PROPOSED

BUCKSKIN

PROJECT

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION

INTRODUCTION

The subject of this part of the environmental statement is the proposed Buckskin surface mining project. This site-specific document contains a description of the proposed action, a description of the existing environment, an analysis of impacts associated with the proposed action, and an analysis of alternatives to that action.

HISTORY AND BACKGROUND

The Buckskin Mine would occupy federal coal lease, Wyoming 0325878. The lease was issued to Farmers Union Central Exchange on November 1, 1967, and was subsequently purchased by Shell Oil Company. Approval of the lease assignment was granted effective May 1, 1975. By approving these lease actions, the United States committed 84 million tons of coal reserves to mining. On May 4, 1977, Shell submitted an application to the Wyoming Department of Environmental Quality (DEQ) for a permit to mine.

In May 1977, Shell Oil Company submitted a mining and reclamation plan for the Buckskin project to the office of the Area Mining Supervisor, Geological Survey (GS), Billings, Montana, in accordance with 30 CFR 211 regulations promulgated in May 1976. This plan was accepted by GS as meeting 30 CFR 211 requirements.

In November 1978, Shell Oil Company submitted a revised mining and reclamation plan to the Office of Surface Mining (OSM) and the
Wyoming Department of Environmental Quality. The revised plan reflects Shell's interpretation of all applicable federal and state regulations, including those promulgated between May 1977 and September 1978. It also reflects Shell's contractual obligations to a second customer, which necessitate an increased coal production rate.

The revised mining and reclamation plan has not been considered in analyzing impacts of the proposed action for the final environmental statement. An analysis of changes in environmental impacts caused by mine plan modifications will be made after the revised plan has been accepted by OSM as meeting requirements of the State and the Surface Mining Control and Reclamation Act. The revised mine plan is currently being reviewed by OSM (with consultation with GS and BLM) to see if it is acceptable for consideration as a legal mine plan.

SURFACE MINING CONTROL AND RECLAMATION ACT

The mining and reclamation plan evaluated in this environmental statement (ES) was submitted for review prior to promulgation of the initial regulations (30 CFR 700) required under Sections 502 and 523 of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 (PL 95-87), and has not been officially reviewed for compliance therewith. Therefore, the applicant's plan may not fully reflect the requirements of the initial regulations. However, it is believed that the plan presents sufficient data to allow analysis of the impacts associated with mining.

As required prior to approval by the Department of the Interior, the mining and reclamation plan must be returned to the operator for revision in accordance with the applicable regulations. As noted above, the applicant submitted a revised mining and reclamation plan in November 1978. The revised plan is being evaluated by the Office of Surface Mining (OSM) to insure compliance with the provisions of 30 CFR 700 and other federal and state regulations. The revised mining and reclamation plan cannot be approved until it conforms to all applicable federal requirements. After acceptance of the modified plan by OSM, any changes in environmental impacts caused by the modifications will be assessed.

In this ES, the initial regulations pertaining to SMCRA are considered as federal requirements similar to other applicable regulations. The regional analysis, Chapter 3, Planning and Environmental Controls, describes applicable provisions of SMCRA. Regulations pursuant to SMCRA which are cited below were published in final form in December 1977.

PROPOSED ACTION

Purpose and Objective

The federal authorization considered in this part of the environmental statement (ES) is the approval of the mining and reclamation plan for Shell Oil Company's proposed Buckskin Mine. The plan cannot be approved until it has been modified to meet all applicable federal requirements. The purpose of the proposed action is to allow recovery of 80 million tons of low-sulfur, subbituminous coal over a 20-year period. Note that only 80 million tons of the 84 million tons of reserves would be

extracted, partly because current mining technology does not permit the economic separation of the remainder from overburden and partings, and partly because some coal would be left in the lease boundary highwalls. The objective is to supply part of the national energy need, specifically an average of 4 million tons of coal per year. However, if demand increases, the mine could produce more than the 4 million tons per year average. As of May 1977, 18 million tons of coal reserves were committed to Western Farmers, a Rural Electrification Administration cooperative, in Anadarko, Oklahoma; the remainder of the reserves was not committed to a particular consumer.

The description of the proposed action which follows is based on Shell's mining and reclamation plan, as well as personal communications from the company.

Location and Site Description

The 600-acre lease area is roughly 1 mile wide by 1 mile long and is located about 10 miles north of the town of Gillette, in Campbell County, Wyoming. The legal description of the lease area is as follows:

T. 52 N., R. 72 W., 6th P.M., Section 32, S½N½, S½
T. 51 N., R. 72 W., 6th P.M., Section 5, Lots 1, 3, 4

Shell Oil Company owns the surface of the land contained in the mineral lease.

Carter Oil Company, which owns the surface of the lands surrounding the lease, has granted the right of encroachment to Shell upon Lot 2, Section 5, T. 51 N., R. 72 W., 6th P.M., and upon a 1,000-foot corridor around the entire perimeter of the lease area for mine-related activities. This encroachment has been granted for reduction of the highwall and for construction of mine haul roads, ditches, and water diversions. Shell is negotiating separate agreements with Carter for access road and railroad rights-of-way. The lease area and surrounding encroachment area constitute the permit area, which totals 1,760 acres.

Figure BU1-1 shows the proposed Buckskin Mine in relation to other coal mines in Campbell County, and Figure BU1-2 shows the Buckskin project location. Figure BU1-3 shows the coal ownership in the immediate area of the project, and Figure BU1-4 shows the surface ownership.

Mining Method

Shell proposes to use the open-pit, haulback method of surface mining, utilizing the truck and shovel technique (Figure BU1-5).

Employment

During the construction phase, Shell estimates maximum employment at 262. When Buckskin Mine reaches full operation, employment would be approximately 125. Shell Oil Company has been discussing the housing situation in Gillette with the local planning commission and plans to provide housing facilities for their construction employees near the mine site.

Surface Facilities

Construction of surface facilities would begin in 1979 and take 2 years. Offices, shops, parking areas, electrical substation, and water treatment plants would be located in the southeast corner of the lease area. Coal-handling equipment and the railroad loop would be located near the middle of the east edge of the lease. Coal-handling equipment would include a truck dump; a single-stage crushing unit; a belt conveyor to storage; a 50,000-ton-capacity, covered bunker storage facility; a load-out belt conveyor; a sampling tower; and load-out bins.

Surface facilities would occupy approximately 140 acres, beneath which no surface minable coal occurs.

Support Developments

Support developments consist of access and haul roads, railroad spur, power lines, and water supply and sewage treatment facilities.

Roads

Access to the mine site would be via a new road from U.S. Highway 14/16 to the southeast corner of the lease (Figure BU1-6). The road would be 2 miles long, and improved. Construction would begin in 1979. The road would require a right-of-way of 100 feet on each side of the centerline. Cuts, fills, and borrow areas would be needed, but the road would be completely reclaimed at the end of the mine life, unless the current surface owner requests otherwise. Natural drainage along the access road would be maintained by metal culverts and appropriate erosion control structures.

The roads built for the purpose of hauling coal and overburden would be 100 feet wide to allow two-way passage of haul trucks. Scoria (clinker) exposed during removal of overburden and/or purchased locally would be used in the construction and surfacing of the haul roads. Haul roads would be traversed by water trucks as often as necessary (at least twice a day) to minimize fugitive dust. Roads would be maintained (graded) as required by weather conditions. All roads would have culverts where they cross major drainage channels; drainage ditches would be constructed along the sides of the roads. Haul roads would be removed and reclaimed as mining progresses. About 40 acres of roads would be off the areas to be disturbed by actual mining, and these would be reclaimed at the end of mine life. Roads would be designed in conformance with 30 CFR 715-17(l); these Office of Surface Mining (OSM) regulations require a road design which minimizes the impact of roads upon streamflow or runoff of the area.

