

PART III

Analysis of Proposed Mining

Atlantic Richfield Co.

CHAPTER I

DESCRIPTION OF PROPOSED ACTION

Background and History

Coal lease W-2313, containing 5,884.31 acres, was offered for sale by competitive bidding on September 27, 1966. It is located about 42 miles southeast of Gillette (Figure 1) and embraces part or all of sections 2 and 3, T42N, R70W, sections 17, 20, 21, 22, 27, 28, 29, 33, 34, and 35, T42N, R70W, Campbell County, Wyoming (Figure 2).

Paul F. Faust from Denver, Colorado, was the successful bidder at \$31.33 per acre. The total amount of the bid was \$184,355.43. The lease was issued on December 1, 1966. A copy of the lease, including a legal description of the land, is included in Appendix D.

The lease was assigned to Atlantic Richfield on July 1, 1968. The original lease included 40 acres of acquired mineral lands in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ of section 22, T34N, R70W. On July 25, 1972, this tract was segregated and assigned a new lease number W-36094 (Acq.). The company doesn't propose to mine from this acquired land during the first 20 years of operation.

The lease with the Bureau of Land Management is a continuing lease subject to reasonable readjustment of terms on a 20-year basis. It provides for a royalty of 17-1/2 cents a ton of coal mined for the first 10 years of the lease and 20 cents a ton for the remainder of the first 20-year period of the lease. The annual rental is set at \$0.25 per acre per year for the first year; \$0.50 for the second, third, fourth and fifth years, respectively; and \$1.00 per acre for the sixth and each succeeding year

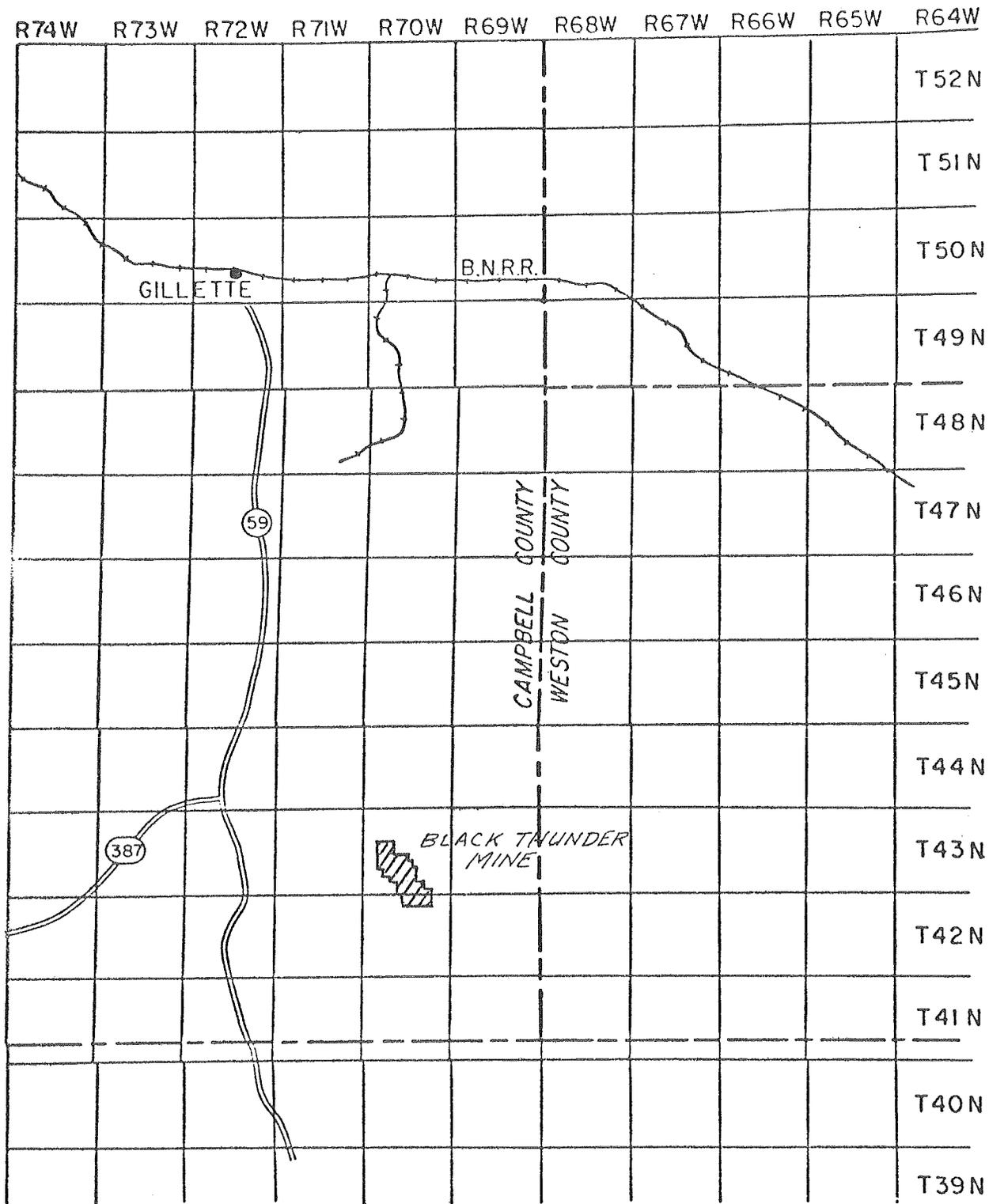


Figure 1

Location of the Black Thunder Coal Property, Atlantic Richfield Company, Campbell County, Wyoming.

