

2.0 PROJECT ALTERNATIVES

Drilling and production methods that follow established regulations and guidelines would be implemented during the expansion of the Monument Butte/Myton Bench Oil and Gas Field. Section 2.1, Management Common to All Alternatives, lists the controlling federal and state regulations for the drilling and production phases. Section 2.2, Field Development Common to All Alternatives, describes standard development and production activities. The individual alternatives then are summarized in terms of surface disturbance estimates, resource requirements, and new infrastructure and work force needed, as applicable.

2.1 Management Common to All Alternatives

Following the NEPA process, but prior to well development on public lands, wells must be permitted by the BLM as part of the requirements set forth by the Onshore Oil and Gas Order No. 1, "Approval of Operations on Onshore Federal and Indian Oil and Gas Leases," issued under 43 CFR 3164 (BLM 1983). This process includes two procedural options for obtaining approval to drill a well. When operators decide to drill a well, they must submit either a Notice of Staking (NOS) or an APD. No surface activity can be conducted until the well is approved by the BLM under one of the two procedural options. The primary documents and associated procedures that control oil and gas development and production on public, state, and private lands are presented in **Table 2.1-1**.

As a standard part of the APD process, the applicant schedules an on-site inspection of each new well site, which is attended by a representative from the appropriate surface management agency (BLM or UDOGM). The objective of the on-site inspection is to review the location and its related access driveway for considerations of topography; topsoil/subsoil stockpiles; natural drainage and erosion control; flora, fauna, and habitat; historical and cultural resources; and any other surface issues that are included in the lease conditions.

Agency specialists in the fields of archaeology, paleontology, biology, botany, and/or other experts may participate in on-site inspections. Based upon this site review, the surface management agency (BLM or UDOGM) may impose a number of restrictions on surface-disturbing activities associated with the development of a well location to avoid sensitive resources identified in lease conditions. In some cases, these restrictions can require the relocation of a potential well away from the center of the 40-acre parcel. In the most severe cases, the restrictions on surface disturbing activities can require outright denial of an APD.

Access roads and well pads located on federal public lands are designed and constructed under the guidelines contained in "Surface Operating Standards for Oil and Gas Exploration and Development" (BLM and U.S. Forest Service [USFS] 1989). Where possible, new roads are located along existing access roads and trails in order to minimize surface disturbance.

The Eightmile Flat prairie dog complex would be monitored every 3 to 5 years (funded by Newfield) to determine relative effects from oil and gas development based on activity levels and size of the complex.

Table 2.1-1
Oil and Gas Development and Production Guidelines Applicable to all Alternatives
for the Newfield Castle Peak and Eightmile Flat Oil and Gas Expansion Project

Activity	Guidance Documents	Requirements
Approvals for Well Drilling, Completion, and Production	BLM Onshore Order #1 (43 CFR 3164.1; 48 Federal Register 48916 and 438 Federal Register 56226); CFR 3162.5-1 Environmental Obligations. UDOGM: Rule R649-3-4. Permitting of Wells to be Drilled, Deepened, or Plugged-Back; R649-3-18. On-site Predrill Evaluation.	<ul style="list-style-type: none"> • Preparation of an APD, including a surface use and drilling, completion, and operations plan. • Inspections prior to construction and drilling approval.
Access Road, Well Pad, and Utility Design and Construction	BLM "Surface Operating Standards for Oil and Gas Exploration and Development (BLM and USFS 1989).	<ul style="list-style-type: none"> • Minimum standards for roads, well pads, and utilities. • Surface management best management practices (BMPs).
Drilling Operations	BLM Onshore Order #2 (43 CFR 3164.1; 53 Federal Register 46790) UDOGM: Rules R649-3-6 (Drilling Operations); R649-3-7 Well Control; R649-3-8 Casing Program; R649-3-9 Protection of Upper Productive Strata; R649-3-15 Pollution and Surface Damage Control.	<ul style="list-style-type: none"> • Well control methods. • Drilling reporting. • Well casing. • Groundwater protection methods. • Pollution control methods.
Site Security	BLM Onshore Order #3 (54 Federal Register 8056).	<ul style="list-style-type: none"> • Facility security requirements.
Measurement of Oil	BLM Onshore Order #4 (54 Federal Register 8086).	<ul style="list-style-type: none"> • Measurement methods for produced oil.
Measurement of Gas	BLM Onshore Order #5 (54 Federal Register 8100).	<ul style="list-style-type: none"> • Measurement methods for produced gas.
Disposal of Produced Water	BLM Onshore Order #7 (58 Federal Register 47354).	<ul style="list-style-type: none"> • Criteria for the management and disposal of produced water.
Underground Injection Control (UIC) (Field Pressure Management during Waterflooding)	USEPA UIC (40 CFR 146.21 through 146.24). UDOGM Rule R649-5 UIC of Recovery Operations and Class II Injection Wells (R649-5-1 through R649-5-7, R693-2).	<ul style="list-style-type: none"> • Permit information requirements and public notices. • Well construction methods. • Testing and monitoring procedures. • Operational monitoring and reporting.
Well Abandonment and Reclamation	BLM 43 CFR 3162.3-4 Well Abandonment. UDOGM Rule R649-3-24; and R649-3-34 Well Site Restoration.	<ul style="list-style-type: none"> • Well plugging and abandonment. • Well site restoration process.

Drilling and completion operations, including aquifer protection and pollution control methods, are outlined in BLM Onshore Order #2, and the UDOGM Rules, which also include well spacing requirements and bonding. Oil and gas production operations on federal lands are managed under Onshore Orders #3 Site Security (requiring a schematic site security diagram of the tank battery), and #4 and #5 for Measurement of Oil and Gas for documenting hydrocarbon production for taxes and royalties. The requirements for disposing of water produced during drilling and operations are included in BLM Onshore Order #7.

Newfield has incorporated the elements of the Onshore Orders and BLM standard operating procedures into its standard operating practices for drilling and surface management (see Appendix A).

The USEPA has promulgated rules for underground water injection that are applicable for wells located on tribal lands, or other lands retained under USEPA jurisdiction. Comparable underground injection rules are implemented by UDOGM on BLM, state, and private lands. These rules control the allowable water pressures in the oil formation during waterflooding, and the monitoring and reporting of these pressures during the life of the injection well. Monthly injection volumes and pressures are reported to the State of Utah. Well injection rates and pressures are measured daily through the use of surface monitoring devices at each injection well. In addition, well casing integrity tests must be completed as mandated by the State of Utah and USEPA to ensure isolation of the injection interval.

Both BLM and UDOGM prescribe procedures for well plugging and abandonment at the end of the life of a particular well, as well as site restoration procedures.

2.2 Field Development Activities Common to All Alternatives

Development and primary production of oil and gas reserves underlying the Monument Butte/Myton Bench Oil and Gas Field follow a standard set of drilling and completion procedures, followed by secondary oil recovery activities that are the same for all alternatives. The field development pattern of one well per 40 acres is the same for all alternatives. The following development steps are common to all alternatives (including previously authorized wells under the No Action Alternative and proposed wells under the Proposed Action and Alternative A):

- Approvals are received from the BLM and the State of Utah to construct new access roads and well pads.
- Wells are drilled and completed. Both oil and gas are produced from each well. Oil is stored on the well site and then picked up by truck. Gas production is linked to the existing gas gathering pipeline system. A portion of the gas production is used to meet field energy needs, particularly to fuel well site production equipment and injection pumps. The remaining natural gas is delivered to a nearby gas processing facility that is connected to gas transmission pipelines.
- As initial oil production declines, every other well in the grid of 40-acre blocks is converted to a water injection well. Injected water must be low in dissolved and suspended solids to be effective in recovering oil. This step requires expansion of a high-pressure underground water pipeline system that links the water injection plants to the individual water injection well heads. At the water injection well heads, water

is pumped down the well bore under high pressure to increase the formation pressure to stimulate oil production. Oil, formation water, and injected water are recovered in adjacent production wells. Produced water is either trucked or pumped through an underground line to the central water injection plants for treatment and reuse, or is stored in tanks on the well pad for trucking to approved produced water disposal locations. Produced oil is stored in tanks on the well pad and removed by truck.

- As the field matures, the ratio of produced water to oil increases. At some point, oil recovery volumes drop below an economic level sufficient to continue injection and recovery options. Older wells then are progressively plugged and abandoned (P&A) in accordance with agency requirements. The surface natural gas gathering system is removed, and sub-surface pipelines are abandoned in place.

2.2.1 Access Roads

2.2.1.1 Land Requirements

Collector roads, local roads, and individual well access roads are constructed and used for oil and gas operations in the Monument Butte/Myton Bench Oil and Gas Field. Average construction disturbance widths of collector roads are approximately 45 feet wide, local or secondary roads are approximately 33 feet wide, and access or spur roads into well sites are 25 feet wide. Collector roads normally connect to, or are extensions of, a public road system and provide access to larger blocks of land. Local roads usually provide the internal access network within a wellfield. Individual well access roads or resource roads provide entry to well pad sites. Roads generally include an additional 55-foot-wide utility corridor that contains waterlines, gas pipelines, and other utilities.

2.2.1.2 Road Construction

Following approval of the road design plan and on-site review, the road ROW is staked in accordance with the road design plan. After APD approval, standard cut and fill construction methods and construction equipment, such as crawler tractors, graders, and scrapers, are used to construct new roads. A wellfield access road typically takes 1 to 3 days to construct. In steep terrain, a construction technique known as side casting (using the material taken from the cut portion of the road to construct the fill portion) is used; slightly less than one-half of the road bed is placed on a cut area and the remainder is placed on a fill area. Soil texture, steep road grades, and moisture conditions may dictate whether the well access road is surfaced with shale. Generally, shale only is used in selected sections and not for the entire road length.

Once road construction is complete, damage to adjacent areas from erosion or construction-related causes is repaired. Repair activities may include filling gullies, repairing incidental damage, and reseeding. Immediately prior to reseeding, surfaces are scarified at right angles to the slope plane. All areas incidentally disturbed in the course of construction or maintenance are revegetated with a seed mix approved by the BLM.

2.2.2 Well Drilling and Completion

2.2.2.1 Land Requirements

Well site construction consists of leveling a typical 1.2-acre rectangular pad in native sand/soil/rock materials. No non-native gravel, concrete, or other foreign materials are brought in for use in construction of the well pads. **Figure 2.2-1** illustrates a typical well pad layout.

2.2.2.2 Well Pad Construction

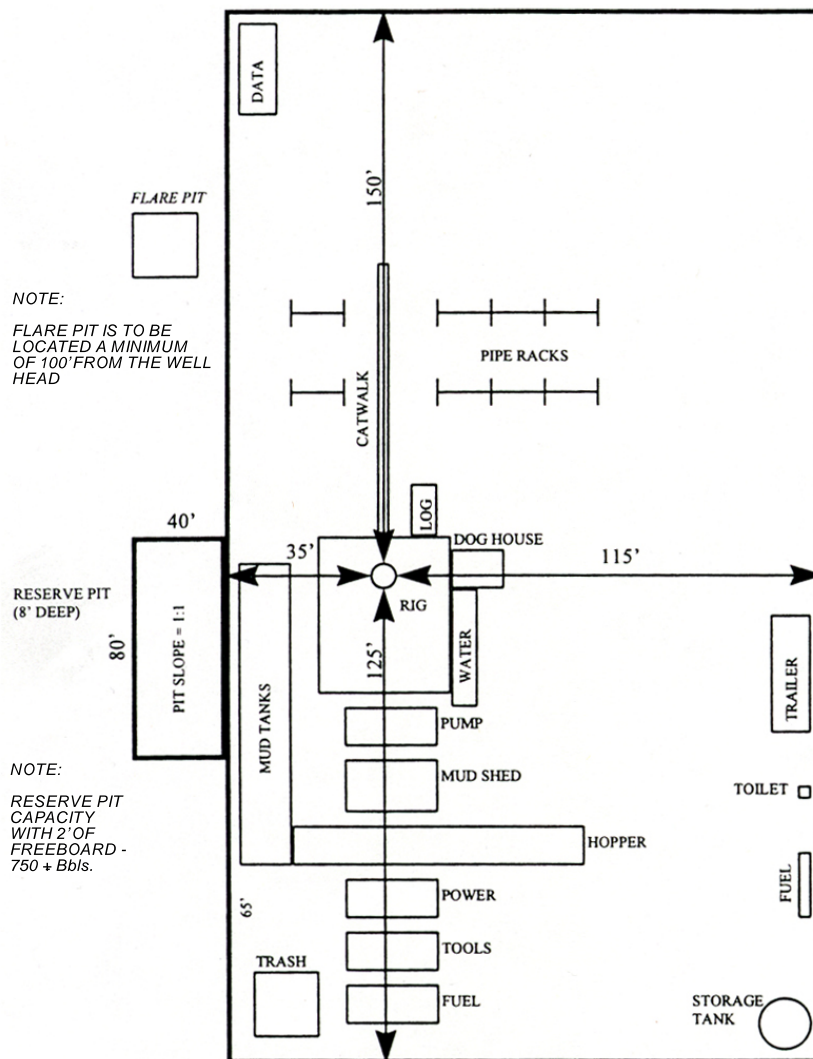
Construction of well pads typically begins with stripping and stockpiling topsoil. The top 6 inches of topsoil material suitable for plant growth is removed from areas to be disturbed and stockpiled in a designated area, usually adjacent to the pad. Soil stockpiles are reseeded and maintained for future use in rehabilitating the pad. Bulldozers (track-mounted and rubber-tired), scrapers, and road graders then grade and level the site. The well pad is constructed so that the drilling rig sits on solid ground and not on fill. This location procedure ensures that the foundation of the drilling substructure is on solid ground and prevents it from leaning or toppling due to settling of uncompacted soil.

In addition to the drilling platform, a rectangular reserve pit is constructed. Reserve pits are used to store process water, drilling fluid, and drill cuttings. Generally, the reserve pit is approximately 0.07 acre in size. If possible, the unlined pits are constructed on cut material and not fill material. In some instances, removal of bedrock through pulverizing may be required to construct the pit. Pits may be divided into compartments separated by berms for the proper management of derived waste (e.g., drill cuttings, mud, water flows).

2.2.2.3 Well Drilling

Drilling begins as soon as practicable after the pad and access roads have been constructed. A drilling rig and associated equipment are moved to the location and erected. Drilling rig installation requires moving 10 to 15 truckloads of equipment (some over legal weight, height, and width) over public highways and private roads. Special transportation permits for oversize loads are obtained from the USDOT prior to transport. The derrick, when erected, can be as much as 140 feet high, but derrick heights vary depending on the depth and weight capacity of the rig.

The drilling operation is conducted in two phases. The first phase utilizes a small drilling rig (similar in type to a water well drilling rig) to drill to a depth of approximately 300 feet. The BLM is notified within 24 hours if any aquifers are encountered. This shallow hole is cased with steel casing and entirely cemented in place from total depth (TD) of about 300 feet to the surface. This surface casing serves the dual purpose of providing protection for any freshwater aquifers present and, as a safety feature, to contain any abnormal pressure that may be encountered while drilling deeper. The BLM is notified in advance of running surface casing and cement in order to witness these operations, if so desired. This part of the drilling operation normally takes 2 to 3 days to complete.



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Figure 2.2-1

Schematic for a Typical
Single Well Pad Layout

Following the first drilling operation, a larger drilling rig (depth rated to 7,000 feet minimum) is mobilized to drill the remainder of the hole to a TD of about 6,500 feet (**Figure 2.2-2**). Prior to drilling below the surface casing, a blowout preventer (BOP) is installed on the surface casing and both the BOP and surface casing are tested for pressure integrity. The rig pumps fresh water as a circulating fluid to drive the mud motor, cool the drill bit, and remove cuttings from the wellbore. In order to achieve borehole stability and minimize possible damage to the hydrocarbon producing formations, a potassium chloride substitute and commercial clay stabilizer are added to the drilling fluid. Also, polyacrylamide polymer is added to the drilling fluid to provide adequate viscosity to carry the drill cuttings out of the wellbore. From time to time, other materials are added to the fluid system, such as sawdust, natural fibers, or paper flakes, to reduce downhole fluid losses. No potassium chloride, chromates, nor any hazardous materials are mixed in the drilling fluid (see Appendix A for a list of chemicals used in drilling, completion, and production operations).

Water for drilling is hauled to the rig storage tanks or transported by surface pipeline from water injection facilities in the area. During drilling operations, water continually is transported to the rig location. Water demand varies depending on the specific sub-surface conditions that are encountered during the drilling of the well.

