CHAPTER III

PROBABLE IMPACT OF PROPOSED ACTION

Development of the Kerr-McGee property will impact various environmental components. The impact analysis covers the entire area, an estimated 4,960 acres. Mine facilities will be constructed off of the leased area on private surface which has been purchased by Kerr-McGee. The impact of these facilities is discussed.

Construction of an access corridor involving a road, a spur rail line, and a transmission line into the Atlantic Richfield area will be shared by Kerr-McGee. The impact of this access corridor was analyzed in Part III of this statement.

For purposes of this analysis, it was assumed that all the coal mined will be exported via railroad. Information as to the amount which may be committed to the coal slurry pipeline which has been proposed was not available at the time the analysis was prepared. The analysis does not cover the impact associated with the coal slurry pipeline. These impacts are in Part I. The impact of transportation of coal after it leaves the spur rail line is also covered in Part I of this statement. Impacts of offsite use of the exported coal is beyond the scope of this statement.

The impacts as analyzed here relate only to the mining operation. Cumulative regional impacts are discussed in Part I.

Air Quality

Mining of an estimated 300 million tons of coal over a total of 4,960 acres will create an impact on air quality for the expected life of the mine, an estimated 22 years or until the year 1999. Mining is expected to begin in 1977 (1.2 million tons). Forty acres will be disturbed for the initial boxcut. Production will increase to 15.9 million tons per year in 1982 and will not exceed this rate for the remainder of the mine life. At the 15.9-million-ton production level, an estimated 231 acres and 30 million cubic yards of overburden will be disturbed per year. An estimated 619 million cubic yards of overburden will be removed and handled over the life of the mine. Removal of vegetation and disturbance of topsoil and overburden will expose fine-grained soil and parent material to wind action which is frequently quite strong. Soil particles will be lifted by the wind and carried into the atmosphere, causing a reduction in air quality and reducing visibility during periods of high wind. Coal dust from crushers, trucks, coal piles, and loading operations will also pollute the air during the frequent, windy periods.

Emission from machinery, vehicles, and trains will add particulate matter and odor to the air on and adjacent to the mine site. The emissions as a result of train operations over this spur line are shown in Table 1.

Table 1

Train Emissions Resulting from Transporting
Kerr McGee Coal Production*

Year	Trains Per Year	Million Tons Per Year	Fuel Per Day-1,000 gals.	Emissions-Tons Per Year				
				Particulates	SO_2	NO_x	CO	Hc
1980	909**	10	12.1	55	126	820	208	208
1985	1,455***	16	19.8	90	206	1,336	469	340

*Emissions based on the maximum projected production of 10 million at 1980 and 15.9 million by 1982.
**909 loaded - 909 empty.
***1,455 loaded - 1,455 empty.

SO_2 - Sulfur Dioxide
NO_x - Nitrogen Oxides
CO - Carbon Monoxide
Hc - Hydrocarbons

Increased populations (1,550 by 1990) associated with the mine and its employees will generate increased vehicle traffic. Increased traffic, including commuting to work, will add additional emissions to the air and cause a further decrease in air quality. The cumulative impacts of this type of increase of emissions are discussed in Part I of this statement.

Increased mining and exposure of coal beds to the atmosphere will increase the chance of accidental coal fires. These will add particulate matter and other potentially toxic emissions to the atmosphere. Increased train traffic and people on the area also increase the possibility of wildfire. These would add to a temporary lowering of air quality by addition of smoke and particles to the air.

Inversion periods of two day duration can occur 15 times a year. These inversions will trap emissions. During inversion periods, respiratory conditions could be aggravated, asthmatics made worse, and lung diseases

caused or worsened. During normal weather conditions these pollutants will be carried downwind (to the east and southeast), dispersed, and diluted before reaching any population centers.

Reduction in air quality will begin in 1976, rise to a maximum in 1979, and then level off until the end of the mine life in the year 1999.

