2.0 - PROPOSED ACTION AND ALTERNATIVES

This chapter provides detailed descriptions of the three alternatives for the Big Pack EA. Because the three alternatives share a number of common features related to construction, operation, and reclamation activities, **Section 2.1** provides information on the details common to Alternatives A through C. Differences between the alternatives, or features unique to an individual alternative, are provided within the alternative-specific discussions in **Sections 2.2** through **2.4**. The alternatives are as follows:

Alternative A - Proposed Action
Alternative B - No Action
Alternative C - Limited Surface Disturbance within Sensitive Resource Areas

2.1 DETAILS COMMON TO ALL ALTERNATIVES

Enduring Resources has proposed to develop the natural gas resources of the BPPA in Uintah County, Utah, approximately 40 miles south of Vernal. The Project Area encompasses the entirety of T12S, R22E and a portion of T11S, R22E as depicted on **Figure 1-1**. Wells are proposed to be drilled to the Wasatch Formation and Mesaverde Group.

Proposed well pad locations, downhole locations, pipelines, and access roads for each of the alternatives are conceptually illustrated in **Figures 2-1, 2-2,** and **2-3**. Gathering pipelines would be installed on the surface within the edge of the 45-foot wide ROW constructed for the proposed access roads, shown as collocated roads and pipelines. Trunk pipelines would be installed within a 10-foot wide ROW directly adjacent to the existing road ROW. Pipelines would be placed so as not to interfere with road maintenance, nor would they be placed over drainage turnouts or in the borrow ditch. New roads, well pads, and pipelines would be located as near as possible to existing trunk roads, access roads, and/or trails to minimize new surface disturbance. The routes for the proposed new roads have been designed to minimize road construction impacts. Actual locations of wells, roads, and pipelines may be sited differently during the permitting process following site-specific consideration of environmental conditions such as wildlife and plant habitats, archaeological and paleontological sites, as well as consideration of the performance of wells initially completed.

Implementation of any of the alternatives would occur in three primary phases: construction and development of facilities; operation and maintenance; and decommissioning and reclamation. All surface disturbance calculations referenced throughout this document refer to initial disturbance only as reclamation efforts in the Uinta Basin have not proven to be successful in the past due to drought and poor soils.

2.1.1 CONSTRUCTION AND DEVELOPMENT

Construction of wells, pipelines, access roads, and ancillary facilities is expected to be completed over a 10 to 12-year period. However, favorable economic conditions and evaluation of preliminary drilling results would determine the actual drilling timeframe, as well as the total number of wells drilled and the total number of pads required for construction. Where applicable, construction activities on Federal lands would follow guidelines described in the *Surface Operating Standards for Oil and Gas Exploration and Development*, "Gold Book" (BLM and USFS 2007) as well as other applicable guidelines, including API 1104, "Welding of Pipelines and Related Facilities", dated September 1999, or the latest edition. Construction activities on State and private lands would follow applicable guidelines of the appropriate SMA.

2.1.1.1 Well Pads

Prior to well pad construction or surface disturbing activities, Enduring Resources would obtain approval from the appropriate SMA. Each approval would contain site-specific Conditions of Approval (COAs) that would apply to surface use.

Well pad construction would consist of roughing in an access road to the well pad location and then leveling a roughly rectangular pad by balancing cut and fill areas. Well pads would be constructed from the native sand/soil/rock materials present. A small reserve pit (150 feet x 75 feet x 12 feet deep, occupying approximately 0.25 acre) would be excavated adjacent to each pad. Stockpiles for both subsoil and topsoil would be established and maintained for future use in backfilling the reserve pit and rehabilitating the location upon abandonment. Depending on the amount of cut and fill required to level each site, these stockpiles would occupy approximately 0.5 acre. Reserve pits would be reclaimed within 90 days from the date of well completion or as soon as practicable. The subsoil and liner (if any) would be pushed back into the pit, and the topsoil would be respread and reseeded.

Drill cuttings from the wellbore (mainly shale, sand, and miscellaneous rock minerals) and drilling fluids carried over with the cuttings would be held in the reserve pit. No hazardous substances subject to reporting under SARA Title III or 40 CFR 355 would be placed in the pit. The appropriate SMA would determine on a case-by-case basis if unlined pits are acceptable, or if site-specific conditions indicate that a synthetic liner in the fluid reserve pit is required.

