

ENVIRONMENTAL ASSESSMENT#CO-SJPLC-03-042

**KINDER MORGAN
WELL SITES HC-4 and YD-4**



**Project Applicant:
Kinder Morgan
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**Prepared for:
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May 2003**

Project # 10803-1

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1.0 PROPOSED ACTION AND ALTERNATIVES

1.1 INTRODUCTION

Kinder Morgan CO₂ Company, LP (Kinder Morgan) has submitted applications to drill two (2) carbon dioxide (CO₂) gas wells on lands administered by the Bureau of Land Management (BLM), San Juan Resource Area (SJRA) in Montezuma County, Colorado. Specifically, the wells would be drilled on existing federal leases in the McElmo Dome Field within the Canyons of the Ancients National Monument (CANM) approximately 15-20 miles west and northwest of Cortez, Colorado. The two wells are identified as the Kinder Morgan YD-4 and HC-4. The HC-4 would be drilled within the Hovenweep Unit and the YD-4 well would be drilled within the Yellow Jacket Unit. The wells would be drilled to approximately 8,240 feet to 8,450 feet targeting the Leadville Formation. As proposed, the project includes the construction of two well pads (6.36 acres), and associated access roads and flowlines (0.57 acres of disturbance). The gas flowlines would be constructed entirely within the access road easements and would tie-in to existing gathering pipelines adjacent to each well site. Total surface disturbance would be approximately 6.93 acres. If the wells were unproductive, the wells would be abandoned. All surface disturbances would be reclaimed upon abandonment according to BLM specifications.

1.2 PURPOSE AND NEED

The Federal mineral estate, administered by the BLM as part of its mineral leasing program, provides minerals, including fossil fuels, for the benefit and use of the American public, and encourages development of domestic oil and gas reserves to reduce dependence on foreign energy supplies. Mineral development is supported by the Mineral Leasing Act (1920 30 USC 181 et. seq.), the Federal Land Policy and Management Act (FLPMA), Department of Interior (DOI) policy, the San Juan-San Miguel RMP, and the issuance of leasing rights by the BLM.

The purpose of the proposal is to develop CO₂ gas reserves in the McElmo Dome Field on two (2) oil and gas leases that have been issued by the BLM. Most of the CO₂ produced from this field is moved via existing pipelines to the Permian Basin for use in oil production operations. Oil and gas leases issued by the BLM at the direction of Congress (1920 Mineral Leasing Act as amended) are contractual agreements between the U.S. and the lessee. The lease rights granted consist of the right to occupy as much of the lease surface as is reasonable for the extraction of the resource and the right to remove the resource (oil and/or gas).

The proposals include all activities associated with gas development including activities to construct, operate, reclaim, and abandon one well per (Application for Permit to Drill) APD. The APDs include associated new access roads and pipelines.

This EA has been prepared to address potential impacts associated with approval of Kinder Morgan's APD the Kinder Morgan YD-4 and HC-4 well pads and an access road.

The intent of this EA is to: 1) inform the public of the Proposed Action and reasonable alternatives; 2) analyze the impacts associated with the Proposed Action and alternatives; 3) identify mitigation measures to potentially reduce or eliminate impacts; 4) solicit public comment on the Proposed Action and alternatives; and 5) provide agency decision makers with adequate information upon which to base the decision to approve or deny the Proposed Action or to select an alternative action.

1.3 CONFORMANCE WITH SAN JUAN/SAN MIGUEL RESOURCE MANAGEMENT PLAN

In December of 1984, the San Juan/San Miguel Resource Area completed a Resource Management Plan (RMP), which was amended in 1991 (*San Juan/San Miguel Resource Management Plan Amendment / Final Environmental Impact Statement Colorado Oil & Gas Leasing and Development*). It is stated in the RMP, "BLM actively encourages and facilitates the development by private industry of public land mineral resources so that national and local needs are satisfied and economically and environmentally sound exploration, extraction and reclamation practices are provided." [United States Department of Interior (USDI), BLM 1984]. The proposed action has been developed to comply with the conditions of the RMP and amendments, and is being reviewed for consistency and compliance with this plan.

The RMP was developed to provide a framework for long range planning (10-20 years), "...land use plans and multiple use management decisions would recognize that mineral exploration and development can occur concurrently or sequentially with other resource uses" (BLM, 1984). The RMP addresses oil and gas exploration and development: "Except for Congressional withdrawals, public lands shall remain open and available for mineral exploration and development unless withdrawal or other administrative action is clearly justified in the national interest" (BLM, 1984).

The objectives of the 1991 Oil and Gas Amendments to the RMP are identified as "Facilitate orderly, economic, and environmentally-sound exploration and development of oil and gas resources using balanced multiple-use management" (BLM, 1991). These updates require the BLM to look at the impacts of site-specific oil and gas projects. In accordance, "areas are identified where (1) stipulations may be applied to new oil and gas leases, or (2) Draft Conditions of Approval (Draft COAs) may be attached to applications for APDs on existing leases" (BLM, 1991).

Additionally, the proposed action has been reviewed for conformance with the CANM Proclamation (9 June 2000). The CANM was created to protect cultural, geologic, and biologic resources that make the area: one of the highest (if not the highest) known density of archaeological sites in the Nation, geology that is remarkable for its landforms, and crucial habitat for several unique reptiles. The proclamation addresses oil and gas development as follows:

“Because most of the Federal lands have already been leased for oil and gas, which includes carbon dioxide, and development is already occurring, the monument shall remain open to oil and gas leasing and development; provided the Secretary of the Interior shall manage the development, subject to valid existing rights, so as not to create any new impacts that interfere with the proper care and management of the objects protected by this proclamation;”

The CANM is currently in the process of initiating the preparation of a new Resource Management Plan (RMP). Until this RMP is implemented, management of the CANM is guided by the 1984 San Juan/San Miguel Resource Management Plan (BLM, 1984) and the 1991 Oil and Gas Amendment to the RMP (1991 O+G Amendment).

Interim management guidance is provided in an Oct. 5, 2000, BLM State Director’s Guidance memorandum and a Sept. 13, 2000, BLM Washington Office memorandum “Interim Management Guidance for Oil and Gas Leasing and Development of the Canyons of the Ancients National Monument”. A reprint of the Interim Guidance can be found at the following web site: www.co.blm.gov/canm/canmoginterim.htm.

Relating to NEPA review, the BLM Washington Office memorandum states:

“...The analysis would recognize the short-term nature of oil and gas operations in the context of the long-term nature of the natural and cultural resources environment.

If the analysis indicates no impact to the Monument resources, or indicates impacts to resources, but determines that the impacts are consistent with the Proclamation, the proposed operation can proceed in accordance with applicable regulations, standards and stipulations.

If the analysis and documentation indicate that the proposal may have impacts that are not in conformance with the Proclamation, the BLM would work with the applicant to find alternatives or modifications to the proposal that would minimize such impacts through special permit conditions, consistent with the applicants right under applicable laws, regulations, and stipulations.”

The Proposed Action, as well as the other alternatives, is in conformance with the BLM 1984 RMP, the 1991 O+G Amendment, and the above referenced Interim Guidance from the BLM State Director and the BLM Washington Office. Oil and gas exploration and development is considered an appropriate management activity within the CANM.

1.4 CONFORMANCE WITH EXISTING PLANS, STATUTES OR OTHER REGULATIONS

This EA is prepared under the authority of the National Environmental Policy Act (NEPA) of 1969 (PL 91-852) and its regulations (40 CFR 1500 - 1508), Chapter V.

Oil and gas operations are dependent upon valid existing leases. Federal leases are issued and administered by the BLM under the authority of the Federal Oil and Gas Leasing Reform Act of 1987 and the Federal Oil and Gas Royalty Management Act of 1982 (43 CFR Part 3160). The development and long term management of these resources is governed by a wide array of federal laws such as (but not limited to) Onshore Oil and Gas Order No. 1, Onshore Oil and Gas Order No. 2, the Endangered Species Act of 1973, the 1966 National Historic Preservation Act as amended and the NEPA.

Protection of some surface resources that are potentially affected by development is mandated by various requirements.

Surface water resources are protected from pollution sources by the Federal Water Pollution Control Act (40 CFR Part 112) and the Clean Water Act of 1972. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 and other federal regulations are designed to control the releases of hazardous materials into the environment and to direct the handling of response to accidental spills.

Cultural resources threatened by development are protected by the Antiquities Act of 1906, [Public Law (PL) 52-209], the National Historic Preservation Act of 1966 (PL 89-665) and as amended (PL 52-209) and its regulations (36 CFR 800), and other legislation including NEPA, the 1971 Executive Order No. 11593, the Archaeological and Historical Conservation Act of 1974 (PL 93-291), the Archaeological Resources Protection Act of 1979 (PL 96-95) and its regulations (36 CFR 296), the American Indian Religious Freedom Act (48 USC 1996) and the Native American Graves Protection and Repatriation Act of 1990.

Threatened and endangered flora and fauna species are protected under the Endangered Species Act of 1973 as amended (PL 94-325). Additionally, the Migratory Bird Treaty Act (16 USC 703-71L) and the Bald and Golden Eagle Protection Act (16 USC I.S.C. 668a-668d) protect other sensitive wildlife species potentially occurring in the proposed project area.

The 1972 Clean Air Act as amended (EPA, 1990) regulates national ambient air quality standards (NAAQS) to control air pollution. In Colorado, the state oversees air quality regulations and standards for stationary sources of air pollution. Air quality impacts from oil and gas activities are accomplished by mitigation measures developed on a case-by-case basis. Impacts are evaluated to see if they are allowable or unacceptable.

The Clean Water Act of 1972, amended 1977, is the primary federal law that protects our nation's waters, including lakes, rivers, aquifers and coastal areas. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of this Act and specifically under Section 404 (Discharges of Dredge or Fill Material) of the Act. Section 401 (Certification) specifies additional requirements for permit review particularly at the state and tribal levels. Additionally, Section 402(p) of the (Title 33, Chapter 26, § 1342, USC), the National Pollutant Discharge

Elimination System (NPDES) Storm Water Program addresses the non-agricultural sources of storm water discharges which adversely affect the quality of our Nation's waters.

Executive Order 12898 of 1994 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires implementing procedures to insure that proposed projects within the auspices of federal agencies do not result in disproportionate shares of negative environmental impacts affecting any group of people due to a lack of political or economic strength. Environmental justice requires "...the fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (BLM, 1997). As such, this document includes an assessment of impacts of the project on minority and low-income populations.

1.5 INTERRELATIONS WITH OTHER PROJECTS

The proposed project area is within the Paradox Basin, an area of sustained development by oil and gas producers. The area encompassed by the proposed project, as well as adjacent areas, have been affected by oil and gas development since the early 1950s. Exploration and development of existing oil and gas leases on BLM administered lands in Montezuma County continues today.

Existing or previous oil and gas development consists of over 100 active or abandoned wells within 5 miles of the proposed wells (COGCC, 2003). An existing 50-foot wide permanent oil and gas infrastructure right-of-way (ROW) with a 30-foot wide temporary use area (TUA) exists adjacent to both of the proposed Kinder Morgan well sites (BLM, 1983).

As proposed, the HC-4 and YD-4 wells would tie, via flowlines and short access roads, into this existing permanent ROW. After tying into the permanent ROW the pipelines would tie into the Hovenweep and Yellowjacket cluster facilities respectively.

The surface disturbance and associated impacts from construction activities within the permanent infrastructure ROW were addressed by the BLM in the 1983 Shell Oil Company proposed CO₂ Project, Wasson Field/Denver Unit (BLM, 1983).

Other oil and gas development within the CANM consists of the Questar Exploration and Production Company's Cutthroat #14 conventional gas well which will disturb 4.0 acres.

The BLM has signed the decision record for this project and construction is underway. No other projects have been identified interrelated to the Kinder Morgan proposal, nor are other projects, non-oil/gas related, known to be proposed in the proposal study area in the foreseeable future.

1.6 PROPOSED ACTION

Project specific descriptions of the proposed action and its components are presented in the following sections.

1.6.1 Project Description

Kinder Morgan has filed APDs to construct and drill two CO₂ gas wells in the Leadville Formation of the McElmo Dome Field. The proposed project involves construction of two well pads (disturbing approximately 6.36 acres) to drill the wells. The two wells are the Kinder Morgan YD-4 and HC-4. The wells and associated project components are located on Federal lands managed by the BLM, CANM.

As proposed, new road construction would consist of a 350-foot long by 50-foot wide access road (0.4) to the HC-4 well site, and a 150-foot by 50-foot wide access road (0.17) to the YD-4 well site. The total surface disturbance from access road construction would be approximately 0.21 acres. The access roads would connect each well site to the existing permanent oil and gas infrastructure ROW. Once drilling and testing are completed, and the wells deemed productive, the wells would be connected via construction of a flowline to an existing CO₂ pipeline gathering system within the permanent oil and gas infrastructure ROW. Total proposed surface disturbance would be approximately 6.93 acres.

Reclamation of the well pads and flowline/access road ROWs is required by the BLM. If a well would be deemed unproductive, the well and location would be abandoned and reclaimed in accordance with applicable BLM requirements stipulated in the Draft COA for the well. Reclamation efforts would continue until all related Draft COA stipulations are met. If a well were produced, reclamation would occur after the well is no longer economically productive (in an estimated 10-20 years).

1.6.2 Project Location

The proposed Kinder Morgan CO₂ gas wells are located from approximately 17 to 20 miles west and northwest of Cortez, Colorado and within the northern portion of the CANM (Figures 1-2).

The proposed wells are entirely within Montezuma County, Colorado and can be found on the Woods Canyon and Ruin Canyon; 7.5 minute U. S. Geological Survey (USGS) topographic quadrangle maps (Figures 3 and 4 Project Area Maps). The wells would be vertically drilled at the following locations:

Kinder-Morgan HC-4
Surface Location (1030-feet FNL/1515-feet FWL)
Township 37N, Range 19W, Section 13
Montezuma County, Colorado
6375-feet Elevation
New Mexico Principal Meridian

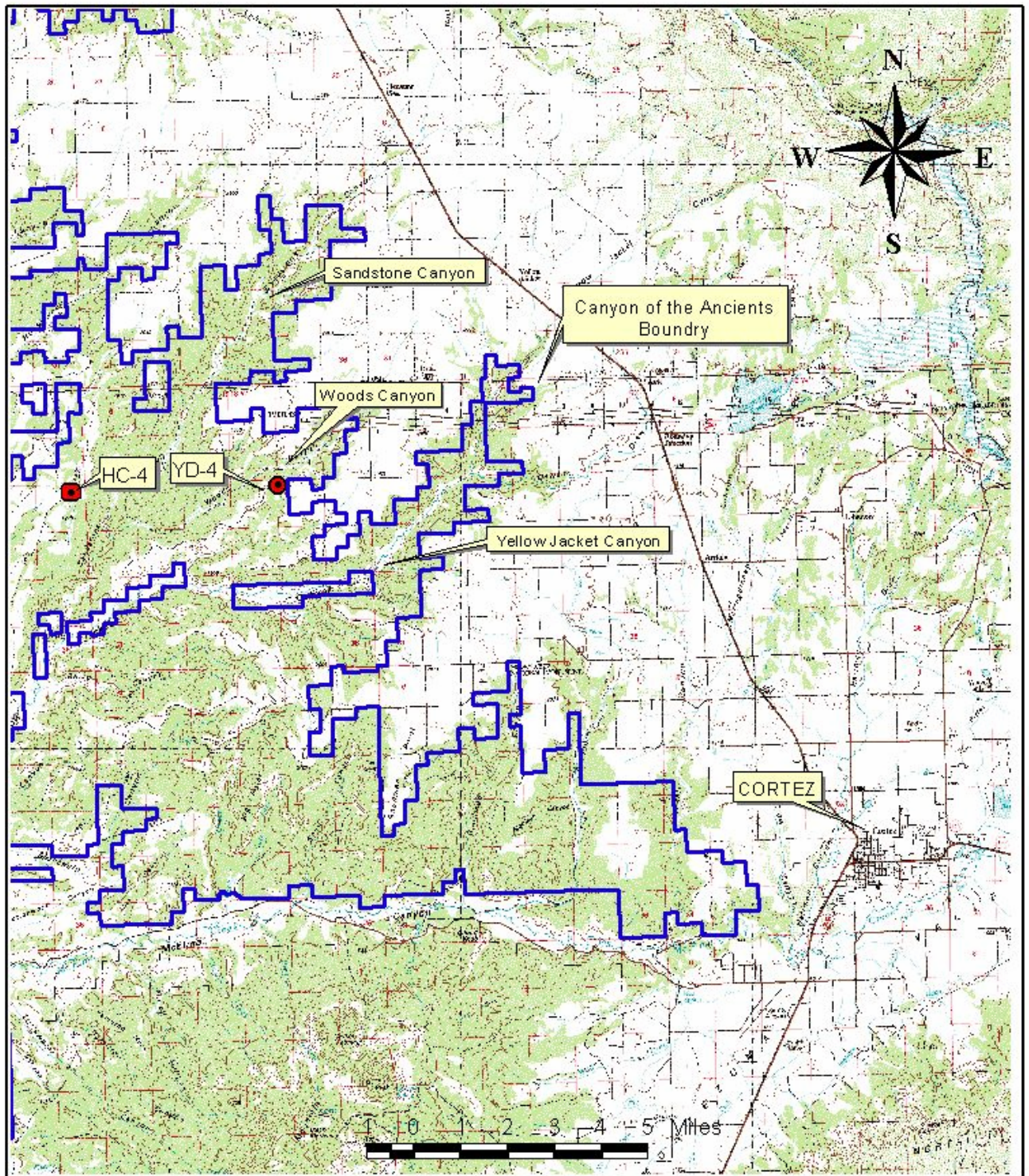
Kinder-Morgan YD-4
Surface Location (760-feet FSL/215-feet FWL)
Township 37N, Range 18W, Section 14
Montezuma County, Colorado
6505-feet Elevation
New Mexico Principal Meridian



