SECTION 4

MAYSDORF II LBA TRACT

S4-1 TOPOGRAPHY AND PHYSIOGRAPHY

The Maysdorf II LBA Tract is in an area of gently rolling terrain of moderate relief influenced by the Belle Fourche River and its tributary, Caballo Creek. Elevation ranges from 4,540 to 4,885 ft within the LBA tract and from 4,520 to 4,885 ft including the area added under Alternatives 2 and 3. Within the LBA tract and the area added under Alternatives 2 and 3, slopes range from flat in the Belle Fourche River floodplain to over 57 percent in the adjacent breaks. The breaks are sharp transitions between the bottomlands and the uplands. The slopes of the gently rolling uplands, which comprise most of the LBA tract, seldom exceed 10 percent. A slope analysis would be done for the LBA tract if a lease sale is held and it is proposed for mining.

S4-2 GEOLOGY

Surficial deposits in the general analysis area include alluvial and eolian deposits, clinker, and weathered Wasatch and Fort Union Formations. Although clinker is present throughout the eastern portion of the general analysis area and the Cordero Rojo Mine's existing permit area, the LBA tract analyzed in this EIS contains no appreciable amounts of clinker. There are thin alluvial deposits along some of the ephemeral stream channels. These alluvial deposits typically consist primarily of poorly to well-sorted, irregularly bedded to laminated sequences of unconsolidated sand, silt, and clay. The valley floor of the Belle Fourche River contains appreciable amounts of alluvium, both in width and depth, and exhibits a complex, well developed terrace and floodplain system. The Belle Fourche River alluvial deposits contain much more coarse-grained material (sands and gravels) than any of the other ephemeral tributaries that drain the general analysis area.

The Eocene Wasatch Formation directly overlies the recoverable coal seam and thus forms most of the overburden in the general analysis area. It consists of interbedded lenticular sandstones, siltstones, shales, and thin discontinuous coals. Typically, units are gradational mixtures of these sediments. There is no distinct boundary between the Wasatch Formation and the underlying Paleocene Fort Union Formation. From a practical standpoint, however, the top of the mineable coal zone is considered as the contact between the two formations. The average overburden thickness in the LBA tract as applied for and in the Alternatives 2 and 3 is about 300 ft, although this number varies significantly depending on location. Regionally, overburden thickness generally increases to the west due to the westerly dip (one to three degrees) of the beds in this area. In general, overburden thickness decreases in stream valleys where it has been removed by erosion.

The Fort Union Formation consists primarily of shales, mudstones, siltstones, lenticular sandstones, and coal. It is divided into three members: Tongue River (which contains the target coal seam), Lebo Shale, and Tullock, in descending order (refer to Figure 3-2 in the SGAC EIS document).

The Tongue River Member of the Fort Union Formation consists of interbedded claystone, silty shale, carbonaceous shale, and coal, with lesser amounts of fine-grained sandstone and siltstone.

At the Cordero Rojo Mine and within the Maysdorf II LBA Tract, there is one mineable coal seam. The nomenclature of this seam varies according to mine operator. The U.S. Geological Survey (Flores et al. 1999) refers to the thick mineable coals in the Gillette coal field as the Wyodak-Anderson coal zone of the Tongue River Member of the Fort Union Formation. Locally, this coal zone is referred to as either the Wyodak or the Wyodak-Anderson. On the Maysdorf II LBA Tract as proposed and the Alternative 2 and Alternative 3 tract configurations, the Wyodak coal seam thickness averages about 62.6 ft. Up to five noncoal splits or partings occur within the seam and they are typically local, discontinuous lenses of carbonaceous clay or shale that are less than one ft thick.

An east-west trending "no coal" zone is located throughout the central portion of Sections 4 and 5, T.46N., R.71W. It is postulated that an ancient drainage channel (or paleochannel) eroded and removed the coal and replaced it with unconsolidated fine sand, occasional gravel, and silty clays.

Within the general analysis area, the coal strikes essentially north-south and dips vary from zero to five degrees to the west.

The Fort Union coal seams are subbituminous and are generally low-sulfur, low-ash coals. Typically, the coal being mined has a higher heating value and lower sulfur content south of Gillette than north of Gillette. According to the analyses (which were done on an as-received basis) of exploration drilling samples collected in the combined LBA tract as proposed and areas added under Alternative 2, the heating value of the coal is approximately 8,541 Btu/lb and contains an average of 4.65 percent ash, 0.28 percent sulfur, and 29.8 percent moisture. Under Alternative 3, the tract would be divided into two distinct tract and, according to the analyses of coal samples collected in the two distinct tracts, the recoverable coal reserve in the northern portion has an average heating value of approximately 8,599 Btu/lb, with an average of 4.29 percent ash, 0.28 percent sulfur, and 29.61 percent moisture and the coal reserve in the southern portion has an average heating value of approximately 8,461 Btu/lb, with an average of 5.14 percent ash, 0.29 percent sulfur, and 30.05 percent moisture.

The Lebo Shale and Tullock Members of the Fort Union Formation consist primarily of sandstone, siltstone, mudstone, shale, and coal. In general, the Tullock Member contains more sand than the Lebo Shale Member.

Table S4-1 presents the average thicknesses of the overburden and the coal seam for the Maysdorf II LBA Tract. Figures S4-1 and S4-2 depict four geologic cross sections (two north-south and two east-west) drawn through the Maysdorf II LBA Tract.

Table S4-1. Average Overburden and Coal Thicknesses in the Maysdorf II LBA Tract.

Mining Unit	Proposed Action (ft)	Alternative 2 (ft)	Alternative 3 (ft)	
			North	South
Overburden	305.2	305.2	346.6	248.5
Coal	62.6	62.6	65.5	58.7

These cross sections are representative of the geology in the vicinity of the LBA tract.

S4-3 PALEONTOLOGY

Erathem-Vanir Geological PLLC (EVG) of Pocatello, Idaho conducted a paleontological evaluation of the Maysdorf II general analysis area in June 2005. The evaluation included a pre-field geology and paleontology review and a pedestrian field survey. One of the primary goals of the evaluation was to locate unique localities of fossilized bone, such as those reported elsewhere in the Wasatch Formation of the PRB.

Seven vertebrate fossil localities were identified as a result of the records search in T.46N., R.71W. and T.47N., R.71W. in the Wasatch Formation (EVG 2001).

Geological mapping by the USGS and WSGS have documented that the general analysis area is underlain by sedimentary deposits of the Eocene Wasatch Formation and Paleocene Fort Union Formation. The paleontological field survey confirmed the presence of Wasatch Formation as the bedrock underlying the general analysis area, as depicted on the published geologic maps. However, surficial deposits of the Fort Union Formation that are mapped along the extreme eastern edge of the general analysis area are not present as outcrops. These deposits probably underlie the alluvial deposits within the Coal Creek valley. The disagreement between what was observed as surface outcrops and that depicted on the geologic maps is the result of those maps depicting bedrock geologic units that would occur at the surface in the absence of recent, unconsolidated surficial deposits. They do not depict surficial deposits such as colluvium that occur widespread over the general analysis area. In addition, actual outcrops of the Wasatch Formation that could be prospected for fossils were infrequent. The only extensive outcrops that were prospected occur in the rough breaks along the south side of the Belle Fourche River in Sections 9, 10, 11, 14, and 15, T.46N., R.71W.

Five fossil localities (two plant, one invertebrate, and two vertebrate) were identified during the field survey. These localities occur in exposures of the Wasatch Formation south of the Belle Fourche River in Sections 9, 10, and 14. These localities occur in the same general vicinity of exposures prospected by EVG in 1999 (EVG 2001) that produced two fossil vertebrate localities. The two plant localities yielded an in-place tree stump preserved in a sandstone outcrop

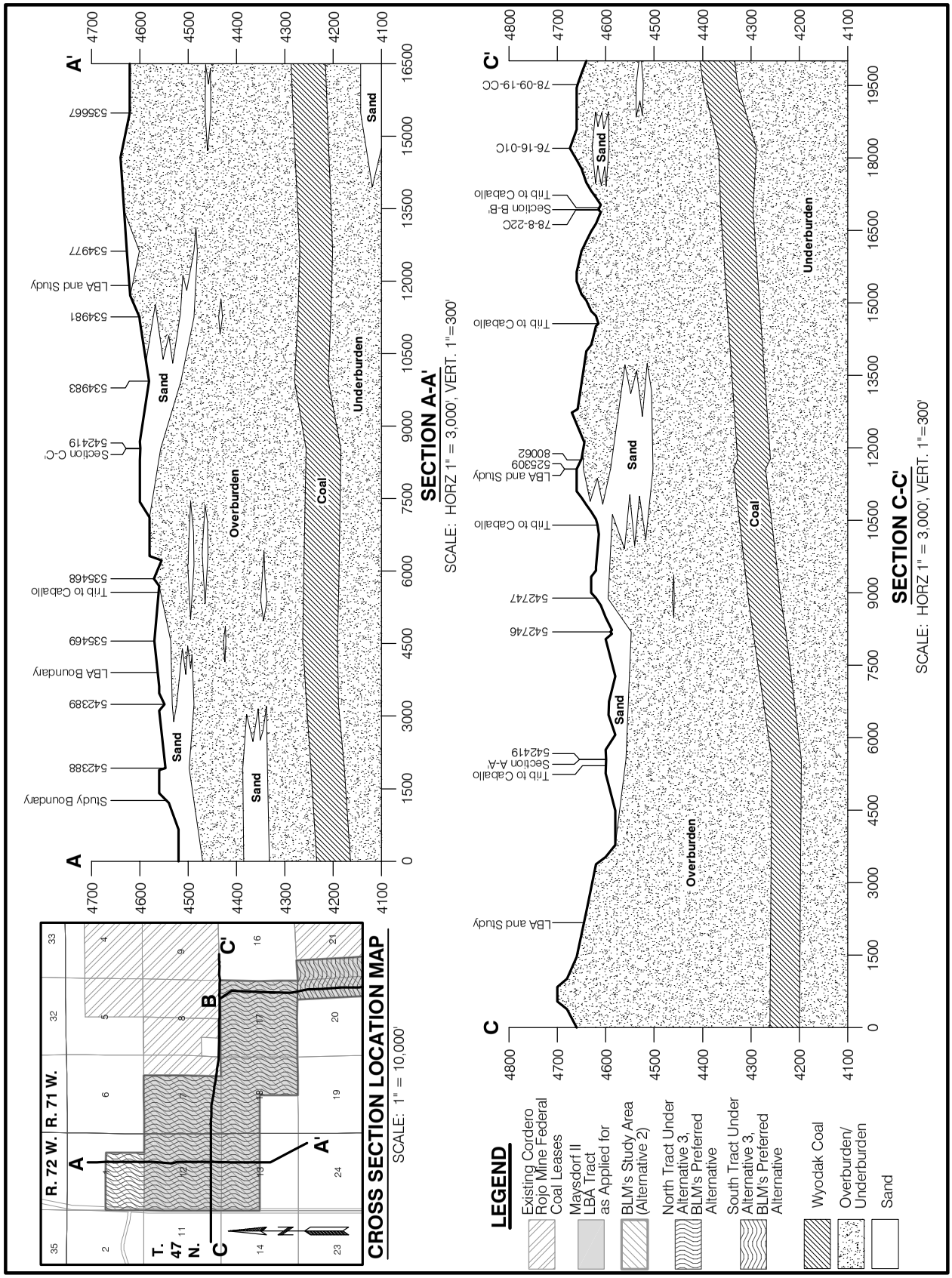

Figure S4-1. Geologic Cross Sections for the Maysdorf II LBA North Tract.

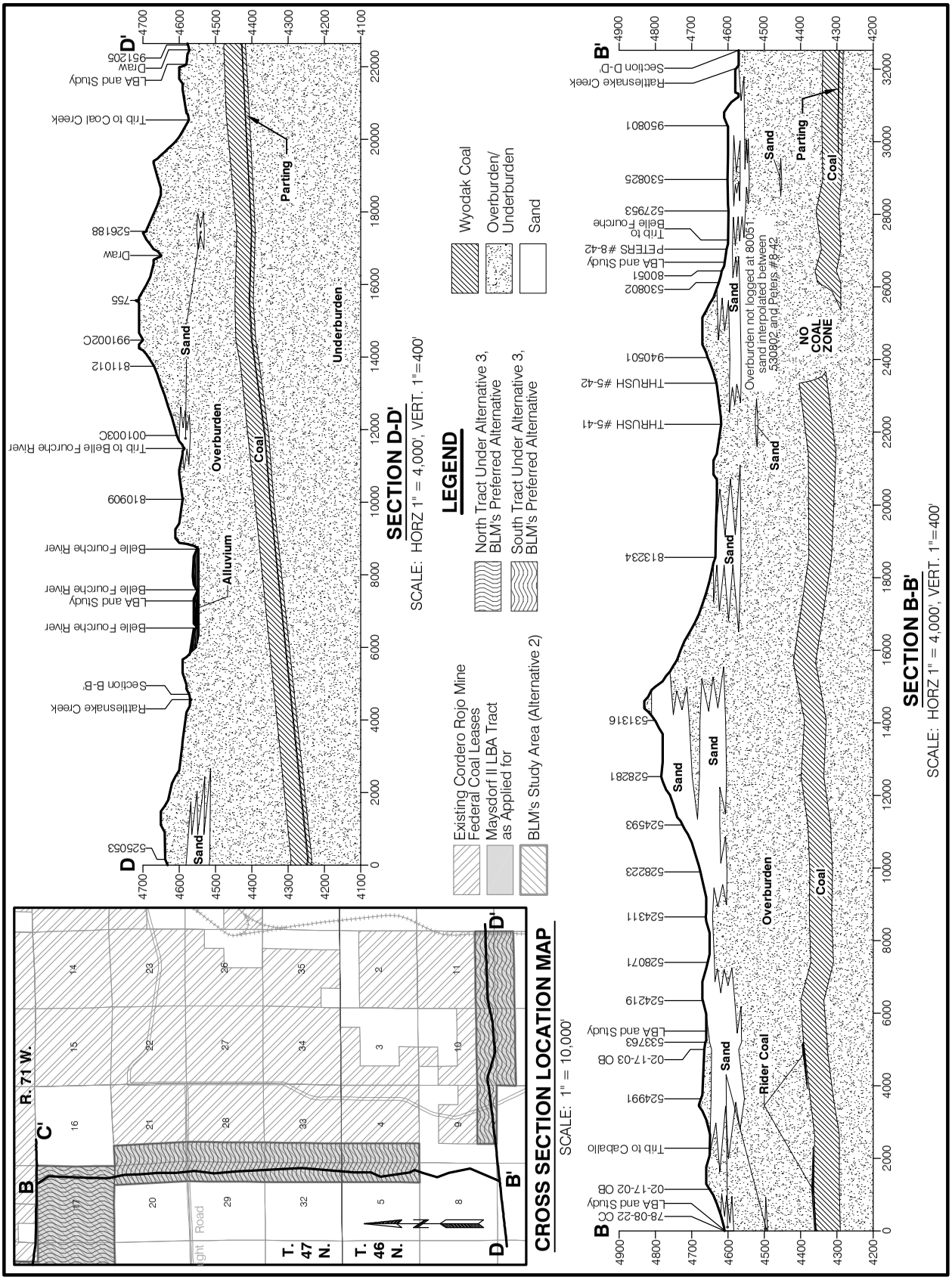

Figure S4-2. Geologic Cross Sections for the Maysdorf II LBA South Tract.

in Section 9 and fragmentary fossil wood associated with a coal in Section 10. The invertebrate locality yielded fragmentary fossils of the fresh water bivalve *Unio*, preserved in a lag conglomerate at the base of a sandstone outcrop in Section 9. The two vertebrate localities yielded the fragmentary bone and dermal scutes of a crocodile, preserved in a carbonaceous mudstone in Section 10, and a reptilian coprolite, preserved in a carbonaceous mudstone in Section 14. None of this fossil material at these localities is considered to have much scientific significance and as a result no specimens were collected. Vertebrate fossils appear to be very scarce. Fossil wood is much more common and observed at many unrecorded locations, particularly associated with coal outcrops.

Due to the widespread nature of the fossilized plant remains and gastropods in the Wasatch and Fort Union Formations in the PRB, the recording of fossil localities is limited to unique finds. No localities produced exceptional examples and no unique finds were located. Fossil plant and gastropods can be collected elsewhere in the PRB.

S4-4 AIR QUALITY

S4-4.1 Existing Emission Sources

In the vicinity of the Maysdorf II LBA Tract, the main sources of air pollution are surface coal mines, vehicle traffic, railroad traffic, and various sources associated with oil and gas production and farming and ranching activities. The closest existing coal-fired power plants to the LBA tract are the Dave Johnston plant (approximately 80 miles south-southwest) and the Wyodak Complex (approximately 15 miles north), which consists of the 90-Mw WyGen No. 1, the 335-Mw Wyodak No. 1, the 21.8-Mw Neil Simpson No. 1, the 80-Mw Neil Simpson No. 2, and two 40-Mw natural gas-fired power plants.

S4-4.2 Proposed Emission Sources

All of the currently proposed emission sources in the eastern PRB are discussed in Chapter 4 of the SGAC EIS document. There are currently ten pending LBA applications including the Maysdorf II tract. Table S4-2 provides the approximate distances from the Maysdorf II LBA Tract to each of the other nine pending LBAs.

S4-4.3 Historical Ambient Air Quality: Particulate Emissions

Emission Producing Activities

Fugitive particulate (dust) emissions are produced within the mine areas by activities such as coal and overburden blasting, excavating, loading, and hauling and large areas of disturbed land. Stationary or point sources of particulate emissions produced within the mine areas include coal crushing, handling/conveying, and storage facilities.

Table S4-2. Distances to Pending LBAs.

LBA Tract Name	Adjacent Mine	Distance from Maysdorf II LBA
North Maysdorf	Cordero Rojo	Proximate
Eagle Butte West	Eagle Butte	20 miles north
Caballo West	Caballo	4 miles north
Belle Ayr North	Belle Ayr	3 miles north
West Coal Creek	Belle Ayr	1 mile southeast
West Antelope II	Antelope	29 miles south
North Hilight Field	Black Thunder	13 miles south
South Hilight Field	Black Thunder	19 miles south
West Hilight Field	Black Thunder	17 miles south
West Jacobs Ranch	Jacobs Ranch	13 miles south
Hay Creek II	Buckskin	27 miles north
North Porcupine	North Antelope Rochelle	25 miles south
North Porcupine	North Antelope Rochelle	29 miles south

Monitoring Results

WDEQ/AQD requires the collection of information documenting the quality of the air resource at each of the PRB surface coal mines. Each mine was required to monitor air quality for a 24-hour period every six days at multiple monitoring sites through the end of 2001. All PM_{10} monitors located at the active mines are now required by WDEQ/AQD to sample air quality for a 24-hour period every three days beginning in 2002.

In accordance with the Ambient Air Quality Assurance Project Plan, Cordero Rojo Mine operates a particulate and meteorological monitoring network. Figure 3-6 in the SGAC EIS document shows the current locations of the particulate (PM_{10}) air quality sampling sites and the meteorological stations at the Cordero Rojo Mine. Ambient particulate data are collected at three sites: CRC-E, CRC-S, and CRC-W. The network consists of four low-volume PM_{10} samplers (CRC-E10, CRC-E10A, CRC-S10, and CRC-W10) with their corresponding satellite samplers (CRC-E10S, CRC-S10S, and CRC-W10S). CRC-E10 and CRCE10A serve as the primary and collocated samplers respectively at the CRC-E site. The State of Wyoming added PM_{10} based standards in 1989 and retained the TSP standards until March 2000; therefore, the TSP standard is no longer being enforced. Cordero Rojo discontinued monitoring TSP at site CRC-E in 2005.

There were no violations of the TSP standard at the Cordero Rojo Mine when TSP was the federally regulated pollutant, and there have been no violations of the 24-hour and annual average PM_{10} based standards at the Cordero Rojo Mine since PM_{10} became the federally regulated pollutant. Table S4-3 presents

the average annual PM_{10} concentrations measured at the mine's three air quality monitoring sites from 1995 through 2004. In effort to relate measured particulate emissions to mine activity, Cordero Rojo Mine's annual coal and overburden production are included in Table 4-3.

Table S4-3. Summary of Cordero Rojo Mine Annual Coal and Overburden Production and Particulate Emissions Monitoring Data, 1997 - 2006.

			Average Annual PM_{10} (µg/m³)		
Year	**Coal Produced (mmtpy)**	**Overburden Yards Moved (mmbcy)**	**Site CRC-E**	**Site CRC-S**	**Site CRC-W**
1997	28.1	54.4	15.0	11.0	N/A
1998	37.0	79.4	15.0	10.0	N/A
1999	45.7	97.9	15.0	10.0	N/A
2000	38.6	102.0	26.0	17.0	N/A
2001	43.5	107.5	24.0	18.0	18.0
2002	38.2	117.5	25.0	16.0	15.0
2003	36.1	116.5	22.1	15.0	15.8
2004	38.7	131.9	22.0	14.0	15.0
2005	37.8	171.0	16.0	14.0	17.0
2006	39.7	183.2	19.0	29.0	22.0

Sources: Production data from CMC and WDEQ/AQD (2005c).
Emissions data from EPA (2009a).

Control Measures

The WDEQ/AQD requires the use of BACT on all sources of emissions in the State of Wyoming. CMC practices control measures that are applicable to surface mining operations, which are outlined in Section 14 or the WAQSR.

Fugitive emissions are controlled with a variety of methods that the agency considers BACT. Water trucks are used to apply water and chemical dust suppressants on the mine access road and all haul roads used by trucks and/or scrapers. Haul truck speed limits are imposed to further help reduce fugitive emissions from roads. Emissions are further reduced by the assumption of 100 days of precipitation per year. Limiting the drop height between the shovel bucket and truck bed controls emissions from overburden and coal loading. Best mining practices are used to limit the number and areal extent of overburden blasts. Soil is revegetated, either temporarily or permanently, in a timely manner to help minimize emissions from wind erosion. Fugitive emissions from the coal truck dumps are controlled with stilling sheds. Mine-wide emissions are further reduced by the use of pavement where possible.

Point source emissions from the coal preparation plants (at both the Caballo Rojo and Cordero Mine facilities) are reduced via the use of covered conveyors, telescoping loadout chutes, enclosed storage devices (silos), and dust collectors (baghouses) at all coal transfer points. WDEQ/AQD issued air quality permit MD-1058 on September 17, 2004 to modify operations at the Cordero Rojo Mine with the addition of atomizer/fogger dust control systems that replaced all 14 existing conventional baghouses. This new emission control system will reduce point source particulate emission levels such that the facility is no longer considered a major source as defined by Chapter 6, Section 3 of the WAQSR and therefore no longer required to have a Title V Operating Permit.

S4-4.4 Historical Ambient Air Quality: NO_2 Emissions

Emission Producing Activities

Vehicular traffic, both inside and outside the areas of mining, is responsible for tailpipe emissions. Exhaust emissions from large-scale mining equipment, emissions from compressor engines used in the production of natural gas, emissions from railroad locomotives, and coal-fired power plant emissions all contain oxides of nitrogen (NO_x). Tailpipe emissions consist primarily of NO_2, CO, and VOCs, but may also include SO_2 and other trace constituents. Overburden blasting also sometimes produces gaseous orange-colored clouds that contain NO_2. NO_2 is one of several products resulting from the incomplete combustion of the explosives used in the blast.

Monitoring Results

NO_2 monitoring results are available from several currently-active air quality monitoring stations in the eastern PRB, including the Thunder Basin National Grasslands Site, located approximately 50 miles north-northeast of the LBA tract; the Campbell County site, located approximately 15 miles west-northwest of the LBA tract; the Tracy Ranch Site, located approximately 24 miles south-southeast of the LBA tract; the Belle Ayr Mine Site, located approximately four miles northeast of the LBA tract; and the Antelope Mine Site, located approximately 33 miles south of the LBA tract. WDEQ/AQD and respective mines maintain these air quality monitoring stations. The monitoring data that have been gathered from these sites, as well as other sites that no longer monitor NO_2 concentration, are included in Section 3.4.3 of the SGAC EIS document.

Control Measures

Although there have been no reported events of public exposure to NO_2 from blasting activities at the Cordero Rojo Mine and the WDEQ/AQD has not required the mine to implement any specific measures to control or limit public exposure to NO_2, the mine has voluntarily implemented a program designed to control/limit public exposure to the intermittent, short-term releases of NO_2 that sometimes occur as a result of incomplete combustion of blasting

materials. The Cordero Rojo Mine strictly adheres to their self-implemented Environmental Management System, which includes a detailed blasting procedures plan. The plan complies with the blasting plan publication/notification requirements associated with the Permit to Mine issued by WDEQ/AQD. The voluntary measures that have been instituted, particularly when large blasts are planned are listed in Section 3.4.3 of the SGAC EIS document.

S4-5 WATER RESOURCES

S4-5.1 Groundwater

The Maysdorf II LBA Tract overlies three geologic water-bearing strata that have been or would be directly affected by mining. In descending order, these units are the recent alluvium, the Wasatch Formation overburden, and the Fort Union Formation Wyodak coal seam that will be mined. The underlying, subcoal Fort Union Formation, the Lance Formation, and the Fox Hills Sandstone are utilized for industrial water supply at the Cordero Rojo Mine and other nearby coal mines, but these units are not physically disturbed by mining activities. Baseline hydrogeologic conditions within and around the Cordero Rojo Mine are characterized in the Wyoming Department of Environmental Quality (WDEQ) mining and reclamation permit (CRM 2007a), and groundwater monitoring data (depth to water and water quality) are included in the WDEQ Mine Permit and Annual Reports. Cordero Rojo Mine's current groundwater monitoring program is addressed in their 2007 WDEQ Annual Report (CRM 2007b), and Figure S4-3 depicts the locations of the currently active monitoring wells.

Recent Alluvium

Within the Maysdorf II LBA Tract, alluvial (unconsolidated, stream laid) deposits are found primarily within the Belle Fourche River valley in southern areas of the tract and along Caballo Creek one-half mile north of the tract. Less extensive deposits of alluvium are also found along the lower reaches of draws that are tributary to these major streams. The alluvium consists of recent stream channel deposits within the channels and active floodplains of the valley floors and topographically higher terrace deposits that predate the recent deposition. The recent deposits and the lower terrace deposits are typified by both lateral and vertical heterogeneity and are generally comprised of gravels, coarse- to fine-grained sands and local lenses of silty, commonly organic-rich clays. The upper-most terrace is comprised predominately of relatively homogeneous sandy silts and clays overlying basal gravel deposits. The alluvial materials presently being deposited by the streams are clayey and heavy-textured.

The thickness of Belle Fourche River alluvial deposits varies from absent where bedrock is exposed in the stream channel to more than 40 feet. Lesser quantities of alluvium occur along Caballo Creek and in tributaries to the Belle

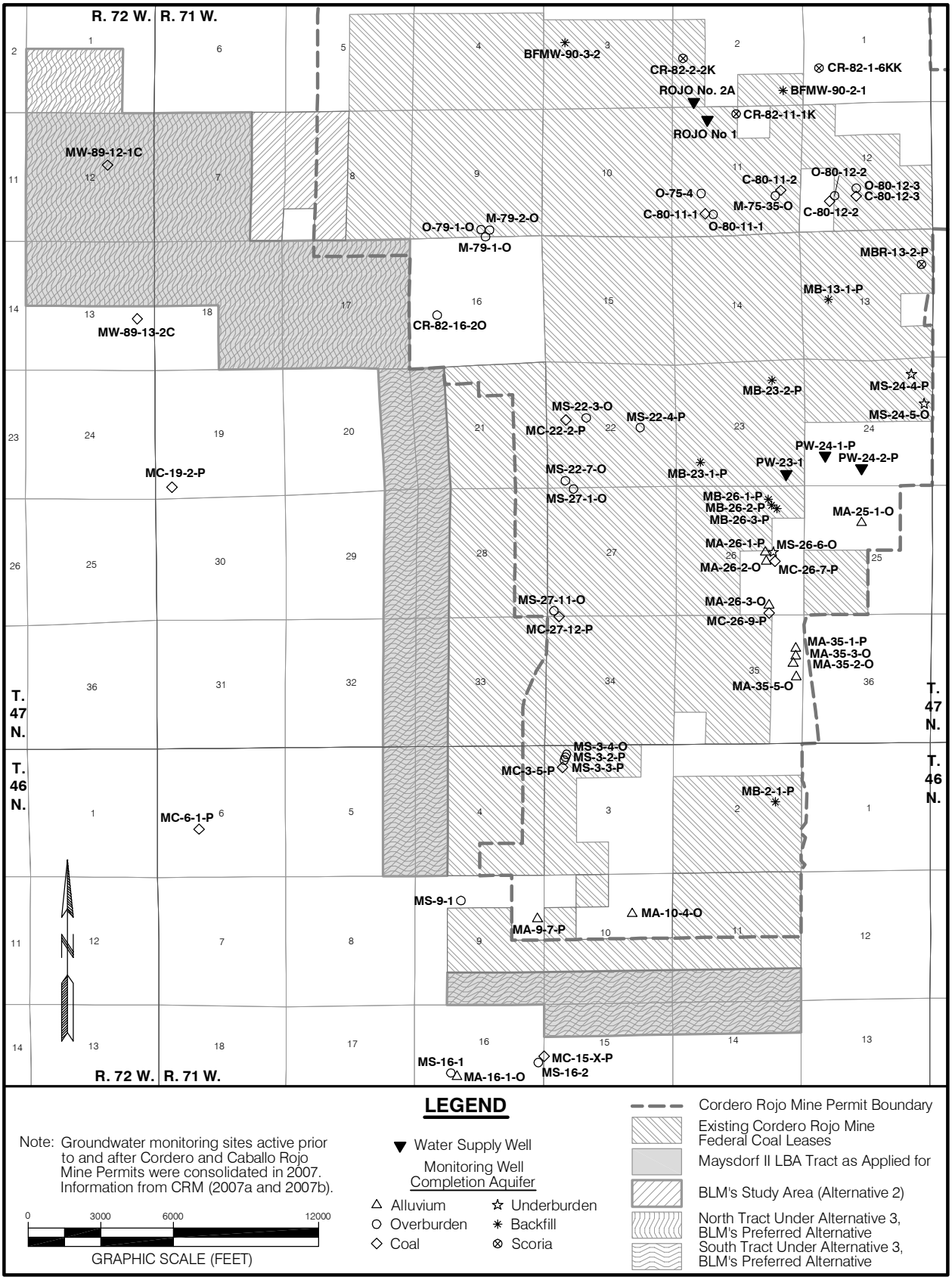

Figure S4-3. Locations of Currently Active Groundwater Monitoring and Water Supply Wells at the Cordero Rojo Mine.

Fourche. The alluvial, colluvial, and playa deposits associated with these dry tributary draws and other minor surface drainages within the LBA tract are generally thin and not laterally extensive enough to be considered aquifers. Saturated alluvium along the Belle Fourche varies from absent (dry from land surface to the top of the underlying Wasatch Formation) to more than 10 feet thick, and is greatest near the stream channel. Maximum saturation occurs upstream of bedrock outcrops, where surface water and groundwater collect behind the outcrops (CRM 2007a).

Aquifer testing in the field and laboratory indicate that the Belle Fourche River alluvium has a very low hydraulic conductivity within the current Cordero Rojo Mine permit area, ranging from nearly zero to 2.8 feet per day (ft/day). The testing results verify the low productivity of the alluvial deposits.

Belle Fourche alluvial monitor well water levels indicate that alluvial groundwater flows down-valley, and exhibits a hydraulic gradient similar to that of the valley profile. Recharge to the alluvium is from direct precipitation, stream flow infiltration, and adjacent upland overburden areas. The water table geometry near the stream suggests that the stream generally loses water to the alluvium, but may gain water depending on the season and extent of saturation in the alluvium. Groundwater elevations and flow directions in the undisturbed portion of the Belle Fourche River valley within the southern portion of the Maysdorf II LBA Tract have not been impacted by surface coal mining activities (i.e., Belle Fourche River diversion constructed in 1995) to date. The heavy-textured nature of the alluvial aquifer material severely limits groundwater flow down gradient.

In general, the groundwater quality in the saturated Belle Fourche River alluvium within the LBA tract is poor. The alluvial water type is characterized as a sodium/calcium-sulfate with a total dissolved solids (TDS) concentration averaging around 4,100 milligrams per liter (mg/L). Due to the high salinity, Belle Fourche River alluvial groundwater is considered unsuitable for domestic consumption and irrigation, and marginal for livestock and wildlife use. The alluvial groundwater quality is similar to that of the underlying Wasatch Formation. The low hydraulic conductivities and limited areal extent of saturation indicate that the alluvium does not exhibit aquifer characteristics adequate for agricultural or domestic use. There is currently no known use of alluvial groundwater in or near the Maysdorf II general analysis area.

Wasatch Formation

Within the Powder River Basin (PRB), the Wasatch Formation (overburden lying above the Wyodak coal seam) consists of interbedded sands, silts, and clays with occasional discontinuous deposits of carbonaceous material. This description basically holds true for the Maysdorf II LBA Tract. The Wasatch strata range in cohesion from unconsolidated (i.e., loose sands and siltstones) to lithified (sandstones, siltstones, shales, and coal stringers). Any of the deposits may be water bearing, although the sands and sandstones possess a

greater, but laterally limited, potential for groundwater yield. These sands are generally discontinuous and separated laterally and vertically by fine-grained deposits. The discontinuous nature of the deposits produces considerable variability in groundwater elevations both laterally and vertically. The hydraulic connection between sandstone lenses is tenuous due to intervening shale aquitards; thus, groundwater movement through the Wasatch Formation overburden is limited. Because the water-bearing units within the Wasatch Formation are not continuous, the Wasatch is not considered to be a regional aquifer.

Water production from the overburden within and around the Cordero Rojo Mine area is typically low. Isopach maps and geologic cross sections indicate that sandstone lenses contained in the Wasatch Formation cannot be reliably correlated over the mine's permit area. The formation is also composed of interbedded clays, which tend to vertically isolate water production units. Channel-like deposits of unconsolidated sands (paleochannel sands) with up to about 60 feet of sand saturation are occasionally found in the shallow overburden, and wells developed in these sands may individually yield up to about 50 gallons per minute (gpm). The paleochannels are typically less than 500 feet wide, however, and are separated laterally from each other by deposits of silt and clay having very low groundwater yields.

Another geologic unit that may be considered a part of the Wasatch Formation is scoria, also called clinker or burn. It consists of sediments that were baked, fused, and melted in place when the underlying coal burned spontaneously. These burned sediments collapsed into the void left by the burned coal. Scoria deposits can be a very permeable aquifer and can extend laterally for miles in the eastern PRB. The occurrence of scoria is site specific, typically occurring in areas where coal seams outcrop at the surface. The hydrologic function of scoria is to provide infiltration of precipitation and recharge to laterally contiguous alluvium, overburden and Wyodak coal beds. Clinker outcrop areas occur along the Cordero Rojo Mine's eastern permit boundary. No scoria deposits are present within the Maysdorf II LBA Tract.

Recharge to the Wasatch Formation is from the infiltration of precipitation and lateral movement of water from adjacent scoria bodies. Regionally, groundwater is discharged from the Wasatch Formation by evaporation and transpiration, by pumping wells, by drainage into mine excavations, and by seepage into the alluvium along stream courses. Overburden in the vicinity of the LBA tract is recharged naturally by precipitation infiltration and infiltration of surface water runoff stored in playa areas. Additional, artificial recharge occurs where reservoirs have been constructed for ranching operations and where groundwater is discharged to the surface from coal bed natural gas (CBNG) production. CBNG-produced groundwater has been discharged to a low-lying playa area located in the western half of Section 21, T.47N., R.71W., in the central portion of the LBA tract, and has possibly enhanced recharge to the overburden in that area. Overburden groundwater is not generally connected to the underlying Wyodak coal seam due to a low-permeability

stratum at the base of the overburden, which is fairly widespread in the general south Gillette analysis area. However, there is likely some leakage between the aquifers that provides vertical recharge to the coal aquifer.

For the Wasatch Formation as a whole in the PRB, the discontinuous nature of the water bearing units results in low overall hydraulic conductivity and low groundwater flow rates. Because of the varied nature of the aquifer units within the Wasatch, hydraulic properties are variable as well. Martin et al. (1988) reported that hydraulic conductivities within the Wasatch ranged from 10^{-4} ft/day to 10^{2} ft/day, and the geometric mean hydraulic conductivity based on 203 tests was 0.2 ft/day. The geometric mean hydraulic conductivity from 70 aquifer tests using wells completed in sandstone in the Wasatch overburden was 0.35 ft/day, while that from 63 aquifer tests using wells completed in siltstone and claystone in the Wasatch overburden was 0.007 ft/day (Rehm et al. 1980). Field aquifer tests within and adjacent to the Cordero Rojo Mine indicate that the water-bearing Wasatch strata typically have a low hydraulic conductivity, with a range of roughly two orders of magnitude (0.03 to 3.3 ft/day); with locally higher values being associated with higher sand fractions relative to the low-permeability silts and clays that make up the majority of the overburden. Aquifer testing also verified that the overburden sands are typically isolated hydraulically from one another (CRM 2007a).

Premine saturated thicknesses in the overburden ranged from near zero in the eastern part of the Cordero Rojo Mine permit area to more than 200 feet in parts of the Maysdorf II LBA Tract as applied for. Due to the discontinuous nature of the deposits, premine overburden groundwater movement generally followed the topography. Before mining, overburden groundwater flow in the vicinity of the Cordero Rojo Mine was generally toward, and discharged to the Belle Fourche River and Caballo Creek valleys. Groundwater flow has since been affected in the mine area by the removal of overburden, and west of the mine by some pre-mine dewatering operations. Monitor well data indicate that overburden groundwater in the Maysdorf II general analysis area now flows toward the mine. Overburden groundwater levels show steady decline in areas within about one-half mile of the mine pits as a result of mine drainage and pre-mine dewatering operations. Currently, overburden groundwater levels in the Cordero Rojo Mine area vary from approximately 6 feet to over 160 feet below land surface. Discharge from the overburden still occurs in limited areas to the alluvium in the southern portion of the LBA tract along the Belle Fourche River.

Water quality in the Wasatch Formation near the Maysdorf II LBA Tract is extremely variable, but generally poor. The shallow sand zones are found to have higher concentrations of TDS and the water quality tends to improve with depth. TDS concentrations range from approximately 525 mg/L to 9,600 mg/L and the water type is characterized as a calcium/magnesium-sulfate. The water is considered unsuitable for domestic consumption and irrigation, but suitable for livestock and wildlife use. According to Wyoming State Engineer's Office (SEO) records, excluding wells for industrial and mining use, and based

on depth of completion, there are 83 wells within three miles of the Maysdorf II general analysis area that are completed in the overburden: 15 for domestic use only, 23 for domestic and/or livestock use, and 45 for livestock use only.

Wyodak Coal

The Tongue River Member of the Fort Union Formation contains the mineable coal zone, which is often divided by partings that separate it into two or more units. The mineable coal zones are variously referred to as the Anderson and Canyon, Roland and Smith, Wyodak-Anderson, Upper and Lower Wyodak, or Wyodak. At the Cordero Rojo Mine it is referred to as the Wyodak seam. Only local, discontinuous carbonaceous shale partings, typically less than one foot thick, occur in the Maysdorf II general analysis area; therefore, the Wyodak coal seam is considered a single aquifer. A general discussion of the coal seam aquifer is presented as follows.

Due to its continuity, the Wyodak coal seam is considered a regional aquifer because it is water bearing and is laterally continuous throughout the area. Hydraulic conductivity within the Wyodak coal seam is highly variable and reflective of the amount of fracturing the coal has undergone, as unfractured coal is virtually impermeable. Field tests indicate that the coal has a low to moderate transmissivity with a range of roughly three orders of magnitude, with localized zones of moderately high transmissivity due to increased fracturing. The yield of groundwater to wells and mine pits is smallest where the permeability of the coal is derived primarily from localized unloading fractures. These fractures, which are the most common, are created by the expansion of the coal as the weight of overlying sediments is slowly removed by erosion. The highest permeability is imparted to the coal by tectonic fractures. These are through-going fractures of areal importance created during deformation of the Powder River structural basin. The presence of these fractures can be recognized by their linear expression at the ground surface, controlling the orientation of stream drainages and topographic depressions. Due to their pronounced surface expression, these tectonic fractures are often referred to as “lineaments”. Coal permeability along lineaments can be increased by orders of magnitude over that in the coal fractured by unloading only. Such increased aquifer transmissivity occurs west of the Cordero Rojo Mine area, and is attributed to structural development that has produced additional fracturing.

Field aquifer tests conducted by CRM in the vicinity of the Maysdorf II LBA Tract indicate that the coal aquifer is non-homogeneous and generally low in transmissivity with some local areas of high transmissivity. Hydraulic conductivity values reported for the Wyodak coal seam within the Cordero Rojo Mine permit boundary range from 0.03 to 19.0 ft/day, with a mean of approximately 4.0 ft/day (CRM 2007a). Storage coefficients measured within and around the Cordero Rojo Mine area range from 10^{-3} to 10^{-4}, indicative of a confined aquifer.

Recharge occurs principally by infiltration of precipitation in the clinker outcrop areas along the Cordero Rojo Mine's eastern permit boundary. Secondary vertical recharge from the overburden also occurs. Prior to mining, the direction of groundwater flow within the coal aquifer was generally from recharge areas westward into the basin, following the dip of the coal. Groundwater conditions varied from unconfined to confined depending on the coal elevation and proximity to outcrop, and the coal was unsaturated in some portions of the Cordero Rojo Mine permit area.

Site-specific water-level data collected from monitoring wells by CRM and other Gillette area coal mining companies and presented in the Gillette Area Groundwater Monitoring Organization (GAGMO) 25-year report (Hydro-Engineering 2007) indicate that the groundwater flow directions in the Wyodak coal have been greatly influenced by surface mine dewatering and groundwater discharge associated with CBNG development. Near active mining areas, groundwater flow within the coal aquifer is typically toward the mine pits. Cordero Rojo Mine development began in 1976 and gradual water level declines recorded prior to 1997 were likely due to mine dewatering alone. By year 2000, groundwater level decline rates had dramatically increased because drawdown caused by widespread CBNG development west of the mine was overlapping with drawdown caused by mining operations. A continuous cone of depression existed around the Caballo, Belle Ayr, and Cordero Rojo Mines due to their closeness to each other and the cumulative drawdown effects from pit dewatering and nearby CBNG discharges. The extent of drawdown west of the mines that is specifically attributable to mine dewatering can no longer be defined due to much greater and areally extensive drawdown caused by CBNG development (Hydro-Engineering 2007).

