APPLICATION FOR AN UNDERGROUND COAL MINE PERMIT REVISION

KAISER COAL CORPORATION
SUNNYSIDE MINES
CARBON COUNTY, UTAH

RESOURCE RECOVERY AND PROTECTION PLAN

KAISER COAL CORPORATION
102 SOUTH TEJON STREET, SUITE 800 ■ P.O. BOX 2679
COLORADO SPRINGS, COLORADO 80901-2679
(303) 475-7005 ■ TELEX 289 909

December 10, 1985

Ms. Diane Nielson
Utah Division of Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180

Attn: Mr. John Whitehead

Dear Mr. Whitehead:

Attached please find six (6) copies of the Sunnyside Mines Permit Revision Resource Recovery and Protection Plan (RRPP). This RRPP is to accompany the Sunnyside Mines Permit Revision which was submitted to the Utah Division of Oil, Gas and Mining on November 4, 1985. It is a supplement to the existing Sunnyside Mines RRPP.

The RRPP is organized into two (2) volumes. Volume I contains general information. Volume II contains information which Kaiser Coal Corporation considers proprietary. Please hold Volume II confidential. As agreed in telephone conversations between Mr. John Whitehead and Mr. Conrad Parrish, Kaiser is transmitting only one (1) copy of Volume II to the Division of Oil, Gas and Mining.

Distribution of this RRPP has been made as follows:

Bureau of Land Management, Mr. Jackson W. Moffitt	1 copy
Office of Surface Mining, Mr. Allen Klein	7 copies
Utah Division of Oil, Gas & Mining, Ms. Diane Nielson	6 copies
Carbon County Courthouse, Price, Utah	1 copy

If you have any questions, please do not hesitate to contact either Mr. Conrad Parrish at ACZ INC. or me.

Very truly yours,

KAISER COAL CORPORATION

Conrad Parrish for MPH

Martin P. Holmes
Manager of Permits and
Compliance

CHP:ski

RESPONSES TO REGULATIONS

The following responses are intended to fulfill the requirements of the paragraphs cited.

43 CFR 3482.1 (b)

This section requires no information.

43 CFR 3482.1 (c)(1)

The resident agent responsible for operations to be conducted under the approved plan to whom notices and orders are to be delivered is:

Charles W. McGlothlin
General Manager, Sunnyside Mines
Kaiser Coal Corporation
P.O. Box D
Sunnyside, Utah 84539
(801) 888-4421

The mine operator and lessee are one and the same and is:

Kaiser Coal Corporation
102 South Tejon, Suite 800
Colorado Springs, Colorado 80903
(303) 475-7005

The Federal Lease Number is:

Salt Lake 068754 - Utah 01215

The location of this lease is shown on the Permit Area Map (Map SPR-R2P2-1).

Kaiser holds no federal licenses, as defined in 43 CFR 3440. The name of the mine is Sunnyside No. 1 Mine. The MSHA I.D. No. assigned to the mine is: 42-00093.

Prepared For
Utah Division of Natural Resources
Oil, Gas & Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180

RESOURCE RECOVERY AND PROTECTION PLAN

December 10, 1985

Submitted By
Kaiser Coal Corporation
102 South Tejon, Suite 800
Colorado Springs, Colorado 80903

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF MAPS

LIST OF EXHIBITS

INTRODUCTION

A Resource Recovery and Protection Plan (RRPP) has been formulated for Kaiser Coal Corporation's (Kaiser) Sunnyside Mines. The Sunnyside Mines RRPP is included in the Sunnyside Mines Mining and Reclamation Plan submitted under the Utah Coal Mining and Reclamation Permanent Program.

Kaiser has submitted an application to revise the Sunnyside Mines Permit. The permit revision will add approximately 155 acres to the Sunnyside Mines permit area. The original Sunnyside Mines RRPP did not cover the permit revision area.

This RRPP is submitted as an addendum to the Sunnyside Mines RRPP. This document, when combined with the current Sunnyside Mines RRPP, provides the complete RRPP for the Sunnyside Mines permit area, including the revision area.

This document is designed to supplement the information found in the Sunnyside Mines RRPP. As such, the information contained herein addresses the aspects of the RRPP that are affected by the revision of the permit area.

The Sunnyside Mines Permit Revision involves mining one (1) longwall panel. The panel is located within Federal Coal Lease No. SL068754-U01215. There is a long history of production from this lease, although no mining was planned from this lease when the original Sunnyside Mines Permit Application Package (PAP) was submitted. This document provides the life-of-mine mine plan and reserve data for Federal Lease No. SL068754. Also included in this document are all other data required for approval of the RRPP for the entire federal lease.

Life-of-mine data is included here for purposes of the Bureau of Land Management (BLM) approval of the RRPP. The inclusion of life-of-mine data should not be construed to mean that Kaiser is applying for a permit to mine the entire lease. The permit boundary is clearly

delineated on all the maps and no mining will take place outside this boundary until all appropriate permits are obtained.

Kaiser is currently in the process of preparing a PAP to cover the area outside the permit boundary. That permit will be separate from the Sunnyside Mines Permit and the Sunnyside Mines Permit Revision. Kaiser will submit an RRPP for the entire permit area covered by the PAP. The permitting effort in this area will result in a Sunnyside Mines Permit, a Sunnyside Mines Permit Revision, and a B/C Canyon Permit. Each of these three (3) documents will have an RRPP associated with it.

ORGANIZATION

This RRPP is a supplement to the Sunnyside Mines RRPP, and is written to accompany the Sunnyside Mines Permit Revision Application. The only information contained herein is information pertaining to Federal Lease No. SL068754-U01215 which was not contained in the original RRPP.

This RRPP is organized by paragraph and sub-paragraph of 43 CFR 3482.1. The paragraph by paragraph organization was chosen to ensure that all required information is included in this RRPP. This RRPP is, for the most part, a stand-alone document. Minimal cross referencing to other documents has been employed where needed.

Surface owners are:

United States of America
Department of the Interior
Bureau of Land Management
Consolidated Financial Center
324 S. State, Suite 301
Salt Lake City, UT 84111-2303

Kaiser Coal Corporation
102 South Tejon, Suite 800
Colorado Springs, CO 80903
(303) 475-7005

Coal owners are:

United States of America
Department of the Interior
Bureau of Land Management
Consolidated Financial Center
324 S. State, Suite 301
Salt Lake City, UT 84111-2303

43 CFR 3482.1 (c)(2)

GENERAL GEOLOGY

Stratigraphy

The coal beds of economic importance in the Book Cliffs coal field are Upper Cretaceous in age, and are confined to the Blackhawk Formation of the Mesa Verde Group as shown on the Generalized Lithologic Section (Map SPR-R2P2-2). The general geology of the area is shown on the Hydrology & Geology Map (Map SPR-R2P2-3). The Mesa Verde consists of three (3) formations which are, in ascending order, the Blackhawk Formation, Castlegate Sandstone, and the Price River Formation. The Upper Cretaceous Mancos Shale underlies and intertongues with the Blackhawk Formation. The Mancos Shale was deposited in an offshore marine environment. The Castlegate Sandstone and the Price River Formation were formed in a continental environment.

The bluish-gray shale of the Mancos Shale crops out in a small area in the southwest corner of the quadrangle along the base of the Book Cliffs. Sandstone beds of the Blackhawk Formation occur in steep and precipitous cliffs and ledges above the Mancos Shale.

The lowest bed of the Blackhawk Formation is the Kenilworth Sandstone member. The lower section of this cliff-forming unit is thin-bedded and divided by shale partings, but the major part is a massive sandstone body some 130 feet (40 m) thick. The coal-bearing part of the Blackhawk Formation lies above the Kenilworth Sandstone and has been divided roughly into three (3) members recognized by Fisher (1936). The lower division consists of alternating sandstone, shaley sandstone, shale, and coal. It contains the Kenilworth coal bed. The middle division is dominated by massive cliff-forming sandstone, but near the top has lagoonal deposits which include the Upper and Lower Sunnyside coal beds. The upper division is a sequence of shaley sandstone, shale and coal. The entire Blackhawk Formation is about 700 feet (214 m) thick.

The cliff-forming Castlegate Sandstone overlies the Blackhawk Formation. It is about 180 feet (55 m) thick and is composed mainly of fine to medium grained, light gray sandstone.

The Price River Formation overlies the Castlegate and is about 500 feet (153 m) thick. It consists of interbedded sandstone and shale. The sandstone is light colored, slightly calcareous to argillaceous, and is thin-bedded to massive. The shale is medium to dark gray, carbonaceous, and contains minor beds of bony coal.

The strata successively overlying the Price River Formation include the North Horn Formation (Upper Cretaceous and Paleocene), the Colton, and Wasatch Formation (Eocene) - which may be partially equivalent or intertonguing (Doelling, 1972) - and the Green River Formation (Eocene). The North Horn Formation consists of interbedded yellowish gray sandstone, light yellow to greenish gray shale and limestone, and conglomeratic sandstone at the base of the formation. The Colton Formation is composed of interbedded sandstone, siltstone, and shale. The Green River Formation is the youngest formation in the quadrangle and is exposed over the eastern two-thirds of that area. The formation consists mainly of greenish gray and white claystone and shale. Between 2,500 and 3,000 feet (763 to 915 m) of the formation are exposed in the quadrangle.

Structure

The general structure of the region is a gently dipping homocline with an eastward dip in the southern half of the mine area and a northeastward dip in the northern part. Inclinations of the beds range from five (5) to twelve (12) degrees and average about eight (8) degrees. Several northwest trending faults occur in the region where detailed mapping has been done. Several faults with displacements exceeding 100 feet (30 m) cut the strata just south of Bear Canyon and just north of the mouth of Whitemore Canyon. These faults are widely spaced and have not excessively impeded mining in the past. The occurrence of faults in other parts of the area is unknown. The displacements of the known faults are generally under 100 feet (30 m) but may exceed this. Some of the faults have produced shear zones. North of the town of Sunnyside in Section 31, T14S, R14E, SLBM, three (3) parallel faults strike nearly east-west. Vertical displacements of these faults range from 13 feet (4 M) to 100 feet (34 m).

Coal Geology

Coal in the permit area outcrops along a southwest facing escarpment. In the northeast part of the permit area, the coal beds are deep but have been identified in other areas and are listed in ascending order as follows:

Kenilworth Coal Bed. Where measured, the Kenilworth coal bed ranges in thickness up to 2.5 feet (0.8 m), but is not an important resource in the area. The coal bed rests either directly on the massive Kenilworth Sandstone Member of the Blackhawk Formation or is separated from it by a few feet of shale.

Gilson Coal Bed. The Gilson coal bed occurs in the permit area. It is composed of a thin bed, or beds, generally less than two (2) feet (0.6 m) in thickness. The Gilson bed is approximately 30 feet (9 m) above the Kenilworth coal bed.

Rock Canyon Coal Bed. The Rock Canyon coal bed is 70 to 75 feet (21 to 23 m) above the Gilson coal bed. According to Doelling (1972), the Rock Canyon is only present along the northern edge of the area and is, therefore, unimportant in this area.

Lower Sunnyside Coal Bed. The Lower Sunnyside coal bed occurs approximately 22 feet (6.7 m) above the Kenilworth coal bed and ranges from 4.1 to 17.5 feet (1.2 to 5.3 m) or more in thickness in the southwest part of the area. This coal bed has been extensively mined in the southwest part of the area. Clark (1928) emphasized the continuity of the bed and believes that the coal is thicker under cover than where it has been measured at the outcrop. This has been found to be generally true in subsequent mining.

The Lower Sunnyside coal is brittle, tough, and hard to pick. It has a metallic ring when struck with a hammer (Clark, 1928). It is a bright coal lacking definite fracture lines and breaks into large, irregular lumps (Thiessen and Sprunk, 1973). Doelling (1972) summarized the coal's descriptions as "a uniform attrital-anthrazulous bright coal largely derived from small plant material such as small stems, twigs, roots and leaves." Clark (1928) reports that the Upper and Lower Sunnyside coal beds contain the best coking coal known in the Book Cliffs coal field in Utah and that "the coal weathers very slowly on exposure to the air and, therefore, makes a good stocking fuel ...".

Upper Sunnyside Coal Bed. The Upper Sunnyside coal bed is perhaps better developed in this area than in any other part of the Book Cliffs coal field. The bed ranges in thickness from 0.6 to 6.2 feet (0.12 to 1.9 m) in areas where it has an outcrop or was encountered in drill holes. A problem with the bed is its close proximity to the Lower Sunnyside coal bed in the eastern part of the area. The non-coal interval between the Upper Sunnyside bed and the uppermost sub-bed of the Lower Sunnyside coals range from only two (2) or three (3) feet (0.6 to 0.9 m) to 39 feet (12 m) in the Sunnyside No. 1 Mine (Doelling, 1972).

Clark (1928) describes the physical characteristics of the Upper Sunnyside coal and the Lower Sunnyside coal together as though both coals were the same. The description of the Lower Sunnyside coal in the preceding section also applies to the Upper Sunnyside coal.

Numerous workers have studied the Sunnyside coals since mining began in the late 1800's. The most comprehensive are by Osterwald, et al. (1981) and Doelling, et al. (1979). The following are excerpts from their reports:

> "The sequence of rock beneath the Sunnyside Coal Zone varies from place to place with respect to thickness, number of key beds and other characteristics, but generally there is a sequence of about 25 to 30 feet of transgressive restricted marine rocks consisting of thin-bedded sandstones and interbedded mudstone overlain by at least 35 feet of offshore and shoreface (Littoral) sandstone." (Doelling, et al., 1979).

> "The coal throughout the Sunnyside zone is remarkably uniform in physical and chemical characteristics and it is difficult to correlate individual horizons and beds by detailed geologic descriptions of the coal. Some degree of correlation is possible, however, across distances of less than a mile by employing the positions, nature, and sequence of partings and splits, and by the way certain horizons of coal react to compressive forces along the coal faces, along with the estimates of vitrain content. There is no appreciable change in coal composition vertically or laterally between the Sunnyside No's. 1 and 3 mines. The species of plants and the makeup of materials supplied to the coal swamp did not vary much throughout its history." (Doelling, et al., 1979).

The Sunnyside coal bed varies in thickness from a few inches in the west near Kenilworth, Utah, to as much as 24 feet (7 m) in a single bed in parts of the Sunnyside District. The coal commonly splits into two (2) beds, with as much as 75 feet (23 m) of rock intervening. Both seams are exploited where multilevel mining is practical. The Sunnyside coal

bed has been mined extensively in the northern and central parts of the district, but most coal in the southern part of the district has not been exploited, and only a few prospect pits have been opened south of the Book Cliffs Mine.

Clark (1928), named the Sunnyside coal bed for the Sunnyside Mines, where the bed was first worked. He distinguished the "Lower Sunnyside" and "Upper Sunnyside" beds and traced the "Lower Sunnyside" from "a point between the canyons of Soldier Creek and Coal Creek (T13S, R11E) to Horse Canyon (T16S, R14E)."

The Sunnyside coal interval consists of locally thick coal accumulations interrupted at places by variable thick rock partings. Field studies have shown that no single parting persists throughout the lateral extent of the coal interval, and that most partings are open to the east and south. Data from drill cores indicate that partings are variable and of only local extent (Osterwald. et al., 1969).

> "Local thickness variations in the coal are due mostly to differential compaction and to channelfill sandstone bodies that cut the coal from above to various depths. These sandstone bodies occupy relict stream channels, which were abandoned as the coastal plain progressed seaward.
>
> "In Utah, only the Sunnyside coal is known to contain the qualities necessary for the production of metallurgical coke, and it is the most important source of coking coal in the Western United States". (Averitt, 1966).
>
> "Structures in the Sunnyside coal include banding and a particular type of cleavage known as "eye coal", as well as cleavage, joints, and fracture zones. Banding in coal is due to alternating layers of different texture or composition. In the Sunnyside coal, banding varies from microscopic size to layers several inches thick." (Osterwald, et al., 1981).

