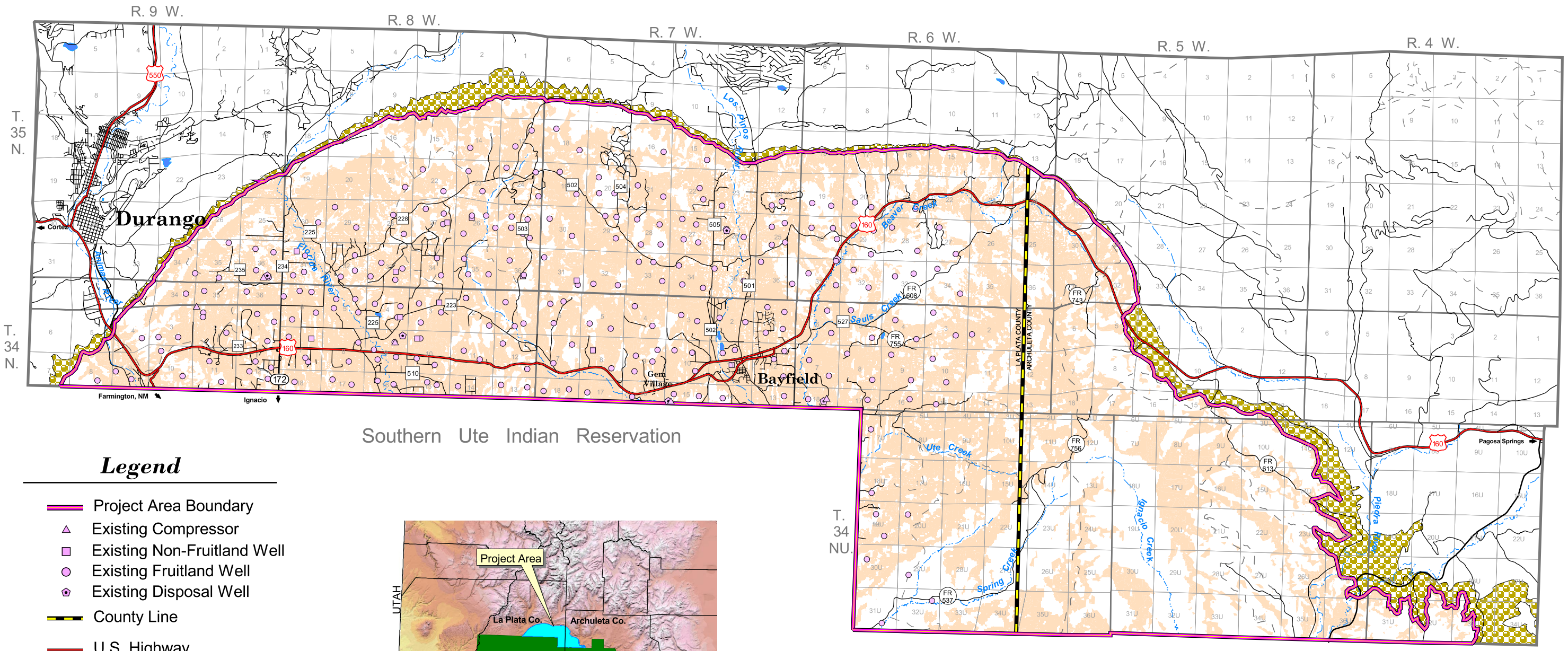
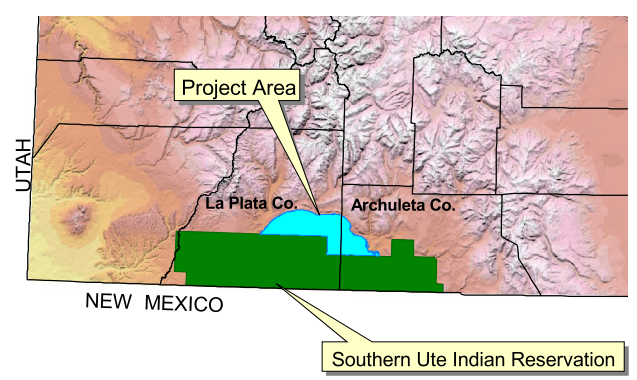
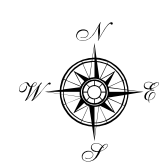