Single well pads are expected to initially occupy approximately 4.0 acres to accommodate drill rigs and equipment. Well pads on which multiple wells would be located would likely be 5.0 acres initially to accommodate drill rigs and equipment. For disturbance calculation purposes in this EA, an average well pad size is estimated to be 4.5 acres.

2.1.1.2 Access Roads

Under all alternatives, existing roadways would be used where possible and new roads would be constructed where needed. The approximately 73 miles of existing roads within the Project Area would provide the primary access to the new well pads. Conceptual access routes to the proposed well pads are depicted on **Figures 2-1, 2-2**, and **2-3**. Exact locations of access roads would be determined by the appropriate SMA at the time of the onsite inspection. Proposed roads are expected to cross Federal, State, and private surfaces. Prior to any construction, improvement, or maintenance on County-claimed roads, Enduring Resources would coordinate with the Uintah County Roads Department to determine County requirements.

Construction of proposed roads on BLM surface would conform to standards outlined in the "Gold Book (BLM and USFS 2007). All construction materials for the proposed access roads would consist of native borrow and soil accumulated during road construction. New access roads (with collocated pipelines) on Federal surface would be crowned (2 to 3 percent), ditched, and constructed with a running surface of 18 feet and a maximum disturbance width of 45 feet. Although the running surface of the new roads would be 18 feet, initial surface disturbance has been calculated using a width of 45 feet based on the width of a typical collocated road and pipeline ROW. Surface pipelines would lie along the surface at the edge the road ROW.

Graveling or capping the roadbed may be performed as necessary to provide a well constructed, safe road. Prior to construction or upgrading, the proposed road ROW would be cleared of any snow and allowed to dry completely.

All new access roads would be constructed with appropriate drainage and erosion control features and structures to include cut-and-fill slope and drainage stabilization, relief and drainage culverts, water bars, and wind ditches similar to those described in the "Gold Book" (BLM and USFS 2007). Access roads would be constructed using standard equipment and techniques. Bulldozers and/or road graders would first clear vegetation and topsoil from the ROW. Surface disturbance and vehicular use would be limited to the approved location and access route.

2.1.1.3 Pipelines

Steel pipe gathering lines with a 4-inch outside diameter (OD) would be installed on the surface, with the exception of burial at road crossings in order to provide and maintain access routes and burial in sensitive locations as determined during onsites, to transport the produced gas from the wells to larger lateral (or trunk) lines. Steel pipe lateral lines with a 6-inch OD would be installed on the surface as needed, depending on well performance and gathering system requirements. Conceptual pipeline routes are depicted on **Figures 2-1, 2-2** and **2-3**. Exact location of pipelines would be determined at the time of the onsite inspection with the appropriate SMA. Proposed pipelines are expected to cross Federal, State and private surface. Where the pipeline is expected to cross stream channels, those crossings would be conducted in accordance with State Stream Alteration Permits, U.S. Army Corps of Engineers requirements, and the appropriate SMA guidance. For crossings on Federal lands, consideration would be given to BLM Technical Note 423 (BLM 2007a). As feasible, stream crossing would be conducted during low-flow conditions and would be constructed perpendicular to the axis of the stream channel. Where necessary, scouring analyses would be performed to determine the appropriate depth of burial.

All of the proposed pipelines are expected to be installed parallel to the proposed and existing access roads within the 45-foot ROW. For pipelines installed along existing roads, an initial 10-foot wide disturbance ROW is expected. Removal of vegetation would be kept to a minimum.

2.1.1.4 Compression

Under each alternative, in order to accommodate the increased production expected to occur, a 1,500-horsepower (hp) compressor station would be constructed in Section 2 of T12S R22E. The compressor station would require approximately 4 acres of surface disturbance and would consist of a compressor, central glycol dehydrator, meter run, and two 300-barrel stock tanks to collect produced water and condensate that would be removed from the gas stream.