"Eye coal derives its name from numerous smooth and shining, crudely equidimensional to elongate spots on nearly parallel cleavage planes. The size of individual eyes in the Sunnyside coal ranges from one (1) inch (2.5 cm) to more than six (6) inches (15 cm) in diameter. The eyes have no third dimension." (Osterwald, et al., 1981).

GEOLOGY OF COAL BED AND ADJACENT UNIT

Exploration and Drilling

Exploration drilling has been conducted by U.S. Steel Corporation on Federal Lease SL068754. Holes were generally drilled by rotary method down to a core point, followed by coring the lower part of the hole including the coal seam(s). Core recovery was good.

Included in Exhibit 1, Drill Hole Logs, are drill logs for DDH B1, DDH B2, and DDH B4. These holes are representative of the areas planned to be mined during the permit period. These drill logs illustrate the general rock types in the overburden over the coal seams as well as thickness of the coal. Location of these holes are shown on the Hydrology and Geology Map (Map SPR-R2P2-3).

Geology

Stratigraphy, structure, and coal geology have been discussed in previous sections. Information on coal geology is also shown on the Generalized Lithologic Section (Map SPR-R2P2-2) and in Exhibit 1, Drill Hole Logs.

The only coal seams of commercial interest on Federal Lease SL068754 area are the Upper and Lower split of the Lower Sunnyside seam. The strata and coal seams generally dip north and eastward away from the outcrop at five (5) to eight (8) degrees. The cover varies from 500 feet to over 2,000 feet. Rugged topography and high relief create a marked difference in cover thickness within a few hundred feet horizontally.

Adjacent Units (Overburden)

The Lower Sunnyside seams lie underneath the southwestward facing Book Cliffs which rise several thousand feet above deeply incised stream channels. The cliffs are formed by the Blackhawk, Castlegate Sandstone, Price River, North Horn, Colton, and Green River formations. The stream channels emerge from the sharp canyons onto a relatively flat surface of the Mancos Shale Formation. The coal and mine workings are confined mainly to the Blackhawk Formation. The geological formations dip away from the cliff line, and water in any permeable strata would tend to travel down the structure toward the north and east. The rocks above the coal are dominated by strong, well cemented sandstones.

Sandstone channels are the predominate sedimentary structure found in the formations overlying the Sunnyside coal of the permit area. The Green River and Colton Formations form the steep Roan Cliffs escarpment. The Bluecastle Sandstone member of the Price River Formation and the Castlegate Formation form vertical cliffs which make up the Book Cliffs escarpment. Geologic workers in the Sunnyside district have indicated the overall flow direction of channel deposits of the Bluecastle member of the Blackhawk Formation, to be east southeast. Because of the vertical form of outcrop of the channel deposits, little aquifer recharge can be expected except where the joint system is deeply eroded into the rock outcrop.

Channel sandstone deposits occur below, between, and above the Sunnyside coal bed. They are most common in the upper part of the upper mudstone member. Channels overlying the Sunnyside coal have been noted to contain small amounts of water and on occasion, oil. The observations of water-bearing and oil bearing channels occurred in what are now mined out areas of the Sunnyside Mines. Water and oil seepage from these channels has stopped.

43 CFR 3482.1 (c)(3)(i)

COAL QUALITY

Total sulfur content of the coal in the permit area is relatively low and pyritic sulfur generally constitutes only a minor fraction of that total sulfur. Listed below are the results of four (4) samples taken in the B Canyon entries.

Sample I.D.	% Pyritic Sulfur	% Sulfate Sulfur	% Organic Sulfur	Total
BC-1	0.14	0.03	0.75	0.92
BC-2	0.39	0.08	0.57	1.04
BC-3	0.25	0.09	0.89	1.23
BC-4	0.22	0.10	0.70	1.02

Samples were taken in June of 1985. Additional coal quality data appears in Exhibit 4, Confidential Information.

43 CFR 3482.1 (c)(3)(ii)

MINING METHODS

Continuous miners will be used to block out panels for the longwall systems. The development entries will be driven along the strike as shown on the Mine Plan Map (Map SPR-R2P2-4). After completion of the panel entries, the longwall will extract the coal in the block. This sequence will continue until the area of mineable coal is exhausted.

The mining sequence shown on the Mine Plan Map (Map SPR-R2P2-4) is for the life-of-mine. No mining will take place outside the permit boundary until all appropriate permits are obtained for the area.

Typically, a development section consists of two (2) twenty foot entries driven parallel 50 feet apart. Crosscuts connecting the entries are driven every 100 feet. Equipment used in the section is as follows:

- Continuous Miner - 1 each
- Shuttle Cars - 2 each
- Roof Bolter - 1 each
- Ram Car - 1 each
- Tractor - 1 each
- Transformer - 1 each

Exhibit 3, Mining Sequence & Ventilation Figures, shows detailed sequences for coal development and extraction.

Longwalls are hydraulically operated, self-advancing support systems with a self-propelled shearer to cut the coal. Longwalls work between two (2) sets of development entries driven parallel 500 to 600 feet apart. The length of a longwall panel varies from 2,000 to 8,000 feet. Equipment to be used in the 500 foot longwall face are as follows:

- Supports - 110 each
- Conveyor Pan Sections - 55 each
- Tail Drive - 1 each
- Head Drive - 1 each
- Stage Loader - 1 each
- Hydraulic Power Pack - 2 each
- Electrical Control Boxes - 1 each

Basic Underground Mining Equipment

Major underground equipment includes:

- Continuous Miners
- Cutting Machines
- Loading Machines
- Face Drills

- Feeder Breakers
- Shuttle Cars
- Roof Bolters
- Scoop Trams
- Rock Dusters
- Longwall Mining Systems Including Chock or Shield Type Roof Supports, Shearers, and Face Conveyors
- Belt Haulage System
- Rail Haulage System (hoists, locomotives, track systems)
- Power Centers and Electric Distribution System
- High Pressure Spray Pumps
- Ventilation Fans
- Dewatering Pumps and Water Lines
- Compressor Stations and Air Lines

The mining sequence and projected advance can be seen on the Mine Plan Map (Map SPR-R2P2-4).

Mining Rates

Mining in the permit revision area will comprise development mining with continuous miners and extraction with longwall equipment. Development rates are projected to be 10,000 to 15,000 tons per month. Extraction is estimated to average 85,000 to 90,000 tons per month. Development and extraction will proceed in sequence. Development will be completed prior to commencement of extraction. Total production expected from the revision area is approximately 1,040,000 tons.

Coal Recovery

U.S.G.S. General Order No. 1 defines bituminous coal at 1,800 tons per acre foot. A rule of thumb for recoverable coal has been estimated at 1,000 tons per acre foot. This results in a recovery factor of 55.5 percent. Historically, the actual recovery rate at the Sunnyside Mines has been less than 50 percent. Among the factors that determine the

amount of coal that can be successfully mined are coal thickness, amount of overburden, roof conditions, steepness of pitch, equipment limitations, and ventilation.

Longwall mining methods allow almost full extraction of the coal seam, within the height limitation of the equipment. Only barrier pillars are left to protect haulage and ventilation entries as shown on the Mine Plan Map (Map SPR RRPP 4). Coal recovery is expected to exceed 55 percent in the lower split of the Sunnyside seam.

Area Affected

No new surface disturbance is planned for the permit revision area. All coal removed from the permit area will be extracted through the existing Sunnyside surface facilities. A description of the existing Sunnyside surface facilities can be found in Chapter 3 of the Sunnyside Mines Permit Application.

New surface facilities are planned for the C Canyon area. Planning for these facilities is not complete. The new facilities will be part of the permit application for areas not covered in the permit revision. When the Permit Application is filed for the area outside the revision area, an updated RRPP will be filed which will include a description of the surface facilities.

43 CFR 3482.1 (c)(3)(iii)

Coal reserve information is considered by Kaiser to be confidential information. Exhibit 4, Confidential Information, contains the reserve data for Federal Lease SL 068754.

The coal reserve calculations that appear in Exhibit 4, Confidential Information, have been prepared to meet the requirements of 43 CFR 3480, regarding coal reserves in Federal Coal Lease SL-068754. Exploration by Kaiser has identified two coal seams of commercial value on this Federal Lease.

The lease is adjacent to Kaiser fee land. Drill sites are located on both fee and Federal land; therefore, all data is projected with the use of structure, cross sections and isopach maps, to determine reserves on the Federal property.

Coal of commercial value is found in the Blackhawk Formation of Upper Cretaceous age. The Sunnyside Seam splits in the lease areas forming an upper and lower bench.

CALCULATION ASSUMPTIONS

The coal reserves for each seam have been calculated, using the given criteria of General Mining Order No. 1. Assumptions for each reserve calculation are as follows:

Coal Reserve Base

- Reserve calculations include coal two feet high or higher
- In-seam shale is not included in the coal reserve base calculation

Mineable Reserve Base

- Reserve calculations include coal four feet high or higher
- Coal having more than 35 percent in-seam shale is not included in mineable reserves

Recoverable Reserve

- Seams from four (4) to ten (10) feet in height are included in the recoverable reserve base
- A 100-foot wide lease boundary barrier has been used except where the Federal leases are contiguous with Kaiser's fee land

- Approximately 5 percent of the reserve is assumed to be lost to adverse geologic conditions such as wants and faults. An additional 5 percent was deducted for outcrop coal (less than 500 feet of cover) where some of the coal is typically oxidized and/or burned

- Based on Kaiser's mining experience in the Sunnyside District, an overall mining recover factor of 60 percent of the remaining coal is considered reasonable for the remaining coal reserves in the upper and lower benches

Weight of Coal

Laboratory analysis has determined the coal bituminous; therefore, 1,800 tons per acre foot is used in the calculations.

CALCULATION METHOD

The reserves have been calculated by combining data developed from two general methods of measurement:

- Circle areas of influence were constructed around each drill hole

- A system of isopachs was drawn using the identical data

Seam isopachs were superimposed on the circles derived from each point of observation. The measured, indicated, and inferred reserve areas were planimetered on 1" = 1000' maps and expressed in acres. The Coal Reserve Base and Mineable Reserve Base were then calculated by the formula:

Reserve Base Tonnage In Place = Area x Seam Height (ft) x 1,800 tons/ac ft

The raw recoverable reserve was calculated by the following formula:

Recoverable Reserve (Raw) = [(Mineable Reserve In Place) -
(Barrier Losses + Geological Losses)]
x (Mining Recovery Factor)

43 CFR 3482.1 (c)(3)(iv)

METHOD OF ABANDONMENT

Portal and Shaft Seals proposed herein are general methods designed to protect the postmining environment and ensure resource protection. Prior to sealing any entries into federally owned coal, Kaiser will consult with appropriate BLM personnel and hold on-site inspections with BLM personnel, if necessary. Detailed portal closure designs for each site will be officially submitted to the Bureau of Land Management for its approval. The detailed portal and shaft closures will contain all of the elements described herein and shown on the Typical Permanent Seals Map (Map SPR-R2P2-5), plus any additional measures deemed necessary by the BLM at the time of closure. There are no other known resources within the permit revision area that require protection.

Sealing of Mine Openings

Shaft openings required to be sealed shall be effectively capped as shown on the Typical Permanent Seals Map (Map SPR-R2P2-5). The cap will consist of a six (6) inch thick concrete and steel plate cap with a 15 foot high, two (2) inch diameter steel vent pipe above the surface of the shaft.

Slope or drift openings required to be sealed shall be sealed with solid, substantial, noncombustible material such as concrete blocks, bricks, or tile and shall be completely filled with noncombustible material for a distance of at least 25 feet into such openings.

There are 29 mine openings within the Sunnyside Mines permit area that will be permanently cased and sealed during abandonment. These portals are specifically located on the Surface Facilities, Hydrology and Pre-Law Disturbance Vegetation Map, Plate III-1 in the Sunnyside Mines Permit Application.

The portals will be filled with incombustible material for a minimum distance of 25 feet.

Most mine openings are framed with a concrete structure to maintain the portal integrity. These structures will be demolished and placed inside the mine against the permanent seal, which is located 25 feet inside the mine. See the Typical Permanent Seals Map (Map SPR-R2P2-5) for a visual description of the mine openings and design of the permanent seals.

After the permanent seal is constructed, the concrete surface structure will be demolished and placed inside the mine opening. Fill material will then be hauled from designated borrow areas and placed inside the mine opening.

Sealing of Drill Holes. Plugging and management of drill holes will adhere to the procedures stipulated by the BLM. The stipulations are shown in Exhibit 2, BLM Stipulations Covering Drilling Programs.

43 CFR 3482.1 (c)(4)(i)

The following required features can be found on the indicated map:

- Federal Lease Boundary and Serial Number - Permit Area Map (Map SPR-R2P2-1)
- Surface Improvements and Surface Ownership - Surface Ownership Map (Map SPR-R2P2-6)
- Coal Outcrop Showing Strikes and Dips - Mine Plan Map (Map SPR-R2P2-4)
- Location of Mines - Mine Plan Map (Map SPR-R2P2-4)

43 CFR 3482.1 (c)(4)(ii)

Isopach maps of coal, overburden, and interburden are considered by Kaiser Coal to be confidential documents. The information is shown on the following maps:

- Lower Sunnyside Seam Coal Isopach Map (Map SPR-R2P2-C1)
- Upper Sunnyside Seam Coal Isopach Map (Map SPR-R2P2-C2)
- Upper Sunnyside Seam Interburden Isopach Map (Map SPR-R2P2-C3)
- Lower Sunnyside Seam Cover Isopach Map (Map SPR-R2P2-C4)

43 CFR 3482.1 (c)(4)(iii)

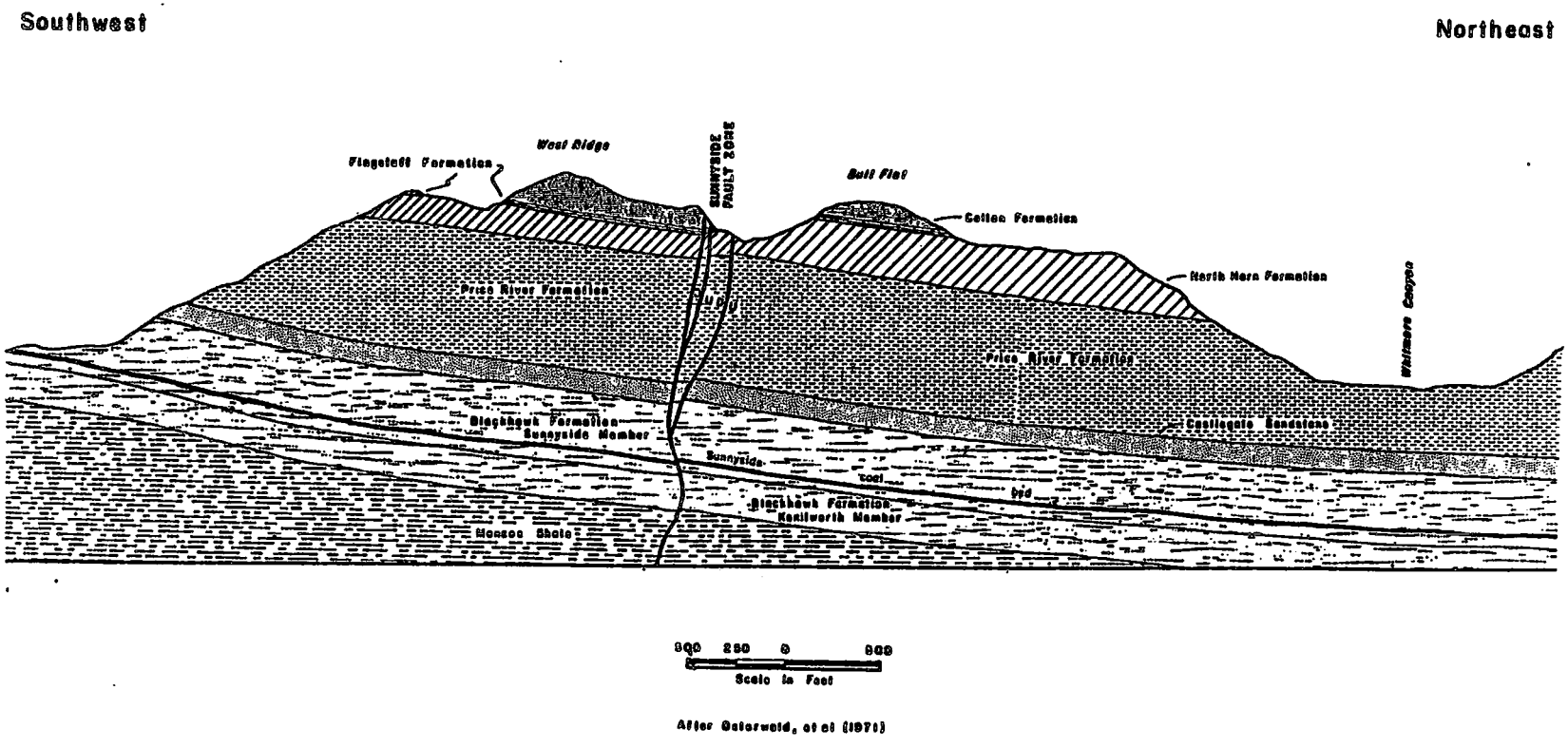
A typical cross-section of the Sunnyside area can be seen on Figure SPR-R2P2-1, Southwest to Northeast Cross-Section Through the Sunnyside Coal Mining District. More detail can be seen on the Generalized Lithologic Section Map (Map SPR-R2P2-2).

