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APPENDIX D-1
LAND USE

1.0 GENERAL

The Smith Ranch Project is located in Converse County, Wyoming approximately 25 miles north of Douglas and 24 miles northeast of Glenrock. Converse County is a rural county that comprises approximately 2.74 million acres of land. Urban areas of Douglas and Glenrock constitute less than 2 percent of the total, while transportation systems account for approximately 4.5 percent. A generalized land use map for Converse County is presented in **Figure D-1-1** of this appendix. **Figure D1-2 provides the complete permit boundary, including the Proposed Reynolds Ranch Amendment area. Notes on the index map indicate when individual plates and figures for Smith Ranch, Highland or Reynolds can be found in the addenda. Table D-1.1 provides a tabulation of the land use acres in Converse County. The information provided in the table was obtained from the Converse County Land Use Plan dated August 1978. Cameco Resource (CR) reviewed the recent Converse County Land Use Plan (July 15, 2003), and the detailed land use acreage was not provided. The land use data from 1978 is probably comparable to today's present land use with the exception of agricultural land use. The Converse County Agricultural Extension office reported from 358 ranches and farms, 2,515,000 acres (total farm acres), 79,000 acres (total ranch acres), and 7,228 acres (total cropland acres). Several electrical utility companies (PacifCorp Energy, Duke Energy and others) have shown interest in Converse County as potential wind farm sites and have submitted Section 109 Permit Applications pursuant to Wyoming Statute (W.S.) § 35-12-109 of the Industrial Development Information and Siting Act. In fact, a wind farm has been constructed at the former Dave Johnston Coal Mine property located a few miles west of the Smith Ranch permit area. Plates D1-1 and D1-2 provide information from the 2003 Converse County Land Use Plan relating to assessed land use and the transportation network.**

Historically, the area was homesteaded and dry-land farmed. Many of these dry farmed areas were ultimately abandoned and left to revegetate by natural processes or were seeded with crested wheatgrass or other grasses for grazing purposes.

Today the area remains remote and contains a low population density primarily dominated by agricultural pursuits (see **Figure D1-1** and **Plate D1-1**). The majority of people living in the area reside on dispersed ranches. Sheep and cattle grazing comprise the major past and present land use in the area and at the project site. The Vollman Ranch is the only inhabited residence located within the current permit area. According to the 2007 Census of Agriculture, agricultural uses of 2.37 million acres account for 86.4 percent of the total surface area, and un-irrigated grazing is the dominant use. Per the Wyoming Department of State Lands records, grazing leases are limited to one animal unit month (AUM) per four acres of land surface.

The discovery and production of energy-related minerals temporarily influenced these traditional land uses. The Dave Johnston Power Plant and Wind Farm, east of Glenrock, represent the major industrial complex in the county. The historical uranium operations of Exxon, the TVA and Bear Creek had a temporary impact on the area in the 1970s and 1980s. Those activities have since ceased operation and have been or are in the process of being reclaimed.

The project area has limited surface water other than ephemeral streams, playas and stock ponds. A discussion of these waters is provided in Appendix D-6 (Hydrology).

2.0 PRESENT LAND USE

The area can be characterized as a predominately sagebrush-grassland type. The land surface within the existing permit area lies within a large region of native rangeland used for grazing sheep, cattle and some horses and is predominantly in private ownership. The land is fenced to accommodate such activities. **In situ recovery (ISR) production areas and surface facilities are fenced to maintain security and keep livestock from damaging the facilities. Fencing of the site is discussed in Section 3.4.5 of the Operations Plan and Section 3.5.2 of the Reclamation Plan**. The locations of fences are shown on **Plate OP-1** of Volume I: Operations and Reclamation Plan.

As detailed in the Operations Plan, fencing is used around the mine unit pattern areas and satellite facilities to primarily prevent livestock from creating interruptions or damage to construction and/or production activities. This is the Type I fence described in LQD Guideline 10. Fences are constructed using 32-inch high, woven wire (sheep-tight) fence that is approximately 1 inch off the ground surface. There is one barbed wire approximately 6 inches above the woven wire and another barbed wire approximately 6 inches above the first barbed wire. Therefore, fences are constructed with a total height of approximately 45 inches. Type I fences do not restrict the passage of deer or other high jumping wildlife. Due to the odd shapes and limited extent of mine unit areas, fencing of these areas does not pose a significant problem to antelope as they can move around fenced areas. Wildlife problems from fencing have not been observed during the 23 year operation of the Project.

When livestock, antelope, deer and other high jumping wildlife are present, LQD Guideline 10

Type II fencing is used. Fenced areas include impoundments, storage ponds, purge storage reservoirs, radium settling basins, and any other structures or facilities that may present a danger to livestock and/or wildlife. These fences are constructed with a total height of 7 to 8 feet utilizing 6 foot high woven wire fencing. There is one barbed wire approximately 6 inches above the woven wire and another barbed wire approximately 6 inches above the first barbed wire.

Those areas undergoing final reclamation are fenced with LQD Guideline 10 Type III fence. This type of fence consists of four strands of barbed wire, with the lower most strand placed approximately 15 inches from the ground and the remaining three strands at approximately 11 inch intervals. As discussed in the Reclamation Plan, all reclaimed areas will remain fenced for a period of two years, or until the vegetation is capable of renewing itself with properly managed grazing and without supplemental irrigation and fertilization, as determined by CR, LQD, and on public lands, Bureau of Land Management.

Alfalfa hay and some grains are grown south of the permit area in the vicinity of the Sundquist Ranch. Limited dry-land farming takes place east and north of the permit area, while wind farming occurs to the west. There are no producing oil and gas wells on the permit area. Oil and gas production are carried out both southwest and northwest of the area.

Due to the potential for harsh winter conditions at the site most livestock is moved off the area and closer to the Platte River for wintering. Although sheep and cattle are the primary domestic stock in the permit area, many varieties of native wildlife also utilize the permit area. Thus, the present use is periodic grazing by domestic livestock and concurrent use by native wildlife.

3.0 PAST MINING ACTIVITIES

From the 1970's to the early 1980's, areas within and adjacent to the project site were extensively mined for uranium. Both surface and underground mining methods were employed in the area, with the majority of uranium ore being recovered by surface mining methods. **From the early 1970s through the mid-1980s, companies such as Bear Creek Uranium, Kerr McGee Nuclear, Rio Algom Mining Corp. (RAMC), TVA and Exxon Minerals produced uranium from the sandstone deposits within or near the current permit boundary. Most of these mines were shut down and/or reclaimed by 1985 because of poor uranium market conditions. Past mining disturbance areas are presented on Plate D1-3.**

The Nuclear Regulatory Commission (NRC) first authorized Kerr-McGee Corporation (KMC) to conduct Research & Development (R&D) ISR operations at the Smith Ranch site in June 1981

under Wyoming Department of Environmental Quality (DEQ) Permit to Mine 304-C and Source Material License SUA-1387, with a corresponding Environmental Assessment (EA) issued at that time (46 FR 30924). In February 1984, SUA-1387 was amended to reflect that Sequoyah Fuels Corporation (SFC), a wholly-owned subsidiary of KMC, was the NRC licensee for the Smith Ranch R&D operations (NRC, 1984). The NRC renewed SFC's NRC license for continued R&D operations by letter dated January 29, 1988 (NRC, 1988b). In support of the license renewal, the NRC staff published a Finding of No Significant Impact (FONSI) in the Federal Register on January 7, 1988 (53 FR 459). RAMC acquired the Smith Ranch ISR site in December 1988 (Quivira Mining Corp., 1988). On June 18, 1991, DEQ issued Permit to Mine 633 to RAMC. On March 12, 1992, the NRC issued Source Material License SUA-1548 to RAMC, which authorized expansion of the Smith Ranch R&D operations into commercial scale production (NRC, 1992a). An Environmental Assessment (EA)/FONSI documenting the NRC staff's environmental review was published in the Federal Register on January 10, 1992 (57 FR 306). License SUA-1548 was renewed on May 8, 2001 (NRC, 2001c), and the FONSI published in the Federal Register on May 4, 2001 (66 FR 22620). Power Resources, Inc. acquired RAMC's Smith Ranch properties in July 2002 and, by letter dated August 18, 2003, the NRC approved the integration of the Highland Uranium Project (HUP) license into the Smith Ranch license (NRC, 2003d). With that integration, combined operations at Smith Ranch were authorized under Source Material License SUA-1548. The NRC staff did not prepare an EA/FONSI as this action was considered administrative and organizational in nature.

Results of core studies confirmed the two pilot R&D projects at the Smith Ranch site could successfully utilize a leaching solution of bicarbonate/carbonate with hydrogen peroxide and oxygen. The pilots were authorized by DEQ, Land Quality Division (LQD) with Permits 5RD and 13RD and by the NRC under license SUA-1387. These tests, conducted in uranium deposits at depths of 500 feet and 750 feet, have demonstrated the feasibility of mining the uranium reserves in the project area using ISR methods.

The initial in situ leach (ISL) pilot, the Q-Sand pilot, operated from October 1981 until May 1986. The Q-Sand pilot was a 1-acre, 100 gallon per minute operation. Uranium recovery from the pilot exceeded the forecast recovery and aquifer restoration, completed in May 1986, was deemed acceptable, as was the completion of a one-year aquifer stability demonstration period. The Q Sand pilot surface area is encompassed by Mine Unit 1 and surface reclamation will include both. The second ISL pilot, the O-Sand pilot was a 1.8 acre, 150 gallon per minute test and began operation in July 1984. The O-Sand pilot performed as forecast, confirming the

amenability of the ore to ISL mining. The O-Sand Mine Unit was placed on stand-by in 1991 and fully contained within the approved Mine Unit 3 commercial operation. Both the O-Sand pilot and Mine Unit 3 will be restored and reclaimed together. The pilots, authorized under NRC License SUA-1387 and DEQ Licenses 5RD and 13RD, operated without an excursion of leach solution, without a lost time accident, without serious injury to any employee, and without health or safety risks to the public, or significant impact to the environment.

The Smith Ranch processing facilities are located at the original site of the Bill Smith Mine shaft and underground mine. The mine was operational from 1976 through the early 1980s. The ore removed from the underground mine was transferred by truck to the Exxon mill for processing; as a result there are no mill tailings associated with the mining at Smith Ranch.

There were two open pit mines located north of Permit to Mine 633. These mines were in Sections 3 and 28/33, T37N, R73W and were mined under Permit to Mine 304C. The mined areas were reclaimed and revegetation was completed and verified. A release request for the reclaimed mined areas was included in the March 25, 1994 annual report/bond submittal for Permit 304-C.

The removal of the head frame was completed in 1991, disposed of in 1993, and removed from surety during the annual report/surety update. The 2003 annual report states the plugging of the shaft was completed in 1994 and removed from the surety. Two of the three settling ponds were reclaimed as described in the 1997 annual report. The vent hole has been plugged and is located under the south end of the office.

Two pilot R&D projects were completed at the HUP site by Exxon during the period from 1972 to 1981. These projects were operated under DEQ Permit No. 218-C and NRC License SUA-1064. The first pilot R&D project, known as the "Original R&D" was operated from 1972 to 1976. This project investigated the technical feasibility of in situ uranium mining utilizing different concentrations of sodium bicarbonate and hydrogen peroxide within the leach fluid.

The second pilot R&D project (known as the "Expanded R&D"), which was operated from December 16, 1978 to September 1981, demonstrated the technical feasibility of in situ mining utilizing gaseous oxygen, sodium bicarbonate and gaseous carbon dioxide within the leach fluid, the ability to control leach fluids within the mining zone, and the restorability of the affected ground water to its original use suitability. Reports concerning the results of the pilot activities, including restoration of affected ground water, were previously submitted to NRC and DEQ.

The HUP site is located adjacent to portions of the reclaimed Exxon Highland Uranium Mine, which used conventional open pit and underground mining methods, and was in operation from 1971 to 1984. The underground mine was shut down with the shaft sealed by 1985. In 1985, Exxon sold their remaining uranium reserves to Everest Minerals Corp. who developed the HUP, and ISR project. HUP began commercial uranium production in 1988.

Also during this time period, Silver King Mines, Inc. operated an underground uranium mine for the TVA in the Section 14 area of the HUP property (North Morton Ranch Mine) during the late 1970s and early 1980s. The mine was shut down and the shaft sealed in the mid-1980s. Everest Minerals Corp. acquired the reclaimed property from the TVA, which allowed expansion of the HUP operation to the west in 1993. Between 1989 and 2000, HUP produced approximately one million pounds of uranium per year. CR acquired PRI and the HUP in 1997.

Open pit uranium mining also occurred from the mid-1970s through 1986 at Union Pacific Resources' Bear Creek site, which is approximately 15 miles northeast of the Smith Ranch license area.

The proposed Reynolds Ranch Amendment Area was previously owned by Solution Mining Corporation (SMC). During 1980 to 1990, SMC installed wells, collected water quality data and performed two aquifer tests within the Reynolds Ranch area. SMC never permitted the property which was subsequently purchased by RAMC and then PRI. The regional ground water data collected by SMC is provided in Addendum C to Appendix D6. Recent well installation and ground water quality information are also included in Addendum C to Appendix D6.

Within the project site boundaries, there is limited disturbance from both underground and surface mining activities. Due to economic conditions, in the mid 1980's, all surface and underground uranium mining was discontinued in the area.

Because of the cost of conventional mining and the comparative low grade uranium resources in the area, it is doubtful that any company will consider using surface or underground mining methods to recover uranium in this area. Any additional uranium recovery in the area will be conducted utilizing ISR methods similar to those employed at the Smith Ranch Project. CR has no plans to develop conventional mines at the Project site.

4.0 POST-MINING LAND USE

Since the area has proven to be marginal for dryland farming because of limited rainfall, domestic livestock grazing with concurrent wildlife usage is the highest use for the land unless irrigation could be developed to supplement normal rainfall. Even production from native range fluctuates widely between years of moderate rainfall and years of drought. For these reasons, reclaimed lands will be returned to the pre-mining use of domestic livestock grazing and wildlife habitat. Since the affected areas will be relatively small, they will be grazed in conjunction with undisturbed native range.

