2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

Bill Barrett Corporation (BBC) has proposed to modify an existing plan for the development of the Cooper Reservoir Unit (CRU) and adjacent federal oil/gas leases as approved in the Decision Record (DR) and Finding of No Significant Impact (FONSI) for the Environmental Assessment (EA) of Intoil, Inc.'s Cooper Reservoir Natural Gas Development Project (CRNGDP) (BLM 1998) to increase well densities within certain portions of the analysis area. Whereas the original CRNGDP EA analyzed a combination of 40-acre, 80-acre, and 160-acre well densities (16, 8, and 4 wells per section respectively), BBC is now proposing a 20-acre well density (32 wells per section) in the "core" area of the MCRNGDPA, with the remainder of the analysis area proposed for development at a 40-acre well density (16 wells per section).

After additional development, it may be determined that a 10-acre well density pattern is necessary in order to fully and efficiently recover natural gas reserves within certain portions of the MCRNGDPA. BBC would drill these 10-acre wells from existing well pads constructed in conjunction with wells drilled at the larger 20-acre and 40-acre well densities. The total number of wells that may be drilled at the 10-acre density is not precisely predictable at present, but is not expected to exceed 50 additional well bores over the life of the project. BBC proposes to utilize directional drilling techniques in conjunction with these 10-acre density wells. While economic conditions are such that the sustained drilling of wells at the 10-acre density is not currently justified, BBC seeks analysis of this contingency in anticipation of potential future improvements in both directional drilling technology and market conditions.

Consistent with the increase in well density, BBC also proposes to increase the total number of well locations proposed within the MCRNGDPA. Whereas the CRNGDP EA analyzed 73 total well locations, the current proposal would increase that number by 42 to a total of 115 locations. Including the potential for 10-acre density wells, the total number of well bores to be analyzed in the MCRNGDP EA will be 165, with the total number of well bores to be drilled on a maximum of 115 individual well locations. While the total number of wells proposed in conjunction with the MCRNGDP would be increased relative to the 1998 CRNGDP EA, the overall size of the analysis area would be reduced 35% from the 6,282 acres originally analyzed in 1998 to a current project area of approximately 4,082 acres.

Since the issuance of the DR and FONSI for the CRNGDP in 1998 both Intoil and BBC have drilled a combined total of 38 additional wells within the original CRNGDPA (as of December 1, 2003). These wells are identified in Table 3.3 (page #34). Of the 18 wells identified in Table 3.3 of the CRNGDPA EA (BLM 1998), 6 wells are currently producing, 4 wells are now shut-in, 1 well remains a water disposal well, 6 wells have been plugged and abandoned, and 1 well was never drilled. There are currently 40 producing gas wells, 5 shut-in gas wells, 1 water injection well, and 3 wells recently drilled which are now waiting on completion operations within the MCRNGDPA (WOGCC 2003).

Under this modified proposal, BBC would be allowed to continue with development activities within the modified project area boundary so long as the spacing parameters approved in the DR and FONSI for the CRNGDP EA (BLM 1998) are adhered to. These actions have been analyzed and future drilling proposals will continue to be approved on a case-by case basis during the preparation of the MCRNGDP EA.

The current proposal to modify the CRNGDP environmental analysis considers all foreseeable activities required for full and final development of the natural gas resource within the project area. This development would occur over a ten year period, with the bulk of the additional drilling activity to be conducted within the first few years following project approval. As with the original CRNGDP EA, the precise number of wells ultimately drilled at each density, exact locations of the proposed drill sites, and timing of drilling activities would be dictated by:

- the continued success of development wells drilled in the fringe areas surrounding (abutting) the existing CRU,
- future success of wells drilled at increased well densities,
- technological advances that allow for the efficient development of marginal resources, and
- future economic considerations including natural gas prices at the well head compared with the cost(s) to develop, what may prove to be, marginal properties on the fringes of the heretofore known geologic structure (KGS) within the Cooper Reservoir Field.

This environmental assessment (EA) addresses both the Proposed Action (modified from the original CRNGDPA EA) and the No Action alternative. Directional drilling operations were considered for wells proposed on a 20-acre spacing pattern but this alternative was not analyzed in detail (please refer to Section 2.5 for additional information in this regard.

- **Proposed Action.** This alternative would allow BBC to construct 42 additional well locations, drill up to 92 additional well bores, and install related production (ancillary) facilities within the Modified Cooper Reservoir Natural Gas Development Project Area (MCRNGDPA). An additional 158.79 (+/-) acres of initial (short-term) surface disturbance would occur in conjunction with the modified project proposal
- **No Action Alternative.** This alternative implies that both ongoing and previously approved natural gas exploration, development, and production activities would be allowed to continue by the Bureau of Land Management (BLM) in the overall project area, but activity beyond the level of activity analyzed in the original CRNGDP EA would not be allowed. Future Applications for Permit to Drill (APD's) and Right-of-Way (ROW) applications would be evaluated by the BLM on a case-by-case basis through site specific environmental analyses in accordance with management direction contained in Platte River Resource Area RMP and the DR and FONSI for the CRNGDP EA (BLM 1998).

2.2 PROPOSED ACTION

The proposed action entails the continued development of natural gas resources at an increased density within a modified project area which includes the Cooper Reservoir Unit and leases immediately adjacent thereto. The proposed development activities would commence in the winter of 2004 and would continue over a period of approximately 10 years, with the bulk of the proposed development activity expected to occur within the first few years following project approval. The productive life of wells drilled in the MCRNDGPA is estimated to be in excess 20 years.

