4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

The potential environmental consequences of construction, drilling, completion, operations, and maintenance of the West Tavaputs Plateau Drilling Program (WTPDP) are discussed for each affected resource under each alternative. An environmental consequence or impact is defined as a modification in the existing environment brought about by development activities. Impacts can be beneficial or adverse, can be a primary result of an action (direct impacts) or a secondary result (indirect impacts), and can be permanent or long-lasting (long-term impacts) or temporary and short duration (short-term impacts).

Short-term impacts occur during and immediately after the conclusion of construction, drilling, completion, and testing activities. Although short-term in duration, such impacts may be obvious and disruptive. Unless specifically described, short-term impacts are defined as those lasting 5 years or less, whereas long-term impacts last more than 5 years, often for the life of the project (LOP) or beyond.

Discussions of potential environmental consequences for each alternative include the following discussions:

- Impacts. These discussions disclose the level and duration of impacts that would occur as a result of the various Alternatives. Each resource is discussed separately. This impact evaluation assumes that applicant-committed practices described in Appendix B would be implemented to avoid or minimize impacts, as would all measures in Applications for Permit to Drill (APDs) and rights-of-way (ROWs).
- Mitigation. These discussions describe any additional mitigation measures that could be applied to avoid or further reduce impacts.
- Residual Impacts. These discussions reveal the impacts on the affected environment that would remain after the application of mitigation measures.
- Monitoring and Compliance. These discussions identify what resources should be monitored and why, who would do the monitoring, and the frequency and duration of the monitoring.

Cumulative impacts are impacts that result from the incremental impacts of an action added to other past and present actions and RFFAs, regardless of who is responsible for such actions. These impacts are

presented in a separate section that includes two parts--reasonably foreseeable future actions (RFFAs) and cumulative impacts. RFFAs identify the actions that would cumulatively affect the same resources as the Alternatives being analyzed.

This chapter analyzes the impacts of Alternative A (Proposed Action), Alternative B (No Action Alternative), and Alternative C on seven critical elements of the human environment: air quality; cultural resources; floodplains; threatened, endangered, candidate, and sensitive species (TESS); water quality; wetlands/riparian zones; and wild and scenic rivers. In addition, impacts to eight other resources are analyzed: vegetation; wildlife resources; soils; recreation; visual resources; geology/minerals; wild horses and burros; and non-WSA lands with wilderness characteristics.

Following are the assumptions used to evaluate environmental impacts.

- The pipeline and ancillary facilities would be constructed as described in Chapter 2 of this document and in accordance with a final Plan of Development (POD).
- The applicant-committed environmental protection measures presented in Appendix B would be implemented, as well as any additional agency stipulations developed as a result of this analysis.
- The standard ROW width of from 40 to 60 feet would be cleared for the pipeline located in Nine Mile Canyon.

4.2 DIRECT AND INDIRECT IMPACTS

4.2.1 Alternative A – Proposed Action

4.2.1.1 Air Quality

Issues 1 and 2. Fugitive dust from construction and traffic/Emissions from vehicles and equipment, well production, and compressors.

Air pollutant emissions would occur in the WTPPA during well site construction activities and natural gas production. These emissions would impact air quality in the West Tavaputs Plateau Project Area (WTPPA). The primary pollutants emitted would be particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), nitrogen oxides (NO_X), carbon

monoxide (CO), volatile organic compounds (VOC), sulfur dioxide (SO_2), and hazardous air pollutants (HAPs) including benzene, toluene, ethylbenzene, xylene, and formaldehyde. Emissions of these air pollutants would occur temporarily during well and field infrastructure construction and during natural gas production operations occurring over the LOP. Air quality impacts from the emission of these pollutants are limited by regulations, standards, and implementation plans established under the *Federal Clean Air Act* and State of Utah Air Quality Rules, as administered by the Utah Department of Environmental Quality, Division of Air Quality (UDAQ). Under the *Federal Land Policy Management Act* and the *Clean Air Act*, the Bureau of Land Management (BLM) cannot conduct or authorize any activity that does not conform to all applicable local, state, Tribal, or federal air quality laws, statutes, regulations, standards, or implementation plans.

The compressors would require that a construction permit be obtained from UDAQ. Air pollutant emissions in the Proposed Action would occur during construction of well pads and access roads, diesel-fired heavy construction equipment, diesel-fired well drilling engines, pipeline construction, travel on unpaved roads to and from the construction sites, and wind erosion of disturbed areas. Specifically, PM_{10} and $PM_{2.5}$ emissions would result from well pad, access road, pipeline construction, and travel on unpaved roads. NO_X, CO, VOC, SO_2, and HAP emissions would occur from drilling engine operation, natural gas flaring during well completion operations, and tailpipe emissions from heavy construction equipment. Well pad and road construction would occur along the linear project facilities (roads and pipelines) and at multiple and widespread areas within the WTPPA. Air pollutant impacts from each individual well would be temporary (i.e., occurring during the approximately 35-day well or pipeline construction period) and have limited interaction with other sites under concurrent development.

Although temporary air emissions of fugitive dust from construction activities are not subject to UDAQ air quality permitting procedures, such emissions may be subject to required control measures under Utah Air Conservation Rule R307-205-3, which requires the control of fugitive dust during construction operations greater than 0.25 acre. Under the Proposed Action, water would be applied to control fugitive dust during construction activities. The application of water to active construction areas and roads is estimated to control fugitive dust by 50 percent. If a hovering dust cloud exceeds 200 feet behind a vehicle traveling 30 miles per hour along an unpaved road, additional dust suppression will be required.

Although emissions from fugitive dust and diesel combustion would occur at increased levels in locations adjacent to well and road construction sites, potential impacts would be temporary. Dispersion modeling

performed for similar oil and gas projects has found that construction activities would not violate 24-hour or annual average ambient air quality standards.

Air quality impacts from natural gas production would occur over the LOP from natural gas combustion in well site heaters at the 38 proposed wells, natural gas combustion and gas processing activities at compressor stations, and employee travel on unpaved roads. One small natural gas-fired separator heater approximately 0.75 million British Thermal Units (MMBTU)/hour in size would operate at each well, emitting NO_X, CO, VOC, and HAP emissions. NO_X would be the primary pollutant emitted, and emissions from a typical 0.75-MMBTU/hour heater would be approximately 0.3 tons per year. One heater at each of the 38 wells would result in annual NO_X emissions of 11.4 tons per year. This calculation assumes year-round operation. In practice, these heaters would be operated primarily during the winter months. Condensate storage tanks at each well would emit VOC emissions at a rate commensurate with condensate production, with a typical well expected to emit an average of 7.5 tons per year VOC. Average annual VOC emissions from 38 wells would be approximately 285 tons per year.

The Proposed Action also includes the addition of one 1,500-horsepower (hp) natural gas-fired compressor at the existing Dry Canyon compressor site, one additional 1,500-hp compressor at the existing Water Canyon compressor site, and one 1,500-hp compressor at the new Sage Brush Flat compressor site, for a total field compression increase of 4,500 hp. Non-selective catalytic reduction (NSCR) would be employed in the compressor engines to reduce pollutant emissions. The compressors would operate year-round and are assumed to operate at maximum engine load. One additional TEG dehydrator would be installed at both the Dry Canyon site and Sage Brush Flat site. Both dehydrators would be equipped with a 500-MMBTU/hour natural-gas fired reboiler. VOC and HAP emissions from the Dry Canyon dehydrator would be controlled with a NATCO condenser and a flare with a minimum of 95 percent destruction efficiency. Condensate tank vapors would also be directed to the flare for combustion. At the Sage Brush Flat site, dehydrator emissions would be controlled with a NATCO condenser.

Annual field-wide criteria pollutant emissions from the Proposed Action and existing field-wide annual pollutant emissions are shown in Table 4.1, along with a demonstration of percent change in field-wide emissions that would result from development of the Proposed Action.

Table 4.1 WTPDP Pollutant Emissions from Gas Production for the Proposed Action.

	Pollutant Emission Rate (tpy)			
	NO_X	CO	VOC	Total HAPs[1]
Existing Field				
Dry Canyon	16.5	32.5	30.3	NA
Water Canyon	16.9	32.6	3.4	NA
Well Sites (30)	9.0	2.0	225.5	- -
Total Existing Field	42.4	67.1	259.2	NA
Proposed Action				
Dry Canyon	33.9	37.8	28.1	3.8
Water Canyon	16.2	7.4	3.2	0.5
Sage Brush Flat	32.7	32.5	29.4	16.3
Well Sites (38)	11.4	2.6	285.6	--
Total WTPPA - Proposed Action	94.2	80.3	346.3	20.6
Percent Change in Field-Wide Emissions	+222 percent	+120 percent	+134 percent	NA

[1] NA = Not Applicable.

Prior to commencement of construction of a new or modified industrial facility such as a compressor station, UDAQ requires an emission source to undergo a permit review to ensure compliance with New Source Review permit requirements. A Notice of Intent would be required to be submitted to UDAQ for review and approval prior to construction or operation of the proposed new facility or any modification to an existing facility. NO_X emissions from each proposed compressor station modification are below thresholds established in Utah Air Conservation Rule R307-410-3, above which dispersion modeling would be required as part of an air permit application. As a result, direct impacts from compressor station operation would be expected to be below ambient air standards and Prevention of Significant Deterioration (PSD) increments. Direct impacts on ambient air from the seasonal operation of 38 separator heaters located throughout the field, each at 0.75 MMBTU/hr, much smaller than a compressor engine, would also be expected to be negligible.

4.2.1.2 Cultural Resources/Native American Religious Concerns

Issue 1. Direct impacts to cultural sites.

Direct impacts to cultural resources as a result of the Proposed Action, except for the pipeline in Nine Mile Canyon, would be negligible to low because a Class III cultural resources survey was completed on all sites (not previously surveyed), Section 106 consultation would be completed prior to signing a Decision Record, and all identified cultural sites would be avoided. In the event that any buried cultural resources would be discovered during construction activities, work would immediately cease, the Authorized Officer (AO) would be notified, and work would not resume until a determination was made by the AO as to how to handle the discovery and a Notice to Proceed was issued. All cultural sites located during the Class III survey would be avoided, their locations recorded, and a determination of eligibility made.

An archaeological survey of 1.65 miles of the proposed Nine Mile Canyon pipeline disclosed 21 sites, at least four of which could not be avoided. The survey was not completed because of the high site density. If Alternative A was selected as the preferred alternative, the survey would have to be completed, and it would not be possible to avoid all cultural sites. Therefore, there would be impacts to those sites that could not be avoided.

Water would be used to suppress dust that could damage rock art. Bill Barrett Corporation (BBC) may also use magnesium chloride as a dust suppressant. No definitive study has been found indicating direct damage to rock art as a result of the use of magnesium chloride, and the Environmental Protection Agency (EPA) has approved its use as a dust suppressant.

Implementation of the Proposed Action would not impact cultural resources in the Nine Mile Canyon Special Recreation and Cultural Management Area (SRCMA) (BLM 1995a) except for the pipeline in Nine Mile Canyon, where impacts to cultural resources cannot be avoided. The Proposed Action would not exclude the possible designation of portions of the area as a National Historic District because additional oil and gas development was anticipated to occur in the area due to the existence of valid leases.

Issue 2. Increased public access would increase likelihood of vandalism.

Additional access to the WTPPA as a result of project-related roads may result in increases in vandalism of cultural resources. However, these new roads would be constructed on the plateau where densities of cultural resources are much lower than in the canyon. Thus, higher incidents of vandalism would not occur as a result of the Proposed Action.

Issue 3. Impacts to Native American religious concerns.

Native American consultation has been completed (see Section 3.3.2). No Traditional Cultural Properties were identified within the WTPPA.

4.2.1.3 Floodplains

Issues 1 and 2. Construction in floodplains and changes in floodplain function/Compliance with Price MFP.

Three structures would be built in floodplains: 1) the 27-3 well; 2) the 6.3-mile long surface pipeline in Dry Canyon; and 3) the 7.6-mile long surface pipeline in Nine Mile Canyon. The 27-3 well would not be in conformance with the perennial stream/floodplain stipulation included in leases for units within the WTPPA; the proposed 23-7 location is limited due to the narrow and steep nature of the canyon and would be within 330 feet of the drainage. The Price MFP states the following:

> Therefore, modifications to the existing stipulations must be made whenever it is necessary to occupy land within the 330 feet from centerline to 100 year floodplain boundaries of perennial streams and 660 feet from (the discharge points of) springs.

The compacted well pad (see Section 2.2.1.2) would prevent any surface drainage from entering the shallow aquifer, and absorbent material would be kept on the well pad to use to prevent any accidental spills from reaching those aquifers. No change in floodplain function would result from implementation of the Proposed Action. Flow velocities may be temporarily increased in the floodplains where vegetation has been removed. Scouring and/or gullying may occur on the floodplains where vegetation has been removed. Mitigation for both effects could be achieved with fiber matting.

4.2.1.4 Threatened, Endangered, Candidate, and Sensitive Species (TESS)

Issue 1. Direct impacts to TESS.

Federally listed Species. BLM wildlife seasonal closures from November 1 to May 15 would reduce disturbance to bald eagles that could roost or forage in the WTPPA. Although some project-related activity would occur during the seasonal closure, the limited activity and the relatively low use of the area by the bald eagle may affect, but would not be likely to adversely affect, the species.

Sensitive Species. Sensitive plant species that may occur in the WTPPA would be protected by surveys prior to any surface disturbance to determine their presence, followed by avoidance. In some cases, individual plants may be inadvertently destroyed, but viable populations would remain.