Topography

The factors that make mining economically feasible in the coal basin--thin overburden and thick coal--also cause a local topographic change. Removal of thick coalbeds having little overburden for backfill creates a discrepancy between the volume of coal removed and the spoils returned to the mined area. Coalbed thicknesses in the mining area, excluding thin coal at the burnline, range from 60 to about 64 feet. Overburden thickness ranges from about 20 to 168 feet. The decrease in altitude over the lease area will range from a maximum of 54 to a minimum of 20 feet. The average drop in altitude for the entire area to be mined where the average coal thickness is 62 feet and the average overburden thickness is 88 feet will be about 44 feet. The maximum decrease in altitude will occur in the areas which have thick coal in relation to thin overburden.

The topography at the Jacobs Ranch mine before mining is shown on Figure 1. Mining will start at the west side and proceed northward from the suboutcrop or burnline in mile-wide panels. The topography as it could appear after the removal of coal by dragline operation is shown in Figure 2. The model is based on mining 90 percent of the coal, expanding the overburden by 20 percent, mining a pit (panel) one mile wide, and returning or casting spoils 150 feet. Topography after mining could look surprisingly similar to the original topography. Topographic slope can be increased or decreased. The smoothing and rounding of the spoil piles generally tends to create a more subdued, rolling topographic relief. The postmining model shows many tiny hills and basins that probably can be smoothed in the reclamation process. Any cliff-like or abrupt topographic breaks now present on the area will be eliminated.