Well densities would vary across the project area with wells generally being developed on both 40-acre and 20-acre densities, with the potential for 10-acre densities in limited areas of the MCRNGDPA. Figure 2.1 identifies the approximately 2,528 acre "core" area of the MCRNGDPA that has already proven to be commercially productive and which could see further development at increased well densities of both 10-acres and 20-acres. Twenty (20) acre well density has been shown to be both viable and necessary for the efficient production of the natural gas resource in the core area by a grouping of closely spaced wells. If warranted, development on 10-acre densities would most likely be focused within the core area referenced above. Various associated facilities (e.g., roads, pipelines, etc.) would also be constructed in conjunction with the continued development of the natural gas resource in the project area as previously described in the CRNGDP EA (BLM 1998).

The original CRNGDP EA evaluated an exploration/development program designed to test the productive potential of both the Lower Fort Union/Lance (LFU/L) undifferentiated and Lance Formation(s) and proposed twin wells (dual well bores on a single well pad) to that end (BLM 1998). Drilling activities within the CRNGDPA subsequent to the issuance of the DR and FONSI in June 1998 that tested the Lower Fort Union/Lance (LFU/L) undifferentiated horizons were unproductive. As a result, development of these shallower zones is not anticipated with the result that the proposal for twin wells designed to test the productive potential of both the LFU/L undifferentiated and deeper Lance Formation(s) has been eliminated from consideration in the MCRNGDP proposal. The primary focus of this modified project proposal will be to further develop hydrocarbon resources contained within the Lance Formation based upon previous exploration and development activities within the overall project area. BBC may elect to evaluate deeper formations such as the Mesaverde, Frontier, and Dakota at selected locations within the MCRNGDPA at some future date; however, they have no definite plans at this point to pursue exploratory drilling operations to test the productive potential of these deeper formations.

Surface disturbances associated with the modified proposal are not expected to vary dramatically from those presented in the CRNGDP EA (BLM 1998). However, it should be noted that BBC has adopted a well pad design for "dual" wells that is slightly larger than the design originally proposed by Intoil in the CRNDGP EA (BLM 1998). Considering an average of 2.79 acres of new surface disturbance per well location, the construction of an additional 42 individual well pads would result in approximately 117.18 acres of new surface disturbance within the MCRNGDPA. Additional disturbances within the MCRNGDPA would include the construction of approximately 13,900 feet (2.63 miles) of new access road (12.77 acres), the installation of approximately 31,200 feet (5.91 miles) of buried pipeline (27.84 acres), and the 1.0 acre expansion of the existing compressor site resulting in an additional 41.61 acres of initial (short-term) surface disturbance.

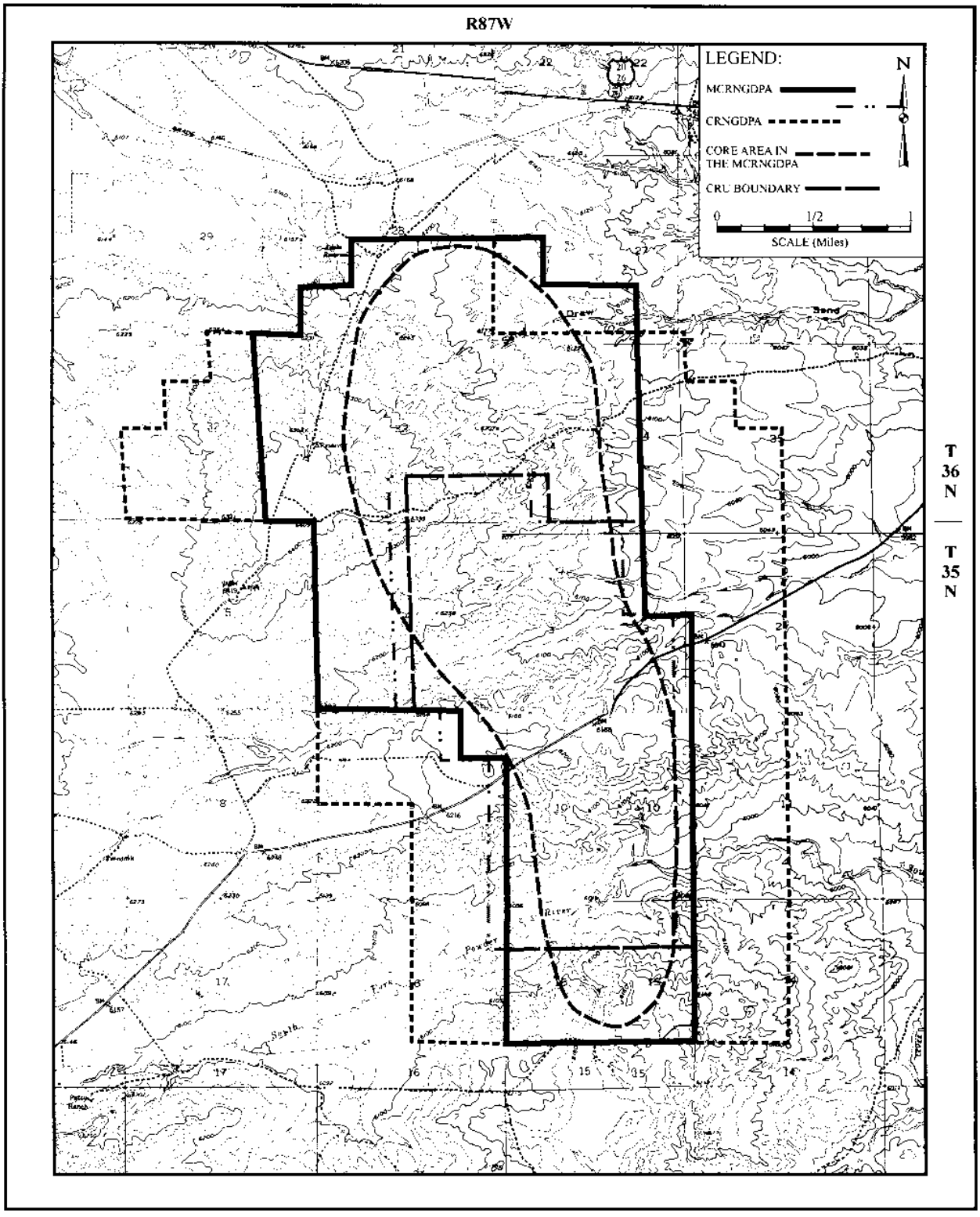

Figure 2.1: Map Showing the 2,528 Acre "Core" Development Area within the MCRNGDPA

Total new short-term and life of project (LOP) surface disturbance resulting from the modified Proposed Action would be 158.79 acres and 56.81 acres (respectively) resulting from approval of operations on the additional 42 wells as proposed in the MCRNGDPA (see Table 4.4).