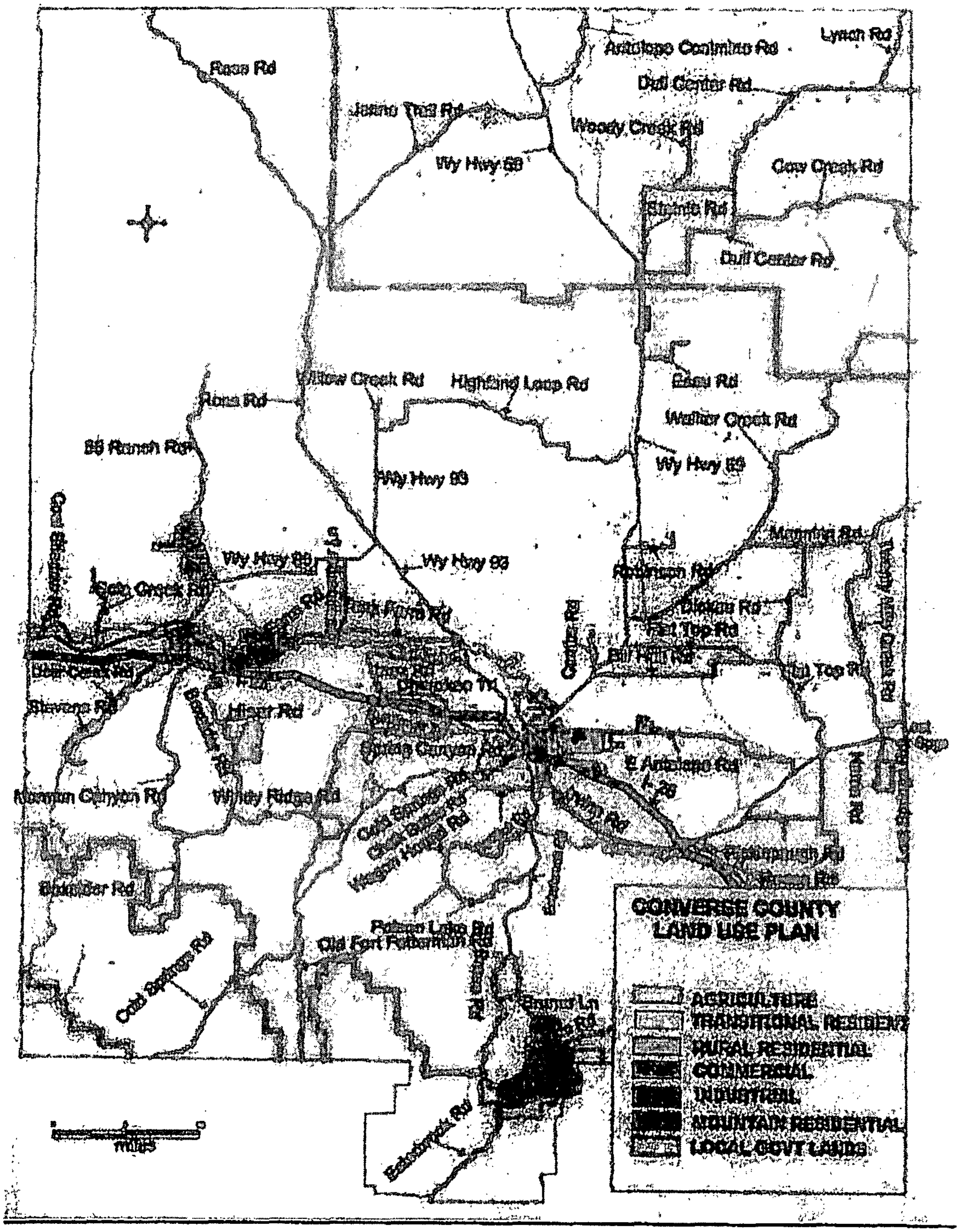
The area contained within the Smith Ranch permit area, including the proposed Reynolds Ranch area totals approximately 40,000 acres. Based on recent calculations of disturbed areas (Reynolds Plan of Operations, BLM, 2011), it is estimated that, during the life of the project, construction and operation activities associated with the development of Mine unit pattern areas will disturb approximately 1,880 acres, or less than 5% of the total area. CR estimates that more than 87% of the total disturbed wellfield acreage (1,635 acres) will be short-term disturbance (one year or less). All disturbed mine unit pattern, monitor well, pipeline and utility trench acreage will be reclaimed and revegetated as soon as possible after construction has been completed. This revegetated acreage will be available for wildlife habitat for the life of the project. The remaining 13% of disturbed acreage (approximately 244 acres) will be long-term disturbance and includes the uranium recovery satellites, processing facilities, mine unit header houses, pump stations, powerline corridors and access roads. These disturbances will remain for the life of the Project. Therefore, for the projected operational life of the Project, it is estimated that approximately 244 acres of the 40,000 acre project area will be completely removed from livestock and wildlife habitat use until final reclamation. This represents less than 1% of the total permitted acreage. Mine unit areas (approximately 1,635 acres) will be fenced to prohibit livestock entry. At the end of the Project, the entire 39,978 acres will be returned to the pre ISR mining use of wildlife habitat and livestock grazing.

Table D1.1 Converse County Land Use in Acres[1]

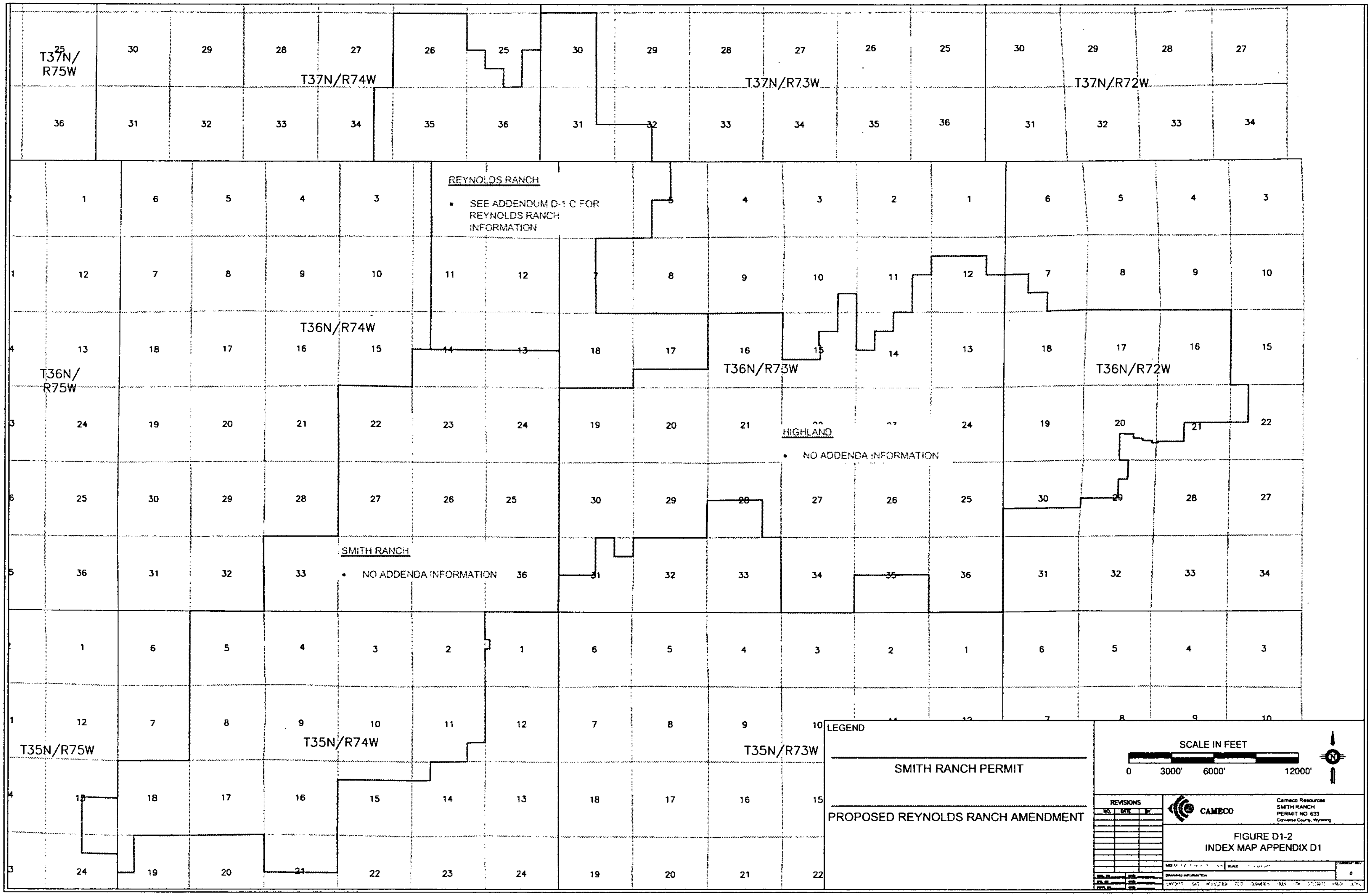
Urban Areas		
Douglas	3,840	
Glenrock	800	
Total Urban		4,640
Rural Housing		
536 Units @ 1 acre/unit	536	
Rural Recreational		
83 Units @ 5 acres/unit	415	
Total Housing		951
Agricultural		
Irrigated Cropland	68,316	
Dry Cropland	20,702	
Irrigated Pasture (seasonal)	16,735	
Unirrigated Grazing	2,420,199	
Tree Covered	142,437	
Total Agricultural		2,668,389
Industrial		31,010
Water Areas		4,082
Rural Business		
Highway Convenience, Guest Areas and Mobile Home Parks		815
Local Government		
Parks and Schools		2,535
Transportation		
Interstate Highway	1,543	
State & Federal Highway	3,528	
County Roads	4,737	
Railroads	2,330	
Total Transportation		12,138
Total County		**2,724,560**

1. Converse County Land Use Plan August 3, 1978, Converse County Planning Commission.

Figure D1-1 General Land Use Map for Converse County



Approved and Adopted as Revised by the Converse County Board of Commissioners July 15, 2003
This Land Use Plan supersedes and replaces any previous Land Use Plan adopted.



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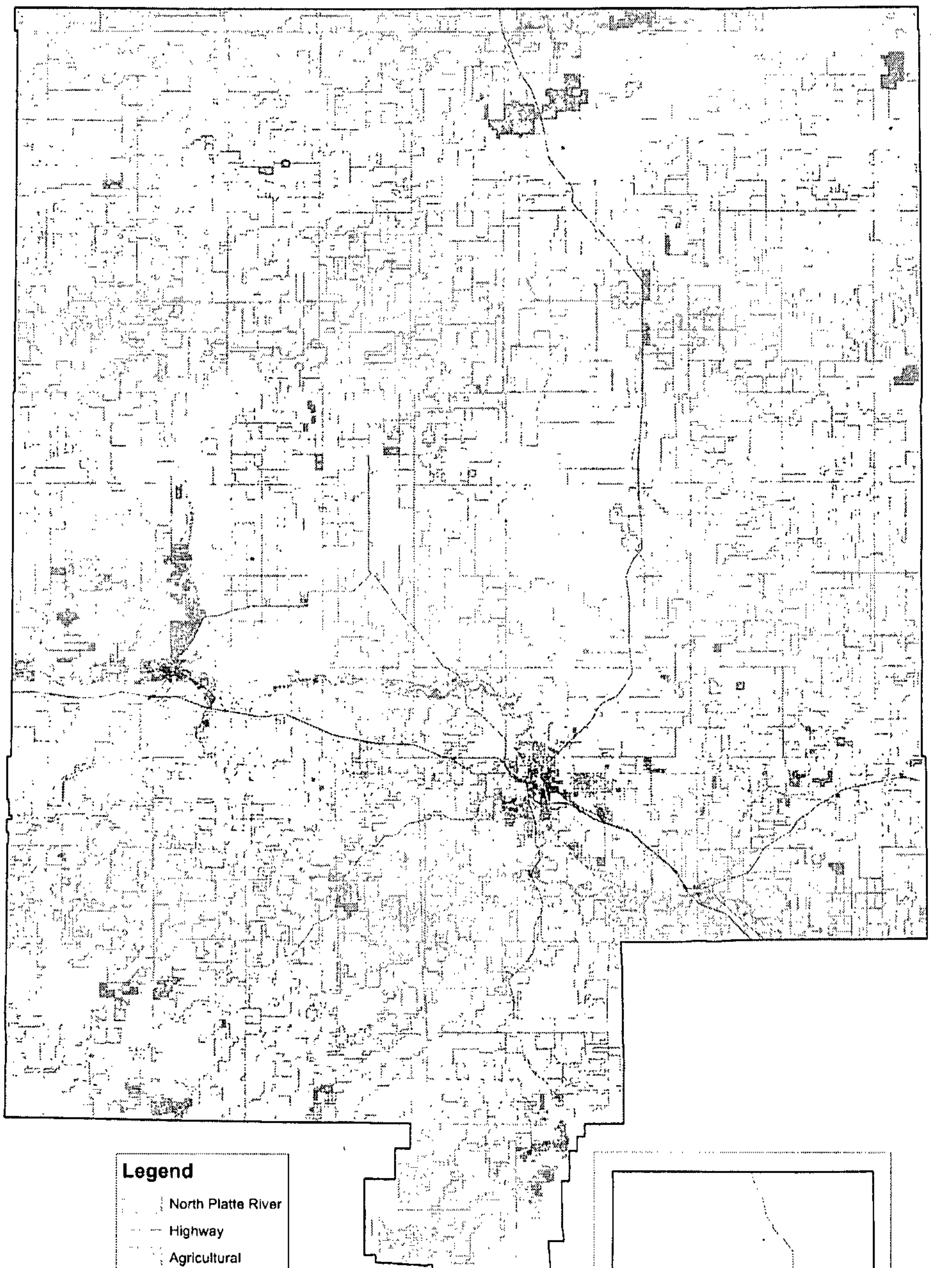

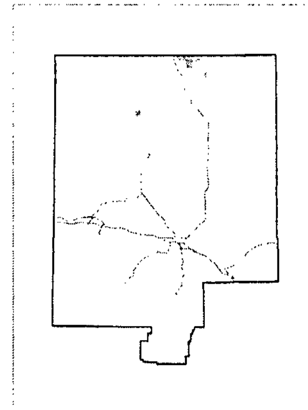

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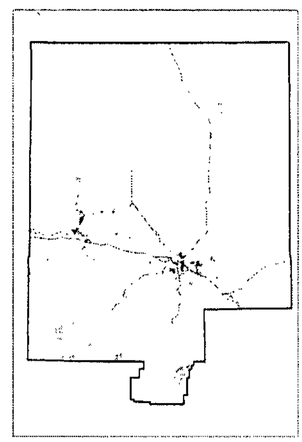

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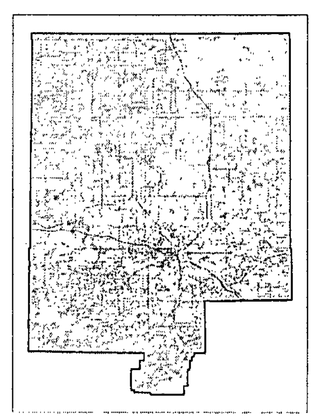

