FIGURE 4.1.6-1
PROPOSED AREAS OF IMPACT (SITES 1 AND 23)

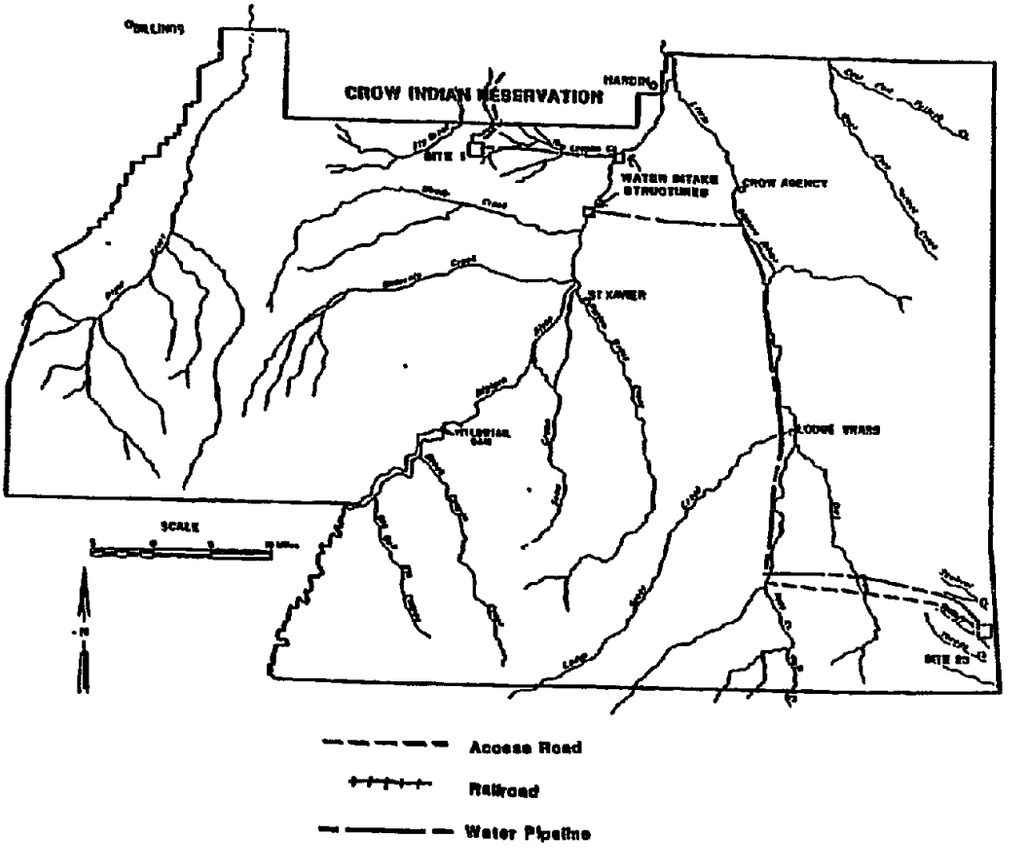
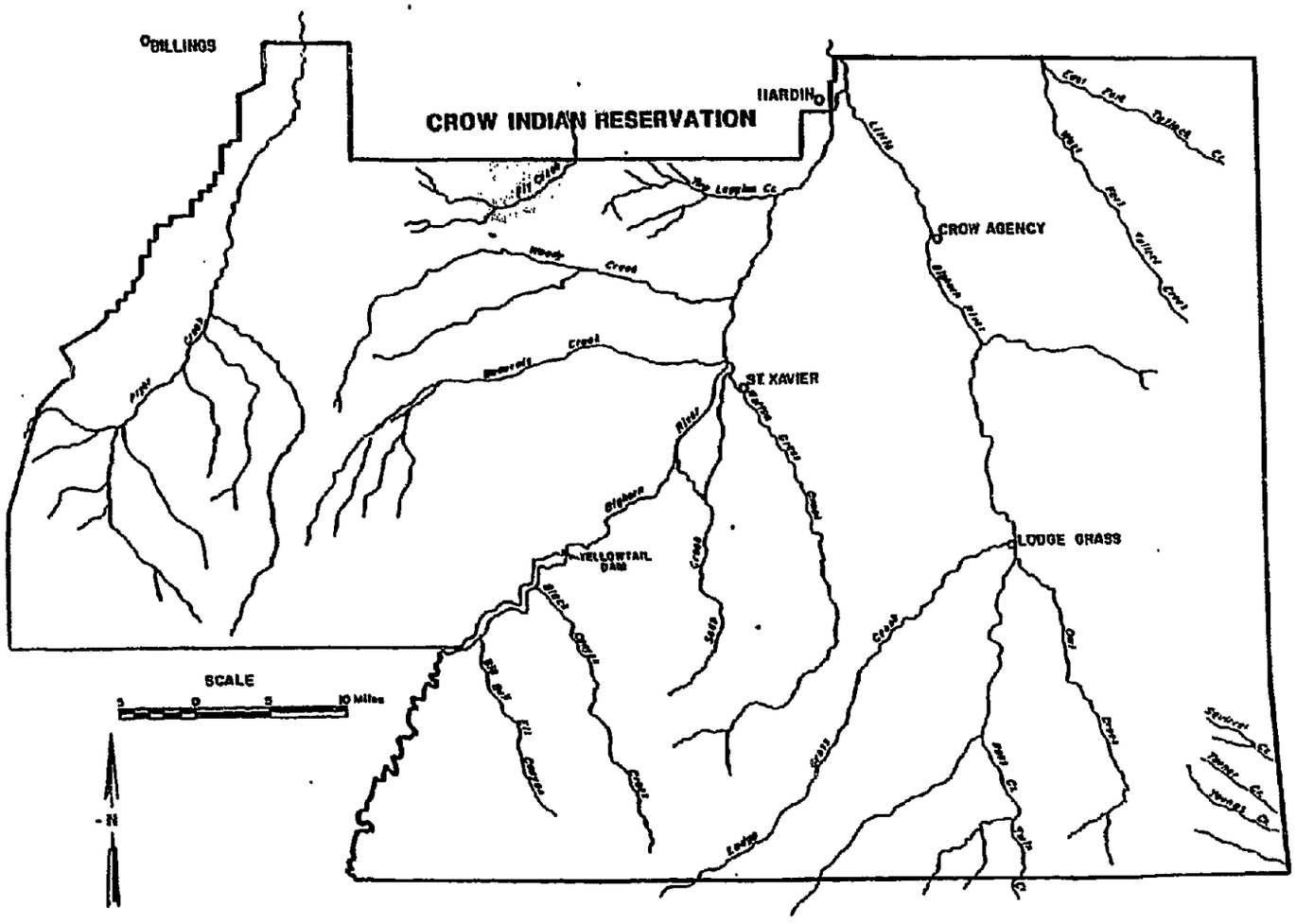


FIGURE 4.1.6-2
PRONGHORN ANTELOPE WINTER RANGE (SITE 1)



White-tailed Deer. Principal-use areas of the white-tailed deer are most commonly associated with riparian habitat and shrub-filled coulees. Preferred habitat within the proposed area of impact would be associated with the Bighorn River, Fly Creek, and the North Fork of Two Leggins Creek. Although site-specific information is limited, available information points out that most white-tailed deer observations occurred along the Bighorn River (USFWS 1979, 1980, and 1981). Information collected by the U.S. Fish and Wildlife Service in 1979 showed good fawn production with a ratio of 68 fawns per 100 adults. Although samples taken during 1980 and 1981 were quite small, average fawn production was excellent at 88 fawns per 100 adults. (References 73, 74, 75).

Carnivores

More commonly occurring species within the proposed area of impact include the coyote, bobcat, red fox, badger, and striped skunk. The rare swift fox could also occur on some occasions. The raccoon and mink would be limited to the Bighorn River and major tributaries and possibly Fly Creek. Populations of most carnivores are expected to be high since prey species (i.e., rodents, upland game birds) usually abound in habitat typical of the proposed area of impact.

Small Mammals

Species representative of the proposed project area include the white-tailed jackrabbit, desert cottontail, prairie dog, pocket gopher, and the more common ground squirrels, chipmunks, mice, and rats. Porcupines would normally be restricted to the riparian habitat along the Bighorn River where cottonwoods and other tree species exist. Muskrats and beavers are probably quite common along the Two Leggins Creek and the Bighorn River and within irrigated agricultural area where suitable habitat exists. Small mammal populations, particularly the smaller rodents (i.e., ground squirrels, mice, and rats), would probably be high since this is typical of small mammals associated with habitat of this type.

Birds

Principal categories of birds occurring within the proposed area of impact include upland game birds, waterfowl and shorebirds, raptors, and passerine birds. A species list of these and other categories of birds is provided in Appendix A-3.

Upland Game Birds. The sharp-tailed grouse occurs primarily in association with the sagebrush and grassland habitat type. Preferred habitat year-round on Westmoreland's Tract III lands include grassland, silver sagebrush-grassland, and agricultural-related areas (pasture, mature wheat or stubble, and alfalfa hay). Riparian areas and shrub filled coulees appear to be important wintering areas since most winter sightings occurred within these areas. Year-round populations within the proposed area of impact are probably good since the necessary habitat components are available.

Sage grouse are reported year-round and are normally restricted to sagebrush-associated habitat. The U.S. Fish and Wildlife Service (1979) reported that during winter months, larger flocks were observed in association with principal drainage areas, including Fly Creek.

Ring-necked pheasants are reported to be extremely abundant throughout the reservation with habitat preferences largely associated with brush-filled areas adjacent to creek bottoms and in agricultural-related areas. Populations within the proposed area of impact are probably high since preferred habitat is available particularly along the Bighorn River, Fly Creek, and Two Leggins Creek.
Although documentation on the occurrence of the gray (Hungarian) partridge is quite limited, preferred habitat is reported to be associated with agricultural areas and the sagebrush-grassland habitat types. Since this type of habitat exists within the general area, gray partridge could occur in limited numbers.

Mourning doves are common and easily adapted to a wide variety of habitats. However, greater concentrations and densities are usually associated with agricultural and riparian habitat types. Populations would probably be high within

the proposed area of impact, particularly during fall seasons.

Waterfowl and Shorebirds. Species of this category are common on the Bighorn River and other major creeks within the proposed area of impact. Ducks and shorebirds also utilize stock ponds on occasion. The agricultural areas, particularly the grain fields, also provide ideal feeding areas for these birds. Although certain waterfowl species probably occur year-round, concentrations and densities are usually highest during spring and fall migrations. Waterfowl apparently winter along the Bighorn River as evident by the 17,600 ducks and 914 geese observed during February 1981 (USGWS, 1981).

Raptors. Common raptors occurring within the general area include the American kestrel, red-tailed hawk, Swainson's hawk, and marsh hawk. Golden eagles appear to be common during the winter along the Bighorn River (USFWS, 1979 and 1980). Nesting by all species most likely occurs and populations of individual species probably fluctuate with the availability of prey species. Other species occurring include the turkey vulture, prairie falcon, short-eared owl, and the Great-horned owl.

Passerine Birds. Habitat characteristics of the proposed area of impact provide ideal components favorable to birds within this category. The current land use and the availability of riparian, shrub, and grassland habitat within the area favor a diversity of species with an abundance of overall species. Blackbirds, sparrows, and meadowlarks are probably most common in association with the agricultural areas with red-winged blackbirds, yellow-headed blackbirds, and swallows more common along the Bighorn River and major creeks.

Amphibians and Reptiles

Amphibians within the area are generally restricted to ponds, creeks, and the Bighorn River. Irrigated agricultural areas would also support various species. Species occurring within the area probably include the painted turtle, snapping turtle, tiger salamander, leopard frog, chorus frog, and the Plain's spadefoot toad.

The shrub, grassland, and riparian types typical of the general area provide ideal habitat for various reptiles. Snakes common within the general area include the bullsnake, prairie rattlesnake, yellow-bellied racer, red-sided garter, Western plains garter, and wandering garter snakes. The garter snakes probably would be most common along major drainages. Common lizards include the northern sagebrush lizard and the eastern short-horned lizard.

Threatened and Endangered Species

The bald eagle and peregrine falcon have been documented as occurring within the Crow Reservation. The Bighorn River could be classified as an important wintering area for the endangered bald eagle (Haliaeetus leucocephalus) since numerous sightings along this river have been documented (USGWS, 1979, 1980, and 1981). Although the bald eagle feeds primarily on fish, the large numbers of waterfowl that winter on the Bighorn River probably constitute a large percentage of the eagles' winter diet. No bald eagle nesting has been reported within the proposed project area but nesting is reported along the Bighorn River north of Hardin (Cathy Bulchis, personal communication, 1982).

The endangered peregrine falcon (Falco peregrinus anatum) is known to breed in the southwestern portion of the Crow Reservation and occurs within the Bighorn River valley during yearly migrations (Cathy Bulchis, personal communication, 1982). Principal-use areas within the proposed area of impact are generally limited to the agricultural, riparian, and water-associated habitat which provide habitat for important prey species (i.e., passerine birds, waterfowl, and shorebirds).

The endangered black-footed ferret (Mustela nigripes) occurred historically within the Crow Reservation with its principal natural habitat being prairie dog colonies. Although the status of prairie dog populations and colonies within the proposed area of impact is unknown, any existing colonies could be considered potential black-footed ferret habitat.

Fisheries

The major fisheries within the proposed project area are located along the Bighorn River. Two Leggins and Fly Creeks are the other possible fisheries but the extent is unknown, since no fishery surveys have ever been conducted. Necessary aquatic sampling will be required to document the extent of the fisheries within these creeks.

the Bighorn River (within the reservation) originates at the Yellowtail Dam (Figure 4.1.6-3) and flows northward to its confluence with the Yellowstone River. Daily fluctuations of flows in the Bighorn River are controlled by the Yellowtail Afterbay Dam located approximately 2 miles below the Yellowtail Dam.

Of the approximately 600 miles of streams located within the reservation, the Bighorn River is reported as having the greatest potential for a sport fishery and provides excellent trout habitat for the first 20 miles (USFWS, 1980). Further documentation of the good fishery is provided by Rocky Mountain Research Corporation which reported that the Montana Fish and Game Department classified the Bighorn River from Yellowtail Dam to the Wood Creek tributary as "very good trout waters—fisheries of statewide importance" (1977). Farther downstream and as tributaries enter, the Bighorn slowly warms to provide good habitat for cool water species such as walleye and northern pike. Other fish species occurring within the Bighorn River are listed in Appendix A-3.

