

**RIO ALGOM MINING CORP.  
SMITH RANCH FACILITY**

**SOURCE MATERIAL LICENSE APPLICATION**

**NRC License No.: SUA-1548**

**Docket No: 40-8964**

**Volume IV**

**Appendix D9 – Mildos 1**

**October 26, 1999**

VEVA

**APPENDIX D-9**

**WILDLIFE**

**SOUTH POWDER RIVER BASIN  
CONVERSE COUNTY, WYOMING**

## Appendix D-9

### Wildlife

#### TERRESTRIAL ECOLOGY

##### General Ecology of the Region

The permit area is located in the western part of the Great Plains in a region referred to as the short-grass prairie. The mixed-grass and tall-grass prairies lie to the east, and the forests of the Rocky Mountains are to the west. In eastern Wyoming the short-grass prairie generally occurs on flat to gently rolling land at elevations between 4500 and 6000 feet. The regional climate can be characterized as having wide ranges in temperature and relatively low annual precipitation (12 to 14 inches). Vegetation is dominated by grasses such as blue grama, with big sagebrush as a codominant in many areas. Except along some major drainages, trees are usually absent in the region.

Extensive cattle and sheep grazing since the late 1800s may have caused some changes in plant species composition (Weaver, 1956). The most evident change is an increase in sagebrush and several grass species characteristic of the short-grass prairie, such as blue grama and buffalo grass.

Many animals are associated with the short-grass prairie of eastern Wyoming. The pronghorn antelope, mule deer, coyote, prairie dog, badger, deer mouse, horned lark, and meadowlark are abundant. During the past century, however, some animal populations have changed as a result of increased human settlement. For example, the bison (or buffalo) and the gray wolf, which preyed primarily on the bison, were both formerly abundant on the short-grass prairie, but they have been virtually extirpated from this habitat in the past 100 years. Today the pronghorn antelope is the dominant big game species of the

prairie, and more antelope occur in Wyoming than in any other state (Sundstrum et al., 1973).

### Ecological Description of the Permit Area

A field survey of the permit area was conducted by Woodward-Clyde Consultants during 1976 and 1979 to obtain site-specific biological information. This survey included the following:

- o identification and delineation of vegetation types
- o quantitative analysis of the dominant vegetation types using the line intercept (percent cover), belt transect (density), and quadrat (standing crop methods)
- o identification and location of major wildlife habitat types
- o qualitative assessment of wildlife (mammals, birds, reptiles, and amphibians) that may utilize the permit area
- o quantitative assessment (using live-traps) of the relative abundance and habitat utilization of small mammals
- o assessment of the possible use of the permit area by protected species
- o qualitative assessment of aquatic organisms
- o collection of vegetation and rodents for radiological analysis

Vegetation was sampled near the Blizzard Heights area (site V-1), and proposed mill site (V-2), (Figure D-9.1A). Small-mammal trapping grids were also established in the Blizzard Heights area (site T-1). Aquatic studies were conducted at Sage Creek in Section 11, T35N, R72W on the permit area as well as down stream from that point (Figure D-9.1A).

Additionally, vegetation mapping was conducted over the entire permit area in 1990. The work was performed by Beartooth Environmental (Mr. Gary Saunders). Results of the vegetation mapping may be found in Appendix D-8, Vegetation.

The following discussion is based on the results of the 1976, 1979, and 1990 field surveys, a review of pertinent literature, and discussions with local personnel in resource management agencies.

Vegetation. Sagebrush/grassland and grassland vegetation types are the two major plant associations that occur in the permit area. The sagebrush/grassland type covers 82 percent of the area, while the grassland type covers 15 percent of the area. Remaining areas consist of hay meadows, disturbed lands, cottonwood/willow stands, roads and other.

Sagebrush/Grassland. The dominant vegetation type (sagebrush/grassland) on the permit area is similar to the plant communities on several other nearby sites that were studied during the 1970s (Woodward-Clyde Consultants, 1975; SERNCO, 1974; Dames and Moore, 1975). Ground cover in the type averages about 40 to 60 percent, and big sagebrush, blue grama, and western wheatgrass are the dominant plants. Big sagebrush typically numbers from 5000 to more than 11,000 plants per hectare (2000 to 4500 per acre) and provides from about 4 to about 25 percent of the ground cover. Blue grama generally covers from approximately 5 to 30 percent of the ground; however, this species is nearly absent in some portions of the permit area that have been seeded with other range grasses such as western wheatgrass. Western wheatgrass accounts for approximately 10 percent of the ground cover at all of the sample sites.

Standing crop estimates for the sagebrush/grassland vegetation type were made by the U.S. Soil Conservation Service for areas of eastern Wyoming that have soil characteristics similar to those on the permit area (U.S. Soil Conservation Service, n.d.). The total annual yield values were 900 to 2500 lb/acre.

Rangeland is fair to good condition that has soil, plant species composition, and annual yield characteristics similar to

those of the permit area can typically support livestock grazing at a rate of 0.2 to 0.33 animal-unit-month (AUM) per acre (U.S. Soil Conservation Service, n.d.).

Alteration of Vegetation Types. The only weeds of significance classified as noxious by the State of Wyoming that have been observed on the permit area is the Canadian Thistle. In order to control the growth and expansion of noxious weeds, areas with significant Canadian Thistle infestations are sprayed annually. The Converse County Weed and Pest Control also sprays rights-of-way in the permit area for noxious weed control.

Some of the mine spoils north of the proposed permit area created by small-scale uranium mining by local landowners in the 1950s, indicate a natural revegetation potential for overburden in the area. Big sagebrush, blue grama, and western wheatgrass, the most common species in undisturbed areas, are almost completely absent from these old mine spoils. In most spoil areas, Indian ricegrass has become fairly well established; and on at least one spoil bank, shortstem wild buckwheat (a low shrub) is extremely common. Saltbush is also present on these spoils but has never been observed in large numbers.

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South of the permit area adjacent to Sage Creek near to Sundquist Ranch is a relatively small field of irrigated cropland, mainly alfalfa. Irrigation water for this land originally came from the Bill Smith mine discharge; however, with the reduced flow, irrigation wells are now used. No agricultural crops are present on the permit area.

Delineation of all habitat types on the permit area was conducted during the spring and summer of 1990. Total and affected areas were calculated. As stated above, the primary vegetation type is sagebrush/grassland, which comprises 82.2 percent of the permit area. Grassland is the second most dominant vegetation type (15.2%). Cottonwood/willow areas, found along small drainages in the permit area, comprise < 1% of the total permit area. All of the vegetation typing conducted during 1990 is described in Appendix D-8, Vegetation, of this application, which includes colored photographs of the dominant vegetation types.

In addition to the updated vegetation (habitat) maps provided in D-8 (Figures D-8.1 and D-8.2), the updated wildlife survey map (Figure D-9.1) shows general topographic features of interest including water sources, playas, stock ponds, etc. General areas to be disturbed during the mining process are indicated on the vegetation survey map D-8.2, and in more detail on the updated Map E-1 located in Appendix E of this application.

Wildlife. To enhance the quality of the existing baseline information on big game, a series of three aerial surveys were initiated in February, 1990. The entire permit area and the two (2) mile perimeter was flown to record numbers, distribution, and habitat affinity. The February flight provided winter information. Flights were repeated in August and December 1990 for production pre-hunt and total numbers post-hunt, respectively. A discussion of the existing baseline information, including the additional information acquired in 1990, follows.

Antelope, deer, cottontail rabbits, and several species of small birds are the most commonly observed animals on the permit area. A detailed literature review and field study of the wildlife in the vicinity of the permit area indicate that many other species of mammals, birds, fishes, reptiles, and amphibians (Attachment A) are present and contribute to the stability of the wildlife resource. Many of the species are expected to be relatively abundant in the area but are rarely observed because of their small size or nocturnal habits. The major wildlife groups and the more significant species in each are briefly discussed below.

Mammals. The mammals present or expected to occur on the permit area (Attachment Table A-1) form a very diverse group and include big game (antelope and deer), medium sized mammals (coyote, fox, badger, skunk, cottontail, jackrabbit), and many small mammals (bats and rodents).

Antelope and mule deer are the two big game species found on the permit area. Because of differences in habitat preferences, antelope utilize the area to a greater extent than mule deer. There is no year around deer habitat on the permit area.

The optimum habitat for pronghorn antelope consists of

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open, rolling sagebrush/grasslands relatively free from human encroachment (Compton, et al., 1971). This type of habitat provides the browse and forbs that constitute the major part of the antelope's diet. Several species of sagebrush are particularly important food for pronghorns during the winter, when little else is available. Since pronghorns rely on their exceptional speed and eyesight to avoid predators, open country provides them with an excellent field of vision and many avenues of escape.

The permit area is classified as year-round antelope habitat and includes parts of Wyoming Game and fish Department Antelope areas 26 and 28. During the 1976 hunting season, an estimated 2519 antelope were harvested from these two areas (Wyoming Game and Fish Department, 1976a). During road counts on two successive days in 1976, 187 and 237 antelope, respectively, were observed on the permit area. Pate\* has estimated that the habitat in the region that includes the permit area is capable of supporting 5 to 7 animals per square mile (a total of 125 to 175 animals in the proposed permit area). The exact number of antelope in the permit area is expected to vary throughout the year and from year to year, depending on such factors as seasonal movement, forage availability, and fawn survival.

Aerial census data for pronghorn antelope observed on the permit area and two mile perimeter during the winter, pre-hunt and post-hunt flights in 1990 are presented in Table D-9.A. The surveys were conducted from a high wing Piper aircraft flown at approximately 70 to 75 knots, 300 feet above the ground along north-south oriented transects. The winter (February, 1990) and pre-hunt (August, 1990) surveys were conducted by Beartooth Environmental (Gary Saunders). The post-hunt survey was conducted by Hayden-Wing Associates (Larry Hayden-Wing). The results provided in Table D-9.A indicate that the antelope are more prevalent on the permit area during the summer months, and that the area does not support many pronghorn during winter months.

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\* L. Pate, Wyoming Game and Fish Department; personal communication, 1977.

Table D-9.B contains the pronghorn distribution by habitat type on the permit area during the 1990 aerial surveys. As expected, the majority of the usage by pronghorn is in the sagebrush/grassland habitat type.

In general, the preferred habitat for mule deer consists of open country interspersed with escape cover. This species feeds primarily on forbs in the spring and summer. During the winter, shrubs become a major part of the mule deer's diet.

Aerial census data for mule deer observed on the permit area and two mile perimeter during the winter, pre-hunt and post-hunt flights in 1990 are presented in Table D-9.A. As with the pronghorn, the winter and pre-hunt surveys were conducted by Beartooth Environmental and the post-hunt survey was conducted by Hayden-Wing Associates. The results provided in Table D-9.A may indicate that mule deer are utilizing the permit area more during the winter than previously suspected. The post-hunt survey was conducted on a day with 75% snow-cover on the surface, making it easier to see the mule deer than on non-snow covered days.

Table D-9.B contains the mule deer distribution by habitat type on the permit area during the 1990 aerial surveys. The prevalent vegetation type utilized by the mule deer appears to be sagebrush/grassland.

A general lack of escape cover probably plays an important role in limiting the number of mule deer that

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utilize the permit area. Mule deer are usually associated with those portions north of the permit area that provide favorable cover, such as the riparian habitat near Duck Creek and Dry Fork of the Cheyenne River.

The desert cottontail and the white-tailed jackrabbit are also common herbivores on the permit area. Almost 4,000 cottontail rabbits were harvested in Converse County during 1975 (Wyoming Game and Fish Department, 1976b). The actual number of cottontail rabbits in any one area changes dramatically from year to year; however, these populations are thought to be increasing in Wyoming (Strickland, 1976). The numbers of cottontail rabbits and jackrabbits per square mile in Converse and Campbell counties have been reported to vary from approximately 60 to 150 for jackrabbits in habitat similar to the permit area (SERNCO, 1974).

Rodents are the most abundant mammals on the permit area and are considered important to the ecosystem because they are consumers of plants and animals as well as prey for other animal species. Trapping for the surface mining and milling operations indicated that the most common species in the area are the thirteen-lined ground squirrel, deer mouse, olive-backed pocket mouse, and northern grasshopper mouse (Table D-9.1). Except for the diurnal ground squirrel, these species are not readily observed, although a density of two to five or more rodents per hectare (one to two per acre) is common in the short-grass prairie (SERNCO, 1974).

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Birds. To supplement the original breeding bird surveys (Tables D9.5, D9.6, D9.7, D9.8 and D9.10), additional passerine bird surveys were conducted on two consecutive days during the month of June, 1990. Transects, 1000 meters long and 100 meters wide, were established in three habitat types, corresponding to the updated vegetation mapping conducted in 1990 (Figure D-8.1). Two transects were located in both the sagebrush/grassland and grassland habitat types, and two transects were located along major drainages.

The results of the 1990 breeding bird surveys are provided in Tables D-9.C(1) and D-9.C(2). Locations of the six survey transects are shown on Figure D-9.1. The primary passerine birds found breeding within the permit area were Horned Larks, Lark Buntings, Western Meadowlarks and Brewer's Sparrows (typical inhabitants of upland grassland areas).

Several species of waterfowl, upland game birds, raptors, and other birds are known to inhabit the permit area and the adjacent region (Attachment Table A-2). These birds are herbivores, insectivores, predators, and scavengers and are important in maintaining stability in the various food chains within the ecosystem.

Mallard ducks were the most commonly observed waterfowl species in the September, 1976 survey. During this survey, more than 20 mallards were observed on the small ponds and reservoirs in the 304C permit area.

Ducks are one of the most popular game species in the region, and hunters harvested an estimated 3,279 ducks in Converse County during 1975 (Wyoming Game and Fish Department, 1976b). Other waterfowl species, including geese and shorebirds, are also expected to utilize habitat within the permit area (Attachment Table A-2).

Mourning doves and sage grouse are the two most common upland game birds utilizing the permit area. Mourning doves feed almost exclusively on plants. They eat the seeds of most of the grass and forb species found on the permit area. An estimated 1,609 doves were harvested in Converse County in 1975 (Wyoming Game and Fish Department, 1976b).

Sage grouse have been observed on the permit area, however |

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no strutting grounds (leks) have been located on the permit area. This species is found almost exclusively in prairie vegetation that consists of dense sagebrush stands with associated herbaceous plants. This type of vegetation is used for food, cover, and nesting habitat by the species (Martin and Pyrah, 1970). Big sagebrush constitutes almost 100 percent of the sage grouse's winter diet. In the spring and summer, sage grouse feed largely on forbs such as salsify and dandelion. Young sage grouse feed mainly on forbs and insects. The sage grouse is nonmigratory but may move considerable distances in winter to find suitable sage brush habitat.

The permit area, as is the case with many areas in this region of Wyoming, provides fair habitat for sage grouse. The dominance of grasslands in the area does limit the preferred sage grouse habitat of big sage brush. During 1975 an estimated 210 sage grouse were harvested in Converse County (Wyoming Game and Fish Department, 1976b).