COLORADO

KINDER MORGAN CO2 COMPANY, L.P.
 GENERAL VICINITY MAP
 PROPOSED TWO CO2 WELLS
 MONTEZUMA COUNTY, COLORADO

FIGURE #1
 Prepared by:
 Geosphere Environmental Services



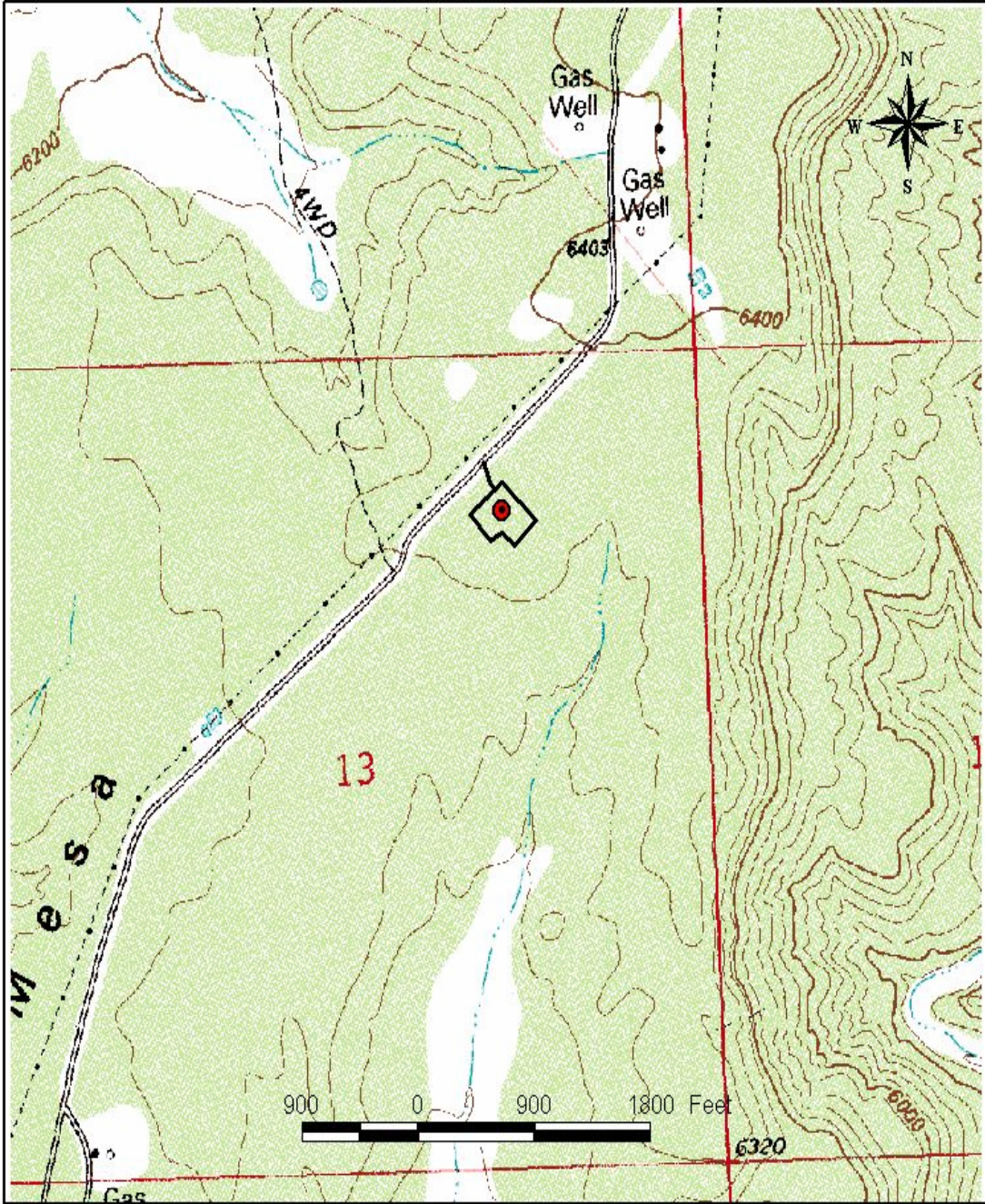
COLORADO
●

KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED TWO CO2 WELLS
MONTEZUMA COUNTY, COLORADO

FIGURE #2
Prepared by:
Ecospine Environmental
Services

USGS 7.5 MINUTE
TOPOGRAPHIC
SURVEY MAP

NEGRO CANYON
QUADRANGLE
MONTEZUMA COUNTY
COLORADO

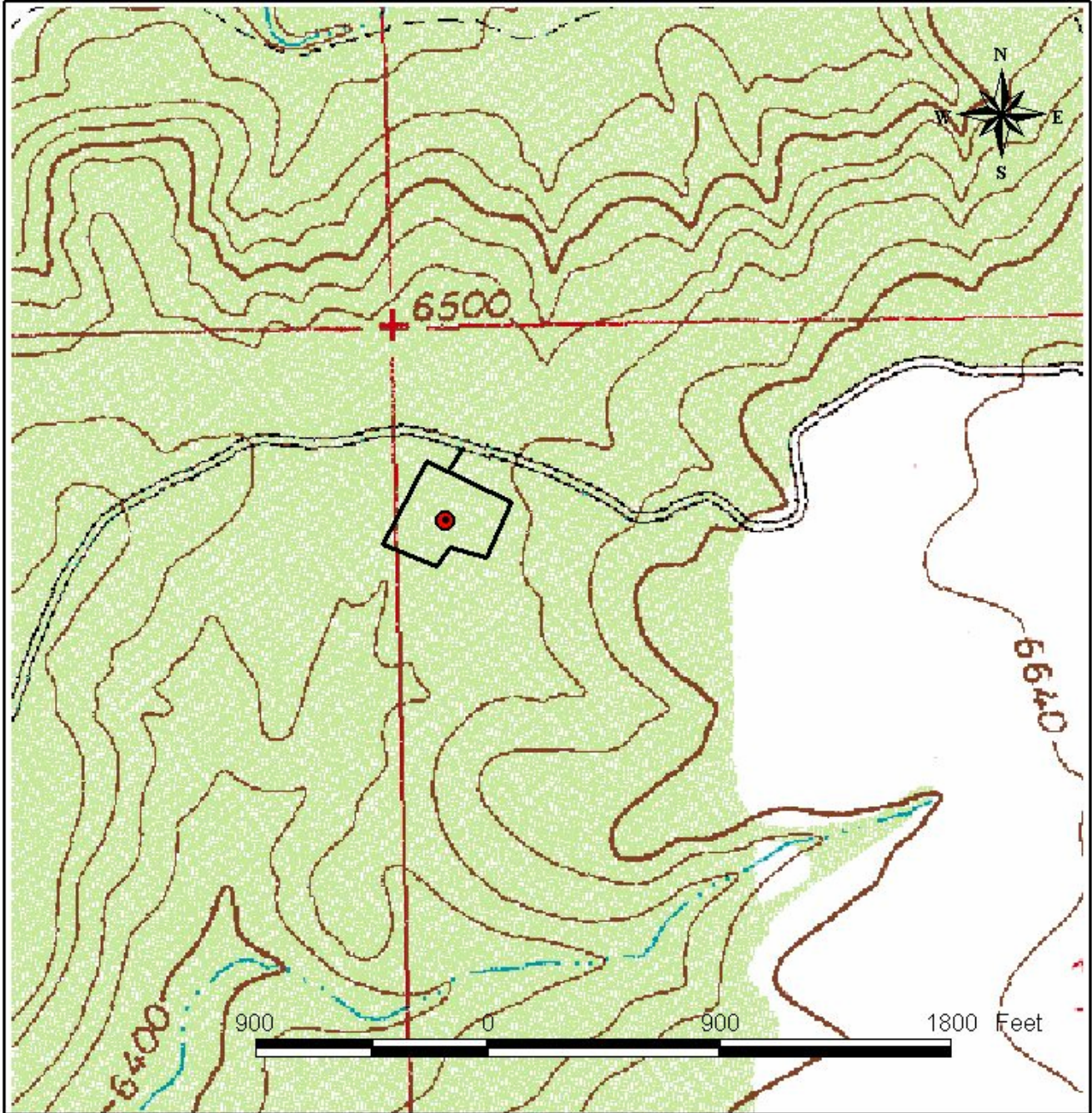


KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED HC-4
WELL, WELL PAD & ACCESS ROAD
T37N-R19W, SECTION 13
NEW MEXICO PRINCIPAL MERIDIAN

FIGURE #3
Prepared By:
Geospatial Environmental
Services

USGS 7.5 MINUTE
TOPOGRAPHIC
SURVEY MAP

WOODS CANYON
QUADRANGLE
MONTEZUMA COUNTY
COLORADO



KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED YD 4
WELL, WELL PAD & ACCESS ROAD
T37N-R18W, SECTION 14
NEW MEXICO PRINCIPAL MERIDIAN

FIGURE #4
Prepared by:
Environmental Services
Section

1.6.3 Project Construction

The following descriptions of project design features (Table 1.0) and construction practices are based on the surface use plans of each well site.

Table 1.0. Project Design Features for Kinder Morgan’s Proposed 2 Well Project, BLM, CANM, Montezuma County, Colorado, 2003.

Well Name	Road/Flowline Length/Acres Disturbed (50-foot wide ROW)	Well Pad Area (Acres)	Total Affected Surface Area (Acres)
Kinder Morgan HC-4	350-ft/0.40-ac	3.18-ac	3.58-ac
Kinder Morgan YD-4	150-ft/0.17-ac	3.18-ac	3.35-ac
Total Disturbance			6.93 acres

Existing Infrastructure – As described in Section 1.5, an existing 50-foot wide permanent oil and gas infrastructure ROW with a 30-foot wide TUA exists adjacent to both of the proposed Kinder Morgan well sites (BLM, 1983). Within this ROW are an improved bladed road and a CO₂ gathering pipeline system. All of the proposed action wells, if productive, would be connected via flowlines to this existing gathering system. Access to all proposed well sites would be via the existing road network with short new construction access proposed for the two well sites.

Access Road Construction - Two (2) short segments of well site access are proposed. New road construction to the HC-4 well site would be 350-feet long by 50-feet wide (0.40 acres) and 150-feet long by 50-feet wide (0.17 acres) to the YD-4 well site. Both of the access roads would originate from the existing area oil and gas infrastructure road system. The following project components would be constructed within the 50-foot wide access road ROWs: an 18-foot wide driving surface; bar ditches along both sides of the driving surface; and a flowline. These access roads would be constructed according to specifications outlined in the BLM SJRA “Gold Book” for road design and construction. Size and location placement of culverts are based on engineering judgment made during the on-site inspection.

Well Pad Construction – The proposed HC-4 and the YD-4 are both located within previously chained (disturbed) piñon-juniper habitat. Each well pad would be approximately 380-feet by 365-feet (3.18 acres) in size. The pads would be stripped of vegetation, leveled and graded. A surface cover of gravel may be applied in order to provide a safe working surface and to reduce the potential for wind erosion of site soils. Trailers for work and living space for the rig supervisor, tool pushers, mudloggers/geologists, mud engineers and safety personnel will be temporarily placed on the pad locations.

Well Drilling –The drilling operations are expected to commence soon after a permit is issued. Drilling operations for each well would last for approximately 3-4 weeks, and would be drilled in succession.

Rig crews work on 12-hour shifts and typically number 5 people per crew. Well depths for the HC-4 and YD-4 would range from approximately 8,240 feet to 8,450 feet.

Conductor pipe would be set from surface to approximately 80-feet deep prior to the drill rig moving onto location. The 12-1/4" diameter surface hole is drilled approximately 3,000', into approximately 100' of the Cutler formation. A full string of 9-5/8" diameter (steel) surface casing is set at this point and cemented to surface in order to protect groundwater, primarily within the Shinarump formation, from mixing with drilling fluid. An 8-3/4" hole is then drilled from the surface casing point to approximately 8,000' (20' within the Leadville formation). A 7" diameter chrome production tubing is then run and cemented to surface. The last approximately 200' of the CO₂ bearing payzone is drilled to 5-7/8" diameter. Wireline logs may then be run to assist in the evaluation of the reservoir. Fresh water for drilling operations would be obtained and trucked from a private, off lease source during construction and drilling. Trucked water would be discharged onsite to the fresh water reserve pit. Approximately 8,000 barrels (bbls) of water would be needed for the first drill location. Any leftover fresh water (following drilling) would be pumped from the pit and hauled to the next drill location. It is estimated that another 2,000 bbls. would be needed to supplement recycled water for the second well. In total approximately 10,000 bbls. or 1.69 acre-feet of fresh water is estimated for use in the drilling process. The fresh water usage could vary depending on the severity of lost circulation during drilling.

Water generated during production testing would be discharged to a flow back tank where it would be collected by vacuum truck and hauled off-site to a permitted underground injection control (UIC) well. In addition to fresh water, salt water (brine) is needed for drilling through salt zones beginning in the Desert Creek formation (approximately 5,800-ft). The brine water is purchased and hauled to the first well site from a private well in Bedrock, Colorado (20 miles west of Naturita). Approximately 4,000 bbls. of brine water would be discharged onsite into the salt-water reserve pit for the first well pit. Any unused brine water would be recycled and hauled to the subsequent drill site. It is estimated that an additional 1,500 bbls. would be needed for the second drill site to supplement the recycled brine. In total, approximately 5,500 bbls or 0.93 acre feet of brine water is estimated for use during the drilling of both wells.

The water remaining at the end of the drilling program would be disposed of in the nearest Kinder Morgan disposal well (Yellowjacket and Hovenweep). It is estimated that approximately 1,000 bbls of fresh water and 2,000 bbls of brine would necessitate disposal upon completion of the drilling operations.

Drilling fluids and mud additives are re-circulated into the wells during drilling. Drill cuttings are extracted from the drilling muds and placed in the reserve pit. The drilling fluids would be recycled whenever practical. Produced water or spent fluids would be allowed to evaporate in the reserve pit, or would be hauled to a Class I non-hazardous disposal well.

