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COAL RESOURCES OF THE
SAN JUAN BASIN, NEW MEXICO

by

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prepared for the

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Clarification to Open-file Report 84, 23 January 1987

To clarify the letter to the Office of State Geologist and NMBM&MR from William R. Speer, Edward C. Beaumont, and John W. Shomaker, the coal ownership maps that are included with this report are available for consultation and reproduction along with the text of the report. The maps, however, are not the sole property of the State of New Mexico, but can be sold by Coal Resource Map Company whose main owners are William R. Speer and James L. Hopkins of Farmington. The confidentiality provisions of the Professional Service Agreement, with the Office of the State Geologist (which has since been replaced by one of the bureaus of the New Mexico Energy and Minerals Department), do not apply to these maps.

These maps are a part of a series of maps that have been constantly updated by Coal Resource Map Company and therefore the original tracings for the 1977 maps are no longer available.

Frank E. Kottlowski

F. E. K.

Office of the State Geologist
New Mexico Bureau of Mines and Mineral Resources

The enclosed coal ownership maps (N.M. E-4, E-5, F-5, G-6, H-4, and I-6) are included for purposes of completeness and additional information with the report titled "Coal Resources of the San Juan Basin, New Mexico" prepared for the Office of the State Geologist and the New Mexico Bureau of Mines and Mineral Resources. However these maps were prepared for commercial sale prior to the project contract by the Coal Resource Map Company and should not therefore be construed as becoming the sole property of these state offices by virtue of their inclusion in this report. Provisions of the Professional Services Agreement, Contract No. 66-2, covering the confidentiality and exclusivity of the report prepared under this contract are understood and agreed not to include these cited maps.

William R. Speer
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Agreed to: _____

Emery Arnold

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Date

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COAL RESOURCES OF THE SAN JUAN BASIN, NEW MEXICO

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INTRODUCTION

This report is prepared at the direction of the Office of the State Geologist and the New Mexico Bureau of Mines and Mineral Resources for the State of New Mexico under a Professional Services Agreement, Contract No. 65-1. The report is a review of economic coal deposits in the San Juan Basin of New Mexico, describing briefly their geologic setting and mode of occurrence, their historical development and use, the current status of coal land ownership and leasing, and mining activity and its economic implications for the state. The primary purpose of the report is to provide an up-to-date estimation of the tonnage of economically recoverable coal underlying developing areas in the San Juan Basin, particularly those owned by the state; reliability of the estimate is also indicated for each area of development.

GEOLOGICAL SETTING

The San Juan Basin occupies the northwestern corner of New Mexico and a small portion of the southwestern corner of the adjacent State of Colorado. It encompasses some 17,000

square miles and is in the southeastern part of the Colorado Plateau physiographic province. This province is characterized by an arid to semi-arid climate, intermittent streams, sparse vegetation and a series of mesas, canyons, plateaus, and broad dry-wash valleys that have resulted from the erosion of alternating sandstone and shale beds.

Geologically, the basin is a broad, regional structural depression ringed almost entirely by mountainous uplifts. It is asymmetrical in that its structural axis lies closer to the northeastern edge of the basin (Figure 1). The sedimentary strata on the northeastern flank dip very steeply while on the broad southwestern flank, termed the Chaco Slope, the beds dip much more gently basinward, rarely exceeding 5°. The extreme western and eastern edges of the basin are terminated by major structural features--the Hogback monocline on the west and the Nacimiento fault-San Juan Mountain complex on the east. Basinward of outcrops of the upper portion of the Late Cretaceous beds, little significant structural deformation (i.e. folds or faults) is evident from either the surface or subsurface control.

The basin contains sedimentary rock with an aggregate thickness of approximately 15,000 feet in the central part (Figure 2). These beds range in age from Cambrian to Tertiary, and overlies Precambrian igneous rocks. Only the Upper Cretaceous beds are of immediate interest to this report, as they contain all of the known economic coal deposits. These beds consist predominantly of an alternating sequence

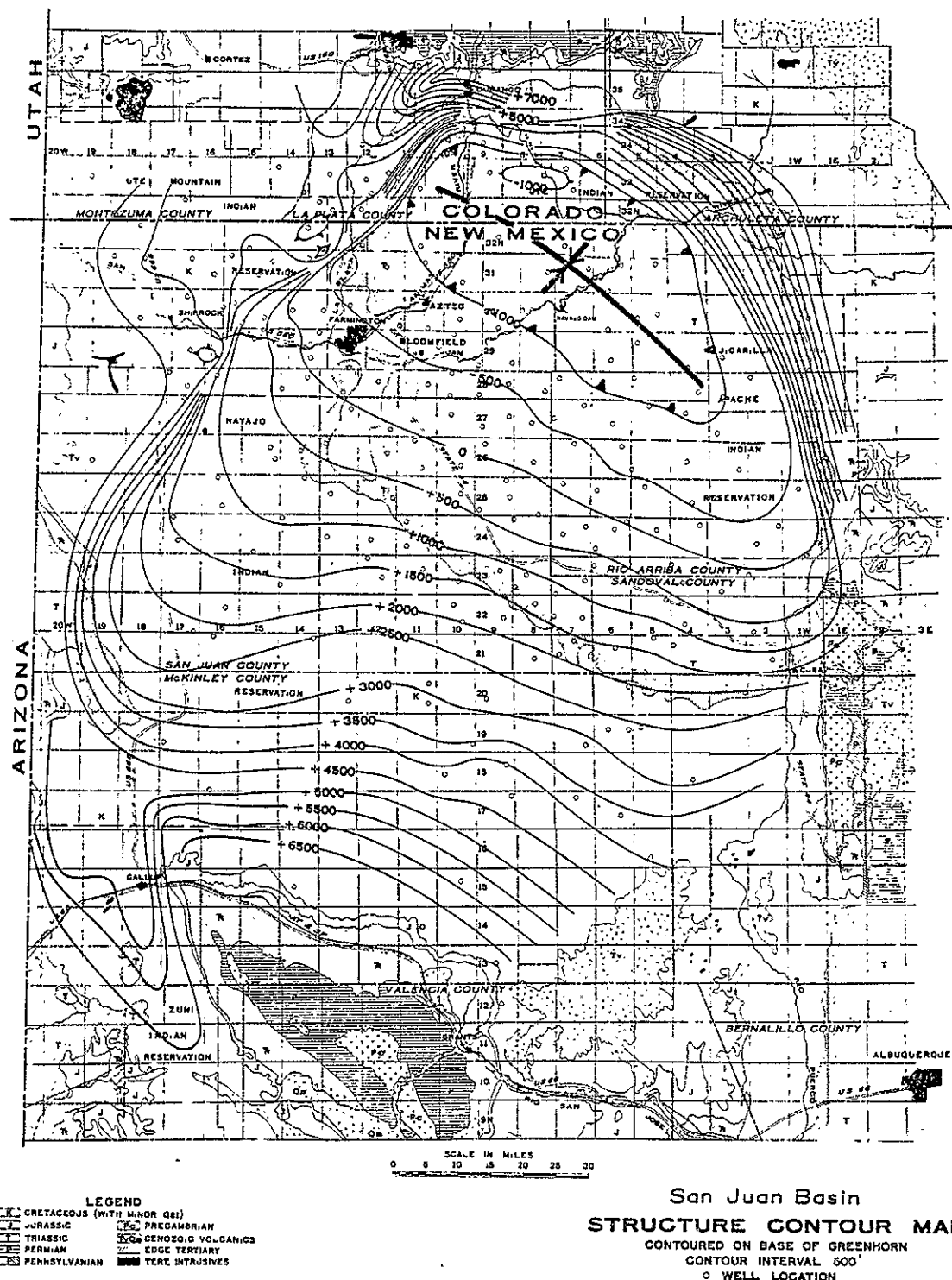
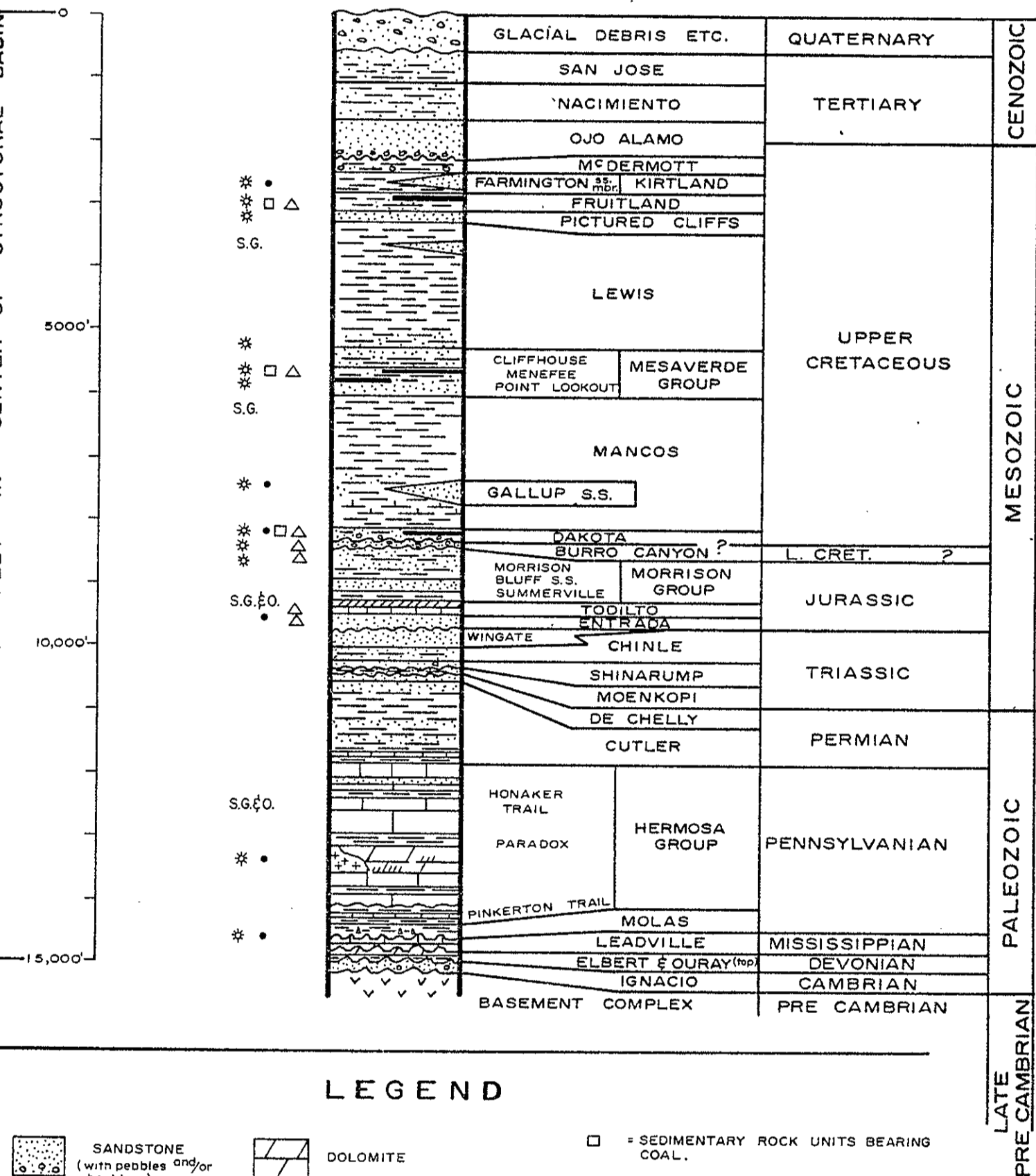


Figure 1 - Structure Contour Map of San Juan Basin, New Mexico from Galley, J.E. et al, 1968, A.A.P.G. Memoir No. 10 - showing the area of study included within this report.

SAN JUAN BASIN - NORTHWESTERN NEW MEXICO

STRATIGRAPHIC COLUMN



of fine-grained sandstones, siltstones, and shales with lesser amounts of limestone, siderite, and coal. The coal-bearing units include, in ascending order, the Dakota Sandstone, the Menefee and Crevasse Canyon Formations of the Mesaverde Group, and the Fruitland Formation. Since the Dakota Sandstone contains limited quantities of coal and has only one known probable commercial occurrence, this report is concerned principally with the Fruitland and Mesaverde coals.

While the structural geology of the basin is relatively simple, the stratigraphy of the Upper Cretaceous beds is complex. The San Juan Basin is a classic geological site for the study of strata which exhibit rapid lateral changes. These changes are the result of sediment deposition in a coastal environment with a constantly shifting shoreline. The basin is the present site of what, in Late Cretaceous time, was the margin of a great shallow inland sea which covered most of the central interior of the North American continent. The shoreline fluctuations of this inland sea and the consequent depositional pattern are recorded in the 6,500 feet of Upper Cretaceous sedimentary beds presently preserved in the down-warped San Juan Basin.

The initial incursion of the Late Cretaceous sea from the northeast extended appreciably beyond the confines of the present basin into central Arizona. Its slow retreat, with many minor and one major reversal, occupied all of Late Cretaceous time in this area. The result, largely preserved in the subsurface and revealed by a study of both surface and

subsurface rocks, is, in gross aspect, a jagged wedge of non-marine sedimentary rocks in the southwest interfingering to the northeast with rocks of marine origin. A vertical section at any one location within the basin will show a complex sequence of strata representing sediments laid down originally in offshore marine, nearshore marine, beach, coastal swamp and nonmarine coastal flood plain environments. Figure 3 is a diagrammatic cross-section of the Upper Cretaceous rocks constructed from examination of outcrops along the western margin of the basin. Although the vertical scale is highly exaggerated with respect to the horizontal scale the lateral changes depicted are approximately in their proper geographic position.

The offshore marine deposits, characterized by muds with occasional fine-grained sands and silts, form the majority of the dense shales found in the section. The nearshore and beach sand deposits constitute the cleaner sandstone while those sandstones with a mixed, generally finer-grained consistency result from flood-plain deposits. It was in the coastal swamp and deltaic environments of the lowlands immediately landward from the beach that the peat beds were deposited and from which the coals were formed. Organic matter from plant debris accumulated in these swamps was preserved in their stagnant bottoms and was eventually buried by a coastline advance or retreat. After the lapse of sufficient geologic time and deep burial, this vegetal material underwent diagenesis to become coal. These swamps periodically received influxes of muds and silts which mixed in varying amounts with the organic matter

to later produce not only the discrete carbonaceous shale and siltstone partings interbedded with the coals, but also the disseminated impurities within the coal. These impurities plus the inherent mineral matter contained in the woody debris make up the ash which remains when the coal is burned.

The thickness of an individual coal bed is generally a function of the length of time in which the shoreline remained stable during any given depositional period. A static shoreline allowed a greater accumulation of organic debris and hence a thicker coal. Generally, individual coal beds in the San Juan Basin are less than 10 feet thick. They tend to occur in a sequence of several beds separated by shales of similar thickness, and while they are lenticular by nature, they do lie generally in a predictable lithologic sequence within a given formation. By and large the thicker coals occur near the boundary between the coal-bearing facies and the marine sand facies. The more economic deposits have beds ranging up to 25 feet in thickness with some individual beds as much as 35 feet thick with some shale partings. Generally coals less than 3 feet thick are considered uneconomical to a strip mine and are excluded from reserve calculations unless they are near thicker coal beds.

It is important to note that within the basin the advancing and retreating shoreline remained relatively straight and trended northwest-southeast throughout the entire period. With minor variations, the depositional trends throughout the period were linear and sub-parallel, whether

the sea was advancing or retreating. Thus, a lithologic unit can be traced or projected to the northwest or southeast and can be correlated on the basis of similar lithologic characteristics with reasonably good accuracy. Marked changes will occur in any unit when traced perpendicular to the depositional trend (i.e. northeast or southwest). Major interruptions of the northwest-southeast trends occur at varying intervals where streams or river systems passed through the swamp environment and replaced peat deposits with sand and silt. It should be noted also that these depositional trends very closely parallel the present structural strike of the strata over most of the southern flank of the basin. This coincidence places a much greater amount of the outcropping coal in a favorable stripping situation.

The coal beds of both the Fruitland Formation and the Menefee and Crevasse Canyon Formations of the Mesaverde Group occur as lenticular bodies elongated in a northwest-southeast direction paralleling the ancient shorelines. Their widths vary appreciably, but are on the order of a few miles. In a vertical sense the individual beds generally occur in an overlapping series as the belt of coastal swamps migrated in response to relatively minor oscillations of the sea.

Because of this progressive transgression and regression of the sea during Late Cretaceous time, the individual rock units are not time-equivalent when traced perpendicular to the depositional trend. As a general rule, any individual regressive deposit is younger--in a seaward or northeasterly

direction. Early geologists mapping and naming surface formations in the basin were unaware of this situation, and because rock units were usually considered to be time units, this later led to a confusion of bed relationships and correlations which in turn led to nomenclature problems. No attempt will be made in this report to review the history of these difficulties, but it is mentioned to explain the reasons for a multiplicity of rock unit names, particularly within the units making up the Mesaverde Group. The relationship of formations can be seen in Figure 3.

Because the southern and southwestern flanks of the basin have a much gentler dip than the other flanks, the outcrop patterns of the coal-bearing strata are wider and more extensively exposed. More coal leasing has occurred along these southern exposures not only because the coal beds are of economic thickness, but also because more coal can be strip-mined at shallower pit depths with less overburden. To a lesser extent the Fruitland coal beds on the western flank are amenable to shallower stripping also, since the increase in dip along the Hogback monocline, marking this margin, occurs in older beds and does not appreciably affect the Fruitland Formation. The Mesaverde coals, on the other hand, are affected by this structural flexure and their steep dip prevents economic stripping. Around the northern and eastern peripheries of the basin the Fruitland Formation and Mesaverde Group have extreme basinward dips, so that the only possibility for mining is underground and even this is

of doubtful economic practicality.

The Mesaverde coals in the southern basin have a much more irregular outcrop pattern. There are more coal beds in the Menefee and Crevasse Canyon Formations than in the Fruitland Formation and individual beds do not tend to be as thick. In the Gallup area (Figure 3) a concentrated sequence of coal units can be found representing a lengthy period during which the Cretaceous shoreline was relatively stable. The accumulation of coal is, however, more in number of units than in thickness of individual units. These units are preserved as a result of their occupying a structurally low-re-entrant in the basin's southern margin, called the Gallup Sag. These commercially valuable coals have been removed by erosion along the depositional trend to the northwest and southeast within the immediate San Juan Basin; however, time-equivalent, coal-bearing beds are found at some distance further to the northwest in the Black Mesa Basin of Arizona.

The coal beds of the San Juan Basin have been studied extensively (see references) aided by extensive deep gas-well drilling in the central portion of the basin. Outcrops and bed configurations have been well-delineated. Early calculations of minable reserves based on these surface measurements were found to be in error upon further exploration by shallow drilling programs. The reserves were uniformly underestimated principally because surface bed thicknesses are usually found to be substantially less than those existing in the shallow

subsurface immediately adjacent to surface outcrops. This apparently results from surface weathering of the coal, from the lenticularity of the coals, and a natural propensity for the section containing the thinner coals to be exposed by a differential erosional process. Whatever the reason, it has been found that an exploration program to delineate minable coal reserves requires a relatively extensive drilling program in order to accurately determine the presence and amount of coal available in any part of the basin.

SAN JUAN BASIN MINING HISTORY, METHODS AND COSTS

The history of coal mining in the San Juan Basin dates back to the late 1800's and coincides with the entry of the railroad into Territorial New Mexico. The town of Gallup, on the southwestern edge of the basin, grew around mines in the area adjacent to the Atchison, Topeka and Santa Fe Railroad Company's standard gauge lines. In the northern portion of the basin, coal fields at Monero and Lumberton supplied the narrow gauge railroad of the Denver & Rio Grande Western Railroad Company. Several minor railroads to the mining districts of the San Juan Mountains were provided coal by mines near Durango. Mining smelters also utilized powdered bituminous coal and the lower grade slack was used for boiler fuel. The copper smelters in east-central Arizona and El Paso, Texas used coal from the mines near Gallup until the 1910's and 1920's when a switch to oil occurred. Dieselization of the railroads immediately after World War II and the conversion

to oil and natural gas heating during this period closed out the first era of San Juan Basin coal production. In 1954 New Mexico's total annual production fell to an all-time low of 123,000 tons from a previous all-time high of about 4 million tons per annum in 1918,

During this initial era essentially all of the basin's coal was obtained from underground mines. Production was mainly from drift mines entering the nearly horizontal coal beds cropping out along the faces of mesas and cuestas. The big turning point in production occurred in 1962 with the advent of large-scale strip-mining operations. Cumulative production in the entire State of New Mexico from the time of the first output records in 1882, until 1962 was 126.5 million tons. This production included substantial amounts of coking coal from the Raton field mines of northeastern New Mexico. The total value of the cumulative coal was \$322 million, resulting in an overall price average of \$2.55 per ton.