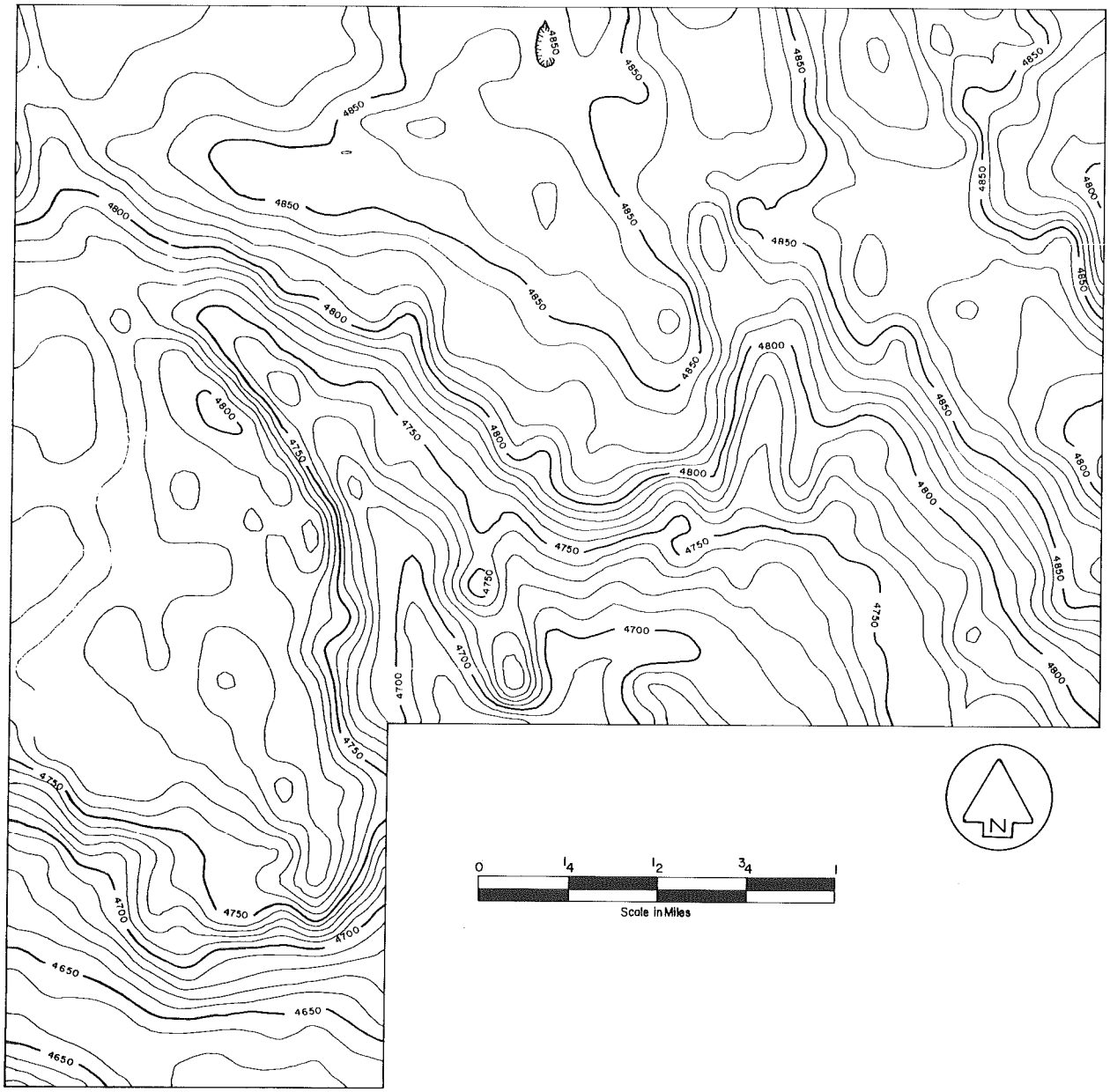

Figure 1

Topography at the Jacobs Ranch Mine Before Removal of
Coal Showing Area to be Mined in 22 Years.
Contour Interval is 10 Feet.