Within the Cordero Rojo Mine area, Wyodak coal groundwater quality is generally poor, but exhibits lower TDS concentrations than alluvial or overburden groundwater. The composition of groundwater in the coal is generally characterized as a calcium/magnesium-sulfate type near the scoria outcrop recharge areas and transitions to a sodium-bicarbonate type as the groundwater moves downgradient. TDS concentrations range from around 600 mg/L to 4,400 mg/L, and average approximately 1,700 mg/L. Coal groundwater commonly exceeds many suitability criteria for domestic uses and has a high salinity and sodium hazard, which makes it unsuitable for agricultural uses. Therefore, coal groundwater is typically only suitable for livestock and wildlife watering purposes.

Subcoal Fort Union Formation

The Fort Union Formation is divided into three members, which are, in descending order: the Tongue River Member, the Lebo Member, and the Tullock Member. The Wyodak Coal occurs within the Tongue River Member. The subcoal Fort Union Formation consists primarily of lithified sands and shales, and is divided into three hydrogeologic units: the upper Tongue River aquifer,

the Lebo confining layer, and the Tullock aquifer (Law 1976). Of the three units, the Tullock is the most prolific in terms of groundwater yield.

Mining does not directly disturb the hydrogeologic units below the Wyodak coal, but many PRB mines use them for industrial water supply wells. In a few cases there have been drawdowns in the subcoal aquifer due to leakage into mine pits, dewatering, and CBNG development (BLM 2001b). The upper Tongue River aquifer consists of lenticular, fine-grained shale and sandstone. The Lebo confining layer is typically more fine-grained than the other two members and generally retards the movement of water (Lewis and Hotchkiss 1981). The Lebo confining layer typically separates the Tongue River and Tullock aquifers hydraulically. The Tullock aquifer consists of discontinuous lenses of sandstone separated by interbedded shale and siltstone.

Transmissivity is equal to an aquifer's hydraulic conductivity, or permeability, times the aquifer's saturated thickness, and is commonly used when discussing the hydraulic properties of the subcoal Fort Union Formation where wells are completed by exposing many discrete sand lenses to the well bore. Transmissivities are generally higher in the deeper Tullock aquifer than in the upper Tongue River aquifer, and many mines in the PRB have water-supply wells completed in this interval (Martin et al. 1988). The City of Gillette also utilizes the Tullock aquifer to meet part of its municipal water requirements. The average transmissivity for the Tullock, as reported by OSM (1984), is 290 ft^2/day.

The water quality of the subcoal Fort Union Formation is generally good. TDS concentrations measured in various subcoal Fort Union Formation water supply wells in the eastern PRB range from 230 mg/L to 520 mg/L. Water from the subcoal Fort Union Formation is of the sodium- bicarbonate type. This water is generally suitable for domestic use and may be suitable for livestock and wildlife watering, as well as irrigation, depending upon TDS concentrations and site-specific sodium adsorption ratio (SAR) values.

According to SEO records, excluding wells for industrial and mining use, and based on depth of completion, there are 18 wells within three miles of the Maysdorf II LBA Tract that are completed in the sub-coal Fort Union Formation: five for domestic and stock use, and 13 for livestock-only use. Cordero Rojo Mine uses four wells completed in this formation (Rojo No. 1, Rojo No. 2A, PW-24-1-P, and PW-24-2-P) to supply water for human consumption and mining operations (Figure S4-3). The depths of these industrial water supply wells range from 988 to 2,034 feet.

Lance Formation-Fox Hills Sandstone

Underlying the Fort Union Formation is the Lance Formation of Cretaceous age. The Lance Formation is comprised of an upper confining layer and a lower aquifer. Individual sandstone beds of the lower aquifer sequence are up to about 100 feet thick, are fine-grained, and contain variable amounts of clay

and silt interbeds. The Fox Hills Sandstone underlies the Lance Formation and is usually difficult to distinguish from the Lance. The Fox Hills is described as a well-developed, fine- to medium-grained, marine sandstone that contains thin beds of sandy shale and probably averages around 250 feet thick beneath the Maysdorf II LBA Tract.

Cordero Rojo Mine's industrial water supply well PW-23-1 (Figure S4-3) is completed in the Fox Hills Sandstone. This well is 4,130 feet deep and permitted to pump 375 gpm. According to chemical analyses, water from this well is potable, although it is used for dust suppression and other miscellaneous uses. Should the need for additional potable water be realized, it could be incorporated into the mine's potable water system.

S4-5.2 Surface Water

The Cordero Rojo Mine site is situated near the center of the PRB, which is a broad structural trough that lies between the Big Horn Mountains and the Black Hills. The PRB is drained by three separate drainage systems: the Powder/Little Powder, the Cheyenne, and the Belle Fourche Rivers. Lying between the Powder River and Cheyenne River drainage basins is the Belle Fourche River drainage system, which is a narrow, linear-shaped basin extending from the Pumpkin Buttes northeast to the Black Hills. The topography of the Belle Fourche drainage basin is typified by broad, flat, inter-stream uplands and a wide, level expanse of eastward-sloping plains broken by a few isolated buttes. The Belle Fourche River and its tributaries drain the existing Cordero Rojo Mine permit area and Maysdorf II general analysis area. The permit area is located primarily along the north side of the Belle Fourche River. In this area, the narrow, shallow channel of the river meanders through a looping, one-half mile wide floodplain. Surface water features in the Maysdorf II LBA Tract and the surrounding areas prior to all mining disturbance are displayed in Figure S4-4.

The Maysdorf II LBA Tract consists predominantly of gently rolling topography, although the southern portion is dissected by the Belle Fourche River bottomlands and breaks. The Belle Fourche River flows roughly east-northeast through the southern portion of the tract and is currently diverted from its natural channel in this area to facilitate mining within the existing Cordero Rojo Mine permit area. The diversion channel was constructed in 1995. The diversion begins within the Maysdorf I LBA Tract area, near and parallel to the northern edge of Section 11, T.46N., R.71W., then extends to the north-northeast across most of Section 2, T.46N., R.71W., where it rejoins the natural channel. Another channel diversion was constructed in 1977 in Sections 25 and 26, T.47N., R.71W. as part of the mine's railroad spur and loop construction. Both of these diversions are shown in Figure S4-4.

Between the point at which the Belle Fourche River enters the Maysdorf II general analysis area (in the SW¼SW¼ of Section 9, T.46N., R.71W.), to the existing channel diversion (in the NW¼NW ¼ of Section 11, T.46N., R.71W.), the channel thalweg spans approximately 20,000 feet and drops in elevation

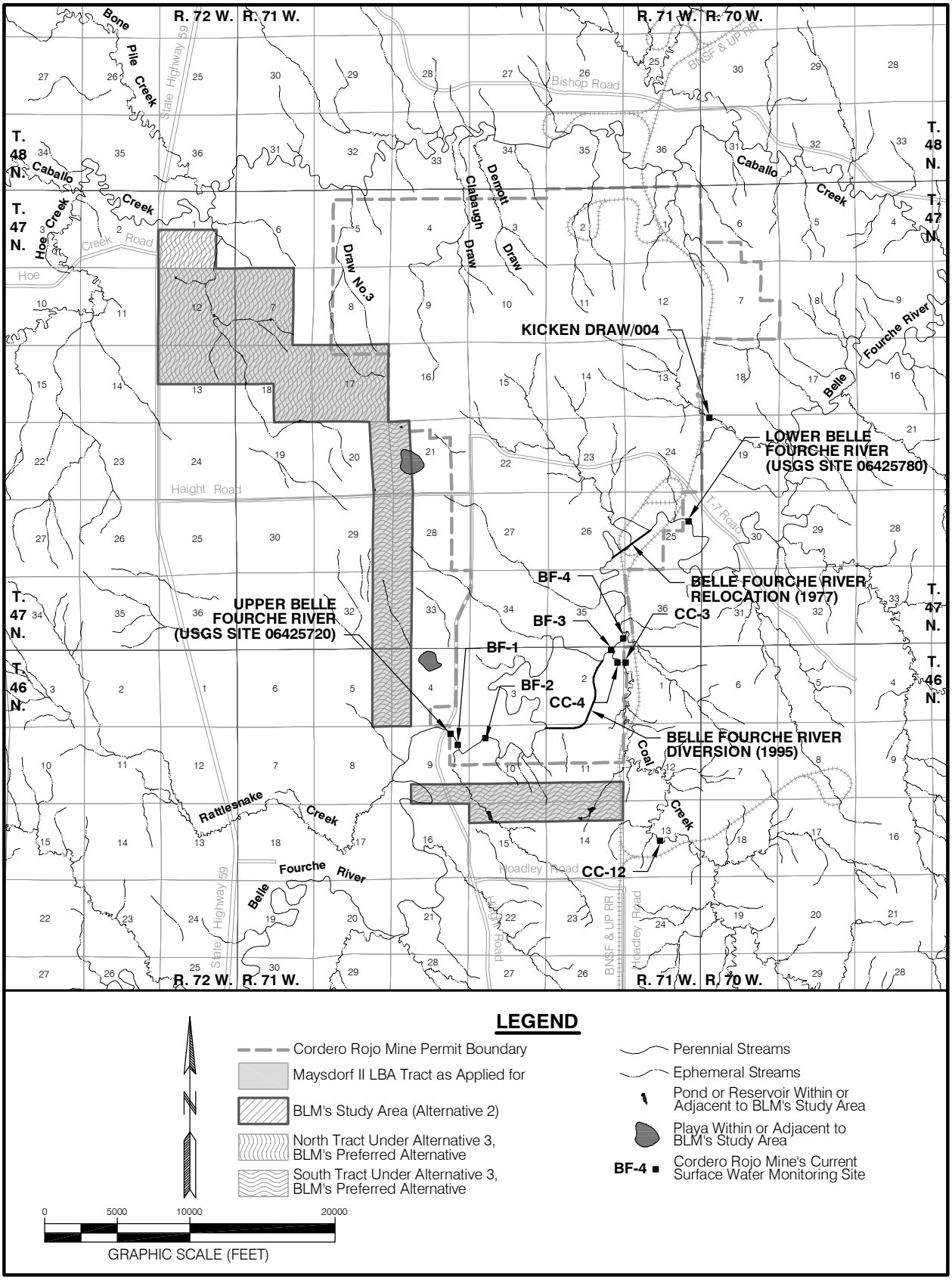

Figure S4-4. Surface Water Features Within and Adjacent to the Maysdorf II LBA Tract.

about 20 feet. The channel gradient of this span is approximately 0.001 (or 5.3 feet per mile), typical for the Belle Fourche River in the region. Outcrops of bedrock in the stream channel break the channel profile into a series of shallow steps, effectively creating pools adjacent to and upstream of the steps.

Caballo and Coal Creeks, which are located north and east of the tract, respectively, both discharge to the Belle Fourche River. Caballo Creek flows easterly toward the Belle Fourche River about 1.5 miles north of the Maysdorf II LBA Tract, and is currently diverted by the adjacent Belle Ayr Mine operation. Caballo Creek flows into the Belle Fourche River in Section 3, T.47N., R.70W. The northern portion of the LBA tract is drained by a few small, unnamed tributaries of Caballo Creek. Two areas on and contiguous to the central portion of the Maysdorf II general analysis area do not contribute runoff to any stream and playas have formed in the lowest portions of these non-contributing drainage basins. Roughly a 30-acre playa exists in the northern portion of Section 4, T.46N., R.71W., and roughly a 40-acre playa exists in the west-central portion of Section 21, T.47N., R.71W. (Figure S4-4). Coal Creek flows northwesterly toward the southern portion of the LBA tract and joins the Belle Fourche River near the end of the diversion channel in Section 2, T.46N., R.71W. A few small, unnamed tributaries of the Belle Fourche River and Coal Creek drain the southern portion of the LBA tract (Figure S4-4).

All streams, including the Belle Fourche River, within and adjacent to the tract are typical for the region, in that flow events are ephemeral and flow only in response to rainfall or snowmelt runoff. Stream runoff is typically of short duration and exhibits temporal patterns similar to precipitation events. All streams in the region show the characteristic extreme low-flow period from October through January. Flow events frequently result from snowmelt during the late winter and early spring. Although peak discharges from such events are generally small, the duration and therefore the percentage of annual runoff volume can be considerable. During the spring, general storms (both rain and snow) increase soil moisture; hence decreasing infiltration capacity, and subsequent rainstorms can result in both large runoff volumes and high peak discharges. Limited segments of the Belle Fourche River do receive recharge from bank storage (groundwater stored in the alluvium along the stream channel) and flow throughout the year, making the stream locally intermittent.

Long-term streamflow records collected by the U.S. Geological Survey (USGS) on the Belle Fourche River near Moorcroft, Wyoming indicate an average discharge of about 16,700 acre-feet (ac-ft) per year, ranging from 825 ac-ft in 1961 to about 98,300 ac-ft in 1978. Streamflow at USGS Station 06425720 (located in the NE¼NE¼ of Section 9, T.46N., R.71W., and depicted on Figure S4-4) was monitored continuously from 1975 to 1983, and then discontinued until 2001 when monitoring was reestablished. According to streamflow records from 1975 to 1983, the river at this gaging station did not flow throughout most of the year except in direct response to snow melt and precipitation runoff events. The annual mean streamflow during that period ranged from 0.19 to 9.82 cubic feet per second (cfs). More recent streamflow records, from 2001 to date, indicate that the mean annual streamflow of the

Belle Fourche River at this location is normally less than 5.0 cfs, with greater, episodic flows occurring during heavy precipitation and snow-melt events. In response to surface discharge of groundwater associated with CBNG production upstream of this monitoring station, which is a relatively recent phenomenon, streamflow occurrence is now more frequent and consistent. In contrast to the infrequent nature of streamflow events that were recorded at Station 06425720 from 1975 to 1983, the Belle Fourche River at this location is now seldom completely dry. However, the mean annual streamflow rate and annual discharge volume have not significantly increased, indicating that pre-CBNG development conditions prevail. Streamflow is still very much a function of the amount and timing of precipitation and snowmelt runoff; however, since 1999, the PRB of northeastern Wyoming has experienced extreme drought conditions. Discharge volumes for 2003 and 2004 (the most recent period of record with a complete year's-worth of data) were 1,860 and 2,710 ac-ft, respectively.

The Belle Fourche River is listed in the WDEQ/WQD Surface Water Classification List (WDEQ/WQD 2007) as a Class 2ABww stream that is protected for drinking water, aquatic life (classified as a warm water fishery), recreation, wildlife, agriculture, industry and scenic value. However, the numeric human health criteria for iron and manganese do not apply to Class 2 waters in the Belle Fourche River drainage and the main stem of the river. Caballo Creek and Coal Creek are listed as Class 3B streams, which are non-fisheries, but are protected for other aquatic life, recreation, wildlife, agricultural and other uses. All other ephemeral streams draining the existing permit area and Maysdorf II general analysis area are categorized as Class 4 streams (where it has been determined that aquatic life uses are not attainable).

Springs are uncommon in the Cordero Rojo Mine area and none have not been identified in the Maysdorf II general analysis area. A few springs have been observed elsewhere in upper terrace areas of the river. One such spring, located on the upper-most terrace of the Belle Fourche River in the SE¼NE¼ of Section 21, T.46N., R.71W., about 1 mile south of the Maysdorf II general analysis area, occurs where groundwater in Wasatch Formation sand flows to the alluvium of the river valley.

Two reservoirs used for livestock water are located on Draw No. 3, which drains north into Caballo Creek: one is in the SE¼SW¼ of Section 8, (0.41 acres), and the other is in the SE¼NW¼ of Section 8 (0.19 acres). Neither of these existing reservoirs has estimated storage capacities of more than 2 acre-feet.

Water quality in the Belle Fourche River was measured by the USGS at Station 06425720 between November 1975 and April 1983, and from March 2001 to the present. In compliance with WDEQ/LQD permit monitoring requirements, CRM collects water quality samples from the Belle Fourche River at both the Upper and Lower Stations (Figure S4-4) on a quarterly frequency. Based on these historical water quality analyses, water from the Belle Fourche River is typically a sodium/calcium-sulfate type with TDS concentrations normally ranging around 2,000 to 4,000 mg/L. Surface water quality is usually

unsuitable for domestic and irrigation uses, but suitable for livestock and wildlife use. Total iron and manganese concentrations are significantly high in relation to domestic water use, although these metal concentrations coincide with increases in total suspended solids (TSS) concentrations.

Surface water quality typically varies with flow and/or season. In general, as streamflow increases, TDS concentration decreases while TSS concentration increases. Conversely, as streamflow decreases, the TDS concentration increases while the TSS concentration decreases. Due to the sparse vegetative cover and the infrequent occurrence of surface runoff in this semi-arid environment, high TSS concentrations can be expected, especially from floods caused by thunderstorms.

S4-5.3 Water Rights

The Wyoming State Engineer's Office (SEO) administers water rights in Wyoming. Water rights are granted for both groundwater and surface water appropriations. Prior to development of water resources associated with energy development, water appropriations (either groundwater or surface water) in the PRB were typically for livestock use. Currently, mining companies and CBNG development companies hold the majority of the water rights in the general south Gillette analysis area.

Records of the SEO have been searched for groundwater rights within a 3-mile radius of the BLM study area for the Maysdorf II LBA Tract. This information is required for WDEQ permitting. SEO data indicate that, as of May 29, 2007, there were 987 non-coal mine related, permitted water wells within 3 miles of the tract, which includes 780 wells permitted for uses related to CBNG development. Those 987 wells are permitted for the following uses:

- 429 CBNG
- 225 livestock and CBNG
- 66 livestock
- 57 livestock, miscellaneous, and CBNG
- 52 miscellaneous and CBNG
- 33 monitoring
- 29 domestic and livestock
- 26 miscellaneous
- 21 industrial
- 21 domestic
- 16 miscellaneous, dewatering, and CBNG
- 2 livestock and miscellaneous
- 2 unknown
- 1 CBNG and reservoir
- 1 dewatering and miscellaneous
- 1 dewatering, reservoir, and industrial
- 1 miscellaneous and domestic
- 1 livestock and industrial

- 1 livestock and irrigation
- 1 livestock, irrigation, and domestic
- 1 temporary, industrial, and drilling

The majority of these wells are permitted for multiple uses. Approximately 79 percent are permitted either for CBNG development only or for CBNG development and other uses; 39 percent are permitted either for livestock use only or for livestock and other uses; 16 percent are permitted for miscellaneous use only or for miscellaneous and other uses; 5 percent are permitted either for domestic uses only or for domestic and other uses; 3 percent are permitted for monitoring use only; 2 percent are permitted for industrial uses; and about 1 percent are permitted for irrigation and other uses.

SEO records have been searched for surface water rights within a 3-mile radius of the BLM study area for the Maysdorf II LBA Tract. Like the groundwater rights, this information is also required for WDEQ permitting. SEO records indicate that as of May 29, 2007, there were 90 non-coal mine related, permitted surface water rights within the search area. The surface water rights are permitted for the following uses:

- 46 livestock
- 16 irrigation
- 10 irrigation and domestic
- 8 temporary oil production, drilling, and industrial
- 4 livestock and domestic
- 3 temporary industrial
- 1 livestock and irrigation
- 1 reservoir supply and domestic
- 1 livestock and fisheries

According to SEO records, there are no permanent withdrawals from the Belle Fourche River within 3 miles of the Maysdorf II LBA Tract. The SEO permits within 3 miles of the tract that are for non-mining withdrawals from the river are designated as temporary and for drilling use.

A listing of the non-coal mine related groundwater and surface water rights is presented in Table S4-4.

S4-6 ALLUVIAL VALLEY FLOORS

Portions of the Belle Fourche River and its associated ephemeral tributaries within and adjacent to the existing Cordero Rojo Mine permit boundary, and portions of Caballo Creek within and adjacent to the existing Belle Ayr Mine permit boundary (north of the Maysdorf II LBA Tract), have been investigated for the presence of AVFs (CRM 2007a and FCW 2003). Figure S4-5 depicts the approximate limits of unconsolidated stream laid deposits, as mapped by the U.S. Geological Survey within and adjacent to the Maysdorf II LBA Tract.

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract.

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P22623P	03/01/1973	46	70	5	SWNW	FLORA M. RAITT	RAITT #3	PUW	STO	5	220
P81649W	01/16/1990	46	70	5	SWNW	UNION OIL COMPANY OF CALIFORNIA	AM KIRK FEDERAL D 3 TANK BATTERY	UNA	IND	1.2	10275
P81647W	01/16/1990	46	70	6	NESE	UNION OIL COMPANY OF CALIFORNIA	BIG HAND FEDERAL 32 1 TANK BATTERY	UNA	IND	7.5	10300
P81650W	01/16/1990	46	70	6	SESE	UNION OIL COMPANY OF CALIFORNIA	AM KIRK UNIT TANK BATTERYAND INJECTION STATION	UNA	IND	0.2	-6
P93068W	10/11/1993	46	70	6	NESE	QUICKSILVER RESOURCES	BIG HAND 1-N19	GST	IND	60	8707
P94245W	01/01/1993	46	70	6	NESE	WYO BOARD OF LAND COMMISSIONERS** UNION OIL COMPANY OF CALIFORNIA	36-15 (STATE)	UNA	IND	15	
P52438W	06/13/1980	46	70	17	NWNE	DAVIS OIL COMPANY	ENL USA-W0310356 #1-0-14	DSC	MIS	100	850
P52438W	06/13/1980	46	70	17	NWNE	DAVIS OIL COMPANY	ENL USA-W0310356 #1-0-14	PU	MIS	100	850
P19834P	04/30/1969	46	70	20	SWSW	R. S. THRUSH	CRICK #1	UNA	STO	10	800
CR3/148A		46	70	29	SESE			PUO			
P11680W	12/13/1971	46	70	29	SENW	UNION OIL COMPANY OF CALIFORNIA	W S W #1	PUW	IND	400	
P11681W	12/13/1971	46	70	29	SESE	UNION OIL COMPANY OF CALIFORNIA	W.S.W. #2	PUW	IND	400	
P5688P	05/02/1969	46	70	31	SWNE	WARREN BROYLES**RICHARD BROYLES	FISH #1	PUW	STO	8	218
P84505W	02/14/1991	46	71	1	NENE	UNION OIL COMPANY OF CALIFORNIA	DAWN FEDERAL #1-41	UNA	IND	8	10550
P15843P	12/31/1922	46	71	2	SESE	ANGELA A. BOOS TRUST	#1 MOORE	PUW	STO	2	60
P106896W	07/24/1997	46	71	4	SWSW	LANCE OIL & GAS COMPANY, INC	ATKINS #4-14	GST	CBM	8.67	347
P106897W	07/24/1997	46	71	4	SESW	LANCE OIL & GAS COMPANY, INC	ATKINS #4-24	GST	CBM	7	321.5
P18724P	12/31/1945	46	71	4	NESW	LENA M. HAIGHT	RIVER #1	PUW	STO	7.5	85
P59069W	12/10/1981	46	71	4	NENE	MILO HAIGHT	MILO HAIGHT #2	PU	STO	25	900
P98962W	04/17/1995	46	71	4	SESW	MARTENS & PECK OPERATING CO.	ATKINS #4-24	UNA	MIS, STO, CBM	25	
P98963W	04/17/1995	46	71	4	NWNE	LANCE OIL & GAS COMPANY, INC	PITTMAN #4-31	GST	CBM, MIS	0	261
P106894W	07/24/1997	46	71	5	SWSE	LANCE OIL & GAS COMPANY, INC	THRUSH #5-34	GST	CBM	7.34	318
P106895W	07/24/1997	46	71	5	SESE	LANCE OIL & GAS COMPANY, INC	THRUSH #5-44	GST	CBM	7.34	340
P106908W	07/25/1997	46	71	5	NWSW	LANCE OIL & GAS COMPANY, INC	GARRETT #5-13	GST	CBM	14	357
P18723P	12/31/1932	46	71	5	NWSE	DAVID THRUSH	THRUSH #1	PUW	STO	7.5	35
P98654W	03/27/1995	46	71	5	NENE	LANCE OIL & GAS COMPANY, INC	THRUSH #5-41	GST	CBM, MIS	0	291
P98655W	03/27/1995	46	71	5	SENE	LANCE OIL & GAS COMPANY, INC	THRUSH #5-42	GST	CBM, MIS	25	309
P99906W	07/24/1995	46	71	5	NWNW	LANCE OIL & GAS COMPANY, INC	GARRETT #5-11	GST	CBM, MIS	0	342
P106322W	06/06/1997	46	71	6	NENW	LANCE OIL & GAS COMPANY, INC	PICKREL #6-21	GST	CBM	12.91	401
P106323W	06/06/1997	46	71	6	NWNE	LANCE OIL & GAS COMPANY, INC	PICKREL #6-31	GST	CBM	0	378
P106324W	06/06/1997	46	71	6	SWNE	LANCE OIL & GAS COMPANY, INC	PICKREL #6-32	GST	CBM	0	370
P106325W	06/06/1997	46	71	6	NENE	LANCE OIL & GAS COMPANY, INC	PICKREL #6-41	GST	CBM	0	371
P106326W	06/06/1997	46	71	6	SENE	LANCE OIL & GAS COMPANY, INC	PICKREL #6-42	GST	CBM	22	377
P106327W	06/06/1997	46	71	6	NESE	LANCE OIL & GAS COMPANY, INC	PICKREL #6-43	GST	CBM	11	383
P106909W	07/25/1997	46	71	6	SWSW	LANCE OIL & GAS COMPANY, INC	PICKREL #6-14	GST	CBM	23.8	384
P106910W	07/25/1997	46	71	6	NWSE	LANCE OIL & GAS COMPANY, INC	PICKREL #6-33	GST	CBM	8	375
P108758W	01/30/1998	46	71	6	NESW	LANCE OIL & GAS COMPANY, INC	PICKRELL 23-6	GST	CBM, STO	7	365
P70173W	05/20/1985	46	71	6	NENE	PICKREL LAND & CATTLE CO., INC	HAIGHT #1 WSW	UNA	IND	15	1075
P106898W	07/24/1997	46	71	7	NWNW	LANCE OIL & GAS COMPANY, INC	CLOSE #7-11	GST	CBM	25	3754
P106899W	07/24/1997	46	71	7	SWNW	LANCE OIL & GAS COMPANY, INC	CLOSE #7-12	GST	CBM	18.67	370

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P110088W	05/12/1998	46	71	7	SESW	LANCE OIL & GAS COMPANY, INC	PICKREL 24-7	GST	CBM, STO	15.5	355
P113967W	02/01/1999	46	71	7	NESW	LANCE OIL & GAS COMPANY, INC	PICKREL 23-7-4671	GST	CBM, STO	12.4	343
P113968W	02/01/1999	46	71	7	SWNE	LANCE OIL & GAS COMPANY, INC	PICKREL 32-7-4671	GST	CBM, STO	11.5	386
P29025P	02/04/1975	46	71	7	SESW	PICKREL LAND & CATTLE CO., INC	TANNER #5	PUW	STO	-1	75
P106900W	07/24/1997	46	71	8	SWNE	LANCE OIL & GAS COMPANY, INC	PETERS #8-32	GST	CBM	4.66	351
P106901W	07/24/1997	46	71	8	SENE	LANCE OIL & GAS COMPANY, INC	PETERS #8-42	GST	CBM	4.33	317
P98967W	04/17/1995	46	71	8	SENE	MARTENS & PECK OPERATING CO.	PETERS #8-42	UNA	MIS, STO, CBM	25	
P15841P	06/17/1961	46	71	11	NWNE	ANGELA A. BOOS TRUST	#7 BOOS	PUW	DOM	4	300
P89857W	10/15/1992	46	71	11	NESW	DCD, INC.	BOOS #11-11	GST	MIS, DEW, CBM	0	245
P131658W	12/28/2000	46	71	13	SENE	JAMES J. JONAS, JR.	JONAS JR # 1	GST	DOM, STO	0	300
P158828W	05/11/2004	46	71	13	NWNW	TONY S HAYDEN	HAYDEN #1	GST	STO		340
P22624P	03/01/1973	46	71	13	SESW	FLORA M. RAITT	RAITT #4	PUW	STO	5	500
P114174W	02/22/1999	46	71	14	SESW	BILL BARRETT CORPORATION	CC-CBM 24-14	GST	CBM	5.1	292
P114175W	02/22/1999	46	71	14	SESW	BILL BARRETT CORPORATION	CC-CBM 14-14	GST	CBM	0.6	287
P114896W	03/26/1999	46	71	14	NWSW	BILL BARRETT CORPORATION	CC-CBM 13-14	GST	CBM	2.6	306
P114897W	03/26/1999	46	71	14	NESW	BILL BARRETT CORPORATION	CC-CBM 23-14	GST	CBM	3.9	337
P128282W	08/14/2000	46	71	14	SWNE	BILL BARRETT CORPORATION	CC-CBM 32-14	GST	CBM	10	257
P128283W	08/14/2000	46	71	14	NWSE	BILL BARRETT CORPORATION	CC-CBM 33-14	GST	CBM	10	281
P128284W	08/14/2000	46	71	14	SWSE	BILL BARRETT CORPORATION	CC-CBM 34-14	GST	CBM	10	306
P128285W	08/14/2000	46	71	14	NESE	BILL BARRETT CORPORATION	CC-CBM 43-14	GST	CBM	10	253
P128286W	08/14/2000	46	71	14	SESE	BILL BARRETT CORPORATION	CC-CBM 44-14	GST	CBM	10	263
P71303W	09/27/1985	46	71	14	SWSW	HOADLEY ESTATE	HOADLEY #1	PUW	DOM, STO	5	120
P107169W	08/18/1997	46	71	15	NESW	RIM OPERATING, INC	CBM A #23-15	GST	CBM, MIS	1	265
P108715W	01/09/1998	46	71	15	SESW	RIM OPERATING, INC	CBM A #24-15	UNA	CBM, STO	2	288
P113998W	02/08/1999	46	71	15	NENW	RIM OPERATING, INC	CBM A #21-15	GST	CBM, STO	0	256
P113999W	02/08/1999	46	71	15	SENE	RIM OPERATING, INC	CBM A #42-15	GST	CBM, STO	0	305
P114000W	02/08/1999	46	71	15	SESE	RIM OPERATING, INC	CBM A #44-15	GST	CBM, STO	25	340
P15839P	10/24/1960	46	71	15	NESE	ANGELA A. BOOS TRUST	#5 BOOS	UNA	STO	7	258
P106932W	07/28/1997	46	71	16	NESE	WYO BOARD OF LAND COMMISSIONERS** RIM OPERATING, INC	CBM A #43-16	GST	MIS, DEW, CBM	5	255
P107172W	08/18/1997	46	71	16	NENE	WYO BOARD OF LAND COMMISSIONERS** RIM OPERATING, INC	CBM A #41-16	UNA	CBM	1	230
P108716W	01/09/1998	46	71	16	NWSW	WYO BOARD OF LAND COMMISSIONERS** RIM OPERATING, INC	CBM A #13-16	UNA	CBM, STO	10	293
P108719W	01/09/1998	46	71	16	SENE	WYO BOARD OF LAND COMMISSIONERS** RIM OPERATING, INC	CBM A #42-16	UNA	STO, MIS, CBM	5	225

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P109057W	02/17/1998	46	71	16	SWNW	WYO BOARD OF LAND COMMISSIONERS** RIM OPERATING, INC	CBM A #12-16	UNA	STO, MIS, CBM	2.6	281
P109059W	02/17/1998	46	71	16	SENW	WYO BOARD OF LAND COMMISSIONERS** RIM OPERATING, INC	CBM A #22-16R	UNA	STO, MIS, CBM	5	240
P107173W	08/18/1997	46	71	17	SWSE	RIM OPERATING, INC	CBM A #34-17	UNA	CBM	5	286
P107174W	08/18/1997	46	71	17	NESE	RIM OPERATING, INC	CBM A #43-17	UNA	CBM	5	267
P108721W	01/09/1998	46	71	17	NWSE	RIM OPERATING, INC	CBM A #33-17R	UNA	STO, MIS, CBM	5	275
P108722W	01/09/1998	46	71	17	SESE	RIM OPERATING, INC	CBM A #44-17	UNA	STO, MIS, CBM	5	269
39/7/353W	10/18/2006	46	71	18	NWSW	JOSEPH ZABEL	WILD PRAIRIE #1	UNA	MIS		
P101685W	02/26/1996	46	71	18	SESW	JAMES D ELLIOTT	ELLIOTT #1	GST	DOM	10	220
P109617W	04/10/1998	46	71	18	NENW	LANCE OIL & GAS COMPANY, INC	PICKREL 18-21	GST	CBM	0	355
P109784W	04/22/1998	46	71	18	SENW	LANCE OIL & GAS COMPANY, INC	PICKREL 18-22	GST	CBM, STO	19	379
P109785W	04/22/1998	46	71	18	SWNE	LANCE OIL & GAS COMPANY, INC	PICKREL 18-32	GST	CBM,STO	16	362
P109906W	05/04/1998	46	71	18	SWSE	DONALD GIBSON	GIBSON #1	UNA	DOM	18	223
P109930W	05/06/1998	46	71	18	NESW	MIKE/KATHLEEN GETTERT	GETTERT #2	UNA	DOM	10	210
P110091W	05/12/1998	46	71	18	SESE	LANCE OIL & GAS COMPANY, INC	LITTLE BUFFALO 44-18	GST	CBM,STO	9	348
P110189W	05/26/1998	46	71	18	SESW	JAMES D ELLIOTT	ELLIOTT #2	UNA	DOM	10	280
P110714W	06/25/1998	46	71	18	SESW	LARRY W. LEMONS	MORNING GLORY #1		DOM	18	200
P111231W	07/28/1998	46	71	18	SWSW	BRIAN PRICKETT	PRICKETT #1		DOM, STO	16	280
P113974W	02/01/1999	46	71	18	SWNW	LANCE OIL & GAS COMPANY, INC	PICKREL 12-18-4671	GST	CBM, STO	8	454
P144329W	05/06/2002	46	71	18	NWSW	JOHN KEVIN GRIFFITH	LISA'S # 1	GST	DOM		262
P168871W	07/07/2005	46	71	18	NESW	JOHN A BOSH	BOSH #1	GST	DOM		560
P110118W	05/18/1998	46	71	19	SENE	LANCE OIL & GAS COMPANY, INC	LITTLE BUFFALO 42-19	GST	CBM, STO	7	343
P122397W	01/24/2000	46	71	19	SWSW	DUNCAN OIL, INC.	EAGLE 14-19	GST	CBM	15	464
P122398W	01/24/2000	46	71	19	NESW	DUNCAN OIL, INC.	EAGLE 23-19	GST	CBM	15	373
P122399W	01/24/2000	46	71	19	SESW	DUNCAN OIL, INC.	EAGLE 24-19	GST	CBM	15	388
P122400W	01/24/2000	46	71	19	NWSE	DUNCAN OIL, INC.	EAGLE 33-19	GST	CBM	15	370
P122401W	01/24/2000	46	71	19	SWSE	DUNCAN OIL, INC.	EAGLE 34-19	UNA	CBM	15	380
P122402W	01/24/2000	46	71	19	NESE	DUNCAN OIL, INC.	EAGLE 43-19	GST	CBM	15	368
P122403W	01/24/2000	46	71	19	SESE	DUNCAN OIL, INC.	EAGLE 44-19	GST	CBM	15	384
P21662P	12/31/1925	46	71	19	NWSW	SYLVIA NEWTON	NEWTON #4	PUW	DOM, STO	22.5	200
CU1/311A	05/21/1974	46	71	20	SWNE	IEXCO OIL COMPANY	GRADY UNIT #1 WELL	PU			
P111740W	09/10/1998	46	71	20	SWNW	RIM OPERATING, INC	CBM A #12-20		STO, MIS, CBM	5	306
P111741W	09/10/1998	46	71	20	NWSW	RIM OPERATING, INC	CBM A #13-20		STO, MIS, CBM	5	326

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P111743W	09/10/1998	46	71	20	SENW	RIM OPERATING, INC	CBM A #22-20		STO, MIS, CBM	5	306
P133434W	03/23/2001	46	71	20	SESW	RIM OPERATING, INC	CBM A #24-20	GST	CBM, STO	0	345
P140136W	10/16/2001	46	71	22	SWSE	RIM OPERATING, INC.	CBM A #34-22	GST	CBM, STO		365
P155763W	11/24/2003	46	71	22	SWNW	RIM OPERATING, INC.	CBM A #12-22	GST	CBM, STO		410
P155764W	11/24/2003	46	71	22	SWSW	RIM OPERATING, INC.	CBM A #14-22	GST	CBM, STO		410
P155765W	11/24/2003	46	71	22	SWNE	RIM OPERATING, INC.	CBM A #32-22	GST	CBM, STO		410
P71304W	09/27/1985	46	71	22	SWNE	HOADLEY ESTATE	HOADLEY #2	PUW	STO	5	110
P114173W	02/22/1999	46	71	23	NWNW	BILL BARRETT CORPORATION	CC-CBM 11-23	GST	CBM	4.5	351
P114176W	02/22/1999	46	71	23	NENW	BILL BARRETT CORPORATION	CC-CBM 21-23	GST	CBM	2.9	321
P114177W	02/22/1999	46	71	23	NWNE	BILL BARRETT CORPORATION	CC-CBM 31-23	GST	CBM	1.9	311
P114178W	02/22/1999	46	71	23	NENE	BILL BARRETT CORPORATION	CC-CBM 41-23	UNA	CBM	0.9	263
P114179W	02/22/1999	46	71	23	SWNE	BILL BARRETT CORPORATION	CC-CBM 32-23	GST	CBM	7.2	309
P114180W	02/22/1999	46	71	23	SENE	BILL BARRETT CORPORATION	CC-CBM 42-23	GST	CBM	1.6	263
P128281W	08/14/2000	46	71	23	SENW	BILL BARRETT CORPORATION	CC-CBM 22-23	GST	CBM	10	326
P128287W	08/14/2000	46	71	23	SWNW	BILL BARRETT CORPORATION	CC-CBM 12-23	GST	CBM	10	410
P56976W	06/03/1981	46	71	23	NENW	DAVIS OIL COMPANY	DAVIS HOADLEY #1	PUW	MIS	85	965
P71305W	09/27/1985	46	71	23	NWSW	HOADLEY ESTATE	HOADLEY #3	PUW	STO	5	180
P71307W	09/27/1985	46	71	23	NENW	HOADLEY ESTATE	HOADLEY #5	PUW	STO	20	965
P129276W	09/25/2000	46	71	24	SENE	SHERRY & DONALD BEHNKE	HOUSE NO. 1	UNA	DOM, STO	10	280
P152672W	07/22/2003	46	71	24	SENE	SHERRY BEHNKE	HOUSE #2	GST	DOM, STO		220
P19833P	12/31/1913	46	71	24	SENE	R. S. THRUSH	HOUSE #1	UNA	DOM, STO	10	155
P13439W	03/29/1972	46	71	25	NWNW	JAMES THRUSH	THRUSH #3	PUW	STO	10	465
P5690P	12/31/1937	46	71	26	SESE	WARREN BROYLES**RICHARD BROYLES	JOE #1	PUW	STO	10	180
P9259W	05/24/1971	46	71	26	SWNW	INEXCO OIL CO.	GRADY UNIT WATER WELL #2	PU	IND	357	4830
P138037W	08/15/2001	46	71	27	SWNW	RIM OPERATING, INC	CBM A # 12-27	GST	CBM, STO		405
P155671W	11/04/2003	46	71	27	NESE	RIM OPERATING, INC.	CBM A #43-27	GST	CBM, STO		530
P155672W	11/04/2003	46	71	27	NENE	RIM OPERATING, INC.	CBM A #41-27	GST	CBM, STO		410
P155766W	11/24/2003	46	71	27	NESW	RIM OPERATING, INC.	CBM A #23-27	GST	CBM, STO		450
P47827W	04/18/1979	46	71	27	SENE	ASSOCIATION OF INDEPENDENT CONSULTANTS	EP8	PUW	MON	0	
P50441W	09/12/1979	46	71	27	SWSW	ASSOCIATION OF INDEPENDENT CONSULTANTS	EV 20	PUW	MON	0	
P50442W	09/12/1979	46	71	27	NWSW	ASSOCIATION OF INDEPENDENT CONSULTANTS	EV 21	PUW	MON	0	
P84138W	12/17/1990	46	71	27	SWNW	AUSTIN POWDER COMPANY	AUSTIN #1	UNA	MIS	10	400
P93007W	09/30/1993	46	71	27	NWSW	ORIN R EDWARDS	ORIN #1	UNA	DOM, STO	13	830
P153533W	08/01/2003	46	71	28	SWNE	RIM OPERATING, INC.	CBM A #32-28	GST	CBM, STO		410
P153534W	08/01/2003	46	71	28	SWSE	RIM OPERATING, INC.	CBM A #34-28	GST	CBM, STO		410