In 1962 the Pittsburg & Midway Coal Co. (a subsidiary of Gulf Energy and Minerals Co., a division of Gulf Oil Corporation), began stripping operations at their McKinley mine in the extreme southwestern portion of the basin, some 14 miles west-northwest of Gallup. A high-volatile "C", bituminous coal is mined from five beds in the Gibson-Cleary Coal Member of the Crevasse Canyon and Menefee Formations, undivided, of the Mesaverde Group. All of the coal from this mine is shipped by unit train to the Arizona Public Service

Company's 120 MW Cholla power plant at Joseph City, Arizona, Production has ranged from 350,000 to 450,000 tons annually. The planned 500 MW expansion of the Cholla plant capacity will necessitate a gradual mine production increase up to 4 million tons annually by 1979, and continue that rate until at least the year 2000.

The average price of the 10,400-Btu coal at plant start-up in 1963 was \$2.95 per ton at the mine and \$4.75 per ton at the Cholla plant. Staged increases have pushed the 1977 coal costs, f.o.b. the plant, to \$14.45 per ton or 68¢ per M²Btu. The royalties paid on this coal by P&M range from 22.5¢ per ton on federal acreage up to a maximum of 37.5¢ per ton to the Navajo Tribe on a sliding scale basis when the mine is under full production.

Shortly after the initial deliveries of the Pittsburgh & Midway Coal Mining Co., a second large stripping operation began on the Navajo Reservation just south of Fruitland, New Mexico, on the western margin of the basin. Utah International, Inc. (UII), known then as Utah Construction & Mining Co., opened the first pit of their Navajo mine in 1962 to supply the nearby Arizona Public Service Co.'s Four Corners mine-mouth generating plant. The plant's first two 175 MW generating units were completed in 1963 and were expanded to a total capacity of 572 MW in 1964. At 572 MW capacity the plant installation required an average of 2.5 million tons of coal annually. The contract base price for a 9,000 Btu average blend coal was \$0.1125 per M²Btu, but was subject to

an automatic escalation ranging up to \$0.1475 per M²Btu. Subsequent contract price adjustments have been based on current nationwide operational costs which in 1977 resulted in a plant-site coal cost of \$4.45 per ton (\$0.2472 per M²Btu).

In 1967 the Southern California Edison Company and four other WEST members joined Arizona Public Service Company in constructing two additional generating units at the Fruitland plant. These units were rated at 818 MW each and their completion in mid-1970 resulted in a total generating capability of 2,172 MW. With the additional units, the coal requirements from the Navajo mine have increased to a maximum of nearly 7.0 million tons in 1974 and are expected to be almost 6.5 million tons for 1977.

The coal reserves on the 31,000-acre UII property are contained in as many as seven major coal seams in a stratigraphic interval of 140 feet within the Fruitland Formation. Bed thicknesses range from four to sixteen feet, with a maximum thickness of twenty-eight feet having been encountered in the southern portion of the lease. Stripping operations follow a normal sequence of drilling, blasting and dragline removal of overburden. The exposed coal seam is drilled and blasted, then loaded with a power shovel or front end loader. The coal is hauled by both a fleet of 120-ton bottom-dump trucks and company-owned railroad cars to a crushing and blending area adjacent to the plant, some 2 to 5 miles from the pits. The mine's stripping ratio of

overburden-to-coal has been maintained at an annual average of not more than 5 to 1 since the opening of the mine and this average apparently can be sustained for most of the 35-year life of the present contract with its optional 15-year extension. The mining costs, though not revealed, can be inferred from the 1977 purchase price figure cited above to be well below the national and regional average for stripping operations,

In early 1973 Utah International, Inc. entered into a 25-year agreement with WESCO, a joint venture of Pacific Coal Gasification Company of Los Angeles and Transwestern Coal Gasification Company of Houston, respectively, subsidiaries of Pacific Lighting Corporation and Texas Eastern Transmission Corporation, to supply coal from the Utah lease to a mine-mouth coal gasification complex to be built by WESCO on the Navajo Reservation. The plant is initially designed to produce 250 million cubic feet of synthetic natural gas per day which will be transported and connected by pipeline to an existing Texas Eastern (Transwestern Coal Gasification Co.) pipeline system near Gallup for transshipment to the West Coast. WESCO's plans call for an ultimate expansion to as many as four plants with a combined output of one billion cubic feet per day. Utah International, Inc. has optioned its remaining coal and water resources to fill these additional requirements. The initial plan awaits approval by the controlling governmental bodies. Before the plants can be built a number of actions and approvals

by federal, state and Indian agencies will be needed. Required Interior Department actions include approval of an amended water contract, mining and restoration plans and pipeline right-of-way clearance. A plant-site lease and right-of-way from the Tribe is also required, as well as approval of the already-released Environmental Impact Statement. The primary requirement at present is the approval of a federally-guaranteed loan bill which WESCO maintains is necessary to be able to finance construction costs.

A third strip mine became productive in mid-1973 immediately north of the Navajo mine on properties of the Public Service Company of New Mexico. The mine operator is Utah International, Inc., under contract to Western Coal Co., a subsidiary of Public Service Co. of New Mexico, and Tucson Gas & Electric Co. The Fruitland Formation coal, being produced at approximately 4,500 tons per day, is being utilized by the current 720 MW generating plant of the Public Service Co. of New Mexico, and Tucson Gas & Electric Company near the coal leases. The first unit was completed in August 1973, and a second 340 MW unit was completed in December 1976. In addition, two more 500 MW units are to be added. Construction on the first is to commence immediately and it is to be operative in May 1978. The second is to be completed by May 1980. As the other two units are added, coal production will be increased to approximately 3.6 million tons per year to supply the total 1,680 MW capacity. The current cost of coal at the plantsite is approximately \$5.26 per ton.

Further expansion of either power or gasification complexes, other than those already described, faces a severe restriction not from inadequate coal supplies, but from lack of available water supplies. Water requirements for power plants in production today are around 18 acre-feet-per-year-per-megawatt capacity. Gasification complex uses are around 30 gallons per million cubic feet delivered. The source of water for the existing power plants, and probably the gasification plants is the San Juan River in the northwestern part of the basin. The San Juan River is the only perennial stream in the basin, although the drainage systems of the Rio Puerco and Zuni Rivers in the extreme southern portion offer intermittent stream flows. The flow and use of water in the San Juan River is regulated by the Colorado River Compact of 1922 and the Upper Colorado River Compact of 1948. New Mexico's allocation of Upper Basin water is 83,000 acre-feet annually. All of this allotment is committed to various irrigation projects, evaporation losses or industrial use. Contracts for annual industrial use already made include 44,000 acre-feet to Utah International, Inc. and 20,200 acre-feet to Public Service Company of New Mexico, while a pending application by El Paso Natural Gas Co. for 28,250 acre-feet-per-year requires Bureau of Reclamation approval and U. S. Congressional action upon a Department of Interior proposal. It is expected that no

action will be taken on this matter until the Master Environmental Impact Statement submitted for the entire project has first been approved. Other users will probably obtain supplies from subsurface sources. A number of major coal and uranium owners have conducted studies of groundwater potentialities, which appear to be promising, although supplies must be drawn from depths generally greater than 5,000 feet and quality is fair to poor.

A substantially smaller stripping operation is immediately south of Gallup. Originally named the Sundance mine, it is operated by AMCOAL and currently produces limited tonnages of coal from the Mesaverde Dilco Coal Member which is transported by rail for use in the parent company, AMCORD, Inc.'s cement plants in Arizona and California. No other currently active commercial mines are known within the basin, although periodically some of the older underground mines scattered around the basin periphery are worked for limited local usage. In addition, government agencies or tribal authorities have opened small prospect pits in some areas, particularly in the southern portion of the basin, for use by local Indian families as a fuel supplement.

COAL RESERVE OWNERSHIP STATUS

General Comments

Land ownership in the basin is overwhelmingly under Federal management (see Coal Lease Map in pocket). Public lands comprise about 45 percent of the total acreage and

are administered by the Department of Interior's Bureau of Land Management. With only rare exceptions, the United States Government has retained the mineral rights under the patented public lands. Some 34 percent of the basin's lands are on Indian reservations with the mineral rights governed by Tribal Council decisions which are subject to the approval of the U. S. Bureau of Indian Affairs. In addition, a considerable number of 160-acre federal tracts in the southern portion of the basin have been set aside for qualified Indians to homestead and are designated as Indian Allotted Lands. The mineral rights on allotted lands are administered in the same manner as are Tribal lands.

Approximately 7 percent of the land in the basin is state-owned, with the state retaining all mineral rights. Under New Mexico's Enabling Act the state was normally granted sections 2, 16, 32, and 36 in each township, but previous land conveyances made it necessary in many cases for the state to select alternate indemnity lands. Some 4 percent of the land and mineral rights in the basin are owned by the Santa Fe Pacific Railroad Company along the southern and southwestern flank of the basin. Originally, these lands were given to the railroad by the federal government in a checkerboard pattern of sections along their right-of-way as an inducement to the early development of the nation's railway systems. Subsequently, the land was traded with various government agencies in an attempt to consolidate acreage into more compact units, a move which resulted in today's somewhat irregular ownership pattern.

The remainder of the San Juan Basin land, about 6 percent, is privately owned. These lands include U. S. patents to individuals, original Spanish land grants, tax-deed lands and county lands. Mineral rights were granted with the patents issued prior to the Homestead Act of December 29, 1916; however, the government retained the rights on those granted after that date. Spanish land grants are those issued by the Spanish Crown and later the Mexican Government prior to the Mexican-American War in which the United States secured the land by treaty. These grants were recognized as legal by the federal government. In many cases the government has subsequently purchased these lands and submitted their mineral rights to the BLM for control under the Acquired Lands Act. Other grants are controlled by trustees, companies or individuals.

Indian Lands

Coal mining leases of Indian tribal lands are granted currently by competitive bid on lands that are requested to be put up for bidding by individuals, companies or the Tribe itself. Leases normally carry a royalty on the tonnages produced with a minimum royalty provision, an annual rental, an annual development expenditure requirement and other stipulations with regard to restoration, damages, waste prevention, Indian employment and accounting procedures. Of the four tribes owning land in the basin proper--Jicarilla Apache, Ute Mountain Ute, Southern Ute and Navajo--only the latter two have issued leases for coal mining.

The Southern Ute Indians in 1965 entered into an agreement with Peabody Coal Co. for exploration of 98,000 acres of Tribal lands in La Plata County, Colorado, with Peabody being assured a minimal 200 million ton reserve leasing right. Peabody has subsequently leased almost 15,000 acres covering a majority of the Fruitland Formation outcrop in the western portion of the reservation under which they estimate a strippable reserve of 50 to 60 million tons. These leases were up for renewal in July of 1977. The Southern Ute Tribe is presently studying ways to structure a new lease or joint venture program and plans to offer a prospectus for consideration by operating companies in the near future. In addition, Peabody has secured leases on 2,044 acres of federal and some 300 acres of fee lands adjacent to the Southern Ute lands across the border into New Mexico. The acreage encompasses the Fruitland coal beds, which occur in a narrow outcrop band and which dip relatively steeply (5° to 18°) into the San Juan Basin along the marginal Hogback monocline. The steep dips with attendant excessive overburden thicknesses combine to make strip-mining possibilities limited. But relatively good coal-bed thicknesses and continuity are positive factors which make stripping more feasible, particularly in the southern portion of the lease where structural modifications result in a flattening of the beds. A reserve of some 10 to 15 million tons has been calculated for a pit of 120 feet depth covering the majority of the Peabody lease within New Mexico. In addition, Peabody selected 4,528 acres of Southern Ute land for leasing

in the Hay Gulch area of T. 32 N., R. 12 W. in Colorado; however, these leases were cancelled in 1975. Coal possibilities here are amenable only to underground mining and consist of upper Menefee coals of the Mesaverde Group under a minimum of 250 feet of massive sandstone overburden.

The Navajo Indian Reservation in New Mexico covers a substantial portion of the outcrop lands of both Fruitland Formation and Mesaverde Group beds along the western margin of the San Juan Basin. Leases issued by the Navajo's include those assigned to Utah International and to El Paso Natural Gas Co.-Consolidation Coal Co. on Fruitland coal outcrops, as well as one, previously mentioned, to Pittsburg & Midway Coal Co. on Mesaverde Group coals. The UII and the El Paso-Consol leases effectively cover all of the strippable Fruitland coal on the Navajo Reservation.

The UII original lease of 24,320 acres granted in 1957 was increased to over 31,000 acres covering the strippable Fruitland coals from the San Juan River in T. 29 N., R. 15 W., southward some 23 miles to the vicinity of the Burnham Trading Post in central T. 25 N., R. 16 W. This lease has an estimated 1,146 million tons of reserve in the surface to 120-foot stripping depth according to company figures, a tonnage considered as minable at less than a 10:1 stripping ratio.

The El Paso Natural Gas Co. and Consolidation Coal Co. jointly hold a lease to the south of the UII lease comprising 40,287 acres which was granted in 1968. The lease extends

for about 20 miles southward and eastward as the strike of the Fruitland Formation changes from a southerly direction along the west side of the basin to a southeasterly direction on the south flank of the basin. The lease is purported to contain total reserves of 825 million tons of which 678 million tons are recoverable to a depth of 150 feet with an overburden-coal ratio of 5.83:1. There are four principal coal seams which average about 8,300 Btu/lb., about 0.72 percent sulfur, and about 22.5 percent ash.

The lease area is divided for planning purposes into northern and southern parts. The plan at the time of this writing is to mine 6.4 million tons a year from the northern part for export to off-site power generation facilities. The southern part is to be reserved for a single 410 M²CFD coal gasification complex which is a significant reduction in the previously planned 785 M²CFD capacity from two gasification complexes. El Paso and Consolidation plan to make the reserves from the southern part available for electric power generation should the gasification project not be implemented. Were the gasification complex to be built, it is anticipated that 453.9 million tons would be mined for that purpose over a 30-year period.

At full production the mines will require about 1700 acre-feet of water per year. This water will be supplied from a series of wells located on the lease. In addition, the 410 M²CFD gasification plant will require between 15,000 and 28,250 acre-feet per year mainly for process. This water

is scheduled to be supplied from the Navajo Reservoir, but the approval of both Congress and the Secretary of the Interior must be forthcoming before the allocation can be made.

In T. 17 N., Rs. 19, 20, and 21 W., the Pittsburgh & Midway Coal Co. has 11,157 acres under lease from the Navajo Tribe. This acreage adjoins the company's McKinley mine in T. 16 N., R. 20 W. which is on 8,156 acres of leased federal lands and approximately 7,600 acres of Santa Fe Pacific lands. Total reserves for the company's properties are on the order of 187 million tons to a stripping depth of 120 feet. Some 75 million tons of the 150-foot stripping-depth reserves are attributed to the non-Indian acreage.

Public Lands

Coal leasing of public lands upon which the United States Government has retained mineral rights was previously provided for in the Mineral Leasing Act of February 25, 1920. Coal was treated specifically in certain sections and amendments of this act, which is administered by the Bureau of Land Management. The main provisions included the following: (1) prospecting permits for a period of two years could be obtained on lands subject to leasing by qualified applicants with the advance payment of the first year's rental at a rate of 25¢ per acre, (2) a permit could not exceed 5,120 acres and individual holdings in permits and leases could not exceed 46,080 acres, (3) applications for permits were to be accompanied by a proposed plan of prospecting, including the estimated cost and timing of such operations, (4) a prospecting

permit could be extended an additional two years by an authorized Bureau of Land Management officer provided the permittee had met certain provisions relating to diligence in determining the presence and workability of coal deposits covered by the permit, (5) a permittee who discovered coal in commercial quantities was entitled, upon application, to a preference right lease on all or part of the lands in the permit, (6) annual rental on leases was 25¢ per acre for the first year, 50¢ for the second, third, fourth and fifth years, and \$1 for each succeeding year thereafter during the continuance of the lease, (7) leases were subject to readjustment or renewal at the end of the first 20-year period, (8) government royalty on a lease was determined on an individual case basis (then not exceeding 25¢ per ton produced), but a minimum royalty was established beginning with the sixth year of the lease, (9) the government was authorized also to lease coal lands by competitive bidding upon application or on the Bureau's own motion, (10) acreage units, terms and conditions of leasing competitively were to be set out in the notice of sale and the highest qualified bonus bid per unit was generally accepted.

However, beginning in mid-1970 coal leasing or prospecting in the Rocky Mountain states on public domain was frozen by the U. S. Department of Interior. The last federal lease issued in New Mexico was dated January 1, 1970, and the last prospecting permit was dated January 1, 1971. All applications pending since these dates have been held without action. On

February 13, 1973, the Secretary of Interior issued a discretionary authority order which suspended the issuance of any prospecting permits until further notice and also rejected all currently pending applications for permits. In the San Juan Basin the backlog of permit applications rejected covered over 270,000 acres. The Secretary's memorandum specifically stated that the order did not restrict the rights of the holders of prospecting permits issued prior to that directive from obtaining preference-right coal leases under the previous regulations of the Mineral Leasing Act. Despite the fact that all of the individuals and companies in this category have subsequently filed applications for preference-right leases, none have been issued to date.

Preference-Right Lease Applications (PRLA's)

These applications for federal leases, made under the old federal leasing provisions, allowed for the leasing of any acreage under a valid federal prospecting permit where "commercial quantities" of coal were discovered during the assessment work required by the permit. All prospecting permits have subsequently expired (being issued for a 2-year period only with a right for an additional 2-year renewal). Accordingly, federal coal prospecting permits no longer exist, but in the Rocky Mountains hundreds of thousands of acres have been applied for under the preference-right provisions. As might be expected, a substantial portion of this acreage includes the better areas of potential coal reserves under federal acreage. A decision on the disposition of this

acreage is at least, if not more, important than the decision to renew competitive bidding on the remaining federal acreage in the San Juan Basin. The USGS reports that there are currently about 12,000 million tons of recoverable coal reserves under the PRLA acreage (as well as 16,000 million tons of undeveloped reserves under existing federal leases).

In the western states the Interior Department has 184 applications pending involving 496,000 acres. In New Mexico there are 27 applications for 71,218 acres (described later) which effectively cover all of the possibilities of strippable reserves of the Fruitland Formation that are not already under lease. Since the outcrop areas of the Mesaverde coal units are primarily under private (Santa Fe Pacific Railroad or New Mexico and Arizona Land Co.) or Indian (Navajo) control, there is actually a relatively small portion of federal acreage with real coal potential that is open for future competitive leasing in New Mexico.

It has been assumed that the federal government will eventually issue the leases that are under preference-right lease application. Certainly if they disallowed the applications many extended legal suits would follow, initiated by the applicants who have expended considerable sums in exploring the original permits.

In early 1976 proposed regulations were issued for comment which set out new terms for federal coal leasing and the issuance of preference-right leases. They included decisions for the definition of (1) logical mining units,

(2) diligent development, (3) continuous operation, (4) lease termination, and (5) valuable deposits or commercial quantities. A logical mining unit (LMU) describes an area amenable to mining in a single, economical operation. Understandably this will vary widely and is not readily definable at present, but apparently will be assigned to presently existing, contiguous leases belonging to one lessee, with the lessee having the right to combine leases into larger mining units and the right for the mine operator to identify a LMU within 2 years. For future leases, the area of each tract offered for competitive bidding will be considered an LMU. Diligent development is "the timely preparation for and initiation of production of reasonable quantities of coal from the LMU", and is defined as the development of at least one-fortieth of the recoverable reserves assigned to the LMU within 10 years from the date of regulation promulgation or the lease issuance, whichever is later. Continuous operation of the lease is based on production of one percent or more of the assigned reserves annually, together with the payment of advanced royalties based on a standard schedule of production sufficient to exhaust the leased deposit within 40 years. Lease termination would result from failure to produce the lease under the diligence and continuous operation provisions, but the Secretary would have discretionary power to extend deadlines in case of events over which the operator has no control.