Sage grouse lek searches were conducted by Beartooth Environmental on the permit area and the two (2) mile perimeter during the last week of March, 1990 through the first week of May, 1990. After checking BLM and Wyoming Game and Fish Department (WGFD) records for previously recorded leks, 17 days were spent on-site searching for leks. Of four previously recorded leks, activity was observed on only two during the spring of 1990. Five male sage grouse were observed on the northernmost lek located in Section 9, T36N, R74W, on the morning of April 24, and two males were observed on May 1. Three males were observed on the lek located in Section 13 on the morning of April 27. Dawn lek searches and interviews with area landowners did not reveal the presence of any other leks within the study area. Please refer to Figure D-9.1 for the location of the two active and inactive leks identified.

RAMC was requested to conduct sage grouse surveys during July to evaluate the importance of wet meadows along drainages. While no true

wet meadows occur within the study area, four drainages with impoundments or small potholes containing water were surveyed for sage grouse usage. These drainages were Willow Creek, Martin Spring Draw, Sage Creek, and an unnamed tributary to Sage Creek running west to east across Section 8, 9, 10 and 11, T35N, R74W. The results of these surveys are provided in Table D-9.D.

Several raptors (birds of prey) are known to utilize the permit area when foraging for rodents, rabbits, birds, and other prey. In September, 1976, raptor species observed in the vicinity of the area included the red-tailed hawk, ferruginous hawk, marsh hawk, Swainson's hawk, American kestrel, and the great horned owl. Several other raptors, including the golden eagle and prairie falcon, have also been observed in the vicinity (SERNCO, 1974).

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Raptor nest searches were conducted by Beartooth Environmental from March through July on the permit area and the two mile perimeter. As a result of these searches, two golden eagle nests were located in Sections 6 and 10, T35N, R74W (see Figure D-9.1 for the locations of the nests). The Section 10 nest is located within the permit boundary, while the Section 6 nest is within the two mile perimeter surrounding the permit boundary. One golden eagle was observed sitting on the Section 10 nest at the end of April and during the second week in May. Access to this site was denied by the landowner from May 15 through June 15. When the nest was checked again on June 18, no eagles were observed in the vicinity. Over the next three weeks the nest was checked twice more with the same results. The golden eagle nest located in Section 6, T35N, R74W was observed to produce two eaglets during the 1990 season. Golden eagles and American kestrels were the only raptor species observed during the course of the March through July, 1990 field observations.

) During the 1990 post-hunt big game aerial surveys, Hayden-Wing Associates plotted the locations of raptor species sighted. Four sightings of bald eagles were noted within the permit area and two mile perimeter (see Figure D-9.1). No other raptor species were sighted, but bald eagles were seen immediately north of the survey area and undoubtedly hunt over portions of the project area during the winter months. One unidentified raptor nest was noted from the air in Section 22, T35N, R74W, outside of the permit area.

) Reptiles and Amphibians. Largely because of climatic conditions and a lack of suitable habitat, reptiles and amphibians (Attachment Table A-3) are generally less common on the permit area than birds and mammals. The eastern short-horned lizard and several snakes, including the garter snake, bull snake, and prairie rattlesnake, have been observed or are expected to occur in the area. Amphibians such as the leopard frog and tiger salamander are usually associated with riparian habitats similar to those found in the permit area and may be present in those area or near ponds during the spring and summer.

Invertebrates. Invertebrates (including insects, spiders, and other arthropods) are extremely abundant, in terms of both species and individuals, in the short-grass prairie. Although small in size and often unnoticed by man, this group represents one of the more important animal groups in the ecosystem. Invertebrates form a significant portion of the animal biomass in most habitats and function at almost every level in the food chain. They are especially important as a food source for amphibians and reptiles and for many species of birds and mammals.

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Threatened and Endangered Species. The peregrine falcon, bald eagle, and blackfooted ferret are endangered animal species that have a very limited potential for occurring on or in the vicinity of the permit area (Table D-9.2). The bald eagle and peregrine falcon, wide-ranging birds, may fly over the property during foraging activities. Because the peregrine falcon nests on high cliff faces (U.S. Bureau of Land Management, 1972a), and there are no cliffs in the vicinity of the permit area, breeding pairs would not be expected to occur there.

The black-footed ferret lives in prairie dog colonies and preys on these rodents (U.S. Bureau of Land Management, 1972b). This rare member of the weasel family is a very secretive, nocturnal animal. Although a black-footed ferret was observed in 1966 about 6 miles east of Casper (Hershkovitz, 1966), none are expected to occur on the permit area because there are no prairie dog colonies.

The lack of prairie dog colonies within the permit area and two mile perimeter was verified during the field studies conducted by Beartooth Environmental in 1990. Coverage of the area was done through ground searches, aerial flights, discussions with local landowners and a search of BLM records and previous studies conducted in the vicinity (Glenrock Coal Company, UNC, Everest Minerals). None of the field surveys or records searches indicated the presence of prairie dogs in the area of interest. A letter of confirmation from Mr. Gary Saunders, Beartooth Environmental, verifying that no colonies were found on the permit area or two mile perimeter is provided as Attachment B to Appendix D-9. Additionally, Dr. Larry Hayden-Wing, Hayden-Wing Associates, did not observe any prairie dog colonies during his big game post-hunt aerial surveys conducted in December, 1990 (verbal communication, January, 1991).

The State of Wyoming has designated two additional animals as rare or high priority (Wyoming Game and Fish Department, n.d.). These are the northern swift fox and burrowing owl. Suitable habitat for these

species exists in the vicinity of the permit area. The swift fox inhabits open plains (Burt and Grossenheider, 1964), and its distribution includes the region around the permit area. The burrowing owl inhabits the burrows of small rodents and other animals such as ground squirrels, prairie dogs, badgers, and skunks (U.S. Bureau of Land Management, 1974), and is distributed throughout Wyoming.

The State of Wyoming also has a list of animal species that are classified as "uncommon" (Wyoming Game and Fish Department, n.d.). The distribution of the uncommon species (Table D-9.2) include the short-grass prairie of eastern Wyoming, and they may occur on the permit area.

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## AQUATIC ECOLOGY

Aquatic studies were conducted during September 1976 at two sampling stations near the southeastern boundary of the permit area. The stations were selected to provide representative sampling of the various aquatic habitats in the area at that time (Figure D-9.1). A description of the sampling station as included in the 1976 study is given below.

"Station A-1 is a swiftly moving stream, 2 to 4 feet wide and 1 foot deep, with intermittent pools 2 feet deep. When sampled, the water was clear and algae was abundant. The stream bottom is composed of firm mud. There is very little riparian growth along the stream banks."

"Station A-2 consists of a recent man-made lake about 3 acres in area. Long and irregularly shaped, it is at least 10 feet deep and is fed by a swiftly moving channelized stream that is 1 foot wide and about 1 foot deep. The lake bottom consists of earth and grass, with cactus, sage, and other terrestrial plants that were flooded during the filling of the reservoir. There is little riparian growth along the banks."

The "stream" in both of the above descriptions was the discharge from the Bill Smith mine dewatering program. With the reduced pump rate from the Bill Smith Mine, these sample points are normally dry; however, the results of the 1976 survey are included for background references.

### Sampling Methods

Fish were sampled at both stations with dip nets since stream widths and bottom growth precluded the use of seines.

Three replicate samples of benthic invertebrates were taken at each station. At both stations, benthic invertebrates were collected with a Surber sampler. All organisms were preserved in a 70 percent solution of isopropyl alcohol and were returned to the laboratory for analysis.

Algae samples were collected at each station by scraping rocks and substrate. The samples were preserved in a solution of 5 percent formalin and were returned to the laboratory for analysis.

Four water quality parameters were measured on samples taken from each station. Water samples to be analyzed for pH and specific conductance were placed on ice and returned to the laboratory for analysis. Samples to be analyzed for dissolved oxygen levels were chemically treated in the field, placed on ice, and returned to the laboratory for titration. Water temperatures were taken in the field with a hand-held thermometer.

### Fish

No fish were taken or observed from other aquatic sampling stations. However, some of the habitats that appeared to be of adequate quality to support fish had been created only a short time before this study. Consequently, fish may not have been introduced into the systems at the time of sampling.

### Benthos

Benthic invertebrates collected from all aquatic sample sites in September 1976 were from three major phyla: Annelida, Arthropoda, and Mollusca (Attachment Table A-4). Arthropods were the most numerous, represented by six orders. Dipterans were numerically the most abundant order, but no one order seemed to

totally dominate the benthic invertebrate samples (Attachment Table A-5). Most of the benthic invertebrate groups found in running streams that are suitable for trout (caddisflies and true flies) were collected at station A-1. Some of these groups were also found at station A-2.

### Water Quality

Alkaline conditions exist at all sample locations (Attachment Table A-6). Temperatures ranged from 58.0° to 63.0°F. Dissolved oxygen values ranged between 6.61 and 6.96 mg/l. Results for specific conductance ranged from 700 to 730 umhos/cm.

### Algae

Samples of floating and attached algae were collected from each sample site. Laboratory analysis indicated the presence of two major genera, Chara and Cladophora, at each sample location.

### Habitat Conditions

All of the aquatic habitats sampled during the September 1976 study were of sufficient quality to support aquatic life and contained adequate food for fish. Previous studies conducted in the region (SERNCO, 1974) found conditions similar to those on the permit area.

### 1977 Wildlife Monitoring Program

In September, 1977, Kerr-McGee Corporation initiated a long-term wildlife monitoring program within Permit Area 304C to supplement work conducted by Woodward-Clyde Consultants in 1976 and to identify:

- (1) Critical or important habitats.
- (2) Actual vertebrate fauna present on a seasonal basis.

- (3) Seasonal changes in habitat affinities, species occurrence and relative densities.
- (4) Direct and indirect impacts of mining developments on wildlife.

A wildlife road census route was established to inventory antelope, mule deer, and other populations on a seasonal basis. Additional bird and mammal transects were located on proposed development sites within the permit area. Small mammal trapping also was conducted to provide site specific information related to proposed development sites.

Continued wildlife monitoring results are provided for September 1977, February, June and September, 1978 and February and October 1979 in the attached Tables D-9.3 through D-9.12. Figure D-9.3 indicates location of road census units and all site specific biological inventories which had been conducted through the October 1979 census period on the permit area.

#### Summary and Discussion

The species observed on the permit area are common throughout eastern Wyoming and many other areas of the Rocky Mountain region. For this reason, it is unlikely that any loss of individuals that might result from project activities will affect the overall maintenance of any species. It is also unlikely that project activities will result in any decrease of species populations in adjacent undisturbed habitats.

Some individuals of the small animal species such as the small burrowing mammals, snakes, lizards, and arthropods that live in areas disturbed by construction will be destroyed when the vegetation is removed. Since a relatively small number of reptiles inhabit the permit area, the impact on these animals will be relatively minor. Vegetation removal will also have a relatively minor effect on insects and other arthropods because of their ability to quickly reestablish populations on reclaimed

areas. However, the loss of arthropods will decrease the amount of food available to insectivorous animals, including many species of birds. Some small mammals (mice, rats, and ground squirrels) be lost as a result of vegetation removal; however, most will be able to move out of the limited construction area. The number of animals lost in any area will be small because of the limited disturbance required for solution mining. The short average life cycle of small mammals means that the loss in potential biomass during construction will be replaced in a very short time.

Highly mobile species, such as the larger mammals (pronghorn antelope and mule deer) and most birds, will escape the disturbed areas and move into the adjacent undisturbed habitat.

In terms of economic value and public interest, the most important wildlife species that utilizes the permit area is probably the pronghorn antelope. It is estimated that the density of pronghorns in this region is five to seven animals per square mile and that they remain in the area throughout the year.\*

Availability of water from mine pumping may result in an increase in the carrying capacity of the local environment. The increased number of people in the permit area could have an additional impact on pronghorn and other wildlife populations, since some animals may be killed by vehicular traffic.

Other than the limited removal of vegetation and the potential of accidents resulting from activity in the area, the project activities will not affect pronghorns. These animals do not appear to be disturbed by mining or activities required for this project.

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\*L. Pate, Wyoming Game and Fish Department; personal communication, 1977.

2. Appropriate state and federal wildlife agencies shall be notified in the event a previously unreported threatened or endangered species is observed on or within 1 mile of the permit area.
3. Should a prairie dog colony become established within the permit area, a ferret search will be conducted within one (1) year prior to disturbing the colony (assuming the colony fits the size and distance requirements for ferret searches). Any ferret searches conducted will be in accordance with the BLM Handbook of Methods for Locating Blackfooted Ferrets. Results of any such ferret search will be submitted to the USFWS Endangered Species Office in Helena, Montana for clearance prior to disturbance.
4. To reduce the risk of wildlife collisions, speed limits not to exceed 45 mph will be posted on access roads controlled by RAMC.
5. During routine inspections of the lined evaporation ponds, RAMC will incorporate a monthly survey to document wildlife usage of the ponds, including any detrimental effects to wildlife noted from use of the ponds.
6. All new powerline installation as a result of RAMC's proposed activities will conform to the specification of: "Olendorff, R.R., A.D. Miller, and R.N. Lehman, 1981. Suggested practices for raptor protection on powerlines -- the state of the art in 1981. Raptor Res. Rep. No. 4, Raptor Research Foundation, Inc. Univ. Minn., St. Paul, 111pp."
7. Areas to be fenced for the in-situ mining activities and the type of fencing to be utilized are as follows:
  - o Central Process Plant Area - Type III (LQD Guideline 10).
  - o Lined Evaporation Ponds - Type II, modified to exclude all wildlife.

- o Wellfields - may or may not be fenced, but if so, will use Type I (if sheep are problematic) or Type III.

8. An inventory of potential jurisdictional wetlands on the permit area was conducted during the month of June, 1991. Five artificial (man-made) potential wetlands areas were identified in the study, as shown on Figure D9-1. These include two small stock water impoundments, two irrigated hay meadows, and a small area at the mine de-watering NPDES discharge point. No natural wetlands were identified. RAMC plans no disturbances or impacts in these areas.

In addition to the above precautionary measures, RAMC will conduct an operational wildlife monitoring program to assess any potential effects to wildlife as a result of the mining operations. The proposed monitoring program is as follows:

1. Big Game - One winter survey (aerial or ground) will be conducted annually under suitable climate conditions during the January/February period. The number and location of each species observed will be recorded by habitat type and mapped. The survey will cover the life of mine disturbance area plus a one (1) mile peripheral zone.
2. Upland Gamebirds (Sage Grouse) - No formal sage grouse lek surveys are proposed as no active leks were found within the permit boundary. However, an annual search for potential leks will be conducted for the life of mine disturbance area plus a one (1) mile peripheral zone. The search may be conducted at the same time as the annual raptor survey, discussed below.
3. Raptors - All known nest locations on and within one (1) mile of the life of mine disturbance area will be inspected annually, during March through July, to determine usage and production success. Additionally, the same area will be searched to locate any new or previously unrecorded nest sites.

4. Threatened and Endangered Species - Opportunistic sightings of these species will be recorded during the other wildlife monitoring surveys discussed above. If a threatened or endangered species is observed which has not previously been observed or recorded, appropriate state and federal wildlife officials shall be notified.

The duration of the operational wildlife monitoring program will continue for a period of three years. At the end of the three year program, results will be summarized and submitted to the Wyoming Game and Fish Department. If the results of the three year program indicate that big game and sage grouse have not been affected by RAMC's activities in the area, these programs will be discontinued. Annual raptor nest monitoring, as well as the observations for threatened and endangered species, will continue for the life of mine.

