131,032 lbs

S.F. = 2.8

b. Production Casing @ 6300' MD; 4-1/2" 11.6# OR 5-1/2" 17# I-80, LTC

Maximum Anticipated Mud Weight at Total Depth = 9.0 ppg

Maximum Anticipated Equivalent Formation Pressure at Total Depth = 7.7 ppg

Maximum Surface Treating Pressure for Fracturing Operations = 7000 psig

Assumed Gas Gradient for Production Operations = 0.115 psi/ft

| Casing String |                |       |            | Casing Strength Properties |             |                   | Minimum Design Factors |       |         |
|---------------|----------------|-------|------------|----------------------------|-------------|-------------------|------------------------|-------|---------|
| Size          | Weight (lb/ft) | Grade | Connection | Collapse (psi)             | Burst (psi) | Tensile (1000 lb) | Collapse               | Burst | Tension |
| 5-1/2"        | 17             | I-80  | LTC        | 6260                       | 7740        | 348               | 1.00                   | 1.10  | 1.3     |
| 4-1/2"        | 11.6           | I-80  | LTC        | 6350                       | 7780        | 212               | 1.00                   | 1.10  | 1.3     |

**Collapse Design:** Designed on evacuated casing properties with 9.0 ppg drilling fluid density with no internal back-up.

5-1/2" 17# I-80 Weakest Collapse Resistance

5-1/2" 17# I-80 from 0' to 6300'

Load =  $9.0 \times 0.052 \times 6300'$  = 2948 psig

Rating = 6260 psig

S.F. = 2.1  
 Burst Design: Assume maximum surface shut-in pressure during production, and maximum surface treating pressure during fracture stimulation operations.

*5-1/2" 17# I-80 Weakest Burst (Internal Yield) Resistance*  
 Design Consideration #1: Maximum Surface Shut-In Pressure  
 Design Point #1: 5-1/2" 17# I-80 from 0' to 6300'  
 MASSIP (Load) = 6300'\*(0.40-0.115) psi/ft = 1795 psig  
 Rating = 7740 psig  
 S.F. = 4.3

Design Consideration #2: Maximum Surface Treating Pressure During Frac Operations  
 Design Point #1: 5-1/2" 17# I-80 from 0' to 6300'  
 MATP: = 7000 psig  
 Rating: = 7740 psig  
 S.F. = 1.1

Design Point #2: 5-1/2" 17# I-80 @ TD  
 Load: Frac grad – FW frac fluid:  
 (0.75-0.433) psi/ft\*6300' = 1997 psig  
 Rating: = 7780 psig  
 S.F. = 3.8

Tensile Design: Designed on Air Weight \* Buoyancy + overpull margin

*Tensile design loads are a function of the casing weight; therefore, both varieties of casing are tested below.*

Design Option #1 – 5-1/2" 17# I-80 LTC at surface  
 Load = (6300' \* 17 lb/ft \* 0.862) + 100,000 lbs (OPM) = 192,320 lbs  
 Rating = 348,000 lbs  
 S.F. = 1.8

Design Option #2 – 4-1/2" 11.6# I-80 LTC at surface  
 Load = (6300' \* 11.6 lb/ft \* 0.862) + 100,000 lbs (OPM) = 162,994 lbs  
 Rating = 212,000 lbs  
 S.F. = 1.3

\*Cementing Volume Design Clarification:

**Surface Casing @ 630' to 1500':**

\*Cement designed to cover the entire string with 100% excess.

**Production Casing**

\*Designed to 200' above top of Mesaverde/Ohio Creek formation. Volume assumes 7-7/8" gauge hole diameter plus 30%.

\*If open-hole logs are run, cement volumes will be determined from the caliper plus 10% excess.

**6. Directional Drilling Program**

An S-shaped directional design will be used to reach the targeted bottom hole locations. In general, a target radius of 200' will be used. Specific directional plans for each well will be included with the APD.

**7. Proposed Drilling Fluids Program**

| DEPTH      | MUD TYPE        | DENSITY<br><i>Lb/gal</i> | VISCOSITY<br><i>(sec/qt)</i> | FLUID<br>LOSS <i>(cc)</i> |
|------------|-----------------|--------------------------|------------------------------|---------------------------|
| 0' – 1500' | Fresh Water Gel | 8.4 - 9.0                | 28 – 35                      | NC                        |
| 1500' – TD | LSND            | 8.8 – 9.0                | 35 – 45                      | 5 - 15 cc                 |

- a. The drilling fluids have been designed for optimal wellbore hydraulics and hole stability.
- b. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers.

**Proposed Alternative Drilling Fluids Program**

In the event that geological conditions permit, an unconventional drilling system may be utilized. Fluids in the system include, but are not limited to, air/nitrogen, mist, foam, and aerated muds. Below listed are three unconventional fluid options and physical characteristics.

| DEPTH      | MUD TYPE     | DENSITY<br><i>lbs/gal</i> | VISCOSITY<br><i>(Equivalent YP)</i> | FLUID<br>LOSS <i>(cc)</i> |
|------------|--------------|---------------------------|-------------------------------------|---------------------------|
| 1500' - TD | Air/N2, Mist | <0.5                      | 5                                   | N/A                       |
| 1500' - TD | Foam         | 0.5 – 4                   | 20                                  | <5                        |
| 1500' - TD | Aerated Mud  | 4-8                       | 8-25                                | 5-10                      |

**8. Testing, Coring and Logging**

- a. Drill Stem Testing – none anticipated
- b. Coring – As deemed necessary by geology
- c. Mud Logging – Optional
- d. Logging:
 

|                   |   |
|-------------------|---|
| <u>Open Hole</u>  | <u>Logging Interval</u>                                   |
| PEX (Optional)    | AIT-GR-Neutron/Litho-Density<br>From TD to surface casing |
| <br>              |   |
| <u>Cased Hole</u> | <u>Logging interval</u>                                   |
| CBL/CCL/GR/VDL    | As needed for perforating control                         |
| RST               | In lieu of PEX  |

