

BLACK HILLS EXPLORATION PROPOSALS

for the

Winter Flats, Homer Deep, and Horseshoe Canyons areas

INTRODUCTION: Black Hills Exploration and Development, Inc. has proposed drilling a total of seven natural gas wells in three different areas on public lands in the Debeque area. The BLM Grand Junction Field Office is asking for public comments on what issues or concerns should be considered in the Environmental Assessments for these three projects. Comments may be mailed to the BLM Grand Junction Field Office at 2815 H Road, Grand Junction, Colorado 81506, or emailed to GJFO_webmail@blm.gov, and they should be submitted by April 30, 2008. For more information contact Julia Christiansen at (970) 244-3093.

Each of the three proposals is described below.

WINTER FLATS

PROPOSED ACTION

Black Hills proposes to drill two exploratory wells (10-43-99 and 11-43-100) in the Winter Flats Oil and Gas Unit. Construction of two new well pads is planned, as well as improvement of an existing access road leading to one of the well locations, and construction of new access roads and pipelines leading to both locations. Initial drilling would occur over a period of 45 to 60 days.

Construction

Access Roads

The two wells would be accessed west from the town of De Beque, mostly on existing roads. Well 10-43-99 would be reached by traveling approximately 14.1 miles west from De Beque on Winter Flats Road (Mesa County Road V.2) to a junction with an unnamed dirt road, then traveling south on the unnamed two-track road for approximately 0.5 mile. The well pad for Well 10-43-99 would be located to the west of the existing road and be reached by traveling 235 feet on a proposed new access road.

Well 11-43-100 would be reached by traveling approximately 21.1 miles west from De Beque on Winter Flats Road. The well pad for Well 11-43-100 would be located south of the existing road and be reached by traveling approximately 1,149 feet on a proposed access road that would be constructed concurrently with the well pad. No widening of existing access roads would be necessary.

For Well 10-43-99, a new access road approximately 235 feet long would be constructed to access the pad from an existing access road, which would be upgraded.

For Well 11-43-100, a new access road approximately 1,149 feet long and 20 feet wide would be constructed to connect the new pad with the existing access road. It would be permitted with a running surface width of 16-18 feet, with a total disturbance width of 25 feet.

Well Pads

The proposed well pads would be constructed using bulldozers, graders, front-end loaders, and/or backhoes. Well pads would be cleared of vegetation and topsoil, then leveled using cut-and-fill construction techniques. Topsoil would be removed from the well pad before construction and stockpiled as directed, for later use in reclamation. New surface disturbance would be kept to a minimum by installing temporary limit-of-disturbance fencing or flagging and confined to approved footprint.

- Well 10-43-99 would be located 235 feet from an existing access road. The new pad would have a working surface 300 feet long by 250 feet wide. The area of initial disturbance would be about 1.99 acres. Mandatory interim reclamation would be completed when the well started production, and 0.52 acres would remain un-reclaimed for the life of the project, until the well was plugged and abandoned.
- Well 11-43-100 would be drilled on a newly constructed well pad located approximately 1,149 feet from an existing access road. The new pad would have a working surface 300 feet long by 250 feet wide. The area of initial disturbance would be about 1.70 acres, with 0.56 acres remaining un-reclaimed for the life of the project, following interim reclamation.

Pipelines

If the exploratory wells are productive, gas gathering pipelines would be constructed to collect gas from the two wells.

A new 20-foot disturbance is proposed for each new proposed pipeline. New lines would be buried from each well to tie-ins with existing pipelines. The 4" steel pipeline for well 10-43-99 would follow the same alignment as the proposed new 235-foot access road, then tie in to an existing pipeline beside the existing access road. The 4" steel pipeline for well 11-43-100 would follow the alignment of the proposed new access road for its 1,149 feet, then tie in to an existing pipeline at the existing access road.

Pipelines would be buried to a depth of 4 feet from the surface to the top of the 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. The pipelines would be pressure-tested with fresh water to locate any leaks. Fresh water used for testing would be obtained from Latham Ponds, a permitted water source.

approximately 15 miles from Well 10-43-99 and 22 miles from Well 11-43-100. The water would be transported to the testing location by truck, with a capacity of 80 bbl. After testing, the water would be disposed of at an approved off-site facility.

The initial disturbance from pipeline construction for both wells would be 0.64 acres. No residual disturbance would remain after pipeline reclamation.

Disturbance from Construction

Total short-term new surface disturbance (disturbance resulting from construction) for the proposed two well pads, pipelines and access roads would be 5.28 acres. All surface disturbance would occur on BLM land. After mandatory interim reclamation of the portion of the surface not needed for production, the residual (long-term) disturbance remaining for the life of the project would be 1.72 acres.

Drilling and Completion

Drilling

Black Hills' drilling operations would be conducted in compliance with Federal Oil and Gas Onshore Orders, and all applicable rules and regulations. Each well is anticipated to require about 12-15 days to drill and approximately 30-45 days to complete. Blow-out Preventors (BOP) and related equipment would meet the minimum requirements of Onshore Oil and Gas Order No. 2. The BLM would be notified in advance of all pressure tests. A water-based drilling mud system would be used for drilling. Each well pad would contain a lined reserve pit to receive the drill cuttings and drilling fluids carried with the cuttings. No hazardous substances would be placed in the pits. The dimensions of reserve pits would be 100 feet x 150 feet with a depth of 10 feet, except where site-specific conditions such as irregular pad configurations dictate different specifications.

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.

Completion

After production casing was cemented in place, the drill rig would be removed and a completion rig would be moved in. A Cement Bond log would be run to evaluate the cement integrity and to correlate the cased hole logs to the open hole logs. The casing would be perforated across the hydrocarbon producing zones, and the formation stimulated to enhance the gas production. The typical method used for stimulation consists of hydraulic fracture treatment of the reservoir, in which sand suspended in non-toxic fluid is pumped into the producing rock formation with sufficient hydraulic pressure to fracture it. Sand grains serve as props to keep the created fractures open, thereby allowing reservoir fluids to move more efficiently into the wellbore.