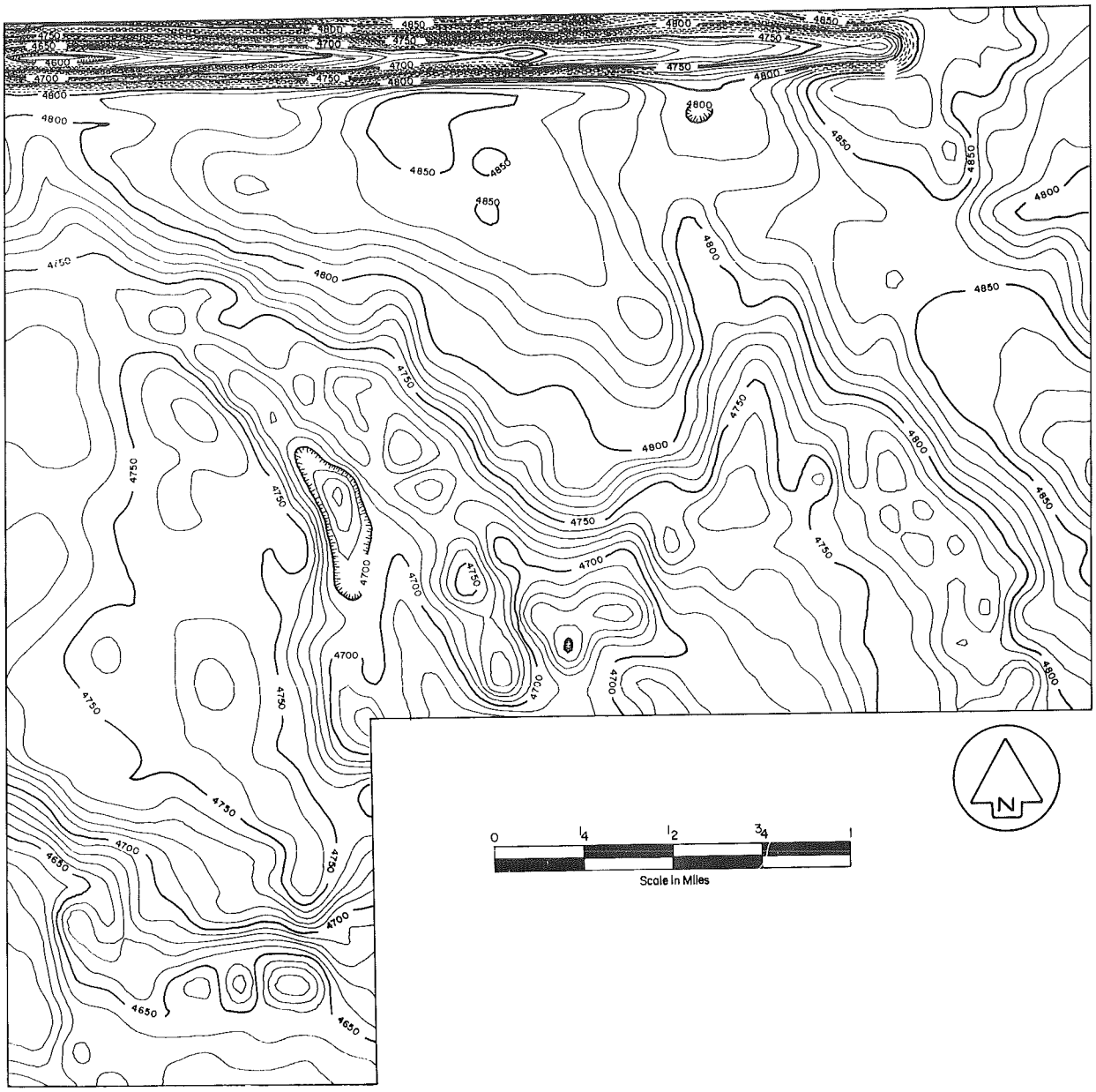

Figure 2

Topography of the Jacobs Ranch Mine After
Removal of About 62 Feet of Coal.
Contour Interval is 10 Feet.

North Prong Creek will be diverted and altered to a minor extent. Its present shallow, steep-sided, meandering channel will be slightly modified and the new channel of the creek may appear to be straighter after mining.

If the topography is as shown in Figure 2 at completion of mining, the remains of the highwall will be visible on the north side of the mined area. The highwalls as illustrated in Figure 2 have not been reduced so this mine pit will create a long, narrow trough-like depression which can be used as a reservoir and will probably be the most visible indication that topography of the area has been altered.

Topographic impacts will occur slowly and may be noticeable in only a small portion of the mined area at any one time. Initially, the mining-reclamation model, including areas stripped, mined, rough and smoothed spoils, and reseeded, will cover about 100 acres. This will increase to about 400 acres at the full annual rate of 15.9 million tons of coal. The shape of the landscape may change surprisingly little according to the mining-reclamation model. Until completion of mining, the most severe impact will be the highwall or active working mine face.

Shovel-and-truck operation presently being considered by this mining company not only permits a more flexible operation but also produces a smoother, lower-gradient surface that is locally more favorable to revegetation and decreased erosion. As mentioned in the regional analysis (page I-472), this type of flexible operation affects a smaller area than dragline operations. It results in closer control of the final surface altitude and allows optimum recontouring after mining.

Soils

Mining of the area will result in the destruction and mixing together of all the existing soil types and horizons on all lands (4,352 acres) mined. The degree of mixing and redistribution of the soils is unknown and will vary from place to place within the lease area. This will change all soil characteristics and destroy microorganisms and soil relationships which have been established over a long geologic time span.

In addition to the topsoil acreage which will be disturbed by mining, approximately 619 million cubic yards of overburden or lower soil horizons will be dug and disturbed during the 22-year life of the mine. This will result in complete destruction of all soil horizons and changes in soil characteristics. It could result in bringing material to the surface which may be toxic to plant growth. After mining, soil structure and properties will be completely different from those existing prior to mining.

These disturbances will result in fine-grained soil and parent material being exposed to wind and water actions. Soil permeability and infiltration rates may be reduced, increasing runoff, soil erosion, and sedimentation. Wind action, which is almost constant over the area, will cause fine soil, silt, and clay particles to be lifted into the atmosphere, reducing air quality and adding to soil loss. As all physical, chemical, and biological systems will be disrupted to an unknown degree, the overall result of mining action, undoubtedly, will be lowering of soil productivity.

Alteration of the channel of North Prong Creek could impact Little Thunder Creek downstream and adjoining land area. Channelizing stream

courses and releasing production waters, including mine drainage, may cause increased flow velocities resulting in accelerated erosion of stream beds and banks. This will increase the amount of soil loss in the immediate area as well as along downstream channels. Alteration of stream channels may deprive some areas of soil moisture, thereby affecting soil productivity and vegetative growth.