Table D-9.1. RELATIVE ABUNDANCE OF SMALL MAMMALS LIVE-TRAPPED IN THE VICINITY OF THE PERMIT AREA - SEPTEMBER, 1976

Species	Location*			
	T-1	T-2	T-3	T-4
Deer mouse ( <i>Peromyscus maniculatus</i> )	8/80%	9/75%	9/82%	8/100%
Olive-backed mouse ( <i>Perognathus fasciatus</i> )	--	1/8%	2/13%	--
Thirteen-lined ground squirrel ( <i>Spermophilus tridecemlineatus</i> )	--	2/17%	--	--
Northern grasshopper mouse ( <i>Onychomys leucogaster</i> )	2/20%	--	--	--
Totals	10/100%	12/100%	10/100%	8/100%

Figures are given in the following form:

Number of animals trapped/Relative abundance (%)

- \*T-1 = proposed mill site (65 trap-nights)
- T-2 = proposed surface mine site (115 trap-nights)
- T-3 = abandoned surface mine site (50 trap-nights)
- T-4 = Duck Creek Meadow (25 trap-nights)

Table D-9.2. DESIGNATIONS OF ENDANGERED, ABUNDANCE, STATUS AND PRIORITY  
FOR SPECIES THAT MAY OCCUR IN THE PERMIT AREA  
(Updated List 1982)

Species	Federal	State		
	Endangered	Abundance	Population Status	Priority
<u>Mammals</u>				
Opposum ( <u>Didelphis Marsupialis</u> )		V (peripheral)	3 (Stable)	3 (Low)
Black-footed ferret ( <u>Mustela nigripes</u> )	x	I (Rare)	1 (Declining)	1 (Hi)
Northern swift fox (kit fox) ( <u>Vulpes velox</u> )		VI (undetermined)	2 (Unknown)	1
<u>Birds</u>				
Turkey vulture ( <u>Cathartes aura</u> )		III (Common)	3	3
Swainson's hawk ( <u>Buteo swainsoni</u> )		III	2	2 (Moderate)
Ferruginous hawk ( <u>Buteo regalis</u> )		III	2	2
Bald eagle ( <u>Haliaeetus leucocephalus</u> )	x	II (Uncommon)	1	1
Prarie falcon ( <u>Falco mexicanus</u> )		III	2	2
Peregrine falcon ( <u>Falco peregrinus</u> )	x	I	1	1
Mountain plover ( <u>Eupoda montana</u> )		III	2	2
Long-billed curlew ( <u>Numenius americanus</u> )		II	2	2
Upland plover ( <u>Bartramia longicauda</u> )		II	2	2
Burrowing owl ( <u>Speotyto cunicularia</u> )		I	1	1
Short-eared owl ( <u>Asio flammeus</u> )		II	2	2

Sources: U.S. Department of the Interior, 1980; Wyoming Game and Fish Department, 1977, Status and Inventory of Wildlife in Wyoming.

Table D-9.3. WILDLIFE OBSERVED ALONG CENSUS ROUTES - PERMIT AREA 304C - SEPTEMBER, 1977

Scientific Name	Common Name	Unit Miles	Numbers Observed by Unit					Totals = 30.2	Census <sup>1</sup> Index
			1 3.0	2 7.0	3 8.2	4 6.0	5 6.0		
<i>Antilocapra americana</i>	Antelope		52	74	43	88	51	= 308	10.19
<i>Odocoileus hemlorus</i>	Mule deer				10			= 10	.33
<i>Ondatra zibethicus</i>	Muskrat		5					= 5	.16
<i>Anas platyrhynchos</i>	Mallard		40					= 40	1.32
<i>Anas strepera</i>	Gadwall		4					= 4	.13
<i>Buteo regalis</i>	Ferruginous hawk		1					= 1	.03
<i>Circus cyaneus</i>	Marsh hawk						1	= 1	.03
<i>Falco sparverius</i>	American kestrel					1		= 1	.03
<i>Buteo jamaicensis</i>	Red-tailed hawk				1			= 1	.03
<i>Centrocercus urophasinus</i>	Sagegrouse		6					= 6	.19

<sup>1</sup>Census Index = total number = observed/total miles.

Table D-9.4. RELATIVE ABUNDANCE OF SMALL MAMMALS TRAPPED AT PROPOSED DISTURBED AREAS ON PERMIT AREA 304C - SEPTEMBER, 1977

Species	Location	
	T35N R74W Sec. 17 (Sec. 16 mine)	T36N R74W Sec. 34
Deer mouse ( <i>Peromyscus maniculatus</i> )	6/75%*	2/50%
Thirteen-lined ground squirrel ( <i>Spermophilus tridecemlineatus</i> )	--	2/50%
Sagebrush vole ( <i>Lagurus curtatus</i> )	1/12.5%	--
Ord's Kangaroo rat ( <i>Dipodomys ordii</i> )	<u>1/12.5%</u>	<u>--</u>
Totals	8/100%	4/100%

\*Number of animals trapped/Relative abundance%

Sec. 17 = 75 trap-nights

Sec. 34 = 75 trap nights

)

)

Table D-9.5. BIRDS OBSERVED DURING SUNRISE CENSUS ALONG 500 METER TRANSECTS AT PROPOSED DISTURBED AREAS  
ON PERMIT AREA 304C - SEPTEMBER, 1977

Location	Habitat Type	Species Observed	Numbers	Density* (Birds/acre)
T35N R74W Sec. 17 (Sec. 16 mine)	Sagebrush/grassland	Horned Lark ( <i>Eremophila alpestris</i> )	5	.4
T36N R74W Sec. 34	Sagebrush/grassland	Horned Lark ( <i>Eremophila alpestris</i> )	1	.08

\*Density = #observed/total acres of survey

$$\text{Total acres of survey} = \frac{500\text{m} \times 100\text{m} \times 10.76}{43,560 \text{ ft}^2} = 12.35 \text{ acres}$$

Table D-9.6. WILDLIFE OBSERVED ALONG CENSUS ROUTES - PERMIT AREA 304C - FEBRUARY, 1978

Scientific Name	Common Name	Unit Miles	Numbers Observed by										Totals	Ave. # Observed	Census <sup>2</sup> Index		
			1		2		3		4		5						
			3.0	7.0	8.2	6.0	6.0	6.0	6.0	6.0	6.0	6.0				6.0	=
		Day <sup>1</sup>	1	2	1	2	1	2	1	2	1	2	1	2			
<i>Antilocapra americana</i>	Antelope	-	53	6	8	71	22	10	-	23	42	=	110	125	117.5	3.8	
<i>Odocoileus hemionus</i>	Mule deer	-	4	-	12	-	13	-	-	-	-	=	-	29	14.5	.5	
<i>Lepus sp.</i>	Jackrabbit	-	-	-	-	-	-	30	-	-	-	=	30	-	15	.5	
<i>Buteo lagopus</i>	Rough-legged hawk	1	-	-	1	-	-	-	-	-	-	=	1	1	1	.03	
<i>Aquila chrysaetos</i>	Golden eagle	1	-	-	1	3	-	-	-	-	1	=	4	2	3	.09	
<i>Eremophila alpestris</i>	Horned lark	-100	-	-	-	-	-	-	-	-	-	=	-	100	50	1.7	
		(Est.)															

<sup>1</sup>Day 1 - February 22, 1978; Day 2 - February 23, 1978.

<sup>2</sup>Census Index = Average number observed/total miles.

D9-22

Table D-9.7. BIRDS AND MAMMALS OBSERVED DURING CENSUS ALONG 500 METER TRANSECTS AT PROPOSED DISTURBED AREAS ON PERMIT AREA 304C - FEBRUARY, 1978.

Location	Habitat Type	Species Observed	Numbers	Density* (per acre)
T35N R74W Sec. 16	Sagebrush/grassland	White-tailed jackrabbit (Lepus townsendii)	1	.08
T36N R74W Sec. 34	Sagebrush/grassland	White-tailed jackrabbit (Lepus townsendii)	2	.16
		Snow bunting (Plectriphenax nivalis)	2	.16

\*Density = #observed/total acres of survey

Total acres of survey =  $\frac{500\text{m} \times 100\text{m} \times 10.76}{43,560 \text{ ft}^2} = 12.35 \text{ acres}$

D9-23

Table D-9.8. WILDLIFE OBSERVED ALONG CENSUS ROUTES - PERMIT AREA 304C AND TWO MILE BUFFER ZONE - JUNE, 1978

Scientific Name	Common Name	Unit Miles Day <sup>1</sup>	1		2		3		4		5		Totals	Ave. # Observed	Census Index	
			3.0	7.0	8.2	6.0	6.0	30.2	1	2	1	2				1
Antilocapra americana	Antelope		3	-	13	38	48	33	40	27	46	84	150	182	166	5.50
Odocoileus hemionus	Muledeer						-	2			1	2	1	4	2.5	.08
Ondatra zibethicus	Muskrat		1	-	-	-	-	-	-	-	-	-	1	-	.5	.01
Anas platyrhynchos	Mallard		4	1	-	-					20	18	24	19	21.5	.71
Charadrius vociferus	Killdeer		-	-	-	-	-	-	-	-	1	3	1	3	2.0	.06
Buteo regalis	Ferruginous hawk		1	-	-	-	1	-	-	-	-	-	2	-	1.0	.03
Circus cyaneus	Marsh hawk		1	-	-	1	-	-	-	-	1	1	2	2	2.0	.06
Zenaidura macroura	Morning dove		3	1	1	-	4	-	-	-	1	-	8	2	5.0	.16
Chordeiles minor	Common nighthawk		-	-	-	1	-	-	-	-	-	-	1	-	.5	.01
Eremophila alpestris	Horned lark		1	5	3	1	20	17	7	6	9	11	40	40	40	1.32
Sturnella neglecta	Western meadowlark		-	1	-	-	-	3	1	2	1	-	2	6	4	.13
Agelaius phoeniceus	Redwinged blackbird		-	1	-	-	-	-	-	-	7	4	7	5	6	.19
Euphagus cyanocephalus	Brewer's blackbird		-	-	-	2	-	-	-	-	-	-	-	2	1	.03
Claamospiza melanocorys	Lark bunting		4	2	14	18	7	9	13	12	7	5	45	46	45.5	1.50
Calcarius mccownii	McCown's longspur		-	-	-	-	-	-	-	4	-	-	-	4	2	.06
Swallows			10	3	-	-	-	3	-	-	-	-	10	6	8	.26

<sup>1</sup>Day 1 - June 21, 1978; Day 2 - June 22, 1978.

<sup>2</sup>Census Index - Average number observed/Total miles.

D9-24

Table D-9.9. MAJOR WILDLIFE SPECIES OBSERVED ALONG CENSUS ROUTES - PERMIT AREA 304C AND TWO MILE BUFFER ZONE - SEPTEMBER, 1978

Scientific Name	Common Name	Unit Miles	Numbers Observed by Unit										Totals	Ave. # Observed	Census <sup>2</sup> Index		
			1		2		3		4		5					= 30.2mi.	
			3.0	7.0	8.2	6.0	6.0	6.0	6.0	6.0	1	2				1	2
		Day <sup>1</sup>	1	2	1	2	1	2	1	2	1	2	1	2			
Antilocapra americana	Antelope		57	50	114	124	74	98	54	69	130	130	=	429	471	450	14.9
Odocoileus hemionus	Mule deer		4	1	-	-	8	17	-	-	12	13	=	24	31	27	.89
Circus cyaneus	Marsh hawk								1	1	1	1	=	2	2	2	.06
Aquila chrysaetos	Golden eagle										1	-	=	1	-	.5	.01

<sup>1</sup>Day 1 - September 21, 1978; Day 2 - September 22, 1978.

<sup>2</sup>Census Index = Average number observed/total miles.

TABLE D-9.A

PRONGHORN AERIAL CENSUS DATA  
 PERMIT AREA AND TWO MILE PERIMETER  
 (1990)

<u>Season</u>	<u>Date</u>	<u>Number Observed</u>	<u>Estimated Density</u>	<u>Avg. Group Size</u>
Winter	2/21/90	91	1.2/sq.mi.	11.4
Pre-Hunt	8/28/90	542	7.0/sq.mi.	5.7
Post-Hunt	12/31/90	48	0.5/sq.mi.	16.0

MULE DEER AERIAL CENSUS DATA  
 PERMIT AREA AND TWO MILE PERIMETER  
 (1990)

<u>Season</u>	<u>Date</u>	<u>Number Observed</u>	<u>Estimated Density</u>	<u>Avg. Group Size</u>
Winter	2/21/90	38	0.5/sq.mi.	12.6
Pre-Hunt	8/28/90	48	0.6/sq.mi.	4.0
Post-Hunt	12/31/90	108	1.1/sq.mi.	7.7

Note: All sighting locations are shown on Figure D-9.1

All big game species were surveyed in accordance with WDEQ/LQD Guideline No. 5 and the WGFD Handbook of Biological Techniques.

TABLE D-9.B

PRONGHORN AND MULE DEER  
PERCENT DISTRIBUTION BY HABITAT TYPE  
(1990)

Species	Season	Date	Number Observed	Habitat Type <sup>1</sup> Percent of Total		
				SG	G	H
Pronghorn	Winter	2/21/90	91	94.6	5.4	--
	Pre-Hunt	8/28/90	542	77.7	17.3	5.0
	Post-Hunt	12/31/90	48	72.9	22.9	4.2
Mule Deer	Winter	2/21/90	38	97.2	2.8	--
	Pre-Hunt	8/28/90	48	96.5	3.5	--
	Post-Hunt	12/31/90	108	83.3	16.7	--

<sup>1</sup> Habitat Types: SG - Sagebrush/Grassland; G - Grassland; H - Hay Meadow

All big game species were surveyed in accordance with WDEQ/LQD Guideline No. 5 and the WGF D Handbook of Biological Techniques.

TABLE D-9.C(1)

RESULTS OF THE BREEDING BIRD SURVEYS  
(June 26, 1990)

<u>Species</u>	<u>Numbers Observed by Habitat</u>		
	<u>Sagebrush-Grassland</u>	<u>Grassland</u>	<u>Drainage</u>
Common flicker			1
Horned lark	17	23	2
Sage thrasher	1		1
Robin			1
Townsend's solitaire	1		
Western meadowlark	3	2	2
Red-winged blackbird			1
Brown-headed cowbird			1
Lark bunting	7	12	
Lark sparrow	4	1	3
Brewer's sparrow	3	1	5
<hr/>			
No. of species observed	7	5	9
<hr/>			
No. of birds observed	36	39	17
<hr/>			

Note: The above data were collected from Transects A-A<sup>1</sup>, C-C<sup>1</sup>, and D-D<sup>1</sup>, all located on Figure D-9.1.

TABLE D-9.C(2)

RESULTS OF THE BREEDING BIRD SURVEYS  
(June 27, 1990)

<u>Species</u>	<u>Numbers Observed by Habitat</u>		
	<u>Sagebrush-Grassland</u>	<u>Grassland</u>	<u>Drainage</u>
Common flicker			3
Horned lark	4	3	1
Sage thrasher	1		2
Robin			5
Western meadowlark	6	4	9
Red-winged blackbird			13
Brown-headed cowbird			8
Lark bunting	3	23	
Lark sparrow	2	1	4
Brewer's sparrow	7	4	7
<hr/>			
No. of species observed	7	5	9
<hr/>			
No. of birds observed	23	35	52
<hr/>			

Note: These data are for transects B-B<sup>1</sup>, E-E<sup>1</sup>, and F-F<sup>1</sup>, all located on Figure D-9.1.

