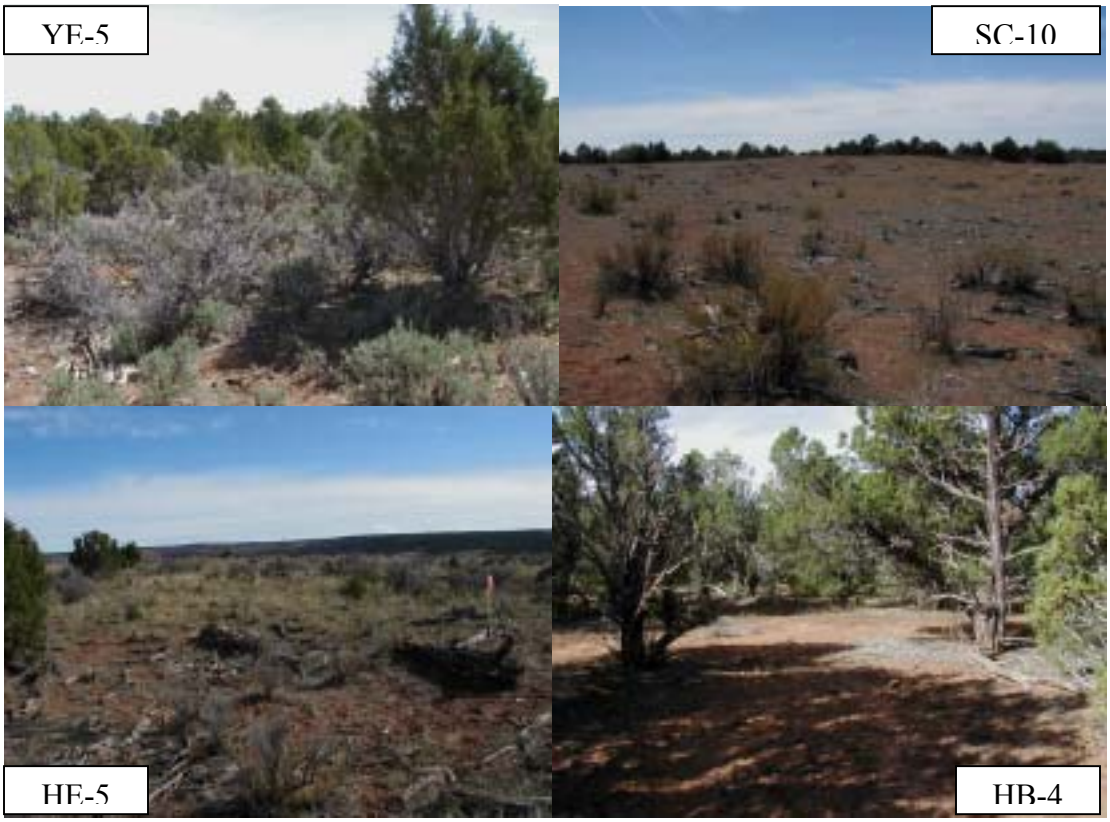
ENVIRONMENTAL ASSESSMENT

KINDER MORGAN
WELL SITES YE-5, HB-4, HE-5, AND SC-10



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Project #15702-1

TABLE OF CONTENTS

1.0 PROPOSED ACTION AND ALTERNATIVES 1
1.1 INTRODUCTION 1
1.2 PURPOSE AND NEED 1
1.3 CONFORMANCE WITH SAN JUAN/SAN MIGUEL RESOURCE MANAGEMENT PLAN 2
1.4 CONFORMANCE WITH EXISTING PLANS, STATUTES OR OTHER REGULATIONS 3
1.5 INTERRELATIONS WITH OTHER PROJECTS 4
1.6 PROPOSED ACTION 5
1.6.1 Project Description 5
1.6.2 Project Location 6
1.6.3 Project Construction 12
1.7 PROPOSED ACTION AND ALTERNATIVES 15
1.7.1 The Alternative No. 1: Preferred Alternative 15
1.7.2 Alternative No. 2: Action Alternatives Eliminated From Detailed Consideration 16
1.7.3 Alternative No. 3: No Action Alternative 16
2.0 AFFECTED ENVIRONMENT 17
2.1 INTRODUCTION 17
2.2 CRITICAL ELEMENTS 17
2.2.1 Air Quality 17
2.2.2 Areas of Critical Environmental Concern 18
2.2.3 Cultural Resources 18
2.2.4 Prime and Unique Farmlands 19
2.2.5 Floodplains, Wetlands, and Riparian Zones 19
2.2.6 Native American Religious Concerns 19
2.2.7 Threatened, Endangered, and Sensitive Species 19
2.2.8 Hazardous or Solid Wastes 20
2.2.9 Water Quality 24
2.2.9.1 Surface Water 24
2.2.9.2 Groundwater 25
2.2.10 Wild and Scenic Rivers 25
2.2.11 Wilderness 26
2.2.12 Environmental Justice 27
2.2.13 Invasive, Non-native Species 27
2.2.14 Standards For Public Lands Health 27
2.3 NON-CRITICAL ELEMENTS 27
2.3.1 Topography 27
2.3.2 Geology 29
2.3.3 Soils
2.3.3.1 Cryptogrammic Soils 30
2.3.4 Vegetation 30
2.3.5 Wildlife 32
2.3.6 Big Game 32
2.3.7 Range 32
2.3.8 Visual Resources 33
2.3.9 Noise 33
2.3.10 Health and Safety 34
2.3.11 Socioeconomics 34
2.3.12 Recreation Resources 35
3.0 ENVIRONMENTAL CONSEQUENCES 36
3.1 GENERAL DISCUSSION 36
3.2 CRITICAL ELEMENTS 36

3.2.1 Impacts to Air Quality 36
3.2.1.1 Summary of Impacts 37
3.2.1.2 Mitigation Measures 37
3.2.2 Impacts to Areas of Critical Environmental Concern 39
3.2.2.1 Summary of Impacts 39
3.2.2.2 Mitigation Measures 39
3.2.3 Impacts to Cultural Resources 39
3.2.3.1 Summary of Impacts 39
3.2.3.2 Mitigation Measures 40
3.2.4 Impacts to Threatened, Endangered, and Sensitive Species 40
3.2.4.1 Summary of Impacts 40
3.2.4.2 Mitigation Measures 40
3.2.5 Impacts to Hazardous or Solid Waste 41
3.2.5.1 Summary of Impacts 41
3.2.5.2 Mitigation Measures 41
3.2.6 Impacts to Surface Water Quality 41
3.2.6.1 Summary of Impacts 42
3.2.6.2 Mitigation Measures 42
3.2.7 Impacts to Groundwater Quality 42
3.2.7.1 Summary of Impacts 43
3.2.7.2 Mitigation Measures 43
3.2.8 Impacts from Invasive, Non-native Species 43
3.2.8.1 Summary of Impacts 43
3.2.8.2 Mitigation Measures 44
3.3 NON-CRITICAL ELEMENTS 44
3.3.1 Impacts to Topography 44
3.3.1.1 Summary of Impacts 44
3.3.1.2 Mitigation Measures 44
3.3.2 Impacts to Soils 44
3.3.2.1 Summary of Impacts 45
3.3.2.2 Mitigation Measures 45
3.3.3 Impacts to Vegetation 46
3.3.3.1 Summary of Impacts 47
3.3.3.2 Mitigation Measures 47
3.3.4 Impacts to Wildlife 47
3.3.4.1 Summary of Impacts 48
3.3.4.2 Mitigation Measures 48
3.3.5 Impacts to Big Game 48
3.3.5.1 Summary of Impacts 48
3.3.5.2 Mitigation Measures 48
3.3.6 Impacts to Range 49
3.3.6.1 Summary of Impacts 49
3.3.6.2 Mitigation Measures 49
3.3.7 Impacts to Visual Resources 49
3.3.7.1 Summary of Impacts 49
3.3.7.2 Mitigation Measures 50
3.3.8 Impacts from Noise 50
3.3.8.1 Summary of Impacts 50
3.3.8.2 Mitigation Measures 50
3.3.9 Impacts to Health and Safety 50
3.3.9.1 Summary of Impacts 50
3.3.9.2 Mitigation Measures 51
3.3.10 Impacts to Socioeconomics 51

3.3.11 Impacts to Recreation Resources **51**
3.3.11.1 Summary of Impacts **51**
3.3.11.2 Mitigation Measures **51**
3.4 CUMULATIVE IMPACTS **52**
4.0 CONSULTATIONS **55**
5.0 REFERENCES **56**
6.0 LIST OF PREPARERS **58**

1.0 PROPOSED ACTION AND ALTERNATIVES

1.1 INTRODUCTION

Kinder Morgan CO_2 Company, LP (Kinder Morgan) has submitted proposals to drill four (4) carbon dioxide (CO_2) 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. Two of the wells would be drilled within the Yellow Jacket Unit and two would be drilled in the McElmo Dome Unit. The wells would be drilled to approximately 7,940 feet to 8,350 feet targeting the Leadville Formation. As proposed, the project includes construction of four well pads (12.36 acres), and associated access roads and well-tie pipelines (0.95 acres). Total surface disturbance would be approximately 13.31 acres. If the wells were unproductive, the wells would be abandoned. All surface disturbances would be reclaimed upon abandonment according to BLM specifications.

The four wells are identified as the Kinder Morgan YE-5, the Kinder Morgan SC-10, Kinder Morgan HB-4, and Kinder Morgan HE-5. All of the wells are located on Federal lands managed by the BLM.

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 CO_2 gas reserves in the McElmo Dome Field on four (4) oil and gas leases that have been issued by the BLM. Most of the CO_2 produced from this field is moved via existing pipelines to 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).

This Environmental Assessment (EA) has been prepared to address potential impacts associated with approval of Kinder Morgan's Application for Permit to Drill (APD) the Kinder Morgan YE-5, the Kinder Morgan SC-10, Kinder Morgan HB-4, and Kinder Morgan HE-5 well pads, access roads, and well-tie pipelines. The proposals include all activities associated with gas development including activities to construct, operate, reclaim, and abandon one well per APD. The APDs include associated new access roads and pipelines as described herein.

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 an alternative development.

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) Conditions of Approval (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 Canyon 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 National Environmental Policy Act of 1969.