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P161697W	08/23/2004	46	71	28	NENW	RIM OPERATING, INC.	CBM A #21-28	GST	CBM, STO		344
P85251W	05/31/1991	46	71	28	SESE	HOADLEY - GRADY PARTNERSHIP	#1-28 HOADLEY	UNA	STO	12	620
P113552W	01/14/1999	46	71	29	NWSW	LANCE OIL & GAS COMPANY, INC	WAGENSEN 13-29-4671	GST	CBM, STO	26	376
P113553W	01/14/1999	46	71	29	SENW	LANCE OIL & GAS COMPANY, INC	WAGENSEN 22-29-4671	GST	CBM, STO	26	342
P113554W	01/14/1999	46	71	29	SESW	LANCE OIL & GAS COMPANY, INC	WAGENSEN 24-29-4671	GST	CBM, STO	26	385
P122406W	01/24/2000	46	71	29	NWNW	DUNCAN OIL, INC.	EAGLE 11-29	GST	CBM	15	363
P122407W	01/24/2000	46	71	29	NENW	DUNCAN OIL, INC.	EAGLE 12-29	GST	CBM	15	340
P133435W	03/23/2001	46	71	29	SWNE	RIM OPERATING, INC	CBM A #32-29	GST	CBM, STO		448
P133436W	03/23/2001	46	71	29	NENE	RIM OPERATING, INC	CBM A #41-29	GST	CBM, STO		405
P146098W	07/19/2002	46	71	29	SWSE	RIM OPERATING, INC.	CBM A #34-29	GST	CBM, STO		505
P146099W	07/19/2002	46	71	29	NESE	RIM OPERATING, INC.	CBM A # 43-29	GST	CBM, STO		475
P153535W	08/01/2003	46	71	29	SWSE	RIM OPERATING, INC.	CBM A #34-29 ANDERSON	GST	CBM, STO		250
P110109W	05/18/1998	46	71	30	NESW	LANCE OIL & GAS COMPANY, INC	LITTLE BUFFALO 23-30	GST	CBM,STO	25	452
P110110W	05/18/1998	46	71	30	SESW	LANCE OIL & GAS COMPANY, INC	LITTLE BUFFALO 24-30	GST	CBM,STO	25	450
P113555W	01/14/1999	46	71	30	SENE	LANCE OIL & GAS COMPANY, INC	WAGENSEN 42-30-4671	GST	CBM,STO	25	393
P122404W	01/24/2000	46	71	30	NWNE	DUNCAN OIL, INC.	EAGLE 31-30	GST	CBM	15	388
P122405W	01/24/2000	46	71	30	NENE	DUNCAN OIL, INC.	EAGLE 41-30	GST	CBM	15	424
P126084W	06/09/2000	46	71	30	NENE	DUNCAN OIL, INC.	EAGLE BLOWER FACILITY	GST	IND	30	-1
P113556W	01/14/1999	46	71	31	SENE	LANCE OIL & GAS COMPANY, INC	WAGENSEN 42-31-4671	GST	CBM, STO	28	348
P120024W	10/18/1999	46	71	31	SWNW	LANCE OIL/GAS COMPANY, INC.	LITTLE BUFFALO 12-31-4671	UNA	CBM, STO	28.8	472
P126806W	06/30/2000	46	71	31	SWNE	LANCE OIL/GAS COMPANY, INC.	FLYING T FED 32-31-4671	UNA	CBM, STO	50	458
P113557W	01/14/1999	46	71	32	NWNW	LANCE OIL & GAS COMPANY, INC	WAGENSEN 11-32-4671	GST	CBM, STO	27	397
P114421W	03/04/1999	46	71	33	NENE	ORIN R EDWARDS	ORIN #2	UNA	DOM, STO	5	170
P115131W	04/07/1999	46	71	33	SWNW	RIM OPERATING, INC	CBM A #12-33		CBM, STO	25	
P115132W	04/07/1999	46	71	33	SWNE	RIM OPERATING, INC	CBM A #32-33		CBM, STO	25	
P115134W	04/07/1999	46	71	33	NENE	RIM OPERATING, INC	CBM A #41-33		CBM, STO	25	
P152666W	06/23/2003	46	71	33	NWNW	RIM OPERATING, INC.	CBM A #11-33	GST	CBM, STO		510
P153529W	08/01/2003	46	71	33	SENW	RIM OPERATING, INC.	CBM A #22-33 ANDERSON	GST	CBM, STO		
P153530W	08/01/2003	46	71	33	SENW	RIM OPERATING, INC.	CBM A #22-33	GST	CBM, STO		430

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P4311P	04/30/1969	46	71	33	NENE	EDW. M. EVANS	EVANS #8	PUW	STO	10	355
P150870W	04/07/2003	46	71	34	NWNE	RIM OPERATING, INC.	CBM A #31-34	GST	CBM, STO		463
P153536W	08/01/2003	46	71	34	NWNW	RIM OPERATING, INC.	CBM A #11-34	GST	CBM, STO		430
P47828W	04/18/1979	46	71	34	SENW	ASSOCIATION OF INDEPENDENT CONSULTANTS	EP9	PUW	MON	0	
P50439W	09/12/1979	46	71	34	SWNE	ASSOCIATION OF INDEPENDENT CONSULTANTS	EV 19	PUW	MON	0	
P50440W	09/12/1979	46	71	34	SWNE	ASSOCIATION OF INDEPENDENT CONSULTANTS	EV 19A	PUW	MON	0	
P9258W	05/24/1971	46	71	34	SENE	INEXCO OIL CO.	GRADY UNIT WATER WELL #1	ADJ	IND	350	4830
P160997W	07/12/2004	46	71	35	NWNW	RIM OPERATING, INC.	CBM A #11-35	GSI	CBM, STO		
P105545W	04/14/1997	46	72	1	SWNE	BARRETT RESOURCES CORPORATION	PICKREL #1-12	GST	CBM	25	561
P105546W	04/14/1997	46	72	1	NWSW	BARRETT RESOURCES CORPORATION	PICKREL #1-13	GST	CBM	24.31	566
P105547W	04/14/1997	46	72	1	NESW	BARRETT RESOURCES CORPORATION	PICKREL #1-23	GST	CBM	25	505
P105548W	04/14/1997	46	72	1	SESW	BARRETT RESOURCES CORPORATION	PICKREL #1-24	GST	CBM	21.44	477
P106272W	06/04/1997	46	72	1	NENW	BARRETT RESOURCES CORPORATION	PICKREL #1-21	GST	CBM	24.83	542
P106913W	07/25/1997	46	72	1	SWSE	BARRETT RESOURCES CORPORATION	PICKREL #1-34	GST	CBM	25	444
P106914W	07/25/1997	46	72	1	SESE	BARRETT RESOURCES CORPORATION	PICKREL #1-44	GST	CBM	24	397
P29022P	02/04/1975	46	72	1	NWSW	PICKREL LAND & CATTLE CO., INC	TANNER #2	PUW	STO	5	100
P29024P	02/04/1975	46	72	1	SESE	PICKREL LAND & CATTLE CO., INC	TANNER #4	PUW	STO	7.5	80
P109600W	04/10/1998	46	72	2	SESE	BARRETT RESOURCES CORPORATION	PICKREL 2-44	GST	CBM	20	660
P111198W	07/24/1998	46	72	2	NWSE	BARRETT RESOURCES CORPORATION	PICKREL 33-2	GST	CBM, STO	17	635
P117239W	06/28/1999	46	72	2	NENW	WILLIAMS PRODUCTION RMT, COMPANY	DAVIS FED. 21-2-4673	GST	CBM, STO	26	1270
P126808W	06/30/2000	46	72	2	SWSE	WILLIAMS PRODUCTION RMT COMPANY	PICKREL 34-2-4672	GST	CBM, STO	50	1481.5
P132584W	02/12/2001	46	72	2	SESE	WILLIAMS PRODUCTION RMT COMPANY	PICKREL 44-2-4672	GST	CBM, STO		1526
P29021P	02/04/1975	46	72	2	SESE	PICKREL LAND & CATTLE CO., INC	TANNER #1	PUW	DOM	5	-1
P29023P	02/04/1975	46	72	2	NESE	PICKREL LAND & CATTLE CO., INC	TANNER #3	PUW	STO	7.5	100
P45993W	11/28/1978	46	72	2	SWSE	AMOCO PRODUCTION COMPANY** PICKREL LAND & CATTLE COMPANY	PICKREL WATER WELL #1	PUW	MIS	150	
P99096W	04/28/1995	46	72	2	NWNE	BARRETT RESOURCES CORPORATION	FEDERAL #602-31	GST	CBM, STO	25	682
P99097W	04/28/1995	46	72	2	NENW	BARRETT RESOURCES CORPORATION	FEDERAL #602-21	GST	CBM, STO	25	735
P52348W	06/15/1980	46	72	3	NENW	ROBERT F. BARLOW**MILTON O. SCHIERMIESTER	#2 SCHIERMIESTER	PUW	STO	25	
P52435W	06/12/1980	46	72	3	NENW	EXCELL ENERGY CORPORATION	EEC WW #21 3	PUW	MIS	15	650
39/1/313W	09/28/2006	46	72	11	NWSE	WILLIAMS PRODUCTION RMT CO.	OSBORN TRUST 11-33-4672	UNA	CBM		
P106277W	06/04/1997	46	72	11	SWSE	BARRETT RESOURCES CORPORATION	OSBORN TRUST #11-34	GST	CBM	25	572
P106904W	07/24/1997	46	72	11	SESE	BARRETT RESOURCES CORPORATION	OSBORN TRUST #11-44	GST	CBM	35	552
P119379W	09/30/1999	46	72	11	NWNE	WILLIAMS PRODUCTION RMT, COMPANY	PICKREL 31-11-4672	GST	CBM, STO	45	630
P125185W	04/27/2000	46	72	11	SENE	WILLIAMS PRODUCTION RMT COMPANY	EDWARDS 42-11-4672	GST	CBM, STO	50	592
P132585W	02/12/2001	46	72	11	NENE		EDWARDS 41-11-4672	GST	CBM, STO		606
P20315W	01/02/1973	46	72	11	NESE	PERRY OSBORN	OSBORN #6	PUW	STO	15	108
P22250P	12/31/1918	46	72	11	NENE	PERRY OSBORN	OSBORN #1	PUW	DOM, STO	25	90

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P29026P	02/04/1975	46	72	11	NWNE	PICKREL LAND & CATTLE CO., INC	TANNER #6	PUW	STO	5	-1
P105671W	05/07/1997	46	72	12	SESE	FREEDOM HILLS JOINT VENTURE	NEWTON #2	UNA	DOM	18	180
P106902W	07/24/1997	46	72	12	NENE	BARRETT RESOURCES CORPORATION	CLOSE #12-41	GST	CBM	26	396
P109929W	05/06/1998	46	72	12	SESE	FREEDOM HILLS JOINT VENTURES	MADER #1	UNA	DOM	10	250
P111353W	08/05/1998	46	72	12	NWSW	BARRETT RESOURCES CORPORATION	EDWARDS 13-12	GST	CBM, STO	45	530
P114441W	03/08/1999	46	72	12	SENW	BARRETT RESOURCES CORPORATION	OSBORN TRUST 12-22-4672	GST	CBM, STO	45	495
P21659P	12/31/1940	46	72	12	SESW	SYLVIA NEWTON	NEWTON #1	PUW	STO	4	100
P59475W	02/17/1982	46	72	12	NENW	PERRY OSBORNE	OSBORNE #1	PUW	STO	25	320
P99218W	05/16/1995	46	72	12	SESE	MIKE & KATIE GETTERT	GETTERT #1	UNA	DOM, STO	19	353
39/2/313W	09/28/2006	46	72	13	NESW	WILLIAMS PRODUCTION RMT CO.	EVERSON FED 23-13-4672	UNA	CBM		
39/7/475W	01/02/2007	46	72	13	SENE	LASHAWN FOULKES	FOULKES #1	UNA	DOM		
39/8/475W	01/02/2007	46	72	13	SENE	LASHAWN FOULKES	FOULKES #2	UNA	DOM		
P100101W	08/23/1995	46	72	13	NESE	BRYAN C TINER	TINER #1	UNA	DOM,STO	25	220
P100837W	11/08/1995	46	72	13	NESW	JACK/PAM BAILEY	EVERSON #1	UNA	DOM	25	1070
P109080W	02/17/1998	46	72	13	NENW	WILLIAMS PRODUCTION RMT, COMPANY	EVERSON FED. 23-13	GST	CBM, STO	35	524
P110119W	05/18/1998	46	72	13	SWSW	BARRETT RESOURCES CORPORATION	SIMPSON FED 14-13	GST	CBM, STO	35	592
P124184W	03/16/2000	46	72	13	NENE	DNR OIL & GAS INC.	LINDSEY 11-18	GST	CBM	50	1087
P124185W	03/16/2000	46	72	13	SENE	DNR OIL & GAS INC.	LINDSEY 12-18	GST	CBM	50	1039
P162469W	08/23/2004	46	72	13	NENE	EAGLE ROCK, LLC.	EAGLE ROCK NO. 1	GSE	MIS		
P162729W	09/28/2004	46	72	13	SENW	TARA AND DELORES EDWARDS	EDWARDS #1	GST	DOM, STO		300
P21660P	12/31/1941	46	72	13	SWNE	STEVE/MONA MITZEL	NEWTON #2	UNA	STO	4	120
P59695W	03/08/1982	46	72	13	SESE	WYOMING STATE HIGHWAY DEPT.	BELLE FOURCHE #4	PUW	MIS	125	270
P60510W	05/04/1982	46	72	13	NESE	WYOMING STATE HIGHWAY DEPARTMENT	BELLE FOURCHE #5	PUW	MON	0	
P99216W	05/15/1995	46	72	13	NWSE	MICHAEL A. & TERRI WEBER	WEBER #1	UNA	DOM, STO	10	240
P99247W	05/24/1995	46	72	13	NWSW	JEFFREY L. OR SHANNA K. MORGAN	MORGAN #875	UNA	DOM, STO	7	382
P106918W	07/25/1997	46	72	14	NWNE	BARRETT RESOURCES CORPORATION	FEDERAL #614-31	GST	CBM	31	600
P22251P	12/31/1930	46	72	14	NESE	PERRY OSBORN	OSBORN #2	PUW	STO	7.5	165
P134355W	04/16/2001	46	72	19	NWNW	DNR OIL & GAS INC.	FED 11-19	GST	CBM		153
P116373W	06/11/1999	46	72	23	NENE	CH4 ENERGY, LLC**DORIS WAGENSEN	THREEMILE CREEK FED #23-11	GST	CBM, STO	35	590
P116374W	06/11/1999	46	72	23	NWNE	DORIS WAGENSEN** CH4 ENERGY, LLC	THREEMILE CREEK FED #23-12	GST	CBM, STO	35	580
P116375W	06/11/1999	46	72	23	SWNE	DORIS WAGENSEN** CH4 ENERGY, LLC	THREEMILE CREEK FED #23-13	GST	CBM, STO	35	713
P116376W	06/11/1999	46	72	23	SENE	DORIS WAGENSEN** CH4 ENERGY, LLC	THREEMILE CREEK FED #23-14	GST	CBM, STO	35	595
P116377W	06/11/1999	46	72	23	SENE	DORIS WAGENSEN** POWER RESOURCES INC	THREEMILE CREEK FED #23-41	GST	CBM, STO	35	560
P116378W	06/11/1999	46	72	23	NWSE	DORIS WAGENSEN** CH4 ENERGY, LLC	THREEMILE CREEK FED #23-42	GST	CBM, STO	35	555
P116379W	06/11/1999	46	72	23	SESE	DORIS WAGENSEN** CH4 ENERGY, LLC	THREEMILE CREEK FED #23-44	GST	CBM, STO	35	550

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P116381W	06/11/1999	46	72	23	SESE	PRIMA OIL/GAS COMPANY**DORIS WAGENSEN	THREEMILE CREEK FED #26-14	UNA	CBM, STO	35	
P60103W	03/26/1982	46	72	23	SWNE	EXXON CORPORATION	RATTLESNAKE FEDERAL #1 WATER	PUW	MIS	150	
40/10/14W	03/15/2007	46	72	24	SESE	KEVIN & DEBRA HANSON	HANSON #11	UNA	DOM		
P100382W	09/15/1995	46	72	24	NWSW	ROBERT D/DEBRA R SEYLER	JOHNSON #1	UNA	DOM, STO	18	300
P103430W	08/09/1996	46	72	24	NESW	ERIC/KAREN SELLERS	SELLERS #1	UNA	DOM	18	283
P127491W	07/14/2000	46	72	24	SWSE	WILLIAMS PRODUCTION RMT COMPANY	WILSON 34-24-4672	UNA	CBM, STO	50	486
P127492W	07/14/2000	46	72	24	SWSW	WILLIAMS PRODUCTION RMT COMPANY	WILSON 14-24-4672	UNA	CBM, STO	50	518
P132726W	02/20/2001	46	72	24	SENW	LANCE OIL/GAS COMPANY, INC.	SIMPSON FED 22-24-4672	GST	CBM, STO		566
P132727W	02/20/2001	46	72	24	NENW	LANCE OIL/GAS COMPANY, INC.	SIMPSON FED 21-24-4672	GST	CBM, STO		581
P142611W	02/08/2002	46	72	24	NESE	DALE / SHARLA DOUGLAS	RAFTER STAR # 1	GST	DOM, STO		162
P142612W	02/08/2002	46	72	24	NWSE	DALE / SHARLA DOUGLAS	RAFTER STAR # 2	GST	DOM, STO		305
P147510W	10/14/2002	46	72	24	SENE	DAVID/EVELYN WRIGHT	WRIGHT 1	GST	DOM,STO		383
P21661P	12/31/1940	46	72	24	NWNE	SYLVIA NEWTON	NEWTON #3	PUW	STO	4	120
P59692W	03/08/1982	46	72	24	SESE	WYOMING STATE HIGHWAY DEPT.	BELLE FOURCHE #1	PUW	MIS	0	289
39/4/313W	09/28/2006	46	72	25	NESW	WILLIAMS PRODUCTION RMT CO.	FEDERAL 23-25-4672	UNA	CBM		
P103547W	08/21/1996	46	72	25	SWSW	LANCE OIL/GAS COMPANY, INC.	FEDERAL #2-14-25-SAND MONITOR WELL	UNA	MON	0	175
P103548W	08/21/1996	46	72	25	SWSW	LANCE OIL/GAS COMPANY, INC.	FEDERAL #1-14-25-COAL MONITOR WELL	UNA	MON	0	536
P110111W	05/18/1998	46	72	25	NWSW	WILLIAMS PRODUCTION RMT, COMPANY	DURHAM RANCH 13-25	GST	CBM, STO	13.9	507
P110112W	05/18/1998	46	72	25	NESW	LANCE OIL/GAS COMPANY, INC.	FEDERAL 23-25	UNA	STO, MIS, CBM	18	490
P127556W	07/14/2000	46	72	25	NENW	WILLIAMS PRODUCTION RMT COMPANY	WILSON 21-25-4672	GST	CBM, STO	50	480
P133401W	03/05/2001	46	72	25	SWNW	LANCE OIL/GAS COMPANY, INC.	DURHAM RANCH FED 12-25-4672	GST	CBM, STO		495
P133423W	03/15/2001	46	72	25	SWSE	LANCE OIL/GAS COMPANY, INC.	DURHAM RANCH FED 34-25-4672	GST	CBM, STO	0	518
P141769W	12/21/2001	46	72	25	NESE	LANCE OIL/GAS COMPANY, INC.	LITTLE BUFFALO 43-25	GST	CBM, STO		452
P59693W	03/08/1982	46	72	25	SENE	WYOMING STATE HIGHWAY DEPT.	BELLE FOURCHE #2	PUW	MIS	0	300
P116380W	06/11/1999	46	72	26	NENE	DORIS WAGENSEN** CH4 ENERGY, LLC	THREEMILE CREEK FED #26-11	GST	CBM, STO	35	565
P118189W	08/06/1999	46	72	36	NENE	LANCE OIL/GAS COMPANY, INC.	WAGENSEN STATE 41-36-4672	UNA	CBM, STO	45	540
P123940W	03/09/2000	46	72	36	SWNE	WILLIAMS PRODUCTION RMT, COMPANY** WY STATE BOARD OF LAND COMMISSIONERS	WAGENSEN STATE 32-36-4672	GST	CBM, STO	43.4	590
P123942W	03/09/2000	46	72	36	NENW	WILLIAMS PRODUCTION RMT, COMPANY** WY STATE BOARD OF LAND COMMISSIONERS	WAGENSEN STATE 21-36-4672	GST	CBM, STO	50	566
P162471W	08/27/2004	46	72	36	SWNE	WYDOT	GILLETTE YARD NO.1	GSI	MIS		
P59694W	03/08/1982	46	72	36	SENE	WYOMING STATE HIGHWAY DEPT.	BELLE FOURCHE #3	PUW	MIS	200	

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P25395W	12/18/1973	47	70	29	SESW	ANGELA A. BOOS TRUST	DRY CREEK #1	PUW	STO	10	210
P15837P	12/24/1959	47	70	31	SENW	ANGELA A. BOOS TRUST	#3 BOOS	PUW	STO	4	190
P27439W	07/30/1974	47	70	31	SWSE	ANGELA A. BOOS TRUST	#1 JACK	PUW	STO	10	233
P5514P	05/08/1958	47	71	4	SWSW	LESLIE CLABAUGH	CLABAUGH #3	PUW	STO	4	210
P79080W	02/13/1989	47	71	4	NWSW	COMDISCO EXPLORATION	ROYAL DRAW UNIT #1	PUW	MIS	15	10500
P130325W	10/16/2000	47	71	6	SESW	RMG I, LLC	DUNLAP 6-24-47-71-A	GST	CBM	25	401
P130326W	10/16/2000	47	71	6	SWSE	RMG I, LLC	DUNLAP 6-34-47-71-A	GST	CBM	25	330
P130327W	10/16/2000	47	71	6	NESE	RMG I, LLC	DUNLAP 6-43-47-71-A	GST	CBM	25	326
P130328W	10/16/2000	47	71	6	SESE	RMG I, LLC	DUNLAP 6-44-47-71-A	GST	CBM	25	341
P130437W	10/25/2000	47	71	6	SWNW	RMG I, LLC	DUNLAP 6-12-47-71-A	GST	CBM	25	330
P130438W	10/25/2000	47	71	6	NWSE	RMG I, LLC	DUNLAP 6-33-47-71-A	GST	CBM	25	301
P130691W	11/03/2000	47	71	6	SENW	RMG I, LLC	RAG 6- 22 - 47 -71 - A	GST	CBM	25	293
P131775W	12/29/2000	47	71	6	NWNE	RMG I, LLC	DUNLAP 6 - 31 - 47 - 71 - A	GST	CBM		326
P131776W	12/29/2000	47	71	6	NESW	HI-PRO PRODUCTION L.L.C.	DUNLAP 6 - 23 - 47 - 71 - A	GST	CBM		321
P131777W	12/29/2000	47	71	6	NWSW	RMG I, LLC	DUNLAP 6 - 13 - 47 - 71 - A	GST	CBM		333
P131781W	12/29/2000	47	71	6	NENW	RMG I, LLC	RAG 6-21-47-71-A	GST	CBM		324
P132111W	12/29/2000	47	71	6	SWNW	RMG I, LLC	ENL DUNLAP 6-12-47-71--A	UNA	CBM		
P132112W	12/29/2000	47	71	6	SENW	RMG I, LLC	ENL R.A.G. 6-22-47-71--A	UNA	CBM		
P132113W	12/29/2000	47	71	6	SESW	RMG I, LLC	ENL DUNLAP 6-24-47-71--A	UNA	CBM		
P132114W	12/29/2000	47	71	6	NWSE	RMG I, LLC	ENL DUNLAP 6-33-47-71--A	UNA	CBM		
P132115W	12/29/2000	47	71	6	SWSE	RMG I, LLC	ENL DUNLAP 6-34-47-71--A	UNA	CBM		
P132116W	12/29/2000	47	71	6	NESE	RMG I, LLC	ENL DUNLAP 6-43-47-71--A	UNA	CBM		
P132117W	12/29/2000	47	71	6	SESE	RMG I, LLC	ENL DUNLAP 6-44-47-71--A	UNA	CBM		
P133817W	04/06/2001	47	71	6	SWNE	RMG I, LLC	DUNLAP 6-32-47-71-A	GST	CBM		313
P133818W	04/06/2001	47	71	6	SENE	RMG I, LLC	DUNLAP 6-42-47-71-A	GST	CBM		351
P130329W	10/16/2000	47	71	7	SWNW	RMG I, LLC	DUNLAP 7-12-47-71-A	GST	CBM	25	415
P130330W	10/16/2000	47	71	7	SWSW	RMG I, LLC	DUNLAP 7-14-47-71-A	GST	CBM	25	366
P130331W	10/16/2000	47	71	7	NENW	RMG I, LLC	DUNLAP 7-21-47-71-A	GST	CBM	25	416
P130332W	10/16/2000	47	71	7	SENW	RMG I, LLC	DUNLAP 7-22-47-71-A	GST	CBM	25	439
P130333W	10/16/2000	47	71	7	SESW	RMG I, LLC	DUNLAP 7-24-47-71-A	UNA	CBM	25	
P130458W	10/25/2000	47	71	7	NENE	RMG I, LLC	DUNLAP 7-41-47-71-A	GST	CBM	25	344
P130459W	10/25/2000	47	71	7	NWNE	RMG I, LLC	DUNLAP 7-31-47-71-A	GST	CBM	25	390
P131773W	12/29/2000	47	71	7	SWNE	RMG I, LLC	DUNLAP 7 - 32 - 47 - 71 - A	GST	CBM		424
P131774W	12/29/2000	47	71	7	NESW	RMG I, LLC	DUNLAP 7 - 23 - 47 - 71 - A	GST	CBM		386
P132118W	12/29/2000	47	71	7	SWNW	RMG I, LLC	ENL DUNLAP 7-12-47-71--A	UNA	CBM		
P132119W	12/29/2000	47	71	7	SWSW	RMG I, LLC	ENL DUNLAP 7-14-47-71--A	GST	CBM		366
P132120W	12/29/2000	47	71	7	NENW	RMG I, LLC	ENL DUNLAP 7-21-47-71--A	UNA	CBM		
P132121W	12/29/2000	47	71	7	SENW	RMG I, LLC	ENL DUNLAP 7-22-47-71--A	UNA	CBM		
P132122W	12/29/2000	47	71	7	NWNE	RMG I, LLC	ENL DUNLAP 7-31-47-71--A	UNA	CBM		
P132123W	12/29/2000	47	71	7	NENE	RMG I, LLC	ENL DUNLAP 7-41-47-71--A	UNA	CBM		
P133807W	04/06/2001	47	71	7	SESW	RMG I, LLC	ENL. DUNLAP 7-24-47-71-A	UNA	CBM		391
P134269W	04/19/2001	47	71	7	NWSW	RMG I, LLC	DUNLAP 7-13-47-71-A	GST	CBM	0	368
P136837W	07/03/2001	47	71	7	SWSW	RMG I, LLC	DUNLAP 7-14-B	GST	CBM		1258
P136839W	07/03/2001	47	71	7	NESW	RMG I, LLC	DUNLAP 7-23-B	GST	CBM		1192
P136840W	07/03/2001	47	71	7	SWNW	RMG I, LLC	DUNLAP 7-24-B	GST	CBM		1124
P5516P	07/14/1966	47	71	8	SESE	LESLIE CLABAUGH	CLABAUGH #5	PUW	STO	5	120
P84217W	12/28/1990	47	71	8	SENE	DCD INC.	CLABAUGH #8-8	GST	MIS, DEW, CBM	0	283

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P84218W	12/28/1990	47	71	8	SESE	DCD INC.	CLABAUGH #16-8	GST	MIS, DEW, CBM	0	285
P5508W	05/19/1970	47	71	9	NWSW	LESLIE CLABAUGH	BAKER #1	PUW	DOM, STO	-1	126
P84215W	12/28/1990	47	71	9	SENW	DCD INC.	LINNY #6-9	GST	MIS, DEW, CBM	0	242
P84219W	12/28/1990	47	71	9	SESW	DCD INC.	CLABAUGH #14-9	GST	MIS, DEW, CBM	0	272
P84591W	03/04/1991	47	71	9	NENW	DCD INC.	LINNY #3-9	UNA	CBM, MIS	35	
P84592W	03/04/1991	47	71	9	NWNW	DCD INC.	LINNY #4-9	UNA	CBM, MIS	35	
P84220W	12/28/1990	47	71	10	SWSW	DCD INC.	CLABAUGH #13-10	GST	MIS, DEW, CBM	0	233
P84221W	12/28/1990	47	71	10	SWSE	DCD INC.	CLABAUGH #15-10	GST	MIS, DEW, CBM	0	220
P22621P	03/01/1973	47	71	14	NENE	FLORA M. RAITT	RAITT #1	PUW	STO	5	170
P7294P	07/31/1953	47	71	15	SWNE	FRANK P. SCHNEIDER TRUST B	SCHNEIDER #7	PUW	STO	7.5	315
P7290P	12/31/1946	47	71	16	SENW	BETTY MAE HETTINGER	SCHNEIDER #3	UNA	STO	7.5	300
P7291P	12/31/1942	47	71	16	SWSW	CPT. DELBERT W. FOOTE** FRANK P. SCHNEIDER TRUST B	SCHNEIDER #4	UNA	STO	7.5	130
P84216W	12/28/1990	47	71	16	SWSW	DCD INC.** WYO BOARD OF LAND COMMISSIONERS	STATE #13-16	GST	MIS, DEW, CBM	0	340
P90939W	02/08/1993	47	71	16	SWNE	STATE BOARD LAND COMMISSIONERS** DCD, INC.	STATE #7-16	GST	MIS, DEW, CBM	0	268
P90940W	02/08/1993	47	71	16	NESE	STATE BOARD LAND COMMISSIONERS** DCD, INC.	STATE #9-16	GST	MIS, DEW, CBM	0	319
P90941W	02/08/1993	47	71	16	NESW	STATE BOARD LAND COMMISSIONERS** DCD, INC.	STATE #11-16	GST	MIS, DEW, CBM	0	344
P90942W	02/08/1993	47	71	16	NWSW	STATE BOARD LAND COMMISSIONERS** DCD, INC.	STATE #12-16	GST	MIS, DEW, CBM	0	368
P90943W	02/08/1993	47	71	16	SESW	STATE BOARD LAND COMMISSIONERS** DCD, INC.	STATE #14-16	GST	MIS, DEW, CBM	0	300
P90944W	02/08/1993	47	71	16	SESE	STATE BOARD LAND COMMISSIONERS** DCD, INC.	STATE #16-16	GST	MIS, DEW, CBM	0	280
P112458W	10/30/1998	47	71	17	NWNW	BOWDEN ENERGY COMPANY	MU #11-17	GST	CBM	5	413
P112494W	11/03/1998	47	71	17	SWNW	BOWDEN ENERGY COMPANY	MU #12-17	GST	CBM	1	431
P112496W	11/03/1998	47	71	17	SESE	BOWDEN ENERGY COMPANY	MU #44-17	GST	CBM	1	341
P112497W	11/03/1998	47	71	17	SWSE	BOWDEN ENERGY COMPANY	MU #34-17	GST	CBM	0.5	357
P112498W	11/03/1998	47	71	17	NESW	BOWDEN ENERGY COMPANY	MU #23-17	GST	CBM	1	403

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P112499W	11/03/1998	47	71	17	NWSW	BOWDEN ENERGY COMPANY	MU #13-17	GST	CBM	3	454
P112500W	11/03/1998	47	71	17	NWSW	BOWDEN ENERGY COMPANY	MU #22-17	GST	CBM	0.4	423
P18700P	12/31/1940	47	71	17	SESE	GLENN HAYDEN	LAKE #6	PUW	STO	5	220
P18701P	12/31/1938	47	71	17	NESW	GLENN HAYDEN	ROYAL #7	PUW	STO	5	140
P105549W	04/14/1997	47	71	18	NWSE	LANCE OIL & GAS COMPANY, INC	HAYDEN #18-33	GST	CBM	25	409
P112459W	10/30/1998	47	71	18	SENE	BOWDEN ENERGY COMPANY	MU #42-18	GST	CBM	1	428
P112460W	10/30/1998	47	71	18	NENE	BOWDEN ENERGY COMPANY	MU #41-18	GST	CBM	1	393
P116720W	06/28/1999	47	71	18	SESW	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN DUVALL 18N WELL	GST	CBM	40	358
P133820W	04/06/2001	47	71	18	NWNW	RMG I, LLC	DUNLAP 18-11-47-71-A	GST	CBM		371
P133821W	04/06/2001	47	71	18	SWNW	RMG I, LLC	DUNLAP 18-12-47-71-A	GST	CBM		373
P133822W	04/06/2001	47	71	18	NENW	RMG I, LLC	DUNLAP 18-21-47-71-A	GST	CBM		375
P133823W	04/06/2001	47	71	18	SENW	RMG I, LLC	DUNLAP 18-22-47-71-A	GST	CBM		381
P136843W	07/03/2001	47	71	18	SWNW	RMG I, LLC	DUNLAP 18-12-B	GST	CBM		1253
P136845W	07/03/2001	47	71	18	SENW	RMG I, LLC	DUNLAP 18-22-B	GST	CBM		1230
P105551W	04/14/1997	47	71	19	NWSE	LANCE OIL & GAS COMPANY, INC	DUVALL #19-33	GST	CBM	25	276
P105552W	04/14/1997	47	71	19	NESE	LANCE OIL & GAS COMPANY, INC	DUVALL #19-43	GST	CBM	25	371
P106903W	07/24/1997	47	71	19	SESW	LANCE OIL & GAS COMPANY, INC	FEDERAL #719-24	GST	CBM	0	377
P106905W	07/24/1997	47	71	19	SWSE	LANCE OIL & GAS COMPANY, INC	FEDERAL #719-34	GST	CBM	0	367
P106906W	07/24/1997	47	71	19	SENE	LANCE OIL & GAS COMPANY, INC	FEDERAL #719-42	GST	CBM	0	412
P106907W	07/24/1997	47	71	19	SESE	LANCE OIL & GAS COMPANY, INC	FEDERAL #719-44	GST	CBM	0	382
P116725W	06/28/1999	47	71	19	SENW	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN MANKIN 19F WELL	GST	CBM	40	363
P22589P	02/07/1973	47	71	19	SWNE	KENNETH R. DUVALL	KEN DUVALL #3	PUW	STO	4	84
P22590P	02/07/1973	47	71	20	SWNW	KENNETH R. DUVALL	KEN DUVALL #4	PUW	STO	5	208
P55070W	10/08/1980	47	71	20	NENW	BOWDEN ENERGY COMPANY	DUVALL 1 20	GST	IND	181	4650
P72898W	07/16/1986	47	71	20	SWNW	KENNITH R. DURALL	KEN DUVALL V	PUW	STO	25	895
P74336W	04/06/1987	47	71	20	SWSW	CNG PRODUCING COMPANY	ENL PIPER #1	PU	MIS	75	
P104460W	11/04/1996	47	71	21	SWNE	PURE PETROLEUM	USA 7-21	GST	CBM	0	357
P7288P	09/21/1930	47	71	22	NWSW	FRANK P. SCHNEIDER TRUST B	SCHNEIDER #1	PUW	DOM	7.5	25
P7292P	08/31/1957	47	71	23	NWSE	FRANK P. SCHNEIDER TRUST B	SCHNEIDER #5	PUW	STO	7.5	140
P18726P	04/30/1953	47	71	25	SWNW	MILO HAIGHT	HOME #1	PUW	DOM, STO	4	120
P7293P	12/31/1939	47	71	25	NWNW	FRANK P. SCHNEIDER TRUST B.	SCHNEIDER #6	PUW	STO	7.5	60
P95999W	06/23/1994	47	71	26	SWNE	ST. MARY OPERATING CO	SWBH UNIT WSW #1	UNA	IND	45	1750
P7289P	12/21/1942	47	71	27	NESW	FRANK P. SCHNEIDER TRUST B	SCHNEIDER #2	PUW	STO	5	270
P18695P	12/31/1925	47	71	28	NESE	GLENN HAYDEN	HOME #1	PUW	DOM, STO	10	140
P106612W	07/01/1997	47	71	29	SWSW	LANCE OIL & GAS COMPANY, INC	LH #14-29	GST	CBM	6	368
P107179W	08/18/1997	47	71	29	SWNW	LANCE OIL & GAS COMPANY, INC	GARRETT #29-12	GST	CBM	3.5	449
P107180W	08/18/1997	47	71	29	SENW	LANCE OIL & GAS COMPANY, INC	GARRETT #29-22	GST	CBM	0	459
P109078W	02/17/1998	47	71	29	NWNW	LANCE OIL & GAS COMPANY, INC	GARRETT 29-11 R	GST	CBM, STO	4	463
P109079W	02/17/1998	47	71	29	NESE	LANCE OIL & GAS COMPANY, INC	GARRETT 29-43	GST	CBM, STO	0	477
P18717P	06/30/1945	47	71	29	SENW	MACSY HAIGHT**TESS GARRETT	STRAATSMA #1	PUW	STO	7.5	135
P18718P	12/31/1945	47	71	29	NENW	MACSY HAIGHT**TESS GARRETT	FLOWING #1	PUW	STO	25	40
P18727P	12/31/1946	47	71	30	SWNE	MACSY HAIGHT**TESS GARRETT	SIMMS #1	PUW	STO	7.5	100
P102861W	07/02/1996	47	71	31	NWSW	CITATION OIL AND GAS CORP	STOCK #13-31	UNA	CBM, STO	5	437

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P102862W	07/02/1996	47	71	31	NWNW	CITATION OIL AND GAS CORP	STOCK #11-31	UNA	CBM,STO	0	410
P102863W	07/02/1996	47	71	31	SENW	CITATION OIL AND GAS CORP	STOCK #22-31	UNA	STO, MIS, CBM	0	400
P102864W	07/02/1996	47	71	31	SESW	CITATION OIL AND GAS CORP	STOCK #24-31	UNA	CBM, STO	7	402
P104242W	10/18/1996	47	71	31	NWSE	CITATION OIL AND GAS CORP	STOCK 33-31	UNA	CBM, STO	0	377
P104243W	10/18/1996	47	71	31	SENE	CITATION OIL AND GAS CORP	STOCK 42-31	UNA	CBM, STO	0	308
P104244W	10/18/1996	47	71	31	SESE	CITATION OIL AND GAS CORP	STOCK 44-31	UNA	CBM, STO	0	359
P106500W	06/24/1997	47	71	31	NWNE	CITATION OIL & GAS CORP.	MACSY CG #31-31	GST	CBM	5	351
P45634W	10/13/1978	47	71	31	NWSW	MILO HAIGHT	MILO HAIGHT #1	PUW	STO	20	430
P88919W	07/16/1992	47	71	31	NESE	RAYMOND T. DUNCAN	HAIGHT 5-31	UNA	IND	31	4721
P106321W	06/16/1997	47	71	32	SESE	CITATION OIL AND GAS CORP	KEIDEL 44-32	UNA	CBM, STO	0	321
P106515W	06/23/1997	47	71	32	NWSE	CITATION OIL AND GAS CORP	KEIDEL 33-32	UNA	CBM, STO	0	297
P107181W	08/18/1997	47	71	32	NENW	LANCE OIL & GAS COMPANY, INC	GARRETT #32-21	GST	CBM	0	334
P107182W	08/18/1997	47	71	32	NWNE	LANCE OIL & GAS COMPANY, INC	GARRETT #32-31	GST	CBM	0	353
P107183W	08/18/1997	47	71	33	NWNW	LANCE OIL & GAS COMPANY, INC	GARRETT #33-11	GST	CBM	0	360
P108043W	11/04/1997	47	71	33	SENW	LANCE OIL & GAS COMPANY, INC	SMW 22-33	GST	CBM	2	327
P108044W	11/04/1997	47	71	33	SENE	LANCE OIL & GAS COMPANY, INC	SML 42-33	GST	CBM	5	319
P108045W	11/04/1997	47	71	33	NWNE	LANCE OIL & GAS COMPANY, INC	SMH 31-33	GST	CBM	6	306
P108046W	11/04/1997	47	71	33	NENE	LANCE OIL & GAS COMPANY, INC	SMM 41-33	GST	CBM	7	282
P18696P	12/31/1919	47	71	33	SESE	GLENN HAYDEN	HARRIS #2	PUW	DOM, STO	5	35
P27535W	07/31/1974	47	71	33	NENE	MACSY HAIGHT**TESS GARRETT	ANNS #1	PUW	STO	10	500
P30959W	08/19/1975	47	71	33	NENE	MACSY HAIGHT**TESS GARRETT	ENL ANN'S #1	PUW	TEM, IND, DRI	25	500
P33978W	06/17/1976	47	71	33	SENE	DALE HETTINGER	HETTINGER #1	PUW	MIS, DOM	25	623
P98612W	03/20/1995	47	71	33	NESW	LANCE OIL & GAS COMPANY, INC	HAIGHT #33-23	GST	STO, MIS, CBM	25	305
P98614W	03/20/1995	47	71	33	NWSE	LANCE OIL & GAS COMPANY, INC	HAIGHT #33-33	GST	CBM, STO	25	288
P98615W	03/20/1995	47	71	33	SWSE	LANCE OIL & GAS COMPANY, INC	HAIGHT #33-34	GST	CBM, STO	25	293
P18697P	12/31/1939	47	71	34	NENE	GLENN HAYDEN	BAKKER #3	PUW	STO	5	130
P18698P	12/31/1950	47	71	34	SWSE	GLENN HAYDEN	MC VAY 4	PUW	STO	5	270
P18699P	12/31/1945	47	71	34	SWNW	GLENN HAYDEN	BAKKER #5	PUW	STO	5	85
P51029W	02/04/1980	47	71	34	SWSE	COTTON PETROLEUM CORPORATION	21 24 WSW	PU	IND	200	
P130321W	10/16/2000	47	72	1	NWSE	RMG I, LLC	DUNLAP 1-33-47-72A	GST	CBM	25	373
P130322W	10/16/2000	47	72	1	SWSE	RMG I, LLC	DUNLAP 1-34-47-72A	GST	CBM	25	366
P130323W	10/16/2000	47	72	1	NESE	RMG I, LLC	DUNLAP 1-43-47-72-A	UNA	CBM	25	350
P130324W	10/16/2000	47	72	1	SESE	RMG I, LLC	DUNLAP 1-44-47-72-A	GST	CBM	25	368
P130384W	10/25/1999	47	72	1	SENW	RMG I, LLC	ENL MORGAN #1-22	GST	CBM, STO		354