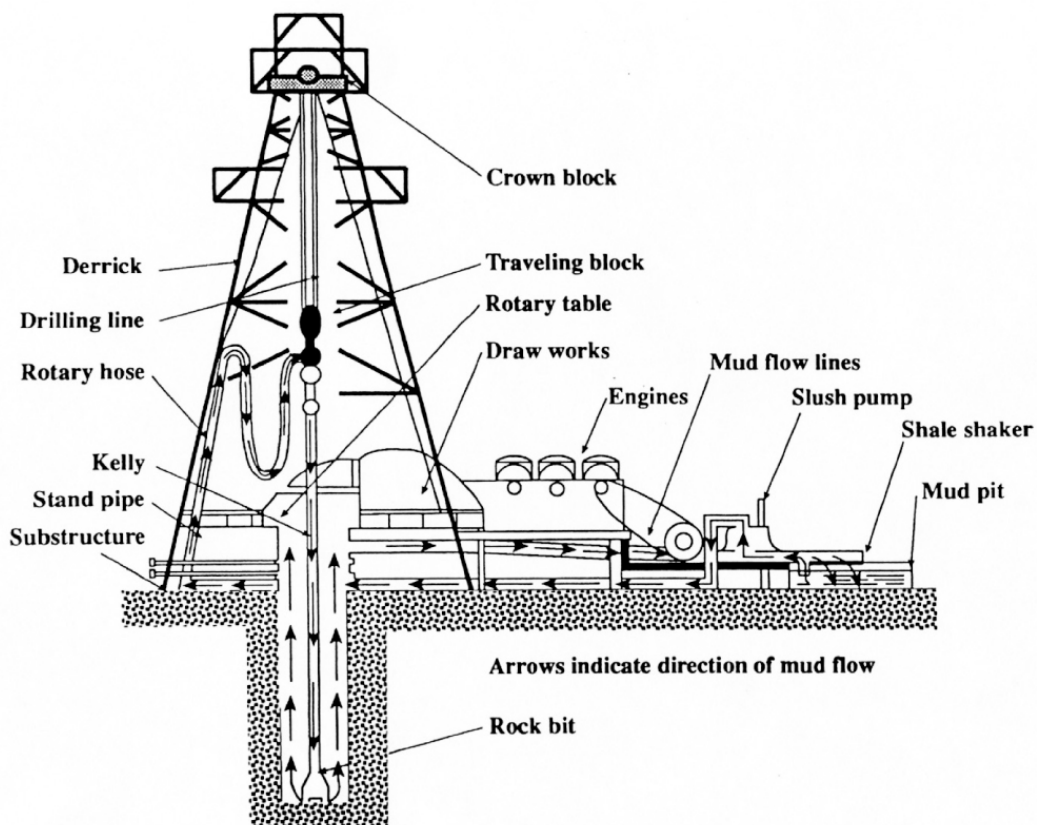
The total water requirement to support the drilling operation is about 2,500 barrels of water per well (1 barrel = 42 gallons). About 60 percent of this total can be reclaimed for reuse and transferred to subsequent drill sites. Of the remainder, about 10 percent is used in mixing cement, another 15 percent is lost downhole to the formation, about 5 percent is left in the casing, and about 10 percent is lost due to evaporation and percolation from the reserve pit. According to USEPA criteria, all additives in this drilling fluid system meet requirements for discharge into the environment.

The primary purpose of the reserve pit is to receive the drill cuttings from the wellbore (mainly shale, sand, and miscellaneous rock minerals). A secondary purpose of the reserve pit is to contain drilling fluids carried over with the cuttings, and fluids that are periodically discharged from the rig's steel tanks (usually to flush out cuttings that have settled in the tanks). No hazardous materials are placed in this pit. The BLM or UDOGM determines on a case-by-case basis if unlined pits are acceptable or if site-specific conditions indicate that a synthetic liner in the reserve pit is appropriate.

Upon drilling the hole to TD, a series of geophysical logging tools are run in the well to evaluate the potential hydrocarbon resource. If the evaluation concludes that adequate hydrocarbons are present and recoverable, then steel production casing is run and cemented in place in accordance with the well design, as approved by the BLM in the APD and any applicable COA. The casing and cementing program are designed to isolate and protect the various formations encountered in the wellbore and to prohibit pressure communication or fluid migration between zones. The average time to drill a hole is 6 to 8 days.

2.2.2.4 Well Completion

After the production casing is cemented into place, the drilling rig is moved off-site and a completion rig is set in place over the hole. Completion operations normally take 5 to 7 days to perform. The well casing and adjacent oil producing formation are perforated so that oil can flow into the well casing. Perforating is



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Figure 2.2-2

Rotary Drill Rig Diagram

Source: BLM 1996.

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accomplished by firing bullet-like projectiles or, more commonly, exploding shaped-charges that create holes that extend several feet through the casing, cement, and into the oil-bearing sand.

Generally, most hydrocarbon wells require stimulation to enhance the transmissibility of oil. Stimulation is accomplished through hydraulic fracturing of the producing zone using a slurry of sand suspended in a viscous fluid (gelled water). The slurry is pumped into the producing formation with sufficient hydraulic pressure 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. The fluids from the fracturing are recovered (swabbed back) and the proppant is left in the fractures. The typical completion operation uses about 1,500 barrels of water.

After stimulation is complete, production tubing is run into the well and anchored to the inside of the production string by the use of a tubing anchor. At the surface, wellhead equipment is installed on the casing to control pressure and the flow of the production stream to processing equipment.

Although certain chemical components of fracturing fluids require handling as hazardous materials, these fluids are at all times confined to storage tanks while on-site, with any excess used in other completion operations or transported to a licensed commercial disposal facility.

2.2.3 Oil and Gas Production and Distribution

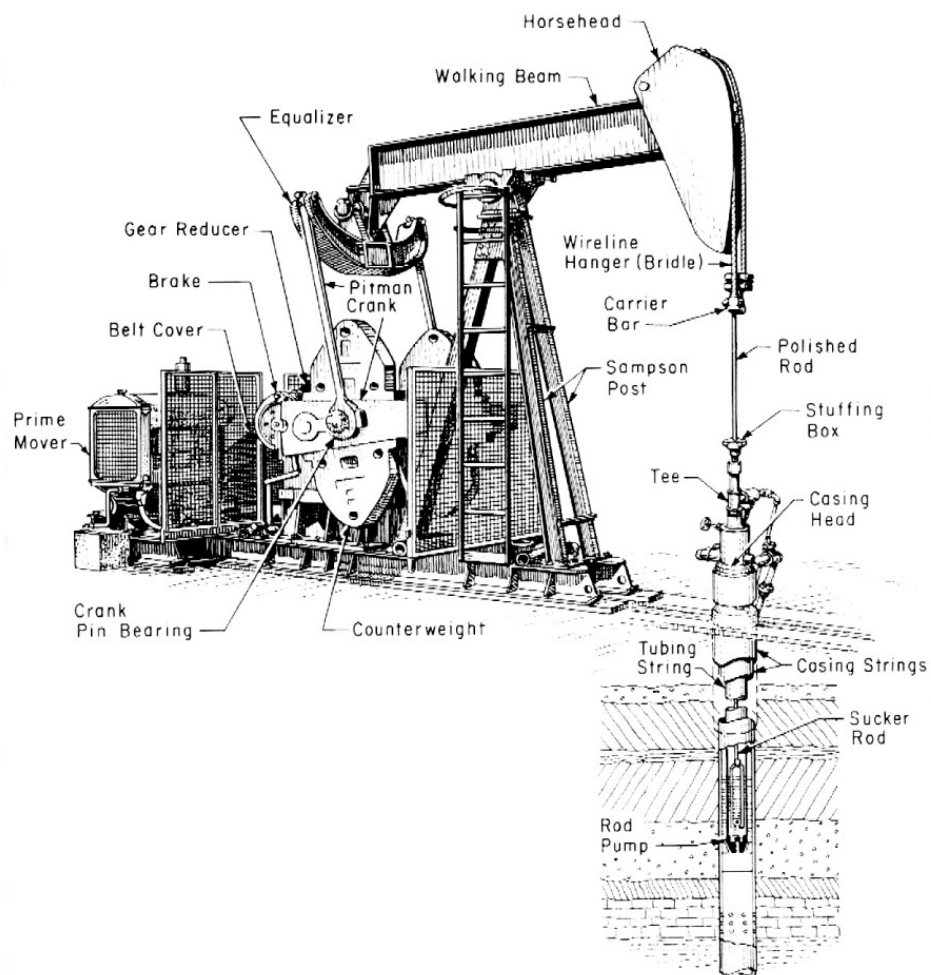
2.2.3.1 Oil Production and Distribution

If the well is successfully drilled and completed as a producing oil well, a pumping unit and tank battery are constructed on-site (**Figure 2.2-3**). These facilities are placed on a portion of the well pad and do not disturb any additional surface area. All surface equipment is painted desert tan to blend in with the surroundings.

The pumping unit generally is powered by an internal combustion engine fueled by natural gas produced in association with crude oil development. In some limited cases, however, an electric motor is used. The pumping unit operates a down hole pump which lifts fluid from the well and delivers it to the tank battery via surface flowlines. The tank battery normally consists of a heater-treater to heat and separate oil, gas, and water; two 400-barrel capacity oil stock tanks; a single 200-barrel water storage tank; and a meter run for recording gas sales volumes. A **Newfield** representative visits each well as needed to gauge production and provide maintenance service on the surface equipment.

Berms are placed around the perimeter of well pads to confine any spills from the storage tanks. The reserve pit is recontoured, reseeded, and returned to natural conditions. Based on current development to date, approximately 4 percent of all wells drilled in the project area are non-productive or dry holes. If a well is deemed a dry hole, it is P&A, and the entire well location and its access driveway are reclaimed and returned to natural conditions.

The crude oil produced from the Green River reservoir sands in the Monument Butte/Myton Bench Oil and Gas Field is high in paraffin content, with a pour point of 95 degrees Fahrenheit (°F) below which the oil



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Figure 2.2-3

Pump Jack and
Downhole Pump

solidifies. Consequently, the flowlines and storage tanks have a closed loop trace system that circulates heated ethylene glycol solution (antifreeze) in order to maintain the crude oil in a fluid state.

Crude oil is sold directly from the stock tanks. The purchaser removes the oil via tanker trucks that carry from 160 up to 300 barrels at a time. On average, a new well produces at an initial rate of about 80 bpd of oil, declining within the first 6 months to about half its initial rate. After the first 6 months, productivity continues to decline, but at a much slower rate.

Many crude oil wells within **Newfield's** project area contain natural gas, condensate, and water. Produced natural gas is utilized as the main fuel source to run the pumping unit and to fire the heater-treater and trace system. In limited cases where electric motors are used, electric power supplied via distribution lines and transformers are needed. Condensate is a liquid hydrocarbon mixture that is often separated from the natural gas either at the wellhead, or during the processing of the natural gas. Natural gas production and distribution are discussed in the section below.

As produced water accumulates at the well sites, it is transported via tanker truck or pumped through buried pipelines to a water injection plant for reinjection or trucked to a licensed commercial disposal facility for disposal.

2.2.3.2 Natural Gas Production and Distribution

Excess gas production above that required for field equipment fuel is sold. Sales gas gathering lines and fuel gas distribution lines for new development are integrated into the existing gas pipeline network. These pipelines contain natural gas and condensate. New lines are laid aboveground in utility corridors that also include access roads and waterlines. The sales lines are normally 3- to 6-inch-diameter poly pipe, whereas the fuel gas distribution lines are 2- or 4-inch-diameter poly pipe. The main gas transmission system consists of steel lines ranging in size from 8 to 10 inches in diameter.

Sales gas is transported by pipeline to the existing North Monument Butte (SE/SW Section 25, T8S, R16E), Ashley (NE/NE Section 14, T9S, R15E), or Odekirk Springs (SW/SW Section 36, T8S, R17E) compression facilities. Gas is shipped from the compression facilities via high-pressure steel pipelines through **Newfield's** gas conditioning plant to the existing Questar Exploration and Production (Questar) transportation and sales pipeline, which delivers gas to consumers along the Wasatch Front (Salt Lake City and the surrounding area).

2.2.4 Waterflooding Infrastructure and Operations

To increase the ultimate recovery of the hydrocarbon resource, **Newfield** currently implements waterflooding soon after new wells are drilled. Waterflooding consists of pumping water into various isolated Green River Formation oil reservoirs to repressurize and displace the oil more efficiently than primary depletion alone. ***Some percentage of oil and gas wells drilled rapidly decrease in production soon after being drilled. These wells would be converted to waterflood or injection wells as described in Section 2.2.5.1, Production Well Conversion to Injection.***

2.2.4.1 Production Well Conversion to Injection

Oil production equipment (anchor, sucker rods, pump jacks, well head valves, flow lines, treater, water tank, and oil tanks) are removed from the well pad. A packer is installed on the end of the tubing and set no more than 100 feet above the top perforation. Pressure monitoring gauges are installed on the wellhead and casing annulus to monitor the pressure at which water is injected and the casing pressure, respectively.

2.2.4.2 Injection Water Supply and Delivery

Water supply sources, including culinary water and process water, provide water to triplex injection pumps through storage tanks or directly, depending on the water quality of the source. A network of high pressure ($\pm 3,000$ pounds per square inch [psi]) injection lines supply water from the injection facilities to injection wells. These buried lines are located adjacent to existing ROWs whenever possible. Injection wells are equipped with flow meters and choke valves to regulate injected water volumes. Generally, water source lines are constructed of either 6-inch fiberglass or steel line pipe, and injection lines are constructed of 3-inch steel line pipe. Source waterlines are designed for 500 psi service and injection lines are designed for 3,000 psi service. Waterlines are buried 4 to 5 feet deep to avoid freezing, along a utility and access road ROW that is approximately 55 feet wide for construction and 30 feet wide for operations.

2.2.4.3 Waterflooding Operations

After all waterlines are installed, pressurized water is injected into the oil-bearing formation at individual injection wells. An oil recovery curve after waterflooding is illustrated on **Figure 2.2-4**.

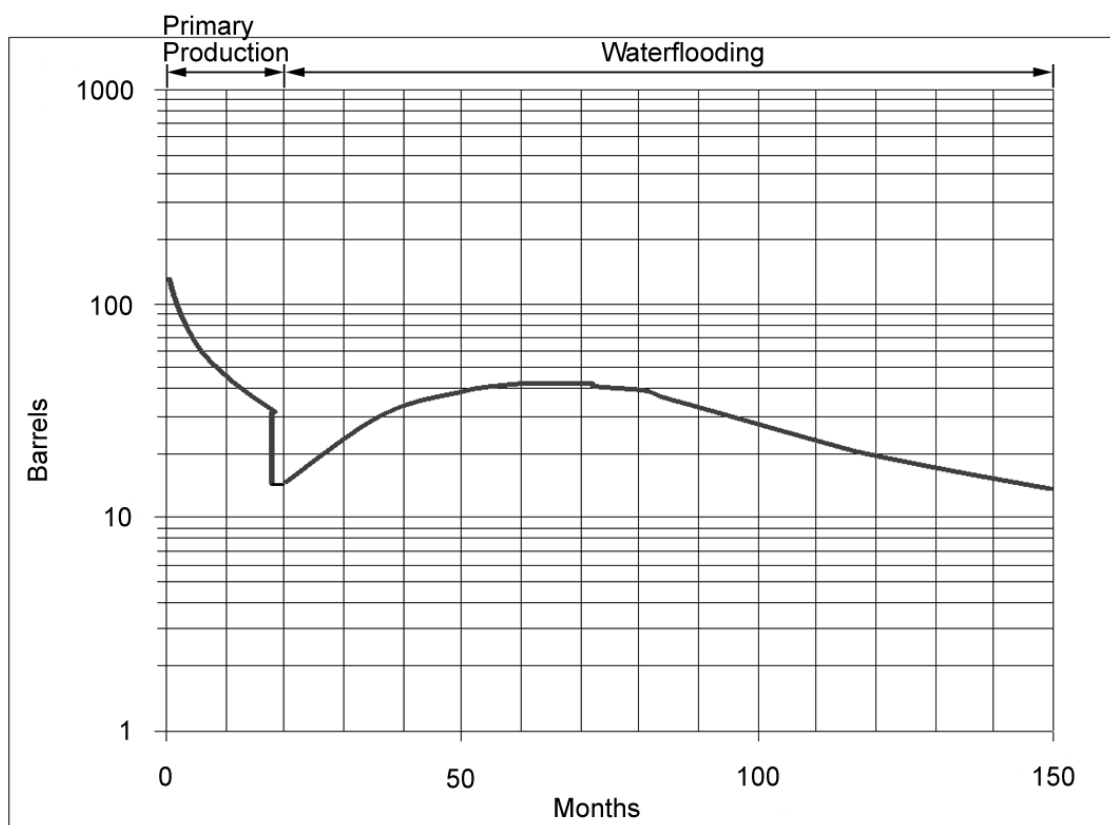
2.2.5 Workovers

Workovers are performed on an as needed basis to repair worn downhole equipment, to sustain existing production rates, or to rework a well to enhance its productivity. Completion rigs are used to perform the workovers. Routine repairs typically take 1 to 2 days, and rework operations typically take 5 to 10 days. Workover operations generally occur once or twice during the life of each operating well location. Operations conducted as part of workovers are identical to those described for completion.

2.2.6 Abandonment and Reclamation

Prior to abandonment of any well location, access drive, or other facility, **Newfield** files with the BLM a NOI to abandon, detailing the proposed P&A procedures. Upon BLM approval, wellbores are plugged with cement, as necessary, to prevent fluid or pressure migration and to protect mineral and/or water resources. Wellheads are removed, both the surface casing and production casing are cut off below ground level, and an appropriate dry hole marker is set in compliance with federal and state regulations.