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 Eagle Protection Act (16 USC I.S.C. 668a-668b) 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 oil and gas exploration consists of seismic surveys and the ongoing drilling of wells. Existing or previous oil and gas development consists of over 150 active or abandoned wells within 5 miles of the proposed wells (COGCC, 2002). An existing 50-foot wide permanent oil and gas infrastructure right-of-way (ROW) with a 30-foot wide temporary use area (TUA) exists in the vicinity of all of the proposed Kinder Morgan well sites (BLM, 1983). As proposed, all of the Kinder Morgan proposed wells would tie, via pipelines and access roads, into this existing permanent ROW. As such, interrelated to the proposed action surface disturbance of 13.31 acres (described in Section 1.6 Proposed Action), is the additional surface disturbance of approximately 16.9 acres within the permanent ROW for the construction of well-tie pipelines from the proposed wells to existing Kinder Morgan gathering cluster facilities. The surface disturbance and associated impacts from construction activities within the

permanent ROW were addressed by the BLM in the 1983 Shell proposed CO_2 Project, Wasson Field/Denver Unit (BLM, 1983). The impacts identified in the 1983 EIS will be mitigated, to the extent possible, by adhering to the mitigation measures presented in the original *Surface Use Plan*, *McElmo Dome Field* (Shell Oil Company, 1983) and by incorporating, where appropriate, the BMP's and mitigations measures presented in Kinder Morgan's current proposed action. All well-tie construction activities would be confined to the 50-foot wide permanent ROW; no TUA would be required. To minimize potential cumulative impacts from development of the proposed action and during construction within the infrastructure ROW, Kinder Morgan will prepare a Stormwater Pollution Prevention Plan that will include conducting threatened/endangered species surveys in order to update the clearances provided in the 1983 EIS. Additionally, any potential Clean Water Act permits, associated with the crossing of ephemeral drainages by utility pipelines, would be acquired as necessary.

The BLM is currently preparing an EA for a seismic survey project (Western Geophysical) proposed within the CANM southwest of the proposal study area. 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 four CO_2 gas wells in the Leadville Formation of the McElmo Dome Field. The proposed project involves construction of four well pads (disturbing approximately 12.36 acres) to drill the wells. The four wells are the Kinder Morgan YE-5, the Kinder Morgan SC-10, Kinder Morgan HB-4, and Kinder Morgan HE-5. All of the wells and associated project components are located on Federal lands managed by the BLM, SJRA.

New road construction associated with access to these well locations consists of approximately 1,379 feet of 18-foot wide graded road surface. Once drilling and testing are completed, and the wells deemed productive, the wells would be connected to an existing CO_2 pipeline gathering system that crosses the area. Three (3) well-tie pipelines would be constructed immediately adjacent to the access roads (1,379 feet) within an approximately 30 foot wide disturbance that includes the access road disturbance. The combined surface disturbance of the access roads and well-tie pipelines would be approximately 0.95 acres within existing lease boundaries. One well site is immediately adjacent to existing access roads and the existing CO_2 gathering pipeline infrastructure, therefore no access road is needed and the well-tie pipeline would be constructed entirely on the pad location. Total proposed surface disturbance would be approximately 13.31 acres.

Reclamation of the well pads and roads is required by the BLM. If a well is deemed unproductive, the well and location would be abandoned and reclaimed in accordance with applicable BLM requirements stipulated in the Conditions of Approval (COA) for the well. If a well is produced, reclamation would occur after the well is no longer economically productive. All reclamation would involve re-contouring the well pads and access roads/well-tie alignments to blend with the natural topography, revegetation with natural grasses, and monitoring to ensure revegetation is successful and that invasive species are controlled. Reclamation efforts would continue until all related COA stipulations are met (Appendix A).

1.6.2 Project Location

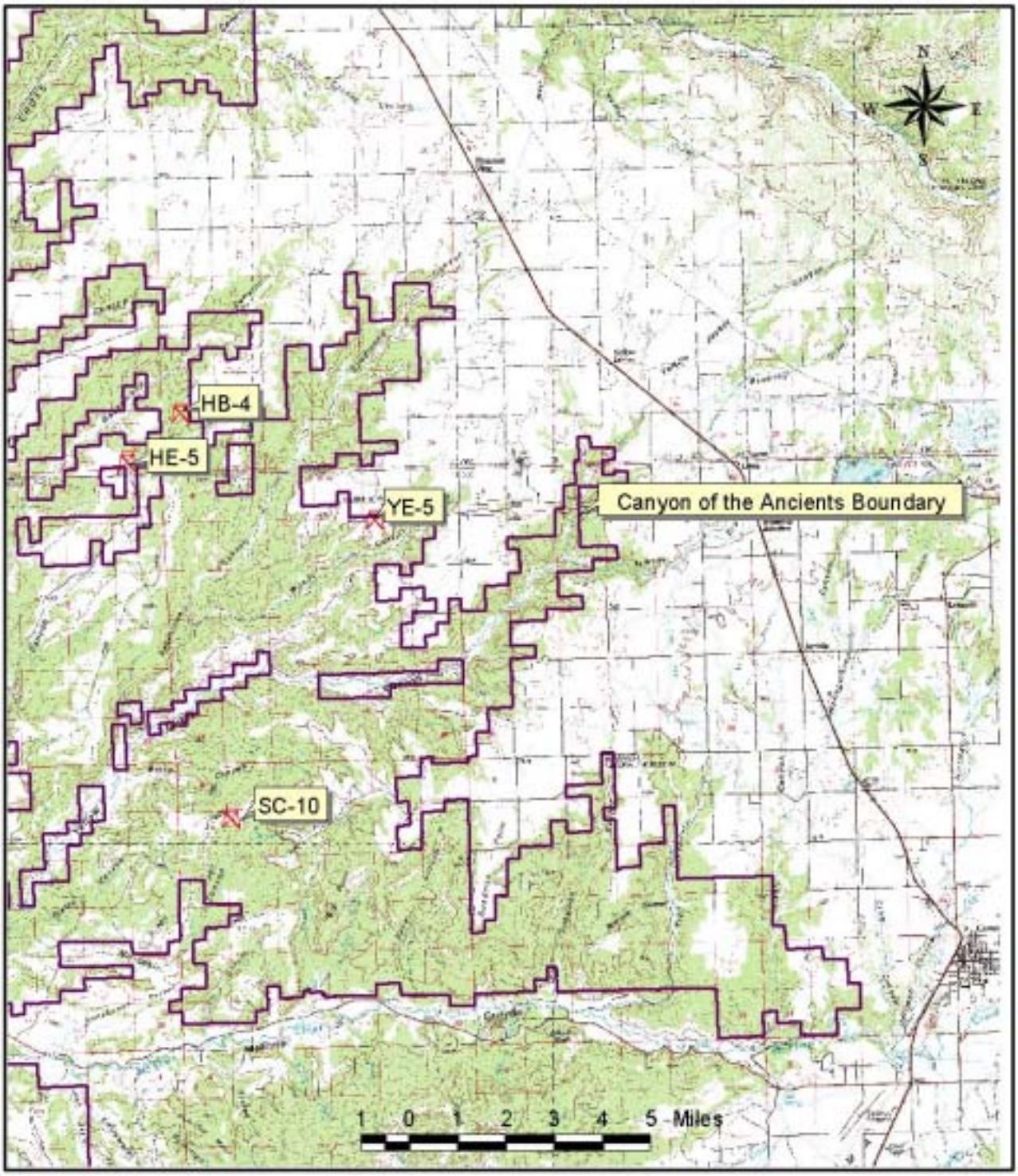
The proposed Kinder Morgan CO_2 gas wells are located from approximately 15 to 20 miles west and northwest of Cortez, Colorado and within the northern portion of the CANM (Figure 1, Vicinity Map). The proposed wells are entirely within Montezuma County, Colorado and can be found on the Woods Canyon and Ruin Canyon; 7.5 minute U. S. Geological Survey (USGS) topographic quadrangle maps (Figures 2, 3, 4 and 5, Project Area Maps). Individual well site survey plats are included in the APDs for each well in Appendix A. The wells would be vertically drilled at the following locations:

Kinder-Morgan YE-5
Surface Location, NE/NW (442-feet FNL/1434-feet FWL)
Township 34N, Range 78W, Section 11
Montezuma County, Colorado
Federal Lease No. COC 21437
6660-feet Elevation
New Mexico Principal Meridian

Kinder-Morgan HB-4
Surface Location, SE/SW (1046-feet FSL/2294-feet FWL)
Township 38N, Range 18W, Section 30
Montezuma County, Colorado
Federal Lease No. C-1713
6625-feet Elevation
New Mexico Principal Meridian

Kinder-Morgan HE-5
Surface Location, SE/SW (736-feet FSL/1573-feet FWL)
Township 38N, Range 19W, Section 36
Montezuma County, Colorado
Federal Lease No. C-1713
6490-feet Elevation
New Mexico Principal Meridian

Kinder-Morgan SC-10
Surface Location, SW/NW (1485-feet FNL/645-feet FWL)
Township 36N, Range 18W, Section 8
Montezuma County, Colorado
Federal Lease No. COC 22486
6480-feet Elevation
New Mexico Principal Meridian