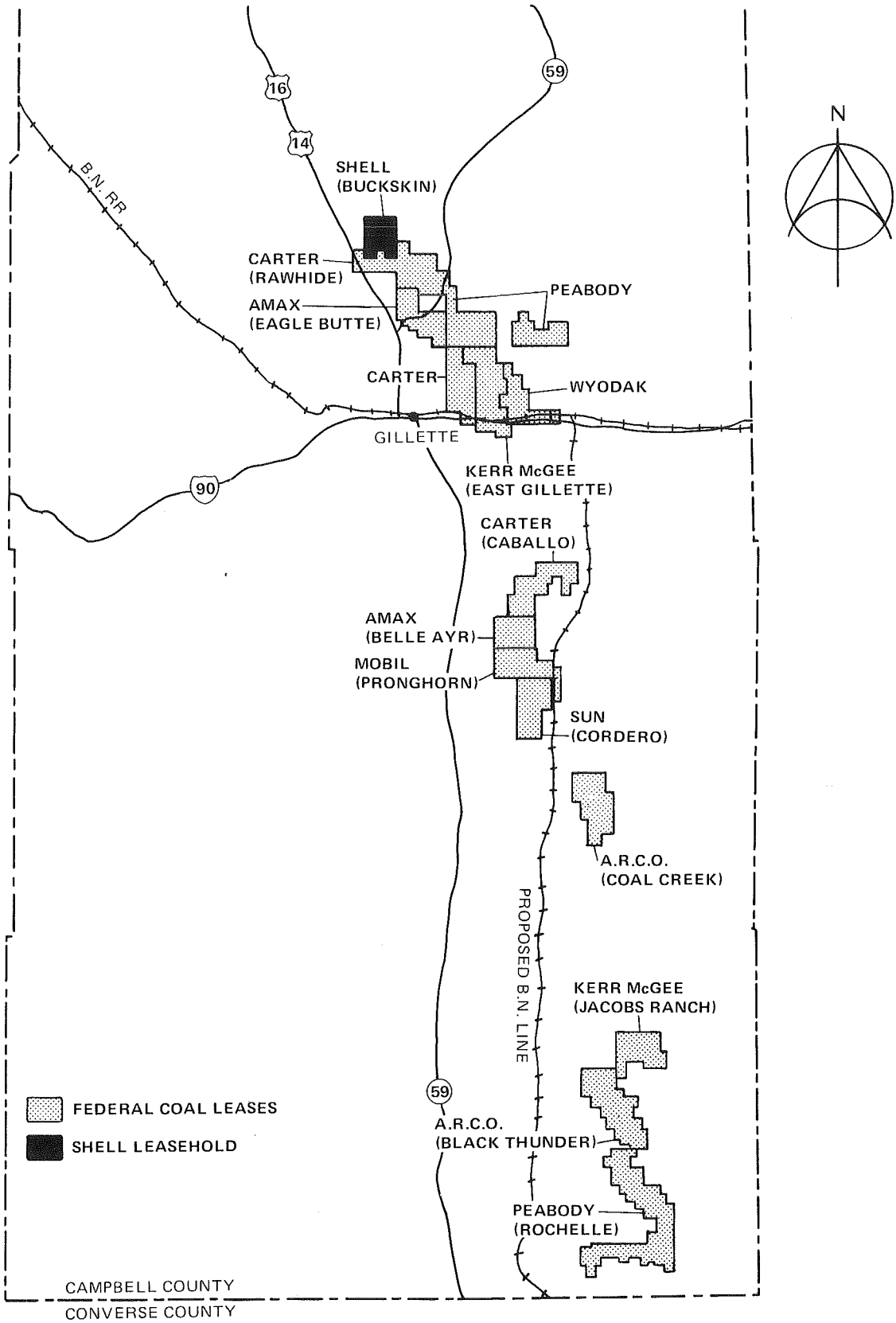


Figure BU1-1

LOCATIONS OF EXISTING MINES OR MINES PENDING APPROVAL ON FEDERAL COAL LEASES IN CAMPBELL COUNTY, WYOMING

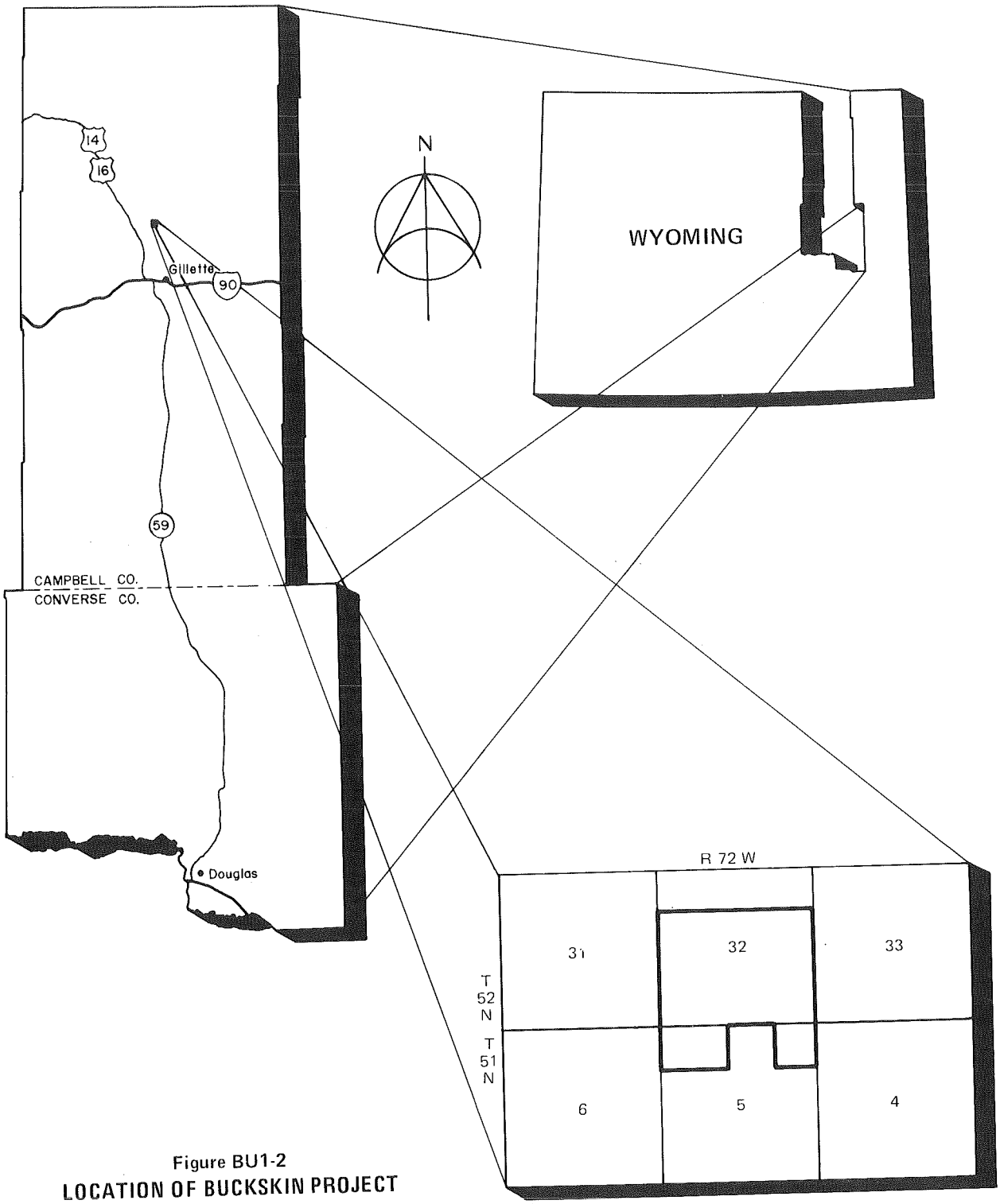
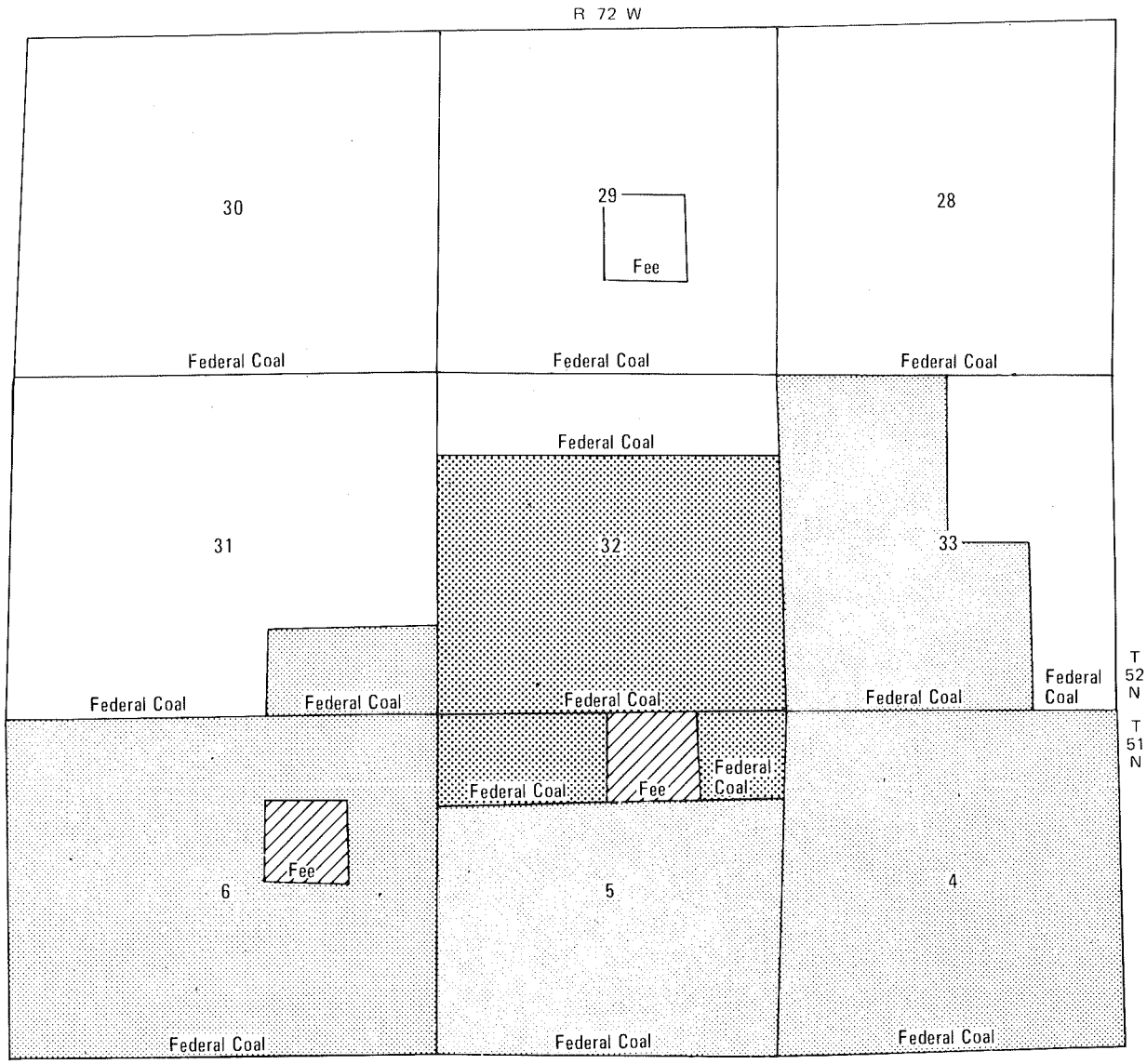


Figure BU1-2
LOCATION OF BUCKSKIN PROJECT



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SHELL OIL COMPANY
FEDERAL COAL LEASE W - 0325878