TABLE D-9.D

## 1990 SAGE GROUSE SIGHTINGS

Date	1/4	Location			Habitat <sup>1</sup>	<u>Numbers Observed</u>		
		Sec.	Twp.	Rng.		Male	Female	Chicks
Willow Creek								
7/13/90	SW	7	36	73	SG	-	3	7
7/13/90	NE	7	36	73	SG	-	1	4
Martin Spring Draw								
7/13/90	NE	16	36	74	SG	1	-	-
7/13/90	SE	9	36	74	SG	-	2	5
7/13/90	NW	9	36	74	SG	-	5	6
Sage Creek								
7/16/90	SE	18	35	73	G	2	-	-
7/16/90	NW	18	35	73	SG	-	1	3
7/16/90	SE	2	35	74	H	-	2	7
7/16/90	NE	3	35	74	H	-	1	2
7/16/90	NE	4	35	74	SG	2	11	7
7/16/90	SW	33	36	74	SG	-	2	5
7/16/90	NE	32	36	74	SG	1	-	-
Trib. Sage Creek								
7/16/90	NE	10	35	74	SG	-	1	4
7/16/90	SW	10	35	74	CW	-	3	2
7/16/90	SE	8	35	74	SG	-	1	3

<sup>1</sup> Habitat Abbreviations: SG - Sagebrush-Grassland, H - Hay Meadow,  
G - Grassland, CW - Cottonwood/Willow Stand.

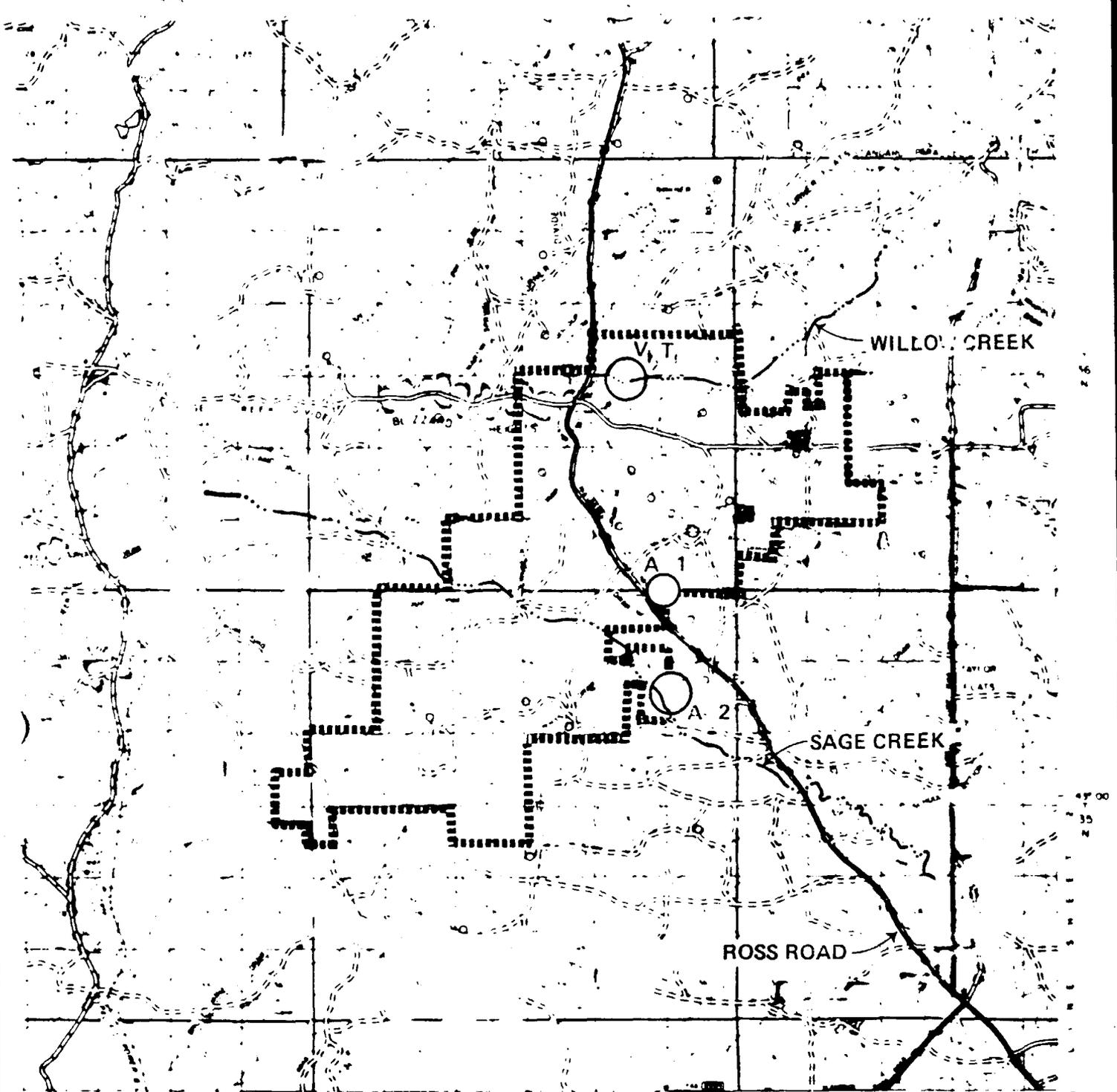
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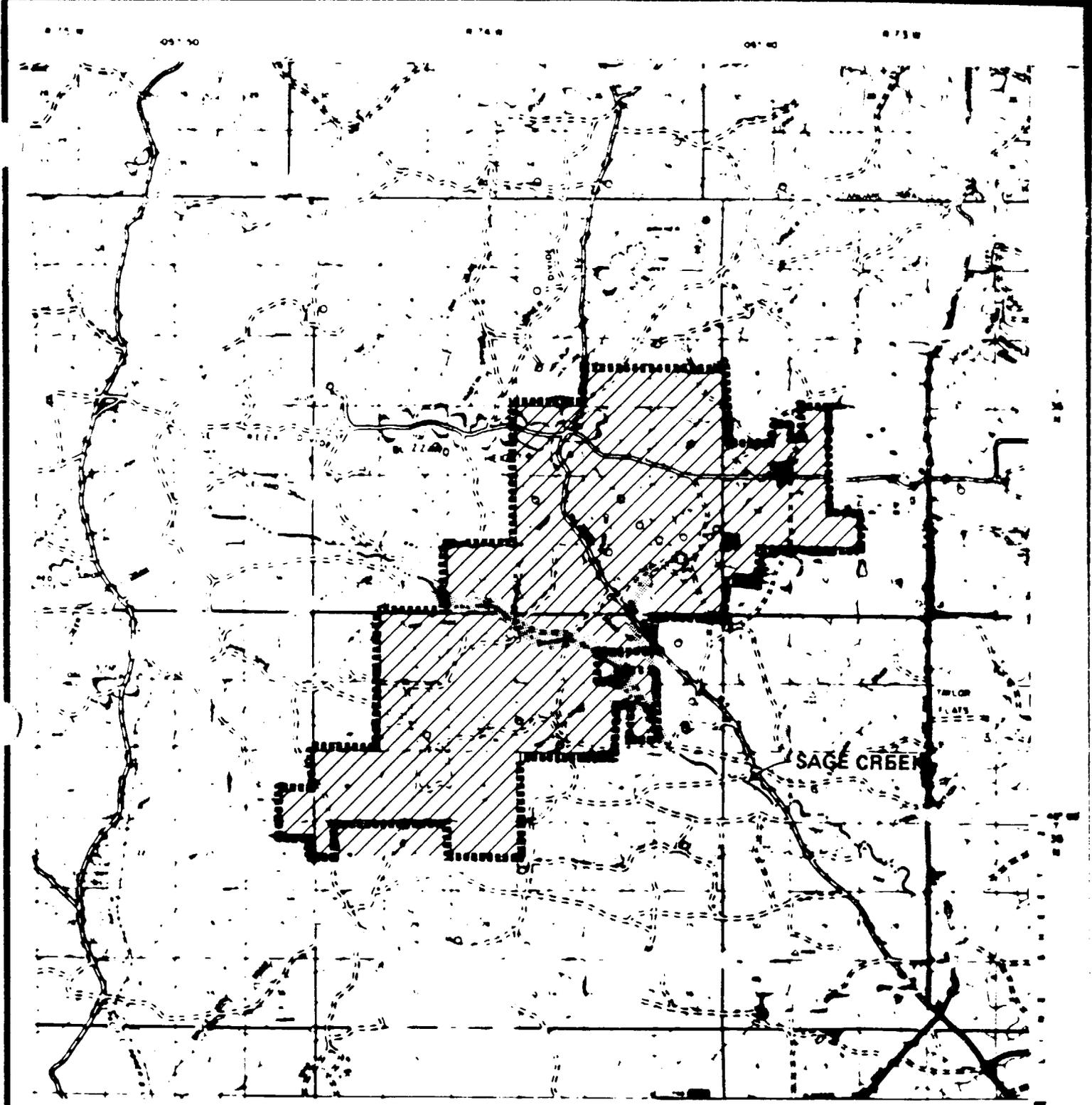
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- Ⓐ AQUANTIC SAMPLING STATIONS
- Ⓥ VEGETATION SAMPLING STATION
- Ⓣ MAMMAL TRAPPING SITES

FIGURE D - 9.1A

REVISIONS			LOCATION OF BIOLOGICAL STUDY SITES ON SMITH RANCH PERMIT AREA SMITH RANCH PROJECT CONVERSE COUNTY, WYOMING SEQUOYAH FUELS CORP.		
NO.	DATE	BY			
1			Geology by	Scale 1" = 2 MILES	Sheet 1 of 1
2					
3			Engineering by	Date	
4					
5			Drafting by J.M.		02-15-91

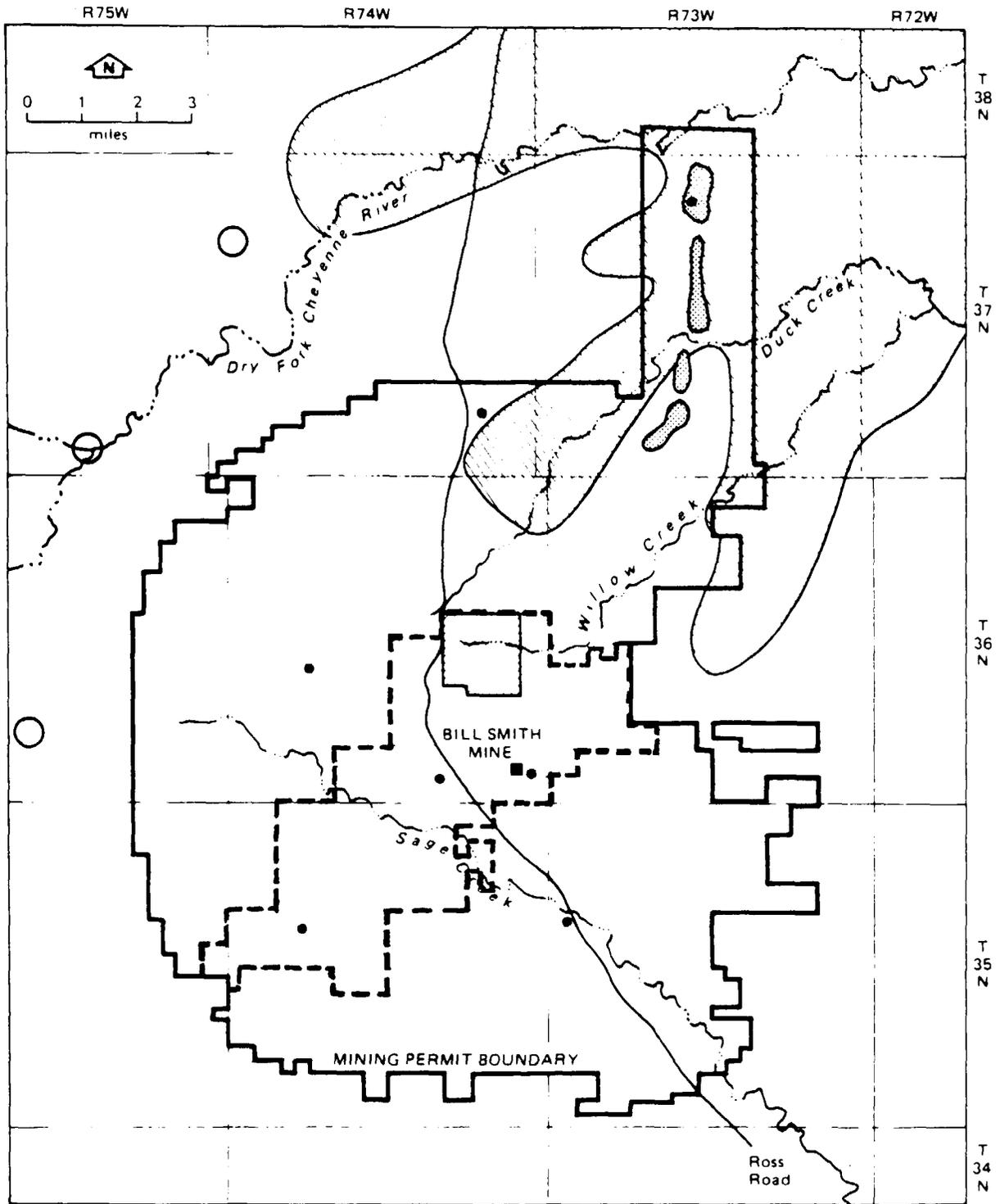


- RIPARIAM
- SAGEBRUSH / GRASSLAND

FIGURE D - 9.2

REVISIONS			VEGETATION TYPES PRESENT WITHIN THE PERMIT AREA			
NO.	DATE	BY	CONVERSE COUNTY, WYOMING		SEQUOYAH FUELS CORP.	
1			Geology by	Scale	Sheet	of
2			Engineering by	Date		
3			Drafting by			
4			J. M.			
5						

FIGURE D-9.3



LEGEND

- ROAD CENSUS UNIT
- ◻ Proposed mill and tailings dam
- ◻ Proposed surface mines
- ◻ Year-round mule deer habitat
- Sage grouse strutting ground
- Original Permit 304C Boundary
- - - Proposed ISL Permit Boundary

WILDLIFE ROAD CENSUS LOCATIONS (1977)