MAP LOCATION

COLORADO

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

FIGURE 1
VICINITY MAP

Prepared by:
Biosphere Environmental Services

USGS 7.5 MINUTE TOPOGRAPHIC SURVEY MAP

WOODS CANYON QUADRANGLE MONTEZUMA COUNTY COLORADO

QUAD LOCATION

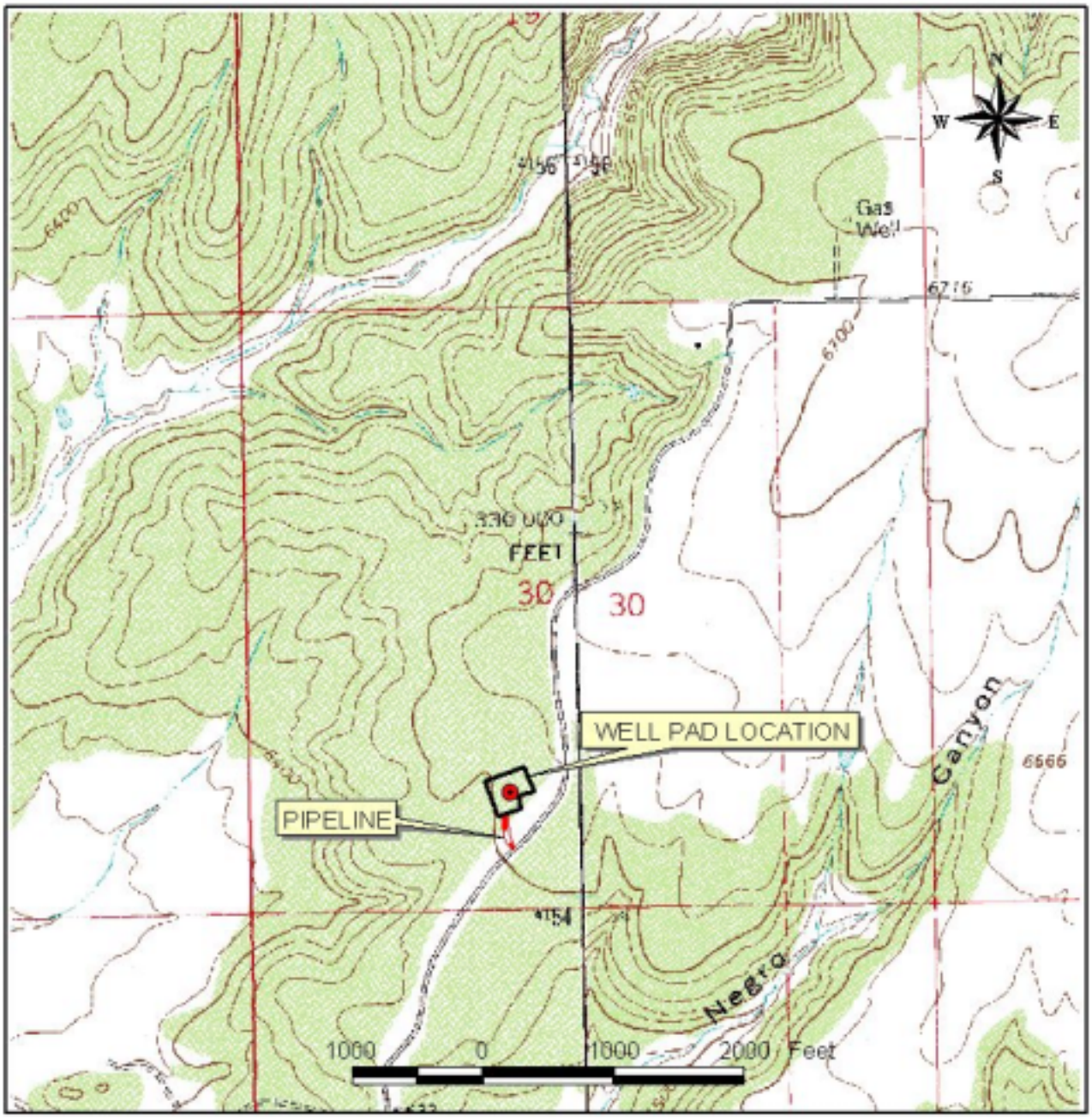
COLORADO

KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED YE-5 WELL AND WELL PAD
T37N-R18W, SECTION 11
NEW MEXICO PRINCIPAL MERIDIAN

FIGURE 2
PROJECT AREA MAP

US GS 7.5 MINUTE TOPOGRAPHIC SURVEY MAP

RUIN CANYON QUADRANGLE MONTEZUMA COUNTY COLORADO



QUAD LOCATION

COLORADO

KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED HB-4 WELL, WELL PAD & PIPELINE
T38N-R18W, SECTION 30
NEW MEXICO PRINCIPAL MERIDIAN

FIGURE 3
PROJECT AREA MAP

USGS 7.5 MINUTE TOPOGRAPHIC SURVEY MAP

RUIN CANYON QUADRANGLE MONTEZUMA COUNTY COLORADO

QUAD LOCATION

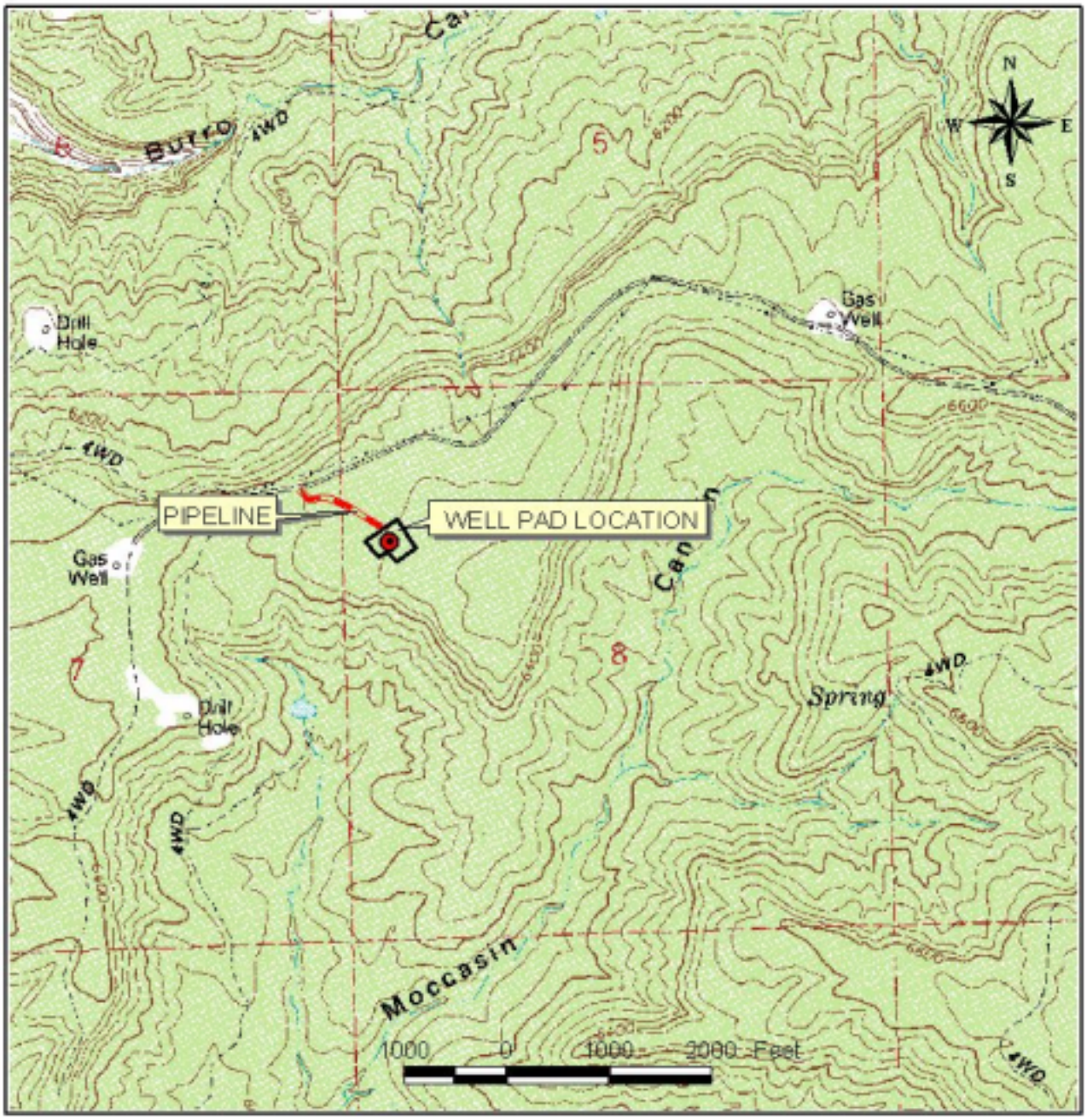
COLORADO

KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED HE-5 WELL AND WELL PAD
T38N-R19W, SECTION 36
NEW MEXICO PRINCIPAL MERIDIAN

FIGURE 4
PROJECT AREA MAP
Prepared By
Biosphere Environmental Services

US GS 7.5 MINUTE TOPOGRAPHIC SURVEY MAP

WOODS CANYON QUADRANGLE MONTEZUMA COUNTY COLORADO



QUAD LOCATION

COLORADO

KINDER MORGAN CO2 COMPANY, L.P.
PROPOSED SC-10 WELL, WELL PAD, PIPELINE
T36N-R18W, SECTION 8
NEW MEXICO PRINCIPAL MERIDIAN

FIGURE 5
PROJECT AREA MAP

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. These plans are included in the APDs provided in Appendix A.

Table 1.0 – Project Design Features for Kinder Morgan's Proposed 4 Wells Project, BLM, CANM, Montezuma County, Colorado, 2002.

Well Name	Road/Well-tie Length/Acres Disturbed (Assumes 30 feet wide ROW)	Well Pad Area (Acres)	Total Affected Surface Area (Acres)
Kinder Morgan YE-5	222-ft/0.15-ac	3.09-ac	3.24-ac
Kinder Morgan HB-4	306-ft/0.21-ac	3.09-ac	3.30-ac
Kinder Morgan HE-5	0	3.09-ac	3.09-ac
Kinder Morgan SC-10	851-ft/0.59-ac	3.09-ac	3.68-ac
		Total Disturbance 13.31 acres	

Existing Infrastructure – Within the proposal study is a network of existing bladed roads and CO_2 gathering pipeline system. As it relates to the proposed action, this infrastructure exists as a 50-foot wide permanent right-of-way (ROW) that includes roads and pipeline ROWs. All of the proposed action wells, if productive, would be connected via well-tie pipelines 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 3 of the well sites. The HE-5 would not require a new access road, as the proposed site is immediately adjacent (abuts) to the permanent 50-foot infrastructure ROW.

Access Road Construction - Three (3) short segments of well site access roads are proposed. The Kinder Morgan SC-10 well site would require approximately 851 feet of access road; the Kinder Morgan YE-5 would require approximately 222 feet of access road; and the Kinder Morgan HD-4 would require approximately 306 feet of access road. The width of disturbance associated with all access roads would be approximately 30-feet to accommodate an 18-foot wide travel surface, drainage (bar) ditches, and to accommodate construction of the well-tie pipelines adjacent to the access road. In total, the surface disturbance from access road and well-tie pipelines, constructed within the same 30-foot wide alignment, would be approximately 0.95 acres. 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. Additional access road alignment and construction specifications are included in the Surface Use Program and APDs in Appendix A.

Well Pad Construction - The proposed Kinder Morgan CO_2 gas well pads would each be approximately 380-feet by 350-feet (3.09 acres) in size. The pads would be stripped of vegetation, leveled, graded, and a surface cover of gravel applied if necessary due to inclement weather conditions. Three or the four proposed well pads were located in previously disturbed areas. The SC-10 well pad would be constructed within an old aggregate site, and the YE-5 and HE-5 would be located within previously chained (disturbed) pinyon-juniper habitat. The HB-4 well pad would be constructed within mature, previously undisturbed pinyon-juniper woodland. Additionally, 4-6 mobile trailers are temporarily placed around the perimeter of the well site. The trailers provide work and living space for the rig supervisor, tool pushers, mudloggers/geologists, mud engineers and safety personnel. Rig crews work on 12-hour shifts and typically number 5 people per crew, often being transported in one vehicle. The well pad layouts, including reserve pit specifications, are provided in the attached APDs in Appendix A.