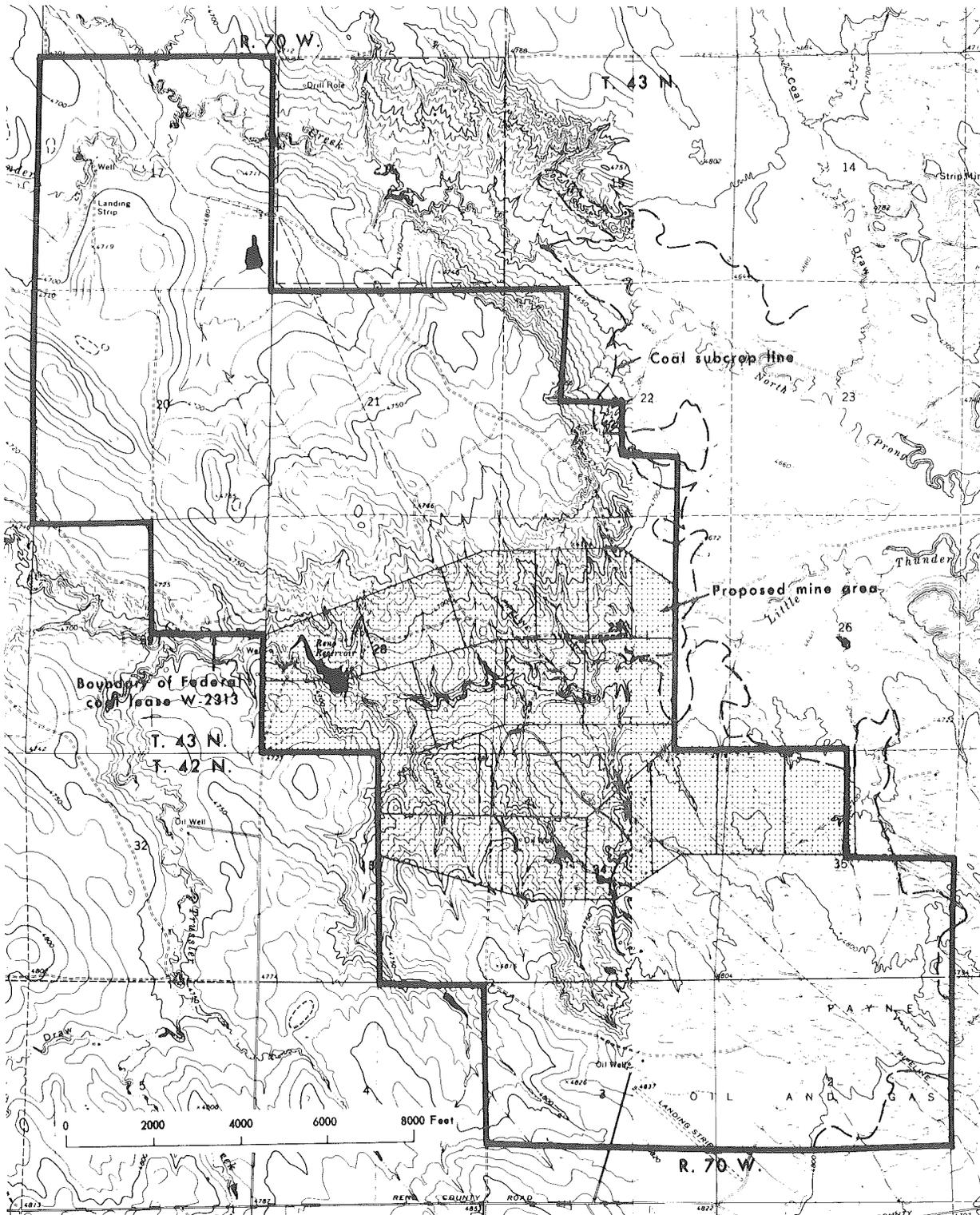


Figure 2
 Map of the Black Thunder coal property, Atlantic Richfield Company,
 Campbell County, Wyoming

during the continuance of the lease. Rental for any year is to be credited against the first royalties as they accrue under the lease during the year for which the rental is paid. Minimum annual royalty based on production is set at \$1.00 per acre or fraction thereof starting the sixth year of the lease. In addition, the lease contains 11 general stipulations plus detailed requirements for exploration and mining on lands under the jurisdiction of the Department of Agriculture.

Purpose of proposed project

On September 5, 1973, the Atlantic Richfield Company submitted a mining and reclamation plan to the office of the Area Mining Supervisor of the U.S. Geological Survey in Billings, Montana, and filed a supplement to this plan on February 27, 1974, followed by a revised plan on May 20, 1974. These plans are being reviewed by the U.S. Geological Survey and the U.S. Forest Service to see if additional requirements are necessary and are available for public inspection at the office of the area mining supervisor in Billings, Montana.

The company proposes to open a surface mine using conventional stripping and mining equipment on federal lease W-2313. The operation would be called the Black Thunder mine. Proposed production is planned for late 1975. Coal is to be shipped by unit train to utility plants in Nebraska, Oklahoma, and Texas. The mine is projected to be producing at the rate of 10 million tons per year by 1979. The only treatment of the coal at the mine site will be crushing.

The mining plan covers the proposed mining operations for a 20-year period. This plan outlines the blocks of land to be mined during this time period. Mining will commence in the W $\frac{1}{2}$ NE $\frac{1}{4}$, section 27, T43N, R70W, and

will move toward the western lease boundary. The mine will be about 2,000 feet wide when developed to its full width and will reach the western lease boundary in 1981. Mining will then move to the south where the adjacent 2,000-foot-wide strip will be mined in an easterly direction until the eastern lease boundary is reached in 1986. Two additional strips, each 2,000 feet wide, will be mined, one in the westerly direction and one in the easterly direction, which will complete the 20-year plan. The proposed blocks to be mined each year are shown in Figure 3.

Site location

The proposed mine operation in T43N, R70W, would be located 9 miles east of State Highway Number 59 which connects Gillette and Douglas, Wyoming (Figure 1). The initial mining area would be 52 miles by highway from Gillette and 89 miles by highway from Douglas in Campbell County. The population of Gillette in 1970 was 7,197 people and Douglas was 2,677 people.

Kerr-McGee Corporation has announced plans to open a mine (Part V of this statement) just north of the Atlantic Richfield mine on federal lease W-23928. A railroad spur track used by both companies would follow the drainage of the north prong of Little Thunder Creek which divides the two properties.

Peabody Coal Company has federal coal lease W-0321779 which adjoins the Atlantic Richfield lease on the south. Peabody and Panhandle Eastern Pipe Line Company have jointly announced plans to open a mine on the Peabody property for a gasification complex as discussed briefly in Part I of this statement. This operation would not affect Atlantic Richfield's operation.

Ownership of the mine area is shown below in acres.