Attachment A  
to  
Appendix D-9  
Species List

Table A-1. MAMMALS OBSERVED OR EXPECTED TO OCCUR ON PERMIT AREA 304C

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<u>Large Mammals</u>				
<i>Antilocapra americana</i> *	Pronghorn	x		
<i>Odocoileus hemionus</i> *	Mule deer	x	x	x
<i>Odocoileus virginianus</i>	White-tailed deer	x	x	x
<u>Medium-Sized Mammals</u>				
<i>Canis latrans</i> <sup>o</sup>	Coyote	x	x	x
<i>Castor canadensis</i>	Beaver		x	
<i>Didelphis marsupialis</i>	Opossum		x	
<i>Erethizon dorsatum</i> <sup>o</sup>	Porcupine	x	x	
<i>Lepus californicus</i> <sup>o</sup>	Black-tailed jackrabbit	x		
<i>Lepus townsendii</i> *	White-tailed jackrabbit	x		
<i>Lynx rufus</i>	Bobcat	x	x	
<i>Mephitis mephitis</i> *	Striped skunk	x	x	
<i>Procyon lotor</i>	Raccoon		x	
<i>Spilogale putorius</i>	Spotted skunk	x	x	
<i>Sylvilagus audubonii</i> <sup>o</sup>	Desert cottontail	x	x	x
<i>Sylvilagus nuttallii</i>	Nuttall's cottontail	x	x	x
<i>Taxidea taxus</i>	Badger	x		
<i>Urocyon cinerreoargenteus</i>	Gray fox	x	x	x
<i>Vulpes velox</i>	Swift fox	x	x	x
<i>Vulpes vulpes</i>	Red fox	x	x	x
<u>Small Mammals</u>				
<i>Sorex cinereus</i>	Masked shrew	x	x	
<i>Sorex merriami</i>	Merriam's shrew	x		
<i>Eptesicus fuscus</i>	Big brown bat	x	x	x
<i>Lasiurus cinereus</i>	Hoary bat	x	x	
<i>Myotis evotis</i>	Long-eared myotis	x	x	x
<i>Myotis keenii</i>	Keen's myotis	x	x	x
<i>Myotis lucifugus</i>	Little brown myotis	x	x	x

Table A-1 (concluded)

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<i>Myotis subulatus</i>	Small-footed myotis	x	x	x
<i>Myotis volans</i>	Long-legged myotis	x		x
<i>Dipodomys ordii</i> <sup>o</sup>	Ord's kangaroo rat	x		
<i>Eutamias minimus</i> <sup>o</sup>	Least chipmunk	x		
<i>Geomys bursarius</i>	Plains pocket gopher	x		x
<i>Lagurus curtatus</i> <sup>o</sup>	Sagebrush vole	x		
<i>Microtus longicaudus</i>	Long-tailed vole	x	x	
<i>Microtus ochrogaster</i>	Prairie vole	x		x
<i>Microtus pennsylvanicus</i>	Meadow vole		x	
<i>Mus musculus</i>	House mouse			x
<i>Neotoma cinerea</i>	Bushy-tailed woodrat	x		
<i>Ondatra zibethicus</i> *	Muskrat		x	
<i>Onychomys leucogaster</i> *	Northern grasshopper mouse	x		
<i>Perognathus fasciatus</i> *	Olive-backed pocket mouse	x		x
<i>Perognathus hispidus</i>	Hispid pocket mouse	x		x
<i>Peromyscus maniculatus</i> *	Deer mouse	x	x	x
<i>Reithrodontomys megalotis</i>	Western harvest mouse	x		
<i>Reithrodontomys montanus</i>	Plains harvest mouse	x		
<i>Spermophilus tridecemlineatus</i> *	Thirteen-lined ground squirrel	x		x
<i>Thomomys talpoides</i>	Northern pocket gopher	x		
<i>Mustela erminea</i>	Ermine	x	x	
<i>Mustela frenata</i>	Long-tailed weasel	x	x	
<i>Mustela vison</i>	Mink	x	x	

Sources: Burt and Grossenheider, 1964; Long, 1965; Woodward-Clyde Consultants' field survey, 1976.

\*Mammals observed on permit area.

Table A-2. BIRDS OBSERVED, REPORTED, OR EXPECTED TO OCCUR ON PERMIT  
AREA 304C

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<u>Waterfowl and Water-Associated Birds</u>				
Podilymbus podiceps	Pied-bill grebe			x
Ardea herodias	Great blue heron			x
Branta canadensis	Canada goose			x
Anser albifrons	White-fronted goose			x
Chen caerulescens	Snow goose			x
Anas platyrhynchos*	Mallard			x
Anas strepera	Gadwall			x
Anas acuta	Pintail			x
Anas crecca	Green-winged teal			x
Anas discors	Blue-winged teal			x
Anas cyanoptera	Cinnamon teal			x
Anas americana	American wigeon			x
Anas clypeata	Northern shoveler			x
Aythya americana	Redhead			x
Aythya collaris	Ring-necked duck			x
Aythya valisineria	Canvasback			x
Aythya marila	Greater scaup			x
Aythya affinis	Lesser scaup			x
Bucephala clangula	Common goldeneye			x
Bucephala albeola	Bufflehead			x
Oxyura jamaicensis	Ruddy duck			x
Mergus merganser	Common merganser			x
Grus canadensis	Sandhill crane	x		
Rallus limicola	Virginia rail			x
Porzana carolina	Sora			x
Fulica americana	American coot			x
Charadrius semipalmatus	Semipalmated plover			x
Pluvialis dominica	American golden plover	x		
Charadrius vociferus	Killdeer			x
Charadrius montana	Mountain plover	x		
Numenius americanus	Long-billed curlew			x
Bartramia longicauda	Upland plover	x		
Actitis macularia	Spotted sandpiper			x
Tringa solitaria	Solitary sandpiper			x
Catoptrophorus semipalmatus	Willet			x
Tringa melanoleucus	Greater yellowlegs			x

Table A-2 (continued)

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<i>Tringa falvipes</i>	Lesser yellowlegs		x	
<i>Salidris melanotos</i>	Pectoral sandpiper		x	
<i>Salidris bairdii</i>	Baird's sandpiper		x	
<i>Calidris minutilla</i>	Least sandpiper		x	
<i>Limnodramus scolopaceus</i>	Long-billed dowitcher		x	
<i>Calidris pusillus</i>	Semipalmated sandpiper		x	
<i>Calidris mauri</i>	Western sandpiper		x	
<i>Limosa fedoa</i>	Marbled godwit	x	x	
<i>Limosa haemastica</i>	Hudsonian godwit	x	x	
<i>Recurvirostra americana</i>	American avocet		x	
<i>Steganopus tricolor</i>	Wilson's phalarope		x	
<i>Lobipes lobatus</i>	Northern phalarope		x	
<i>Larus californicus</i>	California gull		x	
<i>Larus delawarensis</i>	Ring-billed gull		x	x
<i>Larus pipixcan</i>	Franklin's gull	x	x	x
<i>Sterna forsteri</i>	Forster's tern		x	
<i>Chlidonias niger</i>	Black tern		x	
<i>Capella gallinago</i>	Common snipe	x	x	
<u>Birds of Prey</u>				
<i>Cathartes aura</i>	Turkey vulture	x	x	x
<i>Accipiter cooperii</i>	Cooper's hawk		x	
<i>Buteo jamaicensis</i> *	Red-tailed hawk	x	x	
<i>Buteo swainsoni</i> *	Swainson's hawk	x		x
<i>Buteo lagopus</i>	Rough-legged hawk	x	x	x
<i>Buteo regalis</i> *	Ferruginous hawk	x	x	x
<i>Aquila chrysaetos</i>	Golden eagle	x	x	x
<i>Haliaeetus leucucephalus</i>	Bald eagle		x	
<i>Circus cyaneus</i>	Marsh hawk	x	x	x
<i>Falco mexicanus</i>	Prairie falcon	x		
<i>Falco peregrinus</i>	Peregrine falcon	x	x	
<i>Falco columbarius</i>	Merlin	x	x	x
<i>Falco sparverius</i> *	American kestrel	x	x	x
<i>Bubo virginianus</i> *	Great horned owl	x	x	x
<i>Speotyto cunicularia</i>	Burrowing owl	x		x
<i>Asio otus</i>	Long-eared owl		x	
<i>Asio flammeus</i>	Short-eared owl	x	x	x

Table A-2 (continued)

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<u>Upland Game Birds</u>				
Centrocercus urophasianus*	Sage grouse	x		
Pedioecetes phasianellus	Sharp-tailed grouse	x		
<u>Other Birds</u>				
Coccyzus americanus	Yellow-billed cuckoo		x	
Columbia livia	Rock dove	x	x	x
Zenaida macroura*	Mourning dove	x	x	x
Phalaenoptilus nuttallii	Poorwill	x		x
Chordeiles minor <sup>o</sup>	Common nighthawk	x	x	x
Aeronautes saxatalis	White-throated swift	x	x	
Colaptes auratus*	Common flicker		x	
Melanerpes erythrocephalus	Red-headed woodpecker		x	
Asyndesmus lewis*	Lewis's woodpecker		x	
Dendrocopos villosus	Hairy woodpecker		x	
Dendrocopos pubescens	Downy woodpecker		x	
Tyrannus tyrannus	Eastern kingbird		x	
Tyrannus verticalis	Western kingbird		x	
Sayornis saya	Say's phoebe	x	x	x
Contopus sordidulus	Western wood pewee		x	
Nuttallornis borealis	Olive-sided flycatcher		x	
Eremophila alpestris*	Horned lark	x	x	x
Tachycineta thalassina	Violet-green swallow	x	x	x
Iridoprocne bicolor	Tree swallow	x	x	x
Stelgidopteryx ruficollis	Rough-winged swallow	x	x	x
Riparia riparia	Bank swallow	x	x	x
Mirundo rustica	Barn swallow	x	x	x
Petrochelidon pyrrhonota <sup>o</sup>	Cliff swallow	x	x	x
Progne subis	Purple martin		x	
Gymnorhinus cyanocephalus	Pinyon jay	x		
Leucosticte tephrocotis	Gray crowned rosy finch	x		

Table A-2 (continued)

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<i>Pica pica</i>	Black-billed magpie	x	x	x
<i>Corvus brachyrhynchos</i> <sup>o</sup>	Common crow		x	
<i>Corvus corax</i>	Common raven	x	x	x
<i>Troglodytes aedon</i> *	House wren	x		
<i>Salpinctes obsoletus</i>	Rock wren	x	x	x
<i>Mimus polyglottos</i>	Mockingbird	x	x	x
<i>Dumetella carolinensis</i>	Gray catbird	x		
<i>Toxostoma rufum</i>	Brown thrasher	x		
<i>Oreoscoptes montanus</i>	Sage thrasher	x		
<i>Turdus migratorius</i> <sup>o</sup>	American robin	x	x	x
<i>Catharus ustulatus</i>	Swainson's thrush		x	
<i>Sialia sialia</i>	Eastern bluebird		x	
<i>Sialia currucoides</i> *	Mountain bluebird	x	x	
<i>Sialia mexicana</i>	Western bluebird	x	x	
<i>Myadestes townsendi</i> <sup>o</sup>	Townsend's solitaire	x	x	
<i>Anthus spragueii</i>	Sprague's pipit	x		
<i>Lanius excubitor</i>	Northern shrike	x	x	x
<i>Lanius ludovicianus</i> *	Loggerhead shrike	x	x	x
<i>Sturnus vulgaris</i> <sup>o</sup>	Starling	x	x	
<i>Vireo olivaceus</i>	Red-eyed vireo		x	
<i>Vireo gilvus</i>	Warbling vireo		x	
<i>Dendroica petechia</i>	Yellow warbler		x	
<i>Dendroica coronata</i>	Yellow-rumped warbler		x	
<i>Dendroica striata</i>	Blackpoll warbler		x	
<i>Seiurus noveboracensis</i>	Northern water thrush		x	
<i>Oporornis tolmiei</i>	MacGillivray's warbler		x	
<i>Geothypis trichas</i>	Common yellowthroat		x	
<i>Wilsonia pusilla</i>	Wilson's warbler		x	
<i>Wilsonia canadensis</i>	Canada warbler		x	
<i>Setophaga ruticilla</i>	American redstart		x	
<i>Passer domesticus</i>	House sparrow	x	x	x
<i>Sturnella neglecta</i> *	Western meadowlark	x	x	x
<i>Agelaius phoeniceus</i> <sup>o</sup>	Red-winged blackbird	x		
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed blackbird		x	
<i>Icterus galbula</i>	Northern oriole		x	
<i>Euphagus cyanocephalus</i> <sup>o</sup>	Brewer's blackbird		x	
<i>Icterus bullockii</i> <sup>o</sup>	Bullock's oriole		x	
<i>Plectrophenax nivalis</i> <sup>o</sup>	Snow bunting	x		

Table A-2 (concluded)

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<i>Molothrus ater</i>	Brown-headed cowbird		x	
<i>Passerina amoena</i>	Lazuli bunting	x	x	
<i>Spiza americana</i>	Dickcissel			
<i>Carpodacus mexicanus</i>	House finch	x	x	x
<i>Carpodacus purpureus</i>	Purple finch		x	
<i>Spinus tristis</i> *	American goldfinch		x	
<i>Pipilo erythrophthalmus</i>	Rufous-sided towhee	x	x	
<i>Calamospiza melanocorys</i> <sup>o</sup>	Lark bunting	x		x
<i>Passerculus sandwichensis</i>	Savannah sparrow	x	x	
<i>Ammodramus savannarum</i>	Grasshopper sparrow	x		
<i>Ammodramus bairdii</i>	Baird's sparrow	x		
<i>Pooecetes gramineus</i> <sup>o</sup>	Vesper sparrow	x		
<i>Chondestes grammacus</i> <sup>o</sup>	Lark sparrow	x	x	
<i>Amphispiza belli</i>	Sage sparrow	x		
<i>Spizella arborea</i>	Tree sparrow		x	
<i>Spizella passerina</i>	Chipping sparrow	x	x	
<i>Spizella pallida</i>	Clay-colored sparrow	x		x
<i>Spizella breweri</i> <sup>o</sup>	Brewer's sparrow	x	x	x
<i>Zonotrichia querula</i>	Harris's sparrow	x	x	x
<i>Zonotrichia leucophrys</i>	White-crowned sparrow	x	x	x
<i>Melospiza lincolni</i>	Lincoln's sparrow		x	
<i>Melospiza melodia</i>	Song sparrow		x	
<i>Calcarius mccownii</i> <sup>o</sup>	McCown's longspur	x		x
<i>Calcarius lapponicus</i>	Lapland longspur	x		x
<i>Calcarius ornatus</i>	Chetnut-collared longspur	x		x
<i>Plectrophenax nivalis</i>	Snow bunting	x		

Sources: Dames and Moore, 1975, Peterson, 1961; SERNCO, 1974; Woodward-Clyde Consultant's field survey, 1976.

Note: Species are listed in phylogenetic order.

\*Species observed on permit area September 1976.

<sup>o</sup>Additional species observed on permit area during continued wildlife monitoring program.

Table A-3. REPTILES AND AMPHIBIANS OBSERVED OR EXPECTED TO OCCUR ON PERMIT AREA 304C

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<u>Reptiles</u>				
Lizards				
Phrynosoma douglassi*	Eastern short-horned lizard	x		
Scalopus graciosus	Sagebrush lizard	x		
Snakes				
Coluber constrictor	Eastern yellow-bellied racer	x		
Crotalus viridus*	Prairie rattlesnake	x		
Heterodon nasicus	Western hognose snake	x		
Lampropeltis triangulum	Pale milk snake	x		x
Pituophis melanoleucus	Bullsnake	x		
Thamnophis elegans	Wandering garter snake	x	x	
Thamnophis radix	Plains garter snake		x	x
Thamnophis sirtalis	Red-sided garter snake		x	x
Turtles				
Chelydra serpentina	Snapping turtle		x	
Trionyx spiniferus	Western spiny softshell		x	
Chrysemys picta	Painted turtle		x	
<u>Amphibians</u>				
Frogs				
Pseudacris triseriata	Boreal chorus frog		x	
Rana pipiens*	Leopard frog		x	

Table A-3 (concluded)

Scientific Name	Common Name	Habitat Type		
		Sagebrush/ Grassland	Riparian	Disturbed
<b>Toads</b>				
Bufo cognatus	Great Plains toad	x	x	
Bufo woodhousei	Rocky Mountain toad	x	x	x
Scaphiopus bombifrons	Plains spadefoot	x		
<b>Salamanders</b>				
Ambystoma tigrinum	Blotched tiger salamander		x	

Sources: Stebbins, 1966; Wyoming Game and Fish Department, 1974.