Migratory Birds. Impacts to migratory birds in the WTPPA would be dependent upon the timing of project-related activities. The disturbance from construction, drilling, and completion activities would be relatively short-term in any particular location, but such disturbance during the breeding and nesting season (prior to July 25) may result in some nest abandonment, direct mortality, reproductive failure, displacement of birds, and/or destruction of nests. Ground-nesting birds would be particularly susceptible to nest destruction. Shrub-nesting birds may also be affected due to destruction of vegetation. Forest-nesting birds likely would not be impacted because of a lack of project-related activities in such habitat. Impacts would not have a measurable effect on migratory bird populations as a whole or populations of individual species.

Issue 2. Impacts to TESS habitat.

Federally listed Species. Habitat for the Mexican spotted owl (MSO) may be affected by actions associated with the WTPDP. Although specific critical habitat designated by the U.S. Fish and Wildlife Service (USFWS) would not be affected by the Proposed Action, suitable habitat based upon both the 1997 and 2000 models could be. The WTPDP may affect, but would not be likely to adversely affect, MSO for the following reasons:

- annual surveys in 2000-2003 did not verify the presence of MSO within the project area or in potentially suitable habitat near the project area;

- project-related disturbance would affect only foraging habitat for the MSO, should a MSO move into the area;
- impacts to small mammal populations as a result of the project would be low to negligible; and
- the implementation of conservation measures described in the Biological Assessment for this project, including reclamation of disturbed areas; incorporation of regulatory standards for road design, well pad development, and downhole protective measures; restoration of riparian habitat; and efforts to reduce project-related vehicle travel to the extent practicable.

If there is additional depletion of water from the Colorado River system, the annual surface water depletion of approximately 20 acre-feet would initiate a jeopardy opinion regarding the four Colorado River endangered fish species. However, BBC would follow the alternative in the Recovery and Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, in which the USFWS has determined that there has been sufficient progress made to offset jeopardy due to depletions of 100 acre-feet or less (memorandum dated March 9, 1995, to Assistant Regional Director, Ecological Services, Region 6, from Regional Director 6, Intra-Service Section 7 Consultation for Elimination of Fees for Water Depletions of 100 acre-feet or less from the Upper Colorado River Basin). Depletions in excess of 100 acre-feet require a payment of $15.68 (or the current rate) per acre-foot of depletion. This is a one-time charge for the average annual depletion rate for the LOP. The Proposed Action would result in an average annual depletion of 20 acre-feet; therefore, BBC would not be required to make any payment to the National Fish and Wildlife Foundation. Best Management Practices (BMPs) should ensure that additional erosion due to project-related activities would not add to the turbidity or silt/salt load downstream from such activities.

Sensitive Species. No greater sage-grouse leks occur in the WTPPA; therefore, no courtship or breeding activities would be affected. No construction/drilling activities would occur during the time of the year (November 1 through May 15) when greater sage-grouse would winter in the WTPPA. Although there would be activity related to the servicing of wells, such activity would have negligible impacts on greater sage-grouse because of the small amount of area disturbed. Some disturbance to brooding greater sage-grouse would occur, but the size of the WTPPA, the small amount of people-related activities, and the relatively low population of birds would result in negligible to low impacts.

Raptor surveys would be required whenever surface disturbances and/or occupancy proposed in association with oil and gas development would occur within a known nesting complex for raptors within NWNW, Section 10, T12S, R14E (see Section 2.2). Utah Division of Wildlife Resources (UDWR) surveys in 2002 and 2003 did not locate any active raptor nests in the WTPPA, and annual surveys will be continued as long as project-related surface disturbance would occur. Appropriate buffer areas would be required for any active nests during the breeding season. Therefore, impacts to raptors are likely to be negligible.

Blueheaded sucker, flannelmouth sucker, and roundtail chub occuring within the WTPPA may be affected. This is expected because of surface water depletion of 20 acre-feet annually. Adherence to BMPs to control additional turbidity and sedimentation in downstream surface waters would reduce impacts to the fish.

Ringtails, which were observed in the WTPPA, may be temporarily displaced during project-related activities. However, because project-related action would not occur in their preferred habitat (rocky, boulder-strewn riparian areas), opportunities for any direct mortality or physical damage to dens would be unlikely, and impacts would be negligible.

Migratory Birds. There would be a loss of nesting/foraging habitat as a result of vegetation removed from 171 acres disturbed by project-related activities. This would have negligible impacts on migratory birds because of the small area disturbed and the presence of adjacent habitats suitable for nesting and foraging.

4.2.1.5 Water Quality

Issues 1 and 2. Increased sediments in streams due to project-related soil erosion/Introduction of toxic substances into surface or ground water.

As described within the Proposed Action, BBC would incorporate BLM and other regulatory standards for road design, dust control, pad development, and downhole protection measures into their APDs and ROWs to avoid adverse impacts to ground water or surface water. By following these requirements, as well as BMPs, impacts to hydrological resources and related habitats would be negligible. However, burying the pit and liner of the 27-3 well could eventually result in leeching of hydrocarbons into the

alluvial bed of Dry Canyon Creek. Due to the minimal impact to ground water and surface water from the proposed 27-3 location in Dry Canyon resulting from special protective measures, an exception to the lease stipulation requiring a 330-foot set-back from perennial streams could be granted (see Section 4.2.1.3, Floodplains).

4.2.1.6 Wetlands/Riparian Zones

Issue 1. Impacts from sedimentation.

Indirect impacts to riparian areas would include fugitive dust from traffic and construction activities and soil loss from of adjacent well pads, roads, buried pipelines, stream crossings, and compressor sites. These impacts would be negligible because BBC would maintain all pads and roads to Price Field Office standards and erosion of soils into adjacent channels and riparian areas would be limited by BMPs. Dust control proposed by BBC would limit impacts from that source to negligible to low levels.

Issue 2. Direct impacts to riparian vegetation.

Impacts to riparian areas would be limited to the removal of the immature cottonwoods at proposed stream crossings. No direct loss of riparian habitat would occur as a result of the development of well pads. Up to 18 acres of riparian habitat could be impacted by equipment during placement of surface pipelines in Dry Canyon and Nine Mile Canyon but would be expected to recover in 1-3 years. The direct loss of less than 0.01 acre of riparian vegetation associated with proposed crossings of incised and scoured channels would not alter the functioning condition of riparian areas downstream and would comply with the *Price River Management Framework Plan and Summary* (Price MFP) (BLM 1984a) standards for riparian management.

BBC would establish riparian tree vegetation to replace the riparian vegetation removed during construction of road and pipeline stream crossings as part of their proposed re-vegetation. Containerized or bare root cottonwood trees would be planted above and below the crossings.

4.2.1.7 Wild and Scenic Rivers

Issue 1. Impacts to free-flowing condition and outstandingly remarkable values, which make Nine Mile Creek eligible for designation.

The Proposed Action would not result in a change to the eligibility of Nine Mile Creek for designation into the National Wild and Scenic River System. Nor would Nine Mile Creek be precluded from the further consideration of its suitability for such designation.

Although stream alternations would be made at the Nine Mile Creek crossing at Harmon Canyon and the pipeline would cross the stream in places, the character of the stream would remain free-flowing. The installation of the culverts supported by riprap and concrete at the Harmon Canyon Road crossing would modify the streambed for the width of the upgraded road. The riprap would not be extensive enough to further channelize the steam beyond the extent of the culverts.

The outstandingly remarkable cultural, historic, and scenic values related to Nine Mile Creek and within its corridor could be affected to the extent disclosed under analysis of cultural resource and visual resource issues. Impacts to cultural resources as a result of the Proposed Action would be negligible to low for reasons described in Section 4.2.1.2. Two components of the Proposed Action would not meet the Visual Resource Management (VRM) Class II standards along Nine Mile Creek. The expansion of the Water Canyon compressor station facilities and the installation of a larger diameter "drop-down" pipeline near the mouth of Cottonwood Canyon into Nine Mile Canyon would cause a contrast to the existing landscape in form, line, color, and texture. However, this contrast would not be to an extent to eliminate the scenic quality along Nine Mile Creek as an outstandingly remarkable value. The expansion of the compressor and installation of the "drop-down" pipelines would be visible from within the stream's viewshed at the two respective locations within the corridor of 45 miles of stream. Together these sites would be visually intrusive along approximately 1 mile of the stream's corridor. Refer to Section 4.2.1.12 for a detailed visual discussion.

The Proposed Action would be consistent with the recreational tentative classification of Nine Mile Creek. This tentative classification is given to river areas readily accessible by road or railroad and may have some development along their shoreline to the degree substantial evidence of human activity is evident.

4.2.1.8 Vegetation

Issue 1. Direct impacts to native vegetation.

The Proposed Action would have negligible impacts to vegetation. Approximately 171 acres of vegetation would be disturbed. No special or unique habitats would be disturbed other than riparian habitat (Section 4.2.1.6).

Dust from project-related activities can settle on plants and affect growth by blocking sunlight and clogging stomata; however, dust suppression proposed by BBC would reduce dust emissions to levels lower than at present. Since vegetation in the project area is surviving under present dust conditions, no loss of vegetation from project-related dust is anticipated.

Issue 2. Lack of reclamation success.

Adherence to the reclamation plan would ensure that all disturbed areas would be revegetated with native plant species. Reclamation potential in the project area is good. BLM successfully reclaimed a 1,000-acre pinyon/juniper push completed in the late 1960s, and reclamation of abandoned oil and gas related pad sites has been good. Initial seeding results from a 400-acre controlled burn completed in March 2004 are promising. Impacts from the Proposed Action would be negligible to low but could be moderate in the immediate area of any unsuccessful reclamation. This would not occur for extended periods of time because seeding would be repeated if initially unsuccessful.

4.2.1.9 Wildlife Resources

Potential impacts to wildlife in the WTPPA include the direct loss of habitat due to removal of vegetation; displacement of wildlife due to disturbance by project-related activities and increased public access; stress, especially during the winter, caused by disturbance of animals during critical seasons; direct mortality due to construction activities; increased mortality due to poaching and harassment; an increased likelihood of animal/vehicle collisions due to increased traffic; a decrease in species diversity; and habitat fragmentation.

Issues 1 and 2. Direct loss of habitat due to removal of vegetation/Reductions in habitat function due to disturbance.

Easterly et al. (1991) reported that mule deer frequented areas near and in oil fields in the Rattlesnake Hills in Wyoming, and Reed (1981) reported that mule deer continued to occupy areas of the Belle Ayre coal mine in northeastern Wyoming during mining activity. Reeve (1996) found no difference in the distance of mule deer observations and random points from roads and producing wells and concluded that mule deer were able to tolerate roads and wells associated with normal well field activities; however, Western EcoSystems Technology Inc. (WEST) (2003) believes that the methods used to collect the data were biased, and the data presented in the report do not support the conclusions. Lutz et al. (2003) reports that "Research addressing specific impacts of mineral exploration and development is scant." As a result, evaluations of potential impacts of such activities are often based on inferences made on observed effects by other similar actions," and "Depending on time of year and availability of cover, mule deer avoided zones approximately 100-400 m (328-1,312 feet) from roads or human presence (Ward et al. 1980), changed behavioral patterns and habitat use patterns when harassed (Yarmony et al. 1988), and escaped from snowmobiles or humans walking, more so when disturbed repeatedly (Freddy 1986)."

All of the proposed new wells and proposed re-entry wells would be drilled in high-priority mule deer winter range. Assuming the use of winter range within 660 feet of the project's facilities would be reduced by some unknown amount, the areal extent of effects would indirectly affect 1,450 acres of high priority winter range for mule deer.

Mule deer on crucial winter ranges would be protected by seasonal restrictions on construction from November 1 through May 15 where federal permits are required. Although these measures prevent drilling wells during the winter, wells may be drilled during the summer and fall on crucial winter ranges that must be maintained throughout the winter. Human activity associated with maintenance of wells, including road traffic, within crucial winter ranges may continue to disturb big game, potentially causing them to use valuable energy reserves during a time when they are in a negative energy balance (Reeve and Lindzey 1991). As deer expend more energy than they take in, body condition gradually declines as the winter progresses (Short 1981). The energy balance determining whether a deer will survive is thought to be relatively narrow, especially for fawns (Stephenson et al. 1996).

WEST (2003) states the following:

- Although methodologies for documenting animal displacement or changes in distribution are fairly straightforward, those for documenting population-level impacts (i.e., survival, reproduction) are extremely complex. Thus, little information is available concerning how human-related disturbances impact reproduction and survival of ungulates.
- Although the ultimate measure of the effects of oil and gas development of wintering big game is reproduction and survival, no author has measured these variables in relation to oil and gas activity. Although evidence suggests energy development activity may negatively affect big game populations, no research has demonstrated direct reductions in reproduction or survival from energy development. Additionally, no authors have examined the potential impacts of habitat fragmentation on wintering big game.
- Although no studies have documented reductions in populations associated with winter range disturbance, available evidence suggests the potential exists that disturbance to wintering big game may negatively affect populations. The effect of development on transition ranges is unknown.

The Proposed Action would directly disturb approximately 69 acres of high-priority value range for mule deer and could impact the habitat function on some adjacent areas of high-value winter range. Critical spring/fall mule deer habitat in Dry Canyon and Nine Mile Canyon would also be affected. However, specific quantitative estimates of such impacts are not possible because the requisite research has not been done. Because of the limited disturbance to mule deer habitat, it is likely that impacts to mule deer populations from the WTPDP would be low in the WTPPA and negligible in the herd unit and would be masked by impacts from other factors such as weather and hunter harvest.