43 CFR 3482.1 (c)(4)(iv)

This section covers surface mining operations. The Sunnyside Mines are entirely underground operations, therefore, no response is required.

43 CFR 3482.1 (c)(4)(v)

The planned mining sequence is shown on the Mine Plan Map (Map SPR-R2P2-4). Mine layout for the entire Federal Lease No. SL068754 is shown on this map. Sequencing is shown only for the areas within the permit revision area boundary. Sequencing for the area outside the permit revision area will be shown when an RRPP is prepared to accompany the permit application which will be filed for this area.



After Gaterwald, et al (1971)

SOUTHWEST TO NORTHEAST CROSS SECTION THROUGH THE SUNNYSIDE COAL MINING DISTRICT

FIGURE NO. SPR-R2P2-1

The Mine Plan Map (Map SPR-R2P2-4) shows locations of all planned mine features in the permit revision area including main development entries, barrier pillars, panel development, and bleeder entries. The required mine features can also be seen on the MSHA approved ventilation plan maps which are hereby incorporated into this plan by reference.

Current plans for the permit revision area call for mining all economically recoverable barrier pillars on final retreat except those barriers required by law to be left in place, such as the lease boundary barriers, outcrop barriers, drill hole barriers, etc. Final retreat from the permit revision area will not take place until all mining in Federal Lease No. SL068754 is complete. No barrier pillars will be extracted until all economically mineable coal is removed from the mine panels.

Sketches for typical entry development systems are shown in Exhibit 3, Mining Sequence and Ventilation Figures.

Sketches showing typical pillar recovery sequences are shown in Exhibit 3, Mining Sequence and Ventilation Figures. The figures shown in Exhibit 3, Mining Sequence and Ventilation Figures are taken from the MSHA approved ventilation plan and are part of that plan.

43 CFR 3482.1 (c)(4)(vi)

This section covers auger mining. No auger mining is planned at the Sunnyside Mines, therefore, no response is necessary.

43 CFR 3482.1 (c)(5)

There will be no new surface disturbance associated with mining in the permit revision area, therefore, no reclamation is planned other than the reclamation detailed in the Sunnyside Mines RRPP. Chapter 3 of the Sunnyside Mines Permit Application package contains further detailed information on the reclamation plan.

Mining of Federal Lease No. SL068754 outside of the permit revision area will result in surface disturbance. A reclamation plan to cover the area outside the permit revision area will be filed as part of the appropriate Permit Application Package.

43 CFR 3482.1 (c)(6)

The figures shown in Exhibit 3, Mining Sequence and Ventilation Figures are taken directly from the MSHA approved ventilation plan. All features of the MSHA approved ventilation plan are hereby incorporated into this RRPP whether or not they are specifically referenced here.

43 CFR 3482.1 (c)(7)

This section explains how maximum economic recovery will be attained in the permit revision area.

Two seams of economic interest exist within the permit revision area. The seams are the upper and lower splits of the Lower Sunnyside Seam. Due to the thin parting, only one seam can be mined using today's technology. The Upper Seam varies from less than 5 feet to 6 feet thick in the permit revision area while the Lower Seam ranges from 8 to 9 feet in thickness. This 3 foot difference in seam thickness dictates that the Lower Seam be mined. Present day economics would not allow mining of the thinner seam. Mining of the Lower Seam first, combined with the thin parting, will render the Upper Seam un-mineable. Present technology does not allow extraction of the Upper Seam after mining of the Lower Seam. Future technologies, such as in-situ gassification or currently undeveloped longwall techniques, may allow the recovery of this coal but for the present it should be considered lost.

The Mine Plan Map (Map SPR-R2P2-4) depicts the proposed mine layout. Mining operations will proceed down dip from the outcrop and from the old development entries by means of continuous miners and longwall mining systems for the life of the property. Extraction shown outside the permit boundary will not take place until all appropriate permits are obtained.

Overburden on Federal Lease No SL068754 ranges from 500 feet along the outcrop to over 2,500 feet to the east. Present mining technology puts the economic limit of mining between 2,000 and 2,500 feet of cover. Future coal mining technology may allow extraction of deeper reserves.

Pillars in the mains and the barrier pillars protecting the mains will be extracted at the end of the mine life. However, because of the long standing life and the extreme depth of cover, less than average recovery is expected when extracting barrier pillars and main pillars.

A zone will be left unmined between the outcrop and the mine workings as shown on the Mine Plan Map (Map SPR-R2P2-4). This barrier will be left for safety reasons, and to protect environmental resources along the outcrop.

Longwall mining will be practiced when possible to ensure maximum recovery. Room and pillar mining will be used only for development and when areas not suitable for longwall extraction are to be mined. The mine panel to be extracted in the permit revision area will be extracted by longwall methods.

GEOLOGY BIBLIOGRAPHY

Averitt, P. 1966. Coking-Coal Deposits of Western United States: U.S. Geological Survey Bull. 1222 G., p. 23-26.

Clark, F.R. 1928. Economic geology of Castlegate, Wellington and Sunnyside Quadrangles, Carbon County, Utah: U.S. Geological Survey Bull. 793.

Doelling, H.H. 1972. Central Utah Coal Fields: Book Cliffs, Utah Geological and Mineralogical Survey Monograph Series No. 3.

Doelling, H.H. et al. 1979. Observations on the Sunnyside Coal Zone, Coal Studies, Special Studies 49, Utah Geological and Mineral Survey.

Fisher, D.J. 1936. The Book Cliffs coal field in Emery and Grand Counties, Utah: U.S. Geological Survey Bull. 852.

Osterwald, F.W., et. al. 1969. Preliminary Geologic Map of the Columbia Area, Carbon and Emery Counties, Utah. Miscellaneous Geological Investigations Map I-582, U.S. Geological Survey.

Osterwald, F.W., J.O. Maberry, C.R. Dunrud. 1981. Bedrock, Surficial, and Economic Geology of the Sunnyside Coal-Mining District, Carbon and Emery Counties, Utah: Utah Geological Survey Professional Paper 1166, U.S. Government Printing Office.

Thiessen, R., and G. C. Sprunk. 1973. Origin and Petrographic composition of the lower Sunnyside coal of Utah: U.S. Bur. Mines Tech. Paper 473, p. 34.

EXHIBIT 1

DRILL HOLE LOGS

TABLE OF CONTENTS

Hole Log B-1

WESTERN DISTRICT, COAL

DRILL HOLE LOG

NAME OF PROPERTY B-CANYON (LT. FORK-A CANYON)

File No. B.C. 006

HOLE No. B-1

LOCATION:

ANGLE _____ BEARING _____

STATE UTAH

COUNTY CARBON

COLLAR ELEVATION 7457.00

BOTTOM ELEVATION 6593.00

DISTRICT _____

DEPTH:

Overburden _____

Bedrock _____

_____

Total Depth 864

Section 13, T 14 S, R 13 E
NW-SE

Coordinates: 33,828.00 N
13,796.00 W

SCALE 1" = 50'

Date Started 6-24-52

Completed 7-2-52

Company or Driller Jones Core Drilling Co.
Dallas, Texas

Type(s) of Rig(s) _____

Type(s) of Bit(s) 2 1/8"

CASING RECORD _____

CEMENT RECORD _____

REMARKS Hole Cored from 690 ft. to 864 ft.

I-1

DEPTH FROM	DEPTH TO		CORE RECOVERED	DESCRIPTION	LITHO
0	18	18		Alluvium	
8	22	4		Gr SS	
2	57	35		Gr SS w Sh Stks	
7	68	11		Gr SS	
8	68.3	0.3		Coal	
8.3	71	2.7		Sh	
1	112	41		Gr SS	100
2	124	12		Sandy Sh	
4	135	11		Gr SS	
5	141	6		Sandy Sh	
1	153	12		Gr SS	
3	159	6		Black Sh	
9 2	163	4		Gr SS	
3	195	32		Gr Sandy Sh	
5	199	4		Black Sh	200
9	202	3		Gr Sandy Sh	
2	220	18		Gr SS	
0	220.5	0.5		Coal	
0.5	230	9.5		Black Sh	
0	238	8		Gr SS	
8	261	23		Gr SS w Sh Stks	
1	298	37		Sandy Sh w SS bands	
8	306	8		Black Sh	300
6	316	10		Gr SS	
6	318	2		Black Sh	
9	3[illegible]5	38		Gr SS	

ANALYSES

PROXIMATE				ULTIMATE			
V. M.	F. C.	Ash	S	C	H_2	N	O_2

Hole Log B-1
(Cont.)

359	3		Sh
366	7		Gr SS
369	3		Sh
371	2		Gr SS
373	2		Sh
448.5	75.5		Gr SS
.5 449	0.5		Coal
525	76		Gr SS
537	12		Sandy Sh
623.5	86.5		Gr. SS
.5 624.2	0.7		Coal
.2 725.4	101.2		SS w Coal lenses

400

500

600

700

1-3

Hole Log B-1
(Cont.)

4	(729)		Black Sh							
	731	2	Gr SS - Lime Cem							
	744.5	13	Carb Sh							
5	758.5	14	Sandy Sh							
5	773	14.5	Gr SS w Sh bands							
	787.7	14.7	Bl Sandy Sh							
7	787.9	0.2	Coal							
9	788.8	0.9	Carb Sh							
8	790.8	2	Coal							
8	794.4	3.6	SS w Sh Stks							
4	798.9	4.5	Sandy Sh							
	834	20	Gr SS							
	835	1	Coal	37.2	53.4	9.4	.79	72.63	5.08	1.40	10.70
	837.6	2.6	Bl Sh- Fossilized	37.2	53.3	9.5	.87	72.80	4.39	1.26	11.18
6	843.7	6.1	Coal (U.S.)	37.4	47.4	15.2	1.07	67.58	4.81	1.54	9.80
7	848	4.3	Carb Sh	37.9	55.2	6.9	1.05	75.62	5.75	1.54	9.14
	851.7	3.7	SS	39.0	57.9	3.1	1.13	78.84	5.57	1.68	9.68
7	861	9.3	Coal (L.S.)								
	864	3	SS								

800

900

1-4

Hole Log B-1
(Concl.)

Hole Log

WESTERN DISTRICT, COAL

DRILL HOLE LOG

NAME OF PROPERTY B-CANYON (B-CANYON)

File No. B.C. 0062

HOLE No. B-2

LOCATION:

ANGLE _____ BEARING _____

COLLAR ELEVATION 7271.2

BOTTOM ELEVATION 6698.1

STATE UTAH

COUNTY CARBON

DISTRICT _____

DEPTH:

Overburden _____

Bedrock _____

Total Depth 573.1

SCALE 1" = 50'

Section 14, T 14 S, R 13 E

NE-NE

Coordinates: 36,144.07 N.
16,904.82 W

1-5

Date Started 6-16-52

Completed 6-21-52

Company or Driller Jones Core Drilling Co.
Dallas, Texas

Type (s) of Rig (s) _____

Type (s) of Bit (s) 2 1/8"

CASING RECORD _____

CEMENT RECORD _____

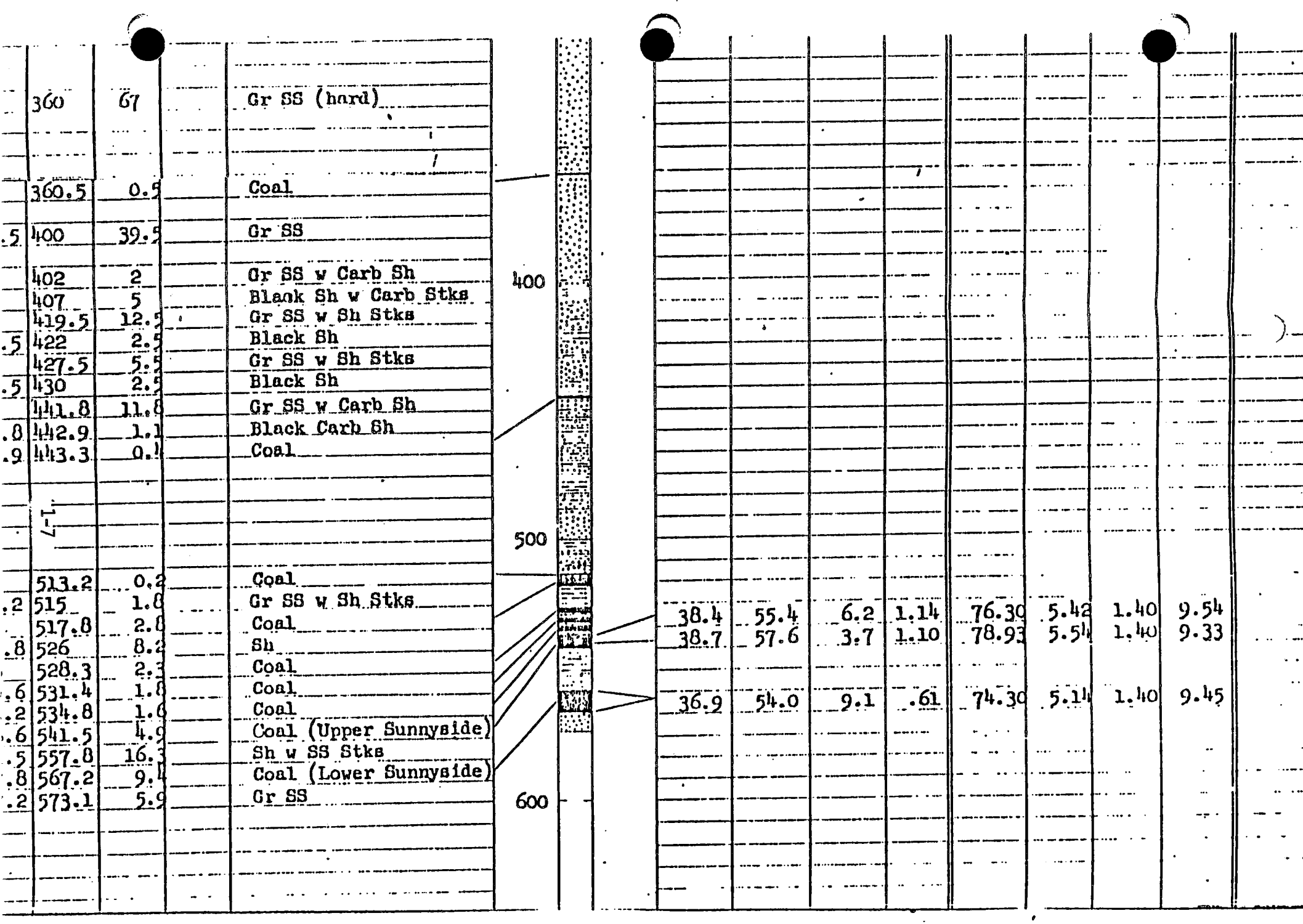
REMARKS Hole Cored from 400 ft. to 573.1 ft.