Fishery surveys of the Bighorn in 1980 revealed many young-of-the-year rainbow trout and brown trout in all sections of the river (USFWS, 1980). Growth rates of brown trout taken during 1972 and 1973 were greater than those reported in other streams in Montana, with the exception of the Beaverhead River which had growth rates similar to those in the Bighorn River (Stevenson, 1975). Figure 4.1.6-4 illustrates the growth rates for brown trout and rainbow trout and reflects the productivity of the Bighorn River which could be attributed to the relatively high levels of calcium, alkalinity, total hardness, and conductivity (Stumm, 1970, in Stevenson, 1975 and USFWS, 1980). Growth rates for both brown trout and hatchery

FIGURE 4.1.6-3

MAJOR WATERCOURSES WITHIN THE CROW RESERVATION, MONTANA

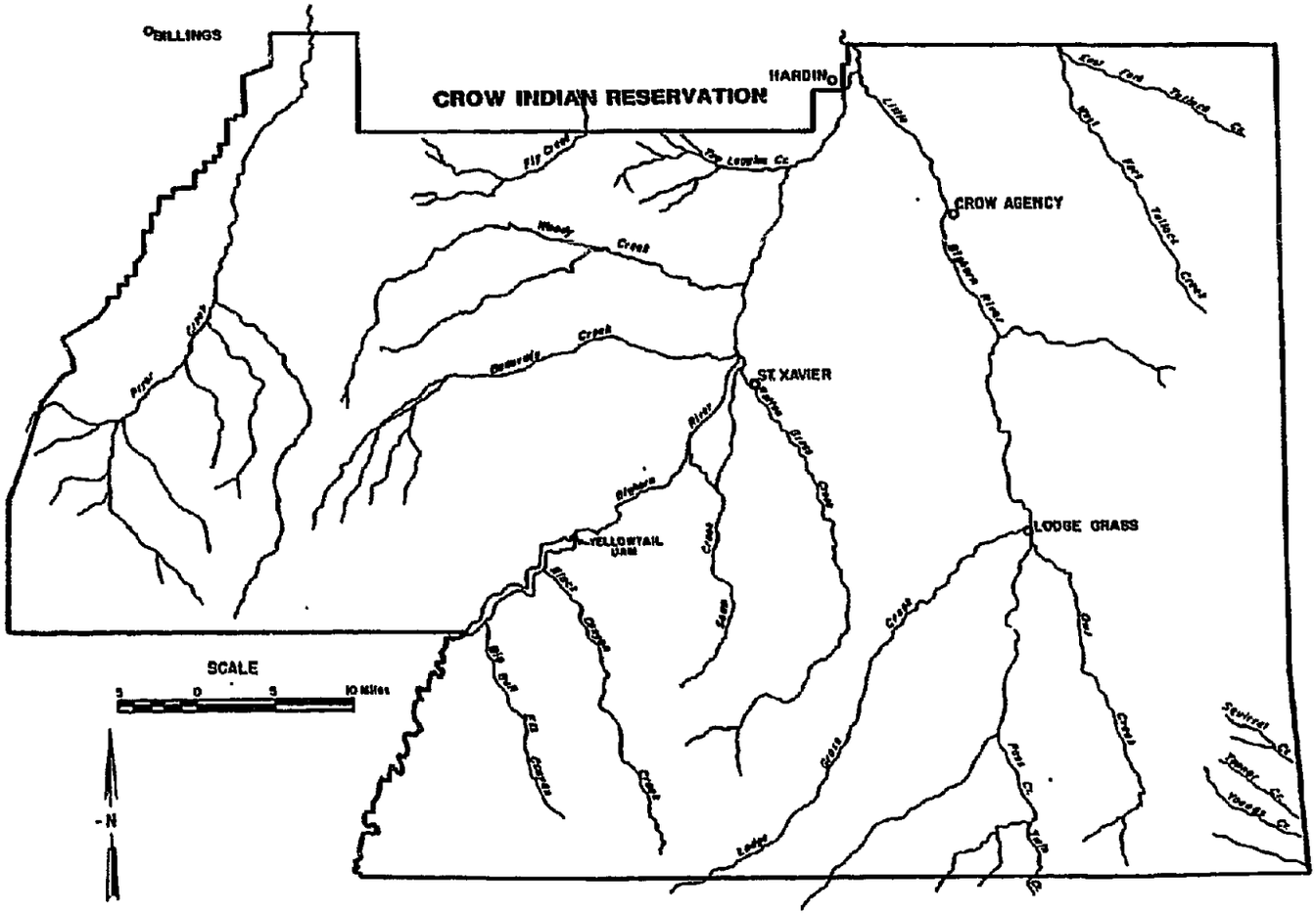
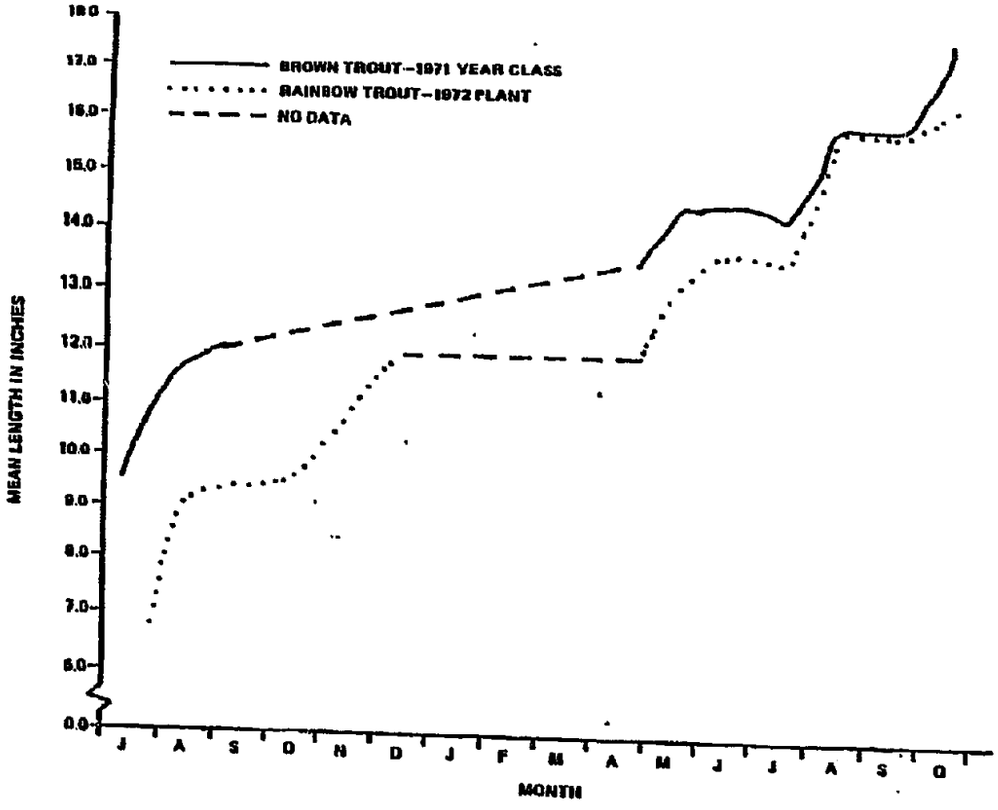


FIGURE 4.1.6-4
AVERAGE TOTAL LENGTH AT CAPTURE OF BROWN TROUT AND HATCHERY RAINBOW TROUT: BIGHORN RIVER (7/72-10-73)



Source: Stevenson 1975

rainbow trout were estimated at 6 in. within a period of 5 months from July 1972 while hatchery cutthroat trout grew about 2.9 in. in 3.5 months (Stevenson, 1975). The fishing pressure for the Bighorn River in 1973 was estimated at 18,648 fisherman days with catch rates ranging 0.05 to 0.82 fish/hour. (References 56, 74).

4.1.6.2 Site 23 (Including Ancillaries and Right-of-Ways).

The wildlife resources located within and immediately adjacent to the proposed area of impact (Figure 4.1.6-1) vary significantly from those associated with Site 1 due, in part, to the diversity of habitat afforded by variations in topography and vegetation types characteristic of this proposed area. Principal habitat types include woodland, xerophytic shrubland, mesophytic deciduous shrub-forb, grassland, agricultural, and riparian.

Although no site- and corridor-specific wildlife studies have been conducted, information collected since 1979 by VTN and others in conjunction with the proposed Crow-Shell coal lease provides baseline information for the general area encompassing the proposed plant site. Likewise, additional data collected by the U.S. Fish and Wildlife Service since 1979 provide further information that serves as abasis for a general discussion of wildlife resources within the proposed impact area. Site-specific studies of the proposed area of impact will be required to further document the extent of wildlife occurrence and habitat use. (References 72, 77, 78, 79).

Large Mammals

Major species occurring within the general area include the pronghorn antelope, mule deer, white-tailed deer, and an occasional elk.

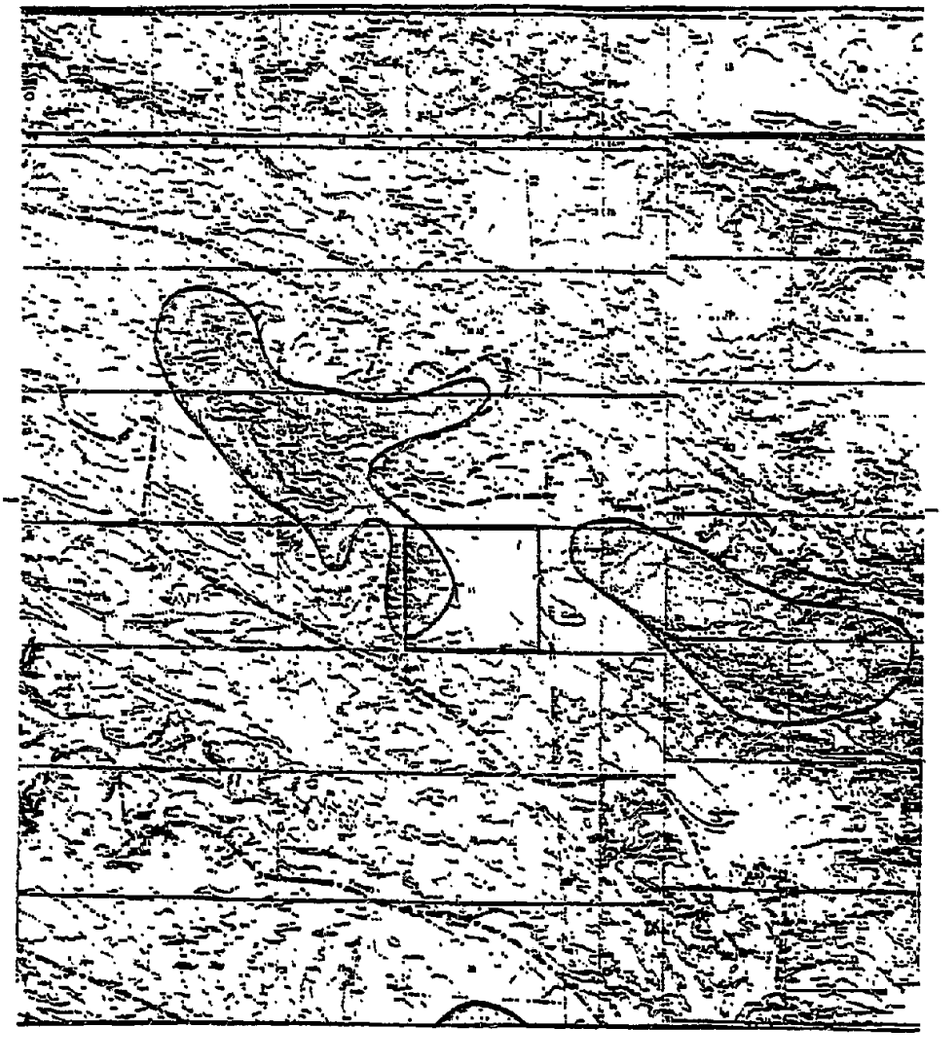
Pronghorn Antelope. This species is the most abundant of all large mammals found within the general area of the candidate plant site. Although populations vary throughout the year, concentrations and populations near the plant site are greatest during winter months (December through February). VTN Wyoming, Inc. (1979)

reported a mean population of 250 animals for the winters of 1975 to 1978 on the Tanner Creek winter range (Figure 4.1.6-5). A peak population of 385 animals was recorded during the 1977 to 78 winter season for the same general area. The U.S. Fish and Wildlife Service (1979) also reported concentrations of wintering populations of antelope within the south section of Squirrel Creek just north of the proposed plant site. Although several important winter ranges are found within the eastern portion of the reservation, most documentation has been derived from the extreme southeastern corner that includes the proposed plant site and portions of the pipeline right-of-way. The Tanner Creek winter range consists primarily of the sagebrush/grass habitat type. More pipeline right-of-way studies will be needed to further document the extent of seasonal antelope range. (Reference 78).

Mule Deer. The mule deer occurs year-round within the proposed area of impact with populations and concentrations generally greatest during winter and spring months. In its study of the Crow-Shell coal lease area, immediately adjacent to Site 23, VTN reported the big sagebrush vegetative type to be the preferred mule deer habitat year-round with mule deer preferences shifting to riparian and mesophytic types during the summer and fall (1979). Important winter and spring habitat is generally associated with the ponderosa pine and mixed shrub, particularly big sagebrush. The U.S. Fish and Wildlife Service reported the Squirrel Creek and Youngs Creek areas as one of the highest concentration areas—180 mule deer were observed (1979). Important mule deer winter ranges occurring within the proposed area of impact are illustrated in Figure 4.1.6-6. (References 72, 78).

White-tailed Deer. Principal-use areas of the white-tailed deer are more commonly associated with riparian habitat associated with major drainages such as the Tongue, Bighorn, and Little Bighorn. Although white-tailed deer use of the proposed plant site has not been documented, they have been reported as occurring within the general area along or near Little Youngs Creek, Youngs Creek, Squirrel Creek, Ash Creek, and Dry Creek. Preferred habitat within these areas includes riparian, ponderosa pine, and the agricultural types. Preferred habitat within the proposed pipeline right-of-way consists primarily of the riparian types associated with the Little Bighorn and Bighorn rivers including their major tributaries.

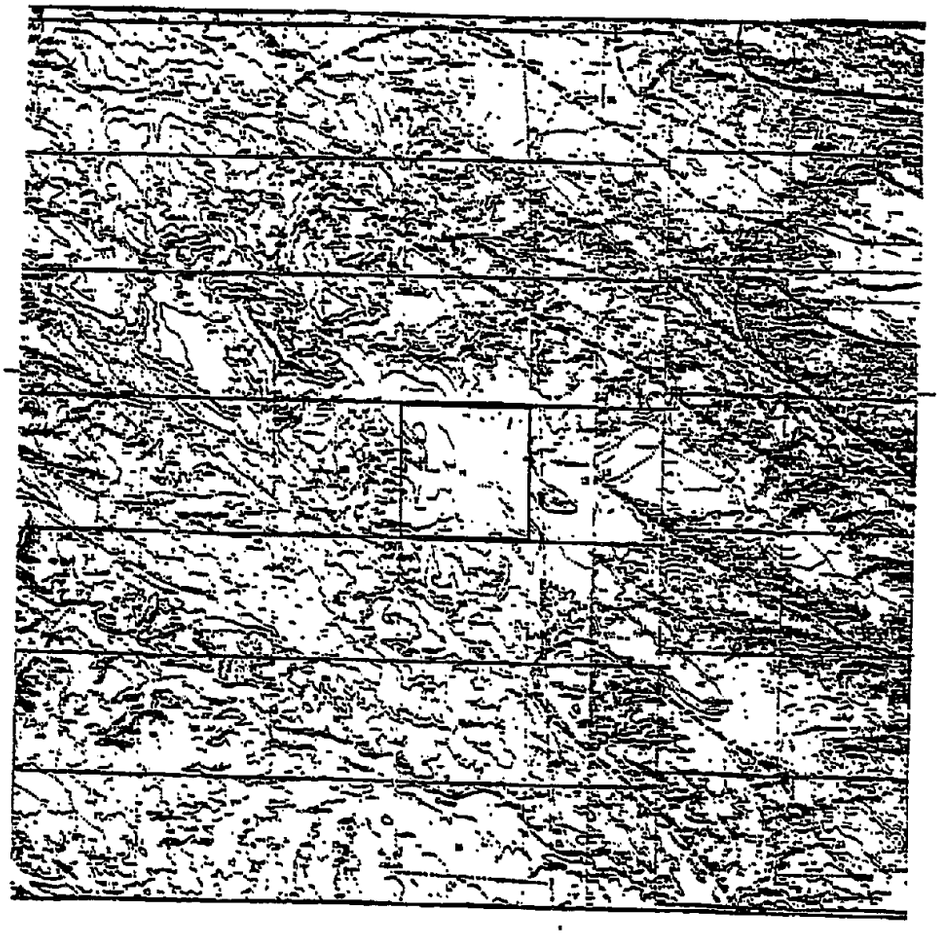
FIGURE 4.1.6-5
PRONGHORN ANTELOPE WINTER RANGE (SITE 23)



Approx. Winter Range Boundary

Approx. Boundary of High Use Area

FIGURE 4.1.6-6
MULE DEER WINTER RANGE (SITE 23)



Approx. Winter Range Boundary.