Mud Products on site during the drilling process are listed in Table 1.1.

Table 1.1. Mud Products and Quantity on each Location, 2 Proposed Kinder Morgan Wells, 2003.

Mud Products	Quantity on Location
Bentonite	400 sacks
Barite	800 sacks
Soda Ash	40 sacks
Lime	120 sacks
Polymer	300 gallons
Lignite	40 sacks
Drispac/polymer	200 sacks
LCM	400 sacks

Source: Mike Atchison, Baroid Drilling Fluids, 2002.

Well Completion, Testing, and Operation – Production casing would be run and the well would be completed for production following drilling. Near surface aquifers would be cased off with a 9-5/8” diameter surface casing string set at 2,800 to 3,200 feet below ground surface and cemented to surface. All areas of the well pad not needed for production would be reclaimed once production commences. Wireline logging at the end of drilling operations would be conducted in one day by one double-axle logging truck. The completion rig would be on location for approximately 4 weeks.

On-site Personnel - During the construction, drilling, completion and operation of each well, the following personnel would be onsite for varying durations: Rig supervisor, tool pusher, mud logger’s (2), mud engineer (1), H2S safety technicians (2), in addition to the regular rig crew (5 people) which work 12-hour shifts. Other personnel such as welders and mechanics may be at the site as needed. Other miscellaneous drilling and production staff, specialists and consultants may be needed. Due to safety concerns all unnecessary personnel and vendors are kept off these closed and gated locations. On-site personnel each have a vehicle on location.

Transportation – Typically 25 tractor-trailer loads are required to move the bulk of the drilling equipment onto the surface location and the same numbers of loads are required to relocate the drilling equipment from the location. Approximately 125 trips (total) per well site are needed to supply water for drilling, 2 trips for fuel, and 4 trips for cement. An additional 10 vehicle trips per day would be needed for transportation of crews to the site. Approximately 70 trips per well site would be needed to relocate (first three wells) and dispose (last well site) of fresh water and brine water after completion of drilling. Solid waste and liquid waste would be disposed of once per week for a total of 8 trips. This is a total of 565 vehicle trips per well.

Safety and Hazards – Safety and security are of primary concern to Kinder Morgan due to possible releases of hydrogen-sulfide gas (H2S) during drilling and completion operations within the McElmo Dome Field.

In order to assure that only personnel certified in H2S safety protocols and the use of specialized H2S safety and emergency equipment, are permitted onsite, all well pad locations would be fenced and gated during drilling and completion operations. All personnel are required to check in and out with the H2S safety supervisor upon arrival or departure from the site. All personnel wear H2S monitors on the outside of clothing when working in the project area. Finally, the drill rig is equipped with several H2S monitors with audible and visual alarm systems to alert personnel when H2S is present. Kinder Morgan's H2S Safety Plan is provided in the APD. Other standard industry safety policies are also in effect during all operations at the well sites in an effort to eliminate all accidents.

Flowline Construction - Should the wells prove productive, the flowlines would be constructed. As described previously, the flowlines and access roads would occupy the same ROW alignments. Typical construction consists of clearing the ROW, trenching the ditch to 5-6 feet, stringing and welding the pipe, and reclamation of the ROW.

Operation and Maintenance - Should the wells be productive, Kinder Morgan would own or have control of the following facilities on each location: a wellhead and a short piece of above ground piping to connect the well to a new underground flowline. The new flowlines would transport the produced CO₂ to an existing cluster facility. At the cluster facilities separators would be used to remove production liquids from the gas stream. Produced water would be transported by an existing pipeline for eventual injection into the same Leadville/Ouray formation through existing EPA Class I disposal wells. Anticipated volumes of production water over the life of the well are difficult to predict due to variability in geologic conditions and well construction. Typically, annual volumes of production water decrease incrementally over the life of the well. Preliminary estimates of production water volumes based on typical CO₂ wells indicate production of 1.0-acre feet/year for the life of the well. However, this produced water is injected back into the Leadville/Ouray formation through the EPA Class I disposal wells.

Plans for Surface Reclamation - After completion of the proposed project, each location would be reclaimed according to BLM specifications provided in each approved APD, and as proposed by Kinder Morgan in their Surface Use Program. Reclamation activities would include removal of facilities and waste, reserve pit closure, re-contouring abandoned sites, reseeding and monitoring of re-vegetation efforts and noxious weed management. All well pad locations would be reclaimed to one acre, which would remain for the life of the well. Kinder Morgan would contact the BLM within 48-hours of initiating reclamation activities and upon completion of restoration measures.

The total area to be disturbed by construction of the two well pads is approximately 6.93 acres.

2.0 AFFECTED ENVIRONMENT

2.1 INTRODUCTION

In this chapter, to comply with the CEQ requirements of analytic and concise environmental documents (40 CFR 1502.2), those resources identified as potentially affected by the proposed action or as a special concern are described. All critical elements (e.g., cultural resources, threatened/endangered species, etc.) are addressed in accordance with H-1790-1 - National Environmental Policy Act Handbook. Non-critical environmental components (e.g., topography, climate, etc.) are not discussed in detail. For the purpose of providing baseline data, the project study areas are defined as approximately 10-acres including, and surrounding each well site. Onsite field investigations of the well sites were conducted in December 2002 by Ecosphere biologists.

Primary uses of the project area are recreation, grazing, Christmas tree procurement, firewood gathering and some existing natural resource development activity consisting primarily of natural gas (including CO₂) production, gathering, and transport. There are no prime or unique farmlands, known paleontological resources, wilderness or wilderness study areas, floodplains, or wild and scenic rivers within the two well pad project areas. No adverse impacts pertaining to environmental justice or Native American religion apply to the proposed project.

2.2 CRITICAL ELEMENTS

2.2.1 Air Quality

According to the Colorado Air Quality Control Commission Report to the Public, 2000-1, (CDPHE, 2002a) the project study areas lie within the Western Slope Colorado Air Quality Control Region. The primary sources of air pollutants in this region are from unpaved roads and streets, seasonal sanding for winter travel, motor vehicles, and wood burning stove emissions. The Western Slope measures Carbon Monoxide, PM10 particulates, PM2.5, and Lead levels at monitoring sites in Grand Junction, Pagosa Springs, Durango, and Leadville (CDPHE, 2002a). The closest monitoring site to the project study areas that exceeded the PM10 level in 2000-1 was in Pagosa Springs, which is in a PM10 Attainment/Maintenance area (CDPHE, 2002a).

Air quality permits are required for emission sources on the well pads if established emission thresholds for designated pollutants are exceeded. State and Federal Air Quality Standards are presented in Table 2.0. No air quality permits are required for the proposed action.

2.2.2 Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACEC) are those specific areas of BLM administered lands, which are managed to protect or enhance particular, special, or unique values (ACEC Plan, 1986). The proposed project area is within the CANM, and formerly within the Anasazi Cultural Multiple Use Area. The management objectives of the Anasazi Cultural Multiple Use Area are superseded by the Monument designation. A description of the resources and management objectives of the CANM are presented in Section 1.3 Conformance with San Juan/San Miguel Resource Management Plan of this EA.

Table 2.0 State and Federal Air Quality Standards (micrograms per cubic meter of air (ug/ m³) and milligrams per cubic meter of air (mg/m³).

Parameter	Ambient Federal Standards			Colorado Standards	
	Averaging Time	Primary	Secondary	Primary	Secondary
Carbon Monoxide	8 hours	10 mg/m ³		10 mg/m ³	
	1 hour	40 mg/m ³		40 mg/m ³	
Lead	Quarterly	1.5 ug/ m ³	1.5 ug/ m ³		
Nitrogen Dioxide	Annual (arith)	100 ug/ m ³	100 ug/ m ³	100 ug/ m ³	
Oxidants (ozone)	1 hour	235 ug/ m ³	235 ug/ m ³	235 ug/ m ³	
Sulfur Dioxide	Annual	80 ug/ m ³			
	3-hour		1300 ug/ m ³		
	24 hours	365 ug/ m ³			
Particulates (PM 10)	Annual (Arith)	50 ug/ m ³	50 ug/ m ³	50 ug/ m ³	
	24 hours	150 ug/ m ³	150 ug/ m ³	150 ug/ m ³	
Particulates (PM2.5)	Annual (Arith)	15 ug/ m ³	15 ug/ m ³		
	24 hours	65 ug/ m ³	65 ug/ m ³		

Sources: National Ambient Air Quality Standards (EPA, 2002). Ambient Air quality Standards for the State of Colorado (CDPHE, 2002b).

2.2.3 Cultural Resources

Human groups have inhabited the project study area during the past 10,000 to 12,000 years. They are characterized by Paleo-Indian hunters of big game; Archaic small game hunters and gatherers; and Formative, sedentary agriculturalists and protohistoric hunters and gatherers (BLM, 1984).

Archaeologists from Complete Archaeological Service Associates (CASA) inventoried the proposed well sites and associated access road and flowline alignments on November 13, 2002 (CASA 02-130, 2002) (CASA 02-131, 2002). For each site, a 660-ft by 660-ft (10 acres) area was inventoried by two persons walking a series of parallel transects spaced no greater than 15 meters apart. Prior to all field surveys, a records search was undertaken at the CANM office in order to identify previously recorded sites in proximity to the project study areas. Provided, as follows are well specific summaries of the literature review and survey efforts for each site.

HC-4 Well Pad and Associated Facilities

The proposed HC-4 well pad and associated facilities are located within the Mockingbird Mesa Cultural Resource Emphasis Area (CREA). The mesa was identified as an important cultural resource area in the San Juan/San Miguel Resource Management Plan, and in the plan for the Anasazi Cultural Multiple Use Area of Critical Environmental Concern. This area is also mentioned in the Monument Proclamation. A Cultural Resource Management Plan specific to Mockingbird Mesa was prepared in 1986. The Mockingbird Mesa area is considered significant as a district of interrelated Ancestral Puebloan archaeological sites. It has one of the highest recorded archaeological site densities in the nation. Six hundred eighty four sites have been recorded within a 3,976 acre area on the mesa. These sites provide evidence that Mockingbird Mesa was utilized and or occupied from as early as 5,000 B.C. to the historic period, with the most intensive occupation occurring during the Ancestral Puebloan, Pueblo II period (A.D. 900-1150).

The Mockingbird Mesa Cultural Resource Management Plan outlines a number of actions that are designed to meet the management objectives for cultural resources in the area. Enhancement, use, and protection of the sites in this cultural resource area are the primary management objectives. The management actions that would be relevant to the HC 4 well pad and facilities, specifies that “all proposed surface disturbing actions involving cultural resources will be given more intense management. Avoidance will remain the primary management measure and compliance activity will be given priority consideration. Due to extremely high site densities, operational areas may frequently be reduced for surface disturbing proposals.”

The record search indicated that numerous sites have been previously recorded in the immediate area of the proposed well, but none within the survey parcels. No cultural resources were identified at the HC-4 well site.

YD-4 Well Pad and Associated Facilities

The record search indicated that numerous sites have been previously recorded in the immediate area of the proposed well, but none within the survey parcels. No cultural resources were identified at the YD-4 well site.

2.2.4 Prime and Unique Farmlands

No prime and unique farmlands have been identified in the project area.

2.2.5 Floodplains, Wetlands, and Riparian Zones

No floodplains, wetlands, or riparian zones occur in the project area.

2.2.6 Native American Religious Concerns

No known Native American sacred site or Traditional Cultural Property occurs in the project area (Laura Kochanski, BLM Archaeologist, personal communication, 2003). Native Americans are being consulted through the request for comments on this environmental assessment. Comments and suggestions will be considered by the decision making official prior to preparation of the Finding of No Significant Impact and signing of the Decision Record. A list of the Native American Tribes being consulted is provided in Section 4.0 of this document.

2.2.7 Threatened, Endangered, and Sensitive Species

In following the guidelines of the Endangered Species Act (ESA) of 1973, as amended, a search was made for threatened, endangered, or sensitive (TES) flora and fauna species with potential to occur in Montezuma County and/or in the project area. Provided in Table 2.1 is a listing of all federally listed threatened, endangered and candidate species, including their protection status, that are considered in this EA.

With the exception of the candidate species, all of these species are protected under the ESA. Table 2.2 provides a listing of BLM sensitive species compiled from the Colorado BLM State Director's Sensitive Species List (1998), and the Colorado Natural Heritage Program (CNHP).

According to the USFWS, there are nine federally listed threatened and endangered flora/fauna species with potential to occur in Montezuma County and/or in the project study area, and four species, the boreal toad, the Gunnison sage grouse, the yellow-billed cuckoo, and the Sleeping Ute milkvetch considered candidates for ESA listing. Additionally, there are 29 BLM sensitive species.

The CANM was identified in the monument proclamation as home to a wide variety of wildlife species, including unique herpetological resources. Habitat for the long-nosed leopard lizard and twin-spotted spiny lizard (desert spiny lizard) may be found within the monument. Peregrine falcons have also been observed in the area. These species are included in the TES evaluation made in this EA.

The project was surveyed for potential habitat of the listed and sensitive species on January 3, 2003 by a BLM biologist and BLM botanist and on December 5, 2002 by biologists from Ecosphere Environmental Services. The potential for TES species to occur in the project area is presented in Table 2.1 and Table 2.2. None of the federally listed threatened, endangered, or candidate species have potential to occur in the project area. Several bat species may occur foraging in the project area. The potential however for sensitive bat species in the project area is limited due to the absence of surface water resources or good roosting areas in the vicinity of the proposed action.

Table 2.1. Threatened and Endangered Species With Potential To Occur in Montezuma County, Colorado and or the Project Area, USFWS, 2002.

Species Common Name	Scientific Name	Federal Status	Habitat	Potential to Occur in Project Area (PA)
MAMMALS				
Black-footed Ferret	<i>Mustela nigripes</i>	Endangered	Habitat consists of prairie dog colonies larger than 80 ha.	No prairie dogs colonies/towns occur in the PA or vicinity.
Canada Lynx	<i>Felis lynx canadensis</i>	Threatened	Habitat consists of mixed conifer types.	No mixed conifer forest types in project vicinity. No habitat on CANM.
BIRDS				
Eagle, Bald	<i>Haliaeetus leucocephalus</i>	Threatened	Nests and roosts along perennial water sources.	No perennial water sources in PA, may occur foraging.
Flycatcher, Southwestern willow	<i>Empidonax traillii eximius</i>	Endangered	Breeds in riparian habitats with dense thickets.	No riparian habitats or dense willow thickets in PA.
Grouse, Gunnison Sage	<i>Centrocercus minimus</i>	Candidate	Requires large expanses of sage with a diversity of grasses and forbs and healthy riparian areas.	No large open sagebrush flats in PA. Sagebrush occurs in the openings and chained areas. No riparian areas existing in the PA.
Owl, Mexican Spotted	<i>Strix occidentalis lucida</i>	Threatened	Nests in caves or cliff ledges in steep-walled canyons and mixed conifer forests.	No mixed conifer forests in PA.
Cuckoo, Yellow-billed	<i>Coccyzus americanus occidentalis</i>	Candidate	Breeds in riparian woodlands and similar habitats.	No riparian woodlands in PA.
FISH				
Pikeminnow, Colorado	<i>Ptychocheilus lucius</i>	Endangered	Eddies & backwater currents in Yampa, Green, Gunnison, & San Juan Rivers.	No perennial water sources exist within the PA.
Sucker, Razormouth	<i>Xyrauchen texanus</i>	Endangered	Occurs in streams to large with backwaters.	No perennial water sources exist with PA.
REPTILES and AMPHIBIANS				
Boreal Toad	<i>Bufo boreas</i>	Candidate	High elevation (>8000 feet) pristine riparian areas.	PA elevation below 8,000 feet and absent of riparian areas.
PLANTS				
Cactus, Mesa Verde	<i>Sclerocactus mesae-verdae</i>	Threatened	Salt Desert Scrub communities in the Fruitland and Mancos Shale formations.	PA geology is not Fruitland or Mancos Shale Formations.
Milkvetch, Mancos	<i>Astragalus humillimus</i>	Endangered	Ledges and mesa tops in slickrock communities of the Mesa Verde Formation.	No Mesa Verde Formation in PA.
Milkvetch, Sleeping Ute	<i>Astragalus tortipes</i>	Candidate	Mixed desert scrub community in gravels derived from volcanic intrusion into Mancos Shale at 5400-5700 ft	Elevation of PA above 5400-5700 ft. No mixed desert scrub in PA.