Approximately 8.25 acres of high-value winter range and 61 acres critical winter range for elk would be disturbed by the WTPDP. All but one of the proposed new wells and all of the proposed re-entry wells would be drilled in critical elk winter range. Assuming the use of winter range within 880 feet of the project's facilities would be reduced by some unknown amount, the areal extent of effects would indirectly affect 2,900 acres of high-priority winter range for elk. Bennington et al. (1982) conducted aerial and track surveys on elk in Michigan and reports that elk activity within 0.25 mile of active drill construction sites decreased but returned to pre-drilling levels within 2 to 4 weeks following abandonment. Gillin (1989) reports that elk in the Wyoming Range in Wyoming were displaced an average of 1.2 km (0.75 mile) by seismic activity but did not abandon home ranges, nor did reproductive

rates or population numbers decline. In southwestern Wyoming, Hayden-Wing Associates (1990) reports that elk moved away from areas where construction activities were occurring and returned when intensive activities ceased. Johnson et al. (1990) reports no significant change in elk population or harvest from 1979 to 1990 during construction and development of a natural gas field. Elk returned to the drill sites the year after drilling ceased. Olson (1981) reports that radio-collared elk in north-central Montana moved away from seismic activities but returned to the previously occupied areas with the cessation of seismic activities. Ward (1986) reported that elk moved 0.5-2.0 miles from seismic activity depending upon sighting distance. People walking caused the most disturbance and elk returned to the original area within 2 days of the end of the activity. There was no evidence that elk suffered detrimental effects from seismic operations.

WEST (2003) reports that avoidance of roads by elk has been documented by numerous authors, including Thomas et al. (1979), Rowland et al. (2000), Irwin and Peak (1979), Witmer and deCalesta (1985), Edge et al. (1987), and Lyon and Canfield (1991). Although habitat near roads is available to elk, it is not used the extent that it could be (Lyon 1983). Most research has been concerned with the effects of roads on summer ranges rather than winter ranges, and those studies have not been consistent in their results (WEST 2003). Information regarding the relationship between elk use and traffic volume, however, is limited (Wisdom et al. 1986). Roads are not generally thought to be barriers to elk (WEST 2003). Phillips and Alldredge (2000) reported that high levels of human disturbance during parturition likely resulted in lower reproductive success in elk populations they studied in Colorado.

Elk on high-priority and critical winter ranges would be protected by seasonal restrictions on construction from November 1 through May 15. Although these measures prevent drilling of wells during the winter, wells drilled during the summer and fall in crucial winter range would be maintained throughout the winter. Human activity associated with maintenance of wells, including road traffic, within crucial winter ranges would disturb elk, potentially causing them to use valuable energy reserves during a time when they are in a negative energy balance.

In summary, impacts to elk from the Proposed Action are likely to be temporary and negligible in the WTPPA and the herd unit due to loss of habitat function in high-priority and critical winter range.

The Price MFP requires the enhancement of an equivalent acreage if there is more than 10 acres of critical winter range for deer or elk is affected. Since this project does exceed the 10-acre threshold for surface

disturbance impacts, the Price MFP would require mitigation for direct impacts to elk and deer. BBC, in cooperation with the BLM and UDWR, has purchased seed for a controlled burn completed on public lands within Dry Canyon. The burn area is located near the proposed Prickly Pear Unit Well 27-3 and qualifies as mitigation for the impacts to wildlife resources anticipated by the Proposed Action.

Raptors would be protected from construction/drilling operations during the breeding/nesting season by species-specific seasonal restrictions and buffer areas that have been developed by the USFWS. The 171-acre reduction in habitat available for prey species would not be likely to reduce raptor foraging opportunities. In addition, no active raptor nests have been observed in the WTPPA in recent years. Therefore, no impacts to raptors are anticipated as a result of the Proposed Action.

Other small animals would be impacted by habitat destruction and loss of habitat function; however, the limited amount of surface disturbance would result in negligible to low impacts.

Mountain lions would be affected to the degree to which their primary prey species (mule deer and elk) are reduced in numbers. Such impacts would be negligible.

Issue 3. Direct mortality caused by project-related activities.

Vehicle/wildlife collisions are expected to be minimal due to existing road conditions and vehicle speeds anticipated on the access roads.

4.2.1.10 Soils

Issues 1 and 2. Increased wind and water erosion/Lack of reclamation success.

Potential direct impacts to soils under the Proposed Action would include removal of vegetation, increased exposure of soils to wind and water erosion, mixing of soil horizons, loss of topsoil productivity, and soil compaction. Disturbance would occur primarily as a result of construction of wellpads, roads, and pipeline corridors, with some additional disturbance due to the construction of ancillary facilities, and would affect 171 acres. This disturbance would result in increased surface runoff and accelerated erosion losses if not adequately controlled. However, the implementation of BMPs would

reduce impacts to soils to negligible to low levels. Past reclamation efforts in the vicinity of the WTPPA have generally been successful.

Issue 3. Impacts to biological soil crusts.

As noted, biological soil crusts occur in the WTPPA on the surface of mostly undisturbed soils supporting the pinyon-juniper and sagebrush/grass vegetation types. These biological soil crusts do not occur in the Nine Mile Canyon area where pipeline construction would occur. New surface disturbance outside of Nine Mile Canyon would impact approximately 171 acres, including up to approximately 51 acres (30 percent) with biological soil crusts.

Biological soil crusts would be crushed, broken apart, and displaced (more than 50 percent overturned and buried) (Belnap et al. 2001) in most cases. Recovery rates for impacted crusts are difficult to estimate as a number of factors contribute to the duration of recovery. As summarized in (Belnap et al. 2001), recovery times in the Book Cliffs range from 15 to 50 years for cyanobacteria crusts and 100+ years for lichen and moss development. However, crusts crushed in place by vehicles, foot traffic, and livestock recover much faster (from one to three years) due to the presence of adjacent inoculant undisturbed crusts (Belnap et al. 2001).

Disruption of the crusts may decrease organism diversity, soil nutrients, stability, and organic matter. Compressional disturbances would break sheaths and filaments and reduce the capability of the soil organisms to function properly particularly in providing nitrogen and soil stability.

Due to the nature of the soils in the WTPPA (heavier textured), coupled with a good moisture regime, past reclamation efforts have been successful. Thus, disruption of biological soil crusts is not expected to cause major increases in soil loss or the ability to reclaim disturbed areas.

4.2.1.11 Recreation

Issue 1. Change in recreation opportunity and experience.

Under the Proposed Action, recreation experience within the SRCMA would be affected in the long and short term. In the short term, increased traffic and associated road dust could diminish the quality of a

visit to Nine Mile Canyon. This effect would be most apparent during heavy equipment mobilization through the canyon and pipeline construction in Nine Mile Canyon between Water Canyon and Cottonwood Canyon. During mobilization and pipeline construction, the recreation opportunity would remain *Roaded Natural*. However, an industrial presence would be noticeable and there would be an increase in social contacts and managerial presence such as signs, detours, etc., that would tend to move recreational opportunity more to the urban end of the spectrum. In both the long and short term, experience could also be diminished due to the loss of landscape context associated with cultural sites. Because some aspects of the project would not meet VRM Class II, in combination with elevated noise levels associated with additions to the two compressor stations, landscape context would be compromised. The loss of landscape context may lead to a decreased appreciation and understanding of the cultural resources by the visitors to Nine Mile Canyon.

Upgrading the roads accessing the plateaus, particularly on Flat Iron Mesa and in the Jack Creek watershed, would decrease the opportunity for semi-primitive recreation. These areas are presently accessed by poorly maintained roads that are closed seasonally and by bad weather would be much more accessible on a year-round, all-weather basis. Improved road access and higher travel speeds may increase the number of social contacts. Improved roads and increased use of the roads would tend to move these semi-primitive areas toward a Roaded Natural condition.

The gravel road in Nine Mile Canyon known as County Road (CR) 53, Nine Mile Canyon Road, or Nine Mile Backcountry Byway (Byway) would provide the primary access into Nine Mile Canyon and the identified side canyons and up into the project area. The Byway connects U.S. Highway 191/6 at Wellington, Utah, and U.S. Highway 191/40 at Myton, Utah. The Utah Department of Transportation (UDOT) and the Castle Country Travel Region Office indicate that this all-season/all-weather road had an annual average daily traffic of 252 vehicles, or 126 round trips, in 2000. Currently, projected daily traffic for spring through fall 2004 is estimated to be higher due to the increased number of heavy vehicles and logging trucks using the road between late spring and late fall. Though access along the Byway may be precarious (muddy or slick) during inclement weather and extremely dusty during dry months, all-season use is supported by regular county maintenance.

Implementation of the Proposed Action would result in approximately 8,255 round trips per year during each of the first 2 years of the project for drilling and completing wells, watering roads, and constructing pipelines, and an additional 11,280 trips for drilling and completing directional wells, watering roads,

and constructing pipelines. The distribution of the 11,280 trips would depend upon whether directional wells were drilled and, if they were drilled, the rate of drilling. The 8,255 round trips during the first 2 years represent an increase of approximately 18% in the estimated 46,000 trips per year in the Nine Mile Canyon area. As a high percentage of project-related traffic would be in the summer months when visitor traffic is high, there could be a moderate degree of disruption to visitors during peak mobilization periods.

Noise levels from project construction and operations depend on the loudness and pitch of the source, the receptor's distance from the source, air temperature, humidity, turbulence, wind gradient, and screening effects from terrain and vegetation. Such noise could be disruptive to recreationists.

Drilling would produce short-term noise levels of up to 115 A-weighted decibels (dBA) at the source and 55 dBA at 3,500 feet from the source (BLM 1991). These operations are expected to be the loudest project-related noise-producing activities and would continue 24 hr/day during drilling of each well. Increased noise levels associated with earth-moving equipment such as large trucks, scrapers, loaders, and graders during construction activities would range from 70 dBA to more than 90 dBA within 50 feet of the activity. Such noise levels would also be short-term in any given well and would be attenuated by approximately 6 dBA with each doubling of distance from the source (Thumann and Miller 1986). Noise levels from mobile equipment would be controlled with proper operating techniques. Noise from unhoused and unmuffled compressor stations (i.e., Water Canyon) would generate from 90 to 120 dBA at the compressor and 55 dBA at distances from 700 to 3,000 feet. This noise would commence once the compressor station began operations and continue for the LOP.

Issue 2. Changes in opportunity for solitude or primitive and unconfined recreation on lands with wilderness character*istics.*

The Proposed Action would involve use and upgrading of approximately 3 miles of road and the use of three abandoned drill pads (PPU-10, PP-11A and PPH-8) for redrilling. These areas are presently accessed by poorly maintained roads that are closed seasonally and by bad weather would be much more accessible and accessible on a year-round, all-weather basis. Improved road access and higher travel speeds could increase the number of social contacts. Improved roads and increased use of the roads would tend to move these semi-primitive areas toward a Roaded Natural condition; however, outstanding opportunity for solitude and primitive and unconfined recreation would still remain available within the

Desolation Canyon Wilderness Study Area (WSA). Such opportunities would be available but reduced on the non-WSA lands with wilderness characteristics.

4.2.1.12 Visual Resources

Issues 1 and 2. Non-conformance with VRM Class II standards/Reductions in scenic values in Nine Mile Canyon.

The proposed oil and gas activities in the study area were analyzed using field reconnaissance and photography, establishment of multiple Key Observation Points (KOPs), development of computer visual simulations, and expert contrast rating analysis from selected KOPs. Sixteen KOPs were established, based on important representative and significant views that would likely be seen by the casual observer, then studied. These included roadside views typical for automobile travelers at 15-25 miles per hour, for pedestrians viewing rock art from the Water Canyon compressor station to the Cottonwood Canyon drop-down pipeline site, and from the Dry Canyon compressor station to the proposed location of federal well 27-3. Visual simulations and contrast ratings were completed for eight of these KOPs (Appendix E). Based on these studies, the following aspects of Alternative A would not meet VRM Class II standards.

- The existing Water Canyon compressor station facilities and any expansion would not meet Class II standards due to the increase in structure that would contrast in form, line, color, and texture with the characteristic landscape.
- The addition of federal well 27-3 and the associated access road in Dry Canyon would not meet Class II standards due to the increase in structure that would contrast in form, line, color, and texture with the characteristic landscape.
- Installation of a larger diameter "drop-down" pipeline near the mouth of Cottonwood Canyon into Nine Mile Canyon along the existing pipeline route would not meet Class II standards due to the increase in structure that would contrast in form, line, and texture with the characteristic landscape.
- Replacement of the existing surface pipeline in Dry Canyon with a larger diameter pipeline would not meet Class II standards for 5-10 years in those areas where a prescribed burn has revealed long sections of pipeline. This is due to the narrow travel corridor that requires the pipe to be placed in close proximity to the road in many areas combined with the effect of the recent prescribed burn. Much of the existing pipeline is now prominently revealed in the severely burned areas and as a result does not currently

meet VRM Class II. This visual contrast would be increased with a larger diameter pipeline. (Based on the results of the recent burn in Dry Canyon, it is apparent that any future burns, whether natural or prescribed, would likely expose surface pipelines of any diameter and not meet VRM Class II in the short-term subsequent to the burn.)

The following aspects of Proposed Action would meet VRM Class II standards by using proper siting so that existing vegetation/topography is used for screening to the extent possible.

- Replacement of the existing surface pipeline in Dry Canyon with a larger diameter pipeline would comply with VRM Class II standards in the long-term. Visual mitigation strategies would include proper and successful revegetation, introduction of screening vegetation where the narrow corridor allows, and careful initial placement of the larger pipeline to take advantage of existing vegetation for screening.
- The installation of a larger diameter "drop-down" pipeline with associated cradles located approximately 3.9 miles up Dry Canyon would meet VRM Class II if visual resource BMPs and mitigation measures are followed, including placement of the pipe to adhere to the route visually simulated for purposes of preparing a contrast rating. That route would hide much of the pipeline behind an intervening rock outcrop. Also, existing topography and vegetation would be used to screen the line wherever possible. The line would be painted or allowed to rust to eliminate any residual glare from the metal casing.
- Replacement of the existing surface pipeline with a larger diameter pipe along the route from the Water Canyon Compressor station through Nine Mile Canyon to the base of the drop-down pipe near the mouth of Cottonwood Creek would meet Class II standards with mitigation including implementation of visual resource BMPs that include using existing vegetation to screen the pipeline.
- Wells 7-25, 15-19, and 16-34 located within VRM Class II.