2.1.1.5 Well Drilling

Drilling operations would be conducted in compliance with all Federal Oil and Gas Onshore Orders, all UDOGM rules and regulations, and all applicable local rules and regulations. Enduring Resources estimates that each well would require approximately 10 days to drill.

The drilling operation would be conducted in two phases. The first phase would utilize a surface-hole rig and an air mist system to drill to a depth of approximately 2,000 feet. During the second phase, a larger rotary drilling rig with conventional mud system would be mobilized to drill the remainder of the hole to a total depth of between 8,000 and 9,000 feet. The larger rig would pump fresh water as a circulating fluid to drive the mud motor, cool the drill bit, and remove cuttings from the wellbore. 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.

Upon drilling the hole to the total depth, a series of data-logging tools would be run in the well to evaluate the potential hydrocarbon resource. If the evaluation concludes that adequate hydrocarbon resources are present and recoverable, then steel production casing would be run and cemented in place in accordance with the well design, as approved in the APD, and in accordance with applicable COAs. The types of casing used, and the depths to which they are set, would depend upon the physical characteristics of the formations that are drilled. The casing and cementing program would be designed to isolate and protect the various formations encountered in the wellbore and to prohibit pressure communication or fluid migration between zones.

2.1.1.6 Completion Operations

Once production casing has been cemented in place, the drilling rig would be released and a completion rig would be moved in. Enduring Resources estimates that approximately 15 days would be required to complete an individual well.

Well completion consists of running a Cement Bond log to evaluate the cementing integrity, correlating (on depth) the cased hole logs to the open hole logs, perforating the casing across the hydrocarbon producing zones, and initiating a stimulation treatment of the formation to enhance its transmissibility of oil and gas. The typical stimulation used in the area is a hydraulic fracture treatment of the reservoir, wherein a freshwater/sand slurry is pumped into the producing formation with sufficient hydraulic horsepower to fracture the rock formation. The sand serves as a proppant to keep the created fracture open, thereby allowing reservoir fluids to move more readily into the well.

2.1.1.7 Interim Reclamation

Following completion activities, Enduring Resources would reduce the size of each well pad to the minimum surface area needed for production facilities, while providing for adequate safety measures, through reclamation. Enduring Resources would reduce the pad size for single wells to approximately 3 acres. The reduced well pad size for multiple well locations would vary depending on the number of wells on each pad, but would average 3.5 acres.

Portions of well pads and ROWs not utilized for the operational phase of the project would be reshaped and stabilized so that the cut and fill slopes mimic the original topography. Those areas would then be reseeded using seed mixtures determined by the appropriate SMA. Post construction seeding applications and reclamation practices would continue as directed by the SMA. Given the history of reclamation efforts in the area, some locations would require special reclamation practices. Methods such as hydromulching, straw mat application on steeper slopes, fertilizing, and soil analysis to determine the need for fertilizer, seed-bed preparation, contour furrowing, watering, terracing, water barring, and the replacement of topsoil would be implemented as directed by the SMA.

2.1.2 OPERATIONS AND MAINTENANCE

Each completed well pad would contain a wellhead, a three-phase separator with a 0.5 million British thermal unit per hour (MMBtu/hr) boiler, a 300-barrel condensate tank, a 300-barrel water tank, a glycol dehydration unit, and a meter house. Produced water and condensate would be stored in the tanks and transported by tanker trucks to commercial points outside the Project Area as necessary. Produced gas would be transported from the Project Area via the Canyon Pipeline which runs along the eastern edge of the Project Area.

2.1.2.1 Waste Disposal

Trash containers and portable toilets would be located on construction sites during well pad and pipeline installation. Toilet holding tanks would be regularly pumped and their contents disposed of at Vernal, Utah's municipal sewage facility in accordance with applicable rules and regulations regarding sewage treatment and disposal. Accumulated trash and nonflammable waste materials would be hauled to the Uintah County landfill once a week or as often as necessary. All debris and waste materials not contained in the trash containers would be cleaned up, removed from the Project Area, and disposed of at the Uintah County landfill. Cleanup of the site would occur everyday.

No chemicals subject to reporting under SARA Title III (hazardous material) in an amount greater than 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with the drilling of wells. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, would be used, produced, stored, transported, or disposed of in association with the drilling of wells. Scrap metal and other recyclable refuse would be periodically hauled off-site.