Uinta Basin hookless cactus	<i>Sclerocactus glaucus</i>	Threatened	Rocky hills, mesa slopes, and alluvial benches; in desert shrub communities elevation 4,500-6,000 feet.	PA above 6,000 feet.
Clay-loving wild buckwheat	<i>Eriogonum pelinophilum</i>	Endangered	Mancos shale badlands, in salt desert shrub community. Elevation 5,200-6,400 feet.	PA is not in Mancos shale badlands.

Source: USFWS listing of threatened and endangered species potentially occurring in Montezuma County, Personal Communication with Terry Ireland, USFWS, 2002., USFWS Federally Listed Species for the San Juan Bureau of Land Management, July 15 2002 and personal communication Leslie Stewart, 2003.

Table 2.2. BLM Sensitive Species With Potential To Occur Within the San Juan Field Office Management Area and/or the Project Area.

Species Common Name	Scientific Name	CNHP Status	Habitat	Potential to Occur in Project Area (PA)
MAMMALS				
Bat, Allen's (Mexican) Big-eared	<i>Idionycteris phyllotis</i>	G4, S2	Roosts are associated with mines/caves. Known to forage in pinyon-juniper woodlands.	May occur foraging, no mines or caves in PA.
Bat, Big Free-Tailed	<i>Nyctinomops macrotis</i>	G5, S1	Rocky cliffs with crevices and fissures required for roosting.	May occur foraging, no rocky cliffs with crevices in PA.
Bat, Spotted	<i>Euderma maculatum</i>	G4, S2	Cliff dwellers with diurnal roosts in cracks and crevices of canyons and cliffs. Known to forage in pinyon-juniper woodlands.	May occur foraging, no rocky cliffs with crevices in PA.
Bat, Townsend's Big-Eared	<i>Corynorhinus townsendii</i>	G4, S2	Dependent on availability of abandoned or inactive mines.	May occur foraging, no mines or caves in PA.
Myotis, Fringed	<i>Myotis thysanodes</i>	G5, S3	Breeds in caves and forages in piñon-juniper woodlands.	May occur foraging, no mines or caves in PA.
Myotis, Yuma	<i>Myotis yumanensis</i>	No CNHP listing	Requires surface water & suitable roost sites	May occur foraging, no perennial water sources, mines or caves in PA.
BIRDS				
Tern, Black	<i>Chlidonias niger</i>	G4/S3S4	Nests in inland marshes of the North American prairie, winters at sea.	No inland marshes or prairies in PA.
Goshawk, Northern	<i>Accipiter gentilis</i>	G5, S3	Nests found on north aspects in aspen stands above 8,250 ft. Also know to nest in conifer stands including ponderosa pine.	PA elevation below 8,250 feet (approximately 6,400). No suitable nesting habitat in PA.
Ibis, White-Faced	<i>Plegadis chihi</i>	G5, S2,	Associated with shoreline and marsh habitats bordering open water.	No potential habitat in PA due to lack of riparian areas.
Falcon, Peregrine	<i>Falco peregrinus anatum</i>	G4T3, S3B	Prefers open country and high vertical cliff areas for nesting (>200 feet).	No suitable nesting habitat in AA
Ferruginous Hawk,	<i>Buteo regalis</i>	G4, S3	Nests next to open areas (grassland or shrubsteppe) in elevated sites: trees, rock outcrops, buttes, haystacks, and low cliffs.	Potential foraging habitat occurs in the chained piñon/juniper and sagebrush shrublands in PA, during the winter only. No nesting habitat occurs in PA.
FISH				
Chub, Roundtail	<i>Gila robusta</i>	G2G3, S2	Inhabits pools and rapids of moderate to large rivers.	No perennial water sources exist within the PA
Sucker, Bluehead	<i>Catostomus discobolus</i>	G4, S4	Inhabits headwater streams to large rivers.	No perennial water sources exist within the PA.
Sucker, Flannelmouth	<i>Catostomus latipinnis</i>	G3G4, S3S4	Inhabits headwater streams to large rivers.	No perennial water sources exist within the PA.
Trout, Colorado River Cutthroat	<i>Oncorhynchus clarki pleuriticus</i>	G5T3, S3	Occurs in headwater streams and lakes.	No perennial water sources exist within the PA.

Table 2.2 (Continued) BLM Sensitive Species With Potential To Occur Within the San Juan Field Office Management Area and/or the Project Area.

Species Common Name	Scientific Name	CNHP Status	Habitat	Potential to Occur in Project Area (PA)
REPTILES and AMPHIBIANS				
Lizard, Desert Spiny	<i>Sceloporus magister</i>	G5, S2	Habitat present by stream channels seems to be essential for the species.	No potential habitat in PA due to lack of riparian areas.
Lizard, Long nose Leopard	<i>Gambelia wislizenii</i>	G5, S1	Below 5000 feet in extreme western Colorado associated with desert shrub.	No desert shrub plant communities in PA, elevation above 5,000 feet
PLANTS				
Jones blue star	<i>Amsonia jonesii</i>	G4, S1	Runoff-fed draws on sandstone in pinyon-juniper, and desert shrub communities, 3,900 to 7,000 feet	Potential habitat within project area. However, no individuals observed during botanical surveys of PA. This species, if present, would have been detectable even in winter due to its tall woody stem.
Cronquist Milkvetch	<i>Astragalus cronquistii</i>	G2, S2	Black brush and desert scrub on sandy, gravelly ridges of sandstone on Mancos Shale.	No Mancos Shale, black brush or desert scrub communities in PA.
Naturita Milkvetch	<i>Astragalus naturitensis</i>	G3, S2, S3	Shallow pockets of soil on Sandstone mesas, ledges, crevices and slopes in PJ woodlands (5000-7000 ft)	No Potential habitat exists in PA.
Giant Helleborine	<i>Epipactus gigantean</i>	G4, S2	Decomposed sandstone; sandstone seeps; <8,000 feet	No habitat within analysis area
Kachina Daisy	<i>Erigeron kachinensis</i>	G2, S1	Saline soils in seeps in canyon walls (4800-5600').	No seeps or canyon walls in PA
Comb Wash Buckwheat	<i>Eriogonum clavellatum</i>	G3, S1	Mancos Shale badlands in salt desert shrub.	No Mancos Shale badlands in PA.
Pagosa Trumpet Gilia	<i>Ipomopsis polyantha var. polyantha</i>	G1, S1	Fine-textured soils derived from Mancos Formation.	No Mancos Shale in PA
Pagosa Bladderpod	<i>Lesquerella pruinosa</i>	G2, S2	Fine-textured soils derived from Mancos Formation.	No Mancos Shale in PA
Dolores Skeleton Plant	<i>Lygodesmia doloresensis</i>	G1Q,S1	Shale slopes in pinyon-juniper or cold desert shrublands, 5,300 to 5,800 feet	No potential habitat; San Miguel County only.
Eastwood monkey-flower	<i>Mimulus eastwoodiae</i>		Shallow caves and seeps on canyon walls, 4,700 to 5,800 feet	No habitat within analysis area
Rollins cryptanth	<i>Oreocarya rollinsii</i>		Shale slopes in pinyon-juniper or cold desert shrublands, 5,300 to 5,800 feet	No habitat within analysis area

Source: Colorado BLM State Directors' Sensitive Species List (June, 2000), and including CNHP listed species and CANM Proclamation sensitive species.

2.2.8 Hazardous or Solid Wastes

Kinder Morgan maintains a file, per 29 CFR 1910.1200(g), containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances which are utilized during the course of construction, drilling, completion and production operations for this project.

Hazardous materials that may be found at the site may include drilling mud and cementing products that are primarily inhalation hazards, fuels (flammable and/or combustible), materials that may be necessary for well completion, stimulation activities such as flammable or combustible substances and acids/gels (corrosives). Human solid and liquid wastes would be generated primarily during the construction and drilling phases of the project and would be contained within portable facilities at the site.

2.2.9 Water Quality

The following sections address project area surface and groundwater resources.

2.2.9.1 Surface Water

Perennial surface water resources in the project area include McElmo Creek and Yellow Jacket Creek. McElmo Creek is located 9.5 miles from HC-4 and 9 miles from YD-4. Yellow Jacket Creek is located 2.5 miles from HC-4 and 2 miles from YD-4. Surface drainage within the project area generally discharges to ephemeral tributaries that discharge to McElmo Creek and eventually the San Juan River located approximately 24 miles southwest of the project area near Aneth, Utah. Typically, the San Juan River experiences peak flows, primarily from snowmelt, between April and June (BLM 1985). Principal water uses within the San Juan River Basin include irrigation, municipal, industrial, domestic, recreational, and transmountain and transbasin diversion uses.

Available surface water hydrograph data for McElmo Creek includes several US Geological Survey (USGS) gage stations including one station downstream of Cortez (USGS, 09371700), and one station near the Colorado/Utah State line (USGS, 09372000). No USGS data is available for Yellow Jacket Creek. Mean monthly streamflow data for McElmo Creek near the State line indicates flows that range from 33.9 cubic feet per second (cfs) to 65.8 cfs based on approximately 50 years of recorded data. Downstream of Cortez, flows in McElmo Creek range from 26.6 to 79.3 cfs. Mean minimum flows for both gage locations, based on the period of record, were recorded in the month of January. Mean peak flows were recorded in March downstream of Cortez and in August near the State line.

At each of the proposed well pad locations no perennial water features or riparian habitats were observed immediately adjacent to the well pads. Various unnamed ephemeral drainages are located throughout the project area. The hydrological regime in the vicinity of the project area is such that surface water flows only on an intermittent basis in conjunction with significant precipitation events. Ephemeral waterways are fed by snowmelt, however thunderstorms are the primary source of intermittent flow in these ephemeral drainages.

Surface runoff from each of the well pad locations discharges to local ephemeral tributaries that eventually discharge to McElmo Canyon via Yellow Jacket Canyon. A summary of the drainage sequence for each well pad location is provided in Table 2.3 below.

Table 2.3. Surface Water Drainage Sequence From Four Proposed Kinder Morgan Wells, 2003

Well Name	Ephemeral Tributary Drainage Sequence
Kinder Morgan HC-4	Unnamed/Yellow Jacket/ McElmo Canyons
Kinder Morgan YD-4	Unnamed/Yellow Jacket/ McElmo Canyons

Key factors that influence the surface water quality in the project area include sparse vegetative cover, highly erosive and saline soils, rapid runoff, and livestock grazing.

Total suspended solids, total dissolved solids (salinity), heavy metal and biogenic pathogens are the water quality parameters of concern (BLM, 1985) within the project area. Water quality is managed to comply with State and Federal regulations including the Clean Water Act (1977), State Water Quality Standards, and the Colorado River Basin Salinity Control Act (1974). Available USGS water quality data for McElmo Creek at the State line indicates suspended sediment discharges ranging from less than 1 ton/day to 1,440 tons/day for the period of record (1977-1991); total dissolved solids concentrations range from 89.9 tons/day to 1,450 tons/day for the period of record (1969-1999). While these figures represent loadings from within the entire McElmo Creek watershed, they demonstrate the magnitude of pollutant loadings from mostly non-point sources and the potential for surface water influences from saline soils and erosion.

2.2.9.2 Groundwater

The groundwater aquifer in the project area consists of the Colorado Plateaus Aquifers that underlies an area of approximately 110,000 square miles in western Colorado, northwestern New Mexico northeast Arizona, and eastern Utah (Figure 5). Aquifers within the Colorado Plateaus are generally composed of permeable sedimentary rocks that vary in thickness, lithology, and hydraulic characteristics. Within the project area, the Mesa Verde and Dakota-Glen Canyon aquifers are the uppermost water-yielding units in the Colorado Plateaus aquifers as shown in Figure 5. Water from the Mesa Verde aquifer is derived from the Menafee and Cliffhouse sandstone formations; water in the Dakota-Glen Canyon aquifer is derived from the Dakota and Morrison formations (Robson and Banta, 1995).

More localized and shallow groundwater resources are encountered within alluvial deposits associated with the surface water drainages within the project area. These aquifers consist of Quaternary deposits of alluvial gravel, sand, silt, and clay or Quaternary deposits of eolian sand and silt (Robson and Banta, 1995). These aquifers tend to be localized near surface water and of limited aerial extent. In general, groundwater movement is from areas of recharge to areas of discharge (i.e. springs, seeps). Higher elevation mountains and low lying areas provide the most important recharge areas based on the presence of outcrops of permeable geologic formations.

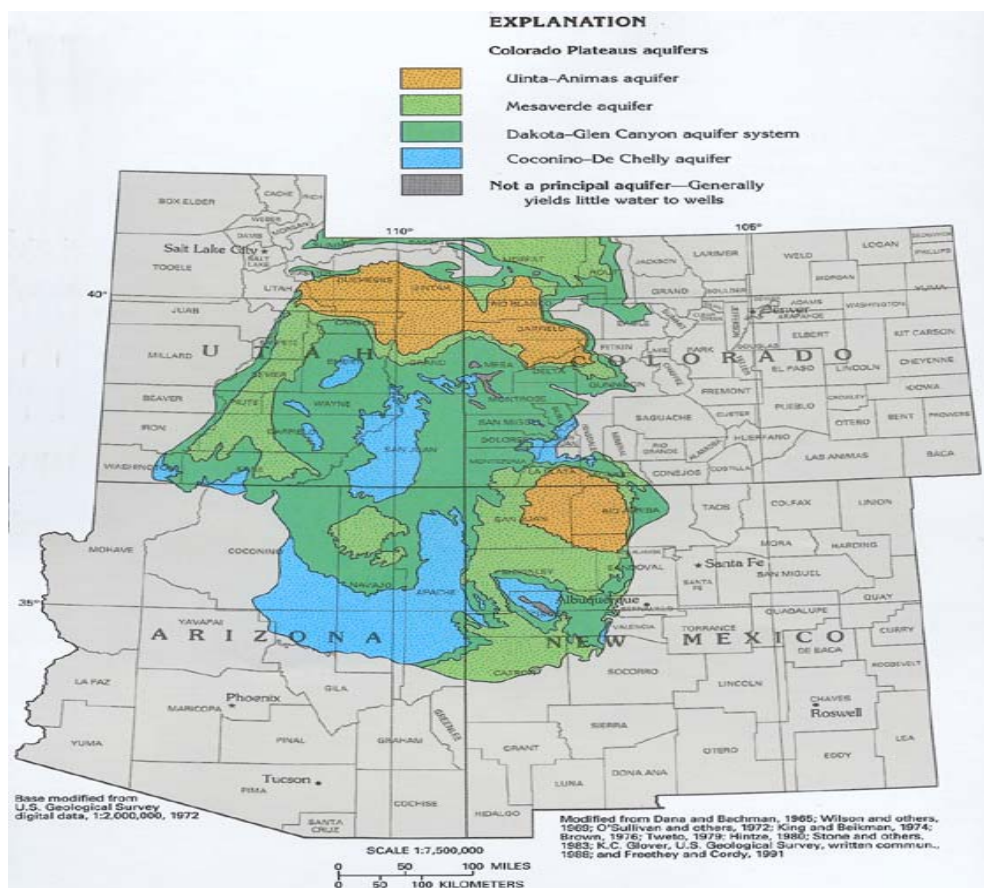


Figure 5. Colorado Plateau aquifer

No groundwater wells were identified within the project area based on a search of the USGS database of available groundwater data. Specific information on groundwater use is limited within the project area and no residential properties or windmill wells for stock watering were observed in proximity to the proposed well pad locations.