**9. Air/Mist Drilling**

The following equipment will be in place and operational during air/gas drilling:

- Properly lubricated and maintained rotating head
- Spark arrestor on engines or water cooled exhaust
- Blooie line discharge 100 feet from well bore and securely anchored
- Straight run on blooie line
- Deduster equipment

- All cuttings and circulating medium shall be directed into a reserve or blooie pit
- Float valve above bit
- Automatic igniter or continuous pilot light on the blooie line
- Compressors will be located in the opposite direction from the blooie line a minimum of 100 feet from the wellbore
- Mud circulating equipment, water, and mud materials sufficient to maintain the capacity of the hole and circulating tanks or pits

**10. Abnormal Pressures or Temperature**

a. This area is known to be underpressured. Lost circulation has been experienced in offset wells. Barite and a selection of “sized” lost circulation materials will be kept on location during drilling operations.

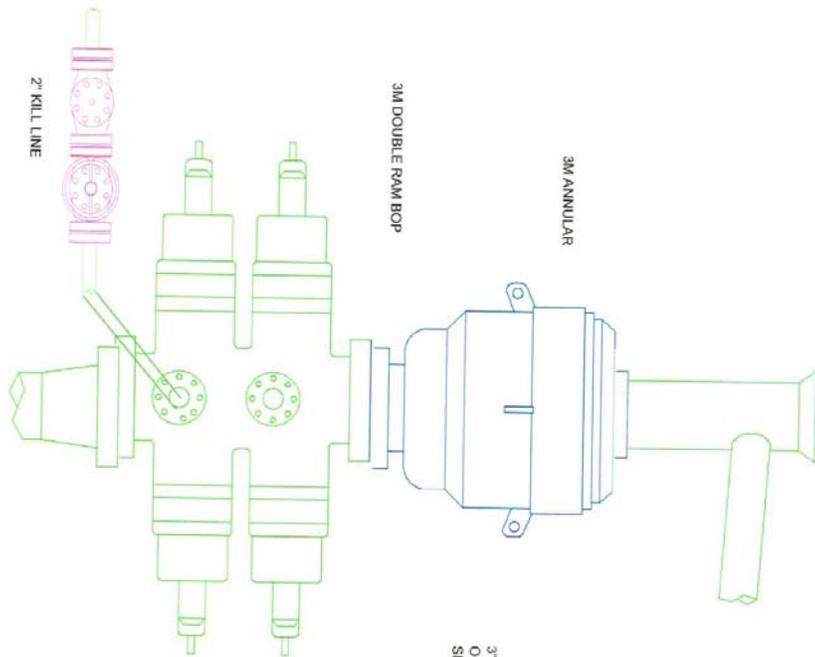
The anticipated bottom hole pressure is  $6300 \times 0.40 \text{ psi/ft} = 2520 \text{ psi}$

The maximum anticipated surface pressure is  $6300 \times (0.4 - 0.22) \text{ psi/ft} = 1134 \text{ psi}$

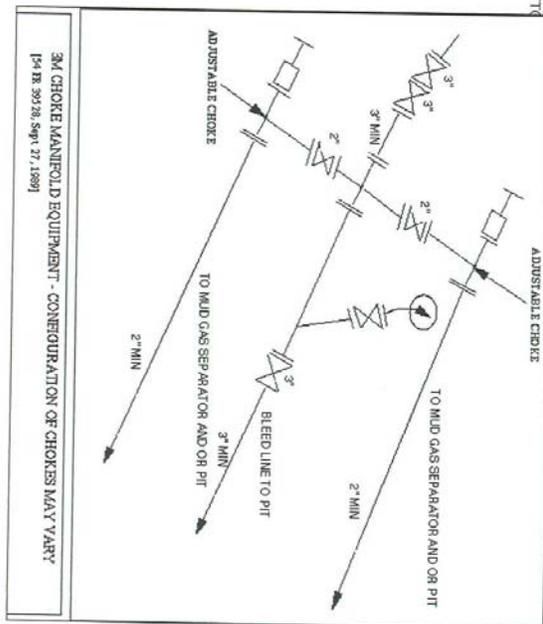
b. No hydrogen sulfide has been encountered or is known to exist from previous drilling in the area at this depth.

**11. Anticipated Start Date and Duration of Operations**

Drilling operations are expected to require  $\pm 12$  days on each well. Completion operations are anticipated to begin within 15 days of finishing the drilling portion of the last well on each pad. Completion operations will require approximately 30 days.

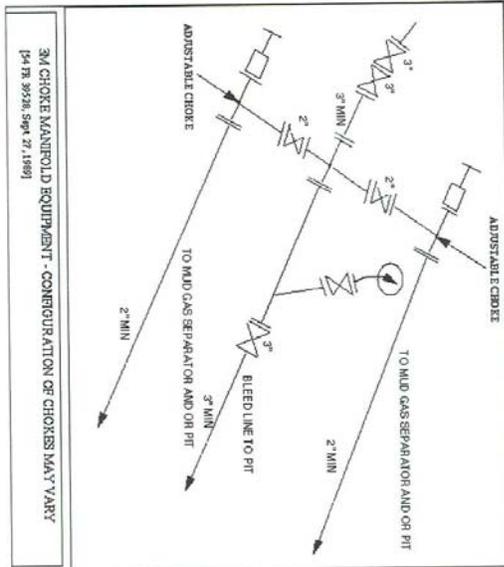
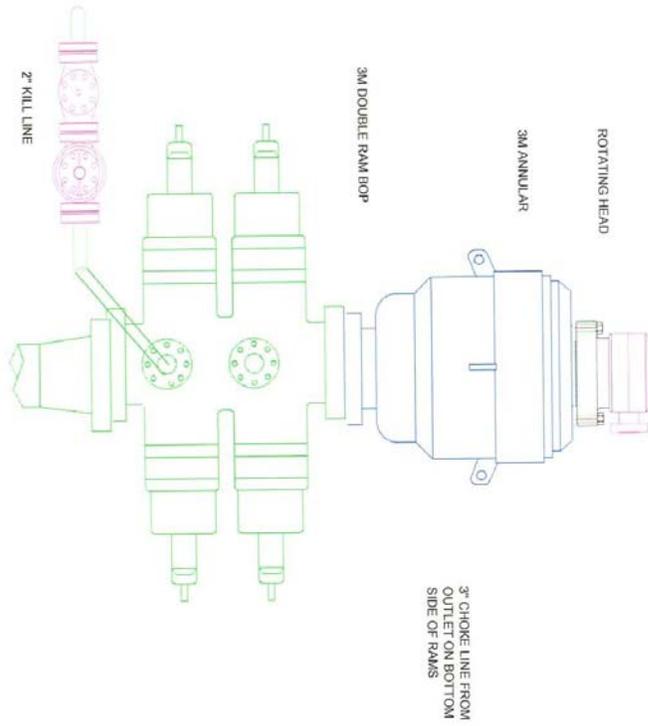