Logged by _____

DEPTH TO	CORE RECOVERED	DESCRIPTION	LITHO
16	16	Alluvium	
26	10	Gr SS	
28.5	2.5	Sandy Sh	
28.8	0.3	Coal	
39	10.2	Black Sh	
55	16	Sandy Sh	
60	5	Black Sh	
68	8	Gr SS	
72	4	Black Sh	
74.5	2.5	Gr SS	
74.8	0.3	Coal	
83	8.2	Gr SS	100
86	3	Black Sh	
103.5	17.5	SS - Greyish Black	
108	4.5	Black Sh	
108.5	0.5	Coal	
176	67.5	Gr SS w Sh Stks	
194.5	18.5	Sandy Sh	
198.8	4.3	Coal	200
203	4.2	Sh	
217	14	Gr SS	
229	12	Gr SS w Sh Stks	
265	36	Gr SS	
293	28	Gr SS w Sh Stks	
			300

ANALYSES							
PROXIMATE				ULTIMATE			
V. M.	F. C.	Ash	S	C	H_2	N_2	O_2

Hole Log B-2
(Cont.)



Hole Log B-2
(Concl.)

Hole Log B-4

WESTERN DISTRICT, COAL
DRILL HOLE LOG

NAME OF PROPERTY B - CANYON (RT. FORK - C CANYON)

File No. B.C. 006

HOLE No. B-4

LOCATION:

ANGLE _____ BEARING _____

COLLAR ELEVATION 7224.2

BOTTOM ELEVATION _____

STATE UTAH

COUNTY CARBON

DISTRICT _____

DEPTH:

Overburden _____

Bedrock _____

_____

Total Depth 634.3

SCALE 1" = 50'

Section 11, T 14S, R 13E
NE-SE

Coordinates: 39,572.04N
19,023.76W

Date Started 7-18-52
Completed 7-22-52

Company or Driller Jones Core Drilling Co. Dallas, Texas

Type (s) of Rig (s) _____

Type (s) of Bit (s) 2 1/8"

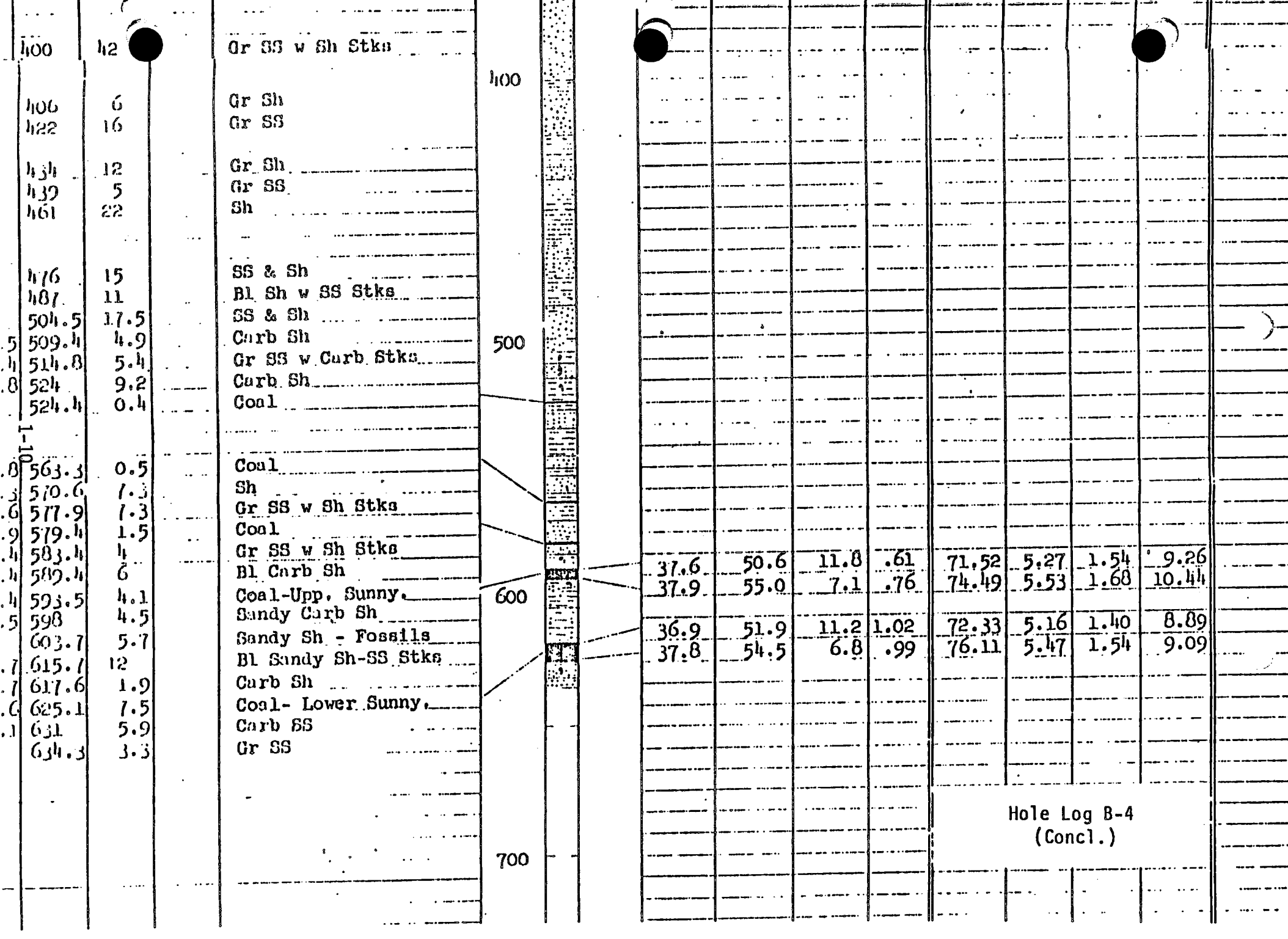
CASING RECORD _____

CEMENT RECORD _____

REMARKS _____

DEPTH		CORE RECOVERED	DESCRIPTION	LITHO	PROXIMATE				ULTIMATE			
					V. M.	F. C.	Ash	S	C	H_2	N_2	O_2
0	8.4	8.4	Alluvium									
8.4	33	24.6	Sh w SS Stks.									
	44	11	SS w Sh Stks.									
	97	53	Sh w SS bands									
97	99	2	Gr SS									
99	107	8	Gr Sh	100								
107	110	3	Gr SS									
110	122	12	Gr Sh w SS bands									
122	129	7	Gr SS									
129	138	9	Gr Sh									
138	145	7	Gr SS									
145	145.4	0.4	Coal									
145.4	150	4.6	Gr SS									
150	170	20	Bl Sh w SS									
				200								
	256	86	Gr SS									
	281	25	Gr Sandy Sh									
				300								
	340	59	Gr SS									
			Sh w SS Stks									

Hole Log B-4
(Cont.)



Hole Log B-4
(Concl.)

EXHIBIT 2

BLM STIPULATIONS COVERING SURFACE DRILLING PROGRAMS

BLM STIPULATIONS
COVERING
SURFACE DRILLING PROGRAMS

1. Archaeological, historical, and endangered species clearances are required prior to the approval of any operation.

2. Any operation will immediately cease upon the discovery of any significant archaeological or historical site. The Authorized Officer shall be immediately notified of any such find.

3. When artesian flows or water horizons with possible development potential are encountered, the Authorized Officer and the surface management agency shall be notified immediately so that a determination can be made concerning their development potential. Where possible, clean water samples shall be collected by the operator for analysis by the BLM.

4. Drill holes shall be cemented with proper slurry from the bottom to the collar. The lessee shall be responsible for the proper plugging of each hold unless a written request to keep the hole open is made by the Authorized Officer. If a drill hole cannot be fully cemented, possibly due to sloughing or fractures, the Authorized Officer must be notified, and his instructions for subsequent plugging followed.

5. The slurry shall be made using 5.2 - 5.5 gallons of water per bag of cement. The drill stem shall be lowered to the bottom of the hole and sufficient slurry pumped through the stem to fill 200 feet of the hole. The drill stem will then be raised 200 feet and the process repeated. The drill hole shall be completely plugged using this method.

6. The Authorized Officer shall be notified as to the time when the first hole is to be plugged so that a representative of his

office can arrange to observe the procedure if circumstances permit. Subsequent observations of other holes being plugged will be arranged as deemed necessary.

7. The hole location is to be marked by placing an approved marker such as a capped pipe, steel fencepost, or metal plate in the concrete plug. Such markers are to show hole number, year drilled, lessee name, and as feasible, the section, township, and range in which the hole is located. Top of concrete plug, if located in cultivated field, must be set below normal plow depth (10 to 12 inches).

8. Mud pits must be backfilled and leveled. Liquids or mud in the pits must be pumped out and removed from the premises or allowed to dry before they are backfilled.

9. Drill sites must be cleaned and all material, including drill cuttings, foregin to the natural setting must be buried or removed. Trash will be removed from the area. Revegetation of disturbed area will generally be required. If excavation is required in preparing a drill site, topsoil will be stockpiled separately. Before the drill site is permanently abandoned, the location will be regraded to a natural contour and the topsoil redistributed. Type, method, and scheduling of revegetation will be specified by the surface management agency through the Authorized Officer.

10. The Authorized Officer shall be notified as to the anticipated completion date of the program.

11. A monthly report shall be submitted to the Authorized Officer within 10 days after the end of the month. It will include:

    (1) The holes completed during the month and the total depth of each hole.
    (2) The date each hole was completed.

(3) The date each hole was plugged.
(4) The type of drilling plug or core.

12. The following reports shall be submitted to the Authorized Officer in duplicate after the completion of the program:

(1) Hydrologic logs using the attached form.
(2) Geophysical and lithologic logs and all geologic interpretations of each log.
(3) Coal analysis.
(4) Total acreage of surface disturbed per hole, including acreage disturbed by access roads.

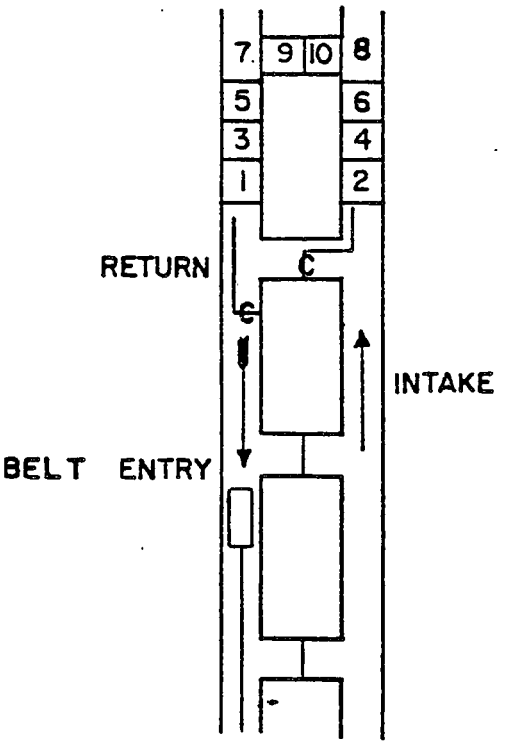
NOTE: All information submitted must contain the lease number. All logs must contain the surface elevation of drill hole and the location of the drill site. The sites will be located using coordinates and/or measured distances from the nearest section line.

EXHIBIT 3

MINING SEQUENCE AND VENTILATION FIGURES

EXHIBIT 3

TABLE OF CONTENTS

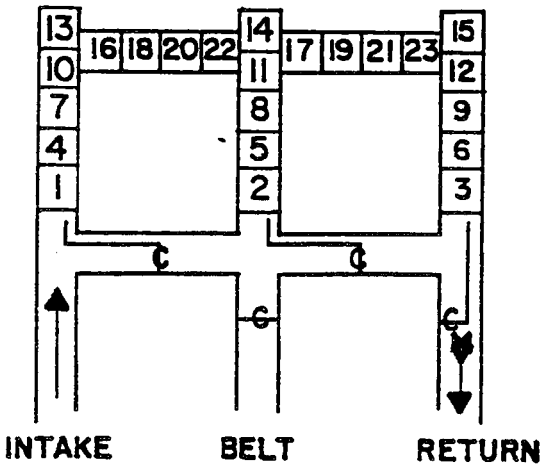


NOTE:

DUE TO BAD TOP OR OTHER PROBLEMS, THE MINING CYCLE MAY BE BROKEN. BREAK THROUGH TO BE MADE FROM INTAKE SIDE.

VENTILATION AND MINING SEQUENCE
TWO ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.1

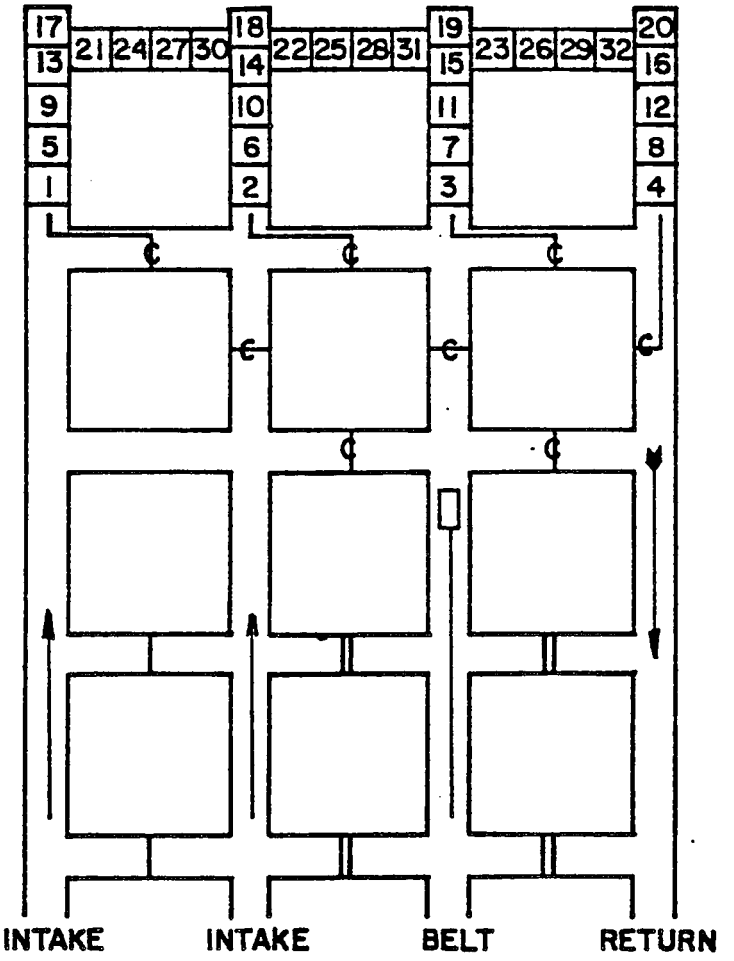


NOTE:

DUE TO BAD TOP OR OTHER PROBLEMS, THE MINING CYCLE MAY BE BROKEN.