Legend

- Project Area Boundary
- Existing Compressor
- Existing Non-Fruitland Well
- Existing Fruitland Well
- Existing Disposal Well
- County Line
- U.S. Highway
- Primary Road
- Secondary Road
- Trail
- Lake/Reservoir
- Stream/River
- Fruitland Formation Outcrop
- Area Visable From Main Transportation Corridors & County Roads In or Near Residential Areas





2 0 2 4 6 8 *Kilometers*

2 0 2 4 6 8 *Miles*

La Plata County transportation data provided by the La Plata County Transportation Study, 1998. Hydrologic and Archuleta County transportation features extracted from 1:100,000 USGS SDTS data. Existing wells extracted from COGCC well database and edited by the BLM & USFS. Viewshed developed from 1:24,000 USGS DEM's.

Transverse Mercator Projection
1927 North American Datum
Zone 13

LA PLATA COUNTY IMPACT REPORT

FIGURE 3-17
SENSITIVE VIEWSHED

ANALYSIS AREA: LA PLATA & ARCHULETA COUNTIES, COLORADO	
Date: 06/15/02	ArcView File: C:\994-sanjuan\CIR.apr
	Prepared By: JG

Linear elements associated with oil and gas pipelines, roads, and well pads can involve clearing dense vegetation or construction on steep slopes. Facilities located in cleared areas or on steep slopes can be prominent in foreground, middleground, and background views. Because of varied topography and vegetation, these linear elements often are visible to the casual observer as infrequent views. In many instances, however, well pads typically are not visible in the middleground and background views. Partially reclaimed well pads typically are subordinate in the middleground and unnoticed in the background views. Unreclaimed well pads with exposed cuts and fills typically are prominent in the middleground and are subordinate in background views. Generally, linear features are more likely to attract attention when the observer is at a higher vantage point. The activity or feature can be screened easily where the observer is at the same level.

Table 3-45 Visual Characteristics of Existing Well Development

Well Facility (CBM and Conventional)	Frequency of Occurrence	Immediate Foreground (0 to 150 feet)	Foreground (150 feet to 0.25 mile)	Middleground (0.25 to 1 mile)	Background (1 to 5 miles)	Aerial
Well head	Common	P	P	U	U	U
Separator	Common	P	P	U	U	U
Meter house	Common	P	P	U	U	U
Pump jack (CBM)	Moderate	P	P	U	U	U
Dehydrator	Sporadic	P	P	U	U	U
Condensate tank	Sporadic	P	P	S	U	U
On-site water storage tanks	Moderate	P	P	S	U	U
Uncovered produced water pit	Sporadic	P	S	U	U	U
Covered produced water pit	Sporadic	P	S	S	U	U
Cathodic protection well		S	S	U	U	U
Support Facilities						
Water disposal well facilities	Sporadic	P	P	P	S	U
Compressor station/gas plant	Sporadic	P	P	P	S	S
Linear Elements						
Access roads	Common	P	P	P	S	P
Gathering pipeline	Common	P	P	P	S	U
Transmission pipeline	Common	P	P	P	S	S
Well pad	Common	P	P	S – if partially reclaimed P – if not reclaimed	U - if partially reclaimed S – if not reclaimed	P

Notes: Sporadic occurrence – very few structures
Moderate occurrence – found with only one well type, optional components of well
Common occurrence – widespread, common distribution of wells
U= unnoticed; does not attract attention
S = subordinate – begins to attract attention
P= prominent – dominates surrounding setting

Within the study area are 266 CBM wells, 13 conventional wells, and six disposal wells owned by a number of different operators. Approximately 292 acres of unreclaimed lands are associated with existing CBM and conventional (non-CBM) oil and gas development on private, state, and federal lands in the study area. Of this existing surface disturbance, approximately 23 acres are on BLM lands and 35 acres are on FS lands. The remaining 234 acres are on private and state lands.