2.1.2.2 Water Requirements

Water needed for the drilling and completion of each well, as well as for dust suppression, would be obtained from an existing water right (Permit #49-2279[T77865]). Water would be trucked to drilling locations from the White River.

2.1.3 DECOMMISSIONING AND FINAL RECLAMATION

While the life span of individual wells may vary, the typical life span is estimated to be approximately 20 to 30 years. Abandonment of a well and its facilities would be performed in compliance with all applicable regulations. All hydrocarbons and water-bearing horizons in an abandoned well bore would be isolated via cement plugs. At the time of final abandonment, all aboveground facilities, including pipelines, would be removed and abandoned; well pads, roads, and other disturbed areas would be reclaimed.

Reclamation includes reestablishing soil conditions and revegetating disturbed areas to the specifications of the SMA at the time of abandonment. All disturbed surfaces would be re-contoured to the approximate natural contours, with reclamation of the well pad and access road performed as soon as practical after final abandonment. Re-seeding would be performed in the fall following completion of the reclamation operations (after September and before permanent snowfall) or in the spring. Reclamation practices would continue, as directed, and until determined successful by the appropriate SMA.

Given the history of reclamation efforts in the area, some locations would require special reclamation practices. Methods such as hydromulching, straw mat application on steeper slopes, fertilizing, and soil analysis to determine the need for fertilizer, seed-bed preparation, contour furrowing, watering, terracing, water barring, and the replacement of topsoil would be implemented as directed by the SMA.

2.2 ALTERNATIVE A – PROPOSED ACTION

Under the Proposed Action, Enduring Resources anticipates constructing approximately 292 well pads from which up to 664 wells would be drilled. Of the planned well pads, 141 are expected to each support a single, vertically drilled well. The remaining 151 well pads would support up to 4 wells (i.e., one vertically drilled and up to three directionally drilled wells per pad). As planned, directionally drilled wells represent approximately 56 percent of the total new wells proposed. The actual number of

directionally drilled wells, however, would depend upon the feasibility of directional wells providing for the optimum recovery of natural gas reserves from the Project Area. As topography allows, the majority of the proposed wells would be drilled on 40-acre downhole spacing with varying surface density. Conceptual locations of facilities under the Proposed Action are illustrated in **Figure 2-1**.

In addition to new wells and well pads, the Proposed Action requires the construction of the following primary components:

- For each well, a well head, 300-barrel condensate tank, 300-barrel water tank, three-phase separator with a heater, glycol dehydration unit, and meter house;
- Approximately 65 miles of new access roads or upgraded two-tracks;
- Approximately 105 miles of pipeline;
- One compressor station (with a 1,500 horsepower gas-fired compressor engine), a three-phase separator with a heater, a glycol dehydration unit, and two 300-barrel tanks (one for water and the other for condensate).

Approximately 70 wells per year would be drilled in 2009 and 2010. Thereafter, wells would be drilled at the rate of approximately 50 wells per year for a maximum of 10 years. Typically, water use for drilling and completion would be approximately 0.75 acre-feet (244,390 gallons) per well. Resulting annual water use would be a maximum of 52.5 acre-feet/year for the first two years and then 37.5 acre-feet/year for the next 10 years. The maximum 12-year development use would be approximately 480 acre-feet for an average of 40 acre-feet/year. If necessary, an additional water right would be obtained by the operator. At full development, about 21 pumpers (each responsible for approximately 32 wells) would be employed to check and maintain facilities on a daily basis. An average of six trucks per day would be needed to haul produced water and condensate from the Project Area. In addition to water for drilling, approximately 0.1 acre feet of water is expected to be used per well for dust suppression efforts during construction.

Under the Proposed Action, construction of the proposed well pads, roads and pipelines would result in an initial disturbance of approximately 1,620 acres[1]. Of the total disturbance associated with the Proposed Action, approximately 300 acres would occur on State or private lands and the remaining 1,320 acres would occur on Federal lands. Disturbance would consist of direct removal of vegetation from grading of the proposed roads and well pads.