Construction of mine facilities on approximately 200 acres outside of the area to be mined will disturb and permanently remove the soil from productivity.

Additional offsite soil impacts will result from increased population associated with mine employment. Cumulative population increase is estimated to be 1,410 by 1980, 1,550 by 1985, and 1,550 by 1990 and would involve removal of an estimated 78 acres of soil from productivity by 1990. Increased recreation use, solid waste disposal, schools and other social facilities will create additional unquantifiable soil impacts such as compaction, erosion, and sedimentation.

Construction and mining equipment crossing undisturbed soil areas susceptible to compaction will reduce soil permeability and water infiltration rates. This will increase runoff, erosion, and sedimentation.

Mineral Resources

The most important impact is the one on coal. The removal and consumption of an estimated 300 million tons of coal from this area over the expected mine life of about 22 years will result in depletion of a nonrenewable energy source. The coal produced from this area will be exported to utility plants of Arkansas Power and Light Company, Gulf States Utilities, and Central Louisiana Electric Company.

Some coal will be lost from production in mining, mostly owing to dilution with waste material near the top and bottom of the coalbed, along the ends of some mining panels, and in areas where the coal is burned.

Small amounts of sand and gravel beds potentially useful for aggregate occur on the lease area in the terraces and floodplains along North Prong Creek. Unless these sand and gravel deposits are removed prior to relocation of the streams and mining of the area, this resource will be lost. With the projected demand for this type of material as discussed in Chapter V, Part I, of this statement, loss of any part of the sand and gravel resource locally would be minimal.

The existing producing oil wells in the area will be exhausted and abandoned before mine operations reach them. No impact on oil and gas resource is expected to occur. Oil and gas drilling can be resumed after mining is completed.

Ground water

During mining and reclamation

Mining of a total of 300 million tons of coal over the life of the project (22 years - 1999), removal of 619 million cubic yards of overburden, and disturbance of 4,352 acres will destroy any aquifers located within the area. Disruption of aquifers would cause a cessation of flow and a draining of water into the pit. Pumping for dewatering during mining operations and for consumption use will lower water levels to the base of the coal in the pit. Either adequate aquifer-test data collected by monitoring a pumping well and nearby observation wells in the coal and the overburden deposits, or the monitoring of water levels in properly spaced observation wells during actual mine-dewatering operations will be necessary to determine accurately the effects of mine dewatering upon water levels in nearby aquifers. From limited data obtained from mine-dewatering operations now in progress in the Gillette area, an estimation of the effects of mine dewatering on nearby water levels is possible. It is estimated that the area of influence caused from mine dewatering could extend outward as much as two miles from the point or points of pumping. Most of the effects will be west of the mining operations. Within the area of influence caused by pumping, water levels will be lowered at increasingly greater depths toward the mine area. At the outer edge of influence, water levels will be lowered insignificantly. Water wells that derive water from shallow aquifers within the area of greater drawdown could be affected. Springs and seeps in the major area of influence may also dry up. Reduction in water levels could impact agricultural use and wildlife populations.

No significant flow can be expected to occur between aquifers as a result of mining the coal; however, the removal of considerable overburden could have an affect on the artesian pressure in the underlying aquifers. Reduced overburden (removed load) could cause a movement of water upward in the underlying aquifers because the artesian pressure could respond to the reduced load and the potentiometric surface (pressure) would rise. Thus, the removed overburden could also result in an increase in water discharged into the mine pit.

The area to be mined is a ground water discharge area. Recharge to deposits involved with mining occurs west of the mine lease and this would not be impacted.

After reclamation

Replacement of spoils into the pit will result in deposits with reduced permeability. This reduction may result in less water flowing into the aquifer and increase surface runoff which could increase erosion and sedimentation. Although the overall altitude of the land could be reduced by 44 feet, this could result in less runoff in low areas where ponding may occur.