CARTER OIL COMPANY
FEDERAL COAL LEASE W - 5036

CARTER OIL COMPANY
PRIVATE COAL

Figure BU1-3

COAL OWNERSHIP IN THE VICINITY OF THE BUCKSKIN PROJECT

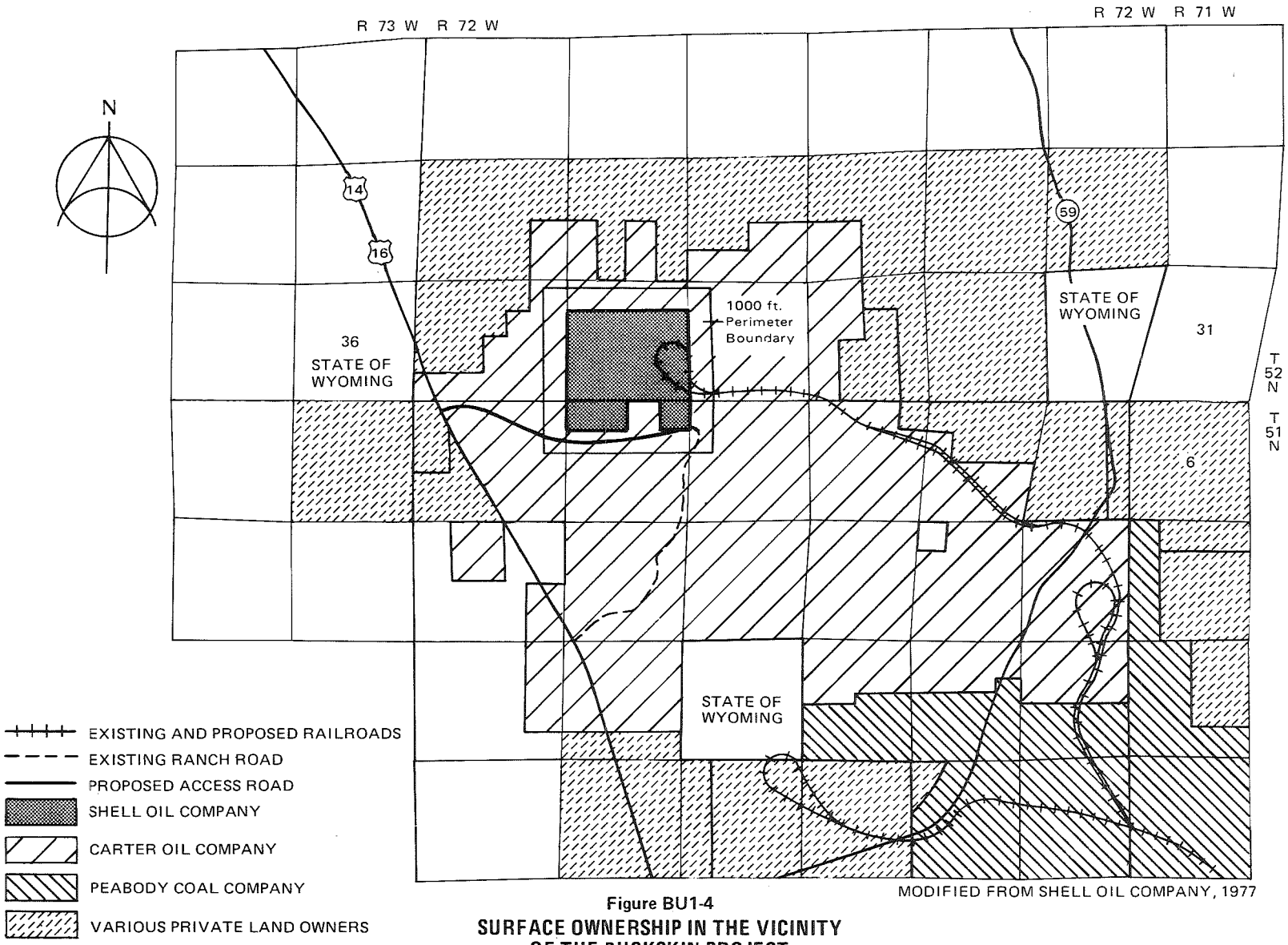

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Figure BU1-4

SURFACE OWNERSHIP IN THE VICINITY OF THE BUCKSKIN PROJECT

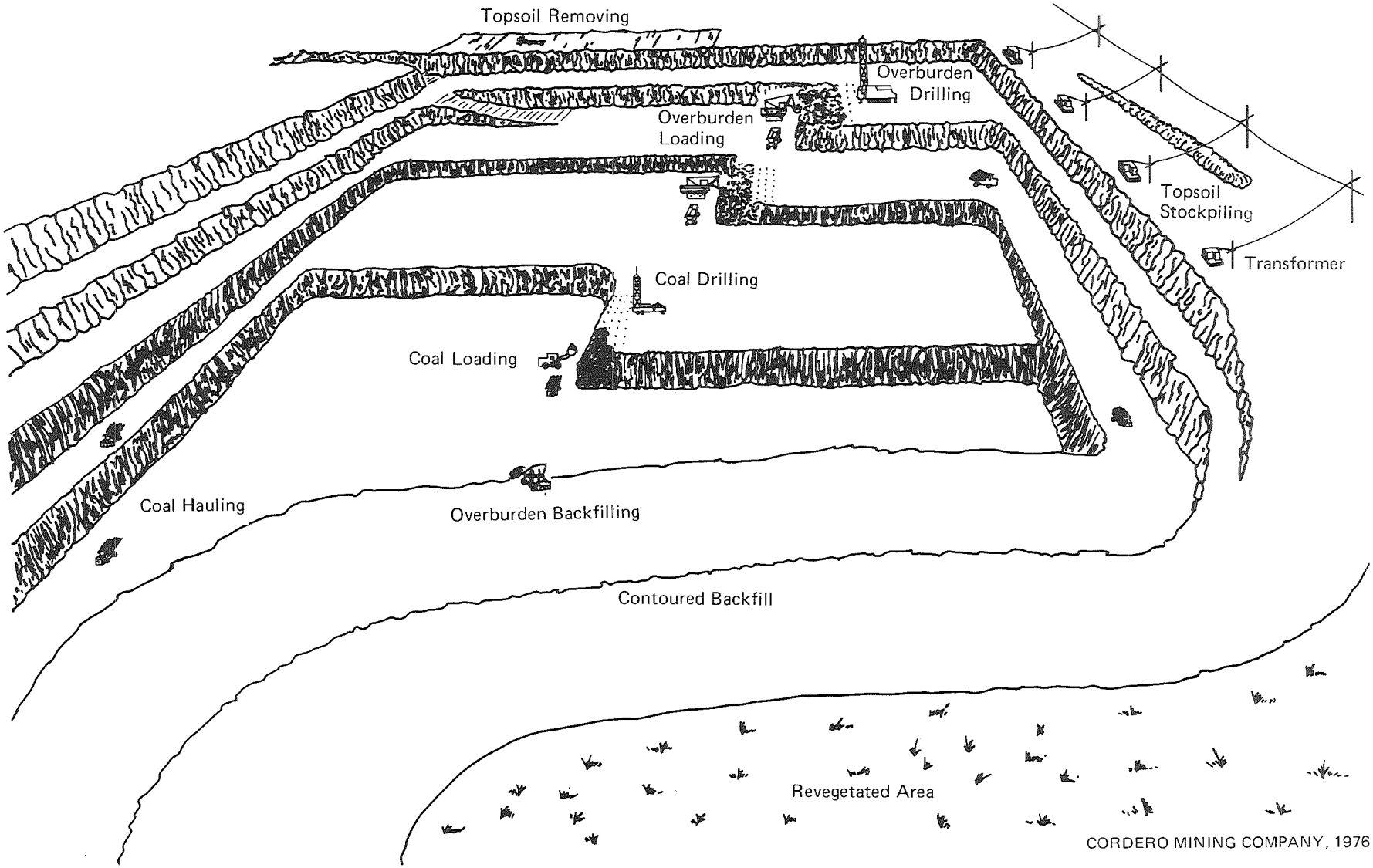

Figure BU1-5
OPEN–PIT, TRUCK AND SHOVEL MINING TECHNIQUE

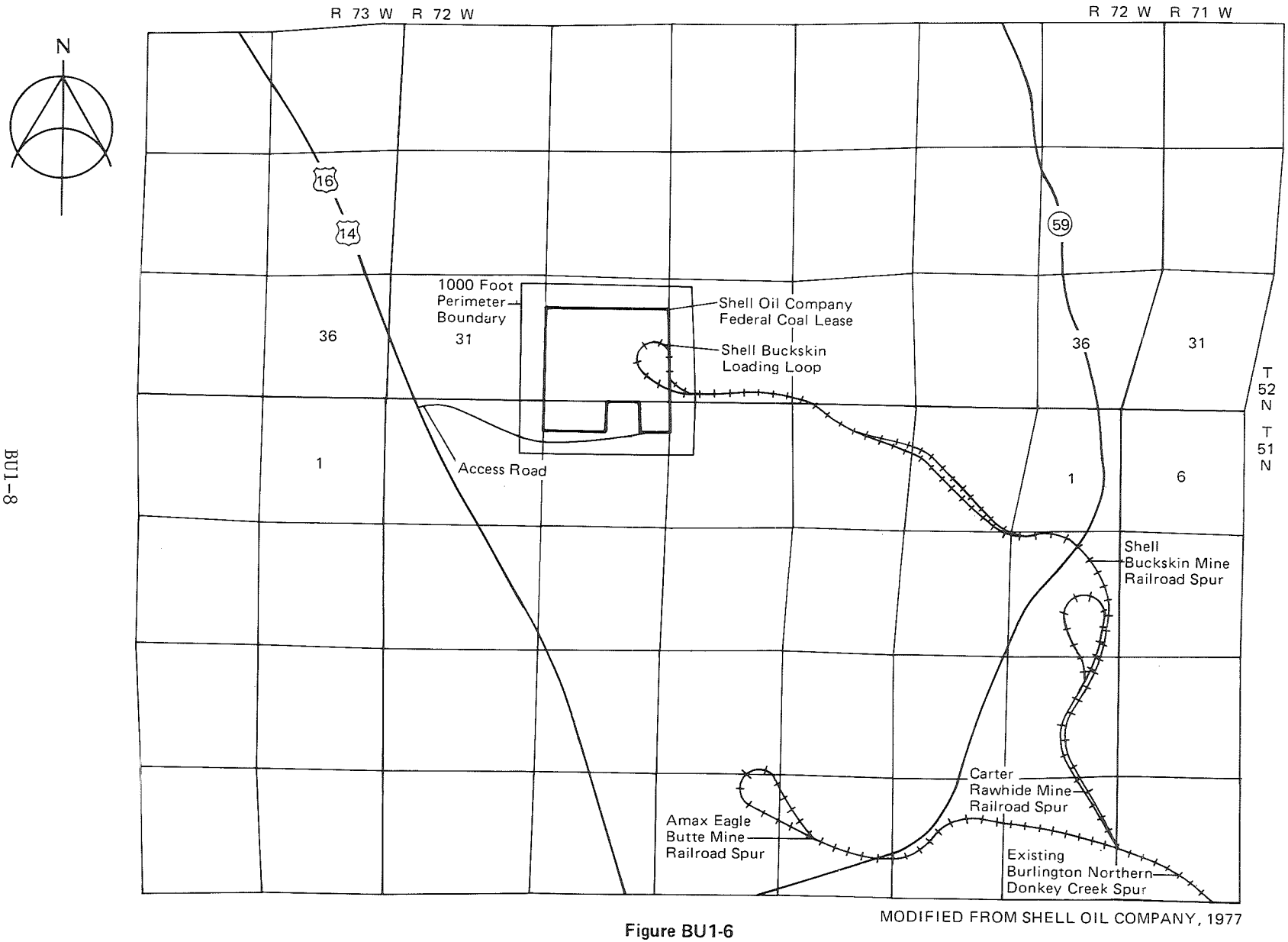

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Figure BU1-6

ACCESS ROAD AND RAILROAD SERVING BUCKSKIN PROJECT

Railroad Spur

As shown in Figure BU1-6, a 6-mile railroad spur and loop would be constructed for the Buckskin Mine. The spur would connect with the Burlington Northern North Gillette line and thence to the existing Burlington Northern main line at a point east of Gillette. The Buckskin spur would require a 100-foot right-of-way. Construction would begin in 1979. If any part of the spur is required for other coal mines in the vicinity after Buckskin is mined out, that part would be left intact. Otherwise the railroad would be removed, and the right-of-way reclaimed. There is a very small quantity of minable coal under the railroad right-of-way; if the coal lessee (Carter Oil Company) wishes to mine this coal while the railroad spur is in place, Shell Oil would move the spur to accommodate Carter's mining operation.

Power Lines

An existing 69-kv power line terminates near the load-out loop of the Carter Oil Company railroad spur. Shell proposes to extend the power line along the 100-foot railroad right-of-way, staying within its confines insofar as practical, to a new terminal point in the Buckskin Mine facilities area. The location of the substation is shown in Figure BU1-7. The overhead power line would be built to accepted engineering standards, including provisions for raptor protection. Power would probably be supplied by Tri-County Electric Association, Inc.

Water Supply and Sewage Treatment

The mine dewatering operation (average 300 gallons per minute (gpm)) is expected to supply about 432,000 gallons per day (gpd), a sufficient quantity for the mining and reclamation operations. Dust suppression on the haul roads would require about 40,000 gpd to be supplied by the mine inflow. Any mine inflow not required would be pumped from settling ponds into Rawhide Creek, probably just above the point where the diversion ditch enters the Rawhide Creek channel (Figure BU1-7). Potable water would be supplied from a well (most likely in the Fort Union Formation) at the location shown in Figure BU1-7. It is estimated that this well would supply about 4,655 gpd, enough for the estimated daily consumption of 125 employees for all uses. In addition, the fire protection system is anticipated to require 400,000 gallons of water, to be obtained from the same well, or perhaps a deeper well in the Lance Formation and Fox Hills Sandstone. Approximately 55,000 gpd of plant water (from the fire suppression well) would be required for cleaning mobile equipment and for dust suppression and cleaning of the coal crusher and loading equipment.