Well Drilling –The drilling operations are expected to commence soon after a permit is issued. Drilling operations for each well would for last approximately 3-4 weeks, and would be drilled in succession. Well depths would vary from 8,350-feet for the HE-5 well to approximately 7,940-feet for the SC-10 well.

Conductor pipe would be set from surface to approximately 80-feet prior to the drill rig moving onto location. The 12-¼" surface hole is drilled approximately 3,000', into approximately 100' of the Cutler formation. A full string of 9-5/8" (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). 7" Chrome production tubing is run and cemented to surface. The last approximately 200' of the CO_2 bearing payzone is drilled with hole size of 5-7/8". Wireline logs may then be run to assist in the evaluation of the reservoir. Additional casing information is provided in the APD packet in Appendix A.

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 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 6,000 bbls. would be needed to supplement recycled water for each of the following 3 wells. In total approximately 26,000 bbls. or 3.8 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 sites. It is estimated that an additional 1,500 bbls. would be needed for each drill site to supplement the recycled brine. In total, approximately 8,500 bbls or 1.1 acre feet of brine water is estimated for use during the drilling of all 4 wells.

The water remaining at the end of the drilling program would be disposed of in the nearest Kinder Morgan disposal well (Yellowjacket, Hovenweep or Moqui). 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, 4 Proposed Kinder Morgan Wells, 2002.

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 9-⅝ inch 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–axel logging truck. The completion rig would be on location 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 drilling equipment onto the surface location. Approximately 11 trips (total) per well site would be needed to supply water for drilling, 2 trips for fuel, 4 trips for cement. An additional 10 vehicle trips per day would be needed for transportation of crews to the site.

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 provided in Appendix A. Other standard industry safety policies are also in effect during all operations at the well sites in an effort to eliminate all accidents.

Well-tie Pipeline Construction – Should the wells prove productive, the well-tie pipelines would be constructed. Total length would be the same as the access road alignments, approximately 1,379-feet. As described previously, the well-tie pipelines and access roads would occupy the same alignments. Typical construction consists of clearing the right-of-way, trenching the ditch to 5-6 feet, stringing and welding the pipe, and reclamation of the right-of-way.

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 pipeline. The new underground pipeline would transport the produced CO_2 to an existing cluster facility. At the Cluster facility a separator 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 CO_2 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, recontouring abandoned sites, reseeding and monitoring of revegetation 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. Specific surface reclamation plans and details are provided in the attached Surface Use Program, Appendix A.

The total area to be disturbed by construction of the four well pads is approximately 12.36 acres. The area to be disturbed by the construction of the proposed access roads and well-tie pipelines is approximately 0.95 acre. The total area to be disturbed by the Proposed Action is approximately 13.31 acres.

1.7 PROPOSED ACTION AND ALTERNATIVES

The following sections describe the proposed action, the Kinder Morgan 4 CO_2 wells project, and alternatives. Alternative No. 1, or the Preferred Alternative, is the Proposed Action. Alternative No. 2 is action alternatives (alternative locations) considered but eliminated from detailed evaluation in this EA. Alternative No. 3, the No Action Alternative, required under NEPA, is considered throughout the document in order to compare the level of potential project impacts to existing background conditions.

1.7.1 Alternative No. 1: Preferred Alternative

This alternative is the proposed action as presented in Section 1.6. Under this alternative, mitigation measures would be attached to the APDs as COA to minimize environmental impacts. This alternative is the Preferred Alternative following BLM resource specialist onsite investigations of the proposed site locations. Following these onsite surveys it is determined by the BLM that the proposed action represents the least environmental impact relative to the placement of the well sites at alternative locations within each lease boundary. This determination was made due to the avoidance of sensitive

CANM resources, placing 3 of the 4 wells on previously disturbed areas, and siting the wells adjacent to existing oil and gas infrastructure (a 50-foot wide permanent infrastructure easement).

1.7.2 Alternative No. 2: Action Alternatives Eliminated From Detailed Consideration

Based on the existing RMP, the 1991 Oil and Gas Amendment, and Interim Criteria under which the APDs are being reviewed for approval, proposed well locations may be relocated by the BLM (43CFR 3101.1-2) up to 200 meters (656-feet) from the proposed site. However, following onsite surveys it was determined by the BLM that the location of the Preferred Alternative well sites represents the least environmental impact relative to the placement of the well sites at alternative locations. The rationale for this determination is provided above in Section 1.7.1. As such, this alternative is not further considered throughout this document.

1.7.3 Alternative No. 3: No Action Alternative

The No Action Alternative would deny Kinder Morgan's proposed well pad developments and the associated access road/well-tie pipeline. Since valid existing rights are given by Lease Nos. COC-21437, C-1713 (2 wells proposed), and COC-22486, and absent of site specific "no surface-occupancy" lease clauses; the BLM cannot deny the right to drill and develop the leasehold. Only Congress can completely prohibit development activities. Based on the existing RMP, the 1991 Oil and Gas Amendment, and Interim Criteria under which the APDs are being reviewed for approval, approval cannot be denied outright. The BLM, in issuing these leases, has made an irrevocable commitment to allow some surface disturbance activities, and can only impose reasonable mitigation measures as Surface Use Conditions of COA attached to the approved APDs.

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 10 acres including, and surrounding each well site. Onsite biological field surveys of the four well sites were conducted in April 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 CO_2) 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 four 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.

Table 2.0 State and Federal Air Quality Standards (micrograms per cubic meter of air (ug/ m^3) and milligrams per cubic meter of air (mg/m^3).

Parameter	Ambient Federal Standards			Colorado Standards	
Parameter	**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).

2.2.2 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. 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 superceeded 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.

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).

Laurens Hammack and Nancy Hammack of Complete Archaeological Service Associates (CASA) inventoried the proposed well sites and associated access road and well-tie pipeline alignments on November 20 and 21, 2001 and on January 30, 2002 (CASA 01-142, 2001) (CASA 02-10, 2002) (CASA 02-05, 2001). 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.

HB-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 HB-4 well site.

HE-5 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. Two new sites were documented in the vicinity of the proposed well pad. Site 5MT 11547 is a Pueblo II/Pueblo III Ancestral Puebloan habitation site consisting of a roomblock, a well-defined kiva and a trash midden. Site 5MT 11548 is a Basketmaker II Ancestral Puebloan artifact scatter with probable subsurface features present. Site 5MT 11547 and Site 5MT 11548 are considered eligible for nomination to the National Register of Historic Places under criterion d.

YE-5 Well Pad and Associated Facilities
The records search revealed that two sites had been previously recorded adjacent to the proposed well pad. Site 5MT 3992 had been recorded for a proposed access road to several wells within the YE cluster and Site 5MT 6722 was recorded for a transmission line inventory. Site 5MT 3992 is a Pueblo II/ Pueblo III habitation consisting of a room block, kiva, and trash midden. Site 5MT 6772 is an artifact scatter on bedrock within an existing 115 KV transmission line ROW. Site 5MT 3992 is considered eligible for nomination to the National Register of Historic Places under criterion d. According to recorders, Site 5MT 6722 needs additional data in order to assess eligibility.

SC-10 Well, Pipeline, and Access Road
The records search revealed that the majority of the project area had been previously surveyed by the BLM for a proposed borrow pit. Approximately 14.5 acres were inventoried; with one Site 5MT 10540 and five isolated finds (5MT 10541-5MT 10544) were recorded. Site 5MT 10540 is recorded as a "small very dense lithic and ceramic scatter on a flat ridge top". As many as 300-400 possible artifacts and many tools for a site of its size were identified. The site was relocated and has been re-recorded, with changes made in location and size. Site 5MT 10540 is considered eligible for nomination to the National Register of Historic Places under criterion d.

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 vicinity of the project area.

2.2.6 Native American Religious Concerns

No known Native American sacred site or Traditional Cultural Property occurs in the vicinity of the project area (Laura Kochanski, BLM Archaeologist, personal communication).

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. Crucial habitat for the Mesa Verde nightsnake, 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. Included in the sensitive species evaluation are the long-nosed leopard lizard, desert spiny lizard, the Mesa Verde night snake, and the peregrine falcon.

The project was surveyed for potential habitat of the listed and sensitive species on April 10 and 14, 2002 by a BLM biologist and BLM botanist and on April 11, 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.

Of the federally listed species and BLM listed sensitive species considered in this EA, potential habitat exists for the Naturita milkvetch. No individual or populations of the milkvetch were found during the biological surveys of the project areas. No habitat exists for any of the federally listed species in or near the project area.

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.

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	*Mustela nigripes*	Endangered	Habitat consists of prairie dog colonies larger than 80 hectares.	No prairie dogs colonies/towns occur in the PA or vicinity.
Canada Lynx	*Felis lynx canadensis*	Threatened	Habitat consists of mixed conifer types	No mixed conifer forest types in project vicinity. No habitat on CANM.
BIRDS				
Eagle, Bald	*Haliaeetus leucocephalus*	Threatened	Nests and roosts along perennial water sources in SW Colorado	No perennial water sources in PA, may occur foraging
Flycatcher, Southwest Wouldow	*Empidonax traillii*	Endangered	Breeds in riparian habitats with dense wouldow thickets.	No riparian habitats or dense wouldow thickets in PA.
Grouse, Gunnison Sage	*Centrocercus minimus*	Candidate	Lek sites are characterized by low vegetation with sparse shrubs surrounded by big sagebrush dominated communities	No large open sagebrush flats in PA. Sagebrush occurs in the openings and chained areas.
Owl, Mexican Spotted	*Strix occidentalis lucida*	Threatened	Nests in caves or cliff ledges in steep-walled canyons and mixed conifer forests.	No mixed conifer forests in PA.
Cuckoo, Yellow-billed	*Coccyzus americanus occidentalis*	Candidate	Breeds in riparian woodlands and similar habitats.	No riparian woodlands in PA.
FISH				
Pikeminnow, Colorado	*Ptychocheilus lucius*	Endangered	Eddies & backwater currents in Yampa, Green, Gunnison, & San Juan Rivers.	No perennial water sources exist within the PA.
Sucker, Razormouth	*Xyrauchen texanus*	Endangered	Occurs in streams to large riv with backwaters.	No perennial water sources exist within the PA
REPTILES and AMPHIBIANS				
Boreal Toad	*Bufo boreas*	Candidate	High elevation (>8000 feet) pristine riparian areas	PA elevation below 8,000 feet and absent of riparian areas.
PLANTS				
Cactus, Mesa Verde	*Sclerocactus mesae-verdae*	Threatened	Salt Desert Scrub Communities in the Fruitland and Mancos Shale Formations	PA geology is not Fruitland or Mancos Shale Formations
Milkvetch, Mancos	*Astragalus humillimus*	Endangered	Ledges and mesa tops in slickrock communities of the Mesa Verde Formation	No Mesa Verde Formation in or near PA.
Milkvetch, Sleeping Ute	*Astragalus tortipes*	Candidate	Mixed desert scrub community in gravels derived from volcanic intrusion into Mancos Shale (5400-5700)	Elevation of PA above 5400-5700 ft. No mixed desert scrub in PA.