The proposed wells on the southern plateau would be within an area managed as VRM Class III. Views of these wells from the Harmon Canyon-Prickly Pear Canyon road would range from foreground/mid-ground views of the wells to an obscured view or no view except from the access road to the well. None of these well locations would be visible from VRM Class II areas in Nine Mile Canyon.

VRM Class III criteria would be met by painting the production equipment at locations on the top of the plateau. Access to the Prickly Pear Unit well 21-2 would be from the access road to state well 16-15. Views of this site and the Prickly Pear Unit well 13-4 would be apparent from the existing road between Harmon Canyon and Prickly Pear Canyon. Prickly Pear Unit well 10-4 and the associated access road intersect the existing road system in an area away from the Harmon Canyon-Prickly Pear Canyon road. High vegetation consisting of pinyon-juniper, sagebrush-grassland and mixed pine (predominantly ponderosa pine) would effectively screen any foreground, mid-ground, or long range views of this location.

In conclusion, the previously stated aspects of the Proposed Action would not meet VRM standards in Class II areas; however, development in VRM Class III areas would meet Class III standards.

4.2.1.13 Geology/Minerals

Issue 1. Recovery of natural gas resources.

Mineral resources would be impacted in that natural gas and condensates would be recovered as authorized under valid leases. It is anticipated that each of the 22 proposed wells would recover 2-3 billion cubic feet (BCF) of natural gas over the life of the project, for a total of 44-66 BCF of natural gas. This would be a beneficial impact that would assist the U.S. in meeting the domestic demand for natural gas. However, since oil and gas reserves are a non-renewable resource, once they are removed they would not be available in the future.

4.2.1.14 Wild Horses and Burros

Issue 1. Direct and indirect mortality caused by project-related activities.

Due to improved road surfaces, the chance of vehicle/horse collisions would increase; however, such collisions are, and would continue to be, rare and would not noticeably affect horse populations. BLM would be notified of such collisions with construction vehicles. Although undocumented, it is possible that increased human disturbance during parturition could result in reduced reproductive success. Human activity associated with servicing wells during the winter could disturb horses, potentially causing them to use valuable energy reserves at a time of year when they are in a negative energy

balance. Though impacts to individual animals may occur, the ability of wild horses to habituate to human activities would minimize these impacts and would not compromise the viability of the herd.

Issue 2. Loss of habitat due to vegetation removal.

There would be some direct loss of habitat due to the removal of 171 acres of vegetation from disturbed areas, and habitat function would be reduced on areas near long-term disturbance. This would result in negligible impacts to both individual horses and the population in the Horse Management Area (HMA).

Issue 3. Reductions in habitat function due to disturbance.

Some disturbance to wild horses would occur as a result of project-related activities; however, impacts would be negligible because of wild horses' abilities to habituate to human activities and because impacts would be minimized during the closure of the WTPPA to construction and drilling activities from November 1 to May 15, the season of heaviest use by horses.

Issue 4. Impacts to manageability of the HMA.

Manageability of the HMA would not be affected because pipelines that could affect horse gathering would be buried.

4.2.1.15 Non-WSA Lands With Wilderness Characteristics

Issue 1. Impacts to non-WSA lands with wilderness characteristics.

The drilling of wells PP-11A and PPH-8 and the drilling of two state wells in Section 1 of T13S, R16E, SLB&M, would entail upgrading approximately 2.75 miles of existing road to BLM Class III Road Standards. The two state wells would be on new well pad construction. The two federal wells are re-entry of plugged and abandoned sites that have mostly re-vegetated. These surface disturbances would directly affect and reduce naturalness on 26 acres (16 acres for roads, 10 acres for pads) on non-WSA lands with wilderness characteristics that are contiguous to the Jack Canyon WSA. The drill site for well PPU-10 is also a re-entry of a largely reclaimed, plugged, and abandoned site. The road construction for this well would entail upgrading on an additional 1.1 miles of road on lands with wilderness character,

also associated with the Jack Canyon WSA. This would result in loss of naturalness on an additional 6 acres, bringing the total surface disturbance and loss of apparent naturalness to 32 acres on wilderness quality lands adjacent to the Jack Canyon WSA. Since all the roads are dead end and do not intersect, they intrude into the lands with wilderness character polygon but do not cause fragmentation of the unit. Opportunity for solitude and primitive and unconfined recreation would be reduced due to the increased road density. The proposed roads would be located up to a mile away from the existing boundary roads. While opportunities would be reduced, the non-WSA lands with wilderness characteristics do not possess outstanding opportunities on their own but rather in association with the Jack Canyon WSA.

Well PPU-10 would be drilled on non-WSA lands with wilderness characteristics associated with the Desolation Canyon WSA. In addition to the previously described road construction, 0.5 mile of road would be upgraded within the non-WSA lands with wilderness characteristics. This would result in a loss of naturalness on 5 acres, 3 acres from road and pipeline construction and 2 acres from well pad construction. This intrusion would have less impact than the developments in the Jack Canyon area. The road and pad would extend 0.5 mile beyond the boundary and would not dramatically affect road density associated with these lands. Opportunity for solitude and primitive and unconfined recreation may be reduced on approximately 300 acres.

4.2.1.16 Mitigation Measures

1) A BLM-permitted archaeologist would monitor construction activities at the 27-3 location in Dry Canyon, Cottonwood Canyon, and Nine Mile Canyon. Monitoring would be necessary due to proximity of surface disturbance to known cultural and the potential for buried cultural remains in the canyon bottoms. Such monitoring would mitigate impacts.
2) To protect Site 42Cb996 (lithic scatter) near Prickly Pear Unit well 13-4, a fence should be erected to protect the site from damage. Such a fence would mitigate impacts to the site.
3) In areas where the soil surface shows evidence of biological soil crusts, the top uppermost (1/4-inch) of undisturbed biological soils from an adjacent and undisturbed area would be randomly collected from small areas (approximately 12-inch squares) and cast over the reclaimed site immediately following final reclamation to the facilitate re-establishment of soil crusts. Such actions would mitigate impacts to soil crusts in the long term, although short-term impacts would remain.

4) A licensed landscape architect would be under contract to either the project proponent or BLM for on-site construction monitoring, inspection, and supervision of visual mitigation and BMPs such as recontouring of landform to approximate natural conditions and berming, revegetation and introduction of screening vegetation, pipeline texturing and coloring, and others mentioned below.
5) To minimize the chance of undesirable plant species (especially seeds) from being carried into the WTPPA, equipment would be power-washed before being brought in.
6) Heavy equipment would not mobilize or demobilize through Nine Mile Canyon on weekends or holidays.
7) A closed loop drilling procedure would be used at well 27-3 to avoid leaching by hydrocarbons into the alluvial bed of Dry Canyon Creek.

4.2.1.17 Residual Impacts

Residual impacts would include an initial loss of 171 acres of vegetation; negligible impacts to migratory birds, surface water, wild horses, and soils; non-compliance with VRM Class II standards; increased noise, especially during drilling and completion operations; and low impacts to non-WSA lands with wilderness characteristics.

4.2.1.18 Monitoring and Compliance

BLM and BBC would monitor construction, drilling, completion, and production activities on an ongoing basis to ensure that all required measures are implemented protect the environment.

4.2.2 Alternative B – No Action Alternative

Under the No Action Alternative, BBC would not be authorized to drill additional wells on federal surface or to access state surface/minerals over federal surface. Additional federal approvals would be required to drill on federal surface or minerals or to access state wells over federal surface. Any proposals to access state lands to develop oil and gas resources would be reviewed and analyzed by BLM in site-specific NEPA documents. Based on legal precedent known as the "Cotter Decision" *(State of Utah v Andrus, 1979), "*BLM is obligated to provide reasonable access to State sections." The decision notes that the BLM can regulate the method and route of access to State of Utah School and Institutional

Trust Lands Administration (SITLA) lands encircled by federal land; however, the regulation may not prevent the state or its lessee from gaining access to its land, nor may it be so prohibitively restrictive as to render the land incapable of full economic development.

4.2.2.1 Air Quality

Issues 1 and 2. Fugitive dust from construction and traffic/Emissions from vehicles and equipment, well production, and compressors.

Under the No Action Alternative, there would be no additional impacts to air quality as a result of the WTPDP. Existing sources of emissions, from both dust generation and emissions from existing sources, would continue.

4.2.2.2 Cultural Resources/Native American Religious Concerns

Issue 1. Direct impacts to cultural sites.

Under the No Action Alternative, there would be no additional impacts to cultural resources as a result of the WTPDP.

Issue 2. Increased public access would increase likelihood of vandalism.

Under the No Action Alternative, there would be no new roads as a result of the WTPDP. The likelihood of vandalism of cultural resources would remain similar to existing levels or increase proportionately with increases in recreational use.

Issue 3. Impacts to Native American religious concerns.

Under the No Action Alternative, there would be no additional impacts to Native American religious concerns as a result of the WTPDP.

4.2.2.3 Floodplains

Issues 1 and 2. Construction in floodplains and changes in floodplain function/Compliance with Price MFP.

No construction would occur in floodplains, and the No Action Alternative would be in compliance with the Price MFP. Federal well 27-3 would not be drilled. No floodplains would be affected other than at stream crossings. Two crossings of Cottonwood Creek for the realignment of a section of road near the Hunter Panel and a realignment of the short section of road at Dry Canyon would still occur if the No Action Alternative was selected.

4.2.2.4 Threatened, Endangered, Candidate, and Sensitive Species (TESS)

Issue 1. Direct impacts to TESS.

Federally listed species. Under the No Action Alternative, there would be no additional impacts to federally listed species as a result of the WTPDP. Impacts from existing development and activities would continue. Impacts to bald eagle and MSO from existing disturbance may affect, but would not be likely to adversely affect, those two species.

Sensitive species. Under the No Action Alternative, there would be no additional impacts to sensitive species as a result of the WTPDP. Impacts would continue at present levels, which are negligible.

Migratory birds. Under the No Action Alternative, there would be no additional impacts to migratory birds as a result of the WTPDP. Impacts would continue at present levels, which are negligible.

Issue 2. Impacts to TESS habitat.

Under the No Action Alternative, there would be no additional impacts to TESS habitat. Water depletion would continue at the current rate.

4.2.2.5 Water Quality

Issues 1 and 2. Increased sediment in streams due to project-related erosion/Introduction of toxic substances into surface or ground water.

Under the No Action Alternative, there would be no additional impacts to water quality as a result of the WTPDP. Two crossings of Cottonwood Creek for the realignment of a section of road near the Hunter Panel and a realignment of the short section of road at Dry Canyon would still occur if the No Action Alternative was selected.

4.2.2.6 Wetlands/Riparian Zones

Issue 1 and 2. Impacts from sedimentation/Direct impacts to riparian vegetation.

Under the No Action Alternative, there would be no additional impacts to wetlands/riparian areas as a result of the WTPDP. Impacts would continue at present levels, which are negligible.

4.2.2.7 Wild and Scenic Rivers

Issue 1. Impacts to free-flowing condition and outstandingly remarkable values, which make Nine Mile Creek eligible for designation.

Under the No Action Alternative, there would be no additional impacts affecting the eligibility of Nine Mile Creek for designation into the National Wild and Scenic Rivers System with a tentative classification of recreational. Nor would Nine Mile Creek be precluded from further consideration of its suitability for such designation. The stream's free-flowing condition and outstandingly remarkable values would not be impacted.

4.2.2.8 Vegetation

Issue 1. Direct impacts to native vegetation.

Under the No Action Alternative, there would be no additional direct impacts to native vegetation as a result of the WTPDP. Impacts would continue at present levels, which are negligible.

Issue 2. Lack of reclamation success.

Under the No Action Alternative, there would be no additional surface disturbance as a result of the WTPDP; therefore, no reclamation would be required.

4.2.2.9 Wildlife Resources

Issues 1 and 2. Direct loss of habitat due to removal of vegetation/Reduction in habitat function due to disturbance.

Under the No Action Alternative, there would be no additional direct loss of habitat or reductions in habitat function as a result of the WTPDP. Impacts would continue at present levels, which are low.

Issue 3. Direct mortality caused by project-related activities.

Under the No Action Alternative, direct mortality caused by project-related traffic would not occur as a result of the WTPDP. Impacts would continue at present levels, which are negligible.

4.2.2.10 Soils

Issues 1 and 2. Increased wind and water erosion/Lack of reclamation success.

Under the No Action Alternative, there would be no additional wind and water erosion or lack of reclamation success as a result of the WTPDP. Impacts would continue at present levels, which are low.

Issue 3. Impacts to biological soil crusts.

Under the No Action Alternative, there would be no additional impacts to biological soil crusts as a result of the WTPDP. Impacts would continue at present levels, which are low.

4.2.2.11 Recreation

Issue 1. Change in recreation opportunity and experience.

Under the No Action Alternative, recreation opportunity and experience would be as described in Section 3.3.11.

Issue 2. Changes in opportunity for solitude or primitive and unconfined recreation on lands with wilderness characteristics.

Under the No Action Alternative, recreation opportunity would be as described in Section 3.3.11.

4.2.2.12 Visual Resources

Issues 1 and 2. Non-conformance with VRM Class II standards/Reductions in scenic values in Nine Mile Canyon.