Approx. Boundary of High Use Area

Elk. The elk populations present on the Crow Reservation are primarily migrants with concentrations and densities greatest during winter months. Although a majority of the elk populations occur within the Bighorn Mountains, they have also been documented as occurring within the proposed area of impact, restricted primarily to the Wolf Mountains. Rocky Mountain Research reported that although the Wolf Mountain elk population was small, some elk remain year-round (1977). Distributions of elk within the proposed area of impact are illustrated in Figure 4.1.6-7.

Carnivores.

Major species occurring within the proposed project area include the coyote, lynx, bobcat, red fox, badger, longtail weasel, and the striped skunk. The black bear and mountain lion also occur but would generally be restricted to relatively remote and inaccessible areas. The raccoon and mink also occur but are normally limited to riparian habitat associated with streams and rivers. Populations of all carnivores associated with the major agricultural areas of the Bighorn and Little Bighorn valleys probably would be high due to the abundance of prey species generally associated with agricultural areas.

Small Mammals.

Commonly occurring species within the area include the porcupine, red squirrel, white-tailed jackrabbit, desert cottontail, mountain cottontail, and the numerous smaller rodents, including ground squirrels and mice. In field studies conducted by VTN (1978 and 1979) in the general vicinity of the proposed plant site, eight species of small mammals were trapped, and the deer mouse comprised 89 percent of the total species captured. Overall, the grassland habitat recorded the greatest rodent diversities. Black-tailed prairie dogs appear to be quite numerous particularly within the candidate plant site. Figure 4.1.6-8 illustrates the vastness of these prairie dog colonies within candidate Site 23. Lagomorph populations for the general area were estimated at 0.44 rabbits/mile and 0.35 rabbits/mile for 1975 and 1976 respectively. (References 77, 78, 79).

FIGURE 4.1.6-7
GENERAL DISTRIBUTIONS OF ELK (SITE 23)

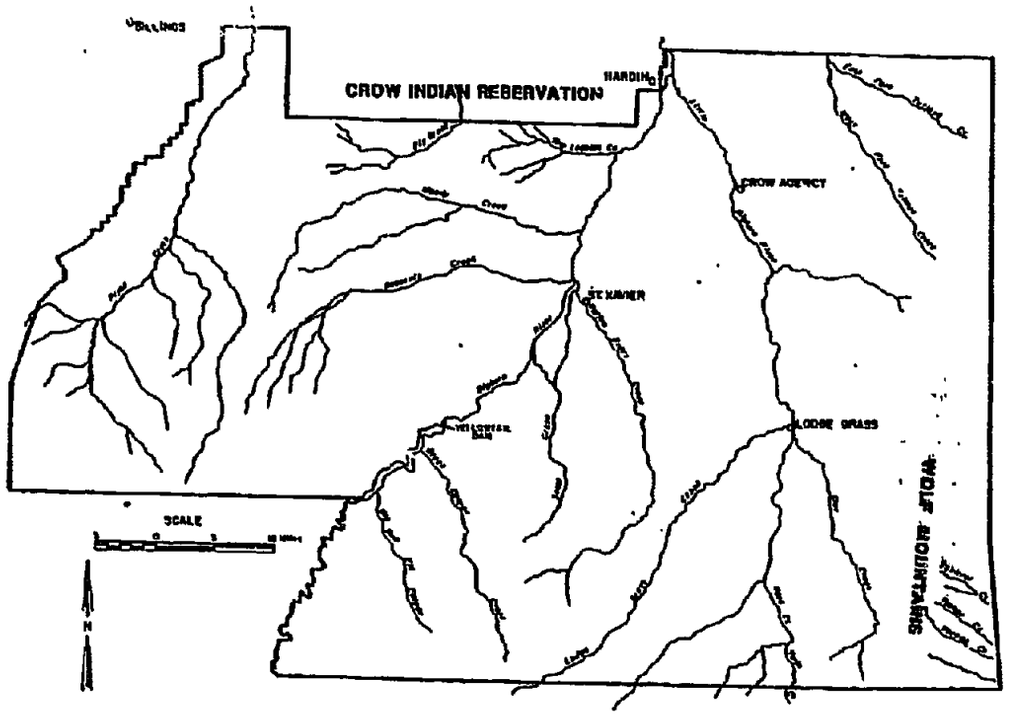
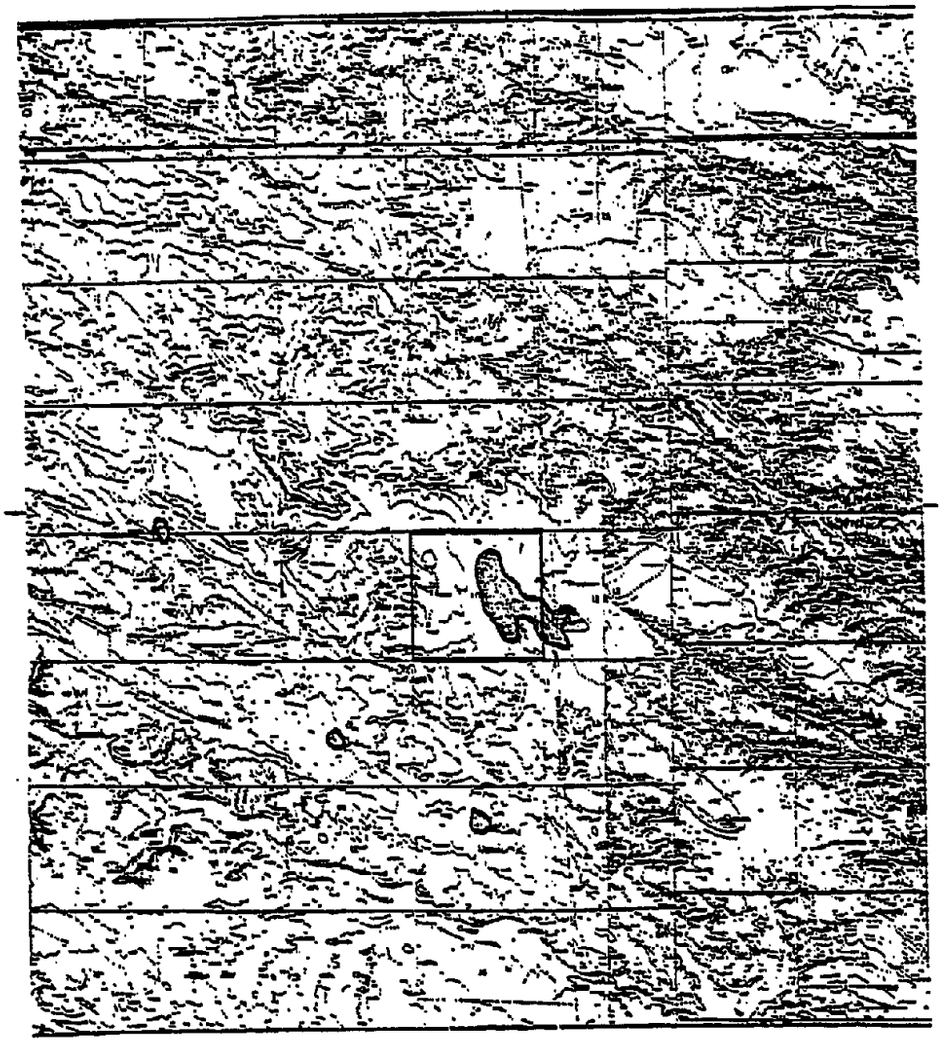


FIGURE 4.1.6-8
BLACK-TAILED PRAIRIE DOG COLONIES
(POTENTIAL BLACK-FOOTED FERRET HABITAT) SITE 23



Birds

Major categories of birds occurring within the proposed area of impact include upland game birds, waterfowl and shorebirds, raptors, and passerine birds. A species list of these and other categories of birds is provided in Appendix A-3.

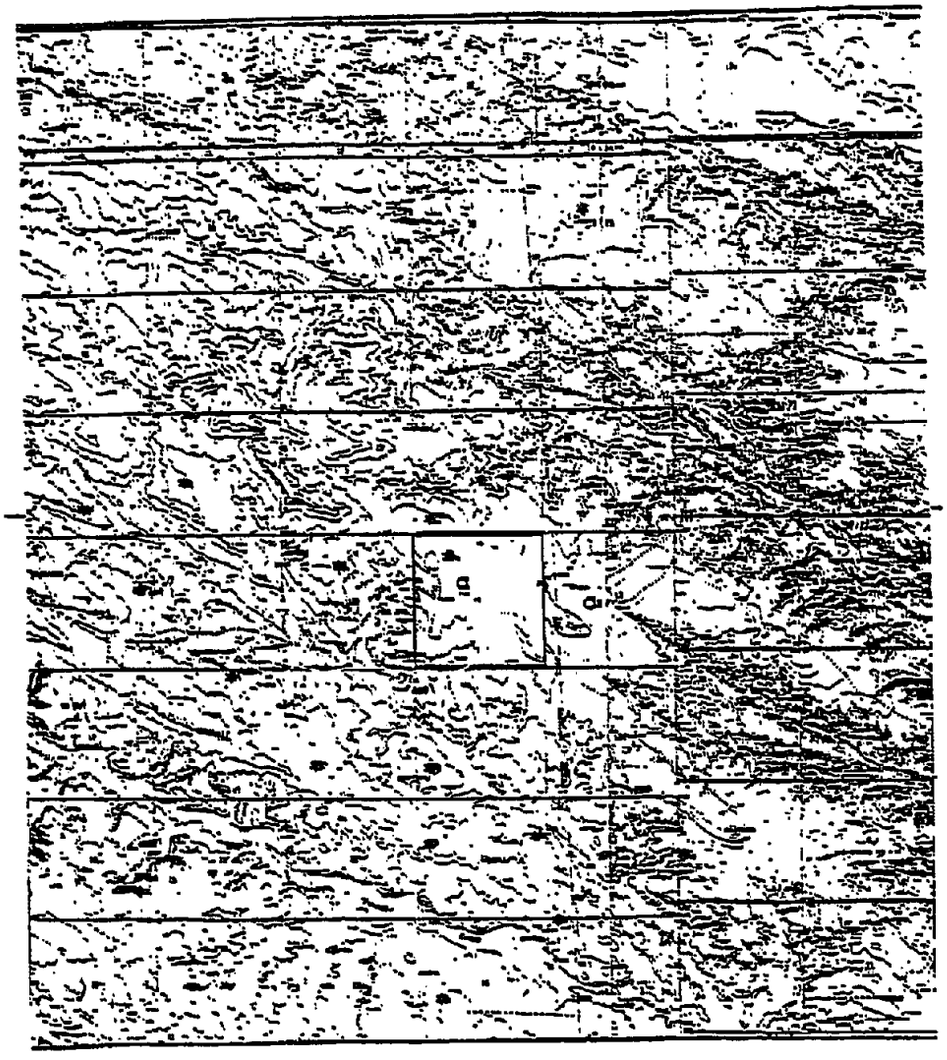
Upland Game Birds. Sharp-tailed grouse are found primarily in association with the sagebrush and grassland type habitat particularly during the spring, summer, and fall seasons. Preferred winter habitat appears to be associated with the riparian, sagebrush, and agricultural habitats. Coenenberg and DePuit (1979) estimated population densities of 18 sharp-tailed grouse per square mile within the general area of the proposed plant site. (Reference 15).

The U.S. Fish and Wildlife Service reported that most sharp-tailed grouse observed during a winter survey were east of the Bighorn River including Ash Creek, a major tributary to the Little Bighorn River, and along the Little Bighorn River southwest of Wyola (1979). These riparian areas appear to be important wintering areas, and winter populations throughout the Little Bighorn River drainage are probably high. The location of several known sharp-tailed grouse leks (strutting grounds) within the general area of the proposed plant site are shown in Figure 4.1.6-9. (Reference 72).

Ring-necked pheasants appear to be common throughout the reservation in association with riparian and agricultural areas. Brushy areas adjacent to creek bottoms and agricultural areas appear to be the preferred habitat. Although pheasant populations are reported as extremely abundant throughout the reservation (USFWS, 1979), populations within the general area of the candidate plant site appear to be rather small with most pheasants observed in cultivated fields, cattle feeding grounds, and riparian areas (Coenenberg and DePuit, 1979; VTN, 1979 and 1980). (References 15, 78).

Sage grouse historically occurred throughout the Crow Reservation wherever sagebrush, particularly big sagebrush, occurred in significant amounts (Rocky Mountain Research, 1977). The U.S. Fish and Wildlife Service reported that larger

FIGURE 4.1.6-9
GENERAL LOCATIONS OF KNOWN GROUSE LEKS (SITE 23)



○ Sage Grouse Lek

✻ Sharp-tailed Grouse Lek

flocks were observed in association with principal drainage areas (1979). Sage grouse populations within the general area of the candidate plant site appear to be low with most activity observed near known grouse leks (Figure 4.1.6-9) which are associated with the sagebrush-grass habitat type (BIA, 1981). (Reference 8).

The Merriam's turkey occurs mainly in the Wolf Mountains and foothills where adequate stands of ponderosa pine are present. Grasses, deciduous brush, and ponderosa pine in openings and drainages appear to be important habitat components. Turkeys have also been reported with the general area of the proposed plant site with most sightings occurring along Little Youngs Creek and Youngs Creek.

The gray (Hungarian) partridge is known to occur within the general area although its present population status is unknown. Its preferred habitat appears to be associated with agricultural areas; therefore, populations along the Little Bighorn River and adjacent agricultural areas could be high. Although agricultural areas appear to provide a majority of their essential habitat, most sightings of gray partridge within the general area of the proposed plant site occurred within the sagebrush-grassland vegetative type (Coenenberg and DePuit, 1979; VTN, 1979). (References 15, 78).

Blue grouse and ruffled grouse, both commonly referred to as "forest grouse," occur in the mountainous portions of the reservation. Blue grouse prefer the ponderosa pine/douglas-fir type while ruffled grouse prefer the dense cover of the mixed conifer and deciduous trees. Although the present status of both species is unknown, occurrences within the possible area of impact are probably limited to available habitat in the Wolf Mountains.

Waterfowl and Shorebirds. Ducks, snipe, and great blue herons are just a few of the common birds associated with ponds and watercourses located within the general area. Mallards are common users of most water systems and ponds particularly during spring and fall migrations. The Little Bighorn River and its major tributaries and associated agricultural areas, particularly grain fields, provide adequate habitat for waterfowl and shorebirds. Other common waterfowl species reported within the

general area include the blue-winged teal, northern shoveler, common merganser, lesser scaup, ring-necked duck, gadwall, bufflehead, goldeneye, Canada goose, and double-crested cormorant.

Raptors. Birds of prey are fairly common in the general area. Twenty raptorial species have been reported within the general area of the candidate plant site (BIA, 1981). Golden eagle nesting has been documented within the general area with densities probably dependent on the availability of prey species. Other raptors reported to breed within the potential area of impact include the red-tailed hawk, Cooper's hawk, prairie, falcon, American kestrel, Swainson's hawk, marsh hawk, goshawk, Great-horned owl, and long-eared owl. (Reference 8).

Passerine Birds. The variety and diversity of habitat types present within the possible area of impact make species of this category the most common and abundant of all bird species present within the general area. VTN reported that densities within the general area of the proposed plant site were highest in the riparian and ponderosa pine habitats which also recorded the highest habitat diversity values (1979). Populations within the Little Bighorn River drainage probably also are high since habitat is quite diversified, consisting of large acreages of riparian and agricultural type, interspersed with shrubs and grasslands.