A waste water treatment plant and sewage lagoon system would be installed in the facilities area. The system would be designed to cope with waste water from employees, shop, and miscellaneous uses. The sewage lagoons are designed to store water to cope with a 120- to 150-day freeze-up. All waste water would be channeled through the system and would be suitable for discharge into the existing surface drainage. A surface water monitoring plan would be designed in conformance with 30 CFR 715.17(b) and submitted to DEQ for approval. Data gathered under such a plan must adequately describe total discharge, water quality (chemical parameters and concentrations), and discharge from disturbed areas.

Mining Sequence

The sequence of mining would be as shown in Figure BU1-8. Each block represents approximately 1 year of mining. The company has chosen this layout and sequence to provide for blending of areas of high-sulfur coal (located in a pocket close to the facilities area) with areas of low-sulfur coal, so that when the coal is burned by Shell's customer(s), plant emissions will meet Environmental Protection Agency standards.

Due to varying coal quality, it would be necessary to keep at least a 2-month (0.7 million-ton) supply of coal completely exposed by removing overburden ahead of the active mining operations. This pit inventory would serve a twofold purpose: it would allow blending of the coal and would provide a safety margin against inclement weather.

The acreage disturbed each year would vary, but after the first 3 years when 500 acres would be disturbed (including facilities construction), mining would average 30 acres per year. The total acreage disturbed on the permit area and for the access road and railroad spur would be 1,071 acres (Table BU1-1).

Coal Deposit

The coal to be mined is from the Anderson and Canyon seams, which are approximately 40 and 64 feet thick respectively, as shown in Figure BU1-9. The Anderson overlies the Canyon, and both beds dip to the west and northwest at about 1 degree. They are separated by a shale parting which averages 3 feet in thickness. The overburden varies in depth from less than 20 feet to over 215 feet, averaging 101 feet (Figure BU1-10), and consists of sandstone, siltstone, clay, and shale sediments of the Fort Union Formation. The coal underlying this lease is a part of the Powder River Coal Field. The total extent of coal resources in the region is discussed in the regional analysis, Chapter 2, Mineral Resources.

The average run-of-mine quality of the coal deposit is as follows: ash—6.11%, BTUs—8,183 BTUs per pound, moisture--29.80%, sulfur—0.51%.

The coal is ranked as subbituminous.