VENTILATION AND MINING SEQUENCE
THREE ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.2

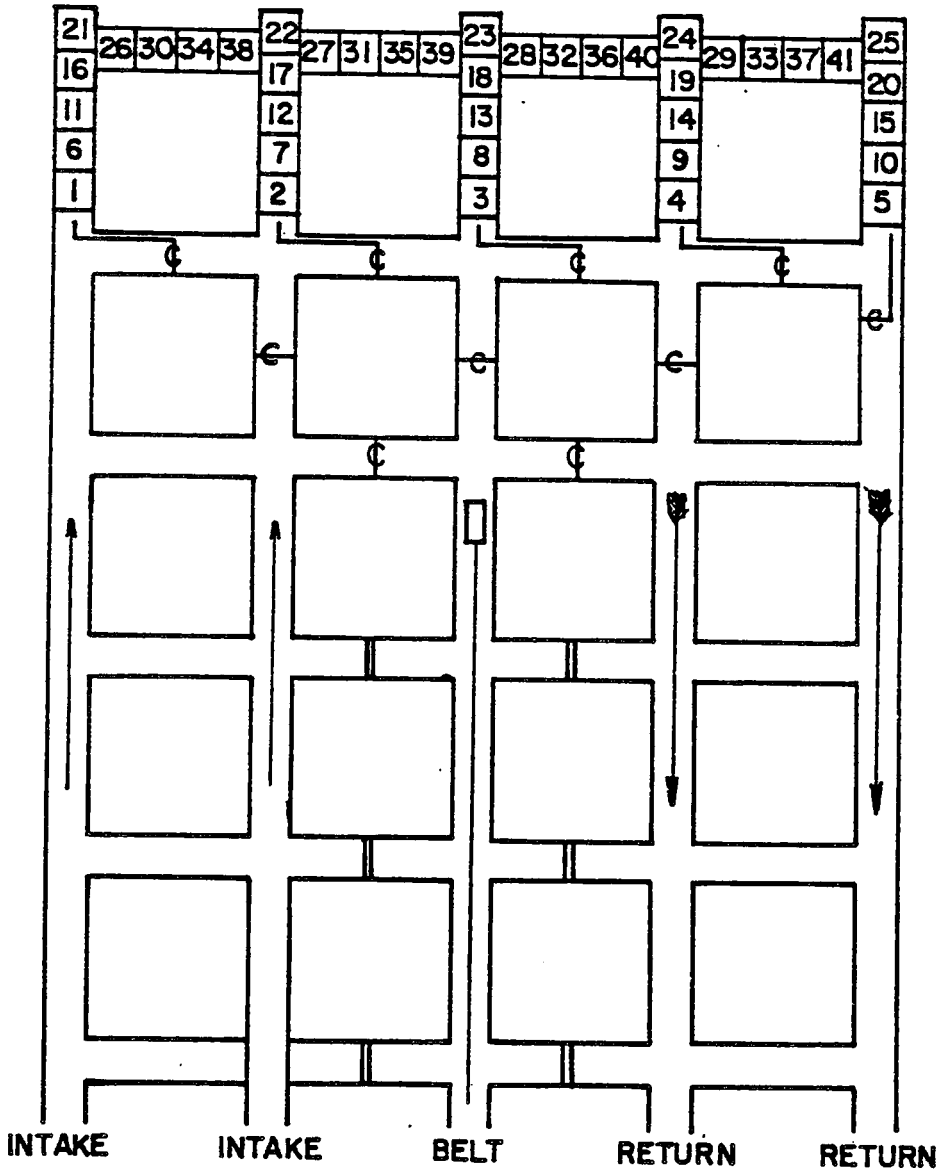


NOTE:

DUE TO BAD TOP OR OTHER PROBLEMS, THE MINING CYCLE MAY BE BROKEN.

VENTILATION AND MINING SEQUENCE
FOUR ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.3

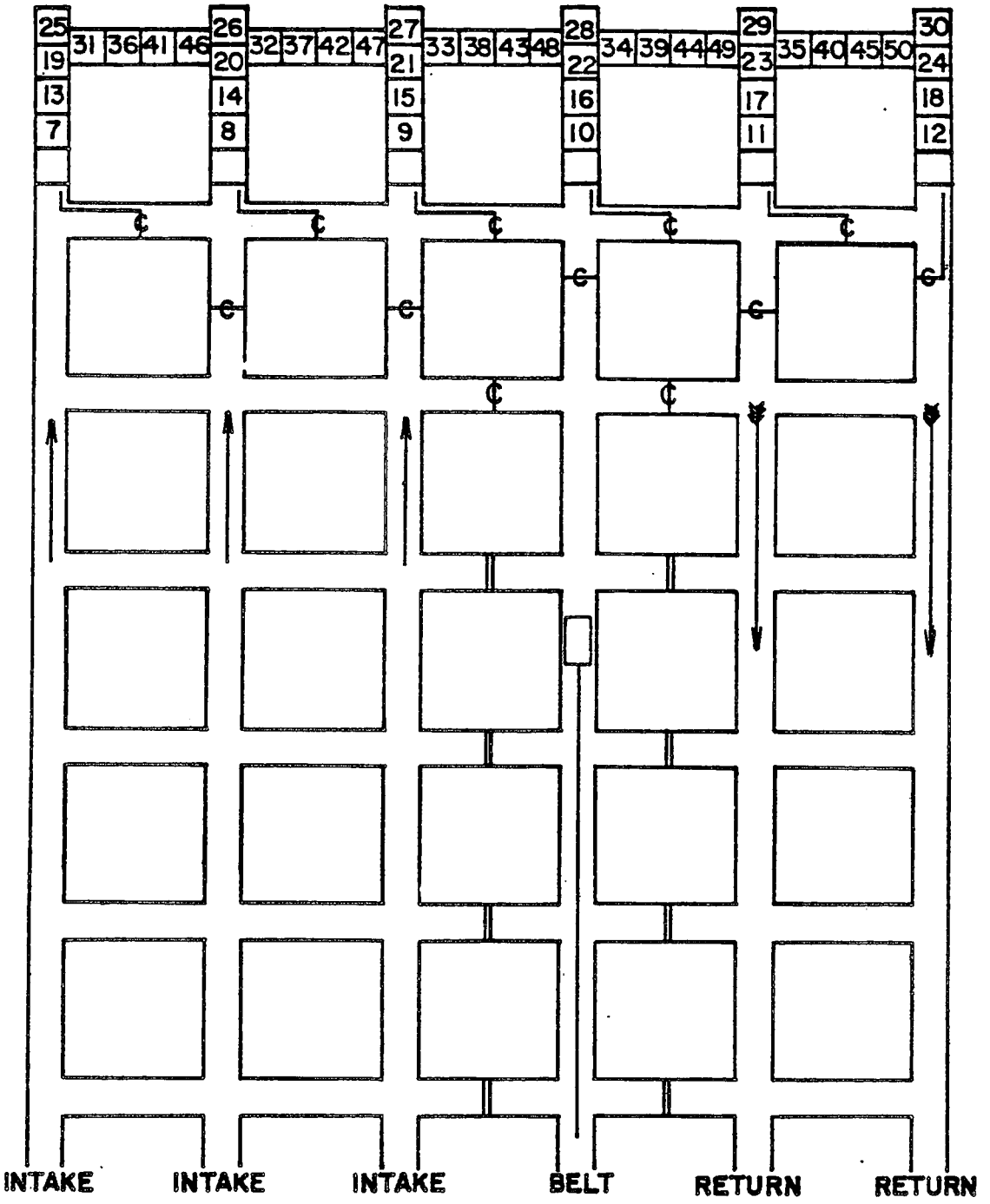


NOTE:

DUE TO BAD TOP OR OTHER PROBLEMS, THE MINING CYCLE MAY BE BROKEN.

VENTILATION AND MINING SEQUENCE
FIVE ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.4

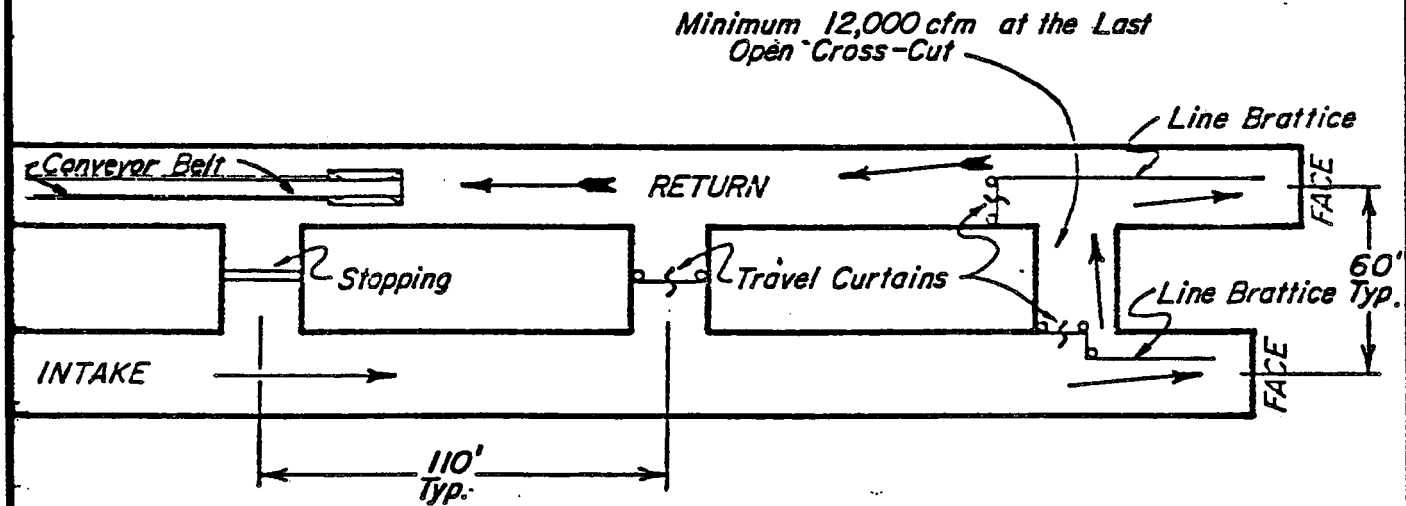


NOTE:

DUE TO BAD TOP OR OTHER PROBLEMS, THE MINING CYCLE MAY BE BROKEN.

VENTILATION AND MINING SEQUENCE
SIX ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.5

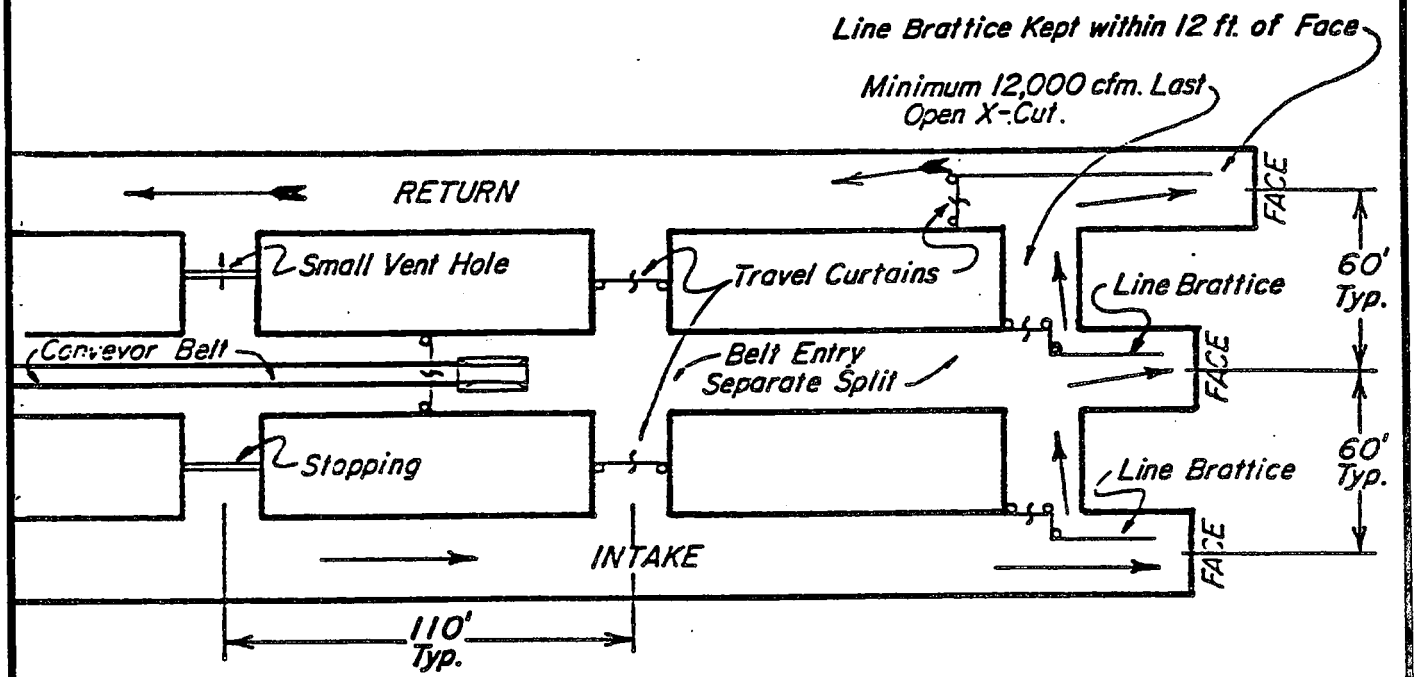


NOTES:

1. LINE BRATTICE TO BE KEPT WITHIN 12FT. OF FACE.
2. A MINIMUM QUANTITY OF 6,000 CFM. OF AIR SHALL REACH EACH WORKING FACE WHERE COAL IS BEING CUT, MINED, OR LOADED.

