

CRANDALL CANYON MINE

ROOF CONTROL PLAN

Roof control plans are designed to control the roof, face and ribs, including coal or rock bursts, in underground coal mines. The Crandall Canyon Mine roof control plan as approved includes maps, drawings, amendment submissions from the mine operator and approval letters from the Mine Safety and Health Administration (MSHA).

Each underground coal mine operator is required to develop and follow a roof control plan. Roof control plans and any revisions to the plan are submitted in writing to the District Manager. When revisions are submitted, the mine operator need submit only the revised pages unless otherwise directed by the District Manager. The District Manager may approve or deny a proposed roof control plan or revision. No plan or revision may be implemented by the mine operator until it is approved, and before implementation of any revision, all persons affected by the revision must be instructed about its provisions. The approved plan and revisions are available to the miners and representatives of miners at the mine.

The roof control plan for each mine is reviewed every six months by MSHA.

(The plan consists of the base plan which was approved on July 3, 2002, and all approved amendments and modifications. The Agapito reports which were submitted to MSHA as reference documents are also included in this posting. Names have been deleted to protect personal privacy, pursuant to Exemption 6 of the Freedom of Information Act (FOIA). Proprietary design information identified as confidential has been redacted pursuant to FOIA Exemption 4.)

UNDERGROUND MINE FILE
DATE FWD. 6-15-07
INITIALS Am

JUN 15 2007

Coal Mine Safety and Health
District 9

Gary Peacock
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-specific Pillaring Plan
Main West South Barrier

Dear Mr. Peacock:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated May 16, 2007, one page, and one drawing, addressing pillar mining of the Main West South Barrier. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval is site-specific for pillar mining the Main West South Barrier and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

[

]

Sincerely,

William G. Dunning

for

Allyn C. Davis
District Manager

Enclosure

P4-A19

UtahAmerican Energy, Inc.



Crandall Canyon Mine
a subsidiary

Hwy31 MP 33, Huntin_g
PO Box 1077, Price, UT 84501
Phone: (435) 888-4000
Fax: (435) 888-4002

May 16, 2007

Mr. Allyn C. Davis
District Manager
Coal Mine Safety and Health
P.O. Box 25367
Denver, Colorado 80225

Re: Crandall Canyon Mine ID# 42-01715 Roof Control Plan
Pillaring Main West South Barrier

Dear Mr. Davis:

Please find attached for your review and approval, a site specific roof control plan for pillaring the South Barrier of Main West at our Crandall Canyon Mine. The plan consists of one page of text and 1 Plate.

Please contact me with any questions at 435.888.4023.

Sincerely,

A handwritten signature in cursive script that reads "Tom Hurst".

Tom Hurst
Mining Engineer
435.888.4023

8646 B4-A19
RECEIVED
MAY 17 2007

USDOL - MSHA
DISTRICT 9

Crandall Canyon Mine
MSHA ID # 42-01715
Main West Pillaring
South Barrier
Roof Control Plan

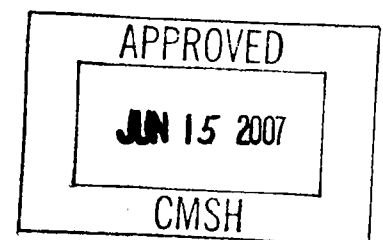
The mine is currently developing entries into the south barrier of the Main West area. This plan proposes to recover coal remaining in the pillars shown on attached Plate 1, Pillar Extraction.

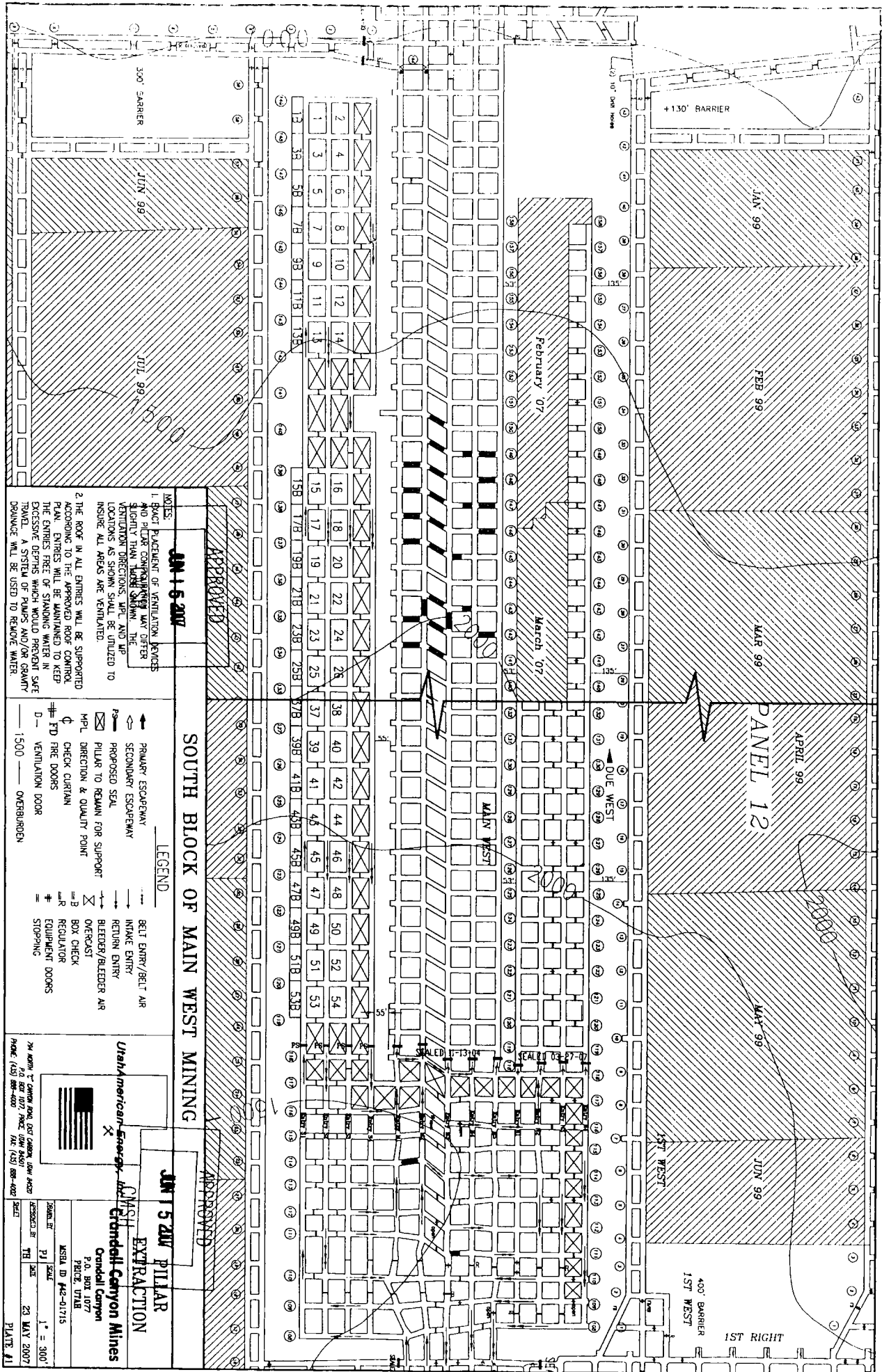
Consultant reports indicate the development will avoid the majority of the side-abutment stress transferred from the adjacent longwall panels. These assessments have been validated by conditions experienced in the mine.

Plate 1, Pillar Extraction, shows the mining sequence and the blocks left in the mining process. This pillar recovery will be done in accordance with the approved Roof Control Plan.

Floor to roof support will be provided in the Bleeder entry. These timbers will be installed at the entrance to the crosscuts in number 4 entry. This support will consist of a double row of timbers (breaker row) installed on four (4) foot centers or closer if deemed necessary by the operator. There will be a minimum of four timbers in each row across the entry.

Also, should conditions warrant pillaring can begin at anytime in the panel. The pillar sequence and bleeder configuration will be same except that pillars will be left in by the beginning of the pillar line.





NOTES:

1. EXACT PLACEMENT OF VENTILATION BARRIERS AND PILLAR CONCENTRATIONS MAY DIFFER SLIGHTLY FROM THIS PLAN. THE PILLAR LOCATIONS AS SHOWN SHALL BE UTILIZED TO INSURE ALL AREAS ARE VENTILATED.
2. THE ROOF IN ALL ENTRIES WILL BE SUPPORTED ACCORDING TO THE APPROVED ROOF CONTROL PLAN. ENTRIES WILL BE MAINTAINED TO KEEP THE ENTRIES FREE OF STANDING WATER IN EXCESSIVE DEPTHS WHICH WOULD PREVENT SAFE TRAVEL. A SYSTEM OF PUMPS AND/OR GRAVITY DRAINAGE WILL BE USED TO REMOVE WATER.

- LEGEND**
- PRIMARY ESCAPEWAY
 - SECONDARY ESCAPEWAY
 - PROPOSED SEAL
 - PILLAR TO REMAIN FOR SUPPORT
 - MFL DIRECTION & QUALITY POINT
 - CHECK CURTAIN
 - FTD FINE DOORS
 - VENTILATION DOOR
 - OVERBURDEN
 - BELT ENTRY/BELT AIR
 - INAKE ENTRY
 - RETURN ENTRY
 - BLEEDER/BLEEDER AIR
 - OVERCAST
 - BOX CHECK
 - REGULATOR
 - EQUIPMENT DOORS
 - STOPPING

UTAH AMERICAN ENERGY SERVICES

Crandall Canyon Mines

MSB EXTRACTION

OSHA ID #42-01715

2006 MAY 23

SCALE 1" = 300'

DATE 23 MAY 2007

PLATE #

SOUTH BLOCK OF MAIN WEST MINING

APPROVED

APPROVED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
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UNDERGROUND MINE FILE	
DATE FWD.	3/9/07
INITIALS	Am

MAR - 8 2007

Coal Mine Safety and Health
District 9

Gary Peacock
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-Specific Plan
Main West South Block Development

Dear Mr. Peacock:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated February 20, 2007, one page, and one drawing. This amendment addresses development in the Main West South Block barrier pillar.

This approval is site-specific for development of the Main West South Block and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

Sincerely,

/s/ Allyn C. Davis

Allyn C. Davis
District Manager

Enclosure

BY: A18

UtahAmerican Energy, Inc.



Crandall Canyon Mine

Hwy31 MP 33, Huntington, UT 84528

PO Box 1077, Price, UT 84501

Phone: (435) 888-4000

Fax: (435) 888-4000

February 20, 2007

Mr. Allyn C. Davis
District Manager
Coal Mine Safety and Health
District 9
P.O. Box
Denver, Colorado 80225

RE: Crandall Canyon Mine
MSHA ID Number 42-01715
Site Specific Roof Control Plan
Main West South Block

Dear Mr. Davis:

Please find enclosed a site specific roof control plan amendment for development of the south barrier of the Main West in the aforementioned mine. This submittal will include one (1) page of text and one (1) plate.

If you require additional information, feel free to contact me at (435) 888-4016 or contact us at the address listed above.

Sincerely,

David W. Hibbs

#8646

B4-A18

FEB 23 2007

LEROY ANDERSON
DISTRICT 9

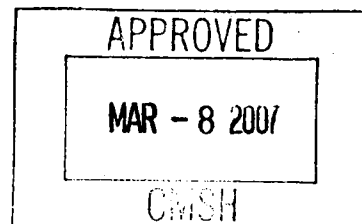
Crandall Canyon Mine
MSHA ID Number 42-01715
Main West South Barrier
Site Specific Roof Control Plan

The mine is planning to develop entries into the south barrier of the Main West area. This area contains a valuable coal resource. Consultant reports indicate the planned development will avoid the majority of the side abutement stress transferred from the adjacent longwall gobs.

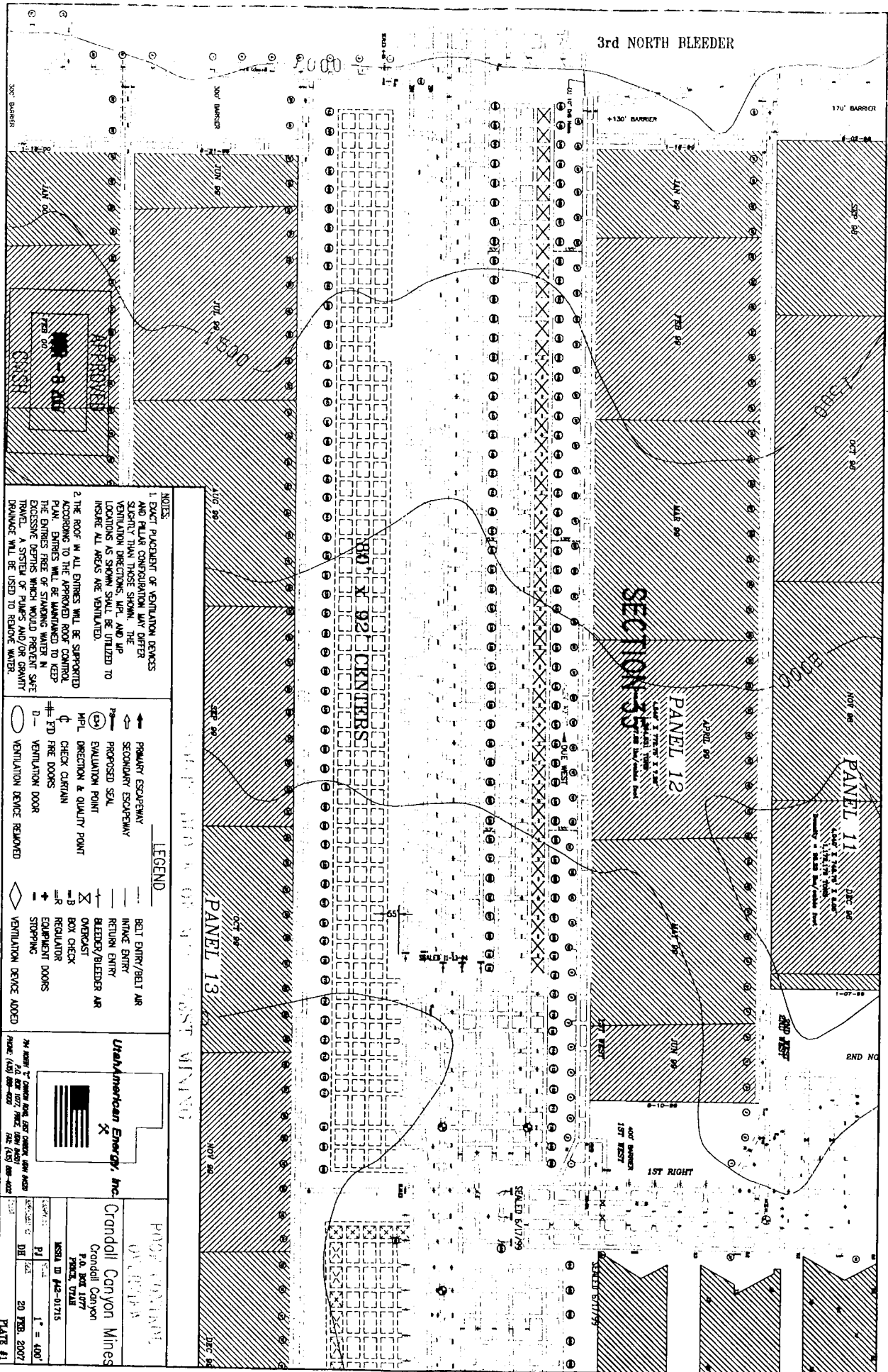
The development in the barrier pillar block will be done from east to west. Four (4) entries will be driven on a nominal 80 foot center to center spacing. Crosscut spacing will be on a nominal 90 foot center to center spacing, but can vary depending upon conditions encountered. The mining horizon will be the upper portion of the Hiawatha seam. Roof coal may be left in areas where weak immediate roof is encountered. See Plate 1, South Block Overview. Overburden depth in the area is between 1,000 feet and 2,200 feet.

Systematic bolting will occur after excavation. The number of roof bolts per row will increase to six (6) bolts per row minimum. Patterned roof support will be six (6) bolts per row and five (5) feet or less between rows. Additional roof support will be installed whenever entry or cross cut width exceeds 20 feet or other conditions warrant additional support.

Development mining of the barrier is anticipated to last for less than one (1) year. During development of the south barrier, conditions will be monitored to determine the possibility of pillar extraction. If conditions appear favorable further discussions and plans will be submitted for approval.



3rd NORTH BLEEDER



NOTES:
 1. EXACT PLACEMENT OF VENTILATION DEVICES SHALL BE DETERMINED BY THE MINER. VENTILATION DEVICES SHALL BE PLACED IN LOCATIONS AS SHOWN. SHALL BE UTILIZED TO INSURE ALL AREAS ARE VENTILATED.
 2. THE ROOF IN ALL ENTRIES WILL BE SUPPORTED ACCORDING TO THE APPROVED ROOF CONTROL PLAN. ENTRIES WILL BE MAINTAINED TO KEEP THE ENTRIES FREE OF STANDING WATER IN EXCESSIVE DEPTHS WHICH WOULD PREVENT SAFE TRAVEL. A SYSTEM OF PUMPS AND/OR GRANTY DRAINAGE WILL BE USED TO REMOVE WATER.

LEGEND	
	PRIMARY ESCAPEWAY
	SECONDARY ESCAPEWAY
	PROPOSED SEAL
	EVALUATION POINT
	HPL DIRECTION & QUALITY POINT
	CHECK CURIAN
	FIRE DOORS
	VENTILATION DOOR
	VENTILATION DEVICE REMOVED
	VENTILATION DEVICE ADDED
	BELT ENTRY/BELT AIR
	INTAKE ENTRY
	RETURN ENTRY
	BLEEDER/BLEEDER AIR
	OVERCAST
	BOX CHECK
	REGULATOR
	EQUIPMENT DOORS
	STOPPING
	VENTILATION DEVICE ADDED

UranAmerican Energy, Inc.

Granddall Canyon Mines
 Granddall Canyon
 P.O. Box 1077
 Picher, OK 74361

PROJ. CONTROL

DATE: 20 FEB 2007

SCALE: 1" = 400'

PLATE #1

DATE RECEIVED: 2-5-07
INITIALS: Am

[]

FEB 9 2007

Coal Mine Safety and Health
District 9

Gary Peacock
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-Specific north barrier of
Main West pillar extraction

Dear Mr. Peacock:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated December 20, 2006, one page, and one map, addressing pillar extraction of the north barrier of Main West. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval is site-specific for the north barrier of Main West and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact []

Sincerely,

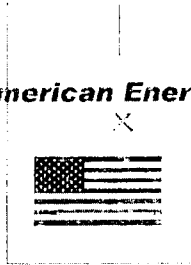
/s/ Allyn C. Davis

Allyn C. Davis
District Manager

Enclosure

BY AIG

UtahAmerican Energy, Inc.



Crandall Canyon Mine

Hwy31 MP 33, Huntington, UT 84528

PO Box 1077, Price, UT 84501

Phone: (435) 888-4000

Fax: (435) 888-4002

8646

December 20, 2006

Mr. Allyn C. Davis
District Manager
Coal Mine Health and Safety
P.O. Box 25367
Denver, Colorado 80225

[]

RE: Crandall Canyon Mine
MSHA ID # 42-01715
Main West
Pillar Recovery Plan

Dear Mr. Davis:

Please find attached a Roof Control Plan amendment for pillar extraction of the north barrier of the Main West in the Crandall Canyon Mine.

The plan includes one (1) page of text and Plate 3a that shows the sequence of mining and pillars to be left. A Ventilation Control Plan amendment is being submitted under a separate cover letter.

If you require additional information, feel free to call me at (435) 888-4016 or contact us at the address listed above.

Sincerely,

A handwritten signature in cursive script that reads "David W. Hibbs".

David W. Hibbs

Crandall Canyon Mine
MSHA ID # 42-01715
Main West Pillaring
Roof Control Plan

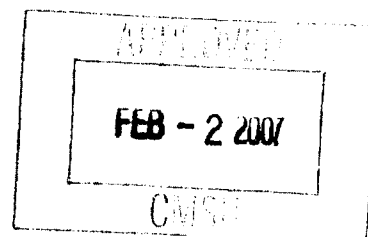
The mine is currently developing entries into the north barrier of the Main West area. This plan proposes to recover coal remaining in the pillars shown on the attached Plate 3a.

Consultant reports indicate the development will avoid the majority of the side-abutment stress transferred from the adjacent longwall panels. These assessments have been validated by conditions experienced in the mine.

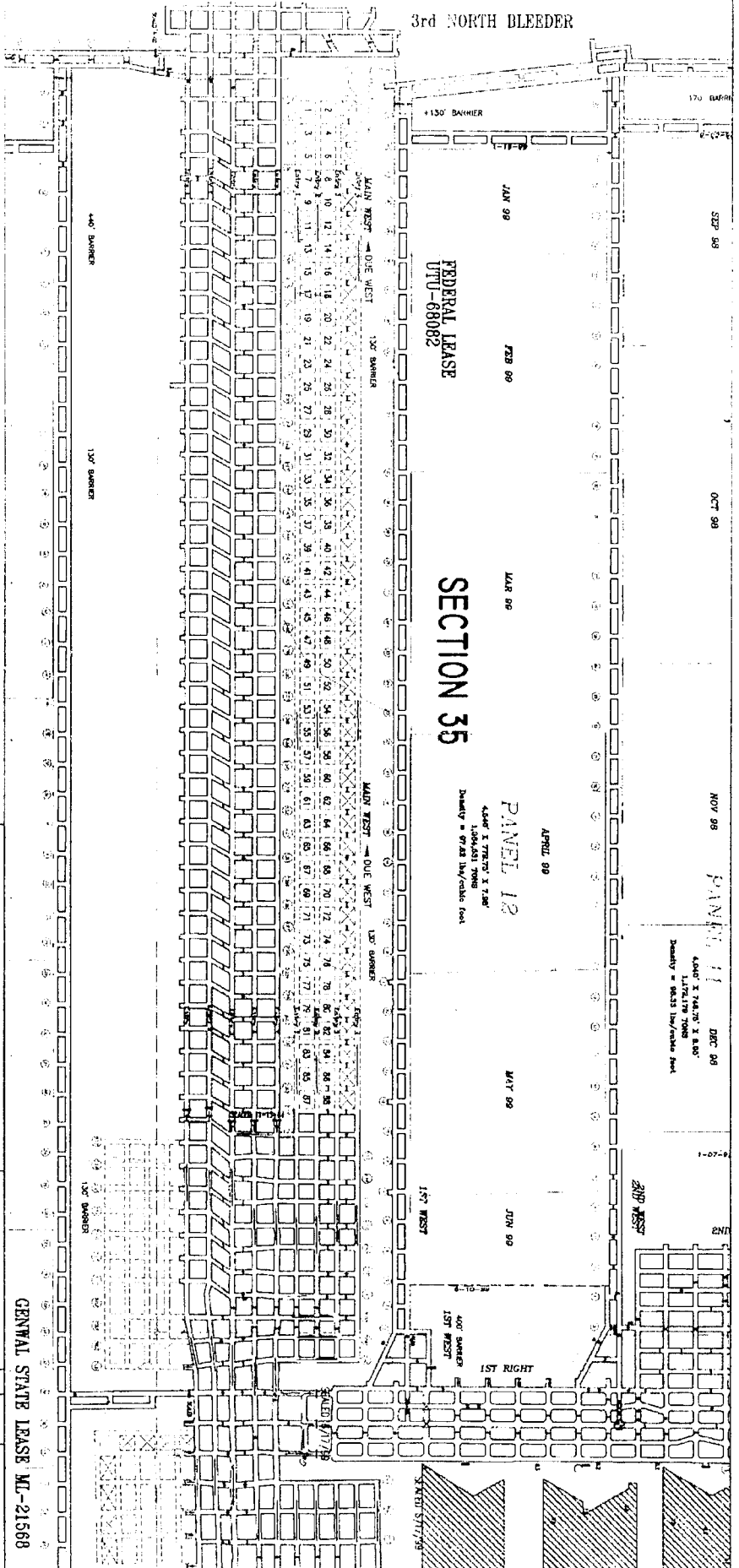
Plate 3a, shows the mining sequence and the blocks left in the mining process. This pillar recovery will be done in accordance with the approved Roof Control Plan.

Floor to roof support will be provided in the Bleeder entry. These timbers will be installed at the entrance to the crosscuts in number 4 entry. This support will consist of a double row of timbers (breaker row) installed on four (4) foot centers or closer if deemed necessary by the operator. There will be a minimum of four timbers in each row across the entry.

Also, should conditions warrant pillaring can begin at anytime in the panel. The pillar sequence and bleeder configuration will be same except that pillars will be left in by the beginning of the pillar line.



3rd NORTH BLEEDER



NOTE: EXACT PLACEMENT OF VENTILATION FANES AND PLEAT SCREENS WILL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL HEALTH DEPARTMENT AND ALL APPLICABLE REGULATIONS AND ORDINANCES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL HEALTH DEPARTMENT AND ALL APPLICABLE REGULATIONS AND ORDINANCES.

APPROVED
FEB - 2 2001

DATE	REVISIONS
03	19 DEC. 2008

UtahAmerican Energy, Inc.

CONDALL CANYON MINES
 Condall Canyon - Fracture Seams
 P.O. BOX 1877
 PIRICK, UTAH

1" = 400'

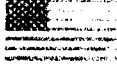
1 of 1

DATE	REVISIONS
03	19 DEC. 2008

Crandall Canyon Mine
a subsidiary

Hwy31 MP 33, Huntington, UT 84528
PO Box 1077, Price, UT 84501
Phone: (435) 888-4000
Fax: (435) 888-4002

UtahAmerican Energy, Inc.



January 10, 2007

Mr. Allyn C. Davis
District Manager
Coal Mine Safety and Health
P.O. Box 25367
Denver, Colorado 80225

8646 B4-A17
RECEIVED
JAN 10 2007

USDOL - MSHA - CMS&H
DISTRICT 9

Re: Crandall Canyon Mine ID# 42-01715 Site Specific Roof Control Plan

Dear Mr. Davis:

Please find attached a revised site specific roof control plan amendment for development of the north barrier block of Main West in the Crandall Canyon Mine. The text of the plan has been revised to allow leaving of roof coal where immediate roof conditions will be improved by leaving roof coal.

Please contact me with any questions at 435.888.4023

Sincerely,

A handwritten signature in cursive script that reads "Tom Hurst".

Tom Hurst
Mining Engineer
435.888.4023

Crandall Canyon Mine MSHA ID# 42-01715
Main West North Barrier
Site Specific Roof Control Amendment

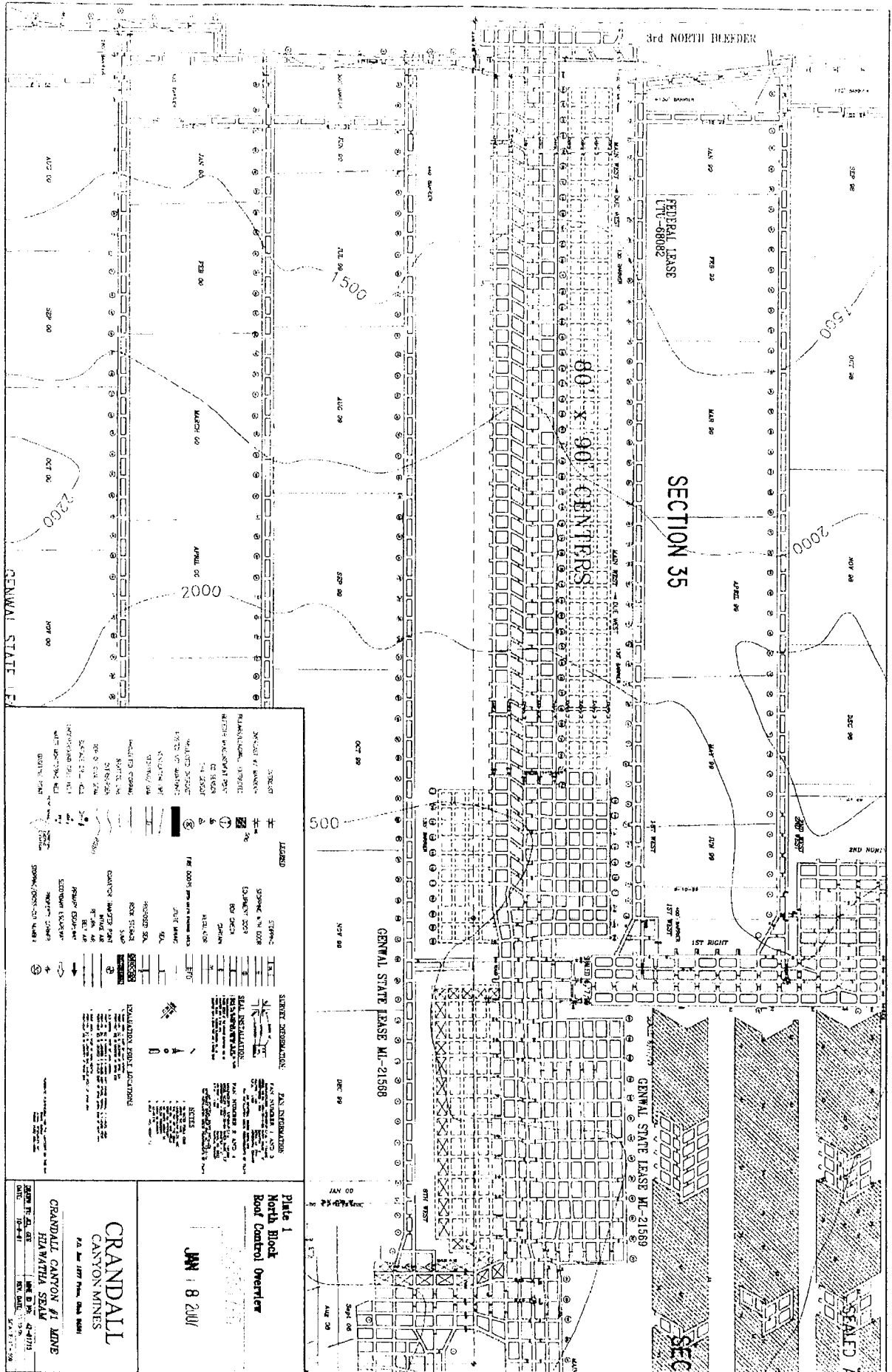
The mine is planning to develop entries into the north barrier of the Main West area. This area contains a valuable coal resource for the Crandall Canyon Mine. Consultant reports indicate the planned development will avoid the majority of the side-abutment stress transferred from the adjacent longwall gobs.

The development in the barrier pillar block will be from east to west. Four entries will be driven on a nominal 80 foot center to center spacing. Crosscut spacing will be on a nominal 90 foot center to center spacing, but can vary depending upon conditions encountered. The mining horizon will be the upper portion of the Hilyatha Seam. Roof coal may be left where areas of weak immediate roof exists. Where roof coal is left the minimum roof bolt length will be 6 feet. See Plate 1, North Block Overview. Overburden depth in the area is between 1,000 and 2,200 feet.

Systematic bolting will occur after excavation. The number of roof bolts per row will increase to a 6 bolt per row minimum. Patterned roof support will be 6 bolts per row and 5 feet or less between rows. Additional roof support will be installed whenever entry or crosscut widths exceed 20 feet or other conditions warrant additional support.

Development mining of the barriers is anticipated to last less than one year. This roof control plan is for development only. During development of the north barrier, conditions will be monitored to determine the possibility of pillar extraction. If conditions appear favorable, further discussions and plans will be submitted for approval.

JAN 18 2007



SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
[Symbol]	STRUCTURE	[Symbol]	STAIRS
[Symbol]	WALLS/DOORS	[Symbol]	ELEVATION
[Symbol]	FLOOR FINISH	[Symbol]	MECHANICAL
[Symbol]	CEILING FINISH	[Symbol]	ELECTRICAL
[Symbol]	MECHANICAL	[Symbol]	PLUMBING
[Symbol]	ELECTRICAL	[Symbol]	TELEPHONE
[Symbol]	PLUMBING	[Symbol]	TELEVISION
[Symbol]	TELEPHONE	[Symbol]	TELEVISION
[Symbol]	TELEVISION	[Symbol]	TELEVISION

CRANDALL CANTON #1 LEASE
CANTON MINNESOTA
 75 1st 1877 Mine, 2nd 1881

Plate 1
North Block
Roof Control Overlay

JAN 18 2007

DATE: 12-4-07
 BY: [Name]
 CHECKED: [Name]

1-18-07
Am

Coal Mine Safety and Health
District 9

JAN 18 2007

Gary Peacock
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-Specific Main West barrier
development

Dear Mr. Peacock:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated January 10, 2007, one page, and a map, addressing leaving roof coal to support the immediate roof in weak areas. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval is site-specific for the development of the north barrier of Main West and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

Sincerely,

/s/ William P. Knepp

Allyn C. Davis
District Manager

Enclosure

11-21-06
Am

[]

Coal Mine Safety and Health
District 9

Gary Peacock
General Manager
Genwal Resources, Inc.
P.O. Box 1077

Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-specific Development of North
Barrier Block of Main West

Dear Mr. Peacock:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated November 11, 2006, and two pages, addressing the development of the north barrier block of Main West. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval is site-specific for the development of the north barrier of Main West and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

Sincerely,

/s/ William P. Knepp

Allyn C. Davis
District Manager

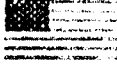
Enclosure

11-21-06

Crandall Canyon Mine
a subsidiary

Hwy31 MP 33, Huntington, UT 84528
PO Box 1077, Price, UT 84501
Phone: (435) 888-4000
Fax: (435) 888-4002

UtahAmerican Energy, Inc.



8046 84-175

November 11, 2006

NOV 13 2005

Mr. Allyn C. Davis
District Manager
Coal Mine Safety and Health
P.O. Box 25367
Denver, Colorado 80225

[]

Re: Crandall Canyon Mine ID# 42-01715 Site Specific Roof Control Plan

Dear Mr. Davis:

Please find attached a site specific roof control plan amendment for development of the north barrier block of Main West in the Crandall Canyon Mine.

Please contact me with any questions at 435.888.4023

Sincerely,

Tom Hurst
Mining Engineer
435.888.4023

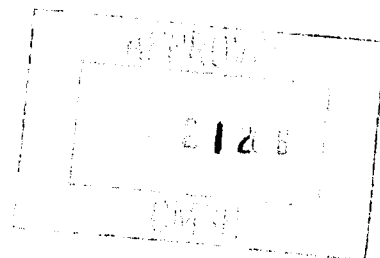
Crandall Canyon Mine MSHA ID# 42-01715
Main West North Barrier
Site Specific Roof Control Amendment

The mine is planning to develop entries into the north barrier of the Main West area. This area contains a valuable coal resource for the Crandall Canyon Mine. Consultant reports indicate the planned development will avoid the majority of the side-abutment stress transferred from the adjacent longwall gobs.

The development in the barrier pillar block will be from east to west. Four entries will be driven on a nominal 80 foot center to center spacing. Crosscut spacing will be on a nominal 90 foot center to center spacing, but can vary depending upon conditions encountered. The mining horizon will be the upper portion of the Hiawatha Seam. Roof coal will not be left in place. See Plate 1, North Block Overview. Overburden depth in the area is between 1,000 and 2,200 feet.

Systematic bolting will occur after excavation. The number of roof bolts per row will increase to a 6 bolt per row minimum. Patterned roof support will be 6 bolts per row and 5 feet or less between rows. Additional roof support will be installed whenever entry or crosscut widths exceed 20 feet or other conditions warrant additional support.

Development mining of the barriers is anticipated to last less than one year. This roof control plan is for development only. During development of the north barrier, conditions will be monitored to determine the possibility of pillar extraction. If conditions appear favorable, further discussions and plans will be submitted for approval.



UNDERGROUND MINE FILE
DATE FWD. 11-21-06
INITIALS Am

NOV 21 2006

Coal Mine Safety and Health
District 9

Gary Peacock
General Manager
Genwal Resources, Inc.
P.O. Box 1077

Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-specific Development of North
Barrier Block of Main West

Dear Mr. Peacock:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated November 11, 2006, and two pages, addressing the development of the north barrier block of Main West. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval is site-specific for the development of the north barrier of Main West and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

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If you have any questions regarding this approval, please contact

Sincerely,

/s/ William P. Knepp

Allyn C. Davis
District Manager

Enclosure

B4-A15

UtahAmerican Energy, Inc.



Crandall Canyon Mine
a subsidiary

Hwy31 MP 33, Huntington, UT 84528
PO Box 1077, Price, UT 84501
Phone: (435) 888-4000
Fax: (435) 888-4002

November 11, 2006

Mr. Allyn C. Davis
District Manager
Coal Mine Safety and Health
P.O. Box 25367
Denver, Colorado 80225

8646 B4-A15
RECEIVED
NOV 13 2006

USDOL - MSHA - CMS&H
DIST

[]

Re: Crandall Canyon Mine ID# 42-01715 Site Specific Roof Control Plan

Dear Mr. Davis:

Please find attached a site specific roof control plan amendment for development of the north barrier block of Main West in the Crandall Canyon Mine.

Please contact me with any questions at 435.888.4023

Sincerely,

A handwritten signature in cursive script that reads "Tom Hurst".

Tom Hurst
Mining Engineer
435.888.4023

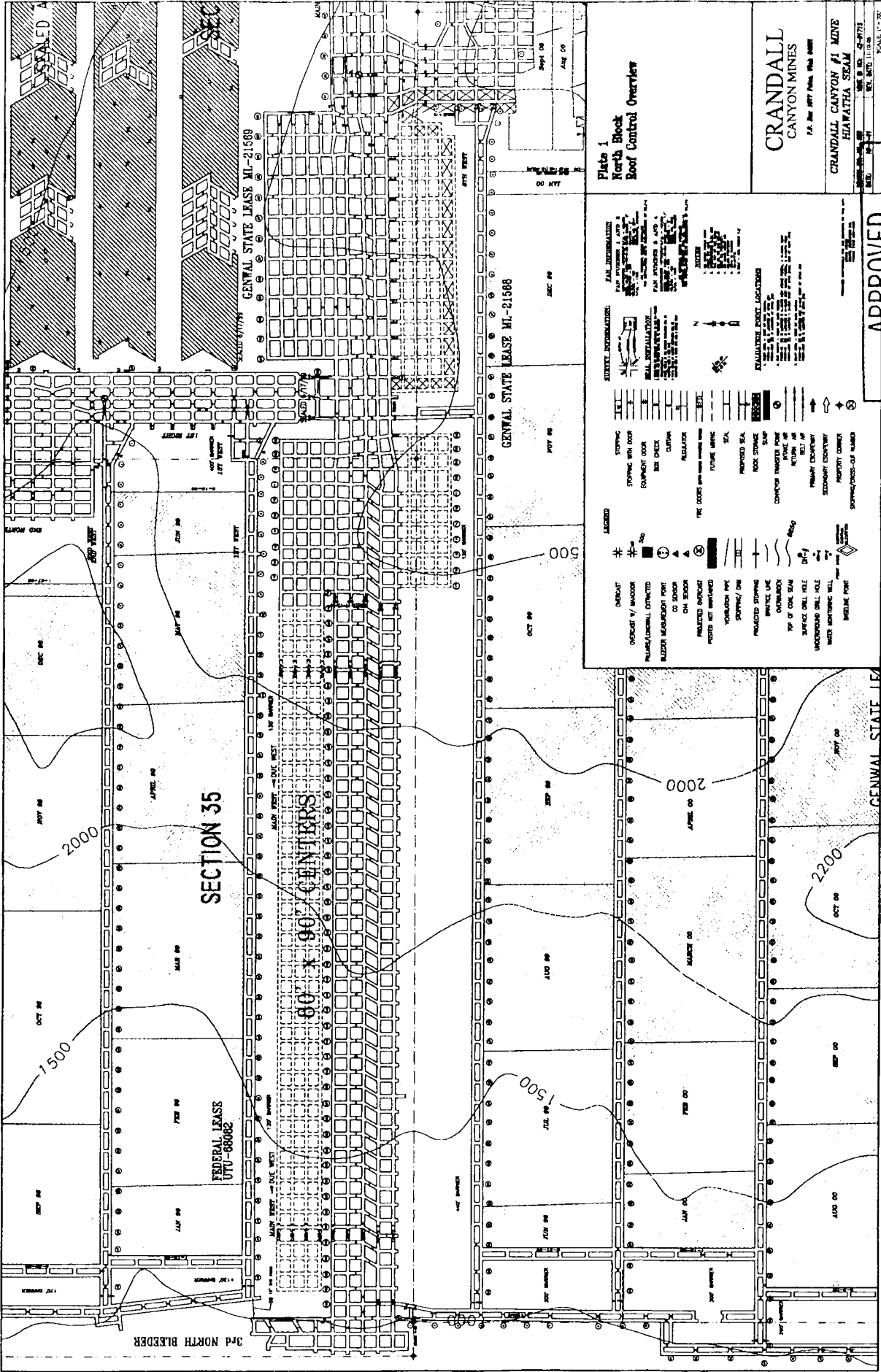


Plate 1
North Block
Roof Control Overlay

GENERAL INFORMATION:
 ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED.
 ALL WALLS ARE 4" THICK UNLESS OTHERWISE NOTED.
 ALL DOORS ARE 3'0" WIDE UNLESS OTHERWISE NOTED.
 ALL WINDOWS ARE 6'0" WIDE UNLESS OTHERWISE NOTED.
 ALL WINDOWS ARE 4'0" HIGH UNLESS OTHERWISE NOTED.
 ALL WINDOWS ARE DOUBLE GLAZED UNLESS OTHERWISE NOTED.
 ALL WINDOWS ARE TINTED UNLESS OTHERWISE NOTED.
 ALL WINDOWS ARE ENERGY EFFICIENT UNLESS OTHERWISE NOTED.

LEGEND:

DOORS:
 # 1 SWING DOOR
 # 2 SLIDING DOOR
 # 3 FOLDING DOOR
 # 4 AUTOMATIC DOOR
 # 5 CURTAIN WALL
 # 6 GLAZED DOOR
 # 7 DOUBLE GLAZED DOOR
 # 8 TINTED DOOR
 # 9 ENERGY EFFICIENT DOOR
 # 10 OTHER DOOR

WINDOWS:
 # 11 DOUBLE GLAZED WINDOW
 # 12 TINTED WINDOW
 # 13 ENERGY EFFICIENT WINDOW
 # 14 OTHER WINDOW

WALLS:
 # 15 4" WALL
 # 16 8" WALL
 # 17 12" WALL
 # 18 18" WALL
 # 19 24" WALL
 # 20 OTHER WALL

FLOORING:
 # 21 CARPET
 # 22 TILE
 # 23 POLISHED CONCRETE
 # 24 OTHER FLOORING

CEILING:
 # 25 SUSPENDED CEILING
 # 26 OTHER CEILING

ROOFING:
 # 27 ASPHALT/FLY ASPHALT
 # 28 OTHER ROOFING

MECHANICAL:
 # 29 AIR CONDITIONING UNIT
 # 30 HEATING UNIT
 # 31 VENTILATION UNIT
 # 32 OTHER MECHANICAL

ELECTRICAL:
 # 33 LIGHT FIXTURE
 # 34 SWITCH
 # 35 OUTLET
 # 36 PANEL
 # 37 OTHER ELECTRICAL

PLUMBING:
 # 38 WATER SUPPLY
 # 39 SEWER
 # 40 VENT
 # 41 OTHER PLUMBING

ENVIRONMENTAL:
 # 42 ASBESTOS
 # 43 MOLD
 # 44 OTHER ENVIRONMENTAL

CRANDALL CANYON MINES
 HAWAIIA SEAM
 U.S. GEOLOGICAL SURVEY
 MINTAS

APPROVED

Nov 2 2006

CMSH

D:\Working\CRANDALL\CRANDALL\WORKING\PLATE 1\PLATE 1 (REVISED 11/10/06) 3:18 PM

Crandall Canyon Mine MSHA ID# 42-01715
Main West North Barrier
Site Specific Roof Control Amendment

The mine is planning to develop entries into the north barrier of the Main West area. This area contains a valuable coal resource for the Crandall Canyon Mine. Consultant reports indicate the planned development will avoid the majority of the side-abutment stress transferred from the adjacent longwall gobs.

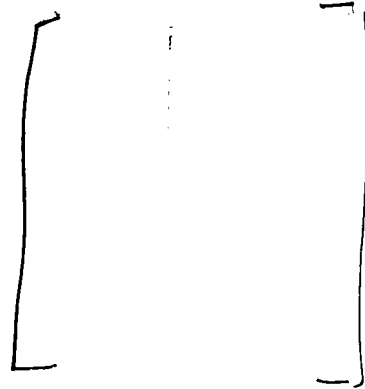
The development in the barrier pillar block will be from east to west. Four entries will be driven on a nominal 80 foot center to center spacing. Crosscut spacing will be on a nominal 90 foot center to center spacing, but can vary depending upon conditions encountered. The mining horizon will be the upper portion of the Hiawatha Seam. Roof coal will not be left in place. See Plate 1, North Block Overview. Overburden depth in the area is between 1,000 and 2,200 feet.

Systematic bolting will occur after excavation. The number of roof bolts per row will increase to a 6 bolt per row minimum. Patterned roof support will be 6 bolts per row and 5 feet or less between rows. Additional roof support will be installed whenever entry or crosscut widths exceed 20 feet or other conditions warrant additional support.

Development mining of the barriers is anticipated to last less than one year. This roof control plan is for development only. During development of the north barrier, conditions will be monitored to determine the possibility of pillar extraction. If conditions appear favorable, further discussions and plans will be submitted for approval.



UNDERGROUND MINE FILE	
DATE FWD.	7/12/05
INITIALS	JB



JUL 12 2005

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Revised page 5

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated June 3, 2005, and a revised page 5. This amendment will be incorporated into the current plan, originally approved on July 3, 2002.

This approval supersedes the approval, dated July 3, 2002, for page 5.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

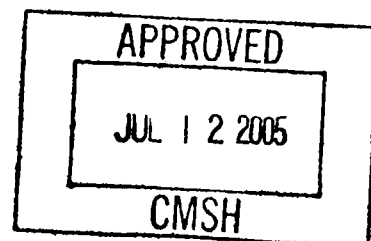
If you have any questions regarding this approval, please contact

Sincerely,

/s/ William P. Knepp

Allyn C. Davis
District Manager

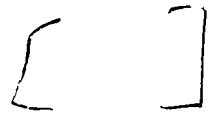
Enclosure



B4-A14



P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002



June 3, 2005

Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

RC
RECEIVED
JUN 06 2005
USDOL - MSHA - CMS&H
DISTRICT 9
#8646
B4-A14

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

Dear Mr. Davis:

Please find enclosed for your review and approval a replacement page 5 to be included in the Approved Roof Control Plan. The enclosed page has changes to the drill hole size for a .914 grouted roof bolt. When approved please insert the page into its respective location within the approved plan.

Should you have any questions or need additional information please contact me at (435) 687-5420 mine site.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Pruitt", written over a horizontal line.

Jim Pruitt
Safety Director
Genwal Resources Inc.

APPROVED
JUL 12 2005
CMSH

UNDERGROUND MINE FILE	
DATE FWD.	4/19/05
INITIALS	JCS

APR 19 2005

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Low Seam Shield Removal

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated March 14, 2005, and four pages, addressing extraction of headgate shields #1 and #2 on low seam longwalls. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval supersedes the approval, dated January 7, 2005, for the site-specific 2nd West Longwall shield removal plan.

These four pages (19A, 19B, 19C, and 19D) are new and will be added to the plan.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

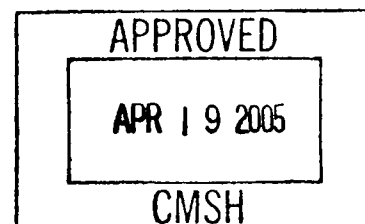
If you have any questions regarding this approval, please contact

Sincerely,

/s/ Allyn C. Davis

Allyn C. Davis
District Manager

Enclosure



B4-A13



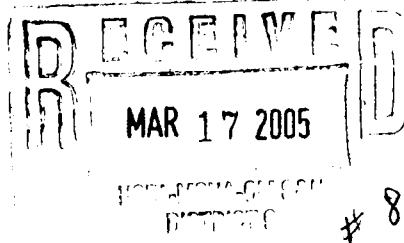
P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002



March 14, 2005

Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

rc



*# 8646
B4-A13*

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

Dear Mr. Davis:

Please find enclosed for your review and approval new pages 19A through 19D to be included in the Approved Roof Control Plan. The enclosed pages address headgate shield removal in low seam coal areas. When approved please insert the page into it's respective location within the approved plan.

Should you have any questions or need additional information please contact me at (435) 687-5420 mine site.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Pruitt", written over a horizontal line.

Jim Pruitt
Safety Director
Genwal Resources Inc.

UNDERGROUND MINE FILE	
DATE FWD.	9/30/04
INITIALS	JB

Coal Mine Safety and Health
District 9

SEP 30 2004

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Revision
Page 7

Dear Mr. Adair:

The referenced roof control plan revision is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated August 14, 2004, a revised page 7, and those items as discussed and noted between Jim Pruitt and Billy Owens on September 27, 2004. This revision will be incorporated into the current plan originally approved on July 3, 2002.

This approval supersedes the approval, dated July 3, 2002, for page 7.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this revision.

If you have any questions regarding this approval, please contact

Sincerely,

/s/ Allyn C. Davis

Allyn C. Davis
District Manager

Enclosure

B4-A9



P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002



August 14, 2004

Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

* BUSINESS MADE AS PER
JIM PRUITT
BY A PHONE CONVERSATION WITH *

Dear Mr. Davis:

Please find enclosed for your review and approval a replacement page 7 for the ~~South~~*
Crandall Canyon Mine approved roof control plan. This page has been changed to remove
the reference to a specific roof bolting machine manufacture (Fletcher) only. We feel that
this will help remove any confusion as to other machines by other manufactures that may be
utilized at Genwal. When approved please insert the page into it's respective location
within the approved plan.

Should you have any questions or need additional information please contact me at (435) 687-
5420 mine site.

Sincerely,

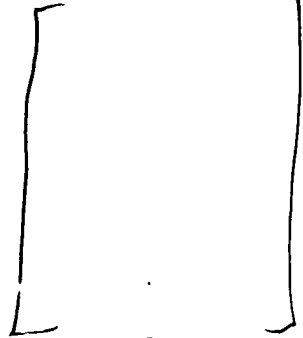
Jim Pruitt
Safety Director
Genwal Resources Inc.

APPROVED
SEP 30 2004
CMSH

AUG 20 2004
RC 104-29

4

UNDERGROUND MINE FILE	
DATE FWD.	10/1/04
INITIALS	JB



Coal Mine Safety and Health
District 9

SEP 28 2004

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Revision
Pages 12 and 15

Dear Mr. Adair:

The referenced roof control plan revision is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated September 3, 2004, and revised pages 12 and 15. This revision will be incorporated into the current plan originally approved on July 3, 2002.

This approval supersedes the approval, dated July 3, 2002, for pages 12 and 15.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

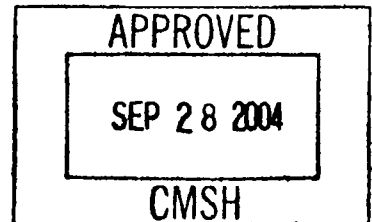


Sincerely,

/s/ Allyn C. Davis

Allyn C. Davis
District Manager

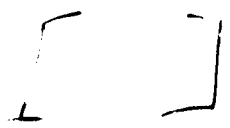
Enclosure



84-A10



P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002



August 31, 2004

RC

Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

SEP 03 2004
RC 105-17

4

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

Dear Mr. Davis:

Please find enclosed for your review and approval replacement pages 12 and 15 referencing the type of longwall equipment used at the Crandall Canyon Mine. The only changes to the pages are the specific references to Longwall equipment types, changing from MTA to JOY and L W Associates. When approved please insert the page into it's respective location within the approved plan.

Should you have any questions or need additional information please contact me at (435) 687-5420 mine site.

Sincerely,

Jim Pruitt
Safety Director
Genwal Resources Inc.