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P130385W	10/25/1999	47	72	1	SENW	RMG I, LLC	ENL MORGAN #1-24	GST	CBM, STO		399
P130689W	11/03/2000	47	72	1	SWSW	RMG I, LLC	RAG 1-14-47-72-A	GST	CBM	25	420
P130690W	11/03/2000	47	72	1	NENW	RMG I, LLC	RAG 1- 21 - 47 -72 - A	GST	CBM	25	347
P132109W	12/29/2000	47	72	1	SWSW	HI-PRO PRODUCTION L.L.C.	ENL R.A.G. 1-14-47-72-A	UNA	CBM		
P132110W	12/29/2000	47	72	1	NENW	RMG I, LLC	ENL R.A.G. 1-21-47-72-A	UNA	CBM		
P132149W	12/29/2000	47	72	1	SWSE	RMG I, LLC	ENL DUNLAP 1-34-47-72 - A	UNA	CBM		
P132150W	12/29/2000	47	72	1	NWSE	RMG I, LLC	ENL DUNLAP 1-33-47-72 - A	UNA	CBM		
P133780W	04/06/2001	47	72	1	NESE	RMG I, LLC	ENL. DUNLAP 1-43-47-72-A	GST	CBM	0	350
P133781W	04/06/2001	47	72	1	SESE	RMG I, LLC	ENL. DUNLAP 1-44-47-72-A	UNA	CBM		
P133804W	04/06/2001	47	72	1	NWSW	RMG I, LLC	ENL. MORGAN 1-13	UNA	CBM		383
P133825W	04/06/2001	47	72	1	NESW	RMG I, LLC	RAG 1-23-47-72-A	GST	CBM		376
P60492W	05/03/1982	47	72	1	SWNW	WYOMING STATE HIGHWAY DEPARTMENT	CABALLO #2	PUW	MON	0	300
39/2/265W	08/31/2006	47	72	2	NWNE	WINDSOR ENERGY GROUP LLC	FEDERAL #2-31	UNA	MIS, CBM		
P104203W	03/01/1996	47	72	2	NWNE	TORCH OPERATING CO	ENL FEDERAL #2-31	UNA	MIS, STO, CBM	5	360.5
P125281W	05/01/2000	47	72	2	SWNE	JM HUBER CORPORATION	FEDERAL 2-32	GST	CBM, STO	25	414
P125282W	05/01/2000	47	72	2	NENE	JM HUBER CORPORATION	FEDERAL 2-41	GST	CBM, STO	25	415
P125283W	05/01/2000	47	72	2	SENE	JM HUBER CORPORATION	FEDERAL 2-42	GST	CBM, STO	25	352
P125372W	05/09/2000	47	72	2	SENW	NORTH FINN, LLC	OXBOW #22-2	GST	CBM	25	422
P81886W	02/27/1990	47	72	2	NENW	PRESIDIO EXPLORATION INC** LYNDE TRUST	LYNDE 1 2 WSW	UNA	IND	25	4570
P90656W	01/19/1993	47	72	2	NWNW	MARTENS & PECK OPERATING CO.	MON #2-11-C	UNA	MON	0	410
P90657W	01/19/1993	47	72	2	NWNW	MARTENS & PECK OPERATING CO.	MON #2-11-S	UNA	MON	0	310
P90658W	01/19/1993	47	72	2	NWNW	MARTENS & PECK OPERATING CO.	MON #22-42-C	UNA	MON	0	515.5
39/1/266W	08/31/2006	47	72	3	SWNW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #3-12	UNA	MIS, CBM		
39/10/264W	08/31/2006	47	72	3	SENE	WINDSOR ENERGY GROUP LLC	FEDERAL #3-42	UNA	MIS, CBM		
39/6/265W	08/31/2006	47	72	3	SWNE	WINDSOR ENERGY GROUP LLC	FEDERAL #3-32	UNA	MIS, CBM		
P104256W	03/25/1996	47	72	3	SENE	TORCH OPERATING CO	ENL FEDERAL #3-42	UNA	MIS, STO, CBM	15	414
P124813W	04/13/2000	47	72	3	NWNW	JM HUBER CORPORATION	LYNDE TRUST 3-11	GST	CBM, STO	25	478
P125284W	05/01/2000	47	72	3	NWNE	JM HUBER CORPORATION	FEDERAL 3-31	GST	CBM, STO	25	473
P125284W	05/01/2000	47	72	3	SENE	JM HUBER CORPORATION	FEDERAL 3-31	GST	CBM, STO	25	473
P125371W	05/09/2000	47	72	3	NENE	NORTH FINN, LLC	OXBOW #41-3	GST	CBM	25	474
P131128W	11/20/2000	47	72	3	SENW	CONOCO PHILLIPS COMPANY	FEDERAL 3-22-47-72	GST	CBM		463
P131129W	11/20/2000	47	72	3	NESE	CONOCO PHILLIPS COMPANY	FEDERAL 3-43-47-72	GST	CBM		439
P131145W	11/20/2000	47	72	3	SWSE	CONOCO PHILLIPS COMPANY	FEDERAL 3-34-47-72	GST	CBM		473
P131168W	11/20/2000	47	72	3	NENW	CONOCO PHILLIPS COMPANY	FEDERAL 3-21-47-72	GST	CBM		469
P131169W	11/20/2000	47	72	3	NWSE	CONOCO PHILLIPS COMPANY	FEDERAL 3-33R-47-72	GST	CBM		440
39/7/267W	08/31/2006	47	72	4	NESW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #4-23	UNA	MIS, CBM		

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
39/8/267W	08/31/2006	47	72	4	SWSE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #4-33	UNA	MIS, CBM		
39/9/267W	08/31/2006	47	72	4	NESE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #4-43	UNA	MIS, CBM		
P104258W	03/25/1996	47	72	4	NESW	TORCH OPERATING CO	ENL LYNDE TRUST #4-23	UNA	MIS, STO, CBM	7	536
P104259W	03/25/1996	47	72	4	NESE	TORCH OPERATING CO	ENL LYNDE TRUST #4-43	UNA	MIS, STO, CBM	5	501
P121593W	01/03/2000	47	72	4	SESW	JM HUBER CORPORATION	LYNDE TRUST 4-24	GST	CBM, STO	25	563
P121594W	01/03/2000	47	72	4	SESE	JM HUBER CORPORATION	LYNDE TRUST 4-44	GST	CBM, STO	25	569
P131120W	11/20/2000	47	72	4	NENE	PENNACO ENERGY, INC.	FEDERAL 4-41-47-72	GST	CBM		510
P131142W	11/20/2000	47	72	4	SWSE	CONOCO PHILLIPS COMPANY	FEDERAL 4-34-47-72	GST	CBM		597
39/2/275W	09/07/2006	47	72	9	NENE	HERBERT A. & TONYA D. REYNOLDS	REYNOLDS 1	UNA	DOM		
P106919W	07/25/1997	47	72	9	SENW	LANCE OIL & GAS COMPANY, INC	CARTER #9-22	GST	CBM	10	646
P106920W	07/25/1997	47	72	9	SWNE	LANCE OIL & GAS COMPANY, INC	CARTER #9-32	GST	CBM	22	601
P106921W	07/25/1997	47	72	9	SENE	LANCE OIL & GAS COMPANY, INC	CARTER #9-42	GST	CBM	27	591
P106922W	07/25/1997	47	72	9	SESE	LANCE OIL & GAS COMPANY, INC	CARTER #9-44	GST	CBM	18.5	585
P106923W	07/25/1997	47	72	9	NESE	LANCE OIL & GAS COMPANY, INC	CARTER #9-43R	GST	CBM	6	620
P109620W	04/10/1998	47	72	9	SWSW	LANCE OIL & GAS COMPANY, INC	CARTER 9-14	GST	CBM	35	675
P131125W	11/20/2000	47	72	9	NWNW	CONOCO PHILLIPS COMPANY	FEDERAL 09-11-47-72	GST	CBM		661
P131154W	11/20/2000	47	72	9	NWNE	CONOCO PHILLIPS COMPANY	FEDERAL 09-31-47-72	GST	CBM		629
P131155W	11/20/2000	47	72	9	NENW	CONOCO PHILLIPS COMPANY	FEDERAL 09-21-47-72	GST	CBM		635
P131156W	11/20/2000	47	72	9	NENE	CONOCO PHILLIPS COMPANY	FEDERAL 09-41-47-72	GST	CBM		609
P32840W	04/12/1976	47	72	9	SENW	EDNA L. CARTER	EDNA #2	PUW	DOM, STO	25	400
P32841W	04/12/1976	47	72	9	NESW	EDNA L. CARTER	EDNA #1	PUW	STO	15	150
P45813W	11/08/1978	47	72	9	NWSE	EDNA L. CARTER	FLOYD #1	PU	STO	2	270
P52263W	05/27/1980	47	72	9	SENW	EDNA L. CARTER	FLOYD #2	PUW	DOM, STO	15	354
P58851W	11/10/1981	47	72	9	NESW	EDNA L. CARTER	ENL EDNA #1	PUW	STO, MIS	10	150
P73225W	08/25/1986	47	72	9	NESW	WESSELY ENERGY COMPANY	ENL EDNA CARTER WATER WELL #1	PUW	MIS	10	
P73316W	09/09/1986	47	72	9	NWSE	EDNA L. CARTER	JOHN #1	PUW	DOM, STO	20	612
39/1/371W	10/24/2006	47	72	10	NWNW	LORAL OPERATING, LLC	11-OCT	UNA	CBM		
39/1/485W	01/09/2007	47	72	10	SWSE	LORAL OPERATING, LLC	OCT-34	UNA	CBM		
39/10/484W	01/09/2007	47	72	10	SESW	LORAL OPERATING, LLC	24-OCT	UNA	CBM		
39/2/371W	10/24/2006	47	72	10	NENW	LORAL OPERATING, LLC	21-OCT	UNA	CBM		
39/2/485W	01/09/2007	47	72	10	NESE	LORAL OPERATING, LLC	OCT-43	UNA	CBM		
39/3/267W	08/31/2006	47	72	10	NWSW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #10-13	UNA	MIS, CBM		
39/3/371W	10/24/2006	47	72	10	NWNE	LORAL OPERATING, LLC	31-OCT	UNA	CBM		
39/3/485W	01/09/2007	47	72	10	SESE	LORAL OPERATING, LLC	OCT-44	UNA	CBM		
39/4/267W	08/31/2006	47	72	10	NESW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #10-23	UNA	MIS, CBM		
39/4/371W	10/24/2006	47	72	10	NENE	LORAL OPERATING, LLC	OCT-41	UNA	CBM		
39/5/371W	10/24/2006	47	72	10	SENE	LORAL OPERATING, LLC	OCT-42	UNA	CBM		

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
39/7/555W	02/23/2007	47	72	10	SENW	LORAL OPERATING, LLC	22-OCT	UNA	CBM		
39/8/555W	02/23/2007	47	72	10	SWNE	LORAL OPERATING, LLC	OCT-32	UNA	CBM		
39/9/555W	02/23/2007	47	72	10	NWSE	LORAL OPERATING, LLC	OCT-33	UNA	CBM		
P104932W	01/27/1997	47	72	10	NWNW	MTG OPERATING	HOE CREEK 10-11	UNA	STO, MIS, CBM	25	599
P104933W	01/27/1997	47	72	10	NENW	MTG OPERATING	HOE CREEK 10-21	UNA	STO, MIS, CBM	25	581
P104934W	01/27/1997	47	72	10	NWNE	MTG OPERATING	HOE CREEK 10-31	UNA	STO, MIS, CBM	25	533.5
P104935W	01/27/1997	47	72	10	NENE	MTG OPERATING	HOE CREEK 10-41	UNA	STO, MIS, CBM	25	476
P104936W	01/27/1997	47	72	10	SENE	MTG OPERATING	HOE CREEK 10-42	UNA	STO, MIS, CBM	25	536
P104937W	01/27/1997	47	72	10	NESE	MTG OPERATING	HOE CREEK 10-43	UNA	STO, MIS, CBM	25	544
P106924W	07/25/1997	47	72	10	SWNW	LANCE OIL & GAS COMPANY, INC	CARTER #10-12	GST	CBM	21.2	610
P112744W	11/05/1998	47	72	10	SENW	MTG OPERATING COMPANY	HOE CREEK 10-22	UNA	CBM, STO	25	577.5
P112745W	11/05/1998	47	72	10	SESW	MTG OPERATING	HOE CREEK 10-24	UNA	CBM, STO	2	585
P112746W	11/05/1998	47	72	10	SWNE	MTG OPERATING COMPANY	HOE CREEK 10-32	UNA	CBM, STO	25	572
P112747W	11/05/1998	47	72	10	NWSE	MTG OPERATING	HOE CREEK 10-33	UNA	CBM, STO	7.5	564
P112748W	11/05/1998	47	72	10	SWSE	MTG OPERATING	HOE CREEK 10-34	UNA	CBM, STO	25	
P112749W	11/05/1998	47	72	10	SESE	MTG OPERATING	HOE CREEK 10-44	UNA	CBM, STO	25	564
P124814W	04/13/2000	47	72	10	SWSW	JM HUBER CORPORATION	LYNDE TRUST 10-14	GST	CBM, STO	25	584
P99049W	04/21/1995	47	72	10	NWSE	TORCH OPERATING COMPANY	LYNDE TRUST #10-33	UNA	STO, MIS, CBM	25	
39/4/268W	08/31/2006	47	72	11	SENW	WINDSOR ENERGY GROUP LLC	MORGAN #11-22	UNA	MIS, CBM		
39/4/485W	01/09/2007	47	72	11	NWSW	LORAL OPERATING, LLC	13-NOV	UNA	CBM		
39/5/268W	08/31/2006	47	72	11	NWSE	WINDSOR ENERGY GROUP LLC	MORGAN #11-33	UNA	MIS, CBM		
39/6/371W	10/24/2006	47	72	11	NWNW	LORAL OPERATING, LLC		UNA	CBM		
39/7/371W	10/24/2006	47	72	11	SWNW	LORAL OPERATING, LLC		UNA	CBM		
39/8/282W	09/12/2006	47	72	11	NESW	WINDSOR ENERGY GROUP LLC	MORGAN #11-23	UNA	MIS, CBM		
P104214W	03/18/1996	47	72	11	SENW	TORCH OPERATING CO	ENL MORGAN #11-22	UNA	MIS, STO, CBM	8	416

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P104215W	03/18/1996	47	72	11	SENW	TORCH OPERATING CO	ENL MORGAN #11-33	UNA	MIS, STO, CBM	10	466
P104262W	03/25/1996	47	72	11	SENW	TORCH OPERATING CO	ENL MORGAN #11-23	UNA	MIS, STO, CBM	5	475
P112750W	11/05/1998	47	72	11	NWNW	MTG OPERATING	HOE CREEK 11-11		CBM, STO	25	438
P112751W	11/05/1998	47	72	11	SWNW	MTG OPERATING	HOE CREEK 11-12		CBM, STO	25	452
P116709W	06/28/1999	47	72	11	NENE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN AMAX #11A WELL	UNA	CBM	40	
P116712W	06/28/1999	47	72	11	SWNE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN AMAX 11G WELL	UNA	CBM	40	
P116713W	06/28/1999	47	72	11	SENE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN AMAX 11H WELL	UNA	CBM	40	
P125280W	05/01/2000	47	72	11	SWSE	JM HUBER CORPORATION	FEDERAL 11-34	GST	CBM, STO	25	537
P128683W	09/05/2000	47	72	11	NENW	J.M. HUBER CORPORATION	HUBER/RAG 11-21	GST	CBM	30	459
P131962W	01/10/2001	47	72	11	SESE	J.M.HUBER CORPORATION	RAG FEDERAL 11-44-47-72	GST	CBM, STO		492
P1844W	05/03/1966	47	72	11	NWNE	ALFREDA DEAVER MORGAN	CABALLO #1	PUW	STO, IRR	1000	
P87749W	02/26/1991	47	72	11	SWNW	I.W. & WINNIE E. LYNDE	LYNDE #11	UNA	STO	25	1200
P115082W	04/05/1999	47	72	12	NWSW	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) CABALLO ROJO #12L WELL	GST	CBM	40	438
P115083W	04/05/1999	47	72	12	SWSW	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) CABALLO ROJO #12M WELL	GST	CBM	40	463
P116698W	06/28/1999	47	72	12	NWNE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN CABALLO ROJO 12B WELL	GST	CBM	40	387
P116699W	06/28/1999	47	72	12	SWNE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN CABALLO ROJO 12G WELL	GST	CBM	40	388
P130692W	11/03/2000	47	72	12	SWNW	RMG I, LLC	RAG 12 - 12 - A	GST	CBM	25	421
P130693W	11/03/2000	47	72	12	NENW	RMG I, LLC	RAG 12 - 21 - A	GST	CBM	25	401
P130694W	11/03/2000	47	72	12	SENW	RMG I, LLC	RAG 12 - 22 - A	GST	CBM	25	421
P130695W	11/03/2000	47	72	12	NESE	RMG I, LLC	RAG 12 - 43 - A	GST	CBM	25	398
P131778W	12/29/2000	47	72	12	SWSE	RMG I, LLC	RAG 12 - 34 - 47 - 72 - A	GST	CBM		403
P131782W	12/29/2000	47	72	12	SESE	RMG I, LLC	RAG 12-44-47-72-A	GST	CBM		366
P132124W	12/29/2000	47	72	12	SWNW	RMG I, LLC	ENL R.A.G. 12-12--A	UNA	CBM		
P132125W	12/29/2000	47	72	12	NENW	RMG I, LLC	ENL R.A.G. 12-21--A	UNA	CBM		
P132126W	12/29/2000	47	72	12	SENW	RMG I, LLC	ENL R.A.G. 12-22--A	UNA	CBM		
P132127W	12/29/2000	47	72	12	NESE	RMG I, LLC	ENL R.A.G. 12-43--A	UNA	CBM		
P133805W	04/06/2001	47	72	12	NWNW	RMG I, LLC	ENL. MORGAN 12-11	UNA	CBM		411
P133806W	04/06/2001	47	72	12	NWSE	RMG I, LLC	ENL. BREEN 12-33	UNA	CBM		383.5
P115086W	04/05/1999	47	72	13	NWNE	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13B WELL	GST	CBM	40	383
P115088W	04/05/1999	47	72	13	NWNW	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13D WELL	GST	CBM	40	488
P115089W	04/05/1999	47	72	13	SWNW	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13E WELL	GST	CBM	40	484
P115091W	04/05/1999	47	72	13	SWNE	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13G WELL	GST	CBM	40	404

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P115094W	04/05/1999	47	72	13	NWSE	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13J WELL	GST	CBM	40	433
P115096W	04/05/1999	47	72	13	SWNW	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13L WELL	GST	CBM	40	533
P115097W	04/05/1999	47	72	13	SWSE	JN EXPLORATION & PRODUCTION LIMITED PARTNERSHIP	(JN) DUVALL #13O WELL	GST	CBM	40	478
P133915W	04/09/2001	47	72	13	NWSE	PEABODY NATURAL GAS, LLC	PNG DUVALL 13J-D WELL	GST	CBM		1367
P133916W	04/09/2001	47	72	13	NESW	PEABODY NATURAL GAS, LLC	PNG DUVALL 13K-D WELL	GST	CBM		1394
P22587P	02/07/1973	47	72	13	SESE	KENNETH R. DUVALL	KEN DUVALL #1	PUW	DOM, STO	25	209
39/5/267W	08/31/2006	47	72	14	NENW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #14-21	UNA	MIS, CBM		
39/6/267W	08/31/2006	47	72	14	SENW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #14-22	UNA	MIS, CBM		
40/10/108W	05/02/2007	47	72	14	SENE	LORAL OPERATING, LLC	14-42	UNA	CBM		
40/5/108W	05/02/2007	47	72	14	NWNW	LORAL OPERATING, LLC	14-11	UNA	CBM		
40/6/108W	05/02/2007	47	72	14	SWNW	LORAL OPERATING, LLC	14-12	UNA	CBM		
40/7/108W	05/02/2007	47	72	14	NWNE	LORAL OPERATING, LLC	14-31	UNA	CBM		
40/8/108W	05/02/2007	47	72	14	SWNE	LORAL OPERATING, LLC	14-32	UNA	CBM		
40/9/108W	05/02/2007	47	72	14	NENE	LORAL OPERATING, LLC	14-41	UNA	CBM		
P104075W	09/16/1996	47	72	14	SENE	JN EXPLORATION/PRODUCTION	BREEN UNIT 42X-14 WSW	UNA	IND	37	1220
P104210W	03/18/1996	47	72	14	NENW	TORCH OPERATING CO	ENL LYNDE TRUST #14-21	UNA	MIS, STO, CBM	17	542
P104211W	03/01/1996	47	72	14	NENW	TORCH OPERATING CO	ENL LYNDE TRUST #14-22	UNA	MIS, STO, CBM	15	552
P112754W	11/05/1998	47	72	14	SWNW	MTG OPERATING COMPANY	HOE CREEK 14-12	GST	CBM, STO	25	585
P116714W	06/28/1999	47	72	14	NESE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN BELL 14I WELL	GST	CBM	40	579
P116715W	06/28/1999	47	72	14	NWSE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN BELL 14J WELL	GST	CBM	40	589
P116716W	06/28/1999	47	72	14	SWSE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN BELL 14O WELL	GST	CBM	40	644
P116717W	06/28/1999	47	72	14	SESE	JN EXPLORATION/PRODUCTION LIMITED PARTNERSHIP	JN BELL 14P WELL	GST	CBM	40	598
P90810W	01/19/1993	47	72	14	SWNE	MARTENS & PECK OPERATING CO.	LYNDE TRUST #14-32	UNA	STO, MIS, CBM	25	
P96782W	08/03/1994	47	72	14	SESW	LANCE OIL & GAS COMPANY, INC	MANKIN #14-24	GST	CBM, STO	25	623
P97258W	08/19/1994	47	72	14	SWSW	LANCE OIL & GAS COMPANY, INC	MANKIN #14-14	GST	CBM, STO	25	631
P97263W	08/19/1994	47	72	14	NENW	MARTENS & PECK OPERATING CO.	STATE #636-12	UNA	STO, MIS, CBM	25	
39/10/265W	08/31/2006	47	72	15	NENE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #15-41	UNA	MIS, CBM		
40/1/91W	04/25/2007	47	72	15	NWNE	LORAL OPERATING, LLC	15-31	UNA	CBM		
40/10/90W	04/25/2007	47	72	15	SENW	LORAL OPERATING, LLC	15-22	UNA	CBM		
40/2/91W	04/25/2007	47	72	15	SWNE	LORAL OPERATING, LLC	15-32	UNA	CBM		

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
40/8/90W	04/25/2007	47	72	15	NWNW	LORAL OPERATING, LLC	15-11	UNA	CBM		
40/9/90W	04/25/2007	47	72	15	NENW	LORAL OPERATING, LLC	15-21	UNA	CBM		
P104212W	03/18/1996	47	72	15	NENE	TORCH OPERATING CO	ENL LYNDE TRUST #15-41	UNA	MIS, STO, CBM	8	561
P104523W	11/18/1996	47	72	15	SESW	WESTERN GAS RESOURCES INC	SM-15-24	UNA	MON	0	65
P104929W	01/27/1997	47	72	15	NWNW	MTG OPERATING COMPANY	HOE CREEK 15-11	UNA	CBM, STO	25	
P104930W	01/27/1997	47	72	15	SENW	MTG OPERATING COMPANY	HOE CREEK 15-22	UNA	CBM, STO	4.95	622
P104931W	01/27/1997	47	72	15	NENW	MTG OPERATING COMPANY	HOE CREEK 15-21	UNA	CBM, STO	1.35	610.5
P112757W	11/05/1998	47	72	15	NWNE	MTG OPERATING	HOE CREEK 15-31		CBM, STO	25	573
P112758W	11/05/1998	47	72	15	SWNE	MTG OPERATING	HOE CREEK 15-32		CBM, STO	25	590
P116037W	05/21/1999	47	72	15	NWNW	CITATION OIL & GAS CORP	MESERVE 33-15	UNA	CBM, STO	8.75	652
P116038W	05/21/1999	47	72	15	NWNW	CITATION OIL & GAS CORP	MESERVE 32-15	UNA	CBM, STO	11.5	587
P116039W	05/21/1999	47	72	15	NWNW	CITATION OIL & GAS CORP	MESERVE 34-15	GST	CBM, STO	13	659
P116040W	05/21/1999	47	72	15	NWNW	CITATION OIL & GAS CORP	MESERVE 11-15	UNA	CBM, STO	11	562
P116041W	05/21/1999	47	72	15	NWNW	CITATION OIL & GAS CORP	MESERVE 12-15	UNA	CBM, STO	11	648
P116042W	05/21/1999	47	72	15	NWNW	CITATION OIL & GAS CORP	MESERVE 31-15	UNA	CBM, STO	13	677
P116043W	05/21/1999	47	72	15	NWSW	CITATION OIL & GAS CORP	MESERVE 13-15	UNA	CBM, STO	11	602
P131124W	11/20/2000	47	72	15	SENE	CONOCO PHILLIPS COMPANY	FEDERAL 15-42-47-72	GST	CBM		584
P131189W	11/20/2000	47	72	15	SWNW	CONOCO PHILLIPS COMPANY	FEDERAL 15-12-47-72	GST	CBM		634
P96783W	08/03/1994	47	72	15	NESE	LANCE OIL & GAS COMPANY, INC	HAIGHT #15-43	GST	CBM, STO	25	589
P108074W	11/06/1997	47	72	16	NESW	LANCE OIL & GAS COMPANY, INC	STATE 716-23	GST	CBM	35	690
P108078W	11/06/1997	47	72	16	SWSW	LANCE OIL & GAS COMPANY, INC** WY STATE BOARD OF LAND COMMISSIONERS	STATE 716-14	GST	CBM	28	756
P108080W	11/06/1997	47	72	16	SESW	WY STATE BOARD OF LAND COMMISSIONERS** LANCE OIL & GAS COMPANY, INC	STATE 716-24	GST	CBM	34	720
P109604W	04/10/1998	47	72	16	SENW	LANCE OIL & GAS COMPANY, INC	STATE 22-16	GST	CBM	35	700.75
P109614W	04/10/1998	47	72	16	NENW	WY STATE BOARD OF LAND COMMISSIONERS** LANCE OIL & GAS COMPANY, INC	STATE 21-16	GST	CBM	34	685
P72091W	02/24/1986	47	72	16	NWNE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP W 1	PUW	MON	0	651
P72092W	02/24/1986	47	72	16	NWNW	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP W 2	PU	MON	0	720
P72093W	02/24/1986	47	72	16	NWSE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP W 3	PUW	MON	0	720
P72094W	02/24/1986	47	72	16	NWSE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP W 4	PUW	MON	0	695
P72095W	02/24/1986	47	72	16	SWNE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP W 5	PUW	MON	0	689
P72096W	02/24/1986	47	72	16	NWSE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP W 6	PUW	MON	0	655
P72097W	02/24/1986	47	72	16	NWSE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP S 1	PUW	MON	0	480
P72098W	02/24/1986	47	72	16	NWSE	AMOCO PRODUCTION COMPANY**BRUCE GASH	RED TOP S 2	PUW	MON	0	580
P108081W	11/06/1997	47	72	21	SENW	LANCE OIL & GAS COMPANY, INC	THIELEN 21-22	GST	CBM	30	780
P108249W	11/26/1997	47	72	21	SWNE	LANCE OIL & GAS COMPANY, INC	THIELEN 21-32	GST	CBM	35	771

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P109075W	02/17/1998	47	72	21	SESE	LANCE OIL & GAS COMPANY, INC	FEDERAL 721-44	GST	CBM, STO	10	904
P110400W	06/05/1998	47	72	21	SESW	LANCE OIL & GAS COMPANY, INC	DAVIS FED. 24-21	GST	CBM, STO	20	864
P114554W	03/15/1999	47	72	21	NWSW	LANCE OIL & GAS COMPANY, INC	DAVIS FEDERAL 13-21-4772	GST	CBM, STO	27	837
P131123W	11/20/2000	47	72	21	SENE	CONOCO PHILLIPS COMPANY	FEDERAL 21-33-47-72	GST	CBM		850
P100634W	09/11/1995	47	72	22	SENE	LANCE OIL & GAS COMPANY, INC	PITTMAN #22-42	UNA	CBM, STO	25	660
P101106W	11/21/1995	47	72	22	SWSE	LANCE OIL & GAS COMPANY, INC	FEDERAL #727-41	GST	CBM, STO	25	719
P104522W	11/18/1996	47	72	22	NWSE	WESTERN GAS RESOURCES INC	SM-22-33	UNA	MON	0	89
P108082W	11/06/1997	47	72	22	NESW	LANCE OIL & GAS COMPANY, INC	FEDERAL 722-23	GST	CBM	20.2	744
P109076W	02/17/1998	47	72	22	SESW	LANCE OIL & GAS COMPANY, INC	FEDERAL 722-24	GST	CBM, STO	14	810
P109619W	04/10/1998	47	72	22	NWSW	LANCE OIL & GAS COMPANY, INC	FEDERAL 722-13	GST	CBM	22	770
P18722P	12/31/1947	47	72	22	SWSE	LENA HAIGHT	WEST #1	PUW	STO	7.5	95
P99907W	07/24/1995	47	72	22	NWSE	LANCE OIL & GAS COMPANY, INC	PITTMAN #22-33	GST	CBM, MIS	25	689
P99908W	07/24/1995	47	72	22	NESE	LANCE OIL & GAS COMPANY, INC	PITTMAN #22-43	GST	CBM, MIS	25	663
P99909W	07/24/1995	47	72	22	SESE	LANCE OIL & GAS COMPANY, INC	PITTMAN #22-44	GST	CBM, MIS	25	652
P126658W	06/29/2000	47	72	23	SWNW	EMERALD OPERATING COMPANY	BELL SEELY 12-23	GST	CBM	40	645
P126660W	06/29/2000	47	72	23	SWSW	EMERALD OPERATING COMPANY	HAIGHT 14-23-4772	GST	CBM	40	628
P126666W	06/29/2000	47	72	23	SWSE	EMERALD OPERATING COMPANY	HAIGHT CBM 34-23	GST	CBM	40	680
P131126W	11/20/2000	47	72	23	NWSE	CONOCO PHILLIPS COMPANY	FEDERAL 23-33-47-72	GST	CBM		662
P131127W	11/20/2000	47	72	23	NESW	CONOCO PHILLIPS COMPANY	FEDERAL 23-23-47-72	GST	CBM		642
P68643W	10/04/1984	47	72	23	SESE	MILO AND MACSY HAIGHT	HAIGHT N W #1	PUW	DOM, STO	20	205
P96784W	08/03/1994	47	72	23	NENW	LANCE OIL & GAS COMPANY, INC	MANKIN #23-21	GST	CBM, STO	25	604
P96785W	08/03/1994	47	72	23	SENW	LANCE OIL & GAS COMPANY, INC	MANKIN #23-22	GST	CBM, STO	25	619
P96786W	08/03/1994	47	72	23	SWNE	LANCE OIL & GAS COMPANY, INC	MANKIN #23-32	GST	CBM, STO	25	643
P126669W	06/29/2000	47	72	24	NWSE	EMERALD OPERATING COMPANY	MANKIN 33-24-4772	GST	CBM	40	521
P126670W	06/29/2000	47	72	24	SENE	EMERALD OPERATING COMPANY	MANKIN 42-24-4772	GST	CBM	40	410
P164810W	01/25/2005	47	72	24	SWSW	TERRY & DEBI OISTAD	OISTAD #1	GST	DOM		360
P42169W	02/01/1978	47	72	24	SWSW	ED ADDINGTON	ADDINGTON #1	PUW	MIS	25	
P97260W	08/19/1994	47	72	24	SWNW	LANCE OIL & GAS COMPANY, INC	MANKIN #24-12	GST	CBM, STO	25	608
P97261W	08/19/1994	47	72	24	NESW	LANCE OIL & GAS COMPANY, INC	MANKIN #24-23	GST	CBM, STO	25	572
P97262W	08/19/1994	47	72	24	SESW	LANCE OIL & GAS COMPANY, INC	MANKIN #24-24	GST	CBM, STO	25	553
P97264W	08/19/1994	47	72	24	NWSW	LANCE OIL & GAS COMPANY, INC	MANKIN #24-13	GST	CBM, STO	25	574
P110121W	05/18/1998	47	72	25	SENW	LANCE OIL/GAS COMPANY, INC.	HAIGHT 22-25	GST	CBM, STO	35	1411
P126662W	06/29/2000	47	72	25	NWSW	EMERALD OPERATING COMPANY	HAIGHT CBM 13-25	GST	CBM	40	605
P126663W	06/29/2000	47	72	25	NWNW	EMERALD OPERATING COMPANY	HAIGHT CBM 25-11	GST	CBM	40	598

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P126664W	06/29/2000	47	72	25	NWNE	EMERALD OPERATING COMPANY	HAIGHT CBM 31-25	GST	CBM	40	498
P126665W	06/29/2000	47	72	25	NWSE	EMERALD OPERATING COMPANY	HAIGHT CBM 33-25	GST	CBM	40	540
P126667W	06/29/2000	47	72	25	SENE	EMERALD OPERATING COMPANY	HAIGHT CBM 42-25	GST	CBM	40	494
P126668W	06/29/2000	47	72	25	SESE	EMERALD OPERATING COMPANY	HAIGHT CBM 44-25	GST	CBM	40	494
P126671W	06/29/2000	47	72	25	SENW	EMERALD OPERATING COMPANY	HAIGHT CBM 22X-25	GST	CBM	40	590
P98610W	03/20/1995	47	72	25	NENW	WESTERN GAS RESOURCES INC	HAIGHT #25-21	UNA	STO, MIS, CBM	25	
P98611W	03/20/1995	47	72	25	SENW	WESTERN GAS RESOURCES INC	HAIGHT #25-22	UNA	STO, MIS, CBM	25	
P106278W	06/04/1997	47	72	26	NESW	BARRETT RESOURCES CORPORATION	OSBORN TRUST 12-31	GST	CBM	35	408
P106279W	06/04/1997	47	72	26	NESW	LANCE OIL & GAS COMPANY, INC	FEDERAL #726-23	GST	CBM, MIS	18	689.5
P108024W	10/31/1997	47	72	26	SWSW	TRUE OIL COMPANY	RANDOLF FEDERAL 14-26	UNA	CBM, STO	10	
P108750W	01/30/1998	47	72	26	NWNE	LANCE OIL & GAS COMPANY, INC	HAIGHT 26-31	GST	CBM, STO	7	650
P126661W	06/29/2000	47	72	26	SENE	EMERALD OPERATING COMPANY	HAIGHT 42-26-4772	GST	CBM	40	630
P131176W	11/20/2000	47	72	26	SWSW	USDI, BUREAU OF LAND MANAGEMENT** CONOCO PHILLIPS COMPANY	RANDOLF FEDERAL 14-26-47-72	GST	CBM		865
P18720P	12/31/1935	47	72	26	SENW	LENA HAIGHT	OLD PLACE #1	PUW	STO	25	100
P18721P	06/30/1946	47	72	26	NESW	MILO HAIGHT	RED HILLS #1	PUW	STO	7.5	165
P96787W	08/03/1994	47	72	26	NWNW	LANCE OIL & GAS COMPANY, INC	HAIGHT #26-11	GST	CBM,STO	25	642
P96788W	08/03/1994	47	72	26	SWNW	LANCE OIL & GAS COMPANY, INC	HAIGHT #26-12	GST	CBM, STO	25	681
P96789W	08/03/1994	47	72	26	SENW	LANCE OIL & GAS COMPANY, INC	HAIGHT #26-22	GST	CBM, STO	25	643
P99234W	05/15/1995	47	72	26	NESE	WARREN E & P INC	LESS #9-26	GST	CBM, MIS	35	630
P99235W	05/15/1995	47	72	26	SWSE	WARREN E & P INC	LESS #15-26	GST	CBM, MIS	35	638
P99236W	05/15/1995	47	72	26	SENW	WARREN E & P INC	LESS #10-26	GST	CBM, MIS	35	624
P99237W	05/15/1995	47	72	26	SESE	WARREN E & P INC	LESS #16-26	GST	CBM, MIS	35	612
P99911W	07/24/1995	47	72	26	NENW	LANCE OIL & GAS COMPANY, INC	HAIGHT #26-21	GST	CBM, MIS	25	641.5
P101106W	11/21/1995	47	72	27	NENE	LANCE OIL & GAS COMPANY, INC	FEDERAL #727-41	GST	CBM, STO	25	719
P106280W	06/04/1997	47	72	27	SENE	LANCE OIL & GAS COMPANY, INC	FEDERAL #727-42	GST	CBM	35	746
P109594W	04/10/1998	47	72	27	NENW	LANCE OIL & GAS COMPANY, INC	FEDERAL 727-21	GST	CBM	10	785
P109621W	04/10/1998	47	72	27	NWNW	LANCE OIL & GAS COMPANY, INC	FEDERAL 727-11	GST	CBM	19	827
P115438W	04/23/1999	47	72	27	NWSW	PHILLIPS PETROLEUM COMPANY	RANDOLF FED. CBM #13-27	UNA	CBM	25	
P115439W	04/23/1999	47	72	27	SWSW	PHILLIPS PETROLEUM COMPANY	RANDOLF FED. CBM #14-27	UNA	CBM	25	
P115441W	04/23/1999	47	72	27	SESW	PHILLIPS PETROLEUM COMPANY	RANDOLF FED. CBM #24-27	UNA	CBM	25	
P115442W	04/23/1999	47	72	27	NWSE	PHILLIPS PETROLEUM COMPANY	RANDOLF FED. CBM #33-27	UNA	CBM	25	
P115443W	04/23/1999	47	72	27	SWSE	PHILLIPS PETROLEUM COMPANY	RANDOLF FED. CBM #34-27	UNA	CBM	25	
P131170W	11/20/2000	47	72	27	NESE	CONOCO PHILLIPS COMPANY	RANDOLF FEDERAL 43-27-47-72	GST	CBM		830
P131177W	11/20/2000	47	72	27	SESE	CONOCO PHILLIPS COMPANY	RANDOLF FEDERAL 44-27-47-72	GST	CBM		930
P134000W	03/22/2001	47	72	27	NWSW	CONOCO PHILLIPS COMPANY	HAIGHT FED 27-13-47-72	GST	CBM		930

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P134001W	03/22/2001	47	72	27	SWSW	CONOCO PHILLIPS COMPANY	HAIGHT FED 27-14-47-72	GST	CBM		959
P134003W	03/22/2001	47	72	27	SESW	CONOCO PHILLIPS COMPANY	HAIGHT FED 27-24-47-72	GST	CBM		984
P58662W	09/21/1981	47	72	27	NWSW	DAVIS OIL COMPANY	CABALLO #1	PUW	MIS	100	
P111398W	07/24/1998	47	72	28	SESW	DAVIS LAND AND LIVESTOCK	EAST JOG WINDMILL		CBM, STO	5	250
P132065W	01/17/2001	47	72	28	NENE	PURE PETROLEUM	FEDERAL 1-28	GST	CBM	0	898
P132066W	01/17/2001	47	72	28	NWNE	PURE PETROLEUM	FEDERAL 2-28	GST	CBM		886
P132068W	01/17/2001	47	72	28	NWNW	PURE PETROLEUM,LLC	FEDERAL 4-28	GST	CBM		936
P132070W	01/17/2001	47	72	28	SENW	PURE PETROLEUM,LLC	FEDERAL 6-28	GST	CBM		1011
P132071W	01/17/2001	47	72	28	SWNE	PURE PETROLEUM,LLC	FEDERAL 7-28	GST	CBM		939
P132072W	01/17/2001	47	72	28	SENE	PURE PETROLEUM,LLC	FEDERAL 8-28	GST	CBM		928
P132074W	01/17/2001	47	72	28	NWSE	PURE PETROLEUM,LLC	FEDERAL 10-28	GST	CBM		989
P132076W	01/17/2001	47	72	28	NWSW	PURE PETROLEUM,LLC	FEDERAL 12-28	GST	CBM		896
P132077W	01/17/2001	47	72	28	SWSW	PETROLEUM DEVELOPMENT CORPORATION	FEDERAL 13-28	GST	CBM		880
P132078W	01/17/2001	47	72	28	SESW	PURE PETROLEUM,LLC	FEDERAL 14-28	GST	CBM		915
P132079W	01/17/2001	47	72	28	SWSE	PETROLEUM DEVELOPMENT CORPORATION	FEDERAL 15-28	GST	CBM		937
P111155W	07/22/1998	47	72	33	NENW	LANCE OIL & GAS COMPANY, INC	DAVIS FED 21-33	GST	CBM, STO	32.5	932
P111157W	07/22/1998	47	72	33	NWNW	LANCE OIL & GAS COMPANY, INC	DAVIS FED 11-33	GST	CBM, STO	33.5	936
P132081W	01/17/2001	47	72	33	NWNE	PURE PETROLEUM,LLC	FEDERAL 2-33	GST	CBM		911
P132083W	01/17/2001	47	72	33	SENE	PURE PETROLEUM,LLC	FEDERAL 8-33	GST	CBM		952
39/8/240W	08/17/2006	47	72	34	NWSE	PURE PETROLEUM, LLC	LESS #10-34	UNA	CBM		
P110991W	07/06/1998	47	72	34	NWNW	LANCE OIL & GAS COMPANY, INC	HAIGHT FED 11-34	GST	CBM, STO	28	938
P110992W	07/06/1998	47	72	34	NENW	LANCE OIL & GAS COMPANY, INC	HAIGHT FED 21-34	GST	CBM, STO	24	923
P110993W	07/06/1998	47	72	34	NWNE	LANCE OIL & GAS COMPANY, INC	HAIGHT FED 31-34	GST	CBM, STO	27	961.5
P110994W	07/06/1998	47	72	34	NENE	LANCE OIL & GAS COMPANY, INC	HAIGHT FED 41-34	GST	CBM, STO	27	922
P112817W	11/09/1998	47	72	34	NESE	LANCE OIL/GAS COMPANY, INC.	ALEX 43-34	GST	CBM, STO	9	803
P131982W	11/14/2000	47	72	34	SWSE	YATES PETROLEUM CORP.	TOPPER CS FEDERAL #5	GSE	CBM, RES	0	
39/6/240W	08/17/2006	47	72	35	SENE	PURE PETROLEUM, LLC	LESS #8-35	UNA	CBM		
39/7/240W	08/17/2006	47	72	35	SWNE	PURE PETROLEUM, LLC	LESS #7-35	UNA	CBM		
P100815W	10/26/1995	47	72	35	SENW	LANCE OIL & GAS COMPANY, INC	FEDERAL #735-22	GST	CBM, STO	25	689
P125364W	05/09/2000	47	72	35	SESW	NORTH FINN, LLC	OXBOW #24-35	GST	CBM	25	380
P28636W	12/09/1974	47	72	35	SESE	WAGENSEN & HAYDEN	BANNISTER #1	PUW	STO	25	256
P98602W	03/17/1995	47	72	35	NENE	WARREN E & P INC	LESS #1-35	GST	MIS, DEW, CBM	2	610
P99233W	05/15/1995	47	72	35	NWNE	WARREN E & P INC	LESS #2-35	GST	CBM, MIS	35	619
P108751W	01/30/1998	47	72	36	SENE	WY STATE BOARD OF LAND COMMISSIONERS** LANCE OIL & GAS COMPANY, INC	STATE 736-42	GST	CBM, STO	15	485
P108752W	01/30/1998	47	72	36	NESE	WY STATE BOARD OF LAND COMMISSIONERS** LANCE OIL & GAS COMPANY, INC	STATE 736-43	GST	CBM, STO	5	498
P108753W	01/30/1998	47	72	36	SESE	WY STATE BOARD OF LAND COMMISSIONERS** LANCE OIL & GAS COMPANY, INC	STATE 736-44	GST	CBM, STO	10	540