In all other respects, including drilling and completion methods, equipment and personnel requirements, gathering and compression, etc., the current proposal is generally consistent with that analyzed in the CRNGDP EA.

2.2.1 Project Schedule

Development activities within the MCRNGDPA have been moving forward on well locations that were previously approved by the CFO under the terms and conditions of the DR and FONSI for the CRNGDPA EA (BLM 1998). These wells are included in the 73 total wells referenced in Section 1.1 and are identified in Table 3.1.

As indicated in Sections 1.1 and 2.1, Intoil drilled a total of 26 additional wells within the original CRNGDPA subsequent to the completion of the CRNGDP EA and prior to their transfer of ownership to BBC. BBC has drilled an additional 12 wells since the transfer of ownership (as of December 1, 2003), for a total of 38 out of the 73 wells originally analyzed. As indicated in Section 2.1 (above), BBC is proposing to construct an additional 42 well pads within the MCRNGDPA in addition to the 35 wells remaining to be drilled under the previous analysis. Of these 77 total well pads, approximately 40% (31 wells) would be drilled on a 40-acre density (16 wells per section) and approximately 60% (46 wells) would be drilled on a 20-acre density (32 wells per section). An estimated 50 wells could be drilled at a 10-acre well density from existing well pads within the MCRNGDPA. The 20-acre and 10-acre well densities would predominately occur within the 2,528 acre (+/-) core area as defined by the productivity of those wells drilled therein to date.

As indicated above, operations on those wells to be drilled on a reduced spacing pattern within the MCRNGDPA would commence in the winter of 2004 and would continue over a period of approximately 5 to 10 years or until such time as:

- the total number of proposed wells have been drilled,
- the economic limits of the field have been fully defined, or
- current economic conditions deteriorate to the point that it is no longer economic to drill and complete wells in the project area.

Generally speaking, drilling operations would be expected to occur on a year-round basis utilizing two rotary drilling rigs. However, emphasis would be placed on conducting drilling operations during the late spring, summer, and early fall periods when weather conditions are generally more favorable for field operations.

2.2.2 Transportation and Workforce Requirements

Transportation and workforce requirements have not changed from the original CRNGDP Environmental Analysis (BLM 1998). Please refer to Section 2.2.2 of the CRNGDP EA (BLM 1998) for additional information in this regard.

2.2.3 Well Pad Construction

Subsequent to the completion of the CRNGDP EA (BLM 1998), BBC has somewhat refined the size of the single well location required for drilling and completion operations. A revised typical location layout for single well locations is shown on Figure 2.2. BBC would require a slightly larger well pad to accommodate those dual wells that would result from any 10-acre density infill drilling operations (see Figure 2.3).

Although the configuration of the single well pad has changed somewhat from Intoil's original proposal, the leveled area required for initial drilling and completion operations for each individual well (well pad) would still be approximately 1.72 acres in size (including the reserve pit) as compared to 1.73 aces in the CRNGDP EA (BLM 1998). Likewise, the area required for cut/fill slopes and topsoil/subsoil stockpiles associated with the BBC pad design would average approximately 0.91 as compared to 1.02 acres in the CRNGDPA EA (BLM 1998) resulting in a net saving of 0.12 acres per well location. Dual well pads would be slightly larger than single well pads and would require a 25 foot extension of the pad itself and a 10 foot extension of the reserve pit resulting in an additional 0.16 acres of surface disturbance per pad or 8.00 acres of total additional disturbance if all fifty 10-acre density wells were drilled. For the purposes of this analysis, the acreages associated with the larger, "dual" well pad were utilized exclusively to calculate disturbance for the 42 additional well locations proposed herein.

Please refer to Section 2.2.3 of the CRNGDP EA (BLM 1998) for a description of the major components of each individual single well pad and techniques to be utilized in the construction, stabilization and reclamation thereof. The major components of the dual well pads would be the same as proposed for the single well pads with the addition of a second set of production facilities (oil tank, produced water tank, production pack, and meter run) and a second well head assembly located approximately eight feet from the first (initial) well bore.

2.2.4 Access Roads

Exploration and development activities to date within and/or directly adjacent to the MCRNGDPA have resulted in the construction of approximately 70,085 feet (13.27 miles) of new access road therein. Generally speaking, previous exploration and development activities within the CRNGDPA have resulted in the construction of a road system that should be more than adequate to serve the needs of BBC for arterial traffic into and within the MCRNGDPA.