All surface equipment, including tank battery, pumping unit, heater-treater, and aboveground flow lines and gas system pipelines are removed from the site. Underground water pipelines are retired in place. All poly



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Figure 2.2-4

Oil Yield Curve during
Primary Production and
Waterflooding Phases

Source: Inland 2003.

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pipe associated with the gas line is collected and removed from the location. Since limited surface disturbance occurs as part of gas pipeline operations, no reclamation is required.

The well pad and access road are reclaimed. At a minimum, this includes recontouring the surface to its approximate original contour and redistributing the topsoil to blend the site in with its natural surroundings. All surface disturbance is planted with a seed mixture appropriate for the site, as specified by the BLM.

All powerline and distribution line poles and conductors are removed, and associated surface disturbance is reseeded.

2.3 No Action Alternative

Wellfield development and production activities that apply to all alternatives are presented in Section 2.2. The following activities are specific to the No Action Alternative.

2.3.1 Field Development Plan and Schedule

Under the No Action Alternative, **Newfield** and other lessees would continue to operate the wellfield under the COA granted by the BLM for individual wells and ROWs that were established under prior NEPA reviews and APD approvals, and existing lease conditions. A total of 671 wells (336 producing wells and 335 **production wells converted to** injection wells) supported by 64 miles of roads compose the No Action alternative (**Table 2.3-1** and **Figure 1.4-1**). Approximately 5 miles of electrical powerlines currently provide power to about 15 well sites and an existing gas plant. The wellfield would continue to produce oil and gas until the costs of production make continued operations non-economic.

2.3.2 Waterflooding Infrastructure and Operations

Newfield would continue to use the water supplies for which the company currently holds contracts. On January 15, 1989, Inland (formerly Lomax Exploration) entered into a contract with the JWD to purchase approximately 5,000 bpd of water. Through subsequent acquisition, **Newfield** has contracted for up to 30,000 bpd from the JWD and an additional 7,000 bpd from the Upper County Water District (UCWD). This UCWD water previously was owned by Duchesne City and East Duchesne Culinary Water Improvement District and had been designated for use by the JWD when “contract” water has been expended and additional water is needed. The water supplied to the JWD by Duchesne City and East Duchesne Culinary Water Improvement District was used for irrigation prior to its sale to **Newfield**. This water currently is delivered to the project area via an existing 6-inch buried pipeline that enters the wellfield along the Sand Wash Road, which is the main access into the wellfield.

Based on a total of 335 injection wells and an average of 2.8 acre-feet per year per injection well for waterflood operations, water usage at full development under the No Action Alternative would be an average of 938 acre-feet per year, a portion of which would be produced water that would be treated and reinjected.

Table 2.3-1
Summary of Land and Resource Use Requirements for Alternatives Considered

Project Component	No Action		Proposed Action		Alternative A	
Land Requirements	Quantity	Acres (Surface Disturbance)	Quantity	Acres (Surface Disturbance)	Quantity	Acres (Surface Disturbance)
Oil and Gas Wells	671	874	973	1,268 ¹	922	1,207 ¹
Access Roads (miles)	210	1,840	272	2,353 ²	261	2,295 ²
Water Supply Wells, Pump Station, and Waterline				80		80
Total	--	2,714	--	3,701	--	3,582
Injection Water Requirements (acre-feet per year)	938		2,333		2,081	
Peak Work Force Requirements	93		171		162	
Wellfield Vehicle Miles per Month	86,700		212,500		201,875	

¹Surface disturbance estimate consists of acres associated with well sites.

²Surface disturbance estimate includes the acres of collector, local, and well access roads needed to support construction. Surface natural gas gathering lines and buried waterlines would be co-located with roads and are included in the overall surface disturbance estimate. The footprint also accounts for the proposed powerline and injection facilities.

2.3.3 Work Force and Field Operations

A work force averaging about 93 individuals is responsible for **Newfield's** current wellfield operations. Of this number, 15 are truck drivers that pick up oil at well locations each day.

Workers, material, and equipment are transported to the project area via U.S. Highway 40 and county and BLM roads.

Estimated daily numbers of passenger and tanker trucks on project area roads include approximately 70 passenger trucks, 4 water tankers, and 15 oil tankers. Average total mileage currently driven for vehicles of 1 ton or less is approximately 116 miles per well, or about 77,500 miles per month. Oil tankers average 14 miles per well per month or 6,400 total miles a month. Water trucks average about 2,800 miles per month. Based on the mileage associated with these three classes of vehicles, total vehicle miles per month are 86,700.

2.4 Proposed Action

Wellfield development and production activities that apply to all alternatives are presented in Section 2.2. This section describes the proposed development and production activities specific to the Proposed Action, as well as the applicant-committed environmental protection measures that would be implemented.

2.4.1 Field Development Plan and Schedule

Under the Proposed Action, **Newfield** would drill and operate 973 new oil and gas wells, with associated access roads, water supply pipelines, and oil and natural gas gathering lines within the Castle Peak and Eightmile Flat areas of the Monument Butte/Myton Bench Oil and Gas Field (**Figure 1.4-2**). Approximately half (486) of these wells would be converted *from production wells* to waterflood injection wells. Approximately 83 miles of existing and new access roads would be needed to support this development. **Table 2.3-1** provides a summary of the estimated surface disturbance that would result from the construction and operation of this alternative.

Should BLM approve this alternative in the ROD, **Newfield** would construct and operate these new facilities under the COA granted by the BLM established under this NEPA review and subsequent APD approvals, and existing lease conditions. **Newfield** currently drills wells at a rate of 70 to 130 per year. Based on a continuation of this drilling rate, it is anticipated that the 973 proposed wells would be drilled by 2016.

Construction of additional compressor facilities would not be necessary to accommodate the Proposed Action. Treatment capacity at existing gas plants would be sufficient to handle the increased production.

2.4.2 Waterflooding Infrastructure and Operations

Newfield's expanded waterflood operations would include two new water filtration/injection plants with injection capacities ranging from 2,500 to 4,000 bpd of water each. The proposed sites for the new filtration/injection facilities are located in the SW/SW of Section 36, T8S, R17E and NW/SW of Section 9, T9S, R18E. The new water filtration/injection plants each would require approximately 3 acres, including a 0.25-mile-long access road (see **Figure 1.4-3** for the proposed location of the plants). An approximately 6.9-mile-long, 12-kV powerline would be installed between an existing powerline (SW of Section 22, T8S, R17E) and the proposed filtration/injection facilities (see **Figure 1.4-3**). The powerline would be constructed in a 30-foot-wide permanent ROW. Powerline construction access would be via existing roads, as available, the proposed road system to the well sites, or overland travel (preferably along the ROW). No temporary or permanent access roads would be required for powerline construction. Forty-foot-tall, wooden, Class 5 poles would be used for the powerline installation. Standard raptor proof design features for the prevention of raptor collision and electrocution would be installed on all poles and structures, as appropriate. Permanent surface disturbance associated with the pole locations would total less than 1 acre.

The estimated new water requirements for the expanded waterflood operations under the Proposed Action would range up to 60,000 bpd. This water requirement would be met from three sources: 1) existing contracts with the JWD totaling about 30,000 bpd of water; 2) water produced from the underground oil- and water-bearing Green River Formation; and 3) development of a water pumping facility to pump up to 30,000 bpd from the Green River alluvial aquifer under leases obtained from the Duchesne County Water Conservancy District (DCWCD). DCWCD currently has water rights in Flaming Gorge Reservoir via rights delegated back to the State of Utah by the U.S. Bureau of Reclamation (BOR). As a result, DCWCD has the authority to lease water from the Green River alluvial aquifer to **Newfield** at the proposed withdrawal point (Anderson 2003).

The existing pipeline connecting the wellfield with the existing JWD source would not require modification. To obtain water from the Green River alluvial aquifer, 3 to 5 new water wells, a pump station, and a new underground water pipeline would be constructed. The location of the water wells and pump station are illustrated in **Figure 2.4-1**; the water pipeline route is illustrated in **Figure 2.4-2**.

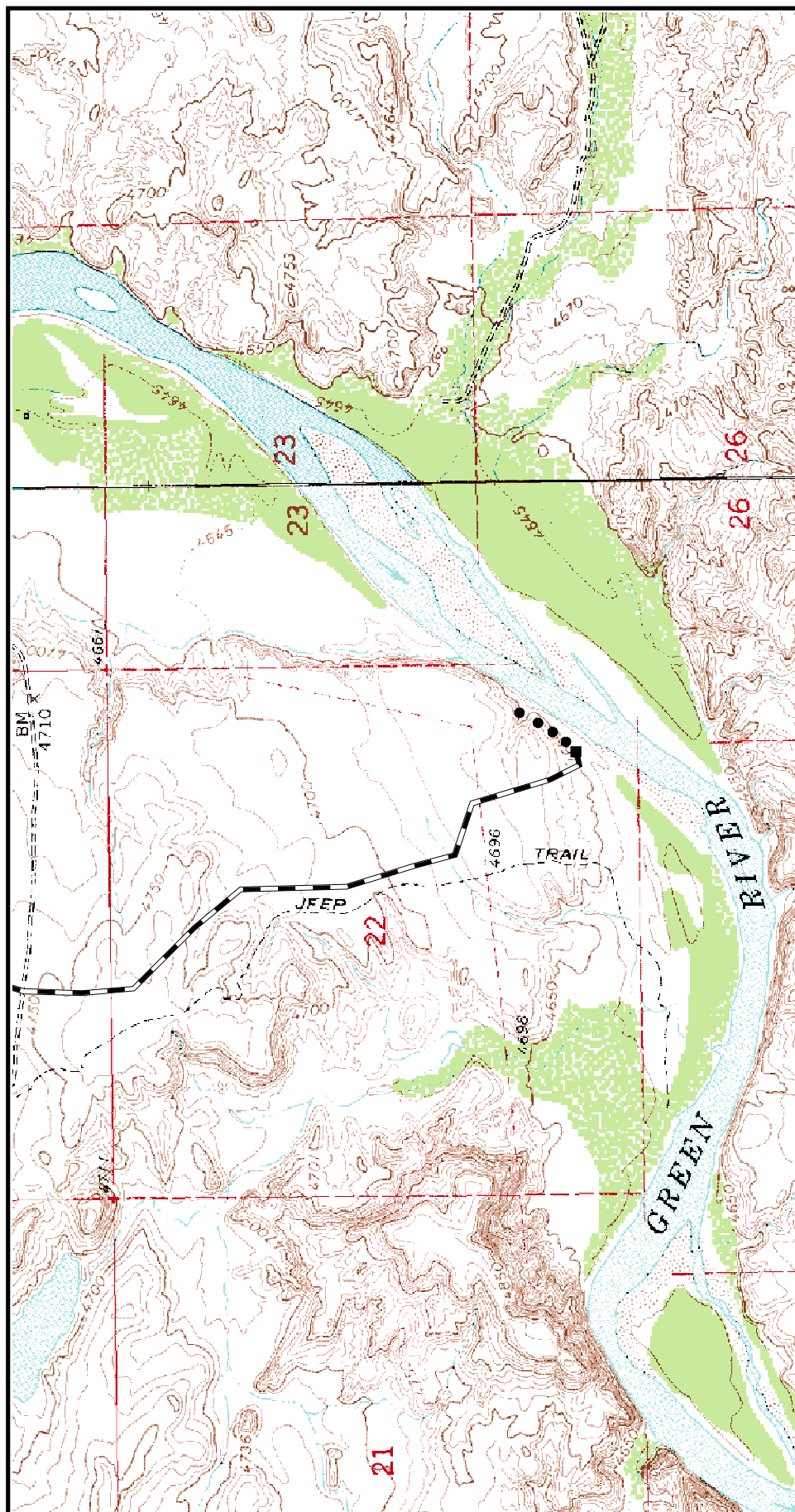
The water collection wells would be connected to the centralized pump station via underground waterlines (see **Figure 2.4-3**). The wells would be developed using conventional drilling methods. Each well would extend to a depth of approximately 100 feet below the surface. Each of the well holes would be equipped with steel casing between 10 to 14 inches in diameter. This casing would include sections of stainless steel screening that would allow groundwater to move from the surrounding alluvial aquifer into the casing. The screen openings typically would be no larger than 0.100 inch. Each well casing would contain a submersible pump and electric cable. The pump would be connected to a 6- to 8-inch pipe, known as a carrier pipe, which would convey the pumped water from the well to the centralized pump facility. All piping would be placed underground.

The surface portion of each well would consist of the well casing, which would terminate 12 inches below the ground surface. The top of the casing would be capped with a bolt down lid. A manhole structure (**Figure 2.4-4**) and manhole lid also may be placed around the well casing with the lid flush to the ground surface. The area adjacent to and surrounding the manhole would be graded to the top of the manhole and seeded with a native seed mix to blend with the surrounding areas.




The centralized water pumping facility would be used to collect water from the wells and to pump water from the source to the injection facilities located west of the pump station. Power for the facility would be provided by a natural gas-fired generator installed in the pump station building. The pumping facility would be located on private land on the west side of the Green River (see **Figure 2.4-1**) and adjacent to, but above the 100-year floodplain. The water pumping station would include a 40-foot-long by 40-foot-wide parking lot and a building approximately 30 feet long by 25 feet wide with walls approximately 10 feet high. The parking lot would be graded and graveled. The building would be constructed of either cinder block or metal siding finished in an earth tone. The roof on the building would be pitched, of metal construction, and also would be finished in an earth tone. Trees and shrubs would be planted along the sides of the building facing the Green River so that the building would not be seen from the Green River corridor.

The building would house booster pumps and the collection well discharge water. The discharge water either would be pumped into a wet well (cistern) located underneath the building or piped directly to the booster pumps for distribution via a pipeline to the wellfield. Depending on the quality of the water received from the collection wells, an in-line filter may be installed on the distribution lines. An overflow/drain collector box also would be installed at the pumping station that would divert excess water from the station into a nearby ephemeral channel draining directly into the Green River.

The 12-inch steel waterline would be buried approximately 4 to 5 feet deep within a 50-foot-wide construction ROW that would follow the alignment illustrated in **Figure 2.4-2**. The waterline would



Legend:

-  Proposed water pipeline
-  Proposed pump station
-  Proposed water well

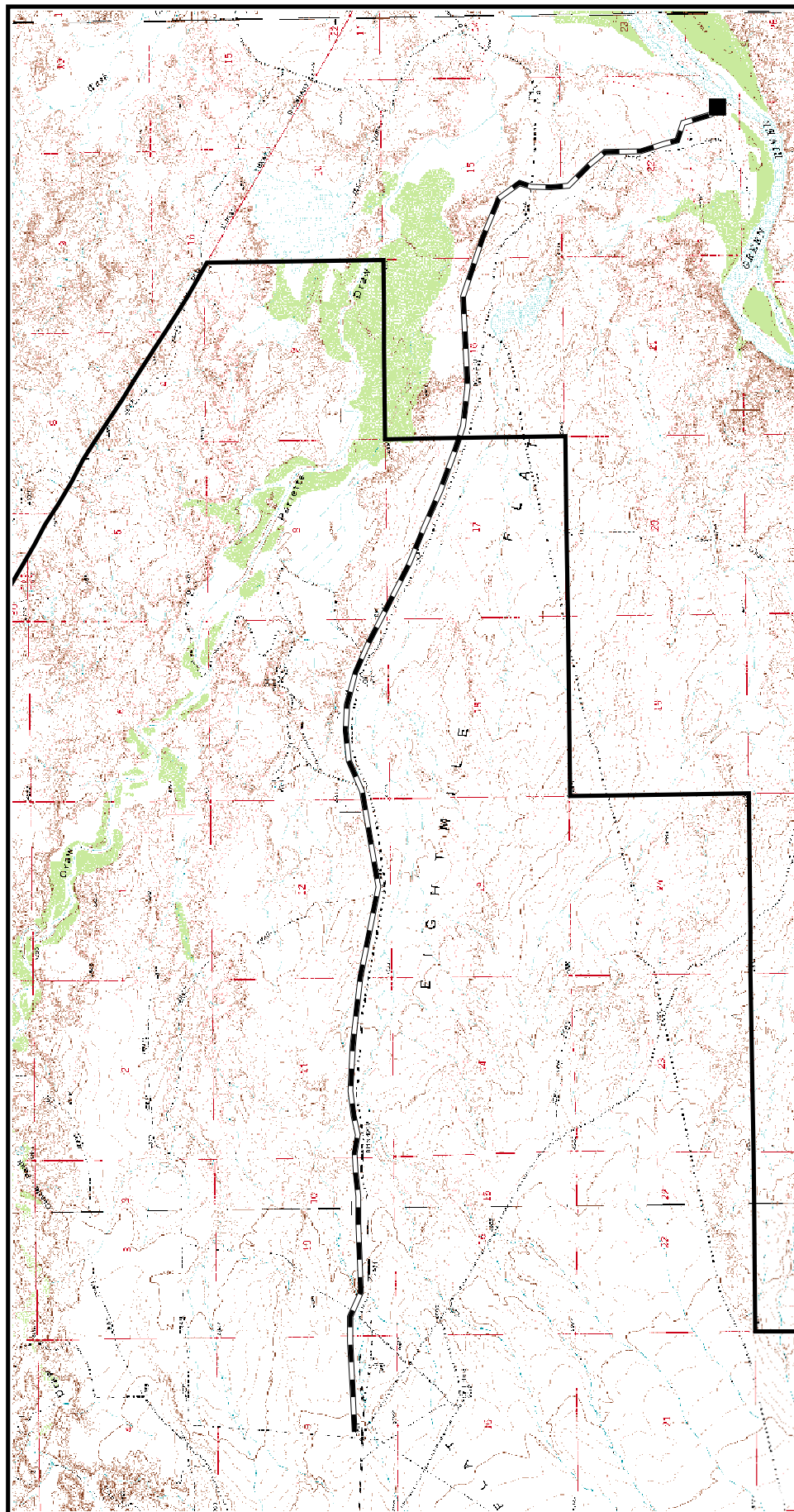
**Castle Peak and Eightmile
Flat Oil and Gas
Expansion Project**

Figure 2.4-1

Location of Green River Water
Supply Wells, Pump Station,
and Water Supply
Pipeline Route



Source: Inland 2003.