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P108754W	01/30/1998	47	72	36	NENE	LANCE OIL & GAS COMPANY, INC** WY STATE BOARD OF LAND COMMISSIONERS	STATE 736-41	GST	CBM, STO	12	467
P40082W	09/28/1977	47	72	36	SENW	GAME & FISH COMM., STATE OF WYOMING**ATLANTIC RICHFIELD COMPANY	WCH 5	PUW	MON	0	
P72107W	02/24/1986	47	72	36	SENW	AMERICAN OIL AND GAS CORPORATION,INC.	WCH 5 (WEST CAMPBELL HYDROLOGICAL)	UNA	MON	0	583
P96790W	08/03/1994	47	72	36	NWNW	LANCE OIL & GAS COMPANY, INC	STATE #736-11	GST	CBM, STO	25	575
P96791W	08/03/1994	47	72	36	SWNW	LANCE OIL & GAS COMPANY, INC** WY STATE BOARD OF LAND COMMISSIONERS	STATE #736-12	GST	CBM, STO	25	579
P97265W	08/19/1994	47	72	36	NENW	LANCE OIL & GAS COMPANY, INC** WY STATE BOARD OF LAND COMMISSIONERS	STATE #736-21	GST	CBM, STO	25	567
P97266W	08/19/1994	47	72	36	SENW	LANCE OIL & GAS COMPANY, INC** WY STATE BOARD OF LAND COMMISSIONERS	STATE #736-22	GST	CBM, STO	25	570
P119781W	10/07/1999	48	71	19	NWSW	RMG I, LLC	R.A.G. 19-13	UNA	CBM	30	404
P119782W	10/07/1999	48	71	19	SWSW	RMG I, LLC	R.A.G. 19-14	UNA	CBM	30	420
P119783W	10/07/1999	48	71	19	SENW	RMG I, LLC	R.A.G. 19-22	UNA	CBM	30	391
P119784W	10/07/1999	48	71	19	NESW	RMG I, LLC	R.A.G. 19-23	UNA	CBM	30	384
P119785W	10/07/1999	48	71	19	SESW	RMG I, LLC	R.A.G. 19-24	UNA	CBM	30	364
P119787W	10/07/1999	48	71	19	NWSE	RMG I, LLC	R.A.G. 19-33	UNA	CBM	30	394
P131534W	12/13/2000	48	71	19	SWNW	RMG I, LLC	ENL. R.A.G. 19-12	UNA	CBM	0	404
P131535W	12/13/2000	48	71	19	NWSW	RMG I, LLC	ENL. R.A.G. 19-13	UNA	CBM		404
P131536W	12/13/2000	48	71	19	SWSW	RMG I, LLC	ENL. R.A.G. 19-14	UNA	CBM		420
P131538W	12/13/2000	48	71	19	NESW	RMG I, LLC	ENL. R.A.G. 19-23	UNA	CBM		384
P131539W	12/13/2000	48	71	19	SESW	RMG I, LLC	ENL. R.A.G. 19-24	UNA	CBM		364
P131541W	12/13/2000	48	71	19	NWSE	RMG I, LLC	ENL. R.A.G. 19-33	UNA	CBM		394
P132137W	12/29/2000	48	71	19	SENE	RMG I, LLC	ENL DUNLAP 19-42-48-71-A	UNA	CBM		
P132138W	12/29/2000	48	71	19	SESE	HI-PRO PRODUCTION L.L.C.	ENL DUNLAP 19-44-48-71-A	UNA	CBM		
P130445W	10/25/2000	48	71	20	SENW	RMG I, LLC	DUNLAP 20-22-48-71-A	GST	CBM	25	385
P130446W	10/25/2000	48	71	20	SWNW	RMG I, LLC	DUNLAP 20-12-48-71-A	GST	CBM	25	390
P132139W	12/29/2000	48	71	20	SWNW	RMG I, LLC	ENL DUNLAP 20-12-48-71-A	UNA	CBM		
P132140W	12/29/2000	48	71	20	SENW	RMG I, LLC	ENL DUNLAP 20-22-48-71-A	UNA	CBM		
P142594W	01/31/2002	48	71	20	SWNE	CONTINENTAL INDUSTRIES	CABALLO 32-20	GST	CBM		394
P142600W	01/31/2002	48	71	21	SWNE	BLACKSTONE OPERATING	CABALLO 21-32	GST	CBM		308
P142603W	01/31/2002	48	71	21	SWNW	BLACKSTONE OPERATING, INC	CABALLO 21-12	GST	CBM		362
P152718W	06/30/2003	48	71	21	SWNE	BLACKSTONE OPERATING	ENL. CABALLO 21-32	GST	CBM		308
P18097P	12/31/1946	48	71	21	SWNE	EILEEN MITCHUM**JOE FOLEY	FOLEY #2	PUW	STO	2	130
P132141W	12/29/2000	48	71	23	NESW	RMG I, LLC	ENL R.A.G. 23-23-A	UNA	CBM		
P72994W	08/04/1986	48	71	24	SWSW	U.S. GEOLOGICAL SURVEY	CA 3	UNA	MON	0	
P30018W	05/30/1975	48	71	27	NESW	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	N-1	PUW	MIS	0	190
P30029W	05/30/1975	48	71	27	NWSE	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	WRRI-3	PUW	MIS	0	206
P30031W	05/30/1975	48	71	27	SWSW	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	WRRI-7	PUW	MIS	0	329
P30032W	05/30/1975	48	71	27	SWSW	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	WRRI-7A	PUW	MIS	0	329
P30022W	05/30/1975	48	71	28	SESE	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	N-5B	PUW	MIS	4	135
P52658W	04/14/1980	48	71	28	SWNE	BEAR CREEK URANIUM	ENL BEAR PIT #1	PU	DEW, RES, IND	0	240
P105930W	05/01/1997	48	71	29	SWSW	FOUNDATION COAL WEST, INC./BELLE AYR MINE	DW 2914	GST	DEW, MIS	50	131
P119805W	10/07/1999	48	71	30	NWNW	RMG I, LLC	R.A.G. 30-11	UNA	CBM	30	384
P119806W	10/07/1999	48	71	30	SWNW	RMG I, LLC	R.A.G. 30-12	UNA	CBM	30	364

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P119807W	10/07/1999	48	71	30	NWSW	RMG I, LLC	R.A.G. 30-13	UNA	CBM	30	341
P119808W	10/07/1999	48	71	30	SWSW	RMG I, LLC	R.A.G. 30-14	UNA	CBM	30	339
P119809W	10/07/1999	48	71	30	NENW	RMG I, LLC	R.A.G. 30-21	UNA	CBM	30	352
P119810W	10/07/1999	48	71	30	SENW	RMG I, LLC	R.A.G. 30-22	UNA	CBM	30	379
P119811W	10/07/1999	48	71	30	NESW	RMG I, LLC	R.A.G. 30-23	UNA	CBM	30	359
P119812W	10/07/1999	48	71	30	SESW	RMG I, LLC	R.A.G. 30-24	UNA	CBM	30	334
P131551W	12/13/2000	48	71	30	NWNW	RMG I, LLC	ENL. R.A.G. 30-11	UNA	CBM		384
P131552W	12/13/2000	48	71	30	SWNW	RMG I, LLC	ENL. R.A.G. 30-12	UNA	CBM		364
P131553W	12/13/2000	48	71	30	NWSW	RMG I, LLC	ENL. R.A.G. 30-13	UNA	CBM		341
P131554W	12/13/2000	48	71	30	SWSW	RMG I, LLC	ENL. R.A.G. 30-14	UNA	CBM		339
P131555W	12/13/2000	48	71	30	NENW	RMG I, LLC	ENL. R.A.G. 30-21	UNA	CBM		352
P131556W	12/13/2000	48	71	30	SENW	RMG I, LLC	ENL. R.A.G. 30-22	UNA	CBM		379
P131557W	12/13/2000	48	71	30	NESW	RMG I, LLC	ENL. R.A.G. 30-23	UNA	CBM		359
P131558W	12/13/2000	48	71	30	SESW	RMG I, LLC	ENL. R.A.G. 30-24	UNA	CBM		334
P130703W	11/03/2000	48	71	31	NWNW	RMG I, LLC	RAG 31-11-48-71-A	GST	CBM	25	351
P130704W	11/03/2000	48	71	31	SWNW	RMG I, LLC	RAG 31-12-48-71-A	GST	CBM	25	321
P132092W	12/29/2000	48	71	31	NWNW	RMG I, LLC	ENL R.A.G. 31-11-48-71-A	UNA	CBM		
P132093W	12/29/2000	48	71	31	SWNW	RMG I, LLC	ENL R.A.G. 31-12- 48-71- A	UNA	CBM		
P132094W	12/29/2000	48	71	31	NWSW	RMG I, LLC	ENL R.A.G. 31-13- 48-71- A	UNA	CBM		
P132095W	12/29/2000	48	71	31	NENW	RMG I, LLC	ENL R.A.G. 31-21- 48-71- A	UNA	CBM		
P132096W	12/29/2000	48	71	31	SENW	RMG I, LLC	ENL R.A.G. 31-22- 48-71- A	UNA	CBM		
P132097W	12/29/2000	48	71	31	NESW	RMG I, LLC	ENL R.A.G. 31-23- 48-71- A	UNA	CBM		
P30033W	05/30/1975	48	71	33	NENE	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	WRRI-8	PUW	MIS	0	20
P5512P	06/09/1953	48	71	33	SESE	LESLIE CLABAUGH	CLABAUGH #1	PUW	DOM, STO	18	150
P88920W	07/27/1992	48	71	34	SESW	BALLARD PETROLEUM HOLDINGS LLC	W.D. WATER WELL #1	UNA	IND	60	2070
P30028W	05/30/1975	48	71	35	SWNW	UNIVERSITY OF WYOMING** AMAX COAL COMPANY	WRRI-2	PUW	MIS	0	36
P50992W	05/22/1979	48	71	35	SWSW	TRUE OIL COMPANY**ARTHUR CUNDY	CLARK STATE WS 1	UNA	STO, IND	18	1100
P99057W	04/24/1995	48	71	35	SESW	PETROGULF CORPORATION	CLABAUGH #41-2 WSW	UNA	IND	30	3400
39/3/265W	08/31/2006	48	72	21	NESE	WINDSOR ENERGY GROUP LLC	FEDERAL #21-43	UNA	MIS, CBM		
39/4/265W	08/31/2006	48	72	21	SESE	WINDSOR ENERGY GROUP LLC	FEDERAL #21-44	UNA	MIS, CBM		
P105026W	02/12/1997	48	72	21	NWSW	MTG OPERATING	BONE PILE #21-13	GST	STO, MIS, CBM	25	617
P105027W	02/12/1997	48	72	21	SWSW	MTG OPERATING	BONE PILE #21-14	GST	STO, MIS, CBM	25	601
P105029W	02/12/1997	48	72	21	SENW	MTG OPERATING	BONE PILE #21-22	GST	STO, MIS, CBM	25	622
P105030W	02/12/1997	48	72	21	NESW	MTG OPERATING	BONE PILE #21-23	GST	STO, MIS, CBM	25	575
P110569W	06/16/1998	48	72	21	SESW	MTG OPERATING	BONE PILE 21-24	UNA	STO, MIS, CBM	25	565
P114146W	02/10/1999	48	72	21	SENE	MTG OPERATING COMPANY	BONE PILE 21-42	GST	CBM, STO	0	517

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P114681W	03/22/1999	48	72	21	SWSE	JM HUBER CORPORATION	FEDERAL 21-34	UNA	CBM, STO	25	528
P114682W	03/22/1999	48	72	21	NWSE	JM HUBER CORPORATION	FEDERAL 21-33	UNA	CBM, STO	25	522
P99047W	04/21/1995	48	72	21	SESW	TORCH OPERATING COMPANY	LYNDE TRUST #21-24	UNA	STO, MIS, CBM	25	
39/10/283W	09/12/2006	48	72	22	NWSE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #22-33	UNA	MIS, CBM		
39/5/265W	08/31/2006	48	72	22	NWSW	WINDSOR ENERGY GROUP LLC	FEDERAL #22-13	UNA	MIS, CBM		
39/5/266W	08/31/2006	48	72	22	SENW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #22-22	UNA	MIS, CBM		
39/6/283W	09/12/2006	48	72	22	SWSW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #22-14	UNA	MIS, CBM		
39/7/266W	08/31/2006	48	72	22	SWNW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #22-12	UNA	MIS, CBM		
39/7/283W	09/12/2006	48	72	22	SESW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #22-24	UNA	MIS, CBM		
39/9/283W	09/12/2006	48	72	22	SWNE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #22-32	UNA	MIS, CBM		
P104204W	03/01/1996	48	72	22	NWSW	TORCH OPERATING CO	ENL FEDERAL #22-13	UNA	MIS, STO, CBM	5	503
P104205W	03/01/1996	48	72	22	SWSW	TORCH OPERATING CO	ENL LYNDE TRUST #22-14	UNA	MIS, STO, CBM	5	508
P104213W	03/18/1996	48	72	22	NWSE	TORCH OPERATING CO	ENL LYNDE TRUST #22-33	UNA	MIS, STO, CBM	20	506
P104268W	04/02/1996	48	72	22	NENE	TORCH OPERATING CO	ENL LYNDE TRUST #22-41	UNA	MIS, STO, CBM	10	610
P110021W	05/12/1998	48	72	22	SENE	USDI, BLM	MP22VSS	UNA	MON	0	80
P120322W	10/25/1999	48	72	22	NESE	JM HUBER CORPORATION	FEDERAL 22-42	UNA	CBM, STO	25	551
P120323W	10/25/1999	48	72	22	NESW	JM HUBER CORPORATION	FEDERAL 22-23	UNA	CBM, STO	25	533
P120324W	10/25/1999	48	72	22	SESE	JM HUBER CORPORATION	FEDERAL 22-44	GST	CBM, STO	25	479
P126571W	06/12/2000	48	72	22	SESW	JM HUBER CORPORATION	RAG 22-24D	GSE	CBM, STO	25	
P128657W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-11	GST	CBM	30	600
P128658W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-21	GST	CBM	30	547
P128659W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-22	GST	CBM	30	549
P128660W	09/05/2000	48	72	22	NESE	J.M. HUBER CORPORATION	HUBER/RAG 14-23	UNA	CBM	30	604
P128662W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-31	GST	CBM	30	505
P128663W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-32	GST	CBM	30	509
P128664W	09/05/2000	48	72	22	NESE	J.M. HUBER CORPORATION	HUBER/RAG 14-33	UNA	CBM	30	560
P128665W	09/05/2000	48	72	22	NESE	J.M.HUBER CORPORATION	HUBER/RAG 14-34-48-72	UNA	CBM	30	528
P128666W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-41	GST	CBM	30	506
P128667W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 14-42	GST	CBM	30	481

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P128668W	09/05/2000	48	72	22	NESE	J.M. HUBER CORPORATION	HUBER/RAG 13-22-48-72	UNA	CBM	30	445
P128669W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 11-13	GST	CBM	30	592
P128670W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 11-14	GST	CBM	30	581
P128671W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 11-23	GST	CBM	30	590
P128672W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 11-24	GST	CBM	30	555
P128673W	09/05/2000	48	72	22	NESE	J.M.HUBER CORPORATION	HUBER/RAG 11-33	GST	CBM	30	625
P128674W	09/05/2000	48	72	22	NESE	J.M. HUBER CORPORATION	HUBER/RAG 11-41	GST	CBM	30	520
P128675W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 11-42	GST	CBM	30	569
P128676W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 12-11	GST	CBM	30	467
P128677W	09/05/2000	48	72	22	NESE	J. M. HUBER CORPORATION	HUBER/RAG 12-21	GST	CBM	30	457
P128681W	09/05/2000	48	72	22	NESE	J.M.HUBER CORPORATION	HUBER/RAG 23-41	GST	CBM	30	535
P131081W	11/24/2000	48	72	22	NWSE	J.M. HUBER CORPORATION	HUBER-RAG 22-33 M	GSE	CBM		
P131082W	11/24/2000	48	72	22	SWSW	J.M. HUBER CORPORATION	HUBER-RAG 22-14 M	GSE	CBM		
P131083W	11/24/2000	48	72	22	SESW	J.M. HUBER CORPORATION	HUBER-RAG 22-24 M	GSE	CBM		
P70169W	05/16/1985	48	72	22	NESE	FIRST NATIONAL BANK OF BUFFALO	STONE #1	UNA	STO	25	245
P90658W	01/19/1993	48	72	22	SENE	MARTENS & PECK OPERATING CO.	MON #22-42-C	UNA	MON	0	515.5
P90659W	01/19/1993	48	72	22	SENE	MARTENS & PECK OPERATING CO.	MON #22-42-S	UNA	MON	0	410
39/1/284W	09/12/2006	48	72	23	NWSW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #23-13	UNA	MIS, CBM		
P104217W	03/18/1996	48	72	23	NWSW	TORCH OPERATING CO	ENL LYNDE TRUST #23-13	UNA	MIS, STO, CBM	10	487
P126005W	05/24/2000	48	72	23	SWNE	JM HUBER CORPORATION	FEDERAL 23-32	GST	CBM, STO	25	459
P126006W	05/24/2000	48	72	23	SENE	JM HUBER CORPORATION	FEDERAL 23-42	GST	CBM, STO	25	514
P128678W	09/05/2000	48	72	23	SWNW	J.M. HUBER CORPORATION	HUBER/RAG 23-12	UNA	CBM	30	465
P128679W	09/05/2000	48	72	23	SENW	J.M. HUBER CORPORATION	HUBER/RAG 23-22	UNA	CBM	30	450
P128680W	09/05/2000	48	72	23	NWSE	J.M. HUBER CORPORATION	HUBER/RAG 23-33-48-72	UNA	CBM	30	446
P128682W	09/05/2000	48	72	23	NESE	J.M. HUBER CORPORATION	HUBER/RAG 23-43-48-72	UNA	CBM	30	420
P130696W	11/03/2000	48	72	23	NESW	RMG I, LLC	RAG 23 - 23 - A	GST	CBM	25	489
P131085W	11/24/2000	48	72	23	SWNW	J.M. HUBER CORPORATION	HUBER-RAG 23-12 M	GSE	CBM		
P136851W	07/03/2001	48	72	23	SESE	RMG I, LLC	HIGH PLAINS 23-44	GST	CBM		435
P136852W	07/03/2001	48	72	23	SWSE	RMG I, LLC	HIGH PLAINS 23-34	GST	CBM		470
P99040W	04/21/1995	48	72	23	SWNE	TORCH OPERATING COMPANY	FEDERAL #23-32	UNA	STO, MIS, CBM	25	
P120315W	10/25/1999	48	72	24	SWNE	JM HUBER CORPORATION	FEDERAL 28-32	UNA	CBM, STO	25	577
P130439W	10/25/2000	48	72	24	NESE	RMG I, LLC	DUNLAP 24-43-48-72-A	GST	CBM	25	425
P130440W	10/25/2000	48	72	24	SENE	RMG I, LLC	DUNLAP 24-42-48-72-A	GST	CBM	25	403
P130441W	10/25/2000	48	72	24	NWSE	RMG I, LLC	DUNLAP 24-33-48-72-A	GST	CBM	25	433
P130442W	10/25/2000	48	72	24	SWNE	RMG I, LLC	DUNLAP 24-32-48-72-A	GST	CBM	25	442
P130698W	11/03/2000	48	72	24	NWSW	RMG I, LLC	RAG 24 - 13 - A	GST	CBM	25	470
P130700W	11/03/2000	48	72	24	SENW	RMG I, LLC	RAG 24 - 22 - A	GST	CBM	25	481
P130701W	11/03/2000	48	72	24	NESW	RMG I, LLC	RAG 24-23-48-72-A	GST	CBM	25	513
P131769W	12/29/2000	48	72	24	SESE	RMG I, LLC	DUNLAP 24 - 44 - 48 - 72 - A	GST	CBM	0	409
P132099W	12/29/2000	48	72	24	NWSW	RMG I, LLC	ENL R.A.G. 24-13- A	UNA	CBM		
P132101W	12/29/2000	48	72	24	SENW	RMG I, LLC	ENL R.A.G. 24-22- A	UNA	CBM		
P132102W	12/29/2000	48	72	24	NESW	RMG I, LLC	ENL R.A.G. 24-23-48-72- A	UNA	CBM		
P132103W	12/29/2000	48	72	24	NWSE	RMG I, LLC	ENL DUNLAP 24-33-48-72- A	UNA	CBM		

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P132104W	12/29/2000	48	72	24	NESE	RMG I, LLC	ENL DUNLAP 24-43-48-72- A	UNA	CBM		
P132151W	12/29/2000	48	72	24	SENE	RMG I, LLC	ENL DUNLAP 24-42-48-72 - A	UNA	CBM		
P132152W	12/29/2000	48	72	24	SWNE	RMG I, LLC	ENL DUNLAP 24-32-48-72 - A	UNA	CBM		
P133824W	04/06/2001	48	72	24	SWSE	RMG I, LLC	DUNLAP 24-34-48-72-A	GST	CBM		446
P136823W	07/03/2001	48	72	24	SWSW	RMG I, LLC	HIGH PLAINS 24-14	GST	CBM		412
P60726W	05/19/1982	48	72	24	SENW	WYOMING STATE HIGHWAY DEPARTMENT	CABALLO #5	PUW	MON	0	299.5
P84018W	11/13/1990	48	72	24	SENW	EP OPERATING COMPANY	RIDGEVIEW FIELD WATER SUPPLY #1	UNA	IND	80	2310
P119794W	10/07/1999	48	72	25	NWNE	RMG I, LLC	R.A.G. 25-31	UNA	CBM	30	458
P119795W	10/07/1999	48	72	25	SWNE	RMG I, LLC	R.A.G. 25-32	UNA	CBM	30	394
P119796W	10/07/1999	48	72	25	NWSE	RMG I, LLC	R.A.G. 25-33	UNA	CBM	30	384
P119797W	10/07/1999	48	72	25	SWSE	RMG I, LLC	R.A.G. 25-34	UNA	CBM	30	418
P119798W	10/07/1999	48	72	25	NENE	RMG I, LLC	R.A.G. 25-41	GST	CBM	30	389
P119799W	10/07/1999	48	72	25	NESE	RMG I, LLC	R.A.G. 25-43	UNA	CBM	30	354
P119800W	10/07/1999	48	72	25	SESE	RMG I, LLC	R.A.G. 25-44	UNA	CBM	30	370
P131543W	12/13/2000	48	72	25	NWNE	RMG I, LLC	ENL. R.A.G. 25-31	UNA	CBM		458
P131544W	12/13/2000	48	72	25	SWNE	RMG I, LLC	ENL. R.A.G. 25-32	UNA	CBM		394
P131545W	12/13/2000	48	72	25	NWSE	RMG I, LLC	ENL. R.A.G. 25-33	UNA	CBM		384
P131546W	12/13/2000	48	72	25	SWSE	RMG I, LLC	ENL. R.A.G. 25-34	UNA	CBM		418
P131547W	12/13/2000	48	72	25	NENE	RMG I, LLC	ENL. R.A.G. 25-41	GST	CBM		389
P131549W	12/13/2000	48	72	25	NESE	RMG I, LLC	ENL. R.A.G. 25-43	UNA	CBM		354
P131550W	12/13/2000	48	72	25	SESE	RMG I, LLC	ENL. R.A.G. 25-44	UNA	CBM		370
P136848W	07/03/2001	48	72	25	NWNW	RMG I, LLC	HIGH PLAINS 25-11	GST	CBM		406
P1724W	05/03/1966	48	72	25	SENW	MARSHALL JEROME MORGAN	#1 MORGAN	PUW	STO, IRR, DOM	200	
P26012W	02/05/1974	48	72	25	SENW	MARSHALL JEROME AND BEVERLY MORGAN	MORGAN #10	PUW	DOM	15	190
P29727W	04/29/1975	48	72	25	SENW	ROBERT W. & BEVERLY B. LAWSON	LAWSON #1	PUW	DOM	10	222
P60494W	05/03/1982	48	72	25	NWSW	WYOMING STATE HIGHWAY DEPARTMENT	CABALLO #4	PUW	MON	0	
P61463W	06/01/1982	48	72	25	SENW	MARSHAL JEROME & BEVERLY ANN MORGAN	MORGAN #20	PUW	STO, MIS	15	180
P68719W	10/01/1984	48	72	25	SENW	MARSHALL J. AND BEVERLY A. MORGAN	ENL MORGAN #10 WELL	PUW	STO	0	190
P125932W	06/02/2000	48	72	26	SWSW	JM HUBER CORPORATION	RAG 26-14	GST	CBM, STO	25	423
P125933W	06/02/2000	48	72	26	SESW	JM HUBER CORPORATION	HUBER RAG 26-24-48-72	GST	CBM, STO	25	422
P136826W	07/03/2001	48	72	26	NENE	RMG I, LLC	HIGH PLAINS 26-41	GST	CBM		416
39/1/267W	08/31/2006	48	72	27	NWNW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #27-11	UNA	MIS, CBM		
39/2/267W	08/31/2006	48	72	27	NENW	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #27-21	UNA	MIS, CBM		
P104202W	03/01/1996	48	72	27	NWNW	TORCH OPERATING CO	ENL LYNDE TRUST #27-11	UNA	MIS, STO, CBM	25	537
P122508W	01/24/2000	48	72	27	SWNW	JM HUBER CORPORATION	FEDERAL 27-12	GST	CBM, STO	25	574
P122509W	01/24/2000	48	72	27	NESW	JM HUBER CORPORATION	FEDERAL 27-23	GST	CBM, STO	25	624
P122510W	01/24/2000	48	72	27	SESW	JM HUBER CORPORATION	FEDERAL 27-24	GST	CBM, STO	25	564
P122511W	01/24/2000	48	72	27	SWSE	JM HUBER CORPORATION	FEDERAL 27-34	GST	CBM, STO	25	504

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P122512W	01/24/2000	48	72	27	NWSW	JM HUBER CORPORATION	FEDERAL 27-13	GST	CBM, STO	25	623
P122513W	01/24/2000	48	72	27	SWSW	JM HUBER CORPORATION	FEDERAL 27-14	GST	CBM, STO	25	643
P122514W	01/24/2000	48	72	27	SENW	JM HUBER CORPORATION	FEDERAL 27-22	GST	CBM, STO	25	515
P122515W	01/24/2000	48	72	27	NENE	JM HUBER CORPORATION	FEDERAL 27-41	GST	CBM, STO	25	473
P122516W	01/24/2000	48	72	27	SENE	JM HUBER CORPORATION	FEDERAL 27-42	GST	CBM, STO	25	488
P122517W	01/24/2000	48	72	27	SWNE	JM HUBER CORPORATION	FEDERAL 27-32	GST	CBM, STO	25	504
P122518W	01/24/2000	48	72	27	NWSE	JM HUBER CORPORATION	FEDERAL 27-33	GST	CBM, STO	25	504
P125930W	06/02/2000	48	72	27	SESE	JM HUBER CORPORATION	RAG 27-44	UNA	CBM, STO	25	
P126573W	06/12/2000	48	72	27	NWNW	JM HUBER CORPORATION	RAG 27-11D	GSE	CBM, STO	25	
P131086W	11/24/2000	48	72	27	NENW	J.M. HUBER CORPORATION	HUBER-RAG 27-21 M	GSE	CBM		
P131087W	11/24/2000	48	72	27	NWNW	J.M. HUBER CORPORATION	HUBER-RAG 27-11 M	GSE	CBM		
39/6/266W	08/31/2006	48	72	28	NWNE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #28-31	UNA	MIS, CBM		
39/8/266W	08/31/2006	48	72	28	NENE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #28-41	UNA	MIS, CBM		
39/9/266W	08/31/2006	48	72	28	SENE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #28-42	UNA	MIS, CBM		
P104200W	03/01/1996	48	72	28	NENE	TORCH OPERATING CO	ENL LYNDE TRUST #28-41	UNA	MIS, STO, CBM	20	500
P104269W	04/02/1996	48	72	28	NWNE	TORCH OPERATING CO	ENL LYNDE TRUST #28-31	UNA	MIS, STO, CBM	5	559
P114689W	03/22/1999	48	72	28	NWSW	JM HUBER CORPORATION	FEDERAL 28-13	UNA	CBM, STO	25	733
P114690W	03/22/1999	48	72	28	SWSW	JM HUBER CORPORATION	FEDERAL 28-14	UNA	CBM, STO	25	664
P114691W	03/22/1999	48	72	28	SESW	JM HUBER CORPORATION	FEDERAL 28-24	UNA	CBM, STO	25	640
P114692W	03/22/1999	48	72	28	SWSE	JM HUBER CORPORATION	FEDERAL 28-34	UNA	CBM, STO	25	686
P114694W	03/22/1999	48	72	28	SENW	JM HUBER CORPORATION	FEDERAL 28-22	GST	CBM, STO	25	667
P114695W	03/22/1999	48	72	28	NENW	JM HUBER CORPORATION	FEDERAL 28-21	UNA	CBM, STO	25	577
P114696W	03/22/1999	48	72	28	NWNW	JM HUBER CORPORATION	FEDERAL 28-11	UNA	CBM, STO	25	636
P120316W	10/25/1999	48	72	28	NESW	JM HUBER CORPORATION	FEDERAL 28-23	GST	CBM, STO	25	738
P120327W	10/25/1999	48	72	28	SWNW	JM HUBER CORPORATION	FEDERAL 28-12	UNA	CBM, STO	25	649
P126572W	06/12/2000	48	72	28	SENE	JM HUBER CORPORATION	RAG 28-42D	GSE	CBM, STO	25	

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P131088W	11/24/2000	48	72	28	NENE	J.M. HUBER CORPORATION	HUBER-RAG 28-41 M	GSE	CBM		
P131089W	11/24/2000	48	72	28	NWNE	J.M. HUBER CORPORATION	HUBER-RAG 28-31 M	GSE	CBM		
P131090W	11/24/2000	48	72	28	SENE	J.M. HUBER CORPORATION	HUBER-RAG 28-42 M	GSE	CBM		
39/2/284W	09/12/2006	48	72	33	NWNE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #33-31	UNA	MIS, CBM		
39/3/284W	09/12/2006	48	72	33	SWNE	WINDSOR ENERGY GROUP LLC	LYNDE TRUST #33-32	UNA	MIS, CBM		
P110433W	06/11/1998	48	72	33	SWNW	MTG OPERATING	CABALLO 33-12	UNA	CBM, STO	1.1	569
P120320W	10/25/1999	48	72	33	NWNW	JM HUBER CORPORATION	FEDERAL 33-11	UNA	CBM, STO	25	615
P99299W	05/19/1995	48	72	33	SWNW	TORCH OPERATING COMPANY	LYNDE TRUST #33-12	UNA	STO, MIS, CBM	25	
P104519W	11/21/1996	48	72	34	NWNE	HEARTLAND ENERGY COMPANY	CABELLO #34-31	GST	CBM, STO	25	563
P104520W	11/21/1996	48	72	34	SWNE	HEARTLAND ENERGY COMPANY	CABELLO #34-32	GST	CBM, STO	25	502
P104521W	11/21/1996	48	72	34	NWSE	HEARTLAND ENERGY COMPANY	CABELLO #34-33	GST	CBM, STO	25	504.5
P105033W	02/12/1997	48	72	34	SENW	HEARTLAND ENERGY COMPANY	CABELLO 34-22	GSE	CBM, STO	25	
P105034W	02/12/1997	48	72	34	NESW	HEARTLAND ENERGY COMPANY	CABELLO 34-23	GSE	CBM, STO	25	
P122519W	01/24/2000	48	72	34	NWNW	JM HUBER CORPORATION	FEDERAL 34-11	GST	CBM, STO	25	629
P122520W	01/24/2000	48	72	34	SWNW	JM HUBER CORPORATION	FEDERAL 34-12	GST	CBM,STO	25	648
P122521W	01/24/2000	48	72	34	NENW	JM HUBER CORPORATION	FEDERAL 34-21	GST	CBM,STO	25	556
P125368W	05/09/2000	48	72	34	SESE	NORTH FINN, LLC	OXBOW #44-34	UNA	CBM	25	456
P125369W	05/09/2000	48	72	34	NESE	NORTH FINN, LLC	OXBOW #43-34	UNA	CBM	25	431
P125370W	05/09/2000	48	72	34	SENE	NORTH FINN, LLC	OXBOW #42-34	UNA	CBM	25	511
P125931W	06/02/2000	48	72	34	NENE	J. M. HUBER CORPORATION	FEDERAL 34-41	GST	CBM, STO	25	504
P99048W	04/21/1995	48	72	34	SESW	TORCH OPERATING COMPANY	LYNDE TRUST #34-24	UNA	STO, MIS, CBM	25	
P99300W	05/19/1995	48	72	34	SENW	TORCH OPERATING COMPANY	LYNDE TRUST #34-22	UNA	STO, MIS, CBM	25	
39/6/268W	08/31/2006	48	72	35	NWSE	WINDSOR ENERGY GROUP LLC	THOMPSON #35-33	UNA	MIS, CBM		
39/7/268W	08/31/2006	48	72	35	SWSE	WINDSOR ENERGY GROUP LLC	THOMPSON #35-34	UNA	MIS, CBM		
39/9/282W	09/12/2006	48	72	35	SWNE	WINDSOR ENERGY GROUP LLC	THOMPSON #35-32	UNA	MIS, CBM		
P104216W	03/18/1996	48	72	35	SWSE	TORCH OPERATING CO	ENL THOMPSON #35-34	UNA	MIS, STO, CBM	10	392

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P104265W	03/01/1996	48	72	35	NWSE	TORCH OPERATING CO	ENL MCCREERY #1-21	UNA	MIS, STO, CBM	5	464
P125365W	05/09/2000	48	72	35	SWSW	NORTH FINN, LLC	OXBOW #14-35	GST	CBM	25	399
P125366W	05/09/2000	48	72	35	NWSW	NORTH FINN, LLC	OXBOW #13-35	GST	CBM	25	418
P125367W	05/09/2000	48	72	35	SWNW	NORTH FINN, LLC	OXBOW #12-35	GST	CBM	25	511
P125928W	06/02/2000	48	72	35	NENW	JM HUBER CORPORATION	RAG 35-21	GST	CBM, STO	25	431
P125929W	06/02/2000	48	72	35	NWNW	JM HUBER CORPORATION	HUBER RAG 35-11-48-72	GST	CBM, STO	25	459
P125934W	06/02/2000	48	72	35	NWNE	JM HUBER CORPORATION	HUBER RAG 35-31-48-72	GST	CBM, STO	25	429
P125935W	06/02/2000	48	72	35	NENE	JM HUBER CORPORATION	HUBER RAG 35-41-48-72	GST	CBM, STO	25	372
P125936W	06/02/2000	48	72	35	SENE	JM HUBER CORPORATION	HUBER RAG 35-42-48-72	GST	CBM, STO	25	367
P125937W	06/02/2000	48	72	35	NESE	JM HUBER CORPORATION	HUBER RAG 35-43-48-72	GST	CBM, STO	25	384
P125938W	06/02/2000	48	72	35	SESE	JM HUBER CORPORATION	RAG 35-44	GST	CBM, STO	25	400
P134270W	04/19/2001	48	72	35	SENW	NORTH FINN, LLC	OXBOW #22-35	GST	CBM	0	481
P134271W	04/19/2001	48	72	35	NESW	NORTH FINN, LLC	OXBOW #23-35	GST	CBM		450
P70776W	07/31/1985	48	72	35	NWSW	SABINE CORPORATION** I. W. LYNDE TRUST	LYNDE TRUST #1	PUW	STO	25	720
P104201W	03/01/1996	48	72	36	NWSW	WYO BOARD OF LAND COMMISSIONERS** TORCH OPERATING CO	ENL STATE #36-13	UNA	MIS, STO, CBM	5	340
P104263W	03/25/1996	48	72	36	SWSW	TORCH OPERATING CO	ENL STATE #36-14	UNA	MIS, STO, CBM	5	370
P104264W	03/25/1996	48	72	36	NWSE	TORCH OPERATING CO	ENL STATE #36-33	UNA	MIS, STO, CBM	5	328
P130383W	10/25/1999	48	72	36	NWSE	WY STATE BOARD OF LAND COMMISSIONERS** RMG I, LLC	2ND ENL STATE #36-33	GST	CBM, STO		330
P130386W	10/25/1999	48	72	36	SWNW	WY STATE BOARD OF LAND COMMISSIONERS** RMG I, LLC	ENL STATE # 36-12	GST	CBM, STO		337
P132142W	12/29/2000	48	72	36	NWSW	RMG I, LLC	ENL STATE # 36 13	UNA	CBM		340
P132143W	12/29/2000	48	72	36	SWSW	RMG I, LLC	ENL STATE # 36 14	UNA	CBM		370
P132144W	12/29/2000	48	72	36	NWSE	RMG I, LLC	ENL STATE # 36-33	UNA	CBM		330
P133803W	04/06/2001	48	72	36	SWNW	RMG I, LLC	2ND ENL. STATE 36-12	UNA	CBM		337
P133818W	04/06/2001	48	72	36	SWSW	RMG I, LLC	DUNLAP 6-42-47-71-A	GST	CBM		351
P133819W	04/06/2001	48	72	36	SWSW	RMG I, LLC	DUNLAP 17-14-48-71-A	GST	CBM		432
P134114W	04/13/2001	48	72	36	NWNW	RMG I, LLC** WY STATE BOARD OF LAND COMMISSIONERS	STATE 36-11-48-72-A	GST	CBM		367
P134115W	04/13/2001	48	72	36	NWNE	RMG I, LLC** WY STATE BOARD OF LAND COMMISSIONERS	STATE 36-31-48-72-A	GST	CBM		375
P134117W	04/13/2001	48	72	36	SWSE	WY STATE BOARD OF LAND COMMISSIONERS** RMG I, LLC	STATE 36-34-48-72-A	GST	CBM		314
P60493W	05/03/1982	48	72	36	SWNW	WYOMING STATE HIGHWAY DEPARTMENT	CABALLO #3	PUW	MON	0	
P71739W	01/13/1986	48	72	36	SESW	WY BOARD OF LAND COMMISSIONERS**MARSHALL MORGAN	MORGAN #36	UNA	STO	25	103

Table S4-4. Groundwater Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Facility Name	Status	Uses	Yld	TD
P93190W	10/22/1993	48	72	36	NWSW	COMMISSIONER OF PUBLIC LANDS** WYO STATE ENGINEERS OFFICE	ECH-1A	UNA	MON	0	350

Notes for Non Mining-Related Groundwater Rights
Within Three Miles of the Maysdorf II LBA Tract

Search Conducted May 29, 2007

Groundwater Right Search Area:

Township	Range	Sections
46N	70W	5-8, 17-20, 29-32
46N	71W	1-36
46N	72W	1-3, 11-14, 23-26, 36
47N	70W	29-32
47N	71W	2-36
47N	72W	1-4, 9-16, 21-28, 33-36
48N	71W	19-21,27-35
48N	72W	21-28, 33-36

Water rights were searched to the nearest quarter-quarter of each section listed above. Any part of a quarter-quarter that lies within three miles of the LBA tract is included.

Permit number suffixes are denoted as follows:

"A" Adjudicated (finalized) rights; unless the right is a territorial appropriation, there will be a match in the reference column from one of the following permit types for the unadjudicated portion:

"P" Stock and domestic use wells completed prior to May 24, 1969 and registered with the State Engineer's Office prior to December 31, 1972

'"W" Permits are for wells with a priority date for the date of filing with the State Engineer

Status Codes

ADJ Adjudicated
DSC Description
EXP Expired
GSE Good standing, permitted time limits have been extended
GSI Good standing incomplete; required notices not received; not yet expired
GST Good standing
PU Point of use non irrigation (not actual status)
PUO Point of reservoir outlet (not actual status)
PUW Location of well (not actual status)
UNA Unadjudicated

Use Codes

CBM Coal Bed Methane
DEW Dewatering
DOM Domestic
DRI Drilling
IND Industrial
IRR Irrigation
MIS Miscellaneous
MON Monitoring
RES Reservoir Supply
STO Stock
TEM Temporary Use

Lands described in these copies are the water rights of record in the SEO database and may or may not reflect the actual situation on the ground. Failure to exercise a water right for five years, when water is available, may constitute grounds for forfeiture.

Table S4-4. Surface Water Rights for Maysdorf II LBA Tract.