APPROVED
SEP 28 2004
CMSH

UNDERGROUND MINE FILE
DATE FWD. 8/31/04
INITIALS JB

Coal Mine Safety and Health
District 9

AUG 31 2004

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
3rd North - 1st Right

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated July 13, 2004, and three drawings. This amendment will be incorporated into the current plan originally approved on July 3, 2002.

This approval is site-specific for trimming two pillars in 3rd North for the 1st Right belt line. This approval will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

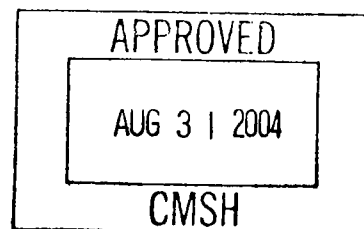
If you have any questions regarding this approval, please contact

Sincerely,

Bob E. Bennett

d Allyn C. Davis
District Manager

Enclosure



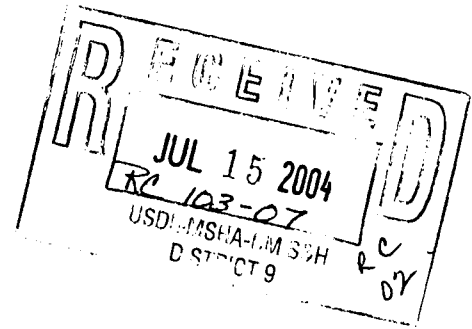
B4-A8



P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002

July 13, 2003

Mr. Allyn C. Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225



Re: Crandall Canyon Mine ID#:42-01715
Roof Control Plan Amendment

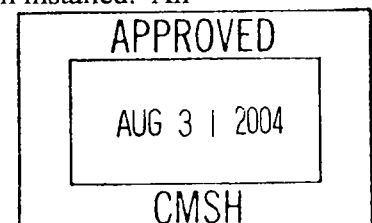
Dear Mr. Davis:

For your review and approval a site-specific plan for the 3rd North section is submitted. In order to access existing coal reserves, it is necessary to trim a maximum of 10ft. of rib on the north side of what is to be the belt entry of the 1st Right Gateroad..

The enclosed plan shows the general location of the 3rd North/1st Right Gateroad sections, the area to be slabbed and supported, and the existing pillar dimensions (**Sheet A**). This area is just north of the pillar slab that was approved for 3rd North by MSHA last week. Roof support in the vicinity of the developed 3rd North area originally consisted of #6 48" and 60" fully-grouted roof bolts on 5 ft. centers with #6 wire mesh utilized as supplemental support in some areas. Recently, this area was unsealed and as part of a rehabilitation effort #8 roof bolts, and in some areas supplemental support consisting of welded wire mesh was installed as roof conditions required. The roof strata in the area to be slabbed appears to be competent. Cover in the area is between 1,500 ft. and 1,600 ft.

The following sequence of steps will be carried-out when this plan is initiated:

1. Two foot diameter OTW Cans on a minimum of 6 ft. centers will be installed as shown in Sheet B prior to slabbing the coal pillar. The yield capacity of each 2 ft. diameter OTW Can is approximately 110 tons.
2. The slabbing of the pillar is to occur as part of the typical mining sequence as three additional entries of the 1st Right Gateroad are developed to the east.. In the area to be slabbed, the roof will be bolted with #8, minimum 60" long roof bolts on a minimum of 5 ft. centers and supplemental support consisting of welded wire mesh installed. All

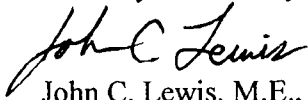


mining and slabbing will be done in accordance with Genwal's MSHA approved Roof Control and Ventilation Plan.

3. Sheet C shows the completed pillar dimensions, effective entry widths, installed Can crib supplemental support, and the proposed 1st Right Gateroad belt.

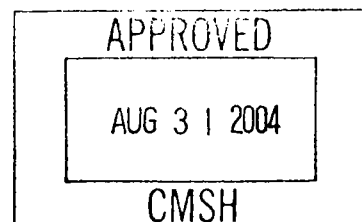
All persons involved in the implementation and execution of this plan will be trained with regard to the safety precautions and specific procedures in order to successfully complete this plan prior to its commencement.

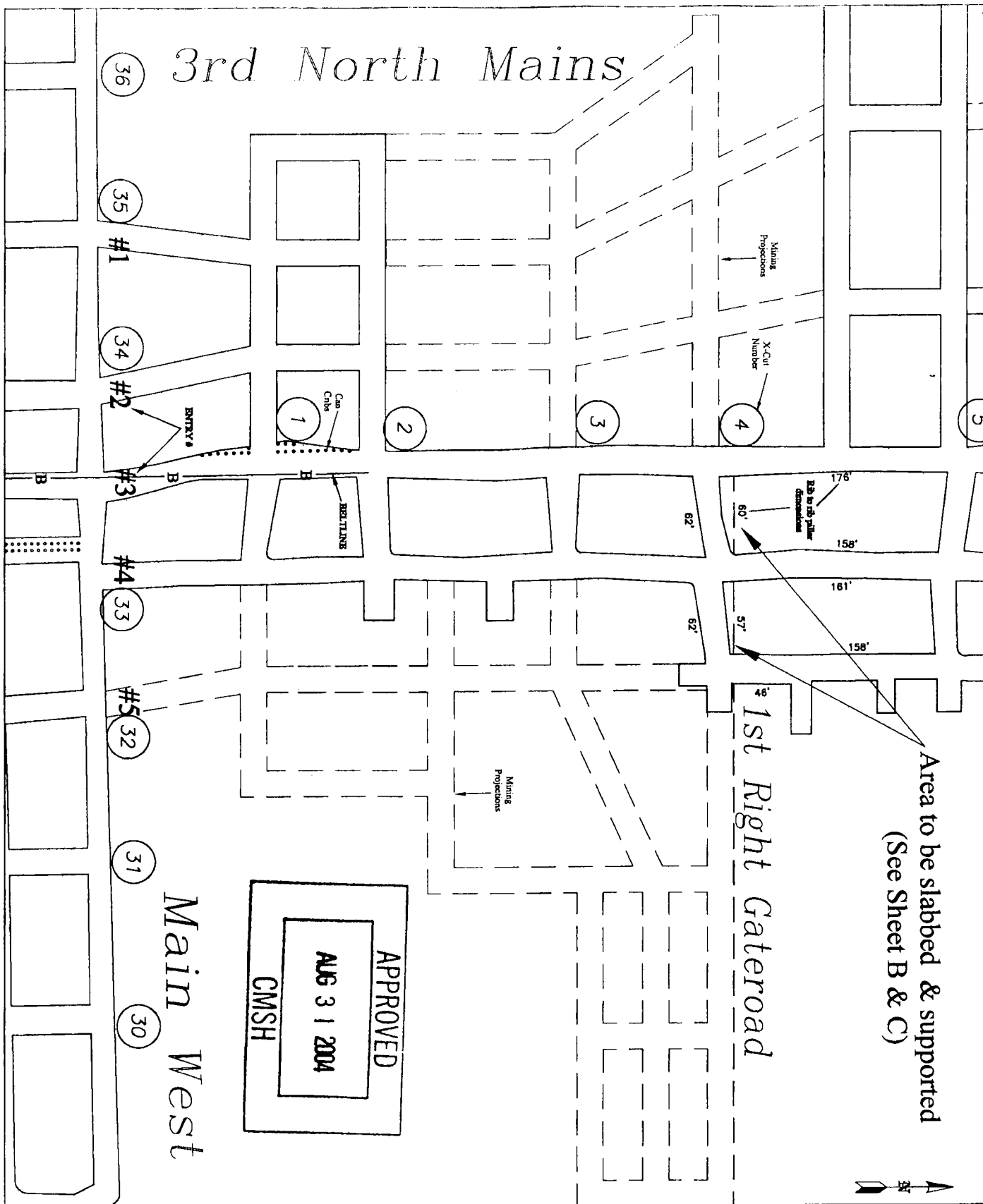
Should you have any questions or require additional information please contact:



John C. Lewis, M.E., P.E.
Mine Engineer
Genwal Resources Inc.
(435) 888-4016
Fax: (435) 888-4002

Jim Pruitt
Safety Director
Genwal Resources Inc.
(435) 687-5420





APPROVED
 AUG 3 1 2004
 CMSH

Area to be slabbed & supported
 (See Sheet B & C)

CRANDALL CANYON MINE
 1ST RIGHT GATEROAD GENERAL LOCATION
 PILLAR SLAB PLAN [SHEET A]

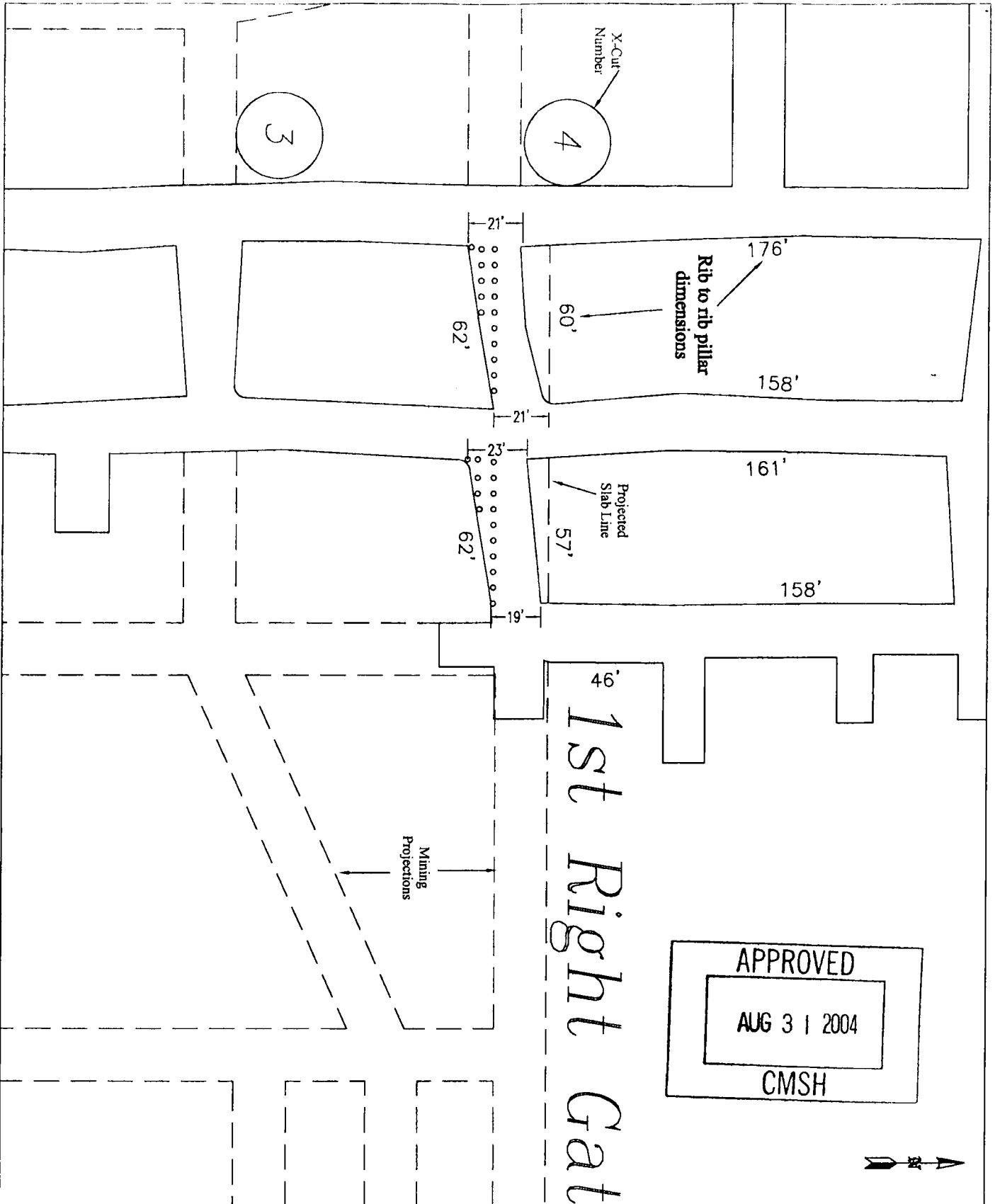
SCALE: 1" = 100'

DATE: 7-10-04

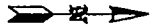
ACAD REFERENCE: 1st Right Gate Pillar Slab


GENWAL
 RESOURCES, INC.

P.O. Box 1077
 Pica, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4002



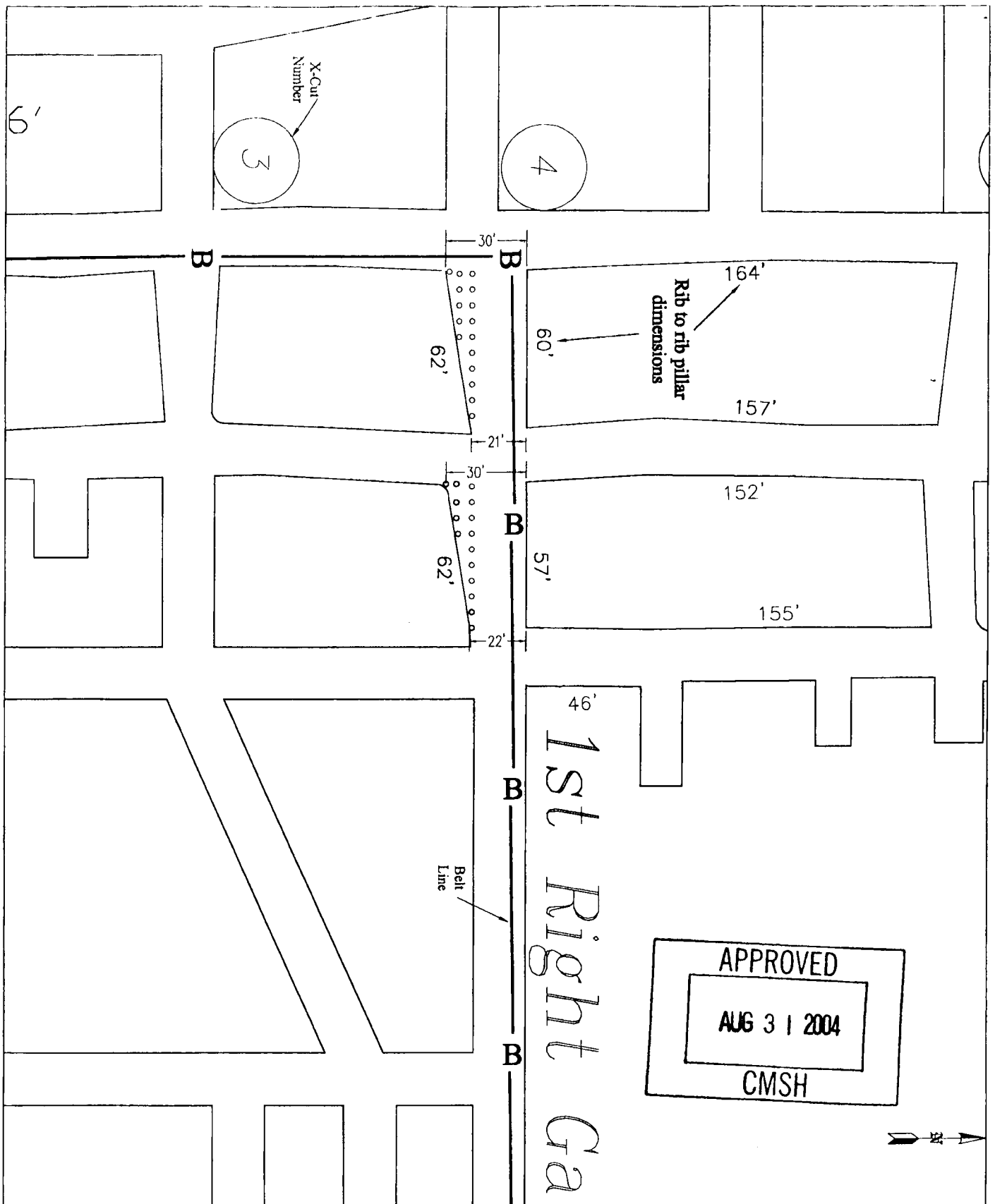
APPROVED
 AUG 3 | 2004
 CMSH



CRANDALL CANYON MINE
 3RD NORTH BELT ENTRY
 PILLAR SLAB PLAN [SHEET B]

SCALE: 1" = 50'
 DATE: 8-04-04
 ACAD REFERENCE: 3rd North Belt Slab

GENWAL
 RESOURCES, INC.
 P.O. Box 1077
 Pritch, Utah 84520
 Telephone: (435) 898-4000 Fax: (435) 898-4002



APPROVED
 AUG 3 | 2004
 CMSH

CRANDALL CANYON MINE
 1ST RIGHT GATEROAD BELT ENTRY
 PILLAR SLAB PLAN [SHEET C]

SCALE: 1" = 50'

DATE: 7-13-04

ACAD REFERENCE: 1st Right Gate Pillar Slab

GENWAL
 RESOURCES, INC.
 P.O. Box 1077
 Price, Utah 84520
 Telephone: (435) 888-4000 Fax: (435) 888-4002

UNDERGROUND MINE FILE	
DATE FWD.	6/29/04
INITIALS	JRS

JUN 29 2004

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
3rd North Mains Belt Entry

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated June 4, 2004, and three drawings, addressing slabbing two pillars in the belt entry of 3rd North Mains. This amendment will be incorporated into the current plan, originally approved on July 3, 2002.

This approval is site-specific for slabbing two pillars in the 3rd North mains and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

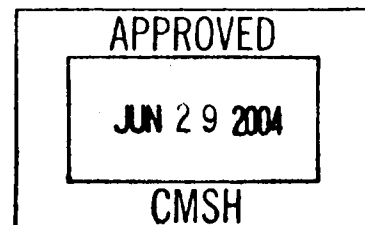
If you have any questions regarding this approval, please contact

Sincerely,

for William B. Denning

Allyn C. Davis
District Manager

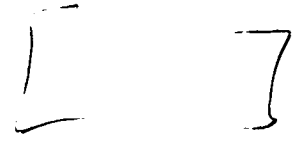
Enclosure



84-A 7

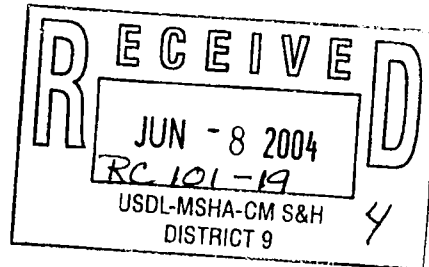


P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002



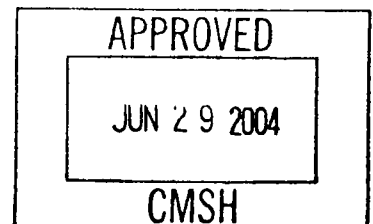
June 04, 2003

RC



Mr. Allyn C. Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

Re: Crandall Canyon Mine ID#:42-01715
Roof Control Plan Amendment



Dear Mr. Davis:

For your review and approval a site-specific plan for the 3rd North section is submitted. In order to access existing coal reserves, it is necessary to trim a maximum of 6 ft. of rib on the east side of what is to be the #3 entry to allow the installation of a belt line.

The enclosed plan shows the general location of the 3rd North section, the area to be slabbed and supported, and the existing pillar dimensions (**Sheet A**). This area is just north of the pillar split that was approved for 3rd North by MSHA several months ago. Roof support in the vicinity of the developed 3rd North section originally consisted of #6 48" and 60" fully-grouted roof bolts on 5 ft. centers with #6 wire mesh utilized as supplemental support in some areas. Recently, this area was unsealed and as part of a rehabilitation effort #8 roof bolts, and in some areas supplemental support consisting of welded wire mesh is being installed as roof conditions require. The roof strata in the area to be slabbed appears to be competent. Cover in the area is between 1,500 ft. and 1,600 ft.

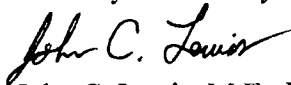
The following sequence of steps will be carried-out when this plan is initiated:

1. Two foot diameter OTW Cans on a minimum of 6 ft. centers will be installed as shown in Sheet B prior to slabbing the coal pillar. The yield capacity of each 2 ft. diameter OTW Can is approximately 110 tons.
2. The slabbing of the pillar is to occur as part of the typical mining sequence as three additional entries are mined to the north. In the area to be slabbed, the roof will be bolted with #8, minimum 60" long roof bolts on a minimum of 5 ft. centers and supplemental support consisting of welded wire mesh installed. All mining and slabbing will be done in accordance with Genwal's MSHA approved Roof Control and Ventilation Plan.

3. Sheet C shows the completed pillar dimensions, effective entry widths, installed Can crib supplemental support, and the proposed 3rd North Section belt.

All persons involved in the implementation and execution of this plan will be trained with regard to the safety precautions and specific procedures in order to successfully complete this plan prior to its commencement.

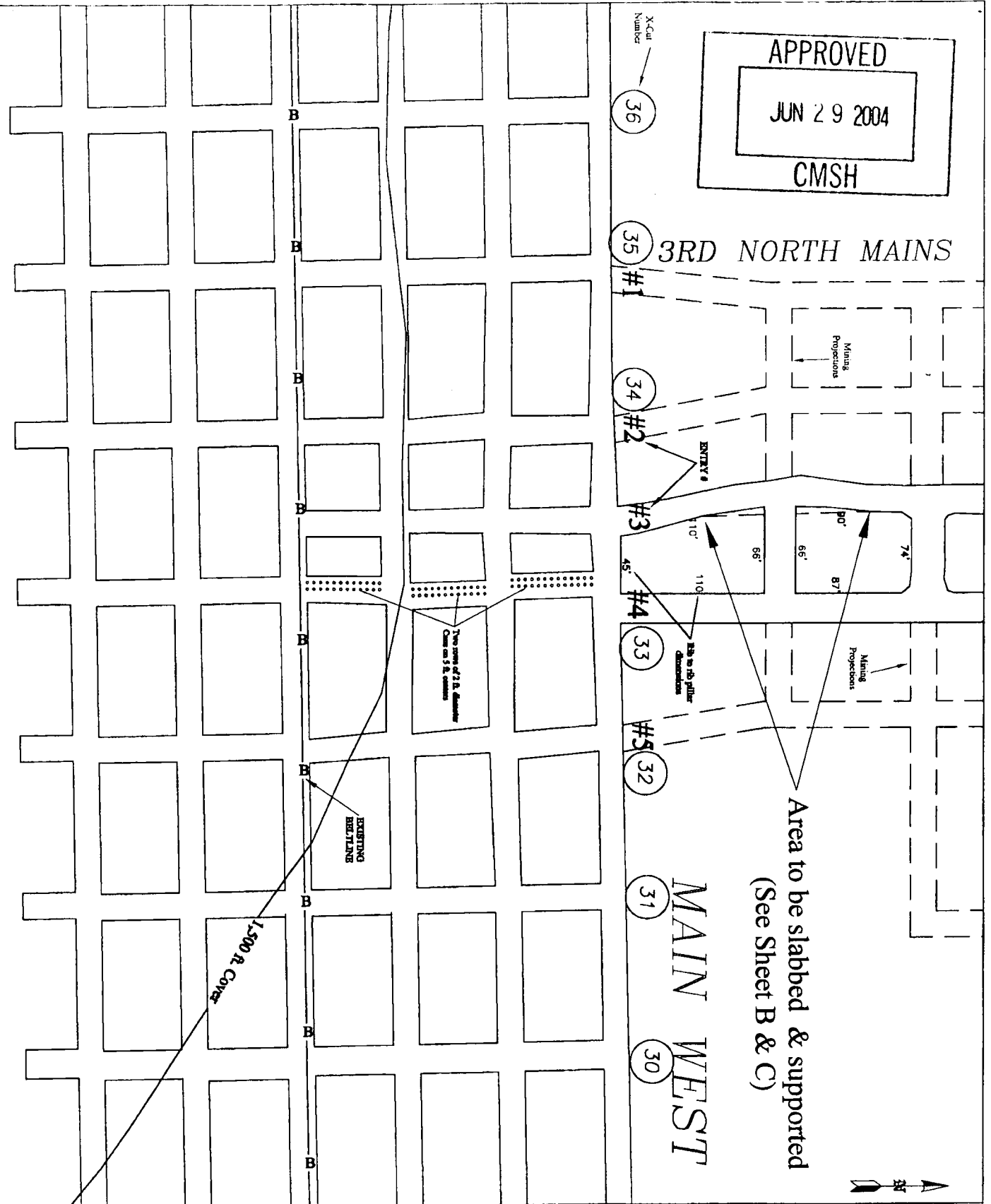
Should you have any questions or require additional information please contact:



John C. Lewis, M.E., P.E.
Mine Engineer
Genwal Resources Inc.
(435) 888-4016
Fax: (435) 888-4002

Jim Pruitt
Safety Director
Genwal Resources Inc.
(435) 687-5420





CRANDALL CANYON MINE
 3RD NORTH GENERAL LOCATION
 PILLAR SLAB PLAN [SHEET A]

SCALE: 1" = 100'
 DATE: 6-04-04
 ACAD REFERENCE: 3rd North Belt Slab

GENVAL
 RESOURCES, INC.

P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4002

3RD NORTH MAINS

X-Cut
Number

35

#1

34

#2

#3

#4

33

#5

32

ENTRY #

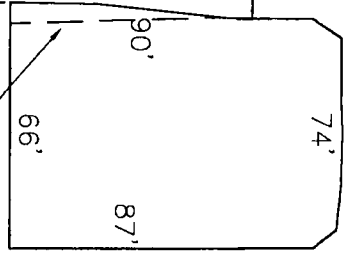
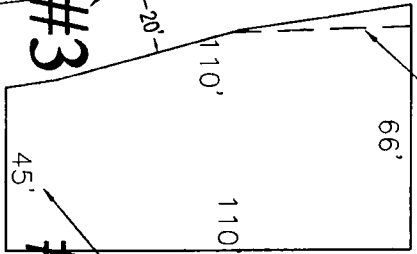
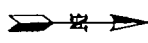
Mining
Projections

Mining
Projections

APPROVED

JUN 29 2004

CMSH



Rib to rib
pillar
dimensions

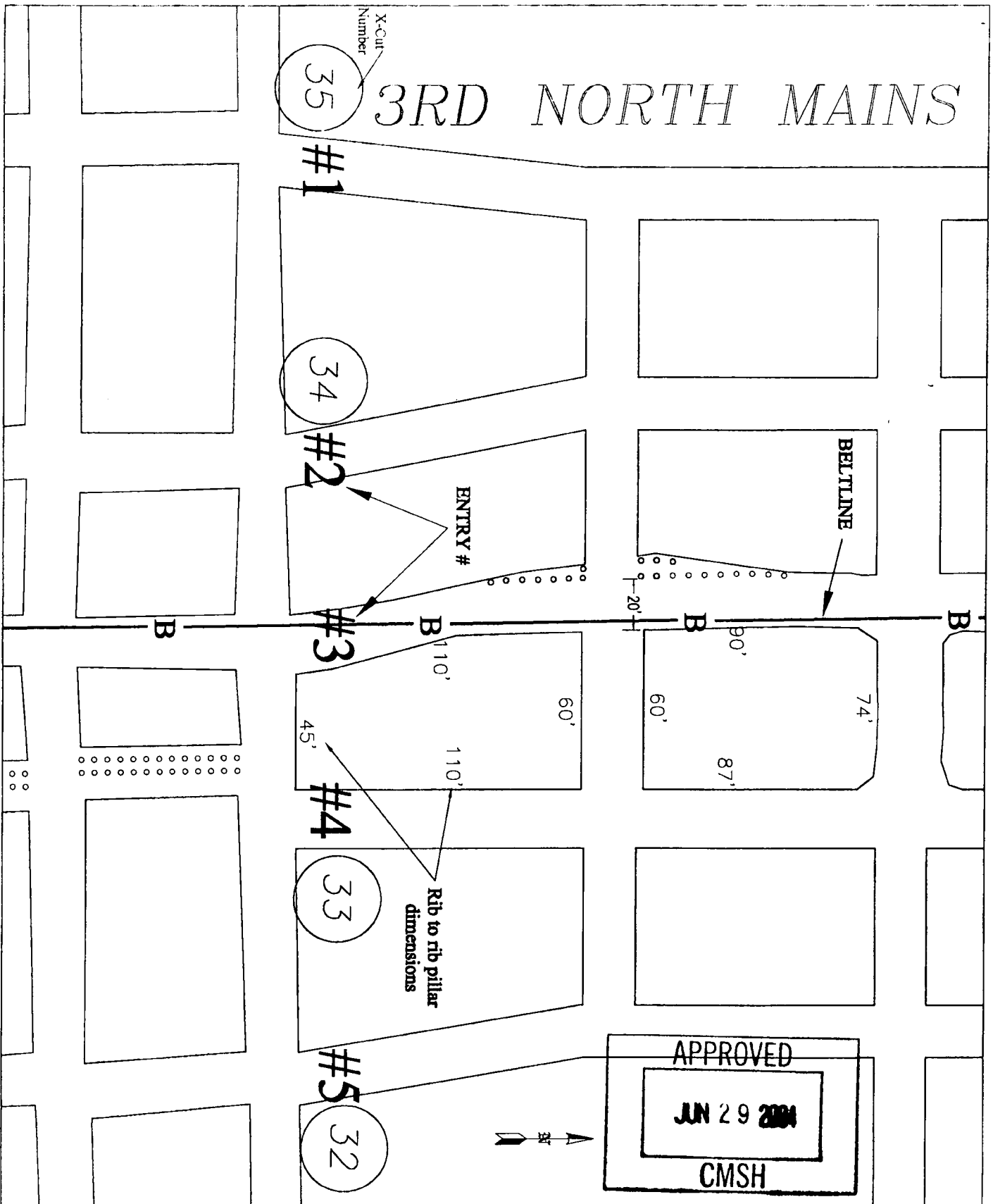
CRANDALL CANYON MINE
3RD NORTH BELT ENTRY
PILLAR SLAB PLAN [SHEET B]

SCALE: 1" = 50'

DATE: 6-04-04

ACAD REFERENCE: 3rd North Belt Slab

GENWAL
RESOURCES, INC.
P.O. Box 1077
Price, Utah 84520
Telephone: (435) 888-4000 Fax: (435) 888-4002



CRANDALL CANYON MINE
 3RD NORTH BELT ENTRY
 PILLAR SLAB PLAN [SHEET C]

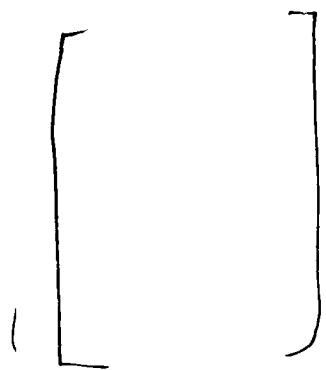
SCALE: 1" = 50'

DATE: 6-04-04

ACAD REFERENCE: 3rd North Belt Slab

GENWAL
 RESOURCES, INC.
 P.O. Box 1077
 Price, Utah 84520
 Telephone: (435) 888-4000 Fax: (435) 888-4002

UNDERGROUND MINE FILE
DATE FWD. 01/08/04
INITIALS JB



JAN - 8 2004

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-Specific 3RD North Section
Pillar Splits - Crosscuts 33 and 34

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated December 2, 2003, and three drawings, addressing pillar splits between crosscuts 33 and 34. This amendment will be incorporated into the current plan originally approved on July 3, 2003.

This approval is site-specific for splitting the pillars at the location noted in the amendment and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

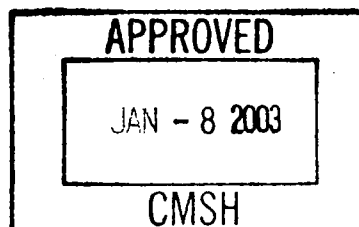
A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

Sincerely,

James Davis
Allyn C. Davis
District Manager

Enclosure



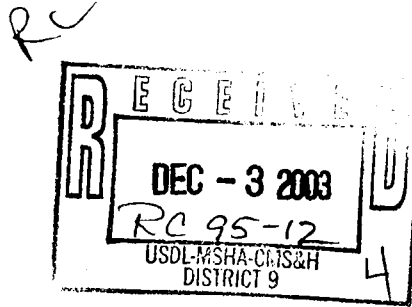
BY-AG



P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002

December 02, 2003

Mr. Allyn C. Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225



Re: Crandall Canyon Mine ID#:42-01715
Roof Control Plan Amendment

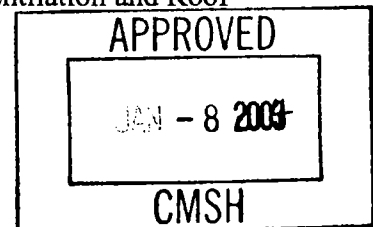
Dear Mr. Davis:

For your review and approval a site-specific plan for the 3rd North section is submitted. In order to access existing coal reserves, it is necessary that pillars between x-cut #33 and #34 be split in Main West in order to accommodate the proposed belt line for the 3rd North section.

Sheet A (attached) shows the general location of the 3rd North mining projections, the pillars to be split, the actual existing dimensions of the pillars in the vicinity of the pillars proposed to be split, and cover contours. Roof support in Main West presently consists of #6 48" and 60" fully-grouted roof bolts on 5 ft. centers with #6 wire mesh utilized as supplemental support in some areas. The roof strata in the vicinity of the proposed 3rd North pillar split area is some of the most competent strata in the Crandall Canyon Mine. The roof strata is primarily comprised of a very strong sandstone exceeding 5 ft. in thickness. 3rd North mining projections are currently sealed and a plan has been submitted to breach the seals and is pending MSHA approval.

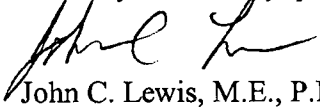
The following sequence of steps will be carried-out as this plan is implemented:

1. At a minimum, prior to any pillar split activities, two rows of 2 ft. diameter OTW Cans on 5 ft. centers will be installed adjacent to the area to be split in x-cut #33 as shown in **Sheet B**. The first row of Cans will be place approximately 4 ft. off the inby rib of x-cut #33. The yield capacity of each 2 ft. diameter OTW Can is approximately 110 tons.
2. Once installation of the OTW Cans is complete, the pillars will be split as part of a typical mining sequence in accordance with the approved Ventilation and Roof Control plans.

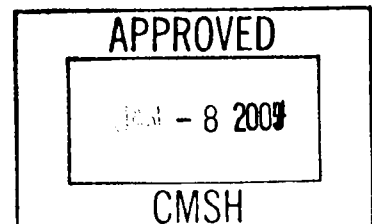


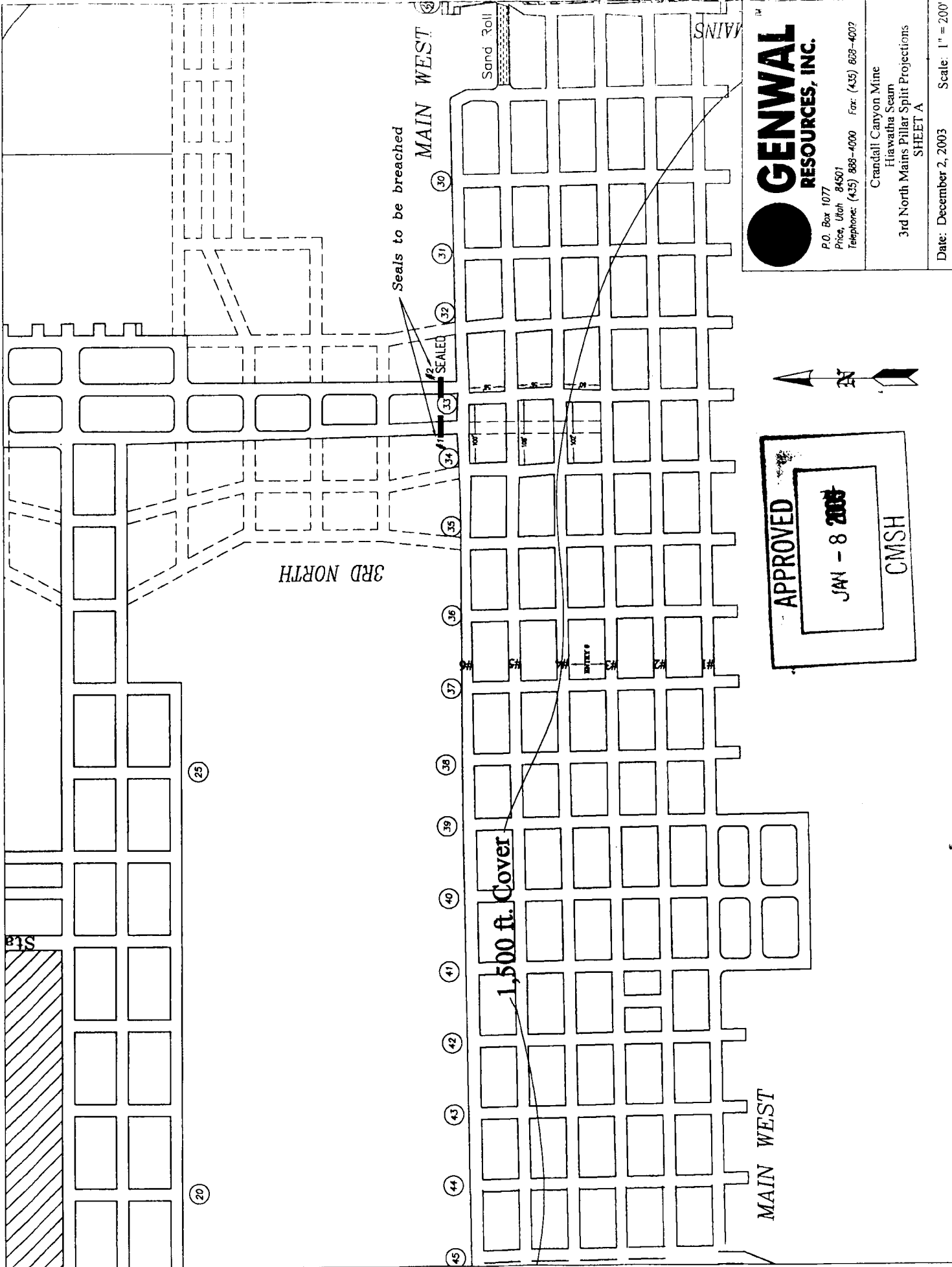
3. The pillar split primary roof support will consist of #8 72" fully-grouted roof bolts on 5 ft. centers with supplemental support consisting of wire mesh will be installed. During the pillar splitting process the roof and ribs will be continuously evaluated. The width of the pillar split entry will be limited to no greater than 20 ft. **Sheet C** shows the completed mining sequence and approximate finished pillar dimensions.
4. All persons involved in the implementation and execution of this plan will be trained with regard to the safety precautions and specific procedures in order to successfully complete this plan prior to its commencement.

Should you have any questions or require additional information please contact:


John C. Lewis, M.E., P.E.
Mine Engineer
Genwal Resources Inc.
(435) 888-4016
Fax: (435) 888-4002

Jim Pruitt
Safety Director
Genwal Resources Inc.
(435) 687-5420





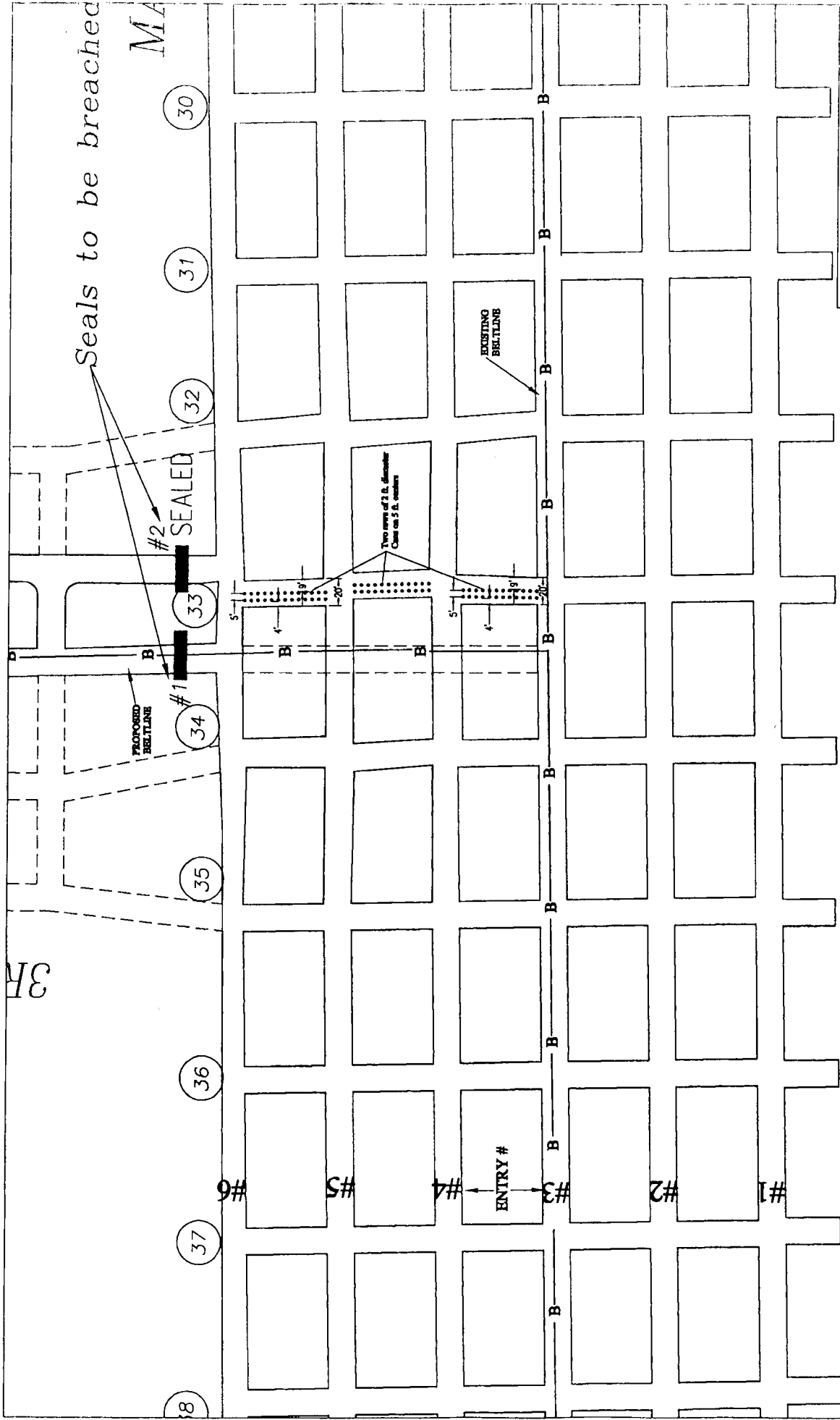
GENWAL
RESOURCES, INC.

P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4007

Crandall Canyon Mine
 Hiawatha Seam
 3rd North Mains Pillar Split Projections
 SHEET A

Date: December 2, 2003 Scale: 1" = 200'

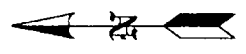
APPROVED
 JAN - 8 2004
 CMSH



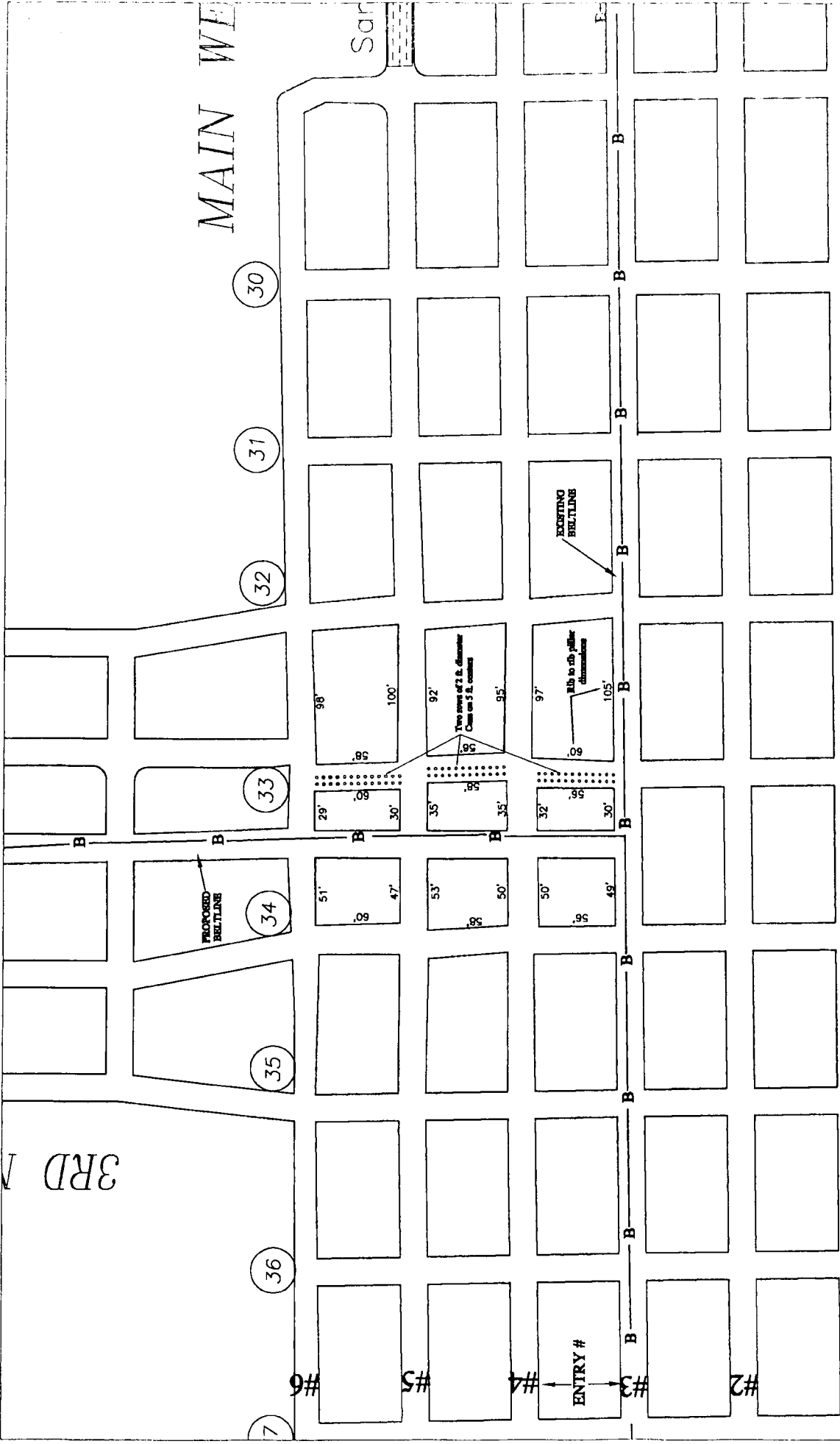
GENWALTM
RESOURCES, INC.
 P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4022

Crandall Canyon Mine
 Hiawatha Seam
 3rd North Mains Pillar Split Projections
 SHEET B

Date: December 2, 2003 Scale: 1" = 100'



APPROVED
 JAN - 8 2004
 CSMH



P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 656-4002

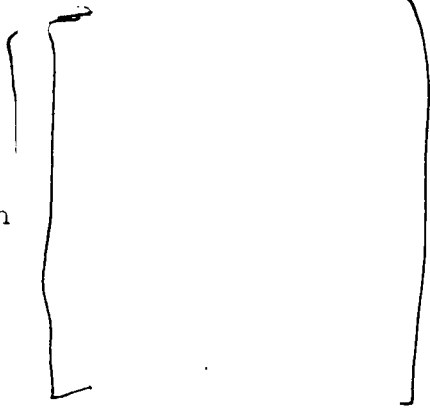
Crandall Canyon Mine
 Haywatha Seam
 3rd North Mains Pillar Split Projections
 SHEET C

Date: December 2, 2003 Scale: 1" = 100'



APPROVED
 JAN - 8 2004
 CMSH

UNDERGROUND MINE FILE	
DATE FWD.	12/12/03
INITIALS	JB



DEC 12 2003

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Pillar Split - Main West

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).


The submittal consisted of a cover letter, dated November 10, 2003 and 4 pages, addressing the splitting of the pillar between crosscut # 27 and # 28 in Main West. This amendment will be incorporated into the current plan originally approved on July 3, 2003.

This approval is site-specific for Main West pillar split and will terminate upon completion of the project. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

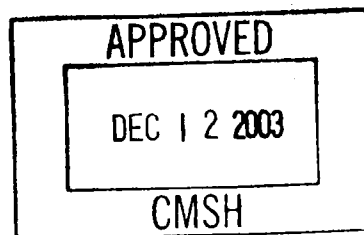
A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

If you have any questions regarding this approval, please contact

Sincerely,


Allyn C. Davis
District Manager

Enclosure



B4-A5

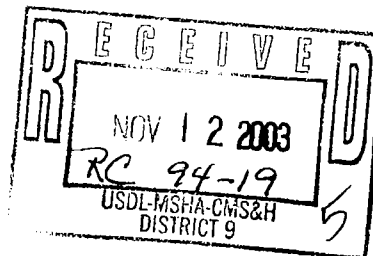


P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002



November 10, 2003

RC



Mr. Allyn C. Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

Re: Crandall Canyon Mine ID#:42-01715
Roof Control Plan Amendment

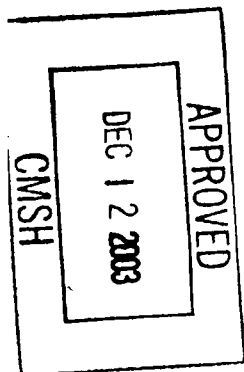
Dear Mr. Davis:

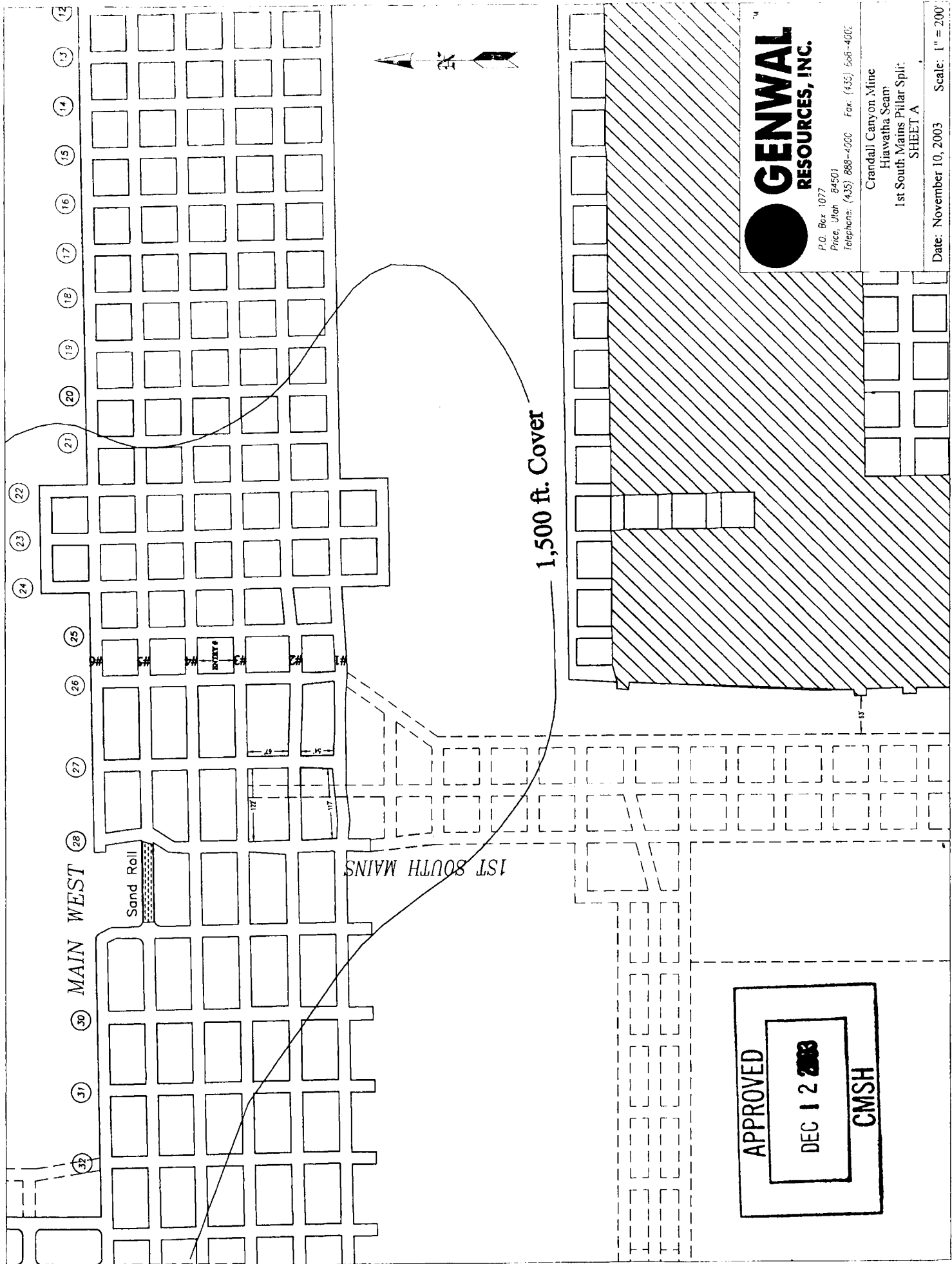
Please find enclosed for your review and approval a site-specific plan for the 1st South Mains section. In order to access existing coal, it is imperative that pillars between x-cut #27 and #28 be split in Main West in order to accomodate the proposed belt line.