	<u>Surface</u>	<u>Coal</u>
United States	3,844*	5,884
State of Wyoming	640	640
Private	<u>2,040</u>	<u>0</u>
Total	6,524	6,524

*Forest Service

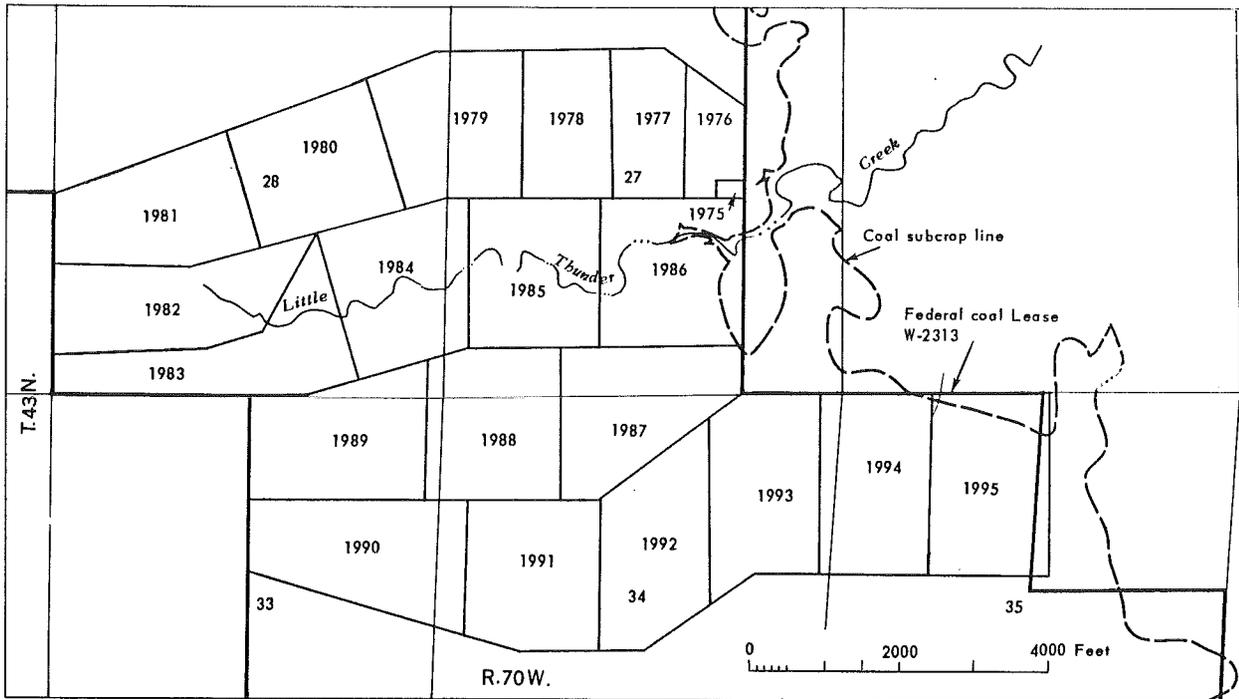


Figure 3

Atlantic Richfield Company's Black Thunder Mine
 Showing Blocks to be Mined per Year on Federal Lease W-2313

Stages of Implementation

Mining procedures

The following description of mining and reclamation activities is taken, with modification, from the mining and reclamation plan submitted by A.R.Co.

Mining will commence in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ of section 27 (Figure 3). The overburden will be removed and the coal will be loaded with a 20- to 27-yard shovel into 100- to 180-ton dump trucks. The truck and shovel overburden removal method is depicted in the overburden removal portion of Figures 6 and 7, Chapter III, Part I, and the coal removal operation is shown in Figure 9, Chapter III, Part I.

The topsoil and overburden from the initial pit will be placed to the east of the pit.

Anticipated yearly production is as follows:

<u>Year</u>	<u>Million Tons</u>
1976	1.2
1977	3.8
1978	6.6
1979	10.0
1980	10.0

Additional coal purchase contracts may result in production increases to 15 or 20 million tons per year. At 20 million tons per year, the mine life is estimated to be 40 years. A coal mine in the Gillette area producing 10 million tons per year would probably employ between 200 to 250 men. At 20 million tons per year, 400 to 450 men would be needed.

The coalbed varies in thickness from 60 to 70 feet. Near the outcrop, the top part of the bed has generally been eroded and in places only 20 feet of coal remain. There has also been extensive burning of the coalbed near the outcrop. The shovel and truck mining method provides the flexibility necessary to mine along an irregular outcrop or burn line.

Soil material removal

Topsoil will be removed with self-loading and/or conventional rubber tired scrapers, front end loaders or other appropriate equipment prior to mining or construction. At the start of operations the topsoil will be stockpiled from the overburden dump area and from the original mining area. When backfilling of the mine commences, topsoil will be taken directly from the stripping operation, ahead of the highwall, and spread over the graded spoil behind the mining area. This will reduce the amount of topsoil that must be stockpiled and rehandled. The topsoil will be mulched as necessary to prevent wind or water erosion.

Overburden removal

Overburden will be loaded by shovel after drilling and blasting. In the initial mining area where softer overburden exists, only limited blasting may be required. As the overburden thickens over the coal, lenticular sandstone lenses will require blasting. All blasting will be done in accordance with applicable safety regulations.

The company proposes to use a truck and shovel stripping method (Figures 4 and 5) but does not exclude the possibility of using a dragline or bucketwheel excavator at some time in the future.

The truck and shovel operation is readily adaptable to any type terrain and offers many advantages over other types of operations for moving overburden. Among the advantages of this type of operation are the following:

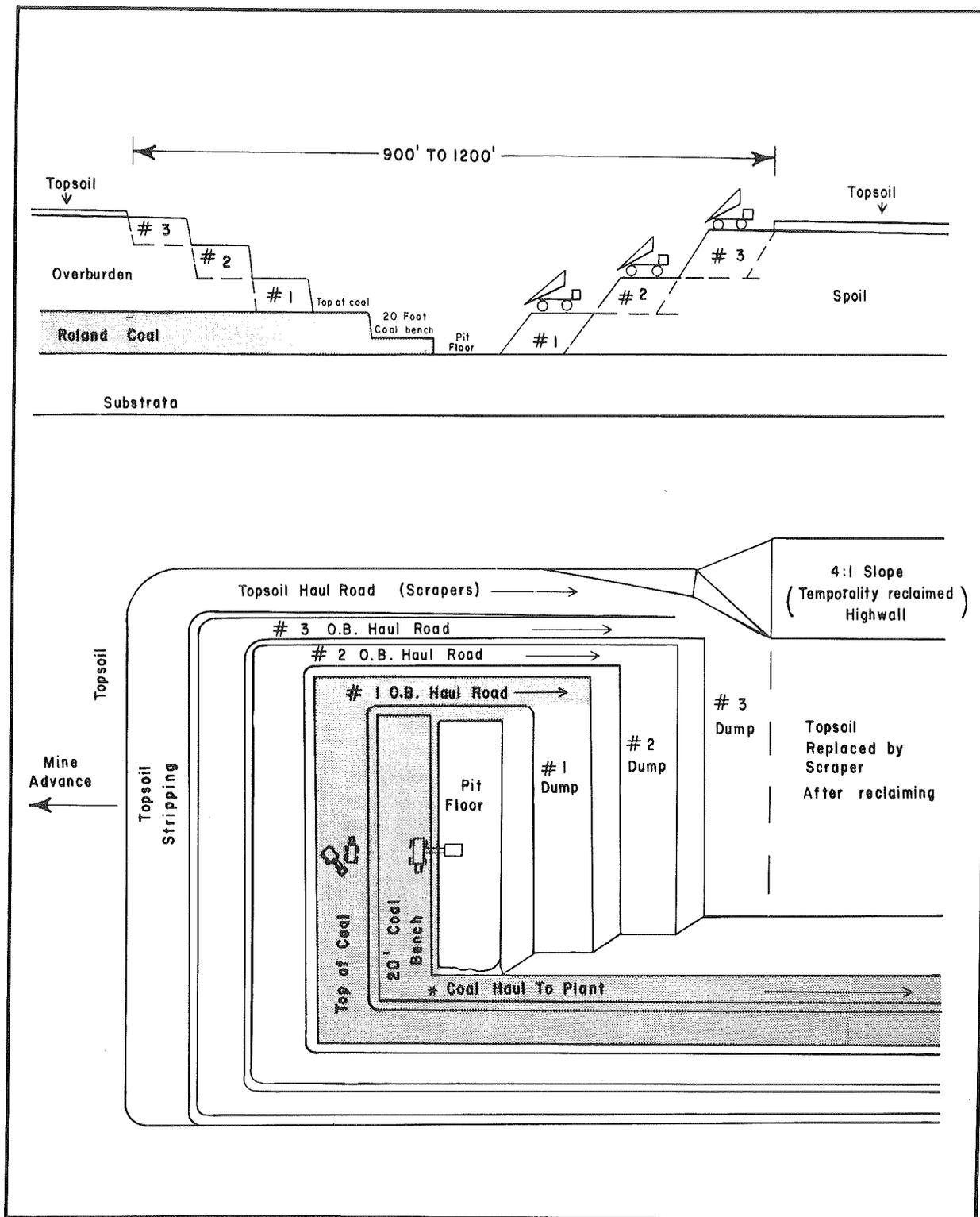


Figure 4
 Schematic of Truck and Shovel Operation Showing Overburden
 and Coal Removal (from A.R.Co.)

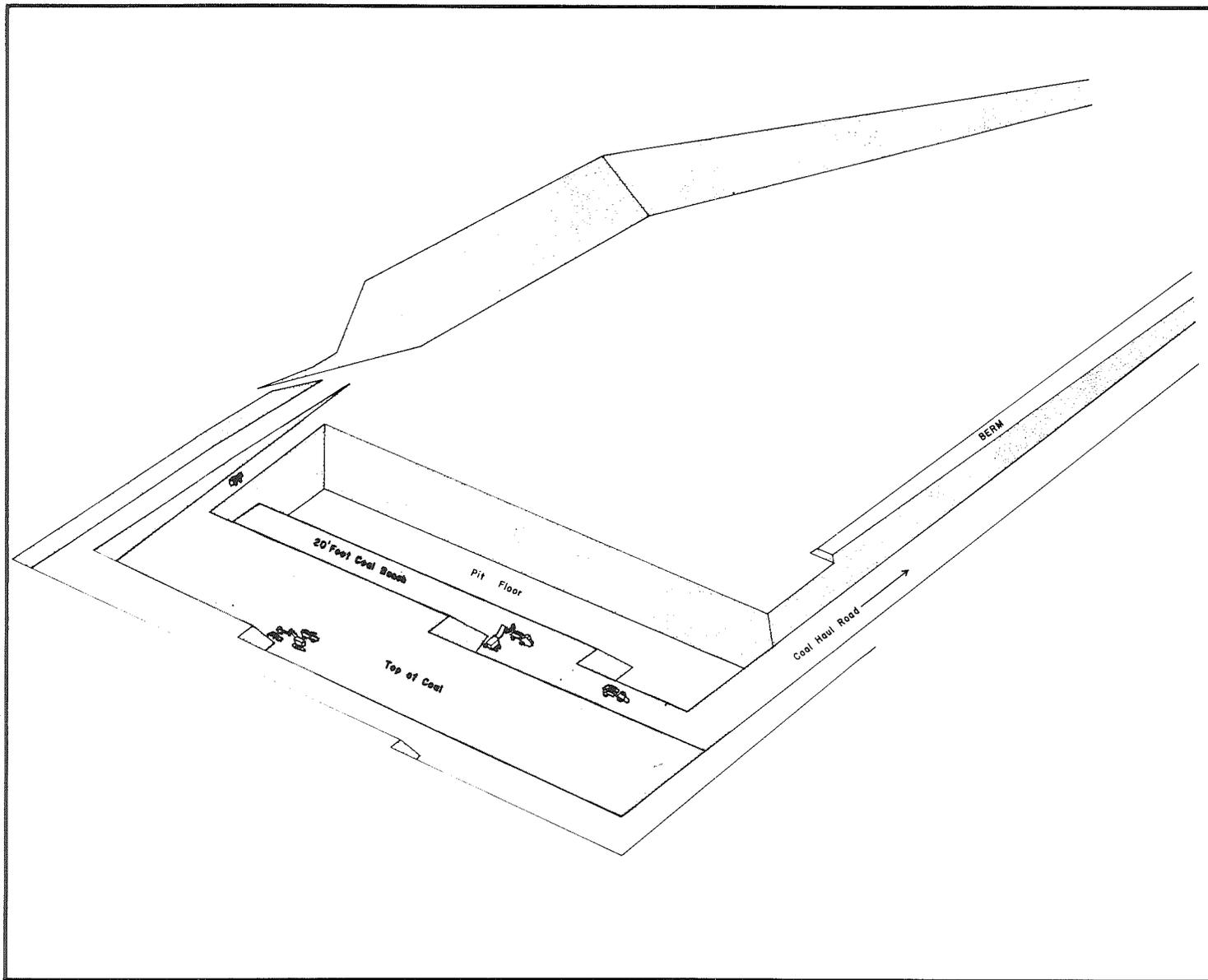


Figure 5

Perspective view of the mining area about 1978 at the Black Thunder Mine (from A.R.Co.)