Production

If the exploratory wells are productive, production facilities, including produced water storage tanks and separators would be installed on each pad, and be located and arranged to facilitate safety and minimize long-term surface disturbance. A low-profile 300-barrel produced water tank, approximately 12 feet in height, would be installed on each well pad. To blend with the natural environment, all permanent above-ground facilities on the well pad would be painted BLM Standard Environmental Color Shale Green, in a non-reflective finish.

All installed production facilities, such as storage tanks, load outs, separation and treating units, which could leak or spill oil, condensate, produced water, glycol, or any fluid which may constitute a hazard to public health or safety would be placed within an appropriate secondary containment structure. The structure may consist of dikes, walls, drip pans or other construction which shall be installed so that any spill or leakage cannot drain, infiltrate, or otherwise escape to ground water, surface water, or navigable waters before cleanup is completed. The structure would be designed to hold 110% of the capacity the largest single tank in use and be impervious to any oil, glycol, produced water, or other toxic fluid for 72 hours.

After well drilling and completion activities, the well pad would be reduced to the minimum surface area needed for production and future work-overs, while providing for reshaping and stabilization of cut and fill slopes. Location and spacing of production facilities on the well pad are proposed in a way that would maximize the area possible for interim reclamation while separating heat-producing equipment to safe distances from one another. Production equipment would not interfere with recontouring of any cut or fill slopes.

Interim Reclamation

At interim reclamation, the described portions of the well pad disturbances would be recontoured, covered with topsoil and seeded, as specified by the BLM. Final reclamation would be implemented at the end of the life of the project or when the well is abandoned. A summary of the interim reclamation activities follows:

- 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 at drilling locations not needed for further production operations, excluding the reserve pit, would be immediately back-filled after the drilling rig is released. any pits, cellars or boreholes remaining on location would be fenced, as specified for the reserve pit.
- The reserve pit would be reclaimed within ninety (90) days from the date of well completion, weather permitting. Dry/non-producing well locations would be plugged, abandoned and reclaimed within 90 days of well completion, weather permitting.

- Any hydrocarbons in the reserve pit would be removed in accordance with 43CFR 3162.7-1. The reserve pit would then be completely dried and the accessible portion of pit liner would be removed and taken to a local landfill. The remaining buried part of liner would be buried in place with native soil/materials removed at the time of excavation. During backfilling, muds and associated solids would be confined to the pit, not squeezed out and incorporated into the surface materials. There would be a minimum of three feet of cover (overburden) over the pit, so that the pit area could support heavy equipment without sinking.
- Areas not necessary for production and future workovers would be reshaped to resemble the original landscape contours. Stockpiled topsoil would be redistributed on the area to be reclaimed, then roughened and re-seeded according to BLM requirements.
- The seedbed would be prepared by contour cultivating four to six inches deep. Seed would be drilled ½ to 1 inch deep following the contour. In areas that could not be drilled, seed would be broadcast at 1.5 times the application rate and covered to ½ to 1 inch in depth with a harrow or drag bar. Seeding would be completed after August 15 and prior to October 15.
- Areas being reclaimed would be fenced (using a fence type approved by the BLM Authorized Officer) to exclude livestock and wildlife for the first two growing seasons or until the seeded species have established, to prevent livestock/wildlife grazing pressure. Seeded species would be considered successfully established when at least 50 percent of the seeded species were producing seed. The reclaimed areas would periodically be monitored for revegetation success and soil stability.
- The seed mix or required site work could be modified with approval from the BLM, based on site-specific conditions, cheatgrass competition, soil stability, winter wildlife habitat needs, species success in past revegetation efforts, and seed availability. Native species would be used whenever possible.
- As part of the reclamation process, the disturbed areas to be reclaimed would be seeded with a weed-free certified PLS seed mix suitable to specific site conditions. This mix would be determined prior to interim or final reclamation by the BLM. Certification and seed tags would be submitted to the BLM within 30 days of seeding.
- Some locations could require special reclamation practices, such as seeding sterile hybrids, hydro-mulching, straw mat application on slopes, fertilizing, seed-bed preparation, contour furrowing or pocking, watering, terracing, water barring, or the replacement of topsoil. All reclamation practices would be pre-approved by the BLM. Noxious weeds would be treated by physical or chemical methods, in accordance with the *Noxious and Invasive Management Plan for Oil and Gas Operators* (BLM 2007).

Reclamation would be considered successful when:

- Soil erosion resulting from the operation was stabilized.
- Vegetative cover at least equal to that present prior to disturbance and a plant species composition at least as desirable as that present prior to disturbance has been established. Establishment of all the species in the seed formula would be viewed as meeting the composition/desirable species criteria.
- Disturbed land has been returned to a form and productivity that is ecologically balanced, self-sustaining and in conformity with pre-determined land management plans.

Road and Pad Maintenance

Access roads and well pads would be inspected by the BLM and Black Hills and maintained on a quarterly basis (at a minimum). Maintenance would include:

- Road and pad surface grading, crowning and graveling, as needed.
- Relief ditch, culvert and cattle guard cleaning, as needed.
- Maintenance of road structures and road contours designed to control stormwater, erosion and sediment, such as road dips, crowns, ditches, in-sloping, ditch turnouts.
- Maintenance of pad structures designed to provide run-on/run-off controls, such as ditches or berms, basins, straw wattles, or other erosion and sediment control methods.
- Erosion control measures for cut and fill slopes and other disturbed areas, as needed.
- Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.
- Road and slope stabilization measures, as required, until final abandonment and rehabilitation.
- Weed control.
- Dust abatement (as often as determined necessary by BLM).