3" CHOKE LINE FROM  
OUTLET ON BOTTOM  
SIDE OF RAMS



ATTACHMENT A

3M BOP-48



3M BOP w/ Red Head kit

ATTACHMENT B

Appendix C

**Standard Conditions of Approval**

## Down Hole - Standard Conditions of Approval

### NOTIFICATION REQUIREMENTS

- Location Construction - at least forty-eight (48) hours prior to construction of location and access roads.
- Spud Notice - at least twenty-four (24) hours prior to spudding the well.
- Casing String and Cementing - at least twenty-four (24) hours prior to running casing and cementing all casing strings.
- BOP and Related Equipment Tests - at least twenty-four (24) hours prior to initiating pressure tests.
- First Production Notice - within five (5) business days after new well begins, or production resumes after well has been off production for more than ninety (90) days.
- Reclamation - at least (24) hours prior to re-shaping the well pad.

For more specific details on notification requirements, please check the Conditions of Approval for Notice to Drill and Surface Use Program.

### REGULATORY REMINDERS

Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease, which would entitle the applicant to conduct operations thereon.

All lease and/or unit operations will be conducted in such a manner that full compliance is made with applicable laws, regulations (43 CFR 3100), Onshore Oil and Gas Orders, and the approved plan of operations. The operator is fully responsible for the actions of his subcontractors.

A copy of the approved application for permit to drill (APD), including the conditions of approval and accompanying surface use plan will be furnished to the field representative by the operator to insure compliance and will be available to authorized personnel at the drill site whenever active construction or drilling operations are underway.

Fire restrictions may be in effect when location is being constructed and/or when well is being drilled. Contact the appropriate Surface Management Agency for information.

#### A. DRILLING PROGRAM

All operations, unless otherwise specifically approved in the APD, must be conducted in accordance with Onshore Oil and Gas Order No. 2.

##### 1. Estimated Depth at Which Oil, Gas, Water, or Other Mineral Bearing Zones are Expected to be Encountered

Any usable water zones encountered below the surface casing shall be isolated and or protected by cementing across the zone. The minimum requirement is to cement from 50 feet above to 50 feet below each usable water zone encountered.

If gas is found to be present in the Wasatch formation, then the zone will need to be isolated either by the primary cement job or remedial cementing.

2. Pressure Control Equipment

The BOP and related equipment shall meet the minimum requirements of Onshore Oil and Gas Order No. 2 for equipment and testing requirements, procedures, etc., for a 3M system and individual components shall be operable as designed. Chart recorders shall be used for all pressure tests.

3. Mud Program and Circulating Medium

Hazardous substances specifically listed by the EPA as a hazardous waste or demonstrating a characteristic of a hazardous waste will not be used in drilling, testing, or completion operations.

No chromate additives will be used in the mud system on Federal and Indian lands without prior BLM approval to ensure adequate protection of fresh water aquifers.

4. Coring, Logging and Testing Program

Daily drilling and completion progress reports shall be submitted to this office on a weekly basis.

All Drill Stem tests (DST) shall be accomplished during daylight hours, unless specific approval to start during other hours is obtained from the AO. However, DSTs may be allowed to continue at night if the test was initiated during daylight hours and the rate of flow is stabilized and if adequate lighting is available (i.e., lighting which is adequate for visibility and vapor proof for safe operations). Packers can be released, but tripping should not begin before daylight unless prior approval is obtained from the AO.

A cement bond log (CBL) will be run from the production casing shoe to **TOC** and shall be utilized to determine the bond quality for the production casing.

5. Notifications of Operations

No location will be constructed or moved, no well will be plugged, and no drilling or workover equipment will be removed from a well to be placed in a suspended status without prior approval of the AO. If operations are to be suspended, prior approval of the AO will be obtained and notification given before resumption of operations.

The following notifications will be called in to the appropriate field office:

**Glenwood Springs Field Office**

At least 24 hours prior to spud - Marty O'Mara (970) 947-2825

**Grand Junction Field Office**

At least 24 hours prior to running surface and production casing and conducting BOP test  
- Carol Snyder (970)244-3033 or Ed Fancher (970)-244-3039

Whether the well is completed as a dry hole or as a producer, "Well Completion and Recompletion Report and Log" (Form 3160-4) will be submitted not later than 30 days after completion of the well or after completion of operations being performed, in

accordance with 43 CFR 3164. One copy of all logs, core descriptions, core analyses, well-test data, geologic summaries, sample description, and all other surveys or data obtained and compiled during the drilling, workover, and/or completion operations, will be filed with Form 3160-4. Samples (cuttings, fluids, and/or gases) will be submitted when requested by the AO.

Operator shall report production data to MMS pursuant to 30 CFR 216.5 using form MMS/3160.