VENTILATION FOR TWO ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.6

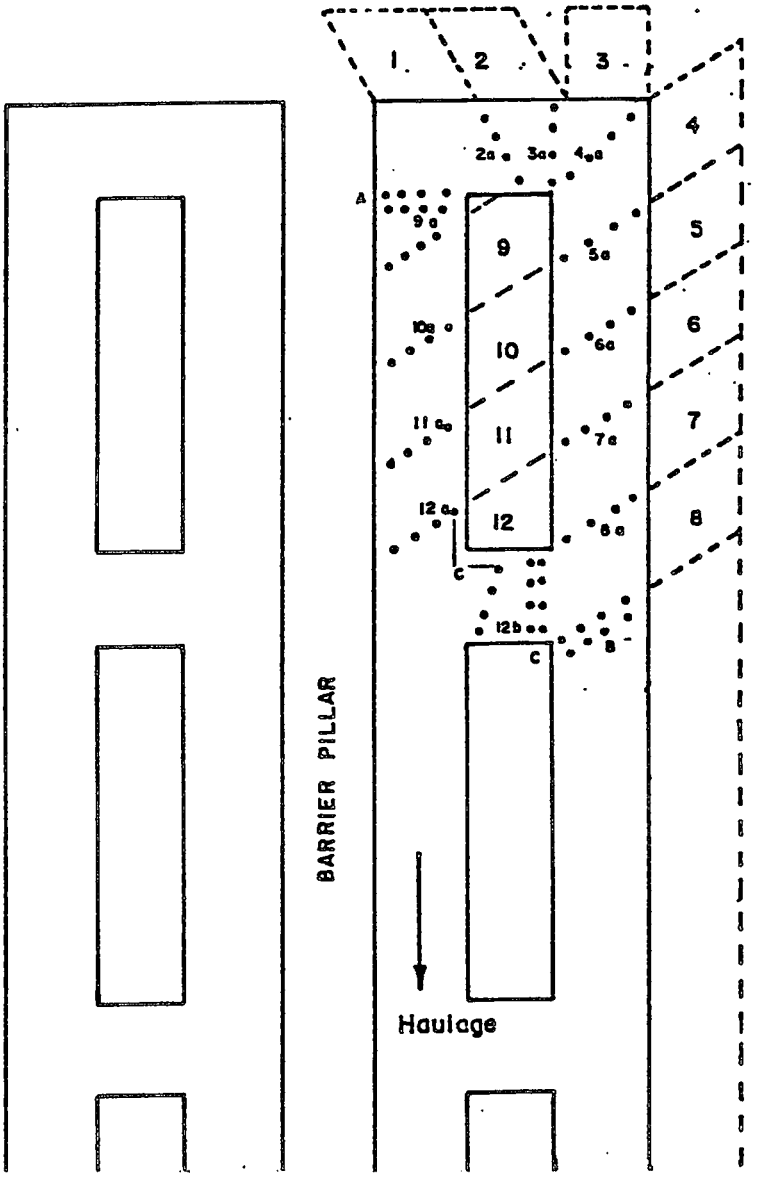


NOTE:

A MINIMUM QUANTITY OF 6,000 CFM OF AIR SHALL REACH EACH WORKING FACE WHERE COAL IS BEING CUT, MINED, OR LOADED.

VENTILATION FOR THREE ENTRY SYSTEM

FIGURE NO. SPR-R2P2-3.7

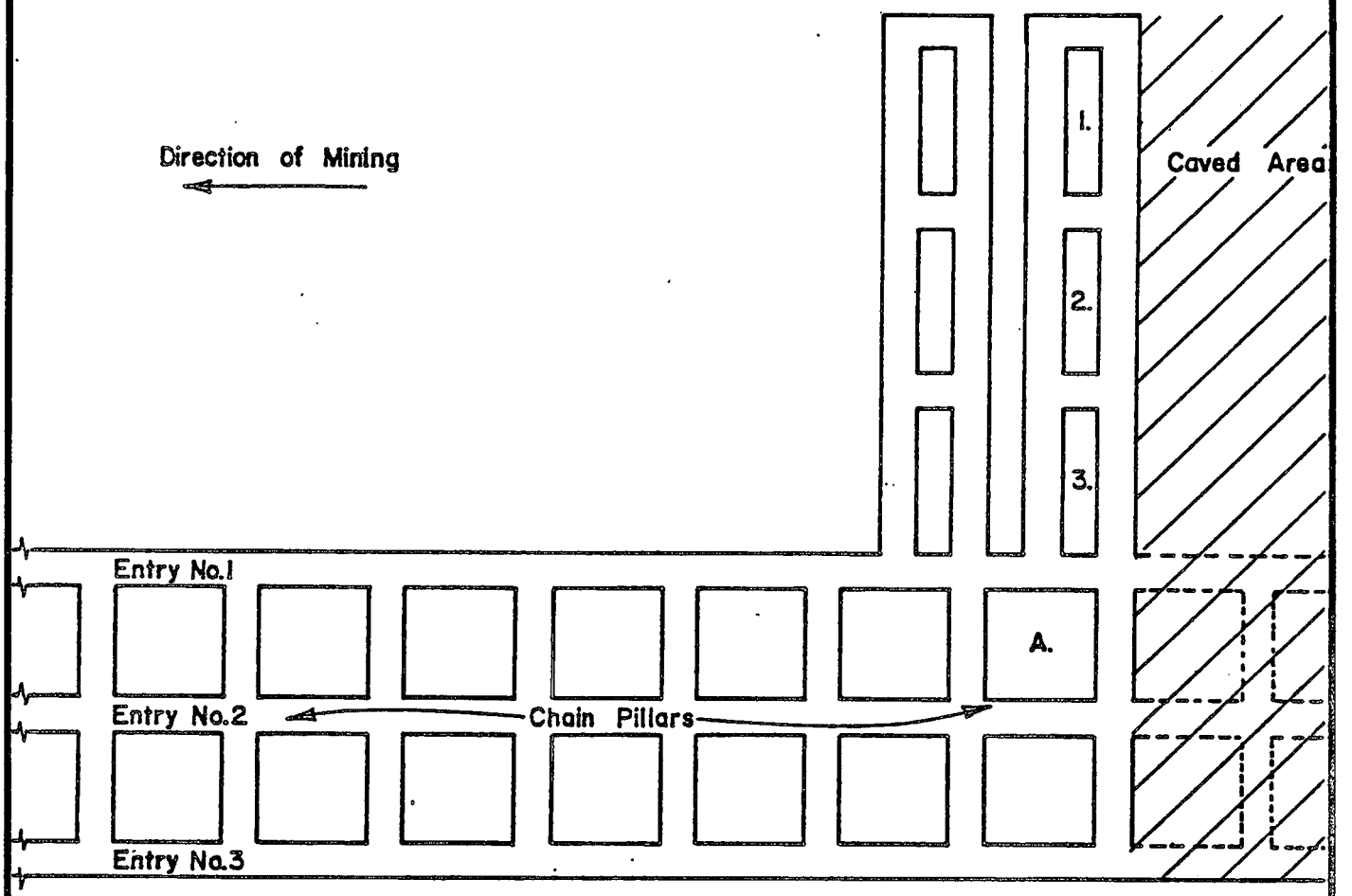


NOTES:

1. ALL ENTRIES, CROSSCUTS, AND INTERSECTIONS SHALL BE BOLTED IN ACCORDANCE WITH THE APPROVED ROOF CONTROL PLANS BEFORE PILLARING.
2. PILLAR BREAKER ROW A SHALL BE INSTALLED ON 5-FOOT CENTERS BEFORE LIFT 1 IS BEGUN. THE WIDTHS OF EACH LIFT SHALL NOT EXCEED 20 FEET.
3. TURN POST 2a SHALL BE INSTALLED BEFORE MINING OF LIFT 2 IS BEGUN. TURN POST 3a SHALL BE INSTALLED BEFORE MINING LIFT 3 AND SO ON THROUGH LIFT 8.
4. PILLAR BREAKER ROW B SHALL BE INSTALLED BEFORE LIFT 8 IS BEGUN.
5. TURN POST ROW 9a AND BREAKER ROW C SHALL BE INSTALLED PRIOR TO CUT 9 BEING MINED. THE TURN POST ROWS SHALL BE A SINGLE ROW OF POSTS ON 5-FOOT CENTERS (MAXIMUM).
6. THE EXACT ANGLE OF INDIVIDUAL BREAKER AND TURN POST ROWS WILL BE DETERMINED AT THE TIME OF INSTALLATION TO BEST COMPLIMENT ROOF CONTROL AND EXISTING MINING CONDITIONS.
7. TURN POST ROWS 12a AND 12b WILL BE INSTALLED AFTER CUT 11 AND PRIOR TO CUT 12.
8. SMALL PUSHOUT STUMP(S) WILL NOT BE REDUCED. IF THE LAST INBY TIMBER (c) ON ROWS 12a AND 12b ARE KNOCKED OUT DURING CUT 12, THEY WILL NOT BE REPLACED DURING EXTRACTION OF CUT 12, THE FINAL LIFT.

PILLAR EXTRACTION SEQUENCE, STEP 1

FIGURE NO. SPR-R2P2-3.8



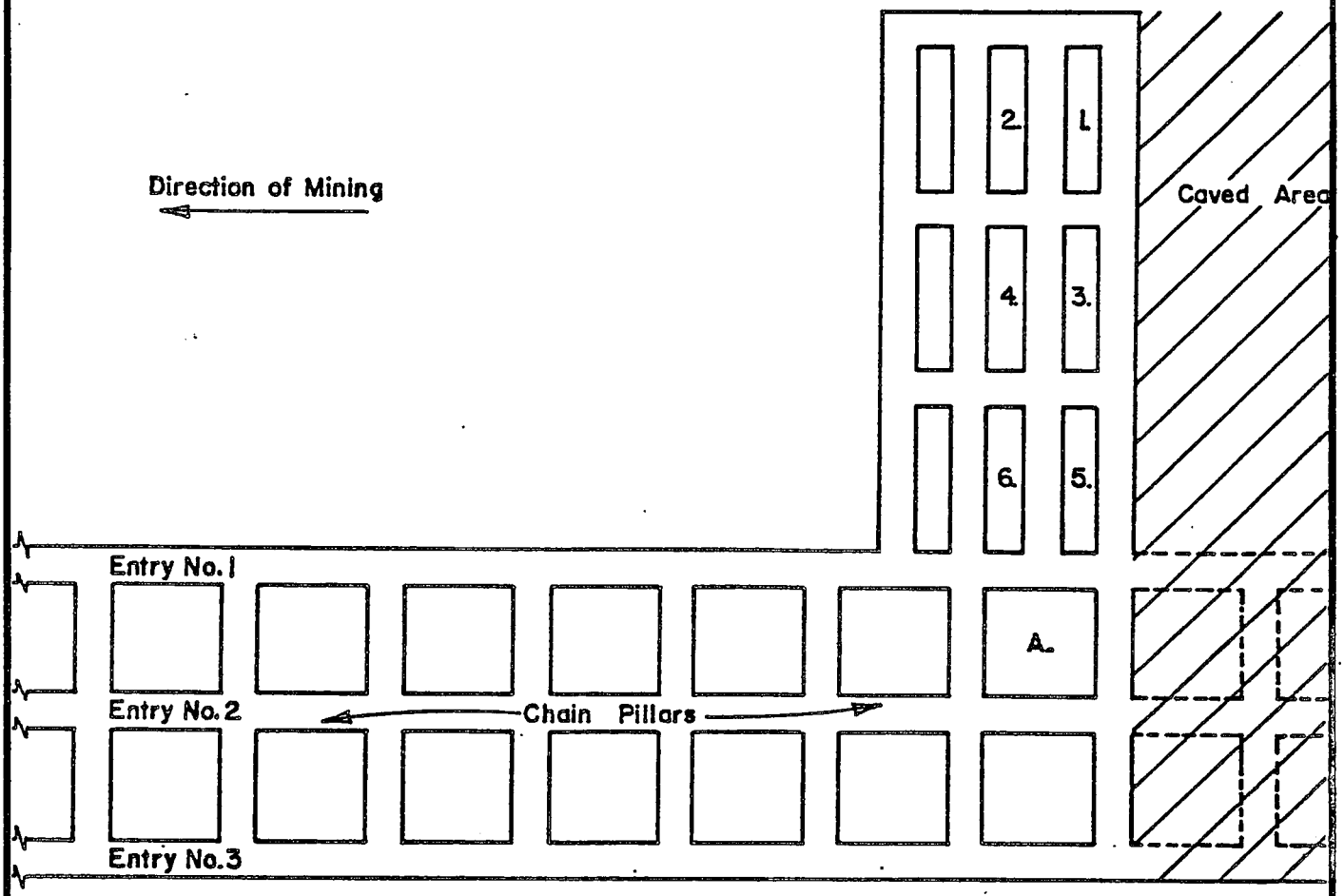
NOTES:

1. ONCE PILLAR 1 HAS BEEN EXTRACTED, THE SEQUENCE SHALL FOLLOW IN ORDER, PILLARS 2 AND 3.

2. CHAIN PILLAR A SHALL BE EXTRACTED FOLLOWING THE EXTRACTION OF PILLAR 1 THROUGH 3. CHAIN PILLARS SHALL BE EXTRACTED ACCORDING TO PILLAR EXTRACTION SEQUENCE FIGURE 3 THROUGH 6.

PILLAR EXTRACTION SEQUENCE, STEP 2

FIGURE NO. SPR-R2P2-3.9



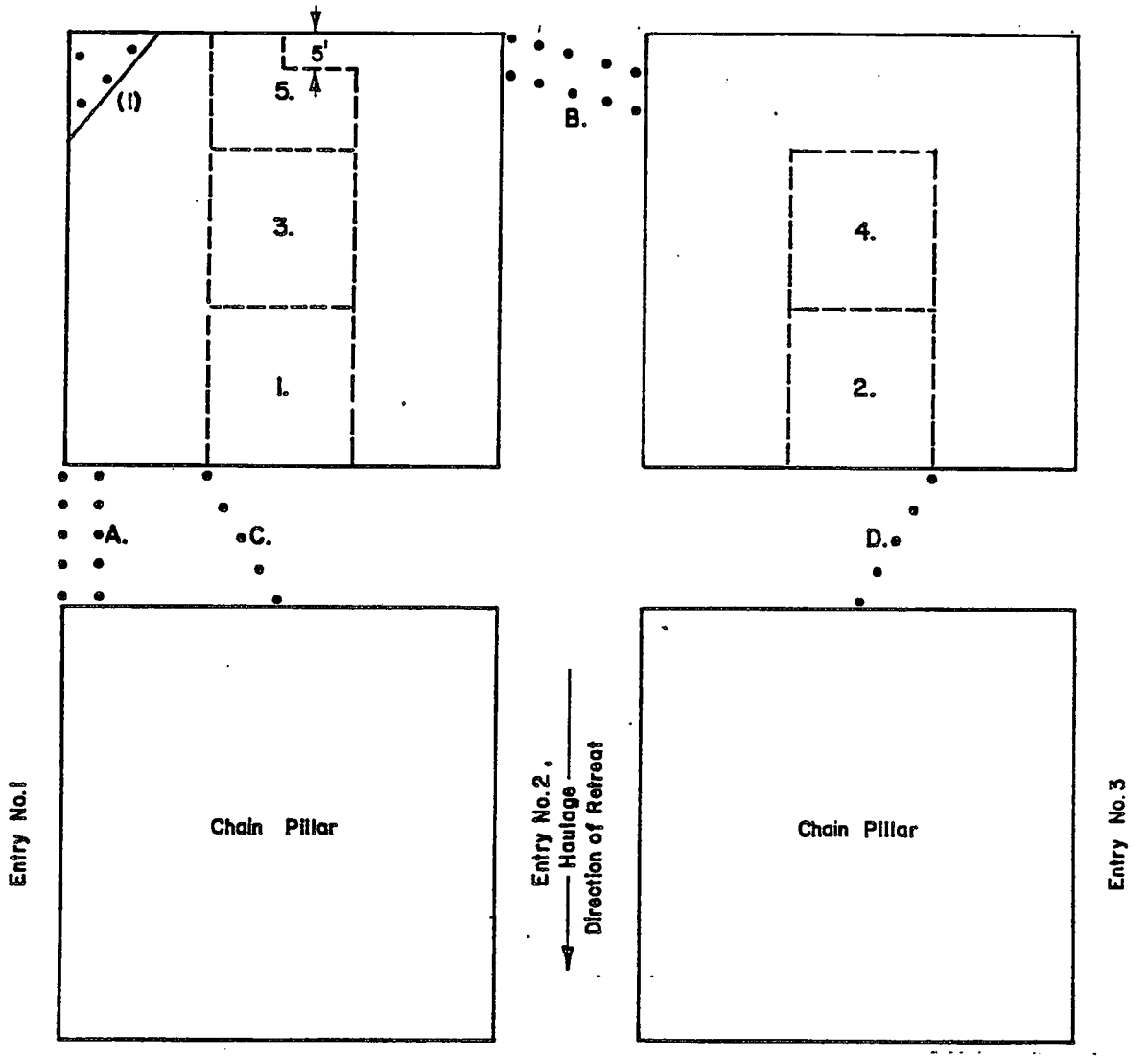
NOTES:

1. ONCE PILLAR 1 HAS BEEN EXTRACTED, THE SEQUENCE SHALL FOLLOW EITHER 2, 3, 4, 5, AND 6; OR 3, 5, 2, 4, AND 6 DEPENDING ON MINING CONDITIONS AT THE TIME.