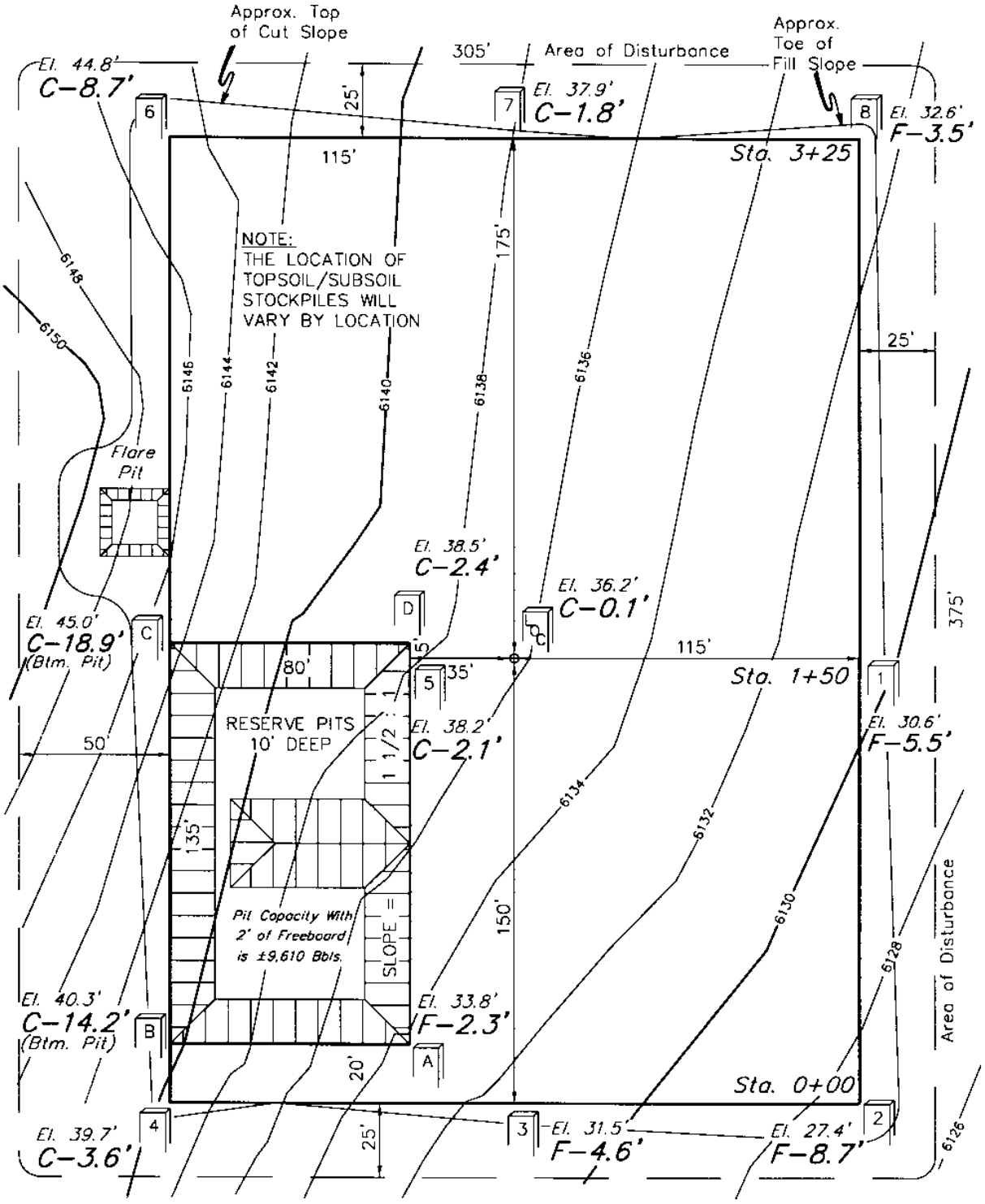

Figure 2.2: Typical Location Layout for a Well Pad with One Well Bore

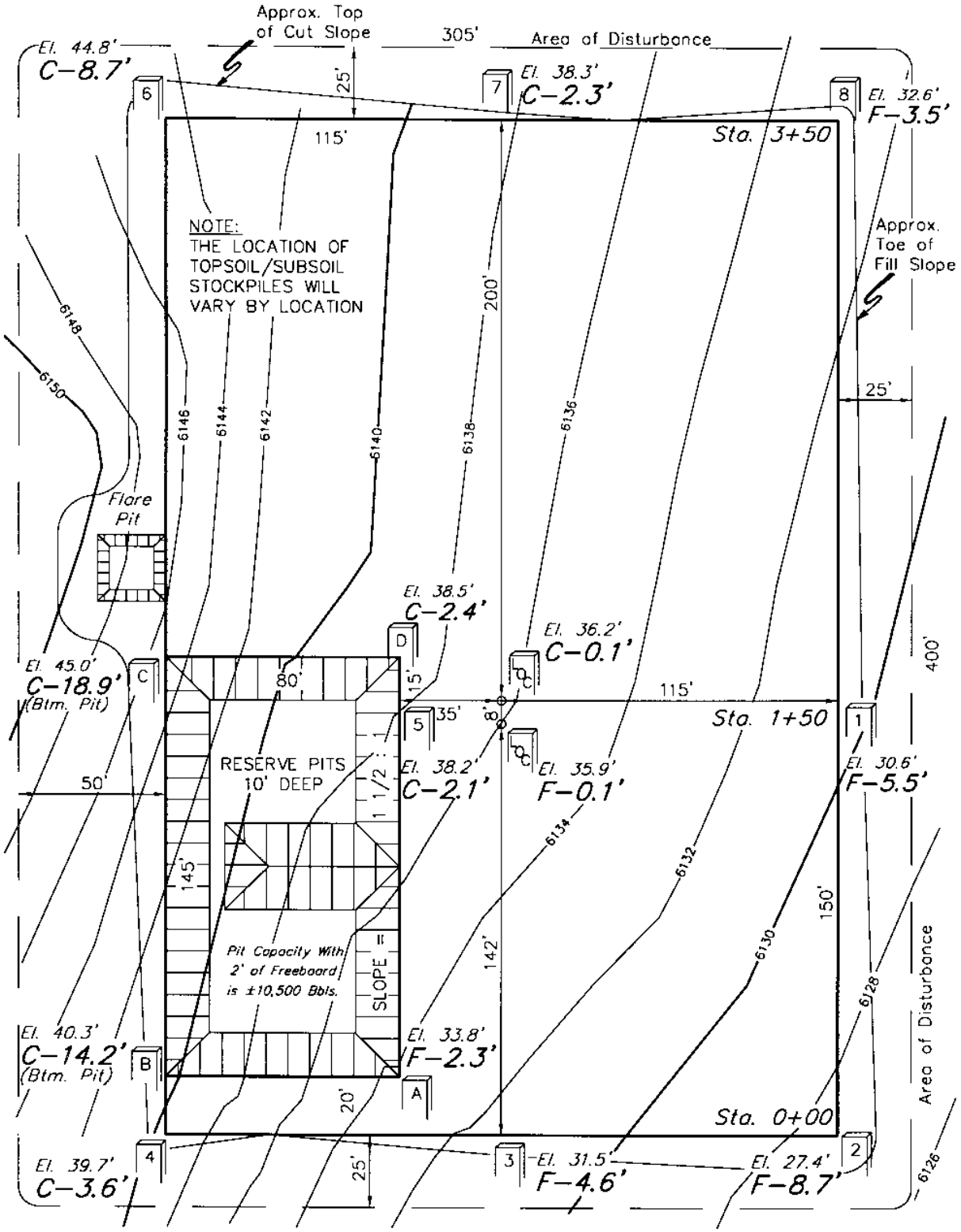

Figure 2.3: Typical Location Layout for a Well Pad with Two Well Bores

New road construction associated with additional exploration and development within the overall project area would generally average approximately 265 feet (0.05 miles) of new road per 20-acre well location and approximately 1,650 feet (0.313 miles) of new road per 40-acre well location. The relatively small amount of road associated with the 20-acre density wells is a direct result of previous activity within the "core" area and the fact that these 20-acre density wells would infill existing development within the project area where an existing, and extensive transportation system has already been constructed in conjunction with wells previously drilled by both Intoil and BBC on 40-acre densities. On the other hand, more road construction would be required for access to those wells proposed on 40-acre densities as these wells would typically be located on the periphery of the overall project area (e.g., outside of the core area) where previous exploration and development activities have been somewhat limited to date. As the 10-acre density wells would be drilled on existing well pads, no new road construction would be associated with the drilling of these wells.

Considering a total disturbed right-of-way (ROW) width that did not exceed 40 feet, this new road construction would result in additional surface disturbance equal to approximately 12.77 acres (calculated based upon 40 wells having 265' of road/well and 2 wells having 1,650' of road each). As indicated above, no new road construction would be required for wells drilled on 10 acre densities. Whenever possible, access roads would be designed and constructed to disturb less than the 40 foot ROW width referenced above, as long as traffic and safety concerns could be satisfied. The existing access roads would be maintained as necessary to accommodate appropriate year-round traffic and prevent unnecessary erosion.

Roads would be constructed in accordance with BLM Manual Section 9113 and/or the roading standards outlined in the joint BLM/USFS publication: *Surface Operating Standards for Oil and Gas Exploration and Development* and would be designed by a professional engineer as directed by the BLM.

2.2.5 Drilling Operations

As indicated in the CRNGDP EA, BBC would utilize a minimum of 1 and a maximum of 2 rotary drilling rigs rated for drilling operations within the MCRNGDPA. Please refer to Section 2.2.5 of the CRNGDP EA (BLM 1998) for a comprehensive description of proposed drilling operations in the MCRNGDPA.

2.2.5.1 Drilling Fluids System