The enclosed plan shows the general location of the 1st South Mains mining projections, the pillars to be split, the actual existing dimensions of the pillars in the vicinity of the pillars proposed to be split, and cover contours (see **Sheet A**). Roof support in Main West presently consists of #6 60" fully-grouted roof bolts on 5 ft. centers with #6 wire mesh utilized as supplemental support in some areas. The roof strata in the vicinity of the proposed 1st South Mains pillar spilt area is some of most competent strata in the Crandall Canyon Mine..

The following sequence of steps will be carried-out when this plan is initiated:

1. At a minimum, prior to any pillar split activities, two rows of **2 ft.** diameter OTW Cans on 5 ft. centers will be installed adjacent to the area to be split in x-cut #27 as shown in **Sheet B**. The first row of Cans will be placed approximately 4 ft. off the inby rib of x-cut #27. The yield capacity of each 2 ft. diameter OTW Can is approximately 110 tons.
2. Once installation of the OTW Cans is complete, the pillars will be split as part of a typical section neck-off mining sequence in accordance with the approved Ventilation and Roof Control plans.
3. The pillar spilt primary roof support will consist of #8 72" fully-grouted roof bolts on 5 ft. centers with supplement support consisting of wire mesh will be installed. During the pillar splitting process the roof and ribs will be continuously evaluated. The width of the pillar split entry will be limited to no greater than 20 ft. **Sheet C** shows the completed mining sequence and approximate finished pillar dimensions.





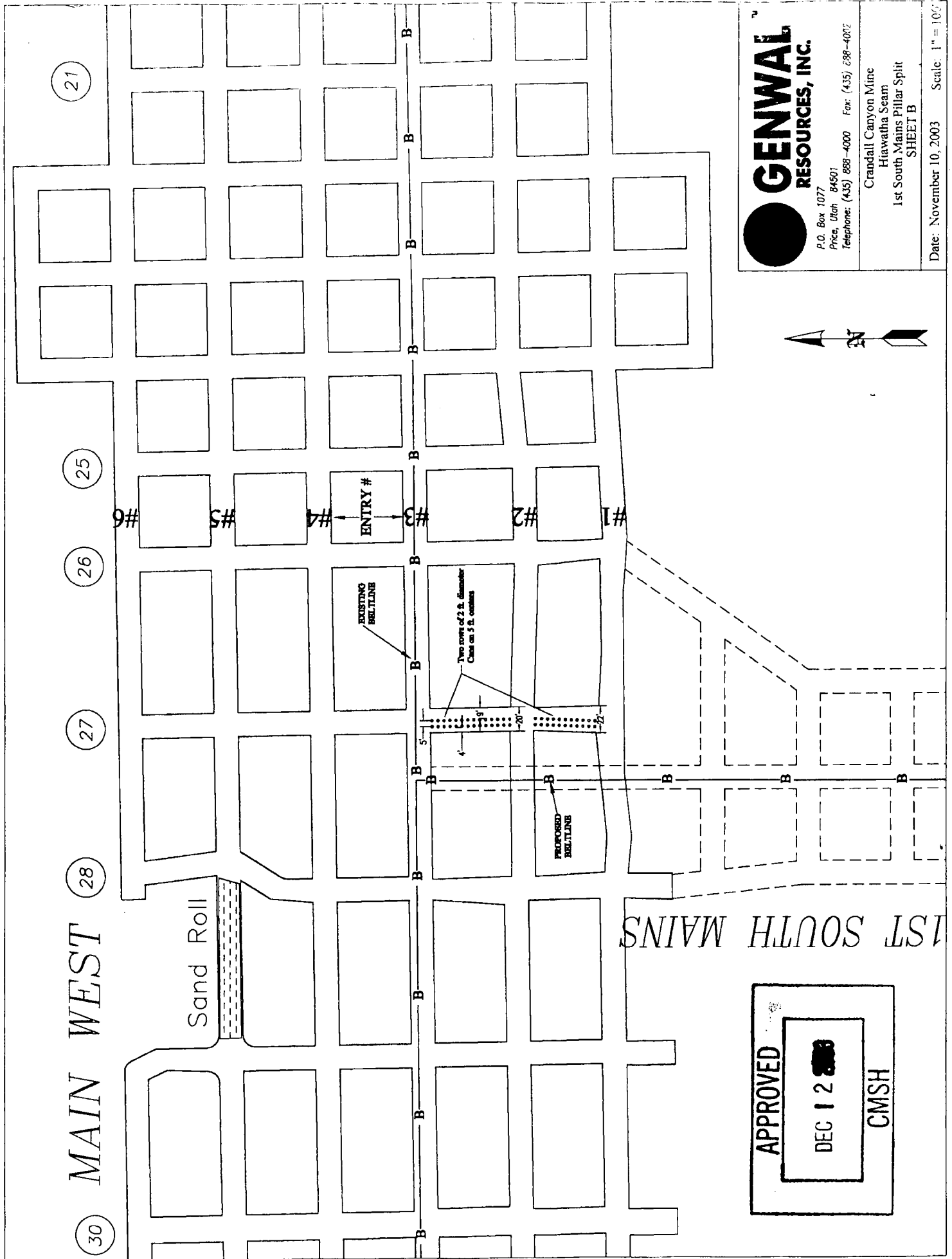
APPROVED
 DEC 12 2003
 CMSH

GENWAL
RESOURCES, INC.

P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-6900 Fax: (435) 566-4000

Crandall Canyon Mine
 Hiawatha Seam
 1st South Mains Pillar Split
 SHEET A

Date: November 10, 2003 Scale: 1" = 200'



MAIN WEST

1ST SOUTH MAINS

Sand Roll

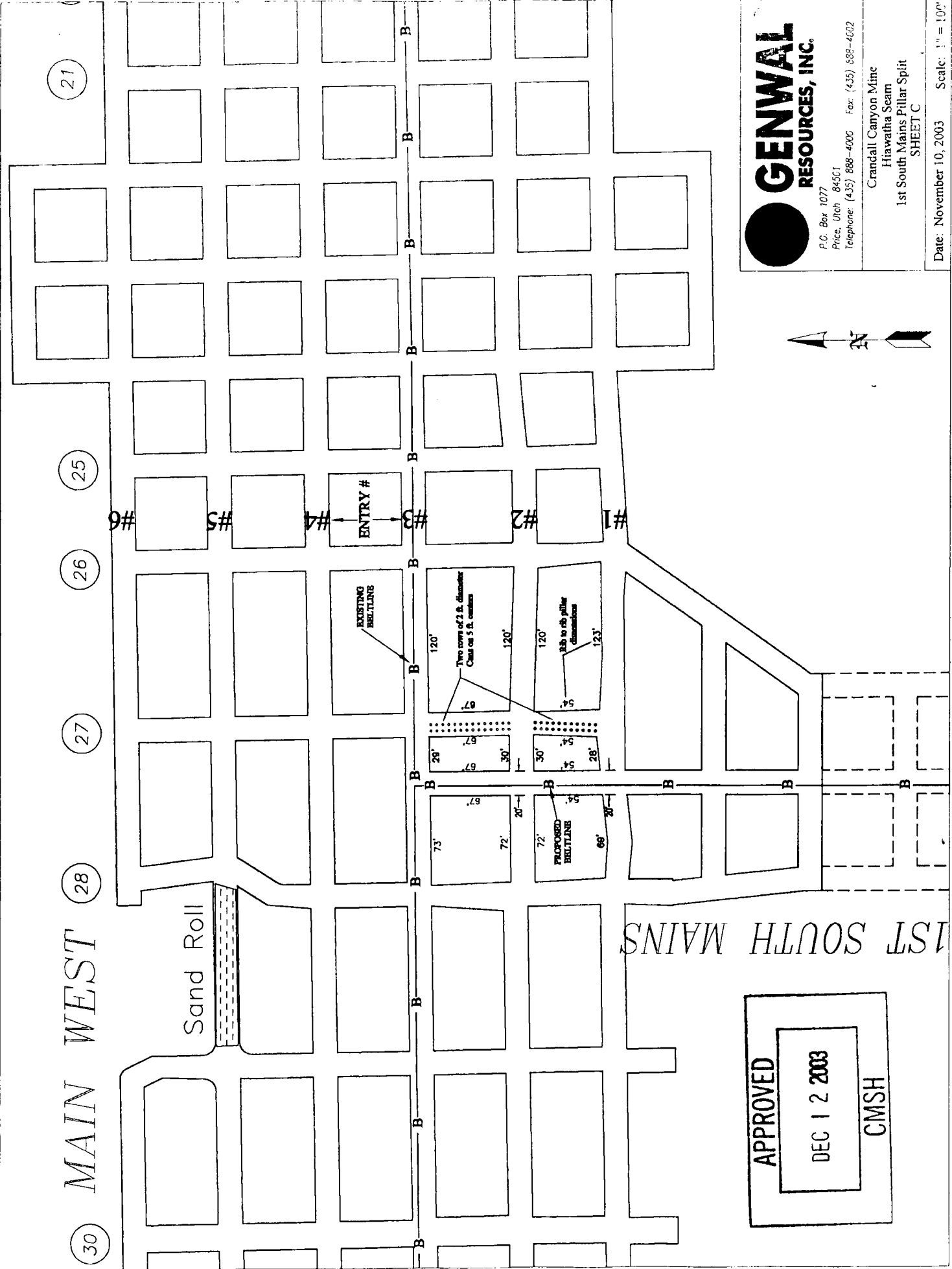
EXISTING BELTLINE

PROPOSED BELTLINE

Two rows of 2 ft. diameter Cuts on 5 ft. centers

APPROVED
 DEC 12 2003
 CMSH

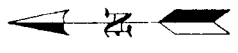
GENWALTM
 RESOURCES, INC.
 P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4002
 Crandall Canyon Mine
 Hiawatha Seam
 1st South Mains Pillar Split
 SHEET B
 Date: November 10, 2003 Scale: 1" = 10'



GENWAL RESOURCES, INC.
 P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4002

Crandall Canyon Mine
 Hiawatha Seam
 1st South Mains Pillar Split
 SHEET C

Date: November 10, 2003 Scale: 1" = 100'



APPROVED
 DEC 12 2003
 CMSH

1ST SOUTH MAINS

MAIN WEST

Sand Roll

EXISTING BELT LINE

PROPOSED BELT LINE

ENTRY #

Two rows of 2 1/2" diameter
 Chalk cut 5 ft. centers

8 1/2" to 10" pillar
 diameters

21

25

26

27

28

30

#6

#5

#4

#3

#2

#1

B

B

B

B

B

B

B

B

B

B

B

B

120'

120'

67'

67'

73'

72'

72'

68'

54'

54'

54'

54'

20'

20'

20'

28'

120'

123'

30'

30'

30'

30'

30'

30'

B

B

B

B

B

B

APPROVED

DEC 12 2003

CMSH

OPERATING MINE FILE
DATE FILED 11/10/04
INITIALS JS

NOV 10 2004

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Site-Specific Longwall Notch

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated November 3, 2004, and five drawings, addressing cutting and supporting a notch for installation of a longwall face bolter. This amendment will be incorporated into the current plan, originally approved on July 3, 2002.

This approval is site-specific for the 2nd Right Tailgate and will terminate after the longwall is extracted. Since this approval is site-specific, no pages in the roof control plan will be superseded. That is, this amendment will be added to the roof control plan as a separate attachment.

A copy of this approval must be made available to the miners and must be reviewed with all miners affected by this amendment.

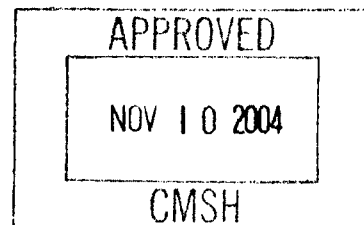
If you have any questions regarding this approval, please contact

Sincerely,

/s/ Allyn C. Davis

Allyn C. Davis
District Manager

Enclosure



8/1-11



GENWAL[™]
RESOURCES, INC.

P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 888-4000
FAX: (435) 888-4002

November 3rd, 2004

District Manager
Coal Mine Safety & Health
Denver, Colorado 80225

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

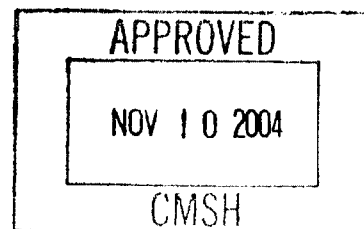
Dear Sir:

Please find attached a site-specific roof control amendment to the MSHA approved roof control plan for the Crandall Canyon Mine. This amendment addresses the mining and supporting of a notch in the 2nd Right Tailgate just outby the longwall extraction face to allow for the installation of a pan line bolter.

Should you have any questions or need additional information please contact me at (435) 888-4016 or Jim Pruitt at (435) 687-5420.

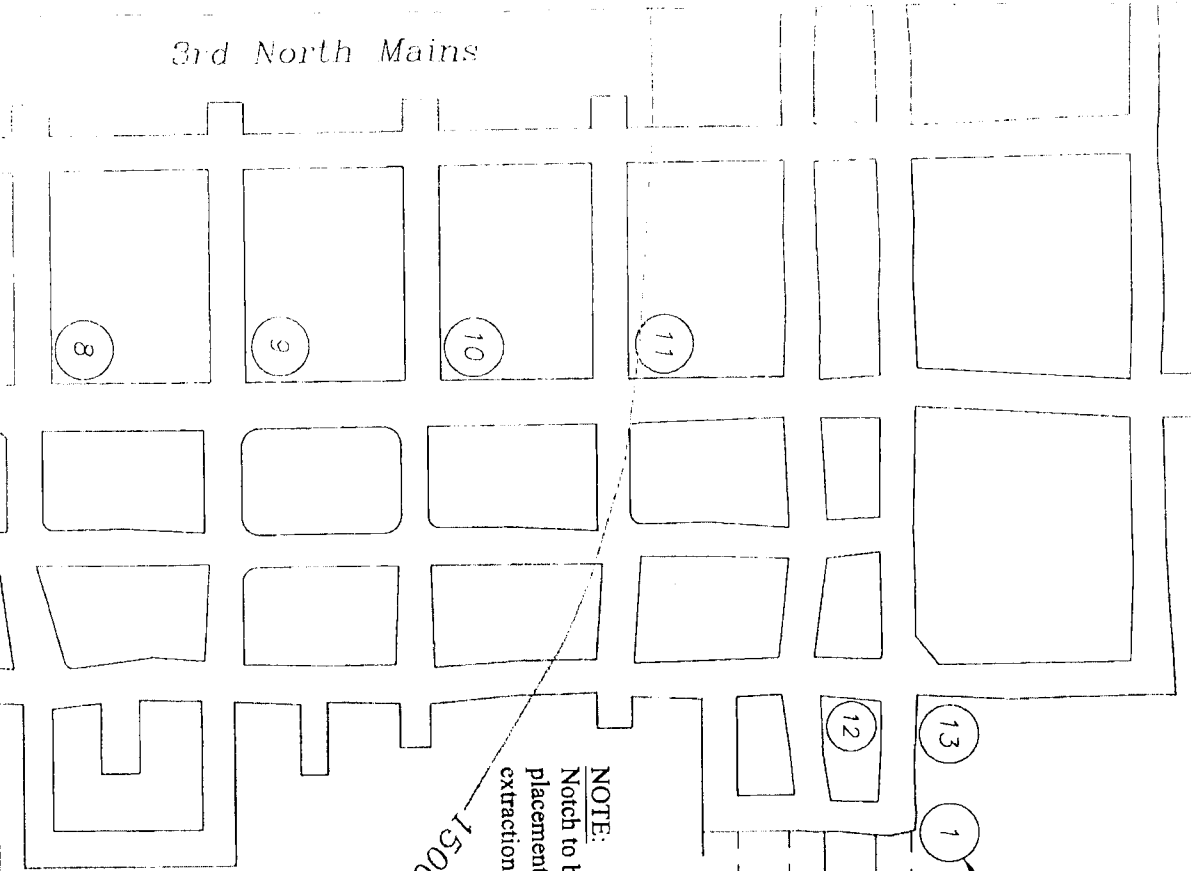
Sincerely,

John C. Lewis
Mining Engineer
Genwal Resources Inc.



NOV - 5 2004
RC 107-11
#1 #f

3rd North Mains



NOTE:
 Notch to be mined to allow for
 placement of longwall pan bolter on
 extraction face.

1500' Cover

Longwall Extraction Face

- (13)
- (1)
- (2)
- (3)
- (4)
- (5)
- (6)

x-cut # 2nd Right Gate

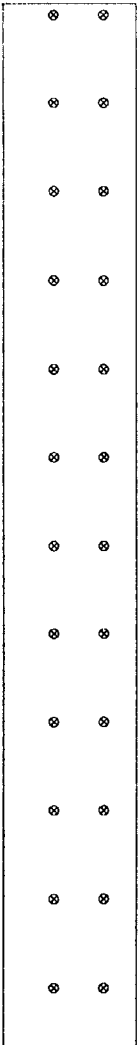
105'	120'	100'	120'	120'	120'
105'	120'	100'	120'	120'	120'
105'	120'	100'	120'	120'	120'
Entry #1	Entry #2	Entry #3			

NOV 10 2004
 GMSH



P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4002

Crandall Canyon #1 Mine
 2nd Right Gate Notch
 Scale 1"=100'
 Date: 11-08-04



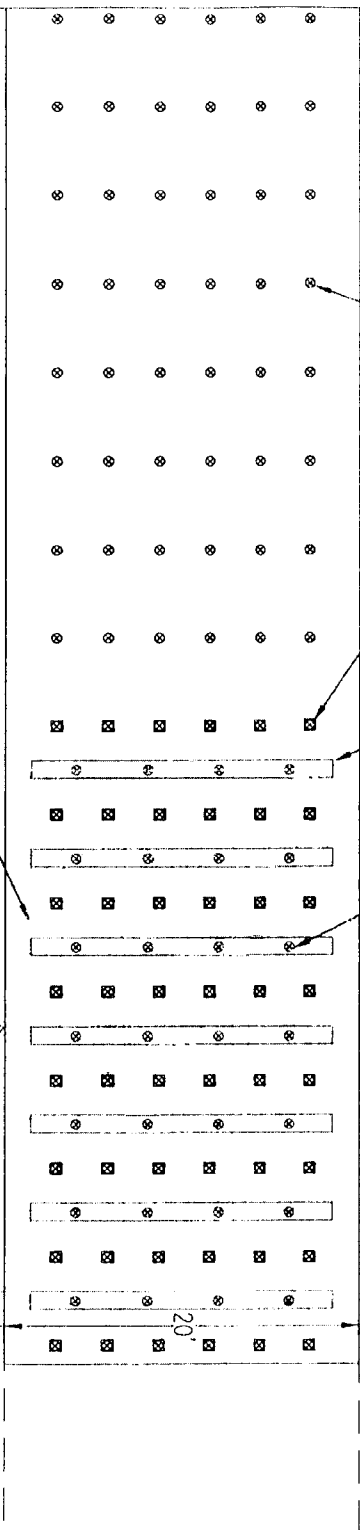
Minimum 5 ft.
fully-grouted #7
grade 60 roof bolts

Minimum 6 ft.
fully-grouted #8
grade 60 roof bolts
(6 per row)

Minimum 14
gage roof mats
installed with
each row of
cable bolts.

Minimum 10 ft. 0.6 inch
diameter cable bolt (4 bolts
per row)

Minimum 9 gage
welded wire mesh



NOTE:
All roof control materials will be installed in accordance with the MSHA approved roof control plan. All mining will be conducted in accordance with the MSHA approved ventilation plan.

Longwall Extraction Face

15' Max.

12' Max.

20

APPROVED
NOV 10 2004
C/MSH



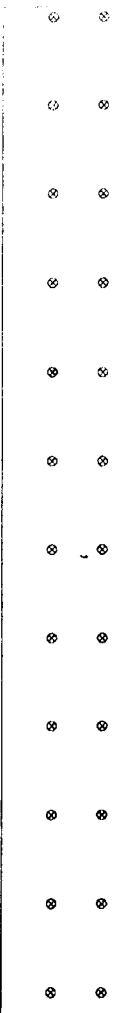
GENWAL
RESOURCES, INC.

P.O. Box 1077
Price, Utah 84501
Telephone: (435) 888-4000 Fax: (435) 888-4002

Grandall Canyon #1 Mine
2nd Right Gate Norch

Scale 1"=10'
Date: 11-08-04

Plate 2



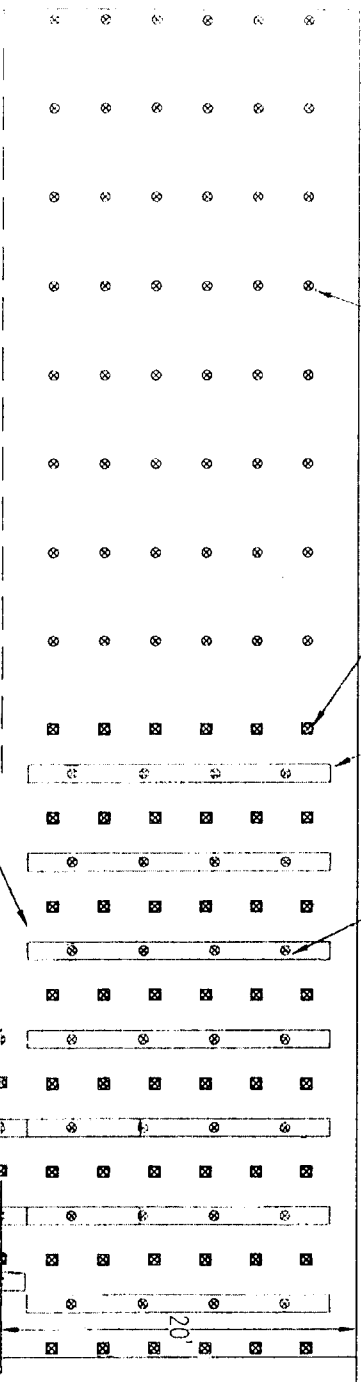
Minimum 5 ft.
fully-grouted #7
grade 60 roof bolts

Minimum 6 ft.
fully-grouted #8
grade 60 roof bolts
(6 per row).

Minimum 14
gage roof mats
installed with
each row of
cable bolts.

Minimum 10 ft. 0.6 inch
diameter cable bolt (4 bolts
per row).

Minimum 9 gage
welded wire mesh



Wall Extraction Face

APPROVED
NOV 10 2004
C/MSH

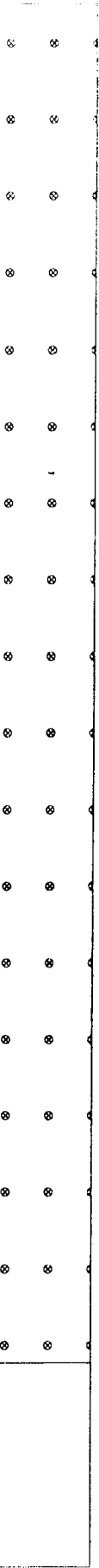


P.O. Box 1077
Pine, Utah 84501
Telephone: (435) 888-4000 Fax: (435) 888-4002

Grandall Canyon #1 Mine
2nd Right Gate Notch
Scale 1"=10'
Date: 11-08-04

Plate 3

NOTE:
All roof control materials will be installed in accordance with the MSHA approved roof control plan. All mining will be conducted in accordance with the MSHA approved ventilation plan.

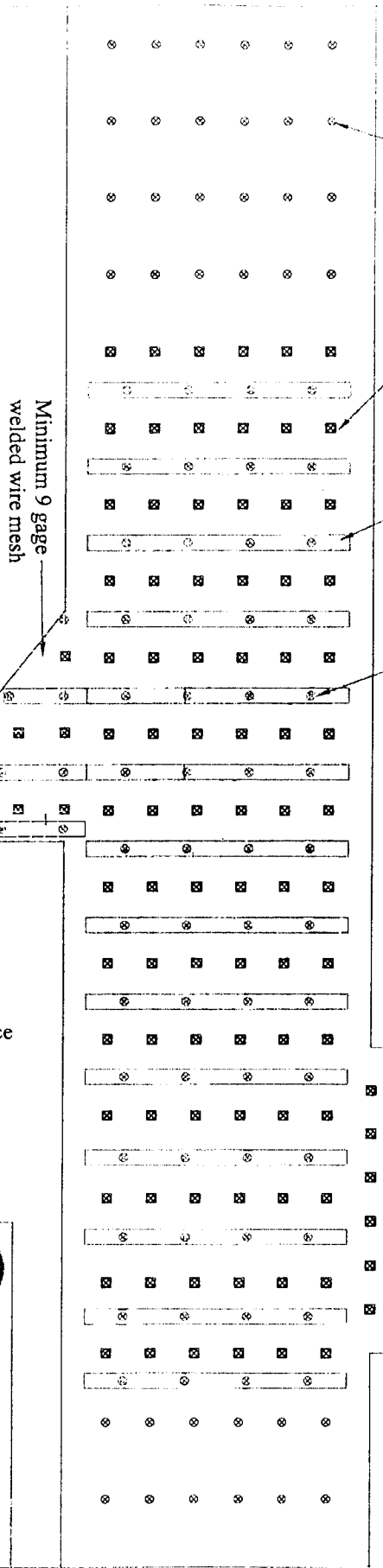


Minimum 5 ft.
fully-gouted #7
grade 60 roof bolts

Minimum 6 ft.
fully-gouted #8
grade 60 roof bolts
(6 per row).

Minimum 14
gage roof mats
installed with
each row of
cable bolts.

Minimum 10 ft. 0.6 inch diameter
cable bolt (4 bolts per row).



NOTE:
All roof control materials will be installed in accordance with the MSHA approved roof control plan. All mining will be conducted in accordance with the MSHA approved ventilation plan.

Longwall Extraction Face

APPROVED

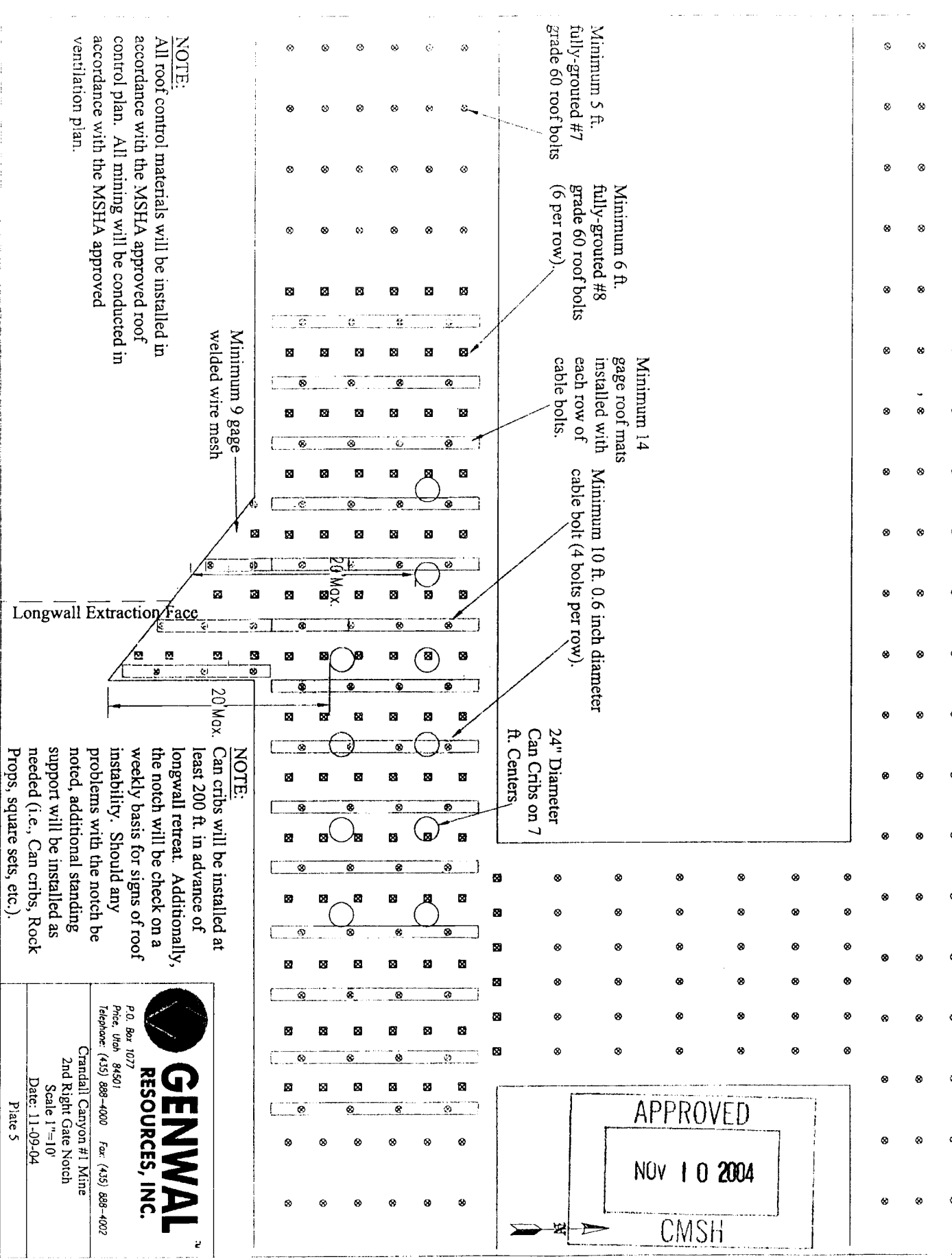
NOV 10 2004

CMSH



P.O. Box 1077
Pine, Utah 84501
Telephone: (435) 888-4000 Fax: (435) 888-4002

Chandall Canyon #1 Mine
2nd Right Gate Notch
Scale 1"=10'
Date: 11-08-04



APPROVED

NOV 10 2004

CMSH

NOTE:

All roof control materials will be installed in accordance with the MSHA approved roof control plan. All mining will be conducted in accordance with the MSHA approved ventilation plan.

Minimum 9 gage welded wire mesh

24" Diameter Can Cribs on 7' A. Centers

NOTE:

Can cribs will be installed at least 200 ft. in advance of longwall retreat. Additionally, the notch will be check on a weekly basis for signs of roof instability. Should any problems with the notch be noted, additional standing support will be installed as needed (i.e., Can cribs, Rock Props, square sets, etc.).



P.O. Box 1077
 Price, Utah 84501
 Telephone: (435) 888-4000 Fax: (435) 888-4002

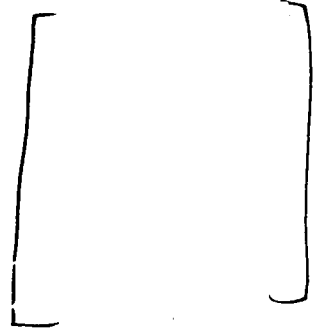
Grandall Canyon #1 Mine
 2nd Right Gate Notch
 Scale 1"=10'
 Date: 11-09-04

UNDERGROUND MINE FILE	
DATE FWD.	9/5/03
INITIALS	JB

SEP - 5 2003

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501



RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan Amendment
Pillar Mining

Dear Mr. Adair:

The referenced roof control plan amendment is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of the following:

Cover letter, dated May 20, 2003.
Cover letter, dated July 24, 2003.
Fax cover sheet, dated September 4, 2003
Pages 21 and 22, dated May 20, 2003.
Page 23, dated September 4, 2003.
Page 24, dated May 20, 2003.
Page 25, dated July 24, 2003.
Pages 26 and 27, dated September 4, 2003.
Pages 28 thru 30, dated May 20, 2003.
Page 31, dated July 24, 2003.
Page 32, dated May 20, 2003.
Pages 33 and 34, dated July 24, 2003.
Pages 35 and 36, dated May 20, 2003.
Page 37, dated July 24, 2003.
Pages 38 and 39, dated May 20, 2003.
Page 40, dated July 24, 2003.
Pages 41 thru 45, dated May 20, 2003.
Pages 46 and 47, dated July 24, 2003.
Pages 48 and 49, dated May 20, 2003.
Page 50, dated July 24, 2003.
Pages 51 thru 53, dated May 20, 2003.
Pages 54 and 55, dated July 24, 2003.
Pages 56 thru 62, dated May 20, 2003.
Page 63, dated July 24, 2003.
Pages 64 thru 66, dated May 20, 2003.
Pages 67 thru 77, dated July 24, 2003.

B4-A4

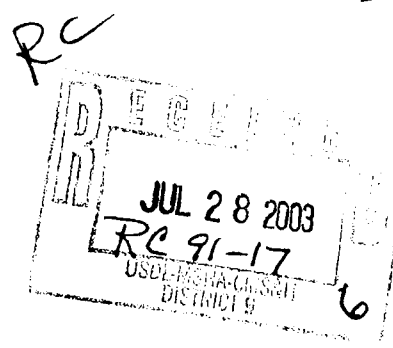


P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 564-4000
FAX: (435) 564-4002



July 24, 2003

Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

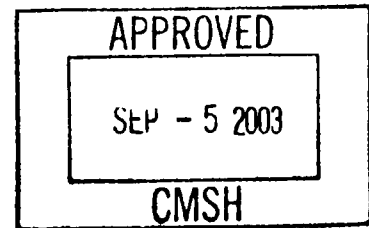


Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

Dear Mr. Davis:

Please find enclosed for your review and approval those pages as identified in your letter of July 14, 2003 noting changes that were needed to the submittal. Please also note that some added pages are included with corrections, these corrections were discussed in a conversation with Mr. Bob Hendrix's of your office prior to your letter. Summary of deficiencies and replacement pages are as follows:

- Item 1; new page 23
- Item 2; new page 25
- Items 3, 4, and 5; new page 26 with exception to item 4, as stated these cuts would need roof bolted and that is stated within the notes on the page. Positioning of the MRS units anywhere within those cuts prevents the mining cycle, and placement of the MRS units after the mining cycle prevents the roof bolting cycle. Placement of the MRS units in any other locations for use during the number 5 and 12 cuts other than where now shown on drawing, may require installation within the gob. Which is not practical.
- Item 6; new page 27
- Items 7 and 8 duplicate requests
- Item 9; new pages 33 and 34
- Item 10; new pages 46 and 47
- Item 11; new pages 54 and 55
- Item 12; new pages 67 through 75
- Item 13; new pages 76 and 77
- Item 14; new pages 82 through 91
- Item 15; new pages 92 and 93
- Added pages form Hendrix's conversation; 31, 37, 40, 50, and 63

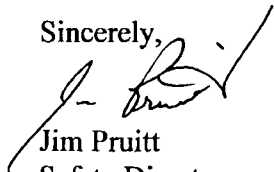


When approved please add these pages to the present plan that was submitted on May 20, 2003 and

then attach to the approved Roof Control Plan, which was approved July 2002.

Should you have any questions or need additional information please contact me at (435) 687-5420 mine site.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Pruitt", written over the word "Sincerely,".

Jim Pruitt
Safety Director
Genwal Resources Inc.

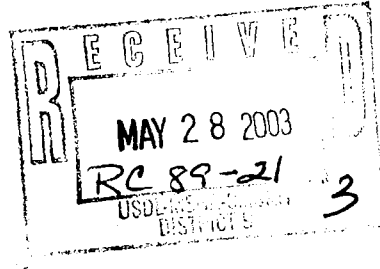


P.O. BOX 1077
PRICE, UTAH 84501
PHONE: (435) 564-4000
FAX: (435) 564-4002



May 20, 2003

RC



Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

Dear Mr. Davis:

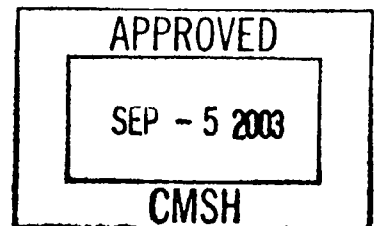
Please find enclosed for your review and approval Genwal's proposed pillar extraction plan utilizing Mobile Roof Supports (MRS). The previous submittals of April 4, 2003 and May 7, 2003 concerning the pillar extraction plan need to be withdrawn from the approval process and replaced with this current submittal. This submittal incorporates those items as discussed with Mr. Bob Hendrix's of your office. When approved please add these pages to the present plan that was approved on July 2002.

Should you have any questions or need additional information please contact me at (435) 687-5420 mine site.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Pruitt", written over a horizontal line.

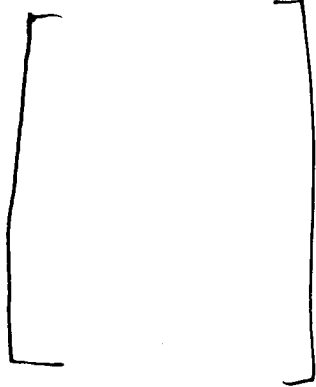
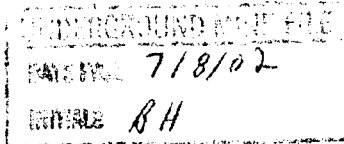
Jim Pruitt
Safety Director
Genwal Resources Inc.



CRANDALL CANYON MINE

BASE PLAN

APPROVED JULY 3, 2002



JUL - 3 2002

Coal Mine Safety and Health
District 9

Laine W. Adair
General Manager
Genwal Resources, Inc.
P.O. Box 1077
Price, UT 84501

RE: Crandall Canyon Mine
ID No. 42-01715
Roof Control Plan

Dear Mr. Adair:

The referenced roof control plan is approved in accordance with 30 CFR 75.220(a)(1).

The submittal consisted of a cover letter, dated January 9, 2002, and 21 pages, a cover letter, dated February 1, 2002, and a revised page 2, a cover letter, dated May 20, 2002, and revised pages 10, 11 and 15, and those items as discussed and noted between Laine Adair and Billy Owens on July 1, 2002. The plan is subject to revision at any time and shall be reviewed by the operator and MSHA at least once every six months.

This plan supersedes the previously approved plan and all previously approved amendments.

A copy of this approval must be made available to the miners and must be reviewed with all persons affected by this plan.

If you have any questions regarding this approval, please contact



Sincerely,

Allyn C. Davis
District Manager

Enclosure

APPROVED

JUL - 3 2002

CMS&H

[]

JUL 3 2002
CHAMBERLAIN



January 9, 2002

P.O. Box 1077, Mile Post 33, Hiway 31, Huntington, UT 84528
Telephone (435) 687-5420 - Fax (435) 687-5422

District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

RC
JAN 14 2002
RC 73-11
SD - SHA-CMS&H
DIST ICT 9

Dear Mr. Davis:

In response to your letter of December 4, 2001 concerning a number of discrepancies to the current approved roof control plan, please find enclosed for your review and approval a complete revised roof control plan. To assist in the review and for identifying the changes made in response to the discrepancies noted in your letter, please note the following:

Discrepancies as numbered:	Action taken;
1 - 4	New page with items addressed changed.
5	Terms omitted and changed as noted.
6	Statement included.
7 (a,b,d)	New statements added page 2,
7 (c)	Statement added item 5 page 3
8	Statement included. Statement included about tunnel liners or arches item C (3).
9	Page removed.
10	Changes as noted.
11	New page, now shown on page 8.
12 (a,b,c)	Changes as noted.
13 - 17	Changes as noted.
18 - 21	Page removed
22	Changes as noted.
23 - 25	Reference page 13 only retained and assigned new page # of page 10, changes as noted.
26 - 31	Changes as noted, assigned new page # as page 11.
32 - 42	Pages removed.

JUL 12 2002

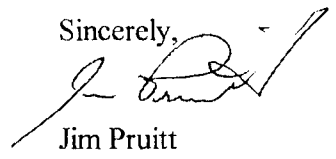
JUL - 3 2002

GMSBH

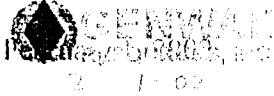
- 43 Change as noted, new page # 12
- 44 - 48 Changes as noted, new page # 13
- 49 - 51 Changes as noted, new page # 14
- 52 Items addressed
- 53 With Two-Entry mining method x-cuts become part of existing gob, the tailgate entry in it's entirety is supported and maintained as described.
- 54 Statement is current as to equipment used.
- 55 Dukes added to support list.
- 56 - 60 Changes as noted, new page #'s 16 and 17
- 61 - 62 Changes as noted, new page # 20
- 63 Not Applicable
- 64 Statement added page 4 item H.
- 65 Statement added page 4 item I.

Should you have any questions or need additional information please contact me at (435)687-5420 minesite or (435)564-4000 main office.

Sincerely,



Jim Pruitt
Safety Director
Genwal Resources Inc.
P.O. Box 1077
Price, Utah 84501



FEB 2002
RC 74-07
USDL-MSTIA-CMSSM
DISTRICT 9

P.O. Box 1077, Mile Post 33, Hiway 31, Huntington, Ut 84528
Telephone (435) 687-5420 - Fax (435) 687-5422

District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

APPROVED

JUL 3 2002

CMS&H

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan Amendment

Dear Mr. Davis:

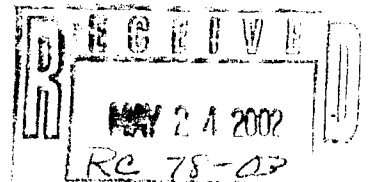
On January 9, 2002 a complete roof control plan was submitted for re-approval. This was in response to your letter of December 4, 2001 which identified a number of items and areas that was felt needed attention. In our hast to get the plan submitted in a timely manner, an oversight and an error we feel were inserted into the submitted plan. Item 7 (d) of your letter references bolting the roof within 8 hours after mining, we responded to this item and made the apparent change. However, after further review of the conditions at Genwal and the past History of roof falls at Genwal we feel that the 8 hours bolting requirement can be changed to a 24 hour time frame for bolting of a newly mined area.

In response to this item, please find enclosed a replacement page (2) **for insertion into the complete roof control plan that was submitted for re-approval on January 9, 2002.**

Should you have any questions or need additional information please contact me at (435)687-5420 minesite or (435)564-4000 main office.

Sincerely,

Jim Pruitt
Safety Director
Genwal Resources Inc.
P.O. Box 1077
Price, Utah 84501



P.O. Box 1077, Mile Post 33, Hiway 31, Huntington U 84528
Telephone (435) 687-5420 - Fax (435) 687-5422

May 20, 2002

Mr. Alynn Davis
District Manager
Coal Mine Safety & Health
P.O. Box 25367
Denver, Colorado 80225

APPROVED

JUL - 9 2002

CMS&H

Re: Crandall Canyon Mine
I.D. # 42-01715
Roof Control Plan

Dear Mr. Davis:

In response to your letter of May 13, 2002, concerning changes to the submitted roof control plan of January 9, 2002, please find the following responses for your review and approval. When approved please add these pages to the complete plan that was submitted for approval on January 9, 2002.

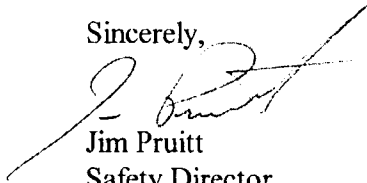
Response to items identified by number;

- #1. The titles have been changes so that they agree.
- #2. The new drawing (page 10) now shows a turn row and a breaker row with corresponding description of installation on a new page 11.
- #3. Changes concerning turn row installation and the exceptions have been removed on the new page 11.
- #4. This item has been deleted on new page 11.
- #7. The reference to 9' skin to skin has been added to the new page 15.
- #8. In response to this issue, Genwal feels that an additional support in this area is not needed due to the following information. A review of the tail gate closure history from Genwal's records and filed reports for the past 5 years, reveals that there have only been 3 occurrences. Those being on 11/9/97, 10/10/97, and 3/24/99. This time frame involves a total of 11 mined tailgates, 9 of which were two entry tailgates. The notes taken during the investigation of the tailgate closures by Genwal and MSHA were reviewed, looking at the cause and location of each of these occurrences. In each case a channel margin of widening shale roof was encountered. Involvement was restricted to deterioration of the immediate roof in and around the permanent and supplemental supports. The area of roof involved was between the supplemental support to the block side or to the yield pillar side. Some rib cutters were identified. Also some lateral movement was noted in the occurrence of 3/24/99. The deterioration that was observed, was the roof screens that became loaded with material from the immediate roof. This condition caused the screens to sag and break allowing the material to hang down or fall to the floor impeding travel. In all cases,

the supports primarily remained intact with some roof bolt heads breaking off. It is noted, none of these blockages involved the cross-cuts. They ranged from only a small area 20 - 25 feet outby the face, to an area extending to a maximum distance of 120 feet outby of the face. It is also noted that these occurrences were isolated to the North West section of the mine. Panel 8 using 5th West as the headgate and 6th West(three entry) as the tailgate experienced 2 of the 3 reports. The other reporting was on panel 12 which used 1st West as the headgate and 2nd West(two entry) as the tailgate. Genwal is presently mining in the South West section of the mine and are moving into panel 18. We have successfully mined 5 complete panels using the present method of support, all without incidents.

Should you have any questions or need additional information please contact me at (435)687-5420 - minesite.

Sincerely,



Jim Pruitt
Safety Director
Genwal Resources Inc.

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JUL - 3 2002

CMS&H

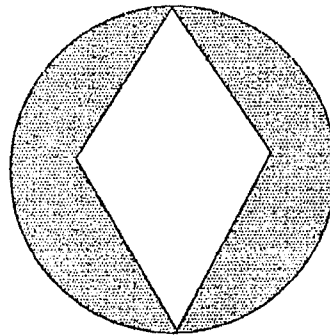
GENWAL RESOURCES INC.

Pride & Performance

GENWAL

RESOURCES

INC.



HUNTINGTON, UTAH

CRANDALL

CANYON

MINE

APPROVED

JUL - 3 2002

CMS&H

ROOF CONTROL PLAN

MINE ID# 42-01715

DECEMBER 20, 2001

GENERAL INFORMATION

A. DATE: DECEMBER 29, 2001 MINE I.D. NUMBER: 42-01715
 COMPANY: GENWAL RESOURCES, INC.
 ADDRESS: P.O. BOX 1077 PRICE UTAH
 Street City State

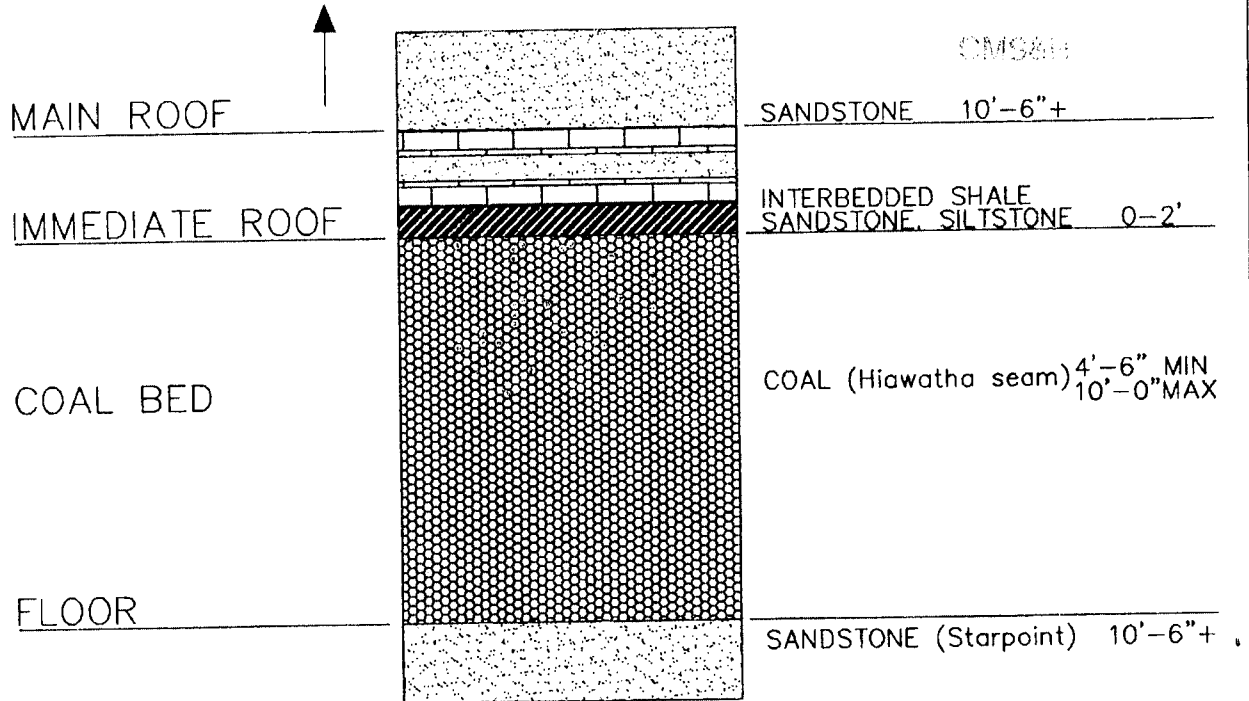
B. MINE: CRANDALL CANYON #1 MINE
 MINE LOCATION: HUNTINGTON EMERY UTAH
 City County State

C. LOCATION (reference to nearest highway route, direction, and distance)
1.5 MILES WEST OFF ROUTE NO. STATE HIGHWAY 31
15 MILES NW OF HUNTINGTON, UTAH

D. TYPE(S) OF PLAN: FULL BOLTING
 E. AREA(S) OF MINE COVERED BY THE PLAN: ENTIRE MINE
 F. MAXIMUM COVER: 2,500 FEET

APPROVED

JUL - 3 2002



G. [Signature] SAFETY DIRECTOR 01/09/02
 Company's Official Signature Title Date

Roof Control Investigator [Signature]
 The Roof Control Plan approved this date hereby supercedes all previously approved plans.

APPROVED BY [Signature] SAFETY DIRECTOR 01/09/02
 Signature Title Date

A. FACE EQUIPMENT:

1. LEE NORSE TD1-43 SERIAL # 3624 ATRS - 11,250 LBS.
2. FLETCHER HDDR-13 SERIAL # 89027 - 37,125 LBS.
3. FLETCHER DDR-13B SERIAL # 90068 - 38,250 LBS.
4. FLETCHER DDO-17B SERIAL # 84090 - 36,000 LBS.

B. SAFETY PRECAUTIONS FOR FULL BOLTING PLAN:

1. This roof control plan was formulated for normal conditions while using the mining system(s) described. In areas where subnormal roof conditions are encountered, indicated, or anticipated, the operator will evaluate and shall provide additional support or action where necessary. If changes are to be made in the mining system that necessitates any change in the roof control plan, the plan shall be revised and approved prior to implementing the new mining system.
2. When a side cut is planned to be turned from any mine opening, permanent supports (roof bolts) shall be installed inby the projected inby rib line or the side cuts either left or right, with at least three (3) full rows of permanent supports or at least to within 5 foot of the face. When a side cut holes through into or is started from a permanently supported entry, room, or crosscut, the intersection so created shall be considered unsupported and no work shall be done in or inby such intersection unless the provisions of item (i) below are followed: **Note Exception**

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JUL - 3 2002

CMS&H

- (i) The newly created intersection opening, shall be supported with at least one row of posts or roof jacks installed from under permanent supports on not more than five foot centers across the opening or one row with a minimum of 4 permanent supports on five foot centers are installed as shown in the drawing on page 20.