Legend:



Proposed water pipeline

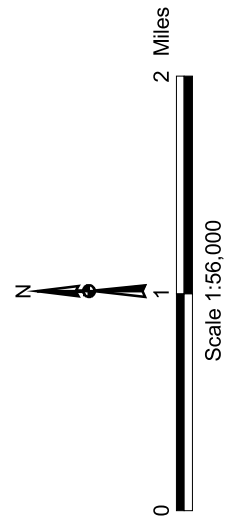


Proposed pump station

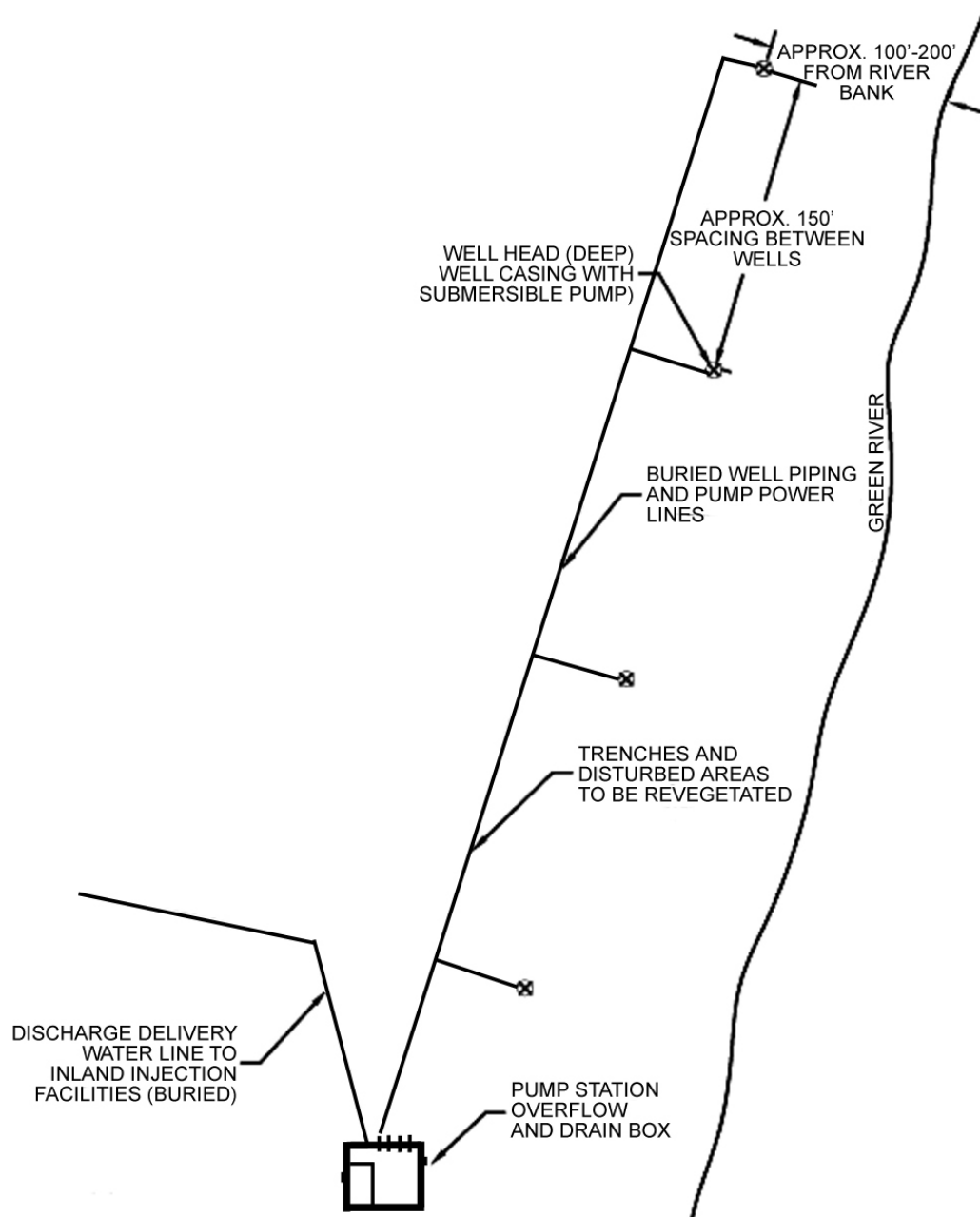
Castle Peak and Eightmile Flat Oil and Gas Expansion Project

Figure 2.4-2

Water Supply Pipeline from the Green River to the Castle Peak and Eightmile Flat Development Area



Source: Inland 2003.



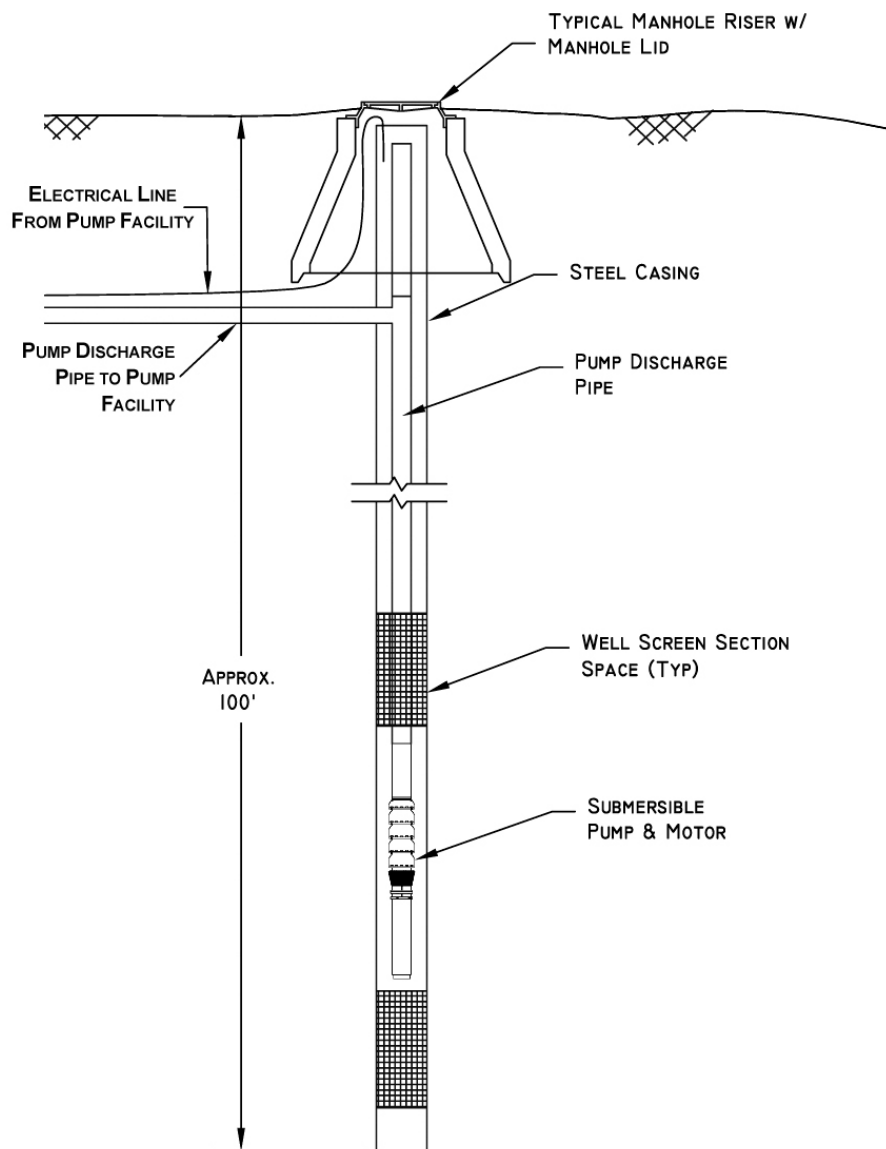
**Castle Peak and Eightmile
Flat Oil and Gas
Expansion Project**

Figure 2.4-3

Conceptual Water Well and
Pump Station Layout

Source: Inland 2003.

10/15/03



**Castle Peak and Eightmile
Flat Oil and Gas
Expansion Project**

Figure 2.4-4

Conceptual Well Detail

Source: Inland 2003.

10/15/03

interconnect with the easternmost proposed filtration/injection facility (see **Figure 1.4-3**), from which water subsequently would be routed to the wellfield for injection.

Assuming a maximum water use rate of 4.8 acre-feet per year per injection well, water demand at full build-out would be 2,333 acre-feet per year. Of this volume, approximately 139 acre-feet per year would be produced water that would be treated for reinjection and a combined 2,194 acre-feet per year would be provided from the JWD and Green River alluvial aquifer. Current **Newfield** assumptions are that 50 percent of the new water would be supplied from each of these two sources (JWD and Green River alluvial aquifer). However, because of long-term uncertainties about the availability of the water from JWD, **Newfield** may need to obtain more than 50 percent of the required 2,194 acre-feet per year of raw water from the Green River alluvial aquifer.

2.4.3 Work Force Requirements

Under the Proposed Action, **Newfield's** peak work force would be about 171 individuals who would be responsible for wellfield operations, drilling, and picking up oil at well locations each day. A maximum work force of 40 individuals would set up, drill, and complete each well.

The types of vehicles driven and the estimated number of miles driven per month by vehicle type would be as follows: 28 oil tankers - 15,700 total miles; 4 water trucks - 6,800 total miles; and 112 passenger trucks - 190,000 total miles. Total miles per month for all classes of vehicles would be 212,500.

2.4.4 Applicant-committed Environmental Protection Measures

The committed environmental protection measures described below would be implemented by **Newfield** under the Proposed Action to reduce the potential environmental impacts of the proposed project.

2.4.4.1 Cultural Resources

A Class III cultural resources survey, conducted by a qualified archaeologist, would be conducted over all areas proposed for surface disturbance that have not been previously surveyed. If these surveys identify areas with a high probability of encountering potentially significant sub-surface archaeological sites, a qualified archaeologist would monitor surface disturbance during construction. **Newfield** 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 immediately would cease, and the BLM's Authorized Officer (AO) 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.

2.4.4.2 Paleontological Resources

Surveys for paleontological resources would be conducted on those areas where bedrock excavation into sensitive formations is necessary. Areas with sandstone outcrops would be surveyed for paleontological resources by a qualified paleontologist funded by **Newfield**. The survey would determine fossil localities and

the sensitivity of the area for fossil resources. These actions would determine the necessity of having a qualified paleontologist on-site during construction. If paleontological resources were uncovered during ground disturbing activities, **Newfield** would suspend all operation that would further disturb such materials and immediately would contact BLM's AO, who would arrange for a determination of significance and, if necessary, recommend a recovery or avoidance plan.

2.4.4.3 Noxious Weeds and Reclamation

Newfield would develop and implement a BLM-approved noxious weed monitoring and control program for the project disturbance areas. **Newfield**, in coordination with the BLM, would develop and implement reclamation monitoring procedures to maximize the success of the reclamation program. **BLM seed mixes for the Monument Butte/Myton Bench area are provided in Appendix A.** If successful reclamation is not occurring for both herbaceous and woody species, **Newfield** would coordinate with the BLM on appropriate remedial measures.

2.4.4.4 Uinta Basin Hookless Cactus

Newfield would restrict new construction or surface-disturbing activities in areas previously identified by BLM as containing potential habitat for this species until notice and approval by BLM's AO. Site-specific surveys within potential cactus habitat would be conducted by a biologist approved by the BLM prior to new construction or surface-disturbing activities to avoid impacts to high quality habitat and individual plants. Surveyors would conduct their work on foot in high cactus population density areas.

2.4.4.5 Raptor Nest Sites

No new construction or surface-disturbing activities would be conducted within a 0.5-mile buffer of known active and inactive raptor nests from courtship through fledging (February 1 through August 15). Activity surveys of known nest locations would be conducted between May 15 and May 30 each year, or as determined in coordination with the BLM to account for annual climate fluctuations. These surveys would be conducted by a qualified biologist approved by the BLM, and nest activity would be reported to the BLM's AO. Active nests are those that are currently occupied and those that have been occupied for nesting activities within the previous two nesting seasons; inactive nests are those that have not been occupied for nesting activities within the previous two nesting seasons. If active nests are documented during the activity survey, new construction or surface-disturbing activities within 0.5 mile of those nests would be avoided during the nesting period identified by BLM's AO.

Ferruginous hawk and golden eagle nest sites within the project area have been identified as sensitive resources requiring special protection. For active and inactive ferruginous hawk and golden eagle nests within the Pariette Wetlands ACEC, no construction or surface disturbing activities would occur within 0.5 mile of the nest sites prior to obtaining a take permit from the USFWS. For active and inactive ferruginous hawk nests within the project area, but outside of the Pariette Wetlands ACEC, and for active and inactive golden eagle nests outside of the Pariette Wetlands ACEC that have been active within the past 2 years, the following applicant-committed protection measures would be implemented in order to promote continued nest-site selection and nesting activities within the project area:

Active Nests

No new construction or surface-disturbing activities would be conducted within a 0.5-mile buffer of active nests during the courtship, nest building, egg laying, incubation, hatching, or fledging periods (February 1 through July 31 for ferruginous hawks and golden eagles). Between August 1 and January 31, new construction or drilling activities would be conducted within a 0.5-mile buffer of active nests subject to the following restrictions:

- No well pad would be constructed within 0.5 mile of an active nest where any portion of its permanent facilities would be visible from the nest, and in no circumstances would construction or surface-disturbing activities take place within 0.25 mile of an active nest. All access roads to well pads would be designed to avoid line-of-site visibility from active nests to the maximum extent practical;
- Injection-designated wells proposed between 0.25 and 0.5 mile would be converted as soon as practicable after drilling and would produce no audible noise from a distance of 100 feet. All proposed producing wells between 0.25 and 1 mile from active nests would be equipped with multi-cylinder engines or muffled to reduce noise levels; and
- Road access from the main road would be limited to a single-lane-improved road for each well. During normal operations, human access to wells would be limited to 1 trip per day by a single lease operator driving a full-size pickup.

Inactive Nests

Between May 30 and January 31, new construction or surface-disturbing activities could be conducted within a 0.5-mile buffer of inactive nests subject to the following restrictions:

- Where possible, well pads proposed for construction within 0.5 mile of an inactive nest would be placed where permanent facilities would not be visible from the nest;
- Wells proposed within 0.5 mile from inactive nests either would be converted to injection wells or equipped with multi-cylinder engines or muffled to reduce noise levels; and
- Road access from the main road would be limited to a single-lane-improved road for each well. During normal operations, human access to producing wells would be limited to 1 trip per day by single lease operator driving a full-size pickup.

In addition, **Newfield** employees would be trained to identify ferruginous hawks and golden eagles, instructed to avoid disturbance of active nests, and to stay within or near vehicles to prevent flushing when birds are present.

2.4.4.6 Powerline Raptor Proofing

Standard raptor proofing designs as outlined in Mitigating Bird Collision with Powerlines (Avian Powerline Interaction Committee [APLIC] 1994) would be incorporated into the design of the proposed powerline to prevent collision to foraging and migrating raptors. Standard, safe designs as outlined in Suggested Practice for Raptor Protection on Powerlines (APLIC 1996) would be incorporated into the design of the proposed powerline in areas of identified avian concern to prevent electrocution of raptor species attempting to perch on the power poles and lines. These measures would include, but would not be limited to, a 60-inch separation between conductors and/or grounded hardware and recommended use of insulating materials and other applicable measures depending on line configuration.

2.4.4.7 Greater Sage Grouse Leks and Nesting Areas

New construction and surface-disturbing activities would be avoided year-round within 1,000 feet of greater sage grouse strutting grounds previously identified by BLM as being historically located in the area. No new construction or surface-disturbing activities would be conducted between March 1 and June 30 each year within greater sage grouse nesting areas (a 2-mile radius of strutting grounds in areas of sagebrush vegetation) until an activity survey is completed. *Newfield*, in conjunction with the jurisdictional agencies, would have the surveys conducted by a qualified biologist to determine the presence or absence of nesting greater sage grouse. The activity survey would be conducted each year between April 1 and April 15, or as determined in coordination with the BLM, to account for annual climate fluctuations, and the results would be reported to BLM's AO. If active nesting areas are documented during the annual survey, new construction and surface-disturbing activities within 0.5 mile of those nesting areas would be avoided during the nesting period identified by the BLM's AO.