The number of proposed well pads and initial surface disturbance estimates are summarized in **Table 2-1**. Initial disturbance is the total acreage potentially disturbed during the construction process. Residual disturbance is defined as the disturbance that is expected to last for the life of the project, plus the time required to successfully re-establish vegetation following abandonment and final reclamation. All disturbance calculations referenced throughout this document refer to initial disturbance only as reclamation efforts in the Basin have not proven to be successful in the past due to poor soils and drought conditions.

Table 2-1. Alternative A - Surface Disturbance in the BPPA

Design Element	Initial Disturbance (acres)
Well Pads	1,314
Compressor Station	4

[1] Surface disturbance calculations are based on conceptual well pad, road, and pipeline locations as presented in Figure 2-1. Actual surface disturbance may vary based on site-specific analysis through the APD process.

Table 2-1. Alternative A - Surface Disturbance in the BPPA	
Design Element	**Initial Disturbance (acres)**
Surface Pipeline (along existing roads)	49
Collocated Roads and Pipeline	355
Total	**1,722 (1,620*)**

*The total disturbance for Alternative A used throughout this document is 1,620 acres. This total is the result of GIS analysis which removes areas of overlapping development (102 acres).

2.2.1 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

Several procedures are described below that would be implemented under all alternatives to reduce the potential environmental impacts of the proposed development activity. These applicant-committed measures are based upon the guidelines developed by BLM and appropriate SMAs for oil and gas operations. The need for the implementation of each measure would be determined through the onsite inspection. Additionally, the onsite inspection would be used in conjunction with the measures described below to develop site-specific mitigating measures for sensitive resources.

2.2.1.1 Cultural Resources

A Class III cultural resources survey, conducted by a SMA-approved archaeologist and funded by Enduring Resources, would be conducted on all areas proposed for surface disturbance. Class III cultural resource block surveys have been conducted in portions of the proposed development area and would be utilized where applicable. If these surveys identify areas with a high probability of encountering potentially significant subsurface archaeological sites, a qualified archaeologist would monitor surface disturbance.

Enduring Resources and their contractors would inform their employees about relevant Federal regulations intended to protect cultural resources. Equipment operators would be informed that if a site is uncovered during construction, activities in the vicinity would immediately cease and the appropriate SMA would be notified. Historic properties considered eligible for the National Register of Historic Places (NRHP) would be avoided or mitigated through an approved data recovery plan.

2.2.1.2 Paleontological Resources

Based on site-specific recommendations from the SMA, surveys for paleontological resources would be conducted on areas with sandstone outcrops and where excavations into sensitive formations may be needed for road, pad, or buried pipeline construction.

The survey would be conducted by a SMA-approved paleontologist, funded by Enduring Resources, and would determine fossil localities and the sensitivity of the area for fossil resources. These actions would help determine the necessity of having a qualified paleontologist onsite during construction. If paleontological resources were uncovered during ground-disturbing activities, Enduring Resources would suspend all operations that would further disturb such materials and would immediately contact the appropriate SMA. A determination would be made by the AO as to what mitigation may be necessary for the discovered paleontological material before construction can resume.

2.2.1.3 Special Status Plants

- Measures that would specifically serve to protect Graham's beardtongue (*Penstemon grahamii*) include adherence to jointly-developed USFWS and BLM final conservation measures for the species, which are provided in **Appendix E**. In brief, these conservation measures include pre-construction surveys in potential habitat, avoidance of known plants, using spatial buffers between surface-disturbing activities and known plant populations, limiting off-road travel, and monitoring the effectiveness of these measures.

2.2.1.4 Noxious Weeds

In an effort to ensure that project activities do not increase the existence of invasive or noxious weeds in the BPPA, the applicant would prepare a Weed Control Plan. Specific steps included in this plan would include:

- Conducting individual noxious weed inventories on a well-by-well basis prior to construction activities. The inventories would include examination of all proposed surface disturbance (i.e., roads, pipeline, and well pads) associated with each well. The results of these inventories would include GPS locations and associated field notes indicating the type and size of each infestation. These data would be formulated into a report and submitted with the associated APD.
- Preparation of a Pesticide Use Proposal.
- Following the construction and drilling phase for each well, all disturbed surface would be monitored annually for the presence of noxious weeds. If monitoring showed increases in presence of noxious weeds, Enduring Resources would be responsible for treating these areas. Invasive plant control measures (mechanical, cultural, chemical) would be conducted before seed set annually. Monitoring and treatment would be conducted annually until reclamation and weed ratification was deemed successful by the appropriate SMA.
- To prevent further spread of noxious weeds, all vehicles and equipment entering the Project Area from outside the Uinta Basin would be power washed to remove seed and plant materials before entering the BPPA and before moving to another area.
- Disturbed areas would be reseeded as soon as possible to reduce the potential for invasive species infestations.

