



U-014217

United States Department of the Interior

GEOLOGICAL SURVEY

Office of the Area Mining Supervisor
Conservation Division
8426 Federal Building
125 South State Street
Salt Lake City, Utah 84138

May 22, 1979

Mr. Cleon Feight
Division of Oil, Gas and Mining
State of Utah
1588 West North Temple
Salt Lake City, Utah 84116

Dear Mr. Feight:

Enclosed is a copy of the exploratory drilling program submitted to us by Meadowlark Farms, Inc.

You will be notified of the date of the on-site inspection.

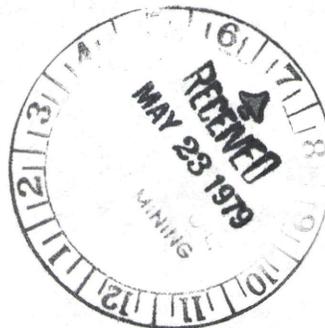
If you have any questions or comments, please address them to Gerry Lebing or me.

Sincerely yours,

Jackson W. Moffitt

Jackson W. Moffitt
Area Mining Supervisor

Enclosure



MEADOWLARK FARMS, INC.

A SUBSIDIARY OF AMAX INC.

105 SOUTH MERIDIAN STREET
INDIANAPOLIS, INDIANA 46225

(317) 266-2626

PROPOSED SUNNYSIDE SOUTH LEASE

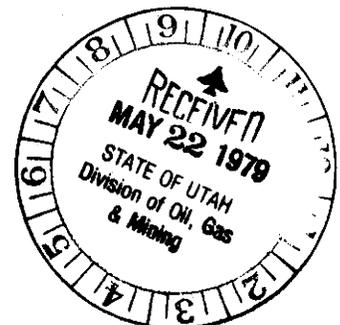
EXPLORATION PLAN

EMERY COUNTY, UTAH

PREPARED BY:

MEADOWLARK FARMS, INC.

May 18, 1979



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PROPOSED SUNNYSIDE SOUTH LEASE EXPLORATION

PLAN - EMERY COUNTY, UTAH

Introduction

Meadowlark Farms, Inc., a subsidiary of AMAX, Inc. proposed to drill 31 exploratory core holes and to construct support roads on Kaiser Steel Corporation's "Sunnyside South Lease" property in Emery County, Utah.

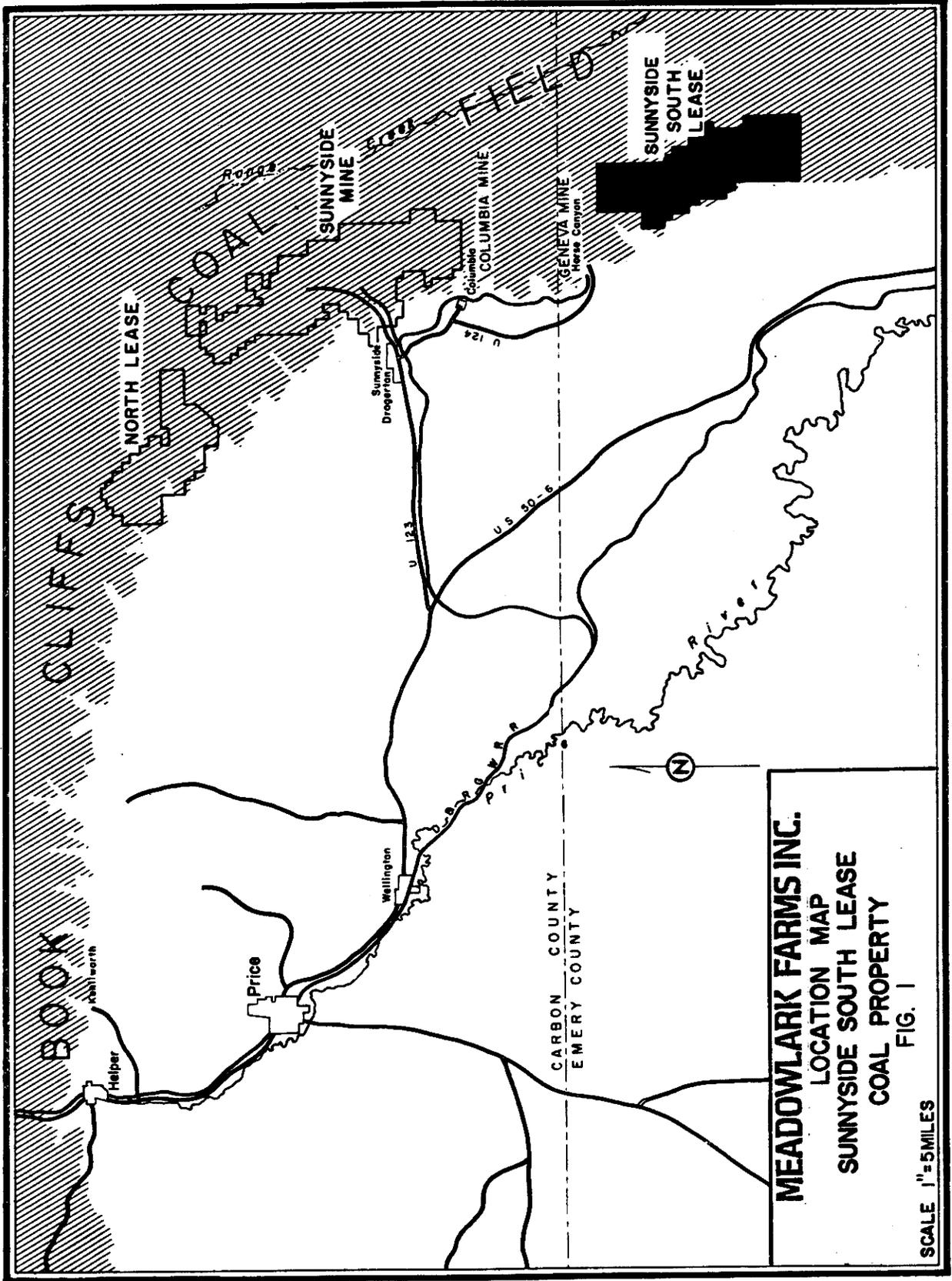
The Sunnyside South Lease is being investigated as a potential site for development of an underground coal mine.