BBC would utilize the same basic drilling fluids system identified in the CRNGDP EA and would obtain their fresh water for use in the mud system from those sources identified therein as well. No water would be diverted from the North Platte River or any of it's tributaries for use in construction, drilling, cementing, or completion operations within the MCRNGDPA.

Water to be utilized in drilling operations would be contained in a "reserve pit" constructed on each location (refer to Figure 2.2) and would serve as the base medium for the drilling mud system. The

reserve pit would be fenced on the three non-working sides during drilling, with the fourth side of the pit fenced immediately following removal of the drilling rig in order to protect wildlife and livestock. Fencing would be installed in accordance with guidelines contained in the joint BLM/USFS publication: *Surface Operating Standards for Oil and Gas Exploration and Development*, Third Edition and would be maintained until the reserve pit has been backfilled. Netting (1 inch mesh) would be placed over reserve pits containing hydrocarbons or other substances toxic to wildlife in compliance with BLM Information Bulletin Number WY-93-054.

Unlike Intoil, BBC intends to utilize a "semi-closed" mud system for drilling operations. Fluids would be contained in steel tanks on the well location and the cuttings would be deposited in the reserve pit. The reserve pit would also be utilized to make up and store conditioned drilling fluids for well control and would be used as a repository for any drilling fluids that could not be recycled. Upon completion of drilling operations, any remaining fluids would be disposed of in strict accordance with applicable state and/or federal rules and regulations pertaining thereto.

2.2.5.2 Casing & Cementing Operations

Please refer to Section 2.2.5.2 of the CRNGDP EA (BLM 1998) for a description of casing and cementing operations in the MCRNGDPA.

2.2.6 Completion and Evaluation Operations

Please refer to Section 2.2.6 of the CRNGDP EA (BLM 1998) for a comprehensive description of proposed completion and evaluation operations in the MCRNGDPA.

2.2.7 Production Operations

BBC proposes to conduct production operations as discussed in Section 2.2.7 of the CRNGDP EA (BLM 1998) with some exceptions as follows:

- Producing well locations will not be equipped with either a glycol regenerating unit, dehydrating contact tower (dehy) with integral scrubber or a 50 psi free water knockout. Production equipment will be limited to a three-phase separator/heater, produced water tank, and an oil tank. In the event that multiple well bores are drilled from a single well location, two (2) sets of production equipment may be necessary, but in most cases oil and produced water tanks would be shared between the two wells.