Amphibians and Reptiles

Amphibians occurring within the general area normally will be restricted to ponds, watercourses, and other water-associated areas. The following species have been documented as occurring within the general area of the candidate plant site: the painted turtle, snapping turtle, tiger salamander, leopard frog, chorus frog, and the Plain's spadefoot toad. Amphibians are probably quite common in suitable habitat found throughout the potential area of impact.

Reptiles common within the general area of the candidate plant site include the bullsnake, prairie rattlesnake, yellow-bellied racer, and three species of garter snakes: red-sided garter, Western plains garter, and the wandering garter. Common

lizards include the northern sagebrush lizard and eastern short-horned lizard. Undoubtedly, these species are representative of those that would be found throughout the potential area of impact. Increased densities of certain species are also likely, particularly within major drainages of the Little Bighorn River and associated agricultural lands.

Threatened and Endangered Species

Two species, including the bald eagle and the peregrine falcon, listed as endangered under the provisions of the Endangered Species Act of 1973, have been documented as occurring within the proposed area of impact. The bald eagle (Haliaeetus leucocephalus) winters throughout the state of Montana and occurs primarily along large rivers and lakes. The Bighorn River could be classified as an important wintering area for bald eagles since numerous sightings along this river have been documented (USFWS, 1979, 1980, and 1981). Although bald eagles are known to breed within the region of Montana that includes the Crow Reservation, no nesting sites have been identified (BIA, 1981). However, bald eagles utilize the proposed area of impact as part of their natural hunting and feeding territory, particularly during winter months. VTN Wyoming Inc. reported the presence of two bald eagles within the general area of the proposed plant site in March 1979 (1979). (References 8, 71, 72, 73, 74, 78).

Flath (1979, in BIA, 1981) reported that the peregrine falcon (Falco peregrinus anatum) is known to breed within the southwest portion of Montana that includes the Crow Reservation. Although no peregrines were observed during the past several years of studies conducted by various agencies (BIA 1981), the possibility exists that the peregrine may utilize the area of impact, particularly those areas associated with agricultural and riparian type habitat, since prey species (passerine birds, waterfowl, and shorebirds) important to the peregrine are associated with these areas. (References 8, 9).

VTN (1979 and 1980) and Coenenberg and DePuit (1979) have documented the occurrence of potential habitat for the endangered black-footed ferret (Mustela

nigripes) within the proposed plant site (Figure 4.1.6-8). Although various black-tailed prairie dog towns within this general area have been surveyed for signs of the ferret, none have been found. However, this does not preclude the possibility that ferrets may inhabit this general area. (References 15, 78).

Fisheries

Principal fisheries within the general area of the proposed plant site consist of the Youngs Creek and Squirrel Creek drainages, both tributaries of the Tongue River. The major fisheries along the proposed pipeline right-of-way are the Little Bighorn River and the Owl Creek, a tributary of the Little Bighorn River.

Young's Creek Drainage. Youngs Creek and Tanner Creek are perennial streams that originate in the southeastern portion of the Wolf Mountains (Figure 4.1.6-3) and drain into the Tongue River. Principal fish species occurring within this drainage are composed largely of the minnow and sucker families. Wesche and Johnson reported that the white sucker and mountain sucker were the most common since they comprised 32.6 percent and 27.2 percent, respectively, of all species sampled in Ash Creek and Youngs Creek (1981). The USFWS also reported high occurrences of suckers in Youngs Creek with white suckers accounting for 75 percent of all species sampled (1980). Brook trout apparently are limited to the upper reaches of Youngs Creek where they occur in low numbers. The white sucker and lake chub are the principal species found in Tanner Creek; they comprise 55 percent and 33 percent, respectively, of all species occurring (VTN Wyoming, Inc., 1977). The long-nosed dace and the fathead minnow are the only other species known to occur. (References 74, 77).

Squirrel Creek Drainage. Major tributaries within this system include Squirrel Creek and Dry Creek. Both originate in the southeastern portion of the Wolf Mountains and drain into the Tongue River. Since data on these two streams are almost nonexistent, surveys will be necessary to determine the status of the fisheries within this drainage. However, the same species present within the Youngs Creek drainage system may also occur.

Tongue River. Although information on the Tongue River fisheries from the Wyoming-Montana state line downstream to the Tongue River Reservoir is limited, available information reported the occurrence of cold-water species (brown trout, rainbown trout, mountain whitefish), cool-water species (sauger, smallmouth bass, northern pike), and warm-water species (black bullhead) (Wesche and Johnson 1981). The most common fish species include the white sucker, northern redhorse, longnose sucker, carp, and longnose dace. Population levels appear to be maintained by natural reproduction and, with the exception of the trout species and mountain whitefish, spawning activity is occurring from Monarch downstream to the Wyoming-Montana state line. A total of 23 species were reported within the area studied. The BIA reported that, downstream from the state line just above the Tongue River Reservoir, 14 species were collected from a 2.5-mile section of the river (1981). Shorthead redhorse and carp were the species most commonly collected. Sauger and smallmouth bass were the only gamefish encountered.

Little Bighorn River. The Little Bighorn originates in the northeast portion of the Bighorn Mountains of Wyoming and flows northward through the Crow Reservation to its confluence with the Bighorn River (Figure 4.1.6-3). Although information is limited, the upper sections within the reservation contain self-sustaining populations of brown, brook, and rainbow trout. As the river flows northward and tributaries enter, turbidity levels and water temperatures increase and the cold-water fishery habitat of the upper reaches changes to that of a cool-water habitat in the lower reaches (USFWS, 1980). Major trout fisheries within the Little Bighorn drainage are generally confined to Lodge Grass Creek, Twin Creek, and Pass Creek which have been classified by the Montana Fish and Game Department as "very good trout waters—fisheries of statewide importance" (Rocky Mountain Research Corporation, 1977). Owl Creek, another major tributary to the Little Bighorn River, has not yet been surveyed and sampling will be required to determine the extent of the fisheries within this creek. Incidentally, Owl Creek is reported to have great potential as a fishery and fishermen have reported taking native trout from this creek (Alan Kelly, Personal Communication, 1982). (Reference 31).

4.1.7 Seismology

4.1.7.1 Background

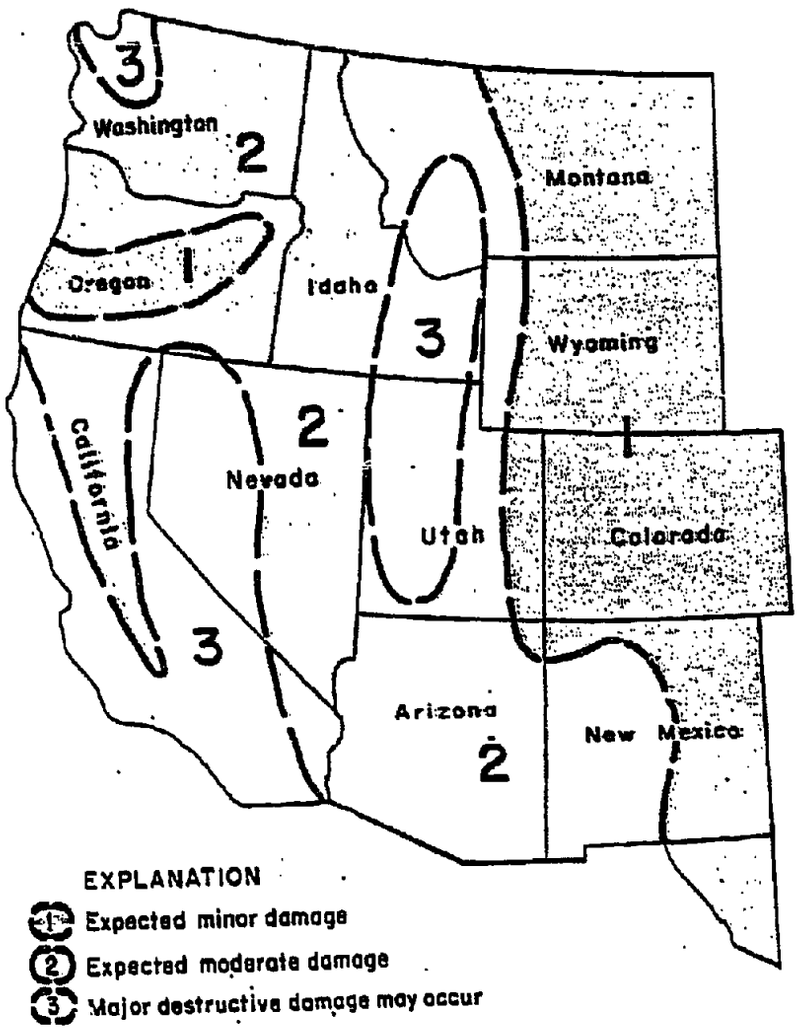
A literature search conducted for this study indicates that the seismology of the Crow Reservation has never been comprehensively investigated. This is primarily due to the fact that no major seismic activity has been recorded on tribal lands as evidenced by the seismic risk map of the western United States presented in Figure 4.1.7-1 (ESSA/Coast and Geodetic Survey, 1974). Figure 4.1.7-1 indicates the area encompassing the Crow Reservation as a Zone 1 (minimum risk, expected minor damage) earthquake risk area. Except for the southwestern section of the state which is considered a Zone 3 (high risk, major destructive damage may occur) area, Montana is shown in Figure 4.1.7-1 to be classified either as Zone 1 or Zone 2 (intermediate risk, expected moderate damage).

The present logarithmic scale for measuring the intensity or destructiveness of an earthquake—the Modified Mercalli Scale—was originally devised by the Italian seismologist, Mercalli, and later revised by C. F. Richter in 1956.

In physical terms, intensity is determined partly by the duration and number of jerks and tremors but mainly by the maximum rate of change of these movements of the ground; i.e., its maximum acceleration which can be estimated from seismograph records. Approximate values of acceleration associated with a specific Modified Mercalli Scale intensity are presented in Table 4.1.7-1. In the same units, the average acceleration of the earth's gravity (g) is 9,800 mm/s^2. When and where this value is exceeded (Intensity XII), the effects result in total destruction.

In 1935, C. F. Richter devised a different type of logarithmic scale for comparing the magnitudes of California earthquakes. Since then, his method has been widely extended and fruitfully developed. The magnitude of a tectonic earthquake is now defined so that it is closely related to the total amount of elastic energy released when the overstrained rocks suddenly rebound and so cause a shock. The relationship between the magnitude, M, and the energy release, E, is given by the equation

FIGURE 4.1.7-1
SEISMIC RISK MAP OF THE WESTERN UNITED STATES



Source: (ESSA/Coast and Geodetic Survey)

$$\log E = 11.8 + 1.5\ M.$$

For a magnitude of 8.6, only three times reached and once exceeded during the present century, E amounts to $10^{24.7}$ erg. The average annual release of energy from all earthquakes ranges from about 10^{25} erg to 10^{27} erg and 80 percent or more is generally accounted for by a few major shocks. For convenience of easy reference,some numerical values of magnitudes have been added to Table 4.1.7-1. It must, however, be clearly realized that the magnitude assigned to a given earthquake corresponds only to the highest intensity of that earthquake. A disastrous earthquake, for example, spreads outward from intensity X through all the lower intensities; but it has only one magnitude, which refers to the total energy set free by the shock. Since 1904 when seismograms first provided information from which magnitudes could be calculated, only a few shocks, including those of 1977 in China, have exceeded magnitude 8.4.

The approximate Richter magnitudes corresponding to the highest Modified Mercalli Scale intensities reached are also given in Table 4.1.7-1 for purposes of comparing the two relationships. Tectonic earthquakes are now classified as:

shallow: when the depth of origin (epicenter) is less than 60 to 70 km,

intermediate: when the epicenter is between 60 to 70 km and 300 km, and

deep: when the epicenter is more than 300 km, the maximum depth so far recorded being about 720 km; most deep earthquakes originate at 500 to 700 km.

4.1.7.2 Preliminary Seismic Evaluation of Candidate Site Areas

The seismic risks associated with the candidate site areas may be inferred to a limited degree from compilations of earthquake occurrences in this region of Montana, which are compiled and plotted by the National Geophysical and Solar-

TABLE 4.1.7-1

SCALE OF EARTHQUAKE INTENSITIES WITH APPROXIMATELY CORRESPONDING MAGNITUDES

Modified Mercalli Intensity	Description of Characteristic Effects	Maximum Acceleration of the mm/s^2	Richter Magnitude Corresponding to highest Intensity Reached
I	Instrumental: detected only by seismographs	10	3.5
II	Feeble: noticed only be sensitive people	25	to
III	Slight: like the vibrations due to a passing lorry; felt by people at rest, especially on upper floors	50	4.2
IV	Moderate: felt by people while walking, rocking of loose objects, including standing vehicles	100	4.3 to 4.8
V	Rather Strong: felt generally, most sleepers are awakened and bells ring		
VI	Strong: trees sway and all suspended objects swing; damage by overturning and falling of loose objects	250	4.9-5.4
VII	Very Strong: general alarm; walls crack; plaster falls	500	5.5-6.1
VIII	Destructive: car drivers seriously disturbed; masonry fissured; chimneys fall; poorly constructed buildings damaged	1000 2500	6.2 to
IX	Ruinous: some houses collapse where ground begins to crack, and pipes break open	5000	6.9
X	Disastrous: ground cracks badly, many buildings destroyed and railway lines bent; landslides on steep slopes	7500	7-7.3
XI	Very Disastrous: few building remain standing; bridges destroyed; all services (railways, pipes and cables) out of action; great landslides and floods	9800	7.4-8.1
XII	Catastrophic: total destruction; objects thrown into air; ground rises and falls in waves		8.1 (maximum known, 8.9)

Source: Homes, A. & D.: Principles of Physical Geology, 1978.

Terrestrial Data Center of the National Oceanic and Atmospheric Administration (NOAA). Figure 4.1.7-2 presents a plot of the 526 recorded earthquake histories from 1904 to 1982 for a land area covering a radius of 320 km (approximately 200 miles) from an origin located at Hardin, Montana (latitude 45.75°N, longitude 107.75°W). The two major candidate plant sites, Site 1 and Site 23, are also superimposed on Figure 4.1.7-2 to indicate relative distances from earthquake epicenters to each site. Only 21 earthquakes (4 percent) have been recorded east of longitude 109°W with a magnitude of less than 9.0 of which about 50 percent have a magnitude of less than 4.0, further substantiating the Zone 1 (minimum) seismic risk rating for this area as previously shown in Figure 4.1.7-1.

A detailed perusal of the complete compilation of earthquake histories presented in Appendix A-3, indicates a maximum magnitude equal to or greater than 6.0 and a maximum Modified Mercalli Scale intensity equal to or greater than VI only three times in the entire history of record. Two of these events are associated with seismic activity from the 1959 earthquake at Hebgen Lake Montana which was reportedly felt in an area of 600,000 square miles. The maximum magnitude of 6.5 and maximum intensity of VII for the entire area are very infrequent and generally can be felt over a distance of 70 to 125 miles based on the information presented in Table 4.1.7-2.

The nearest recorded earthquake to Site 1 is shown in Figure 4.1.7-2 to have been approximately 20 miles east and had a measured magnitude of less than 3.99. Similarly, several minor earthquakes with a magnitude less than 3.99 have been recorded within 10 to 20 miles of Site 23 as also shown in Figure 4.1.7-2.