The purpose of the drilling is fourfold:

- 1) To prove the reserves of coal in the Upper Sunnyside coal seam.
- 2) To describe the quality of the coal seam with respect to its use for steam generation.
- 3) To define the general mining conditions of the coal seam (i.e., roof, floor, gas, water, seam thickness, and seam continuity).
- 4) To furnish preliminary data for an accurate mine design.

Location of the Exploration Area - The Sunnyside South Lease coal property, near the coal mining town of Sunnyside, Utah, is located 125 miles southeast of Salt Lake City, 25 miles east of Price and adjacent to the U.S. Steel Corporation's Geneva Mine (Figure 1). The South Lease is an 8,931 acre contiguous block of Federal and State coal rights. Access to the area is provided by U.S. Highway 50-6, Utah Highways 123 and 124, Horse Canyon Road and by the Denver Rio Grande Western Railroad.

The Sunnyside South Lease is located within the Sunnyside coal mining district of Utah. Coal mining in the district began in 1898 when prospectors found the coal make good coke. At first the coal was hauled to Castlegate, located 35 miles west of Sunnyside, but by 1903 coal was being coked at the mines.



MEADOWLARK FARMS INC.
LOCATION MAP
SUNNYSIDE SOUTH LEASE
COAL PROPERTY

FIG. 1

SCALE 1" = 5 MILES

Over the years, more than 800 beehive coking ovens have been constructed at the town of Sunnyside. Many of these were still in use on an emergency basis during World War II. Today the coal is being processed in modern by-product coke plants, although no longer in the Sunnyside district.

Within the Sunnyside district, two of the largest coal mines in the State of Utah are currently operating. They are the Kaiser Steel Sunnyside Mine and the U.S. Steel Geneva Mine. The Sunnyside and Geneva mines respectively produced 500,000 and 300,000 tons of coal in 1978. To date, total coal production out of the Sunnyside district is in excess of 50,000,000 tons.

To date, there have been no coal mines on the South Lease property. However, an exploration test entry was driven 6,080 feet into the lease from the Geneva Mine during the period of 1957 to 1962. Some 120,000 tons of coal were extracted from the workings and used for steel making purposes. Other investigations of the lease during the period 1946 to 1979 include surface and geologic mapping, core drilling of 23 holes and washability testing of the cores for metallurgical coke making. However, the information acquired thus far is not sufficient to raise the total reserve to a proven status and does not furnish sufficiently accurate information for mine design.

Coal Ownership - The coal in the South Lease area is owned by the Federal government except for Section 36, Township 16 South, Range 14 East, which is owned by the State of Utah. Figure 2 illustrates the coal ownership in the South Lease. Of the 31 holes to be drilled during the proposed exploration program, 4 holes will be located in coal owned by the State of Utah, and 27 holes will be located in coal owned by the Federal government.

Surface Ownership - The surface of the South Lease area is largely public domain, with approximately 240 acres being privately owned. Figure 2 illustrates the surface ownership over the lease area. The private surface is owned by George and Jane Porter, Box 1042, East Carbon, Utah 84520 (unlisted telephone). The State of Utah controls approximately 760 acres of surface and the Federal government controls the remainder. Four of the 31 holes to be drilled during the proposed exploration program will be located on surface owned by the State of Utah. The remaining 27 holes will be located on surface owned by the Federal government.

Leased Coal - The Sunnyside South Lease area consists of coal leases totaling 8931.31 acres. Kaiser Steel Corporation acquired the first 2,400 acre coal lease in 1947. Seven additional State and Federal leases were obtained in subsequent years, completing the present South Lease block. In Township 16 and 17 South, Range 14 and 15 East, Emery County, Utah, Kaiser controls Federal leases SL-066490, SL-069291, Utah-014217, Utah-014218, Utah 0126947, Utah-0216948 and State of Utah leases 16429 and 2880. Figure 2 illustrates the location of each lease in the South Lease block.

Kaiser Steel Corporation's address is as follows:

Kaiser Steel Corporation
300 Lakeside Drive
P.O. Box 58
Oakland, CA 94604
(415) 271-2711

Designation of Operator - On April 5, 1979, Meadowlark Farms, Inc., a subsidiary of AMAX Inc., entered into an Option and Purchase agreement with Kaiser Steel Corporation for Kaiser's Sunnyside South Lease.

Consequently, after this date, AMAX shall act as Operator on the Sunnyside South Lease. The "Designation of Operator" form (Form 9-1123) where Kaiser Steel Corporation gives AMAX the right to act as Operator on the lease is included in Appendix I.

The address of Meadowlark Farms, Inc. is as follows:

Meadowlark Farms, Inc.
105 South Meridian Street
Indianapolis, IN 46225
(317) 266-2626

However, notices and orders regarding operations under the proposed exploration plan should be delivered to:

John H. Sulima
Manager - Western Exploration
Meadowlark Farms, Inc.
600 South Cherry Street
Suite 333
Denver, CO 80222
(303) 320-8300

THE NATURAL ENVIRONMENT

Since Meadowlark Farms entered into a lease agreement with Kaiser Steel Corporation, weather and ground conditions have not allowed access to the area. Therefore, the natural environment has been defined using information provided in the Draft Environmental Statement Development of Coal Resources for Central Utah prepared by the U.S. Department of Interior in 1978.