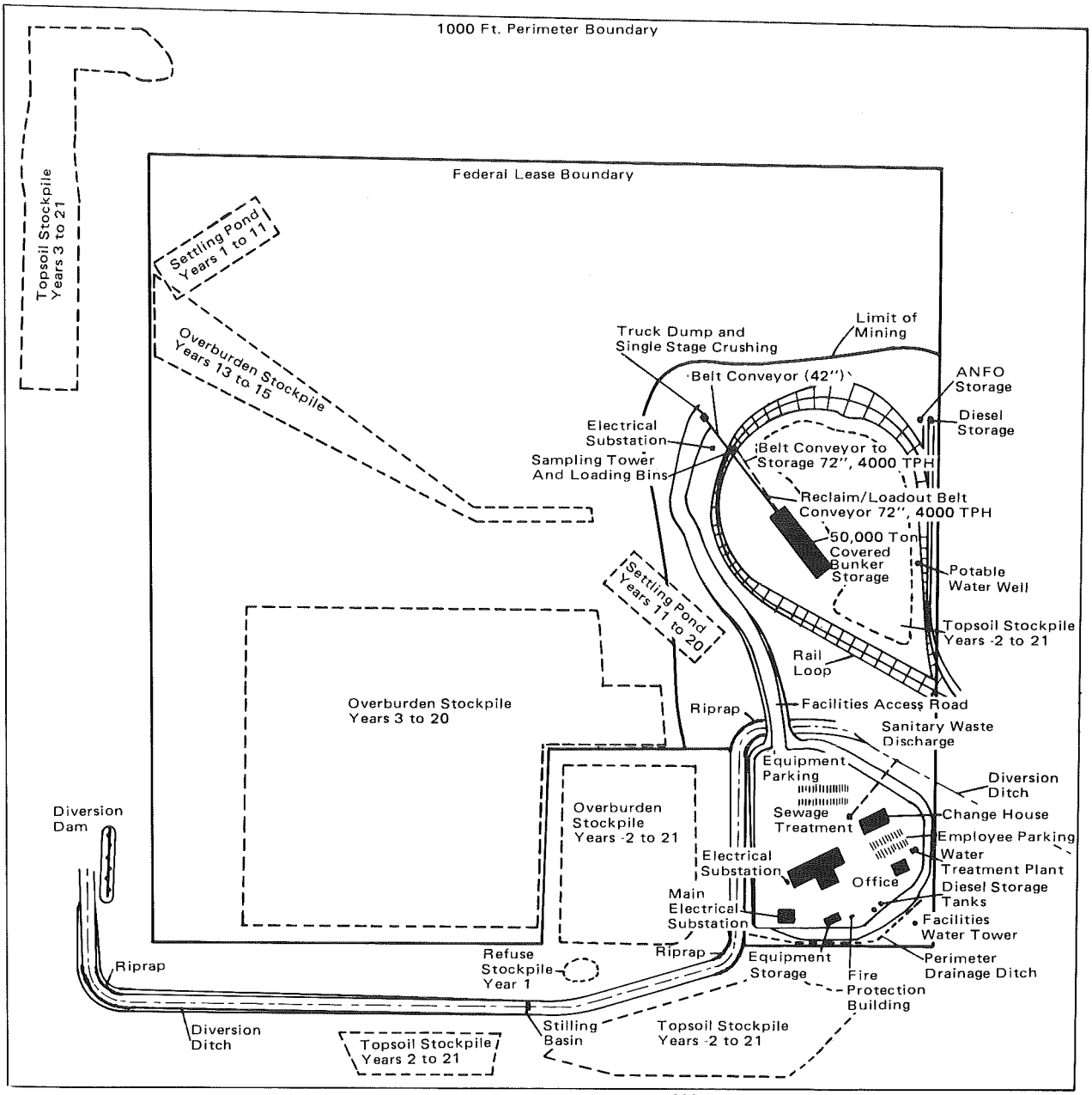

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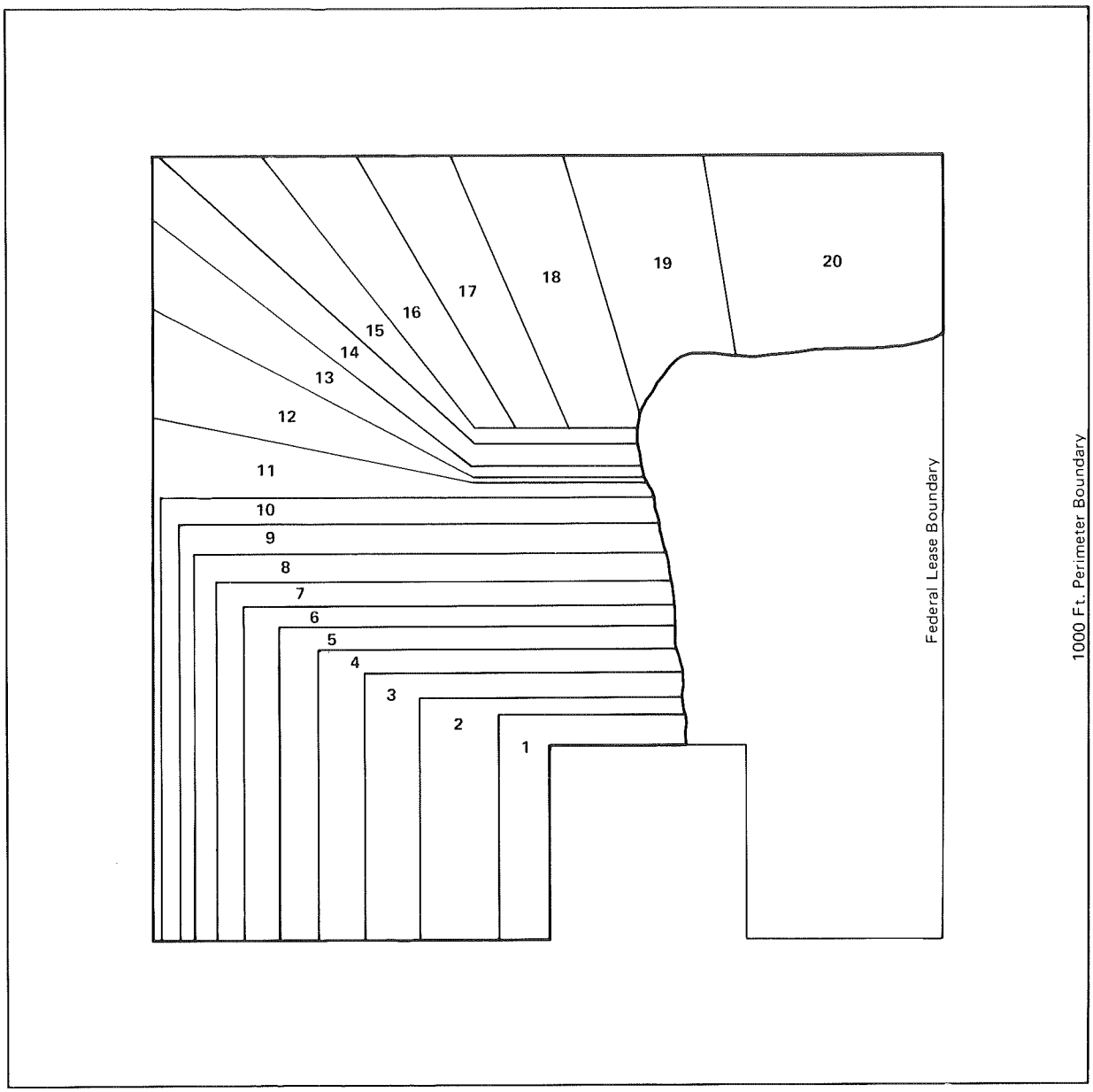
Figure BU1-7
RAIL LOOP AND FACILITIES LAYOUT



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NOTE: Numbers represent years of mine operation