2.4.4.8 Bald Eagle Wintering Areas

No construction or surface-disturbing activities would occur within 0.5 mile of known bald eagle winter concentration areas and winter night roost sites from November 1 through March 31. Daily activities that must occur within the recommended spatial buffers at winter night roosts sites would be scheduled between 9:00 a.m. and 1 hour prior to the official sunset. These measures would be implemented on a site-by-site basis in coordination with BLM.

2.4.4.9 Mountain Plover Breeding Habitat

Mountain plover breeding habitat has been identified within the project area by the BLM. In areas containing suitable mountain plover breeding habitat (as identified by the BLM AO during the on-site inspection) presence/absence surveys would be conducted according to the USFWS plover survey protocol prior to beginning new construction or surface-disturbing activities. No new construction or surface-disturbing activities would be conducted during the mountain plover breeding season (March 15 to August 15) in areas known to contain mountain plover or active mountain plover nest sites. Motorized travel in plover breeding habitat areas would take place only on designated routes with no cross-country travel permitted. Road maintenance would be avoided between May 1 and June 15 to avoid hazards to early developing chicks.

2.4.4.10 Range Resources

Newfield would adjust final placement of well locations to avoid stock ponds, guzzlers, or wells currently established for watering livestock, or provide an alternate water source if existing sources are diminished by well drilling and surface disturbance activities. Existing range study plots and rain gages also would be avoided.

2.4.4.11 Aesthetics

The pump station for the Green River water supply wells would be concealed from view from the Green River by finishing the building in an earth tone and planting, irrigating, and maintaining trees and shrubs around the perimeter of the building.

2.4.4.12 Hazardous Materials and Emergency Response

Newfield Production Company maintains a file containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances that are used during construction, drilling, completion, production and gas gathering operations in Monument Butte Area. **Newfield** has reviewed the USEPA's Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 (as amended) to identify any hazardous substances proposed for use in this project, as well as the USEPA's List of Extremely Hazardous Substances as defined in 40 CFR 355, as amended. Substances that would be used for activities associated with this project are listed in Appendix A.

Newfield and its contractors would comply with all applicable federal laws and regulations existing or hereafter enacted or promulgated. **Newfield** and its contractors would locate, handle, and store hazardous substances in an appropriate manner that would prevent them from contaminating soil and water resources or otherwise sensitive environments. Any release (e.g., leaks, spills, etc.) of hazardous substances in excess of the reportable quantity as established by 40 CFR, Part 117, would be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended. If the release of a hazardous substance in a reportable quantity would occur, a copy of a report would be furnished to the BLM's AO and all other appropriate federal and state agencies.

Newfield has evaluated their overall wellfield operations within the Monument Butte Area and has prepared and implemented Spill Prevention, Control, and Countermeasure (SPCC) plans; copies are kept at **Newfield's** Roosevelt, Utah, field office. The plan includes accidental discharge reporting procedures, spill response and cleanup measures, and maintenance of dikes. A Hazardous Communication Program also is kept at **Newfield's** Utah field office, and SARA Title III (community right-to-know) information is submitted yearly as required; copies are kept in **Newfield's** Denver, Colorado office, as well as in **Newfield's** Utah field office. **Newfield** has a written Confined Space Entry Procedure that is kept in the Utah field office. A waste minimization plan is not required since **Newfield** is not a generator of hazardous waste; however, **Newfield** does employ measures to minimize the amount of wastes generated. **Newfield** is bonded for

facility closure upon termination of public land use authorization, and a copy of the bonding is kept in **Newfield's** Utah field office.

2.5 Alternative A

Well field development and production activities common to all alternatives are presented in Section 2.2. This section describes the elements and activities specific to Alternative A. Applicable DMRA RMP stipulations (**Table 2.5-1**), additional BLM mitigation measures (**Table 2.5-2**), and applicant-committed environmental protection measures as described for the Proposed Action in Section 2.4.4 would be implemented throughout the development area.

2.5.1 Field Development Plan and Schedule

Under Alternative A, **Newfield** would drill and operate up to 922 new oil and gas production wells and associated infrastructure (**Figure 1.4-4**). The reduction of 51 wells as compared to the Proposed Action would be the result of applying the 330-foot riparian zone setback from the Pariette Wash stated in DMRA RMP Stipulation R104 and PW27 (**Table 2.5-1**). The application of this setback is based on the goal of protecting riparian community and wildlife habitat values (e.g., DMRA RMP Stipulations R101, PW34, PW06 and PW15, and PW07- see **Table 2.5-1**).

A spatial analysis of the effect of other mitigation measures on well locations that include setbacks and distance buffer criteria (SWM-1 200-foot setbacks from non-riparian channels; SWM-4 no well pads on 40 percent slopes or greater) indicated that nearly all wells that intersected these features could be moved 200 feet to avoid the constraint, or other special mitigation would be required. Active raptor nests were not considered to be permanent NSO constraints for installation of wells.

All other proposed oil and gas development outside the riparian setback zone would be the same as specified for the Proposed Action. Resource and work force requirements would be approximately 5 percent less than the Proposed Action, as discussed below. **Table 2.3-1** provides a summary of the estimated surface disturbance that would result from construction and operation of this alternative.

No additional compressor facilities would be required or developed to address the increased gas production under this alternative. Treatment capacity at existing gas plants would be sufficient to handle the increased production.

2.5.2 Waterflooding Infrastructure and Operations

The waterflooding infrastructure would be the same as described for the Proposed Action in Section 2.4, and would include two new filtration/injection plants and associated powerline, new water supply wells drilled in the Green River alluvial aquifer, a new pump station near the Green River, and a new water supply pipeline connecting the Green River pump station with the easternmost proposed filtration/injection plant.

Based on **an estimate that 461 of the 922 production wells drilled would be converted to** injection wells at full build-out and assuming a maximum water use rate of 4.8 acre-feet per year per injection well,

Table 2.5-1
Applicable RMP Stipulations for the
Castle Peak and Eightmile Flat Oil and Gas Expansion Project
Alternative A

Existing Diamond Mountain Resource Management Plan Stipulations	
Soil and Water Resources	
SW01/PW30 - Allow new surface-disturbing activities on critical soils on about 75,000 acres within level 3 lands only if watershed values are maintained. (Pariette Wetlands ACEC has been designated as level 3 for critical watershed and soils.)	
SW06 - Upgrade maintenance of existing BLM roads, close and rehabilitate roads no longer necessary, maintain or increase vegetation cover or construction of erosion control structures where possible to reduce critical erosion conditions.	
Construct new roads to standards that will maintain or improve watershed conditions.	
SW10 - Produced water from oil and gas wells will continue to be disposed of by authorized methods that could include injection, removal to non-federal disposal pits, or on-lease disposal pits.	
SW04 - Reduce sediment and salinity production on important watershed and critical soils through intensive management and construction measures to reduce water degradation of the Green River.	
Paleontological Resources	
CR06 - DMRA will adhere to the following significance criteria for paleontological resources: Should significant resources be found during inventory, impacts to them will be mitigated, generally through avoidance. Should it be determined that the paleontological resources cannot be avoided, a program of mitigation will be developed through consultation between BLM and the Utah State Paleontologist.	
PW03 - Paleontological clearances will be required on a case-by-case basis in the Pariette Wetlands ACEC.	
Air Quality	
AQ-01 - DMRA will design projects and permitted uses that comply with UAC Regulation R446-1. The best air quality control technology, provided by the Utah Bureau of Air Quality, will be applied as needed to meet air quality standards.	
AQ02 - DMRA will comply with UAC Regulation R446-1-4.5.3, which prohibits the use, maintenance or construction of roadways without taking appropriate dust abatement measures. Compliance will be obtained through special stipulations as a requirement on new projects and through the use of dust abatement control techniques in problem areas.	
Floodplains and Riparian Areas	
PW31/SW03 - Areas of critical soils and floodplains are closed to off-highway vehicle (OHV) use and surface-disturbing activities during periods of saturated soils.	
RI01 - Avoid or mitigate the impact of surface-disturbing activities on riparian-wetland areas. Riparian habitat will be protected by limiting surface-disturbing activities to established ROW corridors and crossings and by restricting grazing.	
RI04/PW27 - Allow new surface-disturbing activities within 330 feet of riparian zones only when it can be shown that there are no practical alternatives, that long-term impacts are fully mitigated, or that the construction is an enhancement to the riparian area.	
RI06 - Keep construction of all new stream crossings to a minimum. Culverted stream crossings will be designed and constructed to allow fish passage. All stream crossing will be designed and constructed to keep impacts to riparian and aquatic habitat to a minimum.	
PW34 - Manage the vegetation [in the Pariette Wetlands ACEC] to attain the ecological state that would most benefit riparian and watershed values, and manage vegetation in the remaining areas in a way which results in the highest vegetation species diversity to meet the special status plant species, wildlife, and recreation values.	
Fish and Wildlife	
FW19 - Roads, except county and State ROWs, may be permanently or seasonally closed where human/wildlife conflicts exist or are expected, or when roads are no longer necessary.	
PW06/PW15 - Do not allow activities that would result in adverse impacts to nesting waterfowl from March 1 through May 25 in the Pariette Wetlands ACEC.	
PW07 - Do not allow surface-disturbing activities, within 0.125 mile of active goose nest sites year-round in the Pariette Wetland ACEC.	
FW35 - Do not allow surface-disturbing activities within 0.5 mile of an active nest site within the specified active reproductive periods for special status or sensitive bird species. This recommendation would not be considered for maintenance and operation of existing facilities, or if impacts can be mitigated through other management actions. A site-specific analysis will be completed to determine if terrain features adequately protect an active nest site from a proposed surface-disturbing activity.	

Table 2.5-1 (Continued)

Existing Diamond Mountain Resource Management Plan Stipulations
Fish and Wildlife (Continued)
<p>FW26 - No construction or surface-disturbing activities will be allowed year-round within 0.5 mile of known golden eagle nest sites active within the past 2 years, which would adversely affect current use or limit or preclude potential future use of the nest, unless a permit to take is obtained from the USFWS. This restriction does not apply to maintenance and operation of existing programs and facilities, or if impacts can be mitigated through other management actions. A site-specific analysis will be completed to determine if terrain features adequately protect the nest site from a proposed surface-disturbing activity. It would not apply if impacts could be mitigated through other management actions or site-specific analysis of terrain features.</p> <p>FW14 - Construct or modify all power lines to prevent electrocution of raptors.</p> <p>PW09 - In the Pariette Wetlands ACEC, no construction or surface-disturbing activities (does not apply to casual use) are allowed year-round within 0.5 mile of known golden eagle or ferruginous hawk nests which would adversely affect current use or limit or preclude potential future use of the nest, or unless a permit to take is obtained from the USFWS.</p> <p>FW06 - Protect and enhance 6 miles of riparian habitat in Pariette Draw to ensure stabilization of the peregrine falcon's avian prey base, and improve habitat conditions.</p> <p>FW06 - Improve or maintain greater sage grouse strutting, nesting, and brooding-rearing habitat throughout the Habitat Management Plan (HMP) area. Maintain or improve sage grouse wintering habitat.</p> <p>FW24 - Do not allow surface-disturbing activities within 1,000 feet of greater sage grouse strutting grounds. OHV use will be limited to designated roads and trails yearlong within this area. This restriction does not apply if impacts could be mitigated through other management actions.</p> <p>FW25 - Do not allow surface-disturbing activities within greater sage grouse nesting area (a 2-mile radius of sage grouse strutting grounds within the sagebrush vegetation type) from March 1 through June 30. OHV use will be limited to designated roads and trails during this period. This restriction does not apply if greater sage grouse are not present or impacts could be mitigated through other management actions, nor does it apply to maintenance and operation of existing facilities.</p> <p>FW09 - Wildlife habitat for Management Indicator Species (MIS) will continue to be enhanced throughout the resource area by taking opportunities to create water facilities, maintain or create raptor nesting sites, and to design vegetation treatments outlined in the DMRA RMP and specified in the activity plans with these species in mind.</p>
Sensitive Species
<p>FW33 - Authorize no action in suitable habitat for threatened and endangered species if it would jeopardize the continued existence of the species or result in severe modification of the habitat. However, it may be possible to permit activities within the mapped area if a site-specific inventory shows that suitable habitat for threatened and endangered species would not be adversely affected.</p> <p>FW32/PW11 - Allow an experimental, non-essential black-footed ferret reintroduction on one site within the DMRA as described in the 1994 DMRA RMP.</p> <p>Maintain the 16,600 acres of potentially suitable habitat in Eightmile Flat (one of five potential reintroduction areas) (inclusive of the portion in the Pariette Wetlands ACEC) by avoiding any activities that will render potential black-footed ferret habitat unsuitable for future reintroduction until habitat studies at all five sites are completed. (Note: based on the 2001 mapping of the Eightmile Flat area, this complex or colony has been severely reduced. The current size of the complex or colony is approximately 7,759 acres in size.) However, should Eightmile Flat area be selected, the pre-release guidelines, as identified in the DMRA RMP would be continued. Should the Eightmile Flat are not be selected, the protective actions imposed will be withdrawn. Following actual reintroduction, the site will be managed in accordance within the site-specific plan developed for the reintroduction.</p> <p><u>Habitat Stipulations</u></p> <p>Stipulations that would apply to the Eightmile Flat site as a result of the habitat studies and selection of a reintroduction site are listed below.</p> <ul style="list-style-type: none"> - Surface disturbance activities will be limited to a maximum of a cumulative total of 10 percent within the Eightmile Flat potential ferret habitat area. - Surface disturbing activities will avoid potential ferret habitat. If activities cannot, they will cross in areas of low prairie dog density (< 10 burrows/acre), cross at the shortest distance through the prairie dog habitat, or disturb sites not currently being used by prairie dogs. This guideline will not apply to maintenance and operation of existing facilities. - Potential ferret habitat will remain open to mineral entry with appropriate mitigation. - Power lines will avoid potential ferret habitat. If they cannot, they will be buried or designed to preclude raptors from using them as hunting perches.

Table 2.5-1 (Continued)

Existing Diamond Mountain Resource Management Plan Stipulations	
Sensitive Species (Continued)	
–	Non surface-disturbing geophysical exploration will be allowed year-round.
	If ferrets leave a reintroduction area (i.e., Coyote Basin and other future reintroduction sites within the DMRA), all protective stipulations that applied to the reintroduction area will not apply. It would be the USFWS' responsibility to trap and return the ferrets to the reintroduction area.
	Any ferret accidentally taken must be reported to the USFWS immediately.
FW28	No construction or surface-disturbing activities will be allowed year-round within 0.5 mile of known ferruginous hawk nests, which would adversely affect current use or limit or preclude potential future use, unless a permit to take is obtained from the USFWS. This restriction does not apply to maintenance and operation of existing programs and facilities, or if impacts can be mitigated through other management actions. A site-specific analysis will be completed to determine if terrain features adequately protect the nest site from a proposed surface-disturbing activity. It would not apply if impacts could be mitigated through other management actions or site-specific analysis of terrain features. (Also see PW09 under Fish and Wildlife.)
VE10/PW35	Do not allow surface-disturbing activities on 48,000 acres of special status plant habitat. A site-specific analysis will be completed to determine if site characteristics exclude potential habitat from a proposed surface-disturbing activity. [Portions of the project area have been identified as lying in special status plant habitat for the Uinta Basin hookless cactus.]
Land Use	
LR03	Land use authorizations will not be approved in exclusion areas. Land use authorizations in avoidance areas may be authorized provided they are considered consistent with the current management objectives; those which are not will either be rejected or will necessitate a plan amendment prior to approval.
MN02	Level 4 lands are open to leasing with standard conditions (category 1); level 3 lands are open to leasing with special conditions; level 2 lands are open to leasing with NSO stipulation. Restrictions placed on the lease or subsequent conditions of approval (COA) do not apply to maintenance and production of existing facilities. Restrictions from other resource decisions will be applied to new leases, or at the time of lease renewal for existing leases. [The majority of the project area is located in category 2 and 3 lands (stipulations or NSO, respectively). The Pariette Wetlands ACEC is designated category 3 (NSO or highly restricted).]
PW13	Establish a ROW avoidance area within level 2 lands. Make level 3 lands available for placement of ROWs with special restrictions designed to protect the stated values of the ACEC.
Visual Resources	
VR02	Existing roads or trails may be improved if impassable by vehicles or equipment. No widening or realignment will be allowed outside the existing ROW without prior approval. Existing roads or trails may have to be reclaimed or brought back to their original conditions. New roads or trails associated with private proposals or applications may be constructed only when vehicle and equipment passage is otherwise impossible. Such new trails will be temporary in nature and, to the reasonable extent, will follow existing contours or will take a zig-zag path; no straight line-of-sight bulldozing will be allowed.
	Upon project completion, the area and access routes not needed for BLM or BLM-authorized purposes will be reclaimed to as near the original condition as possible.
	All disturbed areas will be recontoured to blend as near as possible with the natural topography. All unnecessary berms will be removed and all cuts (including roads) filled.
	Construction areas and access roads will be kept litter-free.
Recreation	
PW25	Developed recreation sites within the ACEC will be closed to grazing and surface-disturbing activities not directly related to recreation development. [There is a NSO stipulation that says NSO is allowed unless waivers, exceptions, or modifications to these limitations are specifically approved in writing by an authorized officer of the BLM if either the resource values change or the lessee/operator demonstrates that adverse impacts can be mitigated.]
Cultural Resources	
CR04	DMRA will adhere to the following significance criteria for cultural resources: Should significant, in terms of National Register eligibility, cultural resources be found during inventory, impacts to them will be mitigated, generally through avoidance. Should it be determined that the cultural resources cannot be avoided, consultation with the SHPO will be initiated. If the cultural resources are National Register eligible, a program of mitigation will be developed through consultation between DMRA, the SHPO, and the ACHP.
	[There is a NSO stipulation attached with this decision that says "No surface occupancy or use is allowed on National Historic Landmark Areas, Register Properties, and Potential Register Properties. Waivers, exceptions, or modifications to these limitations may be specifically approved in writing by the authorized officer of the BLM if either the resource values change or the lessee/operator demonstrates that adverse impacts can be mitigated."]