Noxious Weed Management

The Colorado Noxious Weed Act (CRS Title 35, Article 5.5) requires that noxious weeds be managed on private and public lands. In March 2007, all oil and gas operators with leases in the jurisdiction of the BLM GJFO received a copy of the *Noxious and Invasive Management Plan for Oil and Gas Operators* (BLM 2007). Operator compliance with the plan is mandatory.

Final Abandonment and Final Reclamation

At the end of the life of the project, each well would be plugged and “abandoned,” at which time the area would be returned to conditions similar to or better than those that existed prior to the initiation of the project.

Abandonment

Upon abandonment, each borehole would be plugged, capped, and its related surface equipment would be removed. Subsurface pipelines would be purged and plugged at specific intervals and site recontouring would be accomplished using appropriate equipment. Topsoil would be removed before recontouring, to be later redistributed across the site. Soils in all disturbed areas would be roughened and reseeded with native vegetation. The seed mix would conform to the typical vegetation surrounding the specific well site and be approved by BLM.

A Sundry Notice would be submitted by Black Hills to BLM describing the proposed engineering, technical, and environmental aspects of final plugging and abandonment. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore would be included in the Sundry Notice, which would also include final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. BLM would inspect the site before and after reclamation, and witness plugging operations.

Final Reclamation

All surface disturbances would be recontoured and revegetated according to a BLM-approved reclamation plan. Final well site reclamation would be inspected, planned, performed and monitored in accordance with all BLM GJFO requirements and the *Noxious and Invasive Weed Management Plan* (BLM 2007). During reclamation of these sites, topsoil would be salvaged and stored for to later redistribution. The operator would restore the well locations and access roads to their original contours. Fill material would be pushed into cut and up over the backslope, leaving no depressions to trap water or form ponds. Upon completion of backfilling and recontouring, stockpiled topsoil would be evenly spread over the reclaimed areas. The seedbed would then be prepared by disking and roller packing following the natural contours. All disturbed surfaces would be re-seeded with the seed mixture specified by the BLM. Seed would be drilled on contours at a depth no greater than one-half to one inch. In areas that could not be drilled, seed would be broadcast at double the seeding rate and harrowed into the soil. Use of certified seed would be required. Fall seeding would be conducted after September 15 and prior to ground frost. Spring seeding would be conducted after the frost leaves the ground but no later than May 15th. If any seeding is unsuccessful, Black Hills would be required to make subsequent reclamation attempts.

Re-vegetation would be considered successful when the following objectives are met:

- Immediate short term: Restore sufficient landform to maintain healthy, biologically active topsoil, including vegetative cover. Control soil stability to prevent erosion and sediment transport. Establish self-sustaining desirable perennial vegetation by end of the second growing season.
- Acceptable establishment: Acceptable level of desirable vegetation by the end of the fifth growing season.
- Long-term establishment: Landform and re-vegetation approximate the original pre-disturbed condition, in terms of visual resources, habitat health, canopy cover, forage and species composition.

HOMER DEEP

PROPOSED ACTION

Black Hills proposes to drill two exploratory wells (15-23 and 21-41) in the Homer Deep Field, formerly designated as South Shale Ridge Unit, in federal lease COC-12735. Construction of one new well pad is planned for well 21-41, along with 75 feet of new access road. The existing well pad where producing Maralex well 11-15 is currently located would be expanded to accommodate new well 15-23, and existing access and pipelines would be used. Existing access roads leading to both well locations are proposed to be upgraded to original surface disturbance boundaries. The proposed design of the well pad expansion is irregular in shape, based on preliminary inspections, to avoid federally threatened plant species Uinta Basin hookless cactus and visual impacts on the public.

Construction

Access Roads

The two Homer Deep wells would be located northwest of the town of De Beque, Colorado, in Mesa County, and be accessed mainly by existing roads. Both wells would be accessed from the Dry Fork Road, north of De Beque. To reach it, travel 2.9 miles northwest from DeBeque along Roan Creek Road (aka Garfield County Road 204, aka Mesa County Road 45) to the junction with the Dry Fork Road (aka Garfield County Road 222). From Dry Fork Road, the first 1.3 miles (7,168 feet) of access road to the southeast would lead toward both wells, and be located off-lease. An additional 0.4 miles of existing access road would lead to proposed well 15-23. To reach the 15-23, turn west along Dry Fork Road for 2.7 miles, then turn south on existing access road for 1.4 miles to a fork. Go left at the fork for half a mile along the existing access road to the proposed well pad. To reach proposed well 21-41 from the fork in the road, turn right at the fork for 1.8 miles along the existing access road to the proposed location. A new access road approximately 75 feet long would be constructed to access the 21-41 pad from the existing road.

From the fork described above, the access roads would be located on-lease and would not require permitted right-of-way grants from BLM. The distance to well 21-41 would be 1.91 miles. BLM generally permits a running surface width of 16-18 feet, with a total road disturbance width of 25 feet. Disturbance resulting from 75 feet of new access road would be about 0.04 acres.

From Dry Fork Road, which is county-maintained, off-lease access to existing roads would be permitted by a new BLM right-of-way (ROW) granted to Black Hills for their project. Maralex Resources also holds off-lease access through BLM ROW COC-50781 (25 foot disturbance) and COC-50821 (35 foot disturbance). Maralex also holds BLM ROW COC-50833 to an existing pipeline that might serve one or both proposed wells.

Well Pads

The proposed well pads would be constructed using bulldozers, graders, front-end loaders, and/or backhoes. Well pads would be cleared of vegetation and topsoil, then leveled using cut-and-fill construction techniques. Topsoil would be removed from the well pad before construction and stockpiled as directed, for later use in reclamation. Surface disturbance would be kept to a minimum and confined to approved footprint by installing temporary limit-of-disturbance fencing or flagging. Monitors may be required to protect sensitive plant resources.