2.2.1.5 Additional Interim Reclamation

- If it is determined that a new road would be constructed to replace an existing one, Enduring Resources would reclaim the existing road, as approved by the appropriate SMA.

2.2.1.6 Erosion Protection

- Enduring Resources would prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), adherence to which would minimize erosion and sedimentation from construction activities.
- Erosion protection and silt retention would be provided by the construction of silt catchment dams where needed and as feasible.

- Where directed by the appropriate SMA, Enduring Resources would construct erosion control devices (e.g., riprap, bales, and heavy vegetation) at culvert outlets. All construction activities would be performed to retain natural water flows.

2.2.1.7 Existing Facilities and Rights-of-Way

- Enduring Resources would repair or replace to current BLM standards any fences, cattleguards, gates, drift fences, and natural barriers that are damaged as a result of the Proposed Action. Cattleguards would be used instead of gates for livestock control on most road ROWs.

2.2.1.8 Construction and Operations

- Enduring Resources would apply water to roads and well pads as needed for dust suppression.

2.2.1.9 Reclamation Monitoring

- Enduring Resources would work with the SMA to monitor the success of interim and final reclamation. Enduring Resources would perform annual inspections on reclaimed sites, as agreed upon by the SMA and Enduring Resources, after a period of 2 years. The 2-year gap would allow the seed to become established and give the vegetation two full growing seasons for a better measure of success. If the SMA determines the reclamation has not been successful, Enduring Resources would reseed the location.

2.2.1.10 Road Maintenance

- Enduring Resources would maintain new access roads leading to their facilities inside the BPPA boundary. Access roads are the short spur access roads from the established trunk road network to the well pads.

2.2.1.11 Wildlife and Fisheries, Including Special Status Species

- Raptor management would be guided by "*Best Management Practices for Raptors and Their Associated Habitats in Utah*" (see Appendix A of the Vernal ROD and Approved RMP) (BLM 2008a). As such, prior to any surface-disturbing activities during the breeding season, a BLM-approved contractor would survey all areas within 1 mile of proposed surface disturbance for the presence of raptor nests. If occupied/active raptor nests are found, construction would not occur during the nesting season for that species within the species-specific buffer described in the "Guidelines" mentioned above. In addition, as specified in these "Guidelines", and as determined by the AO of the appropriate SMA, modifications of these spatial and seasonal buffers for BLM-authorized actions would be permitted, so long as protection of nesting raptors is ensured (BLM 2008a).
- To prevent exposure of migratory birds and other wildlife to petroleum products, Enduring shall remove any visible accumulation of oil from the drilling or workover pit immediately upon release of the drilling rig.
- Screens or other devices would be installed on the stacks and on other openings of heater-treaters or fired vessels as directed by the AO.
- Prior to any project-related surface disturbance, all locations proposed for surface disturbance shall be examined by a wildlife biologist and botanist approved by the appropriate SMA to determine if any Federally-threatened or endangered (T&E) wildlife species are present. If

present, the operator would consult with the appropriate SMA prior to initiating any surface-disturbing activities. Site-specific T&E species clearances would be performed at the time of the onsite review.

2.3 ALTERNATIVE B – NO ACTION

Under the No Action Alternative, no drilling would be permitted on Federal leases. Drilling and production would occur on State of Utah and private leases. Surface land use would be controlled by the appropriate SMA. ROWs for roads and pipelines would be granted across Federal lands to access the leases on the State and private lands. The No Action Alternative provides for 50 well pads on State of Utah leases and three on private leases. In addition to the 53 vertical wells, 59 directional wells are proposed for a total of 112 total wells. As planned, directionally drilled wells represent approximately 53 percent of the total new wells proposed. The actual number of directionally drilled wells, however, would depend upon the feasibility of directional wells providing for the optimum recovery of natural gas reserves from the Project Area.