The overburden can be placed in any sequence in the spoil piles with the more desirable material being placed near the surface; any toxic materials, if present, can easily be buried within the spoils;

The overburden will be removed in approximately 50-foot benches which will eliminate the additional danger of highwalls 200 feet or more in height;

The overburden can be placed in the spoil area in essentially the same stratigraphic sequence as it originally occurred, using approximately 50-foot intervals;

Trucks have the ability to haul spoil to low areas so that reestablishment of disturbed streambeds at the proper gradient should be possible;

Truck and shovel operations would allow a mining rate of up to 10 million tons per year in a single pit. (In this case the pit would be 2,000 feet wide and would advance 1,800 feet per year);

Only one haul road will be required for coal hauling and thus the land can be reclaimed immediately behind the mining operation; and

Coal recovery will be increased because no fenders of coal will be left to maintain highwall stability and no coal will be lost as a result of highwall slides.

Coal removal

Coal beds from 50 to 80 feet thick are generally mined in two benches at mines in Wyoming and Montana. This same method is proposed at the Black Thunder mine since equipment working near a 70-foot highwall of coal could endanger equipment operators. The coal will be loaded initially

by the same 27-yard shovel which is used for overburden loading. The top bench of coal will be taken first, leaving a 20-foot lower bench to be mined immediately behind the top bench. The 100- to 180-ton trucks will dump their loads on a drive-through ramp into a hopper above the primary crusher.

Reclamation

The company proposes to begin rehabilitation efforts on disturbed lands as soon as possible after the coal has been removed. The plan is designed to allow concurrent use of much of the machinery for both mining and reclamation.

All reclamation activity at the proposed Black Thunder mine will conform to the stipulations and requirements of the federal coal lease (W-2312), applicable federal operating regulations, and the Wyoming Environmental Quality Act of 1973. Before any mining is started in Wyoming, the operator must obtain a permit from the state which entitles the operator to mine in conformance with an approved reclamation plan.

It is the policy of the Department of the Interior and the U.S. Geological Survey that the operation be conducted under the more stringent laws and regulations, whether federal or state.

About 2,040 surface acres on the lease are privately owned. The remainder of the surface is owned by the Federal Government and comes under the jurisdiction of the Department of Agriculture. Under the stipulations in the lease, officials of Atlantic Richfield Company have agreed to submit an annual operating plan to the forest supervisor. The plan will show the mine operating areas and the methods of operation planned for each area. It will also show the areas to be treated and detail the rehabilitation and revegetation measures to be initiated in the planning year to meet the stipulated requirements of the Forest Service. In addition, the Forest Service reserves the right to amend, alter, or otherwise change during the life of the

lease, any and all stipulations necessary to meet the land management principles outlined in the lease agreement.

Surface land use on the coal lease is primarily for grazing of cattle. The Soil Conservation Service reports that the carrying capacity of this area would average four acres to graze one animal for one month with an average grazing season of 10.8 months. The Atlantic Richfield Company proposes that the land disturbed by surface mining activities be reshaped into low rolling hills with broad valleys. Existing topsoil will be saved, replaced on the reshaped land, and planted with a mixture of native and introduced grasses.

The company has employed the Wyoming Environmental Institute to conduct a comprehensive environmental study of the property. This group will conduct a research program in revegetation and will recommend alternatives for reclamation. These research workers are all from the University of Wyoming and will evaluate several alternatives in terms of environmental qualities.

Atlantic Richfield has also signed a cooperative agreement with the U.S. Forest Service for "Conducting Forest and Range Research" and "Ecological Study of Proposed Strip Mined Areas." The company's reclamation plan is based on the experience and recommendation of the Soil Conservation Service and the U.S. Forest Service.

Spoil reclamation

Initial spoil removed from the pit will be used as plant fill or contoured into areas in sections 26 and 27 north of Little Thunder Creek. These areas will be covered with topsoil and planted.

The fact that only a part of the coalbed is present along the outcrop will facilitate blending reclaimed mined land with surrounding terrain. When the full 60- to 70-foot seam is taken with an average of 50 feet of overburden, the surface of the reclaimed land will be lower than the original surface. The shovel-truck combination will provide flexibility in placing overburden to avoid low spots which might fill with water and to blend the reclaimed spoils into surrounding terrain.

During reclamation of the surface contours, attention will be paid to habitat requirements of wildlife. Shaping of contours has been demonstrated to be of importance to eagles and some hawks. The company plans to provide outlooks, feeding locations, and updrafts for some animal species, while others such as the pronghorn, will benefit from very long vistas and gently rolling topography.

Careful planning will, however, be required to achieve satisfactory reclamation of the mined lands. Reclamation will be simplified where the coalbed has thicker overburden cover. Advanced partial stripping of selected high overburden areas will also allow better reestablishment of the proximate contours in the lower overburden areas. A 10-million ton per year operation will disturb about 85 acres per year when the full bed is mined and an equal number of acres will be reshaped and planted.

Preliminary tests indicate the overburden contains only minor amounts of toxic trace metals. If toxic materials are encountered, a system of handling overburden will be devised so that undesirable materials are buried in the spoil piles.

Spoil piles will be shaped into low rolling hills with broad valleys. Overburden will be placed in its final position and the land reshaped within a few months after an area has been mined. The land will then immediately

be graded, and topsoil will be returned in the most appropriate manner and season.