Climate - The climate of the lease area is typically continental with cold winters and hot summers. Average monthly temperatures range from 25 degrees Fahrenheit in January to 70 degrees Fahrenheit in July. Precipitation averages 12 inches per year, and potential evaporation averages 36 to 40 inches per year. Winds are generally light to moderate with average speeds below 20 mph.

Geology - The Sunnyside South Lease occupies the higher elevations of two dominant local physiographic features, the Book Cliffs and the overlying Roan Cliffs. Escarpment generally coincides with the western edge of the property and rises nearly 1,000 feet above the lowlands to the west. The lease is situated primarily in a broad valley known as Little Park.

Displayed across the lease area is a complex of Upper Cretaceous and Lower Tertiary strata, of which the Book Cliffs and overlying bench comprise the Upper Cretaceous units, and the Roan Cliffs comprise the Tertiary units. Below and to the west of the cliffs is a broad, topographic low formed in the Mancos Shale. Rising abruptly from this lowland are the Book Cliffs, which are composed of the lower members of the Mesaverde Group - the cliff-forming Blackhawk Formation and Castlegate Sandstone. The more easily eroded, Late Cretaceous Price River and North Horn Formations have weathered

into the ledges and gentle slopes across Little Park above the Book Cliffs escarpment. The Colton Formation (Tertiary) has formed steep canyons and cliffs in the more rugged Roan Cliffs to the north and east. A generalized lithologic section of the South Lease area is presented in Figure 3.

The coal measures in the lease area dip eastward at 11 to 14 percent. A major system of transverse, easterly trending normal faults have been mapped. The pattern of the faults forms a series of horsts and grabens. Displacement of the faults ranges from a few feet to 205 feet.

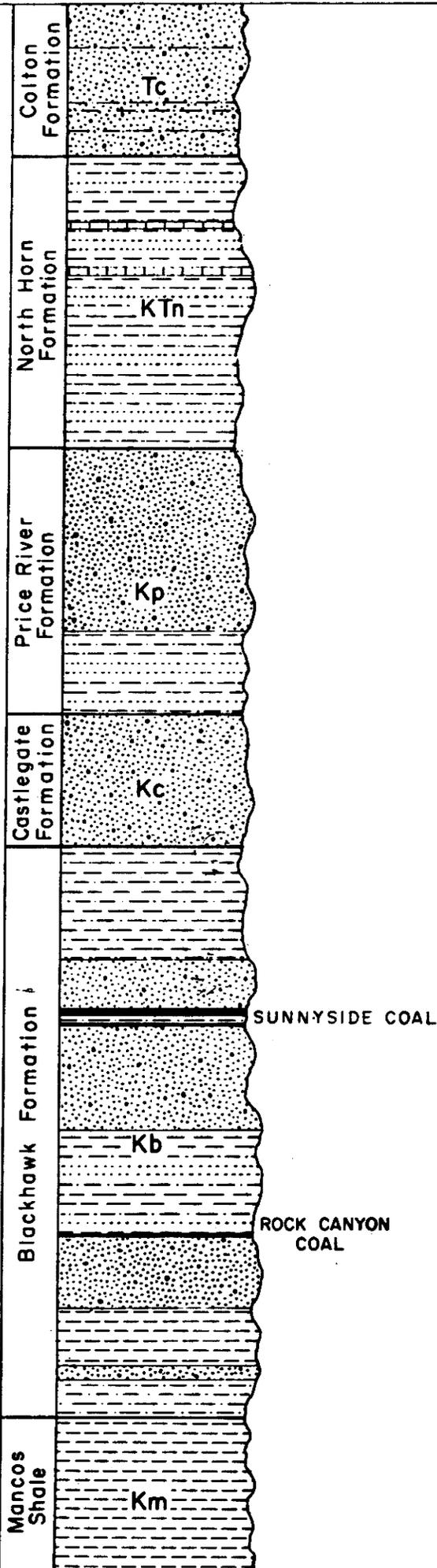
The coal measures are present in the Blackhawk Formation. The principal economically recoverable coal seam is the Upper Sunnyside Seam, which outcrops in the Book Cliffs escarpment approximately 550 to 700 feet from the base of the cliffs. For the most part, the Upper Sunnyside is under less than 1,500 feet of cover throughout the lease, extending over the entire length of the property and varying in thickness from 45 inches to more than 18 feet.

Soils - The soils along the Book Cliffs and in the associated canyons are primarily from parent materials of sandstone and shale. They are typically medium textured, thin to moderately thick, and cobbly and stony. They are well to excessively drained.

Above the Book Cliffs the slopes form gentle to rolling benches. Soils in this area are dominantly dark-colored soils of the mountains and plateaus that are usually moist in some parts during the summer. The soils have formed from sandstone, shale and limestone. They commonly have a silt loam to loam surface and a loam to clay loam subsoil.