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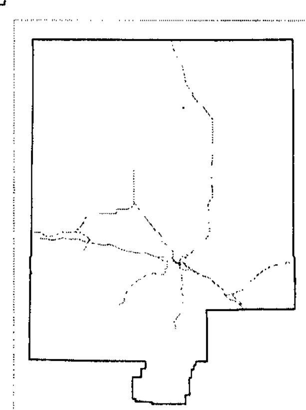
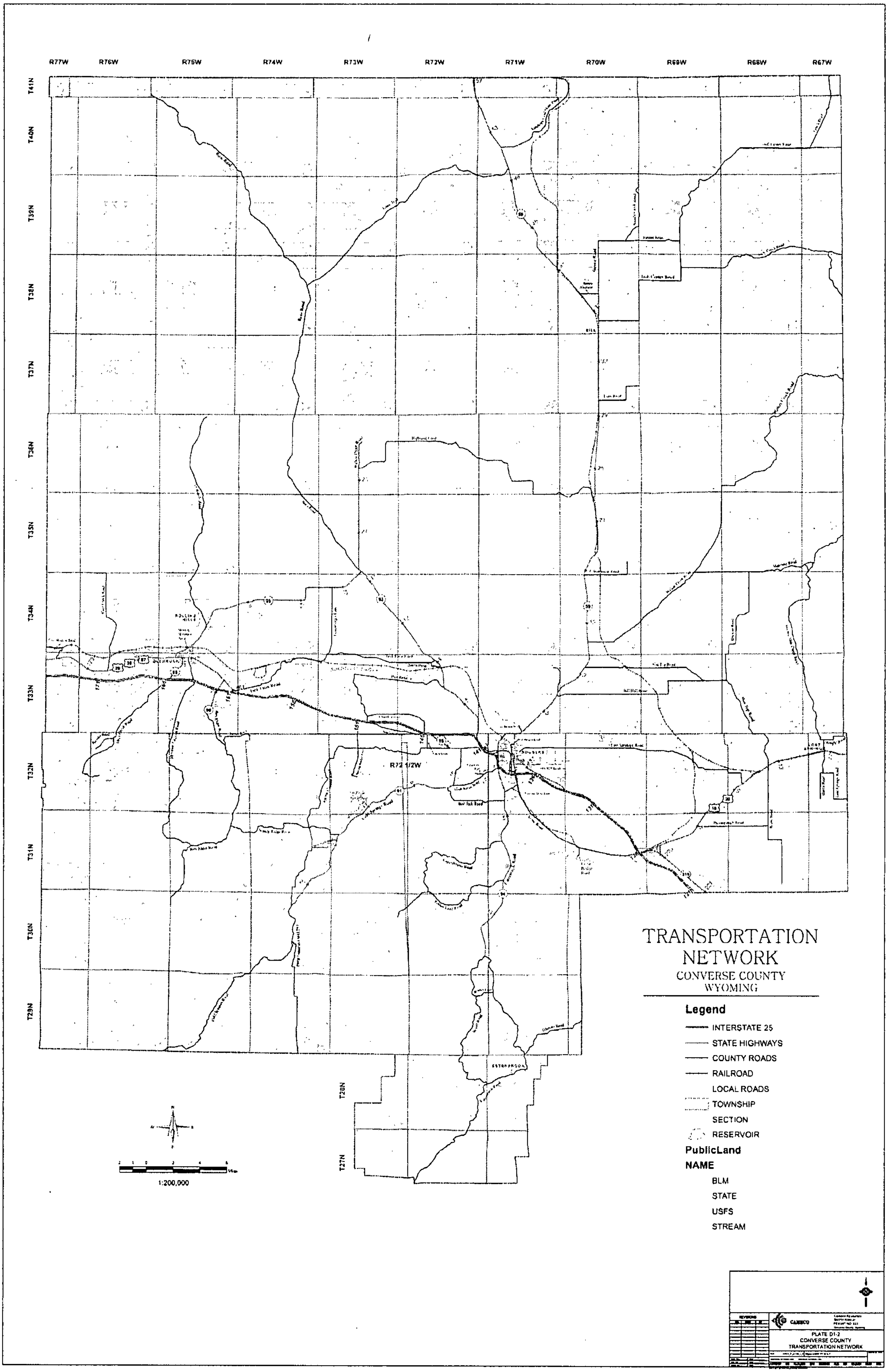


COMMERCIAL

CONVERSE COUNTY GIS 2008

CONVERSE COUNTY ASSESSED LAND USE

PLATE D1-1
CONVERSE COUNTY
ASSESSED LAND USE



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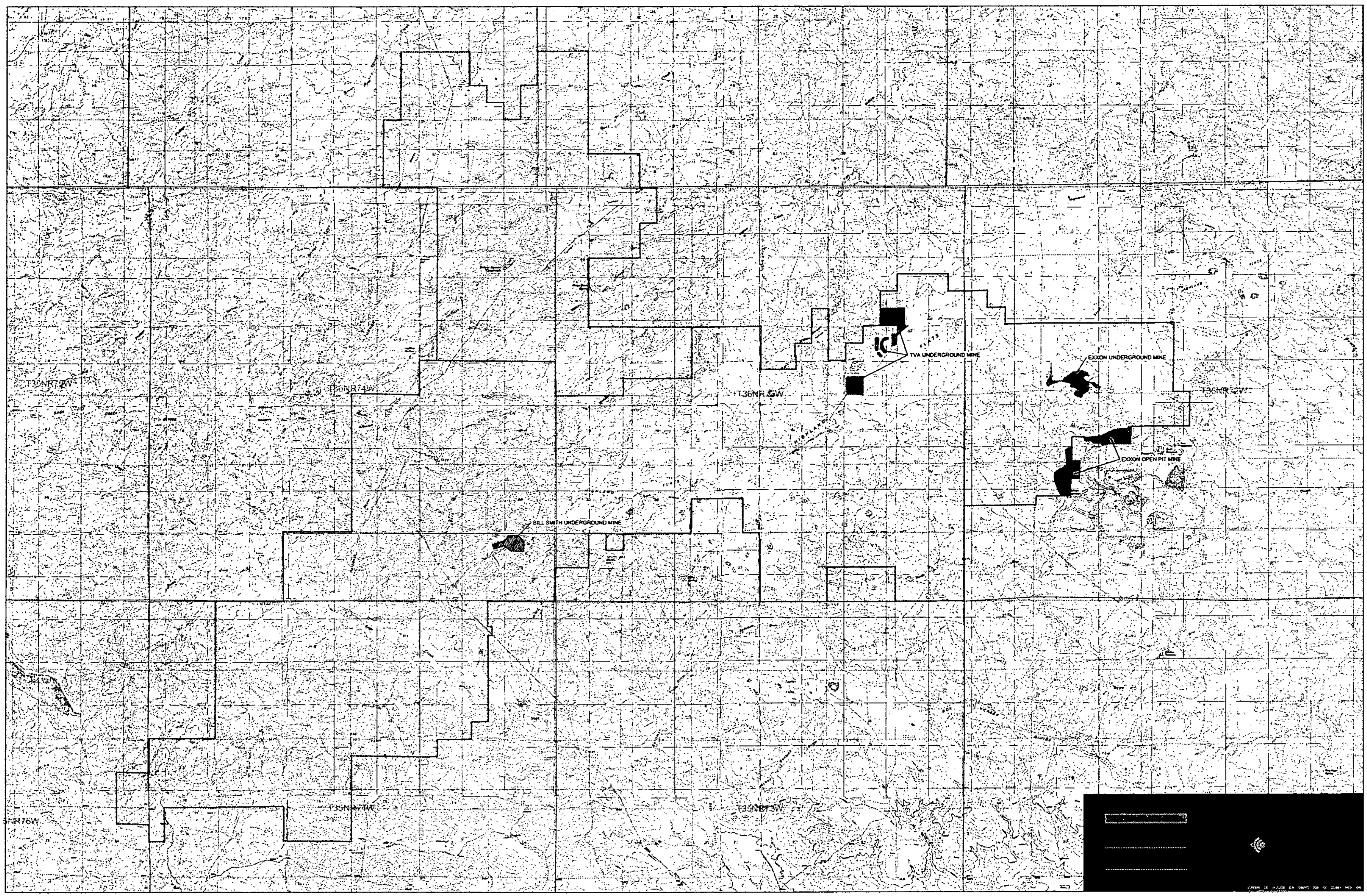
R72 1/2W
TRANSPORTATION NETWORK
CONVERSE COUNTY
WYOMING
Legend
INTERSTATE 25
STATE HIGHWAYS
COUNTY ROADS
RAILROAD
LOCAL ROADS
TOWNSHIP
SECTION
RESERVOIR
PublicLand
NAME
BLM
STATE
USFS
STREAM
1:200,000
CAMECO
PLATE D1-2
CONVERSE COUNTY
TRANSPORTATION NETWORK


TVA UNDERGROUND MINE
EXXON UNDERGROUND MINE
EXXON OPEN PIT MINE
BILL SMITH UNDERGROUND MINE
T36NR73W
T35NR73W

APPENDIX D-1

LAND USE

REYNOLDS RANCH AMENDMENT AREA
CONVERSE COUNTY, WYOMING

1.0 General

Converse County contains approximately 2.74 million acres of land. Agricultural uses account for approximately 98% of the total surface area, with unirrigated grazing (2.4 million acres) being the dominant use (see Table D-1.1). Sheep and cattle grazing comprise the major past and present. Wildlife habitat is also part of the land use in the proposed amendment area and mule deer and pronghorn antelope are primarily hunted in the area. A generalized land use map for Converse County is presented in Figure D1-1.

While there are several ranch houses in the surrounding area, there are no active residents within the proposed amendment area boundaries. Likewise, there are some producing oil wells in the surrounding area, but there are no producing oil wells within the amendment area.

2.0 Grazing Activities

The land surface within the existing and proposed permit area is predominantly in private ownership (see Appendix A) and is used for the grazing of mostly cattle. Grazing activities, although some sheep grazing takes place. The land is fenced to accommodate such activities. Four area ranches predominantly conduct grazing activities.

BLM land ownership within the proposed amendment area constitutes approximately 720 acres and State of Wyoming land ownership constitutes approximately 640 acres of the proposed total 8,704 acres. The remaining 7,134 acres is privately owned. BLM and State of Wyoming lands are leased for grazing.

3.0 Post-Mining Land Use

Since the area has proven to be marginal for dryland farming because of limited rainfall, domestic livestock grazing with concurrent wildlife useage is the highest use for the land unless irrigation could be developed to supplement normal rainfall. Even production from native range fluctuates widely between years of moderate rainfall and years of drought. For these reasons, reclaimed lands will be returned to the pre-mining use of domestic livestock grazing and wildlife habitat. Since the affected areas will be relatively small, impacts to livestock grazing and wildlife habitat during mining and after reclamation will be limited.

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NOTE: There are no Tables included in Appendix D-2; therefore the tab has been removed.

LIST OF FIGURES/PLATES

NOTE: There are no Figures or Plates included in Appendix D-2; therefore the tab has been removed.

SUPPLEMENTAL INFORMATION

NOTE: There is no Supplemental Information included in Appendix D-2; therefore the tab has been removed.

LIST OF ADDENDA

APPENDIX D-2
HISTORY

1.0 BRIEF HISTORY OF THE AREA

The permit area is located in the western part of the Great Plains in a region referred to as the short-grass prairie. Extensive cattle and sheep grazing since the late 1800's may have caused some changes in plant species composition in this area resulting in an increase in sagebrush and several grass species more tolerant of grazing pressures (i.e., blue grama and buffalo grass). During the past century, some wildlife populations have changed as a result of increased human settlement. The bison and gray wolf were both formerly abundant on the short grass prairie but have been virtually extirpated from this habitat during the past 140 years. Today, the pronghorn antelope is the dominant big game animal on the prairie.

The Bozeman Trail, a major route for cattle drives between Texas and Montana in the mid-1800's, roughly parallels Ross Road through the permit area. The Sage Creek Station, a stagecoach stop established in the late 1800's, was also located near the permit area. No other sites of historic value are known to exist within the permit area boundary.

In the late 1800's, the Powder River Basin became open to settlement under the various Land Purchase and Homestead Laws. Due to the arid climate and lack of surface water resources, the area was unsuitable for small scale ranching and farming. Today, larger scale ranching operations are predominant in the region. Coal, oil and uranium were subsequently discovered, and these three energy resources along with cattle and sheep production provide the basic economic structure of the area today.

Converse County is crossed by both the Oregon and Bozeman Trails and also Pony Express routes. Two sites in the county, Fort Fetterman and Glenrock Buffalo Jump, are enrolled in the National Register of Historic Places. Several other sites within the county have been nominated to the National Register of Historic Places and are currently under review.

In the Class III Cultural Resource Inventory conducted on the Smith Ranch site by Frontier Archaeology, a historic literature search was conducted. The report is contained in **Appendix D-3**.

APPENDIX D2

HISTORY

REYNOLDS RANCH AMENDMENT AREA
CONVERSE COUNTY, WYOMING

HISTORY OF THE AREA

The Reynolds Ranch Amendment Area is located in the northern part of Converse County, Wyoming. The area is in the western part of the Great Plains in a region referred to as the short-grass prairie.

The Bozeman Trail, a major route for cattle drives between Texas and Montana in the mid-1800's roughly parallels the Ross Road through the amendment area. However, the segments of the Bozeman Trail in the amendment area have been impacted by the construction of the Ross Road and have relatively minor historic value. The Holdup Hollow segment of the Bozeman Trail is located adjacent to the Ross Road and the southwest portion of the amendment area. The amendment area boundary does not overlap any area of the Holdup Hollow Segment of the Bozeman Trail. No other sites of historic value are known to exist within the amendment area boundary.

In the late 1800's, the Powder River Basin became open to settlement under the various Land Purchase and Homestead Laws. Due to the arid climate and lack of surface water resources, the area was unsuitable for small scale ranching and farming. Today, larger scale ranching operations predominate the region. Coal, oil, uranium, and methane were subsequently discovered and these four energy resources along with cattle and sheep production provide the basic economic structure of the area today.

Converse County is crossed by both Oregon and Bozeman Trails, and also Pony Express Routes. Two sites in the county, Fort Fetterman and Glenrock Buffalo Jump, are enrolled in the National Register of Historic Places (NRHP). In addition, the Holdup Hollow Segment of the Bozeman Trail is also listed in the NRHP.

Cultural resource surveys were conducted for the proposed amendment area and for segments of the Bozeman Trail near or within the proposed amendment area. These surveys are contained in Appendix D-3.

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NOTE: There is no Supplemental Information included in Appendix D-4; therefore the tab has been removed.

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APPENDIX D-4

CLIMATOLOGY

1.0 GENERAL

The permit area is located in eastern Wyoming, where climate can generally be classified under the Koppen system* as semiarid and cool. The mountain ranges in the west-central portion of the state, which are oriented in a general north-south direction, are perpendicular to the prevailing winds. These ranges tend to restrict the passage of storms and thus restrict precipitation in the eastern part of Wyoming. The area is also subject to periodic high winds.

The official weather station closest to the permit area is located at the Natrona County International Airport near Casper. Initial meteorological data was collected in 1974. A discussion of the meteorological considerations from work completed by Woodward-Clyde Consultants in 1974, originally contained in the Smith Ranch permit 603 is included in **Addendum D4-A3**.

Recent meteorological data have been compiled from The National Weather Service (NWS) Weather Forecast Office for Western and Central Wyoming, and the National Oceanic and Atmospheric Administration (NOAA). A discussion of the findings is as follows.

2.0 TEMPERATURE

The climate in northeastern Wyoming is generally cool; however, there are considerable seasonal variations. The average length of the growing season is 129 days, from approximately the end of May to the end of September. The average minimum and maximum temperature for Casper in January, the coldest month, ranges from 12.9 to 33.7°F (1948-2009); the average minimum and maximum temperature for July, the warmest month, ranges from 54.2 to 87.8°F (1948-2009). The highest temperature reported in the Casper area was 104°F in July 1954, and the lowest was -40°F in January 1972. Monthly means and extremes of temperature are presented in **Table D-4.1**.

3.0 PRECIPITATION

Mean annual precipitation for the project area is approximately 12 inches (Normals, Means and Extremes, NOAA). There can be significant variability in the annual precipitation amount from year to year. The bulk of the annual precipitation is received from moisture laden easterly winds, particularly during spring months. Most precipitation is in the form of rain, although occasional heavy wet snowfalls in spring months are not uncommon. Summer precipitation is almost exclusively from thundershower activity and

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* The Koppen climatic classification system is described in most general meteorology texts. Critchfield (1974) presents such a description.

under normal conditions provides sufficient moisture to maintain growth of rangeland grasses. Seasonal snowfall averages about seventy-two inches, but the water content of winter snow is low owing to the cold temperatures at which it usually occurs. The very dry strong west and southwest winds following these winter snows tend to clear the snow from the rangelands thereby permitting winter grazing of livestock.

There are no nearby mountain ranges of substantial size to the west or the north of the permit area. Arctic air masses can therefore move unobstructed over the area. These air masses cross the area most often in winter, when they can occur several times a month. They can be accompanied by strong northerly winds, abrupt temperature changes, and snow. As a rule, the cold arctic air masses modify rapidly after they reach Wyoming (Lowers, 1960). As indicated in **Table D-4.2**, annual snowfall in the Casper area averaged 85.8 inches between 1971 and 2000.

4.0 HUMIDITY

Table D-4.3 shows the monthly and annual mean relative humidity in Casper, with variations listed by time of day. Although the absolute moisture content of the air in the region is normally quite low, cool temperatures keep the relative humidity at moderate levels, particularly during the winter. The average annual Class A pan evaporation for the project area is approximately 63 inches.