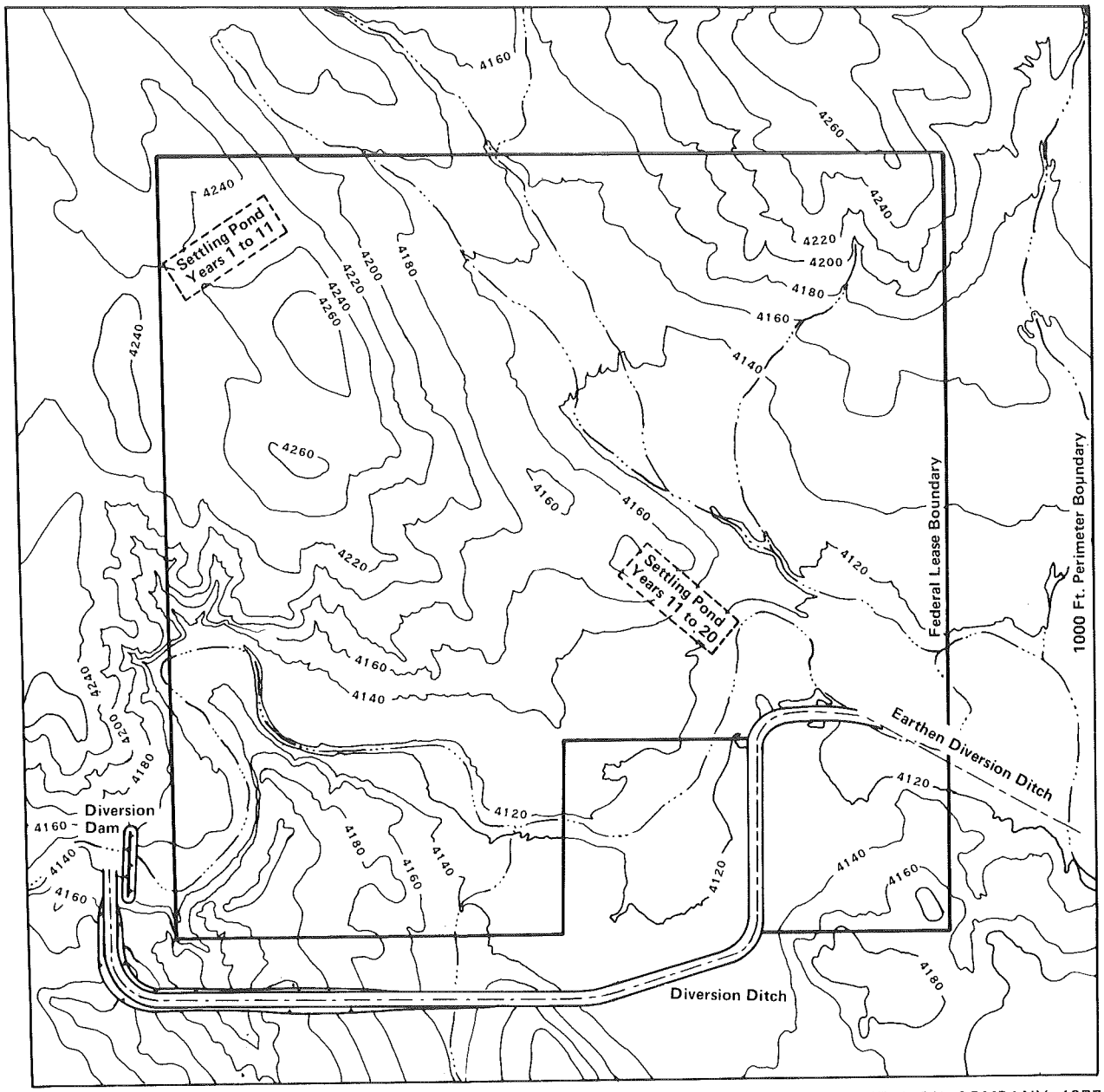
Figure BU1-8
MINING SEQUENCE

TABLE BU1-1

CUMULATIVE ACREAGE DISTURBED BY BUCKSKIN PROJECT

Through Year	Acres Disturbed
1980	434
1985	670
1990	790
1990 to 2001	1,071

Source: Shell Oil Company 1977



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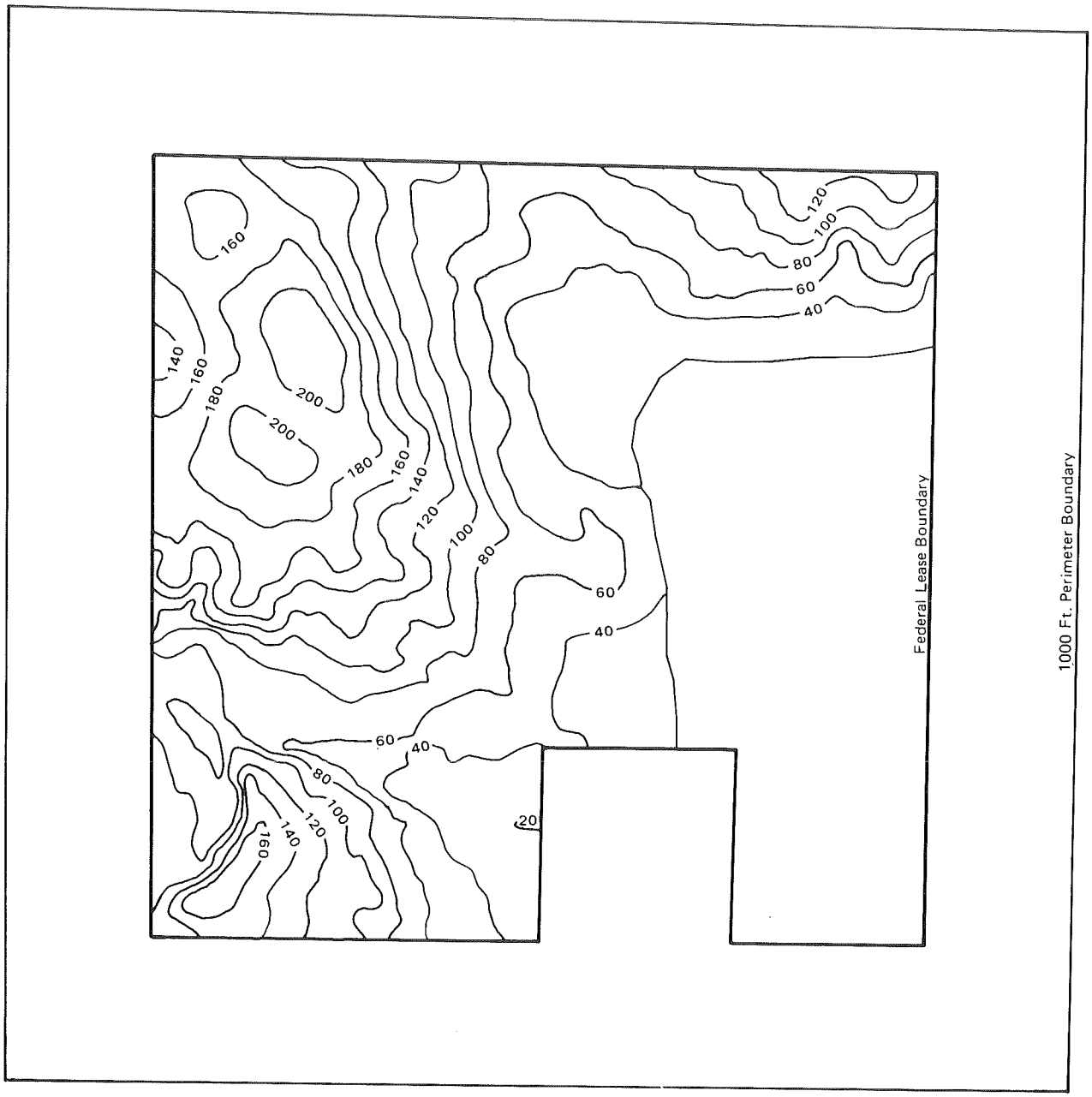
NOTE: Contour interval 20 feet
Elevation in feet above sea level

Figure BU1-11
SETTLING PONDS AND DIVERSION DITCHES



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NOTE: Thickness Measured In Feet

Figure BU1-10
OVERBURDEN THICKNESS MAP

Mining and Process Procedures

Topsoil Removal

Mining plans call for the salvage of all available topsoil ahead of the overburden and coal removal processes. Likewise, prior to the construction of mine buildings, roads, railroads, access roads, diversion channels, and settling ponds, all topsoil which has been determined by analysis to be suitable for reclamation purposes would be salvaged and stockpiled, or immediately spread on areas being reclaimed. (After the initial years of mine operation, it is anticipated that most salvaged topsoil could be spread immediately or during the same year as salvage.) Figure BU1-7 shows the locations and relative sizes of the topsoil stockpiles. Stockpiles would be marked to prevent accidental mixing with overburden, and seeded and mulched to prevent erosion.

A scraper would be used to load, transport, and place the topsoil, except where the removal depths are such that front-end loaders might be used advantageously to load haul trucks for this operation. Shell anticipates that approximately 1,414 bank cubic yards (1,944 tons) of topsoil would be moved per day. Topsoil handling would be done in conformance with 30 CFR 715.16, which delineates methods to remove, segregate, analyze, store, and replace topsoil.

Overburden Removal

The overburden would be removed with a large mining shovel after blasting where necessary. The overburden would be removed in benches with heights ranging from about 40 to 60 feet, and widths averaging 90 feet for benches used as two-way haul roads, or 50 feet for benches not commonly used as haul roads.

The overburden would be loaded into haul trucks and placed in stockpiles or on the advancing spoil bench, where it would be dozed over the edge of the bench into the mined-out pit. This latter operation would provide a spoil surface at or near the elevation of the final reclaimed topography, necessitating only minor grading prior to topsoil replacement.

Overburden material which cannot be immediately replaced in mined-out areas, such as that removed during the opening of the box cut or needed for replacement in the final pit, would be stockpiled. Locations and relative sizes of the overburden stockpiles are shown in Figure BU1-7. Stockpiles would be marked to prevent accidental mixing with topsoil, and seeded and mulched to prevent erosion. Overburden disposal sites would be designed to meet OSM standards set in 30 CFR 715.15, which outlines design criteria for disposal of spoil and waste materials in areas other than the mine workings and excavations.

Overburden removal would require shifting approximately 25,870 tons of material per day, using four 120-ton-capacity haul trucks per shift.

Coal Mining, Loading, and Hauling

The coal would be mined from benches ranging from 30 to 60 feet high, and 90 feet wide for benches used as two-way roads, or 50 feet wide for benches not commonly used as haul roads. Due to the dip of the deposit and the varying coal thickness, bench height would increase as the working face advances, necessitating mining in additional benches. Overall highwall slopes would range from 1:0.4 to 1:0.6.

The coal would be loosened by drilling and shooting with (most probably) an ammonium nitrate-fuel oil (ANFO) type explosive. The blasted or "shot"coal would be loaded into haul trucks by mining shovels or large front-end loaders. Three 85-ton-capacity haul trucks per shift would transport the coal up ramps and along benches to the crusher site or stockpile area.

Coal Handling

Coal would be dumped from the trucks into the single-stage crushing unit and crushed to 2-inch size. From here it would be transported by a 72-inch belt conveyor to a 50,000-ton-capacity, covered bunker storage facility. In case of equipment breakdown, either crushed or mine-run coal may be stored in an active surge stockpile in the area of the coal-handling facilities. The surge pile would seldom exceed 6,000 tons or be in place more than 24 hours.

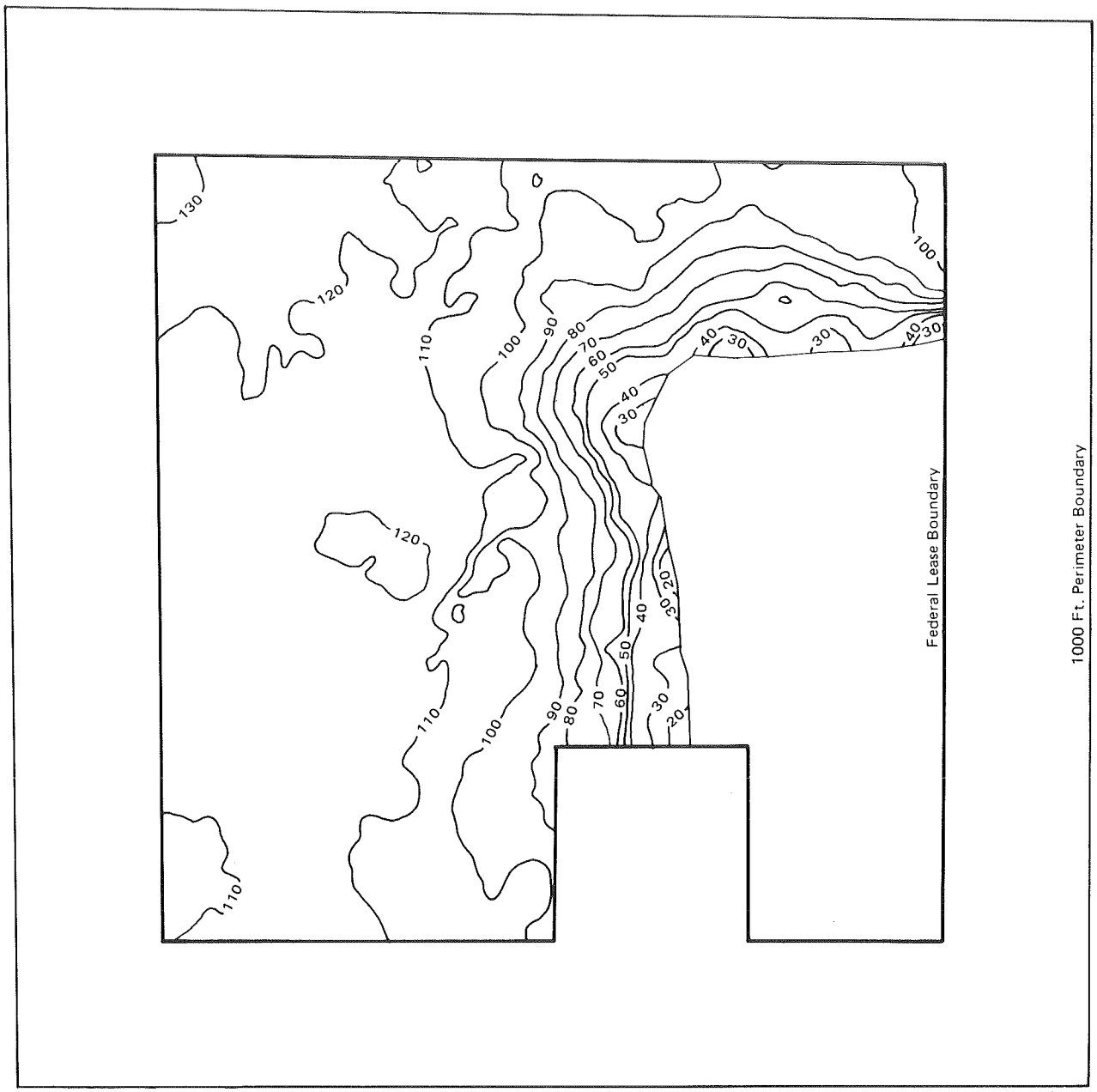
From the bunker, the coal would be conveyed to the sampling tower and load-out bins and loaded into rail cars. The coal would be transported by unit train to markets in Oklahoma. The unit trains would consist of 100 to 120 cars of 100-ton capacity each. The number of unit trains required would depend on coal production rates. With production at 4 million tons per year, unit train frequency would be approximately eight per week. The rail cars would be weighed before leaving the facilities area to measure the amount of coal shipped.