Roads typically account for a considerable amount of the disturbance associated with oil and gas facilities. Of the existing surface disturbance that results from well development, 168 acres are associated with CBM and non-CBM access roads in the study area (Bell 2001).

3.5 NOISE

The following subsections provide information on the definition of noise used for this study, applicable noise guidelines, and baseline noise levels within representative land uses of the study area.

3.5.1 Definition of Noise

This section describes the measurement methods for noise and common noise levels.

Measurements of Noise Level

Noise is generally described as unwanted sound. Discussions of environmental noise do not focus on pure tones because the frequency and pressure characteristics of commonly heard sounds are complex. Accordingly, equipment to measure sound has been designed to account for the sensitivity of human hearing to various frequencies. Correction factors for adjusting actual sound pressure levels to correspond with human hearing have been derived experimentally. A-weighted correction factors are employed for measuring noise in ordinary environments. The A-weighted correction factor emphasizes the very low and very high frequencies of sound in a manner similar to the response of the human ear. Therefore, the A-weighted decibel (dBA) correlates well with a human's subjective reaction to noise.

The dBA measurement is a logarithmic scale. Therefore, the apparent increase in “loudness” doubles for every 10-dBA increase in noise (Bell 1982). Using a baseline level of 50 dBA in a daytime residential area, noise of 60 dBA would be twice as loud, 70 dBA would be four times as loud, and 80 dBA would be eight times as loud, for example.

Each individual’s attitude toward noise differs, and the reaction to noise is influenced by the type of noise, its perceived appropriateness in the setting, time of day, the type of activity when the noise occurs, and the person’s sensitivity. It is easier, therefore, to predict with a high degree of confidence the reaction to noise by an entire community. The Day-Night Average sound level (L_{dn}) is a standard unit of noise measurement used for affected communities. It averages sound levels over a 24-hour period, adding a 10 dBA “penalty” at night (from 10 p.m. to 7 a.m.) to accommodate the increased sensitivity to noise during normal sleeping hours. L_{dn} is represented by the following equation (Harris 1991):

$$L_{dn} = 10 * \log \{1/24 [15 * (10^{Ld/10}) + 9 * (10^{(Ln+10)/10})]\}$$

Where: L_d is the average daytime noise level (dBA) and L_n is the average nighttime noise level (dBA).

Ultimately, this calculation adds 6.4 dBA to the average daytime noise to obtain L_{dn}.

Common Noise Levels

The following discussion of common noise levels encountered in La Plata County is intended to represent the average noise levels over a specified period (for example, a 24-hour interval or a yearly average) in various land use areas. Depending on the location, quantity, and type of noise, these levels can vary, but the variations generally are in the range of 3 to 5 dBA (EPA 1974). As a basis for comparison, the noise level during normal conversation of two people 5 feet apart is 60 dBA. **Table 3-46** shows examples of the typical noise experienced in land use areas and noise produced by activities that occur in La Plata County.

In addition, typical noise levels for construction related to development of CBM are included in **Table 3-47.**

Table 3-46 Typical Noise Levels by Land Use or Activity

Source of Noise	Average Noise (dBA)	Range of Noise (dBA)
Ambulance siren (100 feet)	100	95-105
Motorcycle (25 feet)	90	85-95
Typical Construction Site	85	80-90
Urban shopping center	70	65-75
Within 100 feet of U.S. Highway 160	60	55-65
Single car (25 feet)	65	60-70
Single truck (25 feet)	80	75-85
Normal conversation (5 feet)	60	57-63
Residential area during day	50	47-53
Recreational area	45	40-50
Residential area at night	45	37-43
Rural area during day	40	37-43
Rural area at night	35	32-37
Quiet whisper	30	27-33
Threshold of hearing	20	17-23

Source: Crocker and Kessler 1982.