5.0 WIND SPEED AND DIRECTION

Wind speed data from NOAA indicates that southwesterly winds dominate throughout the year. The mean annual wind speed is 12.8 mph, with averages during December and January of approximately 16 mph. **Table D-4.4** provides a summary of mean monthly wind speeds and prevailing wind directions.

Strong winds can occur in the project area along with thunderstorm activity in the spring and summer or in the form of intense outbreaks in the winter. Winds of 50 mph or more have been reported at Casper in every month of the year except November. A wind rose showing wind velocity and direction in Casper from 1961 to 1990 is included as **Figure D-4.1**.

6.0 SEVERE WEATHER

The permit area lies within the one-degree square bounded by latitudes 43° and 44° and by longitudes 105° and 106°. From 1953 through 1962, the mean annual frequency of tornadoes in this area was 0.4 (Thom, 1963). Using Thom's method,* the yearly probability of a tornado's striking a point within this one-degree square is calculated at 0.0003. The figure was obtained by using the following equation:

---

* Thom (1963). This procedure for calculating tornado frequency is confirmed in Markee, Beckerly, and sanders (n.d.).

$$p = \frac{\bar{z} \times \bar{t}}{A} = \frac{2.8 \times 0.4}{3500} = 0.0003 \text{ per year}$$

where:

p = the mean annual probability of a tornado's striking a point in a one-degree square of area A

z = the mean path area of a tornado, assumed = 2.8 sq mi, as recommended by Thom

t = the mean number of tornadoes per year in the one-degree square

A = area of a one-degree square, in square miles

The recurrence interval (l/p) for a tornado's striking a point within this square is about 3000 years.

Lowers (1960), as well as Thom, indicates that, although tornadoes do occur over Wyoming, they are somewhat smaller and less frequent than the ones that occur in the region to the east. Nevertheless, any tornado can be highly destructive. Thunderstorms are frequent in Wyoming during the spring and summer. Related precipitation is usually light, amounting to only a few hundredths on an inch. However, several heavy local storms occur each year which can be expected to produce 1 or 2 inches of rain in a single day. On some occasions, 3 to 5 inches of rain have fallen in 24 hours (Lowers, 1960). Lowers indicates that the principal damage from thunderstorms in Wyoming is caused by hailstones; however, he indicates that most hailstorms pass over open rangeland, where damage is minimal.

Table D-4.5 provided in Addendum D-4 A1 shows the maximum precipitation estimated for any given location on the property (point precipitation), for specific durations and recurrence intervals. The table was compiled using technical procedures outlined by Hershfield (1961) and Miller (1964). The probable maximum precipitation to occur in the area as a result of 6-hour precipitation event is 10 inches (U.S. Bureau of Reclamation, 1976).

CR has installed a meteorological station at the facility and data collected from the station will be summarized in the annual report to the LQD.

Table D-4.1
Monthly Temperature Averages (°F)
Casper, Wyoming 2008

Yr: 2008 Month	Average High	Average Low	Average Temp	Departure From Normal
January	30.7	10.3	20.5	-1.8
February	37.9	17.6	27.8	1.1
March	43.9	20.6	32.3	-2.7
April	55.7	23.6	39.7	-3
May	63.4	36.0	49.7	-2.4
June	76.6	41.9	59.3	-3.4
July	90.6	52.5	71.6	1.6
August	86.5	50.1	68.3	-0.3
September	73.0	38.5	55.8	-1.8
October	59.8	29.9	44.9	-0.8
November	50.9	26.6	38.8	6.8
December*	33.2	5.1	19.2	-4.6
Total/Avg	58.5	29.4	44	-0.9

* Missing temperatures December 22nd - 29th.

Yearly Temperature Extremes:

Highest Temperature: 99 °F on July 27th and August 1st.
Days with Maximum Temperature of 90 °F or higher: 36
Days with Maximum Temperature of 32 °F or lower: 40
Lowest Temperature: -20 °F on December 15th
Days with Minimum Temperature of 32 °F or lower: 197
Days with Minimum Temperature of 0 °F or lower: 15

1. Source: National Weather Service and National Oceanic and Atmospheric Administration, 2008, Local Climatological Data Annual Summary.

Table D-4.2
Monthly Precipitation Data
Casper, Wyoming

PRECIPITATION (in.)	(a)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SUMMATION
Water Equivalent														
Normal		0.55	0.60	0.95	1.56	2.13	1.46	1.26	0.67	0.94	0.97	0.77	0.66	12.52
Maximum Monthly	45	1.42	1.42	2.43	3.92	6.46	4.15	3.05	2.66	3.40	4.17	2.72	3.71	6.46
Year		1987	1987	1954	1974	1978	1982	1951	1979	1982	1994	1983	1982	May-78
Minimum Monthly	45	T	0.15	0.25	0.08	0.30	0.03	0.09	0.02	0.07	T	0.07	0.03	T
Year		1952	1957	1953	1992	1966	1956	1991	1950	1956	1965	1965	1952	Oct-65
Maximum in 24 hrs	45	0.82	0.60	1.00	3.00	2.61	2.34	2.07	1.74	2.04	2.49	1.21	1.64	3.00
Year		1987	1995	1958	1974	1978	1982	1983	1979	1989	1962	1983	1982	Apr-74
Snow, Ice Pellets, Hail														
Maximum Monthly	45	24.0	23.8	36.2	56.3	24.6	3.0	T	T	11.5	16.1	37.1	62.8	62.8
Year		1987	1952	1975	1973	1978	1969	1994	1993	1982	1986	1983	1982	Dec-82
Maximum in 24 hrs	45	14.0	11.0	14.6	16.5	14.1	3.0	T	T	6.9	13.3	14.3	31.1	31.1
Year		1987	1987	1954	1973	1950	1969	1994	1993	1995	1986	1983	1982	Dec-82

(a) – Length of Record in Years, although some months may be missing.

1. Source: National Weather Service and National Oceanic and Atmospheric Administration, 2008, Local Climatological Data Annual Summary.

Table D-4.3
Monthly and Annual Percent Relative Humidity (Daily Intervals)
Casper, Wyoming

Relative Humidity (%)	(a)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	YEAR
Hour 04	31	69	70	73	75	78	76	70	67	67	68	69	68	71
Hour 10 (local time)	31	59	58	52	47	44	38	32	31	36	44	54	58	46
Hour 16	31	61	57	47	42	40	33	27	25	30	41	57	62	44
Hour 22	31	69	70	69	68	69	63	55	53	58	64	67	67	64

(a) - Length of Record in Years, although some months may be missing

1. Source: National Weather Service and National Oceanic and Atmospheric Administration, 2008, Local Climatological Data Annual Summary.

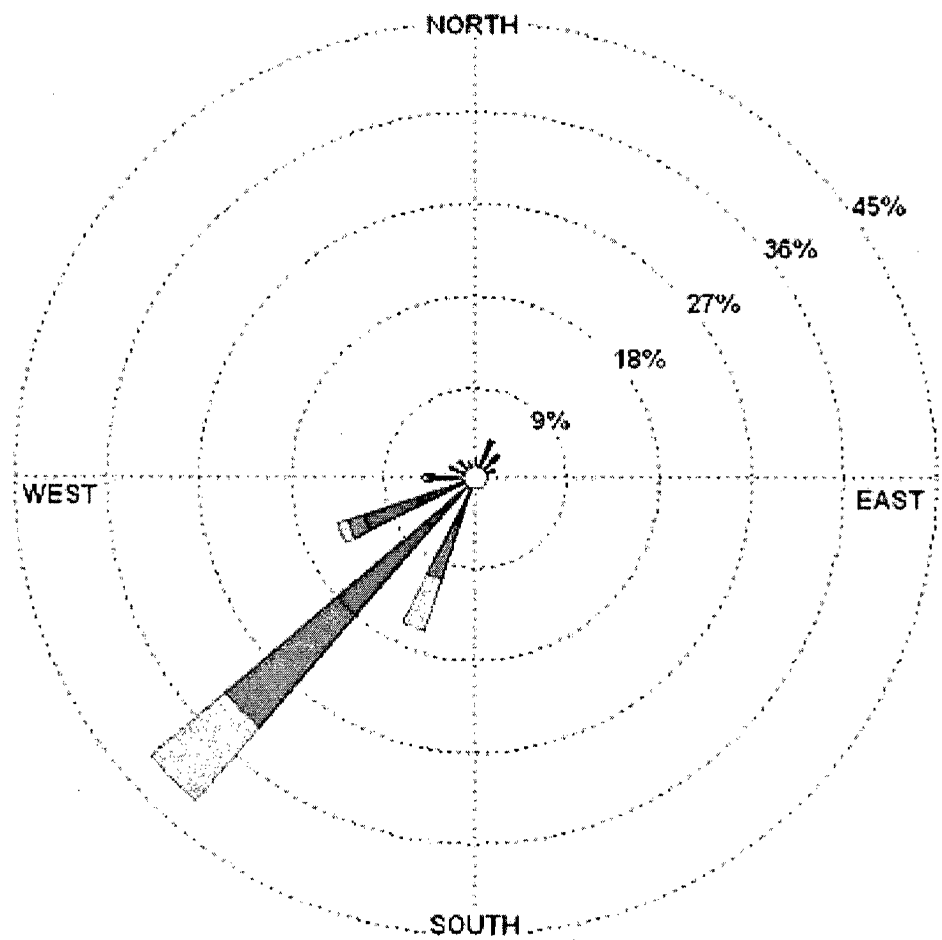
Table D-4.4
Wind Data
Casper, Wyoming

WIND	(a)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Mean Speed (mph)	45	16.3	15.0	13.8	12.6	11.6	11.0	10.1	10.3	10.9	12.0	14.4	16.0	12.8
Prevailing Direction		SW	SW	SW	WSW	WSW	WSW	WSW	SW	WSW	SW	SW	SW	SW
Fastest Mile														
Direction (!!)	45	20	23	25	25	32	36	25	25	32	25	25	20	25
Speed (mph)		58	58	81	54	58	52	52	50	53	55	49	63	81
Year		1954	1957	1956	1967	1959	1959	1974	1954	1965	1954	1970	1955	Mar-56
Peak Gust														
Direction (!!)	12	SW	SW	NW	W	SW	W	NW	SW	SW	SW	SW	SW	SW
Speed (mph)	12	67	64	63	60	64	64	60	62	63	62	60	66	67
Date		1990	1986	1988	1994	1985	1991	1990	1988	1986	1985	1984	1984	Jan-90

(a) – Length of Record in Years, although some months may be missing.

1. Source: National Weather Service and National Oceanic and Atmospheric Administration, 2008, Local Climatological Data Annual Summary.

Figure D-4.1
Wind Velocity and Direction
Casper, Wyoming 1961-1990
Station A24099: Casper/Natrona Co Int'l ARPT, WY



	Date 9/3/2002	Company Name USDA ARS
Display Wind Speed	Unit m/s	Wind Speed m/s > 11.06 > 8.49 - 11.06 > 5.40 - 8.49 > 3.34 - 5.40 > 1.80 - 3.34 > 0.51 - 1.80
avg wind speed 7.59 m/s	Calm Wind 1.36%	
Orientation Direction (Blowing From)	1961-90 Jan 1- Jan 31 Midnight-11pm	

ADDENDUM D-4 A3

SMITH RANCH SUPPLEMENTAL INFORMATION

METEOROLOGICAL DATA

METEOROLOGY CONSIDERATIONS

In 1974, Woodward-Clyde Consultants began collecting meteorological data for the Tennessee Valley Authority on its Morton Ranch property. (TVA, 1976). The 10-meter tower and meteorological sensor (measuring wind speed, wind direction, and temperature) were installed about 8 miles east-southeast of the proposed South Powder River Basin uranium facility. Morton Ranch data were compared with concurrent and long-term records available for the National Weather Service station at the Natrona County International Airport near Casper. Reasonable agreement was found. Because topography and elevation are similar, and because the permit area is adjacent to the Morton Ranch property, Casper data are also expected to be reasonably representative of the permit area. Following is a discussion of the comparison that was performed between Casper and TVA data.

Both Casper and the Morton Ranch property are in rolling hill country, at similar altitudes, east of the Continental Divide. The Natrona County International Airport is located at an elevation of 5338 feet, and the base of the Morton Ranch meteorological tower is at 5320 feet.

A 24-hour daily record of temperature for the Morton Ranch site was kept from August 24 through November 4, 1974. Those data were compared with data obtained concurrently at the

Natrona County International Airport. Tables A-1 and A-2 show the daily maximum, minimum, and mean temperatures at the two locations for September and October. In general, the average daily minimum temperatures were several degrees lower at Casper than at the Morton Ranch site, and the average daily maximum temperatures were several degrees higher. However, the mean temperatures for both months showed less than 1°F difference between the two locations.

The differences in the maximum and minimum temperatures may be explained in part by the different elevations at which the temperature sensors are placed. The extreme thermometers at Casper are located 6 feet above the ground, whereas the mechanical weather station used at the Morton Ranch site is on top of a 10-meter tower (approximately 33 feet above the ground). Nighttime radiational cooling effects close to the ground and daytime insulation can readily account for the differences observed. Additional daily variations in the extremes, as well as in the mean temperatures, can be accounted for by the lag time in movement of weather systems through the area and by the fact that the Morton Ranch site is about 49 miles from Casper. In general, the closeness of the mean values over the two-month test period substantiates the climatic similarity of the two locations.

Figures A-1 and A-2 show the wind roses for the Casper airport and the Morton Ranch site for the concurrent observation period of September-October 1974. Figure A-3 shows a wind rose for September-October obtained from the National Climatic Center STAR Program for Casper, Wyoming, based on data for 1967 through 1971. The 1974 Casper data are in general agreement with the historical data; although in 1974 north-northeasterly winds occurred with approximately 5 percent greater frequency and westerly winds occurred with approximately 6 percent less frequency than in the 1967-1971 record period. However, prevailing winds of almost equal distribution occurred from the west-southwest through the southwest both in 1974 and between 1967 and 1971.

The Morton Ranch site-specific data also show general similarities to historical data, but with some differences. The Morton Ranch data indicate greater frequencies of north-northwest and north winds than the historical data. Both the Morton Ranch data and the Casper data indicate prevailing winds from the west-southwest for September-October 1974; but the Morton Ranch data show greater frequencies of wind from the west, whereas the Casper data show greater frequencies on wind from the southwest. Also, the wind speeds at the proposed site appear to be, on the average, 2 mph stronger than those at Casper. These differences may be attributed to local variations in terrain. It is also possible that the differences in the elevations of the wind-measuring equipment account for some of the variation. The wind equipment at the Natrona County International Airport is 20 feet above ground level, while the Morton Ranch equipment is about 30 feet above ground level. Nevertheless, the Casper climatological data appear to be adequate for providing calculations of the dispersion of effluents from the proposed operations. Since Casper winds do appear to be somewhat lighter than those in the permit area, diffusion calculations obtained from these data will be slightly conservative.