In addition to new wells and well pads, the No Action Alternative requires the construction of the following primary components:

- For each well, a well head, 300-barrel condensate tank, 300-barrel water tank, three-phase separator with a heater, glycol dehydration unit, and meter house;
- Approximately 11 miles of new access roads or upgraded two-tracks;
- Approximately 32 miles of pipeline;
- One compressor station (with a 1,500 horsepower gas-fired compressor engine), a three-phase separator with a heater, a glycol dehydration unit, and two 300-barrel tanks (one for water and the other for condensate).

Wells would be drilled at a variable rate per year for a maximum of 10 years. Typically, water used for drilling and completion would be approximately 0.75 acre-feet (244,390 gallons) per well. Annual water usage would vary depending upon the total wells drilled per year. Assuming 11 wells are drilled per year, the average annual water usage would be approximately 8.25 acre-feet/year.

Similar to Alternative A, the average well pad size is assumed to be 4.5 acres. The total expected initial disturbance for the No Action Alternative as described would be approximately 319 acres[2]; **Table 2-2** shows the approximate disturbance that would result from the implementation of the No Action Alternative. The conceptual locations of facilities are shown on **Figure 2-2**.

Table 2-2. Alternative B - Initial Surface Disturbance in the BPPA

Design Element	Initial Disturbance (acres)
Well Pads	239
Compressor Station	4
Surface Pipeline (along existing roads)	26

[2] Surface disturbance calculations are based on conceptual well pad, road, and pipeline locations as presented in **Figure 2-3**. Actual surface disturbance may vary based on site-specific analysis through the APD process.

Table 2-2. Alternative B - Initial Surface Disturbance in the BPPA	
Design Element	**Initial Disturbance (acres)**
Collocated Roads and Pipeline	69
Total	**338 (319*)**

*The total disturbance for Alternative B used throughout this document is 319 acres. This total is the result of GIS analysis which removes areas of overlapping development (19 acres).

Applicant-committed environmental protection measures discussed in **Section 2.2.1** would be applied as determined necessary by the appropriate SMA.

2.4 ALTERNATIVE C – LIMITED SURFACE DISTURBANCE WITHIN SENSITIVE RESOURCE AREAS

Under Alternative C, limited surface disturbance would be allowed within the Lower Bitter Creek 100-year floodplain and within areas in close proximity to the active East Bench 16 sage-grouse lek. Minimizing surface disturbance in these areas would result in 272 proposed well pads and 392 directionally drilled wells for a total of 664 proposed wells. Well pads within the floodplains would be reduced from 20 under the Proposed Action to four under Alternative C. As planned, using variable surface density and 40-acre or greater downhole drilling spacing, directionally drilled wells represent approximately 59 percent of the total new wells proposed. The actual number of directionally drilled wells, however, would depend upon the feasibility of directional wells providing for the optimum recovery of natural gas reserves from the Project Area.

In addition to new wells and well pads, Alternative C requires the construction of the following primary components:

- For each well, a well head, 300-barrel condensate tank, 300-barrel water tank, three-phase separator with a heater, glycol dehydration unit, and meter house;
- Approximately 60 miles of new access roads or upgraded two-tracks;
- Approximately 99 miles of pipeline;
- One compressor station (with a 1,500 horsepower gas-fired compressor engine) and, for each well, a three-phase separator with a heater, a glycol dehydration unit, and two 300-barrel tanks (one for water and the other for condensate).

Approximately 70 wells per year would be drilled in 2009 and 2010. Thereafter, wells would be drilled at the rate of approximately 50 wells per year for a maximum of ten years. Typically, water use for drilling and completion would be approximately 0.75 acre-feet (244,390 gallons) per well. Resulting annual water use would be 52.5 acre-feet/year for the first two years and then 37.5 acre-feet/year for the next 10 years. The 12-year development use would be approximately 480 acre-feet for an average of 40 acre-feet/year. An average of five trucks per day would be needed to haul produced water and condensate from the Project Area.