Table 2.5-1 (Continued)

Existing Diamond Mountain Resource Management Plan Stipulations
Cultural Resources (Continued)
PW01 - Consult with the Ute Tribe for the protection of areas and items of traditional lifeways and religious significance.
Hazardous Materials and Wastes
HZ04 - All proposed actions on public lands will be analyzed for their potential to release hazardous materials into the environment. Appropriate stipulations will be incorporated into the permitting document to ensure prevention of hazardous incidents.

¹Fossil locality data will be obtained from the Utah Geological Society for the project area. Based on this data, some areas may be recommended for avoidance. For areas where surface disturbance is planned and where significant paleontological resources are known, a plan will be developed for surveying some outcrops of the Uinta and Green River formations so that fossils and data may be collected. If necessary, additional collection may be done during or after surface disturbance. Workers will be informed that the collection of vertebrate fossils from BLM-administered lands without a permit is illegal, and that collecting any fossil for commercial use also is illegal.

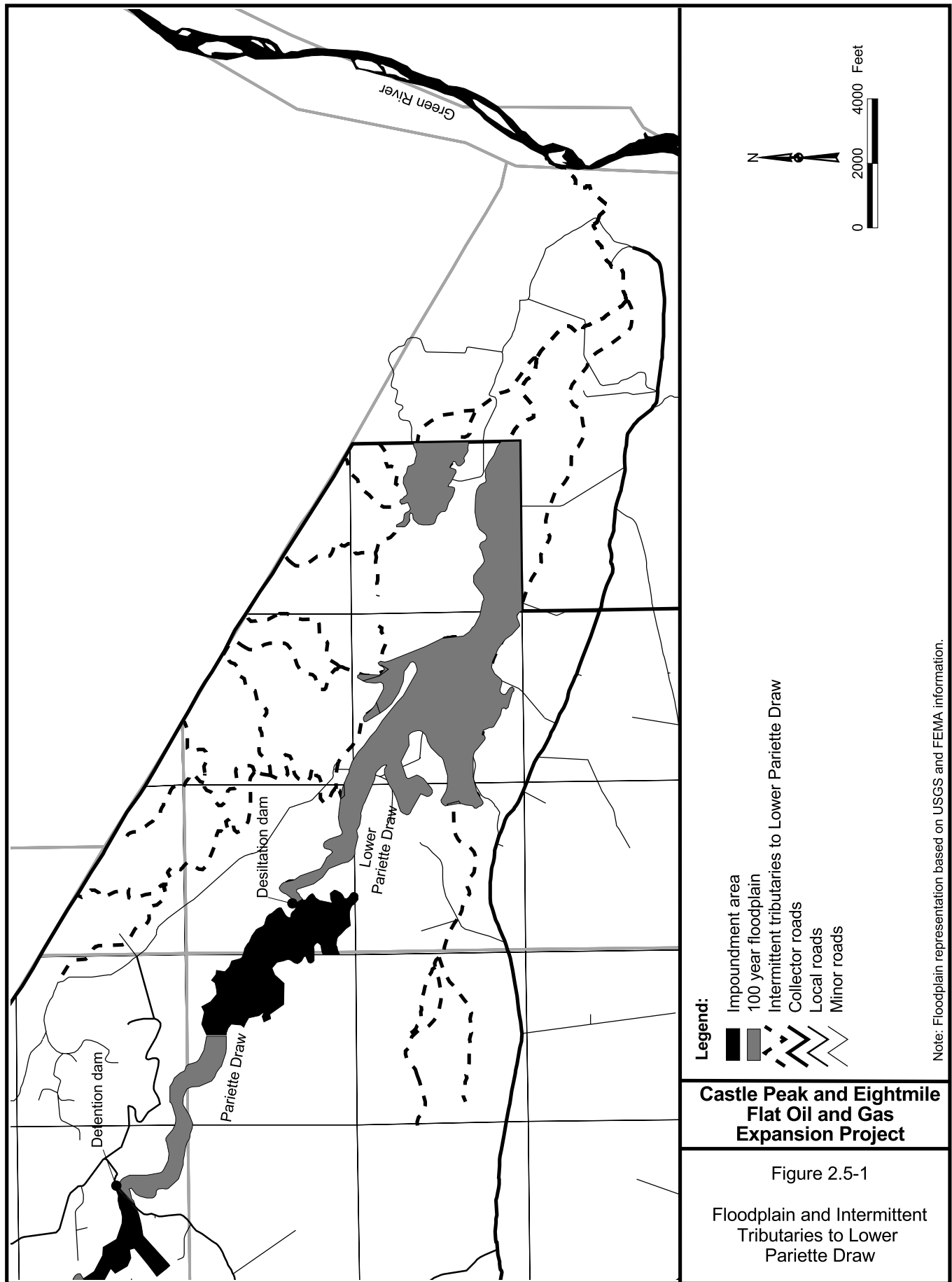
Source: BLM 1994.

Table 2.5-2
Mitigation Measures Being Considered by the BLM Under Alternative A

Soil and Water Resources
SWM-1. Roads parallel to the stream channel and well pads will be set back 200 feet or more from active stream channels (average 3 feet wide or greater without an associated riparian zone) in the watersheds of all tributaries to Pariette Draw. The same setback will apply to each active channel (average 3 feet wide or greater) in all watersheds within the wellfield boundary south of the Pariette Draw that drain the wellfield directly to the Green River (Sheep Wash, other unnamed washes). This setback distance may be lessened if site specific analysis demonstrates that: 1) the proposed well could be placed on higher terrain above the 100-year floodplain but not less than 100 feet from a stream channel, 2) the 100-year floodplain can be demonstrated to be narrower than 200 feet in the area proposed for well location; 3) the well pad can be increased in height to avoid a predicted over-topping 50-year flood, but would not be placed closer than 100 feet from a stream channel after redesign.
SWM-2. If well pads are to be located on steep slopes (8 to 40 percent) with a slope length of 200 feet or more downslope of the pad, the pad will be bermed, and the pad surface will drain away from slopes.
SWM-3. No well pads will be located on slopes 40 percent or greater.
SWM-4. <i>Newfield</i> will apply topsoil and revegetation seed over 90 percent of a production well site when the production well is converted to an injection well. Topsoil and revegetation seed will be applied to the remaining 10 percent of the well site area upon injection well closure.
SWM-5. <i>Newfield</i> will control employees and contractors from driving OHVs off established roads and trails within the area proposed for development.
Vegetation
NWM-1. To prevent the introduction of new weed species into the project area, construction equipment arriving from off-lease locations will be power-washed prior to arrival and use in order to remove noxious weed seeds, roots, or rhizomes.
Wildlife and Fisheries
WFM-1. On level or gently sloping ground (5 percent slope or less) <i>Newfield</i> will elevate surface pipelines (4 inches or greater in diameter) a minimum of 6 inches above the ground to allow passage of small animals beneath the pipe. This ground clearance will be achieved by placing the pipeline on blocks at intervals of 150 to 200 feet.
WFM-2. <i>Newfield</i> will contract a qualified biologist to conduct a breeding bird survey within 660 feet (100 meters) from proposed surface disturbance activities associated with wellfield development (e.g., well pads, roads, pipelines, power lines, and ancillary facilities) that would occur during the breeding season from April 1 through July 31. The biologist will provide documentation of active nests, bird species, and other evidence of nesting (e.g., mated pairs, territorial defense, birds carrying nesting material, transporting of food) to the BLM following each survey and prior to surface disturbance activities. If an active nest for Important Migratory Bird Species (USFWS Bird of Conservation Concern, Partners in Flight Priority Bird Species, Utah Sensitive Species) is documented during the survey (see Table 3.6-2), <i>Newfield</i> will coordinate with the BLM to determine if any additional protection measures will be required. If applicable, appropriate protection measures, including establishment of buffer areas and constraint periods, will be implemented on a case-by-case and species-specific basis. Alternatively, prior to surface disturbance activities within that year, <i>Newfield</i> will clear vegetation within the year of surface disturbance activities outside of the breeding season (April 1 through July 31).
WFM-3. A 400-foot well and road construction buffer from slopes greater than 40 percent located within 0.5-mile of an active, inactive, or newly discovered golden eagle/ferruginous hawk nest (since both species may share the same nest site in different years) would be implemented, in coordination with the BLM.
WFM-4. <i>Newfield</i> will install noise reduction devices on all pump jacks to reduce intermittent noise to 45 dBA at 660 feet from the source.
WFM-5. No surface pipeline containing natural gas liquids condensates will be installed across the Pariette Draw stream channel downstream of the desiltation dam (Figure 2.5-1). <i>Pipelines could be elevated or buried in this zone in accordance with criteria in WFM-8.</i>

Table 2.5-2 (Continued)

<p>WFM-6. Natural gas pipelines that cross the FEMA-mapped 100-year floodplain or mapped riparian areas upstream of the lower Pariette Draw (Figure 2.5-1) will be routinely pigged to ensure that the pipeline contains no more than 125 gallons of natural gas liquids per 0.5 mile of pipe. Lower Pariette Draw is defined as the portion of Pariette Draw located between the foot of the Pariette Draw desiltation dam and the confluence of Pariette Draw and the Green River.</p>
<p>WFM-7. Natural gas pipelines will be located at least 0.1 mile away from stream channels and washes that directly lead into lower Pariette Draw (Figure 2.5-1). Where crossings of these tributaries to lower Pariette Draw are necessary to minimize pipeline length, these pipelines will be pigged as described in WFM-6.</p>
<p>WFM-8. Natural gas pipelines that cross perennial, intermittent, and ephemeral stream channels will either be elevated above the predicted 100-year flood event on a pipe bridge, or buried below the predicted scour depth for an equivalent flood event. The construction requirements for each type of crossing will be determined on a site-specific basis, and will consider the technical guidance of the paper entitled <i>Hydraulic Considerations for Pipeline Crossings of Stream Crossings</i> (BLM 2003c).</p>
<p>WFM-9. <i>Newfield</i> will coordinate with the USFWS and BLM to determine whether black-footed ferret surveys would be warranted prior to project activities within prairie dog colonies, in accordance with the USFWS' 1989 guidelines for the black-footed ferret. This decision will be based on relative size and density of the affected prairie dog colonies, activity status (active or inactive), colony location relative to disturbance areas, and current agency policy. If black-footed ferrets were documented, additional measures would be developed to protect individual ferrets and their habitat, in coordination with the USFWS.</p>
<p>WFM-10. <i>Newfield</i> will incorporate appropriate management guidelines to promote suitable sage grouse habitat as outlined in <i>Guidelines to Manage Sage Grouse Populations and Their Habitats</i> (Connelly et al. 2000).</p>
<p>Special Status Species</p>
<p>SSS-1. <i>Newfield</i> will avoid any Uinta Basin hookless cactus or Pariette Bench hookless cactus identified in proposed disturbance areas. Alternately, <i>Newfield</i> will salvage the individual cacti, and the soil and presumed seed bank surrounding the individual cacti, for agency research or use in site reclamation. In addition, <i>Newfield</i> will prohibit employees from unauthorized off-road vehicle use and routes, and the company will sign all appropriate roads.</p>
<p>SSS-2. Artificial Nesting Structures (ANS) will be constructed and positioned carefully <i>in coordination with the BLM, UDWR, and the USFWS</i> for each existing natural ferruginous <i>hawk</i> nest site (active or inactive) located within 0.5 mile of a new project-related surface disturbance activity. ANS will be afforded the same protection as natural raptor nests for the life of the project. <i>Monitoring of ANS will be conducted annually to determine nesting activity.</i> The potential relocation of ANS structures will occur at the discretion of the BLM, based on annual nesting activity levels at each ANS structure.</p>



the water demand for injection purposes is estimated to be 2,213 acre-feet per year. Of this total, produced water that can be treated for reinjection is estimated to be 132 acre-feet per year (5 percent less than the Proposed Action yield), and 2,081 acre-feet per year would be supplied from the JWD or Green River alluvial aquifer. Due to the long-term uncertainties about the availability of water from JWD, **Newfield** may need to obtain a large portion or all of the required 2,081 acre-feet per year of raw water from the Green River alluvial aquifer.

2.5.3 Work Force Requirements

Based on 5 percent fewer wells under this alternative as compared to the Proposed Action, it has been assumed that the work force would be 5 percent smaller, or 162 workers. Based on a total of 922 wells (461 producing wells and 461 injection wells), it has been assumed that vehicles would travel 201,875 miles per month.

2.5.4 Applicant-committed Environmental Protection Measures

All of the applicant-committed protection measures as described for the Proposed Action in Section 2.4.4, Applicant-committed Environmental Protection Measures, would be applied to this alternative.

2.6 Alternatives Considered but Eliminated from Further Consideration

2.6.1 No Additional Development Alternative

This alternative would eliminate all future oil and gas drilling and production from occurring within the project area. This alternative was removed from consideration because lands in the project area have previously been leased for oil and gas operations. Once public lands are leased, the BLM cannot deny the operators the right to drill on those lands. Limiting use in these areas would contradict the terms of the lease. In addition, the BLM can not restrict or control oil and gas activities on private or state lands within the project area.

2.6.2 Directional Drilling of Multiple Wells from One Drill Pad Location

Three major factors and associated questions were considered in this review:

- Crude oil characteristics and producing zones. Are there unique properties of this type of crude oil that make it either more or less suitable for extraction using directional drilling methods?
- Directional drilling and operation requirements. What are the applicable directional drilling, completion, and maintenance methods, given the crude oil characteristics, and crude oil depth and distribution in the field?
- Economic feasibility. Can oil and gas reserves be economically developed from this field using currently available directional drilling methods?

Crude Oil Characteristics and Producing Zones.

The potential for directional drilling of multiple production wells from a centralized location was reviewed by BLM; the type of black wax crude oil produced in the field and the random nature of the oil-bearing formation makes use of this technology difficult. Even though directional drilling is a proven technology with typical liquid crude, directional drilling and directionally producing black wax crude is experimental. The black wax crude currently produced in the field is a solid at room temperature and does not flow well, especially in winter. It cannot be transported via pipelines unless it is substantially diluted with another liquid or continually heated, and it often creates pumping problems in well pump jacks if the well is not producing sufficient volumes of oil.

Directional Drilling and Operation Requirements

Due to the need to maximize the number of sandstone lenses penetrated, the preferred method to directionally drill wells is to configure the wellbore so that a S-shaped configuration is achieved. Under this configuration, the wellbore would penetrate the target formation vertically. This would allow for optimum fracture control and improve the well economics. To meet the technical and economic viability needs of the project, and given the shallow depth of the target formation, the surface location would have to be less than 0.5 mile from the intended downhole target to drill a directional well that could be turned to drill vertically through the Green River Formation and still allow for conventional rod pump utilization. However, this S-shaped configuration creates difficulties in the completion process (additional pipe, cementing difficulties, and fracturing concerns) that increase the cost of completion. Fracture stimulation is the most important component of completing a successful well; therefore, any imposed stresses that would reduce the fracture effectiveness would in turn reduce production from the well. Directional drilling could exacerbate the wax buildup problem and could cause additional wear and tear on surface and sub-surface well parts, creating the need for additional well maintenance and workover operations. This increased maintenance could result in increased operation costs and make the wells uneconomical to operate. In addition, the target formation is made up of randomly stacked lenticular sand beds that were created in prehistoric stream channels. The greatest potential for intersecting these sand lenses is to drill vertically through target formations within a spacing unit.