Source: USFWS listing of threatened and endangered species potentially occurring in Montezuma County, Personal Communication with Terry Ireland, USFWS, 2002.

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	*Idionycteris phyllotis*	G4, S2	Roosts are associated with mines or caves. Known to forage in pinyon-juniper woodlands	May occur foraging, no mines or caves in PA.
Bat, Big free-Tailed	*Nyctinomops macrotis*	G5, S1	Rocky cliffs with crevices and fissures required for roosting.	May occur foraging, no rocky cliffs with crevices in PA.
Bat, Spotted	*Euderma maculatum*	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	*Corynorhinus townsendii*	G4, S2	Dependent on availability of abandoned or inactive mines.	May occur foraging, no mines or caves in PA.
Myotis, Fringed	*Myotis thysanodes*	G5,S3	Breeds in caves and forages in piñon-juniper woodlands.	May occur foraging, no mines or caves in PA.
Myotis, Yuma	*Myotis yumanensis*	No CNHP listing	Requires surface water & suitable roost sites	May occur foraging, no perennial water sources, mines or caves in PA.
BIRDS				
Tern, Black	*Chlidonias niger*	G4/S3S4	Nests in inland marshes of the North American prairie, winters at sea.	No inland marshes or prairies in PA.
Goshawk, Northern	*Accipter gentilis*	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	*Plegadis chihi*	G5, S2,	Associated with shoreline and marsh habitats bordering open water.	No potential habitat in PA due to lack of riparian areas.
Falcon, Peregrine	*Falco peregrinus anatum*	G4T3, S3B	Prefers open country and high vertical cliff areas for nesting (>200 feet).	No suitable nesting habitat in AA
Hawk, Ferruginous	*Buteo regalis*	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. No nesting habitat occurs in PA.
FISH				
Chub, Roundtail	*Gila robusta*	G2G3, S2	Inhabits pools and rapids of moderate to large rivers.	No perennial water sources exist within the PA
Sucker, Bluehead	*Catostomus discobolus*	G4, S4	Inhabits headwater streams to large rivers.	No perennial water sources exist within the PA.
Sucker, Flannelmouth	*Catostomus latipinnis*	G3G4, S3S4	Inhabits headwater streams to large rivers.	No perennial water sources exist within the PA.
Trout, Colorado River Cutthroat	*Oncorhynchus clarki pleuriticus*	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	*Sceloporus magister*	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	*Gambelia wislizenii*	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
Snake, Mesa Verde Night	*Hypsiglena torquata loreala*	No CNHP listing	Associated with rocky outcrops in shrublands and piñon/juniper woodlands	No individuals observed during biological surveys of PA.
PLANTS				
Jones blue star	*Amsonia jonesii*	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. No individuals observed during biological surveys of PA.
Cronquist Milkvetch	*Astragalus cronquistii*	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	*Astragalus naturitensis*	G3, S2, S3	Sandstone mesas, ledges, crevices and slopes in PJ woodlands (5000-7000 ft)	Potential habitat exists in PA, however no individuals were identified during biological surveys of PA.
Giant Helleborine	*Epipactus gigantean*	G4, S2	Decomposed sandstone; sandstone seeps; <8,000 feet	No habitat within analysis area
Kachina Daisy	*Erigeron kachinensis*	G2, S1	Saline soils in seeps in canyon walls (4800-5600').	No seeps or canyon walls in PA
Comb Wash Buckwheat	*Eriogonum clavellatum*	G3, S1	Mancos Shale badlands in salt desert shrub.	No Mancos Shale badlands in PA.
Pagosa Trumpet Gilia	*Ipomopsis polyantha var. polyantha*	G1, S1	Fine-textured soils derived from Mancos Formation.	No Mancos Shale in PA
Pagosa Bladderpod	*Lesquerella pruinosa*	G2, S2	Fine-textured soils derived from Mancos Formation.	No Mancos Shale in PA
Dolores Skeleton Plant	*Lygodesmia doloresensis*	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	*Mimulus eastwoodiae*		Shallow caves and seeps on canyon walls, 4,700 to 5,800 feet	No habitat within analysis area
Rollins cryptanth	*Oreocarya rollinsii*		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.

2.2.9 Water Quality

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 10 miles from YE-5, 12.5 from HE-5, 13 miles from HB-4 and 4.6 miles from SC-10. Yellow Jacket Creek is located 3.5 miles from YE-5, 5.3 miles from HE-5, 5.7 miles from HB-4 and 2.5 miles from SC-10. Surface drainage within the project area generally discharges to ephemeral tributaries that ultimately 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, 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. Some of these ephemeral drainages have been modified to create stock tanks that impound water on a seasonal basis. 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, 2002

Well Name	Ephemeral Tributary Drainage Sequence
Kinder Morgan SC-10	Burro/Yellow Jacket/ MeElmo Canyons
Kinder Morgan YE-5	Woods/Yellow Jacket/ McElmo Canyons
Kinder Morgan HB-4	Hovenweep/Yellow Jacket/McElmo Canyons
Kinder Morgan HE-5	Hovenweep/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 principle 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 6). 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 7. 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.

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.

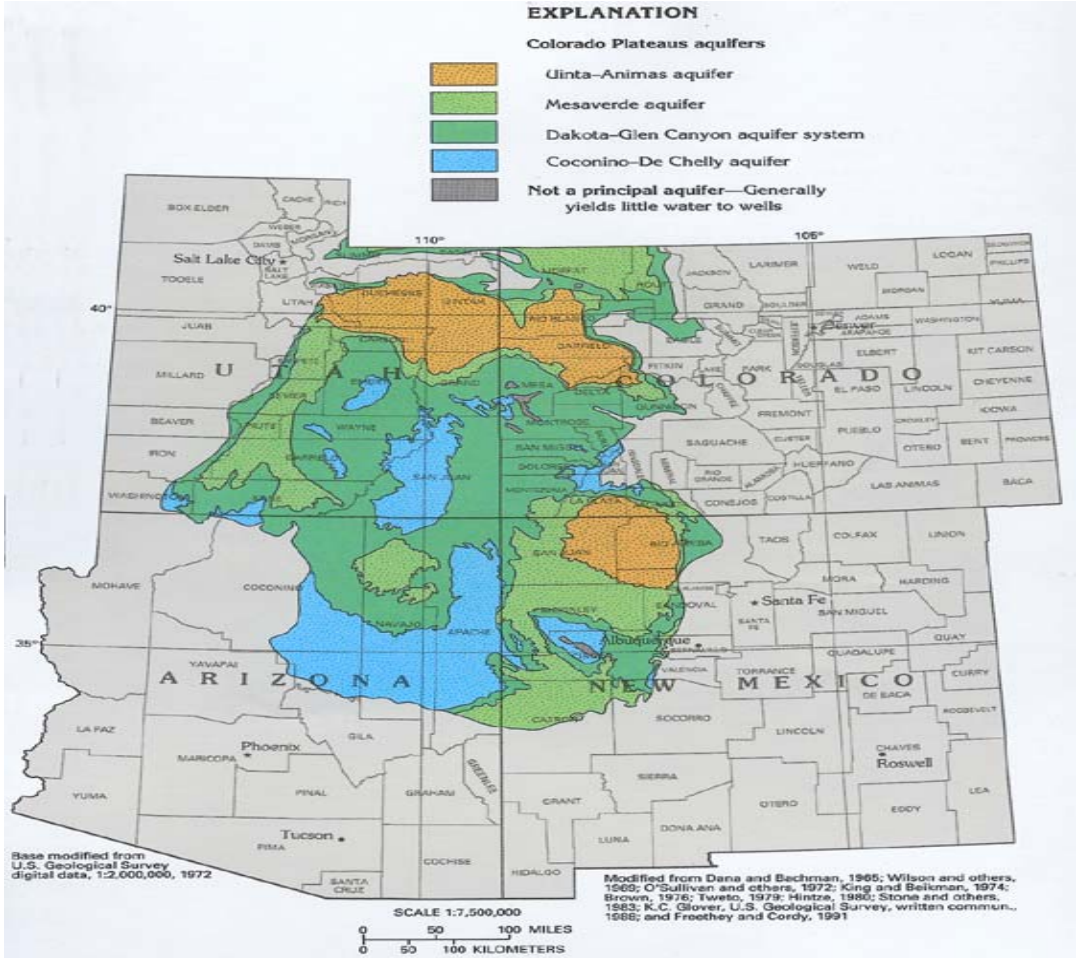


Figure 6. Colorado Plateau aquifers.

2.2.11 Wilderness

There are no designated Wilderness Study Areas (WSAs) within, or immediately adjacent to, the project study areas. The nearest WSA is the Squaw WSA located approximately 8.5 miles from the proposed HB-4 well site. The proximity of all proposed action well sites to BLM WSAs are summarized below.

<u>HE-5 Well Pad and Associated Facilities</u>
The HE-5 well site is located approximately 35 miles from the Weber WSA, 38 miles from the Meneffee WSA, 8.4 miles from the Squaw WSA, 10 miles from the Cahone WSA, and 33 miles from the McKenna WSA (BLM, 1984).

<u>HB-4 Well Pad and Associated Facilities</u>
The HB-4 well site is located approximately 35 miles from the Weber WSA, 37 miles from the Meneffee WSA, 8.5 miles from the Squaw WSA, 11 miles from the Cahone WSA, and 33 miles from the McKenna WSA (BLM, 1984).