2. CHAIN PILLAR A SHALL BE EXTRACTED FOLLOWING THE EXTRACTION OF PILLAR 1 THROUGH 6. CHAIN PILLARS SHALL BE EXTRACTED ACCORDING TO PILLAR EXTRACTION SEQUENCE FIGURE 3 THROUGH 6.

PILLAR EXTRACTION SEQUENCE, ALTERNATE STEP 2

FIGURE NO. SPR-R2P2-3.10

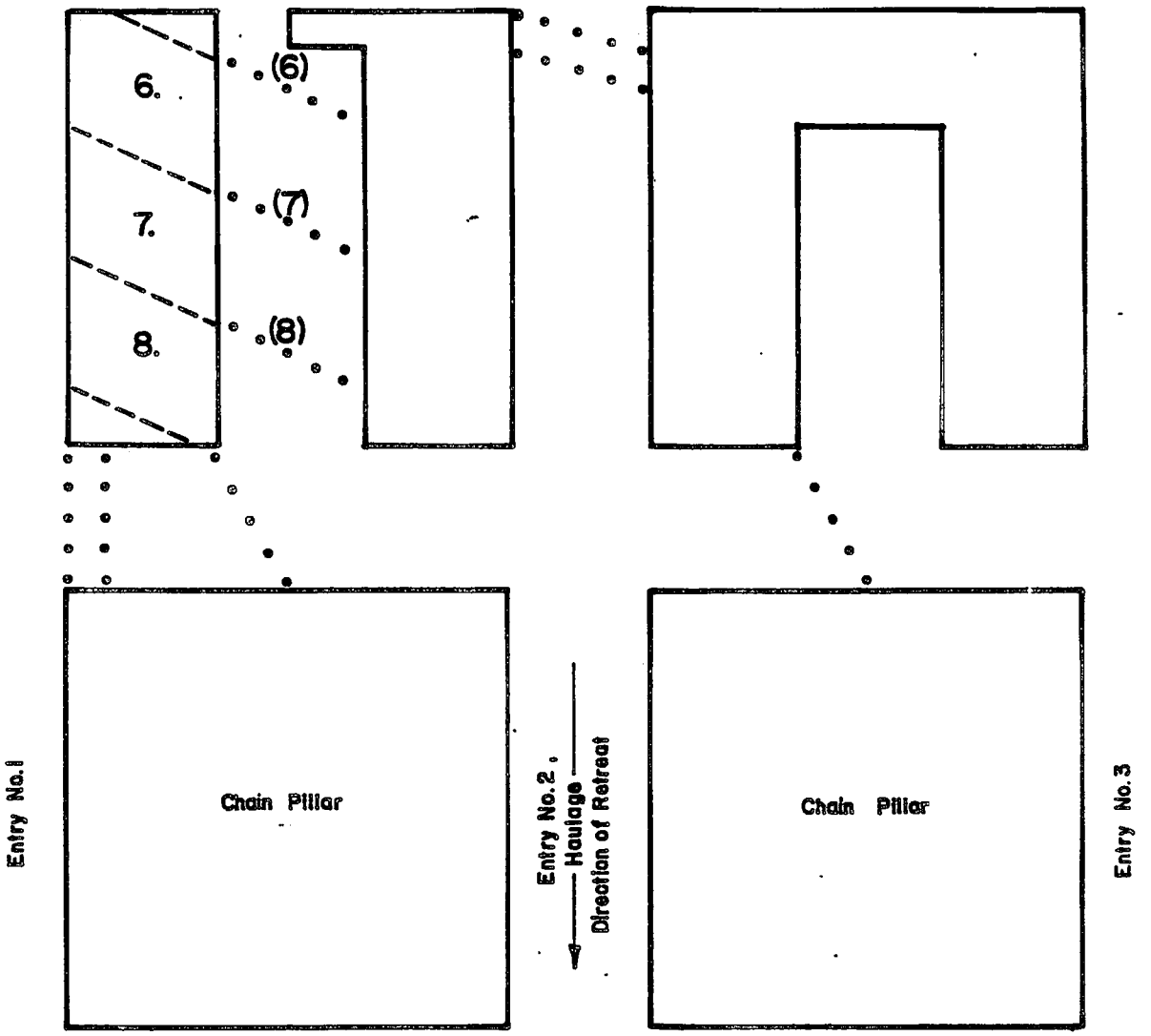


NOTES:

1. ALL ENTRIES, CROSSCUTS, AND INTERSECTIONS SHALL BE BOLTED IN ACCORDANCE WITH THE APPROVED ROOF CONTROL PLAN BEFORE STARTING SPLITS.
2. PILLAR CORNERS (1) MAY BE CUT, IF NECESSARY, TO ENSURE COMPLETE EXTRACTION OF THE FENDER.
3. PILLAR BREAKER ROWS A & B SHALL BE INSTALLED PRIOR TO THE FIRST CUT AND SHALL BE DOUBLE ROWS ON 5-FOOT CENTERS MAXIMUM.
4. CUTS 1 THRU 5 WILL BE MINED AS SHOWN. GENERALLY, CUT 1 WILL BE BOLTED AS CUT 2 IS BEING MINED, CUT 2 BOLTED AS 3 IS MINED, AND SO ON. CUTS 1 THRU 4 WILL BE PERMANENTLY SUPPORTED ACCORDING TO THE ROOF CONTROL PLAN.
5. TURN POST ROWS C & D WILL BE INSTALLED AFTER CUTS 1 & 2 HAVE BEEN COMPLETED BUT PRIOR TO MAKING CUTS 3 & 4.
6. A 5-FOOT STUMP MAY BE LEFT ON EITHER SIDE OF CUT 5.

PILLAR EXTRACTION SEQUENCE, STEP 3

FIGURE NO. SPR-R2P2-3.11



NOTES:

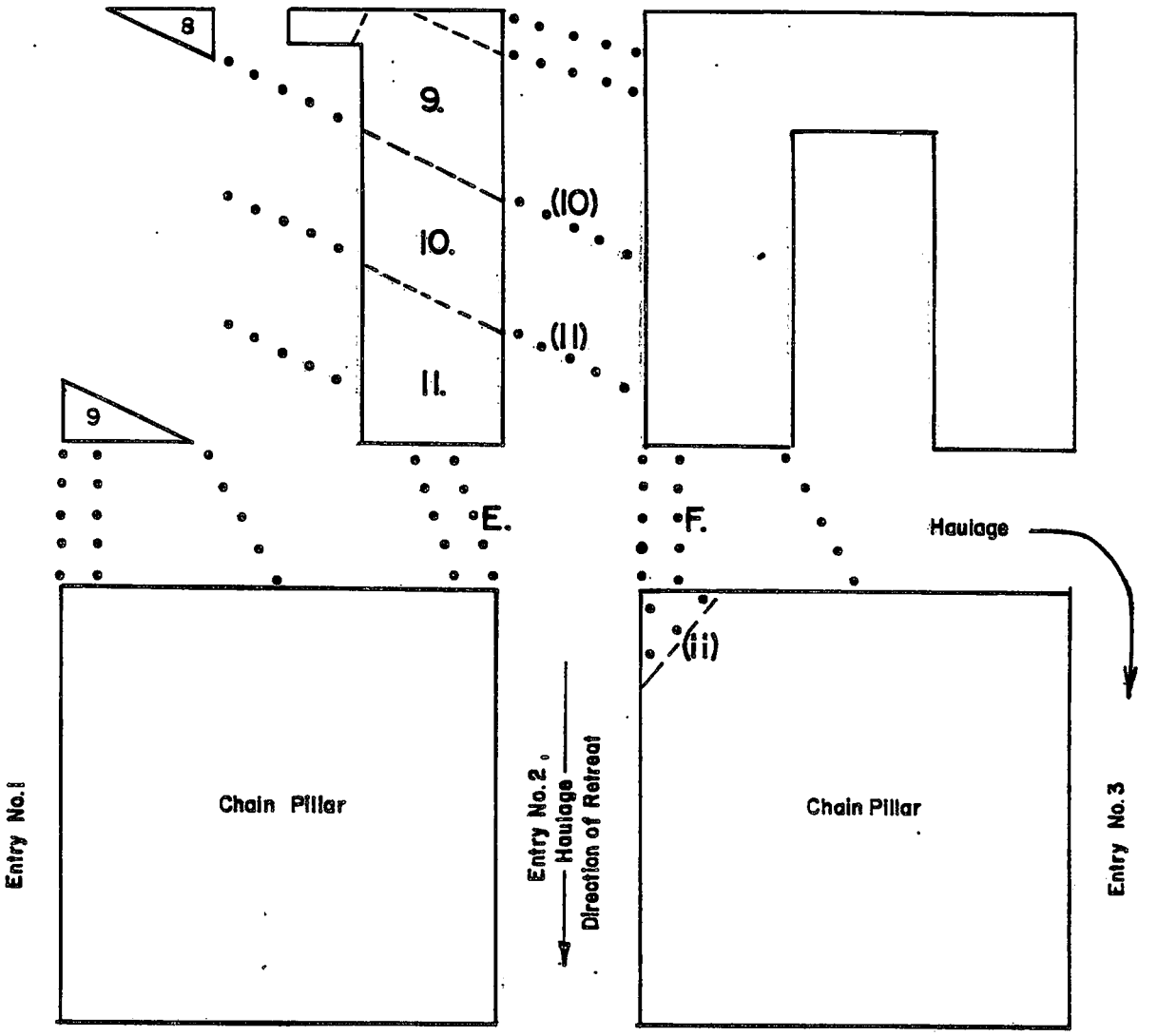
7. TURN POST ROW (6) SHALL BE INSTALLED PRIOR TO CUT 5 BEING MINED. BEFORE EACH PROCEEDING LIFT IS BEGUN, A SINGLE ROW OF TURN POSTS ON 5-FOOT CENTERS (MAXIMUM) SHALL BE INSTALLED.

8. THE EXACT ANGLE OF INDIVIDUAL BREAKER AND TURN POST ROWS WILL BE DETERMINED AT THE TIME OF INSTALLATION IN ORDER TO BEST COMPLIMENT ROOF CONTROL AND EXISTING MINING CONDITIONS.

9. THE WIDTH OF EACH LIFT SHALL NOT EXCEED 20 FEET. THE DEPTH OF EACH LIFT SHALL BE DETERMINED BY THE DISTANCE FROM THE FACE THAT THE EQUIPMENT CAN BE OPERATED WITH THE OPERATOR REMAINING UNDER PERMANENTLY SUPPORTED ROOF. IN THE CASE OF AN EXCESSIVELY WIDE FENDER, A MAXIMUM OF ONE TEMPORARY SUPPORT CAN BE INSTALLED NO GREATER THAN 5 FEET FROM PERMANENT SUPPORT IN ORDER TO SAFELY MINIMIZE THE SIZE OF THE FENDER.

PILLAR EXTRACTION SEQUENCE, STEP 4

FIGURE NO. SPR-R2P2-3.12



NOTES:

10. BREAKER ROW E SHALL BE INSTALLED PRIOR TO BEGINNING CUT 9.

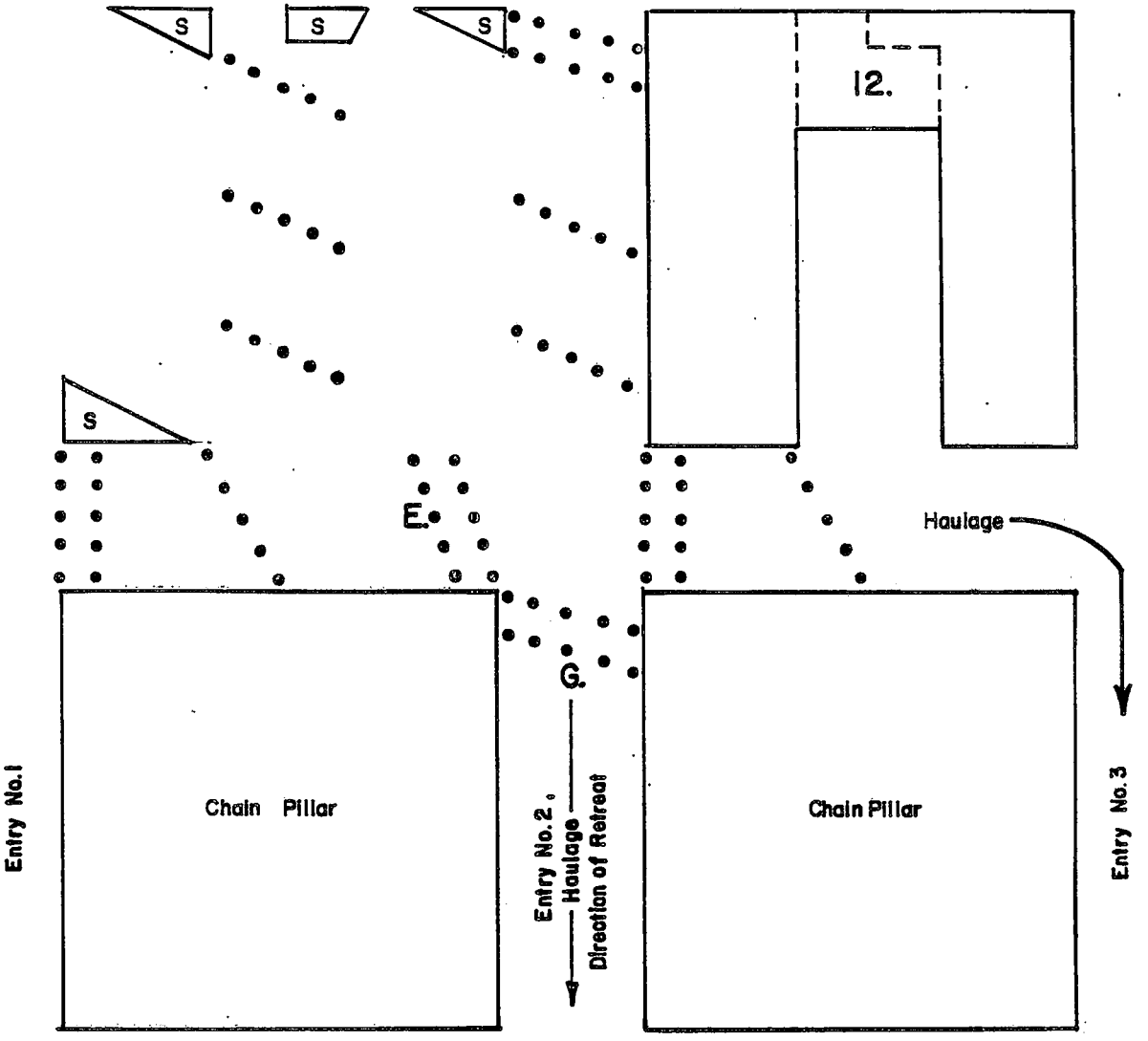
11. TURN POST ROW 10 SHALL BE INSTALLED AFTER CUT 9 IS COMPLETED AND BEFORE 10 IS BEGUN. AFTER CUT 10 IS COMPLETED AND PRIOR TO BEGINNING CUT 11, TURN POST ROWS 11 AND BREAKER ROW F WILL BE INSTALLED.