Exception: Travel inby the newly created intersection opening for performing required examinations or necessary ventilation changes may be allowed, no other work shall be performed.

3. REMOTE OPERATED CONTINUOUS MINER PRECAUTIONS:

(a) A conspicuous reference mark on the continuous mining machine or some other visual means shall be provided for the workers to determine when the maximum depth of cut is attained.

(b) When subnormal or adverse roof conditions are encountered, the depth of the cut will be limited until roof conditions have improved to a point where extended cuts may be resumed. At least one 20-foot cut will be taken in good (normal) roof areas and the roof evaluated by the mine foreman or section foreman before extended cuts are resumed.

(c) Areas will be bolted within 24 hours after mining, especially if the roof is composed of laminated, unconsolidated material. Places will not remain unbolted over weekends or over any other extended periods, regardless of the roof strata. Unless the roof bolter is broke down.

4. On haulage ways, all crossbars or beams shall be installed with some means of support (i.e., pan straps, mats, etc.) that will prevent the beam or crossbar from falling in the event the supporting legs are accidentally dislodged.
5. When the continuous mining machine is being operated from the remote position, neither the operator nor any other person shall be inby the second row of permanent roof supports outby the face area (next to the last row), while the continuous mining machine is in operation. No person shall be inby the continuous mining machine's work position while coal is being cut, mined or loaded. For the purpose of identifying the second outby row of permanent roof supports for haulage equipment operators in deep cut sections, a warning device shall be placed on the next to the last row of permanent supports.
6. A calibrated torque wrench or an other accepted means of measuring the torque shall be provided on each bolting machine.
7. Two safety jacks shall be maintained within the immediate working section to be used when adverse roof conditions are encountered and the ATRS does not supply adequate protection for the roof bolting machine operator.

C. ROOF SUPPORT FOR CLEANUP OF ROOF FALLS, OVERCASTS AND OUTBY AREAS.

This section of the roof control plan is designed to address the areas of the mine outby the face area and in areas where the ATRS will not pressurize against the roof.

1. During the cleanup of roof falls and overcasts outby the face area. A row of temporary supports will be installed on 5 foot centers not more than 5 feet inby the last row of permanent support prior to the installation of the next row of permanent support. To be used only when a Roof Bolting machine not equipped with an ATRS or the ATRS can not be made to pressurize against the roof. Manufactured and Certified ATRS extensions may be used instead of temporary supports to allow pressurizing ATRS against the roof.
2. In areas in the face which have experienced roof falls and the ATRS cannot be made to pressurize against the roof, a row of temporary support will be installed within 5 feet of the last row of permanent support on 5 foot centers. This will be done prior to the installation of the next row of permanent supports. Temporary supports shall be removed by remote means on each advance of the permanent supports.
3. No tunnel liners or arches are presently used at this mine, a site specific plan will be provided if used.

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JUL - 3 2002

CMS&H

D. RIB CONTROL PLAN

Rib control (control of sloughage) shall be dictated by rib conditions and operator evaluation. To control rib conditions, the use of cribs, timbers, bolting, or scaling down will and can be used. If resin bolts are used in the process of rib control, bolts shall be placed at the appropriate spacing and angles to achieve the proper control.

E. MISCELLANEOUS

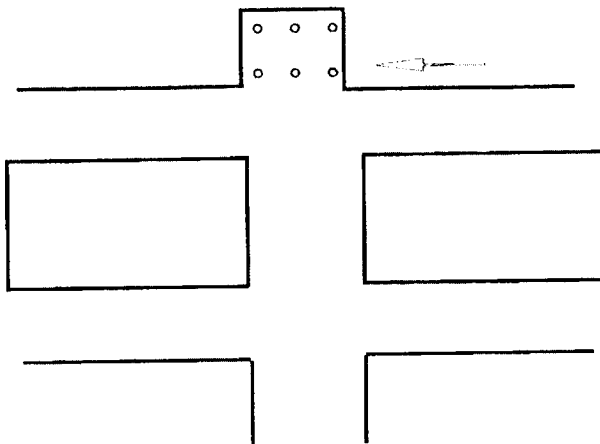
1. The portals that are used for travel shall be constructed to protect people from falling material.
2. When underground workings proceed within 150' of known outcrops, faults, or burn areas, additional supporting materials will be employed to control the roof.

F. Outby Pillar Splitting Plan

A site specific plan will be submitted to MSHA for approval prior to the splitting of any outby pillar.

G. Axillary Fan Notches

Fan notches may be developed a maximum of 10' deep and 20' wide using normal crosscut development procedure (refer to drawing below). **MULTIPLE ENTRY/TWO ENTRY FAN NOTCHES WITH 3 BOLTS IN NOTCH**



APPROVED

JUL - 3 2002

000001

- H. **Bleeder entries** will be maintained free of roof falls and standing water in excessive depths which would prevent safe travel of the bleeder.
- I. **Polyurethane grout** use precautions are addressed in the approved Ventilation Plan.

ROOF SUPPORT MATERIAL LIST

TYPE OF BOLT	LENGTH OF BOLT	DIAMETER OF BOLT	GRADE OF BOLT	ANCHORAGE TYPE	DRILL HOLE SIZE	INSTALLED TORQUE RANGE (FT-LBS)	TEST HOLE INTERVAL	MANUFACTURERS DESIGNATION
NON-TENSIONED GROUTED	60' MIN.	3/4" 7/8" 1"(.914) 1-1/8"	GR 60	RESIN LENGTH WILL MATCH BOLT LENGTH	1" 1-1/8" (1-1/8" to 1-3/8" 1-1/2"	150 MIN. ONE BOLT IN FIRST ROW ONLY	N/A	R KB WVKU B VB D KW UB BI KK M IB KI BB PB KP
MECHANICAL	60' MIN.	5/8" 3/4"	GR 75	EXPANSION SHELL	1-3/8" 1-3/8"	100-200 150-250	1 PER PLACE BOLTED	R KB WVKU B VB D KW UB BI KK M IB KI BB PB KP
INSTALL BOLT	60' MIN.	3/4" .677" MIN.	GR 75	RESIN GROUTED MECHANICAL ANCHOR	1" TO 1-5/8"	100-300	1 PER PLACE BOLTED	R KB WVKU B VB D KW UB BI KK M IB KI BB PB KP
RESIN GROUTED/ MECHANICAL ANCHORED	60' MIN.	3/4" MIN. ANCHOR 5/8" MIN. MECH. SEC.	GR 60 ANCHOR GR 75 MECH. SEC.	RESIN GROUTED MECHANICAL ANCHOR	1" TO 1-1/2" 1" TO 1-1/2"	150-350 150-350	N/A	R KB WVKU B VB D KW UB BI KK M IB KI BB PB KP

TYPE OF BEARING PLATES: BEARING PLATE STRENGTH WILL MATCH BOLT STRENGTH
 5' x 5', 6' x 6', 6' x 16', 6' x 18'; 3/16" & 3/4" thick; Hole Diameter 1-1/4" Max.
 7' x 5" CHANNEL PLATE

LIST OF MATERIALS USED WITH ROOF BOLTS

Header Blocks
 Planks
 Steel Roof Mats
 Wire Mesh
 Steel Bearing Plate
 Chain Link Fence
 Tensar Polymer Grid BX3316 and GC3320

Wooden Crossbars
 Steel Channel
 Wire Rope
 Aluminum Beams
 F-Beams

NOTE: 1. All materials conform to the specifications of ASTM F 432-95 and will be installed, used, and/or discarded according to the manufacturer's recommendations.
 2. 24" Mechanical bolts (belt hangers)

SUPPLEMENTAL ROOF SUPPORT MATERIALS LIST

Posts
 Cap Blocks
 Wedges
 Metal Jacks
 OTW Supports
 Fiberglass Bolt (Longwall block rib support)

Crossbars
 Planks
 Crib Blocks
 Split Sets
 JM Roof Trusses

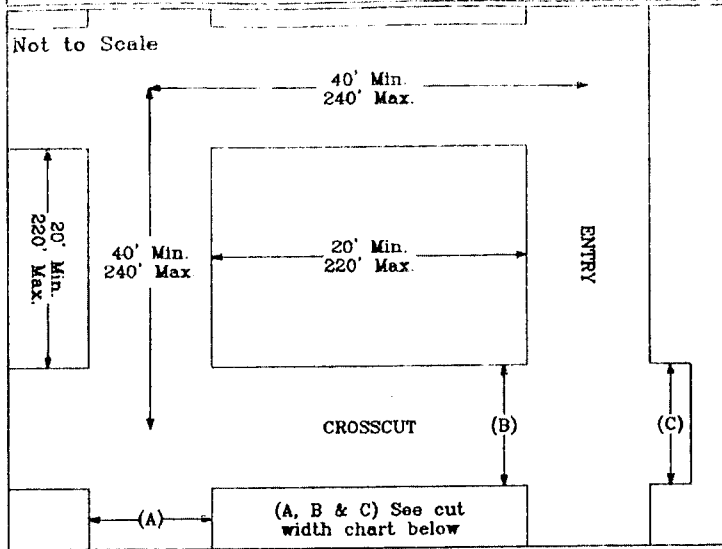
Corrugated Plate
 Steel Sets
 Cable Bolts
 Trusses

Arches
 Polyurethane grout (rock lock)
 Dukes
 Hand Packable
 Variable Yielding
 Cribs (HP VYC)

GENVAL RESOURCES, INC.
 I.D. 42-01715
 SCALE N/A

APPROVED
 JUN 12 2006
 [Signature]

NORMAL PILLAR DIMENSIONS



JUL - 3 702

MSRH

(A) - MAXIMUM CUT WIDTHS FOR ENTRIES

(B) - MAXIMUM CUT WIDTHS FOR CROSSCUTS

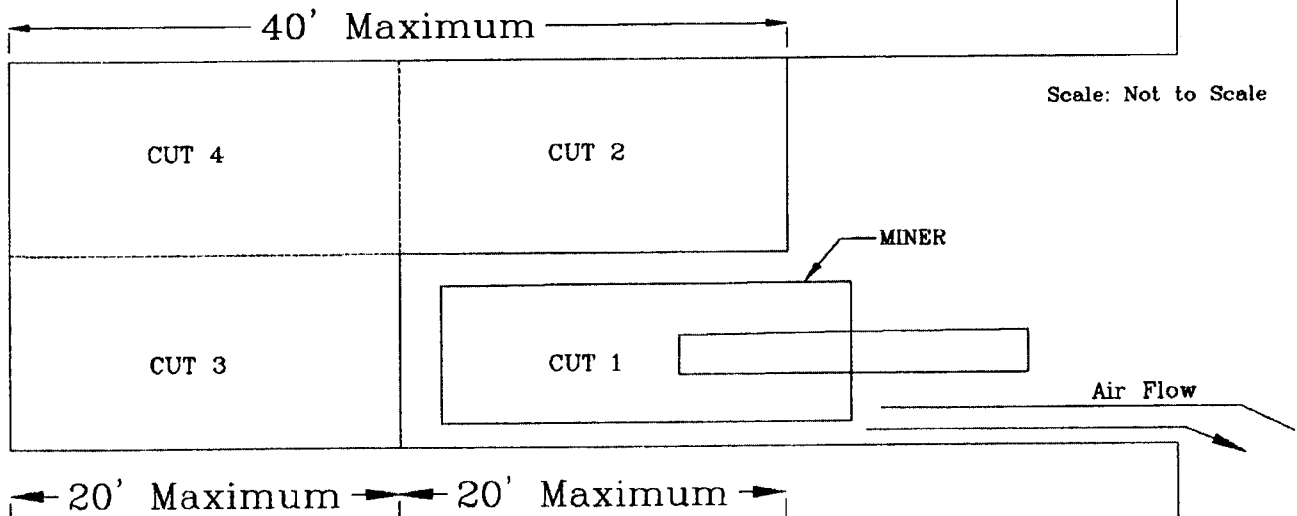
ENTRIES (NORMAL MINING)	20'
ROOM ENTRIES	20'
LONGWALL SET-UP ENTRY	25'
BELT DRIVE/BELT STORAGE UNIT	24'

CROSSCUTS (NORMAL MINING)	20'
ROOM CROSSCUTS	20'
LONGWALL SET-UP AND EXTRACTION	25'
NOTCHES (C)	20'

INFORMATION & PROCEDURES

1. Crosscuts may range from 45° to 90° left to right or right to left.
2. Crosscuts may be staggered or adjacent. Pillar dimensions are independent from one another.
3. Minimum of 4 bolts per row.
4. Mirror image applies.

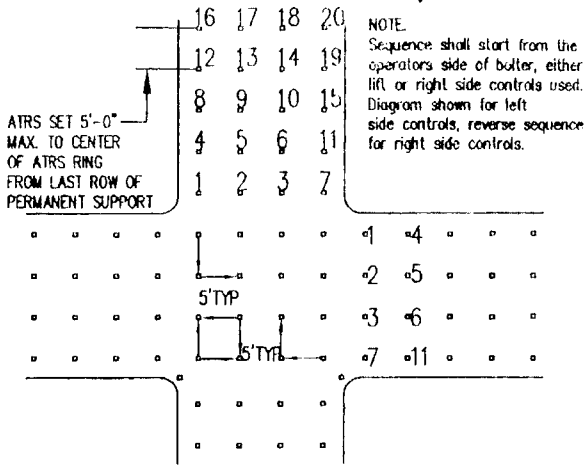
CUTTING SEQUENCE



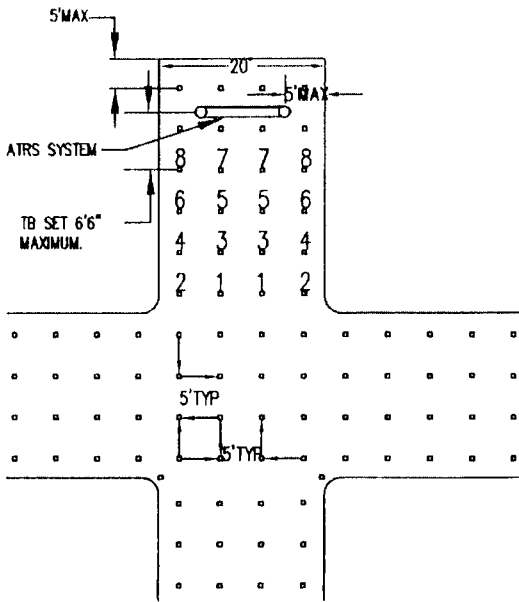
When adverse roof conditions are encountered, depth of cut will be limited.
 On-board operation of continuous miners will be limited to 20' deep maximum cuts.
 Remote control operation of continuous miners will be limited to 40' deep cuts
 as measured from the last row of permanent supports.

SEQUENCE OF MINING

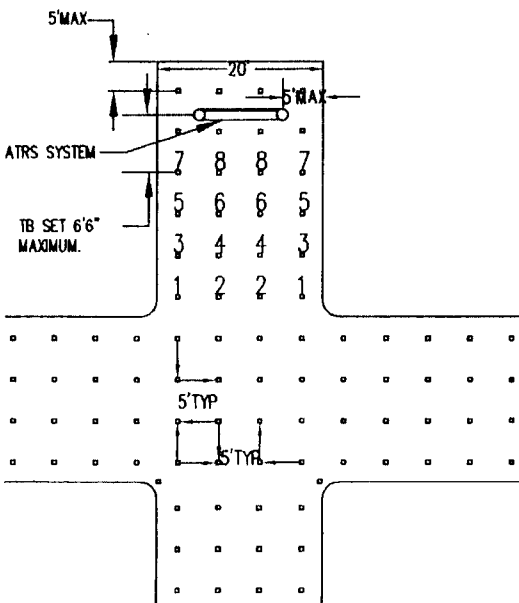
SINGLE BOOM ROOF BOLTING SEQUENCE



**ROOF BOLTING SEQUENCE
INBOARD CONTROLS**



**ROOF BOLTING SEQUENCE
OUTBOARD CONTROLS**



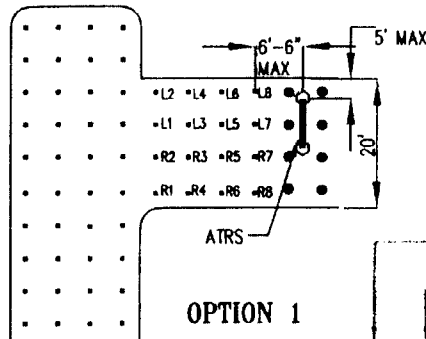
NOTES:

1. Roof bolts will be installed in the sequence as shown by the numbers during normal operations.
2. When conditions dictate, bolting patterns may be altered (reduced spacing) to achieve necessary support. Dimensions are maximums and can be reduced if required.
3. Roof bolt spacing shall not exceed five (5) feet.
4. Bolting sequence is as shown.
5. Minimum of 4 Bolts per row.

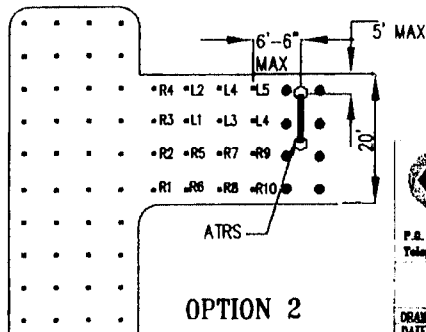
LEGEND:

- Future permanent support
- Permanent support ROOF BOLTS
- R Right boom operator
- L Left boom operator
- 3 Sequence number

TWIN BOOM ROOF BOLTING SEQUENCE TYPICAL CROSS CUT INBOARD CONTROLS



OPTION 1



OPTION 2

APPROVED
SEP 30 2004
CMSh

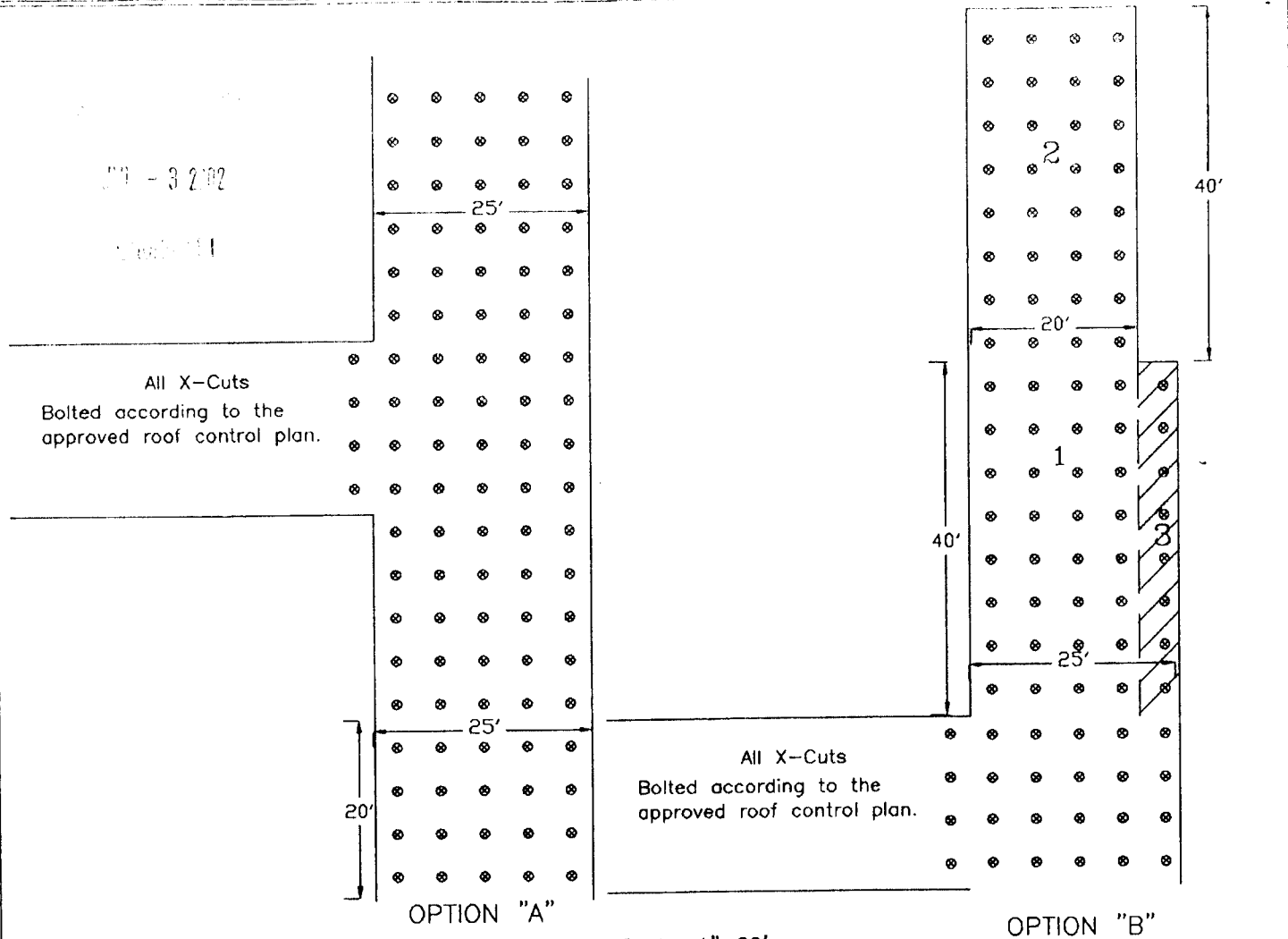
**GENVAL
RESOURCES, INC.**

P.O. Box 10777 Provo, Utah 84601
Telephone (435) 666-6990

**BOLTER SEQUENCE AND
TYPICAL SEQUENCE CUT**

DRAWN BY: P.S.T. SCALE: NONE
DATE: 2/28/04 REV. DATE: 6/17/04
ACAD FILE NO.: MMS00.000

LONGWALL SET-UP ROOM MINING AND ROOF SUPPORT SEQUENCE



LEGEND

Roof Bolt ●

NOTES:

1. The set-up room will be mined to the approved widths during initial development of the set-up entries.
2. The depth of cuts will not exceed 20' option "A". The depth of cut will not exceed 40' option "B".
3. Option "A" mined 25' wide from start. Option "B" mining sequence; cut "1" mined 20' wide for 40' then bolted; cut "2" mined 20' wide for 40' continuous miner then backs up and slabs rib of previous cut "1" by 5' noted as "3"; bolting of slabbed area to completed first before bolting area "2".
4. 5' long fully grouted resin bolts will be installed on not more than 5' centers to support the set-up room.

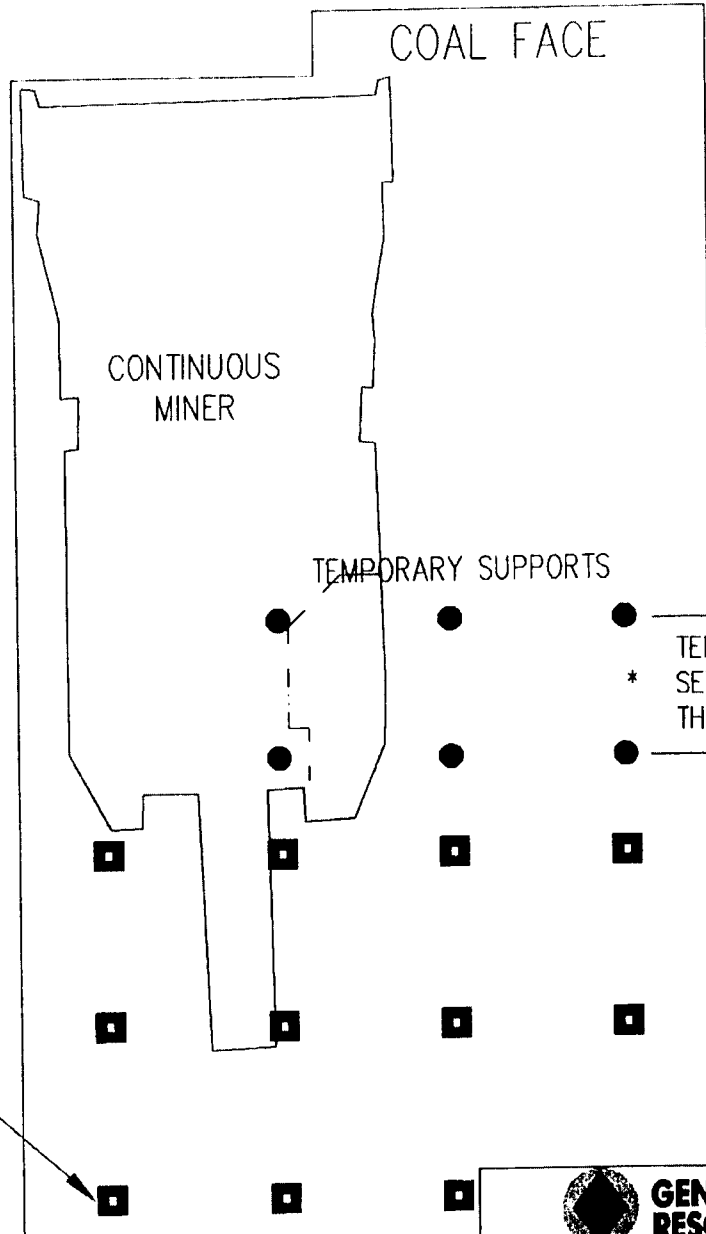
TYPICAL LONGWALL SUPPORT SYSTEM

ROOF SUPPORT INSTALLATION for DISABLED MINER INBY PERMANENT SUPPORTS

JUL 19 9 2007

NOTES:

1. AT LEAST TWO ROWS OF TEMPORARY SUPPORTS SHALL BE INSTALLED INBY WHERE THE WORK IS TO BE PERFORMED.
2. BLOCKING SHALL BE PROVIDED ON THE MACHINE EITHER SIDE WHERE PRACTICABLE.



TEMP. SUPPORTS TO BE
* SET ON NO MORE
THAN 4' CENTERS

LEGEND:

- Temporary supports
- Permanent supports

* IN THE EVENT OF CONTINUOUS MINING MACHINE BREAKDOWN INBY PERMANENT ROOF SUPPORTS, THE UNSUPPORTED AREA SHALL BE ROOF BOLTED ON PATTERN TO THE EXTENT POSSIBLE AND THE TEMPORARY SUPPORTS SHALL BE INSTALLED PRIOR TO STARTING REPAIR WORK. AFTER REPAIR WORK IS COMPLETED, ALL TEMPORARY SUPPORTS SHALL BE REMOVED BY REMOTE MEANS IN A MANNER THAT WILL NOT EXPOSE PERSONS TO UNSUPPORTED ROOF.



**GENVAL
RESOURCES, INC.**

P.O. Box 1077 Price, Utah 84501
Telephone (435) 584-4000

ROOF SUPPORT INSTALLATION for DISABLED MINER

DRAWN BY: L.W.J.

DATE: 11/21/91

SCALE: 1"=5'-0"

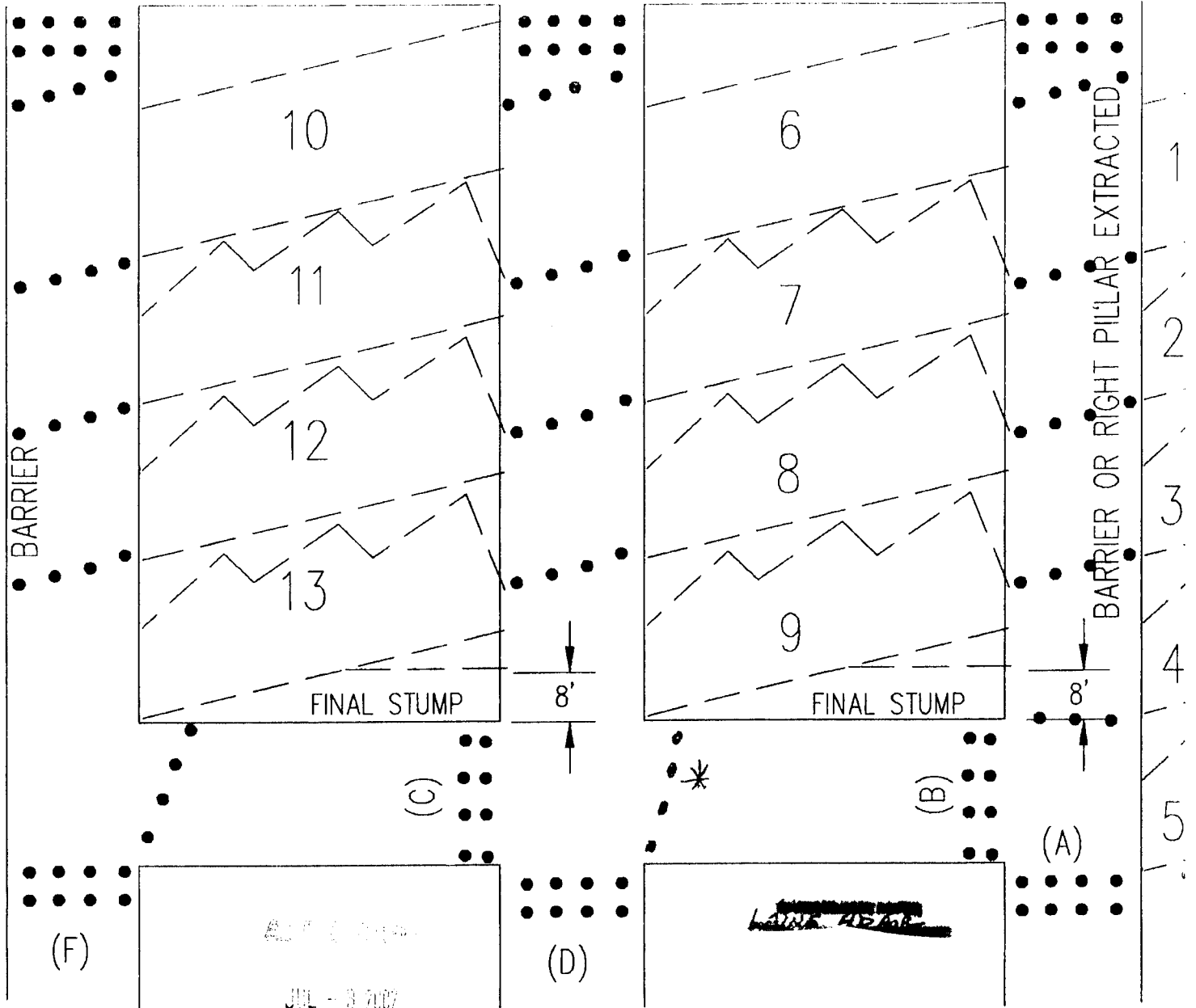
ACAD FILE NO.: TEMPSUPP.DWG

PAGE 9


REV. DATE: 02/10/92

PLOT SCALE: 1"=50'

REMOTE CONTROL PILLAR EXTRACTION NO. 1



See page 11 for details of breaker and radius turn row support installation.

 GENWAL RESOURCES, INC.	
P.O. Box 1077 Price, Utah 84501 Telephone (435) 564-4000	
PILLAR EXTRACTION NO. 1	
DRAWN BY: L.W.J.	
DATE: 11/21/91	REV. DATE: 02/14/92
SCALE: 1"=20'	PLOT SCALE: 1"=20'
ACAD FILE NO.: PILLAR1.DWG	
PAGE 10	

REMOTE CONTROL PILLAR EXTRACTION NO. 1

35 - 3702

GM&H

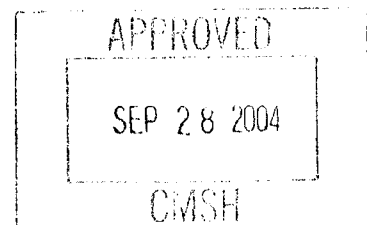
1. Breaker rows shall be installed on 4' centers.
2. Radius/turn row timbers shall be installed on 4' centers.
3. Radius/turn row timbers shall be installed prior to the start of the cut.
4. Final stumps will be left intact.
5. Breaker row A installed prior to cut 4 being mined.
6. Breaker row B installed after cut 5 and prior to cut 6 being mined.
7. Breaker row C and D installed after cut 9 is mined and before cut 10.
8. Breaker row F installed after cut 13 is mined.
9. Breaker rows will be installed at the locations indicated and will be installed as close to the break line as practicable. Previous breaker installation shall proceed the same across section.
10. In sections equipped with a remote control continuous miner, advance will be limited to the extent that the shuttle car operator's controls remain under supported top.
11. Direction of pillar and pillar row will be optional, depending on the existing ground conditions. Pillar extraction will start and remain the same throughout the row of pillars being mined. No left and right mining from the same entry will be done.
12. Size of stumps between full cuts 1 to 4, respectively on each pillar, may be reduced as shown and will vary in size.

SAFETY PRECAUTIONS FOR LONGWALL SHIELDS:

1. Genwal Resources Inc. currently utilizes JOY double leg shield supports, rated at 875 tons per shield. These supports range in height capabilities of up to 112 inches.

The following precautions will apply to use of the JOY shield supports:

- A. Shields will be positioned with pressure against the mine roof at all times except when being advanced. A shield may be lowered away from the roof when necessary to affect repairs to the shield or to use the shield to assist in moving parts along the longwall face, or to assist in clearing the walkway. A shield will be lowered only for the time necessary to complete the work. Only one shield may be lowered at a time in an area so that shields on either side of a lowered shield are set against the roof.
- B. Shields being towed due to faulty ram jacks shall be pressurized against the mine roof after completion of the face conveyor being advanced.
- C. All shields shall be equipped with adjacent unit controls. Shields will be operated from the adjacent shield unless a control malfunction prevents shield operation. Shield control malfunctions will be repaired as promptly as possible. The following safety precautions shall be taken when a shield must be operated from an in-shield position.
 - 1. The shield will be operated from the front catwalk.
 - 2. An observer will be placed in a safe position to warn the operator of hazards while the shield is moved.
- D. No persons will be permitted to enter the face side of the cable trough unless the face conveyor has been locked out and adequate temporary roof and/or face supports have been provided as needed.



SPECIAL PRECAUTIONS FOR A TAILGATE BLOCKAGE:

1. In the event that travel from the longwall face to the tailgate entry is blocked by roof support.
 - A. All miners on the longwall face will be notified that the travel way is blocked.
 - B. All miners on the longwall face will be re-instructed in the following emergency procedures:
 - a. Section escapeway routes
 - b. Location of mantrips
 - c. The use of the SCSR
 - C. Section communication with the surface will be checked. During the production of coal and/or while persons are working on the longwall face, a individual will be stationed at the phone on the headgate side of the longwall. The face communications system will be kept operational.
 - D. The intake air to the longwall face will be continuously monitored for CO by the mine wide monitoring system or by hand held instruments.
 - E. A diesel mantrip will be maintained in the headgate entry within 1,000-feet of the face while miners are on the face.

2. In the event that travel from the longwall face through the tailgate side of the longwall is blocked by loose material or a roof fall:
 - A. In addition to the above requirements:
 - B. M.S.H.A. shall be notified of the blockage.
 - C. Attempts to remove the blockage, to establish ventilation, will be made by:
 - a. Washing out the material with a water hose.
 - b. Loading out the material with the conveyor.
 - c. Loading out the material with the shearer.

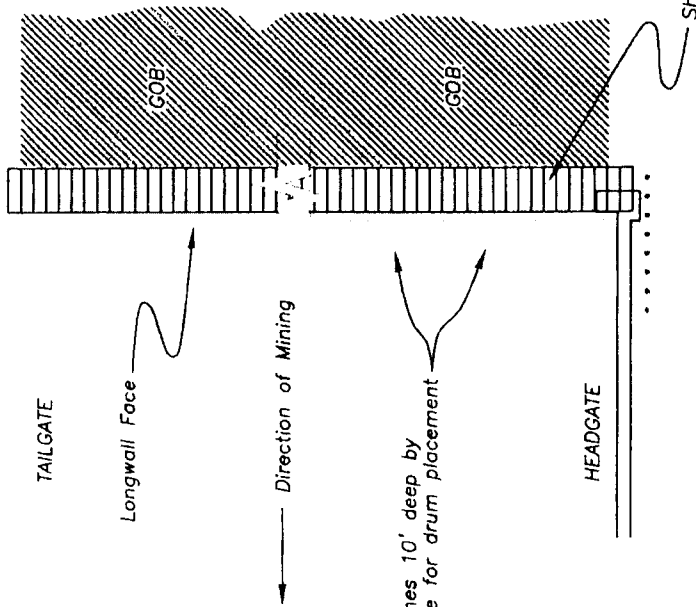
3. Coal mining may be resumed when adequate ventilation is restored. M.S.H.A. will be notified of the ventilation being restored.
4. In the event that the ventilation cannot be restored without mining through the blockage area:
 - A. M.S.H.A. will be notified of the conditions.
 - B. With the agreement of M.S.H.A. coal may be mined, to mine through the blockage with the following precautions:
 - a. Fire-hose type sprays will be added to each drum to suppress coal dust.
 - b. Coal will be cut from the face a maximum of 20 shields at a time. Mining will cease until the dust has cleared.
 - c. All persons will be required to wear respiratory protection and will be restricted from the area downstream of the shearer.
5. Precautions and procedures for a tailgate blockage will remain in effect until a travel way from the face through the tailgate has been reestablished.
6. Efforts to maintain a safe travel from the longwall face through the headgate to the primary escapeway will be accomplished by the use of additional supports and by removing any deep standing water, those items that hinder travel.
7. In the event of a headgate blockage items 1 - 4 above shall be implemented.

Tailgate Support Method:

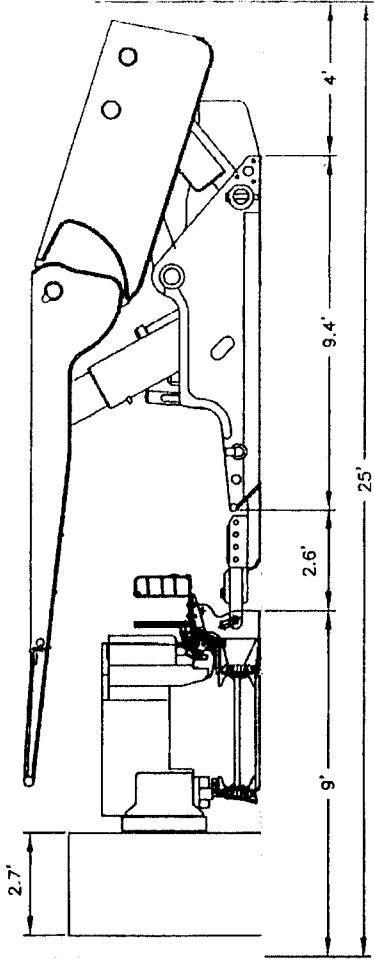
Systematic supplemental support should be installed and maintained throughout the tailgate of the first longwall panel prior to the start of longwall mining. Example; installing longer roof bolts and installing at least 20% more roof bolts than required by the approved roof control plan on development, where minimal amount of cover is encountered (i.e. 1000ft).

Each adjacent panel will have a safe travel way out of the tailgate maintained by the means described in the tailgate support plan. This supports will be installed during the advancement of the next gate section or during mining of the preceding panel as described in the tailgate support plan.

LONGWALL GATE ROOF SUPPORT PLAN



Two notches 10' deep by
11.5' wide for drum placement



TAILGATE SUPPORT INCLUDING PROPOSED TAILGATE OF ADJACENT PANEL

Support will be maintained 250' outby the face in the active tailgate, or support can be installed adjacent to face headgate side during retreat. Cable Bolts: Pattern of 3 bolts (minimum of 10 foot length) installed evenly spaced between permanent supports installed on retreat, and or Cribs and or Omega Cylinders - Cribs or Omegas will be spaced a maximum of 9' skin to skin apart and may be installed center line or offset towards the yield pillars. Also see Tailgate Support Method: page 14

GENERAL

1. Shield support center to center is 1750 mm (5.74').
2. Side flaps routinely provide skin to skin protection between shield.
3. Hydraulic jacks may be added as additional support. A crib may be installed in place of four hydraulic jacks. When the distance between 1st shield and the rib exceeds 10 feet, posts will be installed as shown.
4. Face not to exceed 950'. Timbers or hydraulic supports will be installed as needed to supplement headgate and tailgate area of face.

LONGWALL EQUIPMENT

JOY ROOF SUPPORTS
JOY SHEARER
JOY STAGE LOADER
JOY CRUSHER
L.W. ASSOCIATES CONVEYOR
HAUHINGCO HYDRAULIC SYSTEM
LINE POWER ELECTRICS

JOY SHIELDS

2 LEG, 875 TON CAPACITY
RANGE: 48" COLLAPSED HEIGHT
112" EXTENDED HEIGHT

SEP 28 2004



**GENWAL
RESOURCES, INC.**

P.O. Box 1077 Price, Utah 84501
Telephone (435) 564-4000

Crandall Canyon Mine
Longwall Gate
Roof Support Plan

SAFETY PRECAUTIONS AND PROCEDURES FOR EXTRACTING SHIELDS FROM LONGWALL FACES (REFER TO ATTACHED DRAWINGS)

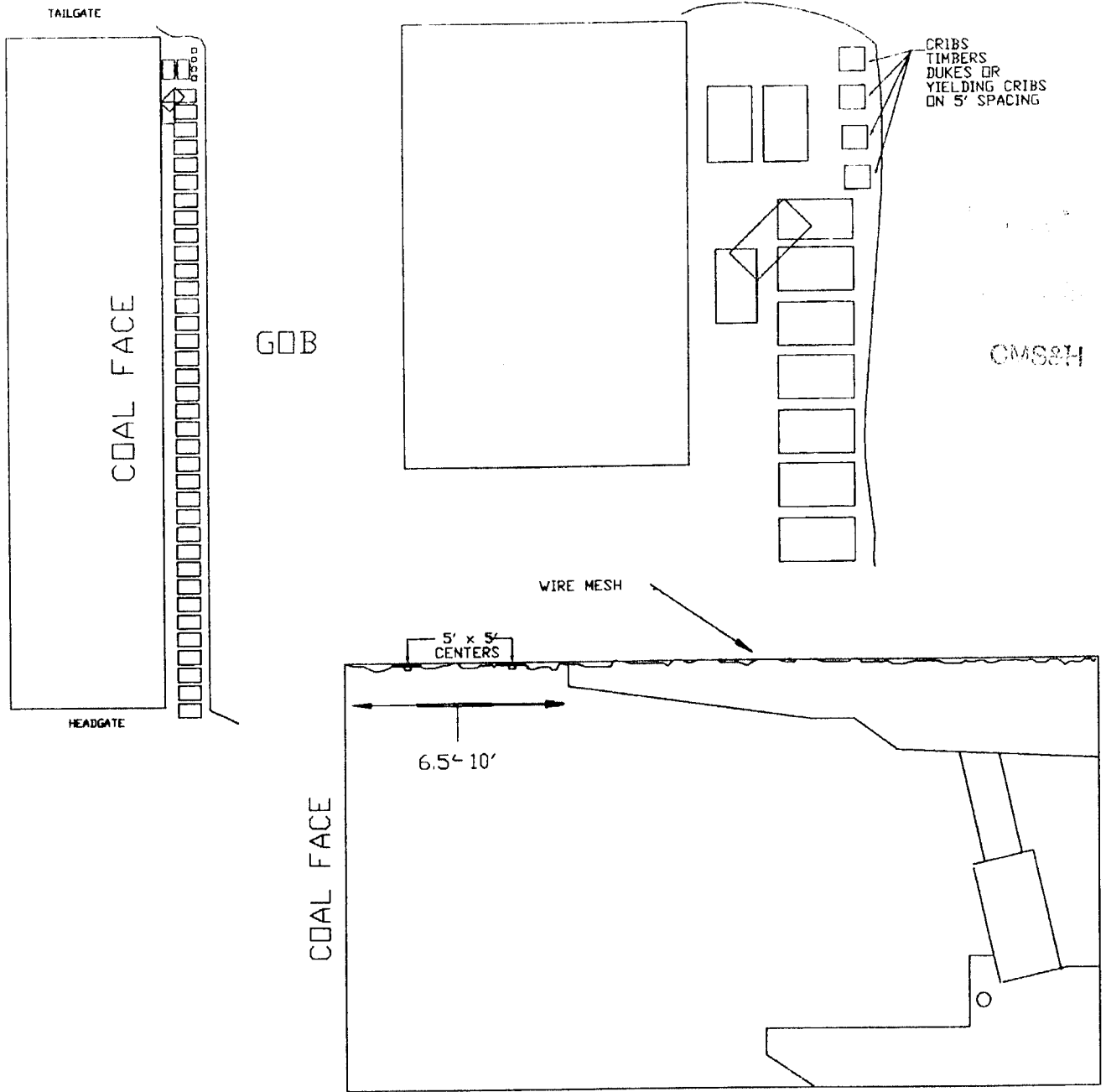
1. Shield removal equipment may be located at both the maingate and tailgate entries or at other convenient locations. The shearer, panline, drives, or other unnecessary equipment will be removed from the face area before shield extraction begins.
2. Procedure for extracting shields starting with the end shield.
 - A. Prior to the longwall reaching its stop line in preparation for a move, mesh (wire or poly grid) will be installed above the shields to prevent the gob from coming into the work area as the shields are removed. Also the last ten feet of roof will be bolted on five-foot centers with minimum five-foot bolts.
 - B. The normal support for maingate and tailgate entries, outby the end shield, remains in place. The supports may, however, be shifted to allow for turning of the end shield.
 - C. The rope or shield extractor is attached to the shield, and the shield is moved toward the sheave or removed panline area.
 - D. As the shield is moved from its starting position, supports (timber, cribs, and/or dukes) are installed as a breaker row at the edge of the gob.
 - E. As the shield is pulled toward the sheave, additional supports are used as necessary.
 - F. If the shield is pulled by a rope and sheave, it will be pulled to the sheave, the rope removed, and the other rope from a hoist located farther outby the first hoist and the shield pulled from the face area.
 - G. After the initial shield is extracted, subsequent shields may be pulled in sequence toward the tailgate and/or maingate, whichever direction applies. Steps C through F, above, apply for remaining shields.
 - H. This procedure may be used starting from the maingate and/or tailgate entries.
3.
 - A. All safety precautions and procedures A-F above apply.
 - B. Shield extraction alternating method is used to provide shield protection around the area where supports are to be placed or built. (NOTE DRAWING) Shield "A" removed,, crib built, Shield "B" removed, trailing shields

advanced. After the initial shield is extracted, subsequent shields may be pulled sequentially toward the tailgate and/or maingate. Steps C through G, above, apply for remaining shields.

- C. This procedure may be used starting from the maingate and/or tailgate entries.

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MSH

SHIELD RECOVERY PLAN



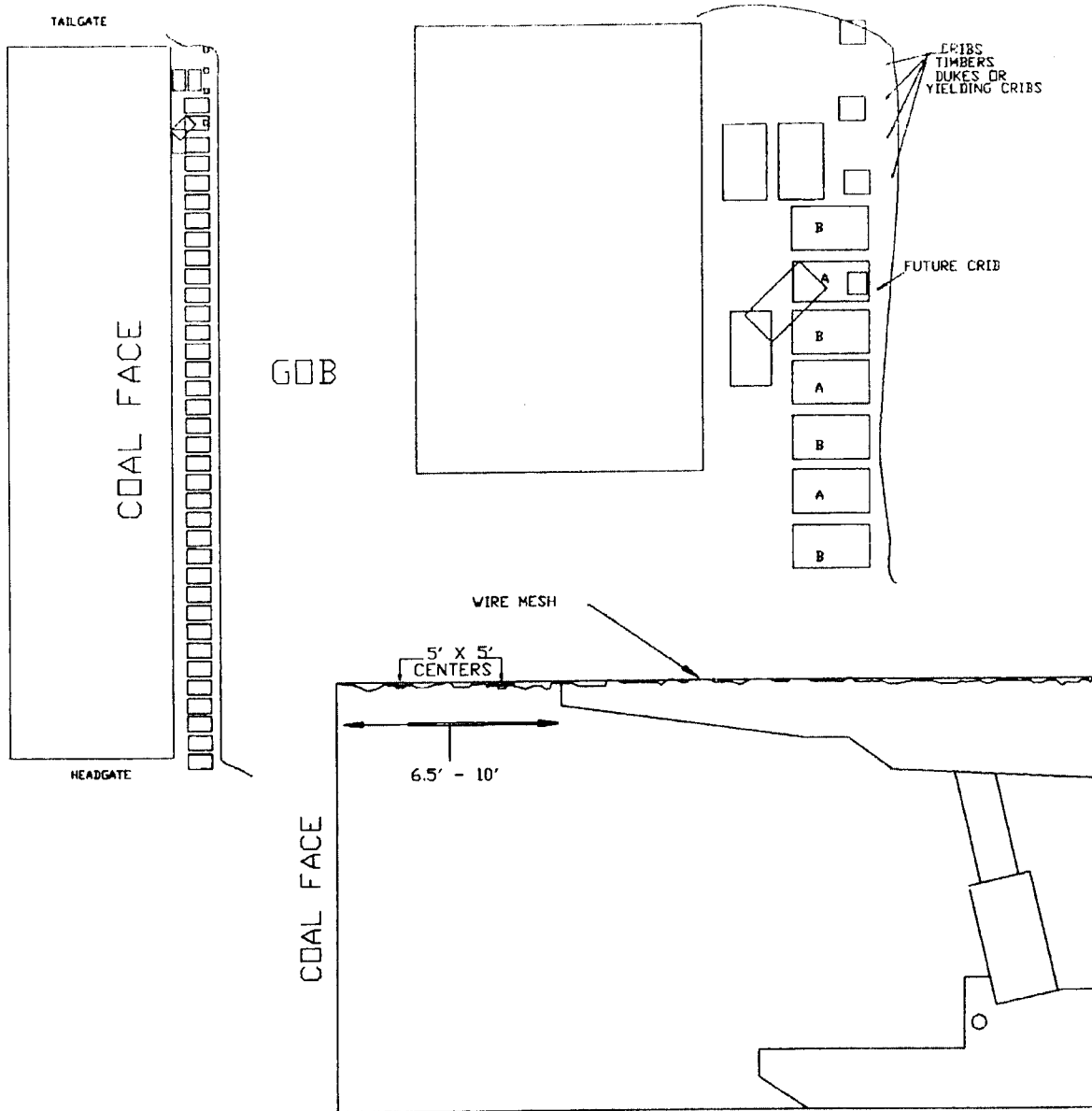
DRAWING: shield-recovery-1

NOTE:

SHIELDS MOVED WITH SCOOP,
MULE, OR CABLE

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SHIELD RECOVERY PLAN ALTERNATE METHOD



NOTE:

SHIELDS MOVED WITH SCOOP,
MULE, OR CABLE





Genwal Resources, Inc.

Crandall Mine: MSHA ID # 42-01715

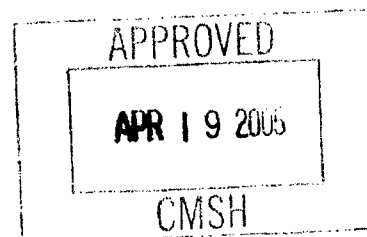
Shield Extraction of Headgate Shields #1 and #2 on Low Seam Coal Longwalls.

This plan will be used to allocate a sufficient clearance for Longwall face equipment removal due to the low seam height of approx. 61" in the gate area. These supports are gate end units, with canopy extensions, it is necessary to extract these first to attain additional clearance for removal of the remaining Longwall face equipment. .

Steps for this plan shall consist of the following:

1. Cribs to be built in place during roping. *(see plate #1, page 19B)*
2. Face bolting will be completed before any extraction of supports.
3. Mesh and rope will be completed and anchored.
4. Stage loader, cross frame and 3 pan sections from headgate area will be removed.
5. Shield #1 will be removed then wood cribs, or Cans, or RocProps will be built in its place. *(see plate #2, page 19C)*
6. Shield #2 will be removed then wood cribs, or Cans, or RocProps will be built in its place. *(see plate #3, page 19D)*
7. Removal of Longwall shear, pan line and taildrive.
8. Extraction of remaining shields will then be from tailgate to headgate.