As indicated in Section 4.1.2, Geology, the Site 1 location is bisected by a northeasterly-southwesterly trending fault approximately 5 miles in length. Since the geologic structure in this area is composed of the Niobrara and Carlile members of the Cody Shale Formation of the late Cretaceous period (65 to 100 million years ago) and the structural displacement is inferred to be less than 100 feet, the fault cannot be classified as capable, although it is recommended that additional test drill data be developed to substantiate this premise if Site 1 is selected for the coal

FIGURE 4.1.7-2
EARTHQUAKE HISTORIES, 1904-1982

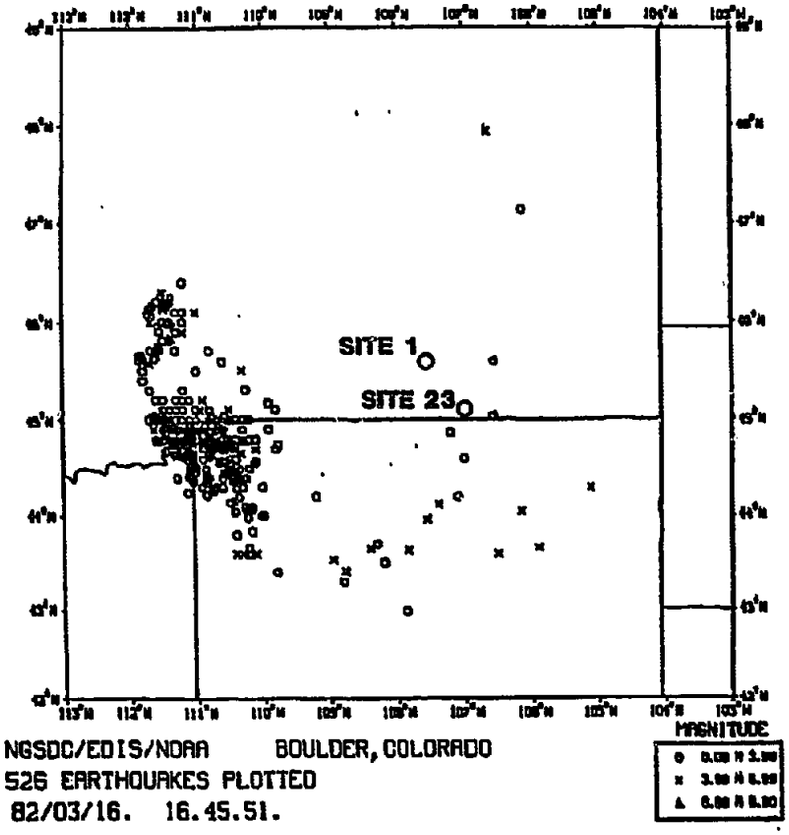


TABLE 4.1.7-2

SEISMICITY: APPROXIMATE RELATIONSHIPS

Magnitude	Expected Annual Incidence	Felt Area (mi^2)	Intensity (Maximum Distance Felt	Expected Modified Mercalli)
3.0-3.9	49,000	750	15	II-III
4.0-4.9	6,200	3,000	30	IV-V
		1 thousand tons of TNT 4.2×10^{19} ergs		
5.0-5.9	800	15,000	70	VI-VII
6.0-6.9	120	50,000	125	VII-VIII
		1 million tons of TNT $4.2 \times {}^{22}$ ergs		
7.0-7.9	18	200,000	250	IX-X
8.0-8.9	1	800,000	450	XI-XII

gasification plant. No major faults are known to occur in the Site 23 area, although a major northeasterly trending fault is inferred to cross the extreme southeastern corner of the area (sec. 11, T9S, R38E).

4.1.8 Cultural Resources

The cultural resources of the Crow Reservation, although not totally documented, are reported to be quite extensive in certain areas. Although a more detailed site- and corridor-specific investigation and analysis will be required to further document the extent of the cultural resources within the proposed areas of impact, basic information on the known archaeological and historic sites was provided by the Montana State Historic Preservation Office and the Bureau of Indian Affairs (1981). (References 9, 45).

4.1.8.1 Historical Account of the Crow Indian Reservation

The following account provided by a tribal member describes in general the history of the Crow Indians.

> The Crows are of Siouan origin but had broken away from their ancestral group (Hidatsa) and settled along the valleys of the Yellowstone and Bighorn long before the coming of the white man. This tribe was originally called Absarokee which means "Children of the large beaked bird," probably the raven.
>
> The Absarokee Tribe evolved through several states of cultural development. The early ancestors who lived in the eastern forests practiced agriculture and achieved a fairly high level of civilization. As they were pushed westward, they gradually became more and more dependent upon the hunt. By the time of their settlement on the plains, their agricultural pursuits were limited to the planting of corn and squash. Soon after their separation from the main tribe (probably somewhere in what is now North

and South Dakota), the Absarokee abandoned agricultural ways and became a nomadic people. (USGS, 1976). (Reference 76).

The Crow Indians eventually acquired the horse (presumably from the Shoshone Indians) which allowed them to pursue buffalo herds and defend their vast territories (bounded by the Powder River on the east, the Wind River Range on the south, the Rocky Mountains on the west, and the Missouri River on the north) against the encroachment of other tribes including the Sioux, Cheyenne, and Arapaho.

During the period from the mid-1700s to the early 1800s, the Crow Indians established friendly relationships with fur traders and signed a Treaty of Friendship with the United States in 1825. The Fort Laramie Treaty of 1851 originally gave the Crow Tribe legal title to 38 million acres; however, subsequent treaties and acts of Congress reduced the original Crow Territory to less than 2.3 million acres.

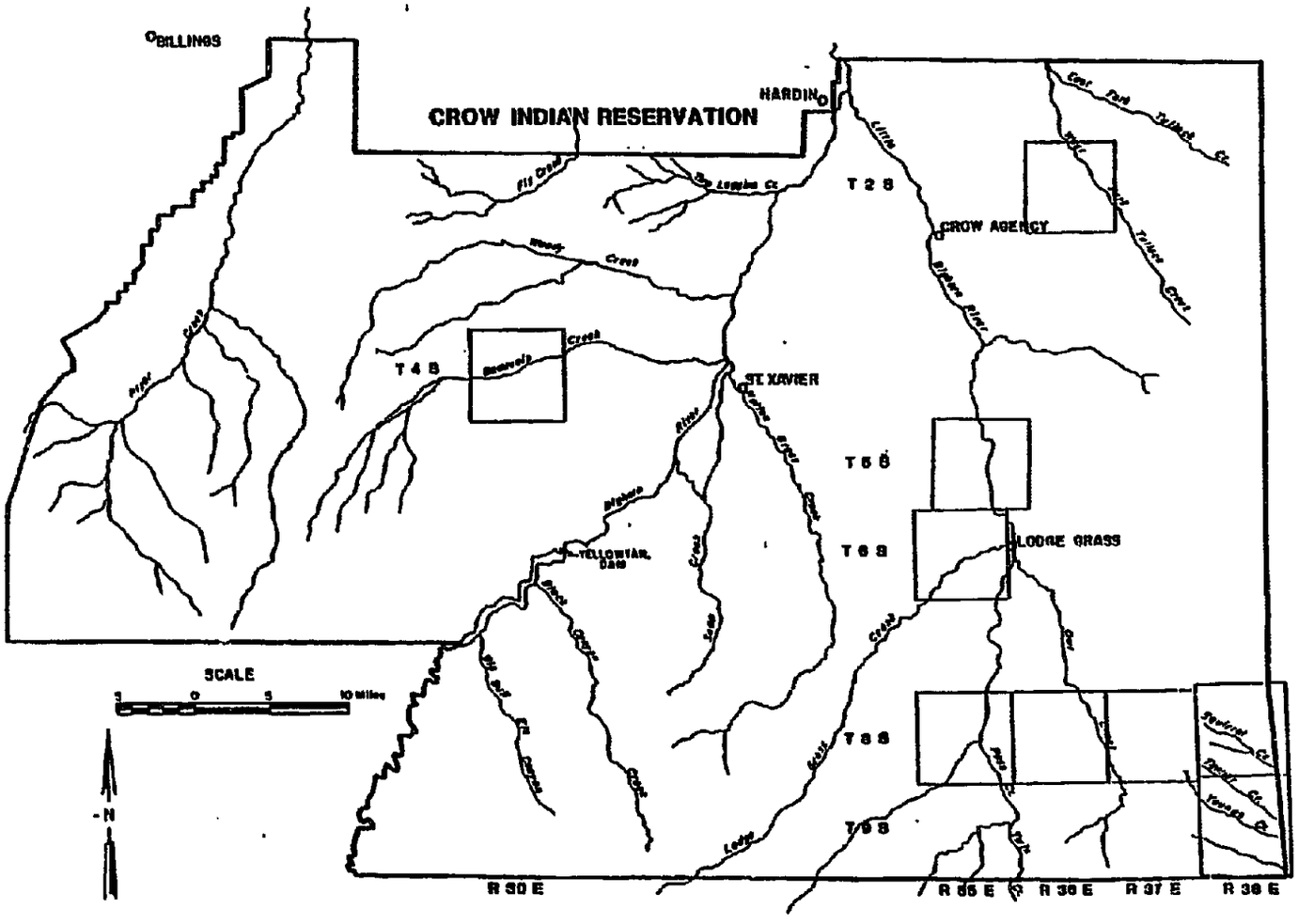
The reservation headquarters was established at its present day location at Crow Agency in 1884 and habitation by Crows of the eastern area began. The Crows living in the general vicinity of present-day Hardin hunted deer and antelope and grazed their livestock in the fertile valleys of the Bighorn and Little Bighorn rivers.

Non-Indian settlers soon saw that these areas were ideal for grazing livestock and, by 1890, large sheep and cattle companies and individual livestock owners began competing for reservation grazing permits. Eventually, Big Horn County was established in 1913 and habitation by non-Indians continued at a rapid pace until about 1940.

4.1.8.2 Archaeological, Traditional, and Historical Sites

Figure 4.1.8-1 illustrates the general locations of known cultural sites within or adjacent to the proposed area of impact. However, this figure does not represent the total extent of cultural resources but is only a small sample of what may be found throughout the project area. Site- and corridor-specific field investigations will be required to fully document the extent of these resources.

FIGURE 4.1.8-1
GENERAL LOCATIONS OF KNOWN CULTURAL SITES WITHIN THE PROPOSED AREA OF IMPACT



Within the proposed area of impact, 46 archaeological sites have been recorded. These consist largely of occupational and buffalo jump sites. Other sites recorded include rock cairns, tipi rings, fortifications, lithic scatters, surface stone quarries, workshops, and transient campsites. Of the 46 documented sites, five have been recorded within the immediate vicinity of Site 23 and the remaining 41 sites are scattered within or adjacent to the proposed corridors. The potential for the occurrence of additional archaeological sites within or adjacent to Site 1 and throughout the unsurveyed portions of the proposed corridors is high, when considering past and recent discoveries (257 documented sites) within the general region. Listed below are sites, structures and districts of historic, archaeological and cultural significance which are found within the proposed project region. The first five are listed on the National Register (Montana State Historic Preservation Office, 1982). (Reference 45).

(1) Fort C. F. Smith Historic District, 40 miles southeast of Hardin.

(2) Bighorn Canal Headgate, near Fort Smith.

(3) Custer Battlefield (Battle of the Little Bighorn) National Monument, 14 miles southeast of Hardin.

(4) Superintendent's Lodge at Custer Battlefield.

(5) Owl Creek Site (24BH2023), south of Lodge Grass.

(6) St. Xavier Mission, 18 miles south of Hardin.

(7) Trinity Free, near St. Xavier.

(8) Hayfield Fight Site, near Fort Smith on Bighorn River.

(9) Crow's Nest, 15 miles southwest of Busby at the headwaters of Davis Creek.

(10) Custer's last campsite, at Busby.

(11) Crow Agency III, 11 miles southeast of Hardin at Crow Agency.

(12) Sword Bearer incident, near Crow Agency.

(13) Yellowstone Expendition Fights, in vicinity of Lodge Grass.

(14) Fort Custer, 3 miles east of Hardin.

(15) Bozeman Trail.

Further discussions on the cultural resources of the general region can be found in the Crow Tribe's Abandoned Mine Lands Reclamation Plan, Final Report, September 1980, and the Crow/Shell Coal Lease Final EIS, October 1981.

The Crow Tribe will continue to identify and preserve areas sacred to its tradition and culture. Two areas (tribal lands) in the Bighorn Mountains and Pryor Mountains, were designated as restricted to use by tribal members in the Crow Land Use Zoning Ordinance (BIA, 1981). A quote from the Crow Tribe's abandoned Mine Lands Reclamation Plan summarizes the Crow's attitude about the cultural resources of their reservation. (Reference 9).

> Although an area may not be listed on the National Register of Historic Places, it may have a special place in the hearts of the Crow people for its intrinsic beauty, for its clean water, for its abundance of game and many other unwritten reasons.

Consultation with Crow tribal members will be required to fully and adequately document the presence and extent of sites significant to the culture and tradition of the Crow people.

4.2 JURISDICTION ISSUES

The question of jurisdiction over energy development on Indian reservations is concerned with whether, and under what circumstances, various governmental entities—tribal, federal, state, and county—have the legal authority to impose regulation. Jurisdiction is likely the most complex area of Indian law and is certainly among the most intricate subjects in American law generally. The complexity of the subject is attributable to two factors. First, the resolution of jurisdictional questions depends largely on the facts of each case, making generalizations and prediction of results very difficult. Second, in recent years the U.S. Supreme Court has issued a number of opinions in the area lacking any clear analytical framework, "leaving in their wake a turbulent backwater of confusing decisions that necessarily engender not only further litigation but on-going tensions between the states and Indian tribes," according to a leading authority.

A number of jurisdictional issues that may arise during the construction and operation of a coal gasification plant on the Crow Reservation are identified below. The discussion does not purport to present an opinion on whether various governmental entities have the legal authority to regulate the plant. Such an opinion, to be useful, would have to be based on an awareness of all facts connected with the construction and operation of the facility including, for example, the facility's ownership structure, financing, precise location, and off-reservation effects; at this early stage, such facts are still unknown. To the limited extent possible in light of the paucity of facts, the discussion attempts to identify some general principles of jurisdiction.

This identification of issues and general principles is intended to promote planning of the facility in a manner that avoids jurisdictional conflicts. As discussed below, there are ways in which the construction and operation of the facility can be structured to minimize jurisdictional overlap. Such informed structuring should ultimately simplify the environmental review process by allowing clearer identification of those permits that are necessary and perhaps by reducing the

number of necessary permits.

4.2.1 Application of Federal Environmental Statutes and Regulations to Activities on Indian Reservations

Several federal environmental statutes (such as the Federal Water Pollution Control Act, the Solid Waste Disposal Act, and the Surface Mining Control and Reclamation Act) are applicable to Indians or Indian lands. Others, such as the National Environmental Policy Act, make no specific mention of Indians or Indian lands. Regardless of whether a federal environmental statute refers to Indians or Indian lands, however, the statutes will generally be applied to reservations regardless of the classification or ownership of the land; e.g., land held in trust by the United States for the tribe, or land held in fee by non-Indians. As the Supreme Court has stated, "It is now well settled in many decisions of this Court that a general statute in terms applying to all persons includes Indians and their property interests." In order to avoid compliance with a federal statute, Indians must ordinarily be expressly excluded from the statute's coverage or specifically exempted by treaty from the type of regulation that the statute implements.

The federal government's power to apply its environmental statutes to activities on Indian reservations is rooted in the Constitution's grant of exclusive authority to the federal government to regulate commerce with Indian tribes. The "Indian commerce clause" has been construed broadly to apply to far more than what would ordinarily be regarded as "commercial" dealings with Indian tribes. It has been invoked to make legitimate Congress' regulation of (1) non-Indians, the states, and the federal government in their relations with individual Indians and Indian tribes; (2) individual Indians both on or off the reservation; and (3) Indian tribes in their relations with each other, the federal government, the states, and non-Indians.