UPPER CRETACEOUS

MESA VERDE



DESCRIPTION OF UNITS

- Tc

COLTON FORMATION: Upper Member — Sandstone and siltstone beds mostly maroon; forms cliffs and very steep slopes. Lower Member — Channel-fill deposits, lens-shaped siltstone deposits interbedded with mudstones; mostly gray and maroon; beds thinner than in the Upper Member; forms ledges and steep slopes. Thickness of formation: Up to 3,000 feet.
- KTn

NORTH HORN FORMATION: Interbedded siltstone, sandstone, mudstone, and limestone; beds mostly thin and lens-shaped; forms gentle slopes and ledges. Limestone beds rich in invertebrate fossils. Thickness of formation: 300 to 350 feet.
- Kp

PRICE RIVER FORMATION: Bluecastle Sandstone Member — Fine- to medium-grained sandstone; a single bed composed of fluviatile, channel-fill deposits; forms cliffs and ledges. Mudstone Member — Interbedded and discontinuous mudstone, siltstone, and sandstone; mostly dark gray to dark brown; forms slopes and low ledges. Locally contains vertebrate fossils. Thickness of formation: 275 to 300 feet.
- Kc

CASTLEGATE SANDSTONE: Fine- to medium-grained sandstone; local concentrations of clay galls at various horizons; forms high, abrupt cliffs and bare sandstone dip slopes. Thickness of formation: 145 to 160 feet.
- Kb

BLACKHAWK FORMATION: Upper Mudstone Member — Mudstone and discontinuous sandstone, siltstone, and claystone; Sunnyside coal bed at base. Sunny-side Member — Arenaceous siltstone and very fine-grained to medium-grained sandstone, grading downward from coarser to finer; forms cliffs; sharp upper contact; transitional lower contact. Lower Mudstone Member — Mudstone and discontinuous siltstone, sandstone, and claystone; Rock Canyon coal bed at base. Kenilworth Member — Siltstone and very fine-grained to medium-grained sandstone; forms lower part of Book Cliffs. Thickness of formation: 550 to 600 feet.
- Km

MANCOS SHALE: Dark gray fissile mudstone containing discontinuous layers of claystone and limy concretions. Intertongues with lower members of the Blackhawk Formation. Thickness of formation: 3,000 to 4,000 feet.

GEOLOGIC DESCRIPTIONS DERIVED FROM USGS MAP 1-798, 1974

MEADOWLARK FARMS INC.

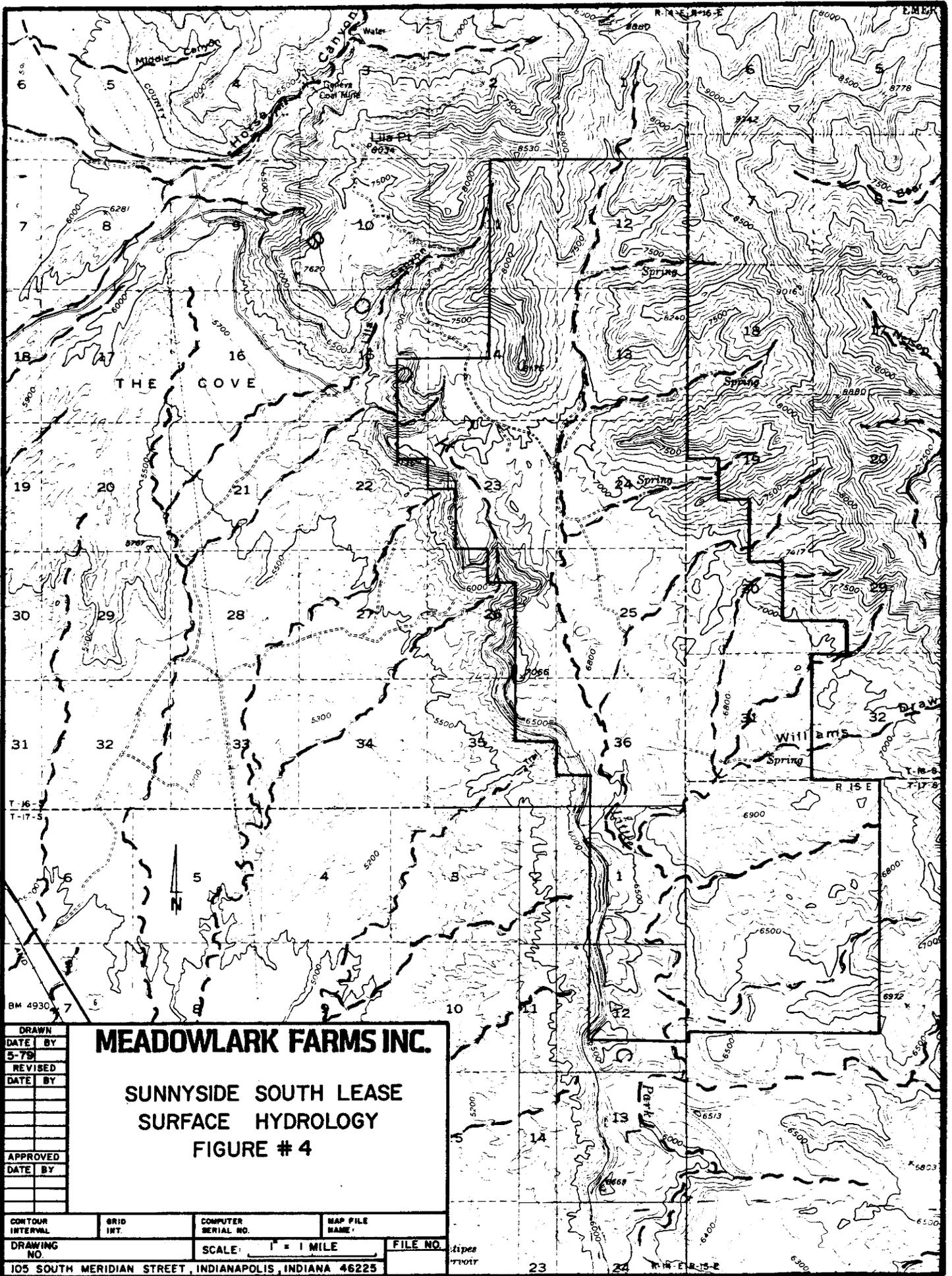
GENERALIZED LITHOLOGIC SECTION SUNNYSIDE SOUTH LEASE