The well pad construction for well 15-23 would adjoin an existing pad where producing Maralex well (11-15) is located. The new disturbance for the expanded pad would be irregular in shape, to protect sensitive plant species in the project area and sensitive visual resources to the south. The boundary of the well pad was revised subsequent to on-site inspections in recognition of site-specific needs and the proposed working surface area was changed to be about 300 by 170 feet, including the existing pad. The total disturbance area required to construct the revised well-pad, including cut and fill slopes and soil piles, would be 1.68 acres in size. Mandatory interim reclamation would be completed when the well started production, and 1 acre would remain un-reclaimed for the life of the project, until the well was plugged and abandoned.

An existing two-track road that crosses parts of sections 15 and 16 could be obstructed by new well pad construction, but areas accessed by the unnamed road could still be reached from either end of it, both of which adjoin existing roads proposed for on-lease access.

The proposed pad for well 21-41 would be 1.91 acres in size and relatively regular in shape, at 260 by 225 feet for working area. Mandatory interim reclamation would be completed when the well started production, 1.46 acres would be reclaimed and 0.45 acres would remain un-reclaimed for the life of the project, until the well was plugged and abandoned.

Pipelines

If the exploratory wells were productive, gas gathering pipelines would be needed to deliver gas from the two wells to the Canyon Gas Company pipeline located parallel to Dry Fork Road. For both wells, existing Maralex pipelines along existing roads are proposed for gas gathering. If this use proved unworkable, Black Hills would submit pipeline requests to BLM for up to 20-foot-wide disturbances along the roads, to install buried gas lines. Well 15-23 would require a line of about 1.7 miles, and well 21-41 would require a pipeline of about 3.21 miles, for a total length of 4.91 miles. Any pipelines that were proposed for installation off-lease would require BLM ROWs. Pipeline disturbances would be located to avoid sensitive plant species.

The pipelines would be buried to a depth of 4 feet from surface to the top of the 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. Each pipeline would be pressure-tested with fresh water to locate any leaks. Fresh water used for testing would be obtained from Latham Ponds, a permitted water source about 10 miles from well 15-23 and 12 miles from well 21-41. The water would be transported to

the testing location by a truck with a capacity of 80 bbl. After testing, the water would be disposed of at an approved off-site facility.

If new pipelines were constructed parallel to the existing access roads, the initial disturbance from pipeline construction to well 21-41 would be 7.76 acres. No residual disturbance would remain after pipeline reclamation. The first 1.3 miles of pipeline from well 15-23 to the Dry Fork Road would be share the alignment for the pipeline to well 21-41. New disturbance for the remaining 0.4 miles of pipeline to well 15-23 would be 0.97 acres.

Disturbance from Construction

Total short-term surface disturbance (disturbance resulting from construction) for both well pads, pipelines, and the proposed section of new access road to well 21-41 would be 11.93 acres. All surface disturbance would occur on BLM-managed land. After mandatory interim reclamation of the portion of the surface not needed for production, the residual (long-term) disturbance remaining for the life of the project would be 1.48 acres.

Drilling and Completion

Drilling

Black Hills' drilling operations would be conducted in compliance with Federal Oil and Gas Onshore Orders, and all applicable rules and regulations. Each well is anticipated to require about 12-15 days to drill and approximately 30-45 days to complete. Blow-out Preventors (BOP) and related equipment would meet the minimum requirements of Onshore Oil and Gas Order No. 2. The BLM would be notified in advance of all pressure tests. A water-based drilling mud system would be used for drilling. Each well pad would contain a lined reserve pit to receive the drill cuttings and drilling fluids carried with the cuttings. No hazardous substances would be placed in the pits. The dimensions of reserve pits would be 100 feet x 150 feet with a depth of 10 feet, except where site-specific conditions such as irregular pad configurations dictate different specifications.

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.

Completion

After production casing was cemented in place, the drill rig would be removed and a completion rig would be moved in. A Cement Bond log would be run to evaluate the cement integrity and to correlate the cased hole logs to the open hole logs. The casing would be perforated across the hydrocarbon producing zones, and the formation stimulated to enhance the gas production. The typical method used for stimulation consists of hydraulic fracture treatment of the reservoir, in which sand suspended in non-toxic fluid is pumped into the producing rock formation with sufficient hydraulic pressure

to fracture it. Sand grains serve as props to keep the created fractures open, thereby allowing reservoir fluids to move more efficiently into the wellbore.

Production

If the wells are productive, production facilities, including produced water storage tanks and separators would be installed on each pad, and be located and arranged to facilitate safety and minimize long-term surface disturbance (See Production Layout in APD Plats). A low-profile 300-barrel produced water tank, approximately 12 feet in height, would be installed on each well pad. To blend with the natural environment, all permanent above-ground facilities on the well pad would be painted BLM Standard Environmental Color Shale Green, in a non-reflective finish.

All installed production facilities, such as storage tanks, load outs, separation and treating units, which could leak or spill oil, condensate, produced water, glycol, or any fluid which may constitute a hazard to public health or safety would be placed within an appropriate secondary containment structure. The structure may consist of dikes, walls, drip pans or other construction which shall be installed so that any spill or leakage cannot drain, infiltrate, or otherwise escape to ground water, surface water, or navigable waters before cleanup is completed. The structure would be designed to hold 110% of the capacity the largest single tank in use and be impervious to any oil, glycol, produced water, or other toxic fluid for 72 hours.

After well drilling and completion activities, the well pad would be reduced to the minimum surface area needed for production and future work-overs, while providing for reshaping and stabilization of cut and fill slopes. Location and spacing of production facilities on the well pad are proposed in a way that would maximize the area possible for interim reclamation while separating heat-producing equipment to safe distances from one another. Production equipment would not interfere with recontouring of any cut or fill slopes.