3.5.2 Applicable Noise Guidelines

The State of Colorado has development guidelines on noise compatibility for various land uses. COGCC uses the state's noise guidelines in monitoring oil and gas programs. According to COGCC's noise monitoring procedures, sound radiating from a CBM-related source should not exceed the noise levels for the predominant land use in the zone (identified in **Table 3-48).** Noise is measured at a location either 25 feet beyond the property line or at a residential home.

Table 3-47 Typical Noise from Various Types of CBM Well Construction Equipment					
Equipment Type	**Noise Level at 50 Feet (dBA)**	**Noise Level at 500 feet (dBA)**	**Noise Level at 1000 feet (dBA)**	**Noise Level at 1,500 feet (dBA)**	**Noise Level at 2,000 feet (dBA)**
Crane	88	68	62	58	56
Backhoe	85	65	59	55	53
Pan Loader	87	67	61	57	55
Bulldozer	89	69	63	59	57
Fuel and Lubrication Truck	88	68	62	58	56
Water Truck	88	68	62	58	56
Motor Grader	85	65	59	55	53
Vibrator/Roller	80	60	54	50	48
Mechanic Truck	88	68	62	58	56
Flat Bed Truck	88	68	62	58	56
Dump Truck	88	68	62	58	56
Flat Bed Trailer	88	68	62	58	56
Tractor	80	60	54	50	48
Concrete Truck	86	66	60	56	54
Concrete Pump	82	62	56	52	50
Front End Loader	83	63	57	53	51
Road Scraper	87	67	61	57	55
Air Compressor	82	62	56	52	50
Average Construction Site	85	65	59	55	53

Source: Crocker and Kessler 1982.

Table 3-48 State of Colorado Noise Guidelines		
Zone	**Noise Level (dBA)**	
	7:00 a.m. to 7:00 p.m.	**7:00 p.m. to 7:00 a.m.**
Residential	55	50
Commercial	60	55
Light Industrial	70	65
Industrial	80	75

Source: COGCC 2001a

3.5.3 Baseline Noise Levels within Representative Land Uses of the Study Area

Noise in the study area is generated by a number of sources. The high-density and industrial/commercial areas and major transportation corridors account for a large portion of the current noise in the study area. Therefore, baseline data on noise were collected within different land use types to characterize the variability in current conditions. Land use in the study area varies from sparsely populated rural areas to more densely populated small urban areas. Residential, commercial, recreation, and transportation land use are also present within the study area. **Figure 3-14** identifies sensitive receptors for noise and visual impacts within representative land use areas as identified by BLM, FS, and La Plata County planners.

Background noise levels measured range from 40.7 dBA in quiet, low-use recreation areas, away from communities and roads, to 58.2 dBA in Grandview Ridge, which is near an urban center. Average noise levels depend on population density and proximity to activities characteristic for each land use. Specific 24-hour noise readings are identified in **Table 3-49** and on **Figure 3-15**. The polygons listed in **Table 3-49** are the receptor locations shown on **Figure 3-15**.

Table 3-49 24-Hour Noise Readings in Representative Land Use Categories

Receptors	Land Use Categories				
	Residential		Transportation		Other Land Use Designations
	Subdivision High Density	Subdivision Low Density	Major Arterial	Collector Road	Rural Residential
24 Hour Noise Readings Specific Location	Polygon H, west of the school	NE portion of Polygon B	U.S. Hwy 160	CR 228, approximately 1.5 miles west of the intersection of CR 502 and CR 228	Polygon D
24-hour reading (L_{av})*	45.0	42.5	57.7	45	46.4**
Typical Noise Level Range (day and night) by Land Use	37-53		55-65		32-43
Comment		Not far from road (may account for spikes)			Wind and thunderstorm in afternoon

Notes: * L_{av} = Average dBA level over a 24-hour period.
** Out of range possibly caused by weather at the time the reading was recorded.

3.6 HEALTH AND SAFETY

Extensive development of CBM occurred in the San Juan Basin during the mid-1980s and has steadily increased in recent years. Although many of these wells may not be within the study area, currently approximately 1,000 CBM wells are in the Northern San Juan Basin (BLM 2000a).