The proposed oil and gas activities in the WTPPA were analyzed using field reconnaissance and photography, establishment of multiple KOPs, and expert contrast rating analysis from selected KOPs. Sixteen KOPs were established, based on important representative and significant views that would likely be seen by the casual observer, then studied. These included roadside views typical for automobile travelers at 15-25 miles per hour, for pedestrians viewing rock art from the Water Canyon compressor station to the Cottonwood Canyon drop-down pipeline site, and from the Dry Canyon compressor station to the proposed location of federal well 27-3. Visual simulations and contrast ratings were completed for eight of these KOPs (Appendix E).

The existing Water Canyon and Dry Canyon compressor sites currently exceed VRM Class II standards, as do numerous existing surface pipelines in Nine Mile Canyon and Dry Canyon. There are existing facilities, including producing and abandoned well pads and related structures, in close physical and/or visual proximity to the existing roads that draw the attention and dominate the view of the casual observer. The existing drop-down pipeline in Nine Mile Canyon near the mouth of Cottonwood Canyon exceeds VRM Class II. The recent prescribed burn in Dry Canyon has exposed many sections of the existing pipeline. This increased visibility will likely extend 5-10 years into the future, even with

successful revegetation, which could extend the time that this feature is not in compliance with VRM Class II.

4.2.2.13 Geology/Minerals

Issue 1. Recovery of natural gas resources.

Under the No Action Alternative, the gas reserves proposed to be recovered by BBC in the Proposed Action or Alternative C would not be recovered at this time and would not contribute to the U.S. meeting the domestic demand for gas. However, the gas would be available for recovery at some future date.

4.2.2.14 Wild Horses and Burros

Issue 1. Direct and indirect mortality caused by project-related activities.

Under the No Action Alternative, there would be no additional direct mortality to wild horses as a result of traffic associated with the WTPDP. Impacts would continue at present levels, which are negligible.

Issue 2. Direct loss of habitat due to vegetation removal.

Under the No Action Alternative, there would be no additional removal of vegetation as a result of the WTPDP. Impacts would continue at present levels, which are low.

Issue 3. Reductions in habitat function due to disturbance.

Under the No Action Alternative, there would be no additional reduction in habitat function as a result of the WTPDP. Impacts would continue at present levels, which are low.

Issue 4. Impacts to manageability of the HMA.

Under the No Action Alternative, there would be no additional impacts to the manageability of the HMA as a result of the WTPDP. Impacts would continue at present levels, which are low.

4.2.2.15 Non-WSA Lands with Wilderness Characteristics

Issue 1. Impacts to non-WSA lands with wilderness characteristics.

Under the No Action Alternative, there would be no new roads, road upgrades, or drill sites located on non-WSA lands with wilderness characteristics.

4.2.2.16 Mitigation Measures

No mitigation measures are recommended.

4.2.2.17 Residual Impacts

No residual impacts would occur as a result of the No Action Alternative.

4.2.2.18 Monitoring and Compliance

No WTPDP monitoring or compliance relative to this proposal would occur under the No Action Alternative. However, monitoring for range, wildlife, and recreation would be ongoing.

4.2.3 Alternative C

The impacts resulting from the implementation of Alternative C are the same as those in Alternative A, except where noted.

4.2.3.1 Air Quality

Issues 1 and 2. Fugitive dust from construction and traffic/Emissions from vehicles and equipment, well production, and compressors.

Under Alternative C, the Sage Brush Flat compressor station would not be constructed, and the Water Canyon compressor station would be dismantled and the facility location reclaimed. Compression would be centralized at the Dry Canyon site, where three 1,500-hp compressor engines would be added to the

single compressor engine currently at the site. The increase in total annual emissions of all air pollutants in the WTPPA would be less than under the Proposed Action. In addition, the pipeline and road would be constructed in the same corridor, resulting in less surface disturbance. This would result in a small decrease in total fugitive dust emissions from the Proposed Action. Impacts from well and road construction activities in the WTPPA would be the same as those described for the Proposed Action. NO_X emissions from separator heaters located at each of the 38 proposed wells would be approximately 0.3 tons per year per well, with field-wide annual NO_X emissions of 11.4 tons per year, and VOC emissions from condensate storage would be approximately 7.5 tons per year per well and 285 tons per year field-wide.

The location of all compressor facilities at the Dry Canyon site would require a higher level of emission controls on the proposed engines to ensure compliance with ambient air quality standards. These engines would each emit 0.7 grams per horsepower-hour NO_X. In addition to the three compressor engines proposed, one dehydrator with NATCO condenser and flare with 95 percent destruction efficiency would also be added. Pollutant emissions resulting from Alternative C and existing pollutant emissions in the field are shown in Table 4.2. An increase in field-wide emissions would result from implementation of Alternative C.

Prior to commencement of operations, UDAQ requires a new or modified industrial facility such as a compressor station to undergo permit review to ensure compliance with New Source Review or other permit requirements. A Notice of Intent would be required to be submitted to UDAQ for review and approval prior to construction or operation of the proposed new facility or any modification to an existing facility. NO_X emissions from the Dry Canyon Compressor Station proposed modification, excluding any emissions reduction from the removal of the Water Canyon site, are below thresholds established in Utah Air Conservation Rule R307-410-3 that requires dispersion modeling as part of an air permit application. As a result, impacts from compressor station operation would be expected to be below ambient air standards and PSD increments. Direct impacts on ambient air from the seasonal operation of 38 separator heaters located throughout the field would also be below ambient air quality standards.

Table 4.2 WTPDP Pollutant Emissions from Gas Production for Alternative C.

	Pollutant Emission Rate (tpy)			
	NO_X	CO	VOC	Total HAPs[1]
Existing Facility				
Dry Canyon	16.5	32.5	30.3	NA
Water Canyon	16.9	32.6	3.4	NA
Well Sites (30)	9.0	2.0	225.5	- -
Total Existing Field	42.4	67.1	259.2	NA
Alternative C				
Dry Canyon	34.8	51.3	14.9	1.6
Water Canyon (removed and site reclaimed)	-16.9	-7.5	-3.4	-0.6
Sage Brush Flat		Not constructed		
Well Sites (38)	11.4	2.6	285.6	--
Total WTPPA Increase in Emissions under Alternative C	29.3	46.4	297.1	1.0
Percent Change in Field-Wide Emissions	+69 percent	+69 percent	+115 percent	NA

[1] NA = not available.

4.2.3.2 Cultural Resources/Native American Religious Concerns

Issue 1. Direct impacts to cultural sites.

The proposed corridor for the buried pipeline in Nine Mile Canyon was selected as a result of a geomorphologic survey conducted by Lamm (2003). The sole purpose of the survey was to identify a route that would be least likely to encounter a buried cultural site. In addition, BBC and BLM have agreed to the procedures to be followed in the event a site is unearthed. With this agreement in place and BBC's commitment to have a BLM-approved archeologist on-site during all aspects of construction in the canyon bottoms, potential impacts to cultural resources would be negligible. The buried pipeline in Dry Canyon would parallel the existing road to the extent practicable, and surface disturbance would be reduced because the existing road would be used as the work area during pipeline construction.

Issue 2. Increased public access would increase likelihood of vandalism.

As with the Proposed Action, additional access to the WTPPA resulting from the construction of project-related roads under Alternative C could facilitate current low levels of vandalism of cultural resources to newly accessible areas.

Issue 3. Impacts to Native American religious concerns.

Native American consultation has been completed (see Section 3.3.2). No Traditional Cultural Properties were identified within the WTPPA.

4.2.3.3 Floodplains

Issues 1 and 2. Construction in floodplains and changes in floodplain function/Compliance with Price MFP.

Under Alternative C, there would be no construction in floodplains other than where roads or pipelines cross streams. Well 27-3 would not be located in Dry Canyon. Potential impacts from the buried pipelines in Dry Canyon and Nine Mile Canyon would include 1) bank erosion at channel crossings; 2) gully erosion where buried pipelines cross the channel; 3) possible damage to pipelines from flood flows and debris at channel crossings; and 4) long-term maintenance-related disturbances within the floodplain and riparian areas along Nine Mile Creek. These impacts would be addressed with proper stream crossing construction as included in stream alteration permits from the Utah Division of Water Rights and with proper pipeline construction techniques as described in Hydraulic Considerations for Pipeline Crossings of Stream Channels, available at the BLM Price Field Office. Inspections of the Nine Mile Canyon pipeline would be done on foot to reduce impacts to riparian areas. Future maintenance, anticipated to be low, could result in disturbance to riparian areas during the time repairs would be made. In order to avoid flood waters causing debris to lodge on the pipe and rupture it, pipeline crossings in Nine Mile Canyon would be designed to be unaffected by high stream flows. All crossings would be armored as appropriate to prevent bank erosion and further exposure of the pipe.

4.2.3.4 Threatened, Endangered, Candidate, and Sensitive Species (TESS)

Issue 1. Direct impacts to TESS.

Alternative C would have similar impacts to TESS and migratory birds as the Proposed Action. The WTPPA was surveyed for TESS, and none were identified within the potentially disturbed areas. Both the bald eagle and the MSO may be affected but would not likely be adversely affected.

Issue 2. Impacts to TESS habitat.

Impacts to TESS habitat would be similar to those in the Proposed Action; however, the area of disturbance would be increased from 171 acres to 255 acres. The annual surface water depletion of approximately 20 acre-feet would initiate a jeopardy opinion regarding the four Colorado River endangered fish species. However, BBC would follow the alternative in the Recovery and Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, in which the USFWS has determined that there has been sufficient progress made to offset jeopardy due to depletions of 100 acre-feet or less (memorandum dated March 9, 1995, to Assistant Regional Director, Ecological Services, Region 6, from Regional Director 6, Intra-Service Section 7 Consultation for Elimination of Fees for Water Depletions of 100 acre-feet or less from the Upper Colorado River Basin). Depletions in excess of 100 acre-feet require a payment of $15.68 (or the current rate) per acre-foot of depletion. This is a one-time charge for the average annual depletion rate for the life of the project. Alternative C would result in an average annual depletion of 20 acre-feet; therefore, BBC would not be required to make any payment to the National Fish and Wildlife Foundation. In addition, BMPs would ensure that additional erosion due to project-related activities would not add to the turbidity/silt load downstream from such activities.

4.2.3.5 Water Quality

Issues 1 and 2. Increased sediments in streams due to project-related soil erosion/Introduction of toxic substances into surface or ground water.

The major water resource issues discussed here are the effects of increased sedimentation in streams crossed during pipeline installation and the effects of trenching. Pipe installation, backfilling, and grading would disturb surface soils, leading to accelerated erosion and the potential for movement of

excess sediment down slope via overland flow processes into streams, water bodies, and wetlands. The likelihood of increased sediment delivery to surface waters would be low because 1) the ROW surface disturbance in perennial stream drainages is very small relative to total watershed area (generally less than 1 percent) and 2) perennial water channel crossings represent far less than 1 percent of the total pipeline lengths. Sediment delivery increases to streams from upland sources would be short-term because erosion control structures would be placed at the floodplain/upland boundary and permanent water bars would be placed across the ROW to divert water away from the ROW into adjacent native vegetation.

Excavation within stream channels during open-cut trenching and pipe installation activities would introduce sediment into the stream flow during the period of stream crossing construction (1 to 3 days). To reduce sediment impacts where streambeds would be trenched, the proponents would construct open-cut crossings during low-flow periods and would implement erosion control measures on the stream banks to reduce the volume of suspended sediment.

BBC may open-cut Nine Mile Creek and Dry Canyon Creek up to 16 times. The short-term increased sediment load would represent a small percentage of the average daily stream sediment load (a range of 1-4 percent for similar streams within the upper Colorado River region). It is likely that the actual sediment load would be less than average at pipeline crossing because construction would be completed during the low-flow season when stream flow volumes and velocities would be low. However, low flow conditions also would limit the amount of suspended sediment that would be transported downstream. Substrate disturbance and sedimentation may affect benthic macroinvertebrates in a localized area within the immediate construction area. Macroinvertebrates would likely recolonize the impacted area within approximately 1 year.

4.2.3.6 Wetlands/Riparian Zones

Issues 1 and 2. Impacts from sedimentation/Direct impacts to riparian vegetation.

The proposed alignment of the buried pipelines would necessitate the crossing of Nine Mile and Dry Canyon Creeks at numerous locations. The buried pipeline in Nine Mile Canyon would disturb approximately 10.1 acres of riparian habitat and 0.21 acre of wetlands, whereas the buried pipeline in Dry Canyon would disturb approximately 1.15 acres of riparian habitat and 0.02 acre of wetland. All

disturbed areas would be reclaimed. The phased removal of the Water Canyon compressor site would not impact water quality, floodplains, or riparian habitat.

4.2.3.7 Wild and Scenic Rivers

Issue 1. Impacts to free-flowing condition and outstandingly remarkable values, which make Nine Mile Creek eligible for designation.

Alternative C would not result in a change to the eligibility of Nine Mile Creek for designation into the National Wild and Scenic River System, nor would Nine Mile Creek be precluded from further consideration of its suitability for such designation.

Although stream alternations would be made at the Nine Mile Creek crossing at Harmon Canyon and pipelines would cross the stream in numerous places, the character of the river would remain free-flowing. The installation of the culverts supported by riprap and concrete at the Harmon Canyon Road crossing would modify the streambed for the width of the upgraded road. The riprap would not be extensive enough to further channelize the steam beyond the length of the culverts. Some riprap may be needed at pipeline crossings to reinforce stabilization of the bank where disturbed during construction. At pipeline crossings where riprap would be necessary, the natural character of the stream would diminish in appearance. Because these locations would be isolated along 45 miles of stream, the overall character of Nine Mile Creek would remain free-flowing.