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Appropriation	Facility Name	Status	Uses	Source
*CR3/148A	09/21/1953	46	70	29	SESE	GLEN V. OSBORN		COAL CREEK STOCK RESERVOIR	ORI	STO	EAST FORK COAL CREEK
*P3515S	03/09/1959	46	70	29	SESE	GLEN V. OSBORN		COAL CREEK STOCK RESERVOIR,,1ST ENLARGEMENT OF THE	ORI	STO	EAST FORK COAL CREEK
*P387S	09/21/1953	46	70	29	SESE	GLEN V. OSBORN		COAL CREEK STOCK RESERVOIR	ORI	STO	EAST FORK COAL CREEK
*CR3/148A	09/21/1953	46	70	29	SESE	GLEN V. OSBORN		COAL CREEK STOCK RESERVOIR,,1ST ENLARGEMENT OF THE	ORI	STO	EAST FORK COAL CREEK
*P3515S	03/09/1959	46	70	29	SESE	GLEN V. OSBORN		COAL CREEK STOCK RESERVOIR,,1ST ENLARGEMENT OF THE	ORI	STO	EAST FORK COAL CREEK
*P387S	09/21/1953	46	70	29	SESE	GLEN V. OSBORN		COAL CREEK STOCK RESERVOIR	ORI	STO	EAST FORK COAL CREEK
*CR3/148A	09/21/1953	46	70	29	SESE	GLEN V. OSBORN		OSBORN NO. 2 STOCK RESERVOIR	ORI	STO	EAST FORK COAL CREEK
*CR2/334A	04/13/1959	46	70	32	SESW	GLEN OSBORN		OSBORN NO. 2 STOCK RESERVOIR	DSC	STO	GUY DRAW
*P2631S	04/13/1959	46	70	32	SESW	GLEN OSBORN		OSBORN NO. 2 STOCK RESERVOIR	ORI	STO	GUY DRAW
*CR2/334A	04/13/1959	46	70	32	SESW	GLEN OSBORN		OSBORN NO. 2 STOCK RESERVOIR	ORI	STO	GUY DRAW
*P2631S	04/13/1959	46	70	32	SESW	GLEN OSBORN		OSBORN NO. 2 STOCK RESERVOIR	DSC	STO	GUY DRAW
P25953D	10/06/1978	46	71	5	NWNW	FLORIDA GAS EXPLORATION CO.		HAIGHT-GARRETT 1-5 WATER LINE	DSC	OIL,TEM IND,DRI	HAIGHT DRAW
P27256D	08/03/1981	46	71	14	SWNE	DIAMOND SHAMROCK CORPORATION		KELLY FEDERAL 32-14 WATER USE	PU	OIL,TEM IND,DRI	BELLE FOURCHE RIVER
P27172D	05/28/1981	46	71	15	SWNE	DAVIS OIL COMPANY		#1 ANGELA WATER HAUL	PU	OIL,TEM IND,DRI	BELLE FOURCHE RIVER
P27341D	10/09/1981	46	71	18	NWSE	INC. PETTY RAY GEOSOURCE		HAY CREEK NO. 1 WATER HAUL	PU	TEM IND	HAY CREEK (30-46-71)
P8605S	08/17/1979	46	71	21	SWSW	HEADLEY, JOSEPH & GRADY		HOADLY STOCK RESERVOIR	GST	STO	BUD DRAW
P5236S	10/21/1963	46	71	23	NENW	A.G. HOADLEY ESTATE		MOUNT LOGAN STOCK RESERVOIR	UNA	STO	LOGAN CREEK
P27838D	11/16/1982	46	72	12	NENE	AMOCO PRODUCTION COMPANY		PICKREL AMOCO NO. 1 WATER HAUL	PUD	OIL,TEM IND,DRI	HAIGHT LAKE
C26/326A	11/30/1906	46	72	13	NENW	JOHN MORTON SHEEP COMPANY		LAKE VIEW RESERVOIR	PUO	STO	DRY CREEK (9-46-71)
P952R	11/30/1906	46	72	13	NENW	JOHN MORTON SHEEP COMPANY		LAKE VIEW RESERVOIR	PUO	STO	DRY CREEK (9-46-71)
P29669D	05/11/1987	46	72	13	SENW	M. R.A.		M.R.A. OSBORN #1-23 WATER HAUL	PUD	OIL,TEM IND,DRI	DRY CREEK (9-46-71)
P17361S	11/16/2005	46	72	14	NENE	DELORES EDWARDS		EDWARDS 41-14-4672 STOCK RESERVOIR	UNA	STO	BEBOP DRAW
P29662D	04/28/1987	46	72	36	NENW	ROUX & ASSOCIATES MCADAMS		M.R.A. STATE #1-36 WATER HAUL	ORI	OIL,TEM IND,DRI	BELLE FOURCHE RIVER
P26150D	05/11/1979	47	70	32	SWNW			PHOENIX WATER HAUL 32-3	PU	OIL,TEM IND,DRI	BELLE FOURCHE RIVER
CR3/347A	06/25/1962	47	71	3	NESW	LESLIE CLABAUGH		CLAYBAUGH STOCKWATER RESERVOIR	PUO	STO	CLABAUGH DRAW
CR10/466A	07/30/1984	47	71	4	NWSE	MOBIL MINERAL RESOURCES, INC.		PILLEY STOCK RESERVOIR	PUO	STO	PETE DRAW
*P5497R	04/05/1943	47	71	6	NWNW	GLENN HAYDEN		CABALLO RESERVOIR (CHANGED TO TEMPORARY NORTH PIT)	TRA	STO,FIS	CABALLO CREEK
P7060S	09/20/1971	47	71	17	SWNE	GLENN HAYDEN		ROYAL STOCK RESERVOIR	PUO	STO	ROYAL DRAW

Table S4-4. Surface Water Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Appropriation	Facility Name	Status	Uses	Source
CR6/401A	09/20/1971	47	71	17	SWNE	GLENN HAYDEN		ROYAL STOCK RESERVOIR	PUO	STO	ROYAL DRAW
CR6/402A	09/20/1971	47	71	21	NESW	GLENN HAYDEN		JOHNSON STOCK RESERVOIR	PUO	STO	JOHNSON DRAW
P7061S	09/20/1971	47	71	21	NESW	GLENN HAYDEN		JOHNSON STOCK RESERVOIR	PUO	STO	JOHNSON DRAW
P25453D	06/29/1977	47	71	22	NESW	BASS ENTERPRISES PRODUCTION COMPANY		BASS ENTERPRISES PRODUCTION COMPANY OIL WELL WATER HAUL	PU	TEM IND	BELLE FOURCHE RIVER
P265S	06/15/1953	47	71	33	NENE	NICK STRAATSMA		BUTTE DRAW STOCK RESERVOIR	UNA	STO	BUTTE DRAW
P26682D	07/24/1980	47	71	34	NESE	MATERI EXPLORATION INC.		CORDERO COAL EXPLORATION DRILLING	PU	TEM IND	BELLE FOURCHE RIVER
CR10/458A	01/26/1956	47	72	2	NENW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 4 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P1366S	01/26/1956	47	72	2	NENW	DELILAH J. MCDONALD		LYNDE NO. 4 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
*P12752D	09/17/1914	47	72	3	NENE	DELILAH J. MCDONALD		CAVYO DITCH	ADJ	IRR DOM	FLAT CREEK
*C37/228A	09/17/1914	47	72	4	NWNE	I. W. & WINNIE E. LYNDE		CAVYO DITCH	PUD	IRR	FLAT CREEK
C37/229A	09/17/1914	47	72	4	NWNE	DELILAH J. MCDONALD		FLAT RESERVOIR	PUO	IRR DOM	FLAT CREEK
*P12753D	10/02/1914	47	72	4	SWNE	DELILAH J. MCDONALD		NATURAL WATERWAY DITCH	ADJ	IRR DOM	CABALLO CREEK
P2745R	09/17/1914	47	72	4	NWNE	DELILAH J. MCDONALD		FLAT RESERVOIR	PUO	IRR DOM	FLAT CREEK
C43/017A	08/15/1914	47	72	9	SESE	I. W. & WINNIE E. LYNDE		HOE NO. 1	ADJ	IRR	HOE CREEK
P12634D	08/15/1914	47	72	9	SESE	I. W. & WINNIE E. LYNDE		HOE NO. 1	ADJ	IRR	HOE CREEK
C43/018A	08/15/1914	47	72	10	SWSW	I. W. & WINNIE E. LYNDE		HOE NO. 2	PUD	IRR	HOE CREEK
C43/019A	08/15/1914	47	72	10	NESW	I. W. & WINNIE E. LYNDE		HOE NO. 4	PUD	IRR	HOE CREEK
C43/020A	08/15/1914	47	72	10	NESE	I. W. & WINNIE E. LYNDE		HOE NO. 4	PUD	IRR	HOE CREEK
P12635D	08/15/1914	47	72	10	SWSW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		HOE NO. 2	PUD	IRR	HOE CREEK
P12637D	08/15/1914	47	72	10	NESE	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		HOE NO. 4	PUD	IRR	HOE CREEK
P12636D	08/15/1914	47	72	10	NESW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		HOE NO. 3	PUD	IRR	HOE CREEK
C43/021A	08/15/1914	47	72	11	SWNW	I. W. & WINNIE E. LYNDE		HOE NO. 5	PUD	IRR	HOE CREEK
CR13/407A	05/12/1993	47	72	11	SWSW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		HOE CREEK STOCK RESERVOIR	ADJ	STO	COAL CANYON CREEK
P11759S	05/12/1993	47	72	11	NWSW	I.W. & WINNIE E. LYNDE MEML TRST		HOE CREEK STOCK RESERVOIR	ADJ	STO	COAL CANYON CREEK
P12638D	08/15/1914	47	72	11	SWNW	I.W. & WINNIE E. LYNDE		HOE NO. 5	PUD	IRR	HOE CREEK
C26/324A	10/08/1906	47	72	16	NENW	JOHN MORTON SHEEP COMPANY		LAKE BUTTE RESERVOIR	PUO	STO DOM	DRY CREEK
P3559R	07/02/1919	47	72	16	NENW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE RESERVOIR	PUO	STO DOM	DRY CREEK
P932R	10/08/1906	47	72	16	NENW	JOHN MORTON SHEEP CO.		LAKE BUTTE RESERVOIR	PUO	STO DOM	DRY CREEK
P17156S	08/05/2005	47	72	19	O	KENNETH GEER		GEER 12-19-4772 STOCK RESERVOIR	UNA	STO	OLD WELL DRAW

Table S4-4. Surface Water Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Appropriation	Facility Name	Status	Uses	Source
P5270S	05/10/1963	47	72	21	NWSE	RUTH M. ROMAKER		RED TOP STOCK RESERVOIR	GST	STO	RED TOP DRAW
P5792R	02/23/1951	47	72	22	SWSE	CLAUDE V. HAIGHT**MILO HAIGHT		HAIGHT RESERVOIR	UNA	IRR DOM	COAL CANYON CREEK
P20609D	02/23/1951	47	72	22	SWSE	CLAUDE V. & MILO HAIGHT		HAIGHT DITCH	PUD	IRR	COAL CANYON CREEK
P11080R	09/13/2000	47	72	28		WYO DAVIS FAMILY LIMITED PARTNERSHIP		RESERVOIR 28-3 RESERVOIR	UNA	STO	THIELEN DRAW
P11079R	09/13/2000	47	72	28	NWNW	WYO DAVIS FAMILY LIMITED PARTNERSHIP		RESERVOIR 28-2 RESERVOIR	UNA	STO	FAMILY DRAW
P11078R	09/13/2000	47	72	28	NWNE	WYO DAVIS FAMILY LIMITED PARTNERSHIP		RESERVOIR 28-1 RESERVOIR	UNA	STO	DAVIS DRAW
C26/323A	10/08/1906	48	71	19	SESW	JOHN MORTON SHEEP COMPANY		SULLIVAN RESERVOIR	ADJ	STO DOM	DUCK NEST CREEK
*P5497R	04/05/1943	48	71	33		WY GAME & FISH DEPT.		CABALLO RESERVOIR (CHANGED TO TEMPORARY NORTH PIT)	TRA	STO,FIS	CABALLO CREEK
P27337D	10/07/1981	48	71	35	NWNE	MAYCO EXPLORATION COMPANY		CABALLO CREEK WATER HAUL NO. 1	UNA	OIL,TEM IND,DRI	CABALLO CREEK
C43/551A	02/14/1914	48	72	21	NESW	ALTA M. TULLY		SOUTH DITCH	ADJ	IRR	BONEPILE CREEK
P13987D	02/14/1914	48	72	21	SWSW	ALTA M. HARRIS		SOUTH DITCH	SEC	IRR	BONEPILE CREEK
P5500R	03/01/1943	48	72	21	SWSW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		MCDONALD RESERVOIR	ADJ	STO	BRANCH BONEPILE CREEK
C29/451A	02/17/1908	48	72	22	NESW	G. M. HUDDLESON AND EMMA M. STONE		STONE NO. 1 RESERVOIR	ADJ	IRR DOM	BONEPILE CREEK
C29/452A	02/13/1908	48	72	22	NWSE	G. M. HUDDLESON		STONE NO. 1	ADJ	IRR DOM	BONEPILE CREEK
P1221R	02/17/1908	48	72	22	NESW	EMMA M. STONE**GEORGE M. HUDDLESON		STONE NO. 1 RESERVOIR	ADJ	STO,IRR	BONEPILE CREEK
C36/235A	02/13/1908	48	72	26	NWNE	MRS. E. M. STONE		STONE NO. 1	PUD	IRR	BONEPILE CREEK
P8257D	02/13/1908	48	72	26	NENW	EMMA M. STONE**GEORGE M. HUDDLESTON		STONE NO. 1	ADJ	IRR DOM	BONEPILE CREEK
CR10/464A	04/10/1956	48	72	33	SWSE	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 10 STOCK RESERVOIR	ADJ	STO	CABALLO CREEK
C37/227A	10/02/1914	48	72	33	SWSW	DELILAH J. MCDONALD		NATURAL WATERWAY DITCH	PUD	RES DOM	CABALLO CREEK
*P12753D	10/02/1914	48	72	33	SWSW	DELILAH J. MCDONALD		NATURAL WATERWAY DITCH	ADJ	IRR DOM	CABALLO CREEK
P17969S	01/17/2006	48	72	33	NWNW	GERALD E. TRIPP		TRIPP 41-32-4872 A&B STOCK RESERVOIR	STR	STO	G T DRAW
P1372S	04/10/1956	48	72	33	NESW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 10 STOCK RESERVOIR	PU	STO	CABALLO CREEK
CR10/459A	01/26/1956	48	72	34	SESW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 5 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/460A	01/26/1956	48	72	34	NESW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 7 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/462A	02/01/1956	48	72	34	SWSE	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 6 STOCK RESERVOIR	PUO	STO	CABALLO CREEK

Table S4-4. Surface Water Rights for Maysdorf II LBA Tract (Continued).

Permit No.	Priority	TNP	RNG	SEC	QQ	Applicant	Appropriation	Facility Name	Status	Uses	Source
*C37/228A	09/17/1914	48	72	34	SESW	DELILAH J. MCDONALD		CAVYO DITCH	ADJ	IRR	FLAT CREEK
P1370S	02/01/1956	48	72	34	SWSE	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 6 STOCK RESERVOIR	PUO	STO	BONEPILE CREEK
P1367S	01/26/1956	48	72	34	SESW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 5 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P1368S	01/26/1956	48	72	34	NESW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 7 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/455A	01/26/1956	48	72	35	SWSW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 1 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/456A	01/26/1956	48	72	35	SWSW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 2 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/457A	01/26/1956	48	72	35	SESW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 3 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/461A	01/26/1956	48	72	35	SESW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 8 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
CR10/463A	04/10/1956	48	72	35	NWSW	I. W. AND WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 9 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P3293D	06/27/1901	48	72	35	SWSW	GEORGE A. KEELINE		KAVIO DITCH	PUD	IRR DOM	CABALLO CREEK
P1371S	04/10/1956	48	72	35	NWSW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 9 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
*P12752D	09/17/1914	48	72	35	NWSW	DELILAH J. MCDONALD		CAVYO DITCH	ADJ	IRR DOM	FLAT CREEK
P1369S	01/26/1956	48	72	35	SESW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 8 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P1363S	01/26/1956	48	72	35	SWSW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 1 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P1364S	01/26/1956	48	72	35	SWSW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 2 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P1365S	01/26/1956	48	72	35	SESW	I.W. & WINNIE E. LYNDE MEMORIAL TRUST		LYNDE NO. 3 STOCK RESERVOIR	PUO	STO	CABALLO CREEK
P3294D	06/27/1901	48	72	35	NENE	GEORGE A. KEELINE		BONE PILE DITCH	EXP	IRR DOM	BONEPILE CREEK
*P5497R	04/05/1943	48	72	36	NESE	WY GAME & FISH DEPT.		CABALLO RESERVOIR (CHANGED TO TEMPORARY NORTH PIT)	TRA	STO FIS	CABALLO CREEK

Notes for Non Mining-Related Surface Water Rights
Within Three Miles of the Maysdorf II LBA Tract

Search Conducted May 29, 2007

Surface Water Right Search Area:

Township	Range	Sections
46N	70W	5-8, 17-20, 29-32
46N	71W	1-36
46N	72W	1-3, 11-14, 23-26, 36
47N	70W	29-32
47N	71W	2-36
47N	72W	1-4, 9-16, 21-28, 33-36
48N	71W	19-21, 27-35
48N	72W	21-28, 33-36

Water rights were searched to the nearest quarter-quarter of each section listed above. Any part of a quarter-quarter that lies within three miles of the LBA tract is included.

Record suffixes are denoted as follows:

"A" Adjudicated (finalized) rights; unless the right is a territorial appropriation, there will be a match in the reference column from one of the following permit types for the unadjudicated portion:

"D" Ditch or pipeline permit
"R" Reservoir permit
"S" Stock reservoir permit

Status Codes

ABA Abandoned
ADJ Adjudicated
DSC Description
EXP Expired
GST Good standing
ORI Original supply (not actual status)
PU Point of use non irrigation (not actual status)
PUD Point of diversion (not actual status)
PUO Point of reservoir outlet (not actual status)
PUW Location of well (not actual status)
TRA Transferred to another facility
UNA Unadjudicated

Use Codes

DOM	Domestic	MIS	Miscellaneous
DRI	Drilling	OIL	Oil refining/production
FIS	Fish propagation	RES	Reservoir supply
IND	Industrial	STO	Stock
IRR	Irrigation	TEM	Temporary use

Lands described in these copies are the water rights of record in the SEO database and may or may not reflect the actual situation on the ground. Failure to exercise a water right for five years, when water is available, may constitute grounds for forfeiture.

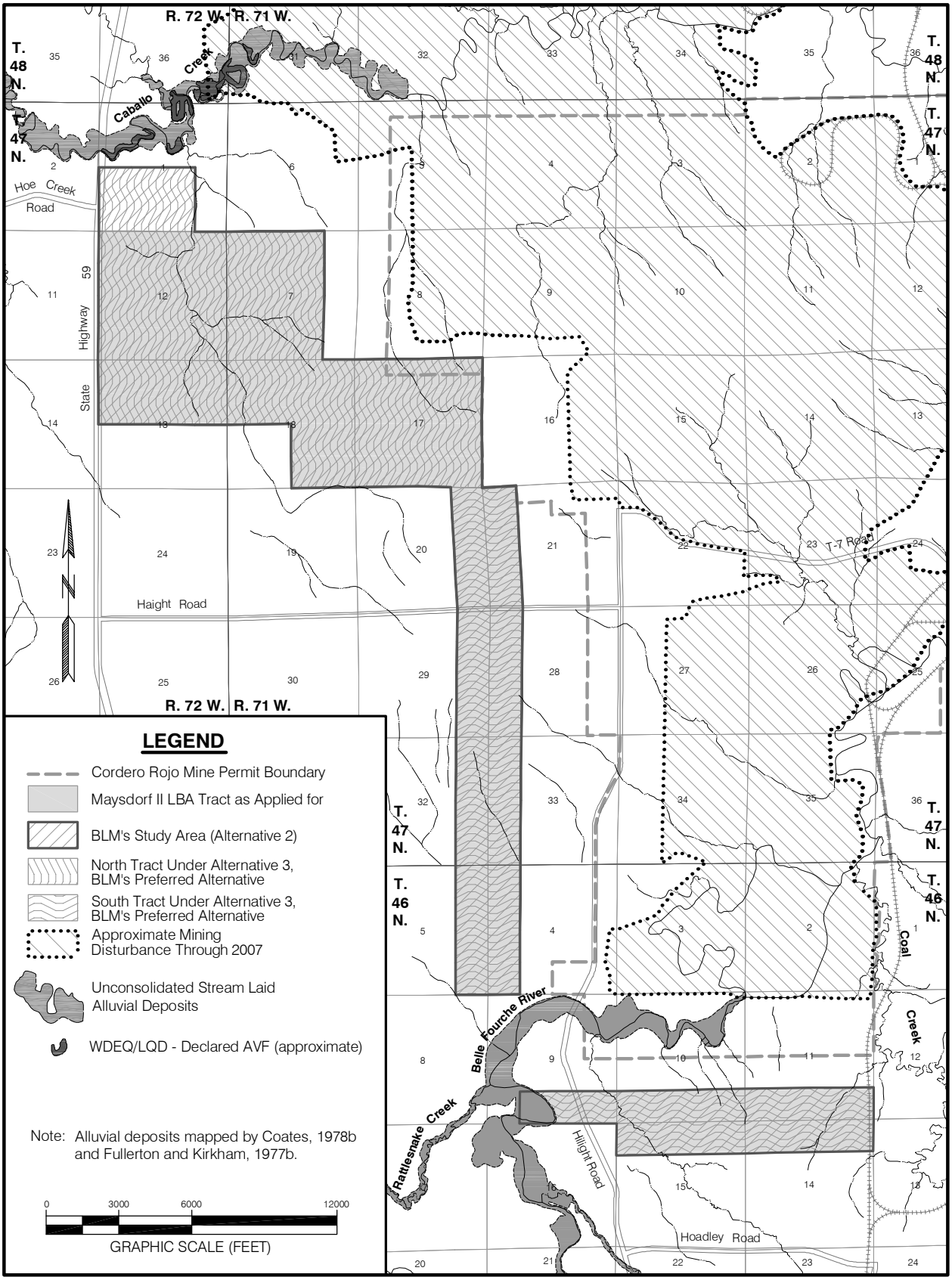

Figure S4-5. Stream Laid Alluvial Deposits and Declared Alluvial Valley Floors Within and Adjacent to the Maysdorf II LBA Tract.

Three separate areas along Caballo Creek, located within and upstream of the existing Belle Ayr Mine permit boundary and north of the Maysdorf II LBA Tract, were studied by FCW and determined by WDEQ/LQD to be AVFs (FCW 2003). One of these areas (located in Sections 35 and 36, T.48N., R.71W.) was determined to be an AVF with possible significance to agriculture. A majority of this AVF area is within the original Belle Ayr Mine permit boundary, which was permitted pre-SMCRA. Since the WDEQ/LQD mine permit to affect the AVF was issued prior to 1977, the effective date of SMCRA, the AVF can be disturbed during mining but must be restored as part of the reclamation process (FCW 2003). The second area along Caballo Creek (located in Sections 32 and 33, T.48N., R.71W. and Section 5, T.47N., R.71W.) was determined to be an AVF not significant to agriculture. This AVF also lies within the Belle Ayr Mine permit boundary. The third AVF study was conducted in 1996 by the Belle Ayr Mine to determine the presence of AVFs west of that mine's original AVF study area. As a result of that study, WDEQ/LQD determined an area along Caballo Creek (located in Section 31, T.48N., R.71W., Section 36, T.48N., R.72W., and Section 1, T.47N., R.72W.) to be an AVF that is not significant to farming (FCW 2003). Figure S4-5 depicts the extent of unconsolidated stream laid alluvial deposits and the areas that have been declared AVFs by WDQ/LQD. The declared AVF located in Section 1, T.47N., R.72W. is within the Maysdorf II general analysis area.

Several AVF studies have been conducted on the Belle Fourche River and its associated ephemeral tributaries within and adjacent to the existing Cordero Rojo Mine permit boundary. WDEQ/LQD has determined that the Belle Fourche River valley in the vicinity of the Cordero Rojo Mine is not an AVF because it is not capable of supporting subirrigation or flood irrigation agricultural activities, and that all lands within the existing permit area are considered undeveloped rangeland (CRM 2007a). The Belle Fourche River is considered an impractical water source for artificial flood irrigation practices due to poor water quality and infrequent water availability. Historic flood irrigation attempts have not been identified along the Belle Fourche River or its ephemeral tributaries within and adjacent to the existing Cordero Rojo Mine permit area. CRM's baseline studies also determined that there is an insignificant amount of groundwater in storage in the unconsolidated deposits of the Belle Fourche River, that alluvial groundwater underflow does not exist over long reaches, and that subirrigation is confined to a very narrow area immediately adjacent to the channel (CRM 2007a).

The most recent AVF study along the Belle Fourche River was completed by CRM in 2007 as part of a mine permit amendment process. The study area included approximately 7.5 miles of the river upstream of the existing permit boundary through Sections 9 and 16, T.46N., R.71W., which includes the southern portion of the Maysdorf II general analysis area. Formal declaration of the presence or absence of an AVF, its significance to agriculture, and the appropriate areal extent would be made by the WDEQ/LQD as part of the mine permitting process if the LBA tract is leased and proposed for mining. Based on previous non-AVF declarations made on the Belle Fourche River within and

adjacent to the Maysdorf II LBA Tract, the fact that no historical flood irrigation attempts have been identified along the river within the Maysdorf II general analysis area, and all lands within the LBA tract are considered undeveloped rangeland, it is unlikely that the WDEQ/LQD would declare that an AVF is present in the Maysdorf II general analysis area. If WDEQ/LQD determines that an AVF is present on the LBA tract, it is reasonable to assume that mining would be permitted in those areas because the lack of agricultural development in this area precludes a determination of significance to agriculture.

The Cordero Rojo Mine is required to monitor impacts to downstream AVFs by measuring discharges from sediment ponds for quantity and quality. The mine is also required to restore the essential hydrologic functions of any affected AVFs, if delineated, and preserve the hydrologic functions of the AVFs on adjacent lands. WDEQ/LQD does not believe that the Cordero Rojo mining operation will result in any material damage to the any AVFs downstream of the current Cordero Rojo mine, and that reclamation will replace the alluvial materials and restore the hydrologic function of the Belle Fourche River (WDEQ/LQD 2004).

S4-7 WETLANDS

The wetlands analysis area for the Maysdorf II LBA Tract includes the BLM study area for the LBA tract plus a ¼-mile disturbance buffer around the BLM study area sufficient to mine and reclaim the tract as a part of the Cordero Rojo Mine operation. Figure S4-6 depicts the Maysdorf II wetlands analysis area. Cordero Rojo Mine conducted a preliminary wetlands inventory in 2005 and 2006 of the lands within the wetlands analysis area, based on USFWS NWI mapping and vegetation mapping in the field ESCO (2007). The area investigated is located almost entirely outside of the existing Cordero Rojo Mine permit area, west and south of the current permit boundary. Some wetland areas previously mapped by the USFWS NWI project have been recently altered somewhat due to CBNG-related water production within and upstream of the Maysdorf II wetlands analysis area. The boundaries of the existing potential wetlands may vary to a greater or lesser extent from the boundaries shown on the NWI maps, and current field conditions may not be representative of the field conditions in the future. Due to the ephemeral nature of CBNG dewatering activities, the wetland boundaries and areas are likewise ephemeral. A formal wetland delineation survey of the area proposed for mining would be conducted and submitted to the COE for verification as part of the mining and reclamation permit process, if the LBA tract is leased.

Wetlands occur in a variety of forms within the wetlands analysis area and are generally associated with the watercourses of the Belle Fourche River and Caballo Creek, diked or impounded ponds, and internally drained playas. The wetland areas mapped by USFWS in this area are described as palustrine (marshy) emergent vegetation. These wetlands support a variety of lush plant life and occur along the banks of the Belle Fourche River and Caballo Creek, around a few diked or impounded livestock ponds, and within a few closed depressions. The palustrine wetlands, which are supported by temporarily or

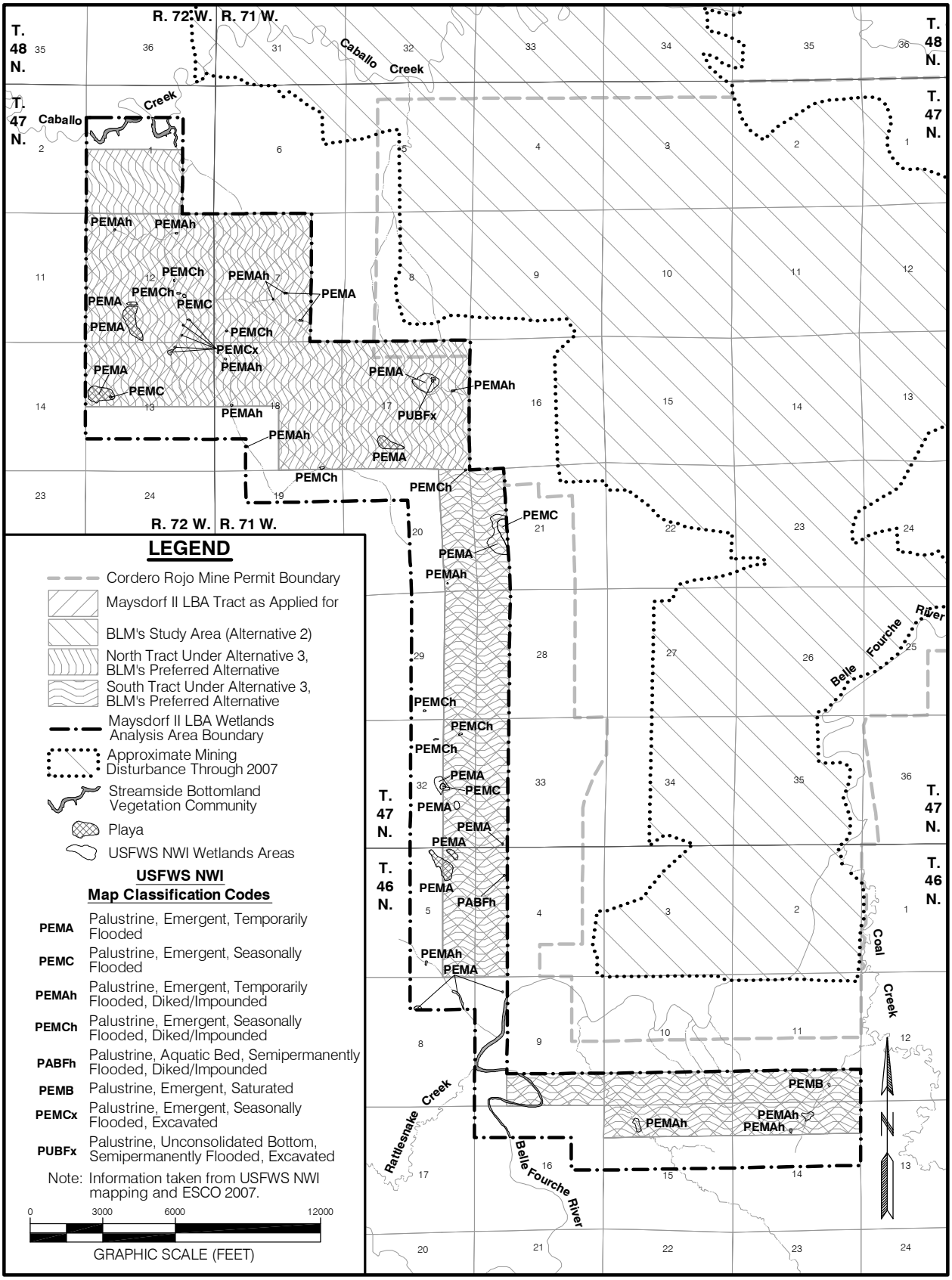

Figure S4-6. Wetlands and Other Waters Within the Maysdorf II LBA Wetlands Analysis Area.

seasonally flooded soils, are adequately supplied with surface runoff and/or discharged waters from CBNG production.

The Streamside Bottomland vegetation community, which was mapped in 2005 and 2006 along the banks of the Belle Fourche River and Caballo Creek, is considered wetlands by COE's wetland delineation standards. The well-wetted banks of the Belle Fourche River have, at present, wetland vegetation, soils and hydrology; the latter being somewhat dependant upon the volume of water discharged into the drainage basin from CBNG dewatering activities.

Immediately along the banks of the Belle Fourche River channel are emergent wetlands in which the primary plant species are threesquare (*Schoenoplectus pungens*), field-clustered sedge (*Carex praegracilis*), Agassiz bluegrass (*Poa agassizensis*), Macoun wildrye (x *Agrohordeum macounii*), slender wheatgrass (*Elymus trachycaulis*), and foxtail barley. Occasionally present as major species are prairie cordgrass (*Spartina pectinata*) and/or woolly sedge (*Carex lanuginosa*). Minor species sometimes present include horsetail (*Hippochaetae laevigata*), Canada thistle (*Cirsium arvense*), showy milkweed (*Asclepias speciosa*), field mint (*Mentha arvensis*), and poison suckleya (*Suckleya suckleyana*).

The Streamside Bottomland vegetation community also occurs along Caballo Creek in the wetlands analysis area. Through this reach, the steep banks of Caballo Creek has helped to minimize an increase in the wetted area caused by increased streamflow from CBNG development-related inflow. However, some areas adjacent to the stream have become more extensively moistened and are likely to exceed pre-CBNG development extents. As a result, some portions of these areas may now be considered wetlands (ESCO 2007a). In addition, increased water-borne salt load in Caballo Creek seems to have altered the Streamside Bottomland species composition from what it was in the mid-1990s (ESCO 1996).

At intermittent locations in upland swales and depressional areas that are found with sufficiently often-wetted soils are small patches of inland saltgrass (*Distichlis stricta* var. *spicata*) that are supported by ground water seepage. Inasmuch as these are not continuously linked to Waters of the U.S., they are regarded as non-jurisdictional. In stock pond excavations along these upland drainages are found small bands of hydrophytic vegetation (largely comprised of facultative species such as foxtail barley (*Critesion jubatu* aka *Hordeum jubatum*). During wet periods, the banks of these stock ponds may stay sufficiently well-wetted to develop the mottling associated with wetland soils. Following dry periods, such as the past six years, the wetland soil characteristics are absent. In any case, these features are isolated and regarded as non-jurisdictional.

In the large playa in Section 21, T.47N., R.71W., where nearby CBNG water extraction wells have regularly discharged water resulting in extended ponding in the playa, the vegetation has shifted from that associated with playas

(primarily western wheatgrass, *Elymus smithii*, aka *Pascopyrum smithii*) to a near monoculture of common spikerush (*Eleocharis palustris*). This wetland area, which now surrounds the pond, is isolated and therefore non-jurisdictional.

Based on the existing USFWS NWI mapping data (which may be somewhat outdated) and the vegetation mapping that was conducted in 2005 and 2006, a total of approximately 140.15 acres of wetlands and other Waters of the U.S. occur within the wetlands analysis area. Of this 140.15 acres identified, approximately 133.54 acres are vegetated wetlands and the remaining 6.61 acres are other Waters of the U.S. The majority of the wetlands are associated with the watercourses of the Belle Fourche River and Caballo Creek, diked or impounded reservoirs, and internally drained depressions/playas, while the majority of the other Waters of the U.S. are associated with ephemeral stream channels and areas of open water. These areas that occur within and adjacent to the Maysdorf II LBA Tract are shown on Figure S4-6.

Non-jurisdictional wetlands and other Waters of the U.S. were included in the above acreages and were not identified separately because only the COE has the authorization to make such determinations. Non-jurisdictional wetlands are generally associated with internally drained depressions/playas that are isolated, and non-jurisdictional other Waters of the U.S. generally occur where areas of open water are ponded in a depression/playa area. Approximately 49.94 acres of playas occur in the area, and those internally drained areas would probably be considered non-jurisdictional by the COE.

S4-8 SOILS

The Maysdorf II LBA soils study area consists of approximately 6,917.3 acres which is divided into 4,650.8 acres for the LBA Tract as nominated and applied for, an additional 241.6 acres that BLM added to the study area, and another 2,024.9 acres added as a ¼-mile buffer to the south, west, and north-northwest. A portion of the soils study area, located in the northwest corner and approximately 886.7 acres in size (12.8% of the total Maysdorf II area), is included in the existing Belle Ayr Mine permit area which is part of the current WDEQ/LQD Mine Permit 214. Almost all of these permitted Belle Ayr acres have native soils.

The soils study area has been subjected to four separate soil surveys in the recent past. The entire area was mapped to the less detailed Order 3 level during the recently completed "Soil Survey of Campbell County, Wyoming, Southern Part" (Westermann and Prink 2004). A small portion of the currently permitted Caballo Rojo Mine (approximately 60.6 acres, 0.88% of the total Maysdorf II area) is also included in the Maysdorf II soils study area. Soils information for this area is included in the CRM baseline soils assessment. In addition, a detailed Order 1-2 soil survey has been previously completed on the currently permitted Belle Ayr Mine portion of the soils study area.

A detailed Order 1-2 soil survey has recently been completed on the Maysdorf I area, a portion of which (approximately 3,466 acres, 50.3% of the total Maysdorf II area) is included in the Maysdorf II soils study area. This area is adjacent to the recently consolidated Caballo Rojo Mine (Caballo Rojo, Inc., and Cordero Mining Company). The remaining portion of the Maysdorf II soils study area (approximately 2,503.5 acres, 36.2% of the total Maysdorf II area) has recently been mapped to the Order 2 level as part of this EIS study. Preliminary results of this survey have been added to the previously completed surveys for overall project evaluation.

All detailed soil surveys were completed to the Order 1-2 resolution in accordance with WDEQ/LQD Guideline No.1 (Topsoil and Overburden), which outlines required soils information necessary for a coal mining operation. The inventories included soils mapping, profile observation and description at the requisite number of individual sites, soil sampling and laboratory analysis of representative samples, soil suitability evaluation, and recommended salvage depth determination. Soils within the analysis area were identified by series, which consist of soils that have similar horizons in their profile. Horizons are soil layers having similar color, texture, structure, reaction, consistency, mineral and chemical composition, and arrangement in the profile.

The soil types and depths on the Maysdorf II soils study area are similar to soils currently being salvaged and utilized for reclamation at the adjacent Caballo Rojo and Belle Ayr Mines and other mines in the eastern PRB. Thirty soil map units and three miscellaneous units (Disturbed Land, Rock Outcrop, and Water) were delineated on the main part of the Maysdorf II soils study area (Figures S4-7 and S4-8). Fourteen soil map units, and the same three miscellaneous units, were delineated on the Belle Ayr portion of the soils study area.

Table S4-5 is attached to this report and lists all Maysdorf II soil map units, acreage, percent of total area, and recommended salvage depths. Disturbed Land, Rock Outcrop, and Water comprise approximately 180.6 acres, about 2.6% of the total Maysdorf II soils study area.

The soils series encountered within the survey area were grouped according to the primary soil formation processes and are listed as follows:

Soils (very shallow, shallow, or moderately deep) developing predominantly in thin residuum from sandstone or shale on upland ridges and hills (505.3 acres, 7.3% of total area)

- Samsil (now Samday) clay, 3 to15% slopes (80BD)
- Shingle clay loam-Rock Outcrop complex, 10 to 60% slopes (151DE)
- Shingle-Worf complex, 10 to 30% slopes (401D)
- Shingle-Rock Outcrop-Taluce complex, 3 to 60% slopes (SRTD)
- Shingle and Taluce soils, 3 to 15% slopes (STD)

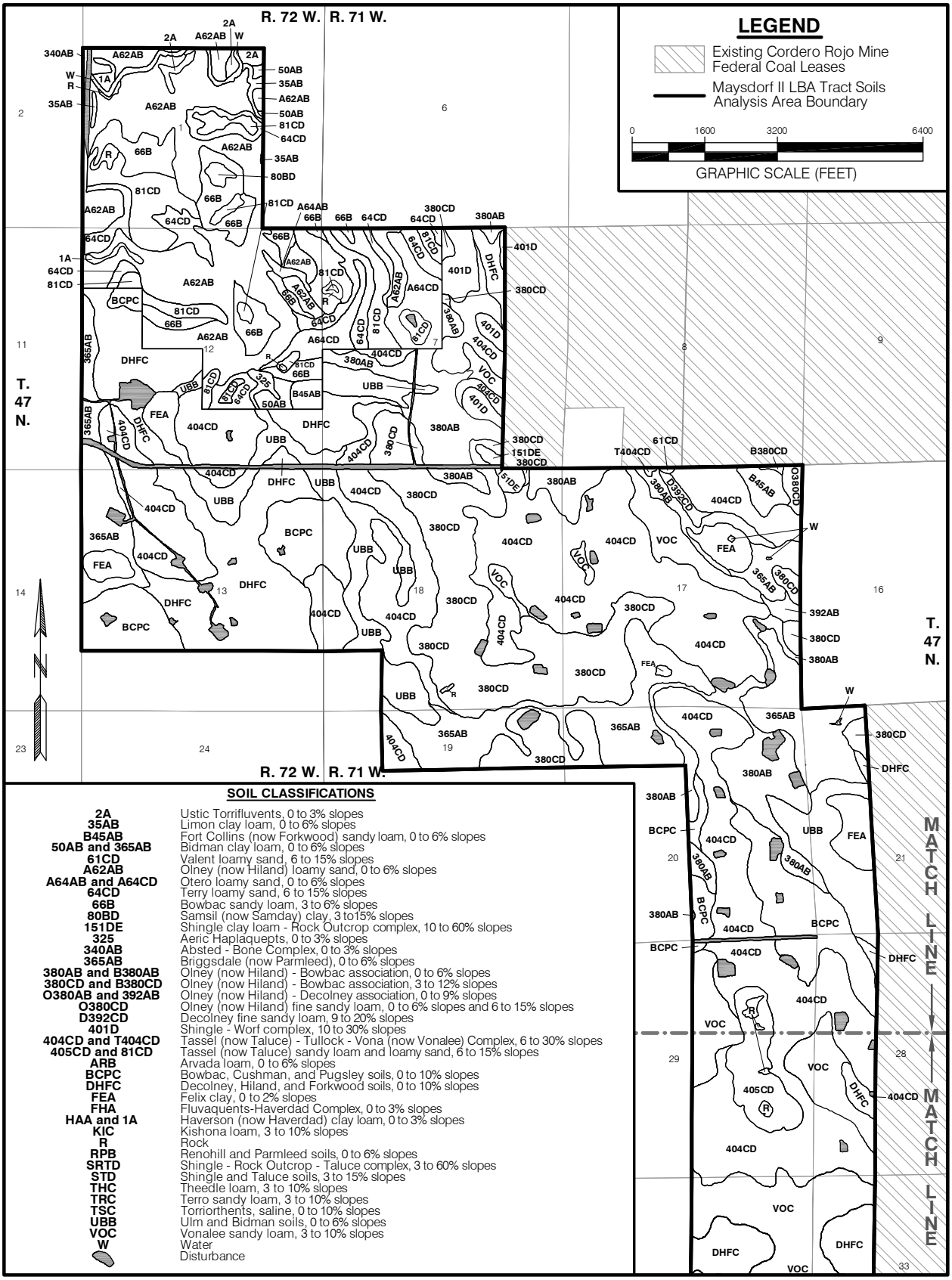

Figure S4-7. Soil Mapping Units Within the Maysdorf II LBA Tract Analysis Area.