Watercourse Diversions

The mining sequence would require the diversion of the intermittent stream, Rawhide Creek. Temporary diversion would be accomplished by use of a 7,500-foot-long, 65-foot-wide, and 12-foot-deep channel around the south boundary of the lease area (Figure BU1-11). After completion of mining and reclamation, Rawhide Creek would be returned to approximately its original (present) location.

The location of the proposed rail loop precludes use of the existing channel in a section of Rawhide Creek downstream from the diversion channel and near the eastern boundary of the lease area. Therefore, an earthen ditch bypass would be constructed as shown in Figure BU1-7.

Both of these diversion channels would have channel beds on essentially flat slopes and grass-lined banks; they have been designed to carry a 20-year flood at a velocity of 2 feet per second. (The flood-capacity design has not been approved. See Chapter 4.) In no case would overburden or topsoil be pushed into, or placed below, the flood level of Rawhide Creek except during the construction of the diversion. Rock riprap, concrete, soil cement, or other suitable material would be used to mini-



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NOTE: Thickness Measured In Feet

Figure BU1-9
COAL THICKNESS MAP

mize erosion and degradation of water quality. The anticipated locations of several of these protective devices are shown in Figure BU1-7.

The watershed and flow of Spring Draw are small, and therefore large runoffs are not expected. Any flow would be diverted around the active operation in temporary ditches, which would be moved as mining progresses. The diverted water would be discharged along existing drainageways and allowed to flow into Rawhide Creek.

Overland flow would be diverted away from the active mining operation, newly reclaimed areas, and stockpile areas by temporary diversion ditches. Ditches in existence longer than 1 year would be grass lined.

Surface water diversions would meet standards set in 30 CFR 715.17(a), which deal with the quality and monitoring of water discharged.

Underground water resources are present in the area, as they are throughout most of the region. Mining would disrupt the existing shallow aquifer, which is the overlying sandstone and the coal itself. Mine inflow during the operation would average 300 gpm. Groundwater would be protected by pumping mine inflow from the pit and discharging the water (after treatment, if necessary) into the surface water system; this would prevent the addition of dissolved and suspended solids into the groundwater, which might occur if the mine inflow were pumped directly back into the groundwater system.

Settling ponds would be utilized for removal of particulates in the water, as well as for sewage treatment. The ponds would be removed during the course of mining or at the completion of mining activities. The locations of these settling ponds are shown in Figure BU1-11.

Groundwater monitoring in wells is currently being done and would continue throughout the mine life to assess any changes resulting from the mining operation. Figure BU2-8 shows the location of monitor wells on the lease. Undesirable changes are not expected, but if they occur, the appropriate authorities would be notified as required by law, and corrective measures would be taken.

Reclamation Activity

The annual reclamation diagram (Figure BU1-12) and Table BU1-2 show the reclamation sequence and schedule.

All reclamation activity at the proposed Buckskin Mine must conform to the stipulations and requirements of the federal coal lease involved, the requirements of the Wyoming State Environmental Quality Act of 1973, and other applicable federal, state, and local regulations and laws. Compliance with these laws would be enforced through regular inspections by federal and state officials.

Present and Future Land Use

Grazing by livestock and wildlife is the major current land use of the proposed mine area. Some small areas along Rawhide Creek are used for hay production. A cultivated field (wheat and barley) at the southern edge of the permit area would be disturbed during construction of the water diversion structures. (This has been determined to be not prime farmland.) There are no active oil or gas wells on the permit area or adjacent lands.

Shell proposes to reclaim the disturbed land primarily for grazing use, although the change in use of the cultivated fields has not been approved. Due to the relatively gentle slopes in the area following mining, portions of the land could be used for hay production. Some areas of the lease would also be planted with shrubs and/or trees for wildlife use. This proposal conforms with the State of Wyoming's regulations.

Shaping of Overburden (Backfilling)

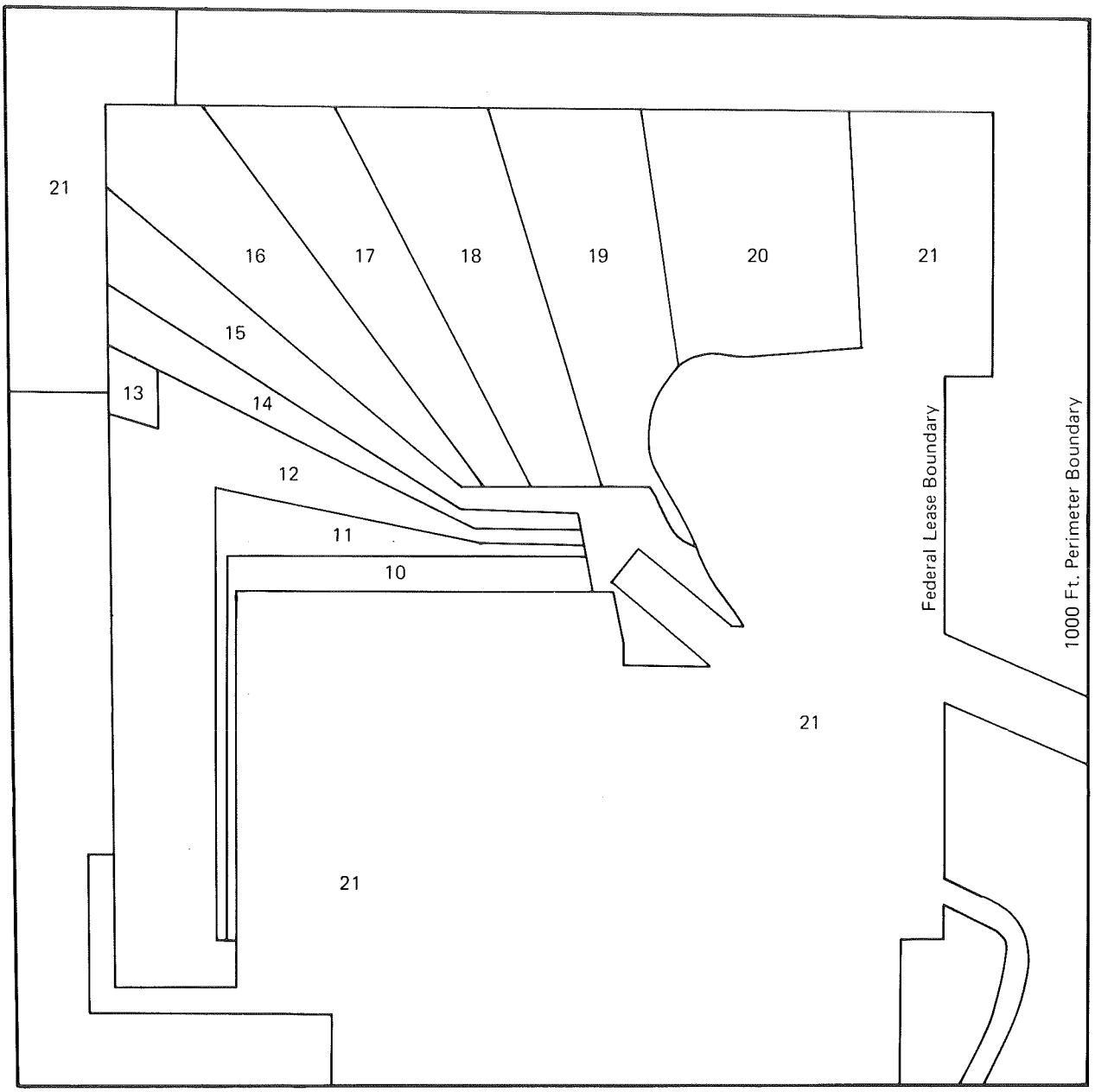
The faces of the overburden and coal bed in the highwall of the final pit would be reduced by blasting. The overburden and coal would be drilled and blasted in accordance with 30 CFR 715.19 regulations concerning use of explosives. The final pit area would be backfilled, graded, and contoured to blend with the surrounding topography and to provide drainage. The postmining topography would have slopes ranging from .5% to 31%, with an average slope of 4.7%; a maximum slope of 31% (17 degrees) would occur at the mineral lease boundaries where the highwalls are blended with the existing topography. (The premining slopes range from 1% to 31%, with an average slope of 7.5%.) Reclaimed highwall slopes greater than the average natural slope (31% vs. 7.5%) might be necessary in order to minimize the amount of affected lands; the use of reclaimed highwall slopes of 7.5% maximum could result in as much as a 125% increase in the amount of the disturbed lands in the area of highwall reduction.

Final shaping of the overburden would be done prior to the placement of topsoil, and would normally occur during the period when seeding of the permanent cover is impractical (usually August 1 through October 31). Backfilling and grading would be done in conformance with 30 CFR 715.14 regulations. These regulations set forth criteria for all backfilling and grading necessary, including slopes, depressions, gullies, overburden conditions, and stabilization.

Placement of Topsoil

Soils tested and found unsuitable for plant growth would be treated as overburden. However, Shell estimates there is enough suitable topsoil available to replace a minimum depth of 18 inches on all disturbed areas.

Topsoil would be obtained from either the stockpiles or the ongoing salvage operation. To the extent practicable, topsoil would be applied at right angles to the slope and left in a rough condition until shortly before the actual seeding is accomplished. This would provide protection against wind and water erosion and increase the accumulation of moisture. Where the shaped spoil material is relatively level, the topsoil would be applied in a



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NOTE: Numbers represent years of mine operation

Figure BU1-12
RECLAMATION SEQUENCE

TABLE BU1-2

RECLAMATION SCHEDULE

Year	Acres Disturbed	Cumulative Acres Disturbed	Acres Reclaimed	Cumulative Acres Reclaimed	Acres Undisturbed	Disturbed Acres Unreclaimed
- 2	362	362	-	-	709	362
- 1	72	434	-	-	637	434
1	23	457	-	-	614	457
2	78	535	-	-	536	535
3	76	611	-	-	460	611
4	44	655	-	-	416	655
5	15	670	-	-	401	670
6	28	698	-	-	373	698
7	34	732	-	-	339	732
8	25	757	-	-	314	757
9	17	774	-	-	297	774
10	16	790	14	14	281	776
11	24	814	23	37	257	777
12	39	853	65	102	218	751
13	21	874	7	109	197	765
14	13	887	32	141	184	746
15	22	909	40	181	162	728
16	15	924	31	212	147	712
17	18	942	31	243	129	699
18	25	967	37	280	104	687
19	51	1,018	70	350	53	668
20	40	1,058	55	405	13	653
21	13	1,071	666	1,071	-	-
TOTAL	1,071		1,071			

Source: Shell Oil Company 1977

north-south direction to control wind erosion. Topsoil placement and handling would be conducted according to 30 CFR 715.16 regulations.