Backfilling of abandoned pits will follow within a few hundred feet of coal loading operations. Very little coal will be mined from areas with more than 100 feet of overburden during the first 14 years of mining. During the last 6 years outlined in the mining plan, overburden will generally range from 100 to 160 feet thick.

A coal haul road will be maintained in the spoils at the south side of the pit. Spoils can be used from areas of thick overburden and from proposed reservoir sites to reestablish old stream channels at their original elevation. Edges of the pit will be graded into the surrounding terrain on an acceptable slope. Prestripping may reduce the highwall slope which is envisioned to be about 4 to 1. The haul roads from the active pit will vary from 0 to 7 percent grade.

Drainage control

Little Thunder Creek flows to the east through the center of the lease, and the north fork of this stream cuts across the northern tip of the lease. This is an intermittent seasonal stream with a watershed of 23,800 acres.

Little Thunder Creek will be left in the original stream channel until 1981 when the pit will cut the stream channel. A berm 20 feet high would be carried in the spoil parallel to the haul road which the company reports will cause all surface runoff entering the spoils from the north to reestablish a drainage pattern in the spoil.

A diversion dike will be constructed on Little Thunder Creek in 1981 ahead of the mining area. The dike will remain south of the creek until 1988. It will divert water around the north edge of the pit where it will be allowed

to flow into the reestablished streambed in the spoil. A 50-acre reservoir will be constructed in 1982-83 to replace the stock reservoir on the land to be mined.

It is planned that reservoir lakes will be constructed in the reclaimed mine area. They will hold approximately 11,000 acre-feet of water with a surface area of about 200 acres. If this proposed reclamation plan is not approved, the mining method and equipment to be used is such that other reasonable surface configurations can be established.

An initial settling pond to receive mine drainage will be constructed using overburden material stripped in 1976. This pond will have a capacity of 123 acre-feet which, it is estimated, is more than adequate for settling needs. The pond will be abandoned when this area is mined in 1978. This will be done after new settling ponds are constructed in the 1977 reclaimed spoil area.

All disturbed areas, including the plant site, will have interceptor ditches constructed to catch surface runoff water and direct it to small siltation ponds for settling and/or treatment.

Seeding and planting

The newly shaped surface for planting will be prepared in one or more of the following ways: deep harrowing with a long-shanked chisel plow along the topographic contour to loosen the soil to a depth of 8 to 10 inches; construction of temporary concavities 8 inches deep, 16 inches wide, and 24 inches long, spaced as closely as possible along the contour to create moisture retention basins; stubble mulching, probably with straw pressed into the surface with a disc, or by using mulches of other kinds, such as excelsior, rock chips, wood chips, etc., appropriately applied; and fertilizing with an appropriate

grassland formula as indicated by soil analyses, such as 75 lbs/acre available nitrogen, 100 lbs/acre available phosphorous, 50 lbs/acre available potassium, spread using standard agronomic procedures.

The objective of such surface preparation is to roughen the surface, thereby increasing infiltration and reducing surface run-off. The micro-relief so produced increases soil water availability in the small depressions, creates shaded areas, and reduces wind action in the depressions.

Prepared surfaces will be planted in both early spring and late fall as these surfaces become available during the mining operation. Either a temporary cover crop will be seeded or a mixture of native and introduced plant species which will ultimately form the final vegetative cover. If a temporary cover crop is needed for erosion control, it will be replaced after one to two years with the final stable mixture. The objective is to achieve a self-sustaining vegetative cover of hardy grassland species.

The kinds of species to be used will be determined after appropriate field trials at the site and upon recommendation of recognized authorities in the area. The principal components of the seed mixtures will be grasses and forbs, but seedling trees and shrubs also will be planted in appropriate sites. Rehabilitation plans will conform to the stated goals of the federal agencies charged with managing the site.

The company proposes to follow the above reclamation and seeding plan but lists alternate reclamation plans for consideration. The alternatives are (1) farming, (2) introduced grass species, (3) woody plant species, (4) recreation-wildlife use area, and (5) multiple use area.

Under the farming plan, the land would be contoured into a series of broad, flat terraces suitable for dryland farming. The primary crops would

probably be hay or wheat. The final cut could be converted to small reservoirs which might supply some water for irrigation.

Species of grasses from other parts of the country or world could be planted rather than species native to the area. It is questionable that introduced species would form a stable, self-perpetuating vegetation and as such may not be very desirable.

Some tree and shrub species are to be planted as part of the reclamation procedure proposed by the company. The trees and shrubs will be native to the area and will be planted for wildlife habitat and shelter.

A recreation-wildlife use area could be created in the mine area by providing small reservoirs for fishing and swimming.

The multiple use area approach would incorporate a combination of several single usage alternatives which would reclaim the land primarily for grazing and also provide for wildlife and recreation.

Surface facilities

Most of the proposed surface facilities are located on a 160-acre tract in the E $\frac{1}{2}$ SE $\frac{1}{4}$ of section 22 and the W $\frac{1}{2}$ SW $\frac{1}{4}$ of section 23 (Figure 6). The company has not yet finalized the sharing of the branch rail line and access road with the Kerr-McGee mining operation to the north nor established final plans for its railroad loop. However, work on these items is well underway.

Surface facilities will include the following: truck dump, hopper, primary crusher, secondary crusher, coal storage piles (4 acres), two train-loading facilities with sampling devices, office and shop buildings (5 acres), railroad loop, flood control and mine water facilities, electric power distribution system, and other miscellaneous buildings and structures.