Under Alternative C, construction of the proposed well pads, Project Area roads and pipelines would result in an initial disturbance of approximately 1,515 acres[3]. Of the total surface disturbance associated

[3] Surface disturbance calculations are based on conceptual well pad, road, and pipeline locations as presented in **Figure 2-3**. Actual surface disturbance may vary based on site-specific analysis through the APD process.

with Alternative C, approximately 261 acres would occur on State or private lands and the remaining 1,254 acres would occur on Federal lands. Disturbance would consist of direct removal of vegetation from grading of the proposed roads and well pads. Conceptual locations of facilities under Alternative C are illustrated in **Figure 2-3**.

The number of proposed well pads and initial disturbance estimates are summarized in **Table 2-3**.

Table 2-3. Alternative C - Initial Surface Disturbance in the BPPA

Design Element	Initial Disturbance (acres)
Well Pads	1,224
Compressor Station	4
Surface Pipeline (along existing roads)	47
Collocated Roads and Pipeline	327
Total	**1,602 (1,515*)**

*The total disturbance for Alternative C used throughout this document is 1,515 acres. This total is the result of GIS analysis which removes areas of overlapping development (87 acres).

2.4.1. ADDITIONAL ENVIRONMENTAL PROTECTION MEASURES

The applicant would commit to implementing the protection measures described in **Section 2.2.1** as determined necessary by the AO. In addition, the applicant would commit to the following measures to further mitigate potential impacts to floodplains and greater sage-grouse:

2.4.1.1 Floodplains

In accordance with the Vernal RMP (BLM 2008a), no new surface-disturbing activities would be allowed within active floodplains, wetlands, public water reserves, or within 100 meters of riparian areas. An exception could be authorized if:

- There are no practical alternatives,
- Impacts could be fully mitigated, or
- The action is designed to enhance the riparian resources.

If an exception is authorized:

- All well pads located within or immediately adjacent to 100-year floodplains would feature a closed-loop system. The need for closed-loop systems at individual well pads would be determined by the AO during the onsite process. No well pads would be located within the active channel.
- Proposed well pads located within 100-year floodplains would be surrounded by berms to divert surface water from the facility. Silt fencing or other approved erosion control methods would also be utilized, as deemed necessary by the appropriate SMA, during the APD process.
- Tank batteries would be centralized outside of the floodplain where topographically feasible; those constructed within the 100-year floodplain would be bermed and the berm would be lined with plastic.

2.4.1.2 Greater Sage-grouse

- Prior to any construction, drilling, or completion activities between March 15 and June 15, the BLM and/or a third party contractor would first coordinate with Utah Division of Wildlife Resources (UDWR) to see if annual lek inventories have been completed within the BPPA. If surveys have not been conducted for that year, the operator would fund a site-specific lek inventory to determine lek activity. If leks are determined to be active, Enduring Resources would adhere to sage-grouse restrictions listed in the Vernal ROD and Approved RMP (BLM 2008a). Specifically, no surface-disturbing activities would occur within 0.25 mile of active sage-grouse leks year-round; no permanent facilities or structures would be allowed within 2 miles when possible; no surface-disturbing activities within 2 miles of sage-grouse leks would be allowed from March 1 through June 15; and within 0.5 mile of known active leks, the best available technology would be used to reduce noise (e.g., installation of multi-cylinder pumps, hospital sound-reducing mufflers, and placement of exhaust systems) (BLM 2008a)

- Surface density would be limited to 80-acre surface density (with 40-acre downhole spacing) within a 2-mile radius of the active East Bench 16 sage-grouse lek.

- Low-profile tanks would be used within 1 mile of the active East Bench 16 sage-grouse lek.

- As feasible, project facilities would be located out of the line-of-sight from sage-grouse leks. Sage-grouse leks would also be obscured from noise-related impacts, using vegetative and/or topographic screening, as directed by the AO during the onsite process.

- The point exhaust stack would be pointed away from sage-grouse winter habitat to reduce noise levels in sensitive use areas.

- Timing of energy exploration, development, and construction would be adjusted to minimize disturbance of sage-grouse breeding activity at dawn and dusk when birds are likely to be found on the leks (Connelly et al. 2000).

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