Surface water

Mining activities will disrupt the existing drainage pattern in parts of the area. Tributaries of North Prong Little Thunder Creek will have to be diverted around the mine pit. The channelizing may decrease annual and low flows due to seepage loss to the pit. Peak flow will not be significantly affected unless protecting dikes break and the flow is diverted to the pit. Characteristics of the minor tributaries will be interrupted by mining until reclamation is complete.

Channelizing stream courses may cause increased flow velocities and result in accelerated erosion of streambeds and banks. In changing the course of the stream, its base level may be lowered and result in headcutting of tributaries. Release of production waters, including mine drainage, would alter flow characteristics, possibly resulting in accelerated erosion of streambeds and banks. The amount of release would govern the extent of erosion in a downstream direction.

Water quality

Ground water

Since the mined area is a point of discharge, reduction of quality of water in the aquifers will not occur while mining is taking place.

After spoils have been returned to the pit, leaching could occur and reduce the chemical quality of the water in the aquifers. This water would eventually move down gradient toward discharge points along Burning Coal Draw. Some discharge as seeps also might occur along North Prong Creek. The discharge of this water could result in lowering water quality in these streams.

Surface water

Erosion and sedimentation will be increased during construction and operation of the mine as vegetation is removed. High sediment yields will occur from spoil piles until they have been reclaimed and a protective grass cover established. Increased erosion and sedimentation could lead to a further lowering of water quality in the streams.

Dissolved solids will increase downstream from the proposed mining site during mining and reclamation, but changes in dissolved solids concentration will depend on the amount and concentration of water in receiving

streams. Dissolved solids concentration in runoff from newly exposed surfaces will increase. Continuance of the increased dissolved solids loading in downstream waters after reclamation is completed will depend on the degree of success achieved in protecting exposed surfaces from leaching and erosion.

Increased population associated with mine development could affect water quality through recreational use of the area and from adding additional untreated sewage to the ground water. A trailer camp is proposed for Reno Junction. Unless sewage from this area is properly treated, it may contaminate ground as well as surface water supplies.

Vegetation

During the 22-year life of the mine, vegetation will be destroyed on 4,352 acres. Vegetation will be removed progressively as mining proceeds across the lease area. Vegetation affected during this period is shown in Table 2.

Table 2

Vegetation Types and Amount to be Disturbed

Vegetative Type	Acres
Western Wheatgrass - Foxtail Barley	110
Western Wheatgrass - Slender Spikerush	30
Inland Saltgrass - Western Wheat - Blue Grama	50
Blue Bunch Wheatgrass - Blue Grama	490
Big Sagebrush - Western Wheat - Blue Grama	950
Big Sagebrush - Needleandthread - Blue Grama	2,672
Big Sagebrush - Blue Grama	50
Total	4,352

Additional detail on vegetative type and relationships to be disturbed and destroyed is in Appendix D.

With initiation of coal production in 1977, some 40 acres of vegetation will be lost from the initial pit (boxcut), in the initial topsoil storage areas, and in spoil waste areas. This will accelerate up to 231 acres in 1982 when mining increases to 15.9 million tons per year. It is assumed that vegetative destruction will remain relatively constant from that point until the end of mining in 1999. After the first five years, equal areas will be reclaimed and disturbed, so at any one time after 1982, the amount of unvegetated area will be approximately 250 to 350 acres.

Construction of mine facilities outside of the area to be mined will permanently remove vegetation on an estimated 200 acres. Vegetative types removed will be inland saltgrass-western wheat-blue grama, big sagebrush-western wheat-blue grama, and big sagebrush-needleandthread-blue grama. The acreage of each type disturbed is not available because the location of plant facilities has not been determined.

Population increase associated with mine employment will remove an estimated 78 acres of vegetation by 1990. Vegetative types removed are indeterminable as location of population cannot be determined at this time. An additional indeterminable amount of vegetation will be disturbed or destroyed by development of social facilities (schools, solid waste disposal areas, etc.) to serve this increased population. Increased recreational use by the new expanded population, especially off-road vehicle use, will affect additional vegetative types and acreages within the total study area.