In the May 7, 1976 Federal Register (Vol. 41, No. 90) the final regulations were issued and it was indicated that

"after final promulgation of these regulations, the Bureau of Land Management will contact all preference lease applicants and inform them of the new regulations, and offer them an opportunity to submit additional information to meet the requirements of the regulations." The only major changes in the proposed regulations involve a revision which would divide the application procedure into two phases in recognition of the unfairness of requesting that the applicant submit mining cost information prior to being informed of the lease terms and royalties. The two-phase method requires that the applicant first submit his reserve information, a physical description of the area requested and a description of his proposed mining operation. From this data Interior will make a technical examination/environmental analysis of the permit area and prepare appropriate lease terms and stipulations which would then be given to the permittee. From these data the permittee must then submit the second phase, a detailed analysis of mining costs and potential revenues, which must then be reviewed and approved by the Department as a reasonable evidence of discovery of "commercial quantities" before the lease will be issued. "Commercial quantities" is defined by regulation as a coal quantity "of such a character and quantity that a prudent person would be justified in the further expenditure of his labor and means with the reasonable prospect of success in developing a valuable mine. The permittee must present sufficient evidence to show that there is a reasonable expectation that his revenues from the sale of the mineral will

exceed his costs of developing the mine, and extracting, removing, and marketing the mineral." The costs must also include applicable royalties and taxes; and those costs included in complying with governmental regulations, reclamation and environmental standards. With regard to the requirement of proving revenue in the final showing to indicate profitability, the regulations clarified this point to the extent that although "an executed contract will usually be the best evidence of revenues," the "Department recognizes that in many instances a contract to sell coal cannot be signed until after a lease is awarded," and that "lack of a contract will not disqualify a permittee from receiving a lease." Instead "estimated revenues may be based on factors such as price received for similar coal, evidence of existing markets or the applicant's best judgment of future markets."

Shortly after issuing the new leasing regulations, the Department of Interior in June 1976 also requested nominations for federal competitive coal leasing tracts, under the new competitive leasing regulations. The nominations were called for in the "principal states which contain major areas of federally-owned coal," and included North Dakota, Montana, Wyoming, Colorado, Utah and New Mexico. Any number of tracts ranging in size from a 160-acre minimum to a 2560-acre maximum could be requested on a confidential basis and without requirements for rationale for the nominations. Subsequent instructions required that a geological justification for the nominations be submitted, as well as a need for specific coal tonnages be

shown. Additionally, some six months after the nominations were made, the Interior Department decided to divulge the names of the nominators and the tracts they nominated, allowing those nominators who desired confidentiality to seek legal relief. In New Mexico approximately 300,000 acres were nominated by thirteen nominees. Arizona Public Service Company and Arizona Electric Power Co-op Inc. were the nominees requesting the largest amounts of acreage for competitive sale.

Lands requested for lease sales were reportedly prioritized by the BLM for each state and an analysis made of each general area for factors such as the total resource base available, immediate coal needs, environmental impact and economic and demographic considerations. Area priorities were then established on the basis of these analyses and a regional environmental impact statement for mineral leasing required to be issued on the areas selected before any competitive sales could be held.

The Department of Interior had already indicated that no coal developments could precede a regional Environmental Impact Statement for each coal-mining area. They also stated that the scheduled completion dates for these environmental statements would have the Northern Powder River, west-central North Dakota, central Utah, southern Utah and west-central Colorado (in that sequence) completed prior to the statement on the San Juan Basin, which was originally scheduled for July of 1978. The San Juan Basin E.I.S. has subsequently

been rescheduled for completion in March of 1979. Since the regional statement must be issued before any actions may be started towards coal mining, it is apparent that no lease issuance--preference-right or competitive--can occur before that date. In addition several new legal actions threaten to abort the new federal coal leasing regulations, to invalidate the regional E.I.S.'s now being prepared and to cause a re-evaluation of the entire EMARS (Energy Minerals Activity Recommendation System) program upon which the Department of Interior is currently basing its coal leasing and mining plans. At best the renewed imposition of the federal coal leasing moratorium for a period variously estimated at three to five years is indicated by the recent decision in the Washington D.C. U. S. District Court case of Natural Resources Defense Council vs. Hughes. Judge John Pratt has enjoined the government from any further leasing of federal coal and questioned the necessity of federal coal being developed at all in light of N.R.D.C.'s contention that "allocation of coal development between regions," the projected need for future coal, the rate of expected development, whether the government should encourage "or restrict the development of western coal as opposed to eastern coal," and the comparative economic costs of western, eastern and midwestern coal in various markets should all be considered before the green light is given to further leasing. N.R.D.C. had advanced three contentions: (1) a leasing moratorium should be declared pending a new environmental statement on the whole leasing

program, (2) no new mining plans should be approved until this EIS is completed, and (3) all current regional EIS's should be rewritten to reflect the considerations listed above.

Judge Pratt not only enjoined further leasing, but stopped any issuance of preference-right leases and restricted to a 3-year supply the amount of production that could be obtained under the currently applicable short-term criteria which applies to federal coal adjoining operating mines. He has ordered the Interior Department to examine its policy of withdrawing federal lands from leasing (noting that there are 26 billion tons of leased federal reserves already, which constitutes only 3 percent of the total U.S. production) and to utilize public comment in its program to rewrite the 1975 coal leasing E.I.S. The Interior Department has appealed the case, but Interior Secretary Andrus is already on record as being committed to revamping the entire EMARS program, including the E.I.S. rewrite and overhaul of both the short-term criteria and the PRLA requirements to make them more stringent.

A complete tabulation of all active federal coal leases and prospecting permits with preference-right lease applications in the San Juan Basin of New Mexico is included with this report as Appendix A. Reference should be made to this tabulation and the accompanying coal lease map for the following discussion of involved federal acreage.

Federal Leases

In the New Mexico portion of the San Juan Basin there are currently 26 active federal leases encompassing 40,881 acres. Individual lessees in the order of the amounts of their holdings and the amount of acreage under lease are as follows:

<u>Lessee</u>	<u>Acres</u>
1. Public Service Company of New Mexico	12,289
2. Consolidation Coal Company	9,303
3. Gulf Oil Corporation (P&M Coal Co.)	8,156
4. Chaco Energy Co.	6,336
5. Peabody Coal Co.	2,044
6. Eastern Fuel Assoc.	1,910
7. Various Individuals	<u>843.</u>

Total - - 40,881

The Public Service Company of New Mexico (PSNM), now under the name of Western Coal Co., are in two blocks, one of 6,833 acres and one of 5,456 acres. The first of these is located in T. 30 N., R. 15 W. and encompasses the bulk of the strippable Fruitland Formation north of the San Juan River northward to the southern boundary of the Ute Mountain Ute Indian Reservation. This lease is supplying coal for the PSNM San Juan Power Plant.

The second Western Coal Co. lease block at Bisti adjoins the eastern boundary of the El Paso Navajo lease on public lands, principally in T. 23 N., R. 13 W. This lease and those of Eastern Fuel Associates-Texas Eastern Transmission Co. and Chaco Energy Co., are located on Fruitland Formation outcrops along the gently northeastward-dipping Chaco Slope portion of the basin. The Western Coal Bisti block partially surrounds

and is adjoined on the east by open federal acreage, part of which was originally also under a prospecting permit by PSNM, predecessor of Western Coal. However, because of the acreage holding limitations, PSNM was unable to take it under lease, and after the permit expired the USGS Mining Supervisor classified the acreage as known coal-bearing, thus removing it from availability through the prospecting permit application route. In late 1973 Western Coal made application for all of the 8,640 acres of classified land on the basis of provisions in the Mineral Leasing Act of 1920 that provides for the modification of existing leases if adjacent federal acreage contains contiguous coal deposits that the authorized officer determines could be included in the original lease with advantage to both the lessee and the United States. No ruling has been made on this application.

The Thermal Energy-Peabody lease of 6,336 acres in the Star Lake area in Ts. 19 and 20 N., R. 6 W. was purchased originally on a competitive sale for \$1.11 per acre in mid-1967 and the lease was assigned to Seneca Oil Company. An agreement was made later between Seneca and Thermal Energy Co. of Dallas whereby Thermal Energy and Peabody Coal would earn rights to the lease by undertaking an exploratory drilling program to determine the minable reserves and Seneca would reserve an overriding royalty on the reserves. This initial program was conducted in early 1972 and the assignment was made in April 1974. The two companies conducted an in-fill drilling program in 1975 to better define the minable reserves

and recently signed an agreement as Thercol Co. with Texas Utilities Services, Inc. (TUSI) to jointly develop these reserves, together with their other potential reserves, as well as those adjacent (and elsewhere) belonging to the Cherokee & Pittsburg Coal and Mining Co., or C&P (a subsidiary of Santa Fe Industries). The agreement allows TUSI rights to purchase and mine 550 million tons of coal from the properties and provides also for an option to purchase an additional 300 million tons of deeper coal during the life of the agreement. The announcement of the agreement indicated that the mining plan contemplates commencement by 1980 of a 2 million ton-per-year rate, which would escalate to 20 million tons per year between 1991 and 2012. Chaco Energy Co. is the operating company formed by TUSI to conduct the mining.

Texas Utilities Service, Inc., a subsidiary of Texas Utilities Fuels Co. of Dallas, is a joint group of three Texas utilities--Dallas Power and Light Co., Texas Power and Light Co., and Texas Electric Service Co. which together provide service for a 75,000 square mile area of east, north-central and west Texas. The utilities plan to use the coal for electric power generation in both converted natural gas-fired boilers and in new coal-fired boilers. The coal is to be transported to the Texas sites by the Santa Fe Railway system. It is estimated that the cost of the construction and operation of the some 65 miles of railroad spur to the mine area, required to connect with Santa Fe's main line to the south, will be \$50 million. The agreement with C&P stipulates that C&P will

receive a royalty payment on each ton of coal mined from their properties amounting initially to approximately \$3.70 per ton. This base price is established on the basis of 9,000 Btu coal and a Gross National Product deflator index for the first quarter of 1976, with the price paid being adjustable for appropriate changes in these factors.

The 3-section Eastern Gas & Fuel Associates-Texas Eastern Transmission Corp. lease was originally taken in the name of Robert Cutherell of Houston, Texas, for a group of individuals who later assigned Eastern Fuel the lease, together with the much larger group of PRLA's that they controlled adjacent to, and northeast of, the lease. Eastern Fuel has conducted a drilling program under the direction of Paul Weir Co. of Chicago, to delineate the reserves under the lease. They also have drilled the PRLA areas under an agreement with the Bureau of Land Management, ostensibly to provide environmental data on the overburden material.

The Gulf Oil and Peabody holdings have been previously mentioned as being portions of larger lease blocks, held by each of the respective companies, which are composed principally of leased Indian acreage. The Consolidation Coal Co. leases cover substantial portions of the former underground mining area on the eastern side of the basin immediately south of Cuba, New Mexico. These mines were developed in the 1920's and 30's in coal beds of the Menefee Formation of the Mesa-verde Group, which crop out with a relatively steep dip along the eastern margin of the basin. The dip of the beds and the

substantial thickness of overlying sandstone strata preclude strip-mining. The Consolidation lease is currently being drilled by Ideal Basic Industries under an option purchase agreement. The several smaller federal leases held by individuals also are principally associated with minor underground workings.

The bulk of the acreage leased at the present time was obtained by an early application for preference rights on prospecting permits. Those obtained by competitive bidding were secured with a minimal \$1 to \$2 per acre bonus bid, with royalty payments of approximately 20¢ per ton established. The subsequent directive of the Secretary of Interior specifically does not preclude coal lease issuance won on future competitive lease sales conducted under the Mineral Leasing Act, but no competitive sales can be conducted until completion of the regional Environmental Impact Statement.

Prospecting Permits and Subsequent Preference-Right Lease Applications (PRLA's)

Prospecting permits issued in the New Mexico portion of the basin cover 80,031 acres, representing several disparate groups. A number of the original permittees have made assignments of portions or all of their permits. With two minor exceptions, all the permits are filed along the Fruitland Formation outcrop in the southern part of the basin, extend from the Public Service Company leases in T. 23 N., R. 13 W., east-southeastward to the vicinity of T. 19 N., R. 5 W. Only two of the original permittees did not file timely applications

for preference-right leases. A grouping of the various current controlling interests and amounts of their holdings is as follows;

<u>Permittee</u>	<u>Acres</u>
1. Eastern Fuel Associates	35,938
2. Arch Minerals (Hunt Oil & Ashland Oil)	22,448
3. Thermal Energy Co., & Peabody Coal Co.,	11,872
4. Kin Ark Corp., Tulsa	2,880
5. United Electric Coal Companies	2,811
6. H. N. Cunningham, Houston	2,080*
7. H. Lee & R. G. Hunt, Waterflow, New Mexico	80*
	<u>78,109</u>

*no preference-right lease application filed

The aforementioned Eastern Gas & Fuel Associates-Texas Eastern Transmission permits, assigned by Robert Cutherell during May of 1972, represent the largest block of mostly contiguous acreage that is under prospecting permit. This block of coal reserves was acquired for the announced purpose of future gasification. The fact that a large majority of this acreage is substantially removed from the Fruitland out-crop areas, thus at excessive stripping depths, makes its viability for strip-mining questionable. Depths to the major coal beds could range from 55 to as much as 800 feet, with depths over a large part of the acreage being in excess of 250 feet. Much of the acreage has been explored with a shallow drilling program. Scattered deep well log control indicates that the Fruitland coals underlying this area attain an exceptional gross thickness ranging up to 45 feet and averaging between 30 and 35 feet. This thickness does much to mitigate the depth factor from an economic standpoint and makes future underground mining or in-situ gasification feasible.

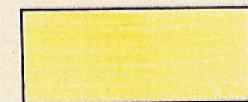
Lying between the Eastern Fuel acreage and the Fruitland coal outcrops in the same general area of T. 22 to 24 N., R. 10 to 13 W., is a series of permits which were filed prior to the Eastern Fuel permits, and which are better situated with regard to stripping depths. They were filed originally by members of a Madisonville, Kentucky coal concern (Badgett, Stegelman and Anderson) and the controlling interest was subsequently transferred to the Ark Land Company in December of 1970. The Ark Land Company is an operating arm of the Arch Minerals Company, a stripping-coal management and acquisition group active throughout the Rocky Mountains. Ninety percent of Arch Minerals was sold to Hunt Oil Company and Ashland Oil Company in equal shares in 1972, but operating control of the combine was retained by the original management group.

The third largest accumulation of permits is that of the Thermal Energy company. Permits controlled by this company were acquired from the L. A. Hodges Estate (Leonard Resources of Ft. Worth) by an exploration drilling agreement and from Sharon and E. B. LaRue, Jr., by assignment. During 1971 the Peabody Coal Company earned a one-half interest in the majority of Thermal Energy's properties by conducting an additional shallow hole program. The original Thermal Energy program of 126 holes in the 150- to 200-foot depth range was conducted in early 1970 on permits extending from state acreage in the Cuthrell and Badgett area of T. 23 N., R. 11 W., a distance of over 50 miles along the area of the Fruitland coal outcrops

DEPOSITIONAL ENVIRONMENT



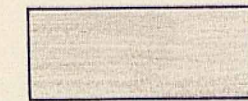
COASTAL SWAMP (COALS, CARB. SHALE, SILTSTONES)



NEARSHORE AND BEACH (POROUS, SORTED SANDSTONES.)



COASTAL PLAIN AND PIEDMONT (POORLY SORTED SANDSTONES, SILTSTONES)



OFFSHORE MARINE (DENSE SHALES)

GALLUP, N.M.

CHUSKA MTS.

SAN JUAN RIVER

NEW MEXICO-COLORADO STATE LINE

KIRTLAND SHALE

FRUITLAND FORMATION

PICTURED CLIFFS SANDSTONE

LEWIS SHALE

Chaco Tongue

Hogback Mt. Tongue

Beechata Tongue

Cholla Cyn. Tongue

CLIFF HOUSE SANDSTONE

Barker Dome Tongue

Lower Tongue of Wanek

MENEFEЕ FORMATION

Lower Coal Member

POINT LOOKOUT SANDSTONE

Cleary Coal Member

Allison Barren Member

Gibson & Cleary Coal Members und.

Bartlett Barren Member

Gibson Coal Member

Upper Dalton Sandstone

Mulatto Tongue

GALLUP SANDSTONE

D. Cross Tongue

Dilco Coal Member

CREVASSE CANYON FM.

Pescado Tongue

Horsehead Tongue (of Pike)

Atarque Member (of Pike)

Stray Sandstone (?)

UPPER MANCOS SHALE

Juana Lopez Member

LOWER MANCOS SHALE

DAKOTA SANDSTONE

JURASSIC MORRISON FORMATION

STRATIGRAPHIC DIAGRAM SHOWING RELATIONSHIPS OF THE UPPER CRETACEOUS ROCKS ON THE WEST SIDE OF THE SAN JUAN BASIN, N.M.

as far southeast as section 6, T. 19 N., R. 3 W. This reconnaissance program resulted in the relinquishment of over 22,000 acres of permits held in the name of either Hodges or LaRue and the retention of approximately 15,000 acres. The Peabody program, conducted in March and April of 1971, consisted of 166 holes of approximately 200-foot depth and 1,000-foot spacing in the more promising coal areas as delineated by the earlier one-hole-per-160-acre reconnaissance program. The two programs resulted in the delineation of a substantial coal reserve underlying about 4,700 acres. This acreage has been made a part of the Texas Utilities agreement, subject to mining by their Chaco Energy subsidiary should the preference-right leases be issued.

The Freeman United Coal Mining Co. (a subsidiary of General Dynamics Corp.) permit acreage is the remainder of a more extensive area in the Star Lake region of Fruitland coal outcrop which was explored by the United Electric Coal Company in the late 1960's. A limited drilling program of less than 30 holes was conducted on this early permit. The application for a preference-right lease on the permit is the only one which has been recommended for lease issuance by the USGS, but it has not been acted upon by the BLM. The Lee-Hunt permit was adjacent to acreage that was previously being strip-mined in a limited fashion in the Fruitland area. Neither it nor the Cunningham permits, in areas of deeper coal, were followed by applications for preference-right leases and hence have expired.

It should be emphasized again that all of the acreage described in this section was filed under federal prospecting permits, which have since expired and are no longer existent. While most of the acreage under the original permits has been applied for under the preference-right-to-lease provision, not one has been given a lease status to date. Consideration of this fact is being included in the regional Environmental Impact Statement presently being prepared by the U. S. Bureau of Land Management office in Albuquerque, as the lead federal agency for the study. In its call for industry information on planned mining projects within the EIS boundaries, the BLM indicated that eventual issuance of the PRLA's was indicated and the data developed to date includes PRLA lands in the various projects being studied. The preliminary BLM work includes a tabulation of the proposed projects and the coal status and surface ownership of all lands involved in each project. These tabulations are included in this report as Tables I and II, Appendix C.

State Lands

Prior to 1971 coal leases could be obtained on state lands by applying for a one-year prospecting permit, conducting appropriate exploratory work and then applying for a lease on any or all of the acreage under the permit. The lease provided for royalty payments on any coal mined and included annual rental and advance royalty payments, which, in recent years, were substantially in excess of those required for federal acreage. The rental rates were \$1 per acre, while

advanced royalty payments were \$3 per acre for the first year, \$4 per acre the second year and \$5 per acre for the third year and each year thereafter. Some 6,400 acres of state leases in the area of Fruitland coal outcrops were obtained in this manner prior to 1971.

In early 1971 the Commissioner of Public Lands ceased to approve any applications for prospecting permits or leases, taking no action at all on state coal lands until June of 1973. At this time a competitive sale of selected state lands for coal mining leases was conducted by sealed bonus bidding, and it was indicated then that all future state coal leases would be obtained by this method. Three hundred and fifty-nine tracts, ranging up to 640 acres in size, were offered for leasing with a minimum bid of the first year's rental of \$25 and an advance royalty payment of \$3 per acre required on each bid. Many of the tracts offered were those upon which previous prospecting applications had been made. Only 48 tracts, totaling 23,423 acres, received bids. Bonus bids ranged from one cent per acre to a high of \$65 per acre, with an average bid of \$7.95 per acre being paid. Bidders included most major companies already holding coal leases in the area with one exception. American Metal Climax, Inc., with 19 tracts totaling 9,640 acres, was the most successful bidder on the sale. The acreage leased was predominantly near or adjacent to previously existing leases or permit blocks, again with the exception of the Amax bids, which were predominantly on sections scattered throughout the

checkerboarded land holdings of the Santa Fe Pacific Railroad in the southern portion of the basin.

Another offering of state lands for competitive coal leasing was conducted in mid-November of 1973, which resulted in the sale of 53 out of the 95 tracts offered. A total of \$148,408 was paid for 27,866 acres, giving a \$5.33 per acre average. The top price paid was \$61 per acre by Cherokee & Pittsburg for a 160-acre tract (N/2 N/2 sec. 16-17N-10W) on which they had previously tied with Utah International at \$20 per acre (which was also the amount of the second highest bids). Amax secured the most tracts on the sale (22), with Utah International second with twelve.

A third state sale on March 13, 1974, resulted in the sale of 43 tracts out of 308 offered for a total of 21,747 acres. High bid of \$36.75 per acre was paid by Lone Star Producing Co. for 322 acres in sec. 2-14N-18W. Lone Star obtained the highest number of tracts (15), Gulf Resources was second with eleven, a new bidder, Independence Energy Co., third with nine, and Utah International fourth with six. Only one other bidder, an individual, was successful on any other tracts--two of which were in remote areas. Both Lone Star and Independence Energy have subsequently dropped all of the acreage that they acquired on this sale.