YE-5 Well Pad and Associated Facilities
The YE-5 well site is located approximately 30 miles from the Weber WSA, 32 miles from the Meneffee WSA, 14 miles from the Squaw WSA, 11 miles from the Cahone WSA, and 32 miles from the McKenna WSA (RMP, 1984).

SC-10 Well Pad and Associated Facilities
The SC-10 well site is located approximately 30 miles from the Weber WSA, 33 miles from the Meneffee WSA, 15 miles from the Squaw WSA, 17 miles from the Cahone WSA, and 38 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 April 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.

2.3 NON-CRITICAL ELEMENTS

2.3.1 Topography

HE-5 Well and Associated Facilities
The proposed HE-5 well site is located on top of a gently sloping mesa overlooking Hovenweep Canyon. The well site slopes to the northeast at approximately 2 to 8 percent. The elevation of the proposed well site is approximately 6,490 feet.

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 well-tie pipeline are designed into 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.			

HB-4 Well and Associated Facilities

The proposed HB-4 well site is located on a mesa between Hovenweep and Negro Canyons. The well site slopes overall to the southwest at approximately 1 to 5 percent. The elevation of the proposed well site is approximately 6,625 feet.

YE-5 Well and Associated Facilities

The proposed YE-5 well site is located on a mesa above Woods Canyon. The well site slopes overall to the southeast at approximately 3 to 5 percent. The elevation of the proposed site is approximately 6,660 feet.

SC-10 Well and Associated Facilities

The proposed SC-10 well site is located on a mesa slopes overall to the west of Moccasin Canyon. The well site slopes to the west at approximately 5 percent. The elevation of the proposed well site is approximately 6,480 feet.

2.3.2 Geology

HE-5, HB-4, and YE-5 Well Pads and Associated Infrastructure

The HE-5, HB-4 and YE-5 well locations all have Cretaceous aged Dakota formation below developed soils and in outcrops found along hillsides and gullies. The lower portion of 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.

SC-10 Well Pad and Associated Infrastructure

The SC-10 well location lies within the Jurassic aged Morrison formation; the proposed pipeline and access road would intermittently cross both the Morrison formation and the overlying Dakota sandstone. The upper portion of the Morrison exposed near the proposed location consists of medium to coarse-grained sandstones with common siliceous shale interbeds. The sandstones are pale gray to pale gray green in appearance and weakly to firmly cemented with silica and clay. The shales are pale green to medium gray green, firm to very firm, sandy in part and non calcareous. The bedrock is mostly covered by soil near the proposed well location.

2.3.3 Soils

HE-5 Well Pad and Associated Facilities

The western portion (~65%) of the proposed well pad consists of Wetherill loam, 3 to 6 percent slopes, forming on hillsides and mesa tops. A deep and very well drained Wittco soil, with 7 inches of surface loam, with the subsoil consisting of loam about 24 inches thick and subsoil clay loam about 17 inches thick. Permeability is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or greater. Shrink-swell potential is moderate. Runoff is medium and the hazard of water erosion is moderate (NRCS, 1997).

The eastern portion (~35%) of the proposed pad consists of Gladel-Pulpit complex, 3 to 9 percent slopes, forming on edges of mesa tops, hillsides, ridges and uplands. These shallow and well-drained soils are derived from sandstone, consisting of fine cobbly sandy loam to sandy loam to loam. Depths to hard sandstone vary from 10 to 40 inches. Available water capacity is low, permeability is moderately slow to moderately rapid, run off is medium to rapid, hazard of water erosion is moderate to severe. Effective rooting depths range from 10 to 40 inches.

HB-4 Well Pad and Associated Facilities

Surveyed soil type for the well location consist almost entirely Wetherill loam, 1 to 3 percent slopes, forming on hillsides and mesa tops. The Wittco soil is very deep and well drained forming on the mesa top. The surface loam is approximately 7 inches thick, the subsoil consisting of loam and clay loam to 40 inches. Other characteristics of the Wetherill loam are described above.

Soils contained in a small amount of the southeastern border of the proposed well location are of the Gladel-Pulpit complex, in addition to a small portion of the pipeline and access road near the existing pipeline/road corridor. This complex is described above.

YE-5 Well Pad and Associated Facilities

The majority of the proposed pad consists of Gladel-Pulpit complex, 3 to 9 percent slopes, in addition to all of the proposed pipeline and access road. This complex is described above. A small portion (15-20%) of the eastern part of the proposed well pad contains soils of the Romberg-Crosscan complex, 6 to 25 percent slopes, very stony. This soil unit consists of co-equal amounts of Romberg very stony loam and Cragola very stony sandy clay loam. The Romberg soil is very deep and well drained on canyon sideslopes, hillsides and benches. The surface layer is 2-inch thick extremely stony loam with 3 to 15 percent stones on the surface. The subsoil is very stony loam 18 inches thick; the substratum is also very stony loam up to 60 inches thick. Permeability is moderately slow, available water capacity is low. Runoff is rapid and the hazard of water erosion is severe. Effective rooting depth is 60 inches or more.

The Cragola soil is a shallow and well drained on canyon side slopes and hillsides. The upper part of the surface layer is very stony sandy clay loam 2 inches thick with 3 to 15 percent stones on the surface. The lower part of the surface layer is gravelly clay loam 7 inches thick. The underlying material to a depth of 18 inches is variegated colors of gravelly clay loam. Calcareous shale is at a depth of 18 inches. Permeability is slow. Available water capacity is very low. Runoff is rapid and the hazard of water erosion is severe. Effective rooting depth is 10 to 20 inches. Depth to soft bedrock is 10 to 20 inches.

SC-10 Well Pad and Associated Facilities

The well pad is contained entirely within the Romberg-Cragola-Rock outcrop complex, 25 to 80 percent slopes. This unit contains 35 percent Romberg extremely stony loam, 30 percent Cragola very bouldery sandy clay loam and 20 percent Rock outcrop. The Romberg-Cragola complex is described above. Rock outcrop consists primarily of exposed sandstone bedrock.

2.3.3.1 Cryptogrammic Soils

Biological, or cryptogrammic soil crusts occur on the soil surface of the project area in a random manner. These crusts are composed of multiple organisms including cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria (Belnap at al. 2001). They reduce wind and water erosion, fix atmospheric nitrogen, and contribute to soil organic matter (Eldridge and Greene 1994). They are a rough carpet on the ground surface, and their below ground components form a matrix that binds soil particles together (Belnap 1995). Cyanobacteria-dominated biological soil crusts that are in a very early successional stage are often present on or just below the soil surface but are not readily visible (Belnap 2001, Jayne Belnap - personnel communication 2002).

Biological soil crusts are common on the Farb and Mack soils of mesa tops within the CANM. Within the project area biological soils are present in the pinyon-juniper woodlands surrounding HB-4 and is the portion of the wooded area of HE-5. The soil association for both of these pads, within the piñon-juniper woodands, is Wetherill loam. The crusts typically occur as small patches ranging from about 1 to 16 square inches. Cyanobacteria-dominated and moss-dominated crusts are the most common within the project area, but lichen-dominated crusts also occur.

2.3.4 Vegetation

HE-5 Well Pad and Associated Facilities

The proposed HE-5 site is located within a mid-mature piñon/juniper (*Pinus edulis/Juniperus* osteosperma) woodland and sagebrush (*Artemisia spp.*) shrubland vegetation mosaic. The western edge of the proposed well pad consists of a wide strip of undisturbed, mid-mature piñon/juniper woodland, consisting of trees approximately 8 to 15 feet high with an estimated canopy cover of 45 to 50 percent.

Shrub cover within this strip of piñon/juniper woodland was estimated to be approximately 10 percent and shrub height ranged from 3-4 feet. Associated early successional shrub species include antelope bitterbrush (*Purshia tridentata*) and big sagebrush (*Artemisia tridentata*). The remainder of the proposed well site consists of a disturbed big sagebrush/rubber rabbitbrush *(Chrysothamnus nauseosus*) dominated shrubland. Apparently this shrubland was formed as a result of chaining and subsequent burning of the slash piles. Estimated canopy cover of this area is 30-35 percent while shrub height ranged from 2-4 feet. Ground cover is relatively sparse throughout the piñon/juniper area, estimated to be less than 5 percent in cover, and increases to approximately 55-65 percent within the shrub-dominated area. Common ground cover species include crested wheatgrass (*Agropyron cristatum*), Indian ricegrass (*Oryzopis hymenoides*), cheatgrass (*Bromus tectorum*), biscuitroot (*Lomatium spp.*), tumble mustard (*Sisymbrium altissimum*), and bur buttercup (*Ranunculus spp*.). Appendix B provides a complete list of plants occurring in the project area as recorded during the biological survey.

HB-4 Well Pad and Associated Facilities

The proposed HB-4 well site is located within homogeneous mature, piñon/juniper woodland. The project area consists of a mixed mosaic of mature piñon/juniper woodland interspersed with small areas of relatively sparse ground cover. The piñon/juniper woodland, consists of piñon pine and Utah juniper trees, approximately 15 to 25 feet in height with an estimated canopy cover of 65 to 75 percent. Shrub cover within this piñon/juniper woodland was estimated to be approximately 5-10 percent while shrub height ranged from 3-4 feet. Associated shrub species include antelope bitterbrush and serviceberry. Ground cover is relatively sparse throughout the area and is estimated to be less than 10 percent. Common ground cover species include mutton grass (*Poa fendleriana*), Indian ricegrass, western wheatgrass (*Elymus smithii*), rock cress (*Arabis spp.),* twin bladder-pod (*Lesquerella spp.*), and penstemon (*Penstemon spp.).* Appendix B provides a complete list of plants occurring in the project area as recorded during the biological survey.

YE-5 Well Pad and Associated Facilities

The proposed YE-5 well site is located within an early-mid mature, relatively dense, historically disturbed piñon/juniper mid-mature woodland vegetation mosaic. Apparently this vegetation was formed as a result of chaining and subsequent burning of the slash piles. Estimated tree canopy cover of the area is 65-85 percent and tree height ranged from 8-12 feet. Shrubs consisted of antelope bitterbrush, serviceberry (*Amelanchier alnifolia*), big sagebrush, and rubber rabbitbrush. Shrub cover is estimated to be 40-45 percent and shrub ranged from height 2-4 feet. The ground cover is estimated to be between 15-20 percent and includes crested wheatgrass, Indian ricegrass, cheatgrass, biscuitroot, tumble mustard, beggars tick (*Bidens cernua*), and bur buttercup. Appendix B provides a complete list of plants occurring in the project area as recorded during the biological survey.