Haul road dust and fugitive coal dust from coal mining, blasting, transporting, processing, and loading on unit trains will be deposited on vegetation adjacent to the mine area. Toxic chemicals which could be present in the deposited dust may damage vegetation when wetted by dew and light rain. Dust-covered and damaged vegetation may be less palatable and possibly toxic to livestock and wildlife.

Suitable vegetation may be difficult or impossible to reestablish on some of the mined area. Toxic or nonproductive material may be brought to the surface; microclimate will be changed; soil structure will be destroyed with loss of some topsoil. These effects of mining may individually or in combination make revegetation difficult or impossible in some areas.

Historical Values

The Kerr-McGee Corporation has received a historical survey of the lease area, and historical values of only a community or local level have been identified on the lease. No state or even county significance is attached to any of these sites. However, if someone can place an important event or person at one of the sites later, the risk of losing the site will be ever present with the total destruction of the surface features.

Aesthetics

The impact on aesthetics will be gradual over time. Intrusions will be added to the landscape prior to and at the beginning of mining. Other changes will take place over a period of 22 years, the projected mine life. The changes to take place on this one site are not significant when compared to the 4.9-million-acre study area. However, the impact of mining on this specific site could be very significant when viewed against the surrounding natural landscape backdrop.

The mining operation will impact the existing landscape character by changing the form, line, color, and texture. Disturbance of vegetation, removal of overburden, and creation of new landforms cause a change in the appearance of the landscape, i.e., landscape character.

A color contrast will be evident where the mixed soil from the mine join the undisturbed natural soils and where the new vegetative cover on the reclaimed land meets the undisturbed sagebrush and grass.

Vegetation and landform will change from a coarser to a smoother texture due to reshaping to a smooth land form and a softer-textured vegetation. Eroded, rough, broken land will be graded to more gentle slopes. This will all result in less variety and natural configuration in the landscape, thereby reducing quality of the landscape character.

Intrusions such as roads, powerlines, railroads, pipelines, base area building, and other structures will add discordant character to the natural landscape character in form, color, line, and texture.

Other impacts on landscape character will be the general lowering of the profile in the mined area and the resultant highwall left at the edge

of the mining operation. Also, where the mining operation meets other mining leases, a discordant landform will result if the two are not coordinated and planned together at this point.

Wildlife and Fish

All wildlife will be displaced from the area as mining progresses. The smaller wildlife (reptiles, amphibians, invertebrates, rodents, and other burrowing animals) which are not able to flee will be destroyed. The populations which are displaced, such as the estimated 35 antelope, sage grouse, numerous birds, and small mammals, will have to relocate on adjacent sites. It is assumed that surrounding areas are already supporting populations in balance with available habitat. Therefore, displaced wildlife may exist for awhile, but the populations will eventually be lowered to remain in balance with the available habitat unless mitigating measure are taken. Part of the displaced population may eventually be lost. The loss of winter range would eliminate the estimated 35 antelope, for example.

Waterfowl which use small reservoirs during periods of migration will be forced to use other bodies of water in the vicinity.

The loss of wildlife habitat will be a constant progression across the mined property. Once full production of 15.9 million tons per year is reached by 1982, an estimated 231 acres of vegetation will be destroyed annually. By the end of the mine life, a total of 4,352 acres of habitat will have been destroyed. In all probability, the increased human activity and noise associated with mining operations will disturb and cause some of the major wildlife species to leave the area prior to destruction of the habitat.

The habitat for big game species (deer, antelope) and for sage grouse will be lost for a long period of time even though the area will be reclaimed. The projected time periods for return of the area to suitable habitat for various wildlife species groups is graphically shown in Figure 7, Chapter V, Part I, of this statement. Some of the animals, especially those associated with a grass habitat (Richardson's and thirteen-lined

ground squirrels, prairie dogs, mice and other small rodents), will return to the area as it is reclaimed and vegetation reestablished. No satisfactory evidence is presently available which would suggest that strip mined areas can be satisfactorily revegetated with plant communities that will satisfy needs for deer or antelope.