3.6.1 CBM-Related Health and Safety Regulations

Existing health and safety regulations that are applicable to well drilling operations for oil and gas in the State of Colorado are summarized in this section.

3.6.1.1 Federal Regulations

Current federal regulations related to public health and safety during oil and gas operations are discussed in this section. Federal oil and gas operations are regulated at Title 43 Code of Federal Regulations (CFR) Part 3160. Well operations are regulated under Onshore Order No. 1, Approval of Operations, which requires approval of a drilling and operations plan that addresses the applicable procedures to be employed to protect environmental quality, including control and removal of wastes, spill prevention, fire prevention and fighting procedures, and safety precautions. This order also requires operators to address the anticipated hazards, such as emissions of hydrogen sulfide, and to prepare contingency plans for mitigating hazards. The siting of well locations and access roads frequently are affected by contingency plans for hydrogen sulfide.

Drilling operations on federal mineral leases must comply with Onshore Oil and Gas Order No. 2, Drilling. This rule establishes standard safety procedures for drilling and minimum Blowout Prevention Equipment (BOPE) to control abnormally high pressures, if encountered, during drilling.

Onshore Oil and Gas Order No. 6, Hydrogen Sulfide Operations, requires that hydrogen sulfide be monitored during drilling on federal mineral leases. This order requires visible and audible alarms that are activated at each drilling and completion site when concentrations of hydrogen sulfide reach threshold limits.

Transportation of hazardous materials is regulated under 49 CFR Parts 171 and 180. In accordance with the terms of federal oil and gas leases, spills or leaks of oil, gas, produced water, toxic liquids or waste materials, blowouts, fires, personal injuries, and fatalities must be reported. The U.S. Environmental Protection Agency (EPA) may require a Spill Prevention Control and Countermeasures Plan (SPCC) under 40 CFR Part 112. Oil spills must be reported to the EPA National Response Center, as required by 40 CFR Part 110.

3.6.1.2 State Regulations

Current State of Colorado regulations related to public health and safety during oil and gas operations are discussed in this section. Regulations that address air emissions, practices that may affect the quality of drinking water, disposal of wastes, and spills of hazardous materials are included in Colorado Department of Public Health and Environment (CDPHE) and COGCC rules and regulations.

All operations associated with oil and gas wells in the State of Colorado are subject to the Colorado Air Quality Control Act, 25-7-101 CRS. Oil and gas operators may not violate the water quality standards or classifications established by the State of Colorado Water Quality Control Commission. Water quality (surface water and groundwater) and surface discharges are regulated by CDPHE.

COGCC Rule 906 requires that spills of exploration and production waste or produced fluid that exceed 5 barrels, including any contained in unlined berms, be reported on COGCC Spill/Release Report Form 19. Prevention measures for spills and releases required under COGCC Rule 906 include secondary containment for tanks that hold crude oil, condensate, or produced water that contains more than 10,000 milligrams per liter (mg/L) of total dissolved solids (TDS). COGCC also requires a Site Investigation/Remediation Work Plan, Form 27, if potential adverse environmental impacts could result from a spill, or when a spill exceeds 20 barrels of net loss. Any remediation required must be carried out in a manner that mitigates, removes, or reduces contamination in soils and groundwater and meets the allowable concentrations shown in COGCC Table 910-1 (COGCC 2001b).

Wells drilled on private and state leases must comply with the standard procedures required by COGCC rules. COGCC Rule 607 requires reporting of any data for analysis of samples of gas that indicate the presence of hydrogen sulfide. COGCC Rule 607 also requires a drilling operations plan for hydrogen sulfide as part of the Application for Permit to Drill, Form 2, if concentrations of hydrogen sulfide in excess of 100 parts per million (ppm) are reasonably expected to be encountered during well drilling or servicing. COGCC safety regulations do not apply to activities regulated under the Federal Occupational Safety and Health Act (OSHA) of 1970.