The outstandingly remarkable cultural, historic, and scenic values related to Nine Mile Creek and within its corridor could be affected to the extent disclosed under analysis of Cultural Resource and Visual Resource issues. Impacts to cultural resources as a result of Alternative C would be negligible for reasons described in Section 4.2.3.2. Some areas of the buried pipeline would create short-term moderate to strong visual contrast in the vegetation and landform. However, this contrast would not be to an extent to eliminate the scenic quality along Nine Mile Creek as an outstandingly remarkable value. Other similar human activities and development occur within the stream's viewshed at relatively close proximity such as roads, bridges, private residences and farming, ranching, and oil- and gas-related facilities. Regardless of the presence of these features, the scenic quality of the surrounding topographic character would continue to contribute to the outstandingly remarkable scenic value. In addition, the

consolidation of compressor stations at Dry Canyon provides for the removal of the Water Canyon facility, which currently detracts from the scenic quality within the stream's corridor.

Alternative C would be consistent with the recreational tentative classification of Nine Mile Creek. This tentative classification is given to river areas readily accessible by road or railroad and may have some development along their shoreline to the degree that substantial evidence of human activity is evident.

4.2.3.8 Vegetation

Issue 1. Direct impacts to native vegetation.

Impacts to native vegetation (Section 4.2.3.6 for wetlands/riparian vegetation) under Alternative C would be the same in kind as for the Proposed Action; however, approximately 255 acres would be disturbed as compared to 171 acres for the Proposed Action. These 255 acres represent 0.6 percent of the 43,373 acres included in the four units in the WTPPA, and an even smaller percentage of the WTPPA when adjacent lands included in the WTPPA are included. Therefore, impacts to vegetation would be negligible.

Issue 2. Lack of reclamation success.

Reclamation potential in the project area is good. BLM successfully reclaimed a 1,000-acre pinyon/juniper push completed in the late 1960s and reclamation of abandoned oil and gas related pad sites have been good. Initial seeding results from a 400-acre controlled burn completed in March, 2004 are promising. Impacts would be negligible to low but could be moderate in the immediate area of any unsuccessful reclamation. This would not occur for extended periods of time because seeding would be repeated if initially unsuccessful.

4.2.3.9 Wildlife Resources

Issues 1 and 2. Direct loss of habitat due to removal of vegetation/Reductions in habitat function due to disturbance.

Alternative C would result in approximately 255 acres of disturbance as compared to 171 acres in the Proposed Action. None of the additional disturbance would occur in critical elk or deer winter range. The buried pipelines line would result in the loss of forage on a short-term basis (1-3 years). Approximately half of this loss would be in the proposed Dry Canyon burn mitigation area, which would be lost regardless of this action. The balance would be in agricultural lands that are routinely plowed and planted or grazed by domestic stock. Elimination of the Sage Brush Flat and Water Canyon compressor facilities would result in a reduction in human disturbance to service those facilities, especially during the winter months, and would reduce disturbance to deer and elk on winter range.

Issue 3. Direct mortality caused by project-related activities.

Vehicle/wildlife collisions are expected to be minimal due to existing road conditions and vehicle speeds anticipated on the access roads.

4.2.3.10 Soils

Issues 1 and 2. Increased wind and water erosion/Lack of reclamation success.

Impacts to soils would be the same as for the Proposed Action; however, Alternative C would disturb approximately 255 acres, compared to 171 acres of disturbance in the Proposed Action. All of the safeguards as outlined for the Proposed Action would be incorporated into Alternative C, and impacts would be negligible to low. Past reclamation in the area has generally been successful.

Issue 3. Impacts to biological soil crusts.

Disturbance to soil crusts would be the same as in the Proposed Action. Most of the increased disturbance in Alternative C would occur in the bottom of Nine Mile Canyon where no soil crusts occur.

4.2.3.11 Recreation

Issue 1. Change in recreation opportunity and experience.

Under Alternative C, recreation experience within the SRCMA would be affected in the long and short term. In the short term, increased traffic would diminish the quality of a visit to Nine Mile Canyon. This effect would be most apparent during heavy equipment mobilization through the canyon and pipeline construction in Nine Mile Canyon between Water Canyon and Cottonwood Canyon. During mobilization and pipeline construction, the recreation opportunity would remain *Roaded Natural*. However an industrial presence may be noticeable, and there would be an increase in social contacts and managerial presence such as signs, detours, etc., that would tend to move the opportunity more to the urban end of the spectrum. In the long and short term, experience could also be diminished due to the loss of landscape context associated with cultural sites. Because of elevated noise levels associated with additions to the Dry Canyon compressor station, landscape context could be compromised. The loss of landscape context could lead to a decreased appreciation and understanding of the cultural resources by the visitors to Nine Mile Canyon.

Upgrading the roads accessing the plateaus, particularly on Flat Iron Mesa and in the Jack Creek watershed, could decrease the opportunity for semi-primitive recreation. These areas are presently accessed by poorly maintained roads that are closed seasonally and by bad weather would be much more accessible on a year-round, all-weather basis. Improved road access and higher travel speeds may increase the number of social contacts. Improved roads and increased use of the roads would tend to move these semi-primitive areas toward a Roaded Natural condition.

The gravel road in Nine Mile Canyon known as CR 53, Nine Mile Canyon Road, or Nine Mile Byway, would provide the primary access into Nine Mile Canyon and the identified side canyons and up into the project area. The Byway connects U.S. Highway 191/6 at Wellington, Utah, and U.S. Highway 191/40 at Myton, Utah. UDOT and Castle Country Travel Region Office indicate that this all-season/all-weather road had an annual average daily traffic of 252 vehicles, or 126 round trips, in 2000. Currently, projected daily traffic for spring through fall 2004 is estimated to be higher due to the increased number of heavy vehicles and logging trucks using the road between late spring and late fall. Though access along the Byway may be precarious (muddy or slick) during inclement weather and extremely dusty during dry months, all-season use is supported by regular county maintenance.

Implementation of the WTPDP would result in approximately 8,855 round trips per year during each of the first 2 years of the project for drilling and completing wells, watering roads, and constructing pipelines, and an additional 11,280 trips for drilling and completing directional wells, watering roads, and constructing pipelines. The distribution of the 11,280 trips would depend upon whether directional wells were drilled and, if they were drilled, the rate of drilling. The 8,855 round trips during the first 2 years represent an increase of approximately 19% in the estimated 46,000 trips per year in the Nine Mile Canyon area. As a high percentage of project-related traffic would be in the summer months when visitor traffic is high, there could be a moderate degree of disruption to visitors during peak mobilization periods.

Noise would increase as in the Proposed Action. Compressor noise would be consolidated at the Dry Canyon site, and the Water Canyon and Sage Brush Flat compressor sites would not used, eliminating noise sources at those sites.

Issue 2. Changes in opportunity for solitude or primitive and unconfined recreation on lands with wilderness characteristics.

Alternative C would involve use and upgrading of approximately 3 miles of road and the use of three abandoned well pads (PPU-10, PP-11A and PPH-8) for redrilling. These areas are presently accessed by poorly maintained roads that are closed seasonally and by bad weather and would be much more accessible, as well as accessible on a year-round, all-weather basis. Improved road access and higher travel speeds may increase the number of social contacts. Improved roads and increased use of the roads would tend to move these semi-primitive areas toward a roaded natural condition. Outstanding opportunity for solitude and primitive and unconfined recreation would still remain available in the Desolation Canyon WSA. Such opportunities would be available but reduced on the non-WSA lands with wilderness characteristics.

4.2.3.12 Visual Resources

Issues 1 and 2. Non-compliance with VRM Class II Standards/Reduction in scenic values in Nine Mile Canyon.

The proposed oil and gas activities in the WTPPA were analyzed using field reconnaissance and photography, establishment of multiple KOPs, development of computer visual simulations, and expert contrast rating analysis from selected KOPs. Sixteen KOPs were established, based on important representative and significant views that would likely be seen by the casual observer, then studied. These included roadside views typical for automobile travelers at 15-25 miles per hour, and for pedestrians viewing rock art from the Dry Canyon Compressor Station to the proposed location of federal well 27-3. Visual simulations and contrast ratings were completed for eight of these KOPs (Appendix E).

The following aspects of Alternative C as proposed would meet VRM Class II objectives with standard visual resource management mitigation practices.

- Installation of a larger diameter "drop-down" pipeline near the mouth of Cottonwood Canyon into Nine Mile Canyon would meet Class II standards assuming placement of the pipe behind the ridgeline that the existing pipeline descends (as seen from the Nine Mile Canyon road east of the pipeline, viewing west) to effectively break the long continuous line of the current alignment. Also, topography and vegetation would be used to screen the line wherever possible. The line would be painted or allowed to rust so as to eliminate any residual glare from the metal casing and to blend in with surrounding vegetation and landform.
- Installation of a larger diameter "drop-down" pipeline with associated cradles located approximately 3.9 miles up Dry Canyon would meet Class II standards by routing the pipe behind an intervening rock outcrop. Also, topography and vegetation would be used to screen the line wherever possible. The line would be painted or allowed to rust so as to eliminate any residual glare from the metal casing and to blend in with surrounding vegetation and landform.
- Removal of the Water Canyon compressor facilities would meet Class II standards with proper recontouring and revegetating using visual resource BMPs.
- Wells 15-19, 7-25, 16-34, and 8-33.

The following aspects of Alternative C as proposed would meet VRM Class II in 3-5 years. On agricultural lands, with mitigation, reclamation may occur in the same year. In riparian areas, where soil moisture is generally higher, reestablishment of vegetation could occur in less than 3 years. In upland areas, revegetation time frames could approach 5 years. Standard visual resource management practices would mitigate these aspects in the long term.

- The impacts associated with the proposed methods of pipe burial (40- to 60-foot ROW disturbance) for the pipeline in Nine Mile Canyon between Cottonwood Canyon and the Water Canyon Compressor Station would create moderate to strong short-term visual contrast in the vegetation and landform in some areas.
- Visual impacts associated with the proposed methods of pipe burial (20-foot ROW disturbance) in Dry Canyon would create moderate contrast in the landform and the vegetation. In Dry Canyon, these impacts are more visually prevalent to the casual observer due to the narrow travel corridor. Post-burn conditions in Dry Canyon present additional opportunities for reducing visual contrast long term. These include the potential for even-aged revegetation and less visually contrasting vegetation patterns between severely burned versus moderately or unburned areas as the vegetation establishes and matures.

4.2.3.13 Geology/Minerals

Issue 1. Recovery of natural gas resources.

Recovery of natural gas resources would be similar to that for the Proposed Action. It is anticipated that each of the proposed wells would recover 2-3 BCF of natural gas over the LOP, for a total of 44-66 BCF of natural gas. This would be a beneficial impact that would assist the U.S. in meeting the domestic demand for natural gas.

4.2.3.14 Wild Horses and Burros

Issue 1. Direct and indirect mortality caused by project-related activities.

Due to improved road surfaces, the chance of vehicle/horse collisions would increase; however, such collisions are, and would continue to be, rare and would not noticeably affect horse populations. Harassment could also increase because vehicle access would be improved. Although undocumented, it is possible that increased human disturbance during parturition could result in reduced reproductive success. Human activity associated with servicing wells during the winter could disturb horses, potentially causing them to use valuable energy reserves at a time of year when they are in a negative energy balance. Though impacts to individual animals may occur, the ability of wild horses to habituate to human activities would minimize these impacts and would not compromise the viability of the herd.

Issue 2. Direct loss of habitat due to vegetation removal.

There would be some direct loss of habitat due to the removal of 255 acres of vegetation from disturbed areas, and habitat function would be reduced on areas near long-term disturbance. This would result in negligible impacts to both individual horses and the population in the HMA.

Issue 3. Reductions in habitat function due to disturbance.

Some disturbance to wild horses would occur as a result of project-related activities; however, impacts would be negligible because of wild horses' abilities to habituate to human activities and because impacts would be minimized during the closure of the WTPPA to construction and drilling activities from November 1 to May 15, the season of heaviest use by horses.

Issue 4. Impacts to manageability of the HMA.

Manageability of the HMA would not be affected because pipelines that could affect horse gathers would be buried.

4.2.3.15 Non-WSA Lands with Wilderness Characteristics

Issue 1. Impacts to non-WSA lands with wilderness characteristics.

Under Alternative C, all actions proposed on lands with wilderness characteristics are identical to those proposed under Alternative A. Therefore, the impacts to non-WSA lands with wilderness characteristics are as described for Alternative A.

4.2.3.16 Mitigation Measures

General Measures

a) To protect Site 42Cb996 (lithic scatter) near Prickly Pear Unit Well 13-4, a fence would be erected to protect the site from damage. Such a fence would mitigate impacts to the site.
b) In areas where the soil surface shows evidence of biological soil crusts, the top uppermost (1/4-inch) of undisturbed biological soils from adjacent an undisturbed area would be randomly collected from small areas (approximately 12-inch squares) and cast over the reclaimed site immediately following final reclamation to the facilitate re-establishment of soil crusts. Such actions would mitigate impacts to soil crusts in the long-term, although short-term impacts would remain.
c) At stream crossings, all equipment would be kept away from edge of escarpments and stream banks thereby minimizing impacts to escarpment edge, and these edges would be stabilized pre-construction using vegetative or mechanical methods.
d) To minimize the chance of undesirable plant species (especially seeds) from being carried into the WTPPA, equipment would be power-washed before being brought in.
e) Heavy equipment would not be mobilized or demobilized through Nine Mile Canyon on weekends or holidays.