Although there may be some limitations on the federal government's constitutional authority to regulate the purely internal affairs of an Indian tribe, those limitations, if they were to be judicially recognized at all, would likely not be applied to federal

regulation of environmental matters on Indian reservations. Those matters have almost inexorable effects on non-Indians and on off-reservation locales and would, therefore, appear to fall squarely within the "Indian commerce clause." As a matter of practice, federal environmental statutes and their implementing regulations have regularly been applied to projects on Indian reservations.

4.2.2 Application of State Environmental Statutes and Regulations to Activities on Indian Reservations

Historically, federal law protected the autonomy of the Indian tribal community as a separate sovereignty from competing claims to authority asserted by state governments. This protection found expression in the Supreme Court as early as 1832 when Chief Justice Marshall, in the landmark case of Worcester v. Georgia, indicated that federal law preempted state law in Indian country over both Indians and non-Indians. Throughout the 1800s and well into the 1900s, the Supreme Court acted to insulate the sovereignty of tribal communities from the encroachment of state authority. Until recently, the only exception to the inapplicability of state law in Indian country involved situations in which the exercise of state authority affected neither Indians nor Indian interests.

In the past decade, however, the Supreme Court has weakened the protection afforded tribal communities against incursions of state authority. A series of conflicting and confusing decisions has authorized substantial state jursidiction over certain activities on Indian reservations. No clear rules emerge from these cases, which has produced, in one commentator's words, "a hodgepodge jursdictional terrain without . . . any clear roadmap to its survey." Perhaps the most that can be said about the current law of state jurisdiction over reservation activities is that the question of state authority is subject to a "sliding-scale" analysis. The more purely "Indian" that on-reservation activities are, the less likely a court will recognize the assertion of state jurisdiction; the more "non-Indian" attributes that reservation activities have, the more likely a court will uphold the exercise of state jurisdiction. The discussion below follows this sliding-scale analysis.

4.2.2.1 Indian Activities on Reservations

Activities conducted only by tribal Indians within reservation boundaries enjoy the strongest protection from the exercise of state jurisdiction. In such situations, it has generally been recognized that, unless federal law expressly confers jurisdiction on the state, the state is without power over reservation Indians and their property. Federal law establishing a reservation is held to preempt the state from regulating any tribal activities conducted there.

In the case of the Crow Reservation, federal preemption of state jurisdiction can be supported by treaty provisions and by federal statute. The Second Treaty of Fort Laramie, ratified in 1868, initially established the Crow Reservation. By the terms of article 2 of the treaty, the United States agreed that the reservation "shall be set aside for the absolute and undisturbed use and occupation" of the Crow Tribe, and that no non-Indians "shall ever be permitted to pass over, settle upon, or reside in" the reservation. Furthermore, the Enabling Act of 1889, by which Montana was admitted to the Union, provided that, as a condition of admission, the people of the state had to agree that they would "forever disclaim all right and title to . . . all lands lying within state limits owned or held by any Indian or Indian tribes; . . . and said Indian lands shall remain under the absolute jurisdiction and control of the Congress of the United States." The Supreme Court has held that similar provisions in other treaties and federal statutes preclude the extension of state law to tribal Indians on a reservation. Furthermore, Congress has not, by legislation, expressly conferred state civil regulatory jurisdiction over Crow activities on the Crow Reservation. The Supreme Court has held that one federal statute, Section 6 of the General Allotment Act, which might appear to have conferred state civil jurisdiction over reservation lands owned in fee by Indians, does not do so. To apply state law to Indian activities on fee lands within a reservation, but not to apply state law to Indian activities on nonfee lands within the reservation would, the Court said, result in "an impractical pattern of checkerboard jurisdiction . . . contrary to the intent embodied in the existing federal statutory law of Indian jurisdiction."

Purely Indian activities conducted on lands located within the reservation boundary, regardless of the character of the particular lands involved, enjoy strong protection from the assertion of state regulatory authority. Inasmuch as the proposed coal gasification plant will likely involve activities by non-Indians on the Crow Reservation, such strong protection may not be available and it may be necessary to use one of the methods of analysis described below to determine the limits of state jurisdiction.

4.2.2.2 Activities Involving Non-Indians on Reservation Trust Lands

The construction and operation of a facility on a reservation involving non-Indians might nevertheless enjoy some immunity from state jurisdiction if the facility were located exclusively on land held in trust by the United States for members of a tribe or for the tribe itself. This protection might result from the special status of trust land as a federal instrumentality held to effect the federal policy of Indian advancement, not to be burdened or interfered with by the state. In essence, the argument would be that the uniquely federal nature of trust lands preempts the exercise of state jurisdiction over the land itself (the application of state authority to actions on the land, for example, by requiring that the operations of a power plant comply with state safety standards rather than to the land itself would probably not be subject to this preemption analysis).

To the extent that a state would seek to regulate the development of trust land as, for example, through the application of a siting statute, a regulation promulgated by the Secretary of the Interior, 25 C.F.4.S 1.4, would add force to the preemption agrument. That regulation provides, in pertinent part, as follows.

> Except as authorized by the Secretary of the Interior or his representative, none of the laws, ordinances, codes, regulations, rules or other regulations of any State or political subdivision thereof limiting, zoning or otherwise governing, regulating, or controlling the use or development of any real property, including water rights, shall be applicable to any such property leased from or held or used under agreement with and belonging to any

Indian or Indian tribe, land, or community that is held in trust by the United States. . . . (emphasis added)

On those reservations where the Secretary has not authorized the application of state laws governing development to trust land, such as the Crow Reservation, this regulation is an indication that the state is preempted from applying such laws. It should be noted, however, that the validity of this regulation has been questioned by some courts and commentators. In addition, any argument making the ineffectiveness of state regulation depend on the trust status of particular reservation lands at issue raises the generally undesirable spectre of "checkerboard" jurisdiction, where the existence or nonexistence of state authority varies with "the ownership of particular parcels of land" on the reservation. And finally, if a state would seek to regulate matters on trust lands other than "the use and development of real property," the regulation would, by its terms, be inapplicable.

4.2.2.3 Activities Involving Non-Indians on Nontrust Reservation Lands

The Supreme Court has developed "two independent but related barriers" to a state's exercise of regulatory powers over non-Indians and their property within Indian reservations. First, the exercise of state authority may be preempted by federal law. Second, the assertion of state regulatory authority may infringe on the tribe's right of self-government.

Preemption. In determining whether the exercise of state authority is preempted by federal law, the "firm federal policy of promoting tribal self-sufficiency and economic development" must serve as a backdrop to the analysis. It is not necessary that a federal statute explicitly preclude the operation of state law; "it is enough that the state law conflicts with the purpose or operation of a federal statute, regulation, or policy." Preemption analysis requires a "particularized inquiry into the nature of the state, federal, and tribal interests at stake" to determine whether the exercise of state authority would be inconsistent with federal law.

The U.S Court of Appeals for the Ninth Circuit recently invoked preemption analysis to hold that the policy underlying the Mineral Leasing Act of 1938 might be "substantially thwart(ed)" by, and thus preempt, Montana's imposition of its severance and gross proceeds taxes on coal mined by non-Indians on the Crow Reservation, and on coal mined by non-Indians from deposits held in trust for the tribe. The court emphasized that an important objective of the Mineral Leasing Act was to encourage tribal economic development, and that the magnitude of the tax that Montana sought to impose would prevent the tribe from receiving "a large portion of the economic benefits of its coal." The court also noted that the regulatory aspects of the tax conflicted with the Mineral Leasing Act's purpose of allowing tribes to control the development of their mineral resources.

The Ninth Circuit's approach illustrates how all state attempts to regulate reservation activities involving non-Indians should be analyzed for preemption purposes. All federal treaties, statutes, regulations, and policies dealing with the particular reservation and activity at issue should be closely scrutinized to determine whether the attempted state regulation presents a conflict. The more pervasive the federal regulation of the activity and the stronger the federal policies involved, the more likely that the exercise of state authority will be preempted.

Preemption analysis requires an individualized analysis of each state statute sought to be applied. One state statute may be preempted by federal law, while other state statutes are not.

Infringement. The second test for determining the propriety of state regulation of non-Indian activities on Indian reservations analyzes the impact of the regulation on tribal self-government. Even if federal treaties and statutes, viewed against the backdrop of tribal sovereignty, do not preempt the attempted state regulation, the regulation will nevertheless be invalid if it "infringe(s) on the right of reservation Indians to make their own laws and be ruled by them." Interference with tribal self-government has been found when state regulation threatens a tribe's self-sufficiency.

In Crow Tribe of Indians v. Montana for example, the Ninth Circuit indicated that, if the imposition of Montana's severance and gross proceeds taxes on coal owned by the Crow Tribe resulted in a "substantial incursion into revenues obtained from the sale of the Indians' land-based wealth," cutting "to the heart of the Tribe's ability to sustain itself," then the tax would infringe on the tribe's right to govern itself. In another case, the Ninth Circuit has suggested that state interference with tribal control over the "timing and scope of the development of tribal resources" might also constitute impermissible infringement.

> (T)ribal use and development of tribal . . . property presently is one of the main vehicles for the economic self-development necessary to equal Indian participation in American life. Extension of local jurisdiction to the reservation would burden that development by increasing its cost . . . . But more critically, subjecting the reservation to local jurisdiction would dilute if not altogether eliminate Indian political control of the timing and scope of the development of reservation resources, subjecting Indian economic development to the veto power of potentially hostile . . . non-Indian majorities.

Where a tribe has implemented its own system of regulating reservation lands by enacting zoning, land use, or reclamation ordinances, a particularly strong argument can be made that the application of different state standards would constitute an impermissible infringement on tribal self-government. This is because, simply as a matter of orderly and consistent development, only one set of land use regulations can be applied to a particular parcel of land. Effective land use regulation must be comprehensive and systematic; the application of different regulatory schemes reflecting different values and goals would defeat the very purpose of regulation. An infringement argument on these grounds loses force if the tribe has not acted comprehensively to regulate land-use development.

If a state regulation infringes on the right of reservation Indians to govern themselves, then the regulation cannot be applied regardless of the involvement of non-Indians in the activity sought to be regulated and, apparently, regardless of the

off-reservation effects of the activity. The U.S. Court of Appeals for the Tenth Circuit recently observed that a state cannot regulate ecological effects beyond reservation boundaries in a manner that interferes with on-reservation activities and tribal self-government, just as a state cannot regulate activities in another state having ambient effects.

Infringement analysis, like preemption analysis, requires an individual study of each state statute sought to be applied. Simply because one state environmental statute infringes on the right of reservation Indians to govern themselves does not mean that another, different environmental statute has the same infringing effect.

4.2.2.4 Activities on the "Ceded Land" Adjoining the Crow Reservation

In 1904, the Crow Tribe ceded its interest in the surface estates of more than one million acres of reservation land to the United States. This land, which formerly constituted the northern portion of the reservation, was opened to non-Indian entry and settlement, and surface interests were conveyed to non-Indians. The rights to minerals underlying the ceded land, were retained in trust for the Crow Tribe by the United States. However, the U.S. Court of Appeals for the Ninth Circuit held twice in 1981, with minimal analysis, that "the ceded area is not a part of the reservation." The courts indicated that, as a result, the state of Montana might exercise regulatory responsibilities over activities on the surface; in one case, the court held that Montana could exercise jurisdiction over crimes committed by a tribal member in the ceded area.

Limits on state regulatory authority in the ceded area might nevertheless arise from the trust status of the mineral estate in the area. Insofar as the state seeks to regulate the mineral estate, the attempted regulation should be subject to the same analysis applied in assessing state jurisdiction over activities on Indian reservations. For example, if non-Indians are involved in developing the mineral estate in the ceded area, state regulation of their activities should be precluded if either (1) the exercise of state authority is preempted by federal law, or (2) the assertion of state regulatory authority would infringe on the tribe's right of self-government. In the

case of non-Indian activities in the ceded area governed by the Mineral Leasing Act of 1938, a strong argument can be made that federal regulation sweeps so broadly that any state involvement in Indian mineral leasing is preempted. In Crow Tribe of Indians v. Montana, the Ninth Circuit court was receptive to such a preemption challenge to the application of Montana's coal severance and gross proceeds taxes on coal mined by non-Indians in the ceded area.

These potential preemption-infringement problems with the exercise of state jurisdiction in the ceded area apply only to state regulation on the mineral estate. Insofar as the state would regulate the surface estate itself or activities on the surface, such regulation would, under applicable judicial precedents, generally be permissible.

4.2.2.5 Summary

The foregoing discussion illustrates the sliding-scale analysis applied in assessing whether a state has jurisdiction over activities on reservations or on certain other Indian lands. From this discussion, the following guidelines emerge.

The more exclusively Indian the activities sought to be regulated are, the less likely a state may assert jurisdiction. Activities conducted exclusively by Indians on reservation lands enjoy the strongest protection from the exercise of state regulatory authority.

Activities on lands held in trust by the United States for a tribe or for individual Indians may enjoy special federal protection against state regulatory incursions, even if non-Indians are involved in those activities.

Activities involving non-Indians on nontrust reservation lands may not be regulated by a state if state regulation is preempted by federal law or if the exercise of state authority would infringe on a tribe's right of self-government.

Infringement on a tribe's right of self-government might be demonstrated by showing that attempted state regulation threatens a tribe's self-sufficiency or interferes with tribal control over the timing and scope of the development of tribal resources.

Infringement on a tribe's right of self-government might also be demonstrated by showing that the tribe has adopted its own regulatory scheme for the orderly and consistent development of tribal lands and that attempted state regulation undermines the tribe's regulatory system.

In the special case of the ceded area adjoining the Crow Reservation, state regulation of the mineral estate could be preempted by federal law.

4.2.3 Application of County Environmental Regulations to Activities on Indian Reservations

The power of county governments to regulate activities on Indian reservations is wholly derived from the power of the state to regulate such activities on Indian reservations, the identical rules set forth above for assessing the limits of state jurisdiction apply (a state may, as permitted by the state constitution, impose limits on the exercise of county jurisdiction over activities on Indian reservations beyond the limits imposed by federal law).

Regardless of the potential power to regulate activities on Indian reservations, many county governments, as a matter of policy, do not enforce ordinances on Indian reservations or they specifically exclude reservation lands from the reach of county ordinances. It is important to evaluate the geographic application and enforcement of county ordinances even as they apply to reservation activities.

4.2.4 Application of Tribal Environmental Regulations to Activities on Indian Reservations

Indian tribes have long been recognized as "unique aggregations possessing attributes of sovereignty over both their membes and their territory." The doctrine of inherent tribal sovereignty was articulated by Chief Justice John Marshall in Worcester v. Georgia, and was reiterated throughout the 1800s. In United States v. Kagama, for example, the Supreme Court noted that Indians

> were, and always have been, regarded as having a semi-independent position when they preserved their tribal relations; not as states, not as nations, not as possessed of full attributes of sovereignty, but as a separate people, with the power of regulating their internal and social relations.

In recent years, the Supreme Court has stated that the inherent powers of tribal self-government "involve only the relations among members of a tribe" and do not extend to "the relations between an Indian tribe and nonmembers of the tribe." The court has repeatedly acknowledged that a tribe retains the power to regulate nonmembers when they are on land within reservation boundaries belonging to the tribe or held by the United States in trust for the tribe. But in the criticized case of Montana v. United States, the Supreme Court restricted tribes' exercise of sovereign authority over nonmember activities on fee land held by non-Indians within the boundaries of an Indian reservation. The Court held that, where nonmembers' activities on fee lands held by non-Indians bear no clear relationship to tribal self-government or internal relations, general principles of tribal sovereignty do not authorize a tribe to regulate those activities. Montana v. United States thus appears to establish a checkerboard of tribal authority over nonmembers on a reservation, depending on the status of the lands on which the nonmembers are located, in direct contradiction of Supreme Court precedents that ridicule the concept of checkerboard jurisdiction.