Water quality data for groundwater in the project area is also lacking although aquifers associated with sedimentary rocks and marine deposits are known to contain high salinity (BLM, 1985) and abundant mineralization. Water quality in the deeper sedimentary aquifers may be influenced by upward movement of saline water through improperly plugged exploration holes (Robson and Banta, 1995).

2.2.10 Wild and Scenic Rivers

No wild and scenic rivers occur in or near the proposed project area.

2.2.11 Wilderness

There are no designated Wilderness Study Areas (WSAs) within, or immediately adjacent to, the project study areas. The proximity of the proposed action well sites to BLM WSAs are summarized below.

HC-4 Well Pad and Associated Facilities

The HC-4 well site is located approximately 31 miles from the Weber WSA, 32 miles from the Meneffee WSA, 6 miles from the Squaw WSA, 11 miles from the Cahone WSA, and 28 miles from the McKenna WSA (BLM, 1984).

YD-4 Well Pad and Associated Facilities

The YD-4 well site is located approximately 30 miles from the Weber WSA, 31 miles from the Meneffee WSA, 5 miles from the Squaw WSA, 10 miles from the Cahone WSA, and 26 miles from the McKenna WSA (BLM, 1984).

2.2.12 Environmental Justice

Environmental justice is evaluated by considering the demographics of the project area, and by determining whether minority and/or low-income populations would be disproportionately adversely impacted by the project. As no minority or low-income populations reside in the project area, environmental justice is not an issue.

2.2.13 Invasive, Non-native Species

No species considered invasive were documented in the field investigations conducted in December 2002.

2.2.14 Standards For Public Lands Health

The BLM has adopted five standards for protecting Public Lands Health. These standards are:

- Ensure healthy upland soils;
- Protect and improve riparian systems;
- Maintain healthy, productive, native plant and animal communities;
- Maintain or enhance the habitat of threatened or endangered species; and
- Ensure water quality meets minimum Colorado state standards.

The Standards describe conditions needed to sustain public land health, and relate to all uses of the public lands. Standards are applied on a landscape scale and relate to the potential of the landscape. Additional information on the standards and guidelines can be found at the Colorado BLM website: <http://www.co.blm.gov/standguide.htm>. Table 2.4 provides an evaluation of project study area standards.

Table 2.4. Evaluation of Project Area Standards for Public Lands Health Criteria.

	Achieving or Moving Toward Achieving	Not Achieving	Not Applicable
Standard 1	Yes		
Upland soils: proper infiltration/permeability rates			
Remarks: Proper construction techniques on the well location, access road and flowline are designed into Draft COA, which would minimize potential erosion from this project. Once the specified reclamation measures takes place, erosion should be returned to its current level.			
Standard 2			N/A
Riparian systems functioning properly			
Remarks: No riparian areas present.			
Standard 3	Yes		
Healthy and productive plant/animal communities			
Remarks: This project would remove some early mature and mature piñon and juniper trees. These would eventually be replaced with native grasses and shrubs.			
Standard 4	Yes		
Threatened and Endangered Species			
Remarks: There would be no effect to any federally listed threatened or endangered species or potential habitat for such species.			
Standard 5	Yes		
Ensure water quality meets minimum Colorado Standards			
Remarks: No surface water in project area. Well construction techniques, Bradenhead testing, and monitoring of nearby wells would provide baseline data to assure detection of degradation in water quality.			

2.3 NON-CRITICAL ELEMENTS

2.3.1 Topography

HC-4 Well and Associated Facilities

The proposed HC-4 well site is located on top of Mockingbird mesa. The well site slopes to the northeast at approximately 3 to 6 percent. The elevation of the proposed well site is approximately 6,375 feet.

YD-4 Well and Associated Facilities

The proposed YD-4 well site is located on a mesa between Yellowjacket and Woods Canyons. The well site slopes overall to the west at approximately 1 to 6 percent. The elevation of the proposed well site is approximately 6,505 feet.

2.3.2 Geology

HC-4 and YD-4 Well Pad and Associated Infrastructure

The HC-4 and YD-4 well locations have Cretaceous aged Dakota formation below developed soils and in outcrops found along hillsides and gullies. The lower portion of the Dakota formation is exposed in the study area, consisting predominately of massive sandstone with occasional thin shale interbeds. Sandstones are light yellow brown in outcrop appearance and off white to light gray when broken, fine to occasionally coarse grained, firmly to well cemented with silica and minor calcite. Shales are medium to dark gray, platy, unconsolidated to firm, occasionally carbonaceous in part, some with organic rich /coaly lenses. The basal Dakota member (Burrow Canyon Member) is coarsely conglomeratic sandstone. The Dakota formation is the source for the numerous sandstone cobbles and boulders in the sandy loam soil developed in the area.

2.3.3 Soils

HC-4 Well Pad and Associated Facilities

The proposed well pad and access road ROW consists of Sharps-Pulpit complex, 6 to 12 percent slopes, forming on hillsides and mesa tops from 6,200-7,400 feet. This is a deep and very well drained soil with moderately slow permeability. The available water capacity is low and the effective rooting depth is 20-40 inches. The shrink-swell potential is low and runoff is high and the hazard of water erosion is severe (NRCS, 1997).

YD-4 Well Pad and Associated Facilities

Surveyed soil type for the well location consists of Romberg-Crosscan complex 6 to 25 percent slopes, forming on hillsides and mesa tops from 5,400-6,800 feet. This soil is a very deep and well drained soil, with moderately slow permeability. The available water capacity is low and the effective rooting depth is 60 inches or greater. The shrink-swell potential is moderate and runoff is high and the hazard of water erosion is severe (NRCS, 1997).

2.3.4 Vegetation

HC-4 Well Pad and Associated Facilities

The proposed HC-4 site is located within chained piñon/juniper (*Pinus edulis/Juniperus osteosperma*) woodland and sagebrush (*Artemisia spp.*) shrubland vegetation mosaic. The overstory canopy cover is approximately 30 to 40 percent and the understory canopy cover is approximately 40 percent.

Understory vegetation is comprised of antelope bitterbrush (*Purshia tridentata*) rabbitbrush (*Chrysothamnus nauseosus*), yucca (*Yucca harrimaniae*) and big sagebrush (*Artemisia tridentata*). Tree heights range from 6 to 12 feet and the shrubs heights are from 2 to 4 feet. Groundcover species included: Prickly pear (*Opuntia polyacantha*), crested wheatgrass (*Agropyron cristatum*), and Indian ricegrass (*Oryzopsis hymenoides*). Common ground cover species were difficult to determine because of winter conditions. Appendix A provides a complete list of plants occurring in the project area as recorded during the biological survey.

YD-4 Well Pad and Associated Facilities

The proposed HB-4 well site is located within a heavily chained piñon/juniper woodland (*Pinus edulis/Juniperus osteosperma*) and sagebrush (*Artemisia spp.*) shrubland vegetation mosaic. Tree heights are approximately 15 to 25 feet in height with an estimated canopy cover of 30 to 40 percent. Shrub cover within this piñon/juniper woodland was estimated to be approximately 10 to 20 percent while shrub height ranged from 3-4 feet. Associated shrub species include rubber rabbitbrush (*Chrysothamnus nauseosus*), mormon tea (*Ephedra viridis*), and yucca (*Yucca harrimaniae*). Ground cover is relatively sparse throughout the area and is estimated to be less than 5 percent. Ground cover species were difficult to determine due to winter conditions. Appendix A provides a complete list of plants occurring in the project area as recorded during the biological survey.

2.3.5 Wildlife

Wildlife with potential to occur in the project area includes a variety of mammals, birds, and reptiles common to southwestern Colorado. A list of wildlife commonly occurring in the CANM is included in Appendix A.

Ecosphere biologists conducted biological investigations of the project area on December 5, 2002, and BLM biologists conducted surveys on January 3, 2003. Signs of deer and rabbit (i.e. scat) were noted at both well sites. No prairie dogs or prairie dog towns were found during the site survey of the well sites. Signs of coyote were detected at the YD-4 well site. Numerous common birds including crows, scrub jays, western bluebirds, and sparrows utilize the project area. Both well sites provide potential raptor foraging habitat. No raptors or raptor nests were observed within the project area at the time of the surveys.

2.3.6 Big Game

Mule deer and elk are year-round residents in the project area. According to the San Juan-San Miguel Resource Management Plan, there are no designated deer or elk winter range or concentration areas within the project area. Both species tend to migrate between forested lands at higher elevations in the spring and summer to woodlands at lower elevations in the fall and winter. Average herd densities are relatively low in the woodland areas in summer (2-3 deer/square mile) due to the large amount of available habitat (RMP, 1984). Winter herd densities are relatively high (200 deer/square mile) on crucial winter ranges because snow depths limit habitat availability (BLM 1984). Signs of deer (i.e. tracks and scat) were noted within the proposed project area.

2.3.7 Range

HC-4 Well Pads and Associated Facilities

The HC-4 well site and associated facilities is located within the Cahone Mesa grazing allotment. The allotment is permitted to Wesley Wallace for use by 185 cattle from November 16 through May 20 for a total of 1,117 Animal Unit Months (AUMs) (Mike Jensen, Range Specialist, personal communication). Livestock will not be present during construction of the proposed project if it occurs in the Spring of 2003.

YD-4 Well Pad and Associated Facilities

The YD-4 well site and associated facilities are within the Sandstone grazing allotment. The allotment is permitted to Dodd and Glenna Harris for use by 400 cattle from November 15 through May 15 for a total of 2,206 AUMs (Mike Jensen, Range Specialist, personal communication). Livestock will not be present during construction of the proposed project if it occurs in the Spring of 2003.

2.3.8 Visual Resources

HC-4-Well Pad and Associated Facilities

The proposed HC-4 well site is located on Mockingbird Mesa. The well pad project should not be visible from Highway 666. The well site would be visible from the Hovenweep Cluster Road, which is located adjacent to the well pad project area, and aerially. The HC-4 well site is located approximately 19 miles from the Cross Canyon Outstanding Scenic Area (OSA), 9.5 miles from the Goodman OSA, and 27 miles from the Mesa Verde OSA.

YD-4 Well Pad and Associated Facilities

The proposed YD-4 well site is located on a strip of mesa situated between Yellowjacket and Woods Canyons. The well site should not be visible from Highway 666. The well site would be visible from the Yellowjacket Cluster Road which is located adjacent to the well pad project area, any high elevation vistas surrounding the project area, and aerially. The YD-4 well site is located approximately 12 miles from the Cross Canyon OSA, 7 miles from the Goodman OSA, and 23 miles from the Mesa Verde OSA.

2.3.9 Noise

The two well sites are located in areas with limited access and moderate activities related to oil and gas development. No background noise studies have been conducted for the project study area. There are no residences, businesses, or private land located within approximately three miles of the two well sites. Ambient sound levels in the project study areas vary greatly, depending on proximity to existing facilities, roadways or other sources. All of the well sites are adjacent to existing gravel, connector roads, primarily used for oil and gas development. These sound levels would fluctuate with variations in weather conditions including temperature, wind and humidity and the general topography of the area. Private land holdings surrounding BLM lands are primarily rural.

2.3.10 Health and Safety

Oil and gas activity related traffic occurs on unimproved (bladed) roads throughout the project study areas. These roads could be hazardous for travel during inclement weather if appropriate caution is not exercised. Miles of high-pressure natural gas pipelines and associated facilities are present in the project area. These existing pipelines and facilities represent project construction and maintenance hazards. Damage to any of these facilities during project operations and maintenance represent health and safety risks to workers and to the general public. Specifically, the following facilities occur on or near the proposed well sites.

HC-4 Well Pad and Associated Facilities

The HC-4 well site is adjacent to an existing ROW pipeline, and the Hovenweep Cluster Road.

YD-4 Well Pad and Associated Facilities

The YD-4 well site is adjacent to an existing ROW and the Yellowjacket Cluster Road.

CO₂ production equipment operates under high-pressure conditions that can cause failed components to become hazards if dislodged from equipment. High-pressure liquid leaks could also result in an injection hazard to unprotected skin surfaces.

H₂S, an odorless, poisonous gas, may be circulated to the surface during drilling operations. A tested H₂S Contingency Plan would be used during drilling of the proposed action. All necessary precautions, drills, and training are routine to protect personnel on location. H₂S monitors and safety equipment would be on location and operational prior to drilling into H₂S geologic sections.

Production fluids may contain low concentrations of potentially hazardous substances but consist mainly of brackish water. Potential ingestion, eye contact, or skin irritation could result from contact with production fluids.

2.3.11 Socioeconomics

Oil and gas development in the Paradox and San Juan basins makes the industry a large employer in southwestern Colorado. The State of Colorado, Montezuma County and the Federal government collect a large amount of revenues from mineral development royalties in the project area. These projected revenues fluctuate with volumes generated, weather, world affairs, market prices for natural gas and oil and other variables.

Temporary jobs would be generated by construction of the proposed action. These jobs would last for several months. Kinder Morgan's costs to develop the proposed action would be realized as economic gains to contractors and businesses in the project area. Restaurants and other service businesses may benefit in the short-term from the presence (purchasing) of work crews in the project area.

2.3.12 Recreation Resources

Recreation management guidelines for BLM lands are identified in the San Juan-San Miguel RMP/EIS (1984). No Intensive/Special Recreation Management Areas or Extensive Recreation Management areas occur within a mile of the proposed well site project areas. Specifically, the closest recreation area to a well site is the Sand Canyon trail located approximately 8.5 miles east of the HC-4 well site and 7 miles east of the YD-4 well site. Primary recreational activities include hunting, hiking, mountain biking, and horseback riding. The closest recreation site as defined in the RMP is the Lowry Pueblo site, located approximately 7 miles from the HC-4 and 9.5 miles from the YD-4 well site. Primary recreational activities include hunting, minimal firewood gathering, and hiking.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 GENERAL DISCUSSION

This chapter discloses the environmental consequences of implementing the alternatives in accordance with the Council on Environmental Quality (CEQ) Guidelines. The information found in Chapter 2.0, Affected Environment provides the baseline for describing these consequences.

Environmental resources may be affected in many ways during implementation of the proposed action. The effect, or impact, is defined as any change or alteration in the pre-existing condition of the environment produced by the proposed action, either directly or indirectly. Impacts can be beneficial to the resource (positive) or adverse (negative), and can be either long-term (permanent) or short-term (incidental, temporary). Short-term impacts affect the environment for only a limited time, and the environment generally reverts to the pre-project condition. Short-term impacts are often disruptive and obvious. Long-term impacts are substantial and permanent alterations to the pre-project environment.

With long-term impacts, the environment would potentially not revert to pre-existing condition during the lifetime of the proposed project and beyond. Long-term impacts are defined as those impacts whose results endure more than five years. Table 3.0 lists a summary of impacts and mitigation for the proposed project. For the purpose of this EA, potential impacts have been divided into three categories:

Significant – as defined in CEQ guidelines (40 CFR 1500-1508) are impacts that are substantial in severity and therefore should receive the greatest attention in decision-making;

Moderate – impacts which cause a degree of change that is easy to detect, and do not meet the criteria for significant impacts; and

Low – impacts which cannot be easily detected, and cause little change in the existing environment

Where critical or non-critical resources do not exist in the project study areas as described in Chapter 2 – Affected Environment, or would not be impacted by the proposed action, these resources are not further evaluated in this section. The project area contains no prime/unique farmlands, floodplains, wild and scenic rivers, wilderness areas, or Native American Religious Concerns. No impacts to area geologic features are expected from the proposed action. Standards for Public Land Health are achieved in the project study areas. As no minority or low-income populations reside in the project area, environmental justice is not an issue. These resource issues are not further addressed in this EA.

3.2 CRITICAL ELEMENTS

3.2.1 Impacts to Air Quality

The Colorado Department of Public Health and Environment (CDPHE), Air Quality Division regulates air quality impacts from oil and gas activities and develops mitigation measures on a case-by-case basis. Impacts are evaluated to see if they are allowable or unacceptable. Air emissions associated with natural gas production include hydrocarbons, carbon monoxide (CO) and nitrogen oxides (NO_x) associated with production equipment; gas fired drilling equipment, and vehicle exhaust. Air quality impacts associated with the construction, drilling and operation of the proposed action would occur from several sources:

- Suspended particulates (dust) during construction and from vehicular traffic on unpaved roads;
- Suspended particulates (dust) from wind erosion on cleared construction areas;
- Hydrocarbon emissions from the drill rig, service/support vehicles and operation of gasoline and diesel engines (i.e. generators).