GASEOUS EFFLUENT DISPERSION MODEL

Turner (1970) has presented a model to predict annual average ground-level pollutant concentrations. The model is derived from the Pasquill-Gifford Equation used to predict short-duration concentrations. Meteorological inputs to this model include annual frequency of wind speed and direction by stability conditions. The equation in multistack form is a follows:

$$x = \sum_i \sum_w \sum_p \frac{2.032\, Q_i F_{p,w}}{\sigma_{Z_{x,p}} U_{w,p} x_i} \exp\left[-\frac{1}{2}\left(\frac{H}{\sigma_{Z_{x,p}}}\right)^2\right]$$

where:

x = resulting concentration (g/m^3)

$\sum_i$ = summation over each stack

$\sum_w$ = summation over each wind direction

$\sum_p$ = summation over each Pasquill stability class

Q_i = emission rate of each stack (g/sec)

$F_{p,w}$ = joint frequency of wind direction and Pasquill stability class

$H_{i,u}$ = effective stack height for each stack and average wind speed (m)

$U_{w,p}$ = mean wind speed for each wind direction and stability class (m/sec)

$\sigma Z_{x,p}$ = vertical dispersion coefficient for each distance and stability class

x_i = distance from stack to receptor (m)

The effective stack height (H) was calculated using Briggs' plume equation.*

ANNUAL JOINT WIND DIRECTION, WIND SPEED, AND ATMOSPHERIC STABILITY FREQUENCY TABLES

Tables A-3 through A-9 present relative frequency distributions of wind speeds and wind directions for each of six Pasquill classes and for all classes combined. Data are for Casper, Wyoming, for the years 1967 through 1971 and were obtained from the National Climatic Center. These frequencies were used as input to the diffusion model used to compute annual average ground-level pollutant concentrations.

*G.A. Briggs, 1969, Plume Rise (Oak Ridge, Tenn.: U.S. Atomic Energy Commission).

Table A-1. COMPARISONS OF DAILY MAXIMUM, MINIMUM, AND MEAN TEMPERATURES BETWEEN THE MORTON RANCH SITE AND THE NATRONA INTERNATIONAL AIRPORT AT CASPER, WYOMING – SEPTEMBER 1974

Date	Maximum Temperature (°F)		Minimum Temperature (°F)		Mean temperature (°F)	
	Site	Casper	Site	Casper	Site	Casper
1	58	48	35	41	47	45
2	51	59	33	35	41	47
3	70	77	35	33	53	55
4	79	84	48	39	63	62
5	71	77	50	50	61	64
6	78	82	49	43	64	63
7	82	85	56	47	69	66
8	82	87	48	46	66	67
9	85	88	49	47	66	68
10	86	87	43	45	65	66
11	41	46	29	33	35	40
12	40	45	29	32	33	39
13	57	60	31	30	44	45
14	67	70	37	35	52	53
15	73	72	52	34	62	53
16	71	76	50	44	61	60
17	75	75	51	40	62	58
18	76	78	53	44	65	61
19	59	59	40	42	49	51
20	50	57	40	39	45	48
21	60	65	37	32	49	49
22	70	71	39	34	55	53
23	78	79	46	36	61	58
24	66	71	50	40	58	56
25	82	81	43	42	64	62
26	82	81	53	47	67	64
27	51	47	32	31	42	39
28	60	63	32	34	46	49
29	53	59	38	35	46	47
30	65	70	31	30	48	50
Monthly Means	67.2	69.9	41.9	38.6	54.6	54.6
Data Source: Natrona International Airport, Casper, Wyoming						

Table A-2. COMPARISONS OF DAILY MAXIMUM, MINIMUM, AND MEAN TEMPERATURES BETWEEN THE MORTON RANCH SITE AND THE NATRONA INTERNATIONAL AIRPORT AT CASPER, WYOMING – OCTOBER 1974

Date	Maximum Temperature (°F)		Minimum Temperature (°F)		Mean temperature (°F)	
	Site	Casper	Site	Casper	Site	Casper
1	65	69	39	29	52	49
2	79	80	35	32	58	56
3	64	67	48	43	57	55
4	50	59	39	43	44	51
5	40	43	29	29	35	36
6	46	53	29	28	38	41
7	65	69	34	35	50	52
8	68	69	50	37	59	53
9	72	72	44	36	57	54
10	64	68	43	41	54	55
11	54	59	36	36	45	48
12	53	58	34	37	44	48
13	56	62	35	38	45	50
14	48	54	27	31	37	43
15	65	69	35	37	50	53
16	74	75	46	42	60	59
17	73	77	51	36	61	57
18	70	72	46	36	58	54
19	74	73	52	34	63	54
20	73	76	44	35	59	56
21	68	68	37	40	54	54
22	43	44	30	35	36	40
23	55	60	31	37	43	49
24	54	56	39	31	47	44
25	58	61	30	25	43	43
26	58	62	38	34	47	48
27	58	62	41	33	50	48
28	58	62	37	25	48	44
29	49	52	34	29	41	41
30	41	45	34	35	38	40
31	37	37	31	34	33	36
Monthly Means	59.1	62.3	38.0	34.6	48.6	48.7
Data Source: Natrona International Airport, Casper, Wyoming						

Table A-3. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (A Stability)

Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	0.000069	0.000137	---	---	---	---	0.000206
NNE	0.000240	0.000274	---	---	---	---	0.000514
NE	0.000103	0.000206	---	---	---	---	0.000308
ENE	0.000240	0.000069	---	---	---	---	0.000308
E	0.000171	0.000137	---	---	---	---	0.000308
ESE	0.000103	0.000206	---	---	---	---	0.000308
SE	0.000069	0.000137	---	---	---	---	0.000206
SSE	0.000411	0.000617	---	---	---	---	0.001028
S	0.000137	0.000069	---	---	---	---	0.000206
SSW	0.000206	0.000206	---	---	---	---	0.000411
SW	0.000240	0.000069	---	---	---	---	0.000308
WSW	0.000240	6.000274	---	---	---	---	0.000514
W	0.000377	0.000548	---	---	---	---	0.000925
WNW	0.000171	0.000343	---	---	---	---	0.000514
NW	0.000206	0.000000	---	---	---	---	0.000206
NNW	0.000103	0.000206	---	---	---	---	0.000308
TOTAL	0.003083	0.003494	---	---	---	---	0.000206
Relative Frequency of Occurrence of A Stability = 0.006576 Relative Frequency of Calms Distributed Above With A Stability = 0.002192							

Table A-4. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (B Stability)

Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	0.000554	0.000959	0.000685	---	---	---	0.002198
NNE	0.000507	0.001233	0.000617	---	---	---	0.002356
NE	0.000374	0.000685	0.000685	---	---	---	0.001744
ENE	0.000421	0.000411	0.000411	---	---	---	0.001243
E	0.000960	0.001233	0.000617	---	---	---	0.002810
ESE	0.000424	0.001165	0.000206	---	---	---	0.001794
SE	0.000665	0.001302	0.000548	---	---	---	0.002515
SSE	0.000651	0.001165	0.00274	---	---	---	0.002089
S	0.000977	0.002124	0.000548	---	---	---	0.003649
SSW	0.000410	0.001028	0.000685	---	---	---	0.002122
SW	0.000618	0.001576	0.000822	---	---	---	0.003015
WSW	0.000445	0.001370	0.001096	---	---	---	0.002911
W	0.001126	0.001370	0.001781	---	---	---	0.004277
WNW	0.000402	0.000959	0.000685	---	---	---	0.002046
NW	0.000208	0.000548	0.000754	---	---	---	0.001510
NNW	0.000644	0.001096	0.000822	---	---	---	0.002562
TOTAL	0.009385	0.018222	0.011234				
Relative Frequency of Occurrence of B Stability = 0.038841 Relative Frequency of Calms Distributed Above With B Stability = 0.002603							

Table A-5. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (C Stability)

Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	0.000186	0.000959	0.002535	0.000274	0.000000	0.000000	0.003954
NNE	0.000133	0.001370	0.001850	0.000137	0.000069	0.000000	0.003558
NE	0.000115	0.000959	0.001576	0.000137	0.000000	0.000000	0.002786
ENE	0.000118	0.001028	0.001713	0.000137	0.000000	0.000000	0.002995
E	0.000366	0.001781	0.002329	0.000343	0.000000	0.000000	0.004819
ESE	0.000186	0.000959	0.001918	0.000343	0.000000	0.000000	0.003406
SE	0.000127	0.001233	0.001233	0.000137	0.000000	0.000000	0.002730
SSE	0.000037	0.000822	0.000822	0.000000	0.00000	0.000000	0.001681
S	0.000282	0.001507	0.001233	0.000343	0.000137	0.000000	0.003502
SSW	0.000186	0.000959	0.001987	0.000959	0.000069	0.000000	0.004159
SW	0.000186	0.000959	0.003699	0.002055	0.000343	0.000069	0.007310
WSW	0.000292	0.001713	0.006439	0.001713	0.000343	0.000137	0.010635
W	0.000179	0.002398	0.004727	0.001918	0.000411	0.000069	0.009701
WNW	0.000273	0.001302	0.002261	0.000343	0.000206	0.000000	0.004383
NW	0.000320	0.000754	0.001644	0.000411	0.000000	0.000000	0.003129
NNW	0.000028	0.000617	0.001576	0.000685	0.000000	0.000000	0.002905
TOTAL	0.003014	0.019318	0.037539	0.009933	0.001576	0.000274	
Relative Frequency of Occurrence of C Stability = 0.071654 Relative Frequency of Calms Distributed Above With C Stability = 0.000959							

Table A-6. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (D Stability)

Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	0.000792	0.005412	0.011440	0.011097	0.002809	0.001028	0.032577
NNE	0.001053	0.005823	0.014249	0.014865	0.003768	0.001028	0.040785
NE	0.000854	0.004453	0.010207	0.010275	0.001713	0.000274	0.027775
ENE	0.000741	0.003220	0.008768	0.006508	0.000617	0.000000	0.019854
E	0.000598	0.004110	0.009248	0.010001	0.002261	0.000137	0.026355
ESE	0.000592	0.003220	0.004932	0.005480	0.000822	0.000069	0.015115
SE	0.000548	0.001918	0.003014	0.0001987	0.000411	0.000000	0.007878
SSE	0.000268	0.001302	0.001370	0.000548	0.000137	0.000000	0.003625
S	0.000548	0.001918	0.002124	0.003699	0.001781	0.000411	0.010482
SSW	0.000336	0.001233	0.006302	0.030826	0.26716	0.014797	0.080210
SW	0.000411	0.002055	0.014180	0.065420	0.050075	0.022469	0.154610
WSW	0.000530	0.003357	0.021304	0.051993	0.022126	0.009727	0.109038
W	0.000679	0.003357	0.017468	0.019318	0.009248	0.005206	0.055276
WNW	0.000816	0.002398	0.005412	0.009453	0.004042	0.001165	0.023285
NW	0.000430	0.001439	0.005206	0.005891	0.002398	0.000411	0.015774
NNW	0.001009	0.004521	0.005001	0.004042	0.001028	0.000343	0.015943
TOTAL	0.010207	0.049733	0.140224	0.251404	0.129949	0.057063	
Relative Frequency of Occurrence of D Stability = 0.638581 Relative Frequency of Calms Distributed Above With D Stability = 0.005001							

Table A-7. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (E Stability)

Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	---	0.004179	0.003425	---	---	---	0.007604
NNE	---	0.003357	0.003014	---	---	---	0.006371
NE	---	0.002877	0.002809	---	---	---	0.005686
ENE	---	0.001918	0.002877	---	---	---	0.004795
E	---	0.002603	0.004042	---	---	---	0.006645
ESE	---	0.001576	0.003083	---	---	---	0.004658
SE	---	0.001507	0.001165	---	---	---	0.002672
SSE	---	0.001028	0.000480	---	---	---	0.001507
S	---	0.001370	0.000548	---	---	---	0.001918
SSW	---	0.001165	0.004042	---	---	---	0.005206
SW	---	0.002466	0.010892	---	---	---	0.013358
WSW	---	0.004932	0.028223	---	---	---	0.033155
W	---	0.007467	0.019044	---	---	---	0.026510
WNW	---	0.003631	0.004042	---	---	---	0.007672
NW	---	0.003288	0.002466	---	---	---	0.005754
NNW	---	0.003288	0.002603	---	---	---	0.005891
TOTAL	---	0.046650	0.092752	---	---	---	

Relative Frequency of Occurrence of E Stability = 0.139403
Relative Frequency of Calms Distributed Above With E Stability = 0.000000

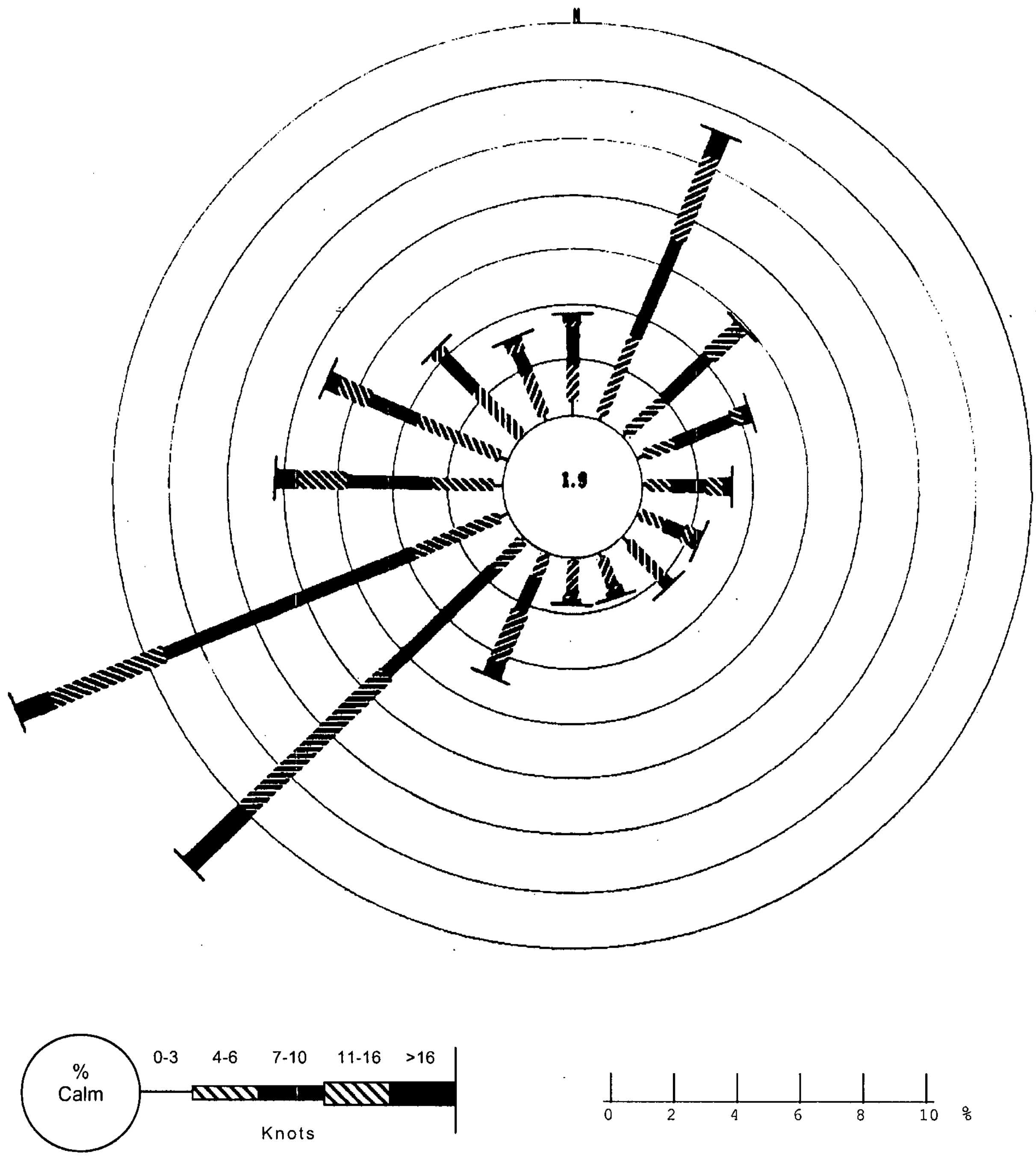
Table A-8. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (F Stability)

Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	0.003723	0.006919	---	---	---	---	0.010642
NNE	0.001668	0.005617	---	---	---	---	0.007286
NE	0.001431	0.003562	---	---	---	---	0.004994
ENE	0.001104	0.003562	---	---	---	---	0.004666
E	0.001608	0.003631	---	---	---	---	0.005239
ESE	0.001124	0.001987	---	---	---	---	0.003111
SE	0.000635	0.001576	---	---	---	---	0.002210
SSE	0.000583	0.000891	---	---	---	---	0.001473
S	0.001221	0.001644	---	---	---	---	0.002865
SSW	0.001124	0.001987	---	---	---	---	0.003111
SW	0.001448	0.002809	---	---	---	---	0.004257
WSW	0.002996	0.007809	---	---	---	---	0.010806
W	0.005746	0.012673	---	---	---	---	0.018419
WNW	0.002607	0.006234	---	---	---	---	0.008841
NW	0.002023	0.005754	---	---	---	---	0.007777
NNW	0.002606	0.006645	---	---	---	---	0.009250
TOTAL	0.031648	0.073298	---	---	---	---	
Relative Frequency of Occurrence of F Stability = 0.104946 Relative Frequency of Calms Distributed Above With E Stability = 0.017126							

Table A-9. ANNUAL RELATIVE FREQUENCY DISTRIBUTION, CASPER, WYOMING, 1967-1971 (Average)

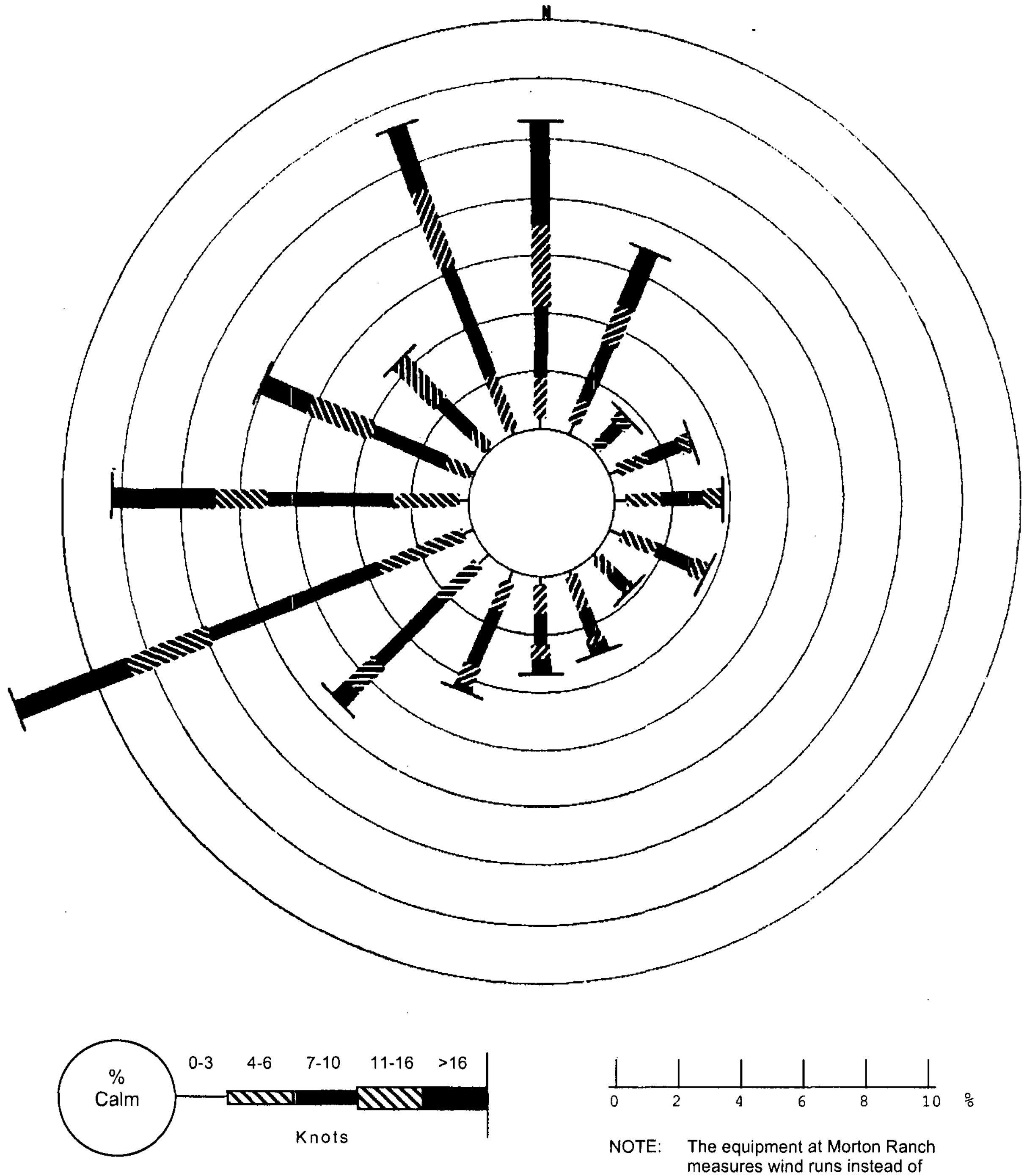
Direction	Wind Speed (knots)						
	0-3	4-6	7-10	11-16	17-21	21	Total
N	0.005290	0.018564	0.018085	0.011371	0.002809	0.001028	0.057146
NNE	0.003657	0.017674	0.019729	0.015002	0.003836	0.001028	0.060925
NE	0.003008	0.012741	0.015276	0.010412	0.001713	0.000274	0.043425
ENE	0.002638	0.010207	0.013769	0.006645	0.000617	0.000000	0.033875
E	0.003860	0.013495	0.016235	0.010344	0.002261	0.000137	0.046332
ESE	0.002510	0.009111	0.010138	0.005823	0.000822	0.000069	0.028473
SE	0.002190	0.007672	0.005960	0.002124	0.000411	0.000000	0.018357
SSE	0.001823	0.005823	0.002946	0.000548	0.000137	0.000000	0.011276
S	0.003296	0.008631	0.004453	0.004042	0.001918	0.000411	0.022730
SSW	0.002216	0.006576	0.013015	0.031785	0.026784	0.014797	0.095174
SW	0.002988	0.009933	0.029593	0.067475	0.050418	0.022537	0.182944
WSW	0.004476	0.019455	0.057063	0.053706	0.022469	0.009864	0.167032
W	0.007816	0.027812	0.043020	0.021236	0.009659	0.005275	0.114817
WNW	0.004172	0.014865	0.012399	0.009796	0.004247	0.001165	0.046644
NW	0.003126	0.011782	0.010070	0.006302	0.002398	0.000411	0.034089
NNW	0.004271	0.016372	0.010001	0.004727	0.001028	0.000343	0.036741
TOTAL	0.057337	0.210713	0.281751	0.261337	0.131525	0.057337	
Total Relative Frequency of Observations = 1.000000 Total Relative Frequency of Calms Distributed Above = 0.027881							

FIGURE A-1



WIND ROSE FOR CASPER, WYOMING – SEPTEMBER AND OCTOBER 1974

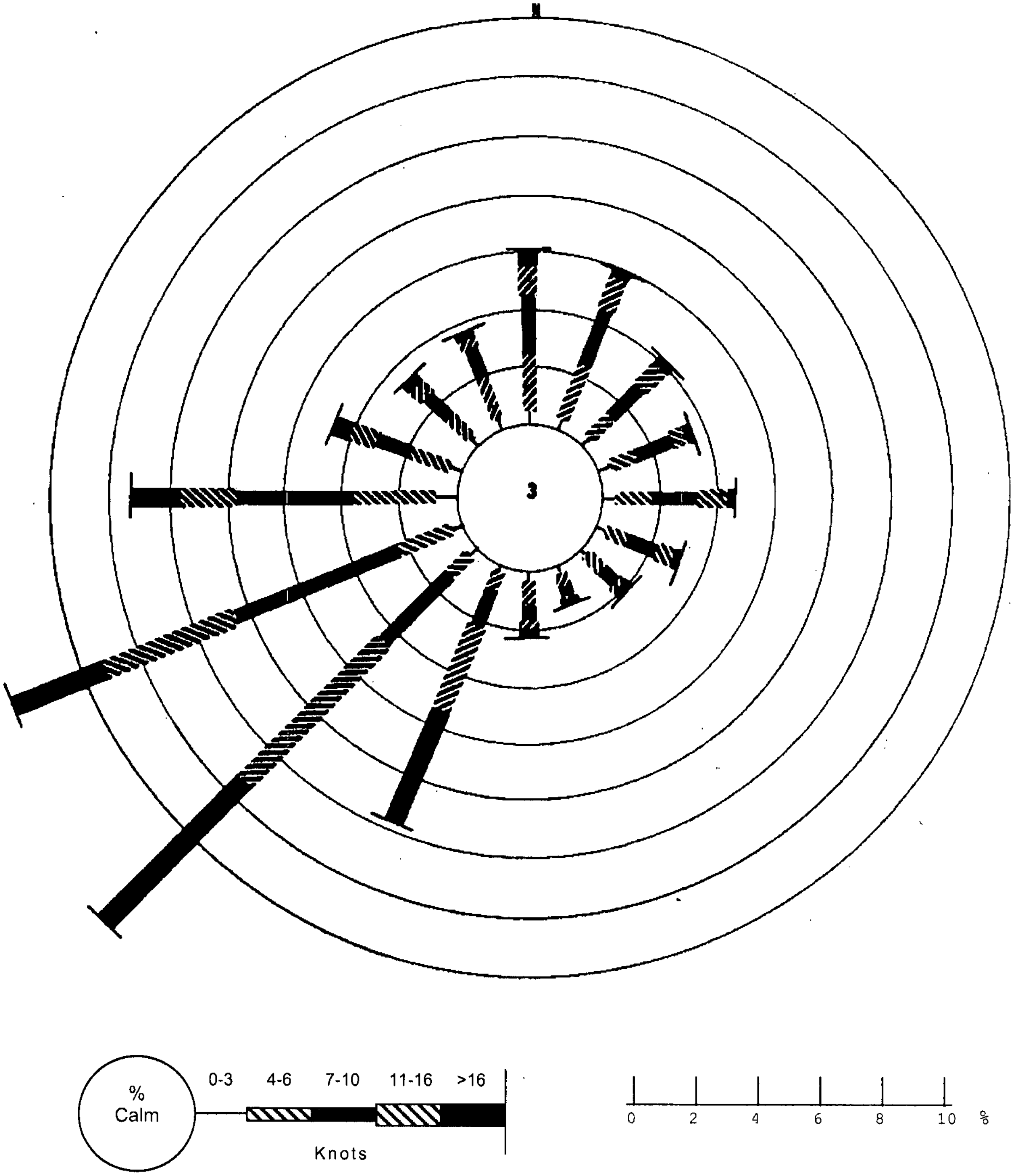
FIGURE A-2



NOTE: The equipment at Morton Ranch measures wind runs instead of instantaneous wind speeds. As a result, there are no calms.

WIND ROSE FOR THE MORTON RANCH SITE AREA – SEPTEMBER AND OCTOBER 1974

FIGURE A-3



SOURCE: Based on the National Climatic Center's STAR program calculation for Casper (U.S. Department of Commerce, 1973).

ANNUAL WIND ROSE FOR CASPER, WYOMING
(Period of Record, 1967 – 1971)

APPENDIX D-4

CLIMATOLOGY

REYNOLDS RANCH AMENDMENT AREA
CONVERSE COUNTY, WYOMING

1.0 General

The Reynolds Ranch amendment area is located in east-central Wyoming. The climate can generally be classified as semiarid and cool. Mountain ranges to the west of the project area restrict precipitation to this portion of the state. The area is subject to periodic high winds as well as droughts.

The official National Weather Service weather station closest to the proposed amendment area is located at the Natrona County International Airport at Casper, Wyoming. A 2003 annual weather summary for Casper, Wyoming is shown on Table D4-1 and a summary of normals, means, and extremes is shown in Table D4-2. Precipitation, temperature, and wind summaries can be found in Chapter 2 of the Operations and Reclamation Plan.

Addendum D4-1 includes a more detailed description of climate characteristics of the Southern Powder River Basin, Converse County, Wyoming.

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NOTE: There is no Supplemental Information included in Appendix D-1; therefore the tab has been removed.

LIST OF ADDENDA

APPENDIX D-1

LAND USE

1.0 GENERAL

The Smith Ranch Project is located in Converse County, Wyoming approximately 25 miles north of Douglas and 24 miles northeast of Glenrock. Converse County is a rural county that comprises approximately 2.74 million acres of land. Urban areas of Douglas and Glenrock constitute less than 2 percent of the total, while transportation systems account for approximately 4.5 percent. A generalized land use map for Converse County is presented in **Figure D-1-1** of this appendix. **Figure D1-2 provides the complete permit boundary, including the Proposed Reynolds Ranch Amendment area. Notes on the index map indicate when individual plates and figures for Smith Ranch, Highland or Reynolds can be found in the addenda. Table D-1.1 provides a tabulation of the land use acres in Converse County. The information provided in the table was obtained from the Converse County Land Use Plan dated August 1978. Cameco Resource (CR) reviewed the recent Converse County Land Use Plan (July 15, 2003), and the detailed land use acreage was not provided. The land use data from 1978 is probably comparable to today's present land use with the exception of agricultural land use. The Converse County Agricultural Extension office reported from 358 ranches and farms, 2,515,000 acres (total farm acres), 79,000 acres (total ranch acres), and 7,228 acres (total cropland acres). Several electrical utility companies (PacifCorp Energy, Duke Energy and others) have shown interest in Converse County as potential wind farm sites and have submitted Section 109 Permit Applications pursuant to Wyoming Statute (W.S.) § 35-12-109 of the Industrial Development Information and Siting Act. In fact, a wind farm has been constructed at the former Dave Johnston Coal Mine property located a few miles west of the Smith Ranch permit area. Plates D1-1 and D1-2 provide information from the 2003 Converse County Land Use Plan relating to assessed land use and the transportation network.**

Historically, the area was homesteaded and dry-land farmed. Many of these dry farmed areas were ultimately abandoned and left to revegetate by natural processes or were seeded with crested wheatgrass or other grasses for grazing purposes.

Today the area remains remote and contains a low population density primarily dominated by agricultural pursuits (see **Figure D1-1** and **Plate D1-1**). The majority of people living in the area reside on dispersed ranches. Sheep and cattle grazing comprise the major past and present land use in the area and at the project site. The Vollman Ranch is the only inhabited residence located within the current permit area. According to the 2007 Census of Agriculture, agricultural uses of 2.37 million acres account for 86.4 percent of the total surface area, and un-irrigated grazing is the dominant use. Per the Wyoming Department of State Lands records, grazing leases are limited to one animal unit month (AUM) per four acres of land surface.

The discovery and production of energy-related minerals temporarily influenced these traditional land uses. The Dave Johnston Power Plant and Wind Farm, east of Glenrock, represent the major industrial complex in the county. The historical uranium operations of Exxon, the TVA and Bear Creek had a temporary impact on the area in the 1970s and 1980s. Those activities have since ceased operation and have been or are in the process of being reclaimed.

The project area has limited surface water other than ephemeral streams, playas and stock ponds. A discussion of these waters is provided in Appendix D-6 (Hydrology).

2.0 PRESENT LAND USE

The area can be characterized as a predominately sagebrush-grassland type. The land surface within the existing permit area lies within a large region of native rangeland used for grazing sheep, cattle and some horses and is predominantly in private ownership. The land is fenced to accommodate such activities. **In situ recovery (ISR) production areas and surface facilities are fenced to maintain security and keep livestock from damaging the facilities. Fencing of the site is discussed in Section 3.4.5 of the Operations Plan and Section 3.5.2 of the Reclamation Plan.** The locations of fences are shown on **Plate OP-1** of Volume I: Operations and Reclamation Plan.