The date on which production is commenced or resumed will be construed for oil wells as the date on which liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which liquid hydrocarbons are first produced into a permanent storage facility, whichever first occurs; and, for gas wells as the date on which associated liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which gas is first measured through permanent metering facilities, whichever first occurs.

Should the well be successfully completed for production, the AO will be notified when the well is placed in a producing status. Such notification will be sent by telegram or other written communication, not later than five (5) days following the date on which the well is placed on production.

A schematic facilities diagram as required by 43 CFR 3162.7-5 (b.9. d.), and shall be submitted to the appropriate District Office within sixty (60) days of installation or first production, whichever occurs first. All site security regulations as specified in Onshore Oil & Gas Order No. 3 shall be adhered to. All product lines entering and leaving hydrocarbon storage tanks will be effectively sealed in accordance with 43 CFR 3162.7-5 (b. 4).

No well abandonment operations will be commenced without the prior approval of the AO. In the case of newly drilled dry holes or failures, and in emergency situations, oral approval will be obtained from the AO. A "Subsequent Report of Abandonment" Form 3160-5, will be filed with the AO within thirty (30) days following completion of the well for abandonment. This report will indicate where plugs were placed and the current status of surface restoration. Final abandonment will not be approved until the surface reclamation work required by the approved APD or approved abandonment notice has been completed to the satisfaction of the AO or his representative, or the appropriate Surface Managing Agency.

6. Other Information

All loading lines will be placed inside the berm surrounding the tank battery.

All off-lease storage, off-lease measurement, or commingling on-lease or off-lease will have prior written approval from the AO.

All open-vent exhaust stacks associated with heater-treater, separator, and dehydrator units must be constructed to prevent birds and bats from entering them and to the extent practical to discourage perching and nesting.

The oil and gas measurement facilities will be installed on the well location. The oil and gas meters will be calibrated in place prior to any deliveries. Tests for meter accuracy will be conducted following initial installation and at least quarterly thereafter. The AO will be provided with a date and time for the initial meter calibration and all future meter-improving schedules. A copy of the meter calibration reports will be submitted to the Grand Junction Field Office. All meter measurement facilities will conform to Onshore Oil & Gas Order No. 4 for liquid hydrocarbons and Onshore Oil & Gas Order No. 5 for natural gas measurement.

The use of materials under BLM jurisdiction will conform to 43 CFR 3610.2-3.

There will be no deviation from the proposed drilling and/or workover program without prior approval from the AO. Safe drilling and operating practices must be observed. All wells, whether drilling, producing, suspended, or abandoned will be identified in accordance with 43 CFR 3162.

"Sundry Notice and Report on Wells" (Form 3160-5) will be filed for approval for all changes of plans and other operations in accordance with 43 CFR 3162.3-2.

Section 102(b)(3) of the Federal Oil and Gas Royalty Management Act of 1982, as implemented by the applicable provisions of the operating regulations at Title 43 CFR 3162.4-1(c), requires that "not later than the 5th business day after any well begins production on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or sundry notice, Form 3160-5, or orally to be followed by a letter or sundry notice, of the date on which such production has begun or resumed."

If you fail to comply with this requirement in the manner and time allowed, you shall be liable for a civil penalty of up to \$10,000 per violation for each day such violation continues, not to exceed a maximum of 20 days. See Section 109(c)(3) of the Federal Oil and Gas Royalty Management Act of 1982 and the implementing regulations at Title 43 CFR 3162.4-1(b)(5)(ii).

In the event after-hours approval or notification is necessary, please contact one of the following individuals:

|  |                                    |
|--|------------------------------------|
| Marty O'Mara<br>Petroleum Engineer           | C: 970.319.5837<br>W: 970.947.5221 |
| Jon Cavanaugh<br>Petroleum Engineering Tech. | W: 970.947.5220<br>C: 970.319.7887 |
| Ken Trueax<br>Petroleum Engineering Tech.    | W: 970.947.5239                    |

BLM Fax: 970.947.5267

## Standard Surface Conditions of Approval (COAs)

The following standard conditions are intended to mitigate natural and cultural resource impacts associated with typical oil and gas operations. Upon completion of the environmental analysis, the Authorized Officer may apply other COAs at a general or site-specific scale to provide additional resource protection.

### **1. Administrative Notification:**

At least 48 hours prior to construction, the operator shall notify the BLM representative of construction startup plans.

### **2. Air Quality:**

The operator shall implement dust abatement measures as needed or directed by the BLM authorized officer. The level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) may be changed in intensity and must be approved by the BLM authorized officer. Dust control is needed to prevent heavy plumes of dust from road use that create safety problems and disperses heavy amounts of particulate matter on adjacent vegetation.

Speed control measures on all project-related unpaved roads would also be implemented to reduce vehicle fugitive dust.

### **3. Cultural Resource/Native American:**

Class III cultural resource inventories will be required on any and all new wells, access roads, pipelines and other ground disturbing activities not covered in this plan that require a federal permit or authorization to conduct the action. Additional action specific mitigation may be required – including but not limited to moving the location, archeological monitoring, testing, or data recovery

Strict adherence to the confidentiality of information concerning the nature and location of archaeological resources will be required of Operator and their subcontractors (Archaeological Resource Protection Act 16 U.S.C. 470hh).

The Native American Graves Protection and Repatriation Act (NAGPRA), requires that if inadvertent discovery of Native American Remains or Objects occurs, activity must cease in the area of discovery, a reasonable effort made to protect the item(s) discovered, and immediate notice made to the BLM Authorized Officer, as well as the appropriate Native American group(s) (IV.C.2). Notice may be followed by a 30-day delay (NAGPRA Section 3(d)).

Colorado State Statutes (CRS 24-80-401 and CRS 24-80-1301) for Historic, Prehistoric, and Archaeological Resources, and for Unmarked Human Graves will have to be adhered to by Operator and their subcontractors on private lands. These State statutes require that the federal Authorizing Officer be notified immediately of any historic or prehistoric finds or human grave. The find must be protected until the Authorizing Officer indicates that the action may proceed.