As far as the application of tribal environmental regulations to activities on reservations is concerned, however, Montana v. United States appears to leave room for the exercise of tribal authority over non-Indians as well as Indians. The case

explicitly recognizes the continuing validity of tribal sovereignty over all tribal members, and over non-members on land belonging to the tribe or held in trust by the United States for the tribe. Furthermore, the case indicates that tribes retain important lands within the reservation boundary.

> To be sure, Indian tribes retain inherent sovereign power to exercise some forms of civil jurisdiction over non-Indians on their reservations, even on non-Indian fee lands. A tribe may regulate, through taxation, licensing, or other means, the activities of non-members who enter consensual relationships with the tribe or its members, through commercial dealing, contracts, leases, or other arrangements . . . . A tribe may also retain inherent power to exercise civil authority over the conduct of non-Indians on fee lands within its reservation when that conduct threatens or has some direct effect on the political integrity, the economic security, or the health or welfare of the tribe.

The U.S. Court of Appeals for the Ninth Circuit has recognized in two recent cases that the language in Montana v. United States permits tribes to regulate water use by non-Indians who own land within a reservation. Non-Indians' use of water on the reservation, the Ninth Circuit court said, "has the potential for significantly affecting the economy, welfare, and health" of a tribe. "Such conduct, if unregulated, could increase water pollution, damage the ecology of (tribal water), interfere with treaty fishing rights, or otherwise harm (tribal water), which is one of the most important tribal resources."

Montana v. United States thus would permit a tribe to apply tribal environmental regulations to non-Indians on a reservation under three separate circumstances: (1) the non-Indians are engaged in activities on land belonging to the tribe or held by the United States in trust for the tribe; (2) as should almost always be the case, the non-Indians all entering into "consensual relationships with the tribe or its members, through commercial dealings, contracts, leases, or other arrangements"; and (3) as should also frequently be the case, the nonmembers' activities threaten or have some direct effect on "the political integrity, the economic security, or the health or

welfare of the tribe." Despite the decision in Montana v. United States, the doctrine of tribal sovereignty appears to allow effective reservation enforcement of tribal environmental regulations against Indians and non-Indians alike.

4.2.5 Conclusion

Two relatively clear principles emerge from the preceding discussion of jurisdictional issues: (1) the federal government generally has pervasive authority to enforce federal statutes on reservations; and (2) inherent tribal sovereignty should permit the application of tribal environmental statutes to Indians and non-Indians engaging in development activities anywhere on a reservation. The applicability of state and county environmental regulations to activities on Indian reservations depends on a case-by-case analysis of facts, including the involvement of non-Indians in the activity, the location of the activity, the relationship between attempted state or county regulation and federal regulatory schemes, and the effect of the attempted regulation on the tribe's right of self-government. Because such facts about the proposed coal gasification plant are not available, little basis for choosing which state or county regulations might apply and because informed planning with the active assistance of legal counsel might avoid jurisdictional conflicts, state and county regulations are not included in this review.

4.3 ENVIRONMENTAL PERMITTING

An evaluation of the existing regulatory framework for development of the Crow synfuels project reveals both potential problems and opportunities. Without proper planning, then confusion, delay, duplication of effort, and inefficiencies may result as is common in large projects. In recent years, however, agencies at all levels of government have taken steps to improve coordination and facilitate permitting. Coordination of permit requirements and full participation by the Crow Tribe and federal, state, and local agencies offer the greatest opportunity for improving and expediting the permit process.

The potential for environmental degradation through development of large-scale projects has resulted in the passage of a number of laws and regulations by tribal, federal, state, and local governments. Most of these regulations were developed independently, leading to conflicts, duplication, and overlap. Two or more levels of government may regulate the same aspects of the Crow synfuels project using different standards, procedures, timing, and information requirements. For example, certain standards of the Crow Tribe's Environmental Health and Sanitation Ordinance conflict with some standards of the Environmental Protection Agency. The appropriate timing sequence in relation to other development activity for environmental permitting on Indian lands is shown in Figure 4.3-1.

State-Tribal Cooperative Agreement Act. In 1981, Montana enacted a statute authorizing state and local governments to enter into cooperative agreements with Indian tribes upon approval by the State Attorney General. The agreements may cover any administrative service, activity, or undertaking that the agencies or tribes are authorized to perform.

The State-Tribal Cooperative Agreements Act could establish a sound framework for establishing agreements between the Crow Tribe and state and local agencies. These agreements could provide for full participation by state and local agencies in the

FIGURE 4.3-1 APPROXIMATE TIMING FOR E
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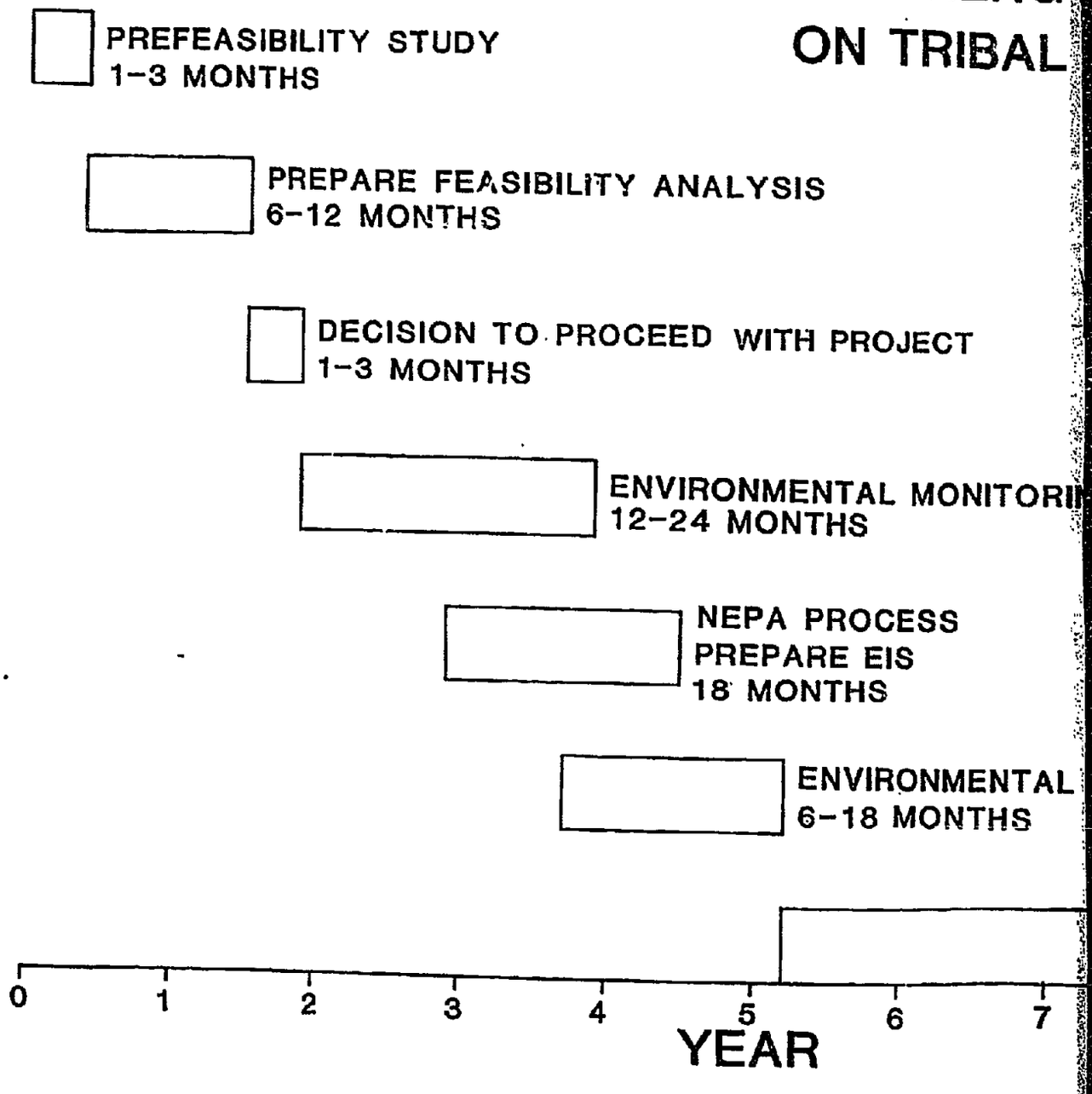

OR ENVIRONMENTAL PERMITTING
ERGY DEVELOPMENT
BAL LANDS

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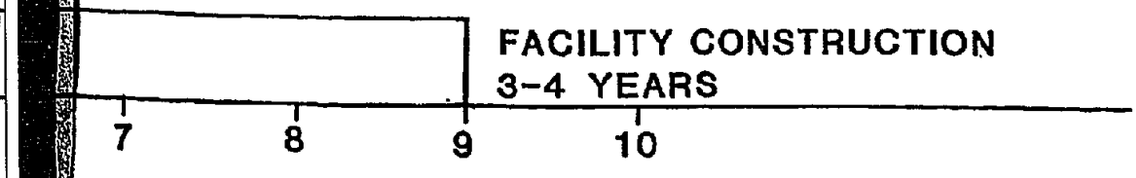
HS



environmental review process, management of off-reservation facilities, or mitigation of environmental and socioeconomic impacts.

Examples of Intergovernmental Cooperation. Numerous examples of formal cooperative agreements among tribal, federal, and state agencies already exist. On the federal level, both the Environmental Protection Agency (EPA) and the Office of Surface Mining, the major regulators of the proposed Crow synfuels project, have demonstrated a willingness to enter into cooperative agreements with Indian tribes. The Environmental Protection Agency has adopted a formal policy to enhance the role of the tribal government in regulatory decision making and to promote opportunities for tribes to assume a central role in implementing EPA's delegable programs, if the tribe desires. EPA is developing a strong record in promoting tribal participation in environmental regulation.

The Office of Surface Mining (OSM), which administers the Surface Mining Control and Reclamation Act on Indian lands, has also demonstrated a willingness to work closely with tribes. OSM funded and worked with the Crow Tribe to develop the Crow Reclamation Code. Without enabling legislation, OSM cannot delegate full authority to the tribe for administration of the federal surface mining permitting program. OSM is willing, however, to initiate pre-delegation programs on Indian reservations. OSM is drafting a cooperative agreement with Crow Tribe to fund the reclamation office, provide technical training, and develop regulatory capabilities.

4.3.1 Required Federal Permits

Several major federal environmental permits and approvals will likely be required prior to construction or operation of the proposed synfuels project. Legal research and extensive discussion with government agency staff members concluded that six major permits will probably be required for the synfuels project. These conclusions are based on limited available information about project design and on existing statutory and regulatory requirements.

4.3.1.1 Prevention of Significant Deterioration Permit

This is a federal-state regulatory permit program requiring preconstruction approval of new or modified industrial plants with significant potential emissions to be built in a clean air region of the country that already meets national primary ambient air quality standards. The program is authorized by the National Clean Air Act and is administered by the EPA or a delegated state. The EPA has retained responsibility for issuing Prevention of Significant Deterioration (PSD) permits on Indian lands.

The Clean Air Act is one of the most comprehensive pieces of environmental legislation and complex in its administration. The heart of the Clean Air Act is the National Ambient Air Quality Standards against which all rules and requirements are measured. One set of rules applies to areas already violating these standards designated as "nonattainment requirements." The other set of rules applies to areas that have air quality better than the ambient standards. In these areas the PSD rules apply. Most Indian reservations at present fall within the PSD requirements. The PSD program is based on a regulatory scheme of "area classifications and increments." All clean air areas can be designated as either Class I, II, or III. Numerical air quality increments have been set for the pollutants sulfur dioxide and particulates for each class. Class I increments are the most stringent allowing very little industrial activity; Class III is the most liberal allowing pollution levels to reach but not exceed the ambient standards. In 1977, Congress designated all clean air areas in the nation as Class II. It also designated certain international parks and the larger National Parks, Memorial parks and Wilderness areas as Class I which cannot be redesignated. Indian tribes, states, and local governments may redesignate an area to either Class I or III. In the only major reclassification action taken to date, the Northern Cheyenne Indian Reservation was reclassified to Class I.

Applicability. A PSD permit is required for any new or modified facility if sulfur dioxide or particulate emissions exceed 100 tons/year and the facility falls within one of the following 26 industrial categories. All other facilities that do not fall within one of these industrial categories require a permit only if their potential (uncontrolled) emissions exceed 250 tons/year.

Fossil fuel-fired steam electric plants of more than 250 million Btu/hr heat input	Sulfur recovery plants
Coal cleaning plants (thermal dryers)	Carbon black plants (furnace process)
Kraft pulp mills	Primary lead smelters
Portland cement plants	Fuel conversion plants
Primary zinc smelters facilities	Sintering plants
Iron and steel mill plants	Secondary metal production
Primary aluminum ore reduction plants	Chemical process plants
Primary copper smelters	Fossil-fuel boilers of more than 250 million Btu/hour heat input
Municpal incinerators capable of charging more than 250 tons/day of refuse	Petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels
Petroleum refineries	Taconite ore processing facilities
Lime plants	Glass fiber processing plants
Phosphate rock processing plants	Charcoal production facilities;
Coke oven batteries	All other new facilities if their potential emissions of any regulated pollutant exceed 250 tons/year

Standards and Conditions. Standards that apply to the PSD permit requirements are of four types: New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), case-by-case standards requiring the application of Best Available Control Technology (BACT), and air quality classification and increments. A brief summary of each set of standards follows.

New Source Performance Standards (NSPS). The Clean Air Act directed the EPA to set NSPS that require new plants to utilize the best system of emission reductions which the administrator determines has been adequately demonstrated. The standards represent the baseline in terms of maximum emissions for pollutants such as hydrogen sulfide, fluorides, acid mist, volatile organic compounds, lead, SO_2, NO_x, and particulate matter. Table 4.3.1-1 lists the industrial categories for which standards have been issued under the Clean Air Act.

TABLE 4.3.1-1
INDUSTRIAL CATEGORIES
FOR WHICH NEW SOURCE PERFORMANCE
STANDARDS HAVE BEEN ISSUED UNDER THE CLEAN AIR ACT

Steam Generators	Phosphate Fertilizer
Municipal Incinerator	Primary Zinc Smelter
Portland Cement Plant	Primary Lead Smelter
Nitric Acid Plant	Primary Aluminum Reduction Plant
Sulfuric Acid Plant	Coal Cleaning Plant
Asphalt Concrete Plant	Lime Plants
Petroleum Refineries	Grain Elevators
Petroleum Storage	Kraft Pulp Mills
Secondary Lead Smelter	Lignite-Fired Steam Generators
Secondary Brass & Bronze Smelter	Sulfur Recovery Plants & Refineries
Iron and Steel Mill	Stationary Gas Turbines
Sewage Treatment Plant	Glass Manufacturing
Ferroalloy Production	Phosphoric Acid Plants

National Emission Standards for Hazardous Air Pollutants (NESHAP). In addition to NSPS, the EPA has issued emission standards for pollutants which it concludes may result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness. To date, the EPA has issued standards only for asbestos, beryllium, mercury, and vinyl chloride. The standards are applicable to any new source that might emit quantities of these pollutants. Procedural conditions or numerical emission limitations may be made a part of a PSD permit.

Best Available Control Technology (BACT). The requirement of BACT in all PSD permits represents the principal basis for emission reductions. BACT is a technology-based requirement that is determined for each facility on a case-by-case analysis taking into account energy, environment, and economic impacts and other costs. BACT cannot be more lenient than an applicable NSPS for similar industrial categories and, in the majority of cases, it is significantly more stringent. BACT requirements apply to SO_2 and particulate matter but can be expanded to include all pollutants subject to regulation under the Clean Air Act. In establishing BACT requirements, one must consider a pollutant impact on vegetation and visibility and the air quality impact of general growth projected to result from construction of the new facility.