As detailed in the Operations Plan, fencing is used around the mine unit pattern areas and satellite facilities to primarily prevent livestock from creating interruptions or damage to construction and/or production activities. This is the Type I fence described in LQD Guideline 10. Fences are constructed using 32-inch high, woven wire (sheep-tight) fence that is approximately 1 inch off the ground surface. There is one barbed wire approximately 6 inches above the woven wire and another barbed wire approximately 6 inches above the first barbed wire. Therefore, fences are constructed with a total height of approximately 45 inches. Type I fences do not restrict the passage of deer or other high jumping wildlife. Due to the odd shapes and limited extent of mine unit areas, fencing of these areas does not pose a significant problem to antelope as they can move around fenced areas. Wildlife problems from fencing have not been observed during the 23 year operation of the Project.

When livestock, antelope, deer and other high jumping wildlife are present, LQD Guideline 10

Type II fencing is used. Fenced areas include impoundments, storage ponds, purge storage reservoirs, radium settling basins, and any other structures or facilities that may present a danger to livestock and/or wildlife. These fences are constructed with a total height of 7 to 8 feet utilizing 6 foot high woven wire fencing. There is one barbed wire approximately 6 inches above the woven wire and another barbed wire approximately 6 inches above the first barbed wire.

Those areas undergoing final reclamation are fenced with LQD Guideline 10 Type III fence. This type of fence consists of four strands of barbed wire, with the lower most strand placed approximately 15 inches from the ground and the remaining three strands at approximately 11 inch intervals. As discussed in the Reclamation Plan, all reclaimed areas will remain fenced for a period of two years, or until the vegetation is capable of renewing itself with properly managed grazing and without supplemental irrigation and fertilization, as determined by CR, LQD, and on public lands, Bureau of Land Management.

Alfalfa hay and some grains are grown south of the permit area in the vicinity of the Sundquist Ranch. Limited dry-land farming takes place east and north of the permit area, while wind farming occurs to the west. There are no producing oil and gas wells on the permit area. Oil and gas production are carried out both southwest and northwest of the area.

Due to the potential for harsh winter conditions at the site most livestock is moved off the area and closer to the Platte River for wintering. Although sheep and cattle are the primary domestic stock in the permit area, many varieties of native wildlife also utilize the permit area. Thus, the present use is periodic grazing by domestic livestock and concurrent use by native wildlife.

3.0 PAST MINING ACTIVITIES

From the 1970's to the early 1980's, areas within and adjacent to the project site were extensively mined for uranium. Both surface and underground mining methods were employed in the area, with the majority of uranium ore being recovered by surface mining methods. **From the early 1970s through the mid-1980s, companies such as Bear Creek Uranium, Kerr McGee Nuclear, Rio Algom Mining Corp. (RAMC), TVA and Exxon Minerals produced uranium from the sandstone deposits within or near the current permit boundary. Most of these mines were shut down and/or reclaimed by 1985 because of poor uranium market conditions. Past mining disturbance areas are presented on Plate D1-3.**

The Nuclear Regulatory Commission (NRC) first authorized Kerr-McGee Corporation (KMC) to conduct Research & Development (R&D) ISR operations at the Smith Ranch site in June 1981

under Wyoming Department of Environmental Quality (DEQ) Permit to Mine 304-C and Source Material License SUA-1387, with a corresponding Environmental Assessment (EA) issued at that time (46 FR 30924). In February 1984, SUA-1387 was amended to reflect that Sequoyah Fuels Corporation (SFC), a wholly-owned subsidiary of KMC, was the NRC licensee for the Smith Ranch R&D operations (NRC, 1984). The NRC renewed SFC's NRC license for continued R&D operations by letter dated January 29, 1988 (NRC, 1988b). In support of the license renewal, the NRC staff published a Finding of No Significant Impact (FONSI) in the Federal Register on January 7, 1988 (53 FR 459). RAMC acquired the Smith Ranch ISR site in December 1988 (Quivira Mining Corp., 1988). On June 18, 1991, DEQ issued Permit to Mine 633 to RAMC. On March 12, 1992, the NRC issued Source Material License SUA-1548 to RAMC, which authorized expansion of the Smith Ranch R&D operations into commercial scale production (NRC, 1992a). An Environmental Assessment (EA)/FONSI documenting the NRC staff's environmental review was published in the Federal Register on January 10, 1992 (57 FR 306). License SUA-1548 was renewed on May 8, 2001 (NRC, 2001c), and the FONSI published in the Federal Register on May 4, 2001 (66 FR 22620). Power Resources, Inc. acquired RAMC's Smith Ranch properties in July 2002 and, by letter dated August 18, 2003, the NRC approved the integration of the Highland Uranium Project (HUP) license into the Smith Ranch license (NRC, 2003d). With that integration, combined operations at Smith Ranch were authorized under Source Material License SUA-1548. The NRC staff did not prepare an EA/FONSI as this action was considered administrative and organizational in nature.

Results of core studies confirmed the two pilot R&D projects at the Smith Ranch site could successfully utilize a leaching solution of bicarbonate/carbonate with hydrogen peroxide and oxygen. The pilots were authorized by DEQ, Land Quality Division (LQD) with Permits 5RD and 13RD and by the NRC under license SUA-1387. These tests, conducted in uranium deposits at depths of 500 feet and 750 feet, have demonstrated the feasibility of mining the uranium reserves in the project area using ISR methods.

The initial in situ leach (ISL) pilot, the Q-Sand pilot, operated from October 1981 until May 1986. The Q-Sand pilot was a 1-acre, 100 gallon per minute operation. Uranium recovery from the pilot exceeded the forecast recovery and aquifer restoration, completed in May 1986, was deemed acceptable, as was the completion of a one-year aquifer stability demonstration period. The Q Sand pilot surface area is encompassed by Mine Unit 1 and surface reclamation will include both. The second ISL pilot, the O-Sand pilot was a 1.8 acre, 150 gallon per minute test and began operation in July 1984. The O-Sand pilot performed as forecast, confirming the

amenability of the ore to ISL mining. The O-Sand Mine Unit was placed on stand-by in 1991 and fully contained within the approved Mine Unit 3 commercial operation. Both the O-Sand pilot and Mine Unit 3 will be restored and reclaimed together. The pilots, authorized under NRC License SUA-1387 and DEQ Licenses 5RD and 13RD, operated without an excursion of leach solution, without a lost time accident, without serious injury to any employee, and without health or safety risks to the public, or significant impact to the environment.

The Smith Ranch processing facilities are located at the original site of the Bill Smith Mine shaft and underground mine. The mine was operational from 1976 through the early 1980s. The ore removed from the underground mine was transferred by truck to the Exxon mill for processing; as a result there are no mill tailings associated with the mining at Smith Ranch.

There were two open pit mines located north of Permit to Mine 633. These mines were in Sections 3 and 28/33, T37N, R73W and were mined under Permit to Mine 304C. The mined areas were reclaimed and revegetation was completed and verified. A release request for the reclaimed mined areas was included in the March 25, 1994 annual report/bond submittal for Permit 304-C.

The removal of the head frame was completed in 1991, disposed of in 1993, and removed from surety during the annual report/surety update. The 2003 annual report states the plugging of the shaft was completed in 1994 and removed from the surety. Two of the three settling ponds were reclaimed as described in the 1997 annual report. The vent hole has been plugged and is located under the south end of the office.

Two pilot R&D projects were completed at the HUP site by Exxon during the period from 1972 to 1981. These projects were operated under DEQ Permit No. 218-C and NRC License SUA-1064. The first pilot R&D project, known as the "Original R&D" was operated from 1972 to 1976. This project investigated the technical feasibility of in situ uranium mining utilizing different concentrations of sodium bicarbonate and hydrogen peroxide within the leach fluid.

The second pilot R&D project (known as the "Expanded R&D"), which was operated from December 16, 1978 to September 1981, demonstrated the technical feasibility of in situ mining utilizing gaseous oxygen, sodium bicarbonate and gaseous carbon dioxide within the leach fluid, the ability to control leach fluids within the mining zone, and the restorability of the affected ground water to its original use suitability. Reports concerning the results of the pilot activities, including restoration of affected ground water, were previously submitted to NRC and DEQ.

The HUP site is located adjacent to portions of the reclaimed Exxon Highland Uranium Mine, which used conventional open pit and underground mining methods, and was in operation from 1971 to 1984. The underground mine was shut down with the shaft sealed by 1985. In 1985, Exxon sold their remaining uranium reserves to Everest Minerals Corp. who developed the HUP, and ISR project. HUP began commercial uranium production in 1988.

Also during this time period, Silver King Mines, Inc. operated an underground uranium mine for the TVA in the Section 14 area of the HUP property (North Morton Ranch Mine) during the late 1970s and early 1980s. The mine was shut down and the shaft sealed in the mid-1980s. Everest Minerals Corp. acquired the reclaimed property from the TVA, which allowed expansion of the HUP operation to the west in 1993. Between 1989 and 2000, HUP produced approximately one million pounds of uranium per year. CR acquired PRI and the HUP in 1997.

Open pit uranium mining also occurred from the mid-1970s through 1986 at Union Pacific Resources' Bear Creek site, which is approximately 15 miles northeast of the Smith Ranch license area.

The proposed Reynolds Ranch Amendment Area was previously owned by Solution Mining Corporation (SMC). During 1980 to 1990, SMC installed wells, collected water quality data and performed two aquifer tests within the Reynolds Ranch area. SMC never permitted the property which was subsequently purchased by RAMC and then PRI. The regional ground water data collected by SMC is provided in Addendum C to Appendix D6. Recent well installation and ground water quality information are also included in Addendum C to Appendix D6.

Within the project site boundaries, there is limited disturbance from both underground and surface mining activities. Due to economic conditions, in the mid 1980's, all surface and underground uranium mining was discontinued in the area.

Because of the cost of conventional mining and the comparative low grade uranium resources in the area, it is doubtful that any company will consider using surface or underground mining methods to recover uranium in this area. Any additional uranium recovery in the area will be conducted utilizing ISR methods similar to those employed at the Smith Ranch Project. CR has no plans to develop conventional mines at the Project site.

4.0 POST-MINING LAND USE

Since the area has proven to be marginal for dryland farming because of limited rainfall, domestic livestock grazing with concurrent wildlife usage is the highest use for the land unless irrigation could be developed to supplement normal rainfall. Even production from native range fluctuates widely between years of moderate rainfall and years of drought. For these reasons, reclaimed lands will be returned to the pre-mining use of domestic livestock grazing and wildlife habitat. Since the affected areas will be relatively small, they will be grazed in conjunction with undisturbed native range.

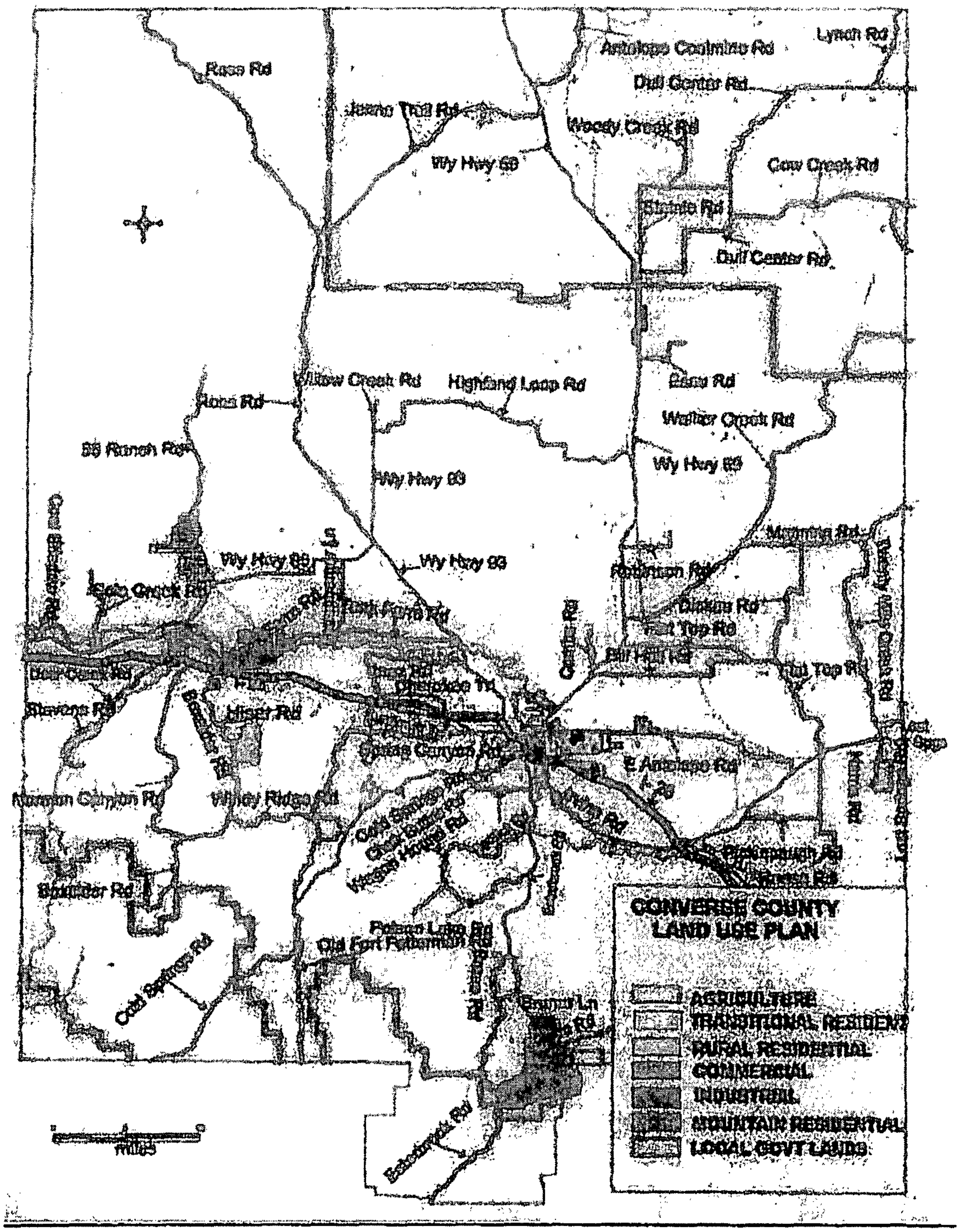
The area contained within the Smith Ranch permit area, including the proposed Reynolds Ranch area totals approximately 40,000 acres. Based on recent calculations of disturbed areas (Reynolds Plan of Operations, BLM, 2011), it is estimated that, during the life of the project, construction and operation activities associated with the development of Mine unit pattern areas will disturb approximately 1,880 acres, or less than 5% of the total area. CR estimates that more than 87% of the total disturbed wellfield acreage (1,635 acres) will be short-term disturbance (one year or less). All disturbed mine unit pattern, monitor well, pipeline and utility trench acreage will be reclaimed and revegetated as soon as possible after construction has been completed. This revegetated acreage will be available for wildlife habitat for the life of the project. The remaining 13% of disturbed acreage (approximately 244 acres) will be long-term disturbance and includes the uranium recovery satellites, processing facilities, mine unit header houses, pump stations, powerline corridors and access roads. These disturbances will remain for the life of the Project. Therefore, for the projected operational life of the Project, it is estimated that approximately 244 acres of the 40,000 acre project area will be completely removed from livestock and wildlife habitat use until final reclamation. This represents less than 1% of the total permitted acreage. Mine unit areas (approximately 1,635 acres) will be fenced to prohibit livestock entry. At the end of the Project, the entire 39,978 acres will be returned to the pre ISR mining use of wildlife habitat and livestock grazing.