A fourth sale was held November 19, 1974, on 638 tracts, including 164 in northeastern New Mexico's Colfax County. Fifty-one tracts were sold in the San Juan Basin with the high bid of \$35 per acre being made by Great

National Corp. of Nevada (from Dallas, Texas) being made for 40 acres adjoining the Sundance mine. Most bids were under \$5 per acre, but Gulf, the successful bidder on 38 of the tracts, bid as high as \$18 per acre.

After a lapse of about a year-and-a-half, a state sale was held July 15, 1976, and included a total of 650 tracts, 467 of which were located in the San Juan Basin. As with previous sales all tracts were 640 acres or less in size and included many that had been offered previously, but had received no bids. A new royalty scale was presented with the sale notice which set out a new state royalty of (1) 8 percent of the coal's gross value at the point of sale, or (2) 55¢ per ton, or (3) the equivalent of the royalty being paid at a market value prevalent in the area for like coal, whichever is the greater. This sale resulted in only 47 tracts being bid upon by some thirteen different companies and individuals. The total state bonus was \$187,155 while the bonus, rentals and advance royalties totalled \$291,000. The high bid was \$35 per acre by Western Coal Co. for 649 acres near their Fruitland mine and the most tracts acquired by one company or individual were the eighteen tracts bought by the Salt River Irrigation and Power Project of Phoenix, the second largest supplier of electrical power to that city. Salt River's entry into the bidding was notable not only because it was their first attempt in New Mexico competitive sales, but also because it was made on tracts which had only underground mining possibilities. In

addition another prominent bidder, Texas Utilities Fuel Co, also obtained five tracts on tracts amenable only to deep mining. Salt River Project has submitted a tentative project to the BLM for inclusion in their regional EIS study which envisions underground mining of Fruitland coals beneath their tracts, which they propose to reach by sinking vertical shafts.

In October of this year the State Land Office issued a notice of yet another competitive sale of coal leases on state lands to be held on November 8. As before the bulk of the tracts offered are within the San Juan Basin; however, a substantial number are in new areas in Catron, Lincoln, Bernalillo and Valencia Counties, principally in areas of Upper Cretaceous rock outcrop areas in which little published information on coal potentialities is available,

This latest sale resulted in the leasing of 36 tracts comprising 18,545 acres in the San Juan Basin while 2 additional areas in Catron County and Lincoln County received bids on 24 tracts and 20 tracts respectively. The Lincoln County properties received the high bid of \$35.02 per acre by Newmont Exploration Limited. Successful bids in the San Juan Basin generally were for less than \$2.50 per acre except for 3 scattered 640-acre tracts in the extreme north-eastern portion of the basin, near Lumberton, which were purchased for \$21.50 per acre by the Rochester & Pittsburgh Coal Company over the next highest bid of \$2.09 per acre. The Catron County tracts actually might be considered as

being in the San Juan Basin, as they are located in the extreme southern part of the Gallup Sag, a southeastward-trending structural extension of the basin proper. Here two companies, Coastal States Energy Co. and Hamilton Brothers Coal Co. (majority interest holder in the Carbon Coal Company) purchased contiguous lease blocks for bids ranging up to \$4.65 per acre. However, the bulk of the \$456,241 derived by the state for successful bids on this sale was paid by Newmont Exploration Limited and Meadowlark Farms, Inc. for acreage in Lincoln County,

Privately-Owned Lands

By far the most extensive privately-owned coal lands are those of the Santa Fe Pacific Railroad Company. Lying on the southern margin of the basin along the Chaco Slope, lands having coal possibilities are predominantly in areas of Mesaverde Group coal outcrops, but extend, in at least two instances, northward into areas with Fruitland Formation coal-stripping possibilities. The latter two areas (in T21N, Rs. 8-9W and T20N, Rs. 6-7W) adjoin acreage held by PRLA's and a lease by Thermal Energy and Peabody Coal jointly. Santa Fe Pacific, under the direction of its subsidiary, Cherokee & Pittsburg Coal and Mining Co., conducted an exploratory drilling program on their properties in 1972-73 and delineated at least three areas warranting additional drilling on a 1,320-foot spacing pattern. The company announced a preliminary estimate of 370 million tons reserves in these areas in beds 4 feet or greater in thickness, at

less than a 200-foot depth, and with less than a 20:1 overburden-coal ratio. During the latter half of 1973, a developmental drilling program on the properties was completed. Two areas of infill drilling included the aforementioned Fruitland Formation properties, termed the Gallo Wash and Star Lake areas. The third covered a promising area of Mesaverde Menefee coal possibilities extending roughly through the southern portions of T17N, Rs. 9-10W, and called the South Hospah area. The Star Lake and South Hospah properties are included in the agreement signed with Texas Utilities Services, Inc. The Gallo Wash property is subject to a leasing agreement with Tucson Gas & Electric Co. whereby TG&E will mine approximately 142 million tons for its proposed generating plant at St. Johns, Arizona. TG&E expects its subsidiary, Alamito Coal Company, to produce some 1.8 million tons in 1985 increasing to 4 million tons per year by 1993 when the third of its three 350 MW units will be on line.

Another extensive tract of checkerboarded, privately-held lands in the southern part of the basin are those of the New Mexico and Arizona Land Co. These holdings are in areas of known Mesaverde coal outcrops, but with the exception of rather small, specific areas, these properties have not been extensively explored by a comprehensive drilling program. Surface geologic work in these topographically rugged areas indicates a relatively weak potential for strippable coal resources, however.

Another privately-held property of known coal potential lies immediately northwest of the town of Gallup. The Gallup-Gamerco Coal Company mined coal underground from their lands in the 1940's to supply a small power-generation plant owned by them, an operation which ceased in 1951. Production was from the Gibson and Cleary Coal Members which underlie most of the properties. A 1960 estimate of coal resources based on mining and surface work, as well as a limited drilling program, credited Gallup-Gamerco with over 276 million tons of indicated and inferred underground reserves in seams 42 inches or more thick, of which 50 percent might be recoverable. Strippable reserves, which have not been developed to date, are considerably less, with a potential approximating 5 million indicated tons under 500 acres and 6 to 10 million inferred tons under 555 acres. These strippable reserves are now being actively developed by the Carbon Coal Co. for Arizona Electric Power Cooperative, Inc. and are scheduled to be mined commencing in mid-1978.

A small strip mine belonging to the AMCOAL Corp. is located about 8 miles southeast of Gallup (sec. 9-T14N-R17W). Sporadically produced since the early 1960's, prior to AMCOAL's acquisition, a 4 to 6.3-foot bed in the Dilco Member, was mined for tonnages which were never officially reported. Since AMCOAL's purchase of the property in 1975, some 160,000 tons per year have been mined to supply the company's cement plants in Arizona and California. The lenticularity of the bed and topographic considerations combine to limit the strippable

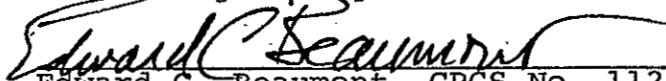
reserves on this property to between 3 to 6 million tons, as determined by drilling, but AMCOAL anticipates conversion of the mine to an auger-mine and possibly to underground mining in the near future.

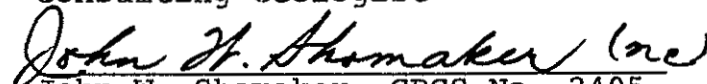
Very little is of record with respect to coal agreements on fee land, except for the transactions between the Santa Fe Pacific and various lessees which have already been discussed. The limited amount of other San Juan Basin acreage under private patent limits the amount of coal reserves available to a relatively minor tonnage. One other area of known private coal reserve ownership is a small area adjacent to Colorado (T32N-R12W) owned by the Bowie Investment Co. of Colorado Springs, Colorado within the Peabody federal coal lease. Western Coal Co. has acquired several small fee tracts in sections 4 and 5, T29N, R15W between their federal and state lease block and the valley of the San Juan River.

A tabulation of the Fruitland and Mesaverde strippable coal resources discussed in the foregoing report appears as Table 1 on the following pages. The letter designations preceding each property containing reserves is keyed to the accompanying map and describes the properties generally in a sequence beginning with Fruitland Formation coal reserves at the Colorado state line and proceeding southerly along the Fruitland outcrop, then easterly as the outcrop swings in that direction. The tabulation then describes Mesaverde Group coal reserves which are scattered in locations mostly along the southwestern margin of the San Juan Basin. The

tabulation describes the controlling interest and type of lease held, the size and general location of each property, the estimated in-place reserves to varying strip depths, as well as the number of coal seams present. Information on or commitments of the reserves are noted. In order to better define the reliability of the reserve estimates made, an indication of drill-hole density is shown and a grade of the reserve estimation reliability is made. Total tonnages in each coal-bearing formation is made with the total of the Fruitland representing essentially all of the known strippable reserves. In the case of the Mesaverde reserves, about which much less is known, a total for the discussed properties is shown, while a much more conjectural estimate is made of the undescribed reserve possibilities using less well-documented data. This admittedly conjectural strippable tonnage covers all remaining acreage in the San Juan Basin not described by property, but which is considered to have stripping possibilities.


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WRS:ECB:JWS/nc

TABLE 1.

October, 1977

SAN JUAN BASIN, NEW MEXICO, STRIP COAL RESOURCES
(Refer to Accompanying Coal Reserves Map)
All reserves in-place, unless otherwise designated

I. FRUITLAND FORMATION

MAP LETTER	LESSEE	TYPE LEASE	LESSOR	ACRES	LOCATION	STRIP DEPTH	TONNAGE RESERVE-M ²	NO. SEAMS	DRILL HOLE CONTROL _a)	RSRV. ESTIM. RELI- ABILITY _b)	REMARKS
A	Peabody Coal Co.	Lease	Fed. & Fee	2,300	T32N,R12W	120'	10-15M ²		III	C	
B	Bowie Investmnt.	Lease	Fee	491	T32N,R12W	120'	1.3-12.5M ²		III	B	2.4-5.7M ² tons undergrnd
C	Unleased		Ute Mtn Ute Ind.	±1,500	T31N,R14-15W	200'	±15M ²	2-3	I	A	Western Coal has negotiated with Utes for southern portion
D	Western Coal Co.	Lease	Federal	6,833	T30N,R15W	150' 250'	82M ² 58M ²	2 2	I I	A A	Estim 80M ² tons undergrnd on adjacent PRLA fed lands (3856 ac). Lease being mined (10-12,000 tons/week) for PSNM San Juan Generating Plant
E	Utah Int'l Inc.	Lease	Navajo Indian	31,000	T25-29N, R15-16W	120'	1,146M ²	4-6	I	A	All tonnage committed to APS Four Corners Power Plant (being mined) and WESCO gasification project (pending)
F	El Paso Nat. Gas & Consolidation Coal Co.	Lease	Navajo Indian	40,287	T23-25N, R14-16W	150'	788.5M ²	4	I	A	Avg overburden to coal ratio of 6:1
G	Western Coal Co.	Lease	Fed. & State	7,376 (1920 St.)	T23-24N, R13W	150'	121M ²	3	III	B	
H	Unleased-Classified		Federal	8,640	T23-24N, R13W T23N, R12W	160' 150'	20M ² 76M ²	3 4	IV II	C C	Western Coal has applied for lease under short term criteria
I & I ₂	Arch Minerals & Badgett group	PRLA'S	Federal	21,849	Blk 1-T22N,R10W Blk 2-T23N,R12W	150' 150'	115M ² 145M ²	3-4 3-4	III III	B B	
J	Eastern Coal & Texas Eastern Transmission	Lease	Federal	1,910	S29, 30 & 31 T23N, R11W	125'	40M ²	1-2	I	B	Drilled under special BLM environmental permit
K	Eastern Coal & Texas Eastern Transmission	PRLA Lease	Federal and Navajo Allotted State	35,938 4,039	T22-24N,R10-13W	150'	50M ²	1-3	I to IV	C	Majority of acreage amenable to undergrnd mining only--may contain ±400M ² tons recoverable

TABLE 1, (continued)

SAN JUAN BASIN, NEW MEXICO, STRIP COAL RESOURCES (continued)

I. FRUITLAND FORMATION (continued)

MAP LETTER	LESSEE	TYPE LEASE	LESSOR	ACRES	LOCATION	STRIP DEPTH	TONNAGE RESERVE-M ²	NO. SEAMS	DRILL HOLE CONTROL ^{a)}	RSRV. ESTIM. RELIABILITY ^{b)}	REMARKS
L	Thermal Energy Co. and Thermal Energy-Peabody Coal	Leases	State	1,917	T23N,R11-12W & T22N, R10W	150'	50M ²	1	I	A	Scattered leases not committed to Chaco Energy or Alamito Coal projects
M	Salt River Agricultural Improvement & Power Pro.	Leases	State	4,477	T23-24N, R9, 10 & 11W	NONE	-----	-	IV	D	Undergrnd rsrvs with insufficient info for reliable estimation. May contain 40M ² tons at 50% recovery
N	Alamito Coal Co. (Tucson Gas & Electric Co.)	Fee Leases	Gallo Wash Coal (Santa Fe Ind.)	+12,500	T21N,R8-9W	150'	128-142M ²	3	I	B	
O	Chaco Energy Co. (Texas Utilities)	PRLA'S Lease	Federal State	7,511 1,120	T21N, R8W T20N, R7-8W	150'	30M ²	3-4	I	A	Gallo Wash Project
P	Hospah Coal Co. (Santa Fe Ind.)	Leases	Santa Fe Fee	+7,800	T19-20N, R6-7W	150'	125M ²	3	I	A	To be mined and purchased by Chaco Energy Co., a subsidiary of Texas Util. Co., Star Lake Project
Q	Chaco Energy Co. (Texas Utilities)	Leases	Federal State	6,336 961	T19-20N, R6W	150'	90M ²	3	I	A	Star Lake Project
R	Freeman United Coal Mining Co.	PRLA	Federal	2,811	T19N, R5W	150'	40-60M ²	2	II	C	
S	Thermal Energy Co Peabody Coal Co.	PRLA Lease	Federal State	1,207	T19-20N, R5W	150'	8M ²	2	I	A	
FRUITLAND FORMATION TOTAL approximately							3,100M ² tons strippable				

II. MESAVERDE FORMATION

T	Consolidation Coal Co.	Lease	Federal State	9,303 1,195	T19-20N, R1-2W	None	--	--	IV	D	Undergrnd reserves only, no reliable estimation
U	Pittsburg & Midway Coal Co.	Leases	Federal Fee Navajo Indian	8,156 7,600 11,100	T16N, R20-21W T17N, R19-20W	120'	162 to 212M ²	3-5	I or II	B	Being mined at McKinley Mine for rail shipment to APS Cholla Power Plant at St. Johns, Arizona

TABLE 1. (continued)

SAN JUAN BASIN, NEW MEXICO, STRIP COAL RESOURCES (continued)

II. MESAVERDE FORMATION (continued)

MAP LETTER	LESSEE	TYPE LEASE	LESSOR	ACRES	LOCATION	STRIP DEPTH	TONNAGE RESERVE-M ²	NO. SEAMS	DRILL HOLE CONTROL ^{a)}	RSRV. ESTIM. RELI- ABILITY ^{b)}	REMARKS
V	Carbon Coal Co.	Leases	Fee Gallup Gomerco Coal Co.	+29,000	T15-16N, R18-19W	150'	20M ²	3-5	I to III	A	Undergrnd rsrvs variously estimated from 42 to 153M ² tons. To be mined for Ariz. Electric Power Coop Inc. plant at Snowflake, Ariz.
W	AmCoal Corp.	Leases	Fee, Santa Fe	1,919	T14N, R17W	150'	3-4M ²	1-2	I to II	B	Being mined for AmCord Corp. cement plants in Ariz. & Calif.
X	Hospah Coal Co. (Santa Fe Ind.)	Lease	Fee	+4,200	T16-17N, R9-10W	150'	65M ²	3-5	I	A	To be mined by Chaco Energy Co. (Texas Util.)
MESAVERDE FORMATION approximately							275M ² tons strippable				

Additional Mesaverde Formation coal possibilities in the Newcomb, Chaco Canyon, San Mateo, Standing Rock, Zuni, Crownpoint, Mt. Taylor, La Ventana and Monero areas might aggregate an additional 478M² tons strippable, based on estimations made from drill-hole control ranging from Category II to no subsurface control, but with reasonable geological projection.

a) Drill-Hole Control Categories

- I - very good (1320' DH spacing)
- II - good (1320' to 2560' spacing)
- III - fair (2560' to 5280' spacing)
- IV - poor (5280' DH spacing)

b) Reserve Estimation Reliability Grades

- A - very good
- B - good
- C - fair
- D - poor

APPENDIX A

FEDERAL COAL LEASES AND PRIA'S - NEW MEXICO

As of 7/1/77

LEASES

Description	Acres	Number	Type	Owner and Address	Effect. Date	Expir. Date	Rental	Royalty	Remarks
T32N,R13W,NMPM San Juan County Sec. 13: Lots 3-12, incl. S/2 NW/4 Sec. 14: SE/4 NE/4, S/2 Sec. 15: S/2 SW/4, SE/4 Sec. 22: E/2 NE/4 Sec. 23: N/2 N/2, SW/4 NW/4	2,044.15	NM 0315559	Comp.	Peabody Coal Co. of Delaware 301 Memorial Dr. St. Louis, Mo. 63102	8/1/63	8/1/83	25¢ 1st yr; 50¢ 2nd, 3rd, 4th & 5th yrs; \$1 6th yr	17½¢/ton 1st 10 yrs strip; 20¢/ton 2nd 10 yrs strip; 15¢/ton 1st 10 yrs undrgr; 17½¢/ton 2nd 10 yrs undrgr.	Sentry Royalty 301 Olive St. St. Louis, Mo. Orig. Lessee
T32N,R12W,NMPM San Juan County Sec. 7: Lots 1, 2, 3, SE/4 SW/4 Sec. 8: Lots 5, 6, 7, 8 Sec. 17: Lots 3, 4, 5 Sec. 18: Lots 1, 3, NE/4, N/2 SE/4, SE/4 NE/4, SW/4		NM 0315559 (continued)	"	"	"	"	"	"	"
T31N,R1E,NMPM Rio Arriba County Sec. 18: SW/4 NE/4, Lot 5, NE/4 NW/4 Sec. 7: SE/4 SW/4	162.72	SF 076008	Pref.	Stanley Idzior Monero Route Lumberton, New Mexico	1/21/42	2/14/82 <u>Cancelled 1/21/71</u>		10¢P/T	
T30N,R16W,NMPM San Juan County Sec. 22: NW/4 NW/4, NE/4 NW/4, SE/4 NW/4, SW/4 NW/4	160.00	SF 077115	Pref.	Floyd Ingram 12313 Cedar Ridge Dr. NE Albuquerque, New Mex. 87112 Assigned 8/1/77	7/27/44	1/15/85		15¢P/T	Orig. Lessee Hollis Tate & G.R. Simpson, Waterflow, NM Assigned to Leo Warren 2/1/73
T30N,R15W,NMPM San Juan County Sec. 15: All Sec. 22: All Sec. 27: All Sec. 34: All	2,565.60	NM 045197	Pref.	Western Coal Co. P.O. Box 1026 Albuquerque, New Mex. 87103	11/1/61	11/1/81		20¢ ton mined 1st 10 yrs; 22½¢ ton mined bal. 20 yrs	Public Service Co of New Mexico P.O. Box 2267 Albuquerque, NM Orig. Lessee
T30N,R15W,NMPM San Juan County Sec. 2: N/2 NW/4, NW/4 NE/4 Sec. 3: NE/4 NE/4 Sec. 9: W/2 NW/4 Sec. 10: W/2 Sec. 21: All Sec. 28: All Sec. 33: All	2,467.24	NM 045196	Pref.	Western Coal Co. P. O. Box 1026 Albuquerque, New Mex. 87103	11/1/61	11/1/81		20¢ ton mined 1st 10 yrs; 22½¢ ton mined 2nd 10 yrs	Public Service Co of New Mexico P.O. Box 2267 Albuquerque, NM Orig. Lessee