EMERY COUNTY, UTAH
1979
FIGURE 3

Surface Water - The lease area is drained almost in total by Little Park Wash a tributary of the Price River (Figure 4). A small portion of the area along the face of the Book Cliffs is drained by unnamed tributaries of the Price River. Little Park Wash drains in a southerly direction parallel to the Book Cliffs. Approximately seven miles of Little Park Wash passes through the proposed exploration area with the headwaters located in the northern portion of the exploration area. Little Park Wash has an intermittent flow primarily in response to rainfall and snowmelt. However, unnamed, spring fed tributaries contribute some flow.

Groundwater - Formations which are potentially water-yielding aquifers are thought to contain little or no water near their outcrops along the Book Cliffs due to drainage or water movement downdip, generally northeastward. Groundwater may be perched, or impeded from deeper infiltration by one or more layers of rock having relatively low permeability. Permeable strata in most of the formations above the Mancos Shale, including the coal-bearing Blackhawk Formation, probably contain water. Springs in the area fed by groundwater are found along the westward-facing outcrops on the east side of Little Park Wash (Figure 4). The springs are probably located either above less permeable strata or along fracture zones caused by faults. Four springs are known to exist along the eastern boundary of the proposed exploration area. Three of these springs are within the lease area.

Vegetation - Vegetation in the lease area is indigenous to that of a semi-arid climate, and has been classified in the pinyon-juniper woodland vegetation type. Conifers of the juniper and pinyon pine species are common, with ponderosa pine predominantly on the highest slopes. Range grasses and



sagebrush flourish over nearly all of the Little Park area. Cottonwoods have become established in zones of higher moisture, such as fault traces, or in the washes near springs. No endangered plant species are known to exist in the area.

Fish and Wildlife - A variety of wildlife species would be anticipated in and near the lease area. Mule deer, cougar, black bear, coyote, red fox, gray fox, bobcat, raptors, chukar partridge, sage grouse, jack rabbits and cottontail rabbits are some of the species which would be anticipated in the area. No endangered species are known to inhabit the area. Mule deer are the most numerous big game animal in the area. The lease area is within the Utah Division of Wildlife Resource's deer management area 27B and is classified as winter range for mule deer.

The Little Park Wash is the principal drainage in the lease area. However, due to its highly intermittent flow it is not thought to support any significant fish populations.

Land Use and Cultural Resources - The principal land uses in the area are grazing and recreation. All land in the proposed exploration area is leased for grazing except for 10 acres of Federal lands and approximately 240 acres of private land for which there is no record of leasing in the Court House of Emery County. The principal use of the area for recreation is thought to be hunting mule deer and small game.

The prehistory of the Central Utah Coal Region spans 12,000 to 14,000 years, and previous study by the Archaeological-Environmental Research Corporation

under contract with the U.S.G.S. has identified a variety of archaeological site types in the region. However, a detailed survey of the lease area has not been conducted to date to determine the presence of any sites. A check of the National Register of Historic Places reveals no cultural features for the lease area.

PROPOSED EXPLORATION PLAN

The proposed exploration plan of Meadowlark Farms on the Sunnyside South Lease will require two seasons of drilling. A total of 31 exploratory core holes will be drilled. Twenty-two holes will be drilled in Phase I during the summer and fall of 1979, and nine holes will be drilled in Phase II during the summer and fall of 1980. The location of proposed drill sites and access roads are shown on Drawing S0-7905-01-1/1.

Phase I Drilling - Meadowlark Farms plans to drill 22 core holes between July and December, 1979. For depths, hole numbers, surface elevations, core points, and easting and northing coordinates, refer to Table 1. Total footage for Phase I drilling amounts to 17,044 feet. The time schedule of Phase I will run as follows: Drill holes at the south end of the lease will be completed first. Drilling operations will then advance north along existing and new access roads to complete the remaining holes. By the end of the drilling period, as the weather is beginning to deteriorate, the only holes left to drill will be those relatively near to Horse Canyon, thus facilitating a speedy finish to the Phase I program. Drilling will be done by two rigs on a 24-hour schedule.

Phase II Drilling - Meadowlark Farms plans to drill 9 core holes between June and December, 1980. Phase II holes will fill in necessary grid points for determining reliable tonnage and quality estimates. Total footage for Phase II drilling amounts to 17,740 feet. For specific data regarding hole numbers, depths, surface elevations, and easting and northing coordinates of Phase II drill holes, refer to Table 2.