### **4. Cultural Resource Education/Discovery:**

All persons in the area who are associated with this project must be informed that if anyone is found disturbing historic, archaeological, or scientific resources, including collecting artifacts, the person or persons will be subject to prosecution.

Pursuant to 43CFR10.4(g), the BLM authorized officer must be notified, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43CFR10.4 (c) and (d), activities must stop in the vicinity of the discovery and the discovery must be protected for 30 days or until notified to proceed by the authorized officer.

If in connection with operations under this contract the project proponent, his contractors, subcontractors, or the employees of any of them, discovers, encounters or becomes aware of any objects or sites of cultural or paleontological value or scientific interest such as historic or prehistoric ruins, graves or grave markers, fossils, or artifacts, the proponent shall immediately suspend all operations in the vicinity of the cultural or paleontological resource and shall notify the BLM authorized officer of the findings (16 U.S.C. 470h-3, 36CFR800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the authorized officer. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the authorized officer from a federal agency insofar as practicable. When not practicable, the holder shall bear the cost of the services of a non-federal professional.

Within five working days the authorized officer will inform the holder as to:

- whether the materials appear eligible for the National Register of Historic Places;
- the mitigation measures the holder will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
- a time frame for the authorized officer to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the State Historic Preservation Officer that the findings of the authorized officer are correct and the mitigation is appropriate.

The proponent may relocate activities to avoid the expense of mitigation and/or the delays associated with this process, as long as the new area has been appropriately cleared of resources and the exposed materials are recorded and stabilized. Otherwise, the proponent will be responsible for mitigation costs. The authorized officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the authorized officer that the required mitigation has been completed, the proponent will then be allowed to resume construction.

Antiquities, historic, prehistoric ruins, or objects of scientific interest that are outside of the authorization boundaries but directly associated with the impacted resource will also be included in this evaluation and/or mitigation.

Antiquities, historic, prehistoric ruins, or objects of scientific interest, identified or unidentified, that are outside of the authorization and not associated with the resource within the authorization will also be protected. Impacts that occur to such resources, which are related to the authorizations activities, will be mitigated at the proponent's cost including Native American consultation cost.

In situations where federal action is required for wells directionally drilled into federal minerals from fee surface overlying fee minerals, BLM's responsibilities under Section 106 of the National Historic Preservation Act [(NHPA) 16 U.S.C. 470] as amended and Section 36 CFR 800.4 will be followed.

## **5. Geology:**

Mitigation measures for protection of geologic resources are detailed in the Down Hole Standard Conditions of Approval listed in Appendix E. These measures include specific procedures for drilling, cementing, and completing the proposed wells to ensure that gas does not migrate into usable water-bearing zones or contaminate other geologic formations. The SPGAP also describes methods for minimizing the potential for slope instability and erosion, and for interim and final reclamation of disturbed surfaces.

## **6. Groundwater / Soils / Riparian:**

All roads in the SPGAP will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity as per current BLM Gold Book standards.

As per BLM Gold Book Standards, gravel or other surfacing is required for steep grades, highly erosive soils, clay soils, and/or where all-weather access is needed.

Relief ditches or corrugated metal pipes will be installed at regular intervals as per current BLM Gold Book standards (25 year 6 hour and 24 hour storm events) to direct drainage off of the road grade and into vegetated areas, where it would infiltrate into the ground and sediment would settle out on the surface.

Culverts at drainage crossings shall be installed during no-flow or low-flow conditions and shall be designed and installed to pass a 25-year or greater storm event. On perennial streams, culverts shall be designed to allow for passage of aquatic biota. The minimum culvert diameter in any installation for a drainage crossing or road drainage shall be 18 inches. Contact Jeff O'Connell, Glenwood Springs Energy Office Hydrologist at 970-947-5215 or [jeffrey\\_o'connell@blm.gov](mailto:jeffrey_o'connell@blm.gov). Crossings of drainages deemed to be jurisdictional waters of the U.S. pursuant to Section 404 of the Clean Water Act may require additional culvert design capacity. Due to the flashy nature of area drainages and anticipated culvert maintenance, the U.S. Army Corps of Engineers recommends designing drainage crossings for the 100-year event. Contact Sue Nall at 970-243-1199 x16 or [susan.nall@usace.army.mil](mailto:susan.nall@usace.army.mil).

All culverts that have currently failed or culverts not aligned in the natural drainage of the channel will be replaced and aligned with the natural channel of the drainage with a gradient that maintains the natural drainage velocity to decrease sedimentation and erosion. Destroyed, damaged or inoperable culverts will be removed from the SPGAP area and disposed of by Operator.

Culverts will be inspected annually to ensure they are functioning properly and promptly maintained (e.g. remove any debris causing blockage) and/or replaced when necessary.

Ditches will be allowed to vegetate and/or would include large rocks or stones to slow the velocity of drainage and allow sediment to settle out.

Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out particulates as per current BLM Gold Book standards.

Operator's road construction plans will identify specific locations of drainage features and proposed BMPs for approval by the BLM prior to construction.

After the completion of drilling operations, the producing formation will be logged and production casing run and cemented in accordance with the drilling program approved in the APD.

The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers prior to discharging fill material into waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent impacts to waters of the U.S. may require mitigation. Contact Sue Nall, Regulatory Specialist, Colorado/Gunnison Basin Regulatory Office, U.S. Army Corps of Engineers, at 970-243-1199 x16 or [susan.nall@usace.army.mil](mailto:susan.nall@usace.army.mil).

For pipelines installed beneath stream crossings, the operator shall bury the pipeline at a minimum depth of 4 feet below channel substrate to avoid exposure by channel scour and degradation. Following burial, the channel grade and substrate composition shall be returned to pre-construction conditions.