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

LEASES

Description	Acres	Number	Type	Owner and Address	Effect. Date	Expir. Date	Rental	Royalty	Remarks
N, R15W, NMPM Juan County 3: S/2 NE/4, NW/4 NE/4, NW/4, S/2 4: SE/4 NE/4, SW/4 SW/4, E/2 SW/4, SE/4 9: E/2 NW/4, E/2, SW/4 10: E/2	1,800.00	NM 045217	Pref.	Western Coal Co. P. O. Box 1026 Albuquerque, NM 87103	12/1/61	12/1/81	25¢ 1st yr; 50¢ 2nd, 3rd, 4th, 5th yrs; \$1 thereafter	20¢/ton 1st 10 yrs; 22½¢/ ton 2nd 10 yrs	Wm. J. Sganzi Savage & Sganzi, Inc. Simms Bldg. Albuquerque, NM Orig. Lessee
N, R15W, NMPM Juan County 4: SW/4 NW/4	40.00	SF 071448	Pref.	Western Coal Co. P. O. Box 1026 Albuquerque, NM 87103	6/11/40	9/7/81		15¢ P/T	Fred A. Silva 1240 W. M St. Wilmington, Calif. Orig. Lessee Assigned to C. Silva
N, R1E, NMPM Arriba County 21: NW/4 NE/4, NE/4 NW/4	80.00	SF 076644	Pref.	James L. Simmons 8907 8th St. NW Albuquerque, New Mex. or Regina, New Mexico	5/10/44	4/14/84		15¢ P/T	
N, R13W, NMPM Juan County 33: S/2 34: SW/4	1,240.00	NM 0186613	Comp.	Western Coal Co. P. O. Box 1026 Albuquerque, NM 87103	8/1/61	8/1/81	25¢ 1st yr; 50¢ 2nd, 3rd, 4th, 5th yrs; \$1 thereafter	17½¢ P/T 1st 10 yrs; 20¢/ ton thereafter	Public Service Coal Co. P.O. Box 2267 Albuquerque, NM Orig. Lessee
N, R13W, NMPM Juan County 4: W/2, N/2 NE/4 5: NE/4, N/2 NW/4, E/2 SE/4 8: NE/4 NE/4		NM 0186613 (continued)	"	"	"	"	"	"	"
N, R13W, NMPM Juan County 31: Lots 2, 3, 4, SE/4 NW/4, E/2 SW/4, SW/4 NE/4, SE/4	2,188.62	NM 0186612	Comp.	Western Coal Co. P. O. Box 1026 Albuquerque, NM 87103	8/1/61	8/1/81	25¢ 1st yr; 50¢ 2nd, 3rd, 4th, 5th yrs; \$1 thereafter		Public Service Coal Co. P. O. Box 2267 Albuquerque, NM Orig. Lessee
N, R13W, NMPM Juan County 5: S/2 NW/4, W/2 SW/4 6: Lot 1, E/2 NW/4, NE/4, SE/4 SE/4 7: Lots 4, 5, 6, 7, NE/4, N/2 SE/4 8: Lots 1, 2, 3, 4, NW/4 SW/4, W/2 NW/4, NE/4 SW/4, N/2 SE/4		NM 0186612 (continued)	"	"	"	"	"	"	"

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

LEASES

Description	Acres	Number	Type	Owner and Address	Effect. Date	Expir. Date	Rental	Royalty	Remarks
<u>T23N,R13W,NMPM</u> San Juan County Sec. 9: Lots 1,2,3,4,N/2 S/2 Sec. 17: NW/4 NW/4 Sec.18: Lots 5,6,E/2 NW/4, N/2 NE/4,SW/4 NE/4		NM 0186612 (continued)	Comp.	Western Coal Co. P. O. Box 1026 Albuquerque, New Mex. 87103.	8/1/61	8/1/81	25¢ 1st yr; 50¢ 2nd,3rd, 4th,5th yrs; \$1 thereafter		Public Service Coal Co. P. O. Box 2267 Albuquerque, NM Orig. Lessee
<u>T23N,R13W,NMPM</u> San Juan County Sec. 1: SW/4 NE/4,NE/4 SW/4, NW/4 SE/4,S/2 S/2 Sec. 10: Lots 1,2,3,4, S/2 N/2, N/2 S/2 Sec. 11: Lots 1,2,3,4, NE/4 NW/4, S/2 NW/4,NE/4, N/2 S/2 Sec. 12: All	2,027.16	NM 0186615	Comp.	Western Coal Co. P. O. Box 1026 Albuquerque, NM 87103	8/1/61	8/1/81	25¢ 1st yr; 50¢ 2nd,3rd, 4th,5th yrs; \$1 thereafter	17½¢P/T 1st 10 yrs; 20¢ P/T thereafter	Public Service Coal Co. P. O. Box 2267 Albuquerque, NM Orig. Lessee
<u>T23N,R11W,NMPM</u> San Juan County Sec. 29: All Sec. 30: Lots 1,2,3,4,E/2, E/2 W/2 Sec. 31: Lots 1,2,3,4, E/2, E/2 W/2	1,910.20	NM 10931	Pref.	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. Corp. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 By assignment 5/5/72	1/1/70	1/1/90	25¢ 1st yr; 50¢ 2nd,3rd, 4th,5th yrs; \$1 6th yr if in prod; \$5 6th yr if not prod. @\$5/ acre rate	to 1/1/80 strip 20¢; UG 17½¢; after 1/1/80 22½¢ strip; UG 20¢; 2¢/ton to R.Cuthrell	R. S. Cuthrell Nominee under Bisti Coal Field Joint Venture No. 2 Orig. Lessee
<u>T20N,R6W,NMPM</u> McKinley County Sec. 17: S/2 Sec. 18: Lots 3,4,E/2 SW/4,SE/4 Sec. 19: Lots 1,2,3,4,E/2,E/2 W/2 Sec. 20: All Sec. 21: All Sec. 26: S/2 Sec. 27: S/2 Sec. 28: All Sec. 30: Lots 1,2,3,4,E/2, E/2 W/2 Sec. 34: Lots 3,4, N/2,N/2 SE/4 Sec. 35: Lots 1,2,3,4,N/2, N/2 S/2	6,336.12	NM 2457	Comp.	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mex. 87108 By assignment 2/1/77	9/1/67	9/1/87	25¢/ac 1st yr,50¢ 2nd, 3rd,4th,5th yr; \$1/yr thereafter	1st 10 yrs: 20¢/ton strip 17½¢/ton UG; 2nd 10 yrs: 22½¢/ton UG	C. B. Branan, Jr. Oklahoma City, Okla & Warren Shear Duncan, Okla. Orig. Lessee Assigned to Seneca Oil Co. Oklahoma City,Okla 6/1/68 Assigned to Thermal Energy Co. & Peabody Coal Co. 4/1/74
<u>T19N,R6W,NMPM</u> McKinley County Sec. 4: Lots 1,2,3,4,S/2 NE/4, E/2 SE/4 Sec. 5: Lots 1,2 Sec. 10: N/2		NM 2457 (continued)	"	"	"	"	"	"	"

APPENDIX A
FEDERAL COAL LEASES AND PRIA'S - NEW MEXICO

As of 7/1/77

LEASES

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Type</u>	<u>Owner and Address</u>	<u>Effect. Date</u>	<u>Expir. Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
T20N,R2W,NMPM Sandoval County Sec. 25: Lots 1,2,3,4,W/2 E/2,W/2	2,505.47	NM 0510468	Pref.	Consolidation Coal Co. 1 Oliver Plaza Pittsburgh, Pa.	7/1/67	7/1/87			
T20N,R1W,NMPM Sandoval County Sec. 30: Lots 1,2,5,6 Sec. 31: Lots 4,5,6,7, SE/4 NW/4,E/2 SW/4		NM 0510468 (continued)	"	"	"	"			
T19N,R1W,NMPM Sandoval County Sec. 6: Lots 1-4,S/2 N/2,S/2 Sec. 7: Lots 1-13,E/2 NE/4, NE/4 NW/4, W/2 W/2, SE/4 SW/4 Sec. 8: W/2 NW/4,SE/4 NW/4,SE/4		NM 0510468 (continued)	"	"	"	"			
T20N,R1W,NMPM Sandoval County Sec. 32: SE/4 SW/4,SE/4 Sec. 33: W/2	2,206.04	NM 0555317	Comp.	Consolidation Coal Co. 1 Oliver Plaza Pittsburgh, Pa.	12/1/64	12/1/84			20¢/ton strip mining 1st yr; 17½¢/ton strip mining undrgr. 10 yrs; 22½¢/ ton strip mining bal. of lease; 20¢/ton undrgr.
T19N,R1W,NMPM Sandoval County Sec. 4: Lots 3,4,SW/4 NW/4, NW/4 SW/4,S/2 SW/4		NM 0555317 (continued)	"	"	"	"			"
T19N,R1W,NMPM Sandoval County Sec. 5: Lots 1,2,3,4,S/2 N/2,S/2 Sec. 8: NE/4,NE/4 NW/4 Sec. 9: W/2 Sec. 17: Lots 1,2,3,4,E/2 W/2, W/2 SW/4		NM 0555317 (continued)	"	"	"	"			"
T20N,R1W,NMPM Rio Arriba County Sec. 33: SW/4 NE/4	40.00	SF 077779	Pref.	Florentino Padilla Box 413 Cuba, NM	5/1/49	5/1/89			

APPENDIX A
FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

LEASES

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Type</u>	<u>Owner and Address</u>	<u>Effect. Date</u>	<u>Expir. Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
T20N,R1W,NMPM Rio Arriba County Sec. 33: W/2 SE/4,SE/4 SE/4	120.00	SF 075321	Pref.	Florentino Padilla Box 413 Cuba, NM	12/11/39	12/11/79		15¢ P/T	
T20N,R1W,NMPM Sandoval County Sec. 28: W/2 E/2,W/2 Sec. 29: Lots 1,2,6,7,8,9,10, E/2 E/2,SW/4 NE/4, SW/4 SE/4 Sec. 30: Lots 3,4,7,9,10, SE/4 NW/4,NE/4 SW/4, NE/4 SW/4 exclusive of area in conflict with SHC 4332, Tr. 1 Sec. 31: Lots 1,2,3,S/2 NE/4,SE/4	1,998.14	NM 0510466	Pref.	Consolidation Coal Co. 1 Oliver Plaza Pittsburgh, Pa.	7/1/67	7/1/87			
T20N,R1W,NMPM Sandoval County Sec. 32: N/2,N/2 SW/4,SW/4 SW/4		NM 0510466 (continued)	"	"	"	"			
T19N,R2W,NMPM Sandoval County Sec. 35: SE/4 SW/4,W/2 SE/4	120.00	SF 048323	Pref.	Ametex Corp. 2223 Campbell St., Albuquerque, NM Assignment pending	7/19/29	7/18/78		10¢ P/T	Clinton P. Anderson Albuquerque, NM Orig. Lessee Assg. J.E.Sackett,Alb,NM Assg. J.L.Roller, Albuquerque, NM
T19N,R2W,NMPM Sandoval County Sec. 1: Lots 1-7,SW/4 NE/4, S/2 NW/4,SW/4, W/2 SE/4 Sec. 12: Lots 1,2,3,4, W/2 E/2, W/2 Sec. 13: Lots 1,2,3,4, W/2 E/2, W/2	2,432.94	NM 0510467	Pref.	Consolidation Coal Co. 1 Oliver Plaza Pittsburgh, Pa.	7/1/67	7/1/87			
T19N,R1W,NMPM Sandoval County Sec. 18: Lots 1-12, W/2		NM 0510467 (continued)	"	"	"	"		"	

APPENDIX A

FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

LEASES

Description	Acres	Number	Type	Owner and Address	Effect. Date	Expir. Date	Rental	Royalty	Remarks
T19N,R1W,NMPM Sandoval County Sec. 8: SW/4	160.00	NM 0555316	Pref.	Consolidation Coal Co. 1 Oliver Plaza Pittsburgh, Pa.	2/1/69	2/1/89	25¢ 1st yr; 50¢ 2nd,3rd, 4th,5th yrs; \$1 6th yr	To 12/1/74 strip 20¢; undrgr 17½¢; after strip 22½¢; after undrgr 20¢	
T19N,R1W,NMPM Sandoval County Sec. 4: SW/4 NE/4,SE/4 NW/4, NE/4 SW/4,NW/4 SE/4	160.00	NM 732	Comp.	Ametex Corp. 2223 Campbell St., Albuquerque, NM Assignment pending 7/11/77	2/1/67	2/1/87		20¢ P/T 1st 10 yrs strip; 22½¢ P/T 2nd 10 yrs strip; 17½¢ P/T undrgr 1st 10 yrs; 20¢ P/T undrgr 2nd 10 yrs	Elena Mining Corp., Orig. Lessee; assigned to Lee Western, Inc.; assigned to J.L. Roller, Alb., NM all pending 7/11/77
T17N,R2OW,NMPM McKinley County Sec. 36: Lots 3,4, S/2 S/2	540.49	NM 0554844	Pref.	Gulf Oil Corporation Gulf Building Pittsburgh, Pa.	11/1/64	11/1/84		20¢ P/T to 4/1/71; 22½¢ P/T bal of 20 yrs	
T16N,R2OW,NMPM McKinley County Sec. 2: Lots 1,2,3,4,S/2 N/2		NM 0554844 (continued)	"	"	"	"		"	
T17N,R2OW,NMPM McKinley County Sec. 32: Fractional S/2 (Lots 1,2,3,4, S/2 S/2) Sec. 34: Fractional S/2 (Lots 1,2,3,4, S/2 S/2)	2,485.12	NM 057348	Pref.	Gulf Oil Corporation Gulf Bldg. Pittsburgh, Pa.	4/1/61	4/1/81		20¢ P/T 1st 10 yrs; 22½¢ P/T 2nd 10 yrs	Spencer Chemical Co Dwight Bldg. Kansas City, Mo. Orig. Lessee
T16N,R21W,NMPM McKinley County Sec. 12: S/2,S/2 N/2 Sec. 14: E/2,E/2 W/2 Sec. 24: NW/4		NM 057348 (continued)	"	"	"	"		"	"
T16N,R2OW,NMPM McKinley County Sec. 4: SW/4 Sec. 10: NW/4 Sec. 22: W/2 Sec. 28: NE/4		NM 057348 (continued)	"	"	"	"		"	"

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

LEASES

Description	Acres	Number	Type	Owner and Address	Effect. Date	Expir. Date	Rental	Royalty	Remarks
T16N,R20W,NMPM McKinley County Sec. 2: S/2 Sec. 4: N/2, SE/4 Sec. 10: NE/4, S/2 Sec. 14: All Sec. 22: E/2 Sec. 26: N/2	2,560.00	NM 065466	Pref.	Gulf Oil Corporation Gulf Building Pittsburgh, Pa.	1/1/64	1/1/84		20¢ P/T until 4/1/71; 22½¢ P/T for re- maining period	Spencer Chemical Co. 610 Dwight Bldg. Kansas City, Mo. Orig. Lessee
T16N,R20W,NMPM McKinley County Sec. 6: Lots 1,2,3,4,5,6,7, S/2 NE/4,SE/4, E/2 SW/4,SE/4 NW/4 Sec. 8: All Sec. 16: All Sec. 18: Lots 1,2,3,4, E/2, E/2 W/2	2,570.13	NM 057349	Pref.	Gulf Oil Corporation Gulf Building Pittsburgh, Pa.	4/1/61	4/1/81		20¢ P/T mined 1st 10 yrs; 22½¢ P/T mined 2nd 10 yrs	Spencer Chemical Co. 610 Dwight Bldg. Kansas City, Mo. Orig. Lessee
An application for the following coal lease was made 12/5/73 by Western Coal Co. for lands classified by the U.S.G.S. Application was based on provisions of the Mineral Leasing Act of 2/25/1920 (41 stat., 438 et seq) providing for leasing of contiguous coal deposits:									
T24N,R13W,NMPM San Juan County Sec. 28: W/2 Sec. 29: All Sec. 30: E/2, E/2 W/2, Lots 1,2,3,4 Sec. 31: Lot 1, NE/4 NW/4, N/2 NE/4, SE/4 NE/4 Sec. 32: NW/4 NW/4 Sec. 33: N/2 Sec. 34: N/2, SE/4	8,640.00	NM 19986	Appl.	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	12/5/73				Not acted upon by BLM
T23N,R13W,NMPM San Juan County Sec. 1: NE/4 SE/4,E/2 NE/4, NW/4 NE/4,NW/4,NW/4 SW/4 Sec. 3: All Sec. 4: SE/4, S/2 NE/4 Sec. 5: W/2 SE/4,E/2 SW/4 Sec. 6: NE/4 SE/4, W/2 SE/4, E/2 SW/4, Lots 3, 4 Sec. 7: Lots 1,2,3, E/2 NW/4,NE/4 SW/4 Sec. 8: E/2 NW/4,W/2 NE/4,SE/4 NE/4 Sec. 9: N/2 Sec. 10: N/2 N/2 Sec. 11: NW/4 NW/4		NM 19986 (continued)	"	"	"				"

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

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LEASES

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Type</u>	<u>Owner and Address</u>	<u>Effect. Date</u>	<u>Expir. Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
T23N,R12W,NMPM San Juan County		NM 19986 (continued)	Appl.	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	12/5/73				Not acted upon by BLM
Sec. 5: S/2									
Sec. 6: S/2									
Sec. 7: All									
Sec. 8: All									
Sec. 9: Lots 1,2,3,4,SW/4									
Sec. 17: Lots 1,2,3,4,6,7,8,9, 10,11,12,13,SE/4 SW/4									
Sec. 18: Lots 1,5, NE/4 NW/4, NE/4 NE/4									
Sec. 20: Lots 1,2,3,7,8									
Sec. 21: Lots 4,5									
T30N,R15W,NMPM	3,840.00	NM 28093	Appl.	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103					Not acted upon by BLM
Sec. 13: S/2									
Sec. 14: S/2									
Sec. 23: All									
Sec. 24: All									
Sec. 25: All									
Sec. 26: All									
Sec. 35: All									

An application for the above coal lease was made by Western Coal Co. Application was based on provisions of the Mineral Leasing Act of 2/25/1920 (41 stat., 438 et. seg) providing for leasing of contiguous coal deposits.

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO
As of 7/1/77

PREFERENCE RIGHT LEASE APPLICATIONS

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
<u>T29N, R15 W, NMPM</u> San Juan County Sec. 5: Lots 5,6,7,8,9, SE/4 NW/4	79.68	NM 9486	Hugh Lee & R. G. Hunt Box 12 Waterflow, NM 87421	1/1/70	1/1/72 (Expired)	25¢ per acre		
<u>T24N, R13W, NMPM</u> San Juan County Sec. 25: All Sec. 26: All Sec. 27: All Sec. 28: E/2 Sec. 35: All	2,880.00	NM 11916	KinArk Corp. Box 1499 Tulsa, Okla, 74101 Assignmt. 2/1/73	12/1/70	11/30/78			Hoover H. Wright Box 2312 Santa Fe, NM 87501 (Orig. Permittee)
<u>T24N, R13W, NMPM</u> San Juan County Sec. 19: All Lots 1,2,3,4, E/2, E/2 W/2 Sec. 20: All Sec. 21: All Sec. 22: All Sec. 23: All Sec. 24: All	4,394.28	NM 6801	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 by assignment 5/5/72	1/1/69	1/1/73	25¢ per acre		Marvin E. Weaster 1126 Americana Bldg. Houston, Tex. 77002 Orig. Permittee Assigned to Robert S. Cuthrell 8/12/70 1914 Esperson Bldg. Houston, Tex. 77002 Pref. Right Lse. Appln 12/27/72
<u>T24N, R12W, NMPM</u> San Juan County Sec. 19: All Lots 5 thru 20 inclusive	"	"	" " " " " "	"	"	" " "		" " "
<u>T24N, R12W, NMPM</u> San Juan County Sec. 27: All (Lots 1-16 incl.) Sec. 28: All (Lots 1-16 incl.) Sec. 29: All (Lots 1-16 incl.) Sec. 31: All (Lots 1-20 incl.) Sec. 33: All (Lots 1-16 incl.) Sec. 34: All (Lots 1-16 incl.) Sec. 35: All (Lots 1-16 incl.)	4,786.76	NM 3838	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 by assignment 5/5/72	6/1/68	6/1/72	25¢ per acre	25¢ per ton	Marvin E. Weaster 11120 Memorial Houston, Tex. 70043 Orig. Permittee; assgnd to Robert S. Cuthrell, 8/12/70. Pref. Right Lse Appln 5/31/72

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

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PREFERENCE RIGHT LEASE APPLICATIONS