Interim Reclamation

At interim reclamation, the described portions of the well pad disturbances would be recontoured, covered with topsoil and seeded, as specified by the BLM. Final reclamation would be implemented at the end of the life of the project or when the well is abandoned. A summary of the interim reclamation activities follows:

- 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 at drilling locations not needed for further production operations, excluding the reserve pit, would be immediately back-filled after the drilling rig is released. Any pits, cellars or boreholes remaining on location would be fenced, as specified for the reserve pit.

- The reserve pit would be reclaimed within ninety (90) days from the date of well completion, weather permitting. Dry/non-producing well locations would be plugged, abandoned and reclaimed within 90 days of well completion, weather permitting.
- Any hydrocarbons in the reserve pit would be removed in accordance with 43CFR 3162.7-1. The reserve pit would then be completely dried and the accessible portion of pit liner would be removed and taken to a local landfill. The remaining buried part of liner would be buried in place with native soil/materials removed at the time of excavation. During backfilling, muds and associated solids would be confined to the pit, not squeezed out and incorporated into the surface materials. There would be a minimum of three feet of cover (overburden) over the pit, so that the pit area could support heavy equipment without sinking.
- Areas not necessary for production and future workovers would be reshaped to resemble the original landscape contours. Stockpiled topsoil would be redistributed on the area to be reclaimed, then roughened and re-seeded according to BLM requirements.
- The seedbed would be prepared by contour cultivating four to six inches deep. Seed would be drilled ½ to 1 inch deep following the contour. In areas that could not be drilled, seed would be broadcast at 1.5 times the application rate and covered to ½ to 1 inch in depth with a harrow or drag bar. Seeding would be completed after August 15 and prior to October 15.
- Areas being reclaimed would be fenced (using a fence type approved by the BLM Authorized Officer) to exclude livestock and wildlife for the first two growing seasons or until the seeded species have established, to prevent livestock/wildlife grazing pressure. Seeded species would be considered successfully established when at least 50 percent of the seeded species were producing seed. The reclaimed areas would periodically be monitored for revegetation success and soil stability.
- The seed mix or required site work could be modified with approval from the BLM, based on site-specific conditions, cheatgrass competition, soil stability, winter wildlife habitat needs, species success in past revegetation efforts, and seed availability. Native species would be used whenever possible.
- As part of the reclamation process, the disturbed areas to be reclaimed would be seeded with a weed-free certified PLS seed mix suitable to specific site conditions. This mix would be determined prior to interim or final reclamation by the BLM. Certification and seed tags would be submitted to the BLM within 30 days of seeding.
- Some locations could require special reclamation practices, such as seeding sterile hybrids, hydro-mulching, straw mat application on slopes, fertilizing, seed-bed preparation, contour furrowing or pocking, watering, terracing, water barring, or the replacement of topsoil. All reclamation practices would be pre-approved by the BLM. Noxious weeds would be treated by physical or chemical methods, in accordance

with the *Noxious and Invasive Management Plan for Oil and Gas Operators* (BLM 2007).

Reclamation would be considered successful when:

- Soil erosion resulting from the operation was stabilized.
- Vegetative cover at least equal to that present prior to disturbance and a plant species composition at least as desirable as that present prior to disturbance has been established. Establishment of all the species in the seed formula would be viewed as meeting the composition/desirable species criteria.
- Disturbed land has been returned to a form and productivity that is ecologically balanced, self-sustaining and in conformity with pre-determined land management plans.

Road and Pad Maintenance

Access roads and well pads would be inspected by the BLM and Black Hills and maintained on a quarterly basis (at a minimum). Maintenance would include:

- Road and pad surface grading, crowning and graveling, as needed.
- Relief ditch, culvert and cattle guard cleaning, as needed.
- Maintenance of road structures and road contours designed to control stormwater, erosion and sediment, such as road dips, crowns, ditches, in-sloping, ditch turnouts.
- Maintenance of pad structures designed to provide run-on/run-off controls, such as ditches or berms, basins, straw wattles, or other erosion and sediment control methods.
- Erosion control measures for cut and fill slopes and other disturbed areas, as needed.
- Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.
- Road and slope stabilization measures, as required, until final abandonment and rehabilitation.
- Weed control.
- Dust abatement (as often as determined necessary by BLM).

Noxious Weed Management

The Colorado Noxious Weed Act (CRS Title 35, Article 5.5) requires that noxious weeds be managed on private and public lands. In March 2007, all oil and gas operators with leases in the jurisdiction of the BLM GJFO received a copy of the *Noxious and Invasive Management Plan for Oil and Gas Operators* (BLM 2007). Operator compliance with the plan is mandatory.

Final Abandonment and Final Reclamation

At the end of the life of the project, each well would be plugged and “abandoned,” at

which time the area would be returned to conditions similar to or better than those that existed prior to the initiation of the project.

Abandonment

Upon abandonment, each borehole would be plugged, capped, and its related surface equipment would be removed. Subsurface pipelines would be purged and plugged at specific intervals and site recontouring would be accomplished using appropriate equipment. Topsoil would be removed before recontouring, to be later redistributed across the site. Soils in all disturbed areas would be roughened and reseeded with native vegetation. The seed mix would conform to the typical vegetation surrounding the specific well site and be approved by BLM.

A Sundry Notice would be submitted by Black Hills to BLM describing the proposed engineering, technical, and environmental aspects of final plugging and abandonment. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore would be included in the Sundry Notice, which would also include final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. BLM would inspect the site before and after reclamation, and witness plugging operations.