3.6.1.3 County Regulations

La Plata County has established specific requirements to protect public safety that apply to oil and gas facilities, as discussed in Section 3.1, Land Use. La Plata County has proposed a Health, Safety, Welfare, and Environmental Protection Plan (La Plata County 2000c). This document would require each producer to file and maintain an emergency preparedness plan with La Plata County. Notification and emergency contact information would be provided to the county at least 48 hours before drilling, completion, or workover operations begin.

3.6.2 Existing CBM-Related Public Health Risks

Historical and existing public health risks associated with the Fruitland Formation, and documented before development of CBM began, include seepage of methane and hydrogen sulfide gas into domestic water wells and residences, dying vegetation, coal fires along the outcrop, and coal mine explosions (Wray 2000). Methane gas is not biologically toxic, but high concentrations of methane gas in confined spaces can displace oxygen and present a danger of fire or explosion.

The existing land use controls for CBM facilities, including setback distances from residential areas, are discussed in Section 3.1, Land Use. Existing traffic levels and speeds, quality and quantity of roads, and transportation safety issues within the study area are discussed in Section 3.3, Traffic and Transportation. The sections below discuss some of the specific risks to public health that currently exist within the study area.

3.6.2.1 Methane Gas Seepage

Existing and historical areas of methane gas seeps and the control measures currently in place are summarized in this section. Naturally occurring seeps of methane gas were documented throughout the San Juan Basin before development of oil and gas began (BLM 2000a). Gas seeps are known to occur along the northern and western rim of the basin in La Plata County. Seeps were recognized during the 1930s in the Carbon Junction area, where the Animas River crosses the Fruitland Formation. Well completions within the Fruitland Formation began in about 1948 (BLM 2000a). Shallow wells that penetrate the Fruitland Formation are documented to have produced methane gas.

Methane gas migrates naturally into surface soils and groundwater in the study area near the outcrops for the Fruitland Formation coal beds and low-lying areas. Naturally occurring methane gas seeps typically occur along topographically low-lying areas, such as streams, and in areas where natural joints and fractures occur. Historical seeps of methane gas have been noted at several locations within the study area, including the Los Pinos River, in soils overlying Mesa Verde sandstone outcrops located northeast of Durango along CR 240, and the Ridges Basin, Carbon Junction, Florida River, Texas Creek, and Pine River Ranches areas (BLM 2000a).

The annulus of the bore in existing wells also may provide a pathway for migration of gas. Existing wells that may provide pathways for migration of gas include conventional gas wells with uncemented well-bore annuli, wells where the integrity of the casing is deficient, wells that lack annular isolation through the coal horizons in the Fruitland Formation, cathodic protection wells, bedrock water wells, and seismic test holes. Bedrock wells in the study area generally exhibit higher concentrations of methane than do alluvial wells.

BLM and FS have issued guidance criteria for management of CBM production on public lands and require an assessment of the potential effects of CBM production on shallow groundwater aquifers and surface waters. Areas where the documented frequency of soil gas seeps is higher than background values are near the outcrop for the Fruitland Formation.

Existing sources of the methane gas found in water wells in the study area include biological decay of organic materials and migration of thermogenic methane (methane formed in coal) away from the regional coal beds. Biological sources of methane gas in domestic water wells may result from sewage lagoons, septic fields, swampy areas, or the groundwater aquifer itself. Shallow wells that penetrate the Fruitland and Menefee coal beds within the study area have historically produced methane gas (BLM 2000a).

Methane in water wells or residences becomes a problem if it accumulates in confined spaces, collects in potentially explosive concentrations, or displaces oxygen and creates unsafe breathing conditions. As a result of extensive testing in water wells within the study area, concentrations of methane in groundwater below 1 mg/L are generally considered harmless (Plateau/CDS 2001). A concentration of methane in well water that is between 7 mg/L and 13 mg/L is usually not a concern, but should be monitored, and confined spaces should be ventilated. Treatment methods that would remove methane from well water, such as aeration or ventilation, are recommended the concentration of methane exceeds 13 mg/L (Plateau/CDS 2001).