Air Quality Classifications and Increments. As indicated at the beginning of this section, the Clean Air Act outlines a comprehensive scheme involving area classification and increments. The air quality increments are the binding limits to which clean air can be deterioriated. NSPS and BACT requirements are bound by these limits or increments. If an increment will be exceeded for that classification of area, the facility cannot be constructed at that location. Table 4.3.1-2 presents the allowable increases (increments) in concentrations of pollutants in clean air areas.

Permit Application Requirements. The Clean Air Act and subsequent EPA regulations establish a number of requirements for data, analysis, and information to be submitted as part of the PSD application. The information required can be summarized as follows.

TABLE 4.3.1-2

PSD AIR QUALITY INCREMENTS[a]

(ug/m^3)

Pollutant	Averaging Time	Class I[b]	Class II[c]	Class III[d]	Primary Ambient Air Quality Standard
Particulate Matter	Annual	5	19	37	75
	24-hr	10	37	75	260
SO_2	Annual	2	20	40	80
	24-hr	5	92	182	365
	3-hr[e]	25	512	700	1300

[a] 40 CFR 52.21 and 42 ULSC 7401 et. seq. Section 163.
[b] Class I pristine areas, larger National Parks and Wilderness areas subject to tightest control.
[c] Class II areas of moderate growth.
[d] Class III areas of major industrialization.
[e] Secondary standard rather than a primary standard.

Name and address of applicant.
Facility and land ownership.
Existing environmental permits.
Pollutant characteristics.
Location and description of the proposed facility.
Specifications, drawings, and construction schedule.
Description of the air pollution control system.
Estimates of uncontrolled emissions and controlled emissions.
Analysis of air quality impact on air quality increments, vegetation, visibility and soils.
Analysis of the impact of growth related to the project on air quality.
After 9 February 1982, the applicant must provide one year's worth of continuous air quality monitoring data. This requirement can be waived at EPA's discretion.

Permit Procedures. The following steps are part of the permit acquisition procedure.

(1) The necessary application forms and instructions can be obtained from the appropriate EPA Regional Office.

(2) A preapplication meeting with EPA and the delegated state is recommended to discuss specifics of the project and PSD application requirements.

(3) Submit the application to the appropriate EPA Regional Administrator.

(4) EPA will review the application for completeness and notify the applicant of any deficiencies in the information submitted within 30 days after receipt.

(5) Within one year after receipt of the completed application, the EPA is required to approve or deny the PSD permit. In the majority of cases, a determination is made within three to six months.

(6) During the review period, the EPA is required to provide public notice and a 30-day public comment period. A public hearing also will be held if there is a significant degree of public interest.

(7) EPA will issue a final permit, a conditional permit, or a permit denial.

(8) An applicant can appeal a final determination by the Regional Administrator of the EPA (40 CFR 124.19). The appeal must be made directly to the Administrator within 45 days following the Regional Administrator's decision.

Permit Lead Time. The lead time required for approval of a PSD permit will vary depending on the nature of the project. Some permits have been issued within 90 days after receipt of a completed application. In these cases, the projects were not complex or controversial and EPA did not require the 1-year preapplication monitoring. With more complex situations, the time period could be as much as two years including the 1-year monitoring requirement. In the cases of Region VIII of EPA (Mont, Colo., N.D., S.D., Utah, and Wyoming), permit decisions are made within six months after receipt of a completed application and in less time for certain projects. This is a requirement of the Regional Energy Policy Statement.

Statutory and Regulatory Authority. The authorizing statutes are listed below.

National Clean Air Act Amendments of 1977 (42 USC 7403 et seq).
EPA Regulations 40 CFR 52.21 and 40 CFR 124 Subparts A and C (Final Rules, Federal Register, 19 May 1980, Part X).
EPA Region VIII Energy Policy Statement, October 1979.

4.3.1.2 404 Dredge and Fill Permit

This is a federal-state regulatory program requiring a permit to discharge dredged or fill material or the construction or installation of any structure into the navigable waters including wetlands. The 404 permit program is authorized by the Federal

Water Pollution Control Act and is administered by the Army Corps of Engineers and EPA or a delegated state.

Applicability. A 404 permit is required of any individual, corporation, or governmental body placing fill material or undertaking construction activities in either a stream having a flow greater than 5 cfs or in a wetland area. Instream activities or structures (such as dams, intake and diversion structures, pipeline crossings, removal or placement of materials) require individual permits. Routine activities such as normal farming, silvaculture, ranching, maintenance of existing structures, construction of farm or stock ponds, and irrigation ditches are covered by general permit requirements and do not require individual permit applications.

Standards and Conditions. The Army Corps of Engineers (COE) has not set specific standards because of the diverse nature of the activities covered by the 404 permit program. Once an application is submitted, it is reviewed by several agencies including the EPA, Fish and Wildlife Service, states, and others that recommend conditions to the permit. Typical conditions include minimizing disturbance to the water course, revegetation of disturbed areas, and restriction on use of machinery and equipment in the stream. Conditions may also include requirements to maintain minimum stream flows, restoration of aquatic habitat, and possible mitigation through land exchanges. General opposition exists to the issuance of 404 permits for any activity in wetlands unless:

no alternative is available;

every effort is made to avoid and prevent damage and loss to fish and wildlife resources, habitat, and uses;

all means and measures have been adopted, with guaranteed implementation, to satisfactorily compensate for unavoidable environmental damages; and

the overall public benefits of the proposal are needed and they override environmental damages.

In addition to the conditions discussed above, the issuance of a 404 dredge-and-fill permit is subject to the requirements of the National Environmental Policy Act. The COE may require the preparation of an Environmental Impact Statement where issuance constitutes a major federal action significantly affecting the environment.

Permit Application Requirements. The application for a 404 dredge and fill permit is not as comprehensive as most environmental permit applications. The application form, number 4345, consists of two pages and requests general information such as name and location of the project, a description of the proposed activity including maps and drawings, and other permit approvals or certifications related to the activity.

Permit Procedures. The following steps are part of the permit acquisition procedure.

(1) The necessary application forms and instructions can be obtained from the COE District Office or the EPA Regional Office.

(2) Submit application along with any supplemental information to the COE District Engineer for the region in which the activity will be located.

(3) The COE will review the application for completeness and request any additional information that may be needed.

(4) COE will issue public notice of the proposed activity and provide a 30-day public comment period. A public hearing may be held if appropriate.

(5) Copies of the application will be sent to all concerned federal and state agencies for comment during the same 30-day public comment period provided for above.

(6) Upon review and consideration of the comments, the COE will prepare an environmental assessment or, if appropriate, an Environmental Impact Statement.

(7) The EPA or an NPDES-delegated state must submit a certification that the proposed activity is in compliance with requirements of the National Pollutant Discharge Elimination System.

(8) The COE will propose general and site-specific conditions based on the comments which will be made a part of the permit if issued.

(9) Applicant signs the final permit and returns it to the COE District Office with appropriate application fee.

(10) COE issues final permit.

(11) The permit is usually valid for the duration of the activity or five years, whichever is less.

Permit Lead Time. In most instances, a permit application can be processed within three months after receipt of a completed application. If the nature of the activity or comments are such that an Environmental Impact Statement will be required, one must allow an additional 18 months to complete the statement.

Statutory and Regulatory Authority. The authorizing statutes are listed below.

Federal Water Pollution Control Act. Public Law 92-500 33 USC 1344 Section 404.
U.S. COE Regulations, 33 CFR Parts 320 through 330.
U.S. EPA Regulations, 40 CFR 230.

4.3.1.3 National Pollutant Discharge Elimination System Permit

This is a federal-state regulatory permit program requiring every public and private facility discharging pollutants from a point source into navigable waters to have a permit. The NPDES program is authorized by the Federal Water Pollution Control Act and is administered by the U.S. Environmental Protection Agency (EPA) or a delegated state.

Applicability. A NPDES permit is required by all industrial and municipal facilities, whether existing or new, that discharge into navigable waters. Industrial facilities that discharge into municipal systems do not require permits, but may be subject to pretreatment requirements and also user charges. A permit is not required of a facility that recycles its potential effluents and thus has "no" or "zero" discharge.

Standards and Conditions. EPA issues effluent guidelines, which define the technology standards for various industrial categories and set numerical limits on the quantities per unit of production of each pollutant which may be discharged by operating plants. These standards have been set for existing facilities which require every discharger to have installed by 1977 the "best practicable control technology" and to install additional control equipment by 1984 representing the "best conventional technology" for certain conventional pollutants and "best available technology" standards for other pollutants including toxics.

In addition, effluent standards have been set for new facilities specifying the greatest degree of effluent reduction achievable through use of the "best available demonstrated control technology." A new source includes any new plant from which a discharge will occur if its construction is commenced after promulgation by the EPA of a new source performance standard (NSPS) for that category of facility. Industrial categories for which NSPS have been issued are listed in Table 4.3.1-3. If a new facility is not covered by a NSPS it will be treated as an existing facility.

Once a new facility is built in compliance with NSPS it is protected against any tightening of the standards for a period of ten years. Although the facility must

comply with any new pollutant standard that may be discharged by the plant. In addition to the above requirements, a new facility covered by a NSPS and to be located in a state where EPA administers the NPDES program will be subject to the National Environmental Policy Act and may require the preparation of an Environmental Impact Statement.

Permit Application Requirements. The Federal Water Pollution Control Act and subsequent regulations promulgated by the EPA establish a number of requirements for data and information to be submitted as a part of an NPDES application. At a minimum, the following information must be submitted as a part of an NPDES permit application.

Operator's name, address, and facility location.
Description of pollutant source and characteristics.
Existing environmental permits.
Location map showing major structures and geography.
Description of the business activity.
Location of outfalls or discharge points.
Description of flows, pollutants, concentrations, types of treatment, and characteristics of receiving waters.
Production information.
Toxicity, volatility, and acidity data and analysis.
Other information as appropriate.

Permit Procedures. The following steps are part of the permit acquisition procedure.

(1) The necessary application forms and instructions can be obtained from the appropriate EPA Regional Office.

(2) A preapplication meeting with the EPA and appropriate delegated state agency is recommended to discuss specifics of the project and NPDES application requirements.

TABLE 4.3.1-3
INDUSTRIAL CATEGORIES FOR WHICH NEW SOURCE PERFORMANCE STANDARDS HAVE BEEN ISSUED UNDER CLEAN WATER ACT

ASBESTOS
BUILDERS PAPER & BOARD MILLS
CANNED AND PRESERVED FRUITS VEGETABLES
- Canned & Preserved Fruits
- Canned & Preserved Vegetables
- Canned & Miscellaneous Specialties

CANNED AND PRESERVED SEAFOODS
CANNED AND PRESERVED SEAFOOD PROCESSING
CEMENT MANUFACTURING
DAIRY PRODUCTS PROCESSING
FEEDLOTS
FERROALLOYS
- Open Electric Furnances w/Wet Air Pollution Control Devices
- Converted Electric Furnaces & Other Smelting Operations w/Wet Air
- Slag Processing

FERTILIZER MANUFACTURING
- Phosphate
- Ammonia
- Urea
- Ammonium Nitrate
- Nitric Acid
- Ammonium Sulfate Production
- Mixed & Blend Fertilizer Production

GLASS MANUFACTURING (INSULATION FIBERGLASS)
GLASS MANUFACTURING (FLAT GLASS SEGMENT)
- Machine Pressed & Blown Glass Mfg

GRAIN MILLS
HOSPITAL INDUSTRY
INORGANIC CHEMICALS
- Aluminum Chloride
- Aluminum Sulfate
- Calcium Carbide
- Calcium Chloride
- Calcium Oxide & Calcium Hydroxide
- Potassium Metal
- Potassium Sulfate
- Potassium Dichromate
- Potassium Sulfate
- Sodium Bicarbonate
- Sodium Sulfite

MEAT PRODUCTS
- Small Processor
- Meat Cutter
- Sausage & Luncheon Meats Processor
- Ham Processor
- Canned Meats Processor

MEAT PRODUCTS (POULTRY)
- Chicken Processor
- Turkey Processor
- Fowl Processor
- Duck Processor
- Further Processing

MINERAL MINING
- Phosphate Rock

NONFERROUS METALS
- Bauxite Refining
- Primary Aluminum - Refining
- Secondary Aluminum - Smelting

ORGANIC CHEMICALS
- Processing w/Process Water Coning Steam Dilutant, Quench or Vent Gas Absorbent

PAVING AND ROOFING
PETROLEUM REFINING
- Cracking

PHOSPHATE MANUFACTURING
PRINTING INK FORMULATING
PULP PAPER AND PAPERBOARD MANUFACTURING
- Unbleached Kraft
- Sodium Base Neutral Sulfite
- Semi-Chemical
- Ammonia Base Neutral Sulfite
- Unbleached Kraft-Neutral
- Sulfite Semi-Chemical
- Paperboard From Waste Paper

RUBBER MANUFACTURING
SOAPS AND DETERGENTS
SUGAR PROCESSING (CANE REFINING SEGMENT)
TEXTILE INDUSTRY
TIMBER PRODUCTS PROCESSING
TIMBER PRODUCTS PROCESSING (FURNITURE)

(3) Submit application to the appropriate EPA Regional Administrator. No application fee is required by the EPA.

(4) EPA will review the application for completeness requiring in most cases less than 30 days.

(5) A complete application is forwarded to the state in which the discharge is to occur for certification and identification of any special conditions required of the state.

(6) After review and state certification, a decision is made with respect to the need for the preparation of an Environmental Impact Statement. If the EIS is required, public comment on the proposed permit will wait completion of the EIS in approximately 18 months. If no EIS is required, the permit is issued as a draft for 30-day public comment and, if necessary, a public hearing will be held.

(7) The draft permit is revised as appropriate and issued.

(8) Permit becomes effective 30 days after issuance and is effective for a fixed term not to exceed five years.

Permit Lead Time. Any new facility with a potential discharge must apply for a NPDES permit no later than 180 days in advance of the date on which the discharge is to commence. However, because of the Environmental Impact Statement requirement for a new source (18 months to complete) and from the viewpoint of the applicant which needs lead time for designing pollution control engineering into the construction of a new plant, the applicant should apply several years in advance of startup. It is also a requirement that a permit be issued in final form before commencing construction.

Statutory and Regulatory Authority. The authorizing statutes are listed below.

Federal Water Pollution Control Act PL 92-500 33 USC 1251 Section 402.
U.S. EPA Regulations 40 CFR 122.

4.3.1.4 Hazardous Waste Management Permits

This is a federal-state regulatory program requiring a permit for the treatment, storage, or disposal of hazardous waste. In addition, certain recordkeeping requirements are imposed on generations and transporters of hazardous waste. The program is authorized by the Resource Conservation and Recovery Act of 1976 and is administered by the U.S. Environmental Protection Agency (EPA) or an authorized state.

Applicability. Any person who owns, operates, or proposes to own or operate a facility that treats, stores, or disposes of hazardous waste must have interim status (existing facility) or receive a permit from EPA or an authorized state. Hazardous wastes have been defined by the EPA based on certain criteria and characteristics. The four basic criteria are ignitability, corrosiveness, reactivity, and toxicity. In addition to the criteria, the EPA has promulgated a list of particular hazardous waste. Substances such as arsenic, cadmium, lead, mercury, many of the pesticides, numerous chemicals, and certain waste from electroplating plants, mineral and metal recovery operations are listed. Certain sludges from the petroleum refining industry, smelters, and tanning facilities are also listed as hazardous waste.

Farmers that use and dispose of pesticides on their own farm are exempt from the program. Fly ash, bottom ash from fossil fuel power plants, and waste associated with exploration, development, or production of oil and gas or geothermal energy are exempted at present as are uranium mills which are regulated under the Atomic Energy Act.