Gas production from the well sites may also result in localized reductions in air quality due to odors and emissions from the well sites. Wind dispersion and dilution would reduce the magnitude of emissions and these impacts would be low at locations beyond the well site boundaries. Air quality impacts from construction and drilling operations, primarily from vehicle/equipment exhaust and increased fugitive dust, would be low to moderate and short-term. A tested H₂S Contingency Plan that is designed to alert and protect the public from accidental releases during the drilling process mitigates potential impacts from releases of H₂S gas. During production, impacts would be low and long-term.

3.2.1.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), the impacts on air quality would be low to moderate and short-term during construction and drilling. The potential for releases of H₂S gas pose a potentially significant impact (refer to Health and Safety). This potential however is highly unlikely due to the necessary implementation of a H₂S Safety Plan. Impacts during production operations would be low and long term. These potential impacts would be mitigated by measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area air quality.

3.2.1.2 Mitigation Measures

The proposed project area disturbance would be re-seeded with a BLM approved seed mix to stabilize soils and reduce the impacts of dust created from wind erosion.

Suspended dust from construction could be reduced through sprinkling of disturbed areas with fresh water from a clean water source during construction. The potential gravelling of the well pads would also serve to reduce the generation of air-borne particulates. These actions would not only reduce the amount of dust in the air, but would maintain good construction site visibility thereby minimizing potential health and safety hazards. Air permits would be required where emission thresholds are exceeded based on CDPHE requirements.

Table 3.0. Summary of Environmental Consequences for HC-4 and YD-4Kinder-Morgan CO₂ Wells, 2003

Resource	Environmental Consequence	Post Mitigative Impacts During Construction	Post Mitigative Impacts During Operation	Mitigation Measures Included in Conditions of Approval for Applications for Permit to Drill
Air Quality	Suspended particulates and hydrocarbon emissions	Low to moderate/short-term	Low/long-term	Re-seeding with BLM seed mix; Dust suppression during construction (watering); Air permits if thresholds are exceeded.
Cultural Resources	Disturbance of undetected cultural resources	Low /short-term	None	If subsurface cultural resources are unearthed during project construction, all activities in the vicinity of the cultural resource would cease and a BLM representative notified immediately. Contractors conducting work on the site would be briefed on notification procedures if artifacts are uncovered and the potential consequences of knowingly desecrating cultural sites.
Native American Religious Concerns	None	None	None	None
TES Species	TES species could incidentally disperse through the area	Low/short-term	None	Vehicle restriction outside of the ROW and BLM notification of sightings.
Hazardous and Solid Waste	Spills or releases of hazardous substances	Low to moderate/short-term	Low/long-term	Posted signs during construction, MSDSs for on-site chemicals, appropriate personal protective equipment, earthen berm around pad.
Surface Water	Stormwater discharges, spills or releases,	Low to moderate/short-term	Low/long-term	Re-seeding with BLM seed mix; re-contour to pre-construction conditions; best management practices for sediment and erosion control; Spill Control Plan.
	Surface water depletions,	Low/long-term	Low/long-term	Surface casing and well head testing program.
Groundwater	Cross-connection and depletion of aquifers, gas migration, contamination of shallow aquifers	Low to moderate/short-term	Low/long-term	Removal of fluids and waste from location, Spill Control Plan, Surface casing and well head testing program.
Invasive, Non-Native Species	Weed infestation on 6.93 acres of disturbed land	Low to moderate/short-term	Low/long term	Reclamation and reseeding of project areas, stockpile of topsoil, monitoring and control of noxious weeds.
Topography	Cut and fill to accommodate well pads and pipelines	Low to moderate/long-term	Low to moderate/long-term	Re-contouring of disturbed areas, re-vegetation and reclamation, final re-contouring upon abandonment.
Geology	None	None	None	None
Soils	Disturbance, mixing & loss due to vegetation removal, contamination from spills or releases	Low to moderate/long-term	Low/long-term	Re-vegetation of unused areas and stockpiling of topsoil, mulching procedures for reclamation, reclamation and maintenance, spill response plan
Vegetation	Loss of vegetation and wildlife forage, weed infestation.	Moderate/short-term	Low/long-term	Stockpiling of topsoil, reclamation and reseeding, noxious weed monitoring, and re-vegetation.
Wildlife	Loss of 6.93 acres of habitat, noise and disturbance, loss of burrowing animals	Low to moderate/short-term	Low to moderate/long-term	Activity limited to well pad and pipeline ROWs, reclamation and reseeding.
Big Game	Loss of 6.93 acres of habitat, area avoidance during operation	Low to moderate/short-term	Low/long-term	Activity limited to well pad and pipeline ROWs, reclamation and reseeding, winter restrictions for construction.
Range	Loss of 6.93 acres of grazing land,	Low/short-term	Low/long-term	Reclamation and reseeding and fencing (well pads) of project area,
	Weed infestation	Low to moderate/long-term	Low/long-term	Monitoring and control of noxious weeds
Visual Resources	Dust and equipment visibility from Goodman and Mesa Verde OSAs	Moderate/short-term	Low to moderate/long-term	Waste removal, re-contouring, reclamation and reseeding, earth tone paints for on site equipment.
Noise	Increased ambient noise levels	Low to moderate/short-term	Low to moderate/long-term	Mufflers on operating equipment
Health and Safety	Hazards from noise, high pressure equipment, and on site chemicals	Low to moderate/short-term	Low/long-term	Posting of hazard signs, MSDSs for on site chemicals, Worker personal protective equipment.
Socioeconomics	Increased revenues for local contractors and businesses	Low/short-term	None	None

Recreation	Area avoidance during construction due to noise and disturbance	Low to moderate/short-term	Low/long-term	Posting of hazard signs, use of mufflers on operating equipment
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3.2.2 Impacts to Areas of Critical Environmental Concern

The proposed action is consistent with the management direction of the Anasazi ACEC as outlined in the 1984, RMP, and consistent with the CANM Interim Management Guidelines and the ACEC Management Plan.

3.2.2.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), there would be no land use conflicts on the Anasazi ACEC or CANM during construction, drilling or production operation of the proposed action.

The No Action Alternative would deny Kinder Morgan’s development of the proposed action. Under this alternative, land use within the Anasazi ACEC and CANM would remain unchanged.

3.2.2.2 Mitigation Measures

No mitigation measures proposed.

3.2.3 Impacts to Cultural Resources

No historic properties were located in area of the proposed well pads and associated facilities during the inventory conducted by CASA. However, it is possible that subsurface cultural resources, not presently identifiable on the ground surface, may occur in deeper soils within the project areas. These previously unidentifiable cultural resources could be impacted by activities associated with the proposed action.

3.2.3.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), and following the implementation of mitigation described below, there would be no impact to cultural resources from developing the proposed action. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan’s development of the proposed action. Under this alternative, there would be no impacts to project area cultural resources.

3.2.3.2 Mitigation Measures

A permitted archaeologist would be on site during initial clearing and topsoil removal operations in the vicinity of the well pads, access roads, and pipelines to monitor for subsurface cultural resources.

If subsurface cultural resources are unearthed during construction, activity in the vicinity of the cultural resource would cease, the area would be protected, and a BLM representative notified immediately. Procedures for notification and treatment of discovered cultural resources are discussed in detail in the BLM Surface Use Conditions of Approval.

The operator would inform all employees and subcontractors of the procedures to follow if cultural resources are uncovered during operations. In addition, the operator would inform employees and subcontractors that any disturbance to, defacement of, or collection or removal of cultural materials, is not permitted and is a violation of law.

3.2.4 Impacts to Threatened, Endangered, and Sensitive Species

There are no federally listed threatened, endangered or candidate species known to occur in the project areas for the proposed action. Several BLM listed sensitive bat species and the ferruginous hawk have potential to occur foraging in the project area during winter. The potential for sensitive bat species (refer to Table 2.2) to occur in the project area is low due to the absence of surface water resources or good potential roosting sites (i.e. caves) near the project area. As such, potential impacts to sensitive bats would be low limited to disturbances from human activity. The impacts however would be low, limited to human disturbances during construction, drilling and operation of the sites that cause the species to avoid the area.

According to the amended Biological Opinion (BO) IM # CO-2000-019 depletions for the San Juan River Basin were consulted on in 1994 and the BLM has exceeded the amount that was consulted on. For projects in the CANM the BLM must consult with the U.S. Fish and Wildlife Service (FWS) before construction of any water depleting projects in the San Juan drainage. Water depletions expected as a result of the proposed action are estimated at less than 1.69-acre feet in 2003. No water depletions would occur during operation of the wells.

Following the adherence to mitigation measures required below, the proposed action would have “No Effect” on federally listed or proposed species and “No Impact” on BLM listed sensitive species. The BLM TES Clearance Request form is provided as Appendix A to this EA.

3.2.4.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), impacts to TES species would be low and short-term during construction and drilling operations, and low and long-term as a result of development and operation of the wells. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan’s proposed action. Under this alternative, there would be no impacts to project area TES species.

3.2.4.2 Mitigation Measures

Construction activities for both well sites will be confined to the proposed well pad, access road and flowline ROWs to avoid potential impacts to TES species possibly occurring outside the area surveyed during the biological survey. Should any TES species be identified during construction or operation of the proposed project, BLM resource specialists should be contacted immediately.

3.2.5 Impacts to Hazardous or Solid Waste

Kinder Morgan maintains a file, per 29 CFR 1910.1200(g), containing current MSDS for all chemicals, compounds, and/or substances which are utilized during the course of construction, drilling, completion and production operations for this project. Hazardous materials which may be found at the site, may include drilling mud and cementing products which are primarily inhalation hazards, fuels (flammable and/or combustible), materials that may be necessary for well completion, stimulation activities such as flammable or combustible substances and acids/gels (corrosives). Hazardous substances at the site would be generally limited to proprietary treating chemicals. All hazardous substances and commercial preparations would be handled in an appropriate manner to minimize the potential for leaks or spills to the environment. Any spills or releases would be cleaned up and disposed in accordance with State and Federal regulations.

Human solid and liquid wastes would be generated primarily during the construction and drilling phases of the project and would be contained within portable facilities at the site.

3.2.5.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), the potential of the proposed action to increase releases of hazardous or solid wastes is low to moderate and short-term during construction and drilling and low and long-term during production operations. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no exposure to hazardous or solid wastes.

3.2.5.2 Mitigation Measures

Signs will be posted on the proposed project facility that identifies potential hazards associated with its operation including chemical hazards. Material Safety Data Sheets for any treatment chemicals would be maintained on site during the construction phase. Equipment operators will be required to wear appropriate personal protective equipment to minimize exposure to these hazards.

A 1-foot earth berm will be constructed around the perimeter of the well location during the drilling and workover phase of the operation to contain any accidental spill of motor fuels or other potentially hazardous substances.

The well pad will be designed in such a manner as to prevent runoff from leaving the pad. The need for the berm will be reassessed upon the completion of the well.

3.2.6 Impacts to Surface Water Quality

Potential impacts to surface water may occur as a result of developing the proposed action. Disturbed project area soils would be subject to erosion by wind and/or water into nearby ephemeral washes. Spills or releases of hazardous substances, production fluids, fuels, or other constituents could be washed into surface drainages during storm events. Depletion of surface water could result from drilling and cross-connection of water bearing zones that may be tributary to surface water. The actual effects on surface water quality depend on the proximity of roads, pads, and support facilities to surface water, the magnitude, duration, and intensity of precipitation events, well completion techniques, and best management practices used for stormwater pollution control. Absence of actively flowing surface waters near the proposed well pads reduces the potential for surface water quality impacts.

During construction of the proposed action, potential effects on water quality would be moderate and short-term based on greater exposure of disturbed project area soils and use of various drilling chemicals, additives and fuels for the drilling rig.

During operation of the wells, potential impacts to surface water quality would be low and long-term based on reclamation and stabilization of unused areas, and a decrease in use of potentially hazardous substances, chemicals, and fuels once the well is in operation. Impacts associated with depletion of surface water are expected to be low and long-term during drilling and operation of the wells based on the proposed drilling and well completion specifications.

3.2.6.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to surface water quality would be low to moderate and short-term during construction and drilling, and low and long-term during production. The potential impact of the proposed action on surface water depletions would be low and long term. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area surface water resources.

3.2.6.2 Mitigation Measures

Unused areas of the proposed project area disturbance will be reseeded with a BLM approved seed mix to stabilize soils and prevent erosion. Should re-vegetation attempts fail, reseeded areas would be repeated at the request of the BLM. All disturbed areas will be re-contoured to natural topography.

Best management practices (BMP's) for sediment and erosion control and inspection and monitoring will be conducted to assure functionality of these erosion control and reclamation measures. The HC-4 and YD-4 well sites have both been included in the *Stormwater Management Plan for Construction Activities in the McElmo Dome Field*, Ecosphere 2002. The general BMP's in *Stormwater Management Plan for Construction Activities in the McElmo Dome Field*, were taken from guidance documents by the Colorado Department of Public Health and Environment (CDPHE) and the US Environmental Protection Agency (USEPA) and other engineering practice sources. Some examples of the general BMP's include:

- disturbance associated with installation of the facility, level and gently sloping terrain outside the project area will not be graded, except where reasonable for construction equipment stability and fire safety.
- Silt fences and/or straw bale or straw wattle structures will be used at the edge of construction stormwater runoff areas where surface drainage features leave the project surface disturbance area. Locations are marked in the field with blue pin flags.
- All cuts made in steep rolling terrain during construction will be re-graded and contoured to blend into the adjoining landscape and to reestablish the natural drainage patterns.
- During construction near perennial streams, lakes or wetlands, sedimentation (detention) basins, straw bales, or fabric filters may be constructed to prevent suspended sediments from reaching down gradient watercourses, streams, lakes or wetlands.

For more information on specific BMP's for each well site please refer to the project specific data sheets in the *Stormwater Management Plan for Construction Activities in the McElmo Dome Field*.

Personnel working on location during drilling and completion of the proposed wells will be informed on appropriate measures and procedures for response to accidental spills and releases of any on site materials. Any waste generated at the locations will be removed from the sites for appropriate disposal in accordance with State and Federal regulations.

Well construction techniques incorporate specific surface casing measures to isolate the deeper target zone drilling and to minimize the potential for cross connection and potential dewatering of surface waters.

3.2.7 Impacts to Groundwater Quality

Potential groundwater impacts associated with CO₂ resource development include:

- Potential cross-connection and dewatering of aquifers across geologic strata;
- Migration of gas into shallow aquifers; and
- Contamination of shallow drinking water aquifers due to surface spills and releases.

Groundwater contamination, dewatering, or gas migration could potentially occur as the result of improperly sealed surface casings during drilling, well bore stimulation activities, production, and abandonment activities. The potential for cross contamination of groundwater aquifers, dewatering, and gas migration is unlikely due to the requirement of wells penetrating fresh water zones to be cased and cemented. Releases of naturally occurring gases to groundwater include methane, hydrogen sulfide, or carbon dioxide. Although migration of gas by diffusion or through natural fractures is possible, manmade conduits account for most of the upward migration of gas to the near surface environment (USGS, 1994). Potential impacts are expected to be low and long-term during drilling and operation.

Shallow groundwater quality could be impacted by leakage of fluids from transfer and transportation of drilling fluids, additives, and fuels. The impact of such spills would likely be minor due to the relatively low volumes of spilled materials and localized extent of such spills. Potential impacts to groundwater resources during drilling are expected to be low to moderate and short-term based on greater amounts of potential contaminants on location. During production impacts are expected to be low and long-term.

3.2.7.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to groundwater quality and aquifer dewatering would be low to moderate and short-term during construction and low to moderate and long term during production operations. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area groundwater.