12. PILLAR CORNER (ii) MAY BE CUT, IF NECESSARY, TO ENSURE COMPLETE EXTRACTION OF THE FENDER.

13. PUSHOUT STUMPS SHALL BE REDUCED OR ELIMINATED DURING MINING. FINAL SIZE WILL BE DEPENDENT UPON MINING CONDITIONS AT THE TIME. TIMBERS ACCIDENTALLY KNOCKED OUT DURING THE MINING OF PUSHOUT STUMPS WILL NOT BE REPLACED DUE TO THE INCREASED HAZARDS IN THE IMMEDIATE AREA.

PILLAR EXTRACTION SEQUENCE, STEP 5

FIGURE NO. SPR-R2P2-3.13



NOTES:

14. AFTER PILLAR IS EXTRACTED, BREAKER ROW G SHALL BE INSTALLED BEFORE CUT 12 IS COMPLETED.

15. CUT 12 AND REMAINDER OF THE NEXT PILLAR WILL BE MINED IN THE SAME MANNER AS DISPLAYED IN FIGURES 3 THROUGH 5.

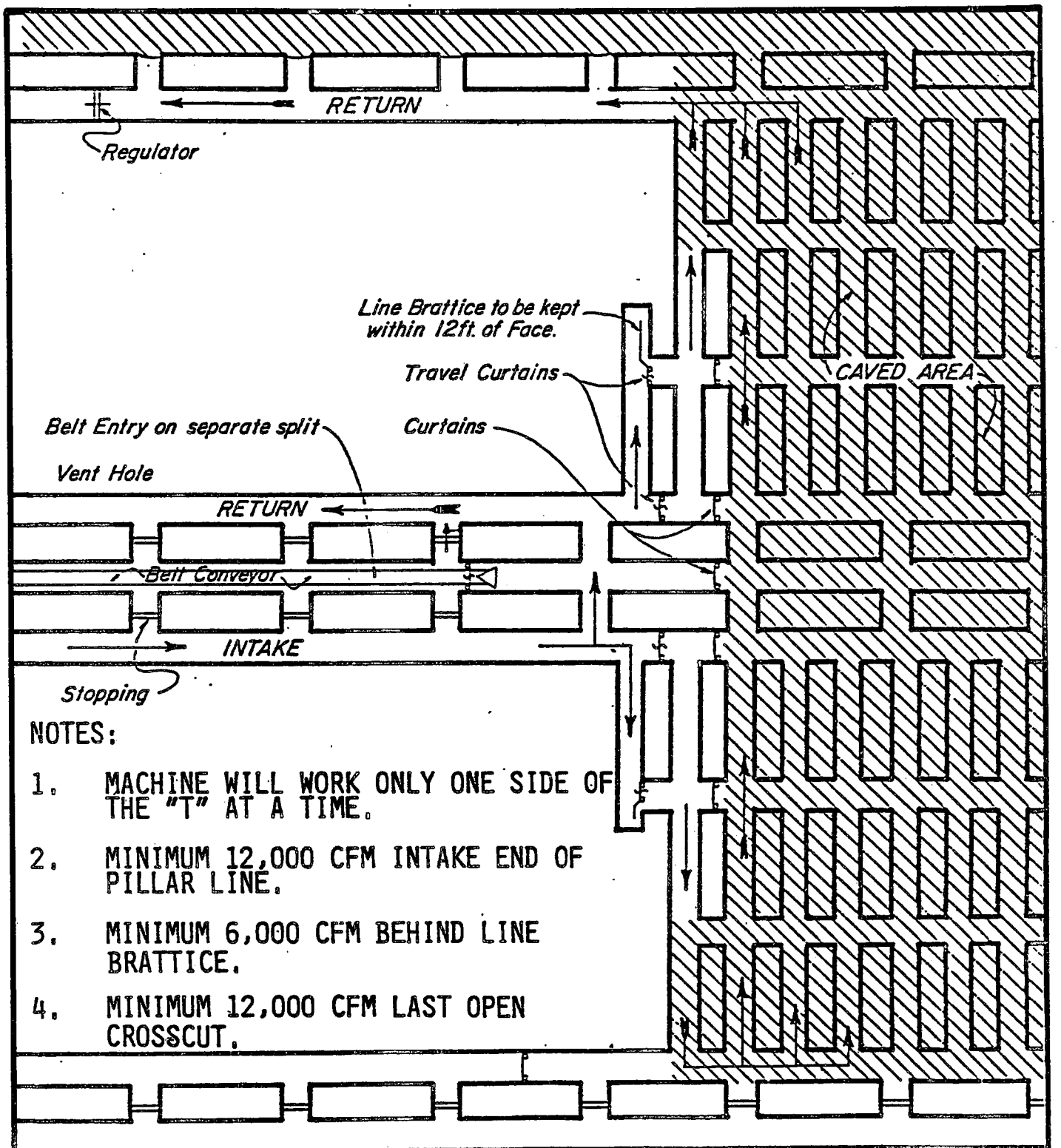
16. CUT SEQUENCES MAY VARY DEPENDING ON PILLAR LOCATION, NUMBER OF PILLARS BEING MINED SIMULTANEOUSLY, PILLAR SIZE AND DIMENSION, HAUL ROAD DIRECTION, ETC., SO LONG AS THE TIMBERING PROCEDURES OUTLINED IN THIS PLAN ARE FOLLOWED. DIRECTION OF PILLAR ATTACK IS OPTIONAL DEPENDING ON EXISTING CONDITIONS SUCH AS THOSE STATED PREVIOUSLY.

17. WIDTH OF ENTRY OR CROSSCUT WILL DETERMINE NUMBER OF POSTS REQUIRED PER ROW.

18. BREAKER AND TURN POST TIMBER MAY BE EXTRACTED FOR THE PURPOSE OF INDUCING CAVING. THIS WILL BE CARRIED OUT REMOTELY WITH A WIRE ROPE PLACED AROUND THE TIMBER(S) PRIOR TO EXTRACTION AND A QUALIFIED MAN POSITIONED AT THE CORNER OF THE ADJACENT OUTBY PILLAR BEHIND THE BREAKER POSTS TO ACTIVATE THE REMOVAL.

PILLAR EXTRACTION SEQUENCE, STEP 6

FIGURE NO. SPR-R2P2-3.14

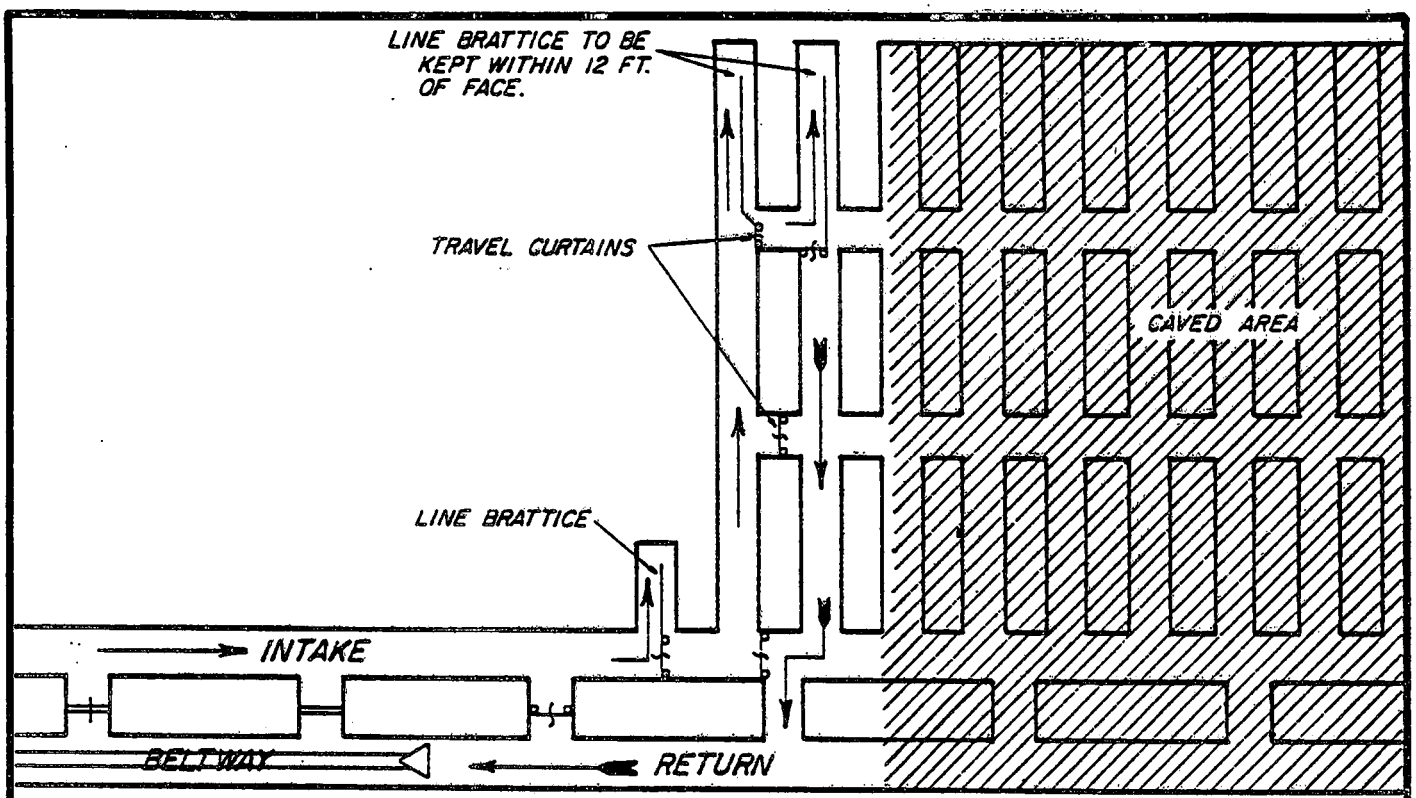


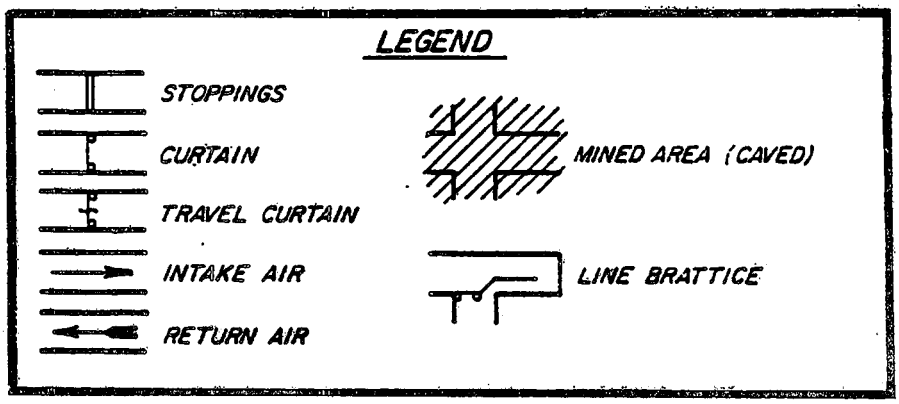
NOTES:

1. MACHINE WILL WORK ONLY ONE SIDE OF THE "T" AT A TIME.
2. MINIMUM 12,000 CFM INTAKE END OF PILLAR LINE.
3. MINIMUM 6,000 CFM BEHIND LINE BRATTICE.
4. MINIMUM 12,000 CFM LAST OPEN CROSSCUT.

TYPICAL 3-ENTRY "T" ROOM AND PILLAR DESIGN

FIGURE NO. SPR-R2P2-3.15



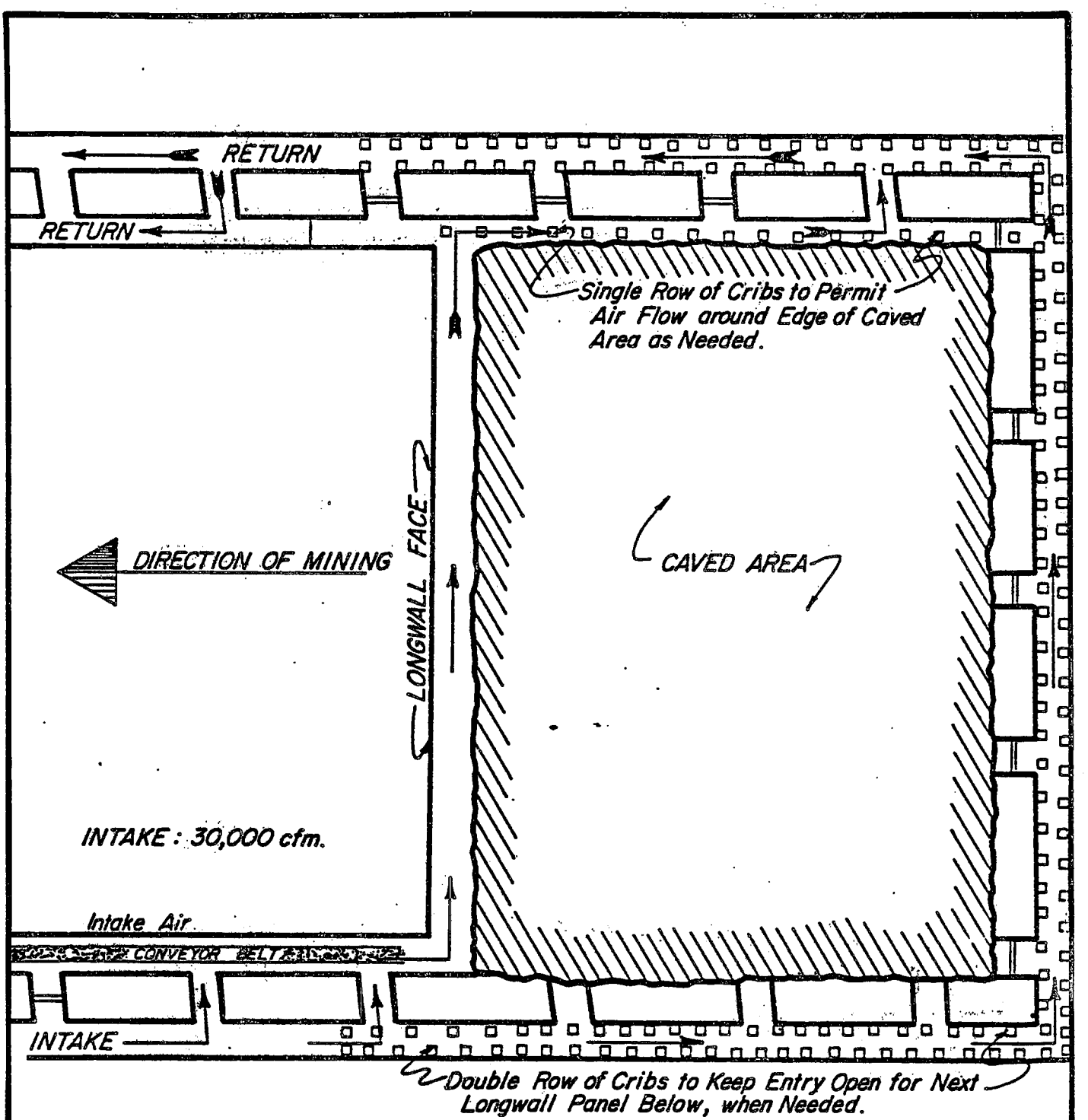


AIR REQUIREMENTS

1. MINIMUM 12,000 CFM INTAKE END OF PILLAR LINE.
2. MINIMUM 6,000 CFM BEHIND LINE BRATTICE.
3. MINIMUM 12,000 CFM LAST OPEN CROSSCUT.

VENTILATION PLAN, ROOM AND PILLAR MINING

FIGURE NO. SPR-R2P2-3.16



VENTILATION PLAN, LONGWALL MINING

FIGURE NO. SPR-R2P2-3.17