Numerous wells in the study area have been sampled and analyzed for methane gas as part of the effort to collect baseline groundwater quality data in La Plata County. Areas where entrained concentrations of methane gas in groundwater have been documented to be 1.0 mg/L or higher are defined as Critical Areas. Critical Areas occur near the outcrop of the Fruitland Formation. Within the study area, COGCC and BLM have targeted specific gas wells for remediation. Remedial actions include placement of annular cement, repairs or replacement to the wellhead or seal, and venting small volumes of trapped gas to the atmosphere.

BLM, FS, COGCC, SUIT, La Plata County, and industry have worked together through a group called the Gas and Oil Regulatory Team (GORT) to manage CBM production and to address environmental concerns. As a result of this team effort, COGCC developed the 3M Study (mapping, modeling, and monitoring) for the area north of the SUIT Reservation, with mapping components provided by the Colorado Geological Survey. Before this study, the outcrop of the Fruitland Formation was mapped near the SUIT Reservation, south of the study area. The 3M Study extended the mapping from the north end of the SUIT Reservation at Ridges Basin to the Archuleta County line. The resulting geologic maps show the existing areas of major methane seeps near the outcrop of the Fruitland Formation.

Currently, under COGCC order 112-157, operators are required to identify and sample the nearest two wells within ½ mile of the proposed location, prior to and after completion of all new infill wells.

The Pine River Ranches Subdivision is located in the Pine River Valley, north of Bayfield. The area is a topographic low where the Los Pinos River has scoured a valley at the northern rim of the basin. The Fruitland Formation is overlain in this area by several feet of alluvium. Samples were analyzed from

domestic wells drilled into the alluvium that overlies the Fruitland coal subcrops in the Pine River Ranches Subdivision. The results for the samples from these wells indicate that Fruitland coal gas is affecting water quality. In addition, significant concentrations of entrained methane gas were detected in several wells, crawl spaces, and living areas of residences (BLM 2000a). BLM's remedial actions included shutting an existing CBM gas well near the Pine River Ranches Subdivision. An operating company purchased and removed the houses that were affected (BLM 2000a).

3.6.2.2 Release of and Odors from Hydrogen Sulfide

Hydrogen sulfide gas can migrate into surface soils and groundwater in the study area, in association with methane gas, in some areas near the outcrops for the Fruitland Formation coal beds and in low-lying areas.

Bacteria can produce hydrogen sulfide gas, a toxic gas that has a "rotten egg" odor, in areas where sulfide minerals such as iron pyrite are associated with coal (BLM 2000a). Sulfate-reducing bacteria can also produce well water that smells like rotten eggs. High concentrations of hydrogen sulfide can be deadly. Treatment methods or corrective measures should be employed when the concentration of hydrogen sulfide in ambient air is more than 10 ppm. Hydrogen sulfide can be detected by smell at a concentration lower than a laboratory can analyze, but smell cannot be used to differentiate between dangerous and low concentrations of gas. In addition, the human sense of smell is blocked (olfactory fatigue) shortly after initially exposure to hydrogen sulfide. Monitoring the concentrations of gas is recommended if the presence of hydrogen sulfide is suspected.

Hydrogen sulfide gas is often associated with water wells that contain elevated concentrations of methane. The migration of methane into groundwater degrades quality of the water by depleting the oxygen. Environments that are depleted of oxygen are favorable for the proliferation of sulfur-reducing bacteria that produce hydrogen sulfide.

Sulfur-reducing bacteria may also create hydrogen sulfide gas and odors in existing wells without the presence of methane gas. Well disinfection techniques may be used to reduce the bacteria in the well casing, which often will alleviate the odor. Water wells may be disinfected with a dilute bleach solution to remove smells caused by bacteria. High levels of hydrogen sulfide gas in wells may be associated with seepage of methane gas and require aeration or ventilation treatments when concentrations approach the action levels for methane gas.