3.2.7.2 Mitigation Measures

Drilling and production fluids from well drilling, completion, and operation will be removed from the locations for appropriate disposal. Releases of hazardous substances, chemicals, or fuels during construction or operation will be contained and disposed in accordance with State and Federal regulations. Personnel working at the site may be informed of spill control procedures in accordance with a written plan. Contamination and dewatering of shallow groundwater will be minimized through casing off of the shallow zone.

3.2.8 Impacts from Invasive, Non-Native Species

Loss of vegetation in the proposed project area would occur due to blading and trenching. A total of approximately 6.93 acres of vegetation would be removed as a result of the development of the proposed action. The removal of vegetation could increase the potential for noxious weed infestations in the project area.

This impact would be moderate and short-term, and would result in a noticeable change in the composition of the project area vegetation. As unused areas of the well pad are reclaimed, impacts would shift to low and long-term.

3.2.8.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action) there would be low to moderate, short-term potential impact during construction, and drilling operations associated with increasing the potential for invasive species to establish in the project area and the conversion of vegetative communities. Following successful reclamation and adherence to mitigation measures and Surface Use Draft COA (if approved), potential impacts would be low and long-term during operation of the wells.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no change to project area vegetation, and no increase in the likelihood of invasive species spreading.

3.2.8.2 Mitigation Measures

Reclamation, including re-seeding and noxious weed management, of the project area is discussed in detail in the BLM Surface Use Conditions of Approval. Stripped topsoil and vegetation will be stockpiled for subsequent reclamation of unused areas of the well pad. Kinder Morgan will initiate re-vegetation activities at the direction of the BLM following construction for areas no longer required for production operations. Kinder Morgan will do monitoring for noxious weeds and implement appropriate treatment and controls if necessary.

3.3 NON-CRITICAL ELEMENTS

3.3.1 Impacts to Topography

Blading, excavations and trenching during construction activities would alter the existing topography of the well pad project areas. These impacts would be low to moderate and long-term. There would be no additional impacts to area topography because of drilling and operation of the well pads, and or use of the access road.

3.3.1.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts area topography would be low to moderate and long-term. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area topography.

3.3.1.2 Mitigation Measures

All disturbed areas will be re-contoured to blend as nearly as possible with the natural topography. This includes removing all berms and refilling all cuts once operations cease. Re-vegetation procedures will assist in stabilizing these re-contoured features.

3.3.2 Impacts to Soils

Approximately 6.93 acres of soil would be directly disturbed in the construction of the proposed well pads. The proposed action would result in temporary displacement, compaction and mixing of soils in the project area. Accidental spills or releases of hazardous substances could result in soil contamination requiring remediation or removal. Due to the susceptibility of the project area soils to wind and water erosion, construction activities would indirectly cause an undetermined amount of loss of upper soil layers. Reduced capacity for plant growth due to removal and/or disturbance of the soil would be an additional indirect effect.

3.3.2.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), impacts to soils from construction of the proposed project would have low to moderate and long-term impacts.

During the operation and maintenance phase of the proposed action, stabilization and reclamation of unused areas should reduce the amount of soil disturbance. The impact from operation and maintenance would be low to long-term. These potential impacts would be mitigated by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area soils.

3.3.2.2 Mitigation Measures

Mitigation measures for construction and operation of the well consist of stockpiling topsoils, reclamation and reseeding unused areas of the pads and pipelines with a weed-free BLM approved seed mix to stabilize soils and to prevent erosion in areas no longer needed for production. Kinder-Morgan will utilize best management practices (BMPs) to control erosion during construction of the proposed project, and during site reclamation. Vehicle and pedestrian traffic will be restricted to the project ROWs or established roads to prevent further soil mixing and compaction outside the proposed project area. Spills or releases of hazardous or solid wastes will be removed and disposed in accordance with State and Federal regulations. Kinder Morgan will avoid biological soil crusts whenever possible and reduce the potential for soil compaction by minimizing vehicle passes over the same piece of ground. Kinder Morgan will not spin the tires of the vehicles to avoid loss of cryptogammic spoils. The proposed project area disturbance will be re-seeded with a weed-free BLM approved seed mix to stabilize soils and prevent erosion for areas no longer needed for production.

Seed labels from each bag shall be available for inspection while seeding is being accomplished. There shall be no primary or secondary noxious weeds in the seed mixture. Should re-vegetation attempts fail, Kinder Morgan will repeat re-seeding at the request of the BLM.

The well pad areas will be bermed to minimize off-site migration of disturbed soils. Vehicle and pedestrian traffic will be restricted to the well pad, access road and well-tie areas or established roads to prevent further soil mixing and compaction outside the proposed project area. Specific erosion control measures, should the proposed action be permitted, would be included in the BLM Surface Use Draft COA. Upon plugging and abandonment of the well following its useful life, the entire well pad and access road will be reseeded to BLM specifications.

3.3.3 Impacts to Vegetation

HC-4 Well Pad and Associated Facilities

Loss of vegetation in the proposed project area would occur due to blading and trenching. Approximately 3.18 acres of early-mid-mature piñon-juniper trees and early-successional shrubland and forbs would be removed as a result of the development of the proposed action. The removal of vegetation could reduce the amount of forage available for wildlife and increase the potential for noxious weed infestations in the project area. This impact would be moderate and short-term, as there would be a noticeable change in the composition of the project area vegetation. As unused areas of the well pad are reclaimed, impacts would shift to low and long-term. Operation of the proposed pipeline and well could potentially affect the surrounding flora in the event of accidental spills or discharge of production fluids. These impacts during operation would be low and long-term.

YD-4 Well Pad and Associated Facilities

Loss of vegetation in the proposed project area would occur due to blading and trenching. A total of approximately 3.18 acres of mature piñon/juniper woodland and shrubland and forbs would be removed as a result of the development of the proposed action. The removal of vegetation could reduce the amount of forage available for wildlife and increase the potential for noxious weed infestations in the project area. This impact would be moderate and short-term, as there would be a noticeable change in the composition of the project area vegetation. As unused areas of the well pad are reclaimed, impacts would shift to low and long-term. Operation of the proposed pipeline and well could potentially affect the surrounding flora in the event of accidental spills or discharge of production fluids. These impacts during operation would be low and long-term.

Operation of the proposed pipeline and well could potentially affect the surrounding flora in the event of accidental spills or discharge of production fluids. These impacts during construction and operation would be low and long-term

3.3.3.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to vegetation on both well sites would be low to moderate and short-term, after site reclamation and low and long-term during operation of the wells. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved. The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area vegetation.

3.3.3.2 Mitigation Measures

Reclamation, including re-seeding and noxious weed management, of the project area is discussed in detail in the BLM Surface Use Conditions of Approval. Specifically the site will be re-shaped to pre-disturbance contours, spread stockpiled topsoil and re-seed with a native seed mix specified by the BLM. Where available local native seed will be used. Scatter crushed woody material removed during site construction over reclaimed site to provide shade and protection for seedlings. The seeded area will be fenced to protect it from livestock until a healthy cover of native plant species is established, for at least three years. Seeding with the designated seed mix will occur as many times as necessary to establish the vegetation successfully, typically up to 2 years.

The fence will be removed from the site when vegetative cover is established. Noxious and invasive weeds will be treated on the well pad, road and pipeline for the life of the well and until reclamation efforts post production are successful in providing a healthy cover of native plant species. Stripped topsoil and vegetation will be stockpiled for subsequent reclamation of unused areas of the well pads. Kinder Morgan will initiate re-vegetation at the direction of the BLM following construction for areas no longer required for production operations. Monitoring for noxious weeds and appropriate treatment and controls will be the responsibility of Kinder Morgan. Any spills or releases of hazardous substances will be cleaned up and disposed of in accordance with applicable requirements and spill plans.

3.3.4 Impacts to Wildlife

The removal of 6.93 acres of vegetation in both the well sites would result in a direct loss of wildlife habitat in the CANM. Construction activities could directly impact area wildlife due to increased noise and human activity. These activities are expected to be low to moderate and short-term.

The duration of construction activities would be for a period of approximately three to four weeks for each well site, thereby limiting the severity of potential impact to a short time period. Some small-burrowing animals and reptiles may be killed or displaced during blading and trenching of the proposed well pad, access road and flowline.

There would be long-term disturbances to area wildlife during operation of the well from periodic human activity, vehicular traffic in the area, and from the conversion of habitat to industrial use. These impacts are expected to be low to moderate and long-term.

3.3.4.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to area wildlife would be low to moderate and short-term during construction and drilling shifting to low to moderate and long-term during production. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area wildlife.

3.3.4.2 Mitigation Measures

Construction activities will be confined to the proposed well pad, access road and flowline right-of-ways to minimize disruption to wildlife for the four well sites. The impact to wildlife caused by the removal of vegetation will be mitigated through the implementation of reclamation measures outlined in the BLM Surface Use Draft COAs.

3.3.5 Impacts to Big Game

Extensive sign of deer, and rabbit were observed during the onsite surveys indicating that the project area is heavily utilized by big game. Construction activities could directly impact the normal migration patterns of big game in the general project area due to increased noise and human activity. The duration of construction activities would be for a period of approximately four weeks, thereby limiting the severity of potential construction impacts to moderate over the short-term.

Approximately 6.93 acres of big game habitat would be affected by development of the proposed project. Impacts from construction and drilling activities would be moderate and short-term based on current seasonal drilling restrictions. Wintering animals may avoid the area due to noise, increased traffic, and equipment operations during production operations. The potential impacts to big game during operation are expected to be low and long-term based on the limited availability of public wintering grounds in the area.

3.3.5.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), the potential impact on big game would be low to moderate and short term during construction and drilling and low and long-term during production operations. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative there would be no impacts to project area big game.

3.3.5.2 Mitigation Measures

Construction activities will be confined to the proposed well pad, access road and flowline right-of-ways to minimize disruption to big game. The impact to big game caused by the removal of vegetation will be mitigated through the implementation of reclamation measures outlined in the BLM Surface Use Draft COA (if approved). Re-seeding may utilize a seed mix designed for big game to enhance forage.

3.3.6 Impacts to Range

Loss of vegetation in the proposed project area would occur due to blading and trenching. Approximately 6.93 acres of vegetation would be removed as a result of the development of the proposed action. The removal of vegetation could reduce the amount of forage available for cattle and increase the potential for noxious weed infestations in the project area. This impact would be low and short-term. The reduction in forage impact would be moderate and long-term, as there would be a noticeable change in the composition of the project area vegetation. The potential for introduction of noxious weeds during construction are expected to be low to moderate and long-term. Operation of the proposed well and pipeline is not expected to affect the surrounding flora significantly and impacts are expected to be low and long-term.

3.3.6.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to grazing conditions and allotments would be low to moderate and long-term. The potential for noxious weed introduction is low to moderate and long term. Impacts from operation are expected to be low and long-term. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area range conditions.

3.3.6.2 Mitigation Measures

Impacts from site clearing activities will be minimized through reclamation of the project area with weed free BLM recommended seed mix, and the project applicants noxious weed control. The reseeded well pads will be fenced for 2 years to improve site reclamation. If these areas are not fenced after reseeding cattle tend to concentrate in these locations and graze the new seedlings, thereby ruining the reclamation efforts. The BLM could consider a reduction in AUMs to maintain forage.

3.3.7 Impacts to Visual Resources

The visual resources of the land within the immediate vicinity of the two well pad project areas would be permanently altered by the proposed action. During construction activities, machinery emissions, disturbed ground, and construction equipment and pipe staging in the project area would result in moderate and short-term, visual impacts. From the vistas of the Goodman and Mesa Verde OSA's, the construction of the proposed action would result in a direct effect to visual quality that would be low and long-term. The proposed action would not be visible from the Cross Canyon OSA. During the production and maintenance phase of the proposed action, visual impacts would be low to moderate and the long-term.

3.3.7.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to area visual resources would be low to moderate and short-term during construction and long-term during production operations. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area visual resources.

3.3.7.2 Mitigation Measures

All trash materials will be removed from the area and disposed of in an authorized disposal area. All disturbed areas will be re-contoured to blend as nearly as possible with the natural topography. This includes removing all berms and refilling all cuts. Re-vegetation procedures would assist in minimizing visual disruption. All permanent structures (onsite for six months or longer) constructed or installed will be painted a flat, non-reflective earth tone color, which would be Carlsbad Canyon (Munsell Color Chart).

3.3.8 Impacts from Noise

During construction of the proposed action there would be a direct short-term increase in project area ambient noise levels due to the operation of heavy equipment. Construction noise would range from 80-93 db(A) during the operation of a grader, 80-82 db(A) using a bull-dozer, and 83-94 db(A) using a truck (EPA, 1971). Drilling rig sound levels would be expected to exceed other heavy equipment on location. The direct impact would be moderate and short-term. Noise impacts are expected to decrease significantly during long-term operation and maintenance and would be dependant on the type and size of compressor or pumping equipment installed at the well (if any) to increase production of natural gas. Operational impacts would be low and long-term.

3.3.8.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts from increases in areas noise generation would be low to moderate and short-term during construction and drilling and low to moderate and long-term during production operations.

These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no increases to project area ambient noise levels.

3.3.8.2 Mitigation Measures

Mufflers will be utilized on all equipment during construction.

3.3.9 Impacts to Health and Safety

The proposed action could potentially result in health and safety hazards to operators during the construction, drilling and operation of the proposed project, in addition to individuals that may travel or access the well pad sites. Potential hazards associated with operation of the proposed well pad include noise exposure, high-pressure liquid hazards, H₂S gas releases, and chemical hazards.

3.3.9.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts from the release of hazardous materials would be low to moderate and short-term during construction and drilling and low and long-term during production operations. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area health and safety.

3.3.9.2 Mitigation Measures

Signs will be posted (as necessary) on the proposed project facilities that identify potential hazards associated with its operation including H₂S gas, noise, high pressure and chemical hazards. Material Safety Data Sheets for any treatment chemicals will be maintained on site during the construction phase. Equipment operators will be required to wear appropriate personal protective equipment to minimize exposure to these hazards. Only authorized personnel would be permitted onsite.

3.3.10 Impacts to Socioeconomics

No adverse socioeconomic impacts are expected to occur as a result of developing the proposed project. There would be low and short-term beneficial economic impacts for a variety of contractors and businesses as a result of development of the proposed action. Additionally there would be moderate beneficial impacts generated in the form of royalties.

3.3.11 Impacts to Recreation Resources

This isolated portion of public lands has legal access from Colorado State Highway 666. The area has approximately ten collector roads that allow access to most of the area. The vicinity of the project area is limited to the dispersed recreation. Impacts to area recreation opportunities because of drilling of the proposed action would be low to moderate and short-term. The impact would shift to low but remain for the long-term during the production life of the wells. Public use of the area for limited dispersed recreational purposes may decrease due to the presence of industrial facilities in the area.

3.3.11.1 Summary of Impacts

Under Alternative No. 1 (Proposed Action), potential impacts to recreational resources would be low to moderate and short-term during construction and drilling and low and long-term during production operations. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use Draft COA should the APDs be approved.

The No Action Alternative would deny Kinder Morgan's development of the proposed action. Under this alternative, there would be no impacts to project area recreation resources.

3.3.11.2 Mitigation Measures

Kinder Morgan will provide public notices, signs, detours and precautions and/or warning necessary to protect the health and safety of the public. Noise impacts on recreation will be reduced through the use of hospital grade mufflers. Visual impacts would be mitigated to the extent possible as described in Section 3.3.8.2.

3.4 CUMULATIVE IMPACTS

Cumulative impacts are an aggregate of direct and indirect impacts and include actions that have occurred or can be reasonably expected to occur both within and outside of the project area in the future.