SC-10 Well Pad and Associated Facilities

The proposed Kinder Morgan SC-10 well site is located within a piñon/juniper woodland and rabbitbrush shrubland vegetation mosaic. The majority of the proposed pad overlaps an existing gravel pit. The northeast corner and the northwest corner of the proposed well site consists of a wide strip of undisturbed, early-mature piñon/juniper woodland, consisting of trees approximately 6-12 feet in height with an estimated canopy cover of 45 to 50 percent. Shrub cover within this strip of piñon/juniper woodland was estimated to be approximately 10-15 percent and shrub height ranged from 2-3 feet. Associated shrub species include antelope bitterbrush and big sagebrush. The remainder of the proposed well site consists of a disturbed rubber rabbitbrush dominated shrubland. This shrubland was formed after gravel mining activities ceased. Estimated canopy cover of this area is 20 percent while shrub height ranges from 2-4 feet. Ground cover is relatively sparse throughout both the piñon/juniper woodland and the old gravel pit, estimated to be less than 5 percent. Common ground cover species

include crested wheatgrass, Indian ricegrass, cheatgrass, filaree (*Erodium spp*), tumble mustard, sweet yellow clover (*Melilotus officinalis*), and bur buttercup. Appendix B 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 B.

Ecosphere biologists conducted biological investigations of the project area on April 11, 2002, and by BLM biologists on April 10 and 14, 2002. Signs of deer and rabbit (i.e. scat) were noted within all of the well sites. No prairie dogs or prairie dog towns were found during the site survey of the well sites. Numerous common birds including crows, scrub jays, western bluebirds, and sparrows utilize the project area. Specifically, a sagebrush lizard was observed in YE-5. Well sites HE-5, YE-5, and SC-10 provide potential raptor foraging habitat. Specifically the HB-4 well site provides excellent perching and potential nesting habitat for area raptors in the surrounding mature piñon-juniper woodland. No raptors or raptor nests were observed within the project area at the time of the surveys. Surveys were conducted during the breeding season of most area raptors.

2.3.6 Big Game

Mule deer and elk are common year-round residents. According to the San Juan-San Miguel Resource Management Plan, there are no designated deer or elk winter range or concentration areas are 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 and elk sign was noted at the HB-4 well site.

2.3.7 Range

<u>HE-5 and HB-4 Well Pads and Associated Facilities</u>
The Cahone Mesa grazing allotment is located with the proposed project area for well sites HE-5 and HB-4. 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). According to the permit stipulations of these allotments, livestock may be present during construction of the proposed project.

<u>YE-5 Well Pad and Associated Facilities</u>
The Sandstone grazing allotment is located within the proposed project area for well site YE-5. 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). According to the permit stipulations of these allotments, livestock may be present during construction of the proposed project.

<u>SC-10 Well Pad and Associated Facilities</u>
The Burro Point Community grazing allotment is located within the proposed project are for well site SC-10 and is held by three separate permit holders. Norman and Sherman Zwicker (first permittee) and

Sheldon Zwicker (second permittee) have permits for 74 cattle from December 1 through February 10 for a total of 175 AUMs. The second grazing period for the Zwickers is from April 14 through May 28 for 152 cattle totaling 225 AUMs. Jackie Wallace holds a permit for 113 cattle from December 1 through January 15 for a total of 171 AUMs. The second grazing period for the permittee is from April 11 to May 20 for 84 cattle totaling 110 AUMs. According to the permit stipulations of these allotments, livestock may be present during construction of the proposed project.

2.3.8 Visual Resources

HE-5 Well Pad and Associated Facilities

The proposed HE-5 well site is located on a mesa top overlooking Hovenweep Canyon. The well pad project should not be visible from County Road 10 or Highway 666. The well site would be visible from the HE cluster road which is located adjacent to the well pad project area, and aerially. The HE-5 well site is located approximately 20 miles from the Cross Canyon Outstanding Scenic Area (OSA), 11.5 miles from the Goodman OSA, and 29 miles from the Mesa Verde OSA.

HB-4 Well Pad and Associated Facilities

The proposed HB-4 well site is located on a strip of mesa situated between Hovenweep Canyon and Negro Canyon. The well site should not be visible from County Road 10 or Highway 666. The well site would be visible from the HE cluster road which is located adjacent to the well pad project area, any high elevation vistas surrounding the project area, and aerially. The HB-4 well site is located approximately 22 miles from the Cross Canyon OSA, 11.5 miles from the Goodman OSA, and 29 miles from the Mesa Verde OSA.

YE-5 Well Pad and Associated Facilities

The proposed Kinder Morgan YE-5 well site is situated on a mesa located approximately 3,500 feet north of Woods Canyon. The well site would not be visible from Highway 666. The proposed well site would be visible from County Road W which is located adjacent to the well site, any high elevation vistas surrounding the project area, and aerially. The YE-5 well site is located approximately 13 miles from the Cross Canyon OSA, 8 miles from the Goodman OSA, and 24.5 miles from the Mesa Verde OSA.

SC-10 Well Pad and Associated Facilities

The proposed Kinder Morgan SC-10 well site is situated on a mesa located approximately 3,000 feet west of Moccasin Canyon. The proposed well site would be visible from any high elevation vistas surrounding the project area, and aerially. The SC-10 well site is located approximately 11 miles from the Cross Canyon OSA, 5 miles from the Goodman OSA, and 25 miles from the Mesa Verde OSA.

2.3.9 Noise

The four 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 three well sites. A residence is located approximately a ¼ mile from the YE-5 well site. 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.

<u>HE-5 Well Pad and Associated Facilities</u>
The HE-5 well site is adjacent to an existing ROW pipeline, the HE Cluster road and a powerline.

<u>HB-4 Well Pad and Associated Facilities</u>
The HB-4 well site is adjacent to an existing ROW containing one Questar natural gas pipeline, the HE Cluster road and a Kinder Morgan $C0_2$ pipeline.

<u>SC-10 Well Pad and Associated Facilities</u>
The SC-10 well site is adjacent to a pipeline ROW containing, a Kinder Morgan $C0_2$ and water pipeline, and fiber optic cable, County Road N, and a powerline.

<u>YE-5 Well Pad and Associated Facilities</u>
The YE-5 well site is located adjacent to a pipeline ROW, existing Road W, and powerlines.

CO_2 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 would be done 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 4 miles east of the SC-10 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 10 miles from the YE-5 well site, 5 miles from the HB-4 and HE-5 well sites, and 13 miles from the SC-10 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 geology 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 (NOx) 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. Potential releases of H2S gas are mitigated by a tested H2S Contingency Plan that is designed to alert and protect the public from accidental releases during the drilling process. The details of this plan are provided in Appendix A. 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 (Appendix A). Impacts during production operations 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 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. This 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, Kinder-Morgan CO_2 Wells

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 SUIT or BIA 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, Surface water depletions,	Low to moderate/short-term Low/long-term	Low/long-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 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 9 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 infestations Loss of mature Piñon-Juniper woodland in HB-4	Moderate/short-term Moderate/short-term	Low/long-term Moderate/long-term	Stockpiling of topsoil, reclamation and reseeding, noxious weed monitoring, and re-vegetation. Re-contouring and wood salvaging
Wildlife	Loss of 13.3 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 13.3 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 13.3 acres of grazing land, Weed infestation	Low/short-term Low to moderate/long-term	Low/long-term Low/long-term	Reclamation and reseeding and fencing (well pads) of project area, 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

Table 3.0. Continued - Summary of Environmental Consequences, Kinder-Morgan CO_2 Wells

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
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

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.

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

A determination of "no historic properties affected" is recommended by CASA for all the proposed well pad sites. This determination is made following the implementation of mitigation measures recommended by CASA and required by the BLM. Following implementation of these measures, no impacts to cultural resources are anticipated during construction, drilling and operation of 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 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

An archaeological monitor is required to be onsite prior to and during any disturbance to the ground surface. 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. Temporary fences would be constructed between the sites identified and the following well pads to avoid cultural resources: HE-5, SC-10 and YE-5. The fences should be removed after site reclamation. As required by BLM, a monitor would be present during construction of the well sites.

3.2.4 Impacts to Threatened, Endangered, and Sensitive Species

There are no TES species known to occur within, or within the vicinity, of these proposed well pad developments. There would be no effect to any listed or sensitive species or their habitats. Two sites are in old chaining areas (HE-5 and YE-5), a third is in a borrow pit (SC-10), and the fourth is in an old-growth piñon-juniper stand (HB-4). The chained areas and borrow pit have been heavily disturbed. There are no concerns regarding well development at these sites. As such, 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 B to this EA.

The BLM, Colorado State Office, prepared a Programmatic Biological Assessment (PBA) in 1994 to address minor water depletions in the Colorado River Basin. A Biological Opinion (BO) was issued which addressed impacts associated with a total water depletion of approximately 176 acre/feet in the San Juan Basin. The original BO was intended to address new and historic depletions for a 5-year period from 1994 through 1999. The BLM is currently in the process of requesting that USFWS amend the current BO for an additional five years (until 9/30/04) or until BLM reaches the depletion thresholds given in the BO. Water depletions expected as a result of the proposed action are estimated at less than 3.8-acre feet.

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 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

Two specific mitigations have been proposed for the HB-4 site in the mature piñon-juniper stand. The first mitigation would be to make the shape of the pad more natural appearing with irregular edges and more rounded corners. The second mitigation would be to remove half of the wood from the site for use as personal use firewood and use the remaining wood for the reclamation. The concern is that if all the wood is used for the reclamation there would be a significant increase of fire risk within that stand.

Construction activities for all of the well sites would be confined to the proposed well pad, access road and well-tie pipeline right-of ways 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 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 would 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 would be required to wear appropriate personal protective equipment to minimize exposure to these hazards.

A 1-foot earth berm would 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 fuel. The well pad would be designed in such a manner as to prevent runoff from leaving the pad. The need for the berm would 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 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 would be reseeded with a BLM approved seed mix to stabilize soils and prevent erosion. Should re-vegetation attempts fail, reseeding would be repeated at the request of the BLM. All disturbed areas would be re-contoured to natural topography. Best management practices for sediment and erosion control and inspection and monitoring should be conducted to assure functionality of these erosion control and reclamation measures.