3.6.2.3 Dying Vegetation

Vegetation has died off in some soil areas above the Fruitland coal seam. As methane seeps through soils, it displaces oxygen, depriving the roots of oxygen. Within the study area, dead and dying vegetation has been noted in the Pine River Ranches Subdivision located north of Bayfield. Concentrations of methane in some soils within the Pine River Ranches Subdivision were reported at 97 percent by volume (BLM 2000a). Areas of affected vegetation appear to be expanding over time, and more plants are showing indications of stress (BLM 2000a). The BLM, SUIT, La Plata County, and gas operators are monitoring concentrations of gas in soil and stressed vegetation in methane seepage areas along the Fruitland Outcrop and low-lying areas.

3.6.2.4 Coal Outcrop Fires

Self-heating of near-surface coals historically has resulted in coal outcrop fires in the region. Geologic evidence indicates that prehistoric fires occurred in the Fruitland coal bed within the San Juan Basin.

Existing and historical coal outcrop fires have occurred within the western portion of the SUIT Reservation, south of the study area. Several coal fires are located in areas of recent wildfires, indicating that the fires may have ignited the subsurface coal (BLM 2000a). Dewatering of coal seams and fluctuating groundwater levels also have been linked to coal fires (BLM 2000a). No coal outcrop fires have been identified within the study area (Keller 2001).

3.6.2.5 Fires and Explosion Risk

Natural pathways for seepage of methane gas occur within the study area. Historically, coal miners have reported pockets of methane gas in mines the northern part of the San Juan Basin (BLM 2000a). Documented incidents have included ignition of natural gas on the surface of local waterways and springs in the area.

As discussed earlier, in the mid-1990s, explosive levels of methane were reported in crawl spaces and living areas of residences located in the Pine River Ranches Subdivision (BLM 2000a). An operating company purchased and removed the affected houses to alleviate the threat to public safety (BLM 2000a).

Wildfires in the study area may ignite both naturally occurring methane gas seeps and potential methane gas leaks associated with development of CBM. Most wildfires near the study area were caused by lightning and occurred in standing piñon-juniper trees. The rate of spread for fires is generally greater in grassy areas than in areas of brush.

The average annual acreage burned by wildfires has been 110 acres per year for a 20-year period of record in the San Juan National Forest. From 1961 to 1970, an average of 109 acres were burned per year; from 1971 to 1980, an average of 112 acres were burned per year (FS 1982).

3.6.2.6 Emergency and Fire Fighting Preparedness

Fire management in the San Jan Basin is a coordinated interagency effort. Cooperative agreements among the National Park Service (NPS), Bureau of Indian Affairs (BIA), Colorado State FS, and La Plata County are in place to facilitate rapid emergency response. The existing fire fighting resources within the study area are discussed briefly in this section. The fire districts in the study area are shown on **Figure 3-18**.

Emergency and fire fighting preparedness for BLM lands within the study area are managed by the San Juan Public Lands Center. The BLM has well-defined wildfire suppression areas and fire protection plans, as discussed in the resource management plan (RMP) and EIS for the San Juan/San Miguel Planning Area (BLM 1984a, b). BLM also has developed a Normal Year Fire Plan that is designed to manage fires in the area. The 1982 forest plan provides the management standards and guidelines for development in the San Juan National Forest. Requirements for protection from wildfire include prescribed burning to reduce hazards from accumulation of fuel and providing fuel breaks or fire lanes (FS 1982).

COGCC rules establish fire prevention and protection operating procedures, including a requirement that materials that are not in use and that may constitute a fire hazard be removed a minimum of 25 feet from the wellhead, tanks, and separator. Flammable liquids cannot to be stored within 50 feet of the wellbore, except for the fuel in the tanks of operating equipment or supply disposal pumps.

The local fire and emergency district locations and response times were previously discussed in Section 3.2.4.2, Public Services. The City of Durango provides water to the incorporated and unincorporated areas adjacent to Durango (City of Durango 1997). The city's raw water is supplied from the Florida and Animas Rivers.