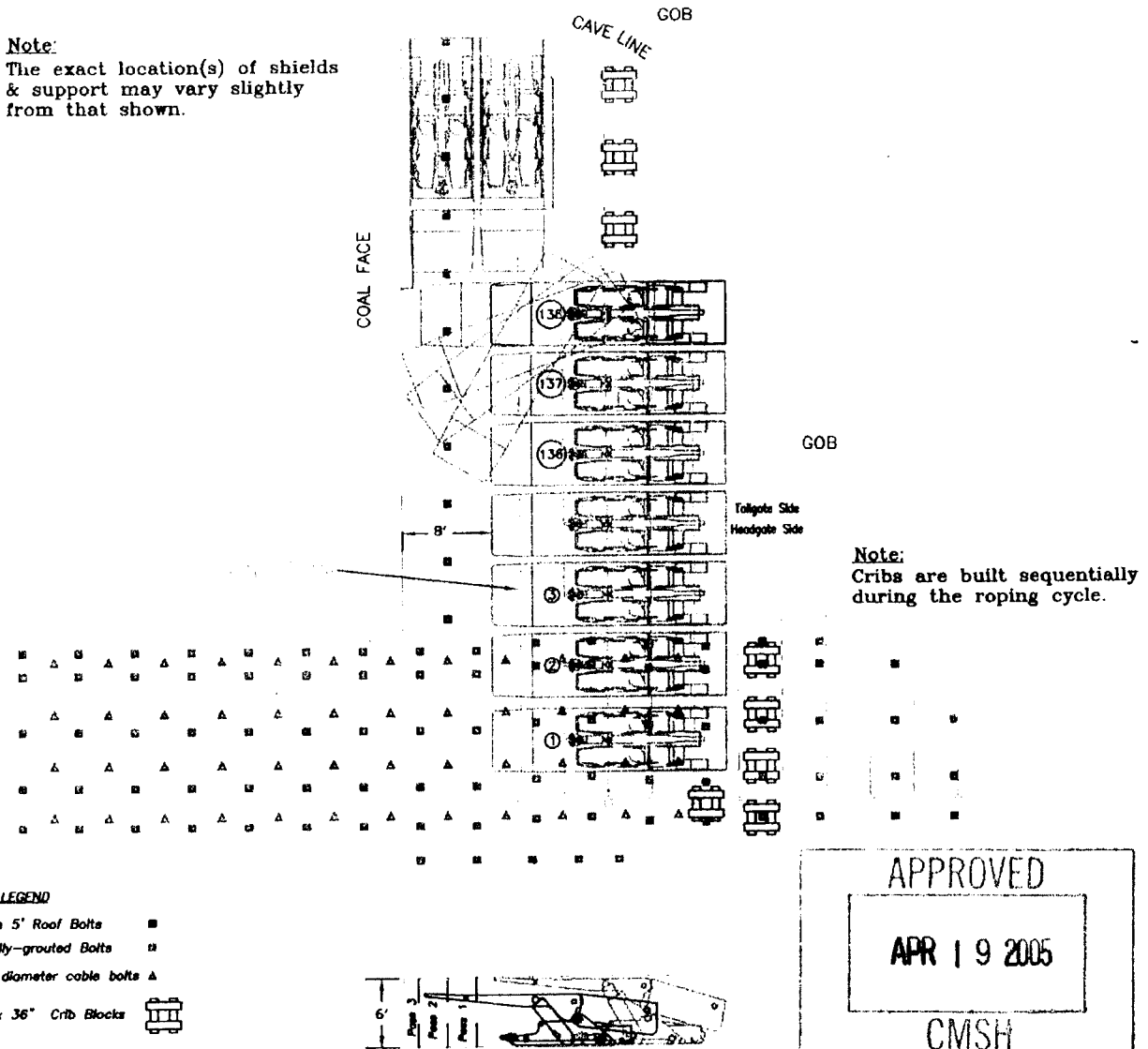
The headgate area will be supported with primary roof support consisting a minimum of 5' length #7 fully-grouted resin bolts. Additional secondary supports, consisting of 10' 0.6 inch diameter cable bolts on 5 ft. centers will be installed.



TYPICAL HEADGATE SHIELD RECOVERY PLAN FOR LOW SEAM COAL

Note:

The exact location(s) of shields & support may vary slightly from that shown.



Note:
Cribs are built sequentially during the roping cycle.

LEGEND

- Minimum 5' Roof Bolts ■
- 5' #8 Fully-grouted Bolts ○
- 10' 0.6 inch diameter cable bolts ▲
- 8' x 8' x 36' Crib Blocks □



Scale: 1"=15'

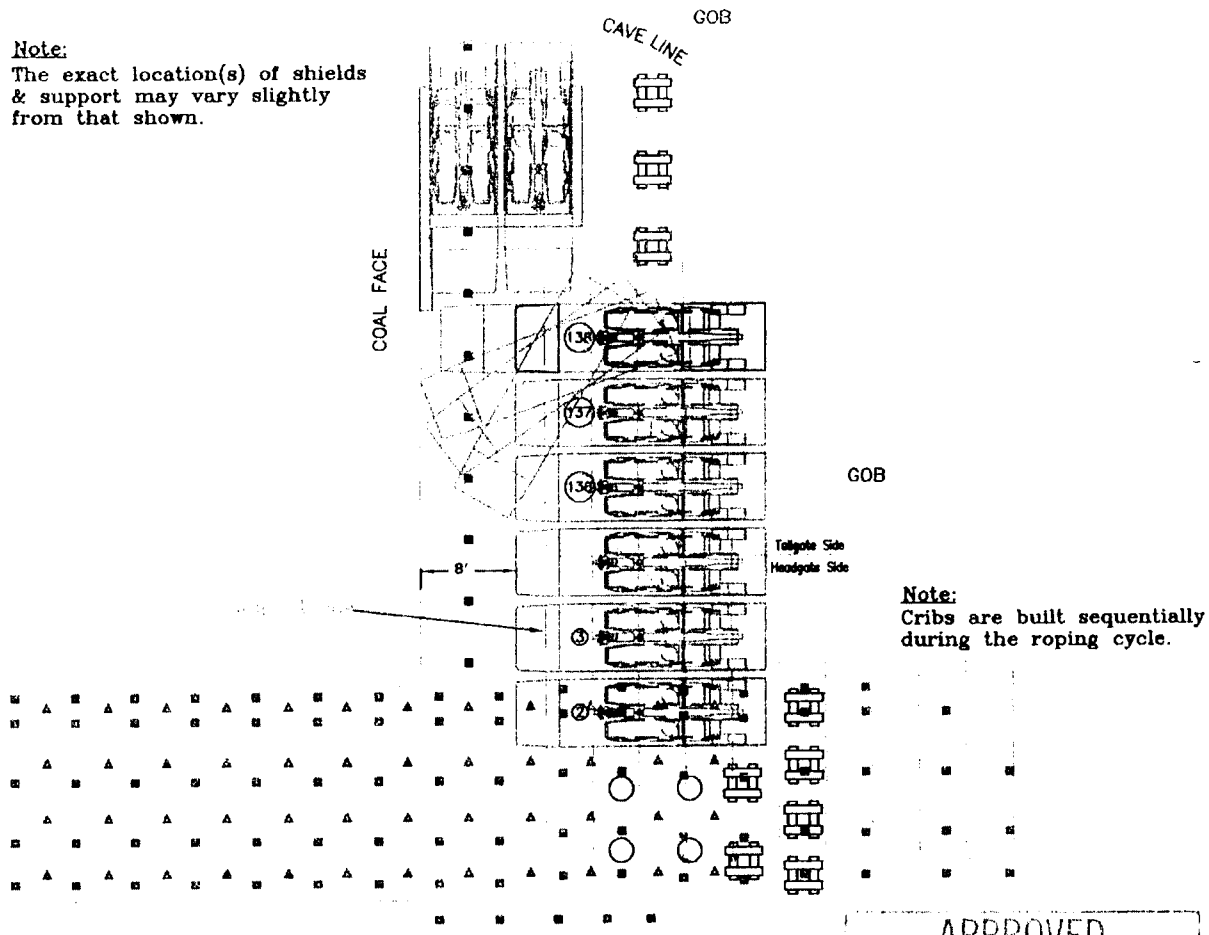
APPROVED
 APR 19 2005
 CMSH

SHIELD RECOVERY AREA



1. Wire mesh begins about 35' from the face stop line.
2. Minimum 5/8" wire rope or equivalent nylon rope installed under wire mesh for about 20'.
3. Area between shields and face to be bolted with 5' minimum length bolts on 5' max. centers using rotary and rotary percussion drills.
4. Roof bolting of the recovery area will be performed with a stoper or other portable roof drill without an integral ATRS system.
5. Wire mesh extends for full length of face.
6. When installing the first row of roof bolts the shield tip to face distance shall not exceed 5'.

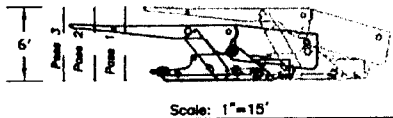
TYPICAL HEADGATE SHIELD RECOVERY PLAN FOR LOW SEAM COAL

Note:
The exact location(s) of shields & support may vary slightly from that shown.



Note:
Cribs are built sequentially during the roping cycle.

- LEGEND**
- Minimum 5' Roof Bolts ■
 - 5' #8 Fully-grouted Bolts □
 - 10' 0.6 Inch diameter cable bolts ▲
 - 8" x 8" x 36" Crib Blocks 
 - 2' Diameter Can Cribs ○
 - 40 ton yield capacity RocProps 



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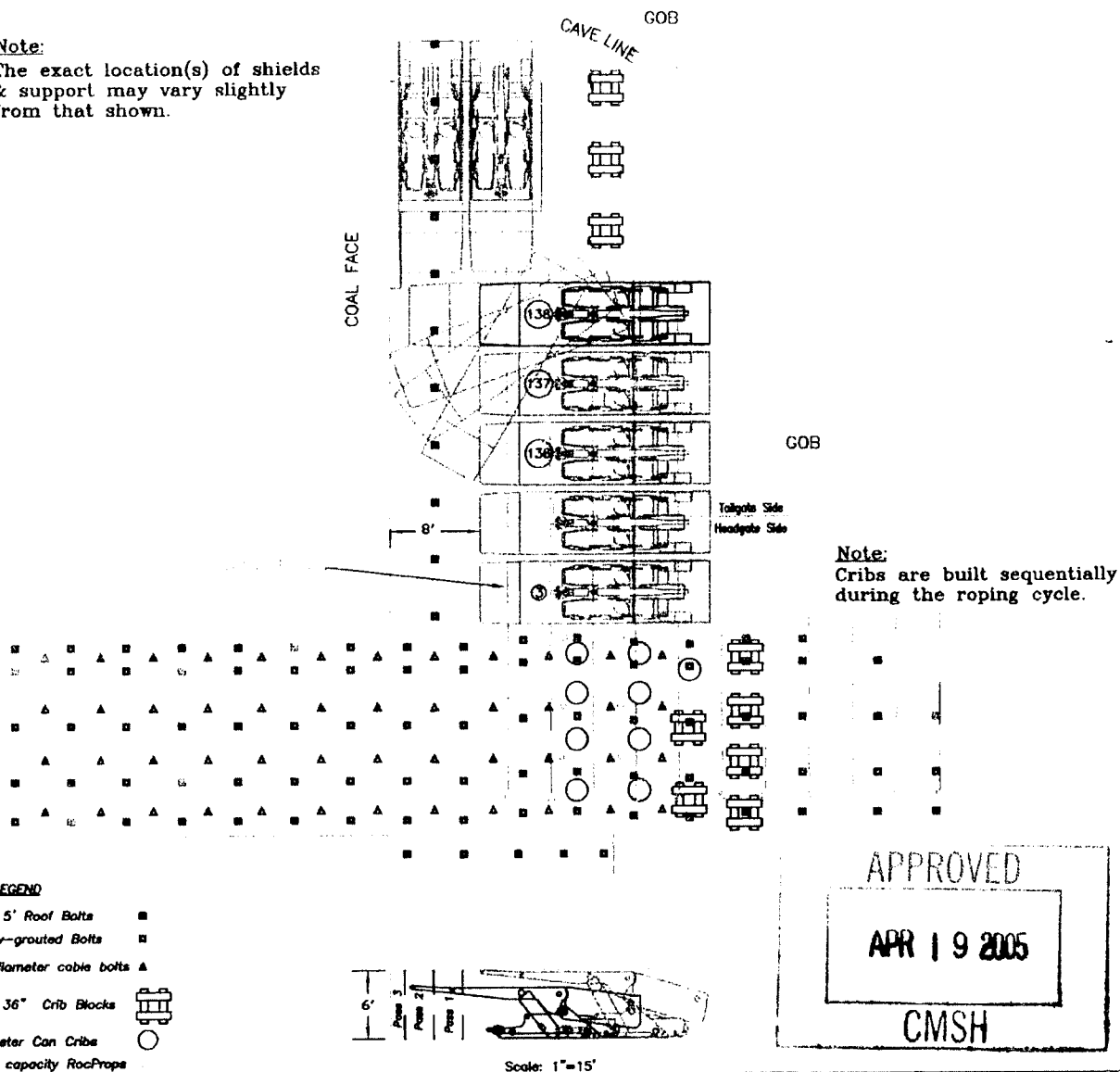
SHIELD RECOVERY AREA

1. Wire mesh begins about 35' from the face stop line.
2. Minimum 5/8" wire rope or equivalent nylon rope installed under wire mesh for about 20'.
3. Area between shields and face to be bolted with 5' minimum length bolts on 5' max. centers using rotary and rotary percussion drills.
4. Roof bolting of the recovery area will be performed with a stoper or other portable roof drill without an integral ATRS system.
5. Wire mesh extends for full length of face.
6. When installing the first row of roof bolts the shield tip to face distance shall not exceed 5'.

TYPICAL HEADGATE SHIELD RECOVERY PLAN FOR LOW SEAM COAL

Note:

The exact location(s) of shields & support may vary slightly from that shown.

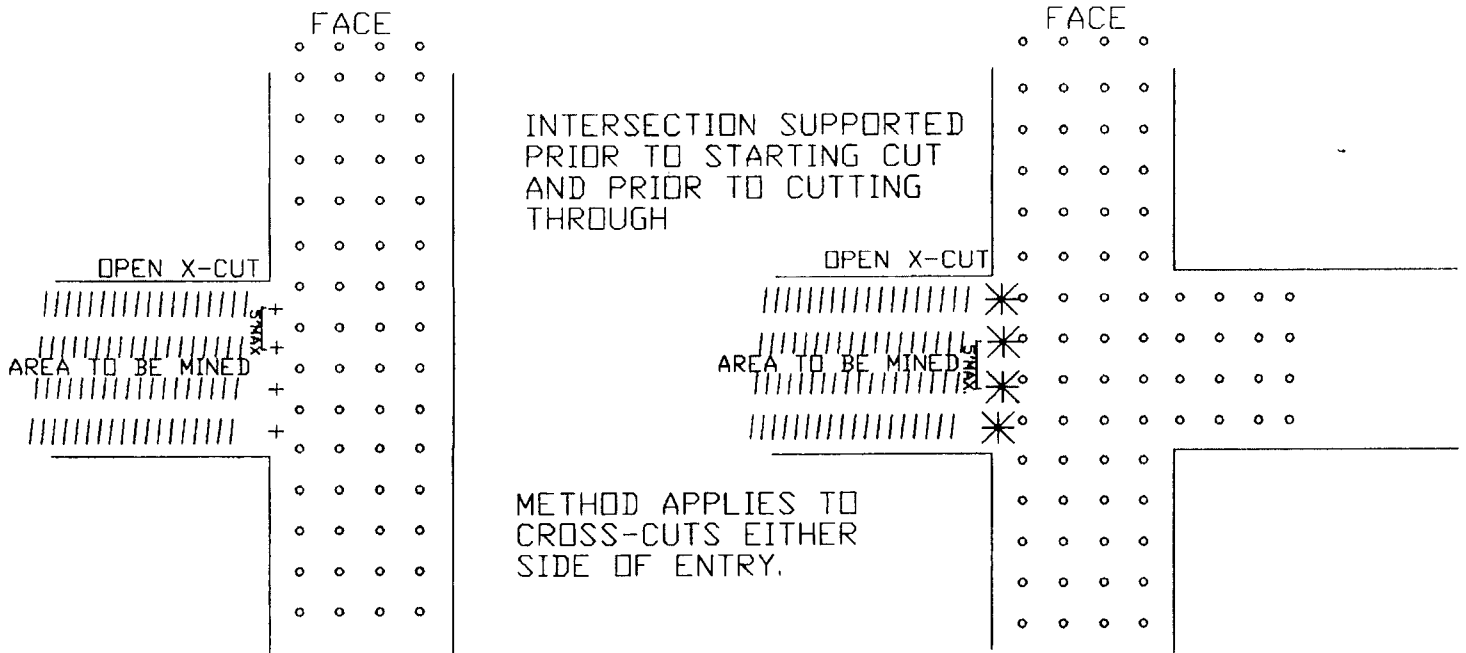


SHIELD RECOVERY AREA

1. Wire mesh begins about 35' from the face stop line.
2. Minimum 5/8" wire rope or equivalent nylon rope installed under wire mesh for about 20'.
3. Area between shields and face to be bolted with 5' minimum length bolts on 5' max. centers using rotary and rotary percussion drills.
4. Roof bolting of the recovery area will be performed with a stoper or other portable roof drill without an integral ATRS system.
5. Wire mesh extends for full length of face.
6. When installing the first row of roof bolts the shield tip to face distance shall not exceed 5'.

OPEN CROSSCUT SUPPORT METHOD FOR WORKING IN OR INBY

(DOES NOT APPLY TO OPENING BEING MINED)



o ROOF BOLTS - NORMAL PATTERN

+ ROOF BOLTS USED FOR SUPPORT OF OPENING.
INSTALLED ACROSS OPENING ON NO MORE THAN (5) FOOT CENTERS.
MINIMUM OF (4) BOLTS PER ROW

* TEMPORARY OR PERMANENT SUPPORTS TO SUPPORT OPENING.

NOTE: REFERENCE TO PAGE 2 ITEM 2.

Intersection.dwg

GENWAL RESOURCES INC
42-01715
ROOF CONTROL PLAN

Mobile Roof Support Specifications Components

Canopy	Electrics	Cable Reel	Caving Shield
Crawler Frame	Hydraulic System	Plow	Remote Control

Machine Dimensions: **Approximately Length-16'6" Width-87"**
Height - 50" collapsed, 110" extended
Under-clearance – 8"
Weight – 42,000 LBS

Chassis: **Plow with dual towing eyes – position 12" above grade to 9" below grade.**
20 LB. Ansul manually and remotely actuated fire suppression system.

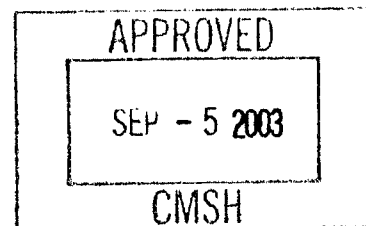
Tram system; **JHF crawler drive with 16" wide forged pads.**
Rexroth – variable displacement drive motor.
Two speeds, 0-80 FPM high torque tram controls

Remote System: **Structured mining system radio remote tram system**
Two transmitters – 9 volt battery design
Two pendant controls
Four receivers

Roof Support: **High strength canopy with load capacity of 800 Tons**
Lemniscates guided canopy with side-to-side oscillation + or – 15 degrees.
Fore-Aft canopy tilt controlled limits, + or – 25 degrees.
Caving shield incorporated into Lemniscates linkage.
Super heavy ¾" diameter chain with rubber belting between chain rows

Electrics: **440 Volts AC**
Permissible 50 HP, 440 volt, 1750-RPM Motor
#4-3 trailing cable, type G-GC Round
One 12-volt Halogen headlight at each end of chassis
One 12-volt Halogen headlight to illuminate roof pressure gauge
Area light as radio link indicator

Hydraulics: **45 GPM variable volume with integral main relief pump**
X/P solenoid operated control valves with manual overrides
Two illuminated 6000-PSI pressure gauges on raise circuit

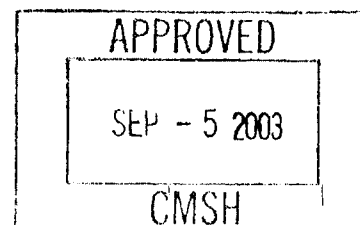


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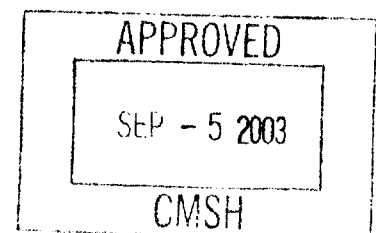
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THE DESIGN AND SE
ON THIS DRAWING
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PROPERTY OF
JH HEICHTER

Safety Precautions While Using Mobile Roof Supports During Pillar Extraction

1. All workings will be supported, at a minimum, in accordance with the approved roof control plan requirements.
2. A breaker row may consist of either:
 - a. Two rows of timbers, posts, steel post, dukes, etc. on a maximum spacing of four feet
3. Breaker posts may be knocked out by the MRS when the MRS is being set in the first cut in a block. However, this procedure will be followed one MRS at a time: the first MRS must be in position prior to the second MRS knocking out timber and being positioned.
4. MRS positions may be varied slightly, or angled, based on the operator's assessment of optimum placement for roof control purposes.
5. No cut will be mined until the MRS have been properly and fully advanced and set in position for that specific cut. The pressure on the MRS will be selected from the operating range (approximately 1100 to 2100 psi) to provide for compression of the immediate roof strata. If an MRS becomes inoperable, no mining will be performed until the MRS is restored to operation, or is replaced by four temporary supports (timbers or jacks) set on a maximum four foot spacing. However, at no time will an inoperable MRS be replaced with timber or jacks in an entry where left and right mining (Christmas-tree method) is being conducted.
6. Any particular cut may be skipped as needed to address adverse conditions, equipment malfunctions, or other operational difficulties. However, no cut will be taken out of cycle.
7. The MRS operator, and all other personnel, will at all times be located outby the last active cut when lowering and moving the MRS units. Only persons who have received the proper task training will be permitted to operate the MRS. Manual operation of the MRS will be for maintenance purposes only. All personnel shall remain outby the operator during movement of the MRS.
8. During mining, no personnel on foot shall go beyond the second to last row of overhead roof supports and the inby edge of the canopy of the shuttle car shall not go beyond the last row of roof bolts. During pillar extraction, all personnel shall be positioned in a safe location away from roadway traffic.
9. No persons shall be allowed inby the continuous miner operator's work position while coal is being mined, nor will more than the essential number of people be involved in the moving of the continuous miner and its trailing cable until the continuous miner is completely outby the previous cut. All other personnel will remain outby the continuous miner. When moving the continuous miner and its trailing cable or the MRS and its trailing cable, the requirements of items 8 and 9 above will be followed. Excess trailing cable slack shall be systematically moved outby as a block is pillared, so as not to create any handling or tripping hazards.



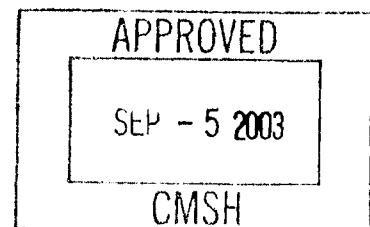
10. If a MRS is moved out of position to facilitate equipment recovery (of another MRS or continuous miner) it shall be replaced by at least four temporary supports (timber or jacks) set on a maximum of four foot spacing.
11. In the event of equipment entrapment, permanent roof support shall be installed, if practical, as close as possible to the equipment prior to installing temporary roof support. Temporary roof supports will be installed in compliance with 30 CFR, 75.210. Roof support may be in the form of longer roof bolts, cribs, timbers, jacks or another MRS. All entrapment related work shall be performed under permanent roof support or between temporary roof supports.
12. Only the minimum number of personnel deemed necessary shall be utilized in equipment retrieval operations. Such work will only commence after the proper support and protection is provided.
13. Only persons trained in the operation of equipment retrieval devices will operate such devices. The trapped equipment may be pulled with an MRS, equipment retriever, the continuous miner or a scoop.
14. Prior to commencing equipment retrieval operations, a condition specific plan will be developed and reviewed with all participants in the recovery operation.

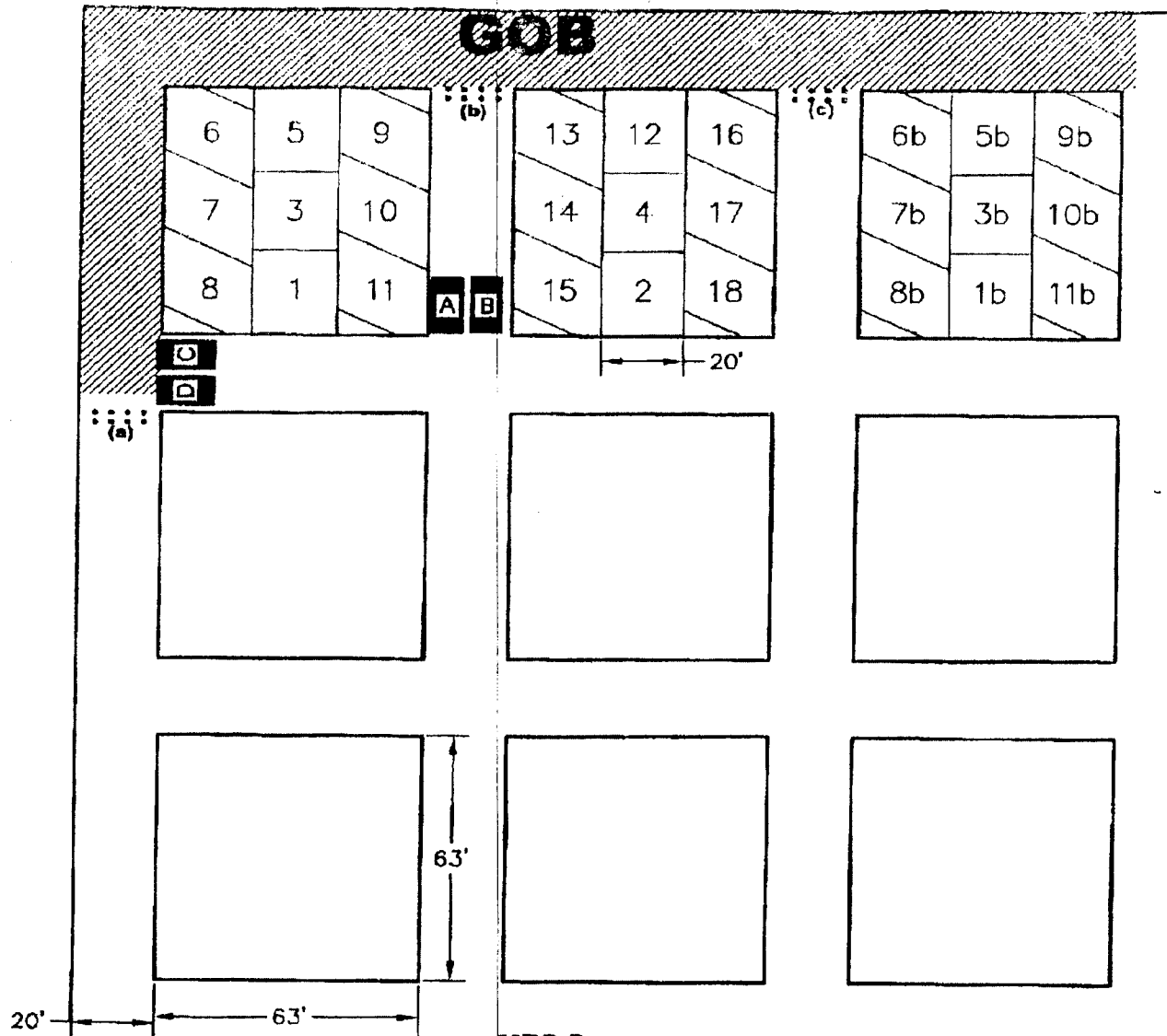


**Remote Control Pillar Extraction Plan using Mobile Roof Supports 63' X 63'
Pillars.**

The mobile roof supports shall be installed at location A, B, C and D as shown on Figures 1 and 2 prior to mining lift No. 1 and lift No. 1b. MRS A and B will be advanced to the location as shown on the page referencing cut 6. MRS A and B will be advanced to the location as shown on the page referencing cut 7. MRS A, B, C, and D will be advanced to the locations as shown on the page referencing cut 8. MRS A, B, C, and D will be advanced to the locations as shown on the page referencing cut 9. MRS A and B will be advanced to the locations as shown on the page referencing cut 10. MRS A, B, C, and D will be advanced to the locations as shown on the page referencing cut 11a option or MRS A, B, C, and D will be advanced to the locations as shown on the page referencing cut 11b option.

MRS A, B, C, and D will be advanced to the locations as shown on the page referencing cut 13. MRS A, B, C, and D will be advanced in the same manner for cuts 14 through cut 18 as described above in cuts 7 through cuts 11a and 11b option. Referencing each page for specific position and following the same sequence of movements for each representative cut.





**MRS Sequence
Roof Support
Overall Cut Sequence
Fig. 1**

1. This diagram shows the sequence of cuts for the complete extraction of pillars.
2. The direction of lifts may vary slightly depending upon mining conditions.
3. All entries, crosscuts, and intersections shall be supported in accordance with the approved roof control plan before starting splits.
4. Cuts 1, 2, 3, 4, 5, & 12 will be bolted according to the approved Roof Control Plan. Cuts 6 thru 11 and cuts 13 thru 18 will not be bolted. The distances in cuts 6 thru 11 and 13 thru 18 may exceed 20' provided MRS are in use.
5. Double-breaker rows at (a), (b), and (c) shall be installed prior to cut 1.

LEGEND

- Timbers with Cap Piece
- D** MRS
- GOB Area
- 1** Cut Sequence

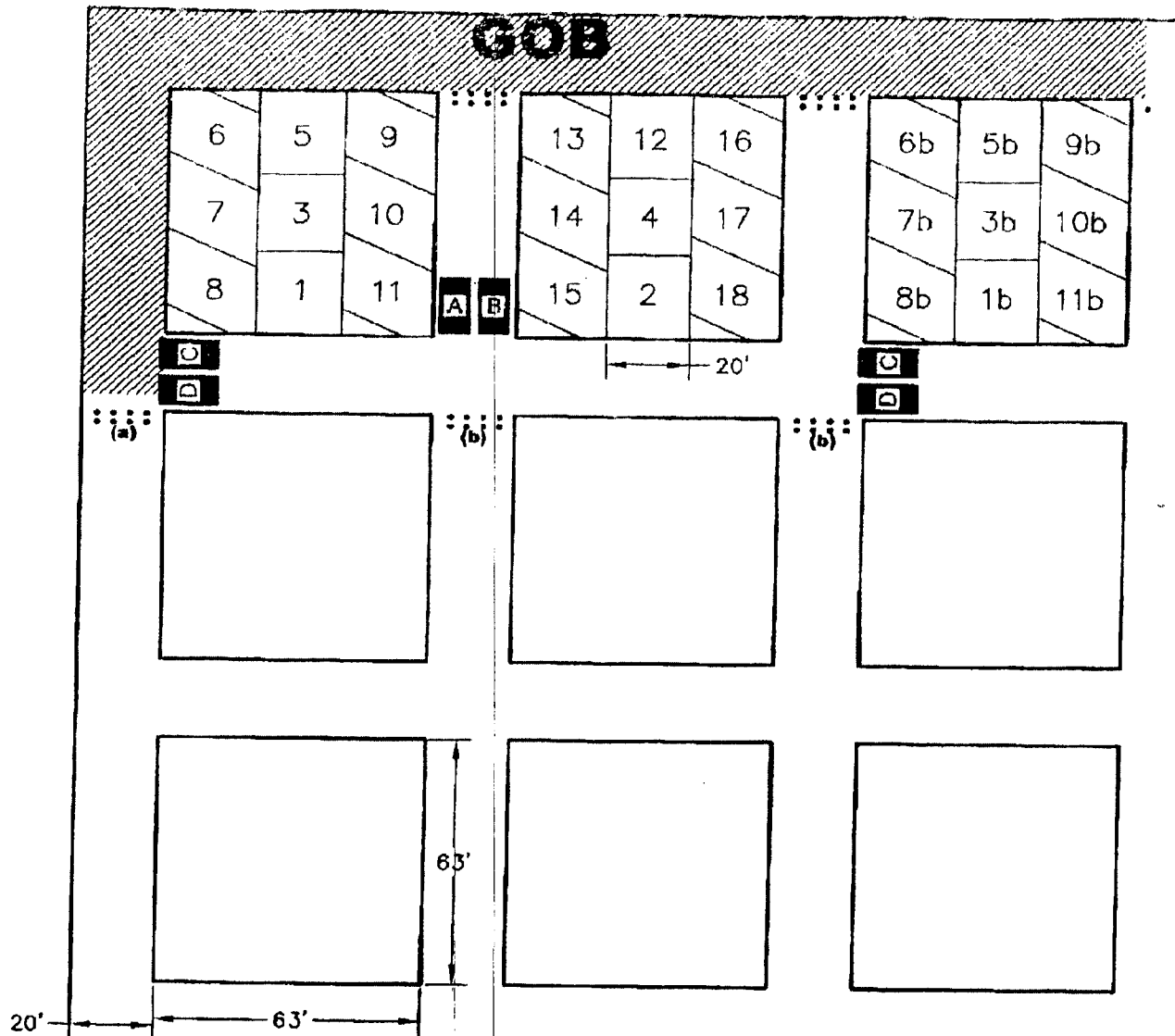
APPROVED
SEP - 5 2003
CMSH

26

**Genwal Resources Inc.
Roof Control Plan**

Scale: 1" = 40'

Date	Description	Drafted By:
8/22/01		JRS
FILE LOCATION:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAB:		
PLANT DATE: 3/8/03		



**MRS Sequence
Roof Support
Overall Cut Sequence
Fig. 2**

1. This diagram shows the sequence of cuts for the complete extraction of pillars, see following pages for each cut movement and sequence.
2. The direction of lifts may vary slightly depending upon mining conditions.
3. All entries, crosscuts, and intersections shall be supported in accordance with the approved roof control plan before starting splits.
4. Cuts 1, 2, 3, 4, 5, & 12 will be bolted according to the approved Roof Control Plan. Cuts 6 thru 11 and cuts 13 thru 18 will not be bolted. The distances in cuts 6 thru 11 and 13 thru 18 may exceed 20' provided MRS are in use.
5. Double-breaker row at (a) shall be installed prior to cut 1. Double-breaker rows at (b) shall be installed prior to next sequence of extraction, identified as (# followed by a "b").

LEGEND

- Timbers with Cap Piece
- D** MRS
- GOB Area
- 1** Cut Sequence

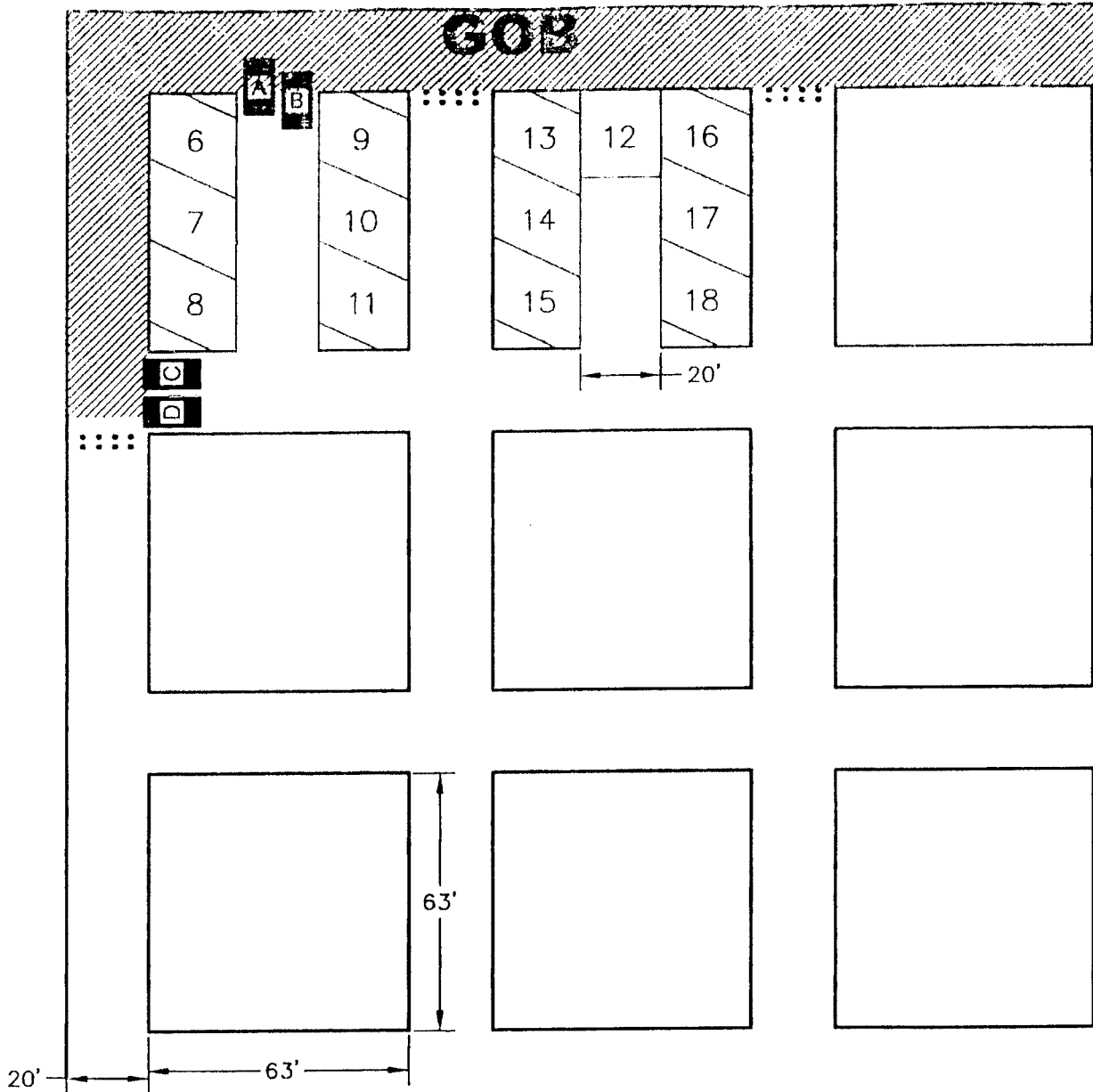
APPROVED
SEP - 5 2003
CMSh

27

**Genwal Resources Inc.
Roof Control Plan**

Scale: 1" = 40'

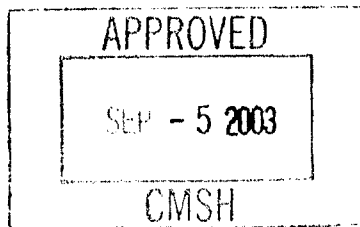
Date	Description	Drawn By
8/22/01		MKS
FILE LOCATION:		
DRAWING NO.: MRS_SPLIT		
LAYOUT TMR:		
PLAN DATE: 8/6/03		



MRS units A, B, C & D shall be positioned as shown above prior to beginning lift cuts.

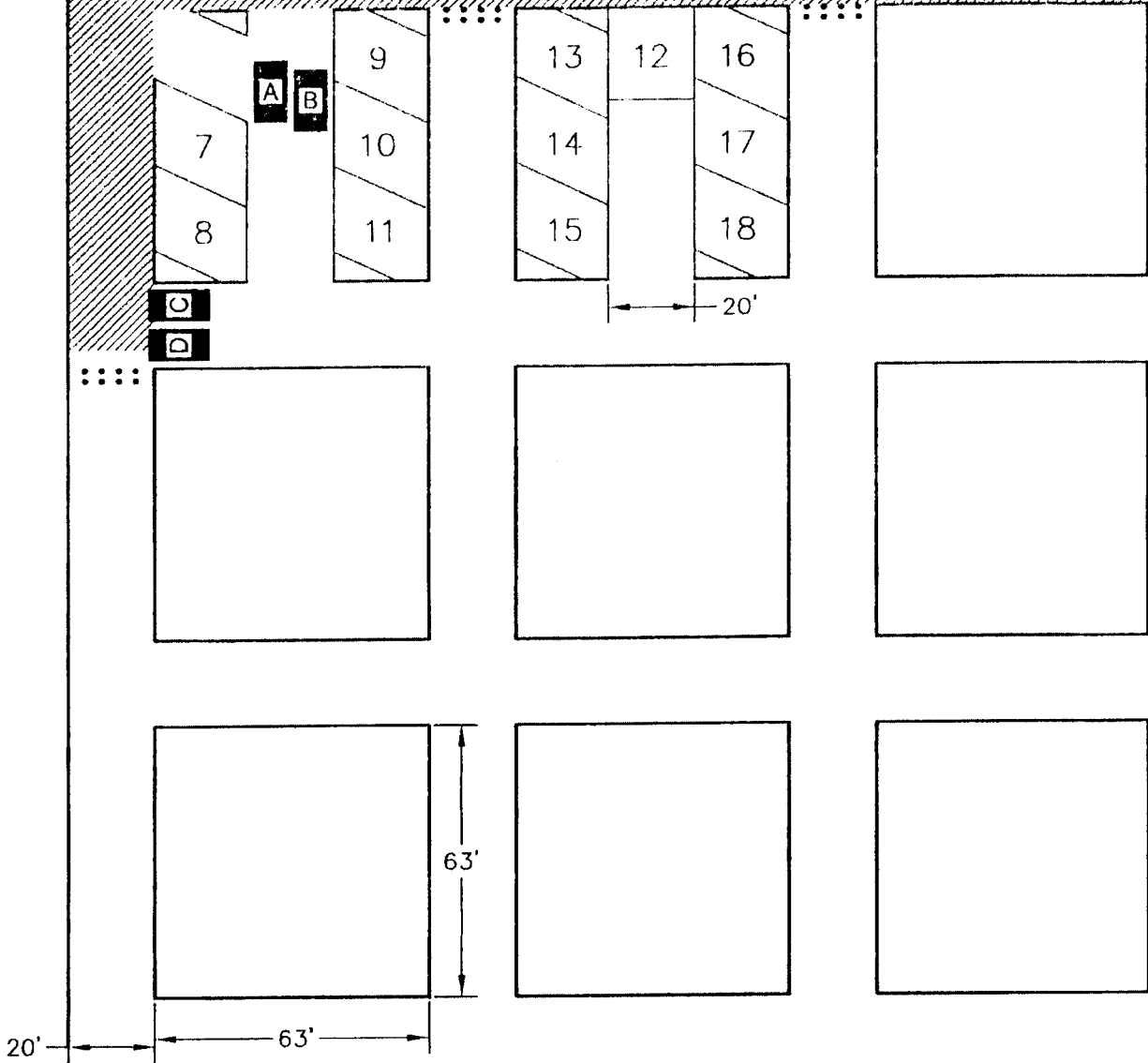
LEGEND

- Timbers with Cap Piece
- D** MRS
- GOB Area
- 1 Cut Sequence




Genwal Resources Inc.		
Roof Control Plan		
Cut 6		
Scale: 1" = 40'		
Date	Description	Drafted By:
8/22/01		JKS
FILE LOCATION: \		
DRAWING NO.: MRS_SPLIT		
LAYOUT VAR:		
PLOT DATE: 3/6/03		

GOB



LEGEND

- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence

APPROVED

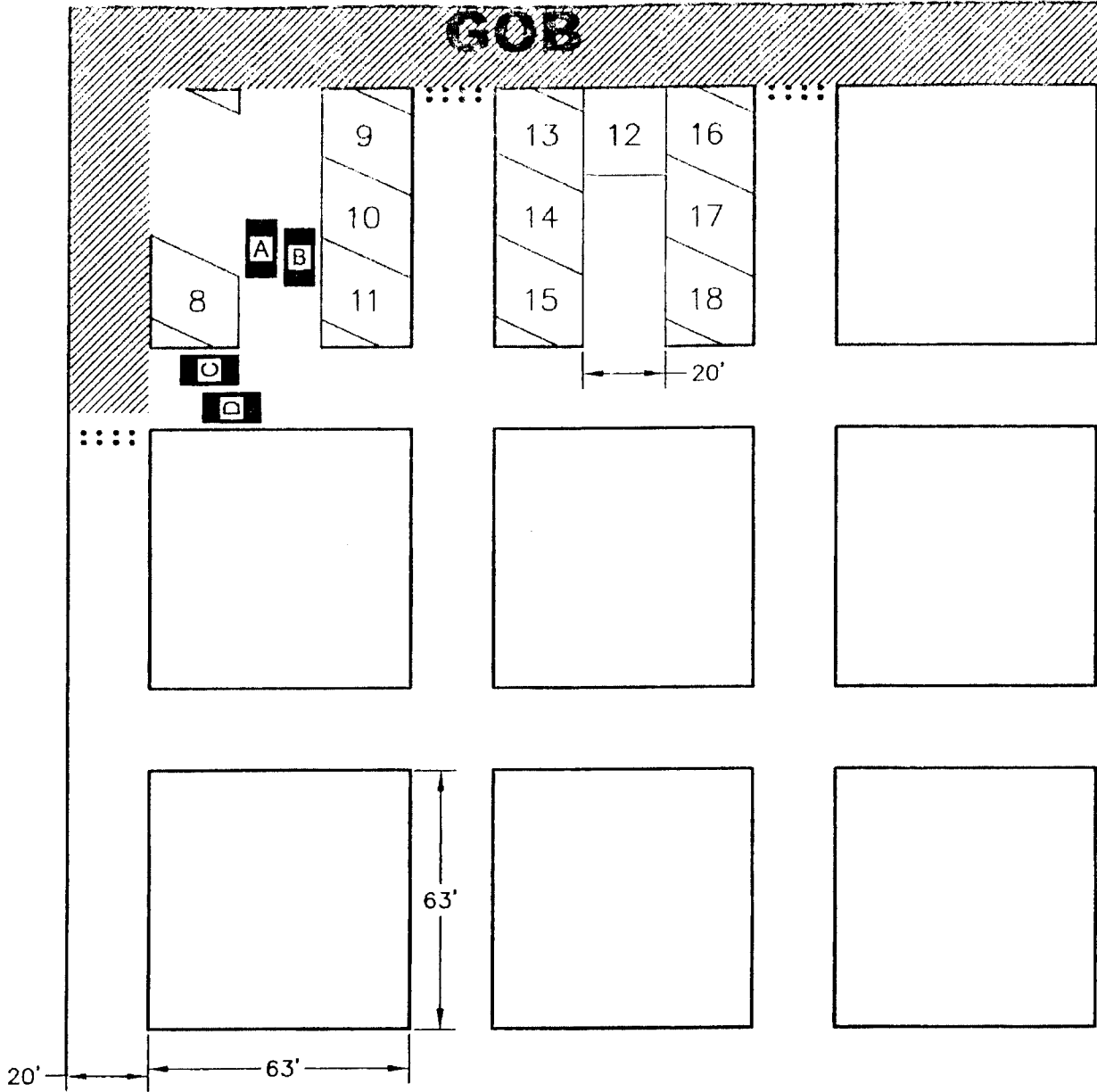
SEP - 5 2003

CMSSH


Genwal Resources Inc.
Roof Control Plan
Cut 7
 Scale: 1" = 40'

Date	Description	Drafted By:
8/22/01		JES
FILE LOCATION: E:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAB:		
PLOT DATE: 3/6/03		

GOB



LEGEND

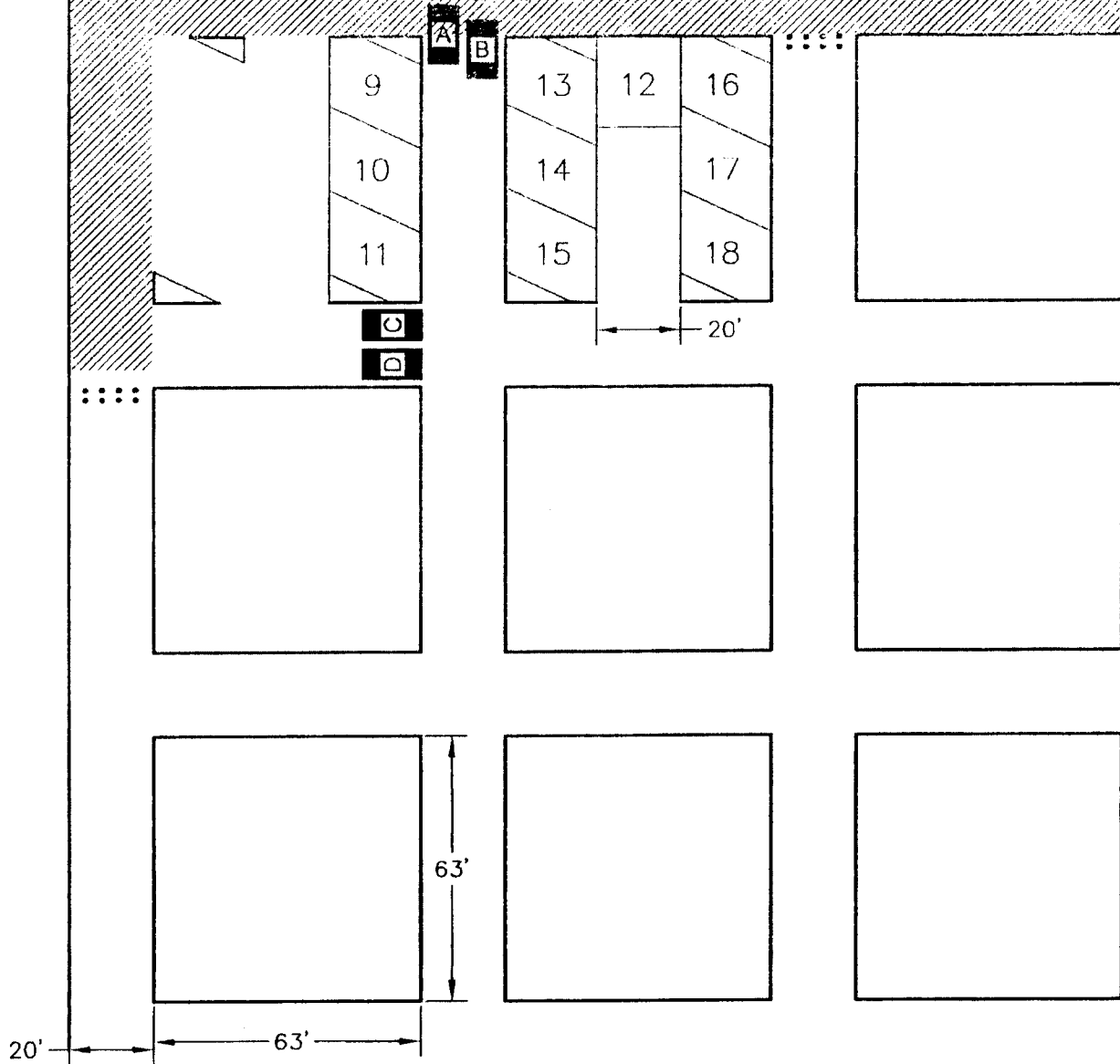
- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence

APPROVED
 SEP - 5 2003
 CMSH

Genwal Resources Inc.
 Roof Control Plan
 Cut 8
 Scale: 1" = 40'


Date	Description	Drafted By:
8/22/01		JES
FILE LOCATION: H:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAB:		
PLOT DATE: 3/6/03		

GOB



Breaker rows which are replaced by MRS units as shown will not be reset.