- BBC may elect to re-enter and convert one or more pre-existing, abandoned well bores within the MCRNGDPA for the disposal of produced water at some point in the future. These water injection/disposal wells would be permitted in full compliance with existing laws, rules and regulations pertaining to the re-entry and subsequent conversion of an abandoned well bore for water injection purposes. It should be noted that BBC has no firm plans at this time in this regard.

- Produced water would be transported via buried flowline to disposal wells located strategically within the MCRNGDPA for subsurface disposal. These produced water flowlines would generally consist of 3 to 10 inch polyethylene pipe buried at a depth of 6 feet and would parallel existing/proposed natural gas lines within the field.

Gas/condensate/water production rates are not expected to vary widely from the information presented in the CRNGDP EA (BLM 1998).

2.2.8 Pipeline Gathering System

Exploration and development activities to date within and/or directly adjacent to the MCRNGDPA have resulted in the installation of approximately 54,078 feet (10.24 miles) of pipeline/gas gathering system within the project area. Generally speaking, previous exploration and development activities within the CRNGDPA have resulted in the installation of gas gathering system "corridors" that should be sufficient for the transportation of additional natural gas produced from those wells proposed in conjunction with the Proposed Action.

The average length of pipelines required to serve individual wells proposed within the MCRNGDPA would decrease from an average 2,200 feet of buried pipeline predicted in the CRNGDP EA (BLM 1998) to an average of approximately 331 feet of buried pipeline/well due to the increased well densities proposed for future development in the MCRNGDPA. New gas pipelines serving individual wells would be 3 to 10 inches in diameter and would be buried to a depth of approximately 6 feet.

Development activities on a 20-acre well density would require significantly less pipeline construction as most of these infill wells would be located within the core of the CRU where an existing gas gathering system already exists. Pipelines would be installed directly adjacent to existing access roads within the MCRNGDPA and would require a slightly smaller overall right-of-way (ROW) width of 25 feet as BBC would be able to utilize the existing access road running surface as a staging area for pipe assembly and installation.

Considering a total disturbed right-of-way (ROW) width that did not exceed 25 feet, installation of pipelines to service individual wells drilled within the MCRNGDPA would result in additional surface disturbance equal to approximately 7.98 acres (calculated based upon 40 wells having 265' of pipeline/well and 2 wells having 1,650' of pipeline each). No new pipelines would be required for those "dual" wells drilled on 10 acre densities.

Water produced from each natural gas well would be transported via buried flowline to disposal wells within the MCRNGDPA for subsurface disposal. These produced water flowlines would generally consist of 3 to 10 inch polyethylene pipe buried at a maximum depth of 6 feet and would parallel existing/proposed roads and/or natural gas lines within the field to the greatest extent possible. We would anticipate that these parallel water lines could/would be buried in the same ROW required for installation of the gas gathering system designed to collect gas produced from the proposed wells within the MCRNGDPA.

In addition, BBC anticipates that the existing gas trunk or gathering lines will need to be "looped" at some point in the future to handle the volumes of gas expected to be produced from additional wells proposed for drilling within the MCRNGDPA. These existing pipeline(s) would be looped by installing up to a ten (10) inch steel line in each existing ROW parallel to the existing, buried line. Approximately 7,900 feet of line would be looped from the CRU #27 southeast to the compressor station and approximately 9,400 feet of line would be looped from the CRU #27 north to said compressor station. While both pipeline ROW's follow existing roads, the size of the pipe and the fact that the "loop" lines will be laid parallel to existing lines suggests that a 50 foot ROW would be required for the safe installation of thereof, which would result in an additional 19.86 acres of short-term surface disturbance.

Please refer to Section 2.2.8 of the CRNGDP EA (BLM 1998) for a discussion of pipeline installation techniques.

2.2.9 Ancillary Facilities

Existing compression (3,500 hp) within the CRU would be augmented on an as-needed basis to provide sufficient additional compression to move gas produced within the MCRNGDPA to market. BBC anticipates increasing compression in the CRU to 7,250 hp utilizing lean-burn engine technology from the 5,000 hp previously analyzed in the CRNGDP EA (BLM 1998). Compression would be utilized to move natural gas produced from the MCRNGDPA into the KN Energy, Inc. (KNE) sales pipeline. While no additional surface disturbance would be required solely for the installation of additional compressors, the existing site has been expanded by BBC to provide adequate space for additional production equipment related to the processing of hydrocarbons produced within the overall project area. As a result of this site expansion, the compressor site now occupies approximately 3.0 acres as opposed to the 2.0 acres previously analyzed in the CRNGDP EA (BLM 1998).

Please refer to Section 2.2.9 of the CRNGDP EA (BLM 1998) for additional discussion of additional (ancillary) facilities proposed in conjunction with further development within the MCRNGDPA.

2.2.10 Hazardous Materials

BBC has reviewed the EPA's Consolidated List of Chemicals Subject to Reporting Under Title III of the *Superfund Amendments and Reauthorization Act* (SARA) of 1986 (as amended) to identify any hazardous substances proposed for production, use, storage, transport, or disposal by this project, as well as the EPA's List of Extremely Hazardous Substances as defined in 40 CFR 355 (as amended) and determined that numerous materials listed as hazardous and/or extremely hazardous would be used or generated by this project. A summary of this information is available for review at the BLM's CFO in Casper.

Please refer to Section 2.2.10 of the CRNGDP EA (BLM 1998) for a more comprehensive discussion of hazardous materials and their use in the MCRNGDPA.