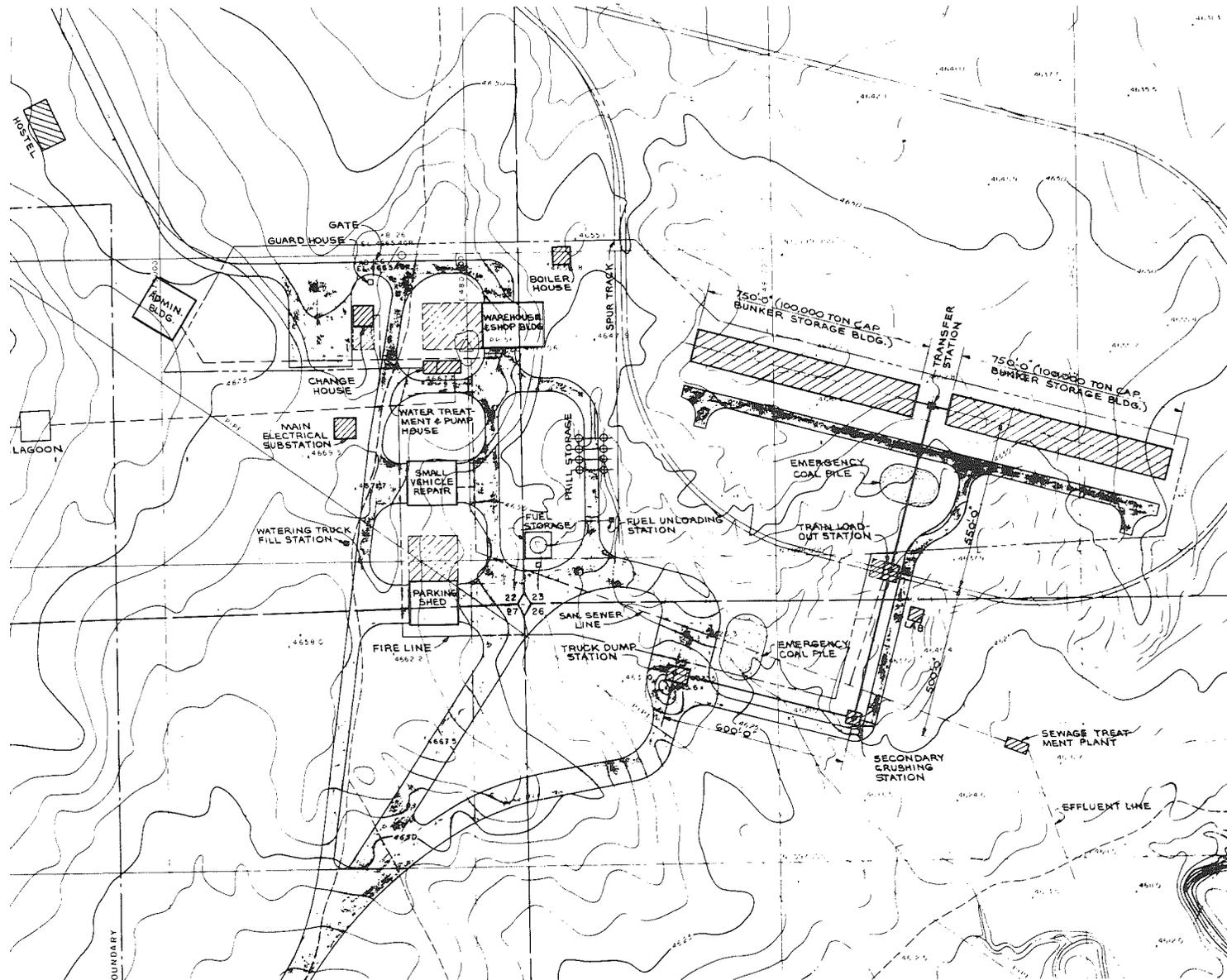


Figure 6

Surface Facilities at the Black Thunder Mine (from A.R.Co.)

Roads

Only two miles of main haul road will be constructed during the first 12 years of mining. This road will be in reclaimed spoils on the south edge of the pit while mining is advancing westward. After the lease boundary is reached in 1981, the same road will be used while the mining face is worked toward the east. When a haul road is abandoned, the surface will be contoured, topsoil will be replaced, and the disturbed area revegetated.

Railroad spur

Under the latest proposal for a new rail line between Gillette and Douglas, Wyoming, the main line would be constructed about three miles west of the present lease. A branch line about five miles long, requiring a right-of-way 200 to 400 feet in width, will be constructed to the approximately 18,000-foot spur line or loop track at the mine. An additional 3,400-foot spur line will be constructed for handling supplies, bad order cars, weigh train maneuvering, etc.

Power

Electric power for the shops, electric shovels, crushing station, and loading facilities will be required. Power is to be supplied by a 69-kv transmission line extending from an existing transmission line about 15 miles north of the lease area to the primary substation to be located north of the entrance road to the plant area as shown in Figures 6 and 7. Distribution in the plant area will be at 69-kv through buried and protected armored cable to secondary transformers and thence by overhead line to portable substations. Power will be transmitted from the substations through trail cables to in-pit equipment. The electric shovels and the mine plant will be the major consumers of power. The electrical load of each shovel will be about 800 kw and the mine plant will be about 5,000 kw.