Pipeline Mitigation Measures

a) A licensed landscape architect would be under contract to either the project proponent or BLM for on-site construction monitoring, inspection, and supervision of visual mitigation and BMPs such as recontouring of landform to approximate natural conditions and berming, revegetation

and introduction of screening vegetation, pipeline texturing and coloring, and others mentioned below.

b) Trenching equipment would be used for pipe burial to reduce overall impact to existing vegetation and landform. Excavation would be limited to a narrow trench to install the pipe thus reducing the width of disturbance to as narrow as possible. This may be especially appropriate in riparian areas and areas where equipment can be brought in with minimal damage to the landscape.

c) Where appropriate, a brush-hog or similar equipment would be used to minimize impact to riparian vegetation and to enhance re-growth and revegetation potential.

d) Edges of disturbed area would be feathered by creating a vertical transition from taller to shorter vegetation along disturbed edges. Width of disturbance would be varied and some plant masses would be preserved to create a more naturally appearing edge and thereby avoiding straight, sweeping, and converging lines in the landscape.

e) Overall width of surface disturbance would be reduced by staging equipment on the road and taking advantage of the access already provided by the roadway.

f) An effective revegetation plan would be implemented, including planting of shrubs and tubelings, thus establishing larger-sized plants early.

g) Rocks and downed vegetation would be used to "break up" new textures created by disturbance and exposure of soils and to provide "planting pockets" for the establishment of new plant materials.

h) Easily established and fast-growing shrubs would be specified in seed mix and as tubelings.

i) All disturbed surfaces would be recontoured to more natural-appearing landform, similar in topography to pre-disturbance and surrounding landscape. The soils would be prepared for proper revegetation and BMPs would be implemented for revegetation and erosion control.

4.2.3.17 Residual Impacts

Residual impacts would include initial disturbance to 255 acres of vegetation; negligible impacts to migratory birds, surface water, wild horses, and soils; short-term non-compliance with VRM Class II standards; increased noise, especially during drilling and completion operations; and low impacts to non-WSA lands with wilderness characteristics.

4.2.3.18 Monitoring and Compliance

BLM and BBC would monitor construction, drilling, completion, and production activities on an ongoing basis to ensure that all required measures are implemented protect the environment.

4.3 CUMULATIVE IMPACTS

4.3.1 Introduction

Cumulative impacts are defined by the *National Environmental Policy Act* (NEPA) as

> the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The following sections assess the cumulative impacts of the BLM-preferred alternative (Alternative C) in combination with past, present, and reasonably foreseeable future actions (RFFAs).

4.3.2 Past and Present Actions

The primary existing surface disturbances in the WTPPA are roads and trails used for access by livestock managers, federal and state agencies, general recreationists, hunters, and oil and gas operators. In addition, within and immediately adjacent to the WTPPA, there is a total of 61 oil and gas wells, of which 27 are capable of producing natural gas. Thirteen of the 27 wells are currently producing, whereas 14 would require either an upgrade of delivery lines or recompletion before they could produce. The other 34 wells are abandoned. Two of the 13 producing wells and eight abandoned wells are located within the boundaries of two WSAs.

There are approximately 57 miles of roads and trails (138 acres of disturbance) in the immediate vicinity of the WTPPA that have been constructed and are maintained for oil and gas development and 26 miles of surface pipelines (63 acres of disturbance). A total of 12.5 miles of roads and trails and 5 miles of surface pipeline is within or form the boundaries of the two WSAs.

Other past projects that have affected the WTPPA are BLM management treatments on federal lands, including pinion-juniper pushes of about 1,000 acres. Oil and gas interests have constructed two runways for light-plane access totaling approximately 30 acres. Additional disturbance in the project area includes 142 acres from roads used primarily by agency land managers, grazing permittees, recreationists, hunters, and a limited number of logging trucks and timber harvesting equipment that access timber stands to the south of the WTPPA. Total past and current disturbance from all actions is estimated to be 2,590 acres.

The current mix of traffic on the Backcountry Byway in Nine Mile Canyon includes large commercial trucks, tour buses, passenger cars, and light truck traffic. The large commercial truck traffic includes primarily logging trucks, cattle transport semi-trailers, and oil- and gas-related drilling and service vehicles.

4.3.3 Reasonably Foreseeable Future Actions (RFFAs)

RFFAs include oil and gas development, wildlife enhancement projects, road repair and maintenance, and wildlife mitigation (i.e., controlled burn) projects. RFFAs for oil and gas development include implementation of the approved BBC's Stone Cabin geophysical project to image subsurface geologic formations and conditions to aid in determining the location of oil and natural gas resources in a 90-square-mile area (approximately 57,500 acres). Surface disturbance as a direct result of the seismic operations, including shot hole drilling by both buggy drills and heli-portable drills and establishment of staging areas would total approximately 11.5 acres. An additional 195 acres would be affected by off-road buggy travel, for a total of 206 acres of surface impacts. The nature of other effects from project implementation would be the temporary evidence of passage of balloon-tired buggy drills off-road in the area. Vibroseis buggy operations would be restricted to existing roads and trails.

Wildlife enhancement projects that are ongoing include the systematic manipulation of grazing practices to enhance forage production for wildlife and domestic stock. The BLM conducted a controlled burn (EA #UT-063-2003-002) in the spring of 2004 to enhance wildlife habitat in Dry Canyon. The 400-acre burn eliminated a relatively dense vegetation cover of over-mature sagebrush, rabbitbrush, and cheatgrass to encourage growth of more desirable forage for deer and elk. BBC purchased the seed mix as part of the mitigation for the WTPDP and other past projects.

County and BLM roads within and accessing the WTPPA are graded and repaired to some degree on an annual basis. The road in Cottonwood Canyon is being realigned around a well-known petroglyph panel known as the Hunter Panel. This realignment is intended to improve safety and visitor experience at the site while providing better protection for the rock art. A parking area and information/viewing area will be constructed to enhance the visitor experience while viewing this nationally famous pictograph. The realignment will reduce dust at the site, will minimize risks to the panel from large truck traffic, and will alleviate traffic and safety issues associated with visitors viewing the panel.

BBC has proposed realigning a portion of the Dry Canyon Road as it enters Nine Mile Canyon. This would necessitate a new crossing of Nine Mile Creek. Impacts are expected to be minimal with implementation of protection measures as part of the stream alteration permit.

Questar has proposed a new compressor site at Blind Canyon approximately 3 miles north of Water Canyon in Duchesne County as part of their Southern System Expansion Project. Construction of this site would disturb approximately 6 acres.

Projections indicate a trend toward increasing recreational visits to Nine Mile Canyon. Most recreational traffic is from passenger cars and sport utility vehicles, with increased mountain bike use in Nine Mile Canyon. BLM's Nine Mile Canyon SRCMA analysis (BLM 1994) recommends that a number of recreational and interpretive sites be developed that would disturb about 50 acres in Nine Mile Canyon. The above-described past and present actions and RFFAs are summarized in Table 4.3.

4.3.4 Cumulative Impacts

4.3.4.1 Air Quality

Air quality impacts would occur in the WTPPA during well site construction activities and natural gas production. The WTPDP, in combination with RFFAs, has the potential to increase fugitive dust emissions from road construction and upgrades, pipeline construction, well pad construction, and drilling activities. NO_X from natural gas compressors potentially could contribute to visibility degradation. However, no impacts to visibility from compression emissions are expected due to topography and the physical separation of facilities. The proposed compressors are projected to emit approximately

Table 4.3 Cumulative Impacts.

Actions	Source[1]	Acreage of Estimated Disturbance
48 Abandoned or Shut-in wells	P	96
27 Wells Capable of Producing	P	54
57 Miles of O&G Roads and Trails	P	138
26 Miles of Surface Pipeline	P	63
Rangeland Improvements	P	1,000
Non-O&G Roads	P	142
Recreation/Hunting	P, C, F	Unknown
Traffic	P, C, F	Unknown
Airstrips	P	30
Controlled Burn/Dry Canyon	P	400
Agricultural activities	P, C, F	Unknown
Buried pipeline between Harmon and Water Canyon	P	7
Road Upgrade/County Maintenance	F	Unknown
Recreational Traffic/off-road vehicle	P, C, F	Unknown
Anticipated Exploratory Drilling/ 5-7 Wells Annually (per year/5 years) (State and Fee Properties)	F	82
Roads & Pipelines for Annual Exploratory Drilling	F	45
Questar Compressor Proposal	F	6
Hunter Panel Project	F	5
Stone Cabin 3-D Seismic Project	F, S	12
West Tavaputs Project - BLM-preferred Alternativce		
Proposed Exploratory Wells (22+ directional)	W	72
New Road Construction/O&G(includes surface pipelines installed adjacent to road)	W	84
New Buried Gas Lines	W	99
Compressor Upgrade/Dry Canyon	W	0
Compressor Upgrade/Sagebrush Flat	W	0
New Compressor/Water Canyon	W	0
Total for West Tavaputs Project	W	255
Total Disturbance		2,590

[1] P = Past, C = Current, F = Future, S = Stone Cabin 3D geophysical project, W = West Tavaputs Project Plateau drilling program.

94.2 tons of NO_X. This is a very small addition to existing sources in the Carbon and Emery County area, where emissions of NO_X from existing sources are estimated to be approximately 60,000 tons per year (BLM 1999).

There is a potential that implementation of the WTPDP and the Stone Cabin seismic project may overlap. However, no additional impacts to air quality from fugitive dust are expected because both projects require dust suppression by watering or other approved methods. Therefore, there would be a net reduction of dust in the Nine Mile Canyon area for the duration of these projects because dust suppression measures would also reduce dust from existing traffic.

4.3.4.2 Cultural Resources/Native American Religious Concerns

Implementation of the BLM-preferred alternative, combined with the past and present land uses of recreation, grazing, farming, geophysical exploration, and oil and gas development, adds to the list of intrusions in the proposed Nine Mile Canyon Historic District. However, because cultural resource surveys are required for all projects approved on state and federal surface, sites would be identified and avoided. No long-term cumulative impacts to the historic district, cultural resources, or Native American religious concerns are expected from incremental actions.

4.3.4.3 Floodplains

The BLM-preferred alternative would require a number of stream crossings of Nine Mile and Dry Canyon Creeks by buried pipelines, and there would be direct disturbance to floodplains. However, the pipeline would be engineered and BMPs would be applied to help ensure that minimal impacts to the floodplains would occur. Some RFFAs would require that roads cross Nine Mile and Cottonwood Creeks; however, all crossings would be designed in conjunction with the stream alteration permit requirements to minimize degradation of water quality and disturbance of floodplains and riparian vegetation.

Other RFFAs that could impact floodplains include agricultural activities, the burn at Dry Canyon, and a 2-mile pipeline constructed on private property between Harmon Canyon and Water Canyon. Reestablishment of vegetation on the controlled burn appears to be doing well, and the overall impact to the floodplain should be positive. The pipeline was constructed to industry standards and reclamation is

ongoing; therefore, this pipeline should have little or no impact on the floodplain. The BLM-preferred alternative and RFFAs would not add appreciably to cumulative impacts in floodplains.

4.3.4.4 Threatened, Endangered, Candidate, and Sensitive Species (TESS)

The BLM-preferred alternative, past and present actions, and RFFAs would have a negligible effect on TESS or their suitable habitat because surveys of all areas of potential disturbance have been completed and no TESS have been found. Although suitable habitat is present for some species, it is not unique, and all past and present actions and RFFAs would impact 4.5 percent of the cumulative impact area.

The TESS that have been identified to possibly inhabit the region include MSO and bald eagle. Four species of Colorado River endangered fish could be affected as a result of water depletion and/or increased sedimentation within the watershed. MSOs have not been identified within the WTPPA, although designated critical habitat and suitable habitat are present. Protected and restricted habitats occur on slopes of 40 percent or greater. The only component of the WTPDP that would affect these areas would be the installation of pipelines from the plateau to the canyon bottoms. Because surveys have shown that MSO are not currently in the area, and all anticipated future activities would be outside of these steep slopes, the designated critical habitat for MSO would remain available and unaltered to accommodate any natural expansion of the MSO population.

BBC currently operates several wells and intends to conduct the Stone Cabin 3-D seismic project in designated critical habitat for MSO. Increased traffic associated with well operations and maintenance, as well as increased recreational use associated with travel on the existing road system, could affect foraging habitat for the MSO if any were to move into the area. However, given the large areas of foraging habitat, cumulative impacts resulting from such activities may affect, but would not be likely to adversely affect, the MSO. Annual surveys would determine if MSO nest in the area. If they do, appropriate consultation between BLM and USFWS would occur and application of buffer zones would ensure avoidance and prevent cumulative impacts.

Bald eagles are transient winter visitors to the area and rely on fish and carrion primarily associated with Desolation Canyon. Due to the timing of oil and gas activity during the summer months and imposed winter closures, no cumulative impacts to this species are anticipated.

The four Colorado River endangered fish species could be impacted by increased sedimentation. However, with the implementation of BMPs, sedimentation would be minimized. Additional surface water depletions could jeopardize these fish. Jeopardy could be offset with the appropriate payments to the National Fish and Wildlife Foundation. APDs would require surveys for TESS and wells would be located to avoid additional impacts to any other TESS.

Cumulative impacts to BLM-sensitive species and migratory birds would depend upon the specific habitats that would be disturbed. Impacts would be greater as suitable habitat is disturbed and habitat function is reduced on other lands due to human activity. This could be especially disruptive to wintering greater sage-grouse, although construction and drilling activities would not occur between November 1 and May 15. Impacts to sensitive fish species would be similar to those four endangered fish species and would result from surface water depletions and increased sediments from soil erosion. Such impacts would be negligible because of the required BMPs. Nesting habitat for migratory birds would be reduced and additional mortality could occur from vehicle/bird collisions and from accidental destruction of nests. However, impacts to bird populations would not rise above low levels because less than 1 percent of the WTPPA area would be disturbed by past and present actions and RFFAs, and about 9.05 miles of new access road would be built in the oil and gas units in the WTPPA where there are already 57 miles of existing roads. Additionally, surveys would be conducted prior to project-related activities and nests would be avoided.