2.2.11 Abandonment

As producing wells within the gas field become commercially non-productive (estimated 20 to 40 year productive life), the Operator would obtain the necessary authorization(s) from the appropriate regulatory agencies to abandon the depleted well(s). All above ground facilities would be removed, the well bore would be physically plugged with cement as directed, and both the abandoned road and well location reclaimed according to BLM and/or WOGCC recommendations.

2.2.12 Reclamation

All disturbed surfaces would be reclaimed as soon as possible after the initial disturbance. This reclamation would consist primarily of backfilling the reserve pit, leveling and recontouring of disturbed areas, redistribution of stockpiled topsoil over the disturbed areas, installation of erosion control measures as appropriate, and reseeding as recommended by the appropriate regulatory agency (BLM or WOGCC). If the drilling of a directional well is anticipated soon after the initial well has been drilled and completed, reclamation would be delayed until such time as the second (directional) well had been drilled and completed. If drilling operations on the second (directional) well have not been initiated within twelve months, the well pad would then be reclaimed as indicated above.

Reclamation of the reserve pit would be accomplished when the pit is no longer required for completion and/or testing operations. Free standing water in the pit would be allowed to evaporate through natural means to the greatest extent possible prior to the commencement of backfilling; however, in some instances the pit contents may be mixed with suitable solid materials and the pit backfilled, as approved by the BLM or WOGCC. Prior to the mixing of reserve pit contents with approved stabilizing materials, the contents of the reserve pit would be tested for total petroleum hydrocarbons (TPH) and toxicity characteristics leaching procedure (TCLP) constituents, and appropriate closure permits would be obtained from the WOGCC and/or WDEQ. If necessary, reserve pit contents would be removed and disposed of at an approved disposal facility in a manner commensurate with all relevant county, state, and federal regulations and stipulations pertaining thereto.

Reclamation of the well location would be accomplished within a maximum of 2 years following the termination of drilling and completion operations (in the case of productive wells) or well abandonment (in the case of newly drilled dry holes).

2.2.12.1 Producing Well Location

During the production phase of operations, the unneeded (non-working) area(s) of the well pad would be reclaimed as soon as possible after conclusion of drilling and completion operations, weather permitting. Reclamation would consist of backfilling the reserve pit, reducing the cut/fill slopes by pushing the fill material back up into the cut, redistributing the stockpiled topsoil over these reclaimed areas, installing erosion control measures as appropriate, and reseeding the reclaimed areas as recommended by either the BLM or WOGCC depending upon jurisdiction. Restoration of these

previously disturbed areas would result in the reclamation of approximately 60% of each individual well pad, or 70.31 acres (42 wells x 2.79 ac/well = 117.18 ac x 0.60 = 70.31 ac) overall for the 42 wells proposed in conjunction with the MCRNGDP. As indicated above, this reclamation would be performed within 2 years of well completion and would reduce the long-term or LOP disturbance resulting from well pad construction under this proposal to 46.87 acres.

2.2.12.2 Access Roads

A minimum of 6 inches of topsoil would be stripped from the access road corridor (new construction portion only) prior to the commencement of construction activities and would be redistributed on the "outslope" areas of the borrow ditch after completion of road construction activities. These borrow ditch areas would then be reseeded as soon as practical thereafter. Likewise, any surface disturbances on/along the "outslope" areas of existing roads within the project area resulting from implementation of the Proposed Action would be reseeded as well. Please refer to Figure 2.2 in the CRNGDP EA (BLM 1998) for a typical access road cross-sectional diagram including those "outslope areas to be reseeded.

Restoration of those areas disturbed in conjunction with right-of-way clearing, topsoil salvage, and subsequent road construction would typically result in the reclamation of approximately 30% of the disturbed road ROW (for a road having a 16-foot running surface), not including any provision for the revegetation of the outslope portion of the borrow ditch. As indicated above, this reclamation would be performed within 2 years of well completion and would reduce the long-term or LOP disturbance resulting from access road construction under this proposal to approximately 8.94 acres.

2.2.12.3 Pipelines

A minimum of 6 inches of topsoil would be stripped from the pipeline ROW prior to the commencement of construction activities. Once trenching and pipe installation operations have been completed, the trench would be backfilled with the subsoil materials previously removed there from, the trench will be compacted to avoid settling, and the stockpiled topsoil redistributed over the disturbed ROW. The pipeline ROW would then be reseeded as soon as practical thereafter. Considering that all disturbances associated with pipeline construction would be reclaimed and reseeded as soon as practical following pipe installation, these disturbance are considered as short-term and are not included in the LOP cumulative disturbance totals.

2.2.12.4 Abandoned Well Location

Upon final abandonment, all existing surface facilities would be removed from the well location as stated in Section 2.2.11. The access road and remaining "work" areas of the well location would be scarified and recontoured, erosion control measures would be installed as necessary, and all recontoured (disturbed) areas would be reseeded as recommended by the BLM or WOGCC.

2.3 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

BBC would implement the applicant-committed practices, design features, and procedures presented in Section 2.3 of the CRNGDP EA (BLM 1998) in order to minimize impacts to the environment. Please refer to the CRNGDP EA and Chapter 5.0 of this document for additional information in this regard.

2.4 NO ACTION ALTERNATIVE

The *National Environmental Policy Act* of 1969 (NEPA) requires that the "No Action" alternative be considered in all environmental documents. Under the No Action Alternative, the BLM would deny further natural gas exploration and development on federal lands in the MCRNGDPA as currently proposed by BBC, while allowing other land and resource uses to continue without the impacts which would be associated with the development proposal. Denial of the modified development proposal is not, however, a denial of all natural gas development in the area. Under the No Action Alternative, development of lands in the CRU and adjoining areas could occur at levels similar to those which have occurred on the area in the past and could occur as authorized by existing management directives contained in the Platte River RMP, which includes the requirement for a site-specific NEPA analysis including the level of development approved in the DR and FONSI for the CRNGDP EA (BLM 1998).