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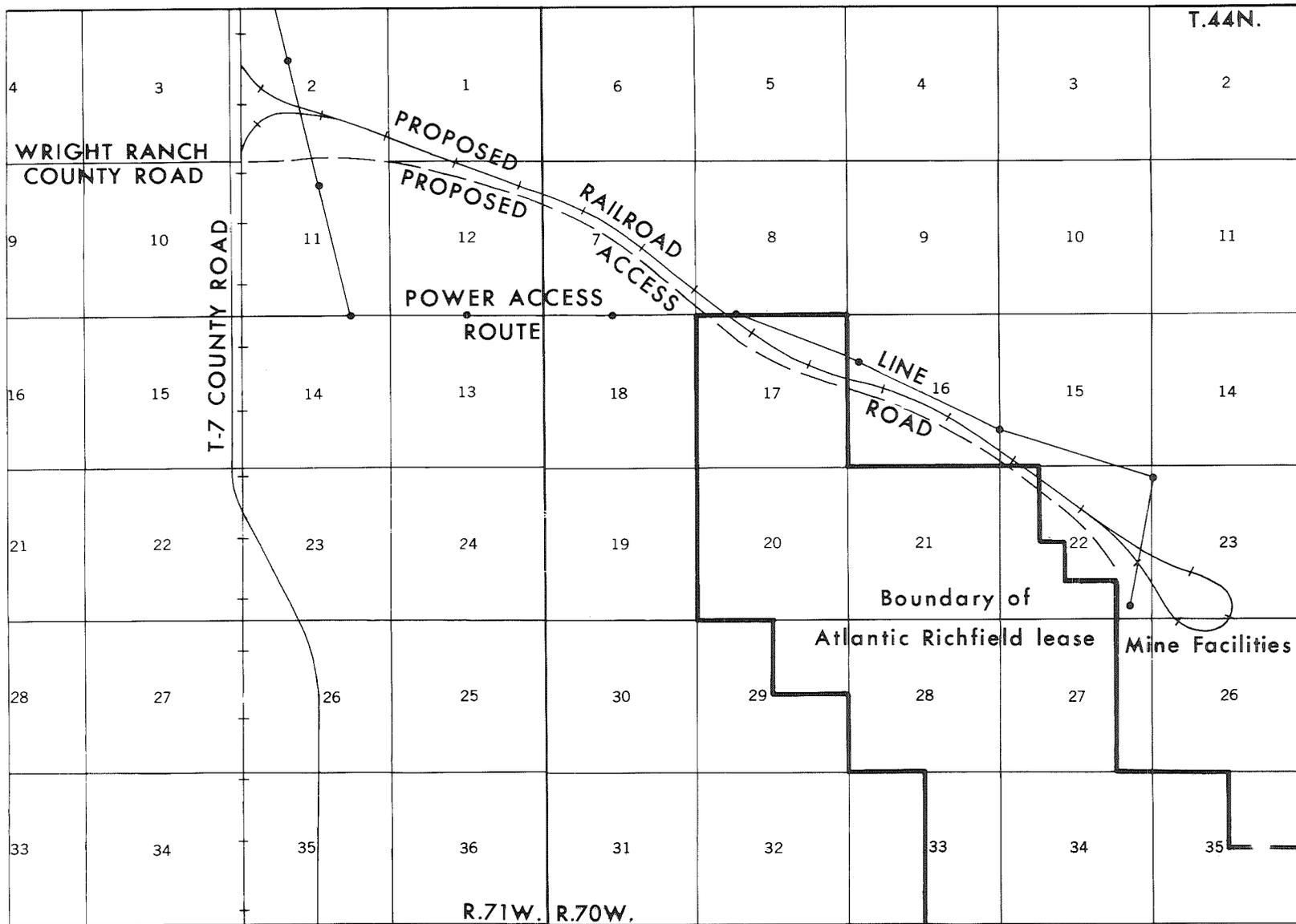


Figure 7

Proposed Access to Atlantic Richfield Mine Facilities

Office and shop

Office and shop facilities will be required at the mine site but specifications as to size and type of structures have not been finalized at present. Sewage from the surface facilities will be treated in a septic tank and discharged to a drain field and sand filter bed of adequate capacity. Waste from the office and shop facilities will be buried under spoil piles in the mine. Little burning of waste is anticipated, but if necessary, burning will be done under controlled conditions and in accordance with local and state laws.

Mining equipment

The company has made plans to purchase the following equipment for the mine: shovels - 20 to 27 yard, dump trucks - 100 to 180 tons, truck and track mounted drills, front end loaders, wheel scrapers - for topsoil, and bulldozers - for reclamation, plus any necessary support equipment.

Loading equipment

Coal will be hauled from the mine to the crushing facility by bottom and/or rear dump off-highway trucks. The trucks will discharge the coal via a drive-over ramp into storage hoppers which will feed the primary crusher.

Storage facilities

Coal storage facilities for crushed coal will include outside surface storage as well as enclosed storage from which the coal will be delivered by conveyors to the flood loading facility for rail cars. The approximate location and size of storage facilities and rail loading system are shown in Figure 6.

Crushing and processing equipment

The coal will be crushed to minus two-inch size prior to shipment to the purchasers. The type and size of crushers have not been finalized at present. A dust collection system is planned for the crushing and screening plant.

Mining Sequence

The company has presently contracted to mine 88,000 tons of coal during 1975 from a pit 250 feet wide and 400 feet long in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ of section 27. This pit will be expanded to a north-south mining face 2,000 feet long in the N $\frac{1}{2}$ of section 27 by 1977. This working face will be advanced 1,000 feet to the west in 1977; 1,200 feet in 1978; and 1,800 feet in 1979. After 1979 the pits will be irregular in shape. Each year about 83 acres will be mined.

Overburden will be removed from the coal for a minimum distance of about 300 feet ahead of the coal mining. Loading operations on the top bench will be independent of the operation on the lower bench to maintain coal quality and safe mining conditions. Coal benches will be mined in north-south strips at a selected width depending on operating considerations.

If proven more practical, efficient, and safe, coal may be mined in a single bench over the full thickness of the bed. Furthermore, future studies may indicate that coal should be conveyed to the plant, rather than hauled by trucks. The earliest that a conveyor system would be installed is 1979.

The overburden will be placed in its final position behind the coal loading operation and the land reshaped within a few months after an area has been mined. Ninety percent of the disturbed land will be reclaimed the year after it has been mined.

Monitoring

Two surface meteorological stations have been installed for one year and a third will be added in the area of the lease. All three will be maintained year around. They continuously record wind speed and direction, air temperature, precipitation, and relative humidity. The company also has plans to set up monitoring stations to record air quality data.

Twenty-five permanent ground water observation wells have been installed by Atlantic Richfield within the lease area. Ten of these wells have continuously operating water level recorders. Pumping tests have been and will continue to be carried out to determine the hydraulic conductivity and storage coefficients of the aquifers. Recording gauging stations will be established on Little Thunder Creek above and below the lease boundaries, and below the junction with North Prong - Little Thunder Creek. Data from all monitoring stations will be used by Atlantic Richfield, the U.S. Geological Survey and surface management agency to determine changes as mining progresses.

If additional mitigating measures, beyond those proposed, are needed, the mining and reclamation plan will be modified to show the changes.

Monitoring of herbage structure, production, and phenology is underway at the present time.

Transportation and Marketing

Coal will be loaded from storage and directly from the mine into 100-car unit trains for shipment. Southwestern Public Service Company will receive about two million tons of coal annually for its power plant in Amarillo, Texas; Oklahoma Gas and Electric will receive about three million tons annually for its power plant in Muskogee, Oklahoma; and Nebraska Public Power District will receive about 1.8 million tons annually for its power plant in Sutherland, Nebraska. The first shipments to Amarillo, Texas, are scheduled for September 1975; however, because of anticipated delays in commencement of construction of mine and railroad facilities, actual deliveries may not take place until late 1975 or early 1976. Factors that may cause additional delays are weather conditions, equipment and materials delivery time, and manpower shortages.