Description	Acres	Number	Owner and Address	Effective Date	Expiration Date	Rental	Royalty	Remarks
<u>T24N, R12W, NMPM</u> San Juan County Sec. 20: All (Lots 1-16 incl.) Sec. 21: All (Lots 1-16 incl.) Sec. 22: All (Lots 1-16 incl.) Sec. 23: All (Lots 1-16 incl.) Sec. 24: All (Lots 1-16 incl.) Sec. 25: All (Lots 1-16 incl.) Sec. 26: All (Lots 1-16 incl.)	4,804.22	NM 3834	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 by assignment 5/5/72	6/1/68	6/1/72	25¢ per acre	25¢ per ton	Marvin E. Weaster 1120 Memorial Houston, Tex. 70043 Orig. Permittee; assgnd to Robert S. Cutherrell, 8/12/70. Pref. Right Lse. Appln 5/31/72
<u>T23N, R12W, NMPM</u> San Juan County Sec. 26: NW/4, N/2 SW/4, NW/4 SE/4 Sec. 27: All Sec. 28: All Sec. 29: All Sec. 30: Lots 1,2,3,4, E/2 W/2, E/2 Sec. 33: NE/4 NW/4, W/2 W/2 Sec. 35: SE/4 SE/4	3,075.32	NM 3754	Arthur Stegelman Greenville Pike Madisonville, Ky. 51% assigned to Ark Land Co. 420 Mansion House Center St. Louis, Mo. 63102	6/1/68	5/31/72	25¢ per acre	25¢ per ton 5¢ per ton ORRI to H. Pohlman	Ark Land Co. or Arch Minerals Corp. is owned by Ashland Re- sources, Ashland, Ky. (45%) & Hunt Oil Co., Dallas, Tex (45%) & management personnel (10%). Pref. right Lse Appln. 5/17/72
<u>T23N, R12W, NMPM</u> San Juan County Sec. 25: NE/4	160.00	NM 7235	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 Assignment 5/5/72	1/1/69	1/1/73	25¢ per acre		Marvin E. Weaster 1126 Americana Bldg. Houston, Tex. 77002 Orig. Permittee; assgn to R.S. Cutherrell 8/12/70 Pref. Right Lse appln 5/31/72
<u>T23N, R12W, NMPM</u> San Juan County Sec. 17: Lot 5, W/2 SW/4 Sec. 18: Lots 2,3,4,6, SE/4 NE/4, SE/4 NW/4, E/2 SW/4, SE/4 Sec. 19: All (Lots 5-20 incl.) Sec. 20: Lots 4,5,6 and 9 thru 16 incl. Sec. 21: Lots 1,2,3,6,7,8,9 thru 16 incl. Sec. 22: All (Lots 1-16 incl.) Sec. 23: Lots 1 thru 8 incl., S/2 Sec. 25: SE/4	3,759.81	NM 3752	Rogers Badgett P.O. Drawer H Madisonville, Ky. 42341 51% assigned to Ark Land Co., 520 Mansion House Center St. Louis, Mo. 63102	6/1/68	5/31/72		5¢ per ton ORRI to H. Pohlman	Ark Land Co. or Arch Minerals Corp. is owned by Ashland Resources, Ashland, Ky (45%) & Hunt Oil Co., Dallas, Tex (45%) & management personnel (10%). Pref. Right Lse Appln 5/31/72

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

PREFERENCE RIGHT LEASE APPLICATIONS

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
<u>T23N, R12W, NMPM</u> San Juan County	4,499.84	NM 3835	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 By assignment 5/5/72	6/1/68	6/1/72	25¢ per acre	25¢ per ton	Marvin E. Weaster 11120 Memorial Houston, Tex. 70043 Orig. Permittee; assign to R.S. Cuthrell 8/12/70 Pref Right Lse Appln 5/31/72
Sec. 1: All (Lots 5-20 incl.)								
Sec. 2: SE/4								
Sec. 3: Lots 5 thru 16 incl., SW/4								
Sec. 4: All (Lots 5-20 incl.)								
Sec. 5: Lots 5 thru 12 incl.								
Sec. 11: All								
Sec. 12: All (Lots 1-16 incl.)								
Sec. 24: Lots 1 thru 8 incl., S/2								
<u>T23N, R12W, NMPM</u> San Juan County	2,950.78	NM 3753	Rogers Badgett P.O. Drawer H Madisonville, Ky. 42341 51% assigned to Ark Land Co, 520 Mansion House Center St. Louis, Mo. 63102	6/1/68	5/31/72	25¢ per acre	25¢ per ton 5¢ per ton ORRI to H. Pohlman	Ark Land C. or Arch Minerals Corp. is owned by Ashland Re- sources, Ashland, Ky. (45%) & Hunt Oil, Dallas, Tex (45%) & management personnel (10%). Pref Right Lse Appln 5/17/72.
Sec. 9: E/2								
Sec. 10: Lots 1 thru 8 incl., E/2								
Sec. 13: All (Lots 1-16 incl.)								
Sec. 14: Lots 1 thru 8 incl., N/2								
Sec. 15: Lots 1 thru 8 incl., N/2								
<u>T23N, R12W, NMPM</u> San Juan County	339.98	NM 6802	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199 By assignment 5/5/72	1/1/69	1/1/73	25¢ per acre		Marvin E. Weaster 1126 Americana Bldg. Houston, Tex 77002 Orig. Permittee; assign to R.S. Cuthrell 8/12/70 Pref. Right Lse appln 5/31/72
Sec. 6: Lots 8,9,10,11,12,13,14,15								
<u>T23N, R11W, NMPM</u> San Juan County	5,120.00	NM 3837	" " " "	6/1/68	6/1/72	25¢ per acre	25¢ per ton	Marvin E. Weaster 1126 Americana Bldg. Houston, Tex 77002 Orig. Permittee; assign to R.S. Cuthrell 8/12/70 Pref. Right Lse Appln 5/31/72
Sec. 24: All								
Sec. 25: All								
Sec. 26: All								
Sec. 27: All								
Sec. 28: All								
Sec. 33: All								
Sec. 34: All								
Sec. 35: All								

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FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

PREFERENCE RIGHT LEASE APPLICATIONS

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
<u>T23N, R11W, NMPM</u> San Juan County	5,110.20	NM 3836	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass, 02199 By assignment 5/5/72	6/1/68	6/1/72	25¢ per acre	25¢ per ton	Marvin E. Weaster 11120 Memorial Houston, Tex 70043 Orig. Permittee; assign to R.S. Cutherell 8/12/70 Pref. Right Lse Appln. 5/31/72
Sec. 15: All								
Sec. 17: All								
Sec. 18: Lots 1,2,3,4, E/2 W/2, E/2								
Sec. 19: Lots 1,2,3,4, E/2, E/2 W/2								
Sec. 20: All								
Sec. 21: All								
Sec. 22: All								
Sec. 23: All								
<u>T23N, R11W, NMPM</u> San Juan County	5,120.94	NM 6803	" " " "	1/1/69	1/1/73	25¢ per acre		Marvin E. Weaster 1126 Americana Bldg. Houston, Tex 77002 Orig. Permittee; assign to R.S. Cutherell 8/12/70 Pref. Right Lse Appln. 12/27/72
Sec. 10: All								
Sec. 11: All								
Sec. 13: All								
Sec. 14: All								
<u>T23N, R10W, NMPM</u> San Juan County		" "	" " " "	"	"	" " "		" " "
Sec. 18: All (Lots 1,2,3,4, E/2, E/2 W/2)								
Sec. 19: All (Lots 1,2,3,4, E/2, E/2 W/2)								
Sec. 30: All (Lots 1,2,3,4, E/2, E/2 W/2)								
Sec. 31: All (Lots 1,2,3,4, E/2, E/2 W/2)								
<u>T22N, R12W, NMPM</u> San Juan County	599.77	NM 3751	Rogers Badgett P.O. Drawer H Madisonville, Ky. 42341 51% assigned to Ark Land Co. 420 Mansion House Center St. Louis, Mo. 63102	6/1/68	5/31/72	25¢ per acre	25¢ per ton 5¢ per ton ORRI to H. Pohlman	Ark Land Co. or Arch Minerals Corp is owned by Ashland Resources, Ashland, Ky. (45%) & Hunt Oil, Dallas, Tex (45%) and management personnel (10%). Pref. Right Lse Appln 5/17/72
Sec. 2: SE/4 NW/4, S/2								
Sec. 4: Lot 4, S/2 NW/4, W/2 SW/4, SE/4 SE/4								

APPENDIX A

FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

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PREFERENCE RIGHT LEASE APPLICATIONS

Description	Acres	Number	Owner and Address	Effective Date	Expiration Date	Rental	Royalty	Remarks
T22N, R11W, NMPM San Juan County Sec. 14: NE/4	160.00	NM 9502	Thermal Energy Co. 4681 First Nat'l Bank Bldg, Dallas, Tex 75202	1/1/70	1/1/72 <u>Expired</u>	25¢ per acre		E.B. LaRue, Jr. & Sharon Allen LaRue 4681 First Nat'l Bank Dallas, Tex 75202 Orig. Permittee;
T22N, R11W, NMPM San Juan County Sec. 4: SW/4 Sec. 6: All (Lots 8-23 incl.) Sec. 8: All Sec. 10: N/2, SE/4 Sec. 12: All	2,587.70	NM 3755	Arthur Stegelman Greenville Pike Madisonville, Ky. 42431 51% assigned to Ark Land Co. 420 Mansion House Center St. Louis, Mo. 63102	6/1/68	5/31/72	25¢ per acre	25¢ per ton 5¢ per ton ORRI to H. Pohlman	Ark Land Co. or Arch Minerals Corp. is owned by Ashland Re- sources, Ashland, Ky. (45%) & Hunt Oil, Dallas Tex (45%) & management personnel (10%). Pref. Right Lse Appln 5/17/72
T22N, R10W, NMPM San Juan County Sec. 3: All (Lots 1,2,3,4, S/2 N/2, S/2) Sec. 4: All (Lots 1,2,3,4, S/2 N/2, S/2) Sec. 10: W/2	1,601.56	NM 6804	Eastern Gas & Fuel Assoc. & Texas Eastern Trans. (Eastern Assoc. Prop. Corp.) 2900 Prudential Tower Boston, Mass. 02199	1/1/69	1/1/73	25¢ per acre		Marvin E. Weaster 1126 Americana Bldg. Houston, Tex 77002 Orig. Permittee; assgnd to R.S. Cuthrell 8/12/70 Pref. Right Lse Appln 12/27/72
T22N, R10W, NMPM San Juan County Sec. 5: Lots 1,2,3,4, S/2 N/2, S/2 Sec. 6: Lots 1,2,3,4,5,6,7, S/2 NE/4, SE/4 NW/4, E/2 SW/4, SE/4 Sec. 7: Lots 1,2,3,4, E/2, E/2 W/2 Sec. 8: All Sec. 9: All Sec. 14: All Sec. 15: All	4,478.24	NM 3919	Robert Anderson, Jr. 750 Homewood Dr. Madisonville, Ky. 42431 51% assigned to Ark Land Co. 420 Mansion House Center St. Louis, Mo. 68102	6/1/68	5/31/72	25¢ per acre	25¢ per ton 5¢ per ton ORRI to H. Pohlman	Ark Land Co. or Arch Minerals Corp is owned by Ashland Resources, Ashland, Ky (45%) & Hunt Oil, Dallas, Tex (45%) & management personnel (10%). Pref. Right Lse Appln 5/17/72
T22N, R10W, NMPM San Juan County Sec. 10: NE/4 Sec. 11: All Sec. 12: SW/4 Sec. 13: All	1,600.00	NM 8592	H.N. Cunningham 12422 Old Oak Drive Houston, Tex. 77024	1/1/70	7/15/75 <u>Expired</u>	25¢ per acre		

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FEDERAL COAL LEASES AND PRIA'S - NEW MEXICO

As of 7/1/77

PREFERENCE RIGHT LEASE APPLICATIONS

Description	Acres	Number	Owner and Address	Effective Date	Expiration Date	Rental	Royalty	Remarks
<u>T22N, R10W, NMPM</u> San Juan County Sec. 17: All Sec. 18: Lots 1,2,3,4, E/2, E/2 W/2 Sec. 19: Lots 1,2,3,4, E/2, E/2 W/2 Sec. 22: All Sec. 23: All Sec. 24: All Sec. 25: All	4,476.66	NM 3918	Robert Anderson, Jr. 750 Homewood Dr. Madisonville, Ky. 42431 51% assigned to Ark Land Co. 420 Mansion House Center St. Louis, Mo. 63102	6/1/68	5/31/72	25¢ per acre	25¢ per ton 5¢ per ton ORRI to H. Pohlman	Ark Land Co. or Arch Minerals Corp. is owned by Ashland Re- sources, Ashland, Ky. (45%) & Hunt Oil, Dallas, Tex (45) and management personnel (10%). Pref. Right Lse Appln 5/17/72
<u>T22N, R10W, NMPM</u> San Juan County Sec. 20: SE/4 NW/4 Sec. 21: N/2, SE/4	520.00	NM 8745	Robert Anderson, Jr. 750 Homewood Dr. Madisonville, Ky. 42431 51% undivided interest assigned to Ark Land Co. 520 Mansion House Center St. Louis, Mo. 63102	1/1/70	1/1/72	25¢ per acre	5¢ per ton ORRI to H. Pohlman	" " "
<u>T22N, R10W, NMPM</u> San Juan County Sec. 21: E/2 SW/4, SW/4 SW/4 Sec. 28: NW/4 NE/4, N/2 NW/4	240.00	NM 9764	Thermal Energy Co. & Peabody Coal Co. 4681 1st Nat'l Bank Bldg. Dallas, Tex. 75202	1/1/70	1/1/72	25¢ per acre	ORRI 2-1/2% or 5¢/ton to L. Hodges Estate 2% to L.R. Spence	E.B. LaRue, Jr. 4681 1st Nat'l Bank Dallas, Tex. 75202 Orig. Permittee; Pref. Right Lse Appln 1/21/72
<u>T22N, R9W, NMPM</u> San Juan County Sec. 18: Lots 3,4, E/2, E/2 SW/4	480.00	NM 12324	H. N. Cunningham 12422 Old Oaks Dr. Houston, Tex. 77024	1/1/71	12/31/74 <u>Expired</u>			
<u>T22N, R9W, NMPM</u> San Juan County Sec. 19: Lot 4, SE/4 SW/4 Sec. 29: W/2 NE/4, NW/4 Sec. 30: Lots 1,2,3,4, E/2, E/2 W/2 Sec. 33: S/2 NE/4, E/2 SW/4, SE/4 (560.00) Sec. 34: S/2 NW/4, SW/4	1,520.36	NM 8129	Thermal Energy Co. 4681 First Nat'l Bank Bldg. Dallas, Tex. 75202 Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mex. 87103 Assignment by Thermal Energy Co. 2/1/77	7/1/69	7/1/73	25¢ per acre	"	Leland A. Hodges, Trustee 200 Throckmorton St. Ft. Worth, Tex. 76102 Orig. Permittee; Pref. Right Lse Appln 3/4/72

APPENDIX A

FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

PREFERENCE RIGHT LEASE APPLICATIONS

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
T21N, R8W, NMPM San Juan County Sec. 7: Lots 3,4, E/2 SW/4 Sec. 17: W/2 Sec. 18: Lots 1,2,3,4, E/2, E/2 W/2	1,118.55	NM 11670	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mexico 87103	9/1/70	9/1/72		ORRI 2-1/2% or 5¢/ton to L.Hodges Estate 2% to L.R. Spence	Sharon Allen LaRue 4681 1st Nat'l Bank Dallas, Tex. 75202 Orig. Permittee; Pref. Right Lse. Appln. 3/4/72
T21N, R8W, NMPM San Juan County Sec. 8: SE/4 SE/4 Sec. 9: S/2 Sec. 10: S/2 Sec. 15: All Sec. 17: E/2 Sec. 22: W/2 Sec. 25: SW/4 Sec. 26: SW/4 NE/4, W/2, SE/4 Sec. 27: Lots 1,2,3,4, N/2, SE/4 Sec. 34: Lots 1,2,3,4,5,6,7,8, NE/4, N/2 SE/4 Sec. 35: All	4,498.56	NM 8128	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mex. 87103 By assignment 2/1/77	7/1/69	7/1/73	25¢ per acre		Leland A. Hodges, Trustee 200 Throckmorton St. Ft. Worth, Tex. 76102 Orig. Permittee; Pref. Right Lse Appln 1/21/72 Thermal Energy Co.
T21N, R8W, NMPM San Juan County Sec. 10: NE/4 NE/4, S/2 N/2 Sec. 14: All Sec. 22: E/2 Sec. 23: All Sec. 26: N/2 NE/4, SE/4 NE/4	1,920.00	NM 8874	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mex. 87103	1/1/70	12/31/73 <u>Expired</u>	25¢ per acre		E.B. LaRue, Jr. & Sharon Allen LaRue 4681 1st Nat'l Bank Dallas, Tex. 75202 Orig. Permittee Assigned to Thermal Energy Co.
T20N, R7W, NMPM McKinley County Sec. 2: SW/4 Sec. 12: SW/4	320.00	NM 11542	Leland A. Hodges, Trustee 200 Throckmorton St. Ft. Worth, Tex. 76102	10/1/70	10/1/72 <u>Expired</u>			
T20N, R7W, NMPM McKinley County Sec. 3: S/2 Sec. 5: Lots 1,2,3,4, S/2 N/2 Sec. 10: All Sec. 11: All	1,601.02	NM 8715	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mex. 87103	1/1/70	1/1/72	25¢ per acre		E.B. LaRue, Jr. & Sharon Allen LaRue 4681 1st Nat'l Bank Dallas, Tex. 75202 Orig. Permittee; Pref. Right Lse Appln 1/21/72 Assigned to Thermal Energy Co.

APPENDIX A

FEDERAL COAL LEASES AND PRLA'S - NEW MEXICO

As of 7/1/77

PREFERENCE RIGHT LEASE APPLICATIONS

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>	<u>Rental</u>	<u>Royalty</u>	<u>Remarks</u>
T20N, R7W, NMPM McKinley County Sec. 6: Lots 1,2,3,4,5,6,7, S/2 NE/4, SE/4 NW/4, E/2 SW/4, SE/4 Sec. 7: NE/4 Sec. 8: SW/4	2,133.42	NM 8130	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mex. 87103	7/1/69	7/1/72	25¢ per acre		Leland A. Hodges, Trustee 200 Throckmorton St. Ft. Worth, Tex. 76102 Orig. Permittee; Pref. Right Lse. Appln 1/21/72 Assigned to Thermal Energy Co.
T20N, R8W, NMPM McKinley County Sec. 1: Lots 1,2,3,4, S/2 N/2, S/2 Sec. 2: Lots 1,2,3,4, S/2 NE/4, SE/4 NW/4 Sec. 3: Lots 1,2 Sec. 12: NE/4		" "	" " " "	"	"	" " "		" " "
T20N, R5W, NMPM McKinley County Sec. 31: Lots 3,4, E/2 SW/4	162.03	NM 9769	Thermal Energy Co. 4681 First Nat'l Bank Bldg. Dallas, Tex. 75202	1/1/70	1/1/72 <u>Expired</u>	25¢ per acre		E.B. LaRue, Jr. & Sharon Allen LaRue 4681 1st Nat'l Bank Dallas, Tex. 75202 Orig. Permittee
T20N, R5W, NMPM McKinley County Sec. 35: NE/4, E/2 NW/4, SW/4 NW/4, S/2	600.00	NM 8717	Thermal Energy Co. 4681 First Nat'l Bank Bldg. Dallas, Tex. 75202	3/1/70	3/1/72	25¢ per acre		Sharon Allen & E.B. LaRue, Jr. 4681 1st Nat'l Bank Dallas, Tex. 75202 Orig. Permittee; Pref. Right Lse Appln 1/1/72 Assigned to Thermal Energy Co.
T19N, R5W, NMPM McKinley County Sec. 3: S/2 Sec. 4: Lots 1,2,3,4, S/2 N/2, S/2 Sec. 5: S/2 Sec. 6: Lots 6,7, E/2 SW/4, SE/4 Sec. 7: Lots 1,2, E/2 NW/4, NE/4 Sec. 8: N/2 Sec. 9: N/2, SW/4, E/2 SE/4, SW/4 SE/4	2,811.17	NM 585	The United Electric Coal Cos. 307 N. Michigan Ave. Chicago, Ill. 60601 {Freeman United Coal Mining Co. 123 So. Tenth St., Mt. Vernon, Ill. 62864}	10/1/67	9/30/71			Pref. Right Lse Appln made 9/20/71
T14N, R17W, NMPM McKinley County Sec. 4: Lots 3,4, S/2 NW/4, SW/4 Sec. 8: All	960.05	NM 11914	Sundance Coal Co. P. O. Box 1402 Gallup, New Mex. 87301	12/1/70	12/1/72 <u>Expired</u>			

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T31N-R24E, NMPM Colfax County Sec. 26: NE/4 NE/4	40.00	M19301	A. W. Hutchings Raton, New Mexico	7/15/76	7/15/81
T31N-R25E, NMPM Colfax County Sec. 16: All	640.00	M19106	Cherokee & Pittsburg Coal and Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/19/74	11/19/79
T12N-R18W, NMPM McKinley County Sec. 16: All	640.00	M19121	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T12N-R20W McKinley County Sec. 32: S/2, S/2 N/2	480.00	M19185	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T14N-R19W, NMPM McKinley County Sec. 32: N/2	320.00	M19126	Gulf Oil Corp. Pittsburgh, Pa.	11/19/74	11/19/79
T14N-R20W, NMPM McKinley County Sec. 36: All	640.00	M19128	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T15N-R6W, NMPM McKinley County Sec. 32: All, except SW/4 NE/4	658.00	M19129	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/19/74	11/19/79
T15N-R7W, NMPM McKinley County Sec. 2: All	640.16	M18925	Peabody Coal Company 301 Memorial Dr. St. Louis, Mo. 63102	11/14/73	11/14/78
T15N-R7W, NMPM McKinley County Sec. 16: All	640.00	M18926	Peabody Coal Company 301 Memorial Dr. St. Louis, Mo. 63102	11/14/73	11/14/78