Final Reclamation

All surface disturbances would be recontoured and revegetated according to a BLM-approved reclamation plan. Final well site reclamation would be inspected, planned, performed and monitored in accordance with all BLM GJFO requirements and the *Noxious and Invasive Weed Management Plan* (BLM 2007). During reclamation of these sites, topsoil would be salvaged and stored for to later redistribution. The operator would restore the well locations and access roads to their original contours. Fill material would be pushed into cut and up over the backslope, leaving no depressions to trap water or form ponds. Upon completion of backfilling and recontouring, stockpiled topsoil would be evenly spread over the reclaimed areas. The seedbed would then be prepared by disking and roller packing following the natural contours. All disturbed surfaces would be re-seeded with the seed mixture specified by the BLM. Seed would be drilled on contours at a depth no greater than one-half to one inch. In areas that could not be drilled, seed would be broadcast at double the seeding rate and harrowed into the soil. Use of certified seed would be required. Fall seeding would be conducted after September 15 and prior to ground frost. Spring seeding would be conducted after the frost leaves the ground but no later than May 15th. If any seeding is unsuccessful, Black Hills would be required to make subsequent reclamation attempts.

Re-vegetation would be considered successful when the following objectives are met:

- Immediate short term: Restore sufficient landform to maintain healthy, biologically active topsoil, including vegetative cover. Control soil stability to prevent erosion and sediment transport. Establish self-sustaining desirable perennial vegetation by end of the second growing season.

- Acceptable establishment: Acceptable level of desirable vegetation by the end of the fifth growing season.
- Long-term establishment: Landform and re-vegetation approximate the original pre-disturbed condition, in terms of visual resources, habitat health, canopy cover, forage and species composition.

This page left blank for two-sided printing

HORSESHOE CANYON

PROPOSED ACTION

Black Hills proposes to drill three exploratory wells (1-6, 3-22, and 4-28) in the Horseshoe Canyon Oil and Gas Unit. Construction of one new well pad is planned for well 4-28, and expansions of existing pads are planned for wells 1-6 and 3-22. Improvement of existing access roads leading to each of the well locations is proposed. The existing access road to well 3-22 is proposed for re-route and about 60 feet of new road would be constructed to well 4-28. Initial drilling would occur over a period of 45 to 60 days.

Construction

Access Roads

The three wells would be accessed, for the most part, by existing roads. To reach all three wells from the town of De Beque, travel south on Mesa County Road 45, (aka Roan Creek Road) for 1.0 mile. Crossing Interstate 70, the road becomes Mesa County Road 45.5 (aka the De Beque Cutoff Road). From I-70, travel south on MCR 45.5 for 6.6 miles, and turn west on existing Horse Canyon Road for 2.3 miles to a four-way intersection.

-Well 1-6 would be reached by turning south at the intersection and traveling an additional 1.1 miles to a right-hand fork, then traveling 0.9 miles to another right fork, then traveling 1.7 miles to the existing well pad for Horseshoe Canyon 2-31, where well 1-6 is proposed to be located.

-Well 3-22 would be reached by turning north at the four-way intersection and traveling 2.3 miles to a right turn on an unnamed dirt road, then forking to the right after 0.1 mile, then traveling 0.7 miles to a right turn onto the existing access road. Follow the access road 0.2 miles to the existing pad for Horseshoe Canyon well 2-22, where the 3-22 is proposed. Approximately 435 feet of the existing access road to well 3-22 would be rerouted around the edge of the proposed expansion of the existing pad.

-Well 4-28 would be reached by continuing west through the four way intersection for 2.3 miles, before bearing left for 0.4 miles along existing roads to a left turn. Turn left, or northeast, to travel 0.6 miles to the beginning of the proposed new access road, which would be 60 feet in length. No widening of existing access roads would be necessary. BLM generally permits a running surface width of 16-18 feet, with a total new road disturbance width of 25 feet. New access disturbance would be about 0.3 acres.

Well Pads

The proposed well pads would be constructed using bulldozers, graders, front-end loaders, and/or backhoes. Well pads would be cleared of vegetation and topsoil, then leveled using cut-and-fill construction techniques. Topsoil would be removed from the well pad before construction and stockpiled as directed, for later use in reclamation. Surface disturbance would be kept to a minimum by installing temporary limit-of-disturbance fencing or flagging and confined to approved footprint. Monitors could be required to protect sensitive plant resources.

- Well 1-6 would be located near existing well 2-31, on an existing pad. Existing disturbance is about 250 by 325 feet, with a current working pad surface of about 150 by 250 feet. The new working surface would be centered on the new well and would be about 300 feet long by 250 feet wide, with a total initial working surface area of about 2 acres. The existing area of disturbance, including cut/ fill slopes and soil piles, would be expanded from about 2.25 acres (0.5 acres working surface) to about 3.5 acres (1.89 acres working surface). An existing access road would be used to access the expanded pad. The area of initial new disturbance would be about 2.25 acres, with 0.7 acres remaining un-reclaimed for the life of the project.
- Well 3-22 would be located near existing well 2-22, on an existing pad. The existing irregularly shaped pad disturbance is about 1.7 acres, with a working surface of about 0.5 acres. The existing pad would be expanded so that the working surface centered on well 3-22 would be 300 feet long by 225 feet wide. Based on rig size, Black Hills anticipates being able to minimize pad size and narrow the reserve pit along the northern edge, as possible. Initially, the working surface for both wells would be about 1.45 acres, and would be reduced to 0.7 acres after interim reclamation. An existing access road would be used to access the expanded pad, but be re-routed for a distance of about 435 feet, to follow the edge of the new working surface. This disturbance would be 0.2 acres in size, but occur within the footprint of the original footprint of well 2-22. The area of combined disturbance for both wells and the new road would initially be about 2.25 acres, with 0.7 acres remaining un-reclaimed for the life of the project.
- Well 4-28 would be drilled within a new well pad located about 60 feet from an existing road. An access road approximately 60 feet long and 25 feet wide (0.034 acres) would be constructed to connect the new pad with the existing road. The well pad is proposed to have a working surface 300 feet long by 250 feet wide, but may be smaller, based on available rig requirements. If possible, Black Hills plans to narrow the pad on the northwest side. The area of initial disturbance would be about 1.94 acres, with 0.52 acres remaining un-reclaimed for the life of the project following interim reclamation.