LEGEND

- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence

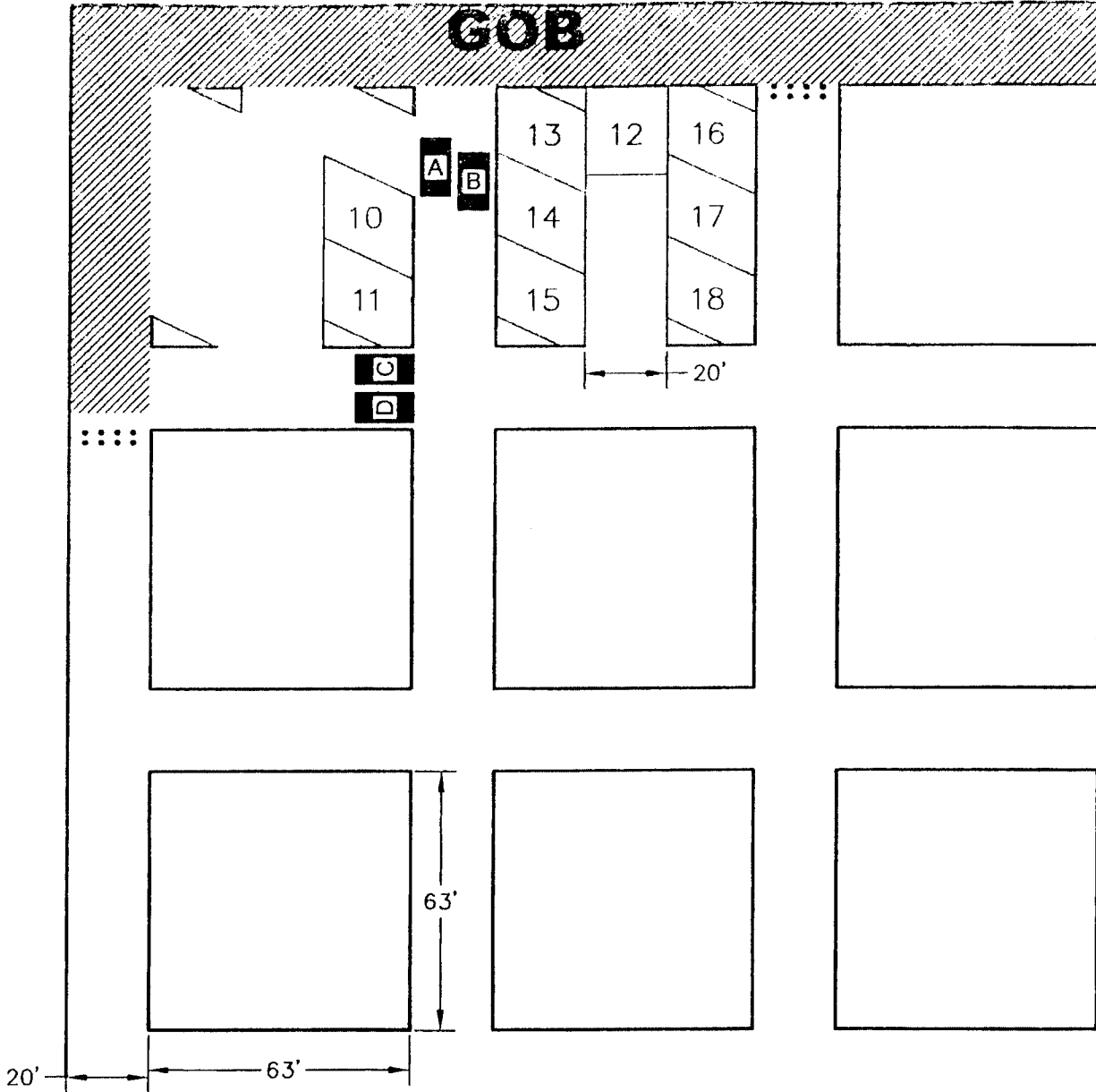
APPROVED
SEP - 5 2003
GMSH

31


Genwal Resources Inc.
Roof Control Plan
Cut 9
Scale: 1" = 40'

Date	Description	Drafted By:
8/22/01		JKS
FILE LOCATION: H:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAB:		
PLOT DATE: 3/6/03		

GOB



LEGEND

- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence

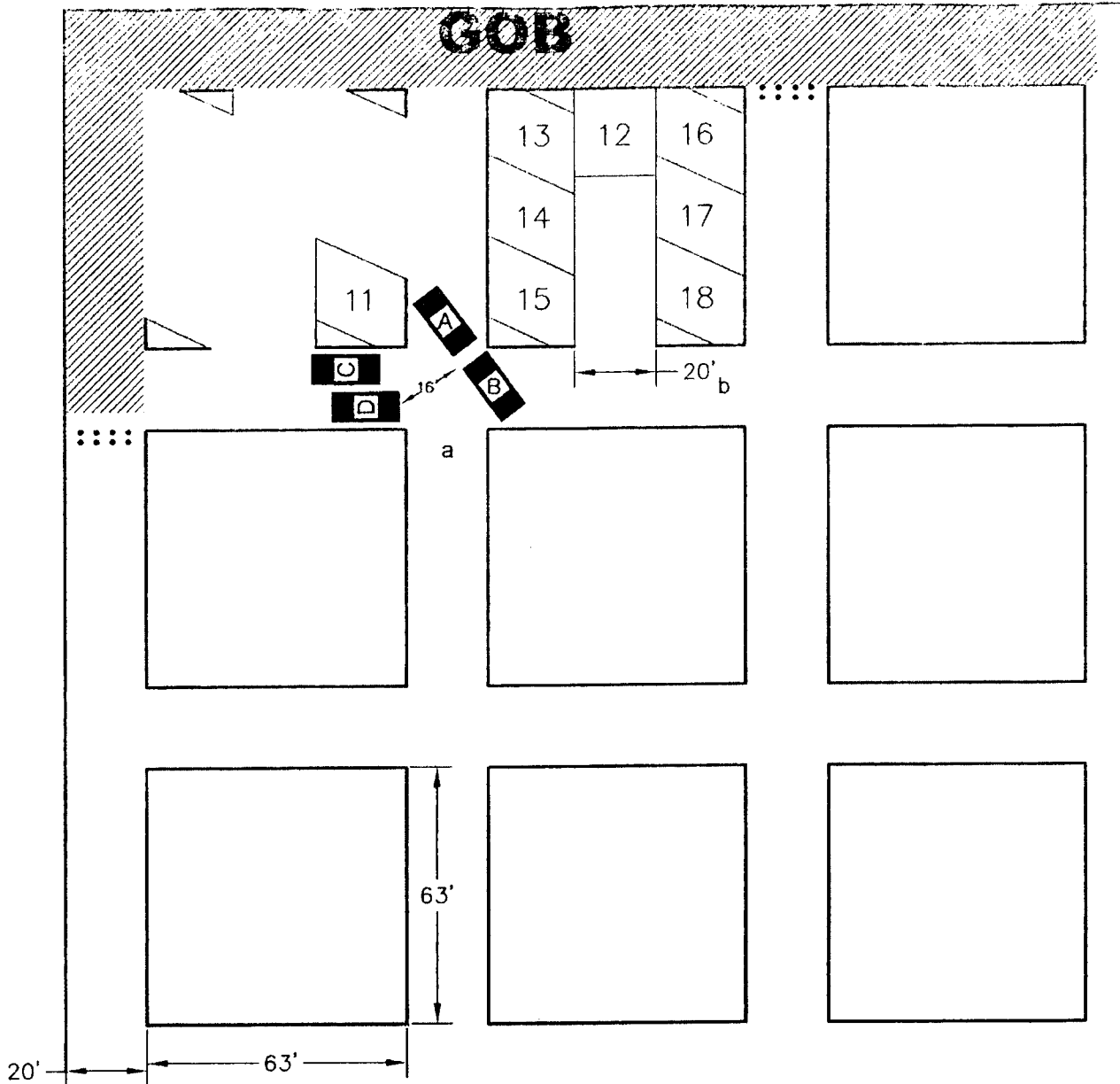
APPROVED

SEP - 5 2003

CM SH


Genwal Resources Inc.
 Roof Control Plan
 Cut 10
 Scale: 1" = 40'

Date	Description	Drafted By:
8/22/01		JKS
FILE LOCATION: H:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT YEAR:		
PLOT DATE: 3/6/03		



Roadway a or b maybe used for final cut (#11) depending on conditions. A 16' roadway will be maintained in the entry while mining the final cut. No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection. The shuttle car operator, under canopy, may be an exception.

LEGEND

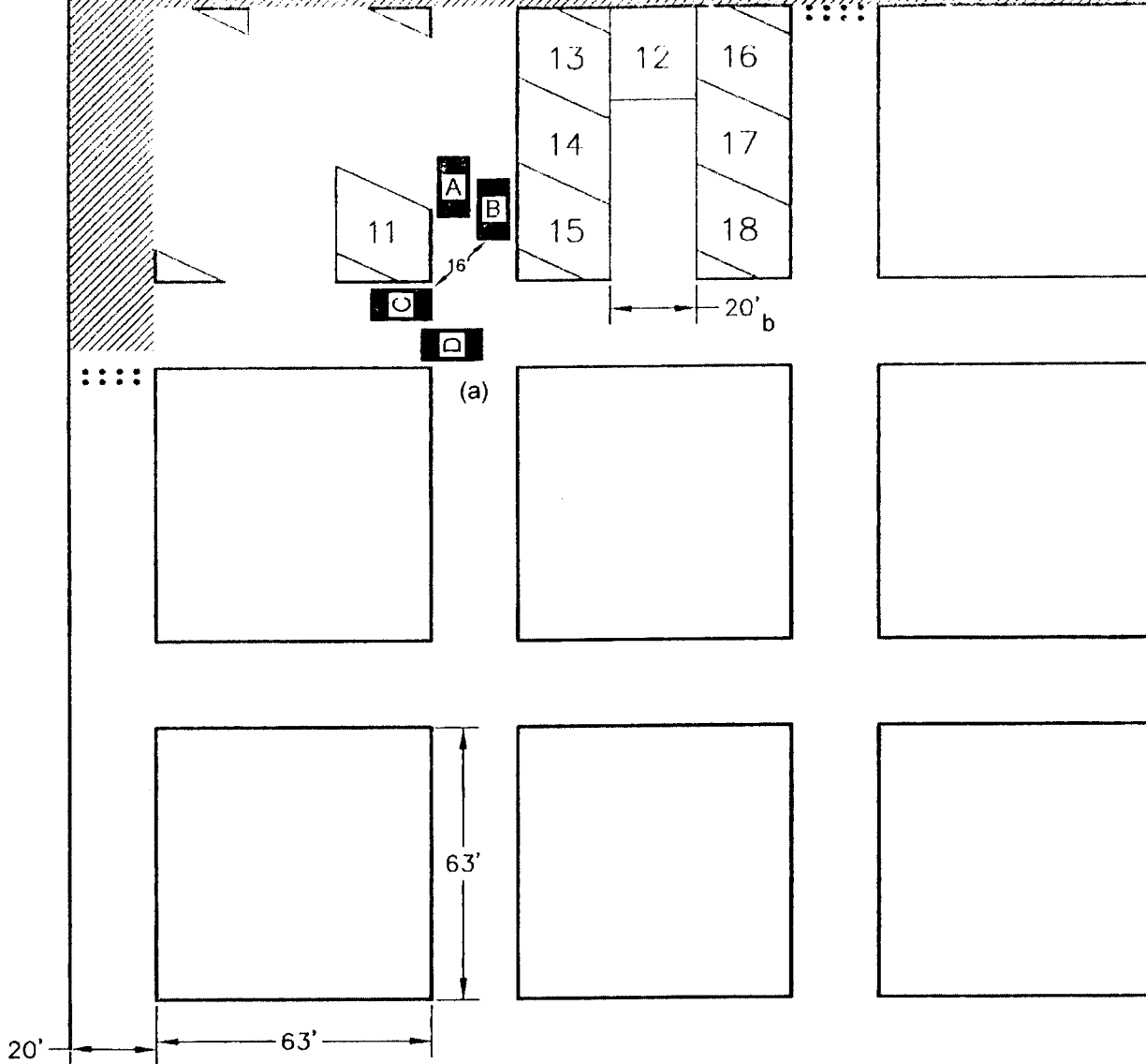
- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence

APPROVED
 SEP - 5 2003
 CMSH

Genwal Resources Inc.
Roof Control Plan
Cut 11a
 Scale: 1" = 40'

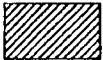
Date	Description	Drafted By:
8/22/01		JKS
FILE LOCATION: H:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAR:		
PLOT DATE: 5/6/03		

GOB



Roadway a or b maybe used for final cut (#11) depending on conditions. A 16' roadway will be maintained in the entry while mining the final cut. No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection. The shuttle car operator, under canopy, may be an exception. Double-breaker row set at (a) prior to initiating cut 11 this option.

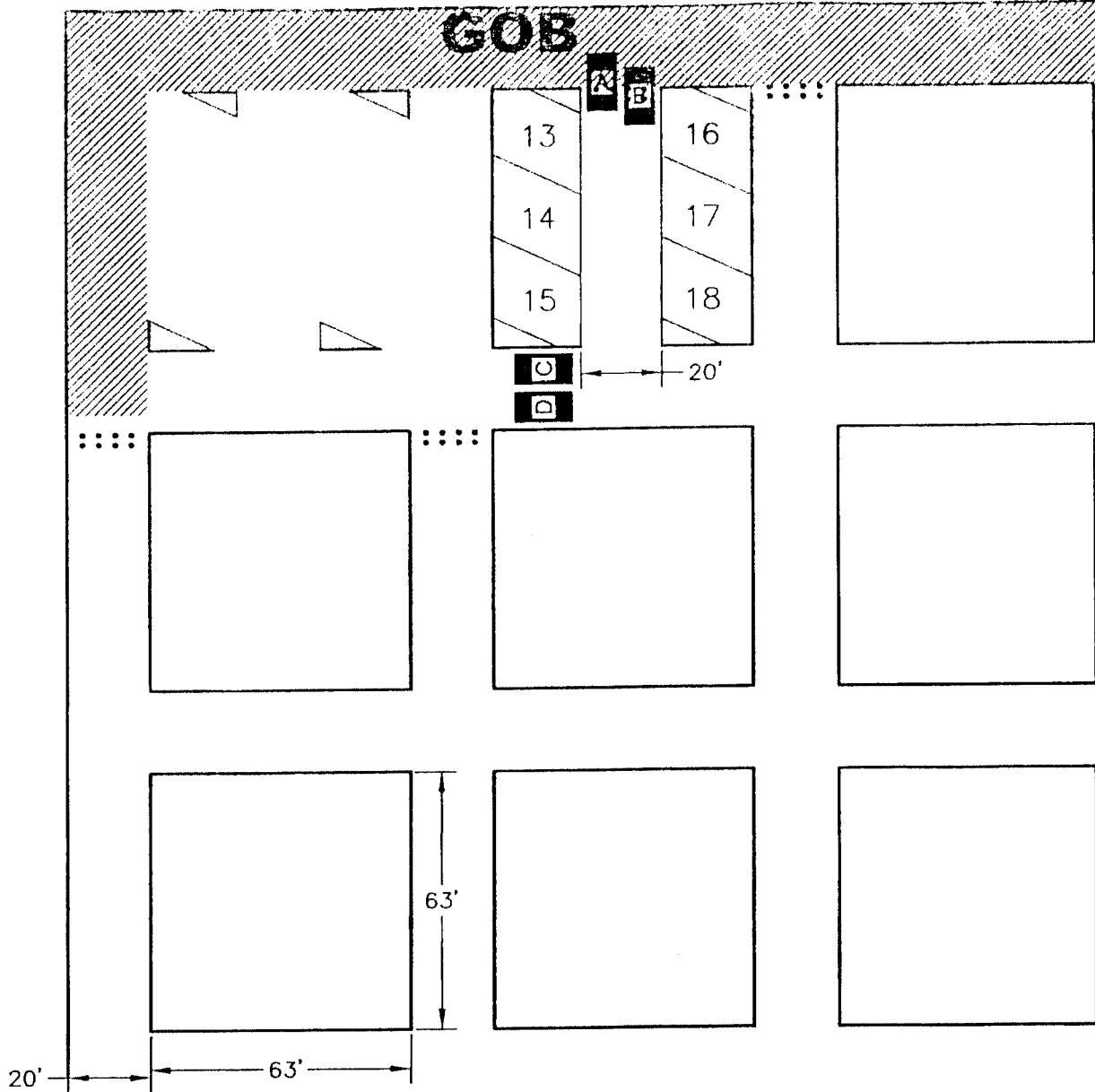
LEGEND

- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence

APPROVED
SEP - 5 2003
CMSH


Genwal Resources Inc.
Roof Control Plan
Cut 11b
Scale: 1" = 40'

Date	Description	Drafted By:
8/22/01		JKS
FILE LOCATION: H:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAB:		
PLOT DATE: 3/6/03		



MRS units A, B, C & D shall be positioned as shown above prior to beginning lift cuts.
 Sequence of cuts to follow same as cuts 6, 7, 8, 9, 10, and 11.

LEGEND

- Timbers with Cap Piece
- D** MRS
-  GOB Area
- 1 Cut Sequence



Genwal Resources Inc.		
Roof Control Plan		
Cut 13		
Scale: 1" = 40'		
Date	Description	Drafted By:
8/22/01		JES
FILE LOCATION: H:\		
DRAWING NO.: MRS_SPLIT		
LAYOUT TAB:		
PLOT DATE: 3/6/03		

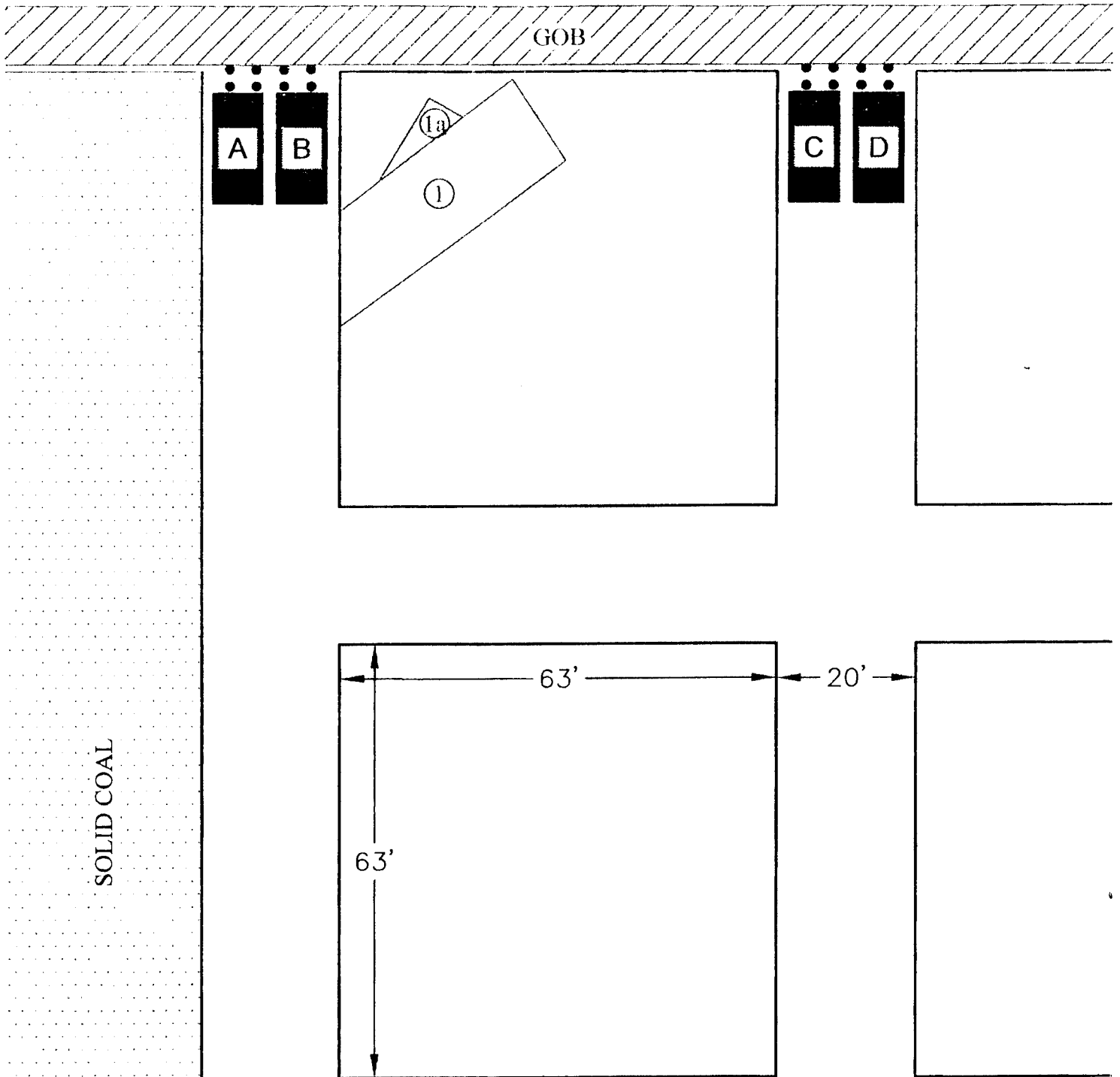
**Remote Control Pillar Extraction Plan using Mobile Roof Supports 63' X 63' Pillars
(With Barrier and No Splits)**

The mobile roof supports shall be installed at location A, B, C, and D as shown on Figures 1 prior to mining lift No. 1 and lift No. 1a. MRS B will be advanced to the location as shown on figure 2 for cuts 2 and 2a. MRS A and B will be advanced to the location as shown on figure 3 for cut 3. MRS A and B will be advanced to the locations as shown on figure 4 for cut 4. MRS A and B will be advanced to the locations as shown on figure 5 for cut 5. MRS A and B will be advanced to the locations as shown on figure 6 for cuts 6 and 7. MRS A and B will be advanced to the locations as shown on figure 7 for cuts 8 and 8a. MRS A, B, C and D will be advanced to the locations as shown on figure 8 for cuts 9 and 9a. MRS C and D will be advanced to the locations as shown on figure 9 for cut 10. MRS C and D will be advanced to the locations as shown on figure 10A for cut 11 option. MRS A and B will be advanced to the locations as shown on figure 10B for cut 11 option.



FIGURE 1

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 1



LEGEND

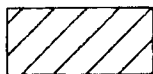
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker-rows which are replaced by MRS units as shown will not be re-set.

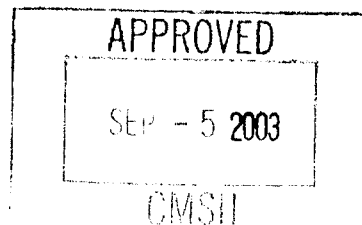
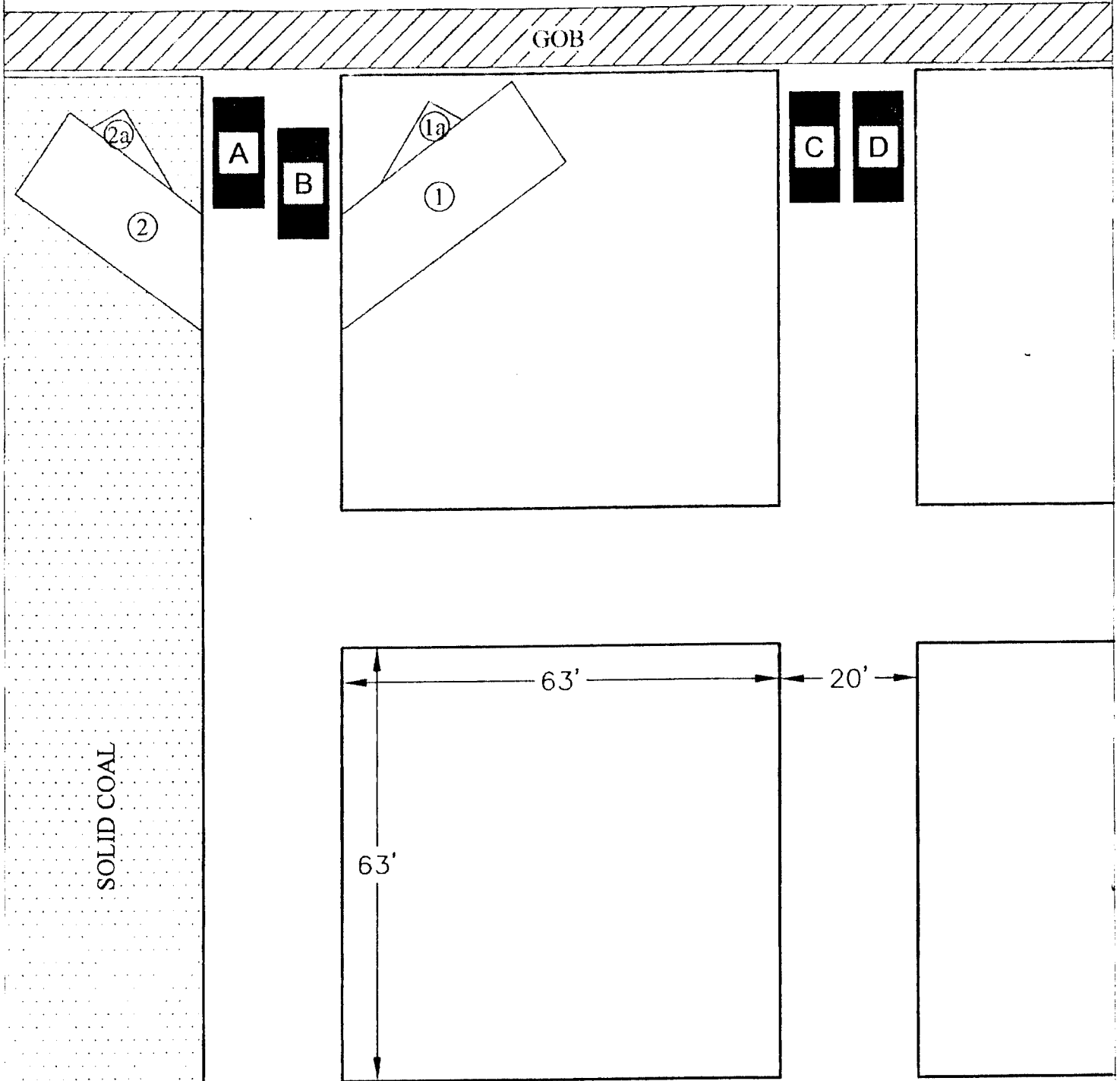


FIGURE 2

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 2



LEGEND

GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

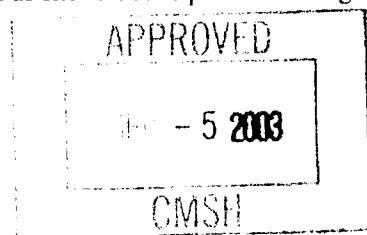
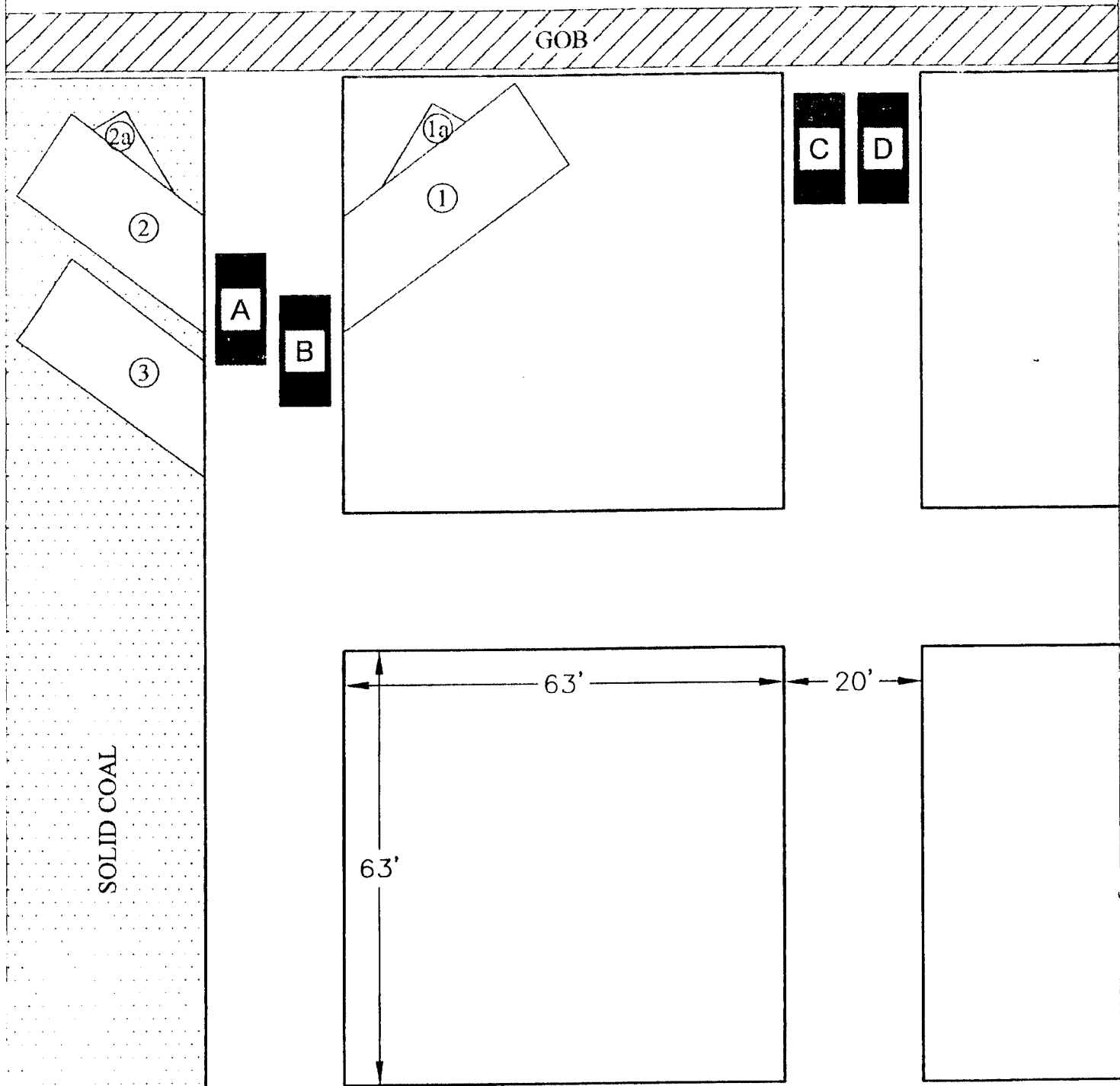


FIGURE 3

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 3



LEGEND

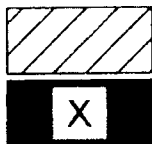
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

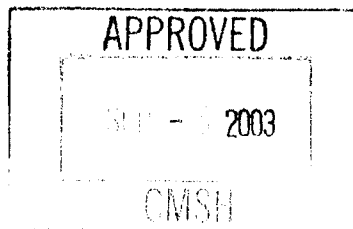
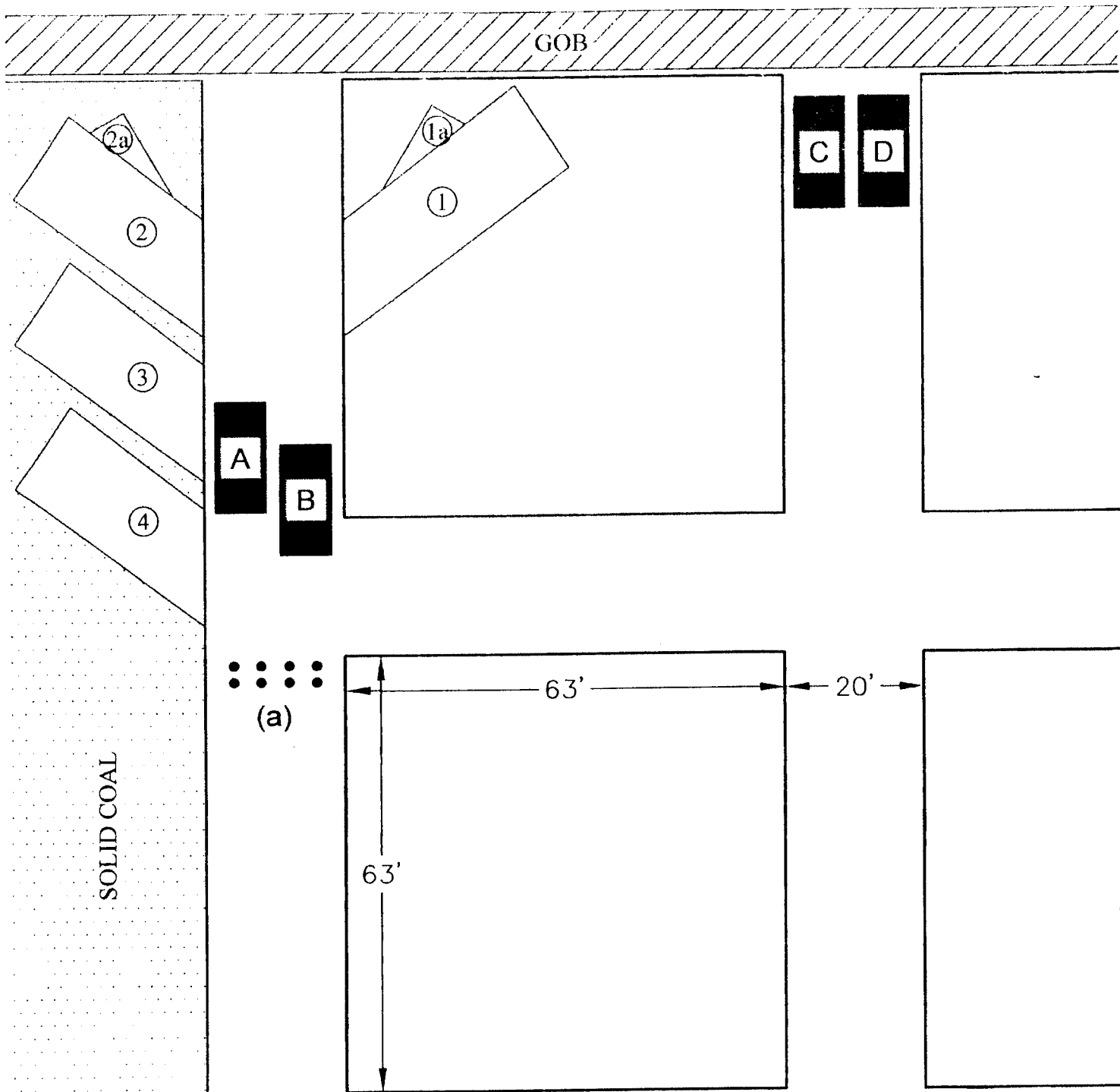


FIGURE 4

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 4



LEGEND

GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Double Breaker row at (a) set prior to cut 4 as shown.

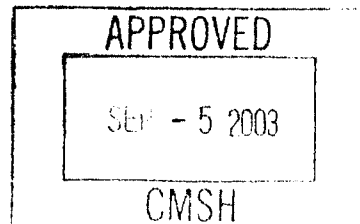
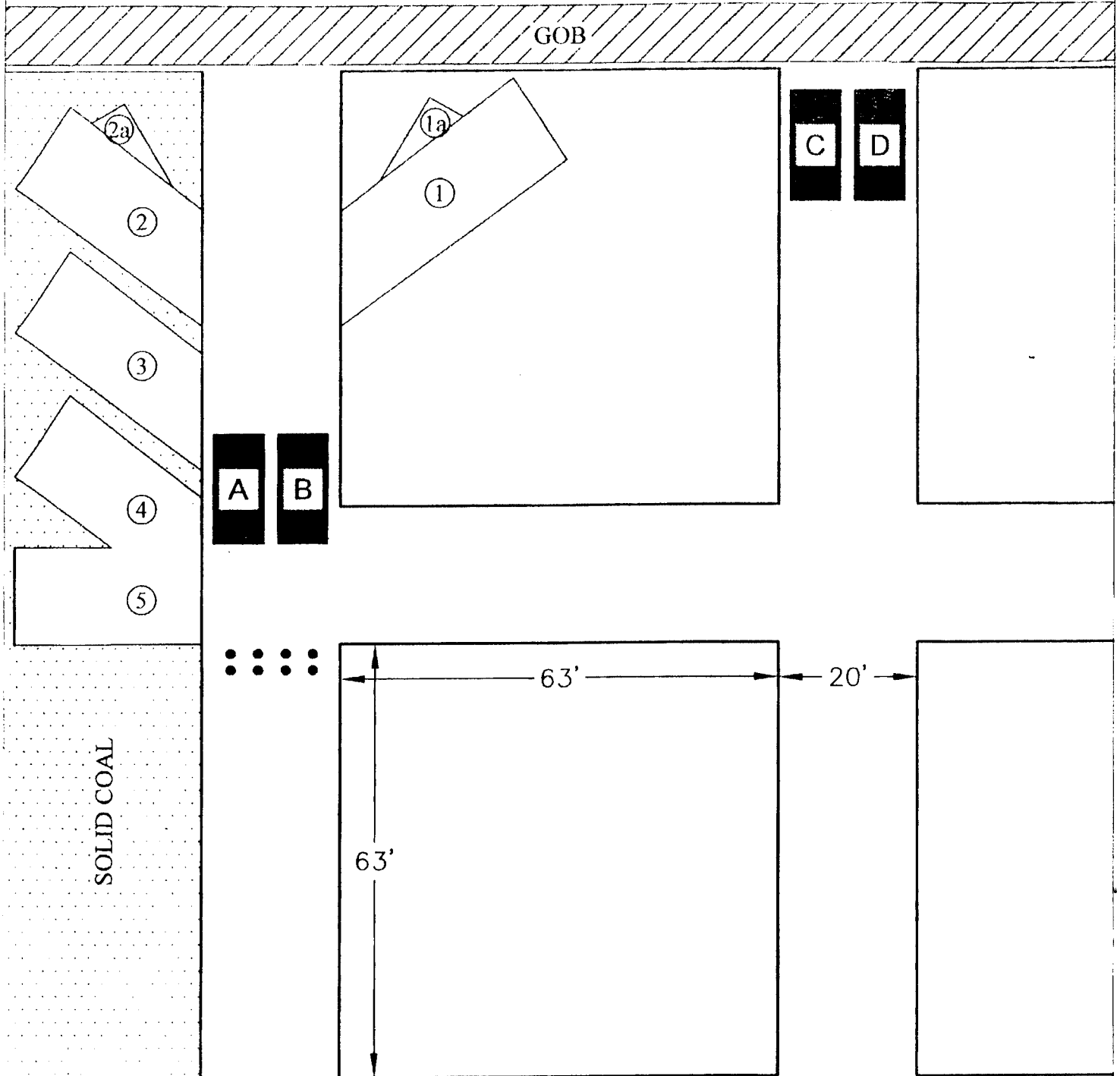


FIGURE 5

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 5



LEGEND

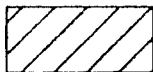
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

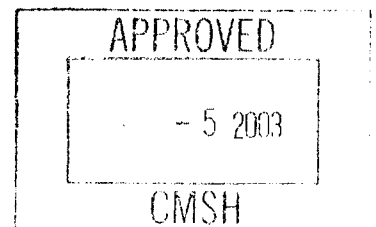
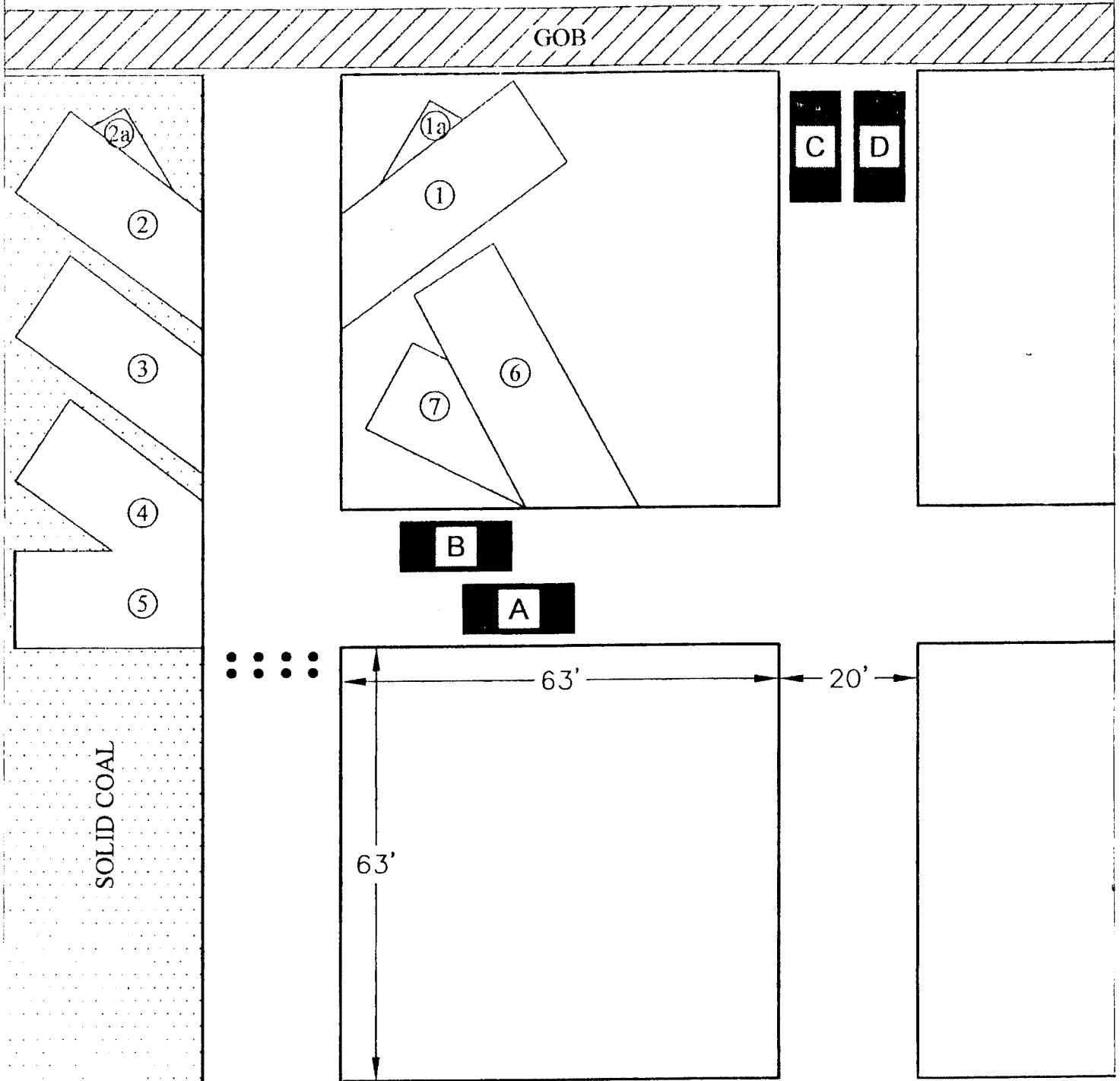


FIGURE 6

Pillar Extraction/With Barrier Mining - No Splits - Cuts No. 6 & 7



LEGEND

GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cuts.

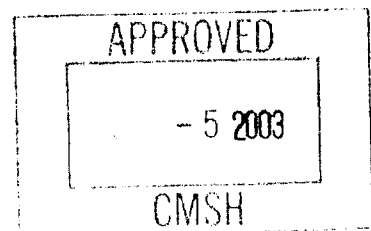
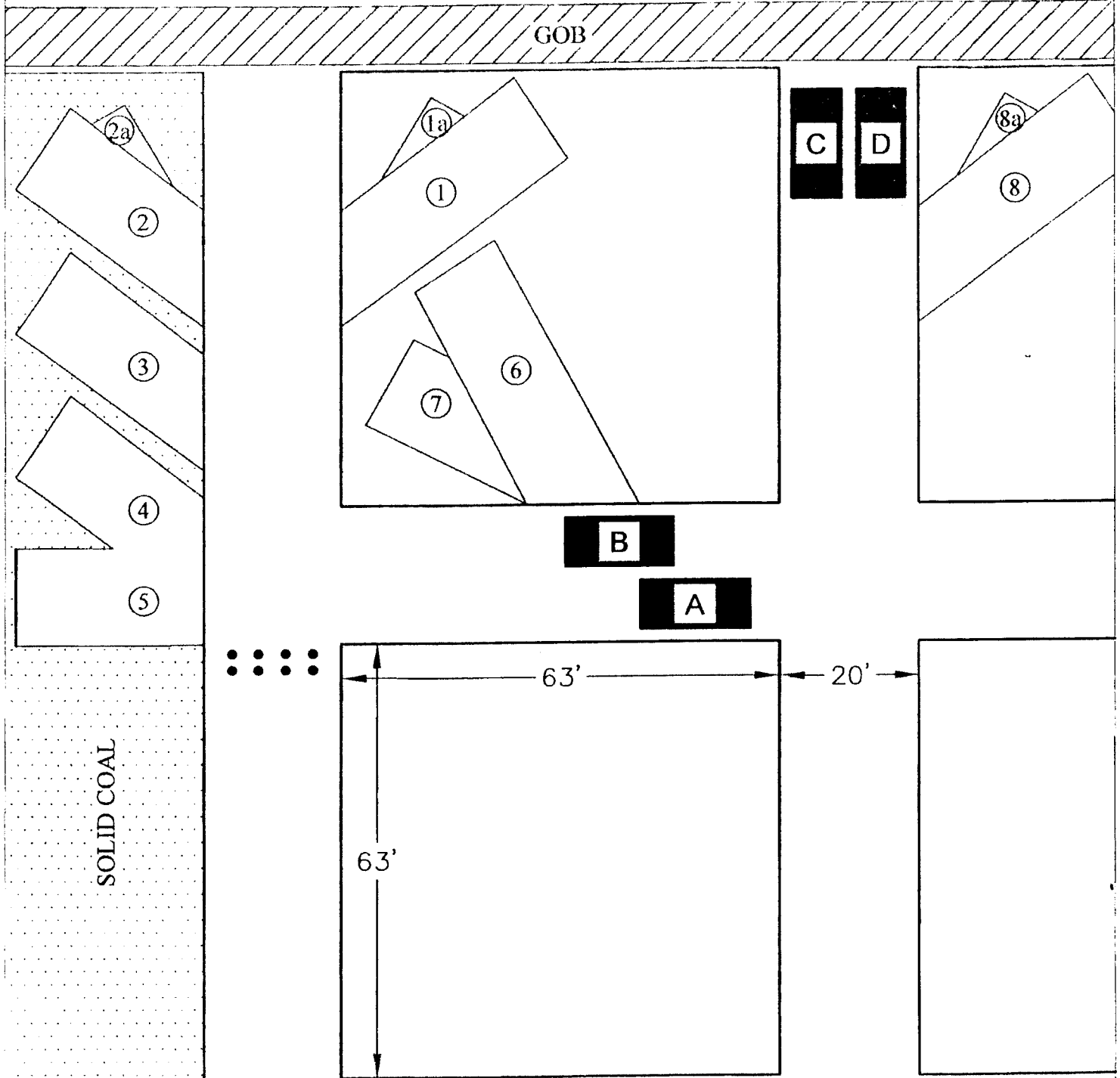


FIGURE 7

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 8



LEGEND

GOB



MRS UNIT



MINING LIFT



TIMBER



SCALE 1"=20'

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

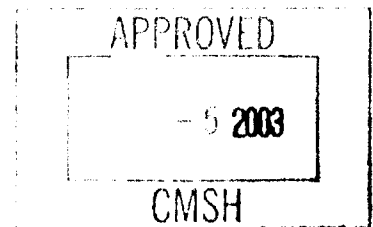
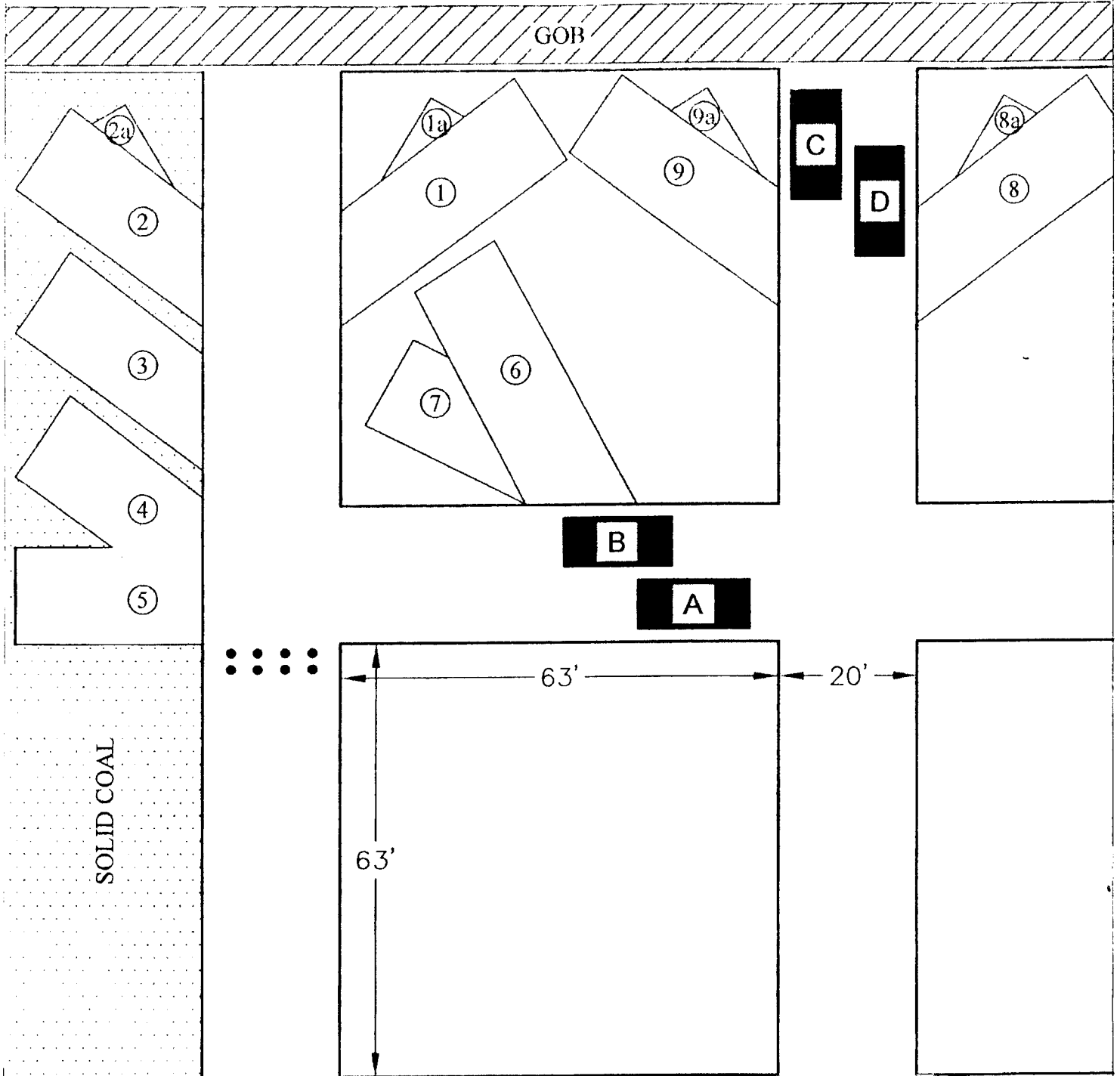


FIGURE 8

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 9



LEGEND

GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

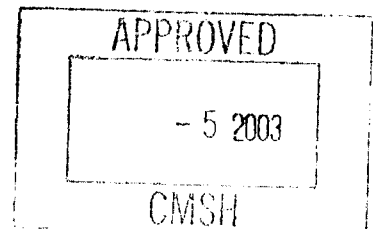
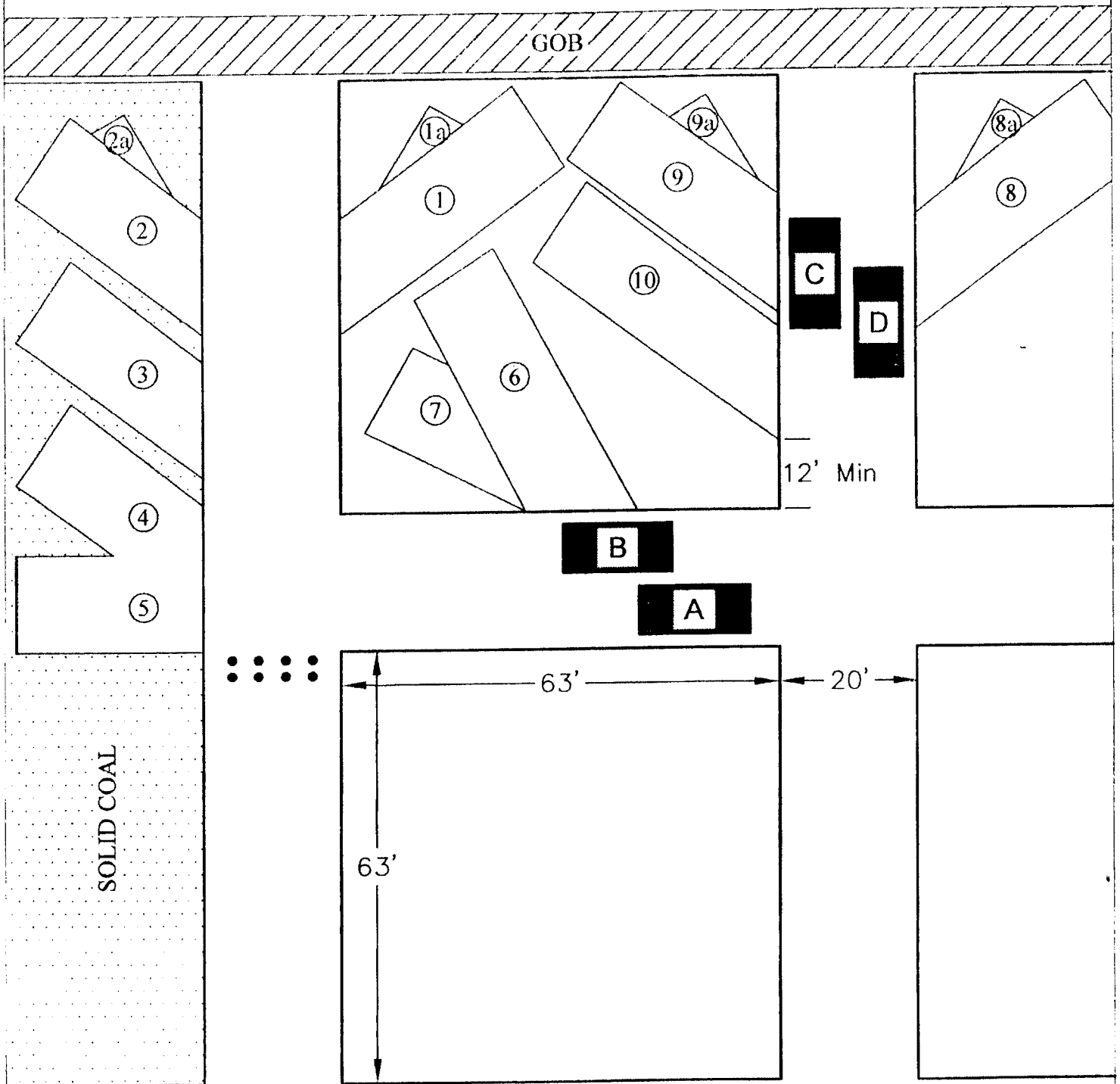


FIGURE 9

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 10



LEGEND

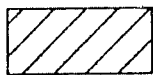
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

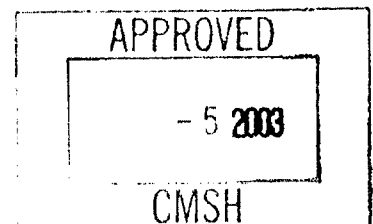
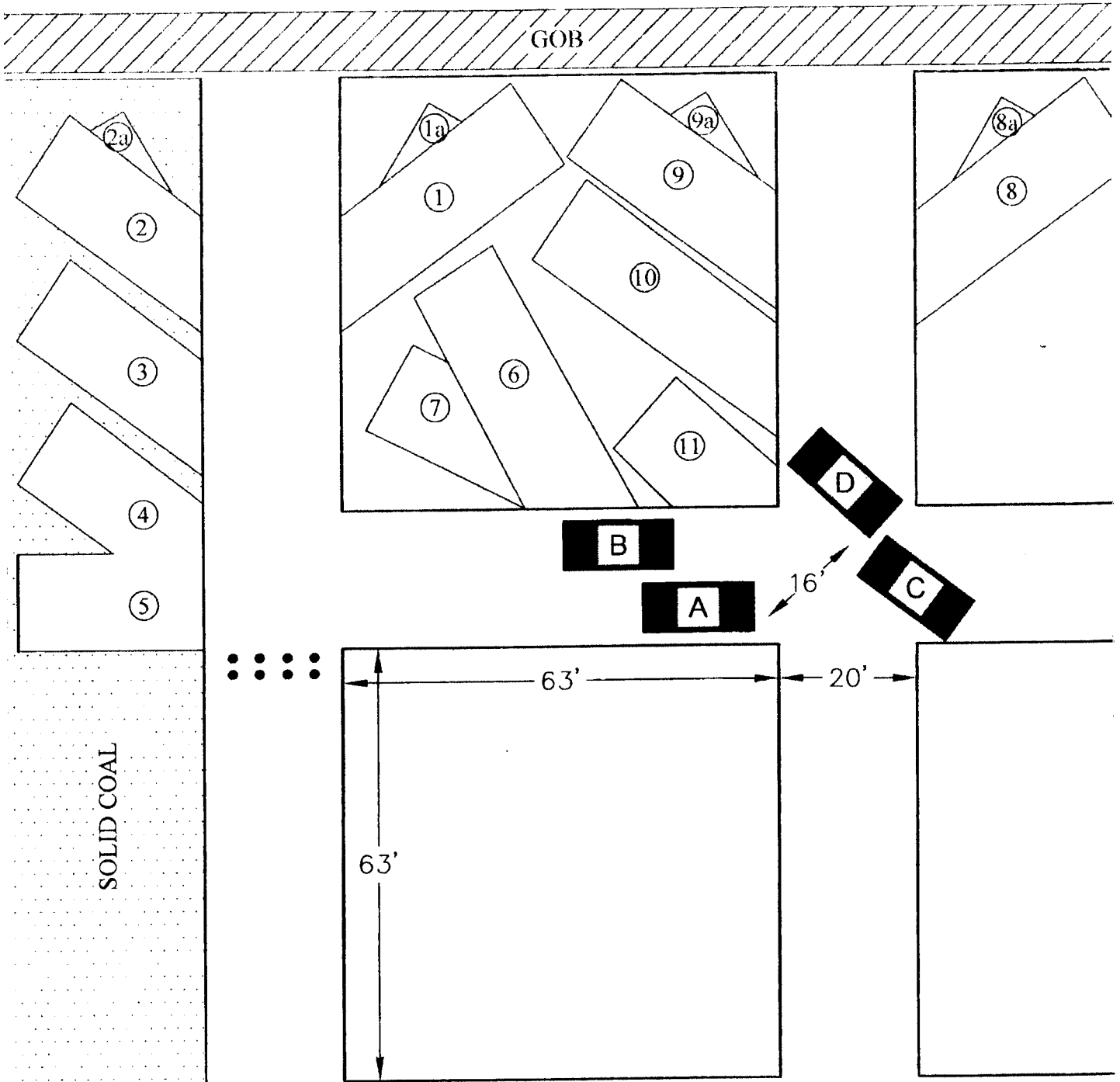


FIGURE 10A

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 11



LEGEND

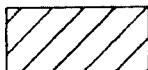
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection. The shuttle car operator, under canopy, may be an exception.