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T15N-R7W, NMPM McKinley County Sec. 32: E/2 NE/4, W/2 NW/4, SE/4 NW/4, S/2	520.00	M18927	Utah International San Francisco, Calif.	11/14/73	11/14/78
T15N-R7W, NMPM McKinley County Sec. 36: All	640.00	M19130	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/19/74	11/19/79
T15N-R8W, NMPM McKinley County Sec. 16: All	640.00	M18928	Utah International San Francisco, Calif.	11/14/73	11/14/78
T15N-R8W, NMPM McKinley County Sec. 36: All	640.00	M18929	Utah International San Francisco, California	11/14/73	11/14/78
T15N-R9W, NMPM McKinley County Sec. 16: All	640.00	M19131	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T15N-R10W, NMPM McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2	321.12	M19302	Atlas Corp. 2506 Prudential Plaza Bldg. Denver, Colo.	7/15/76	7/15/81
T15N-R17W, NMPM McKinley County Sec. 32: SW/4 SE/4	40.00	M19132	Amcoal Inc. 1500 Rubidoux Blvd. Riverside, Calif. 92502	11/19/74	11/19/79
T15N-R19W, NMPM McKinley County Sec. 2: S/2	320.00	M18827	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
<u>15N-R19W, NMPM</u> McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2	320.56	M18826	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
<u>T15N-R19W, NMPM</u> McKinley County Sec. 16: NW/4	160.00	M19303	Arizona Electric Power Coop, Inc. P. O. Box 1980 Phoenix, Ariz. 85001	7/15/76	7/15/81
<u>T15N-R19W, NMPM</u> McKinley County Sec. 36: All	640.00	M19304	Arizona Electric Power Coop, Inc. P. O. Box 1980 Phoenix, Ariz. 85001	7/15/76	7/15/81
<u>T15N-R20W, NMPM</u> McKinley County Sec. 16: N/2, SW/4, N/2 SE/4, SW/4 SE/4	600.00	M18828	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
<u>T16N-R6W, NMPM</u> McKinley County Sec. 2: All	640.00	M18829	American Metal Climax, Inc. 4704 Harlan St. Denver, Colo.	6/6/73	6/6/78
<u>T16N-R6W, NMPM</u> McKinley County Sec. 16: All	640.00	M18830	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	6/6/73	6/6/78
<u>T16N-R7W, NMPM</u> McKinley County Sec. 16: All	640.00	M19135	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
<u>T16N-R8W, NMPM</u> McKinley County Sec. 16: All	640.00	M18932	Utah International San Francisco, California	11/14/73	11/14/78
<u>T15N-R21W, NMPM</u> McKinley County Sec. 2: S/2 SW/4	80.00	M19134	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T16N-R8W, NMPM McKinley County Sec. 32: All	640.00	M18933	Utah International San Francisco, California	11/14/73	11/14/78
T16N-R9W, NMPM McKinley County Sec. 2: SE/4	160.00	M18935	Utah International San Francisco, California	11/14/73	11/14/78
T16N-R9W, NMPM McKinley County Sec. 2: Lots 1,2	65.16	M19136	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T16N-R9W, NMPM McKinley County Sec. 2: S/2 NW/4	80.00	M19137	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T16N-R9W, NMPM McKinley County Sec. 16: All	640.00	M19138	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T16N-R10W, NMPM McKinley County Sec. 36: All	640.00	M19305	Atlas Corporation 2506 Prudential Plaza Bldg. Denver, Colo.	7/15/76	7/15/81
T16N-R12W, NMPM McKinley County Sec. 16: N/2, N/2 S/2, S/2 SE/4	560.00	M19306	Groves/Calder 105 E. Kiowa Colorado Springs, Colo. 80903	7/15/76	7/15/81
T16N-R18W, NMPM McKinley County Sec. 36: All	640.00	M19307	Arizona Electric Power Coop, Inc. P. O. Box 1980 Phoenix, Ariz. 85001	7/15/76	7/15/81
T16N-R19W, NMPM McKinley County Sec. 16: All	640.00	M19308	Arizona Electric Power Coop, Inc. P. O. Box 1980 Phoenix, Ariz. 85001	7/15/76	7/15/81

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T16N-R20W, NMPM McKinley County Sec. 36: N/2, SW/4	480.00	M18831	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
T17N-R9W, NMPM McKinley County Sec. 36: All	665.83	M18939	Utah International San Francisco, California	11/14/73	11/14/78
T17N-R10W, NMPM McKinley County Sec. 16: All	640.00	M18940	Utah International San Francisco, California	11/14/73	11/14/78
T17N-R10W, NMPM McKinley County Sec. 36: N/2 N/2	160.00	M18980	Hospah Coal Company Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/14/73	11/14/78
T17N-R10W, NMPM McKinley County Sec. 36: S/2 N/2, S/2	480.00	M15619	Hospah Coal Company Suite 310, 2500 Louisiana NE Albuquerque, New Mexico	10/15/76	10/15/81
T17N-R12W, NMPM McKinley County Sec. 16: All	640.00	M18836	American Metal Climax, Inc. 4704 Harlan St. Denver, Colorado	6/6/73	6/6/78
T17N-R12W, NMPM McKinley County Sec. 36: All	640.00	M19309	Groves/Calder 105 E. Kiowa Colorado Springs, Colo. 80903	7/15/76	7/15/81
T17N-R20W, NMPM McKinley County Sec. 36: Lots 1,2	64.09	M18837	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78

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STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
<u>T17N-R21W, NMPM</u> McKinley County Sec. 36: Lots 1,2,3,4, S/2 S/2	284.00	M18838	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
<u>T18N-R9W, NMPM</u> McKinley County Sec. 16: All	640.00	M19143	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
<u>T18N-R11W, NMPM</u> McKinley County Sec. 32: All	640.00	M18842	American Metal Climax, Inc. 4704 Harlan St. Denver, Colorado	6/6/73	6/6/78
<u>T18N-R12W, NMPM</u> McKinley County Sec. 2: S/2 NE/4, SE/4	240.00	M18943	Gulf Oil Corporation Pittsburgh, Pa.	11/14/73	11/14/78
<u>T18N-R12W, NMPM</u> McKinley County Sec. 16: All	640.00	M18844	American Metal Climax, Inc. 4704 Harlan St. Denver, Colorado	6/6/73	6/6/78
<u>T18N-R12W, NMPM</u> McKinley County Sec. 32: N/2, NE/4 SE/4	360.00	M19147	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
<u>T18N-R18W, NMPM</u> McKinley County Sec. 16: W/2 SE/4, SE/4 SE/4	120.00	M18848	Chaco Energy Co, P. O. Box 1088 Albuquerque, NM 87103	6/6/73	6/6/78
<u>T19N-R5W, NMPM</u> McKinley County Sec. 2: All	606.68	M15456	Peabody Coal Co. 301 Memorial Drive St. Louis, Mo. 63102	4/15/76	4/15/81

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T19N-R6W, NMPM McKinley County Sec. 2: N/2	321.39	M15597	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mexico 87103	9/15/76	9/15/81
T19N-R6W, NMPM McKinley County Sec. 2: S/2	320.00	M15596	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mexico 87103	9/15/76	9/15/81
T19N-R6W, NMPM McKinley County Sec. 16: All	640.00	M19148	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/19/74	11/19/79
T19N-R6W, NMPM McKinley County Sec. 36: All	640.00	M19149	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87103	11/19/74	11/19/79
T19N-R7W, NMPM McKinley County Sec. 2: Lots 1,2, S/2 NE/4, S/2	456.22	M19150	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/19/74	11/19/79
T19N-R11W, NMPM McKinley County Sec. 16: All	640.00	M19156	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T19N-R13W, NMPM McKinley County Sec. 32: S/2 SE/4	80.00	M19157	Chevron USA, Inc. San Francisco, California	11/19/74	11/19/79
T20N-R5W, NMPM McKinley County Sec. 16: All	640.00	M19311	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T20N-R5W, NMPM McKinley County Sec. 32: All	640.00	M18854	American Metal Climax, Inc. 4704 Harlan Street Denver, Colorado	6/6/73	6/6/78
T20N-R5W, NMPM McKinley County Sec. 36: N/2, N/2 S/2, S/2 SE/4, SE/4 SW/4	600.00	M18952	Gulf Oil Corporation Pittsburgh, Pa.	11/14/73	11/14/78
T20N-R5W, NMPM McKinley County Sec. 36: SW/4 SW/4	40.00	M15463	Peabody Coal Company 301 Memorial Dr. St. Louis, Mo.	4/15/76	4/15/81
T20N-R6W, NMPM McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2, S/2	570.72	M19312	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T20N-R6W, NMPM McKinley County Sec. 16: All	640.00	M18855	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
T20N-R6W, NMPM McKinley County Sec. 32: All	636.64	M18856	Hospah Coal Company Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	6/6/73	6/6/78
T20N-R6W, NMPM McKinley County Sec. 36: All	640.00	M18857	Hospah Coal Company Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	6/6/73	6/6/78
T20N-R7W, NMPM McKinley County Sec. 2: SE/4	160.00	M19314	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mexico 87103	7/15/76	7/15/81

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T20N-R7W, NMPM Sec. 2: S/2 NW/4	80.00	M19313	Chaco Energy Co. P. O. Box 1088 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T20N-R7W, NMPM McKinley County Sec. 16: E/2	320.00	M18858	Hospah Coal Company Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	6/6/73	6/6/78
T20N-R7W, NMPM McKinley County Sec. 36: All	640.00	M19158	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	11/19/74	11/19/79
T20N-R8W, NMPM McKinley County Sec. 16: All	640.00	M19315	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	7/15/76	7/15/81
T20N-R9W, NMPM McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2, SW/4, NE/4 SE/4	522.56	M19159	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T21N-R8W, NMPM San Juan County Sec. 2: All	641.44	M19325	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T21N-R8W, NMPM San Juan County Sec. 16: S/2, S/2 N/2	480.00	M15261	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	9/20/74	9/20/79
T21N-R8W, NMPM San Juan County Sec. 16: N/2 N/2	160.00	M15625	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	10/15/76	10/15/81

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T21N-R8W, NMPM San Juan County Sec. 36: W/2 E/2, N/2 NW/4, SW/4 NW/4	280.00	M15624	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	10/15/76	10/15/81
T21N-R8W, NMPM San Juan County Sec. 36: SW/4, SE/4 NW/4	200.00	M15266	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	10/7/74	10/7/79
T21N-R9W, NMPM San Juan County Sec. 16: All	640.00	M18861	Gallo Wash Coal Company Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87103	6/6/73	6/6/78
T21N-R9W, NMPM San Juan County Sec. 36: All	640.00	M19326	Cherokee and Pittsburg Coal & Mining Suite 310, 2500 Louisiana NE Albuquerque, New Mexico 87110	7/15/76	7/15/81
T22N-R8W, NMPM San Juan County Sec. 16: All	640.00	M19327	Salt River Proj. Agri. Impr & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T22N-R8W, NMPM San Juan County Sec. 36: All	640.00	M19328	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T22N-R9W, NMPM San Juan County Sec. 36: All	640.00	M18863	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
T22N-R10W, NMPM San Juan County Sec. 16: N/2 N/2	160.00	M19029	Gulf Oil Corporation Pittsburgh, Pa.	3/13/74	3/13/79

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T22N-R10W, NMPM San Juan County Sec. 16: S/2, S/2 N/2	480.00	M15238	Peabody Coal Company 301 Memorial Dr. St. Louis, Mo. 63102	8/5/69	8/5/79
T22N-R10W, NMPM San Juan County Sec. 36: SE/4	160.00	M15239	Thermal Energy Company 4681 First Nat'l Bank Bldg. Dallas, Texas	8/5/69	8/5/79
T22N-R11W, NMPM San Juan County Sec. 2: All	641.20	M15299	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	10/26/68	10/26/78
T22N-R12W, NMPM San Juan County Sec. 36: All	640.00	M15609	Kin Ark Corporation Box 1499 Tulsa, Okla. 74101	5/15/76	5/15/81
T23N-R10W, NMPM San Juan County Sec. 2: All	637.92	M19329	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T23N-R10W, NMPM San Juan County Sec. 16: All	640.00	M19330	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T23N-R10W, NMPM San Juan County Sec. 32: All	640.00	M18865	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
T23N-R11W, NMPM San Juan County Sec. 2: All	639.36	M19331	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T23N-R11W, NMPM San Juan County Sec. 16: All	640.00	M18866	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	6/6/73	6/6/78

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T23N-R11W, NMPM Sec. 32: All San Juan County	640.00	M15237	Peabody Coal Company 301 Memorial Dr. St. Louis, Mo. 63102	8/5/69	8/5/79
T23N-R11W, NMPM San Juan County Sec. 36: All	640.00	M18867	Gulf Oil Corporation Pittsburgh, Pa.	6/6/73	6/6/78
T23N-R12W, NMPM San Juan County Sec. 2: Lots 1,2,3,4, S/2 N/2, SW/4	478.28	M18973	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	11/14/73	11/14/78
T23N-R12W, NMPM San Juan County Sec. 16: All	640.00	M15623	Thermal Energy Company 4681 First Nat'l Bank Bldg. Dallas, Texas	10/15/76	10/15/81
T23N-R12W, NMPM San Juan County Sec. 36: N/2 N/2, S/2 NW/4	240.00	M15600	Peabody Coal Company 301 Memorial Drive St. Louis, Mo. 63102	9/15/76	9/15/81
T23N-R12W, NMPM San Juan County Sec. 36: S/2 NE/4, S/2	400.00	M19171	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	11/19/74	11/19/79
T23N-R13W, NMPM San Juan County Sec. 2: All	640.00	M15296	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	10/2/68	10/2/78
T23N-R13W, NMPM San Juan County Sec. 16: N/2	320.00	M15298	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	10/16/68	10/16/78
T23N-R13W, NMPM Sec. 16: S/2 San Juan County	320.00	M19332	Western Coal Co. Box 1026 Albuquerque, New Mexico 87103	7/15/76	7/15/81

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T23N-R13W, NMPM San Juan County Sec. 32: All	640.00	M19172	Gulf Oil Corporation Pittsburgh, Pa.	11/19/74	11/19/79
T23N-R13W, NMPM San Juan County Sec. 36: All	640.00	M19333	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T24N-R9W, NMPM San Juan County Sec. 32: All	640.00	M19334	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T24N-R10W, NMPM San Juan County Sec. 32: All	640.00	M19335	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T24N-R10W, NMPM San Juan County Sec. 36: All	640.00	M19336	Salt River Proj. Agr. Impr., & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T24N-R11W, NMPM San Juan County Sec. 36: All	640.00	M19337	Salt River Proj. Agri. Impr., & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T24N-R12W, NMPM San Juan County Sec. 32: All	640.00	M18870	American Metal Climax, Inc., 4704 Harlan St. Denver, Colorado	6/6/73	6/6/78
T24N-R12W, NMPM San Juan County Sec. 36: All	640.00	M18871	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	6/6/73	6/6/78
T24N-R13W, NMPM San Juan County Sec. 32: S/2	320.00	M14927	Western Coal Co., P. O. Box 1026 Albuquerque, New Mexico 87103	12/15/69	12/15/78

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T24N-R13W, NMPM San Juan County Sec. 32: S/2 N/2, N/2 NE/4, NE/4 NW/4	280.00	M15297	Eastern Associated Properties Corp. 2900 Prudential Tower Boston, Mass. 02199	10/16/68	10/16/78
T24N-R13W, NMPM San Juan County Sec. 36: All	640.00	M18872	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	6/6/73	6/6/78
T29N-R15W, NMPM San Juan County Sec. 2: Lots 1,2,3,4, S/2 NE/4, SE/4, SE/4 NW/4	438.28	M19173	Independence Energy Co., Inc. New York, N.Y.	11/19/74	11/19/79
T30N-R14W, NMPM San Juan County Sec. 16: All	640.00	M19338	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T30N-R14W, NMPM San Juan County Sec. 32: All	650.80	M19339	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T30N-R15W, NMPM San Juan County Sec. 2: NE/4 NE/4, S/2 NW/4, W/2 SW/4, NW/4 SE/4	240.00	M15356	Elliott Riggs Farmington, New Mexico	3/31/70	3/31/80
T30N-R15W, NMPM San Juan County Sec. 16: E/2 NW/4, NW/4 NE/4	120.00	M14014	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	11/1/75	11/1/80

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T30N-R15W, NMPM San Juan County Sec. 16: S/2, W/2 NW/4, E/2 NE/4, SW/4 NE/4	520.00	M15417	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	10/24/75	10/24/80
T30N-R15W, NMPM San Juan County Sec. 32: NW/4 NW/4, SW/4 NE/4, E/2 SW/4, SE/4	309.04	M15354	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	8/26/74	8/26/79
T30N-R15W, NMPM San Juan County Sec. 36: All	649.20	M19340	Western Coal Co. P. O. Box 1026 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T3S-R3E, NMPM Socorro County Sec. 36: All	635.72	M19341	Great National Corp. of Nev. Dallas, Texas	7/15/76	7/15/81
T4S-R3E, NMPM Socorro County Sec. 2: All	650.67	M19342	Great National Corp. of Nev. Dallas, Texas	7/15/76	7/15/81
T4S-R3E, NMPM Socorro County Sec. 16: All	640.00	M19343	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T4S-R3E, NMPM Socorro County Sec. 32: All	640.00	M19344	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T4S-R3E, NMPM Socorro County Sec. 36: All	640.00	M19345	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81

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T5S-R2E, NMPM Socorro County Sec. 16: All	597.28	M19346	Consolidated Development Corp.	7/15/76	7/15/81
T5S-R2E, NMPM Socorro County Sec. 32: All	640.00	M19347	Albert J. Firchau Seattle, Washington	7/15/76	7/15/81
T17N-R2W, NMPM Sandoval County Sec. 16: All	640.00	M19316	Albert J. Firchau Seattle, Washington	7/15/76	7/15/81
T18N-R2W, NMPM Sandoval County Sec. 2: Lots 1,2, S/2 NE/4, SE/4	301.35	M19317	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T18N-R2W, NMPM Sandoval County Sec. 16: W/2	320.00	M19318	Albert J. Firchau Seattle, Washington	7/15/76	7/15/81
T19N-R1W, NMPM Sandoval County Sec. 16: All	640.00	M19167	Ideal Basic Industries Box 8789 Denver, Colo. 80201	11/19/74	11/19/79
T19N-R2W, NMPM Sandoval County Sec. 36: Lots 1,2,3,4, W/2 E/2, W/2	610.36	M19319	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T20N-R2W, NMPM Sandoval Sec. 36: Lots 1,2,3,4, W/2 E/2, W/2	555.12	M19320	Ideal Basic Industries Box 8789 Denver, Colo. 80201	7/15/76	7/15/81
T20N-R4W, NMPM Sandoval County Sec. 32: S/2	320.00	M18853	American Metal Climax, Inc. 4704 Harlan St. Denver, Colorado	6/6/73	6/6/78

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T21N-R6W, NMPM Sandoval County Sec. 36: All	640.00	M19321	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T21N-R7W, NMPM Sandoval County Sec. 16: All	640.00	M19322	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T21N-R7W, NMPM Sandoval County Sec. 32: All	640.00	M18963	Gulf Oil Corporation Pittsburgh, Pa.	11/14/73	11/14/78
T21N-R7W, NMPM Sandoval County Sec. 36: All	640.00	M19323	Chaco Energy Company P. O. Box 1088 Albuquerque, New Mexico 87103	7/15/76	7/15/81
T22N-R7W, NMPM Sandoval County Sec. 32: All	640.00	M19324	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona	7/15/76	7/15/81
T9N-R2W, NMPM Bernalillo County Sec. 2: Lots 3,4, S/2 NW/4, SW/4	320.95	M19479	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
T10N-R1W, NMPM Bernalillo County Sec. 32: S/2, S/2 N/2	480.00	M19480	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
T10N-R2W, NMPM Bernalillo County Sec. 16: All	640.00	M19481	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, New Mexico 87110		