Pipelines

If the exploratory wells are productive, gas gathering pipelines would be used to collect gas from the three wells. Wells 1-6 and 3-22 are proposed to be drilled from existing

pads, and would use existing pipelines, so no new pipelines would be needed for these two wells. A new pipeline will be needed to connect well 4-28 to a tie-in located at existing well 1-28.

A new linear pipeline disturbance about 3142 feet long by 20 feet wide is proposed for the pipeline from well 4-28 to the tie-in at well 1-28. This pipeline would run 60 feet along the newly constructed access road from well 4-28 to the existing access road, then along the existing access road for a distance of 0.63 mile to existing well 1-28. The pipeline would be buried to a depth of 4 feet from surface to the top of the 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. The pipeline would be pressure-tested with fresh water to locate any leaks. Fresh water used for testing would be obtained from Latham Ponds, a permitted water source approximately 7 miles from well 4-28. The water would be transported to the testing location by truck, with a capacity of 80 bbl. After testing, the water would be disposed of at an approved off-site facility.

The initial disturbance from pipeline construction for both wells would be 1.53 acres. No residual disturbance would remain after pipeline reclamation.

Disturbance from Construction

Total short-term surface disturbance for well pads, pipelines, and the proposed section of new access road to well 4-28 would be 7.97 acres. All new surface disturbance would occur on BLM-managed land. After mandatory interim reclamation of the portion of the surface not needed for production, the residual (long-term) disturbance remaining for the life of the project would be 1.92 acres.

Drilling and Completion

Drilling

Black Hills' drilling operations would be conducted in compliance with Federal Oil and Gas Onshore Orders, and all applicable rules and regulations. Each well is anticipated to require about 12-15 days to drill and approximately 30-45 days to complete. Blow-out Preventors (BOP) and related equipment would meet the minimum requirements of Onshore Oil and Gas Order No. 2. The BLM would be notified in advance of all pressure tests. A water-based drilling mud system would be used for drilling. Each well pad would contain a lined reserve pit to receive the drill cuttings and drilling fluids carried with the cuttings. No hazardous substances would be placed in the pits. The dimensions of reserve pits would be 100 feet x 150 feet with a depth of 10 feet, except where site-specific conditions such as irregular pad configurations dictate different specifications.

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.

Completion

After production casing was cemented in place, the drill rig would be removed and a completion rig would be moved in. A Cement Bond log would be run to evaluate the cement integrity and to correlate the cased hole logs to the open hole logs. The casing would be perforated across the hydrocarbon producing zones, and the formation stimulated to enhance the gas production. The typical method used for stimulation consists of hydraulic fracture treatment of the reservoir, in which sand suspended in non-toxic fluid is pumped into the producing rock formation with sufficient hydraulic pressure to fracture it. Sand grains serve as props to keep the created fractures open, thereby allowing reservoir fluids to move more efficiently into the wellbore.

Production

If the wells are productive, production facilities, including produced water storage tanks and separators would be installed on each pad, and be located and arranged to facilitate safety and minimize long-term surface disturbance. A low-profile 300-barrel produced water tank, approximately 12 feet in height, would be installed on each well pad. To blend with the natural environment, all permanent above-ground facilities on the well pad would be painted BLM Standard Environmental Color Shale Green, in a non-reflective finish.

All installed production facilities, such as storage tanks, load outs, separation and treating units, which could leak or spill oil, condensate, produced water, glycol, or any fluid which may constitute a hazard to public health or safety would be placed within an appropriate secondary containment structure. The structure may consist of dikes, walls, drip pans or other construction which shall be installed so that any spill or leakage cannot drain, infiltrate, or otherwise escape to ground water, surface water, or navigable waters before cleanup is completed. The structure would be designed to hold 110% of the capacity the largest single tank in use and be impervious to any oil, glycol, produced water, or other toxic fluid for 72 hours.

After well drilling and completion activities, the well pad would be reduced to the minimum surface area needed for production and future work-overs, while providing for reshaping and stabilization of cut and fill slopes. Location and spacing of production facilities on the well pad are proposed in a way that would maximize the area possible for interim reclamation while separating heat-producing equipment to safe distances from one another. Production equipment would not interfere with recontouring of any cut or fill slopes.

Interim Reclamation

At interim reclamation, the described portions of the well pad disturbances would be recontoured, covered with topsoil and seeded, as specified by the BLM. Final reclamation would be implemented at the end of the life of the project or when the well is abandoned. A summary of the interim reclamation activities follows:

- 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 at drilling locations not needed for further production operations, excluding the reserve pit, would be immediately back-filled after the drilling rig is released. Any pits, cellars or boreholes remaining on location would be fenced, as specified for the reserve pit.
- The reserve pit would be reclaimed within ninety (90) days from the date of well completion, weather permitting. Dry/non-producing well locations would be plugged, abandoned and reclaimed within 90 days of well completion, weather permitting.
- Any hydrocarbons in the reserve pit would be removed in accordance with 43CFR 3162.7-1. The reserve pit would then be completely dried and the accessible portion of pit liner would be removed and taken to a local landfill. The remaining buried part of liner would be buried in place with native soil/materials removed at the time of excavation. During backfilling, muds and associated solids would be confined to the pit, not squeezed out and incorporated into the surface materials. There would be a minimum of three feet of cover (overburden) over the pit, so that the pit area could support heavy equipment without sinking.
- Areas not necessary for production and future workovers would be reshaped to resemble the original landscape contours. Stockpiled topsoil would be redistributed on the area to be reclaimed, then roughened and re-seeded according to BLM requirements.
- The seedbed would be prepared by contour cultivating four to six inches deep. Seed would be drilled ½ to 1 inch deep following the contour. In areas that could not be drilled, seed would be broadcast at 1.5 times the application rate and covered to ½ to 1 inch in depth with a harrow or drag bar. Seeding would be completed after August 15 and prior to October 15.
- Areas being reclaimed would be fenced (using a fence type approved by the BLM Authorized Officer) to exclude livestock and wildlife for the first two growing seasons or until the seeded species have established, to prevent livestock/wildlife grazing pressure. Seeded species would be considered successfully established when at least 50 percent of the seeded species were producing seed. The reclaimed areas would periodically be monitored for revegetation success and soil stability.
- The seed mix or required site work could be modified with approval from the BLM, based on site-specific conditions, cheatgrass competition, soil stability, winter wildlife habitat needs, species success in past revegetation efforts, and seed availability. Native species would be used whenever possible.
- As part of the reclamation process, the disturbed areas to be reclaimed would be seeded with a weed-free certified PLS seed mix suitable to specific site conditions.