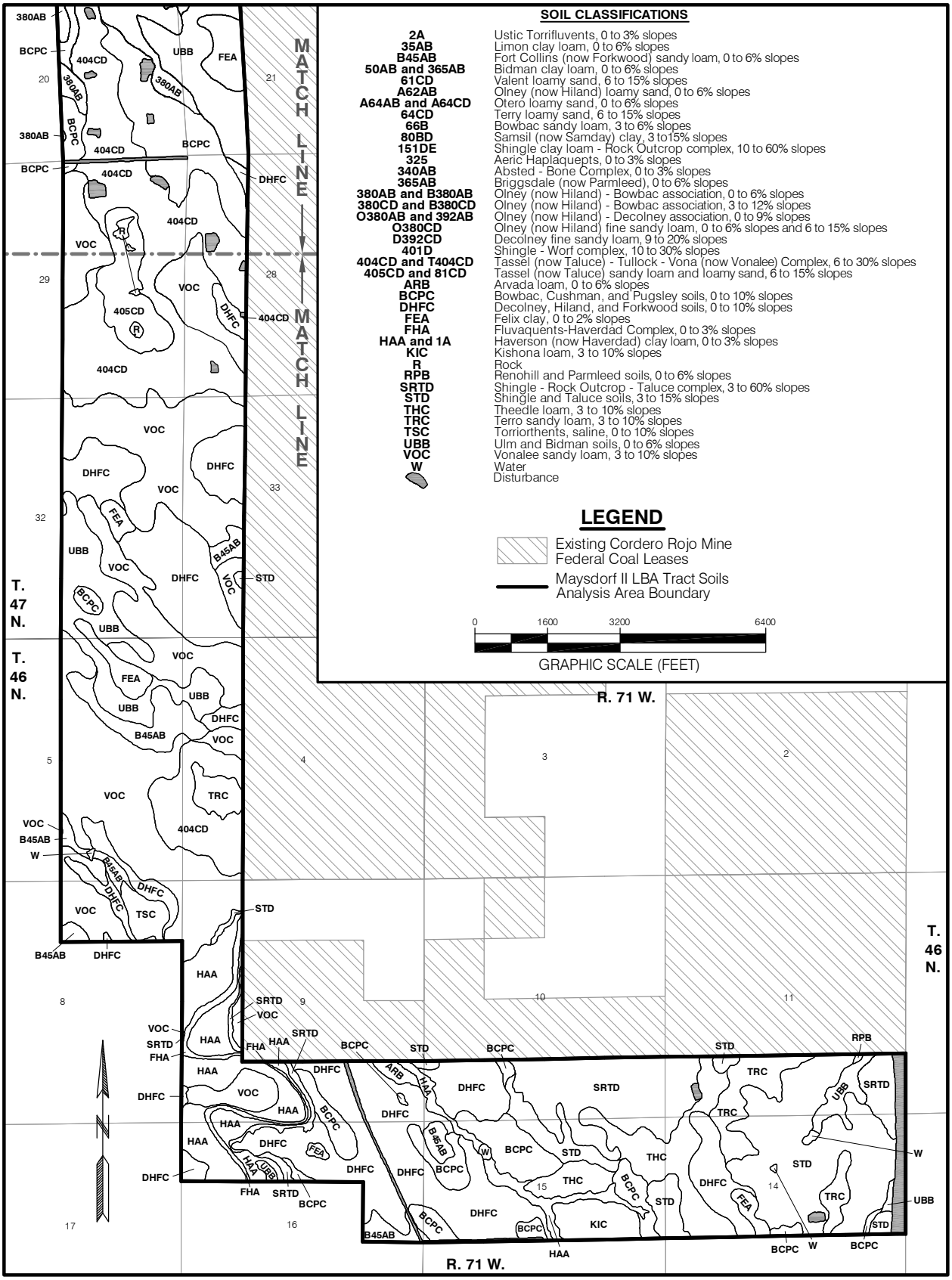

Figure S4-8. Soil Mapping Units Within the Maysdorf II LBA Tract Analysis Area.

Soils (moderately deep, deep, or very deep) developing predominantly in slopewash, colluvium, or alluvial fan deposits from mixed sources on gently sloping uplands (2,725.6 acres, 39.4% of total area)

- Olney (now Hiland)-Bowbac association, 0 to 6% slopes (380AB and B380AB) and 3 to 12% slopes (380CD and B380CD)
- Olney (now Hiland)-Decolney association, 0 to 9% slopes (392AB)
- Olney (now Hiland) fine sandy loam, 0 to 6% slopes (O380AB) and 6 to 15% slopes (O380CD)
- Bowbac sandy loam, 3 to 6% slopes (66B)
- Bowbac, Cushman, and Pugsley soils, 0 to 10% slopes (BCPC)
- Decolney fine sandy loam, 9 to 20% slopes (D392CD)
- Renohill and Parmleed soils, 0 to 6% slopes (RPB)
- Ulm and Bidman soils, 0 to 6% slopes (UBB)
- Theedle loam, 3 to 10% slopes (THC)
- Fort Collins (now Forkwood) sandy loam, 0 to 6% slopes (b45AB and B45AB)
- Decolney, Hiland, and Forkwood soils, 0 to 10% slopes (DHFC)
- Kishona loam, 3 to 10% slopes (KIC)

Soils (very shallow, shallow, moderately deep, deep, or very deep) developing predominantly in coarse-textured alluvium and sandy eolian deposits on rolling uplands (2,785.3 acres, 40.3% of total soil area)

- Olney (now Hiland) loamy sand, 0 to 6% slopes (A62AB)
- Valent loamy sand, 6 to 15% slopes (61CD)
- Vonalee sandy loam, 3 to 10% slopes (VOC)
- Otero loamy sand, 0 to 6% slopes (A64AB, A64CD)
- Tassel (now Taluce)-Tullock-Vona (now Vonalee) Complex, 6 to 30% slopes (404CD and T404CD)
- Tassel (now Taluce) sandy loam and loamy sand, 6 to 15% slopes (405CD, 81CD)
- Terry loamy sand, 6 to 15% slopes (64CD)
- Terro sandy loam, 3 to 10% slopes (TRC)

Drainage and low-lying soils (dominantly deep or very deep) developing in mixed stream laid alluvium on channels and terraces and in fine-textured deposits in playas, depressions, closed basins, and flats (720.5 acres, 10.4% of total soil area)

- Haverson (now Haverdad) clay loam, 0 to 3% slopes (HAA, 1A)
- Ustic Torrifluvents, 0 to 3% slopes (2A)
- Bidman clay loam, 0 to 6% slopes (50AB, 365AB)
- Briggsdale (now Parmleed), 0 to 6% slopes (365AB)
- Limon clay loam, 0 to 6% slopes (35AB)
- Arvada loam, 0 to 6% slopes (ARB)
- Felix clay, 0 to 2% slopes (FEA)
- Aeric Haplaquepts, 0 to 3% slopes (325)

- Absted-Bone Complex, 0 to 3% slopes (340AB)
- Torriorthents, saline, 0 to 10% slopes (TSC)

The following table provides the extent of six depth classes of suitable topsoil within the soils analysis area.

Table S4-5. Acres of Topsoil Available for Reclamation Within the Maysdorf II LBA Tract Soils Analysis Area.

Thickness of Suitable Topsoil (inches)	Acres	Percent
0	303.7	4.4
0 – 12	253.2	3.7
12 – 30	5,270.4	76.1
30 – 48	1,090.0	15.8
48 – 60	0.0	0.0
> 60	0.0	0.0
Unknown	0.0	0.0
Total	**6,917.3**	**100.0**

The Maysdorf II LBA soils analysis indicates that the amount of suitable topsoil that would be available for salvage prior to mining and redistribution during reclamation on all disturbed acres within the analysis area would have an average depth of 21.4 inches (1.78 feet). Areas of unsuitable soils include sites with high salinity, alkalinity, or clay content. The tract is expected to have adequate quantity and quality of soil for reclamation. The site-specific soil surveys have located hydric soils and/or inclusions of hydric soils, which are one component used in identifying wetlands.

S4-9 VEGETATION

The vegetation analysis area (6,917.29 total acres) includes the LBA tract as applied for under the Proposed Action, the area added under Alternatives 2 and 3, and the additional area (assumed to be a ¼-mile buffer) that would be disturbed by mining the LBA tract under Alternative 2. The eastern edge of the LBA was previously studied as part of the original Maysdorf lease area. Data from the Maysdorf I lease area have been referred to in developing the vegetation type descriptions below. Vegetation of the portion of the LBA that lies in the Belle Ayr Mine permit area is described and mapped based on the 1982 permit mapping and descriptions. The balance of the vegetation assessment was completed by ESCO Associates, Inc. of Boulder, Colorado in 2006. The vegetation communities in this area were appraised and mapped to provide a preliminary assessment.

A total of nine vegetation types have been preliminarily identified and mapped within the Maysdorf II LBA vegetation analysis area. Disturbed and rock outcrop/blowout areas were also mapped. Table S4-6 presents the acreage and percent of the analysis area encompassed by each vegetation type. Figures

S4-9 and S4-10 depict the nine vegetation communities, previously disturbed areas, and rock outcrops areas. The vegetation types include sagebrush grassland, sandy grassland, rough breaks, playa, saline grassland, streamside bottomland, crested wheatgrass pasture, and salt pond. These vegetation types are described as follows:

Table S4-6. Vegetation Types Identified and Mapped Within the Maysdorf II LBA Tract Vegetation Analysis Area.

Vegetation Type	**Acres**	**Percent of Area**
Sagebrush Grassland	2,533.52	36.63
Belle Ayr	657.29	9.50
Sandy Grassland	2,294.52	33.17
Crested Wheat Improved Pasture	523.30	7.57
Disturbed	241.48	3.49
Belle Ayr	11.48	0.17
Rough Breaks	214.11	3.10
Loamy Grassland	171.77	2.48
Playa Grassland	113.52	1.64
Saline Grassland	73.47	1.06
Draw Bottomland (Belle Ayr)	55.16	0.80
Streamside Bottomland	8.16	0.12
Belle Ayr	14.01	0.20
Rock Outcrop/Blowout	5.50	0.08
Total	**6,917.29**	**100.00**

Source Nyenhuis 2005

The **Sagebrush Grassland** vegetation type is characterized by finer-textured soils largely of the Forkwood and Cushman series. Wyoming big sagebrush (*Artemisia tridentata*) is the single most abundant plant species present, accounting for about one fifth of all plant cover. Close behind are the cool season native perennial grasses needleandthread (*Hesperostipa comata*) and western wheatgrass (*Pascopyrum smithii*, aka *Agropyron smithii*) and the warm season native blue grama (*Bouteloua gracilis*). On certain years when moisture conditions of the previous fall and winter are favorable, non-native annual bromes are similarly abundant to these latter grasses as is the native annual grass sixweeks fescue (*Festuca octoflora*, aka *Vulpia octoflora*). Note that with the finer-textured soils, Japanese brome (*Bromus japonicus*) is the more commonly encountered annual brome rather than cheatgrass (*Bromus tectorum*). Other grasses and grass-likes commonly encountered include sun sedge (*Carex pensylvanica* ssp. *heliophila*), needleleaf sedge (*Carex stenophylla*), Junegrass (*Koeleria macrantha*) and Sandberg bluegrass (*Poa sandbergii*). Escaped or remnant from earlier reseeding efforts, crested wheatgrass

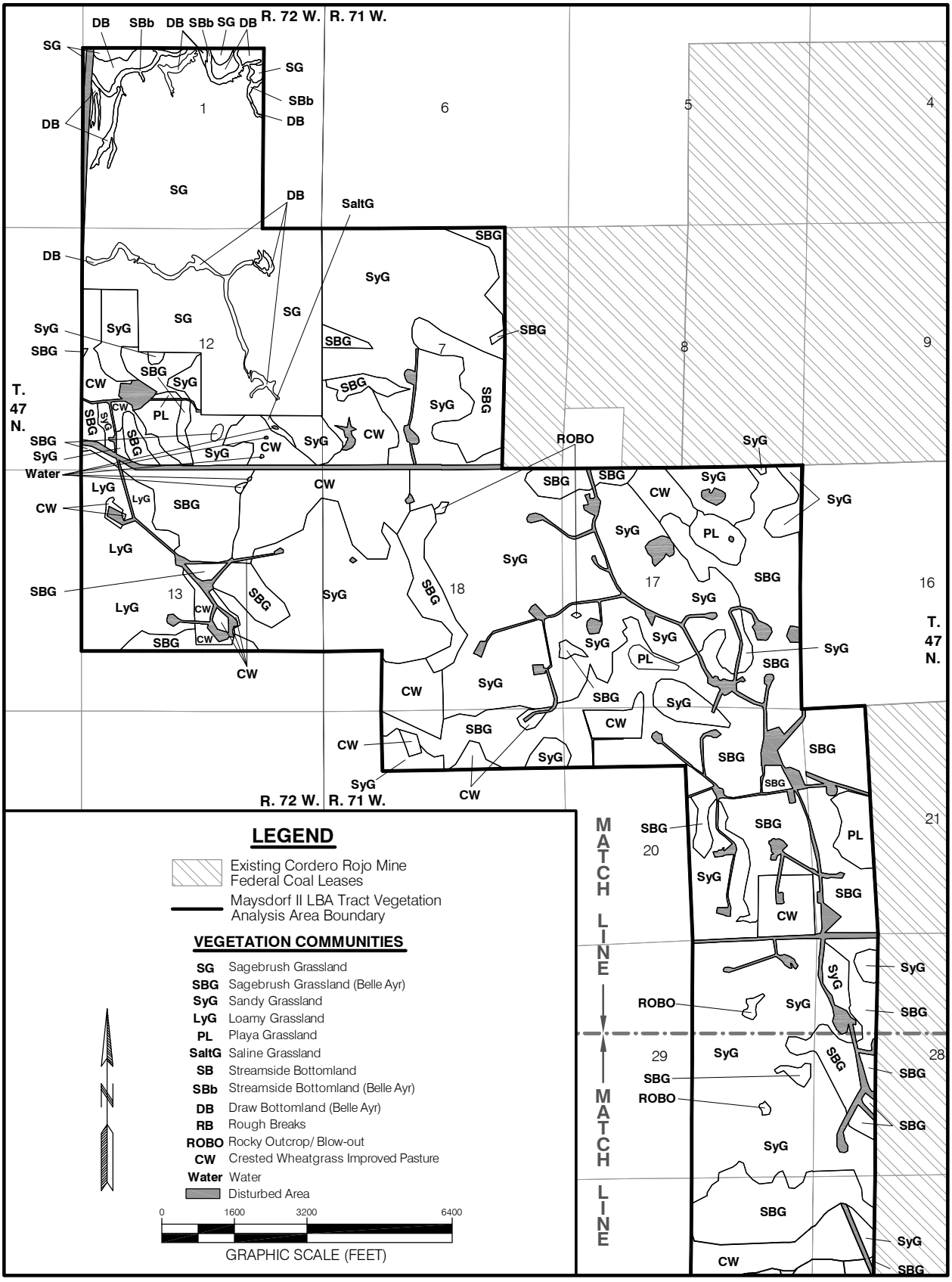

Figure S4-9. Vegetation Communities Within the Maysdorf II LBA Tract Analysis Area - Northern Portion.

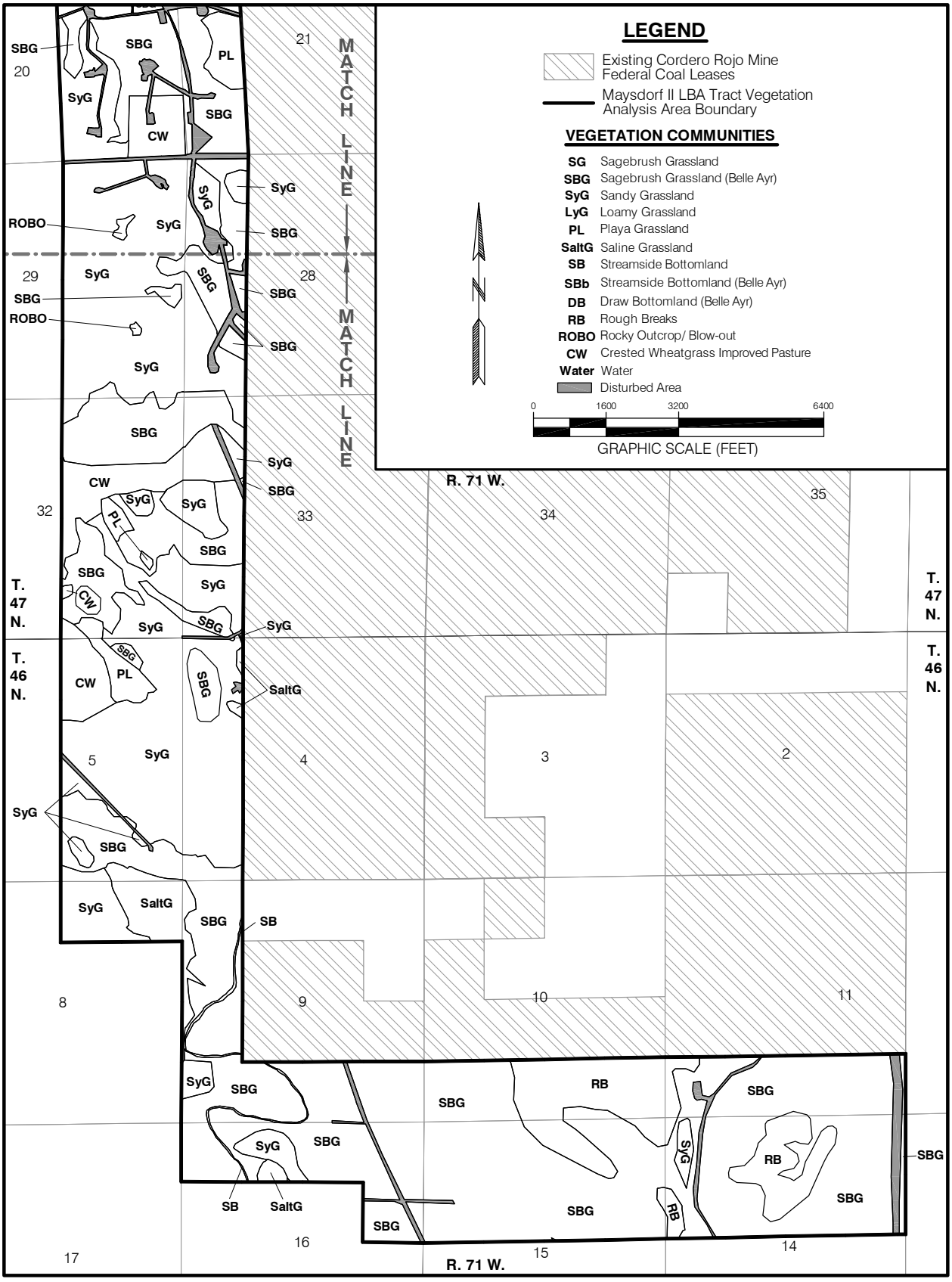

Figure S4-10. Vegetation Communities Within the Maysdorf II LBA Tract Analysis Area - Southern Portion.

(*Agropyron cristatum*) is locally present in substantial amounts. Native perennial forbs account for only about one percent cover on the ground. Most commonly encountered species are textile onion (*Allium textile*), scarlet gaura (*Gaura coccinea*), ironplant goldenweed (*Machaeranthera pinnatifida*, aka *Haplopappus spinulosus*), silverleaf scurfpea (*Pediomelum argophyllum*), white penstemon (*Penstemon albidus*), Hood's phlox (*Phlox hoodii*), scarlet globemallow (*Sphaeralcea coccinea*), and American vetch (*Vicia americana*). The dandelion (*Taraxacum officinale*) is also encountered. Annual and biennial forbs offer very limited in cover. The few that are commonly present often include the natives Carolina whitlow-wort (*Draba reptans*), denseflower pepperweed (*Lepidium densiflorum*), and Indian plantain (*Plantago patagonica*) and the non-natives desert alyssum (*Alyssum desertorum*) and fluffweed (*Filago arvensis*). Vagrant lichen (*Xanthoparmelia chlorochroa*) and manyspine pricklypear cactus are important components of ground cover in the Sagebrush Grassland type.

The **Sandy Grassland** vegetation type occurs on the coarser soils of the Hiland, Vonalee, Keeline, and Tullock series (NRCS 2004). By far the most abundant single species is needleandthread. Other strongly contributing species include the cool season native perennial grasses and grass-like species threadleaf sedge (*Carex filifolia*), western wheatgrass, and Junegrass, along with the warm season native perennial grass blue grama. Other grasses and grass-likes commonly encountered include needleleaf sedge, thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*), and Sandberg bluegrass. On occasional years, the native sixweeks fescue may be of comparable abundance to the latter subordinates. More commonly, the cheatgrass is abundant especially when a dry growing season is followed by a moist fall and winter. Like most native areas in southern Campbell County, there is at least some presence of the non-native forage species crested wheatgrass. It is typically found in about one out of five randomly picked examples of this vegetation type.

The subshrub fringed sage (*Artemisia frigida*) is the most abundant non-grass plant. Native perennial forbs, though numerous, cumulatively typically account for only a little over one percent cover of the ground. The more commonly encountered of these include cockscomb hiddenflower (*Cryptantha celosioides*), western wallflower (*Erysimum asperum*), scarlet gaura, hairy goldenaster (*Heterotheca fulcrata*), stoneseed puccoon (*Lithospermum incisum*), rush skeletonweed (*Lygodesmia juncea*), cutleaf eveningprimrose (*Oenothera coronopifolia*), silverleaf scurfpea, white penstemon, Hood's phlox, and scarlet globemallow. The lone introduced perennial forb that is commonly present is the dandelion. Annual and biennial forbs account for very little cover, but nonetheless are commonly present. The more frequently encountered of these include the native species wavyleaf thistle (*Cirsium undulatum*), pinnate tansymustard (*Descurainia pinnata*), stickseed (*Lappula redowskii*), denseflower pepperweed, rusty lupine (*Lupinus pusillus*), threadleaf phacelia (*Phacelia linearis*), and Indian plantain, as well as the non-natives desert alyssum and fluffweed. Big sagebrush is fairly commonly present but in extremely small amounts. Of little importance as forage plants, but accounting for a non-

negligible amount of ground cover are the vagrant lichen aka tumbleweed shield lichen and manyspine pricklypear cactus (*Opuntia polyacantha*). Forage production on these sandy sites exceeds that of the finer textured sites such as Sagebrush Grassland, especially during dry years.

The **Crested Wheatgrass Pasture** vegetation type consists of areas that have been converted (at least originally and intentionally) from native vegetation of one of the above-described types to a monoculture of crested wheatgrass. Some of these areas were treated strictly for the purposes of achieving improved early-season forage production for livestock; while part is the result of revegetation following denudation during well-drilling activities. Through time, those areas that have not been actively managed are likely to experience invasion by native plant species from adjacent areas. Big sagebrush, blue grama, purple threeawn (*Aristida purpurea*), Junegrass, and needleandthread are among the more commonly invading grasses. Native perennial forb invaders that are most common are stoneseed puccoon, rush skeletonweed, ironplant goldenweed, silverleaf scurfpea, and scarlet globemallow. Common invading annual/biennial forbs include the native species wavyleaf thistle, rusty lupine, Indian plantain, desert alyssum, and fluffweed. The introduced annual brome grasses cheatgrass and Japanese brome are moderately commonly present also. Although not comprising the cover they offer in the Sandy Grassland or Sagebrush grassland, both vagrant lichen and pricklypear cactus (both *Opuntia macrorhiza* and *O. polyacantha*) are common.

The **Rough Breaks** vegetation mapping unit occurs on shallow to moderately deep soils of relatively highly dissected sites that formed insitu from shales often including acid-forming strata (Shingle and Hilight- Wags- Badland complex soils, for example). The soils material that is present on these sites is variable though mostly fine-textured. Grass cover is limited compared to Sagebrush Grassland or Sandy Grassland; in addition to needleandthread, western wheatgrass is prominent, along with other wheatgrasses. These wheatgrasses include thickspike wheatgrass, bluebunch wheatgrass (*Elymus. Spicatus*), and the putative hybrid of the latter two, Montana wheatgrass (*E. lanceolatus* fm. *Albicans*).

Shrubs, mostly big sagebrush and rubber rabbitbrush (*Ericameria nauseosa*) are visually notable, though offering low absolute cover. The number of native perennial forb species present is relatively high, partly as a consequence of the reduced extent of highly competitive grass cover. Among the more commonly encountered are western yarrow (*Achillea lanulosa* ssp. *millefolium*), wild onion (*Allium macropetalum*), three-leaved milkvetch (*Astragalus gilviflorus*), standing milkvetch (*Astragalus laxmannii* var. *robustior*), tufted milkvetch (*Astragalus spatulatus*), bastard toadflax (*Comandra umbellata*), western hawksbeard (*Crepis occidentalis*), cockscomb hiddenflower as well as other hiddenflowers (*Cryptantha* spp.), Hooker sandwort (*Eremogone hookeri*, aka *Arenaria hookeri*), pale yellow fleabane (*Erigeron ochroleucus* var. *scribneri*), scarlet gaura, ironplant goldenweed, narrowleaf four-o-clock (*Mirabilis linearis*), leafy musineon (*Musineon divaricatum*), false dandelion (*Nothocalais cuspidata*),

locoweed (*Oxytropis* sp.), silverleaf scurfpea, penstemon (often *P. albidus* or *P. eriantherus*), Hood's phlox, pickerelweed (*Picradeniopsis oppositifolia*), stiff goldenrod (*Solidago rigida*), other goldenrods (including *S. missouriensis* and *S. mollis*), scarlet globemallow, golden banner (*Thermopsis rhombifolia*), American vetch, Nuttall violet (*Viola nuttallii*), and deathcamas (*Zigadenus venenosus*). By comparison annual / biennial forbs are no more abundant or common than in the major upland communities, Sandy Grassland or Sagebrush Grassland. The more commonly found are native species pinnate tansymustard, Carolina draba, stickseed, denseflower pepperweed, and Indian Plantain as well as the non-natives desert alyssum, littlepod falseflax (*Camelina microcarpa*), and salsify (*Tragopogon dubius*). As with annual/biennial forbs, annual grasses are also no more abundant than they are in the two major upland types, but because of the prevalence of fine-textured substrates, Japanese brome is much more commonly encountered than cheatgrass. Manyspine pricklypear cactus is as commonly encountered as in the major two types but covers much less of the ground. Vagrant lichen, however, is equally abundant in this type as in the major types.

Overall cover and production in these areas are much lower than levels in Sagebrush Grassland or Sandy Grassland, and bare soil is more than twice as abundant, reflecting the plant growth limitations inherent in the soils.

The **Loamy Grassland** vegetation type is underlain by Bidman and Parmaleed loam soils. These soils occur on low slopes, have a thin, loam-textured epipedon overlying very clay-rich subsoils. Dominant grasses include western wheatgrass, Junegrass and Sandberg bluegrass, with varying amounts of Japanese brome, depending on the year. Needleandthread, the major component of nearby Sandy Grassland sites is a minor species in the Loamy Grassland type. Native perennial forbs of note include scarlet globemallow, western ragweed, Hood's phlox, and American vetch. Although there is relatively little big sagebrush on this site, and perhaps cleared of it in historic time, these substrates could sustain heavy invasion and establishment of the shrub were persistently overgrazed occurs. Annual and biennial forbs that are common include fluffweed, desert alyssum, and denseflower pepperweed.

The **Playa Grassland** type occurs in the more or less flat bottoms of interior drainages on very fine-textured sediment transported and accumulated as waters run off adjacent slopes and have nowhere to go. Soils included are of the Felix clay – ponded series. By far the major plant species present is western wheatgrass. Other grasses, especially the native annuals shortawn foxtail (*Alopecurus aequalis*), sixweeks fescue and the non-natives Carolina foxtail (*Alopecurus carolinianus*), cheatgrass, and Japanese brome may be present on a given year depending on the moisture conditions of the preceding winter and spring. Present in small amounts often are foxtail barley (*Critesion jubatum*, aka *Hordeum jubatum*), Junegrass, and Sandberg bluegrass. Native perennial forbs are minimally developed in this type; at least half the locations have none present whatsoever. Annual/biennial forbs, however, can exploit spring ephemeral moisture. The more commonly encountered of these species

include denseflower pepperweed, desert alyssum, fluffweed, and two-lobe speedwell (*Veronica biloba*). In the lowest, well-puddled areas, such small annuals as mousetail (*Myosurus aristatus*), navarettia (*Navarettia intertexta*), and popcornflower (*Plagiobothrys scouleri*) may occur on the open mudflat sites.

The **Saline Grassland** vegetation type occurs on sites in which the soils are sufficiently salt-affected to support inland saltgrass (*Distichlis stricta*). In addition to being salt-affected, these sites seem to be associated with impermeable layers that at many locations "perch" groundwaters so that at least some of this type is sufficiently wet to qualify as wetlands (though mostly isolated and non-jurisdictional). It is thought that the soil salinity on many of these sites may originate from the long-term effects of daylighting groundwaters. This type includes some of the vegetation of concave sites that might have been included in a "Drainage Bottomland" or "Draw Bottomland" types in other mines to the north, such as Belle Ayr (see below). The common theme of high salinity on this site brings together locations where low topography relates to high salinity and locations where high salinity occurs but terrain may not be distinctly concave into this Saline Grassland type.

The dominant plants are the warm season native perennial grasses inland saltgrass and alkali sacaton (*Sporobolus airoides*) along with somewhat lesser amounts of the two rhizomatous native wheatgrass, western wheatgrass and streambank wheatgrass (*Elymus lanceolatus* ssp. var. *riparius*). Though salt-affected, these sites are within the ecological amplitude of both cheatgrass and Japanese brome, and both may contribute sub-dominant amounts of cover in years with adequate moisture in the late summer/fall preceding. Other grasses commonly present include needleandthread, Junegrass, and Sandberg bluegrass. Native perennial forbs offer a small amount of cover, typically less than 1.5%. The most commonly encountered include textile onion, pussytoes, Hooker sandwort, scarlet globemallow, and American vetch. The introduced perennial forb dandelion is commonly present.

Among annual / biennial species, the natives pinnate tansy mustard and stickseed along with the non-native desert alyssum, littlepod falseflax (*Camelina microcarpa*), and fluffweed are commonly present. Less common but of note are western rockjasmine (*Androsace occidentalis*), narrowleaf goosefoot (*Chenopdium leptophyllum*), linearleaf collomia (*Collomia linearis*), denseflower pepperweed, Richardson tansymustard, and poison suckleya (*Suckleya suckleyana*).

Shrubs and subshrubs are an extremely minor component of this vegetation type, and both manyspine pricklypear cactus and vagrant lichen are much less extensive than in the sagebrush grassland type.

The **Streamside Bottomland** vegetation type is comprised primarily of lands that are sufficiently well-wetted to qualify as wetlands under COE 1987 delineation guidelines. Most of this type exists in the form of narrow bands of

from approximately two to 50 ft in width along the edges of the Belle Fourche River. Dominant plants are usually some combination of threesquare (*Schoenoplectus pungens*), common spikerush, broadleaf cattail (*Typha latifolia*), and softstem bulrush (*Schoenoplectus tabernaemontani*). Along the upslope edge of these wetland communities are bands of variable width of plant growth supplemented by uptake by deep roots or the rise of moisture from deeper zones wetted by capillary rise. The vegetation of these zones is comprised largely of the deep-rooted prairie cordgrass or inland saltgrass.

With the abundance of both CBNG and traditional oil and gas extraction in the area, networks of **Disturbed Areas** are present that overlay much of the Sagebrush grassland and Sandy Grassland vegetation types. Areas mapped as Disturbed are mostly associated with roads to drill pads or well pads as well as the pads themselves. These roads and pads are mostly at least somewhat "improved" to the degree that they have been graded high in the center to drain and covered with aggregate (mostly porcelanite or "clinker").

Rock Outcrop/Blowout areas are outcrops of sandstone and the portions of the extremely sandy associated colluvial slopes that are blowouts devoid of vegetation.

Vegetation and Other Mapping Units of the Belle Ayr Permit Area included in the Maysdorf II LBA Resource Study Area

Part of the Maysdorf II LBA resource study area includes land contained within the existing Belle Ayr Mine permit area. Mapping shown within that area reflects that of the original permit Belle Ayr permit documents compiled in 1981 and revised in 1988. The portion of the Belle Ayr permit area included in the Maysdorf II LBA Resource Study Area includes a portion of Caballo Creek and side-drainages. The associated well-wetted environments support two vegetation types – Streamside Bottomland and Drainage Bottomland. In addition, original mapping of the Belle Ayr site combined the grasslands of the coarser soils and the shrub steppes of the finer soils into a single broad unit titled Sagebrush Grassland.

Within the Belle Ayr permit area, this mapping unit is a combination of what is elsewhere separately identified as **Sagebrush Grassland** and Sandy Grassland. As such its average composition is intermediate between these two units as described above, and may in this way correspond somewhat more closely to the regional dominant vegetation of the upland areas mapped by Kuchler (1966) as Wheatgrass-Needlegrass shrub steppe.

Where the moist bottoms of natural swales and drainages were not wet enough to support the hydrophytes discussed in Streamside Bottomland, Belle Ayr mapping identifies a unit referred to as **Draw Bottomland**. This unit includes low stature herbaceous plants that generally need somewhat more moisture than would be available in the upland areas, but are not strong wetland

indicators (hydrophytes). Such plants include inland saltgrass, alkaligrass, foxtail barley, and alkali bluegrass (*Poa juncifolia*, now aka *P. secunda*).

Some of these Draw Bottomland areas have clearly changed in the 25 years between the original 1982 Belle Ayr mapping and present. In general, where different they are larger at present. This difference probably relates to the addition of dewatering flow from CBM wells in recent years.

Streamside Bottomland type as it occurs along Caballo Creek in the Belle Ayr Mine permit area corresponds fairly closely to the type described above as it occurs along the Belle Fourche River. The primary difference is that the Caballo Creek drainage would seem to be more salt-affected, especially after the recent years of coalbed methane wells flowing into the drainage. This supplement of water corresponded with visually greater salt efflorescence that is not as apparent along the Belle Fourche. Because of apparently higher salinity (and this may have pre-dated coalbed methane development at least to some degree), there is more development of alkali bulrush (*Bolboschoenus maritimus* var. *paludosus*) in the Streamside Bottomland vegetation and less prairie cordgrass.

Areas mapped as **Disturbed** are mostly associated with roads to drill pads or well pads as well as the pads themselves. These roads and pads are partly at least somewhat "improved" to the degree that they have been graded high in the center to drain and covered with aggregate (mostly porcelanite or "clinker"). Some of the roads are not improved.

S4-9.1 Threatened, Endangered, Proposed, and Candidate Plant Species

Potential habitat for T&E species and their occurrence on the Maysdorf II LBA Tract are discussed in Appendices E and F of the SGAC EIS document.

S4-10 WILDLIFE

S4-10.1 Wildlife Resources

Background information on wildlife in the vicinity of the Maysdorf II LBA Tract was drawn from several sources, including the South Powder River Basin Coal FEIS, Maysdorf Coal Lease Application FEIS (BLM 2007), WGFD and USFWS records, and personal contacts with WGFD and USFWS biologists. Site-specific data for the Maysdorf II LBA Tract general analysis area were obtained from several sources, including WDEQ/LQD mine permit applications and annual wildlife monitoring reports for the applicant and nearby coal mines. CMC initiated baseline investigations in 2006 expressly for the Maysdorf II LBA Tract. The proposed lease area has received comprehensive coverage during baseline and annual wildlife monitoring surveys for the adjacent Cordero Rojo Mine since the mid-1970s. Baseline and annual wildlife surveys cover a large perimeter around mine permit areas; consequently, a majority of the proposed lease area and adjacent lands have been surveyed for wildlife species as part of

the required monitoring surveys for the Belle Ayr, Coal Creek, and Cordero Rojo Mines. The results of site-specific surveys for the entire leased area and appropriate perimeter would be part of the mine permitting process if the tract is leased.

The topography within the general analysis area is mainly gently rolling and of moderate relief, influenced by the Belle Fourche River and Caballo Creek. Rough breaks and streamside bottomland areas occur in the southern portion of the tract near the Belle Fourche River valley. Elevation ranges from approximately 4,520 to 4,885 ft above sea level.

In an undisturbed condition, the major vegetation types in the general analysis area provide high quality habitats for many species. Vegetation types tend to occur in a mosaic across the landscape; therefore, many wildlife species can be expected to utilize more than one habitat type. Wildlife habitat types include sagebrush grassland, sandy grassland, seeded grassland, bottomland grassland, and rough breaks. Various, relatively small parcels of crested wheatgrass pasture occur throughout the area and networks of road and well-pad disturbance areas overlay much of the sagebrush grassland and sandy grassland areas. There are also numerous tank batteries and miles of pipeline disturbance with varying degrees of recovering vegetative cover. No designated critical, crucial, or unique wildlife habitats are present in the area.

The predominant habitat type is sagebrush grassland, which consists mostly of Wyoming big sagebrush, western wheatgrass, needleandthread, prairie junegrass, Sandberg bluegrass, blue grama, cheatgrass brome, crested wheatgrass, and locally abundant upland sedges. The manyspine plains pricklypear cactus is frequently a large component of the sagebrush grassland community. The sandy grassland is the next largest habitat type and it consists mostly of needleandthread and upland sedges. In certain areas, prairie sand reed, western wheatgrass, blue grama, prairie junegrass, and thickspike wheatgrass are predominant. Domesticated crested wheatgrass and smooth brome are erratically present, as is the native annual grass sixweeksgrass. Japanese brome and cheatgrass brome, both introduced annual grasses, are frequently present in some areas. Seeded grassland is dominated by crested wheatgrass, but older seedings have a mixture of less dominant native plant species, and with the passage of time these seedings begin to resemble sagebrush grassland again. Bottomland grassland, or streamside bottomland habitat is limited to a narrow band along the edges of the Belle Fourche River in the southern portion of the general analysis area. Vegetation common to these areas includes threesquare, common spikerush, broadleaf cattail, bulrush, and inland saltgrass. No trees are present along the river or any of its tributaries in the LBA tract. Rough breaks habitat is distinguished by the irregularity of vegetation, slopes, and soils. Vegetation on the rough breaks is typically sparse, although the diversity of vascular plant species is greater than in the sagebrush grassland and sandy grassland communities.

Under natural conditions, all streams, including the Belle Fourche River, within and adjacent to the LBA tract are ephemeral. Limited segments of the Belle Fourche River do receive recharge from bank storage (groundwater stored in the alluvium along the stream channel) and flow throughout the year, making the stream locally intermittent. In response to surface discharge of groundwater associated with CBNG production upstream of the LBA tract, which is a relatively recent phenomenon, streamflow occurrence is now more persistent. The Belle Fourche River and the distinctive shallow pools that are present along its natural course in the general analysis area are seldom completely dry, resulting in an increase in habitat for waterfowl, shorebirds, and aquatic species. No more than nine small stock reservoirs and two playa areas exist in the general analysis area. One of the playas is now mostly a temporary shallow pond as the result of a CBNG well discharging within its drainage area. Some of the stock reservoirs are also currently augmented by CBNG water. Cordero Rojo Mine's approved mining plan allows disturbance of the Belle Fourche River channel. Approximately six miles of the natural channel have been diverted to-date within the Cordero Rojo Mine's current permit area. CMC would propose another diversion of the Belle Fourche River if they acquire a lease for the Maysdorf II LBA Tract.

S4-10.2 Big Game

Pronghorn (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) are the only two big game species that regularly occur in the wildlife general analysis area. The nearest elk (*Cervis elaphus*) population is the Rochelle Hills Herd, approximately five miles east of the LBA study area. Elk have been seen west of that area during some winter aerial surveys, but never in the LBA tract itself or surrounding two-mile perimeter. White-tailed deer (*Odocoileus virginianus*) have rarely been observed in the vicinity. No crucial big game habitat or migration corridors are recognized by the WGFD in this area. Crucial range is defined as any particular seasonal range or habitat component that has been documented as the determining factor in a population's ability to maintain and reproduce itself at a certain level.

Pronghorn are by far the most common big game species in this area. This species is most abundant in the sagebrush grassland or mixed-grass prairie habitats. Reclaimed grassland constitutes only a small portion of the available habitat around the PRB mines, although pronghorn are observed during all seasonal surveys in these areas. Home range for pronghorn can vary between 400 acres to 5,600 acres, according to several factors including season, habitat quality, population characteristics, and local livestock occurrence. Typically, daily movement does not exceed six miles. Pronghorn may make seasonal migrations between summer and winter habitats, but migrations are often triggered by availability of succulent plants and not local weather conditions (Fitzgerald et al. 1994). The WGFD has classified the general analysis area as primarily winter/yearlong pronghorn range, which means that a population or a portion of a population of animals makes general use of this habitat on a year-round basis and that there is a significant influx of additional animals onto this habitat from other seasonal ranges in the winter. The entire general

south Gillette analysis area is within the WGFD Hilight Herd Unit. In post-season 2007, the WGFD estimated the Hilight Herd Unit to be 12,397 animals, with an objective of 11,000 (WGFD 2008).

In 2007, the WGFD issued 1,200 licenses for the Hilight Herd Unit, Hunt Area 24, and 1,056 antelope were harvested (88 percent success rate). In the years 2002 through 2006, hunters on average harvested 735 animals with better than 90 percent success and spent 2.8 days per animal harvested. Approximately 2,964 recreation days were spent on antelope hunting in 2006. Due to the fact that the Hilight Herd Unit is slightly above herd objectives and the population is in a trend of increasing numbers, additional harvest may be needed to better control the herd and stabilize the population near objectives. Increased harvest may be difficult to achieve because of the increased CBNG development and the presence of coal mines, which are limiting hunter rifle hunting on associated lands. Given the predicted harvest and average winter conditions, the 2008 post-season population was expected to be 12,129 antelope.