Table D1.1 Converse County Land Use in Acres[1]

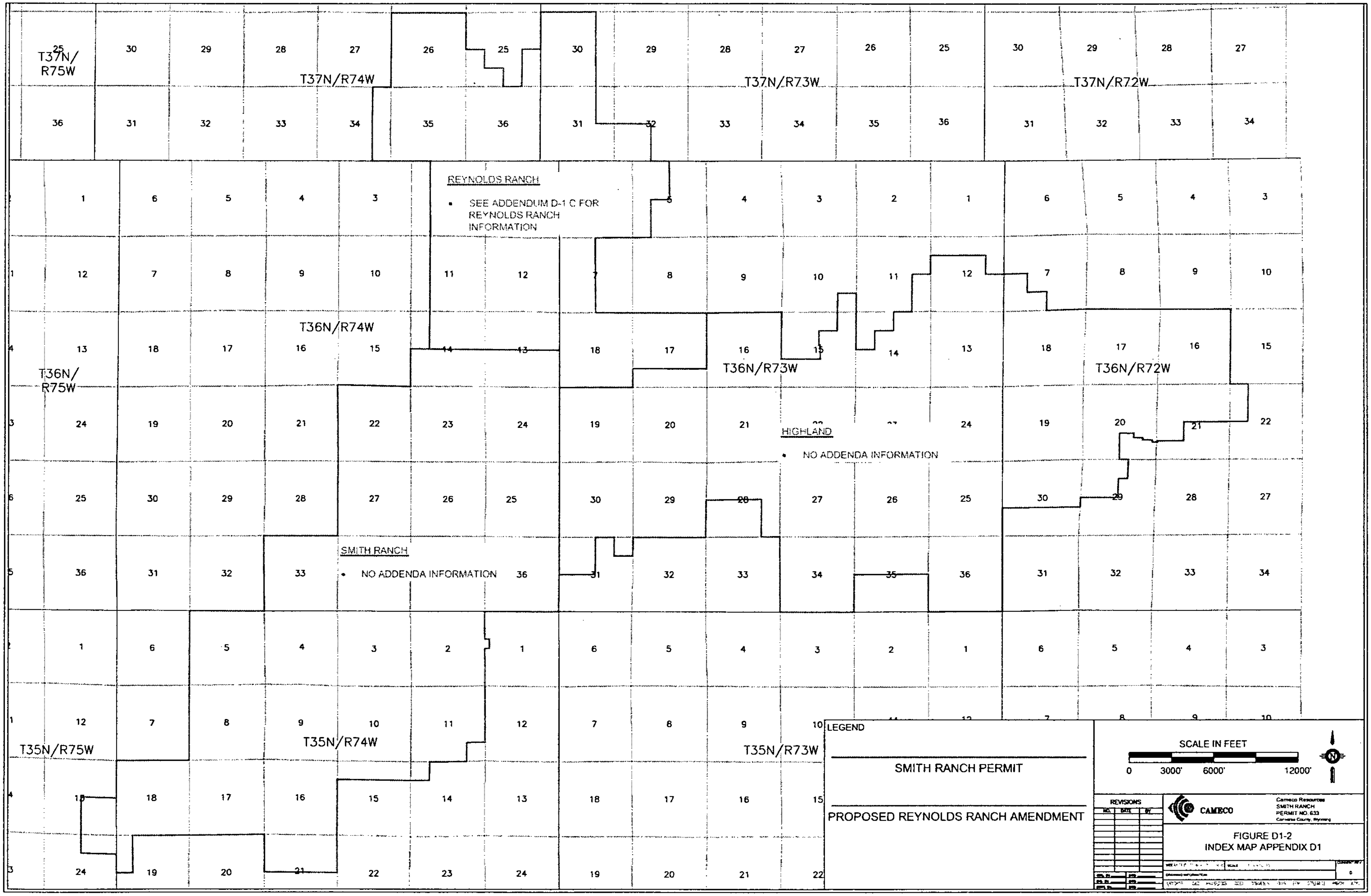
Urban Areas		
Douglas	3,840	
Glenrock	800	
Total Urban		4,640
Rural Housing		
536 Units @ 1 acre/unit	536	
Rural Recreational		
83 Units @ 5 acres/unit	415	
Total Housing		951
Agricultural		
Irrigated Cropland	68,316	
Dry Cropland	20,702	
Irrigated Pasture (seasonal)	16,735	
Unirrigated Grazing	2,420,199	
Tree Covered	142,437	
Total Agricultural		2,668,389
Industrial		31,010
Water Areas		4,082
Rural Business		
Highway Convenience, Guest Areas and Mobile Home Parks		815
Local Government		
Parks and Schools		2,535
Transportation		
Interstate Highway	1,543	
State & Federal Highway	3,528	
County Roads	4,737	
Railroads	2,330	
Total Transportation		12,138
Total County		**2,724,560**

1. Converse County Land Use Plan August 3, 1978, Converse County Planning Commission.

Figure D1-1 General Land Use Map for Converse County



Approved and Adopted as Revised by the Converse County Board of Commissioners July 15, 2003
This Land Use Plan supersedes and replaces any previous Land Use Plan adopted.



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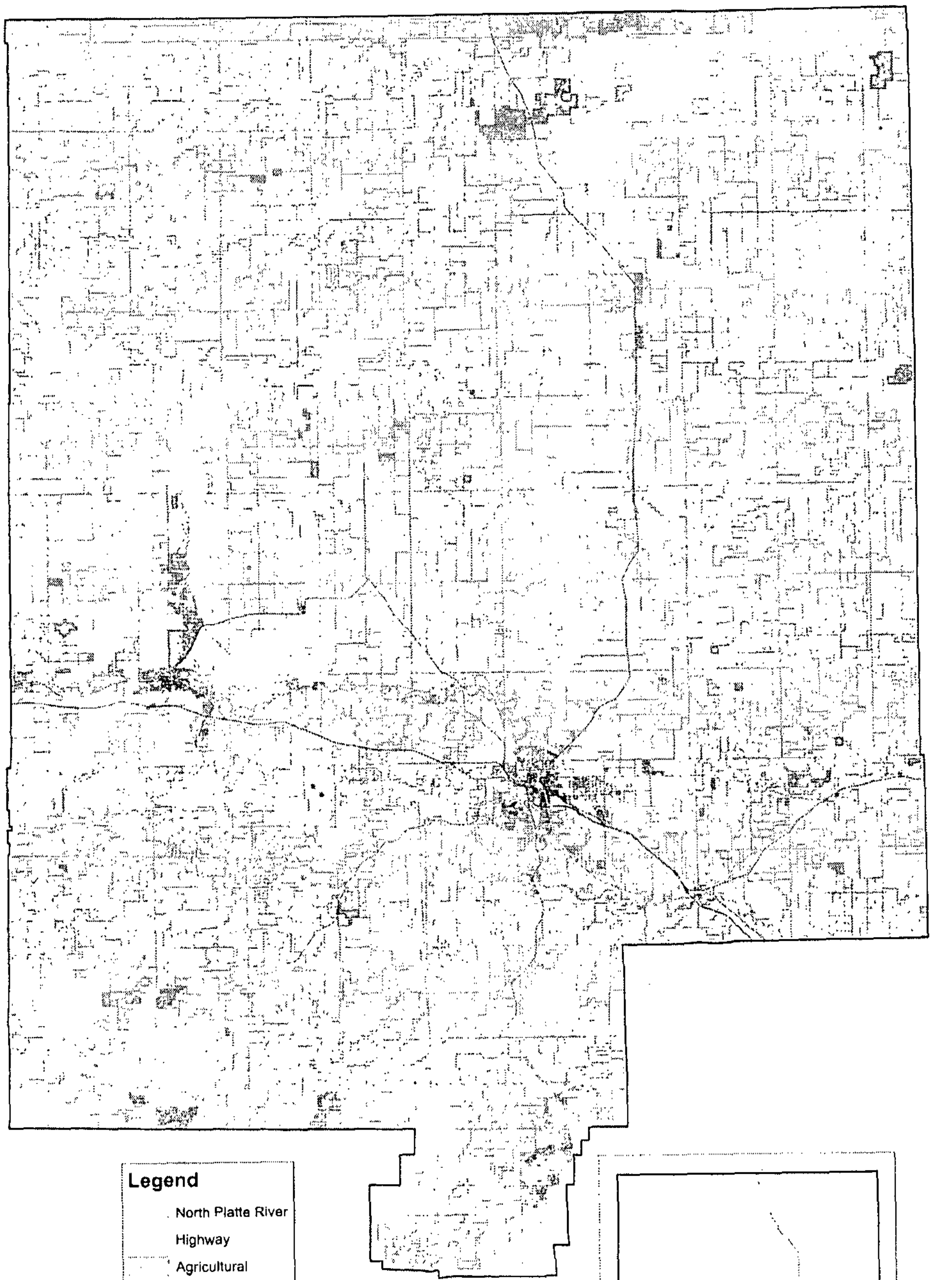

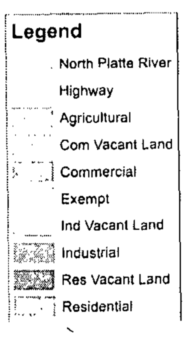

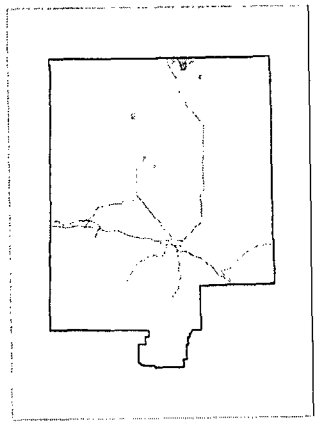

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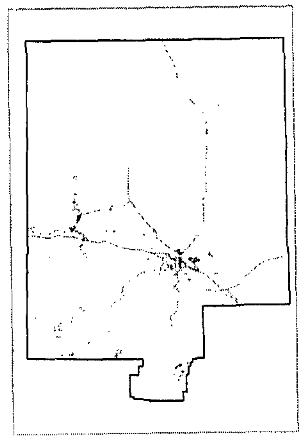

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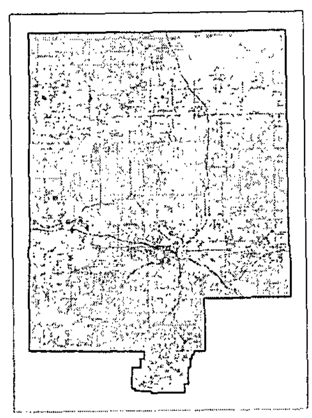

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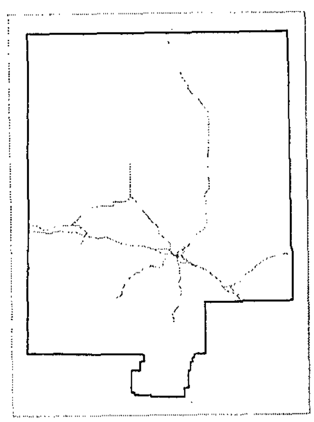


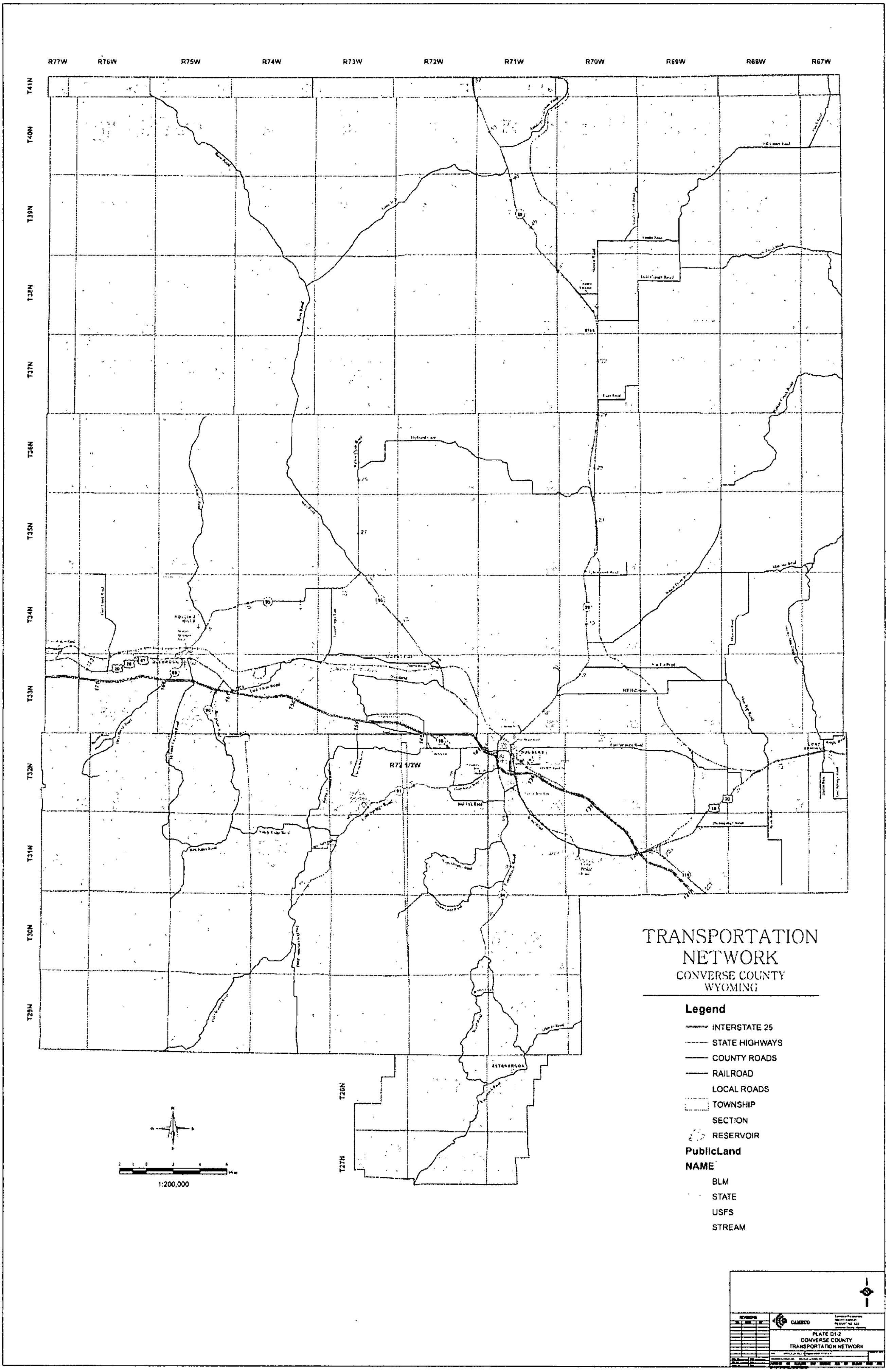
COMMERCIAL

CONVERSE COUNTY GIS 2008

CONVERSE COUNTY ASSESSED LAND USE

CAMECO

PLATE D1-1
CONVERSE COUNTY
ASSESSED LAND USE


R77W
R76W
R75W
R74W
R73W
R72W
R71W
R70W
R69W
R68W
R67W
T41N
T40N
T39N
T38N
T37N
T36N
T35N
T34N
T33N
T32N
T31N
T30N
T29N
T28N
T27N
R72 1/2W
TRANSPORTATION
NETWORK
CONVERSE COUNTY
WYOMING
Legend
INTERSTATE 25
STATE HIGHWAYS
COUNTY ROADS
RAILROAD
LOCAL ROADS
TOWNSHIP
SECTION
RESERVOIR
PublicLand
NAME
BLM
STATE
USFS
STREAM
1:200,000
REVISIONS
CAMECO
PLATE D1-2
CONVERSE COUNTY
TRANSPORTATION NETWORK