Construction activities at perennial stream crossings (e.g. burying pipelines, installing culverts) shall occur during low-flow conditions (i.e. late summer/early fall) and shall consist of either a piped stream diversion or the use of a coffer dam and pump to divert flow around the disturbed area.

Operator will implement aggressive reclamation and revegetation of disturbed areas not needed for operational activities. These measures will help prevent erosion and sedimentation to drainages.

Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected and the presence of these zones reported to the BLM and COGCC.

In order to isolate the Mesa Verde -Wasatch contact, production casing on Federal wells will have a cement top a minimum of 200 feet above the top of Mesa Verde formation.

In accordance with Operator's standard policy, all pits will utilize impermeable liners to contain drilling fluids. Following completion activities, pit liners would be removed at the respective landowner's request.

For pads where a reserve pit is planned, Operator would construct a lined reserve pit to receive the drill cuttings from the wellbore (mainly shale, sand, and miscellaneous rock minerals) and to contain drilling fluids carried over with the cuttings. No hazardous substances would be placed in this pit.

Frac pits to contain water used in completion process will be planned for each new pad location in GAP. Frac pits will also be lined. Compliance with Onshore Order #1 would determine the timing and closure of frac pits. In instances where well drilling would occur in more than 1 drilling season on a pad, the frac pit will be drained dry prior to winter shutdown period or expiration of 90 day period, whichever occurs first. The liner in drained frac pits will be retained until frac pit use is completed.

The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Glenwood Springs Energy Office to determine appropriate mitigation,

including verification of native plant species to be used in restoration. Contact Jeff O'Connell, Glenwood Springs Energy Office Hydrologist, at 970-947-5215 or [jeffrey\\_o'connell@blm.gov](mailto:jeffrey_o'connell@blm.gov).

#### **7. Invasive Non-Native Species:**

The Operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Energy Office *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, dated March 2007. A Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides. Contact Beth Brenneman, Glenwood Springs Energy Office Ecologist, at 970-947-5232 or [beth\\_brenneman@blm.gov](mailto:beth_brenneman@blm.gov).

#### **8. Migratory Birds and Raptors:**

To protect nesting raptors, a survey shall be conducted prior to construction and drilling activities that are to be initiated during the raptor nesting season (February 1 to August 15). The survey shall include all potential nesting habitat within 0.25 mile of proposed well pads and 0.125 mile of any access roads, pipeline, or other surface facilities. Results of the survey shall be submitted to the BLM. Contact Jeff Cook, Glenwood Springs Energy Office Wildlife Biologist, at 970-947-5231 or [jeffrey\\_cook@blm.gov](mailto:jeffrey_cook@blm.gov). If a raptor nest is located within the buffer widths specified above, a 60-day Timing Limitation (TL) shall be applied to prohibit initiation of construction and drilling activities *[subject to site-specific adjustment by BLM based on factors such as visual screening and the type, timing, and duration of the proposed action]*. The dates of this TL will be based on the particular species of raptor.

It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act with respect to "take" of migratory bird species. "Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The operator shall prevent use by migratory birds of reserve pits, produced water pits, and evaporation pits, that store or are expected to store fluids which may pose a risk to such birds (e.g., migratory waterfowl, shorebirds, wading birds, and raptors) during completion and after completion activities have ceased. Several established methods to prevent bird access are known to work. Methods may include but are not limited to netting, the use of bird-balls, or other alternative methods that effectively prevent bird access/use. Regardless of the method used, it should be applied within 24 hours after completion activities have begun. All mortality or injury to species protected by the Migratory Bird Treaty Act shall be reported immediately to the BLM project lead.

#### **9. Noise:**

During drilling and completion, the operator will angle the exhaust muffler stacks on the power units or generators away from private homes. The operator will encourage commuting of construction and drilling crews to mitigate vehicle noise impacts. Operator will use telemetry equipment at all gas well meters to reduce pumper-truck traffic within the SPGAP area.

#### **10. Paleontological Resource Education/Discovery:**

All persons associated with operations under this authorization shall be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered the operator shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM authorized officer of the findings. The discovery must be protected until notified to proceed by the BLM authorized officer. As feasible, the operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM authorized officer of any finds. The BLM authorized officer will, as

soon as feasible, have a BLM-permitted paleontologist check out the find and record and collect it if warranted. If ground-disturbing activities cannot be immediately suspended, the operator shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.

**12. Paleontological Resource Monitoring:**

If significant fossils resources are encountered, construction activities would be halted and the BLM notified of the occurrence immediately. A qualified paleontologist would then visit the site and make site-specific recommendations for impact avoidance. Operations in the area of the discovery would not resume until authorization to proceed has been received from the BLM Authorized Officer.

**13. Range Management:**

Range improvements (fences, gates, reservoirs, pipelines, etc.) will be avoided during development of natural gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator will be responsible for repairing or replacing the damaged range improvements.

If a new or improved access road bisects an existing livestock fence, steel frame gate(s) or a cattleguard with associated bypass gate shall be installed across the roadway to control grazing livestock.

**14 Reclamation.** Reclamation goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS (DSEIS). The specific measures described below shall be followed during interim reclamation of disturbed surfaces associated with well pads, access roads, and pipelines. These measures, except seedbed preparation, shall also apply to temporary reclamation of topsoil storage piles and surfaces that are subject to interim reclamation but not scheduled to undergo interim reclamation for more than 1 year.

- a. Seedbed Preparation. For interim reclamation, all slopes shall be reshaped prior to seedbed preparation. Initial seedbed preparation shall consist of backfilling, leveling, and ripping all areas to be seeded to a minimum depth of 18 inches with a furrow spacing of 2 feet, followed by recontouring the surface and then spreading the stockpiled topsoil evenly. Prior to seeding, the seedbed shall be scarified and left with a rough surface. No depressions shall be left that would trap water and form ponds. Final seedbed preparation shall consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding. NOTE: Seedbed preparation is not required for topsoil storage piles or other areas of temporary reclamation.