Mule deer use nearly all habitats, but prefer sagebrush grassland, rough breaks, and riparian bottomland. Browse is an important component of the mule deer's diet throughout the year, comprising as much as 60 percent of total intake during autumn, while forbs and grasses typically make up the rest of their diet (Fitzgerald et al. 1994). Mule deer are frequently observed on Cordero Rojo Mine reclaimed lands. In certain areas of the state this species tends to be more migratory than white-tailed deer, traveling from higher elevations in the summer to winter ranges that provide more food and cover. However, monitoring has indicated that mule deer are not very migratory in the vicinity of the Maysdorf II LBA Tract. The WGFD has classified a majority of the general analysis area as being out of normal mule deer use range and a small portion as being yearlong mule deer use range, which means that a population or substantial portion of a population of animals makes general use of this habitat on a year-round basis, but may leave the area under severe conditions on occasion. The entire area is located within the WGFD Thunder Basin Mule Deer Herd Unit. No crucial or critical mule deer ranges or migration corridors occur on or within several miles of the Maysdorf II LBA Tract or in the wildlife general analysis area. Crucial range is defined as any particular seasonal range or habitat component that has been documented as the determining factor in a population's ability to maintain and reproduce itself at a certain level. The WGFD estimated the 2007 post-season mule deer for the herd unit at 20,980, which is above the current objective of 20,000 (WGFD 2008).

The 2007 postseason mule deer population was estimated at 20,980, which is 5 percent above the herd objective of 20,000 animals. In 2007, the WGFD issued 2,073 licenses and 1,355 mule deer were harvested from the Thunder Basin Herd Unit and the hunter success rate was 65 percent. The days spent per animal harvested were 6.1 in 2007, which was slightly below the five-year

average. It is likely that insufficient harvest within the Thunder Basin Mule Deer Herd Unit will result in a population increase in the future.

White-tailed deer are generally managed separately by the WGFD in the Central Herd Unit. White-tailed deer prefer riparian habitats and are therefore seldom observed in the general analysis area due to the lack of that particular habitat. The WGFD classifies the entire general analysis area as out of the normal white-tailed deer use range. A narrow corridor along the Belle Fourche River east of the Maysdorf II LBA Tract and east of the Cordero Rojo Mine area is classified as yearlong range. White-tailed deer are occasionally recorded along the Belle Fourche River and Pine Hills to the east but have rarely been recorded in the general analysis area.

Elk reside in the Rochelle Hills south of the wildlife general analysis area. Elk do wander from the protection of the Rochelle Hills to forage in native and reclaimed grasslands within the general south Gillette analysis area. None of the Maysdorf II wildlife general analysis area is classified by the WGFD as within normal elk use range. As more lands are reclaimed from mining, elk are shifting their winter use to these areas. The WGFD has designated an approximately five square mile area on reclaimed lands within the Jacobs Ranch Mine permit area as crucial winter habitat for the Rochelle Hills elk herd (Odekoven 1994). The Jacobs Ranch Mine is located about 15 miles south of the Cordero Rojo Mine (Figure 1-1 in the SGAC EIS document). No elk have been observed recently within the Maysdorf II LBA Tract but they are occasionally recorded in the Pine Hills east of the Cordero Rojo Mine.

S4-10.3 Other Mammals

A variety of small and medium-sized mammal species occur in the vicinity of the general analysis area, although not all have been observed on the LBA Tract itself. These include predators and furbearers, such as coyote (*Canis latrans*), red fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), striped skunk (*Mephitis mephitis*), long-tailed weasel (*Mustela frenata*), badger (*Taxidea taxus*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), and beaver (*Castor canadensis*). Prey species include various rodents (such as mice, rats, voles, gophers, ground squirrels, chipmunks, muskrats, black-tailed prairie dogs [*Cynomys ludovicianus*], and lagomorphs [jackrabbits and cottontails]). These prey species are cyclically common and widespread throughout the region. Porcupines (*Erethizon dorsatum*) and bats (such as hoary [*Lasiurus cinereus*] and big brown [*Eptesicus fuscus*]) also have habitat in the vicinity, primarily east of the Cordero Rojo Mine area. The prey species are important for raptors and other predators.

Qualified wildlife biologists with Intermountain Resources have mapped the current acreage of prairie dog colonies in the vicinity of the Cordero Rojo Mine by walking the perimeters of colonies and delineating them on topographic maps. No colonies are currently present on the Maysdorf II LBA Tract under the Proposed Action or Alternatives 2 or 3. One black-tailed prairie dog colony

exists within one mile east of the Cordero Rojo Mine's current permit area while two other towns are located one to two miles west of the current mine permit area and the Maysdorf II LBA Tract.

S4-10.4 Raptors

The raptor species expected to occur in suitable habitats in the general analysis area include golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), rough-legged hawk (*Buteo lagopus*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), great horned owl (*Bubo virginianus*), burrowing owl (*Athene cunicularia*), and short-eared owl (*Asio flammeus*). The bald eagle (*Haliaeetus leucocephalus*) is a migrant and winter resident. Those species that commonly nest in the general analysis area are the ferruginous hawk, golden eagle, red-tailed hawk, Swainson's hawk, northern harrier, and great horned owl. The burrowing owl and short-eared owl occasionally nest in the area. Habitat is limited for those species that nest exclusively in trees or on cliffs, but several species have adapted to nesting on the ground, creek banks, buttes, rock outcrops, powerlines, mine high walls and mine facilities.

Surveys conducted by Intermountain Resources documented eight raptor species (golden eagle, ferruginous hawk, red-tailed hawk, Swainson's hawk, northern harrier, great horned owl, short-eared owl, and burrowing owl) that had nested at least once within the wildlife survey area for the Maysdorf II LBA Tract. That raptor survey area is defined as a 2-mile radius around the Maysdorf II wildlife general analysis area (Figure 3-28 in the SGAC EIS document). During surveys that were completed in 2006-2007 a total of five raptor species (golden eagle, ferruginous hawk, red-tailed hawk, Swainson's hawk, and great horned owl) were found to be currently nesting within the Maysdorf II survey area. In the past, the prairie falcon, northern harrier, short-eared owl, and burrowing owl have also been identified nesting within or adjacent to the survey area.

The 2008 survey identified 47 intact raptor nests in the raptor survey area. There were 12 intact nests within the Maysdorf II wildlife general analysis area including 10 ferruginous hawk nests, one red-tailed hawk/ferruginous hawk nest and one red-tailed hawk/golden eagle nest.

S4-10.5 Upland Game Birds

Three upland game bird species are known to occur in suitable habitats in the Maysdorf II wildlife general analysis area. These species are sage-grouse (*Centrocercus urophasianus*), mourning doves (*Zenaida macroura*), and gray partridge (*Perdix perdix*).

Sage-grouse are a large upland game bird considered a "landscape species", annually using widespread areas of sagebrush habitats. This grouse is referred

to as both sage-grouse and greater sage-grouse, and the terms are interchangeable. Sage-grouse are found in sagebrush shrub-land habitat, and sagebrush is essential for sage-grouse during all seasons of the year. During winter, sage-grouse feed almost exclusively on sagebrush leaves and buds. Suitable winter habitat requires sagebrush above snow. Sage-grouse tend to select wintering sites where sagebrush is 10-14 inches above the snow. Population and habitat analyses suggest that wintering habitat can be as limiting as mating and breeding habitats. Breeding occurs on strutting grounds (leks) during late March and April. Leks are generally situated on sites with low vegetation and little or no sagebrush, broad ridge tops, grassy openings, and disturbed sites such as burns, abandoned well locations, airstrips or roads. However, often there are areas of denser sagebrush near the lek that are used for foraging, loafing, and hiding cover (WGFD 2003). Approximately two-thirds of hens nest within three miles of the lek where they were bred. The rest of the hens usually nest within 15 miles of the lek. Sage-grouse typically nest under tall sagebrush, but may use other large shrubs. Sagebrush stands used for nesting range in height from eight to 18 inches, with individual plants reaching up to 32 inches tall. Both new spring herbaceous growth and residual cover are important in the understory for nesting sage-grouse (WGFD 2003). Hens move their brood immediately upon hatching from the nest site to brood-rearing areas. Sites used during the first 10-14 days after hatching are typically within 1.5 miles of the nest. The vast majority of chick mortality (87 percent of total brood loss in four studies conducted in Wyoming) occurs during this period. After the first 10 days, broods may have dispersed five or more miles from the nest. As summer progresses and food plants mature and dry, sage-grouse move to areas still supporting succulent herbaceous vegetation. They continue to rely on adjacent sagebrush for protection from weather and predators, and for roosting and loafing. Sage-grouse normally move off late brood-rearing habitat onto transitional fall habitat before moving onto winter range (WGFD 2003).

On and after July 2, 2002, the USFWS received three petitions requesting that the greater sage-grouse be listed as endangered across its entire range. Following a 12-month status review of the best available scientific and commercial information on the species, the USFWS found that listing was not warranted at this time. However, the USFWS continues to have concerns regarding sage-grouse population status, trends and threats, as well as concerns for other sagebrush obligates (USFWS 2005). USFWS has indicated there is a need for continued efforts to conserve sage-grouse and sagebrush habitat on a long-term basis. USFWS encourages continued development and implementation of conservation strategies throughout the grouse's range.

Experimental studies at the USDA National Wildlife Research Center have shown that West Nile virus is usually fatal to sage-grouse, resulting in death within six days of infection (USGS 2006). The disease was first detected in sage-grouse in the PRB in 2003. That year, the deaths of 11 sage-grouse in northeastern Wyoming were confirmed from West Nile virus in August and early September. In 2004 and 2005 combined, five sage-grouse in the PRB

were found to have died from the disease. Summer temperatures in 2004 and 2005 were cooler than normal, while 2003 was warmer than normal. The lower temperatures in 2004 and 2005 are believed to have contributed to the reduced mortality rate during those years (WGFD 2006). The warmer summer of 2006 was accompanied by increased sage-grouse mortality due to West Nile virus (USGS 2006). Lek, or strutting ground, count data indicate that Wyoming's sage-grouse populations increased slightly in 2004 and 2005.

In May 2002, the USFWS office in Cheyenne, Wyoming released a list entitled *Coal Mine List of 40 Migratory Bird Species of Management Concern in Wyoming,* which replaced the previous *Migratory Birds of High Federal Interest List*. The greater sage-grouse is included on the new list and, as a result, the presence of sage-grouse and sage-grouse sign are included in the annual migratory bird surveys that are conducted by the coal mines in both spring and summer.

Cordero Rojo Mine conducts surveys to identify new sage-grouse leks and sage-grouse lek attendance at previously identified leks in the spring as part of the annual wildlife surveys that are conducted for the mine. These surveys and baseline inventories, which include the mine's permit area and a one-mile perimeter, were initiated in the mid-1970s to early 1980s when the CRI and CMC Mines were initially permitted. As a result, most of the area included in the proposed Maysdorf II LBA Tract has been included in previous annual survey areas.

The sage-grouse is a yearlong resident and is occasionally encountered in the general analysis area. The most abundant vegetation type on the tract is the sagebrush grassland type, which is characterized by the moderate to heavy presence of Wyoming big sagebrush (Section 3-10). However, at the present time sage-grouse do not appear to be abundant or common in the area.

Five recently active sage-grouse leks have been surveyed within 3 miles of the Maysdorf II wildlife general analysis area: the Belle Ayr, Stowe, Thrush, Doud (Cordero Mine), and Lynde leks. The Belle Ayr lek consists of at least two contiguous areas where sage grouse were observed strutting (Belle Ayr I and Belle Ayr II). The Belle Ayr I and Belle Ayr II leks are located within the wildlife general analysis area. The peak number of males was 12 in 1991, while no males were recorded in surveys conducted in 1992, 1993, 2004, 2006 or 2007. One male was recorded on the Belle Ayr lek in 2005. Attendance has been relatively low, averaging less than four males over the last 18 years. The Stowe lek is located approximately 0.4 miles north of the wildlife general analysis area. The Stowe lek had a peak of eight males in 2001, but no birds were recorded on this lek in 2003, 2004, 2005, 2006 or 2007. Due to their proximity to one another, the WGFD considers the Belle Ayr I, Belle Ayr II and Stowe to be within the Belle Ayr Complex. The Thrush lek is located over 1.5 mile southeast of the Maysdorf II wildlife general analysis area. The Thrush lek was not active in 1995 through 1999 and 2001 through 2007. The peak number of males observed on the Thrush lek was 19 (1990 and 1991). The Doud (Cordero Mine) lek is located approximately 0.5 mile from the southwest corner of the wildlife general analysis area. A maximum of seven males were

recorded at the Doud lek in 2003, but no birds were in attendance in 2004, 2005, 2006 or 2007. The Lynde lek is located approximately 2.9 miles northwest of the wildlife general analysis area and its 3-mile radius just intersects the northwest corner of the analysis area. The 3-mile radii around the Stowe, Belle Ayr I and II, Thrush, and Doud (Cordero Mine) leks also extend onto the Maysdorf II wildlife general analysis area.

Mourning doves are a migrant and relatively common in the area during migration, particularly near sites with water sources and trees and in the summer for breeding and nesting. This species is a relatively common breeding bird in Campbell County and may be found in a variety of habitat types. Mourning doves were common on the survey area in 2007.

Gray (or Hungarian) partridge, an introduced species, have been infrequently observed on reclaimed areas, sagebrush shrublands, upland grassland, and cultivated lands. In some years this species is occasionally encountered while in other years partridge appear to be totally absent. A single pair of Hungarian partridge was observed in a crested wheatgrass field in 2007.

S4-10.6 Migratory Bird Species of Management Concern in Wyoming

USFWS uses a list entitled *Migratory Bird Species of Management Concern in Wyoming*, specifically the *Coal Mine List of 40 Migratory Bird Species of Management Concern in Wyoming,* for reviews related to existing and proposed coal mine leased land (USFWS 2002). This list was taken directly from the Wyoming Bird Conservation Plan (Cerovski et al. 2001), and was current through 2006. The *Migratory Bird Species of Management Concern in Wyoming* list replaced the *Migratory Birds of High Federal Interest* list. The Cordero Rojo Mine previously conducted annual surveys for the species included on the MBHFI list and now conducts annual surveys for the species included on the coal mine list. The surveys, which are conducted in the winter through summer, include the permit area and a one-half to one mile perimeter.

Sixteen of the listed species have historically been observed within the general analysis area (Table S4-7). The species usually observed nesting in the area include the ferruginous hawk, Swainson's hawk, greater sage-grouse, loggerhead shrike (*Lanius ludovicianus*), Brewer's sparrow (*Spizella breweri*), vesper sparrow (*Pooecetes gramineus*), lark bunting (*Calamospiza melanocorys*), and McCown's longspur (*Calcarius mccownii*). The upland sandpiper (*Bartramia longicauda*), burrowing owl, short-eared owl, chestnut-collared longspur (*Calcarius ornatus*), and the grasshopper sparrow (*Ammodramus savannarum*) may also nest in the area but less frequently because nesting habitat for these species is not abundant. The bald eagle is only observed in the winter or as a migrant and the long-billed curlew (*Numenius americanus*) has only been observed as a migrant.

Table S4-7. Migratory Bird Species of Management Concern in Wyoming: Their Regional Status, and Expected and Actual Occurrence on or Near the Maysdorf II LBA Tract.

Species	Seasonal Status/Breeding Records in Northeastern WY[1]	Expected Occurrence on and in Vicinity of the LBA Tract [2]	Historical Sighting Records and Breeding Status in Vicinity of the LBA Tract[3]
LEVEL I (species need conservation action)			
Mountain plover	Summer/Breeder	Rare	None
Greater sage-grouse*	Resident/Breeder	Common	Common breeder
McCown's longspur*	Summer/Breeder	Uncommon	Uncommon breeder
Baird's sparrow	Summer/Observed	Rare	None
Ferruginous hawk*	Resident/Breeder	Common	Common breeder
Brewer's sparrow*	Summer/Breeder	Common	Common breeder
Sage sparrow	Summer/Breeder	Rare	None
Swainson's hawk*	Summer/Breeder	Common	Common breeder
Long-billed curlew*	Summer/Observed	Uncommon	Uncommon breeder
Short-eared owl*	Resident/Breeder	Uncommon	Uncommon breeder
Peregrine falcon	Resident/Observed	Uncommon Migrant	None
Burrowing owl*	Summer/Breeder	Uncommon	Uncommon breeder
Bald eagle*	Resident/Breeder	Seasonally Common	Common in winter
Upland sandpiper*	Summer/Breeder	Uncommon	Uncommon breeder
LEVEL II (species need monitoring)			
Cassin's kingbird	Never Recorded	Very Rare	None
Lark bunting*	Summer/Breeder	Common	Common breeder
Dickcissel	Summer/Observed	Very Rare	None
Chestnut-collared longspur*	Summer/Breeder	Common	Uncommon breeder
Black-chinned hummingbird	Never Recorded	Very Rare	None
Pygmy nuthatch	Never Recorded	Not Expected	None
Marsh wren	Never Recorded	Very Rare	None
Western bluebird	Summer/Breeder	Not Expected	None
Sage thrasher	Summer/Breeder	Uncommon	Uncommon breeder
Grasshopper sparrow*	Summer/Breeder	Uncommon	Infrequent breeder
Bobolink	Summer/Observed	Very Rare	None
Common loon	Summer/Observed	Not Expected	None
Black-billed cuckoo	Never Recorded	Not Expected	None
Red-headed woodpecker	Summer/Breeder	Rare	None
Yellow-billed cuckoo	Summer/Observed	Not Expected	None
Eastern screech-owl	Never Recorded	Not Expected	None
Western screech-owl	Never Recorded	Not Expected	None
Western scrub-jay	Never Recorded	Not Expected	None
Loggerhead shrike*	Summer/Breeder	Uncommon	Occasional breeder
Vesper sparrow*	Summer/Breeder	Common	Common breeder
Lark sparrow	Summer/Breeder	Uncommon	None
Ash-throated flycatcher	Summer/Observed	Not Expected	None
Bushtit	Never Recorded	Not Expected	None
Merlin	Resident/Observed	Uncommon Migrant	None
Sprague's pipit	Never Recorded	Rare	None
Barn owl	Summer/Observed	Very Rare	None

[1] Compiled from Luce, et al. (1999 and subsequent revisions), for the Campbell County Area.
[2] Expected occurrence in the study area was based on range, history of occurrence, and habitat availability.
[3] Sighting records were derived from actual occurrence on or within one-half mile of the LBA tract and the Alternatives 2, 3, and 4 tract configuration area.
* Species marked with an asterisk have historically been recorded during baseline or monitoring surveys for the Cordero Rojo Mine.

The mountain plover is included on the list of *Coal Mine list of 40 Migratory Bird Species of Management Concern in Wyoming*. The USFWS proposed listing the mountain plover as a threatened species in February 1999 but in September 2003 the agency withdrew the proposed rule to list the mountain plover as threatened (USFWS 2008). The USFWS continues to encourage provisions that would provide protection for this species, as it continues to be protected under the Migratory Bird Treaty Act and as a sensitive species under BLM policy (Bureau Manual 6840.06 E. Sensitive Species).

Wildlife surveys conducted at the Cordero Rojo Mine since the 1970s have failed to detect the presence of mountain plovers in the area. The survey area, which includes the Cordero Rojo Mine permit area and a half-mile perimeter, is inventoried for suitable mountain plover habitat annually. Qualified wildlife biologists with Intermountain Resources keep watch during all surveys and site visits for all migratory birds of potential concern and habitats that could support them. Data is included in Cordero Rojo Mine's annual wildlife monitoring reports to WDEQ/LQD as required by the "monitoring and mitigation plan for raptors and species of High Federal Interest" approved for Cordero Rojo Mine by the USFWS. Mountain plover preferred habitat consists of level, open and exceedingly grazed sites (Knopf 1996) that are generally lacking in the Cordero Rojo Mine survey area and the Maysdorf II LBA study area. Prairie dog towns can provide habitat for the mountain plover, although no colonies exist within the tract as applied for and the area added by Alternatives 2 and 3. No sightings of mountain plover have ever been recorded in the vicinity of the LBA tract.

The bald eagle (*Haliaeetus leucocephalus*) is seasonally common and most frequently observed during the winter months. Bald eagles are relatively common winter residents and migrants in northeastern Wyoming's PRB. No bald eagle roosting habitat is present on the Maysdorf II LBA Tract or areas added by Alternatives 2 and 3. No known nest sites, or consistent yearly concentrated prey or carrion sources for bald eagles are present in the area of the Cordero Rojo Mine, including the Maysdorf II LBA Tract and adjacent study area. However, this species is commonly observed in the general vicinity of the Maysdorf II LBA Tract in the winter.

In the winters of 2004-2005, 2005-2006 and 2006-2007, the bald eagle was far more common and abundant in the area than in previous years. This may have been a result of mild winters and the abundance of lagomorphs (rabbits) to prey upon. Bald eagles also scavenged road-killed rabbits off of adjacent roads. Lagomorph numbers appeared to be at or near a peak in their cycle. In the winters of 2004-2005, 2005-2006 and 2006-2007, bald eagles frequently used a large windbreak within the existing Cordero Rojo Mine permit area in the NW¼ of Section 22, T.47N., R.71W. Bald eagles had never been observed concentrating in this windbreak during the previous 25+ years of wildlife surveys. A maximum of 29 bald eagles were observed at this roost site on February 16 of 2005 with maximums of 20 and 15 recorded in 2005-2006 and 2006-2007, respectively. Very few birds had been observed at the roost through late 2007. This roost site is within ¼ mile of active mining operations

and bald eagles were commonly observed around mining activities. Bald eagle roosts or concentration areas were not observed on the Maysdorf II LBA Tract during the winters of 2004-2005, 2005-2006 and 2006-2007 or during prior wildlife monitoring surveys.

The burrowing owl is uncommon and is observed as an occasional breeder in the Maysdorf II wildlife general analysis area. Sage-grouse, recently added to the Level 1 list, are becoming less common in the general analysis area but are still classified as a common breeder on and in the near vicinity of the Maysdorf II LBA Tract (see Section 3.10.5 above). Additional information about the observed occurrence of the bald eagle in the general analysis area can be found in the Biological Assessment (Appendix E).

Sage-grouse, recently added to the Level 1 list, are becoming less common in the general analysis area but are still classified as a common breeder on and in the near vicinity of the Maysdorf II LBA Tract.

Suitable nesting habitat is scarce if not absent in the Maysdorf II wildlife general analysis area for the remainder of the *40 Migratory Bird Species of Management Concern in Wyoming*; therefore, the 25 other species have rarely or never been recorded.

S4-10.7 Other Species

Incidental sightings of other species not targeted by systematic wildlife surveys completed specifically for the applicant and adjacent mines, as well as biological research projects in the eastern PRB, have documented numerous other wildlife species that are generally common inhabitants of the area. Other species observed include waterfowl, shorebirds, nongame birds and nongame fish, as well as various herptiles. Extensive wildlife species lists, that document species observed and those with the potential for occurring in the area, are included in the Cordero Rojo Mine WDEQ/LQD mine permits.

Wildlife species richness is generally greatest in habitats with water, trees, and/or varied terrain. Excluding the Belle Fourche River valley and its breaks, there is little topographic diversity within the Maysdorf II LBA wildlife study area. The relatively homogeneous upland habitats and the low occurrence of water and trees would tend to indicate a limited suite of avian species. Baseline and monitoring surveys at the Cordero Rojo Mine and nearby mines confirm that habitats in this portion of the semi-arid northern Great Plains typically possess little avian diversity (Commonwealth 1980, Powder River Eagle Studies 1987-1999, Intermountain Resources 1987-2005). During the 2004-2005 annual wildlife monitoring surveys conducted for the Cordero Rojo Mine and the 2005 baseline wildlife survey conducted by IR for the Maysdorf II LBA Tract, common nongame avian species observed included the lark bunting, western meadowlark (*Sturnella neglecta*), Brewer's blackbird (*Euphagus cyanocephalus*), horned lark (*Eremophila alpestris*), western kingbird (*Tyrannus verticalis*), and various species of sparrows. Numerous other avian

species were observed during the yearly and seasonal surveys. These additional avian species are listed in the Cordero Rojo Mine permits.

Under natural conditions, the Maysdorf II LBA Tract provides limited waterfowl and shorebird habitat. The natural aquatic habitat, prior to CBNG development within the Belle Fourche River drainage basin, was mainly available during spring migration as ponds (primarily stock reservoirs and playa areas) and ephemeral streams. Many of these water features generally got quite low or dried up during the summer. However, the relatively recent development of CBNG resources upstream and within the general analysis area has supplied the river, its tributaries, ponds, and playas with water nearly continuously, resulting in an increase in habitat for waterfowl and shorebird species. Broods from the American wigeon (*Anas Americana*), blue-winged teal (*Anas discors*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), gadwall (*Anas strepera*), and green-winged teal (*Anas crecca*) have been observed in the area.

Water discharged from CBNG wells has recently supplied the Belle Fourche River and some tributaries, ponds, and playas with water nearly continuously, resulting in an increase in habitat for aquatic species. However, in July of 2005 only 40 percent of the river's channel length through the Maysdorf II LBA Tract contained water, while the remaining 60 percent of the channel length was dry. These observations document that this reach of the Belle Fourche River has not become perennial, even with the addition of CBNG discharge water.

In 1997, the Belle Fourche River was sampled at Section 19, T.46N., R.71W., which is several miles upstream from the Maysdorf II LBA Tract. The black bullhead, creek chub, carp, fathead minnow, green sunfish, sand shiner, and white sucker were found during those surveys (Patton 1997). WGFD has categorized the black bullhead as a Status 3 species. Status 3 species are widely distributed throughout their native range with stable populations; however, habitat is declining or vulnerable.

Excluding the black bullhead, none of the other aquatic species found during the 1975, 1997, or 2005 surveys are of specific concern to state or federal agencies and the Belle Fourche River channel through the Maysdorf II LBA Tract is not considered a viable fishery. The site rating for this stream reach was poor to very poor, based on the 2005 macroinvertebrate samplings and the WDEQ Indices.

Numerous reptile and amphibian species have been recorded during the various surveys on the Cordero Rojo Mine area and adjacent lands, including the LBA tract. These species include the tiger salamander (*Ambystoma tigrinum*), plains spadefoot (*Scaohiopus bombifrons*), great plains toad (*Bufo cognatus*), boreal chorus frog (*Pseudacris triseriata maculata*), northern leopard frog (*Rana pipiens*), common snapping turtle (*Chelydra serpentina serpentina*), western painted turtle (*Chrysemys picta belli*), eastern short-horned lizard

(*Phrynosoma douglassi brevirostre*), northern sagebrush lizard (*Sceloporus graciosus graciosus*), prairie rattlesnake (*Crotalus viridis viridis*), plains hognose snake (*Heterondon nasicus nasicus*), bullsnake (*Pituophis melanoleucas sayi*), western plains garter snake (*Thamnophis radix haydeni*), red-sided garter snake (*Thamnophis sirtalis parietalis*), and eastern yellowbelly racer (*Coluber constrictor flaviventris*). The abundance of these reptiles and amphibians is difficult to determine but these species appear to be common to the area.

S4-10.8 Threatened, Endangered, Proposed, and Candidate Animal Species

Potential habitat for T&E species and their occurrence on the Maysdorf II LBA Tract are discussed in Appendices E and F of the SGAC EIS document.

S4-11 LAND USE AND RECREATION

The majority of the surface estate on the Maysdorf II LBA Tract as applied for under the Proposed Action and the area added under Alternatives 2 and 3 is privately owned by CRI, CMC, and six other private parties, with a relatively small portion owned by the United States of America and a very small tract is owned by the Campbell County Cemetery District. The ownership of the surface estate is shown in detail in Figure 3-34 in the SGAC EIS document. The federally owned land is administered by the BLM. The principal land uses within the LBA tract and the area added under Alternatives 2 and 3 include livestock grazing on native rangelands, oil and gas production, wildlife habitat, and recreation. The Campbell County Cemetery District owned a small cemetery that contained the remains of six relatives of the Haight Family as well as six other people. CMC, the Campbell County Cemetery District, and the Haight Family worked on a plan to relocate the remains to the Mt. Pisgah Cemetery in Gillette, Wyoming.

Areas of disturbance within the general analysis area include power transmission lines, ranching-related roads, producing, shut-in and plugged and abandoned conventional oil and gas wells, producing, shut-in and plugged and abandoned CBNG wells, roads and production facilities associated with these oil and gas wells including numerous buried pipelines, and surface mine-related facilities. No state highways cross the LBA tract but State Highway 59 lies two to four miles to the west. Two county roads traverse and provide public and private access within the proposed lease area. These include the Haight Road and the Hilight Road. Two other county roads provide public and private access near the proposed lease area. These include the T-7 Road and Hoadley Road. The BNSF & UP railroad ROW also crosses a small portion of the tract.

The oil and gas estate within the Maysdorf II LBA Tract as applied for and the area added under Alternatives 2 and 3 is federally and privately owned, with the majority (approximately 76 percent) being privately owned. The ownership of the oil and gas estate is shown in Figure 3-38 in the SGAC EIS document. A

list of the current federal oil and gas lessees of record is included as Table 3-16 in the SGAC EIS document.

As of December 13, 2007, 39 wells have been drilled into conventional oil and gas reservoirs on lands included in the Maysdorf II LBA Tract as applied for and the lands added under Alternatives 2 and 3. Figure 3-38 in the SGAC EIS document depicts the locations of these conventional oil and gas wells. Of these 39 wells, 16 are permanently abandoned, 14 wells are still producing, seven well are active injectors, one well is shut in, and one is temporarily abandoned. Two of the producing wells are on federal leases. All the conventional oil and gas wells on the proposed lease area and the area added under Alternatives 2 and 3 were originally drilled between 1966 and 2004 and were designed to produce from either the Pennsylvanian-Permian Minnelusa Formation or the Lower Cretaceous Mowry or Muddy Formation at an average depth of approximately 10,560 ft (WOGCC 2007a). Conventional oil and gas wells capable of production within the Maysdorf II general analysis area are listed in Appendix G of the SGAC EIS document.

According to the WOGCC records as of December 13, 2007, there were 14 producing CBNG wells, 43 shut-in CBNG wells, 12 permanently abandoned wells, and one spudded CBNG well within the Maysdorf II LBA Tract as proposed and the lands added under Alternatives 2 and 3. Figure 3-38 in the SGAC EIS document depicts the locations of these CBNG wells. Extensive CBNG development has occurred west of the LBA tract. CBNG wells capable of production on or in sections adjacent to the tract are listed in Appendix G in the SGAC EIS document. Most CBNG drilling within and near the Maysdorf II LBA Tract has occurred on a 40-acre spacing pattern, either because the wells were drilled prior to the WOGCC establishing the 80-acre default spacing for CBNG wells in the PRB, or under authorization of spacing exceptions granted by WOGCC. Certain townships in the PRB are now exempt from the 80-acre spacing pattern rule, including T.46N. and T.47N., R.71W. (WOGCC 2005b). CBNG wells capable of production on or in sections adjacent to the Maysdorf II LBA Tract are listed in Appendix G of the SGAC EIS document.

Coal mining is a dominant land use in the area surrounding the proposed lease area. The Caballo, Belle Ayr, Cordero Rojo, and Coal Creek Mines form a group of contiguous or nearly contiguous surface coal mines located in Campbell County (Figure SI-1). Coal production from these four active mines increased by nearly 47 percent between 1997 and 2007 (from approximately 74 million tons in 1997 to 108.5 million tons in 2007). Since decertification, two coal leases (the West Rocky Butte LBA Tract and the South Maysdorf LBA Tract) have been issued within the group of four mines. The lease sale of the Maysdorf North LBA Tract is currently pending.

Big game hunting is the principal recreational land use within the general analysis area, and pronghorn, mule deer, and white-tailed deer are present within the area. On private lands, hunting is allowed only with landowner permission. Land ownership within the PRB is largely private (approximately 80 percent), with some private landowners permitting sportsmen to cross

and/or hunt on their land. There has been a trend over the past two to three decades towards a substantial reduction in private lands that are open and reasonably available for hunting. Access fees continue to rise and many resident hunters feel these access fees are unreasonable. This trend has created problems for the WGFD in their attempt to distribute and control harvest at optimal levels, as well as for sportsmen who desire access to these animals (WGFD 2004). Pronghorn, mule deer, and white-tailed deer occur on or adjacent to the Maysdorf II LBA Tract. Sage grouse, mourning dove, waterfowl, rabbit, and coyote may be also harvested in the vicinity, and some trapping of red fox may also occur.

The WGFD has classified the general south Gillette analysis area as primarily winter/yearlong pronghorn range (a population or a portion of a population of animals makes general use of this habitat on a year-round basis, with a significant influx of additional animals onto this habitat from other seasonal ranges in the winter) and yearlong pronghorn range (a population or substantial portion of a population of animals makes general use of this habitat on a year-round basis, but may leave the area under severe conditions on occasion). The Maysdorf II LBA Tract wildlife general analysis area is within the WGFD Hilight Herd Unit. In post-season 2007, the WGFD estimated the Hilight Herd Unit to be 12,397 animals, with an objective of 11,000 (WGFD 2008).

In 2007, the WGFD issued 1,200 licenses for the Hilight Herd Unit, Hunt Area 24, and 1,056 antelope were harvested (88 percent success rate). In the years 2002 through 2006, hunters on average harvested 735 animals with better than 90 percent success and spent 2.8 days per animal harvested. Approximately 2,964 recreation days were spent on antelope hunting in 2007. Due to the fact that the Hilight Herd Unit is slightly above herd objectives and the population is in a trend of increasing numbers, additional harvest may be needed to better control the herd and stabilize the population near objectives. Increased harvest may be difficult to achieve because of the increased CBNG development and the presence of coal mines, which are limiting hunter rifle hunting on associated lands. Given the predicted harvest and average winter conditions, the 2008 post-season population was expected to be 12,129 antelope.

The Maysdorf II LBA Tract as applied for and the area added by Alternatives 2 and 3 is located within the WGFD Thunder Basin Mule Deer Herd Unit. According to WGFD maps, a majority of the proposed lease area is considered yearlong mule deer range. Crucial or critical mule deer ranges do not occur on or within several miles of the LBA tract. The LBA tract is in mule deer Hunt Area 21, part of the Thunder Basin Herd Unit, which also includes Hunt Areas 7, 8, 9, 10, and 11. The Thunder Basin Herd Unit encompasses 3,642 square miles, of this, 71 percent is privately owned. Access fees are common, resulting in heavy hunting pressure on accessible public land, particularly in recent years. Much of the public owned surface lands are scattered and inaccessible without crossing private land.

The 2007 postseason mule deer population was estimated at 20,980, which is 5 percent above the herd objective of 20,000 animals. In 2007, the WGFD issued 2,073 licenses and 1,355 mule deer were harvested from the Thunder Basin Herd Unit and the hunter success rate was 65 percent. The days spent per animal harvested were 6.1 in 2007, which was equal to the five-year average. It is likely that insufficient harvest within the Thunder Basin Mule Deer Herd Unit will result in a population increase in the future.

The Rochelle Hills Elk Herd resides in the Rochelle Hills, which is located in southeastern Campbell County, southwestern Weston County, and north central Converse County. Elk Hunt Area 123 of the Rochelle Hills Herd Unit extends into the Maysdorf II LBA Tract as proposed; however, no recognized elk herds are located in the immediate vicinity and no elk have been recorded on or near the LBA track.

White-tailed deer are generally managed separately by the WGFD in the Central Herd Unit. White-tailed deer prefer riparian habitats and are therefore seldom observed in the general analysis area due to the lack of that particular habitat. The WGFD classifies the entire general analysis area as out of the normal white-tailed deer use range. A narrow corridor along the Belle Fourche River east of the Maysdorf II LBA Tract and east of the Cordero Rojo Mine area is classified as yearlong range. White-tailed deer are occasionally recorded along the Belle Fourche River and Pine Hills to the east but have rarely been recorded in the wildlife general analysis area.

Under natural conditions, aquatic habitat is very limited by the ephemeral nature of surface waters in the general analysis area; therefore, public fishing opportunities are very limited. The lack of deep-water habitat and extensive, persistent water sources limits the presence and diversity of fish and other aquatic species. Water discharged from CBNG wells located upstream of the general analysis area has supplied the Belle Fourche River with water nearly continuously, resulting in an increase in habitat for aquatic species. The Belle Fourche River currently supports a variety of nongame fish in the general analysis area. The Belle Fourche River is listed in the WDEQ/LQD Surface Water Classification List as a Class 2AB stream that is protected for drinking water, aquatic life (classified as a warm water fishery), recreation, wildlife, agriculture, industry, and scenic value. Downstream of the general analysis area, the Belle Fourche River becomes a warm water fishery. All other ephemeral streams draining the existing Cordero Rojo Mine permit area and the general analysis area are categorized as Class 4 streams (WDEQ/WQD 2001).

S4-12 CULTURAL RESOURCES

CMC contracted with TRC Mariah Associates, Inc. of Laramie, Wyoming to complete a Class I and Class III cultural resource inventory of the Maysdorf II LBA Tract as proposed, the area added under Alternatives 2 and 3, and the additional lands that would be disturbed by mining the LBA tract under the

Alternative 2 tract configuration (assumed to be a ¼ mile buffer) in 2007. These areas included all areas of disturbance assuming the coal is mined as a maintenance tract for the Cordero Rojo Mine. Much of the LBA survey area had already been intensively surveyed at a Class III level by numerous inventories that were associated with oil and gas field development and surface mining operations.

S4-12.1 Previous Investigations

Class I (review of previous survey records) file searches conducted at the Wyoming SHPO produced information from 39 cultural resource projects in the Maysdorf II Tract survey area. The majority of these projects are Class III seismic, well pad, and drillhole inventories conducted in association with oil and gas development. Portions of the project area surveyed at a Class II level during early projects were subsequently surveyed at a Class III level. Previous investigations also include two monitoring projects and testing of Site 48CA3285.

The Class I review of previous survey records identified 33 archeological sites, of which 20 are prehistoric, 12 are historic, and one is multi-component. Prehistoric sites consist primarily of open camps and lithic scatters. Fifteen of the prehistoric sites are considered not eligible to the NRHP, two remain unevaluated, and three are considered eligible to the NRHP. Historic sites consist primarily of homesteads, trash dumps, and historic trails. Four historic trails (Hay Creek-Porcupine Road, Hathaway's-Black Hills Trail, Sawyer's Expedition Trail, and Crook's Military Trail) and one homestead are considered eligible to the NRHP. Seven historic sites are considered not. The one multi-component site is a lithic and trash scatter and is unevaluated.

A total of 13 isolated occurrences were identified during the Class I records search. The isolates consist of prehistoric flakes and tools.

S4-12.2 Current Investigations

The remainder of the Maysdorf II cultural resources general analysis area was surveyed at a Class III level in 2007. A total of eight archaeological sites and 16 isolated occurrences were identified and recorded during this recent Class III inventory. The eight newly recorded cultural sites consist of five historic sites (two homesteads, a windmill, a trash scatter, and a cemetery) and three prehistoric sites, including a cairn with artifacts, a stone circle site, and a lithic scatter. Two of the three prehistoric sites will remain unevaluated pending Native American consultation, while the remaining six archaeological sites will be recommended as not eligible. The 16 isolates consist of nine localities of prehistoric flakes and tools and seven localities of historic debris items.

S4-12.3 Summary

To summarize the identified cultural properties, a total of 41 archaeological sites are located in the Maysdorf II cultural resources general analysis area

(Table S4-8). Of these 41 sites, 23 are prehistoric, 17 are historic, and one is multi-component. A total of eight sites are considered eligible to the NRHP. These sites include the four historic trails (Hay Creek-Porcupine Road, Hathaway's-Black Hills Trail, Sawyer's Expedition Trail, and Crook's Military Trail), one homestead, and three prehistoric open campsites. Only the Sawyer's Expedition Trail (48CA1570 and associated reports) has not yet been concurred by SHPO. A total of 11 sites remain unevaluated to the NRHP. The remaining 22 sites have either been determined or are recommended as not eligible to the NRHP. Twenty-two prehistoric isolated finds and seven historic isolated finds were also recorded. The entire Maysdorf II cultural resources general analysis area has been surveyed for cultural resources at a Class III level.

Table S4-8. Sites and Isolated Finds in the Class I and Class III Cultural Resource Inventory of the Maysdorf II Tract Survey Area.

Prehistoric sites:	
Lithic Scatter:	48CA1879, 48CA1880, 48CA5625, 48CA5628, 48CA5689, 48CA5724, 48CA5736, 48CA5740, Site #7[1]
Open Campsite:	48CA1436, 48CA1886, 48CA1893, 48CA5686, 48CA5690, 48CA5716, 48CA5717, 48CA5723, 48CA5735, 48CA5738
Stone Circle/Cairn:	48CA5685, Site #12[1]
Campsite with Stone Circle:	48CA5737, Site #11[1]
Isolated finds:	22 localities
Historic sites:	
Trail:	48CA1568, 48CA1570, 48CA4975, 48CA5297
Debris:	48CA1884, 48CA4124, 48CA5687
Homestead:	48CA1881, 48CA1888, 48CA1894, 48CA4495, Site #4[1], Site #5[1]
Marker:	48CA5727
Livestock/Ranching:	Site #3[1], Site #9[1]
Cemetery:	Site #10[1]
Isolated finds:	7 localities
Multi-component sites:	48CA1437

[1]Sites recorded during current Maysdorf II inventory that do not yet have a Smithsonian Site Number and have not been reviewed by the BLM.

Through mitigation procedures involving data recovery plans at each site, the archaeological record will not be negatively affected due to the loss of sites 48CA1568, 48CA1570, 48CA1881, 48CA4975, 48CA5685, 48CA5717, 48CA5723, and 48CA5297. Archaeological excavation and analysis will provide information toward a better understanding of local history, offsetting the loss of these and the other, less significant, local historic sites to coal mining impacts. Until consultation with SHPO has occurred and agreement regarding NHRP eligibility has been reached, all sites should be protected from disturbance.