Economic Feasibility

Inland (***prior to acquisition by Newfield***) completed two experimental directionally-drilled wells on a 40-acre offset (horizontal distance of 1,320 feet) in the Monument Butte/Myton Bench field, and initiated production. The costs of drilling these wells, estimated costs of production, and efficiency of resource extraction were submitted to BLM for review. The following are the major findings of this study:

Drilling, Completion, and Maintenance Costs. The expense to drill these directional well was about 50 percent greater than the cost of a single, vertical well. Directional wells are more expensive because they take longer to drill, must be drilled with mud rather than air, and require specialized tools, surveys, and expertise. Depending on the horizontal distance from the surface location to the desired downhole location, larger rigs, larger well pads, and larger reserve pits are required. Directional well completion costs were about 20 percent greater than vertical well completion costs, primarily because of higher rod and tubing

costs for the directional wells. The operational history for the directional wells is very brief, but Inland expects that maintenance costs for these wells will be approximately 100 percent of vertical wells because of higher rates of equipment wear and repair.

Recovery Efficiency. Inland has estimated that it can produce 76 percent as much oil, and 77 percent as much gas from directional wells, meaning that hydrocarbon recovery in the field would drop by almost 25 percent, with associated loss of revenue. Inland also estimated that directional well life would be about half that of a vertical well, meaning that substantial additional investment could be required for a directional well to reach the equivalent operating life of a vertical well.

Summary. Based on its analysis of drilling and completion costs, maintenance costs, and relative product recovery rates, Inland (**now Newfield**) concluded that it could not economically drill and operate directional wells. BLM concurs with this assessment.

2.6.3 Greater than 40-acre Drill Pad Spacing

Under this alternative, well pad placement would occur at greater spacing intervals than every 40 acres. This could include placing wells every 80 to 160 acres.

Oil and gas reservoir studies conducted in the Castle Peak and Eightmile Flat area by Inland have indicated that 40-acre spacing is necessary for both oil producing wells and injection wells to encounter connected “pay sands.” Larger spacing in the discontinuous Green River Formation would result in a significant number of oil pay sands being unaffected by the waterflood and Inland’s (**now Newfield’s**) purpose and need would not be met. For this reason, this alternative was considered by eliminated from further discussion.

2.7 Comparison of Alternatives

Table 2.7-1 provides a summary of the expected impacts for each of the alternatives analyzed. The focus of the table is to highlight differences among the alternatives in terms of impact magnitude, importance, and duration. A summary of residual impacts for each alternative is presented after each major resource topic in Chapter 4.0, Environmental Consequences.

Table 2.7-1
Impact Summary for Alternatives Analyzed for the Castle Peak and Eightmile Flat Oil and Gas Expansion Project

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
General Project Assumptions	<ul style="list-style-type: none"> Well sites – 671 Well site and ancillary facility surface disturbance – 2,714 acres Number of total production wells converted to injection wells - 335 Number of total production wells not converted to injection wells – 336 	<ul style="list-style-type: none"> Well sites – 973 Well site and ancillary facility surface disturbance – 3,701 acres Number of total production wells converted to injection wells – 486 Number of total production wells not converted to injection wells – 487 	<ul style="list-style-type: none"> Well sites – 922 Well site and ancillary facility surface disturbance – 3,582 acres Number of total production wells converted to injection wells – 461 Number of total production wells not converted to injection wells – 461
	Production water collected – Approximately 85,344 gallons daily at 336 production wells (approximately 254 gallons per well).	Production water collected – Approximately 123,698 gallons daily at 487 production wells.	Production water collected – Approximately 117,094 gallons daily at 461 producing wells.
Water Resources			
Groundwater and Surface Water Use	No shallow groundwater underlying the wellfield, or surface water sources within the wellfield, has been used to supply injection water.	No shallow groundwater underlying the wellfield, or surface water sources within the wellfield, would be used to supply injection water.	No shallow groundwater underlying the wellfield, or surface water sources within the wellfield, would be used to supply injection water.
	Waterflood operations consume approximately 938 acre-feet per year of water purchased from JWD and UCWD. This will continue through the remaining 10-years of operation.	Waterflood operations over the 15- to 20-year operating life would consume approximately 2,194 acre-feet of water per year from the proposed Green River wells and 139 acre-feet per year of produced water.	Waterflood operations over a 15- to 20-year operating life would consume approximately 1,942 acre-feet per year of fresh water from the Green River wells, and 132 acre-feet per year of produced water.
Watersheds: Floodplains and Riparian Areas.	165 wells and roads located within 200 feet of intermittent stream channels with no riparian zone could be exposed to flood damage.	314 wells and roads proposed within 200 feet of intermittent stream channels with no riparian zone could be exposed to potential flood damage; 8 wells proposed in a flood control impoundment and desiltation pond in Pariette Draw could be inundated.	263 wells proposed within 200 feet from intermittent stream channels with no riparian zone could be exposed to potential flood damage, but at a lower risk with implementation of mitigation measures. No wells would be located in the Pariette Draw flood impoundment or desiltation pond.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
	Approximately 56 acres of wellfield-related disturbance in riparian areas has resulted in a small long-term (50 years or more) alteration in watershed and wildlife habitat functions.	Approximately 178 acres of project-related disturbance in riparian areas would result in a small long-term (50 years or more) alteration in watershed and wildlife habitat functions. Well pads and roads could fill seasonally flooded areas classified as jurisdictional wetlands.	Based on implementation of DMRA RMP stipulations, project-related disturbance in riparian areas would be minimized.
Watersheds: Soil Erosion, Sedimentation, and Water Quality	Soil erosion from wellfield-related surface disturbance is estimated to be 108 tons per year (0.06 acre-foot) over a period of 50 years or more.	Soil erosion from project-related surface disturbance is estimated to be 148 tons (0.08 acre-foot) per year over a period of 50 years or more.	Soil erosion from project-related surface disturbance is estimated to be 143 tons (0.08 acre-foot) per year over a period of 50 years or more. Additional steep slope erosion control measures would be applied to minimize erosion.
	Wellfield-related sediment yield to stream channels is estimated at 0.56 acre-foot per year (1.0 percent background). No resulting changes in water quality in Pariette Wetlands or the Green River are expected.	Project-related sediment yield to stream channels is estimated at 0.90 acre-foot per year (1.3 percent of background). No resulting changes in water quality in Pariette Wetlands or the Green River are expected.	Project-related sediment yield to stream channels is estimated at 0.76 acre-foot per year (1.0 percent of background). No resulting changes in water quality in Pariette Wetlands or the Green River are expected.
Crude Oil and Natural Gas Condensate Spills	165 wells located within 200 feet of intermittent stream channels with no riparian zone could be damaged by a major flood event. The risk of an oil spill and dispersion of oil is low. No impacts to surface water quality would be anticipated in the event of an oil spill due to the properties of the oil.	314 wells located within 200 feet of intermittent stream channels with no riparian zone could be damaged by a major flood event. The risk of an oil spill and dispersion of oil is low. No impacts to surface water quality would be anticipated in the event of an oil spill due to the properties of the oil.	263 wells proposed within 200 feet from intermittent stream channels with no riparian zone could be exposed to potential flood damage, but at a lower risk with implementation of mitigation measures. Implementation of mitigation measures and DMRA RMP stipulations would further reduce the risk of an oil spill. No impacts to surface water would be anticipated in the event of an oil spill due to the properties of the oil.
	Because of the proximity of 3 wells to the Pariette Ponds (1 to 2 miles upstream), a large flood could wash spilled oil and condensate into the Pariette Ponds resulting in fish and wildlife exposure.	Because of the proximity of wells to the Pariette Ponds (8 wells in impoundments area) a large flood could wash spilled oil and condensate into the Pariette Ponds resulting in fish and wildlife exposure.	Implementation of mitigation measures and DMRA RMP stipulations would reduce the potential for oil spills into the Pariette Ponds. A release, if it were to occur, would result in fish and wildlife exposure. No wells would be located in Pariette Draw impoundment.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
	If a condensate spill should occur near a drainage, effects to surface water quality would be short term due to its rapid evaporation.	If a condensate spill (predicted to occur once in 300 years) should occur near a drainage or water body, effects to surface water quality would be short term due to its rapid evaporation.	Implementation of mitigation measures and DMRA RMP stipulations would reduce the potential for a condensate spill near drainages and water bodies (once every 7,100 years). If a release were to occur, effects to surface water quality would be short term due to its rapid evaporation.
Geology and Minerals	Oil production under waterflooding is estimated to be 3,700 bpd of oil and natural gas production would be 4.7 million cubic feet (mmcf) per day over an estimated 10-year project life.	Oil production under waterflooding is estimated to be 5,357 bpd, and natural gas production would be 6.8 mmcf per day over a 15- to 20-year project life.	Oil production under waterflooding is estimated to be 5,071 bpd, and natural gas production would be 6.5 mmcf per day over a 15- to 20-year project life.
Paleontology	Wellfield-related activities have resulted in surface disturbance on approximately 2,277 acres of high scientific value (Condition 1) fossil-bearing deposits.	Project-related activities would result in surface disturbance on approximately 1,185 acres of high scientific value (Condition 1) fossil-bearing deposits. Applicant-committed protection measures (pre-construction surveys, monitoring, and avoidance or data recovery) would minimized resource impacts.	Project-related activities would result in surface disturbance on 1,171 acres, and long-term protection of about 800 acres, of high scientific value (Condition 1) fossil-bearing deposits. Applicant-committed protection measures (pre-construction surveys, monitoring, and avoidance or data recovery) would minimized resource impacts.
Air Quality	Concentrations of primary criteria air pollutants from existing well emissions are in compliance with national standards for CO and NO ₂ . Hazardous air pollutants (HAPs) are well below the applicable regulatory threshold.	Concentrations of primary criteria air pollutants from proposed well construction and operation would be in compliance with national standards for CO and NO ₂ . HAPs would be well below the applicable regulatory threshold.	Concentrations of primary criteria air pollutants from proposed well construction and operation would be in compliance with national standards for CO and NO ₂ . HAPs would be well below the applicable regulatory threshold.
Soils and Vegetation	Approximately 91 percent of oil and gas-related surface disturbance in the development area is located on soils with moderate to high rehabilitation constraints.	Approximately 73 percent of the project-related surface disturbance in the development area would be located on soils with moderate to high rehabilitation constraints.	Approximately 73 percent of project-related surface disturbance in the development area would be located on soils with moderate to high rehabilitation constraints.
	Approximately 2,714 acres of native vegetation in the development area have been disturbed.	Approximately 3,701 acres of native vegetation would be disturbed under this alternative.	Approximately 3,582 acres of native vegetation would be disturbed under this alternative.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Soils and Vegetation (Continued)	Vegetation recovery to similar cover and species composition is expected to occur over the long term (50 years or more). Areas experiencing seeding failures will not recover to former vegetation cover and species composition because of a lack of seed sources and suitable seed beds.	Vegetation recovery to similar cover and species composition after application of a revegetation program is expected to occur over the long term (less than 50 years). Re-establishment of mature piñon-juniper woodlands would require 75 to 100 years.	Vegetation recovery to similar cover and species composition after application of a revegetation program (including monitoring and remediation) is expected to occur over the long term (less than 50 years). Re-establishment of mature piñon-juniper woodlands would require 75 to 100 years. Vegetation recovery would be accelerated on 635 acres of well pad disturbances with implementation of mitigation measures.
	Invasive weeds (e.g., halogeton, cheatgrass) occur throughout the wellfield. These species will continue to spread into disturbed areas and will slow the rate of re-invasion by native species.	Invasive weeds (e.g., halogeton, cheatgrass) occur throughout the wellfield. The spread of noxious could be slowed, but not stopped, by application of a weed control program.	Invasive weeds (e.g., halogeton, cheatgrass) occur throughout the wellfield. The spread of noxious could be slowed, but not stopped, by application of a weed control program.
	Cryptobiotic soil communities, where present, are expected to recover very slowly (up to 250 years) after soil disturbance. Approximately 1,617 acres of potential cryptobiotic soil disturbance.	Cryptobiotic soil communities, where present, are expected to recover very slowly (up to 250 years) after soil disturbance. Approximately 853 acres of potential cryptobiotic soil disturbance.	Cryptobiotic soil communities, where present, are expected to recover very slowly (up to 250 years) after soil disturbance. Approximately 853 acres of potential cryptobiotic soil disturbance.
Wildlife and Fisheries			
Wildlife Habitat	Wellfield activities have resulted in a long-term surface disturbance of approximately 2,714 acres of potential breeding and foraging habitat.	There would be a long-term surface disturbance of approximately 3,701 acres of potential breeding and foraging habitat.	There would be a long-term surface disturbance of approximately 3,582 acres of potential breeding and foraging habitat.
Habitat Fragmentation	Fragmentation effects have resulted from the long-term surface disturbance of approximately 2,714 acres of habitat. Indirect effects have further reduced habitat quality and utilization for approximately 12,029 acres. It is anticipated that noise generated by pump jacks exceeds 45 dBA, a general threshold for wildlife avoidance, throughout the development area where few mufflers have been installed.	Fragmentation effects would result from the long-term surface disturbance of approximately 3,701 acres of habitat. Indirect effects would further reduce habitat quality and utilization for approximately 16,791 acres. It is anticipated that noise generated by pump jacks would exceed 45 dBA, a general threshold for wildlife avoidance, throughout the Proposed Action development area.	Fragmentation effects would result from the long-term surface disturbance of approximately 3,582 acres of habitat. Indirect effects would further reduce habitat quality and utilization for approximately 16,672 acres. Implementation of mitigation measures would reduce pump jack noise below 45 dBA at a distance of about 600 feet.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Management Indicator Species	Habitat reductions for management indicator species have occurred in the following habitat types: riparian – 56 acres; sagebrush – 998 acres; desert shrub - 1,617 acres. It is assumed there has been a corresponding reduction in the populations of these species over the long term.	Habitat reductions for management indicator species would occur in the following habitat types: riparian – 178 acres; sagebrush – 822 acres; desert shrub – 2,497 acres; and piñon-juniper – 31 acres. It is assumed there would be a corresponding reduction in the populations of these species over the long term.	Habitat reductions for management indicator species would occur in the following habitat types: sagebrush – 822 acres, desert shrub – 2,483 acres, and piñon-juniper -31 acres. It is assumed there would be a corresponding reduction in the populations of these species over the long term.
Non-game Species/ Pronghorn	Wellfield activities have resulted in a long-term loss of approximately 4 AUMs for pronghorn (about 2 percent of the monthly forage requirements for the 180 animal herd unit).	There would be a long-term loss of approximately 5 AUMs for pronghorn (about 3 percent of the monthly forage requirements for the 180 animal herd unit).	There would be a long-term loss of approximately 5 AUMs for pronghorn (about 3 percent of the monthly forage requirements for the 180 animal herd unit).
Non-game Species/ Migratory Bird Species	Workover or maintenance activities during the breeding season could result in the abandonment of a nest site or territory or loss of eggs or young. (See Other Raptor Nests above.)	If project activities were to occur during the breeding season, impacts to migratory bird species could include abandonment of a nest site or territory or loss of eggs or young. (See Other Raptor Nests above.)	Implementation of mitigation measures would minimize impacts to important migratory bird species. However, if project activities were to occur during the breeding season, impacts to migratory bird species could include abandonment of a nest site or territory or loss of eggs or young.
Non-game Species/Raptor Nests	Wellfield development has affected the suitability of 28 raptor nests. Future use will be influenced by foraging and nesting habitat quality and recovery of the prey base from prolonged drought and disease.	Development of wells within 0.5 mile of nest sites, including development within 0.5 mile of occupied nests outside of the breeding season, likely would result in a reduction in habitat suitability and may preclude future use of nest sites as well densities increase. Future use would be influenced by foraging and nesting habitat quality and recovery of the prey base from prolonged drought and disease.	Active raptor nest sites would be protected by seasonal and spatial constraints on a year-by-year basis in accordance with the DMRA RMP. Project activities in the vicinity of inactive nests likely would result in a reduction in habitat suitability and may preclude future use of nest sites as well densities increase. Future use would be influenced by foraging and nesting habitat quality and recovery of the prey base from prolonged drought and disease.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Crude Oil and Natural Gas Condensate Spill Effects on Fish and Wildlife	Potential toxicity effects to fish and wildlife as a result of a spill or release of crude oil are expected to be low due to the characteristics of the oil. However, because this crude is waxy, it would float in a flood, and could be dispersed downstream, resulting in fish and wildlife exposure.	Potential toxicity effects to fish and wildlife as a result of a spill or release of crude oil are expected to be low due to the characteristics of the oil. However, because this crude is waxy, it would float in a flood, and could be dispersed downstream, resulting in fish and wildlife exposure.	Potential toxicity effects to fish and wildlife as a result of a spill or release of crude oil are expected to be low due to the characteristics of the oil. Implementation of mitigation measures and DMRA RMP well setback stipulations would further reduce the potential for a release and resulting fish and wildlife exposure.
	The probability of a condensate release is estimated at once in 300 years. In the event of a release, effects would be short term, and toxicity to aquatic life in the Green River would not be anticipated; aquatic biota in lower Pariette Draw could suffer acute mortality.	The probability of a condensate release is estimated at once in 300 years. In the event of a release, effects would be short term, and toxicity to aquatic life in the Green River would not be anticipated; aquatic biota in lower Pariette Draw could suffer acute mortality.	With implementation of mitigation measures, the probability of a condensate release is estimated at once in 7,100 years. If a release should occur, effects would be short term, and toxicity to aquatic life in the Green River would not be anticipated; aquatic biota in lower Pariette Draw could suffer acute mortality.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Special Status Species			
<p>Uinta Basin Hookless Cactus</p>	<p>An estimated 61 acres of <i>S. glaucus</i> and 764 acres of <i>S. brevispinus</i> habitat have or will be directly disturbed by wellfield development under the No Action Alternative.</p> <p>Implementation of protection measures contained in prior BOs has resulted in the take of less than 100 individuals since 1995 out of an estimated population of about 10,000.</p>	<p>An estimated 199 acres of <i>S. glaucus</i> and 591 acres of <i>S. brevispinus</i> habitat would be directly disturbed by wellfield development under the Proposed Action Alternative. Based on implementation of applicant-committed protection measures, it is expected that the take of individual cactus plants could be maintained below 1 percent of an estimated population of 10,000 plants.</p>	<p>Potential disturbance effects to the Uinta Basin hookless cactus (<i>Sclerocactus glaucus</i>), including <i>S. brevispinus</i>, would be very similar to those described under the Proposed Action except that approximately 82 fewer acres of cactus habitat would be impacted as compared to the Proposed Action due to riparian setbacks that would be implemented in the vicinity of the Pariette Wash. As a result, an estimated 154 acres of <i>S. glaucus</i> and 554 acres of <i>Sclerocactus brevispinus</i> habitat would be directly disturbed by wellfield development under Alternative A. Based on implementation of applicant-committed protection measures and RMP stipulations, it is expected that the take of individual cactus plants could be maintained below 1 percent of an estimated population of 10,000 plants.</p>
<p>Black-footed Ferret</p>	<p>Approximately 82 acres of wellfield-related disturbance has occurred within the mapped boundary of the Eightmile Flat white-tailed prairie dog colony, a potential ferret reintroduction area. This disturbance represents 1 percent of the mapped colony area of 7,759 acres. Potential impacts to ferrets are extremely low based on its rarity and the current health of the prairie dog colony.</p>	<p>Approximately 495 acres of project-related disturbance would occur within the mapped boundary of the Eightmile Flat white-tailed prairie dog colony, a potential ferret reintroduction area. This disturbance would represent 6 percent of the mapped colony area of 7,759 acres. Potential impacts to ferrets would be extremely low based on its rarity and the current health of the prairie dog colony.</p>	<p>Oil and gas development would disturb approximately 495 acres within the mapped boundary of the Eightmile Flat white-tailed prairie dog colony, a potential ferret reintroduction area. This disturbance represents 6 percent of the mapped colony area of 7,759 acres. Implementation of mitigation would minimize potential impacts to ferrets, if present.</p>