Requests for use of soil amendments, including basic product information, shall be submitted to the BLM for approval.

- b. Seed Mixes. Selection of seed to be used in temporary or interim reclamation shall comply with the menu-based seed mixes in the letter provided to oil and gas operators dated April 16, 2007. For private surfaces, the menu-based seed mixes are recommended, but the landowner would have ultimate authority over the seed mix to be used in reclamation. The seed shall be certified free of noxious weeds. Seed may contain up to 2.0 percent of "other crop" seed by weight, including the seed of other agronomic crops and native plants; however, a lower percent of other crop seed is recommended. Seed tags or other official documentation shall be supplied to the BLM Glenwood Springs Energy Office Ecologist (Beth Brenneman, 970-947-5232 or

beth\_brenneman@blm.gov) at least 14 days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands.

- c. Seeding Procedures. Seeding shall be conducted no more than 24 hours following completion of final seedbed preparation. A seed mix consistent with BLM standards in terms of species and seeding rate for the specific habitat type shall be used on all BLM lands affected by the project (see Attachments 1 and 2 of the letter provided to operators dated April 16, 2007).

Where practicable, seed shall be installed by drill-seeding to a depth of 0.25 to 0.5 inch. Where drill-seeding is impracticable, seed may be installed by broadcast-seeding at twice the drill-seeding rate, followed by raking or harrowing to provide 0.25 to 0.5 inch of soil cover. Hydroseeding and hydromulching may be used in temporary reclamation or in areas where drill-seeding or broadcast-seeding/raking are impracticable. Hydroseeding and hydromulching must be conducted in two separate applications to ensure adequate contact of seeds with the soil.

If interim revegetation is unsuccessful, the operator shall implement subsequent reseedings until interim reclamation standards are met. Requirements for reseeding of unsuccessful temporary reclamation will be considered on a case-by-case basis.

- d. Mulch. Mulch shall be applied within 24 hours following completion of seeding. In areas of interim reclamation that used drill-seeding or broadcast-seeding/raking, mulch shall consist of crimping certified weed-free straw or certified weed-free native grass hay into the soil. Hydromulching may be used in areas of interim reclamation where crimping is impracticable, in areas of interim reclamation that were hydroseeded, and in areas of temporary reclamation regardless of seeding method.

NOTE: As an exception to this provision, mulch is not required in areas where erosion potential mandates use of a biodegradable erosion-control blanket (straw matting).

- e. Erosion Control. Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the authorized officer. Biodegradable straw matting, bales or wattles of weed-free straw or weed-free native grass hay, or well-anchored fabric silt fence shall be used on cut-and-fill slopes and along drainages to protect against soil erosion. Additional BMPs shall be employed as necessary to reduce erosion and offsite transport of sediment.
- f. Site Protection. The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50% of the new plants are producing seed. The authorized officer will approve the type of fencing.
- g. Monitoring. The operator shall conduct annual monitoring surveys of reclaimed areas and shall submit an annual monitoring report to the authorized officer by December 31 of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the authorized officer.

Contact Beth Brenneman, Glenwood Springs Energy Office Ecologist, at 970-947-5232 or [beth\\_brenneman@blm.gov](mailto:beth_brenneman@blm.gov).

**15. Deadline for Interim Reclamation:**

Operator will be allowed to construct well pad to the maximum expected pad size necessary to drill and complete the number of wells proposed for this location. If one year has passed since the spudding of the initial well or subsequent wells on a given pad, the operator will be required to implement and complete standard interim reclamation practices as identified under Reclamation section in these surface Conditions of Approval OR submit proposed best management practices to be approved by the Authorized Officer that would be implemented on the “open” pad to control storm water drainage, weed control, wildlife protection measures, dust abatement plan and/or visual resource management.

**16. Recreation:**

To promote safety for hunters and project workers alike during hunting season, warning signs should be posted along access roads serving active construction and drilling sites to warn hunters of the presence of workers and associated vehicle traffic in the area.

**17. Special Status Species:**

Any discoveries of previously unknown bald eagle nesting or roosting sites would be addressed by application of the appropriate stipulations and consultation with the USFWS prior to commencement of development activities.

Biological inventories (surveys) for sensitive plant species will be conducted in potential new disturbance areas not covered in the GAP EA.

Mitigation of impacts to special status plants would include (1) relocating gas activities and facilities to minimize direct impacts; (2) requiring Operator to seed the well pads with native species, including species that provide direct competition with cheatgrass, such as bottlebrush squirreltail, and/or Sandberg bluegrass; (3) ensuring that seeding occurs at the appropriate time of year to optimize the potential for seeding success; and (4) requiring Operator to control all noxious weeds within the disturbed areas.

**18. Transportation/ Road Maintenance:**

Commuting construction and drilling crews would be encouraged to car pool to reduce the number of vehicle trips on local area roads and associated wear and tear.

All road construction and maintenance activities will adhere to standards identified in Gold Book.

The operator would encourage commuting construction and drilling crews to comply with posted speed limits on public roads and limit driving speeds to 20 mph on more primitive access roads to reduce the potential for vehicle collisions. By complying with posted speed limit along County Roads, traffic-related noise would also be reduced at nearby residences

**19. Terrestrial Wildlife:**

Remote monitoring will be conducted during the winter months to minimize site visits to pad locations and reduce traffic impacts to wintering big game wildlife. In addition, scheduled winter visits (those other than for emergency purposes), should be scheduled between 10 a.m. and 3 p.m. to further minimize disturbance to wintering big game wildlife.

**20. Vegetation:**

To avoid pinyon tree mortality caused by infestations of the *Ips* beetle, any pinyon trees disturbed during road, pad, or pipeline construction work shall be chipped after being severed from the stump or grubbed from the ground, buried in the toe of fill slopes (if feasible) or cut and removed from the site within 24 hours to a location approved by the Colorado State Forest Service.