\*Species observed on permit area.

Table A-4. MACROINVERTEBRATES COLLECTED FROM AQUATIC SAMPLE SITES ON PERMIT AREA 304C - September 1976

Scientific Name	Common Name
Annelida	
Hirudinea	Leeches
Arthropoda	
Insecta	
Ephemeroptera	Mayflies
Baetidae	
Tricorythodes	
Callibaetis	
Baetis	
Odonata	Damseflies and dragonflies
Coenagrionidae	
Ischnura	
Gomphidae	
Octogomphus	
Libellulidae	
Sympetrum	
Hemiptera	True bugs
Notonectidae	
Notonecta	
Coleoptera	Beetles
Hydrophilidale	
Helophorus	
Haliplidae	
Halipus	
Trichoptera	Caddisflies
Hydropsychidae	
Hydropsyche	
Diptera	True flies

Table A-4 (concluded)

Scientific Name	Common Name
Chironomidae	
Simuliidae	
Syrphidae	
Stratiomyiidae	
Odontomyia	
Crustacea	
Amphipoda	Scuds
Gammaridae	
Gammarus	
Mollusca	
Gastropoda	Snails
Pulmonata	
Physidae	
Physa	
Lymnaeidae	
Lymnaea	
Planorbidae	
Pelecypoda	Clams

Table A-5. NUMERICAL ABUNDANCE AND TAXONOMIC COMPOSITION OF BENTHIC FAUNA TAKEN FROM AQUATIC SAMPLE SITES ON PERMIT AREA 304C - SEPTEMBER 1976

Species	Station						Total Number of Individuals
	A-1			A-2			
	Replicate						
	A	B	C	A	B	C	
<b>DIPTERA</b>							
Chironomidae	5	6	4	2			17
Simuliidae	36	53	46	1			136
Syrphidae		1					1
Odontomyia		1					
Total							155
<b>EPHEMEROPTERA</b>							
Baetis	2	7	8	49	12	9	87
Callibaetis				1		2	3
Total							90
<b>TRICHOPTERA</b>							
Hydropsyche	17	14	40	2			73
Total							73
<b>COLEOPTERA</b>							
Halipus	1	1	1	2			5
Total							5
<b>ODONATA</b>							
Ishnura		1					1
Octogomphus			1				1
Total							2
<b>AMPHIPODA</b>							
Gammarus		106	71	4	9	3	193
Total							193

Table A-5 (concluded)

Species	Station						Total Number of Individuals
	A-1			A-2			
	Replicate						
	A	B	C	A	B	C	
<b>HEMIPTERA</b>							
Notonecta				15	4	3	22
Total							22
<b>MOLLUSCA</b>							
Physa		39	2	1		1	43
Lymnaea					1		1
Total							44
<b>HIRUDINEA</b>							
Hirudinea		1	1				2
Total							2

Table A-6. WATER QUALITY SAMPLE ANALYSIS FOR AQUATIC SAMPLE SITES ON PERMIT AREA 304C - September 1976

Station	pH	Specific Conductance (umhos/cm <sup>2</sup> at 25°C)	Dissolved Oxygen (mg/l)	Temperature (°F)
A-1	8.54	730	6.96	58.0
A-2	8.45	700	6.61	63.0

## DEFINITION OF ANIMAL UNIT MONTH

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An animal unit month (AUM) is defined as the amount of land required to support one cow, or a cow with an unweaned calf, for one month each year. For example, if an acre produces enough forage to support 0.5 AUM then it takes 2 acres to support one cow for a month out of each year, or 24 acres to support one cow for a whole year. Table A-7 provides a rough conversion of AUM's for other domestic animals and deer.

Table A-7. ANIMAL UNIT EQUIVALENTS

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	<u>Animal Unit</u>
Cattle	
Weaned calves and yearlings to 12 months	0.6
Mature cows and steers - cows with or without unweaned calf at side	1.0
Bulls, 2 years and over	1.3
Horses	
Yearlings	0.75
Two-year-olds	1.00
Three-year-olds and over	1.25
Sheep, Goats, and Deer	
5 weaned lambs, kids, and yearlings to 12 months	0.6
5 ewes or does, with or without unweaned lambs or kids	1.0
5 rams or bucks	1.3
5 deer	1.0

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# **Beartooth Environmental Services**

2411 Glendale Ave • Casper, Wyoming 82601 • 307/234-8087

January 4, 1991

Mrs. Donna Wichers  
Rio Algom Mining Corp.  
401 East E Street  
Casper, Wyoming 82601

RE: Powder River Basin Project

Dear Donna;

During 1990, while conducting baseline wildlife and vegetation studies on the above referenced project area, I did not encounter any prairie dog colonies. The area covered during the course of field studies included your permit area and a two mile perimeter. Coverage of the area was done through ground searches, aerial flights, and discussions with local landowners. Also, a review was done of BLM records and previous studies (PP&L, UNC, Everest) conducted in the vicinity. None of these indicated the presence of prairie dogs in your area of interest.

If I can be of assistance in the future, please feel free to contact me at any time.

Sincerely,

  
Gary A. Saunders



APPENDIX E

SITE LOCATION AND LOCAL  
POPULATION DATA

SOUTH POWDER RIVER BASIN  
CONVERSE COUNTY, WYOMING

## Appendix E

### Site Location and Population Data

#### Permit Area Location Data

The permit area for the solution mining project is located in the North Platte River drainage of the Southern Powder River Basin in Converse County, Wyoming. The recovery plant site is approximately 17 air miles northeast of Glenrock, Wyoming and 23 air miles northwest of Douglas, Wyoming. Access to the site is by State Highway 93 or State Highway 95 to the intersection of State Highway 93 and State Highway 95 then Ross Road, a paved country road to the northwest a distance of about eight miles. The permit area is outlined on a composite map of the Highland Flats, Gilbert Lake, Fifty Five Ranch and Hylton Ranch, US Geological Survey Quadrangle Maps, attached as Figure E-1. This map shows the general topography, drainages and other surface features in and adjacent to the permit area.

Other significant rights-of-way near the permit area are shown on Figure E-2. Names and addresses of the owners of known rights-of-way and easements in the permit area and on adjacent lands are listed in Appendix A and B, along with their locations.

Lands to be affected by mining are all within the permit area as shown and are described in detail in the mine plan portion of the application. The only known lands in the permit area and adjacent to it which have been previously disturbed by mining activities are the Sequoyah R&D project and the South Powder River Basin uranium project.

## Population, Distribution and Projections

The population within fifty miles of the proposed Recovery Plant site is centered within the communities of Casper, Douglas and Glenrock, Wyoming as shown on Figure E-3. These urban areas are significant in that they provide the major locations of public services such as schools, churches, medical care facilities, and public parks. These communities also provide the majority of the cultural and scenic attractions for the residents of Converse and Natrona Counties.

Casper is the county seat of Natrona County. In 1986 Casper claimed to be the largest city in the state. Casper has developed into a regional retail trade center serving a 150 mile radius which includes all or part of seven counties. Its regional prominence as a retail center is supported by the Eastridge Mall, which opened in the Fall of 1982. The Casper labor force and population peaked in Spring of 1982 and has declined since that time.

The city has doubled its acre size in the last ten years. This growth can be contributed to the energy boom in the late 1970's and early 1980's. From 1970 to 1980 the city experienced a 30% increase in its population. However, with the decrease of price and demand for oil and uranium the city is projected to only increase by 6% between 1980 to 1990. Many feel that even this projection is very optimistic. (See Table E-1)

Douglas is the county seat of Converse County. Glenrock, also in Converse County, is the closest town to the Smith Ranch site being approximately 25 road miles northeast. Between 1970 and 1980 both Glenrock and Douglas experienced phenomenal growth, 80.6% and 136.9% respectively. However, with the change in

energy demand, through 1984 Glenrock lost 27% of its population and Douglas lost 17% of its population. (See Table E-1)

The reduction in employment in the area uranium operations illustrates the loss of jobs to the area. In March 1980, uranium producers reported 1,264 people directly employed in the uranium mining and milling operations in Converse County. In October 1987 the uranium producers reported only 90 employees in Converse County with many of these employees working on reclamation projects that will be completed within 2 years. Implementation of the proposed project is expected to provide employment for about 40 company employees and provide jobs for 15 to 20 contractor employees. Most of the new positions would be filled from the local population.

There are no residences in the permit area and only two occupied dwellings within the five miles of the proposed plant site. The nearest dwelling, the Sunquist Ranch site, is 2.6 miles south of the plant and the second site, the Vollman Ranch, is 4.2 miles east northeast of the plant. A total of seven people normally reside at these ranch homes for an occupational density of 0.09 persons per square mile for the area within a five mile radius of the plant.

A summary of the population history and projections for Converse and Natrona Counties for 1980 through 1995 is included as Table E-2. A "Community Profile" for the Casper area distributed by the Casper area Chamber of Commerce is also attached.

TABLE E-1

## POPULATION TRENDS

Percentage of Population Change  
Converse County

	<u>1970</u>	<u>1980</u> <sup>1</sup>	<u>Percent Change</u>	<u>1983-4</u> <sup>2</sup>	<u>Percent Change</u>
Glenrock Area	1,515	2,736	80.6%	2,000	-27%
Douglas Area	2,677	6,030	152.5%	5,000	-17%
Converse County	5,938	14,069	136.9%	11,256	-20%

Population Summary  
Converse and Natrona Counties

<u>Year</u>	NATRONA <sup>3</sup> COUNTY		CONVERSE COUNTY		
	<u>Casper</u>	<u>County</u>	<u>Douglas</u>	<u>Glenrock</u>	<u>County</u>
1970	39,361	51,264	2,677	1,515	5,938
1980	51,016	71,856	6,030	2,736	14,069
1990	53,852	76,509			13,922 <sup>4</sup>

1. Wyoming Data Handbook 1985, Department of Administration and Fiscal Control, Division of Research and Statistics.
2. Estimated projections by Mike Sierz, Converse County Planning Director, November 13, 1986.
3. Economic Profile for the City of Casper, 1986, Planning Department, Community Planners Commission.
4. Furtney, Steve and Sommers, Steve; "Wyoming Population and Employment Report", Division of Research and Statistics, Department of Administration and Fiscal Control, State of Wyoming, 8th Edition, September 1985.

TABLE E-2  
POPULATION FORECAST 1980-1995\*

<u>Year</u>	<u>Converse County</u>	<u>Natrona County</u>
1980	14,069	71,856
1981	13,812	76,040
1982	12,658	72,882
1983	12,512	68,807
1984	12,621	66,106
1985	12,825	64,738
1986	12,782	64,997
1987	12,456	65,285
1988	12,778	63,636
1989	13,365	65,143
1990	13,922	67,679
1991	14,422	69,967
1992	14,916	72,393
1993	15,399	74,613
1994	15,895	76,832
1995	16,366	78,952

\*Furtney, Steve and Sommers, Steve: "Wyoming Population and Employment Forecast Report", Division of Research and Statistics, Department of Administration and Fiscal Control, State of Wyoming, September 1985, p. 8 & 9.

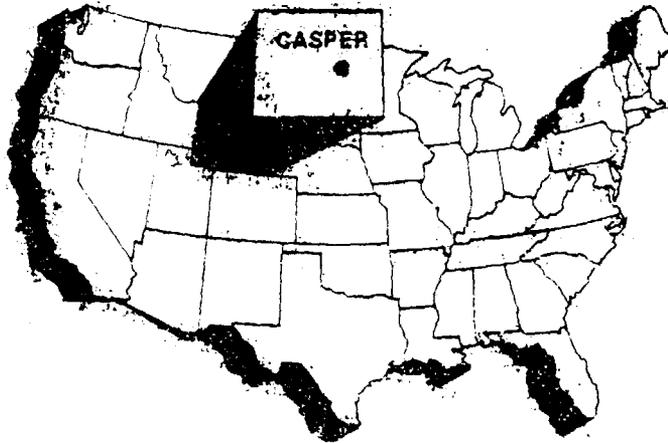
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## COMMUNITY PROFILE

### STRATEGIC LOCATION

One of Casper's many advantages is its location. Casper is not only in the heart of Wyoming, it is within a day's drive of many major metropolitan areas.

Distances from Casper to other major cities:

Billings, MT	289 Miles
Cheyenne, WY	180 Miles
Denver, CO	275 Miles
Kansas City, MO	782 Miles
Omaha, NB	616 Miles
Salt Lake City, UT	357 Miles

### POPULATION

Casper is the largest metropolitan area in Wyoming.

	Casper	Natrona County
1970	39,361	51,264
1980	51,016	71,656
1984 (est)	52,077	73,542

### INCOME

Wyoming residents have an above average per capita personal annual income, \$15,496. The median Effective Buying Income for Natrona County households in 1983 was \$29,771.

### HOUSING

Housing costs for Casper are below the national average. A new 1,800 sq. ft. home costs between \$65,000 and \$75,000. Rent for a 2-bedroom apartment averages \$350 monthly. 60% of Casper residents own their homes.

#### Number of Housing Units:

Casper	22,700
Natrona County	29,500

### ACCOMMODATIONS

Motels and Hotels: 33 with 2,022 rooms. In addition to the Events Center, there are five other convention facilities.

### MEDICAL

Casper has one major 282 bed hospital: Wyoming Medical Center plus several clinics including the Central Wyoming Counseling Center, Casper Clinic, Cancer Treatment Center, County Health Building, an allergy clinic, Casper Surgical Center, Crestview Psychiatric Hospital, Insta-Care, Medi-Kwik and the Wyoming Family Practice Center. 104 doctors, 49 dentists, 8 Chiropractors and 8 mental health professionals serve the medical needs of Casper. Two nursing home facilities (314 beds) are in Casper.

### EDUCATION

Casper has outstanding public education programs for over 13,000 students in grades K-12. Kathy Walsh, one local high school, was listed among the top ten high schools in the nation in 1983.

Casper area schools have an average elementary student/teacher ratio of 17:1 with a \$4,163 state/local expenditure per student during 1984-1985.

Type of School:	Number of Students
High Schools (2)	2,695
Jr. High Schools (3 + 1 in 1986)	2,995
Elementary Schools (26)	7,724
Parochial	357
Wyoming School for the Deaf	43
State Children's Home	40
Casper College	4,578

30 specialized career programs  
 47 university-paralel programs  
 University of Wyoming-Casper 365  
 9 bachelor degrees programs  
 1 MBA program



## EMPLOYMENT/LABOR

The Casper area work force is young, dedicated and well-educated. The median age of Casper residents is 27.3. Over 80 percent of the work force are high school graduates; 30 percent have attended college.

Wyoming has the third highest state primary education ranking in the nation. 78 percent of the state's work force are high school graduates. Wyoming workers are ranked the most productive in the nation, based on the "value-added" per worker measure of productivity.