An estimated 278 acres of habitat, including that associated with construction of mine buildings and increased populations will be permanently lost. This will involve an indeterminable loss of various animal species. Increased recreation use will remove additional acres of habitat and increase pressure on wildlife populations by disturbance and displacement.

Increased vehicular use on the area and on surrounding roads will increase animal road mortality. Mortality will also occur from train traffic. Construction of right-of-way fences and fences to protect the reclaimed area to allow for revegetation may cause some impact on wildlife movement and migration. The greatest impact of fences will likely be on antelope, and any east-west fencing will be most restrictive to their present seasonal movements.

The noise and human activity associated with this mining operation may impact the elk herd usually located to the east of the leased area. Elk in this type of habitat do not normally tolerate excessive human activity or noise. They may be forced out of their present habitat which could in the long run result in their elimination.

Some food chains will be disrupted when habitat is lost, but it is difficult to estimate the species or the amounts of the smaller animals and the effects on each.

Recreation

The proposed mining operation will disrupt present patterns of recreation activities on the lease and adjacent areas.

The mining operation and base plant site will eliminate approximately 500 acres of hunting area on an annual basis throughout the life of the mining lease. This will affect approximately 10 visitor days of use per year.

Improved access will be available for recreation activities. Hunting can be expected to increase due to better access and increased human population. Elimination of vegetation and reduction of wildlife habitat and populations could affect hunting quality on and adjacent to the mine property.

Other activities can be expected to increase except for artifact hunting which will be slowly eliminated as the mining progresses. Sightseeing will definitely increase because of the interest in the mining activity and the desire to capture it on film.

Agriculture

Livestock forage

Grazing on the entire 4,352 acres of the mine area will be disrupted by the end of the mine life in 1999. A total of 1,088 AUMs (animal unit months) of animal production will be affected. The disruption will occur over time. Construction of mine plant facilities will disturb an additional 200 acres and 50 AUMs of forage production.

Of the total area disturbed, an estimated 200 acres (50 AUMs) will be permanently removed from production. This area will be utilized by mine facilities. Livestock management facilities which will be destroyed include: 12-1/2 miles of fences, five stock water dams, numerous spreader dams, and two water wells.

The ranchers presently using this area will be affected to an unknown extent. A major portion of the area is owned and utilized by Jacobs Land & Livestock which is a subsidiary of Kerr-McGee. Once mining is completed, it plans on continued utilization of the area for grazing purposes.

Transportation Networks

There will be 2-1/2 miles of Little Thunder Road and a number of unimproved dirt roads destroyed as mining reaches them. These roads are used by ranchers for access to cattle pastures and by hunters for access. Loss of these roads will cause an inconvenience to these users by requiring them to travel somewhat further. There are a number of other roads that may be used when the above roads are destroyed.

The existing 14.4 kv powerline will have to be moved as mining operations reach the area it crosses. There should be no impact on power users.

Increased traffic created by population growth and employment at the mine may increase road congestion and hasten deterioration. Without knowing where the population will settle, identification of which roads will receive this increased use is not possible.

Socio-Economic Conditions

The primary socio-economic impacts will be those associated with increases in capital expenditures, employment, population, and income.

Estimated capital expenditure at the mine will be 58 million dollars. Construction of the mine site will employ 200 people for about 1-1/2 years. These people and their families will probably live in a trailer camp to be established near Reno Junction.

The following table shows estimates of employment, population, and wages induced by the mine. An average annual income of $15,230 per employee in 1975 is expected.

Table 3

Estimated Employment, Population and Wages Induced by the Jacobs Ranch Mine

	1975	1980	1985	1990
Mine Employment	175	200	225	225
Other Employment	350	400	450	450
Total Population	1,260	1,410	1,550	1,550
Wages from Mine Employment only*	2,665,250	3,887,400	5,581,800	7,123,950

*Assume inflation = 5 percent per year.

The mine operation will continue until the year 1999. Population growth will increase the demand for services, protection, water supplies, sewage disposal facilities, and housing. Problems associated with more dense populations such as crime, mental illness, and unemployment will probably increase. These impacts are discussed in Part I.