Table 1

PHASE I DRILLING

Drill Hole Number	Coordinates		Surface Elevation (ft)	Total Depth (ft)	Core Point (ft)
	Easting	Northing			
A-AF-2	E 2,343,250	N 375,180	6405	875	805
A-AF-3	E 2,344,220	N 376,210	6390	1105	1035
AF-1	E 2,339,080	N 377,020	6300	240	170
AF-10	E 2,341,920	N 380,600	6600	1000	930
A-AF-5	E 2,339,250	N 380,540	6350	460	390
A-AF-7	E 2,341,120	N 383,780	6600	1220	1150
A-AF-4	E 2,339,280	N 383,210	6475	685	615
AF-8	E 2,336,200	N 385,380	6500	430	360
A-AE-1	E 2,335,600	N 387,470	6560	665	595
AE-5	E 2,333,900	N 388,280	6610	460	390
A-AE-4	E 2,338,400	N 388,260	6690	1115	1045
A-AE-2	E 2,333,850	N 390,210	6670	610	540
A-AC-3	E 2,334,020	N 393,180	6720	720	650
A-AC-4	E 2,336,680	N 395,800	6885	1307	1237
A-AC-5	E 2,335,720	N 397,100	7000	1368	1298
AC-1	E 2,331,320	N 397,830	6960	900	830
AC-8	E 2,332,060	N 396,490	6850	740	670
A-AC-2	E 2,331,460	N 395,560	6675	489	419
A-AC-7	E 2,329,880	N 397,670	6800	490	420
A-AB-5	E 2,328,720	N 398,840	6825	565	495
A-AB-6	E 2,329,640	N 398,930	6905	660	590
A-AB-1	E 2,330,580	N 400,480	7050	940	870
Total				17,044	

Table 2

PHASE II DRILLING

Drill Hole Number	Coordinates		Surface Elevation (ft)	Total Depth (ft)	Core Point (ft)
	<u>Easting</u>	<u>Northing</u>			
AF-6	E 2,344,200	N 380,450	6740	1440	1370
AF-9	E 2,345,800	N 384,310	6775	1775	1705
A-AE-6	E 2,342,840	N 389,860	6775	1695	1625
A-AE-3	E 2,341,680	N 390,980	6825	1645	1575
A-AC-6	E 2,341,500	N 394,400	6950	1810	1710
A-AB-2	E 2,335,040	N 404,620	7140	1730	1630
AB-3	E 2,337,640	N 403,420	800	2880	2780
AB-4	E 2,337,800	N 405,460	7390	2390	2290
A-AA-1	E 2,336,880	N 407,160	7335	<u>2375</u>	2275
Total				17,740	

It is not possible, at this time, to provide a precise schedule for completing the Phase II drill holes. However, the schedule is anticipated to be similar to that for the Phase I holes with drilling being initiated in the south and advancing to the north. A more specific schedule will be provided prior to commencement of drilling in 1980.

Access Roads - Access roads will be constructed to 17 of the 31 proposed holes. The preferred routes to these holes require a total of 8.12 miles of new road. However, it must be emphasized these 8.12 miles of road will not necessarily require excavation and grading. Access roads will be located to the extent possible where vehicles and equipment can pass overland without grading and excavation being necessary. Where feasible, all access roads will be limited to existing drainages, preferably in the stream bottoms themselves where width permits. This limits disturbance in most cases to areas that can be naturally reclaimed as well as those reclaimed by man. Width of the access roads will be the minimum necessary for drilling equipment, and will not exceed 14 feet.

Newly constructed and existing roads, including the Horse Canyon/Little Park roads, will be regraded as needed. For existing roads, appropriate procedures for road-use applications will be followed. Where necessary, drainage ditches will be constructed in conjunction with new access roads to reduce soil erosion and road surface deterioration. Table 3 lists the pertinent information on proposed access roads, such as name designation, length, and in which phase of drilling they will be used. Generally, road names were derived from the fault blocks in which they occur combined with a north-to-south order of numbering.

Table 3
PROPOSED ACCESS ROADS

	<u>Name</u>	<u>Feet</u>	<u>Miles</u>
Phase I:	F7	1840	0.35
	F3	2640	0.50
	F4	4720	0.89
	F3-1	560	0.11
	E1	1520	0.29
	C4	2160	0.41
	C2	1840	0.35
	C3	1120	0.21
	C5	1440	0.27
	B2	3440	0.65
	B3	320	0.06
	C1	<u>1200</u>	<u>0.23</u>
Sub Total		22,800	4.32
Phase II:	F2	3200	0.60
	F1	4640	0.88
	E2	5360	1.02
	E3	2320	0.44
	B1	3040	0.57
	A1	<u>1520</u>	<u>0.29</u>
Sub Total		20,080	3.80
Total		<u>42,880</u>	<u>8.12</u>

Equipment - The proposed drilling will be completed with two rigs, working on a 24-hour per day schedule. Both rigs will be truck mounted of the general size of a 1500 Midway with 3-axle drive. The gross weight of one rig is on the order of 25 tons. These rigs will be outfitted with Sullair 750 (or similar type) air compressors capable of compressing a maximum of 750 cubic feet per minute, averaging 425-450 cubic feet per minute, and lifting a load of 250 pounds per square inch. Auxillary equipment to the rigs will be three or four 1250 gallon water trucks, two pipe trailers, a winch and casing truck, two doghouses, two foreman's pickup trucks, two fuel trailers, three geologist's trucks, and a geophysical logging truck. For preparation of access roads and drill sites and backfilling and grading during reclamation, backhoes and D-6 to D-8 size bulldozers will be used.

Drilling Sites, Drilling Fluid, and Mud Pits - The drilling fluids to be used are non-toxic, biodegradable foam, and bentonitic compounds, and will be contained in mud pits while drilling proceeds. Two mud pits, averaging 6 x 8 x 8 feet each will be dug for each drill hole. If the two mud pits are not large enough to contain all the drilling fluid, then an additional sump(s) will be dug to trap the excess. At drill sites where mud pits are left unattended, temporary fencing will be constructed around the pits to protect wildlife and livestock.

Drill sites will be constructed only of a sufficient size to accommodate the rig and necessary support facilities. If surficial material needs to be removed for construction of a drill site, it will be stockpiled for redistribution on those sites. Drill sites probably will average 50 x 60 feet, with a probable maximum disturbance area of 50 x 100 feet.