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T10N-R2W, NMPM Bernalillo County Sec. 32: NW/4, N/2 SW/4, SW/4 NE/4, NW/4 SE/4	320.00	M19482	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
T10N-R2W, NMPM Bernalillo County Sec. 36: All	640.00	M19483	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
T2N-R17W, NMPM Catron County Sec. 5: Lots 3,4, S/2 NW/4, N/2 SW/4, SE/4 SW/4	280.63	M19484	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R17W, NMPM Catron County Sec. 6: Lots 1 thru 7, S/2 NE/4, SE/4 NW/4, E/2 SW/4, SE/4	629.99	M19485	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R17W, NMPM Catron County Sec. 7: Lots 1,2,3,4, E/2 W/2, N/2 NE/4, S/2 SE/4	468.26	M19486	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R17W, NMPM Catron County Sec. 8: NE/4, E/2 NW/4, SE/4	400.00	M19487	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R17W, NMPM Catron County Sec. 8: SW/4 SW/4	40.00	M19488	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		

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T2N-R17W, NMPM Catron County Sec. 9: E/2 NE/4, W/2, SE/4	560.00	M19489	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R17W, NMPM Catron County Sec. 15: N/2, W/2 SW/4, E/2 SE/4	480.00	M19490	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R17W, NMPM Catron County Sec. 16: All	640.00	M19491	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T2N-R18W, NMPM Catron County Sec. 1: Lot 2, SW/4 NE/4, SE/4 NW/4, NE/4 SW/4, NW/4 SE/4	200.21	M19492	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T2N-R18W, NMPM Catron County Sec. 2: Lots 1,2,3,4, S/2 N/2, S/2	641.54	M19493	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T2N-R18W, NMPM Catron County Sec. 12: NW/4 NE/4	40.00	M19494	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T3N-R9W, NMPM Catron County Sec. 32: All	640.00	M19495	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		

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T3N-R17W, NMPM Catron County Sec. 19: Lots 1,2,3,4, NE/4 NW/4, SE/4 SW/4	225.84	M19496	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R17W, NMPM Catron County Sec. 30: Lots 3,4, E/2 W/2, E/2	553.69	M19497	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R18W, NMPM Catron County Sec. 23: N/2, N/2 S/2, SW/4 SW/4	520.00	M19498	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R18W, NMPM Catron County Sec. 24: All	640.00	M19499	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R18W, NMPM Catron County Sec. 26: W/2 NW/4, W/2 SW/4, SE/4 SW/4, S/2 SE/4	280.00	M19500	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R18W, NMPM Catron County Sec. 27: All	640.00	M19501	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R18W, NMPM Catron County Sec. 33: All	640.00	M19502	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
T3N-R18W, NMPM Catron County Sec. 34: All	640.00	M19503	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		

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<u>T3N-R18W, NMPM</u> Catron County Sec. 35: All	640.00	M19504	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
<u>T3N-R18W, NMPM</u> Catron County Sec. 36: All	640.00	M19505	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
<u>T4N-R9W, NMPM</u> Catron County Sec. 32: All	640.00	M19506	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
<u>T4N-R11W, NMPM</u> Catron County Sec. 36: All	640.00	M19507	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		
<u>T32N-R24E, NMPM</u> Colfax County Sec. 36: All	640.00	M19508	Cherokee & Pittsburg Coal and Mining Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
<u>T7S-R10E, NMPM</u> Lincoln County Sec. 12: All	640.00	M19509	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
<u>T7S-R10E, NMPM</u> Lincoln County Sec. 13: All	640.00	M19510	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
<u>T7S-R10E, NMPM</u> Lincoln County Sec. 23: NE/4, N/2 SE/4	240.00	M19511	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		

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T7S-R10E, NMPM Lincoln County Sec. 24: N/2, N/2 S/2, SW/4 SE/4	520.00	M19512	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R10E, NMPM Lincoln County Sec. 25: SE/4 NE/4	40.00	M19513	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R10E, NMPM Lincoln County Sec. 25: SW/4 NW/4	40.00	M19514	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R10E, NMPM Lincoln County Sec. 25: N/2 SW/4	80.00	M19515	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R10E, NMPM Lincoln County Sec. 26: SE/4 NE/4	40.00	M19516	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R10E, NMPM Lincoln County Sec. 26: NW/4 NE/4	40.00	M19517	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R11E, NMPM Lincoln County Sec. 4: Lots 1,2,3,4, S/2 N/2, SW/4, W/2 SE/4	560.11	M19518	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		
T7S-R11E, NMPM Lincoln County Sec. 5: Lots 2,3,4, S/2 N/2, S/2	600.36	M19519	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		

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T7S-R11E, NMPM Lincoln County Sec. 7: Lots 1,2,3,4, E/2 W/2	321.55	M19520	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R11E, NMPM Lincoln County Sec. 7: E/2	320.00	M19521	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		
T7S-R11E, NMPM Lincoln County Sec. 8: All	640.00	M19522	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		
T7S-R11E, NMPM Lincoln County Sec. 9: All	640.00	M19523	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		
T7S-R11E, NMPM Lincoln County Sec. 17: All	640.00	M19524	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		
T7S-R11E, NMPM Lincoln County Sec. 18: Lots 1,2,3,4, E/2 W/2, E/2	639.58	M19525	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R11E, NMPM Lincoln County Sec. 19: Lots 1,2,3, E/2 NW/4, NE/4, NE/4 SW/4, NW/4 SE/4	439.61	M19526	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		
T7S-R11E, NMPM Lincoln County Sec. 20: SE/4	160.00	M19527	Newmont Exploration, Ltd. 200 W. Desert Sky Road Tucson, Arizona		

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<u>T7S-R11E, NMPM</u> Lincoln County Sec. 20: N/2, N/2 SW/4	400.00	M19528	Meadowlark Farms, Inc. 105 S. Meridian Indianapolis, Ind.		
<u>T13N-R17W, NMPM</u> McKinley County Sec. 32: N/2, W/2 SW/4, SE/4 SW/4, NE/4 SE/4	480.00	M19529	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T13N-R18W, NMPM</u> McKinley County Sec. 36: All	640.00	M19530	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T14N-R18W, NMPM</u> McKinley County Sec. 2: S/2	320.00	M19531	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T14N-R18W, NMPM</u> McKinley County Sec. 36: NW/4 NE/4, N/2 NW/4, SW/4 NW/4, S/2	480.00	M19532	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T14N-R19W, NMPM</u> McKinley County Sec. 36: All	640.00	M19533	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T15N-R18W, NMPM</u> McKinley County Sec. 36: All	640.00	M19534	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T15N-R20W, NMPM</u> McKinley County Sec. 2: Lots 2,3	79.40	M19535	Carbon Coal Co. 3620 Wyoming NE Albuquerque, NM		

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T16N-R7W, NMPM McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2, S/2	642.72	M19536	Chaco Energy Co. P. O. Box 1088 Albuquerque, NM 87103		
T16N-R7W, NMPM McKinley County Sec. 32: N/2 NE/4, W/2, S/2 SE/4	480.00	M19537	Chaco Energy Co. P. O. Box 1088 Albuquerque, NM 87103		
T16N-R8W, NMPM McKinley County Sec. 2: Lot 2, S/2 NE/4	120.86	M19538	Chaco Energy Co. P. O. Box 1088 Albuquerque, NM 87103		
T16N-R9W, NMPM McKinley County Sec. 32: All	640.00	M19539	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T16N-R10W, NMPM McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2, S/2	623.00	M19540	Chaco Energy Co. P. O. Box 1088 Albuquerque, NM 87103		
T16N-R21W, NMPM McKinley County Sec. 2: Lots 1,2,3,4, S/2 N/2, SE/4	486.40	M19541	Carl F. Meyers Box 1408 Corrales, NM		
T17N-R6W, NMPM McKinley County Sec. 32: Lots 1 thru 8, W/2, W/2 E/2	639.18	M19542	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
T17N-R6W, NMPM McKinley County Sec. 36: All	640.00	M19543	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		

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STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
<u>T17N-R7W, NMPM</u> McKinley County Sec. 32: All	640.00	M19544	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T17N-R7W, NMPM</u> McKinley County Sec. 36: All	640.00	M19545	Chaco Energy Co. P. O. Box 1088 Albuquerque, NM 87103		
<u>T17N-R8W, NMPM</u> McKinley County Sec. 36: All	640.00	M19546	Chaco Energy Co. P. O. Box 1088 Albuquerque, NM 87103		
<u>T17N-R11W, NMPM</u> McKinley County Sec. 32: All	640.00	M19547	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T17N-R19W, NMPM</u> McKinley County Sec. 32: Lots 1,2, S/2 SE/4	144.44	M19548	Gulf Oil Corp. 1720 S. Bellaire Denver, Colo.		
<u>T18N-R12W, NMPM</u> McKinley County Sec. 36: All	640.00	M19549	Cherokee & Pittsburg Coal and Mining Co. Suite 310 Citizens Bank Building 2500 Louisiana NE Albuquerque, NM 87110		
<u>T18N-R13W, NMPM</u> McKinley County Sec. 2: W/2 SE/4	80.00	M19550	Hamilton Bros. Coal Co. 3620 Wyoming NE Albuquerque, NM		
<u>T31N-R1E, NMPM</u> Rio Arriba County Sec. 16: All	640.00	M19551	Rochester & Pittsburg Coal Co. 655 Church St. Indiana, Pa.		

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T31N-R1W, NMPM Rio Arriba County Sec. 16: SW/4, S/2 SE/4	240.00	M19552	Rochester & Pittsburgh Coal Co. 655 Church St. Indiana, Pa.		
T32N-R1W, NMPM Rio Arriba County Sec. 32: N/2, E/2 SW/4	400.00	M19553	Western Nuclear, Inc. 1 Park Central Denver, Colo.		
T32N-R1W, NMPM Rio Arriba County Sec. 36: N/2, N/2 SW/4, SE/4	560.00	M19554	Rochester & Pittsburgh Coal Co. 655 Church St. Indiana, Pa.		
T19N-R2W, NMPM Sandoval County Sec. 2: Lots 1,2,3,4, S/2 N/2, S/2	609.52	M19555	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		
T19N-R2W, NMPM Sandoval County Sec. 16: All	640.00	M19556	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		
T20N-R1W, NMPM Sandoval County Sec. 16: All	640.00	M19557	Ideal Basic Industries, Inc. Box 8789 Denver, Colo.		
T21N-R6W, NMPM Sandoval County Sec. 16: All	640.00	M19558	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		
T22N-R6W, NMPM Sandoval County Sec. 32: All	640.00	M19559	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		

APPENDIX B

STATE COAL LEASES

As of 11/20/77

<u>Description</u>	<u>Acres</u>	<u>Number</u>	<u>Owner and Address</u>	<u>Effective Date</u>	<u>Expiration Date</u>
T22N-R7W, NMPM Sandoval County Sec. 36: All	640.00	M19560	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		
T22N-R10W, NMPM San Juan County Sec. 36: N/2, SW/4	480.00	M19561	Ark Land Co, 500 N. Broadway St. Louis, Mo. 19561		
T22N-R12W, NMPM San Juan County Sec. 2: Lots 1,2, S/2 NE/4	160.30	M19562	Ark Land Co. 500 N. Broadway St. Louis, Mo. 19562		
T23N-R9W, NMPM San Juan County Sec. 16: All	640.00	M19563	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		
T24N-R10W, NMPM San Juan County Sec. 16: All	640.00	M19564	Salt River Proj. Agri. Impr. & Pwr. Phoenix, Arizona		
T5S-R2E, NMPM Socorro County Sec. 2: E/2, SE/4 NW/4, NE/4 SW/4, S/2 SW/4	480.00	M19565	Cherokee Coal Co. 5200 S. Yale Ave., Suite 500 Tulsa, Okla.		
T5S-R2E, NMPM Socorro County Sec. 32: All	640.00	M19566	Cherokee Coal Co. 5200 S. Yale Ave., Suite 500 Tulsa, Okla.		
T5N-R10W, NMPM Valencia County Sec. 32: All	640.00	M19567	Coastal States Energy Co. 5 Greenway Plaza East Houston, Texas		

NOTE: Leases numbered prior to M18826 were issued prior to competitive sales

APPENDIX C

Tables Compiled by the U. S. Bureau of
Land Management, Albuquerque office,
Showing Coal Leasing and Surface Owner-
ship Status of Acreage Involved in the
Current Environmental Impact Statement
Being Prepared for Northwestern New Mexico

Table I

ACRES WITHIN PROPOSED MINES SHOWING COAL STATUS
By Type of Lease Action

Company	Federal Coal			State Coal		Private Coal	Total
	Leased	PRLA <u>1/</u>	Nominated <u>2/</u>	Other <u>3/</u>	Leased	Other <u>3/</u>	
Amcoal <u>4/</u>			640			1,919	2,559
Arch Mineral		21,849					21,849
Carbon Coal <u>4/</u>			160		641	7,481	8,282
Chaco Energy							
Gallo Wash		6,953	3,448	1,840	1,120	160	13,921
Star Lake	6,336	1,600	320	1,480	961	12,656	23,353
Consolidation Coal	9,315				1,195		10,510
Eastern Coal	1,910	35,938			4,039		41,887
Freeman - United		2,811					2,811
Peabody							
Gallo Wash		240		160	1,120		1,520
Star Lake East		600	40 <u>5/</u>		647		1,287
Salt River Project			16,955		3,837		20,792
Western Coal							
Bisti	5,456 <u>6/</u>		8,349 <u>7/</u>		1,920		15,725
San Juan	6,833		3,856		769		11,458
TOTAL	29,850	69,991	33,768	3,480	16,249	160	175,954

1/ Preference Right Lease Applications

2/ Nominated for competitive lease bidding

3/ Areas inside proposed mine boundary which are not leased, under PRLA nor nominated

4/ Includes area of existing mines

5/ Inside boundary of proposed Peabody - Star Lake East mine, but nominated by Committee on Federal Coal

6/ Includes 400 acres which have been proposed for a natural area

7/ Includes 800 acres which have been proposed for a natural area.

Source: Compiled from company proposals on file at BLM, Albuquerque District Office.

TABLE 2

Acres Within Proposed Mines Showing Surface Ownership
By Type of Lease Action

[illegible]

(continued)

Coal Status						
Federal Leases	PRLA <u>1/</u>	Nominations <u>2/</u>	Other Federal Coal <u>3/</u>	Private	State Leases	Other State Coal <u>3/</u>
<u>State Lands</u>						
Arch Minerals	672					
Carbon Coal <u>4/</u>					641	
Chaco Energy Co.						
Gallo Wash	680				640	
Star Lake	5,135		320	1,277	961	
Consolidation Coal	643				1,195	
Eastern Associated	1,910	3,495			3,398	
Peabody						
Gallo Wash					640	
Salt River Project					640	
Western Coal Co.						
Bisti			342		1,280	
San Juan <u>4/</u>					769	
TOTAL (State Lands)	7,688	4,847	662	1,277	10,164	
<u>Indian Lands</u>						
Amcoal <u>4/</u>			640		1,919	
Arch Minerals		2,636				
Chaco Energy Co.						
Gallo Wash		1,320	1,000	721	400	
Star Lake	721	960		1,042	10,339	
Eastern Associated		6,470				
Freeman United		763				

(continued)

Coal Status						
	Federal Leases	PRLA <u>1/</u>	Nominations <u>2/</u>	Other Federal Coal <u>3/</u>	Private	State Leases
						Other State Coal <u>3/</u>
<u>Indian Lands (continued)</u>						
Peabody						
Gallo Wash		200		120		
Star Lake East		280	40 <u>5/</u>			
Salt River Project			881			
Western Coal Co.						
Bisti	1,202		1,220			560
TOTAL (Indian Lands)	1,923	12,629	3,781	1,883	12,658	560
<u>Indian Withdrawal Lands</u>						
Arch Minerals		1,680				
Chaco Energy Co.						
Gallo Wash		2,647	1,848	799		
Eastern Associated		160				
TOTAL (Indian Withdrawal)		4,487	1,848	799		

(continued)

Coal Status						
	Federal Leases	PRLA <u>1/</u>	Nominations <u>2/</u>	Other Federal Coal <u>3/</u>	Private	Other State Leases Coal <u>3/</u>
<u>Private Land</u>						
Arch Minerals		320				
Carbon Coal <u>4/</u>			160		7,481	
Chaco - Star Lake	320			400	1,040	
Consolidation Coal	2,997					
Salt River Project			240			
Western - Bisti			200			
Western - San Juan <u>4/</u>	2,428		1,040			
TOTAL (Private)	5,745	320	1,640	400	8,521	
<u>Bankhead - Jones Lands</u>						
Consolidation Coal	815					

1/ Preference Right Lease Applications

2/ Nominations of tracts for competitive bid

3/ Areas inside proposed mine boundary which are not leased, under PRLA, or nominated

4/ Includes area of existing mines

5/ Inside boundary of proposed Peabody - Star Lake East mine, but nominated by Committee on Federal Coal.

Source: Compiled from Company Proposals on file at BLM, Albuquerque District Office.

Coal Status							
	Federal Leases	PRLA <u>1/</u>	Nominations <u>2/</u>	Other Federal Coal <u>3/</u>	Private	State Leases	Other State Coal <u>3/</u>
<u>Private Land</u>							
Arch Minerals		320					
Carbon Coal <u>4/</u>			160		7,481		
Chaco - Star Lake	320			400	1,040		
Consolidation Coal	2,997						
Salt River Project			240				
Western - Bisti			200				
Western - San Juan <u>4/</u>	2,428		1,040				
TOTAL (Private)	5,745	320	1,640	400	8,521		
<hr/>							
<u>Bankhead - Jones Lands</u>							
Consolidation Coal	815						

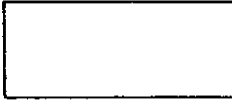
- 1/ Preference Right Lease Applications
- 2/ Nominations of tracts for competitive bid
- 3/ Areas inside proposed mine boundary which are not leased, under PRLA, or nominated
- 4/ Includes area of existing mines
- 5/ Inside boundary of proposed Peabody - Star Lake East mine, but nominated by Committee on Federal Coal.

Source: Compiled from Company Proposals on file at BLM, Albuquerque District Office.

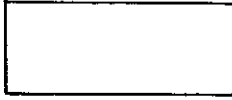
DEPOSITIONAL ENVIRONMENT



COASTAL SWAMP (COALS CARB SHALE SILTSTONES)



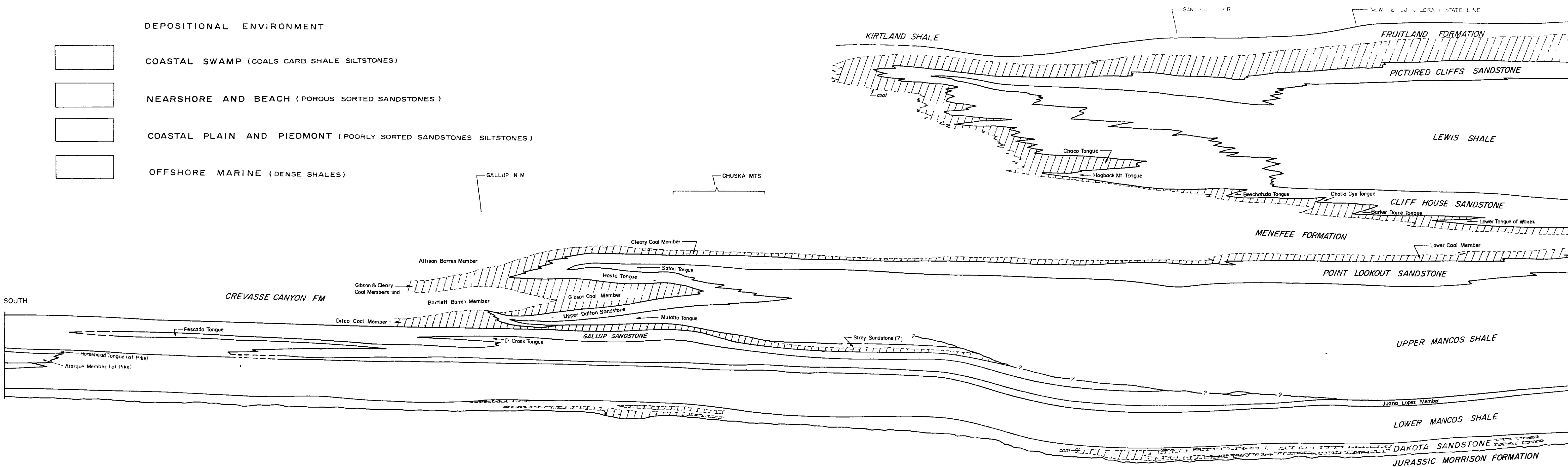
NEARSHORE AND BEACH (POROUS SORTED SANDSTONES)



COASTAL PLAIN AND PIEDMONT (POORLY SORTED SANDSTONES SILTSTONES)



OFFSHORE MARINE (DENSE SHALES)



STRATIGRAPHIC DIAGRAM SHOWING RELATIONSHIPS OF THE UPPER CRETACEOUS ROCKS ON THE WEST SIDE OF THE SAN JUAN BASIN, N.M

AFTER SHOMAKER BEAUMONT KOTTELOWSKI ET AL
NMBM EMBR MEMOR 25 1971