4.3.4.5 Water Quality

Road maintenance and upgrading, the controlled burn in Dry Canyon, existing farming operations, and the pipeline constructed between Harmon and Water Canyons are actions that could have impacts on water quality. Sedimentation increases can be expected in Dry Creek as a result of the controlled burn. However, they are not expected to be high because the reestablishment of vegetation is going well. Agricultural practices are not increasing sediment loads or adding inordinate levels of nitrates from fertilizers. This cannot be confirmed as extensive monitoring for water quality has not occurred. The pipeline may have contributed some sediment to Nine Mile Creek; however, the creek was spanned and construction completed at low flows.

Pipe installation, backfilling, and grading would disturb surface soils, potentially leading to accelerated erosion and the potential for movement of excess sediment downslope via overland flow processes into

streams, water bodies, and wetlands. However, the likelihood of increased sediment delivery to surface waters would be low because 1) the ROW surface disturbance in perennial stream drainages is small relative to the total watershed area (generally less than 1 percent) and 2) perennial water channel crossings represent less than 1 percent of the total pipeline lengths. Increased sediment delivery to streams from upland sources would be short term because erosion control structures would be placed at the floodplain/upland boundary and because permanent water bars would be placed across the ROW to divert water away from the ROW and into adjacent native vegetation. Excavation within stream channels during open-cut trenching and pipe installation activities would introduce sediments to the stream during the period of stream crossing construction (1 to 3 days).

Overall, cumulative impacts to water quality are expected to be low with implementation of the BLM-preferred alternative.

4.3.4.6 Wetlands/Riparian Zones

Farming operations, road improvement projects, and the pipeline constructed between Harmon and Water Canyons are the actions that could affect wetlands and riparian areas. Road improvement projects and farming operations have not and are not expected to have a high impact on riparian zones. Because all disturbed areas will be reclaimed, the impact to riparian areas would be minimal.

Wetlands and riparian areas would be avoided to the extent practicable. As much as 12 acres of riparian areas and wetlands could be impacted through implementation of Alternative C. Successful reclamation of these areas is anticipated; therefore, the contribution of the BLM-preferred alternative to cumulative impacts to wetlands/riparian areas would be low. None of the RFFAs are anticipated to affect wetlands/riparian areas.

4.3.4.7 Wild and Scenic Rivers

Road construction and maintenance, the road improvement at the Hunter panel, farming operations, and the pipeline between Harmon and Water Canyons occur within the corridor of Nine Mile Creek. Cumulative impacts to the eligibility of Nine Mile Creek as a recreation river under the Wild and Scenic Rivers Act is based on impacts to the outstandingly remarkable values and free-flowing conditions that

made Nine Mile Creek eligible. These values, as stated in Section 3.3.6, are cultural, historic, and scenic. RFFAs would not compromise cultural, historic, or scenic values.

Cultural and historic values would not be compromised by the BLM-preferred alternative. Project-related activities would comply with VRM Class II standards and would not make Nine Mile Creek ineligible for consideration for designation.

4.3.4.8 Vegetation

Wells, pipelines, new roads and upgrades, rangeland improvements, the burn at Dry Canyon, runway construction, off-road vehicle use, compressor stations, and the Stone Cabin geophysical project, all impact vegetation. The anticipated area of disturbance in the WTPPA from the BLM-preferred alternative and all past actions and RFFAs would be less than 5 percent.

4.3.4.9 Wildlife Resources

Unmitigated impacts to critical winter range for deer and/or elk since 2000 have been approximately 6 acres. The BLM-preferred alternative would result in additional impacts, and in accordance with the Price MFP BBC is required to mitigate the total number of acres of cumulative disturbance anticipated for critical winter range for deer and elk for both the WTPDP, the Stone Cabin geophysical project, and other RFFAs that require federal permits. This mitigation would address the impacts of past and present actions and to some extent RFFAs by BBC up to a disturbance of 96 acres. This mitigation has been accomplished by BBC's contribution to the controlled burn in Dry Canyon that was completed in March 2004. Other future disturbance to critical deer and elk range would require similar mitigation.

Indirect displacement of wildlife from preferred habitats would occur as a result of additional development and operation of the gas field. Such displacement would occur in response to human-related activity such as vehicle traffic (recreational and project-related), dispersed recreation, heavy equipment operation, construction/drilling, etc. Cumulative disturbance and displacement impacts on critical winter range could occur during the drilling of additional wells and road construction and use required to access existing and proposed development. However, restrictions on construction and drilling from November 1 to May 15 would limit disturbance to wintering deer and elk. Direct mortality to animals from vehicle/animal collisions would be expected to increase with increasing traffic; however,

impacts would likely remain low and occur primarily to small animal species. Overall, impacts from the BLM-preferred alternative to wildlife are expected to be low, and past actions and RFFAs would not add appreciably to cumulative impacts to wildlife.

4.3.4.10 Soils

Wells, pipelines, new roads and upgrades, rangeland improvements, the burn at Dry Canyon, airstrip construction, off-road vehicle use, compressor stations, and the Stone Cabin geophysical project all impact vegetation. The anticipated disturbance to vegetation in the WTPPA from all past and present actions and RFFAs is less than 5 percent. Approximately 255 acres would be disturbed under the BLM-preferred alternative. Impacts would depend on the success of controlling erosion and the success of reclamation. Reclamation potential in the WTPPA is good. BLM successfully reclaimed a 1,000-acre pinion/juniper push completed in the late 1960s and reclamation of abandoned oil- and gas-related pads have been good. Initial results from seeding the 400-acre controlled burn completed in March 2004 are promising.

Cumulative impacts to vegetation would be negligible to low but could be moderate in the immediate area of any unsuccessful reclamation. This would not occur for extended periods of time because seeding would be repeated if initially unsuccessful.

4.3.4.11 Recreation

Visitor experience is affected by a number of factors, including natural, social, and managerial settings; weather; success in locating attractive sites; and dust. Nine Mile Canyon generates more information requests than any other attraction in the Castle Country Travel Region office, and visitation has been increasing. Both personal and commercial traffic have been increasing. Minerals exploration has contributed to this increase in traffic, although oil and gas exploration has not appeared to have had any effect on recreational visitation to Nine Mile Canyon. Whether cumulative impacts would impact the amount of visitation is difficult to predict; however, it appears that visitation will increase in the future. The quality of the experience of viewing cultural sites could be diminished if the natural cultural landscape elements take on a more modern, industrialized appearance. However, no permanent facilities are anticipated in Nine Mile Canyon or its tributary canyons as a result of RFFAs.

Carbon and Duchesne Counties operate the Nine Mile Canyon Backcountry Byway. Because the Backcountry Byway is not a federal aid highway, the counties also control road construction, traffic, and dust suppression. Carbon County has recently made improvements including widening, better drainage, and gravel surfacing. Travel speeds and dust levels have increased as a result of these improvements. Both heavy truck traffic and visitation to Nine Mile Canyon have contributed to the increase in dust levels. Carbon County plans to undertake a dust suppression effort within the Nine Mile Canyon, and BBC has committed to control dust related to their WTPDP to improve the recreational experience.

Implementation of the BLM-preferred alternative would result in approximately 8,855 round trips per year during each of the first 2 years of the project for drilling and completing wells, watering roads, and constructing pipelines, and an additional 11,280 trips for drilling and completing directional wells, watering roads, and constructing pipelines. The distribution of the 11,280 trips would depend upon whether directional wells were drilled and, if they were drilled, the rate of drilling. The 8,855 round trips during the first 2 years represent an increase of approximately 19% in the estimated 46,000 trips per year in the Nine Mile Canyon area. As a high percentage of this traffic would be in the summer months when visitor traffic is high, there could be a moderate degree of disruption to visitors during peak mobilization periods. Also, if the WTPDP is implemented concurrently with the Stone Cabin seismic project, visitor experience could be further compromised for short periods of time.

During mobilization for the seismic project, 10 to 20 round trips per day could occur, representing an increase in traffic of 8-16 percent.

Cumulative impacts to traffic from the WTPDP would be high for short periods of time. However, the overall impacts would be low.

4.3.4.12 Visual Resources

Some oil and gas-related and other human-produced features are in non-compliance with the VRM Class II standards that currently exist in portions of the WTPPA. The addition of more visual intrusions would have an increased cumulative impact on visual resources in several instances. Visual resource mitigation techniques and BMPs (Sections 4.2.1.16, 4.2.2.16, and 4.2.3.16) would be employed to reduce the visual contrast of some actions. However, some of the short-term and long-term impacts to visual

resources may impact the visitor experience in the Nine Mile Canyon Backcountry Byway and the SRCMA.

Of particular visual importance are the pipelines from the Water Canyon compressor station to the Dry Canyon compressor station, the drop-down pipe in Nine Mile Canyon near the mouth of Cottonwood Canyon, the pipeline along the existing road in Dry Canyon, and the pipelines on the ridge tops and plateaus.

The majority of visitors to Dry Canyon enter from Nine Mile Canyon; therefore, the visual impacts must be considered for both canyons. It is reasonable to assume that visual impacts (positive and negative) in Nine Mile Canyon (such as the removal of the Water Canyon compressor station in the BLM-preferred alternative) would affect the visual resources in Nine Mile Canyon and Dry Canyon. However, not all visitors to Nine Mile Canyon also enter Dry Canyon; therefore, impacts in Dry Canyon affect fewer visitors than do impacts in Nine Mile Canyon.

Increased oil and gas development in VRM Class III areas is one of the primary reasons that the development in VRM Class II areas is occurring (pipeline dropdowns from the ridges and larger capacity pipes are needed to transmit the minerals). There is potential for visual impacts to the visitor who ventures into both VRM Class II (Nine Mile Canyon and Dry Canyon) and VRM Class III areas (on the plateaus) or where any of the VRM Class III areas can be viewed from a VRM Class II area. The visitor to both VRM Class II and III areas would likely perceive increased oil and gas development in the area without drawing a clear distinction between VRM Class II and Class III areas because most visitors are not familiar with VRM classifications.

The compressor station at Dry Canyon is located on private land, and it is not required to comply with VRM Class II but is within the viewshed of the VRM Class II area. As it exists now, it contributes to the cumulative visual impacts of the area.

Dry Canyon had a relatively dense vegetation cover prior to the recent prescribed burn. The burn affected the majority of vegetation and has made existing and proposed facilities more evident in the short term. With successful revegetation and application of BMPs, weather and other natural systems conditions permitting, the long-term effect on the visual resources cumulative impact would be positive.

The BLM-preferred alternative would incorporate BMPs and applicant-committed practices and would meet VRM Class II objectives in 3-5 years. On agricultural lands, with mitigation, reclamation may occur in the same year. In riparian areas, where soil moisture is generally higher, reestablishment of vegetation could occur in less than 3 years. In upland areas, revegetation time frames could approach 5 years. Standard visual resource management practices would mitigate these aspects in the long term.

The burial of the pipelines throughout the study area would have a positive cumulative visual impact by diminishing the growth in the network of surface-laid (exposed and visible) pipelines both short and long term. Therefore, burial of the pipelines may have a cumulative impact advantage over surface-laid pipelines in the long term, whereas the analysis of each alternative tends to favor surface laid pipelines in the short term.

The removal of the Water Canyon compressor station would immediately diminish the overall cumulative visual resource impacts of the BLM-preferred alternative, and the visual contrast would be even less in the long term, assuming there is carefully planned, implemented, and managed recontouring, vegetative screening, and overall revegetation of the site.

Dry Canyon had a relatively dense vegetation cover prior to the recent prescribed burn. The burn affected the majority of vegetation and has made existing and proposed facilities more evident in the short-term. With successful revegetation and application of BMPs, weather and other natural systems conditions permitting, the long-term effect on the visual resources cumulative impact would be positive.

Most wells, road upgrades, and pipelines in the BLM-preferred alternative occur outside of the SRCMA where VRM Class II standards apply. Rather, these facilities would be located within a VRM Class III area. Although intrusions of this type impact visual resources, the overall cumulative impacts from these additional facilities would be minimal in VRM Class III areas. Wells 15-19, 7-25, 16-34, and 8-33 would meet VRM Class II objectives with standard visual resource mitigation practices.

4.3.4.13 Geology/Minerals

Past, present, and future development of oil and gas resources in the WTPPA would provide natural gas to facilitate the U.S. domestic demand for energy. As previously noted in Section 2.2.1.4, existing wells are currently producing 1-3 million cubic feet of gas per day (mmcfd). Anticipated production from the

proposed wells is 44 to 66 BCF for the LOP. Successful implementation of the project would result in a positive cumulative impact.

4.3.4.14 Wild Horses and Burros

Additional development associated with the BLM-preferred alternative would add disturbance to wild horses in the WTPPA. Because horses habituate well to human activity and because no construction or drilling would occur from November 1 to May 15 when horses are wintering in the area, impacts would be negligible and the viability of the herd would not be compromised by the Alternatives and RFFAs. Overall, the BLM-preferred alternative would add few cumulative impacts to wild horses and burros.

4.3.4.15 Non-WSA Lands with Wilderness Characteristics

Of the RFFAs, only the WTPDP and the Stone Cabin geophysical project could impact lands with wilderness characteristics. The Stone Cabin geophysical project would have short-term impacts on the naturalness of the area. The WTPDP would result in direct disturbance of 37 acres in the Jack Canyon and Desolation Canyon Units, which comprise 214,000 acres of non-WSA lands with wilderness characteristics. Therefore, the cumulative impacts to these lands would be negligible.

The WTPDP would not impact either of the two WSAs; therefore, there would be no cumulative impacts to the Desolation Canyon WSA or the Jack Canyon WSA as a result of the WTPDP.