An average penetration rate of 10 feet/hour, which is characteristic of drilling in this area, would require a rig to occupy a site approximately two days for the shallowest holes and 20 days for the deep holes. This includes anticipated normal delays due to mobilization, set up and demobilization.

Drill Hole Dimensions - Maximum depth of drilling will not exceed 2900 feet. Rotary hole size will range from 4.25 to 5.25 inches with a 2.4 inch or "NC" core being taken through the Sunnyside coal seams. All holes will be cased at the surface for 20-50 feet. Down hole casing will be used if needed. All casing will be retrieved after drilling, if possible. Each hole will initially be an open hole drilled with air and foam injection. Once these methods prove to be inefficient with the increased depth of the hole the method of drilling will then be switched to mud circulation. Mud circulation will be used until the completion of the hole. Approximately the bottom 100 feet of each drill hole will be cored.

Drill Hole Data - Geophysical logs will be run on each hole drilled. These logs will include but not be limited to a gamma ray, gamma-gamma (density), resistivity, spontaneous potential and caliper log. Other drill hole data will include driller's and geologist's lithologic logs, and laboratory analyses taken from the coal cores. All of the above data will provide information concerning water-bearing zones, lost circulation areas, mineral constituents of coal, roof, and floor, and general lithology.

Water - Water will be obtained from a variety of sources. At the beginning of drilling, it will be obtained from surface springs on the

Sunnyside South Lease. As the dry weather becomes more common, water sources will switch to one or more of several areas: Geneva Mine waste water, Range Creek, Price River, and Green River. Before any water is taken from these sites, Meadowlark will either obtain its own water rights or draw up an agreement for compensation with individual owners. To increase the efficiency of drilling, water will be stockpiled - either in large storage tanks on the South Lease, or in the pre-existing hollows from natural springs, or in pre-existing hollows that are not natural springs. For haulage truck information, see "Equipment" subsection. Anticipated water needs for the proposed drilling will be approximately 2550 gallons per hole, or 80,000 gallons for the entire project of 31 holes.

PROPOSED RECLAMATION PLAN

It is the objective of Meadowlark Farms to conduct the proposed exploration program in a manner which promotes minimal disturbance of the natural environment. To the extent possible, all exploration activities will be restricted to areas of existing access. However, in the event this is not possible, access roads and drill sites will be located so that disturbance of the natural vegetation and existing land form will be minimal. The impact of necessary disturbances on the natural environment will be minimized by responsible reclamation.

Access Roads - Access shall be restricted to existing roads to the extent possible. Existing roads shall be maintained in good condition throughout the life of the exploration program. At completion of the program, existing roads will be abandoned in a condition equal to or better than they existed prior to the exploration activities.

For drill sites located away from existing roads, access roads will be routed through those areas which will have minimal impact on the natural environment. To the extent possible, access roads will be routed through dry stream beds. No stream beds will be utilized unless they are of a size sufficient for vehicles and equipment to pass without causing significant damage. No flowing streams will be used for access.

In those areas where dry stream beds are not available for access, roads will be routed over the most stable slopes available to minimize erosion. Access roads will be located to the extent possible where vehicles and equipment can pass overland without grading or excavation

being necessary. The overall grade of access routes will not exceed 10 percent. Access roads will meander to the extent necessary to avoid excessive damage to vegetation and other obstacles. Access roads will not be located in wet, steep or unstable areas where complete restoration is not possible.

In those areas where development of access roads requires grading or excavation, surficial material will be removed and stockpiled. In the instance it is necessary to cross flowing streams or wet areas, temporary culverts will be installed. All access roads will be maintained sufficiently to ensure minimal erosion for the life of the road.

Immediately after a constructed access road is no longer needed for operations or reclamation it will be closed to all vehicle traffic. Constructed access roads, including temporary culverts, will be completely removed and the land affected regraded to the approximate original contour. Surficial material will be redistributed, and the area seeded. Access roads will be reclaimed as promptly as possible upon the completion of operations. All disturbed areas will be reclaimed prior to abandonment of the area.

Drill Sites - To the extent possible, drill sites will be located adjacent to existing roads. When it is not possible to locate drill sites adjacent to existing roads and still conform to the exploration objectives of Meadowlark, drill sites will be located adjacent to dry stream beds which can be utilized for access. Drill sites will be selected which permit drilling operations without requiring extensive leveling and excavation to

the extent possible. For those areas where excavation is required, such as mud pits, surficial material will be removed and stockpiled for redistribution.

When drilling is completed, mud in the mud pits will be allowed to dry to a solid prior to backfilling and grading. If time does not permit complete drying of the mud, it will be pumped out, hauled off the lease, and disposed of in a location approved by federal, state, and local authorities. When it is necessary to abandon mud pits temporarily prior to backfilling, they will be fenced to protect livestock and wildlife.

Waste materials from the drilling operation, including excess drill cuttings, will be removed from the property and disposed of at a site approved by federal, state and local authorities.

Groundwater encountered during drilling will be drained into the mud pit. However, should excessive amounts of water be produced, a small impoundment will be constructed to receive the water. The water will be allowed to evaporate prior to backfilling and seeding.

Hole Plugging - Abandonment of drill holes in Phases I and II will be done by **cementing from bottom to top**. A cement slurry will be pumped through the drill stem under pressure to assure proper cementation. This requires approximately one bag of cement per seven foot depth. Initial plans are to have the two rigs do their own cementing. However, as an alternative, the services of an independent contractor, such as Halliburton Services, may be employed to cement the holes.

At completion of abandonment, a numbered steel washer or tag will be embedded at the top of each hole for future identification. The proposed method of plugging should provide adequate protection from contamination of groundwater aquifers and for future underground mining in the area.