To prevent creation of a cloddy structure, topsoil would not be salvaged or redistributed when it is excessively wet or frozen. When it is possible, topsoil salvage and redistribution would take place immediately prior to the planting seasons (fall and spring). If it is necessary to place topsoil at other times, it would be seeded with quick-growing annuals (such as oats or barley) to minimize erosion and to contribute a dead mulch into which the permanent species would be seeded later.

Revegetation Plan

Shell's revegetation plan was developed primarily to support domestic livestock grazing; this plan must be reviewed for compliance with 30 CFR 715.13 regulations, which require the restoration of lands affected to a condition capable of supporting the uses which existed prior to mining, or higher or better uses of which there is reasonable likelihood. Note that the impact analysis in Chapter 3, Soils, disputes Shell's statement that 100% of premining productivity can be restored. A permanent vegetative cover of predominantly native grass species, which are perennial, self-renewing, and adapted to the climate of the region, would be reestablished on all lands disturbed by mining or for surface or support facilities. Although the seed mixture and seeding techniques may be adapted to meet the requirements of the Wyoming Department of Environmental Quality (DEQ), Land Quality Division, Shell proposes to use the mixtures and rates shown in Table BU1-3. DEQ has recommended against the use of *Caragana*, but the final seed mixture has not been determined. In areas where wildlife habitat is to be provided, native trees and shrubs would be hand planted from nursery stock or transplanted from areas being stripped.

Prior to seeding, the topsoil would be ripped to a depth of at least 18 inches to allow root penetration and water retention. Additional shallow ripping may be required to assure a loose, friable soil surface. Seed would be drilled on the contour to a depth of 1 inch in sandy soils and ½ inch in clayey soils. If seed must be broadcast in areas too steep or rocky for drill-seeding equipment, soil material would be hand raked or harrowed over the seed. Topsoil handling and seedbed preparation would be done in conformance with 30 CFR 715.16 and 715.20; the former regulations define topsoil handling procedures so as to minimize degradation and loss, and the latter regulations establish revegetation procedures, timing, methods, and success standards.

Needed fertilizer, as determined by testing of the topsoil, would be applied prior to seeding or after seedling emergence. Annual applications of fertilizer are not planned. Except in abnormally dry years, irrigation of newly planted areas would not be considered (except for the trees and shrubs); Shell would time seeding to take full advantage of natural available moisture (between mid-October and late April). To prevent wind or water erosion and loss of moisture, mulches will be applied to the seeded areas. To accumulate moisture on exposed slopes or for trees and shrubs, snow fences may be constructed. Herbicides would be used according to state and federal regulations to control noxious weeds in newly planted areas. Livestock grazing would be excluded from reclaimed areas for at least 2 years.

Decommissioning and Abandonment

At the end of mine life, all surface facilities would be removed. The land surface involved would be ripped to loosen compaction, spread with a minimum of 24 inches of topsoil, and revegetated.

The railroad spur and access road could be retained, as might some buildings, if requested by the surface owner at the time.

Pollution Control Methods

Methods proposed by Shell to control air pollution from coal dust and blowing soil are as follows:

1. All unsurfaced roads would be watered a minimum of twice a day, and more if necessary.
2. Topsoil and overburden storage piles would be seeded with fast-growing annual and/or perennial species.
3. Coal would be stored in a covered bunker.

Methods proposed by Shell to prevent water pollution from sediment or toxic material are as follows:

1. The bottoms and sides of temporary water diversion structures would be grass lined.
2. Culverts or bridges would be installed to prevent traffic through drainages.
3. Diversion ditches would be designed to discharge away from topsoil and overburden storage areas, and newly reclaimed areas.
4. Riprap or concrete would be used at curves in diversion ditches, if it becomes necessary to prevent erosion.
5. Overburden material determined to be toxic or a health hazard would be buried at the bottom of the mine pit, or well below the root zone, and kept away from stream channels or drainages. It is expected that Shell would be monitoring the overburden characteristics during the mining operation, and would take any necessary steps to deal with any toxic materials discovered.
6. If runoff leaches toxic material from overburden or coal stockpiles, the contaminated water would be impounded and treated prior to release into surface drainage.

Methods proposed by Shell to prevent or control fires are as follows:

1. Coal storage areas would be designed to eliminate fire hazards from spontaneous combustion.
2. A fire protection system is planned for the surface facilities area.

TABLE BU1-3

PROPOSED SEEDING RATES (POUNDS OF PURE LIVE SEED PER ACRE)

Species	Basic Mixture	Heavy Soil Uplands	Heavy Soil Depressions	Sandy Soil	Wildlife Areas	Wet Areas
Agropyron smithii western wheatgrass (Rosana)	3	4	4		2	4
Agropyron dasystachyum thickspike wheatgrass (Critana)	3	3	2	3	2	
Agropyron riparium streambank wheatgrass (Sodar)	3	3	2	3	2	
Onobrychis viciaefolia sainfoin (a legume)			3			
Oryzopsis hymenoides Indian ricegrass				2	1	
Stipa viridula green needlegrass	1	1			1	
Phalaris arundinacea reed canary grass						3
Agropyron elongatum tall wheatgrass (Orbit)						4

TABLE BU1-3
(cont'd)

PROPOSED SEEDING RATES (POUNDS OF PURE LIVE SEED PER ACRE)

Species	Basic Mixture	Heavy Soil Uplands	Heavy Soil Depressions	Sandy Soil	Wildlife Areas	Wet Areas
Astragalus cicer Cicer milkvetch (a legume)						1
Atriplex canescens fourwing saltbush				2	2	
Rosa spp. rose					*	
Caragana pymaea pygmy caragana					*	

Source: Shell Oil Company 1977

Note: Rates of seeding are for drilled stands. If broadcast seeding is necessary, the rate of seeding should be doubled.

* Amount used per acre would depend upon the size and frequency of the spot seeding areas selected.

DESCRIPTION OF THE PROPOSED ACTION

AUTHORIZING ACTIONS

This section identifies governmental authorizations which would be required to implement the proposed action.

Assistant Secretary of Energy and Minerals

The Assistant Secretary shall approve the mining permit application (including the mining and reclamation plan) and significant modifications or amendments thereto prior to commencement of mining operations by the company.

Office of Surface Mining (OSM)

OSM, with the concurrence of the leasing agency (Bureau of Land Management) and GS, recommends approval or disapproval of the mining and reclamation plan to the Assistant Secretary of Energy and Minerals. Since Wyoming has entered into a state-federal cooperative agreement with the Secretary of the Interior, pursuant to Section 523(c) of the Surface Mining Control and Reclamation Act (SMCRA), the state regulatory authority and OSM will jointly review mining and permit applications. Both agencies will recommend approval or disapproval to the officials of the state and Department of the Interior authorized to take final actions on the permit.

Bureau of Land Management (BLM)

BLM develops special requirements to be included in the reclamation plan concerning management and protection of all resources other than coal and the postmining land use of the affected lands.

Geological Survey (GS)

GS is responsible for development, production, and coal resource recovery requirements included in the mining permit.

State of Wyoming, Department of Environmental Quality (DEQ)

Wyoming entered into a cooperative agreement with the Secretary of the Interior in October 1978, pursuant to Section 523(c) of SMCRA; DEQ and OSM will jointly review and act on the mining and reclamation plan and permits to mine authorized under a federal coal lease.

The Land Quality Division of DEQ issues permits and licenses to mine according to the approved mining and reclamation plan. The Air Quality Division issues permits for construction and operation after review of applications with regard to air contaminants and plans for control and monitoring. The Water Quality Division issues permits to construct water systems. The Solid Waste Division issues construction fill permits and industrial waste facility permits for solid waste disposal during construction and operation.

Wyoming State Engineer

Use of surface or groundwater for mining and coal processing operations requires a permit from the State Engineer. Permits are also necessary prior to installation of wells, the use of mine inflow waters, and construction of water pipelines.

INTERRELATIONSHIPS

Relationship to Land Use Plans

Bureau of Land Management (BLM)

The Management Framework Plan (MFP) for the Eastern Powder River Basin, as updated in 1977, recommends the management of mineral resources for efficient development, giving priority consideration to energy minerals. At the same time, it considers environmental protection and mitigation of socioeconomic impacts.

Planning recommendations specific to the proposed Buckskin Mine were not addressed in the MFP since the coal is under an existing federal lease issued in 1967.

Gillette/Campbell County

The City of Gillette/Campbell County Planning Department, formed in 1968, completed a draft comprehensive plan in 1977. Among other provisions, the plan proposes countywide monitoring of surface coal mining for conformance to the plan, in order to control the rate and location of development in the county. BLM land use planning would consider the recommendations of this plan; however, specific applications of this draft plan have not been made to the proposed Buckskin Mine.

Relationship to Other Proposed and Future Actions

The proposed Buckskin Mine would supply 2% of the 173 million tons of coal to be mined in the region in 1990 under the probable level of development, as discussed in the regional part of this document. The 400 additional unit trains of coal per year would constitute 2.5% of the projected 15,697 unit trains that would leave the region from all mines annually by 1990.

Other active and approved mines in the Gillette area would cause competition for housing, services, and the

available labor supply; would increase rail traffic, dust, and water usage; and would increase the demand on transportation and communication networks.

Reference is made to the analysis included in the regional part of this environmental statement for a full discussion of the interrelationship between the Buckskin Mine and other mines in the region.