<b>Employed workers in Natrona County, February, 1985</b>	38,693
<b>Unemployed workers, February, 1985</b>	2,824
<b>Unemployment rate, February, 1985</b>	7.3

### Distribution of Labor Force by Industry:

Industry	Percent of Labor Force	Number Employed
Manufacturing	4	1,300
Mining	15	5,100
Contract Construction	6	2,400
Transportation		
Utilities	6	2,200
Wholesale Trade	10	3,600
Retail Trade	17	5,900
Finance, Insur., Real Estate	5	1,700
Services	16	5,600
Government	19	6,500

Source: Wyoming Employment Security Commission, July, 1984

### CASPER'S 10 LARGEST EMPLOYERS

Employer	No. Employees
Natrona County School District	1,898
Natrona Co. Memorial Hospital	883
City of Casper	774
True Oil and Affiliates	436
Casper College	371
Marathon Oil Co.	357
Natrona County	334
Amoco Oil Refinery	281
Gulf Oil Co.	275
First Interstate Bank	260



**Worker's Compensation Rate:** First 12 months with premium, \$10.00 application fee plus 5 percent of total gross wages. Thereafter, the rate is 1, 1 3/4 or 4 1/2 (if overdrawn), depending on the employer account balance.

**Unemployment Compensation Rate:** Rates are based on industry codes, with average base rates ranging from 3.24-5.40 plus adjustment factors.

### Wages Paid in Natrona County by Category:

CATEGORY	TOP	ENTRY	AVERAGE
Electronic Assembler	\$ 3.65	\$ 3.53	\$ 3.58
Production Assembler	4.28	3.65	4.09
Drill/			
Press Opr.	9.75	8.50	9.50
Janitor	9.44	4.51	6.98
Machinist	9.90	9.12	9.51
Maintenance Mechanic	9.51	9.00	9.12
Secretary	8.75	3.35	4.50
Sheet Metal Worker	15.01	6.00	10.51
Shipping/ Rec. Cirk.	5.50	4.58	5.04
Warehouse Worker	9.45	5.58	7.51
Tool/Die Maker	14.50	9.25	9.90
Welder	15.00	6.13	9.75

Source: Casper Job Service, June, 1985

## UTILITIES

**Gas Service:** Natural Gas is supplied in the Casper area by the Northern Utilities Division of KN-Energy, Inc. Available supply over 11 years, 1040 BTU/cu. ft. Average price per mcf \$4.92.

**Electric Service:** Supplied by the Pacific Power and Light Company  
Residential rates:

Winter: \$4.531 /kilowatt hour  
Summer: \$4.112/kilowatt hour  
Other rates available by request.

**Municipal Water:** Casper receives its water primarily from wells located near the North Platte River. Capacity is 40 million gallons per day. Maximum day demand in 1983 was 27.8 million gallons. Total available storage is 21.5 million gallons. Administered by the city Board of Public Utilities, the Casper water system has a Class A Rating from the American Insurance Association. Residential, Commercial, Industrial Rates: First 4,000 gallons bi-monthly \$7.20;

Over 4,000 gallons 90¢/1,000 gallons  
Water hardness: 220 ppm  
Treatment: Chlorination and/or filtration

**Municipal Sanitation:** Casper area sewage needs are served by the Casper Wastewater Treatment Plant which currently operates with a capacity of 6.5 million gallons per day. By 1985, the wastewater plant will have twice the capacity, 13 million gallons/day, when highly-advanced new facilities are constructed. Residential rates (based on winter water use): \$5.55 for first 5,000 gallons bi-monthly; over 4,000 gallons, 70¢/1,000 gallons. Commercial rates same as residential (based on actual water use).

**Sanitary Landfill Rates:** \$1.25/car load; \$2.25/pick-up load; \$7.50/ton. Residents using municipal water service may enter without charge once a month.

**Telephone:** Telephone service in the Casper area is provided by Mountain Bell. Several long distance services are also available.

## TRANSPORTATION

**Air Service:** Natrona County International Airport serves as the major airport for central Wyoming, and is an official bad-weather alternate for Denver's Stapleton Airport. With four well-maintained asphalt runways and a favorable location, Natrona County International Airport has not been closed due to snow accumulation in the last eight years.

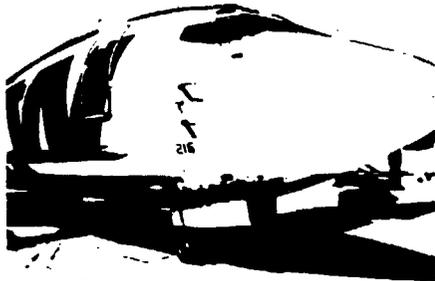
Served by: Western Airlines, Frontier Airlines, United Airlines, Centennial Airlines, Big Sky Airlines and Pioneer Airlines. General Aviation service available.

**Highway Service:** Interstate 25, US 20-26, WY Hwy 87, and WY 220.

**Trucking Service:** There are eight common contract carriers in the state; the largest ones are located in Casper. Additionally, numerous private carriers serve the Casper area.

**Rail Service:** Rail service in the Casper area is provided by Burlington Northern and Chicago-North Western Transportation, which maintain local reciprocal switching agreements. No passenger service is available.

**Bus Service:** Intra-City: Casper Area Transportation Coalition for the elderly/handicapped residents. Inter-City: Trailways Bus System



## GOVERNMENT

**Casper City Government:** City Manager/Council  
Police Protection: 115 sworn and civilian personnel  
Fire Protection: 93 personnel;  
insurance rating = 4

**Evansville:** Police Protection: 13 personnel; Fire Protection: 21 personnel

**Mills:** Police Protection: 9 personnel; Fire Protection: 21 personnel; insurance rating = 4

**Natrona County Government:** Three County Commissioners; Sheriff's Department: 84 personnel; Fire Protection: 15 personnel

**Total Revenue Collected by the City in 1984:** \$30,124,160.00

**City Bonded Indebtedness:** \$3,097,000.00

## TAXES

Residents in Wyoming pay fewer total state and local taxes than persons living anywhere else in the country. Individuals pay an average of just \$870 annually in state and local taxes—far below the \$2,200 national average.

Taxes for most businesses are the second lowest in the nation. Casper area residents and businesses pay no personal income tax, no corporate income tax, low property taxes, no inventory/gross receipts taxes and just 4% sales tax (3% state; 1% county optional tax).

## CLIMATE

Mean daily maximum temperature: January 32.5 degrees; July 87.1 degrees

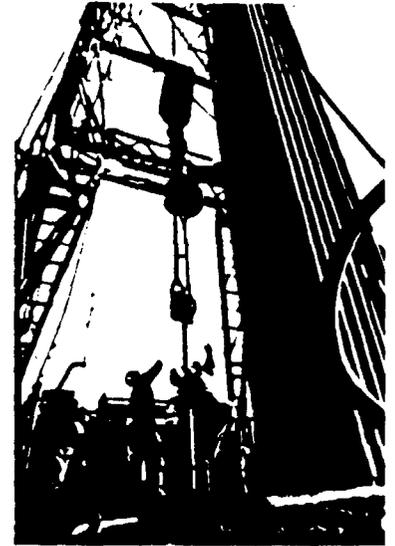
Mean monthly temperature: January 22.2 degrees; July 70.9 degrees

Annual precipitation: 11.43 inches

Annual snowfall: 76.9 inches

Average wind velocity: 13.1 mph

Average annual relative humidity: 64%



## NATURAL RESOURCES

**Minerals:** Casper is the hub of oil-related industries for the state and the Rocky Mountain region. Natural gas, bentonite and uranium are also found in abundance in the area.

**Agricultural:** Wyoming is the third largest sheep and lamb producer in the nation. Other important agricultural products include beef, alfalfa, oats and barley.

## FINANCIAL INSTITUTIONS

Casper, located close to the geographic center of the state and home to Wyoming's gas and oil industry, has financial assets that far exceed any other city in Wyoming. The ten Casper banks had combined assets of nearly 800 million in 1984. Four savings and loan institutions are in Casper.

## MEDIA

The major newspapers are the Casper Star Tribune (37,035 daily statewide circulation) and the Casper Journal (3,500 weekly circulation). Casper has 6 radio stations; KTWQ, KVOC, KTKL-FM, KTRS-FM, KQLT-FM, and KATI-KGRQ-FM. There are three local TV stations in Casper, KTWQ, KCWY, and KXWY, plus one cable company offering a variety of channels.



### QUALITY OF LIFE

**Outdoor Recreation:** Recreational opportunities abound for Casper residents, with many scenic areas just minutes away. Casper Mountain, twenty minutes from downtown Casper, offers hiking, camping and fishing recreation; as well as cross-country and downhill skiing at the popular city-managed Hogadon Ski Area. Medicine Bow National Forest is just 14 miles south of Casper.

Alcova Lake, covering 2,513 acres, offers recreational enthusiasts boating, fishing and swimming. Only 26 miles from Casper, it is a favorite community summer spot.

Hunters may harvest abundant antelope, deer and other game in many open areas just outside of the Casper area. Hell's Half Acre, a tourist attraction, is less than an hour away.

**Community Recreation:** The community enjoys 37 city parks, 37 Softball/baseball fields, 5 swimming pools, 10 wading pools, 3 golf courses and tennis courts await the sports-minded resident.

The recently-completed Casper Recreation Center offers sports and fitness, arts and crafts, dance, computer instruction and senior citizen programs.

The Wyoming Wildcatters, the state CBA team, are an exciting professional basketball team. The Wildcatters took second place in the league last year. Home games are held at the Casper Events Center.

**Religion:** There are 77 churches and one synagogue, representing 24 denominations.

**Library Facilities:** Three libraries serve the Casper area: Natrona County Public Library, Goodstein Foundation Library at Casper College and the UW-Casper Library offering a total of 188,698 volumes.

**Culture/Arts:** Casper enjoys many cultural activities. The Casper Symphony Orchestra, the Contemporary Ballet Theatre, community concerts in the park, and several art galleries stimulate residents seeking cultural entertainment. The Casper Trooper Drum and Bugle Corps is nationally recognized for their performances and have received many awards. In 1985, the Krampert Theatre for Performing Arts will be completed.

Other attractions include Fort Caspar, the Pioneer Museum, the Werner Wildlife Museum and the Tate Mineralogical Museum.

**Casper Events Center:** With a seating capacity of 10,000, the Events Center has sponsored many world-renowned entertainers. The Center also serves the convention, meeting and conference needs of community and private groups.



### RETAIL

Because Casper serves the central Wyoming market area the level of retail activity is higher than would normally be expected for a city of Casper's size, providing a large selection of retail stores. Eastridge Mall, with 92 stores, is the largest shopping area. Other major shopping areas are:

- Downtown Casper--85 stores
- Hilltop Shopping Center--27 stores
- Sunrise Shopping Center--18 stores
- Westridge Village--14 stores
- Mountain Plaza--10 stores
- Plaza East--10 stores
- Beverly Plaza--12 stores
- CY Avenue--60 stores/businesses

Number of retail establishments (1984):	498
Number of wholesale establishments (1984):	446
Amount of retail sales (1983):	\$678,990,000

APPENDIX F

NPDES PERMIT WY-0022411

SOUTH POWDER RIVER BASIN

CONVERSE COUNTY, WYOMING

APPENDIX F

NPDES PERMIT WY-0022411  
BILL SMITH MINE, CONVERSE COUNTY, WYOMING

The Bill Smith Mine is an underground uranium mine located approximately 17 miles northeast of Glenrock, Wyoming. Water pumped from the mine and associated dewatering wells is routed to a barium chloride treatment plant for precipitation of radium and is then routed to a series of three settling ponds which eventually discharge (via point 001) to an unnamed tributary of Sage Creek (class IV water).

The solution mining project bleed stream is routed through ion exchange columns to remove the uranium, through a separate radium treatment and settling system, and then is mixed with the mine water and routed to the Bill Smith Mine water treatment system for precipitation of radium and eventually discharge. The permit limits the concentrations of sodium, bicarbonate, and chloride in the bleed stream and the quantity of this discharge must be measured prior to introduction into the Bill Smith Mine water treatment system. The bleed stream is identified as discharge point 003.

Discharge point 002 was associated with a separate project and that point of discharge has been deleted from the permit.

Monitoring of the discharge quality and quantity is required on a regular basis. Reports on the results of the monitoring program are submitted to Wyoming Department of Environmental Quality, Water Quality Division, quarterly. The current permit, if not renewed, has an expiration date of January 31, 1991. A copy of NPDES Permit WY-0022411 is attached.

# STATEMENT OF BASIS

## Renewal

APPLICANT NAME: Sequoyah Fuels Corporation  
MAILING ADDRESS: P. O. Box 1120  
Glenrock, WY 82637  
FACILITY LOCATION: Bill Smith Mine, Converse County  
PERMIT NUMBER: Wy-0022411

The Kerr-McGee Nuclear Corporation's Bill Smith Mine is an underground uranium mine located in the "uranium district," approximately 20 miles northeast of Glenrock, Wyoming. Approximately .23 million gallons of water per day are pumped from the mine shaft and surrounding dewatering wells. This water is routed to a barium chloride treatment plant for precipitation of radium and is then routed to a series of three settling ponds which eventually discharge (via point 001) to an unnamed tributary of Sage Creek (class IV water).

The ISL project is a separate leach project located in a separate ore zone. Solution from the project is reinjected into that zone after the addition of sodium bicarbonate and hydrogen peroxide. A bleed stream of approximately two gallons per minute (50 gpm during aquifer restoration) is routed to the Smith Mine treatment system. The proposed permit limits the concentrations of sodium, bicarbonate, and chloride. The quality and quantity of this discharge must be measured prior to introduction into the Bill Smith Mine treatment system and is identified as discharge point 003.

Discharge point 002 which was associated with a separate in-situ leach project has now been abandoned and that point of discharge has been deleted from the permit.

The limitations contained in the proposed permit are those which represent "best available treatment." However, the proposed permit also contains a "reopener clause" which requires the permit to be modified if more stringent standards are developed at the federal level. The proposed permit contains an exemption from effluent limitations when a precipitation event in excess of the ten year - 24 hour storm occurs and contains standard language on control of runoff from disturbed areas.

Self-monitoring of effluent quality and quantity is required on a regular basis with reporting of results quarterly. The permit is scheduled to expire January 31, 1991.

John Wagner  
Wyoming DEQ  
December 3, 1985

Permit No.: Wy-0022411

AUTHORIZATION TO DISCHARGE UNDER THE  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et. seq.,) (hereinafter referred to as "the Act"), and the Wyoming Environmental Quality Act (W.S. 35-11-101 through 1104, specifically 301(a)(i); Laws 1973, ch. 250, Section 1),

the Sequoyah Fuels Corporation

is authorized to discharge from a facility located at

the Bill Smith Mine, Section 36, T36N, R74W, Converse County

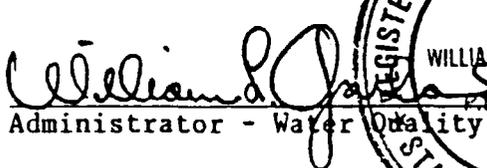
to receiving waters named

) Sage Creek via unnamed drainage

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II and III hereof.

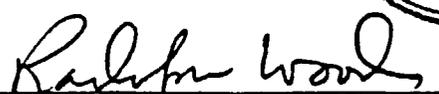
This permit shall become effective on February 1, 1986.