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Bats	No direct disturbance to potential roost sites has occurred; foraging habitat reductions have been very small relative to the wide foraging range of these species.	No direct disturbance to potential roost sites would occur. Riparian foraging habitat would be disturbed by placement of up to 35 wells. Impacts to upland foraging habitat would be very small relative to the wide foraging range of these species.	No direct disturbance to potential roost sites would occur. Impacts to upland foraging habitat would be very small relative to the wide foraging range of these species. Implementation of DMRA RMP well setback stipulations would minimize impacts to riparian foraging habitat.
White-tailed Prairie Dog	Approximately 82 acres of disturbance in occupied prairie dog habitat has occurred. Potential impacts include direct mortalities of individual prairie dogs as a result of crushing during previous construction and ongoing operations.	Approximately 495 acres of disturbance in occupied prairie dog habitat would occur. Potential impacts would include direct mortalities of individual prairie dogs as a result of crushing.	Approximately 495 acres of disturbance in occupied prairie dog habitat would occur. Potential impacts would include direct mortalities of individual prairie dogs as a result of crushing.
River Otters	No effects to otters from wellfield development or operation.	Approximately 32 acres of river otter habitat (Pariette Ponds) would be disturbed by project development.	No river otter habitat (Pariette Ponds) would be affected by project development based on implementation of DMRA RMP stipulations.
Thirteen-lined Ground Squirrel	Potential impacts include direct mortalities of individual squirrels as a result of crushing during previous construction and ongoing operations. Based on known distribution and rarity of the species, it is anticipated that impacts have been low.	Potential impacts would include direct mortalities of individual squirrels as a result of crushing during construction and operations. Based on known distribution and rarity of the species, it is anticipated that impacts would be low.	Potential impacts would include direct mortalities of individual squirrels as a result of crushing during construction and operations. Based on known distribution and rarity of the species, it is anticipated that impacts would be low.
Burrowing Owl, Short-eared Owl, and Swainson's Hawk	Potential impacts include the long-term loss of foraging and nesting habitat and potential disturbance to breeding birds from previous development and ongoing operations, thereby reducing habitat suitability.	Seasonal protection for active nests during project development would be implemented in accordance with applicant-committed environmental protection measures. Potential impacts to future use of inactive nests include the long-term loss of foraging and nesting areas from habitat fragmentation, thereby reducing habitat suitability.	Seasonal protection for active nests during project development would be implemented in accordance with DMRA RMP stipulations. Potential impacts to future use of inactive nests include the long-term loss of foraging and nesting areas from habitat fragmentation, thereby reducing habitat suitability.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Bald Eagle	Servicing of the 5 wells located below the desiltation pond in the Pariette Wetlands ACEC could cause winter roosting eagles to flush from the roost. Eagles would likely move to other roosting sites, since no particular roost sites are used on an annual basis.	Project-related impacts to bald eagles would include 3,701 acres of foraging habitat disturbance and 178 acres of potential winter roosting habitat disturbance. Inland would minimize impacts to wintering bald eagles in Pariette Draw by limiting well servicing to daylight hours in the vicinity of known winter roosts.	Project-related impacts to bald eagles would include 3,701 acres of foraging habitat disturbance and less than 5 acres of potential winter roosting habitat disturbance within the Green River floodplain. With implementation of DMRA RMP stipulations, impacts roosting riparian habitat in Pariette Draw would be minimized. Inland would minimize impacts to wintering bald eagles in Pariette Draw by limiting well servicing to daylight hours in the vicinity of known winter roosts.
Golden Eagle Nests	A total of 98 wells (approximately 392 acres of disturbance) are located within 0.5 mile of 22 known golden eagle nest sites in the development area. It is likely that development in the vicinity of known nest sites has reduced habitat suitability and may preclude future use of these sites.	A total of 157 wells (approximately 628 acres of disturbance) would occur within 0.5 mile from 24 known golden eagle nest sites. Application of applicant-committed environmental protection measures would minimize, to a degree, potential impacts to one of these nest sites. However, it is likely that development in the vicinity of known nest sites would reduce habitat suitability and may preclude future use of these sites.	Implementation of mitigation measures would assist in maintaining the suitability of a portion of the 24 known golden eagle nest sites in the project area.
Ferruginous Hawk	Wellfield development has affected the suitability of 21 ferruginous hawk nest sites. Based on the sensitivity of this species, it is unlikely that these nests will be reoccupied.	A total of 80 wells would be developed within 0.5 mile of 25 known ferruginous hawk nests. Based on the sensitivity of this species, it is probable that continued energy development and operation within 0.5 mile of these nest sites would severely decrease habitat suitability and preclude future use of nest sites as well densities increase.	A total of 80 wells would be developed within 0.5 mile of 25 known ferruginous hawk nests. Based on the sensitivity of this species, it is probable that continued energy development and operation within 0.5 mile of these nest sites would severely decrease habitat suitability and preclude future use of nest sites as well densities increase. Implementation of mitigation measures would aid in maintaining the suitability of a portion of the nest sites for future reoccupation.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Western Yellow-billed Cuckoo	Wellfield development has removed approximately 56 acres of potentially suitable breeding habitat (riparian areas). If workover or maintenance activities should occur during the breeding season and cuckoos are present, potential impacts could include abandonment of a nest or territory or the loss of eggs or young.	Project development would remove approximately 178 acres of potentially suitable breeding habitat (riparian areas). If project-related activities should occur during the breeding season and cuckoos are present, potential impacts could include abandonment of a nest or territory or the loss of eggs or young.	Project development would remove less than 5 acres of potentially suitable breeding habitat (riparian areas) in the floodplain of the Green River; direct impacts to riparian habitat in Pariette Draw would be minimized with implementation of DMRA RMP stipulations.
Lewis' Woodpecker and Common Yellowthroat	Wellfield development has resulted in approximately 56 acres of disturbance in potentially suitable breeding habitat (riparian areas). Impacts would be low due to the adjacent, very large riparian community along the Green River.	Project development would result in approximately 178 acres of disturbance in potentially suitable breeding habitat (riparian areas). Impacts would be low due to the adjacent, very large riparian community along the Green River.	Implementation of DMRA RMP stipulations would minimize project-related impacts to potentially suitable breeding habitat (riparian areas) in Pariette Draw.
Mountain Plover	Previous development and ongoing operations have resulted in 29 acres of long-term disturbance in designated concentration areas and 265 acres of long-term disturbance in historic concentration areas, with associated habitat fragmentation effects.	Project development and operation would result in 11 acres of long-term disturbance in designated concentration areas and 132 acres of long-term disturbance in historic concentration areas, with associated habitat fragmentation effects. Potential impacts would be minimized through implementation of applicant-committed protection measures.	Project development and operation would result in 11 acres of long-term disturbance in designated concentration areas and 132 acres of long-term disturbance in historic concentration areas, with associated habitat fragmentation effects. Potential impacts would be minimized through implementation of applicant-committed protection measures.
Greater Sage Grouse	Sixty-two wells have been developed within 2 miles of the known lek site, likely affecting its suitability.	Proposed wells within 2 miles of the known lek site would be developed in accordance with applicant-committed protection measures to minimize impacts to this species.	Proposed wells within 2 miles of the known lek site would be developed in accordance with applicant-committed protection measures to minimize impacts to this species.
Milk Snake	There is a small risk that individual snakes were crushed during wellfield development.	Direct impacts to milk snakes could occur as a result of the development and operation of 35 wells in riparian habitat.	Implementation of mitigation would minimize impacts to the milk snake and its habitat (riparian areas).

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Green River Fish	About 938 acre-feet would be purchased from surface water source. The Green River depletions associated with this source previously were authorized.	Up to 2,194 acre-feet would be withdrawn from the Green River alluvium and would represent a depletion of the Green River. This Green River depletion would be subject to the payments to the USFWS threatened and endangered fish recovery program.	Up to 2,081 acre-feet would be withdrawn from the Green River alluvium, and would represent a depletion of the Green River. This Green River depletion would be subject to the payments to the USFWS threatened and endangered fish recovery program.
	Water quality effects: See Watershed-sedimentation; Oil and Condensate Spills; and Oil Spill Effects on Fish and Wildlife above.	Water quality effects: See Watershed-sedimentation; Oil and Condensate Spills; and Oil Spill Effects on Fish and Wildlife above.	Water quality effects: See Watershed-sedimentation; Oil and Condensate Spills; and Oil Spill Effects on Fish and Wildlife above.
	No effect to the larval fish support functions of the Green River floodplain as no wells have been drilled in the floodplain under this alternative.	No aboveground structures associated with the proposed water supply wells would be located in the Green River floodplain, and the existing floodplain contour would be maintained. As the result of these actions, the larval fish support functions of the floodplain at this location would not be changed.	No aboveground structures associated with the proposed water supply wells would be located in the Green River floodplain, and the existing floodplain contour would be maintained. As the result of these actions, the larval fish support functions of the floodplain at this location would not be changed.
Range Resources	Wellfield development has resulted in the loss of 245 AUMs over the long term (likely 50 years).	There would be a total incremental loss of 343 AUMs over the long term (likely 50 years). Some minor changes in seasonal stocking rates could occur in 3 allotments.	There would be a total incremental loss of 333 AUMs over the long term (likely 50 years). Some minor changes in seasonal stocking rates could occur in 3 allotments.
Land Use and Access	With the exception of the reduced availability of livestock grazing, no additional impacts have been identified.	With the exception of the reduced availability of livestock grazing, no additional impacts have been identified.	With the exception of the reduced availability of livestock grazing, no additional impacts have been identified.
Special Management Areas	Approximately 220 acres have been disturbed in the Pariette Wetlands ACEC. The existing wellfield development is in general conformance with the BLM's objectives for managing this ACEC.	Approximately 613 acres would be disturbed in the Pariette Wetlands ACEC. The proposed development would not be in full conformance with the objectives of this ACEC; however, the proposed wells would be located on leases that pre-date the DMRA RMP and would not be subject to its stipulations. The project would conform with the Lower Green River ACEC prescriptions.	With implementation of DMRA RMP stipulations, the proposed development would conform to the RMP prescriptions for the Pariette Wetlands and Lower Green River ACECs.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Recreation	Public access has not been affected by wellfield development. Hundreds of existing oil wells with associated pump jacks are located within viewing distance of recreational users driving these roads.	Public access would not be affected by wellfield development. This alternative would add incrementally to the hundreds of existing oil wells with associated pump jacks that are located within viewing distance of recreational users driving these roads.	Public access would not be affected by wellfield development. This alternative would add incrementally to the hundreds of existing oil wells with associated pump jacks that are located within viewing distance of recreational users driving these roads.
	Development of project-related roads has resulted in greater access for, and wider distribution of ORV usage.	Development of new project-related roads would result in greater access for, and a wider distribution of ORV usage.	Development of new project-related roads would result in greater access for, and a wider distribution of ORV usage. A measure restricting Inland employee and contractor ORV use to established roads and trails would reduce unauthorized use, but it would not apply to the public.
Visual Resources	The wellfield development is consistent with a VRM Class IV designation.	Proposed wellfield facilities would conform to the applicable BLM VRM classes.	Proposed wellfield facilities would conform to the applicable BLM VRM classes.
Noise	One residence is located within 0.25 mile of the wellfield boundary, and may experience perceptible noise from pump jacks located within 0.25 to 0.5 mile from the residence but not at levels requiring mitigation to protect human health.	It is likely that one resident located in a house on the north boundary of the wellfield would hear pump jack noise, but not at a level that would require mitigation to protect human health.	It is likely that one resident located in a house on the north boundary of the wellfield would hear pump jack noise, but not at a level that would require mitigation to protect human health.
	—	Pump jack noise would be audible at the Pariette Wetlands overlook. Although unlikely, the noise level could exceed 55 dBA at this location.	With implementation of mitigation, pump jack noise would not exceed 55 dBA at the Pariette Wetlands overlook.

Table 2.7-1 (Continued)

Resource Area/Impact Issues	No Action Alternative	Proposed Action	Alternative A
Social and Economic Values			
Employment and Taxes	Employment (about 93 workers) and revenue generated from 671 existing and previously approved wells would continue for about 10 years. <i>Based on economic multipliers, about 122 to 198 new indirect jobs would be created in communities supporting wellfield workers.</i>	Employment (about 171 workers) and revenue generated from 973 new wells would continue for about 15 to 20 years. Based on economic multipliers, about 224 to 364 new jobs would be created in communities supporting wellfield workers.	Employment (about 162 workers) and revenue generated from 922 new wells would continue for about 15 to 20 years. Based on economic multipliers, about 212 to 345 new jobs would be created in communities supporting wellfield workers.
Employment and Taxes (cont.)	Oil royalties would be \$4 million per year, and natural gas royalties would be \$0.4 million per year over an estimated project life of 10 years. It is estimated that local counties would receive a combined total of about \$2.8 million in ad valorem and other taxes per year over a 10-year period.	Oil royalties would be \$5.8 million, and natural gas royalties would be \$0.6 million per year over an estimated project life of 15 to 20 years. It is estimated that local counties jointly would receive about \$4 million in ad valorem and other taxes per year over a 15- to 20-year period.	Oil royalties would be \$5.5 million, and natural gas royalties would be \$0.6 million per year over an estimated project life of 15 to 20 years. It is estimated that local counties jointly would receive about \$3.8 million in ad valorem and other taxes per year over a 15- to 20-year period.
Environmental Justice	There are no existing environmental justice issues or concerns related to the placement or operation of wellfield facilities.	There are no known environmental justice issues or concerns related to the placement or operation of wellfield facilities.	There are no known environmental justice issues or concerns related to the placement or operation of wellfield facilities.
Transportation	Current accident rates for tanker truck traffic are approximately 2 accidents involving spills and 1 accident involving injuries per year.	Approximately 2.5 project-related highway accidents involving spills (including diesel) and 1 additional injury accident could occur along the haul route to and from Salt Lake City per year.	Approximately 2.5 project-related highway accidents involving spills (including diesel) and 1 additional injury accidents could occur along the haul route to and from Salt Lake City per year.
Cultural Resources	Wellfield development has resulted in approximately 644 acres of disturbance in areas assumed to have high potential for cultural resources.	Project development would result in approximately 571 acres of development in areas assumed to have high potential for cultural resources. To minimize impacts, applicant-committed environmental protection measures would be followed. Increases in accidental disturbance, vandalism, and illegal collecting would be expected to occur as a result of the Proposed Action.	Project development would result in approximately 470 acres of development in areas assumed to have high potential for cultural resources. The DMRA RMP stipulations and applicant-committed measures for cultural resource protection would be followed. Increases in accidental disturbance, vandalism, and illegal collecting would be expected to occur as a result of the Proposed Action.