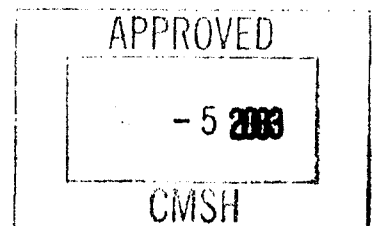
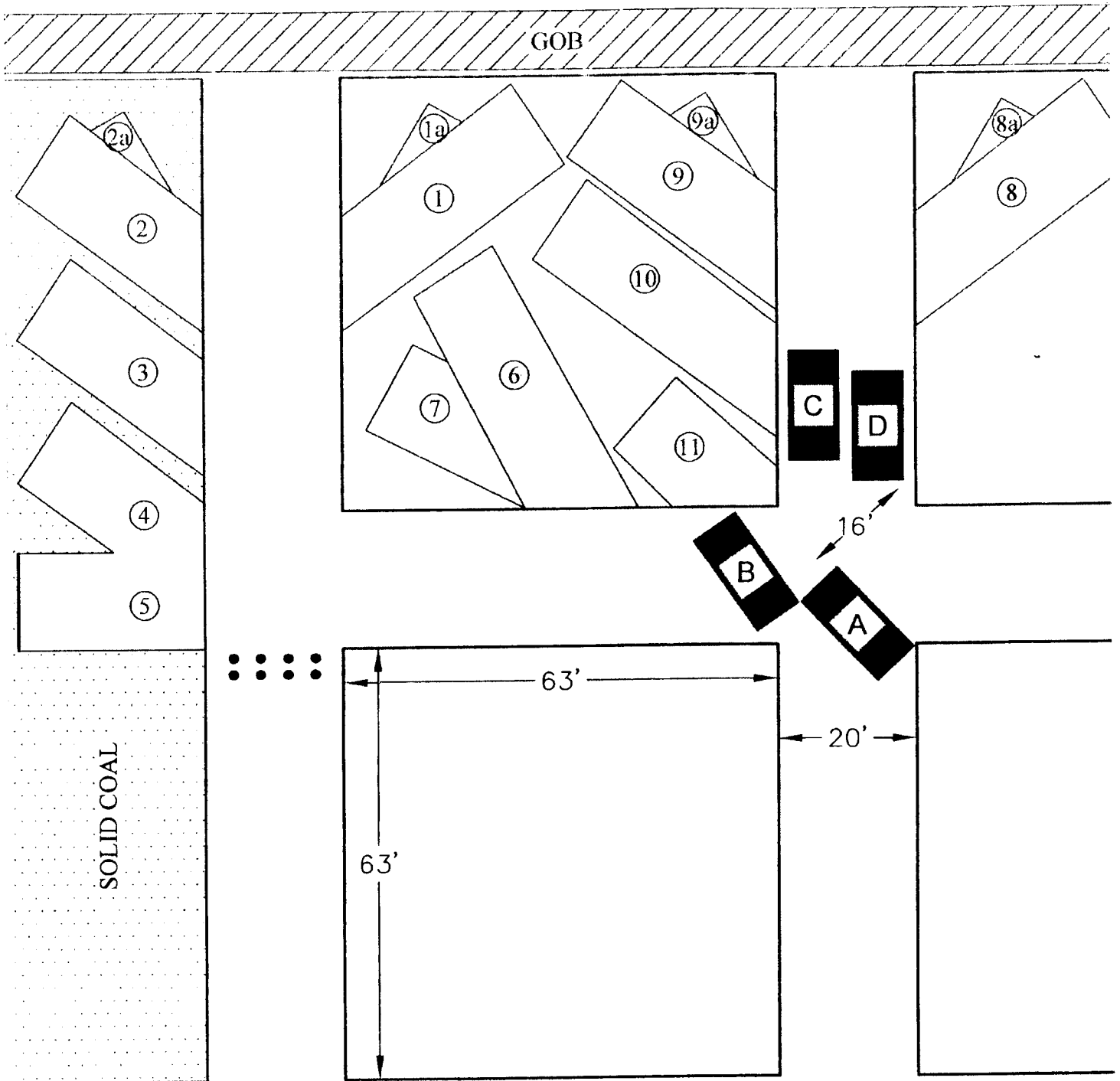


FIGURE 10B

Pillar Extraction/With Barrier Mining - No Splits - Cut No. 11



LEGEND

GOB



MRS UNIT



MINING LIFT

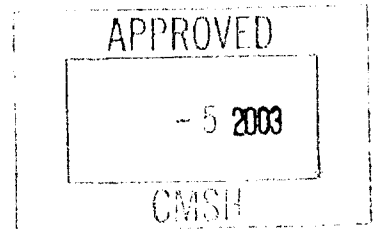


TIMBER



SCALE 1"=20'

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 No miners will be in the intersection during the mining of the final lift, unless
 additional support has been installed in the intersection.
 The shuttle car operator, under canopy, may be an exception.



**Remote Control Pillar Extraction Plan using Mobile Roof Supports 63' X 63' Pillars
(No Splits)**

The mobile roof supports shall be installed at location A, B, C, and D as shown on Figures 1 prior to mining lift No. 1 and lift No. 1a. MRS A and B will be advanced to the location as shown on figure 2 for cuts 2 and 3. MRS A and B will be advanced to the location as shown on figure 3 for cuts 4 and 4a. MRS C and D will be advanced to the locations as shown on figure 4 for cuts 5 and 5a. MRS C and D will be advanced to the locations as shown on figure 5 for cut 6. MRS C and D will be advanced to the locations as shown on figure 6A for cut 7 option. MRS A and B will be advanced to the locations as shown on figure 6B for cut 7 option.

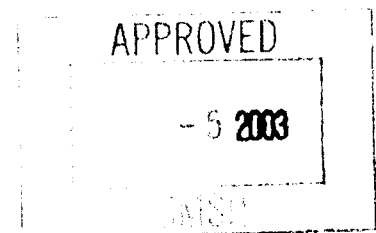
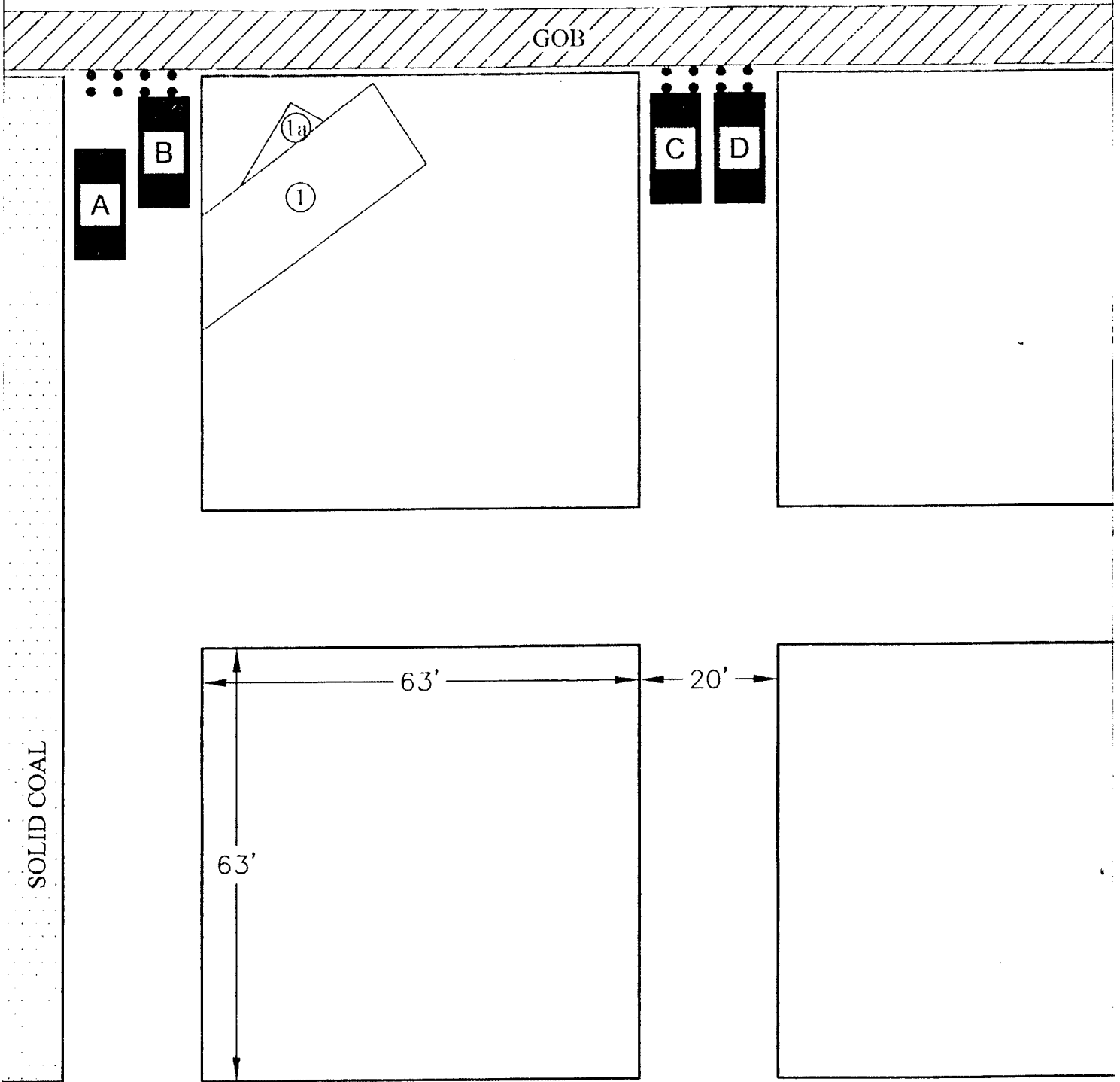


FIGURE 1
Pillar Extraction - No Splits - Cut No. 1



LEGEND

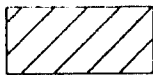
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

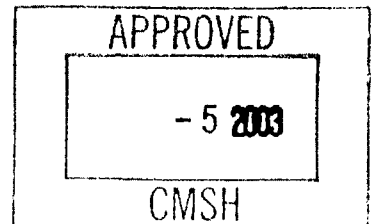
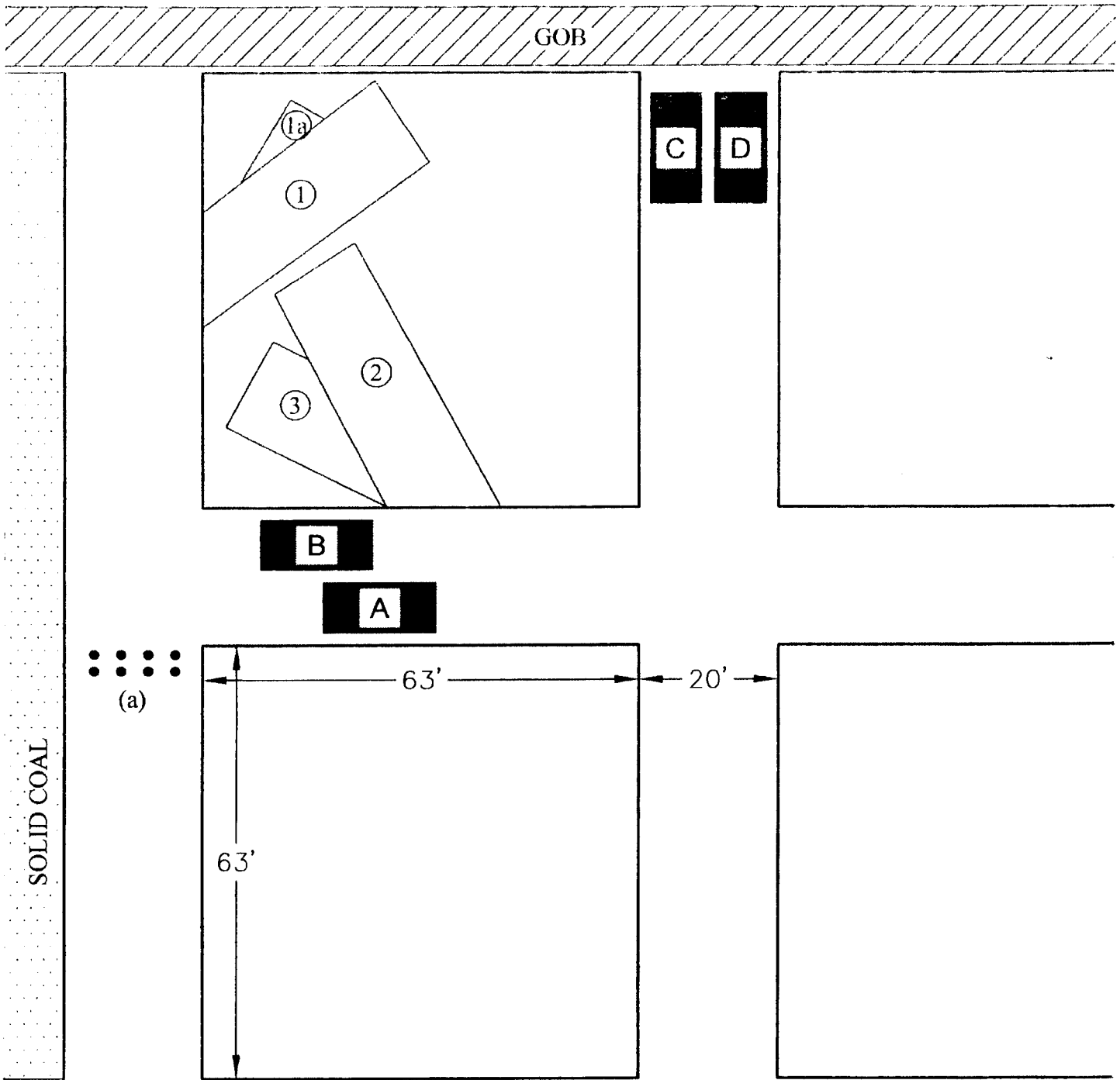


FIGURE 2
Pillar Extraction - No Splits - Cuts No. 2 & 3



LEGEND

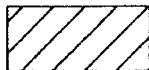
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cuts.
Double Breaker row at (a) to be set prior to cut 2 as shown.

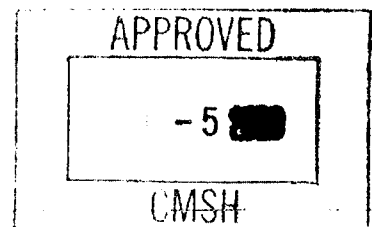
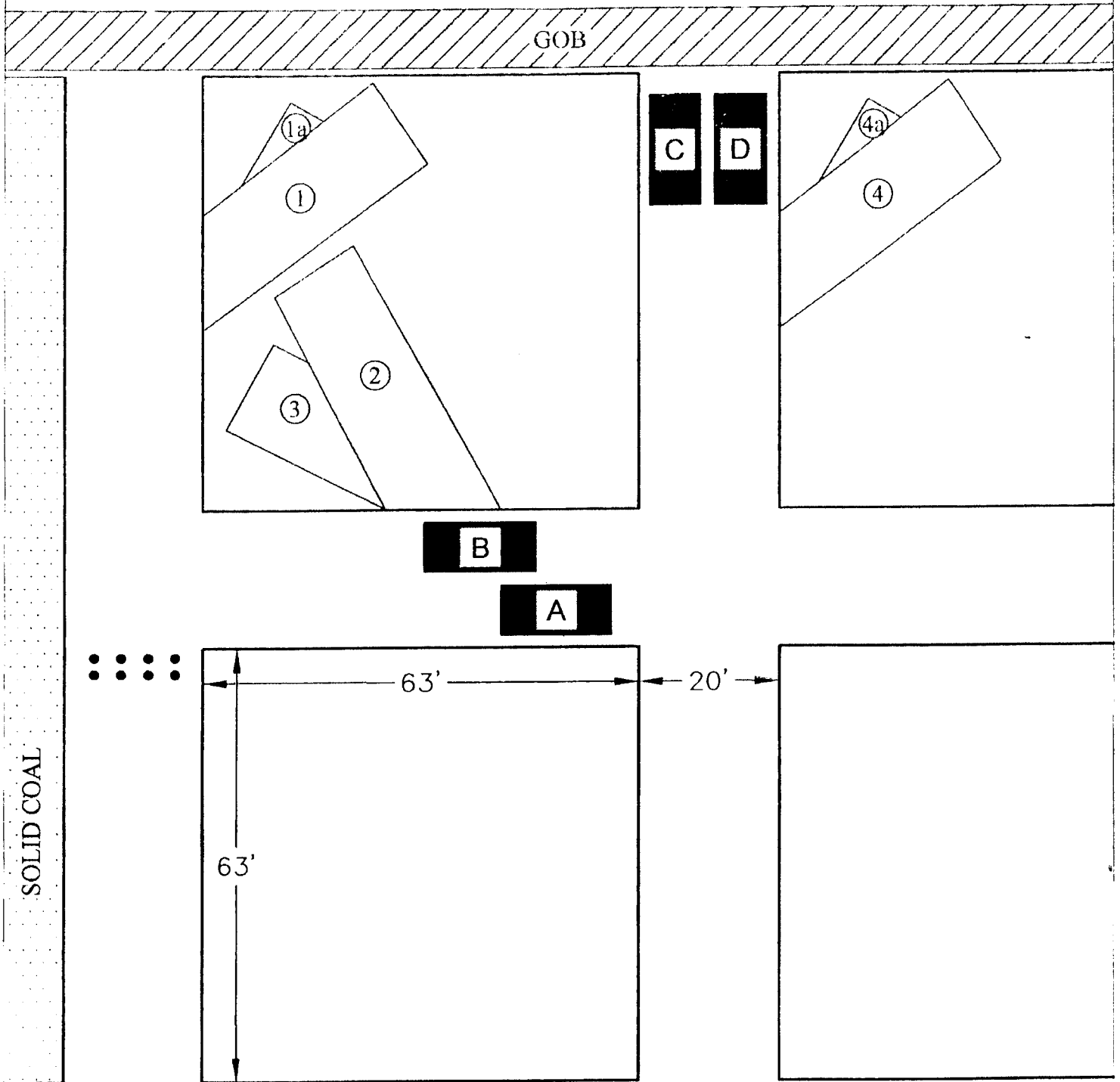


FIGURE 3
Pillar Extraction - No Splits - Cut No. 4



LEGEND

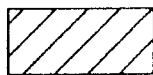
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

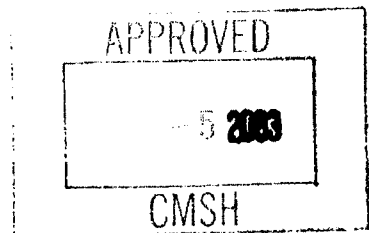
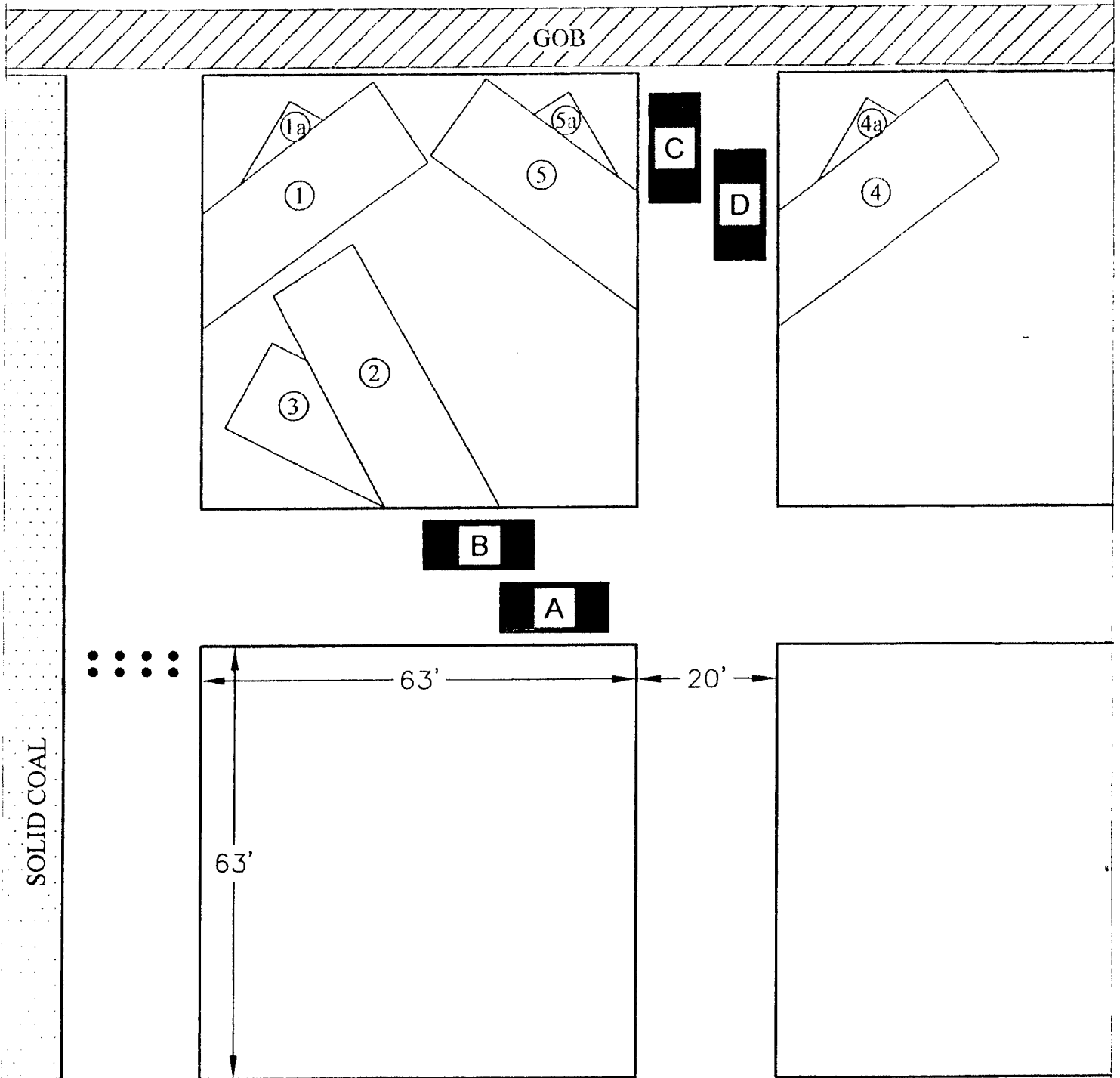


FIGURE 4
Pillar Extraction - No Splits - Cut No. 5



LEGEND

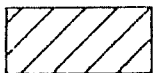
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

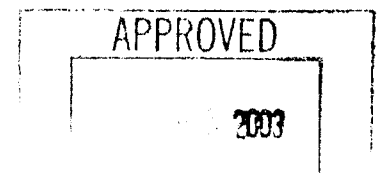
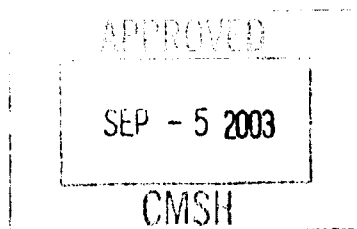
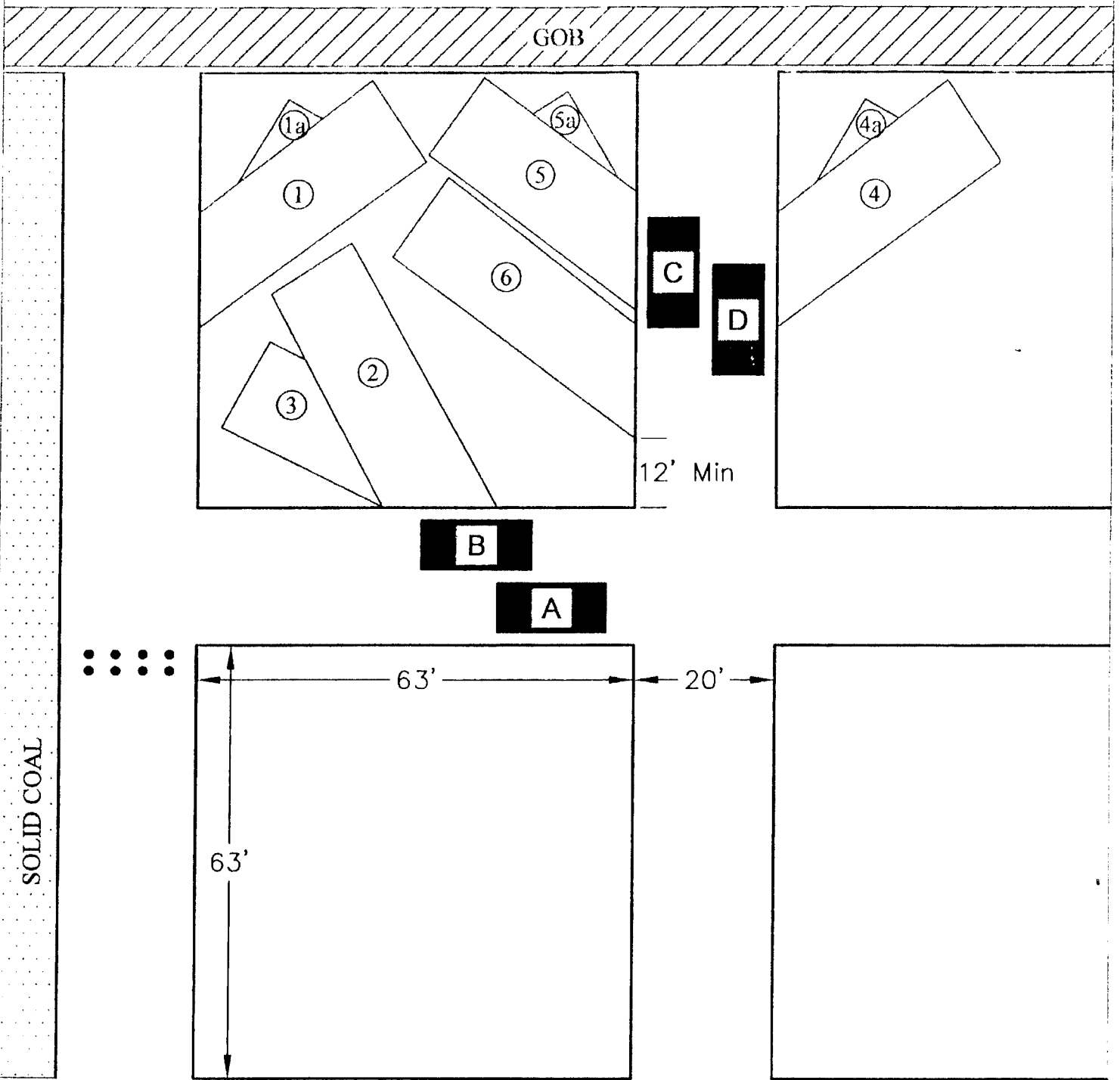


FIGURE 5
Pillar Extraction - No Splits - Cut No. 6



LEGEND

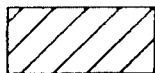
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



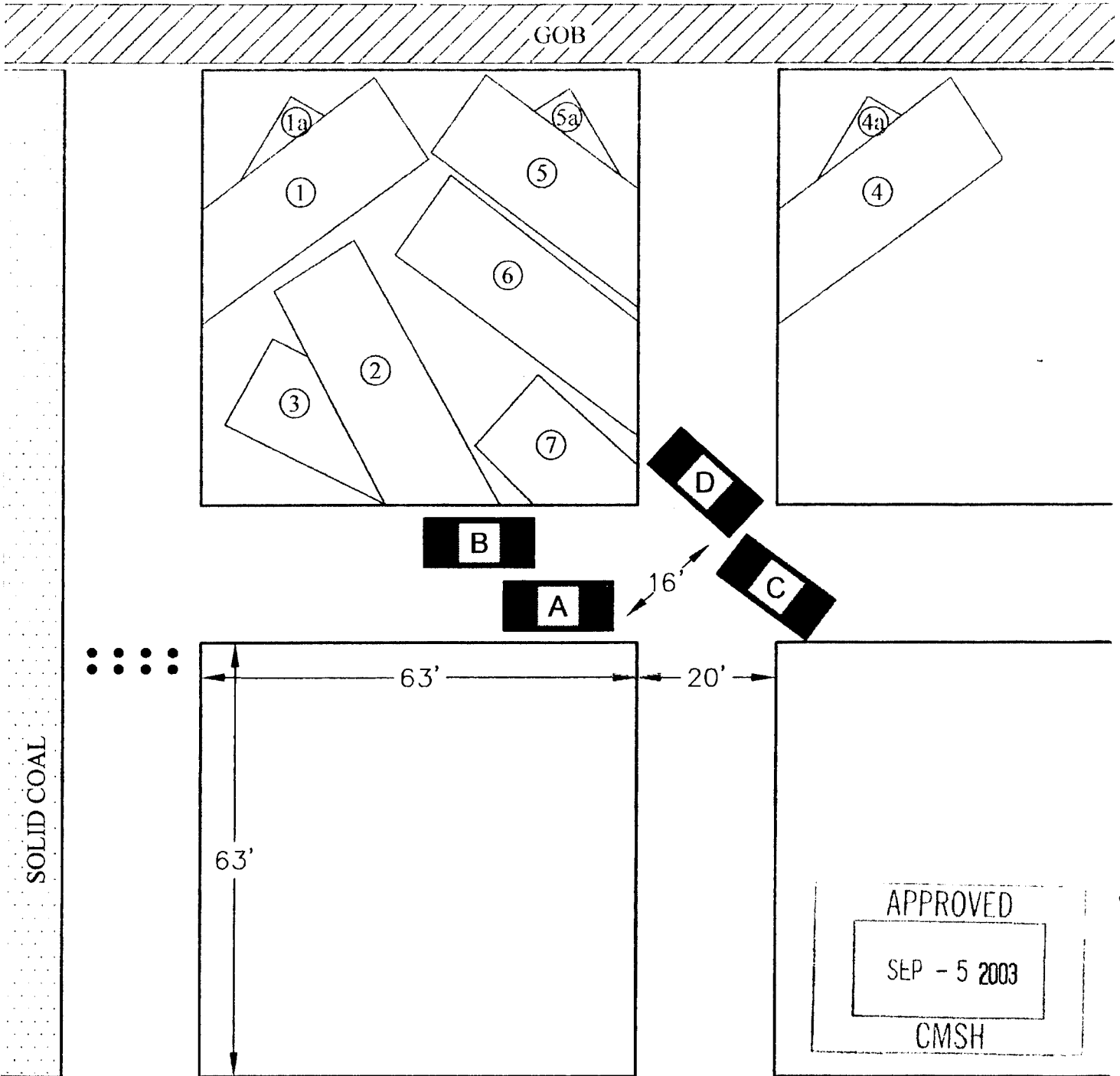
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.

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FIGURE 6A
Pillar Extraction - No Splits - Cut No. 7



LEGEND

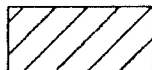
GOB

MRS UNIT

MINING LIFT

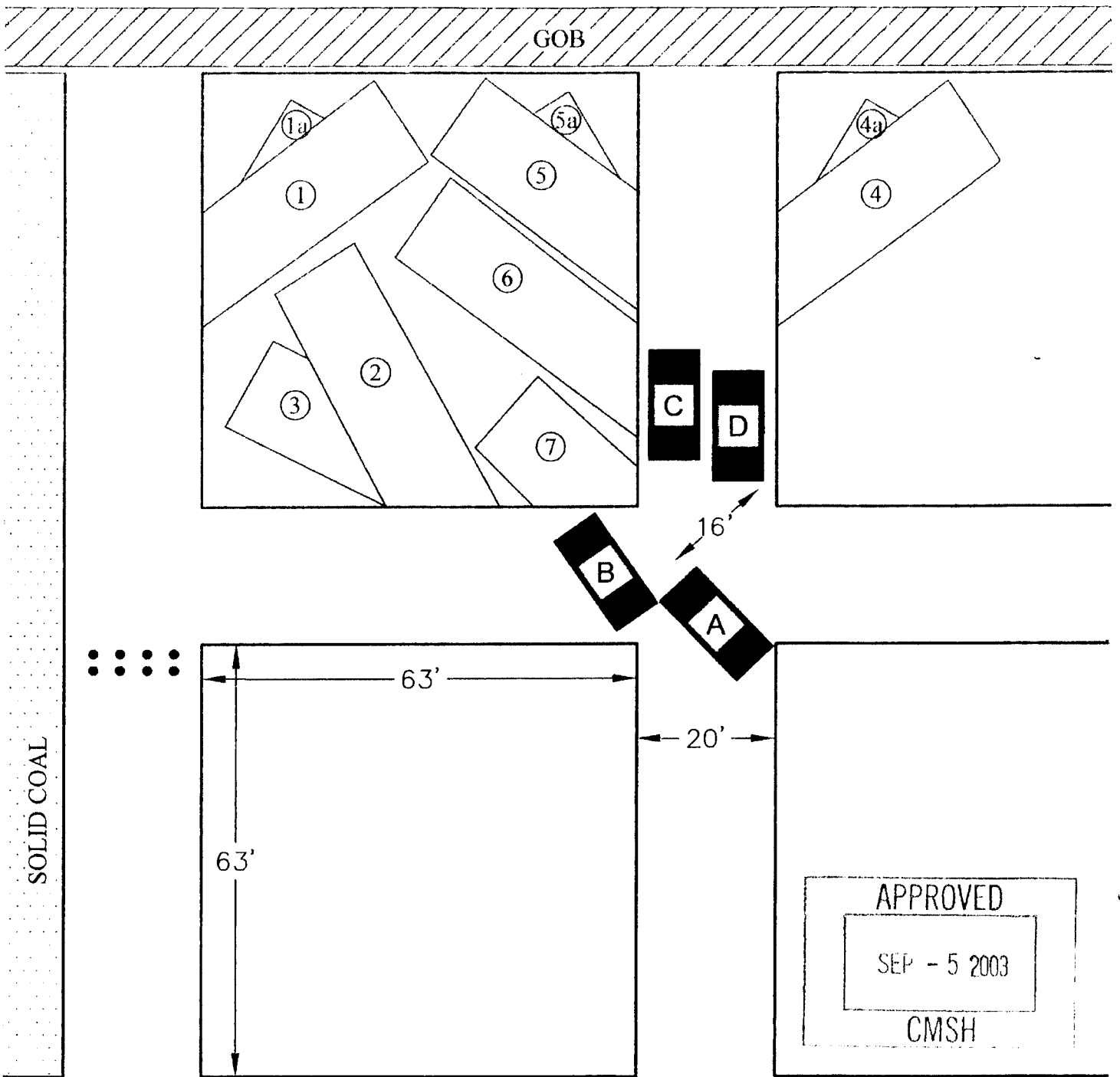
TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. MRS Units A, B, C, & D will then be positioned for the next sequential pillar as shown in Figure 2, and the next pillar will be started as shown in cuts 2 & 3. No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection. The shuttle car operator, under canopy, may be an exception.

FIGURE 6B
Pillar Extraction - No Splits - Cut No. 7



LEGEND

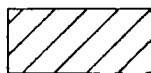
GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=20'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. MRS Units A, B, C, & D will then be positioned for the next sequential pillar as shown in Figure 2, and the next pillar will be started as shown in cuts 2 & 3. No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection. The shuttle car operator, under canopy, may be an exception.

**Remote Control Pillar Extraction Plan using Mobile Roof Supports 63' X 180'
Pillars (No Splits)**

The mobile roof supports shall be installed at location A, B, C, and D as shown on Figures 1 prior to mining lift No. 1 and lift No. 1a. MRS A and B will be advanced to the location as shown on figure 2 for cut 2. MRS A and B will be advanced to the location as shown on figure 3 for cut 3. MRS A and B will be advanced to the location as shown on figure 4 for cut 4. MRS A and B will be advanced to the location as shown on figure 5 for cut 5. MRS A and B will be advanced to the location as shown on figure 6 for cut 6. MRS A and B will be advanced to the location as shown on figure 7 for cuts 7 and 8. MRS C and D will be advanced to the locations as shown on figure 8 for cuts 9 and 9a. MRS C and D will be advanced to the locations as shown on figure 9 for cuts 10 and 10a. MRS C and D will be advanced to the locations as shown on figure 10 for cut 11. MRS C and D will be advanced to the locations as shown on figure 11 for cut 12. MRS C and D will be advanced to the locations as shown on figure 12 for cut 13. MRS C and D will be advanced to the locations as shown on figure 13 for cut 14. MRS C and D will be advanced to the locations as shown on figure 14 for cut 15. MRS C and D will be advanced to the locations as shown on figure 15 for cut 16. MRS C and D will be advanced to the locations as shown on figure 16 for cut 17. MRS C and D will be advanced to the locations as shown on figure 17 for cut 18. MRS C and D will be advanced to the locations as shown on figure 18 for cut 19. MRS C and D will be advanced to the locations as shown on figure 19 for cut 20. MRS C and D will be advanced to the locations as shown on figure 20A for cut 21 option. MRS C and D will be advanced to the locations as shown on figure 20B for cut 21 option.

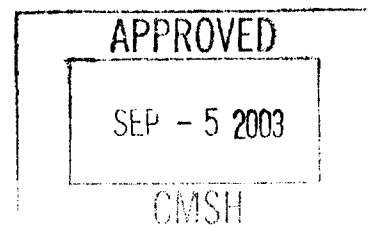
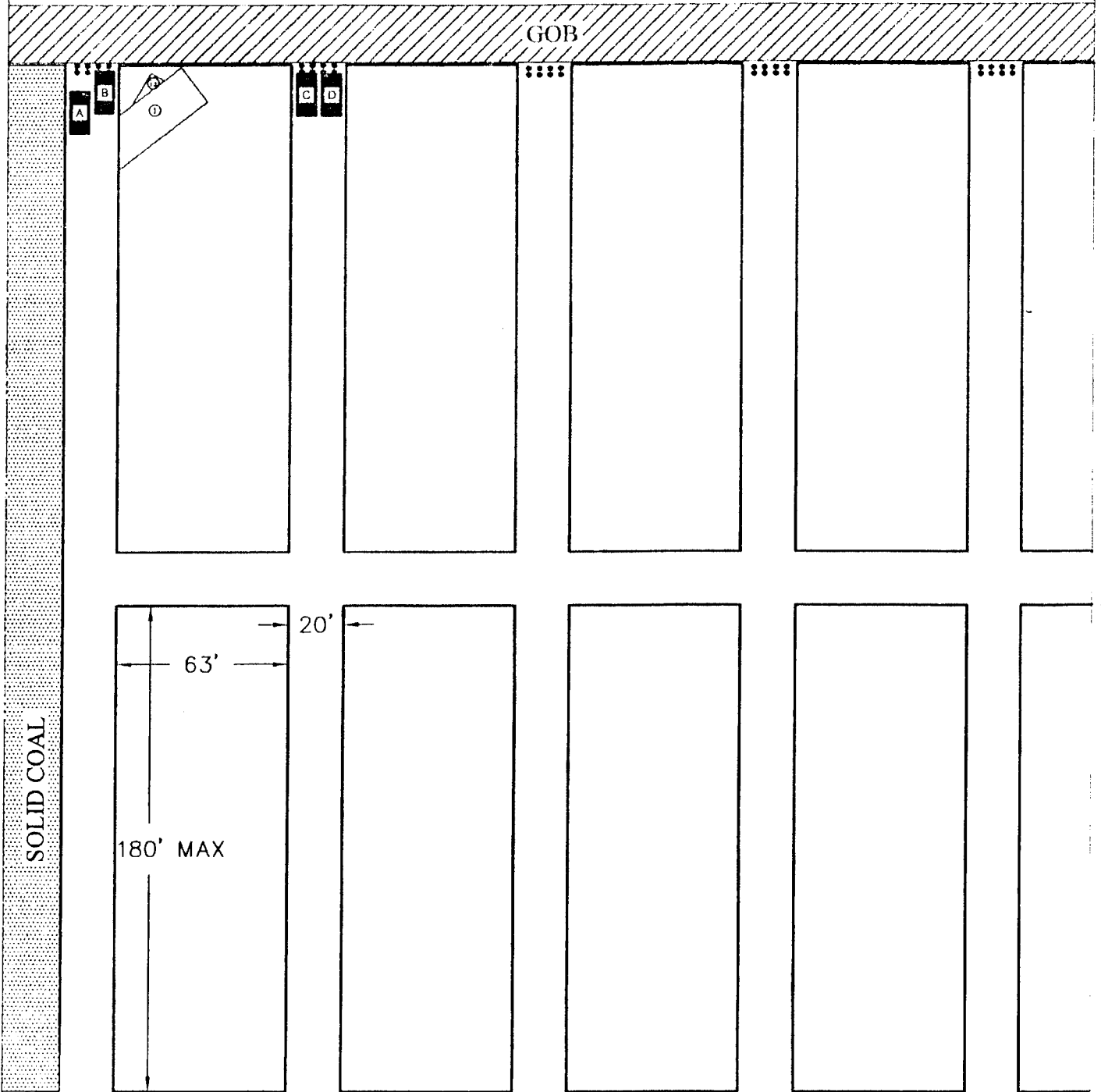


FIGURE 1
Pillar Extraction - No Splits - Cut No. 1



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1" = 50'



Note:

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker rows which are replaced by the MRS units as shown will not be reset.