Personnel working on location during drilling and completion of the proposed wells would 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 would 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 CO_2 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 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 would be removed from the locations for appropriate disposal. Releases of hazardous substances, chemicals, or fuels during construction or operation would be contained and disposed in accordance with State and Federal regulations. Personnel working at the site should be informed of spill control procedures in accordance with a written plan. Contamination and dewatering of shallow groundwater would 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 12.0 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 re-claimed, 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. Following successful reclamation and adherence to mitigation measures and Surface Use 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 in Appendix A of this EA. Stripped topsoil and vegetation would be stockpiled for subsequent reclamation of unused areas of the well pad. Re-vegetation would be initiated by Kinder Morgan 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 would be done by Kinder Morgan.

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 four well pad project areas. Cut and fill activities associated with the construction of the well pad are detailed in the well site plat in Appendix A. 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 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 would 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 would assist in stabilizing these re-contoured features.

3.3.2 Impacts to Soils

Approximately 13.3 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. A loss of crytogrammic soils would occur in well sites HE-5 and HB-4 due to vehicular traffic and heavy equipment. 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 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

During well site selection (BLM onsite), the BLM requested that HB-4 be rotated in order to avoid impacting an adjacent ephemeral drainage. Other onsite mitigation measures included the siting of all wells as close as possible to an existing oil/gas 50-foot wide permanaent infrastructure easement in order to minimize the length of needed access roads. Mitigation measures for construction and operation of the would 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 would utilize best management practices (BMPs) to control erosion during construction of the proposed project, and during site reclamation. Vehicle and pedestrian traffic would 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 would be removed and disposed in accordance with State and Federal regulations. Kinder Morgan would 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 would not spin the tires of the vehicles to avoid loss of cryptogrammic spoils.

The proposed project area disturbance would 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, re-seeding would be repeated by Kinder Morgan at the request of the BLM.

The well pad areas would be bermed to minimize off-site migration of disturbed soils. Vehicle and pedestrian traffic would 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 COA. Upon plugging and abandonment of the well following its useful life, the entire well pad and access road would be reseeded to BLM specifications.

3.3.3 Impacts to Vegetation

HE-5 Well Pad and Associated Facilities

Loss of vegetation in the proposed project area would occur due to blading and trenching. Approximately 3.1 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.

HB-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 3.3 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. Due to the loss of a mature piñon-juniper woodland that is difficult to re-establish, the impacts would shift to moderate 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.

YE-5 Well Pad and Associated Facilities

Loss of vegetation in the proposed project area would occur due to blading and trenching. A total of approximately 3.2 acres of early-mid-mature piñon/juniper woodland, 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. The impact during construction and operation would be low and long-term.

SC-10 Well Pad and Associated Facilities

Loss of vegetation in the proposed project area would occur due to blading and trenching. A total of approximately 1.5 acres of piñon/juniper woodland and approximately 2.2 acres shrub species 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. Due to the highly disturbed character of the site, reclamation would likely bring the site closer to a natural state. 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 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 well sites YE-5, HE-5, and SC-10 would be low to moderate and short-term, after site reclamation and low and long-term during operation of the wells. Potential impacts to vegetation of well site HB-4 on vegetation would be moderate and short-term, after site reclamation and during operation of the pad, impacts would remain moderate and long-term due to the clearing of a large area of mature piñon-juniper woodland. These potential impacts would be minimized by the implementation of mitigation measures described below and following adherence to Surface Use 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. Stripped topsoil and vegetation would be stockpiled for subsequent reclamation of unused areas of the well pads. Kinder Morgan would 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 would be the responsibility of Kinder Morgan. Any spills or releases of hazardous substances would be cleaned up and disposed of in accordance with applicable requirements and spill plans.

In addition to the mitigation measures above, the HB-4 well site would comply with the following additional mitigation measures: contour the shape of the pad to appear more natural with irregular edges and more rounded corners and remove half of the wood from the site for use as personal use firewood and use the remaining wood for the reclamation.

3.3.4 Impacts to Wildlife

The removal of 13.3 acres of vegetation in all of 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 well-tie.

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

3.3.5 Impacts to Big Game

Extensive sign of deer, and sign of elk at the HB-4 well site 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 13.3 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 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 would be confined to the proposed well pad, access road and well-tie pipeline right-of-ways to minimize disruption to big game. The impact to big game caused by the removal of vegetation would be mitigated through the implementation of reclamation measures outlined in the BLM Surface Use COA (if approved). Re-seeding could 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 13.31 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 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 would 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 would 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 four 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 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 would be removed from the area and disposed of in an authorized disposal area. All disturbed areas would be recontoured to blend as nearly as possible with the natural topography. This includes removing all berms and refilling all cuts. Revegetation procedures would assist in minimizing visual disruption. All permanent structures (onsite for six months or longer) constructed or installed would 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 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 would 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 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 would 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 would be maintained on site during the construction phase. Equipment operators would 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 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 would provide public notices, signs, detours and precautions and/or warning necessary to protect the health and safety of the public. Noise impacts on recreation would 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 3.4 acres for a total disturbance of 13.3 acres.

Currently, the actual number of wells drilled in the SJ/SMRA and associated acreage of disturbance is unavailable. Therefore, it is unknown how much the proposed action contributes to the planned 1,430 acres of disturbance. In lieu of actual oil and gas disturbance data across the SJ/SMPA, an analysis of Colorado Oil and Gas Conservation Commission (COGCC) records within the project area was made in order 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.

Accordingly, both individually (per well) and collectively, the cumulative impact from the proposed action would result in less than the 2% planned oil and gas surface disturbance in each development project area. Additionally, the proposed action results in a smaller surface disturbance impact per well than planned for in the BLM Colorado Oil and Gas Leasing and Development EIS (1991).

The 13.3 acres of disturbance associated with the development of the proposed YE-5, HB-4, HE-5, and SC-10 well sites would result in cumulative impacts to soils, wildlife, and vegetation. The most significant cumulative impact would be the construction of well site HB-4 in mature piñon-juniper woodland. This could lead to increased erosion and sedimentation, with difficulty in re-establishment of vegetation.

The removal of 13.31 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.

Existing Wells in Proximity to Kinder Morgan's Proposed Action								
Type of Well	**Well #HB-4**		**Well #HE-5**		**Well #SC-10**		**Well # YE-5**	
	1-mile radius	5-mile radius	1-mile radius	5-mile radius	1-mile radius	5-mile radius	1-mile radius	5-mile radius
Abandoned Location	1	7		9		5		3
Drilled and Abandoned		16		16	2	15		6
Injecting		5		3				2
Plugged and Abandoned		3		1	1	9		
Producing	5	30	5	30	4	19	2	28
Shut-in		3		3				
Temporarily Abandoned		3		4	1	11		
Permitted Location		3		3		2		3
Total Existing Disturbance (Acres)	24	287	20	276	32	250	8	172
Land Disturbance	1.2%	0.5%	1.0%	0.5%	1.6%	0.5%	0.4%	0.3%

Table 3.2. Kinder Morgan Well site YE-5, HB-4, HE-5, and SC-10 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 13.3 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 four 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 toModerate	Proposed project would result in 13.3 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 four 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 13.3 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 four 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 four well sites.
Range	Loss of 9.0 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
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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

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APPPENDIX A
KINDER MORGAN APD

APPENDIX B
TES CLEARANCE LETTER
PLANT AND WILDLIFE LIST

PLANTS OCCURRING IN THE KINDER MORGAN CO_2 GAS WELL PROJECT AREAS

Forbs:

Achillea millefolium L.	Milfoil Yarrow
Alyssum minus (L.) Roth	Annual alyssum
Arabis perennans Wats.	Rockcress
Arabis selbyi Rydb.	Rockcress
Cordylanthus wrightii Gray	Cordylanthus
Cryptantha sp.	Cryptantha
Cymopterys bulbosus Nels.	Biscuitroot
Erodium cicutarium (L.) L'Her.	Filare
Helianthus annuus L.	Sunflower
Lappula redowskii (Horne.) Greene	Beggar;s tick
Lepidium sp.	Peppergrass
Lesquerella rectipes Woot. & Standl.	Colorado bladderpod
Lomatium grayi Coulter & Rose	Lomatium
Lupinus sp.	Lupine
Melilotus officinalis (L.) Lam.	Yellow sweet-clover
Penstemon linarioides Gray	Penstemon
Physaria acutifolia Rydb.	Rydberg twinpod
Ranunculus testiculatus Crantz.	Buttercup
Senecio multilobatus Torr.& Gray	Groundsel
Sisymbrium altissimum L.	Tumblemustard
Sphaeralcea coccinea (Nutt.) Rydb.	Globe mallow
Verbascum thapsus L.	Mullein

Grasses:

Agropyron cristatum	Crested wheat
Agropyron trachycaulum (Link) Malte.	Wheatgrass
Aristida purpurea Nutt.	Red three-awn
Bouteloua gracilis (H.B.K.) Lag.	Blue grama
Bromus inermis Leyss	Smooth brome
Bromus tectorum L.	Cheatgrass
Elymus smithii (Rydb.) Gould	Western wheatgrass
Hilaria jamesii (Torr.) Benth.	Galleta grass
Oryzopis hymenoides (R. & S.) Ricker	Indian ricegrass
Poa fendleriana (Steud.) Vasey.	Muttongrass
Sitanion hystrix (Nutt.) J.G. Smith	Squirrel-tail

Shrubs:

Amelanchier utahensis Koehone.	Serviceberry
Artemisia tridentata (Pursh) Nutt.	Big sagebrush
Chrysothamnus nauseosus (Pall.) Britt.	Rubber rabbitbrush

Ephedra torreyana Wats.	Jointfir
Gutierrezia sarothrae (Pursh) Britt. & Rusby	Broom snakeweed
Purshia stansburiana (Torrey) Hend.	Cliff Rose
Purshia tridentata (Pursh.) DC.	Antelope-bitterbrush
Yucca baccata Torr.	Wild banana yucca
Yucca harrimaniae Trelease.	Yucca

Cacti and Cactus like plants:

Sclerocactus whipplei (Englm.) Britt. & Rose	Whipple fishhook
Opuntia polyacantha Haw.	Prickly pear cactus
Echinocereus triglochidiatus Engelm.	Hedgehog cactus

Trees:

Juniperus osteosperma (Torr.) Little	Utah juniper
Pinus edulis Engelm.	Piñon pine

COMMON WILDLIFE WITH POTENTIAL TO OCCUR IN THE KINDER MORGAN CO_2 GAS WELL PROJECT AREAS

Mammals

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

Birds

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

Reptiles

Crotalus viridis	Prairie rattlesnake
Pitulophis melanoleucus	Bull snake
Sceloporus stansburiana	Side-blotched lizard
Sceloporus graciousus	Sagebrush lizard