This mix would be determined prior to interim or final reclamation by the BLM. Certification and seed tags would be submitted to the BLM within 30 days of seeding.

- Some locations could require special reclamation practices, such as seeding sterile hybrids, hydro-mulching, straw mat application on slopes, fertilizing, seed-bed preparation, contour furrowing or pocking, watering, terracing, water barring, or the replacement of topsoil. All reclamation practices would be pre-approved by the BLM. Noxious weeds would be treated by physical or chemical methods, in accordance with the *Noxious and Invasive Management Plan for Oil and Gas Operators* (BLM 2007).

Reclamation would be considered successful when:

- Soil erosion resulting from the operation was stabilized.
- Vegetative cover at least equal to that present prior to disturbance and a plant species composition at least as desirable as that present prior to disturbance has been established. Establishment of all the species in the seed formula would be viewed as meeting the composition/desirable species criteria.
- Disturbed land has been returned to a form and productivity that is ecologically balanced, self-sustaining and in conformity with pre-determined land management plans.

Road and Pad Maintenance

Access roads and well pads would be inspected by the BLM and Black Hills and maintained on a quarterly basis (at a minimum). Maintenance would include:

- Road and pad surface grading, crowning and graveling, as needed.
- Relief ditch, culvert and cattle guard cleaning, as needed.
- Maintenance of road structures and road contours designed to control stormwater, erosion and sediment, such as road dips, crowns, ditches, in-sloping, ditch turnouts.
- Maintenance of pad structures designed to provide run-on/run-off controls, such as ditches or berms, basins, straw wattles, or other erosion and sediment control methods.
- Erosion control measures for cut and fill slopes and other disturbed areas, as needed.
- Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.
- Road and slope stabilization measures, as required, until final abandonment and rehabilitation.
- Weed control.
- Dust abatement (as often as determined necessary by BLM).

Noxious Weed Management

The Colorado Noxious Weed Act (CRS Title 35, Article 5.5) requires that noxious weeds be managed on private and public lands. In March 2007, all oil and gas operators with leases in the jurisdiction of the BLM GJFO received a copy of the *Noxious and Invasive Management Plan for Oil and Gas Operators* (BLM 2007). Operator compliance with the plan is mandatory.

Final Abandonment and Final Reclamation

At the end of the life of the project, each well would be plugged and “abandoned,” at which time the area would be returned to conditions similar to or better than those that existed prior to the initiation of the project.

Abandonment

Upon abandonment, each borehole would be plugged, capped, and its related surface equipment would be removed. Subsurface pipelines would be purged and plugged at specific intervals and site recontouring would be accomplished using appropriate equipment. Topsoil would be removed before recontouring, to be later redistributed across the site. Soils in all disturbed areas would be roughened and reseeded with native vegetation. The seed mix would conform to the typical vegetation surrounding the specific well site and be approved by BLM.

A Sundry Notice would be submitted by Black Hills to BLM describing the proposed engineering, technical, and environmental aspects of final plugging and abandonment. A configuration diagram, a summary of plugging procedures, and a job summary with techniques used to plug the well bore would be included in the Sundry Notice, which would also include final reclamation procedures and any mitigation measures associated with the final reclamation performed by the operator. BLM would inspect the site before and after reclamation, and witness plugging operations.

Final Reclamation

All surface disturbances would be recontoured and revegetated according to a BLM-approved reclamation plan. Final well site reclamation would be inspected, planned, performed and monitored in accordance with all BLM GJFO requirements and the *Noxious and Invasive Weed Management Plan* (BLM 2007). During reclamation of these sites, topsoil would be salvaged and stored for to later redistribution. The operator would restore the well locations and access roads to their original contours. Fill material would be pushed into cut and up over the backslope, leaving no depressions to trap water or form ponds. Upon completion of backfilling and recontouring, stockpiled topsoil would be evenly spread over the reclaimed areas. The seedbed would then be prepared by disking and roller packing following the natural contours. All disturbed surfaces would be re-seeded with the seed mixture specified by the BLM. Seed would be drilled on contours at a depth no greater than one-half to one inch. In areas that could not be drilled, seed would be broadcast at double the seeding rate and harrowed into the soil. Use of certified seed would be required. Fall seeding would be conducted after September 15 and prior to ground frost. Spring seeding would be conducted after the frost leaves the

ground but no later than May 15th. If any seeding is unsuccessful, Black Hills would be required to make subsequent reclamation attempts.

Re-vegetation would be considered successful when the following objectives are met:

- Immediate short term: Restore sufficient landform to maintain healthy, biologically active topsoil, including vegetative cover. Control soil stability to prevent erosion and sediment transport. Establish self-sustaining desirable perennial vegetation by end of the second growing season.
- Acceptable establishment: Acceptable level of desirable vegetation by the end of the fifth growing season.
- Long-term establishment: Landform and re-vegetation approximate the original pre-disturbed condition, in terms of visual resources, habitat health, canopy cover, forage and species composition.