Reclamation - Upon completion of drilling operations, all disturbed areas will be backfilled and graded to approximate original contour. Surficial materials will be redistributed over the disturbed area. The disturbed area will then be seeded with a mixture of species which have a history of success in revegetation of disturbed lands, provide palatable forage for livestock, and have food and cover values for wildlife. The following seeding mixture is proposed at the rates specified:

Fairway Crested Wheatgrass	2 lb./acre
Standard Crested Wheatgrass	1 lb./acre
Pubescent Wheatgrass	2 lb./acre
Intermediate Wheatgrass	2 lb./acre
Russian Wild Rye	2 lb./acre
Smooth Broom	2 lb./acre
Orchard Grass	1 lb./acre
Yellow Sweet Clover	<u>2 lb./acre</u>
TOTAL	14 lb./acre

Seeding will be done by hand. Fertilizer will be applied as determined necessary to successfully revegetate disturbed areas. Mulch will be applied as determined necessary to control erosion. Additional erosion control structures, such as water bars, will be installed if determined necessary.

Reclamation Schedule - Reclamation will be completed as promptly as conditions permit. However, the optimum period for seeding is thought to begin in October. Therefore, backfilling and grading will be initiated in September and seeding will begin in October. After October 1, all areas of active disturbance will be progressively backfilled, graded and seeded. All disturbed areas will be reclaimed prior to abandonment in the late fall of 1979 and 1980.

Air Quality - The proposed exploration program will have negligible affect on the ambient air quality. The only source of potential pollution of any significance would be fugitive dust from vehicles traveling in the area. However, due to the minimal amount of travel in the lease area and the low speeds which will be maintained, this is considered to be a negligible impact.

Hydrology - The proposed exploration program has given careful consideration to protection of the hydrologic regime. Potential sources of pollution would be open drill holes, erosion from disturbed areas and extended exposure of potentially toxic materials. Drill holes will be sealed promptly upon completion of drilling to avoid contamination of groundwaters. Appropriate measures for erosion control will be incorporated in each phase of the program, and potentially toxic materials will be removed from the area. Therefore, impacts of the proposed exploration program on the hydrologic regime will be minimal.

Fish and Wildlife - The impact of the proposed exploration program on the wildlife resources of the lease area will result from increased activity in the area and disturbance of the natural vegetation. These impacts will be minimized by restricting exploration activity to those areas specified

in the proposed exploration plan and promptly revegetating disturbed areas with species of value to wildlife for food and cover.

The value of the lease area for winter range for mule deer will not be diminished. Exploration activities will cease prior to arrival of the major portion of the winter deer herd. Therefore, the proposed operations should not have a significant impact on the winter deer herd.

No significant populations of fish are known to exist in the lease area. However, streams and water bodies will be protected by incorporating the appropriate measures of erosion control into each phase of the proposed exploration program.

Considering the small scale of the proposed operations in the lease area, impacts upon the fish and wildlife resources should be minimal. The proposed reclamation and environmental protection measures should further minimize any impact on the fish and wildlife resources of the lease area.

Endangered Species - No endangered species of plants or animals are known to inhabit the lease area. However, prior to any disturbance, the presence or absence of any endangered species will be verified. The verification will be provided by a joint effort on behalf of the Bureau of Land Management and Dr. S. Welsh of Brigham Young University in Provo, Utah to insure no disturbance of any endangered species.

Archaeology - No formal survey of archaeological sites within the lease area has been conducted to date. Therefore, prior to any disturbance, all areas of potential disturbance will be surveyed by Dr. R. Holmer, of the University of Utah, in Salt Lake City, Utah, to insure no historic or prehistoric values will be disturbed.

Fire - No burning or open fires will be permitted on the lease area. In the event of fire, equipment such as fire extinguishers, picks, shovels and water will be available at the site for fire control.

Public Health and Safety - No phase or specific act of the proposed exploration program will create a hazard to public health and safety.

APPENDIX I

DESIGNATION OF OPERATOR

The undersigned is, on the records of the Bureau of Land Management, holder of lease

DISTRICT LAND OFFICE: Salt Lake City
SERIAL NO.: SL-066490, SL-069291, U-014218, U-0126947,
U-14217, U-2820, U-0126948

and hereby designates

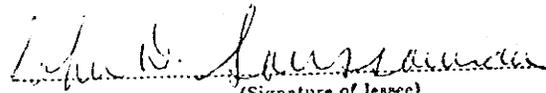
NAME: Amax Coal Company, a Division of Amax, Inc.
ADDRESS: 105 South Meridian Street
Indianapolis, Indiana 46225

as his operator and local agent, with full authority to act in his behalf in complying with the terms of the lease and regulations applicable thereto and on whom the supervisor or his representative may serve written or oral instructions in securing compliance with the Operating Regulations with respect to (describe acreage to which this designation is applicable): The above contiguous leases are generally referred to as the "Sunnyside South Lease" and total about 8,331 acres.

It is understood that this designation of operator does not relieve the lessee of responsibility for compliance with the terms of the lease and the Operating Regulations. It is also understood that this designation of operator does not constitute an assignment of any interest in the lease.

In case of default on the part of the designated operator, the lessee will make full and prompt compliance with all regulations, lease terms, or orders of the Secretary of the Interior or his representative.

The lessee agrees promptly to notify the supervisor of any change in the designated operator.


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(Signature of lessee)

John D. Saussaman
Vice President, Raw Materials
Kaiser Steel Corporation
300 Lakeside Drive, P.O. Box 58
Oakland, CA (Address) 94604

April 23, 1979

(Date)