This permit and the authorization to discharge shall expire at midnight, January 31, 1991.

  
Administrator - Water Quality Division



January 29, 1986  
Date

  
Director - Department of Environmental Quality

January 29, 1986  
Date

PART IEFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning immediately and lasting through January 31, 1991, the permittee is authorized to discharge from outfall(s) serial number(s) 001.

Such discharge shall be limited and monitored by the permittee as specified below:

<u>Effluent Characteristic</u>	<u>Discharge Limitations*</u>		
	<u>mg/l</u> <u>Daily Avg</u>	<u>mg/l</u> <u>Daily Max</u>	<u>mg/l</u> <u>Instantaneous Max</u>
Flow - MGD	N/A	N/A	N/A
Total Suspended Solids	20	30	45
Total Zinc	.5	1.0	1.5
Dissolved Radium 226	3(pC/1)	10(pC/1)	15(pC/1)
Total Radium 226	10(pC/1)	30(pC/1)	45(pC/1)
Total Uranium (as U)**	2.0	4.0	6.0
COD	100	200	300

The oil and grease concentration shall not exceed 10 mg/l in any single grab sample and shall be monitored visually.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

- \* Any overflow, increase in volume of a discharge or discharge from a by-pass system caused by precipitation or snowmelt shall not be subject to limitations set forth in this section. This exemption shall be available only if facility is designed, constructed and maintained to contain or treat the volume of water which would fall on the areas covered by this permit during a 10 year-24 hour or larger precipitation event (2.5 inches) or snowmelt of equivalent volume. The operator shall have the burden of demonstrating to the appropriate authority that the prerequisites to this exemption have been met.

\*\* See Part IC-9.

2. During the period beginning immediately and lasting through January 31, 1991, the permittee is authorized to discharge outfall(s) serial number(s) 001.

Such discharge shall be monitored by the permittee as specified below:

Monitoring Requirements

<u>Parameter</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
Flow	Continuous	Daily Total
Total Suspended Solids	Weekly	Grab
Total Zinc	Quarterly	Grab
Dissolved Radium 226	Monthly	Composite
Total Radium 226	(Monitoring of this parameter not required)	
Total Uranium (as U)	Monthly	Composite
COD	(Monitoring of this parameter not required)	
pH	Quarterly	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the outfall from the final treatment unit and prior to admixture with diluent water or the receiving stream.

PART IA. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

3. During the period beginning immediately and lasting through January 31, 1991, the permittee is authorized to discharge from outfall(s) serial number(s) 003.

Such discharge shall be limited and monitored by the permittee as specified below:

<u>Effluent Characteristic</u>	<u>Discharge Limitations</u>			
	<u>kg/day</u> <u>Daily Avg</u>	<u>kg/day</u> <u>Daily Max</u>	<u>mg/l</u> <u>Daily Avg</u>	<u>mg/l</u> <u>Instantaneous Max</u>
Flow - MGD	N/A	N/A	N/A	N/A
Sodium	N/A	N/A	N/A	1,500
Bicarbonate	N/A	N/A	N/A	4,500
Chloride	N/A	N/A	N/A	750
Arsenic	N/A	N/A	N/A	N/A
Selenium	N/A	N/A	N/A	N/A

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units in any single grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Monitoring Requirements

<u>Parameter</u>	<u>Measurement</u> <u>Frequency</u>	<u>Sample</u> <u>Type</u>
Flow - MGD	Continuous	Daily Total
Sodium	Monthly	Grab
Bicarbonate	Monthly	Grab
Chloride	Monthly	Grab
Arsenic	Quarterly	Grab
Selenium	Quarterly	Grab
pH	Quarterly	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): See part IC8.

B. RUNOFF FROM AFFECTED LANDS

Effective immediately and lasting through January 31, 1991 the permittee shall control all runoff from affected land to insure there is no violation of Wyoming's surface water quality standards.

Affected land means the area of land from which overburden is removed, or upon which overburden, development waste rock or refuse is deposited, or both, access roads, haul roads, mineral stockpiles, mill tailings, impoundment basins, and all other lands whose natural state has been or will be disturbed as a result of the operations.

If runoff from affected land is controlled through the use of settling pond(s), the following provisions apply:

1. If a settling pond is not sized to completely contain the runoff resulting from precipitation, an equivalent snow melt or combination of precipitation and resulting snow melt equal to the ten year/twenty-four hour precipitation event (2.5 inches), the outfall from such settling pond must be identified as a point of discharge and must meet the provisions of Part IA of this permit. Such ponds must also be permitted through the Permit to Construct process described in Wyoming Water Quality Rules and Regulations, Chapter III.
2. If a settling pond is sized to completely contain the runoff from the ten year/twenty-four hour precipitation event as described above, the outfall from such settling pond need not be identified as a point of discharge. However, it must be permitted through the Permit to Construct process described in Wyoming Water Quality Rules and Regulations, Chapter III, and shall be operated as follows:
  - a. During and immediately following a precipitation or runoff event equal to or greater than the ten year/twenty-four hour precipitation event as described above, runoff in excess of the design capacity of the pond may be discharged even if the effluent does not meet the quality requirements of Part IA of this permit.
  - b. If, as the result of any precipitation or runoff event, the volume of water held in the pond exceeds the permanent pool, the water in the pond shall be analyzed at a minimum of once every five (5) days. When the quality of the water meets or exceeds the provisions of Part IA of the permit, the quantity in excess of the permanent pool shall be discharged within ten (10) days.
  - c. The Total Suspended Solids, Total Zinc, Dissolved Radium 226, Total Uranium and pH of the discharges described in "b" above shall be monitored with single grab samples and shall be reported to the permit issuing authority as an addendum to the regular reports described in Part IC2 of this permit.
  - d. All runoff control facilities shall be operated in a manner to minimize, to the extent practicable, the discharge of suspended solids and sediment. If, after on-site inspection by the Wyoming Department of Environmental Quality and/or the U.S. Environmental Protection Agency, it is determined that a runoff control pond is not being so operated,

such finding shall be considered to be a violation of this permit.

In addition, the permittee shall operate and maintain all runoff control ponds such that:

1. Sluicing of collected sediments does not occur;
2. Scouring or erosion of the bottom of outlet channels does not occur;
3. The ponds shall be designed and maintained to contain at least one year's worth of accumulated sediment storage as determined by acceptable empirical methods.

The official weather station identified with this permit shall be the Glenrock 5 ESE station operated by the official observer designated by the U.S. Department of Commerce. The permittee has the option of maintaining additional precipitation gages at his facility.

C. MONITORING AND REPORTING1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and approval by, the permit issuing authority.

2. Reporting

Monitoring results obtained during the previous 3 month(s) shall be summarized and reported on a Discharge Monitoring Report Form, postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on April 28, 1986. Duplicate signed copies of these and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

U.S. Environmental Protection  
Agency  
One Denver Place  
999 18th Street, Suite 1300  
Denver, Colorado 80202-2413  
Attention: Enforcement-Permits  
Telephone: (303) 837-4901

Wyoming Department of Environmental  
Quality/Water Quality Division  
Herschler Building  
122 West 25th Street  
Cheyenne, Wyoming 82002  
Telephone: (307) 777-7781

If no discharge occurs during the reporting period, "no discharge" shall be reported. If discharge is intermittent during the reporting period, sampling shall be done while the facility is discharging.

3. Definitions

- a. The "daily average" discharge means the total discharge by weight determined by the arithmetic mean (geometric mean in the case of the fecal coliform parameter) of a minimum of three (3) samples taken on three (3) separate days during a calendar month.
- b. The "daily maximum" discharge means the total discharge by weight as determined by the analysis of a properly preserved composite sample composed of a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow at the time of sampling.
- c. The "daily average concentration" means the average concentration determined by the arithmetic mean (geometric mean in the case of the fecal coliform parameter) of a minimum of three (3) samples taken on three separate days during a calendar month.
- d. The "daily maximum concentration" shall be determined by an analysis of a properly preserved composite sample composed of a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals

and proportioned according to flow at the time of sampling.

- e. The "instantaneous maximum" shall be determined by the analysis of a single properly preserved grab sample.
- f. "Net" value, if noted under Effluent Characteristics, is calculated on the basis of the net increase of the individual parameter over the quantity of that same parameter present in the intake water measured prior to any contamination or use in the process of this facility. Any contaminants contained in any intake water obtained from underground wells shall not be adjusted for as described above and, therefore, shall be considered as process input to the final effluent. Limitations in which "net" is not noted are calculated on the basis of gross measurements of each parameter in the discharge, irrespective of the quantity of those parameters in the intake waters.
- g. A "composite" sample, for monitoring requirements, is defined as a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow.

#### 4. Test Procedures

Test procedures for the analysis of pollutants, collection of samples, sample containers, sample preservation, and holding times, shall conform to regulations published pursuant to Section 304(h) of the Federal Water Pollution Control Act.

#### 5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The exact place, date and time of sampling;
- b. The dates the analyses were performed;
- c. The person(s) who performed the analyses;
- d. The analytical techniques or methods used; and
- e. The results of all required analyses.

#### 6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

#### 7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and

calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

8. Location of Discharge Points

001 - The final outfall from the treatment system which treats the wastewater from the Bill Smith Mine and the ISL project.

003 - The discharge from the ISL project located prior to the point of mixture with the water from the Bill Smith Mine.

9. Analytical Technique for Uranium

The analytical technique for Total Uranium (as U) shall be the fluorometric method as referenced in Methods for Determination of Radioactive Substances in Water and Fluvial Sediments, Techniques of Water - Resource Investigations of the U.S. Geological Survey, Book 5, Chapter A-5, pp. 83 - 92, or, Uranium in Drinking Water - Fluorometric Method, Section 13, Method 908.1, as referenced in, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600/4-80-032 August 1980.

PART IIA. MANAGEMENT REQUIREMENTS1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases or process modifications which will result in new, different or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

- a. A description of the discharge and cause of noncompliance; and
- b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to waters of the State resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of

this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass.

If a partial or complete bypass is considered necessary, a request for such bypass shall be submitted to the State of Wyoming and to the Environmental Protection Agency at least sixty (60) days prior to the proposed bypass. If the proposed bypass is judged acceptable by the State of Wyoming and by the Environmental Protection Agency, the bypass will be allowed subject to limitations imposed by the State of Wyoming and the Environmental Protection Agency.

If, after review and consideration, the proposed bypass is determined to be unacceptable by the State of Wyoming and the Environmental Protection Agency, or if limitations imposed on an approved bypass are violated, such bypass shall be considered a violation of this permit; and the fact that application was made or that a partial bypass was approved shall not be a defense to any action brought thereunder.

6. Removed Substances

Solids, sludges, filter backwash or other pollutants removed in the course of treatment or control of wastewaters or intake waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering waters of the State.

7. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

- a. In accordance with the Schedule of Compliance contained in Part I, provide an alternative power source sufficient to operate the wastewater control facilities;

or, if such alternative power source is not in existence and no date for its implementation appears in Part I,

- b. Take such precautions as are necessary to maintain and operate the facility under his control in a manner that will minimize upsets and insure stable operation until power is restored.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator and/or their authorized representatives, upon the presentation of credentials:

- a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and
- b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any

monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge(s) emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Act, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Act.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended or revoked in whole or in part during its term for cause including, but not limited to, the following:

- a. Violation of any terms or conditions of this permit;
- b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
- d. If necessary to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
  - (1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
  - (2) Controls any pollutant not limited in the permit.

5. Toxic Pollutants

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the Federal Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties established pursuant to any applicable State law or regulation.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provisions of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART IIIOTHER REQUIREMENTS1. Flow Measurement

At the request of the Director of the Wyoming Department of Environmental Quality, the permittee must be able to show proof of the accuracy of any flow measuring device used in obtaining data submitted in the monitoring report. The flow measuring device must indicate values within ten (10) percent of the actual flow.

2. 208(b) Plans

This permit may be modified, suspended or revoked to comply with the provisions of any 208(b) plan certified by the Governor of the State of Wyoming.

## APPENDIX G

### TRANSPORTATION ACCIDENT RESPONSE GUIDE

#### 1. INTRODUCTION

Transportation accidents during the shipment of uranium concentrates (yellowcake, brine, byproduct, or slurry) infrequently occur on public highways and at trucking terminals. Leakage or spillage of concentrate from its container can be a potential health hazard to persons if they ingest or inhale the materials.

The purpose of this procedure is to provide guidance for persons responding to a shipping accident involving uranium concentrate, particularly when the concentrate has leaked or is spilled from its containers. Leakage or spillage can range in severity depending on the specific accident conditions. Although this guide addresses the worst-case situation, it intends lesser response activity for less severe accidents.

The guide provides instruction to the truck driver and to other persons who are the first to arrive at the accident scene. These instructions request notifications be made to the shipper and the carrier. If warranted, the shipper is to dispatch an initial response team to investigate the accident. Shipper will also alert a clean-up crew for possible duty. Guidance is given for securing pre-arranged clean-up equipment and services. Clean-up methods, monitoring, sampling, release levels, and concluding activities are also described.

#### 2. SHIPPING PROCEDURES AND RESPONSIBILITIES

The shipper (Rio Algom Mining Corp.) will insure the following actions are accomplished prior to shipment of uranium concentrate (yellowcake, brine, byproduct, or slurry).

1. D.O.T. Regulations  
All general requirements, Title 49 CFR, Department of Transportation regulations, have been complied with by the shipper (Appendix A).
2. Carrier Emergency Response Procedures  
Each truck driver is provided with two copies of the emergency response procedures (Appendix B). One copy is to be maintained with the shipping documents. The second copy is to be secured to the rear door of the truck for ready access when transporting packaged uranium concentrate.
3. Spill Cover Kit:  
Each truck driver carries a spill cover kit consisting of the following:

- Disposable Coveralls
- Shoe Covers
- Gloves
- Respirators and Filters
- Plastic Sheeting
- Tent Stakes
- Plastic Bags
- Tape
- Shovel

- Radioactive Signs
- Hammer
- Knife

The kit will be clearly marked as to its purpose and use and will be addressed for return by the carrier. The kit should be the last item loaded on the truck for easy accessibility in the event it is needed.

### 3. TRANSPORTATION ACCIDENT RESPONSE ORGANIZATION AND DUTIES

1. The Shipper
  - a. Contact Representative  
In the event of transportation related accident, the carrier is instructed to promptly notify a

Rio Algom Mining Corp. representative (Appendix C). The responsibilities of the representative receiving such a call are as follows:

- (1) Record the information set forth in the evaluation questionnaire (Appendix B).
- (2) Notify the proper management and emergency response personnel (Appendix C).

b. Emergency Response Coordinator

- (1) Direct the initial response team and the clean-up crew.
- (2) Designate individuals as emergency response crew members and ensure they are instructed on emergency procedures which include the safe handling of Low Specific Activity (LSA I) radioactive material.
- (3) If necessary, procure additional personnel for the clean-up crew and any additional equipment as required.
- (4) Coordinate movement of team and equipment to accident site.
- (5) Notify the appropriate Oklahoma City personnel (Appendix D).

c. Radiation Safety Officer/Radiation Safety Technician:

- (1) Initial response capability including maintenance of necessary equipment.
- (2) Serve as the on-site technical liaison between the emergency response coordinator and the appropriate state and/or federal officials.