Please refer to Section 2.4 of the CRNGDP EA (BLM 1998) for a more thorough discussion of the No Action Alternative.

2.5 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The proposed action includes development within a core area on an increased density of 20-acres (32 wells per section). Directional drilling was considered as an alternative to the construction of two separate well pads per 40-acre subdivision. Under this alternative one well pad would typically be strategically located in each 40-acre subdivision in such a manner as to allow two wells to be drilled from a single well pad, with one well drilled vertically and one well directionally drilled to the preferred bottom hole location on a 20-acre spacing pattern (WRMG 2003b). Use of directional drilling techniques in this instance would conceivably reduce the overall number of well pads required to achieve extraction of natural gas from the Lance Formation on a 20-acre spacing pattern. Overall surface disturbances would decrease with the use of a single well pad to drill two individual wells to different bottom hole targets; however, these disturbances would not be reduced by one-half as may be expected considering that a larger well pad would be required in order to accommodate both well bores, associated production equipment and, perhaps more importantly, to provide sufficient room in which to conduct safe directional drilling operations there from. BBC estimates that a well pad designed to accommodate twin wells utilizing directional drilling techniques in the drilling thereof would be approximately 6% larger than a similar pad built for one single well.

Both technical and economic factors determine the feasibility of directional drilling in any given situation and directional drilling is considered to be technically feasible in the MCRNGDPA using current drilling technology. From a purely technical standpoint, directional wells have been drilled in

geologic environments similar to the Cooper Reservoir area. The second factor to be considered is the economic feasibility of directional drilling in the MCRNGDPA. Well economics are primarily dependant on the cost of drilling, which is influenced by drilling conditions and the amount of natural gas ultimately produced by the well. For example, at given ultimate natural gas recovery rates, a well which produces a relatively large amount of natural gas may yield an economic rate of return that justifies drilling the well with the increased costs of directional drilling . But at the same well cost, a well yielding less gas may be sub-economic. Conversely, with a fixed estimated ultimate recovery (EUR), as is typically the case for adjacent wells within a field, the economic feasibility of directional drilling can be adversely affected by the incremental cost of drilling using directional techniques. The volume of gas ultimately produced by the well must generate enough revenue to repay the cost of drilling the well and provide a rate of return sufficiently adequate to compel the operator to drill the well (Vigil 2003).

In this regard, the cost to drill a well using directional techniques/equipment is much greater than that for a vertical well. Incremental costs of directional drilling include the use of the specialized drilling tools, additional labor and drilling rig costs associated with a longer drill time, and the cost of potential and predictable problems that are uniquely associated with directional drilling operations. There are facility savings associated with directional drilling including shared well pad, access road and gathering lines that reduce the incremental cost of directional drilling; however, these costs are minor compared to directional drilling costs. Moreover, risks associated with the directional drilling of wells in the MCRNGDPA are increased due to the presence of relatively soft shales downhole. The potential for key seating, differential sticking and stuck pipe is increased as the drill pipe mechanically erodes the relatively soft shales of the Waltman Formation in the curved (deviated) portion of the well bore. In addition, hole instability increases in a directional well as gravity and the mechanical action of the drill pipe tend to cause sloughing of these shales off of the "high" side of the hole (Vigil 2003).

The costs of directionally drilling a 20-acre density well in the MCRNGDPA are estimated to be 14% higher than comparable costs for the drilling of a vertical well. These higher costs are a direct result of the additional time required to drill the well, the application of directional drilling technology, and the employment of mitigation techniques while drilling. The best-case increase in drilling costs for a directional well, net of facility savings, is approximately $179,233 and is not adjusted for risk associated with potential drilling problems likely to be encountered in the MCRNGDPA (Vigil 2003). The BLM Wyoming Reservoir Management Group also analyzed the feasibility of directionally drilling wells within the CRU on a 20-acre spacing pattern and determined that a typical vertical well would have a net present value (NPV) of $128,194 while a typical directional well would have a NPV of -$51,039 at a 10% discounted cash flow (DCF). Their conclusion was that "...prudent exploitation of the natural gas resources would require the proposed 20-acre spaced infill wells to be drilled vertically" (WRMG 2003b).

It is presently estimated that an additional 25 billion cubic feet (Bcf) of gas can be recovered by increasing well densities to 20-acres within the MCRNGDPA. However, the incremental reserves available in the MCRNGDPA can not be developed in paying well quantities based upon average well reserves of 0.71 Bcf if additional costs are incurred to directionally drill the well (Vigil 2003).

Although directional drilling costs have declined and the technical feasibility has significantly improved over the past decade, exclusive use of directional drilling for 20-acre wells is not currently economically feasible in the MCRNGDPA. Although widespread directional drilling is not feasible, some smaller proportion of the wells may be drilled using directional methods. These certain wells may be drilled directionally if the surface is inaccessible, the estimated natural gas recovery for the individual location is estimated to be high enough and/or natural gas prices are expected to offset the increased costs of directional drilling and provide a rate-of-return on investment sufficient to promote the drilling of the well (Vigil 2003).

BBC has proposed the drilling of up to fifty (50) well bores on 10-acre densities utilizing directional drilling techniques. Although directional drilling operations on 20-acre densities are not considered economic at this time, 10-acre density wells are expected to have a greater likelihood of becoming economic if pricing or technology improves due to the reduced lateral offset distance required to reach the proposed bottom hole target. However, the primary reason that BBC has included a discussion of 10-acre density wells utilizing directional drilling techniques is a matter of full disclosure and the subsequent analysis of a potential approach to long term development which would prevent waste by fully and effectively draining the natural gas reservoir.