#### **21. Visual Resources:**

To help mitigate the contrast of bare, recontoured slopes, reclamation will include measures to feather cleared lines of vegetation, and to save and redistribute cleared trees, debris, and rock over reshaped cut-and-fill slopes.

To reduce the view of production facilities from visibility corridors and private residences, facilities will not be placed in visually exposed locations (i.e., they will be located against backdrops or cut side of pad) and will be placed to allow the maximum reshaping of cut-and-fill slopes. Furthermore, all above ground facilities will be painted Shale Green (Munsell 5Y4/2) to blend with the existing landscape.

As a general rule, unless otherwise approved by BLM Authorized Officer, the production pack(s) and storage tanks(s) will not be set more than 100 feet from the nearest wellhead to satisfy COGCC regulation.

Trees and vegetation would be left along the edges of the pads whenever feasible. Berms may need to be constructed on the fill portion on leading edges of pads with substantial cuts and fills.

#### **22. Wastes, Hazardous or Solid:**

EnCana and its contractors would be required to collect and properly dispose of any solid wastes generated by this project. Any release (leaks or spills) of hazardous substances in excess of the reportable quantity, as established by 40 CFR, Part 117, would be reported as required by the CERCLA of 1980, as amended. If the release of a hazardous substance in a reportable quantity would occur, a copy of a report would be furnished to the BLM and all other appropriate federal and state agencies. In addition, all releases to soil or water of 10 gallons or more of any substance would be immediately reported verbally to the BLM and COGCC compliance officers and proof of cleanup provided for the project record. This mitigation would be applied at all stages of the project including drilling, completion, operation, and abandonment of the wells.

Protection of sensitive environments in the drilling area would be accomplished through the use of a liner in the reserve pit and the construction or installation of secondary containment facilities. All cuttings, drilling fluids and chemicals are to be contained in the lined pit. Any hydrocarbons in the reserve pit would be removed as soon as possible and processed or disposed of at a permitted offsite facility, and excess liquids in the reserve pit evaporated. The cuttings would then be buried in place. Backfilling of the pit would be performed in a manner to confine the mud in the pit and avoid incorporating the mud with surface soils.

No chromate additives would be used in the mud system without prior BLM approval. No hazardous substances specifically listed by EPA as a hazardous waste or demonstrating a characteristic of hazardous waste will be used in drilling, testing, or completion operations.

Tank batteries for the storage of produced water and condensate would be placed in secondary containment to prevent migration offsite. These may consist of either corrugated steel surrounds, earthen berms, or both. In the event of an accidental release, produced water and condensate would be confined for clean-up in the containment area and would not migrate to surrounding soils and water.

Under the proposed drilling plan, fuel and lubricants would be temporarily stored in transportable containment trailers or tanks on the proposed well pads. EnCana would implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan to minimize potential impacts from unintentional releases. The SPCC Plan would include accidental discharge reporting procedures, spill response, and cleanup measures. All potentially hazardous materials and substances would be handled in an appropriate manner that minimizes the risk of accidental contamination of soil and water resources.

### **23. Water Quality, Surface and Ground:**

Operator will implement aggressive reclamation and revegetation of disturbed areas not needed for operational activities. In addition operator will implement multiple BMPs including the following: New access roads will be crowned and ditched to allow water to flow off the road surface to reduce volume and velocity. Relief ditches will be installed at regular intervals to direct drainage off of the road grade and into vegetated areas, where it would infiltrate into the ground and/or sediment would settle out on the surface.

Ditches will be allowed to vegetate and/or will include large rocks or stones to slow the velocity of drainage and allow sediment to settle out. Where drainage ditches are installed to direct runoff away from the road on steeper grades, water bars or hay bale dikes will be installed nearly perpendicular to the flow direction of the ditch to reduce runoff velocity and settle out. Operator's road construction plans will identify specific locations of drainage features and BMPs for approval by the BLM prior to construction.

Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected and the presence of these zones reported to the BLM and COGCC. All usable water zones encountered (those with TDS less than 10,000 mg/L) must be isolated and protected, whether they are shallow or deep. Isolation of shallow zones would be accomplished by setting and cementing surface casing from a depth of at least 50 feet below the deepest water zone to the ground surface. Deeper water-bearing zones would be cemented off as required in the Master APD. For these zones, cementing would be used from 50 feet above to 50 feet below each water-bearing zone.

After the completion of drilling operations, the producing formation would be logged and production casing run and cemented in accordance with the drilling program approved in the APD.

The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers prior to discharging fill material into waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent impacts to waters of the U.S. may require mitigation. Contact Sue Nall, Regulatory Specialist, Colorado/Gunnison Basin Regulatory Office, U.S. Army Corps of Engineers, at 970-243-1199 x16 or [susan.nall@usace.army.mil](mailto:susan.nall@usace.army.mil).

In accordance with Operator's standard policy, all reserve pits will utilize impermeable liners to contain drilling fluids. Following completion activities, pit liners would be removed at the respective landowner's request. At the discretion of Operator and in cooperation with the respective landowner, closed-loop drilling systems may be used on well pads within 100 feet of intermittent drainages.

A minimum of 2 feet of freeboard shall be maintained in the reserve pit. Freeboard is measured from the highest level of drilling fluids and cuttings in the reserve pit to the lowest surface elevation of ground at the reserve pit perimeter. All vehicles would be refueled at least 100 feet from stream channels.

In accordance with Operator's standard policy, erosion protection and silt retention techniques including construction of silt catchment dams, installation of culverts or drainage dips, placement of surface rock on approaches to stream crossings, placement of surface rock, straw bales, and/or matting will be used along proposed road reaches within 100-feet of stream channels.

Within areas less than 100 feet from intermittent drainages, an adequate vegetative buffer, artificial buffers (e.g., straw bales, matting, etc.), or filter strip will be maintained between the road and the drainage to filter runoff from the road before it reaches the creek, wherever possible.