According to the RMP and the 1991 Oil and Gas Amendment (BLM, 1991), for the San Juan/San Miguel Planning Area (SJ/SMPA), approximately 2% (1,430 acres) of the surface area within the management area will be impacted by oil and gas activities by 2009. That considers the potential drilling of 353 wells with an average surface disturbance of 4.1 acres per well (BLM 1991). The average acreage of disturbance per well for the proposed action is approximately 3.18 acres for a total disturbance of 6.93 acres. The estimated reasonable foreseeable development (RFD) scenario includes, 188 "development wells" on BLM lands within the Paradox Basin, the geologic basin encompassing the project analysis area. According to BLM records no more than 125 development wells have been drilled in the Paradox Basin on BLM lands. Therefore, the addition of Kinder Morgan's 4 proposed wells is within the number of wells planned for in the RMP and 1991 amendment.

In order to further consider cumulative impacts within the CANM, an analysis of Colorado Oil and Gas Conservation Commission (COGCC) records within the project area was made to quantify existing oil and gas disturbance within a 1-mile and 5-mile radius of each proposed well site. Provided below are the results of this analysis. Table 3.1 contains a listing of facilities within a 1-mile and 5-mile radius of each of wells in the proposed action. Total disturbance estimated for each project is based on the above estimate of 4.1 acres per well. According to the RMP and the 1991 Oil and Gas Amendment (BLM, 1991), for the San Juan/San Miguel Planning Area (SJ/SMPA), approximately 2% (1,430 acres) of the surface area within the management area will be impacted by oil and gas activities by 2009. That considers the potential drilling of 353 wells with an average surface disturbance of 4.1 acres per well (BLM 1991).

The 6.93 acres of disturbance associated with the development of the proposed HC-4 and YD-4 well sites would result in cumulative impacts to soils, wildlife, and vegetation.

The removal of 6.93 acres of wildlife habitat would contribute to the habitat fragmentation that exists throughout the area from existing roads, pipelines, and well pads. Less noticeable cumulative impacts include increases in impacts to local air resources and noise levels during construction. It is intended that reclamation measures would minimize the majority of cumulative impacts from the proposed action.

Cumulative effects within the context of present activities and the basis for the effects determination are summarized in Table 3.2. Overall, cumulative impacts are expected to be low and in conformance with the RMP and 1991 Oil and Gas Amendment.

Table 3.1 Existing wells located within a 1-mile and 5-mile radius of Kinder Morgan proposed wells in Montezuma County, Colorado.

Type of Well	Well #HC-4		Well #YD-4	
	1-mile radius	5-mile radius	1-mile radius	5-mile radius
Abandoned Location	-	7	-	4
Drilled and Abandoned	-	16	-	4
Injecting	-	1	-	3
Plugged and Abandoned	-	3	-	-
Producing	5	24	4	21
Shut-in	-	2	-	-
Temporarily Abandoned	-	1	-	-
Permitted Location	-	-	-	-
Total Existing Disturbance (Acres)	20	221	16	131
Land Disturbance	0.1%	0.4%	0.7%	0.2%

Colorado Oil and Gas Conservation Commission, 2003

Table 3.2 Kinder Morgan Well Sites HC-4 and YD-4 Cumulative Impacts Summary

Environmental Resource	Environmental Consequences	Cumulative Impact	Basis For Determination
Vegetation	Vegetation and habitat loss due to numerous operating wells, access roads and pipelines Increase of invasive species.	Low-Moderate	Proposed action would result in 6.93 acres of disturbance constructed in Piñon-Juniper woodlands and shrublands.
Threatened, Endangered & R3 Sensitive Flora Species	Potential loss of unidentified listed species due to development.	Low	No TES species, or critical habitat in two well site project areas. Conclusion determined in biological assessment.
Soils	Soil transfer and erosion, road damage, rutting,.	Low	Consequences directly related to number of wells, volume and frequency of traffic in the area.
Surface Water	Potential contamination of surface water from sediments and other pollutants.	Low	Lack of perennial surface water resources in the project area.
Groundwater	Potential contamination of ground water resources from leakage.	Low	Minimal groundwater use in project area, approved construction procedures to reduce potential contamination.
Wildlife	Fragmentation and loss of habitat, noise disturbance, wildlife/vehicle encounters.	Low to Moderate	Proposed project would result in 6.93 acres of disturbance constructed on a steep slope in Piñon-Juniper woodlands and shrublands.
Threatened, Endangered and Sensitive Fauna Species	Potential loss of unidentified listed species due to development.	Low	No TES species, or critical habitat in two well site project areas. Conclusion determined in biological assessment.
Hunting and Gathering	Fragmentation and loss of habitat, noise disturbance, wildlife/vehicle encounters.	Low	Proposed action would result in 6.93 acres of disturbance constructed in Piñon-Juniper woodlands and shrublands.
Air Quality	Nominal increase in air quality pollutants from natural gas equipment and traffic.	Low	Impacts are dispersed and relatively minor for construction of two wells.
Cultural Resources	Disturbance of unidentified archaeological sites during construction and operation.	Low	Archaeological clearance required for APD application, operator training for incidental findings.
Health and Safety	Increased vehicular travel and vehicle/wildlife/human encounters, high pressure and chemical hazards.	Low	Difficult roads restrict vehicle speeds
Recreation	Increased traffic noise and visual impacts.	Low	Limited dispersed recreation throughout the two well sites.
Range	Loss of 6.93 acres of forage	Low	Size of acreage allotments in relation to loss of forage is minimal
Visual	Reduction in overall visual quality in the project area.	Low to Moderate	Mitigation measures can reduce visual impacts of development.
Noise	Increase in noise levels		Levels of noise
Socioeconomic	Increase in employment during construction and revenues for nearby communities.	Low	Significant positive economic impact on surrounding communities.

4.0 CONSULTATIONS

Individuals and agencies listed below have been consulted in the preparation and review of this Environmental Assessment:

Helen Mary Johnson - BLM Mineral Staff Chief
Loren Wickstrom - BLM Geologist
Lou Ann Jacobson - BLM Canyons of the Ancients Manager
Mike Jensen - BLM Range Management Specialist
Kathy Nickell - BLM Wildlife Biologist
Leslie Stewart - FS Ecologist
Stacy Weber-FS Hydrologist
Laura Kochanski - BLM Archaeologist
Charlie Rosenbaugh - Kinder Morgan
Bob Clayton - Kinder Morgan
Doug Fredrick - Kinder Morgan
Ken Havens - Kinder Morgan
Norman Utley - Utley Construction

The following organizations were contacted during preparation of this document.

U.S. Fish and Wildlife Service regarding TES Fauna
Colorado National Heritage Program regarding Montezuma species of concern
BLM State Director's List of BLM Sensitive Species
The Northern Ute Tribe
The Ute Mountain Ute Tribe
The Southern Ute Tribe
The Navajo Nation
The Hopi Tribe
The Jicarilla Apache Tribe
The Pueblos of Acoma, Cochiti, Isleta, Jemez, Laguna, Nambe, Picuris, Pojoaque, Santa Ana, Santo Domingo, Sandia, San Juan, San Ildefonso, Santa Clara, Taos, Zia, and Zuni

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**APPENDIX A
TES CLEARANCE LETTER
PLANT AND WILDLIFE LIST**

FISH AND WILDLIFE CLEARANCE REPORT

To be completed by the specialist

Instructions for completing the report are in italics

PROJECT NAME: Kinder Morgan Well Site Proposal HC-4 and YD-4

Please select one of the following choices from Table 1 and record the date you reviewed the available records.

Table 1. Survey results.

X	A field survey was completed on (date) by (name of specialist). Ecosphere		
	No field survey is required.		
	A field survey is needed, but cannot be completed by required date due to:		
	Inappropriate season	Inadequate lead time	Higher priorities

A review of records & biological files was conducted on (date). **3/27/03**

SPECIES CONSIDERED

Tables 2 lists threatened, endangered and candidate fish, plant, and wildlife species. Tables 3 and 4 provide plant and wildlife sensitive species lists for the Forest Service and BLM. Table 5 lists the Forest Service fish and wildlife management indicator species. Only complete the table appropriate to the land base you are working on. If you don't need a table, please delete it to avoid confusion.

Table 2. Federally listed species for the San Juan National Forest and San Juan BLM Resource Area based on March 3, 2003 list from the FWS.

Species	Status	Habitat Present In Project Area?	Species Affected?
Canada lynx	Threatened	No	No
Bald eagle	Threatened	Yes – roosting	No
Gunnison sage grouse	Candidate	No	No
Mexican spotted owl	Threatened	No	No
Southwestern willow flycatcher	Endangered	No	No
Yellow-billed cuckoo	Candidate	No	No
Bonytail	Endangered	No	No
Colorado pikeminnow	Endangered	No	No

Humpback chub	Endangered	No	No
Razorback sucker	Endangered	No	No
Uncompahgre fritillary butterfly	Endangered	No	No
Boreal toad	Candidate	No	No

Table 3. Colorado Bureau of Land Management sensitive fish, plant, and wildlife species based on Information Bulletin No. CO-2000-14 (April 2000) for the San Juan Public Lands.

Species	Habitat Present In Project Area?	Species Impacted?
Allen’s big-eared bat	Yes – foraging only	Unlikely
Big free-tailed bat	No	NA
Fringed myotis	Yes – foraging only	Unlikely
Spotted bat	Yes – foraging only	Unlikely
Townsend’s big-eared bat	No	NA
Yuma myotis	Yes – foraging only	Unlikely
Black tern	No	NA
Ferruginous hawk	Yes – winter only	Unlikely
Gunnison sage grouse	No	NA
Northern goshawk	No	NA
White-faced ibis	No	NA
Bluehead sucker	No	NA
Colorado River cutthroat trout	No	NA
Flannelmouth sucker	No	NA
Roundtail chub	No	NA
Desert spiny lizard	No	NA
Longnose leopard lizard	No	NA

DISCUSSION: *Does the project conflict with LRMP or RMP guidelines? Are Federally listed Threatened or Endangered species affected? Are Forest Service and BLM Sensitive species impacted? Are Forest Service Management Indicator Species impacted? If a species is impacted or affected by the action, describe how and why. Also describe how and why conclusions were drawn to support the conclusions identified above.*

This project does not conflict with RMP guidelines.

Bald eagles are known to forage within the larger drainages within CANM (Yellowjacket, McElmo, etc) during the winter. There is no known nesting and seems to be little potential for a consistent prey base. There are few suitable nesting structures available.

Although the Allen’s big-eared bat, fringed myotis, spotted bat, and Yuma myotis may forage in these areas, the likelihood is low since the features they use for breeding (mines, caves, cliffs, etc.) do not occur in the project area.

The ferruginous hawk is a rare winter migrant in southwest Colorado. These wells are likely to be developed during the spring and summer 2003. If wells were developed during the winter months, hawks would not be likely to forage in the area due to the disturbance and human activity.

A minor water depletion is associated with this project. All drainages in the CANM are tributary to the San Juan River. Consultation was conducted with the U.S. Fish and Wildlife Service in the form of a letter describing the project and potential depletion. The letter was finalized the week of 3/24/03 and a response is expected within 30 days. Both letters will be available in the project files.

MITIGATION MEASURES Describe any mitigation measures that should be included in the project design.

No mitigation measures have been identified for this project.

CONCLUSIONS

Threatened and Endangered Species

	There are no federally listed or proposed species known to occur within the project area.
X	The proposed action will have no effect on the following federally listed or proposed species: Bald eagle
	The proposed action will have no effect on designated or proposed critical habitat for the following species:
	The proposed action may affect but is not likely to adversely affect the following federally listed species and their habitats. <i>Effects are expected to be beneficial, insignificant (unmeasurable), or discountable (extremely unlikely).</i>
	The proposed action may affect and is likely to adversely affect the following federally listed species and their habitats. <i>Effects are expected to be adverse or detrimental.</i>

If the determination is may affect, informal or formal consultation must be initiated with the U.S. Fish and Wildlife Service. Describe which species may be affected by the project and why, and determine a timeline for the consultation.

Proposed timeline for consultation: NA for bald eagle. Informal consultation has been initiated regarding the minor water depletion.

Forest Service and BLM Sensitive Species

X	The proposed action will have no impact on the following sensitive species: Allen’s big-eared bat, fringed myotis, spotted bat, Yuma myotis, and ferruginous hawk.
	The proposed action will have a beneficial impact on the following sensitive species:
	The proposed action may adversely impact individuals but is not likely to result in a loss of viability on the planning area, nor cause a trend to federal listing or a loss of species viability rangewide on the following sensitive species: <i>Effects are expected to be insignificant (unmeasurable), or discountable (extremely unlikely).</i>
	The proposed action may adversely impact individuals and is likely to result in a loss of viability on the planning area, in a trend to federal listing, or in a loss of species viability rangewide on the following sensitive species: <i>Effects are expected to be detrimental and substantial.</i>

A Biological Evaluation is not required for BLM sensitive species so this Clearance Form completes the assessment of these species.

SPECIALIST

Date:

**PLANTS OCCURRING IN THE
KINDER MORGAN CO₂ GAS WELL
PROJECT AREAS**

Forbs:

Achillea millefolium L.
Alyssum minus (L.) Roth
Cymopterys bulbosus Nels.
Penstemon linarioides Gray
Verbascum thapsus L.

Milfoil Yarrow
Annual alyssum
Biscuitroot
Penstemon
Mullein

Grasses:

Agropyron cristatum
Agropyron trachycaulum (Link) Malte.
Aristida purpurea Nutt.
Bouteloua gracilis (H.B.K.) Lag.
Elymus smithii (Rydb.) Gould
Hilaria jamesii (Torr.) Benth.
Oryzopsis hymenoides (R. & S.) Ricker

Crested wheat
Wheatgrass
Red three-awn
Blue grama
Western wheatgrass
Galleta grass
Indian ricegrass

Shrubs:

Amelanchier utahensis Koehone.
Artemisia tridentata (Pursh) Nutt.
Chrysothamnus nauseosus (Pall.) Britt.
Ephedra viridis Wats.
Purshia tridentata (Pursh.) DC.
Yucca baccata Torr.
Yucca harrimaniae Trelease.

Serviceberry
Big sagebrush
Rubber rabbitbrush
Mormon Tea
Antelope-bitterbrush
Wild banana yucca
Yucca

Cacti and Cactus like plants:

Opuntia polyacantha Haw.
Echinocereus triglochidiatus Engelm.

Prickly pear cactus
Hedgehog cactus

Trees:

Juniperus osteosperma (Torr.) Little
Pinus edulis Engelm.

Utah juniper
Piñon pine

**COMMON WILDLIFE WITH POTENTIAL TO OCCUR IN THE
KINDER MORGAN CO₂ GAS WELL
PROJECT AREAS**

Mammals

<i>Canis latrans</i>	Coyote
<i>Cervus elaphus</i>	American Elk
<i>Cynomys gunnisonii</i>	Gunnison's prairie dog
<i>Dipodomys spectabilis</i>	Bannertail kangaroo rat
<i>Erethizon dorsatum</i>	Porcupine
<i>Lepus californicus</i>	Blacktail jackrabbit
<i>Mephitis mephitis</i>	Striped skunk
<i>Odocoileus hemionus</i>	Mule deer
<i>Sylvilagus auduboni</i>	Desert cottontail
<i>Ursus americanus</i>	Bear
<i>Vulpes vulpes</i>	Red fox

Birds

<i>Apelocoma coerulescens</i>	Scrub jay
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Carpodacus mexicanus</i>	House finch
<i>Cathartes aura</i>	Turkey vulture
<i>Chordeiles minor</i>	Common nighthawk
<i>Colaptes auratus</i>	Northern flicker
<i>Corvus corax</i>	Common raven
<i>Eremophila alpestris</i>	Horned lark
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Falco spawerius</i>	Sparrow hawk
<i>Gymnorhinus cyanocephalus</i>	Piñon jay
<i>Pica pica</i>	Black-billed magpie
<i>Sialia mexicana</i>	Western bluebird
<i>Sturnella neglecta</i>	Western meadowlark
<i>Turdus migratorius</i>	Robin

Reptiles

<i>Crotalus viridis</i>	Prairie rattlesnake
<i>Pituophis melanoleucus</i>	Bull snake
<i>Sceloporus stansburiana</i>	Side-blotched lizard
<i>Sceloporus graciosus</i>	Sagebrush lizard