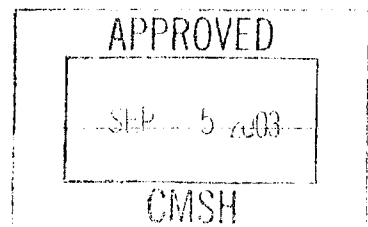
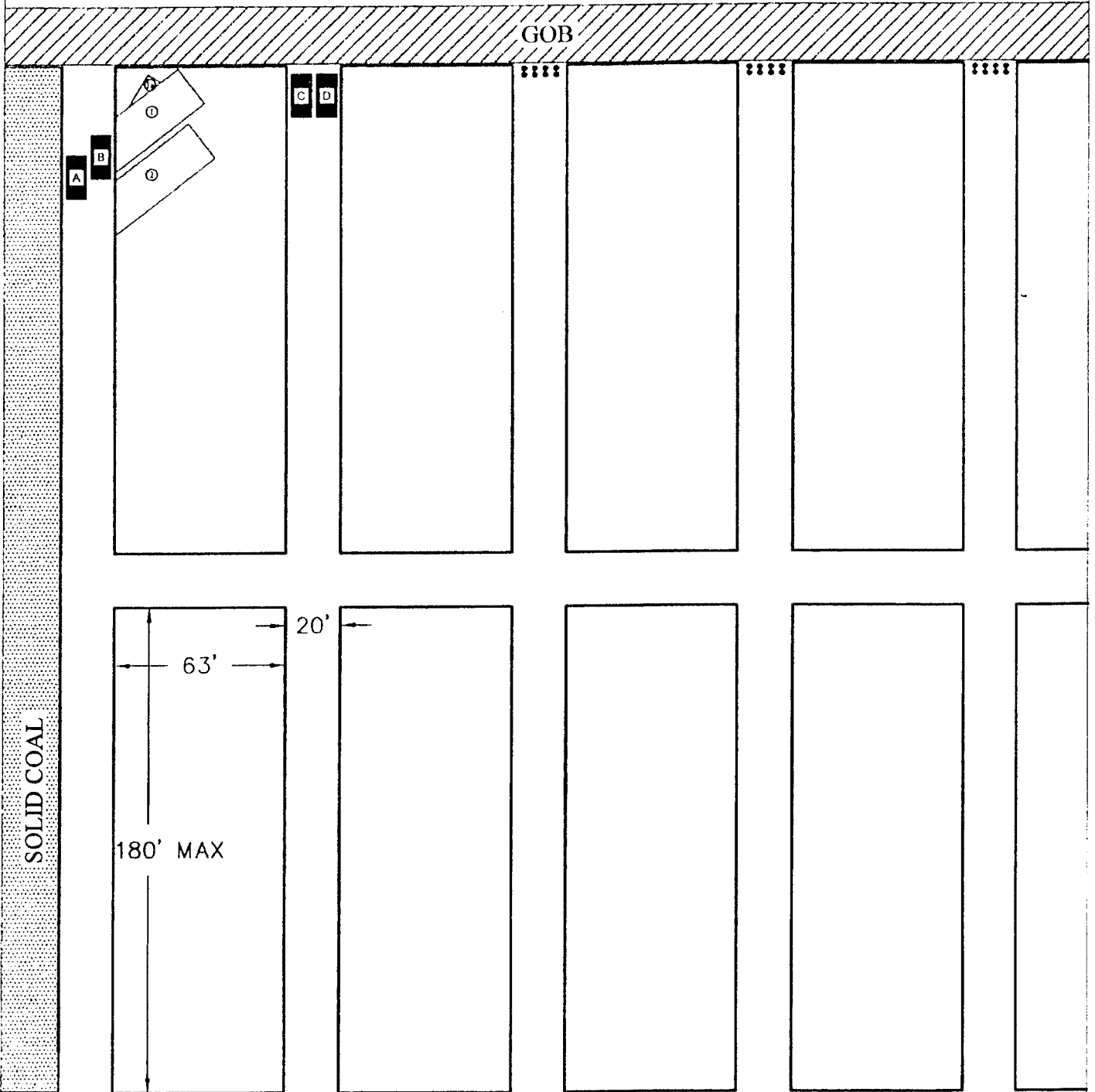




FIGURE 2
Pillar Extraction - No Splits - Cut No. 2



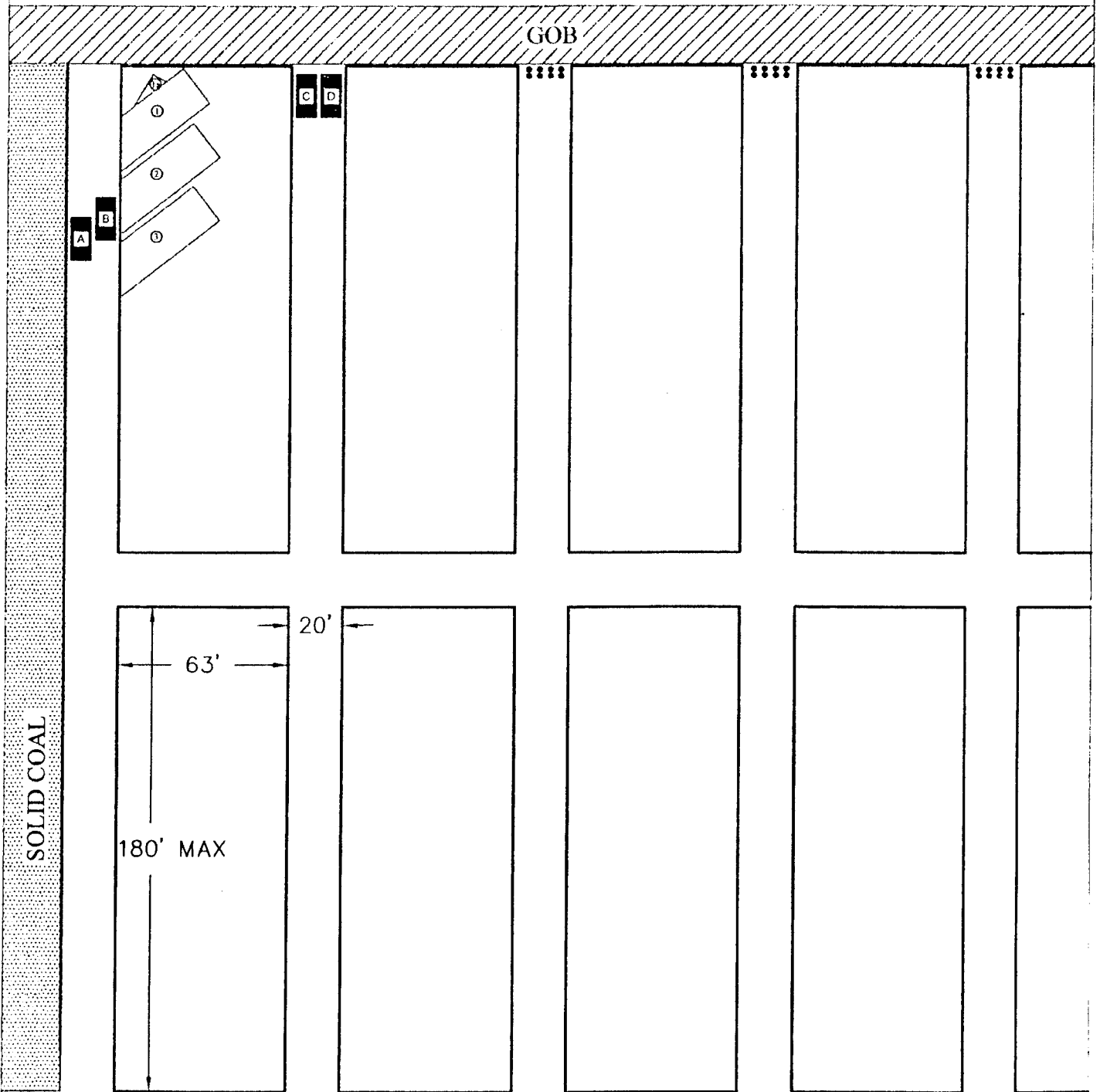
LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 3
Pillar Extraction - No Splits - Cut No. 3



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'



Note:

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. Breaker rows which are replaced by the MRS units as shown will not be reset.

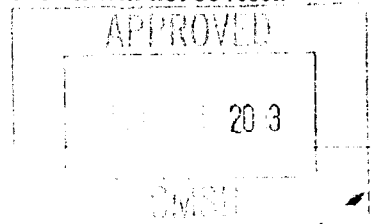
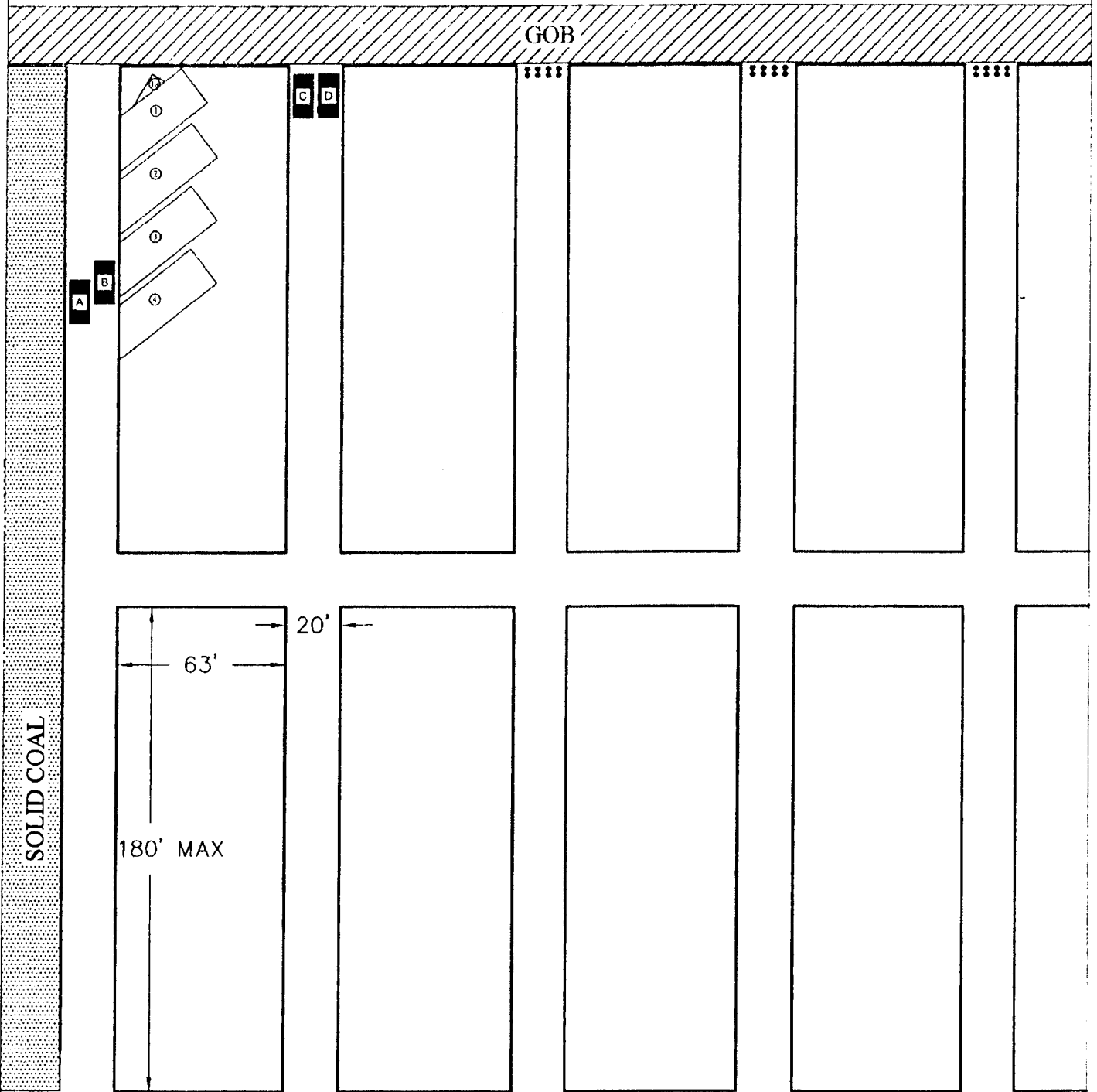


FIGURE 4
Pillar Extraction - No Splits - Cut No. 4



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'



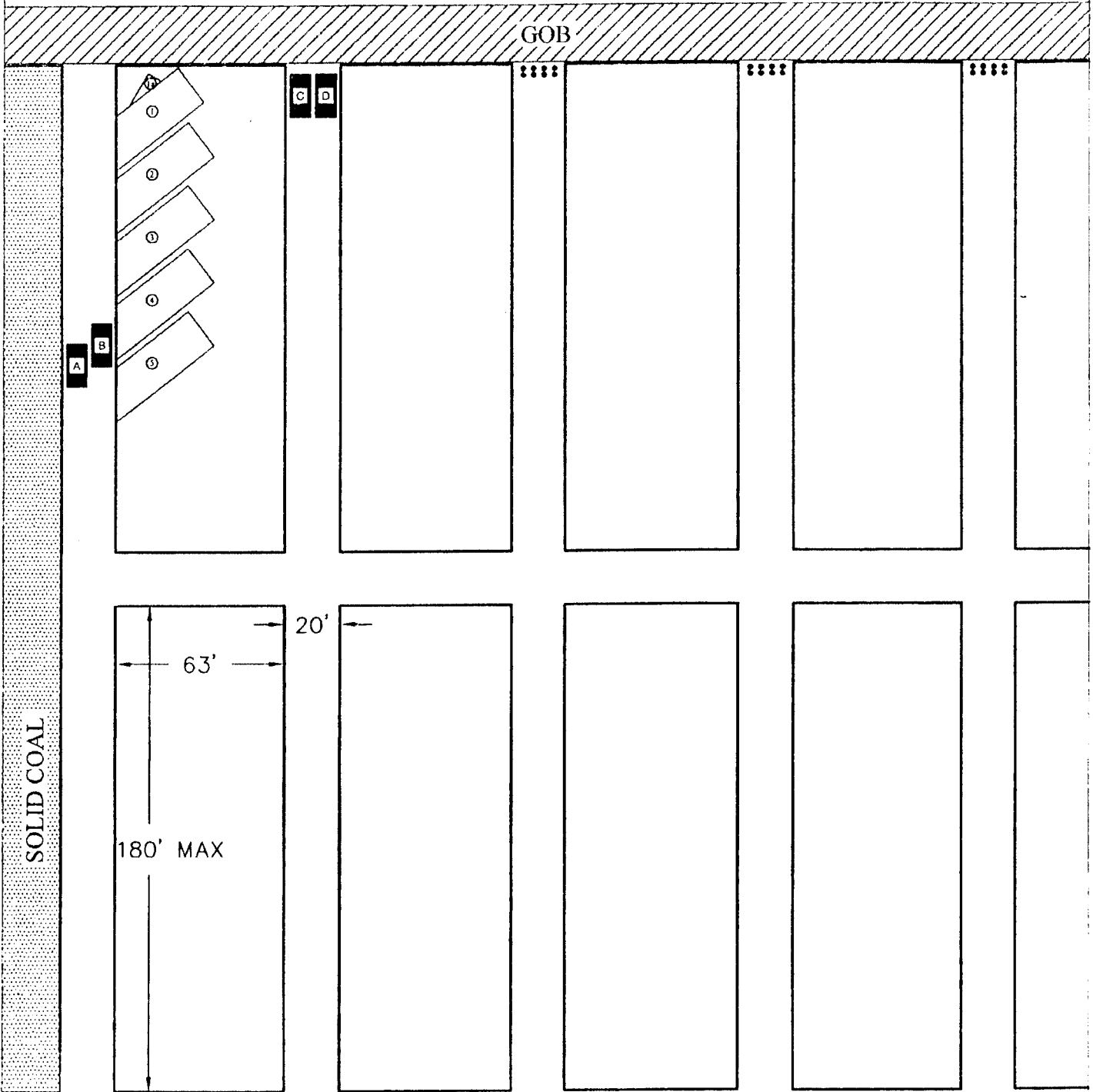
Note:

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.



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FIGURE 5
Pillar Extraction - No Splits - Cut No. 5

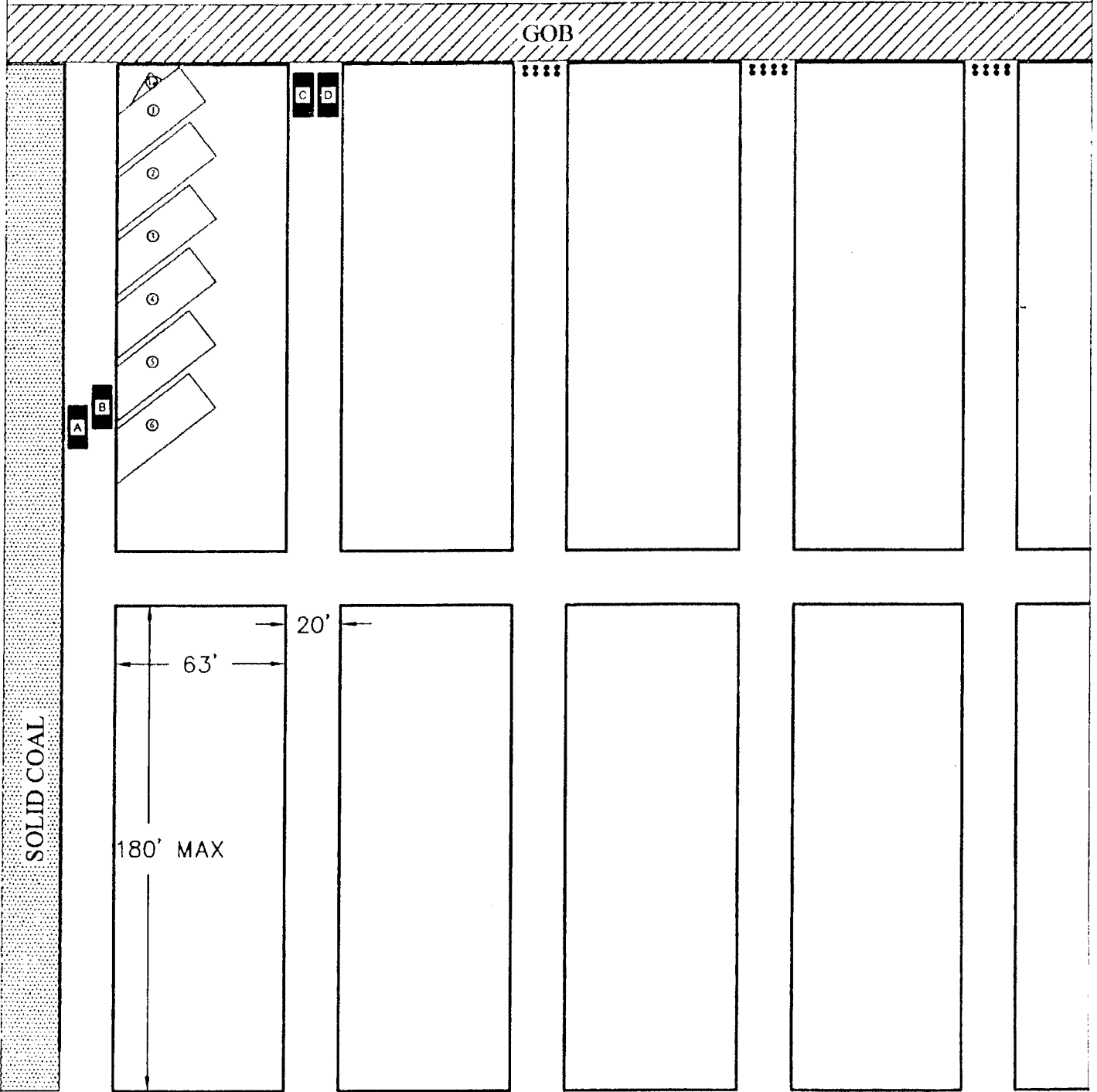


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 6
Pillar Extraction - No Splits - Cut No. 6



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

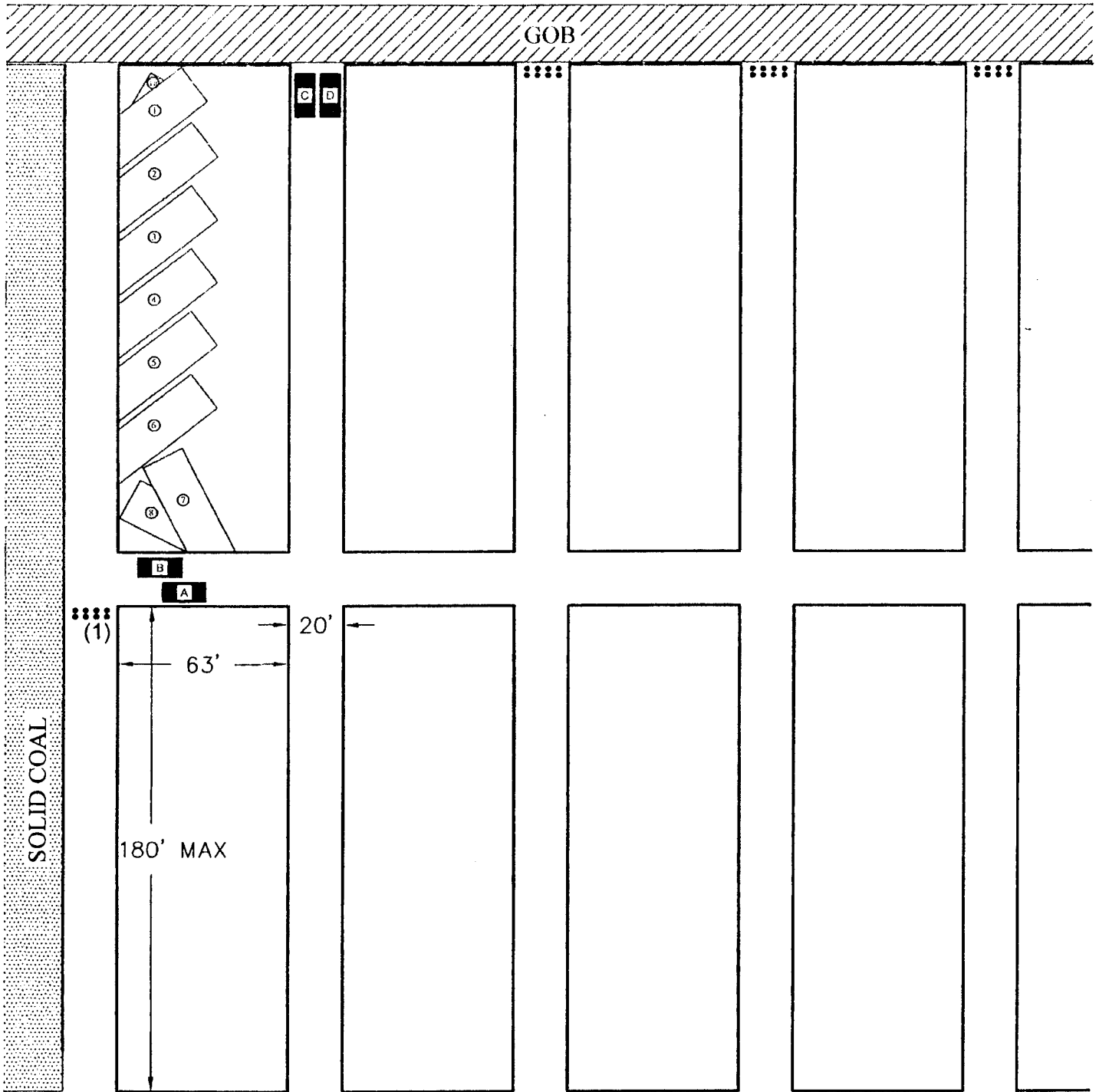


Note:

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 7
Pillar Extraction - No Splits - Cuts No. 7 & 8

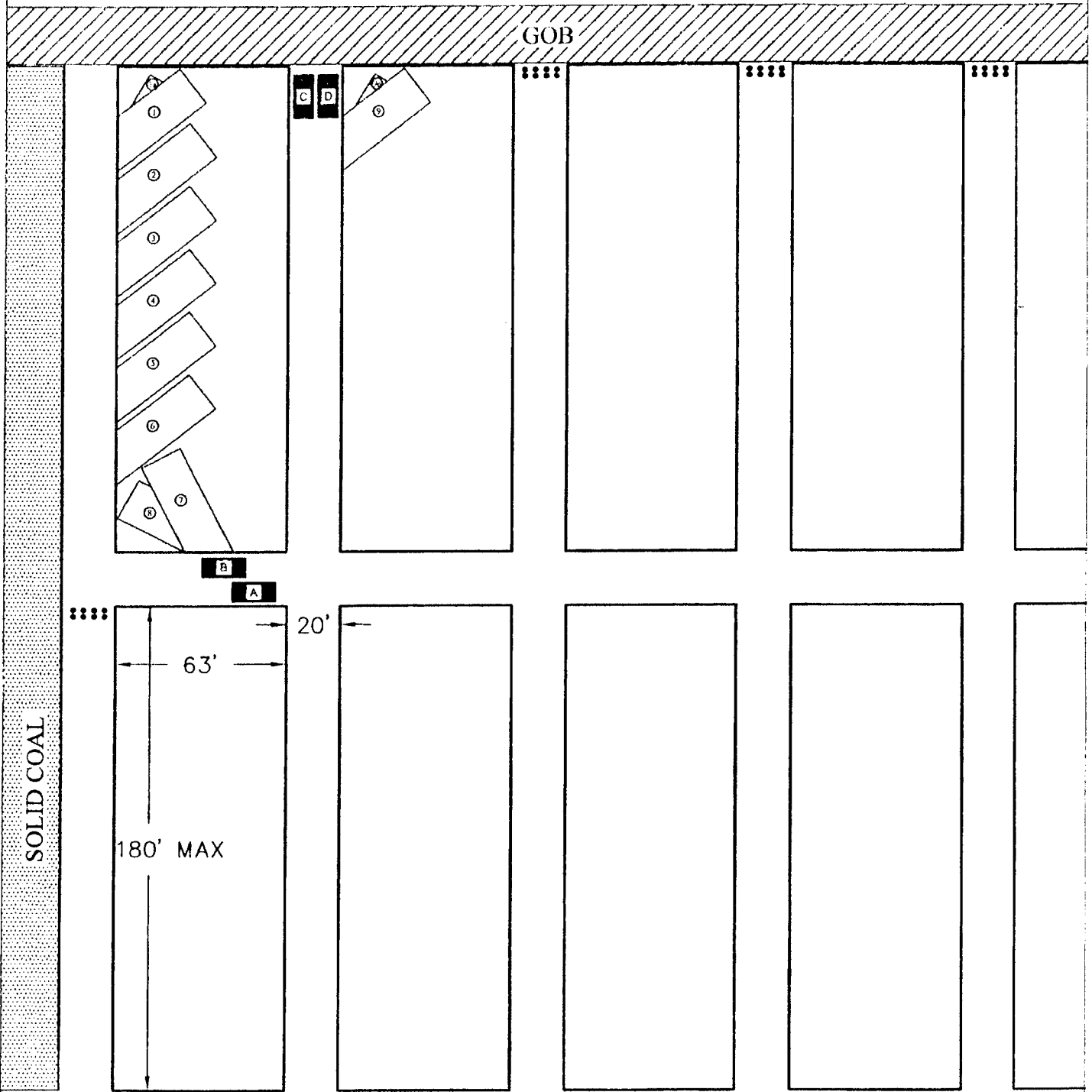


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 Double Breaker row (1) to be set prior to mining cut #7 as shown.

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FIGURE 8
Pillar Extraction - No Splits - Cut No. 9



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:

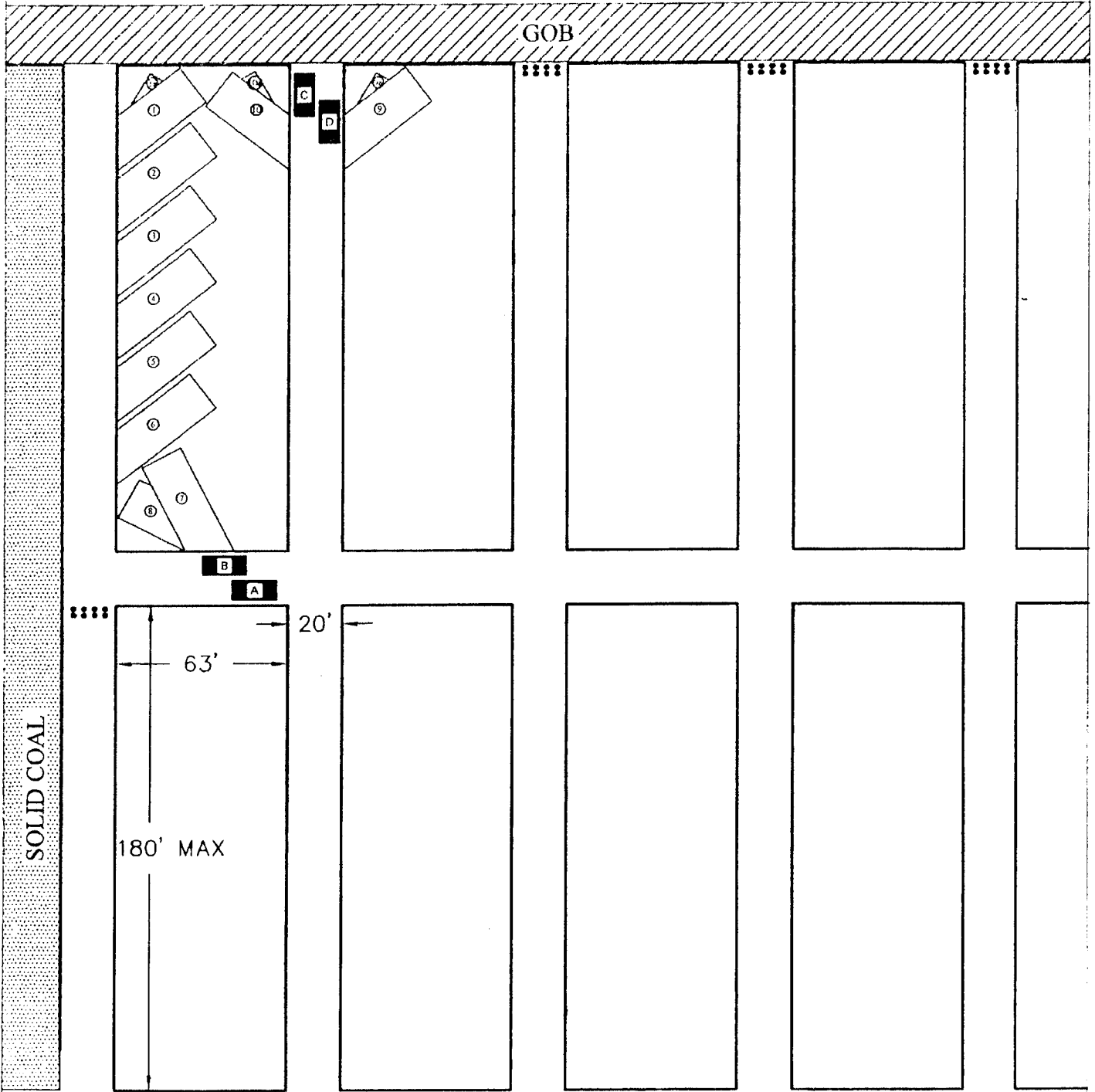
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 9
Pillar Extraction - No Splits - Cut No. 10



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1" = 50'

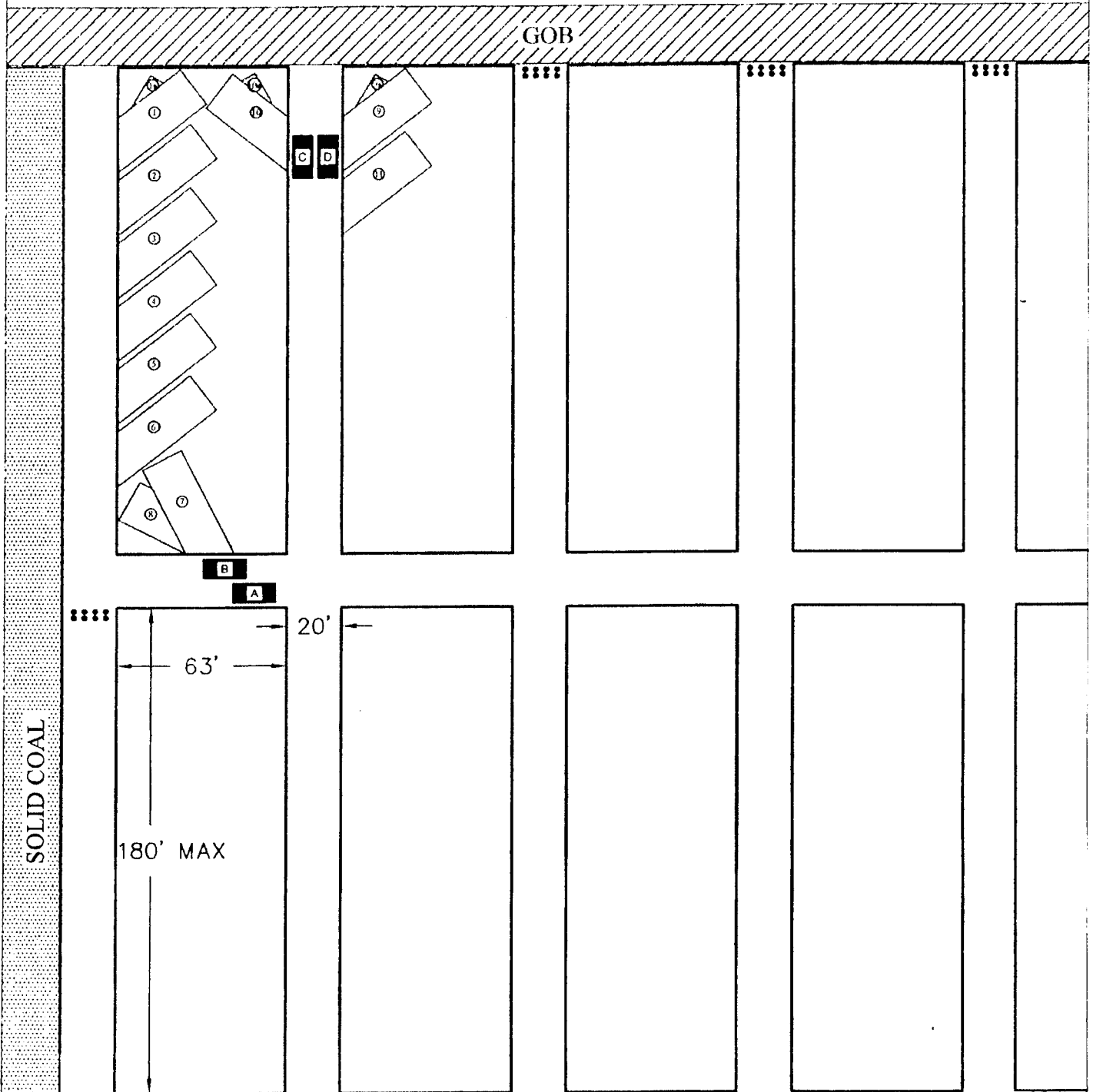
Note:



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 10
Pillar Extraction - No Splits - Cut No. 11



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:



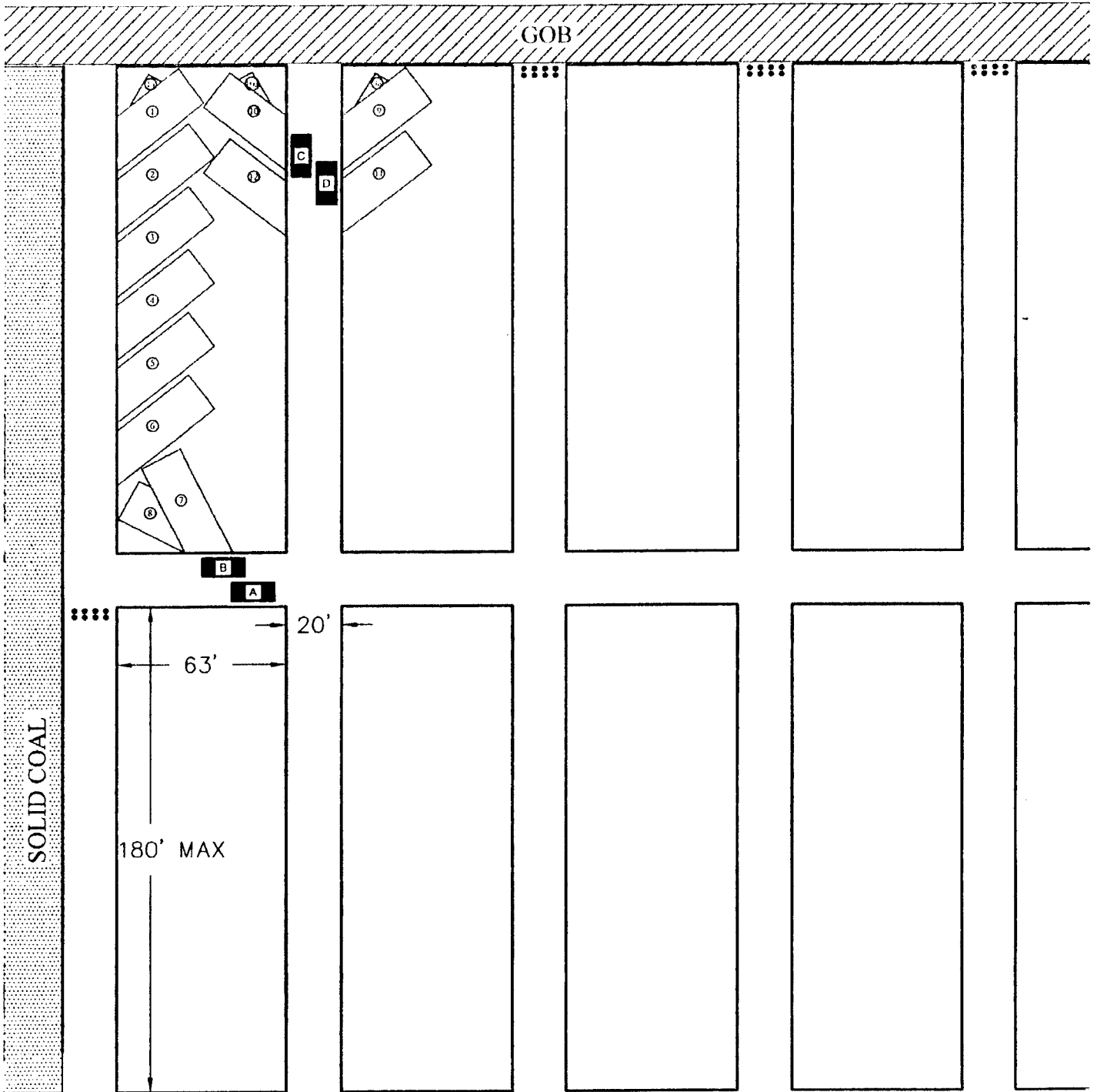
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

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

FIGURE 11
Pillar Extraction - No Splits - Cut No. 12



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:

-  MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
-  Breaker rows which are replaced by the MRS units as shown will not be reset.
- ⊗ A minimum fender thickness of 5' between lifts, left side of entry, will apply.

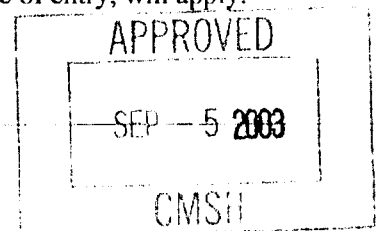
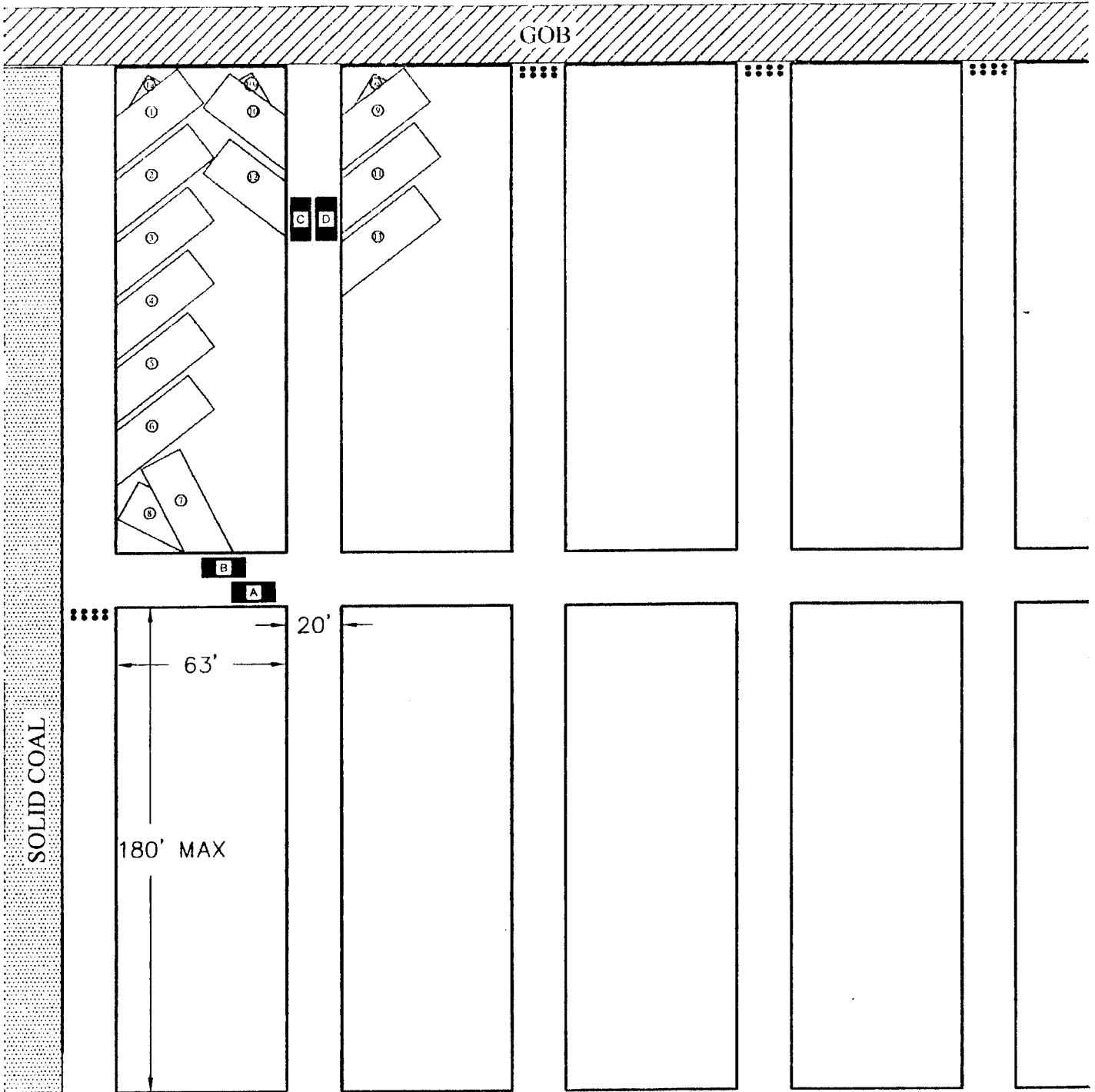




FIGURE 12
Pillar Extraction - No Splits - Cut No. 13

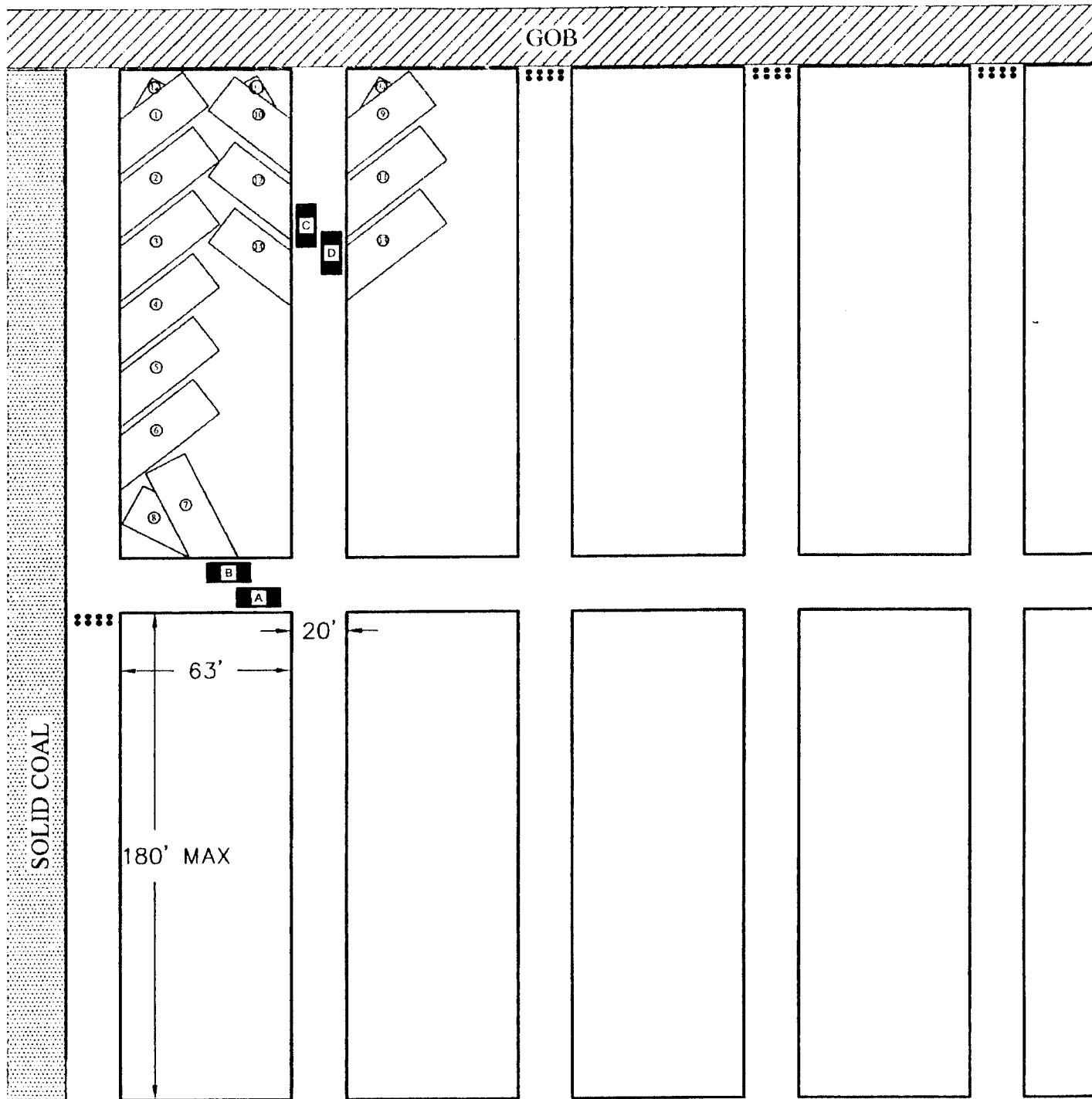


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'



Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 • A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 13
Pillar Extraction - No Splits - Cut No. 14

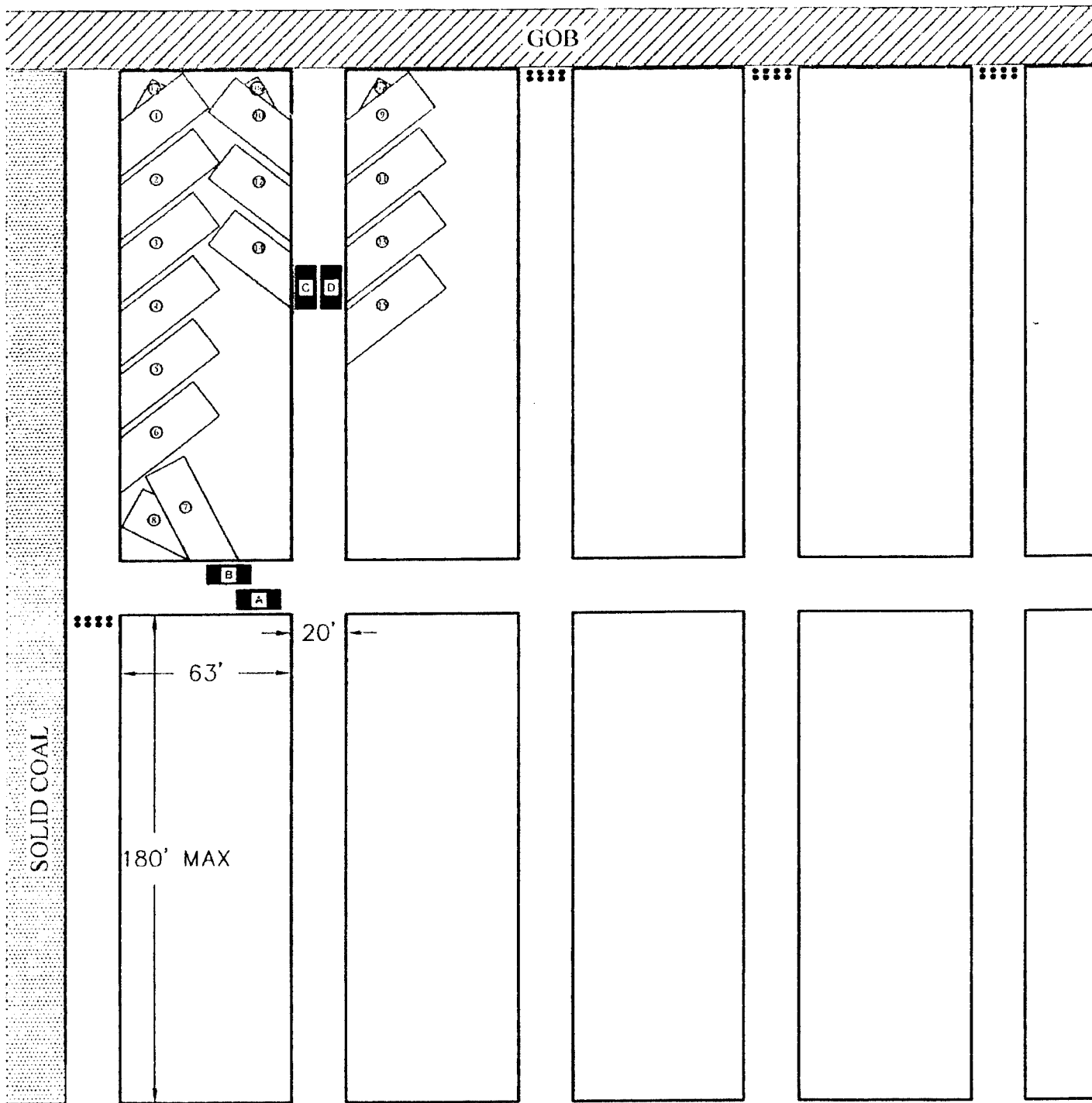


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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

FIGURE 14
Pillar Extraction - No Splits - Cut No. 15



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:

-  MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
-  Breaker rows which are replaced by the MRS units as shown will not be reset.
- ⊕ A minimum fender thickness of 5' between lifts, left side of entry, will apply.
-

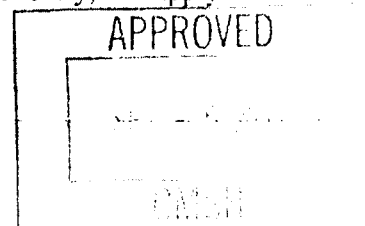
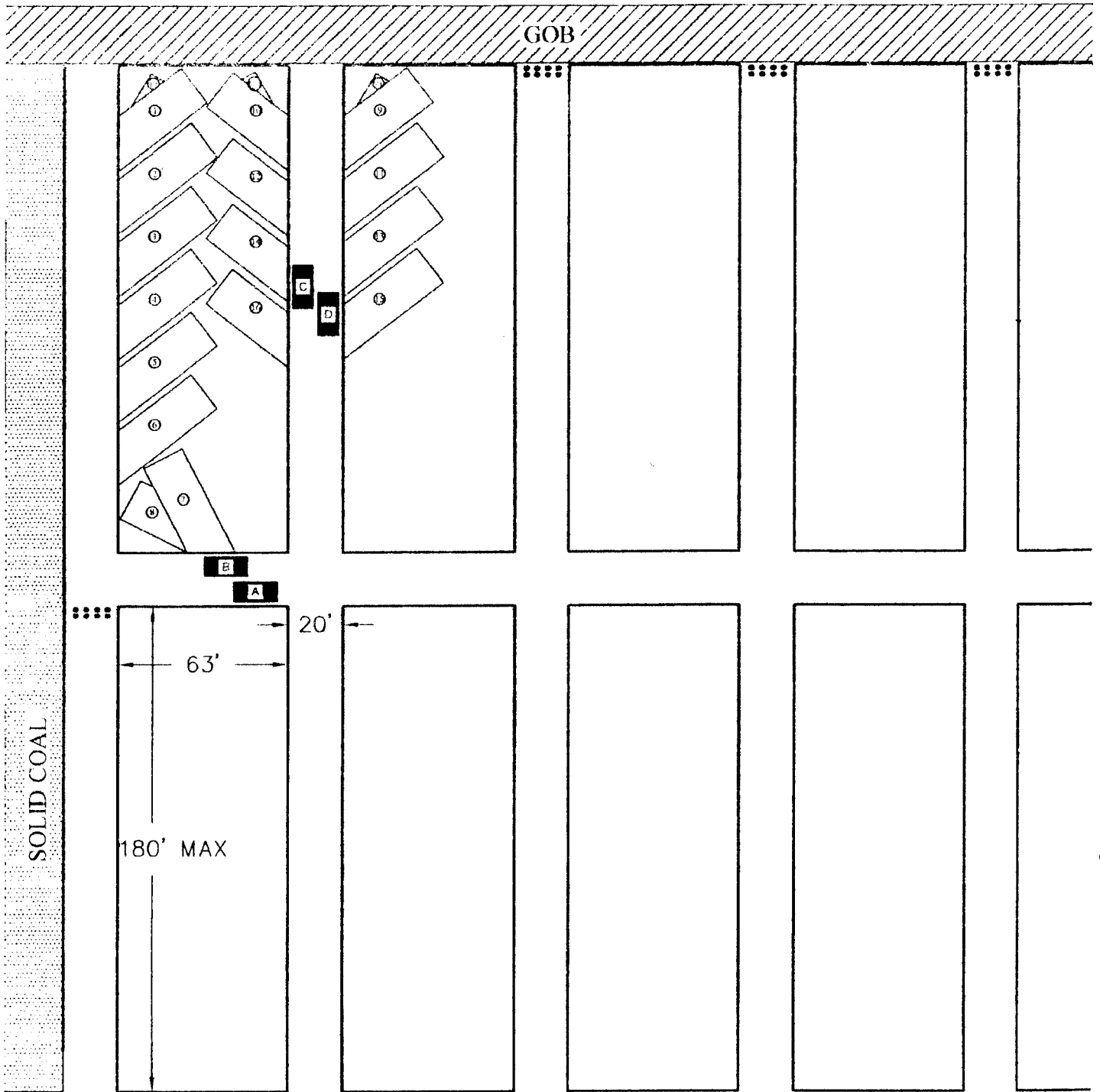





FIGURE 15
Pillar Extraction - No Splits - Cut No. 16



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1" = 50'

Note:

-  MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
-  Breaker rows which are replaced by the MRS units as shown will not be reset.
-  A minimum fender thickness of 5' between lifts, left side of entry, will apply.

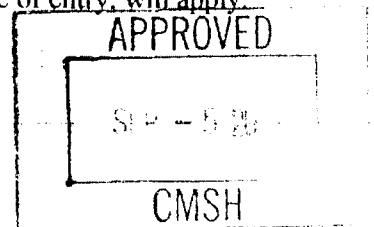
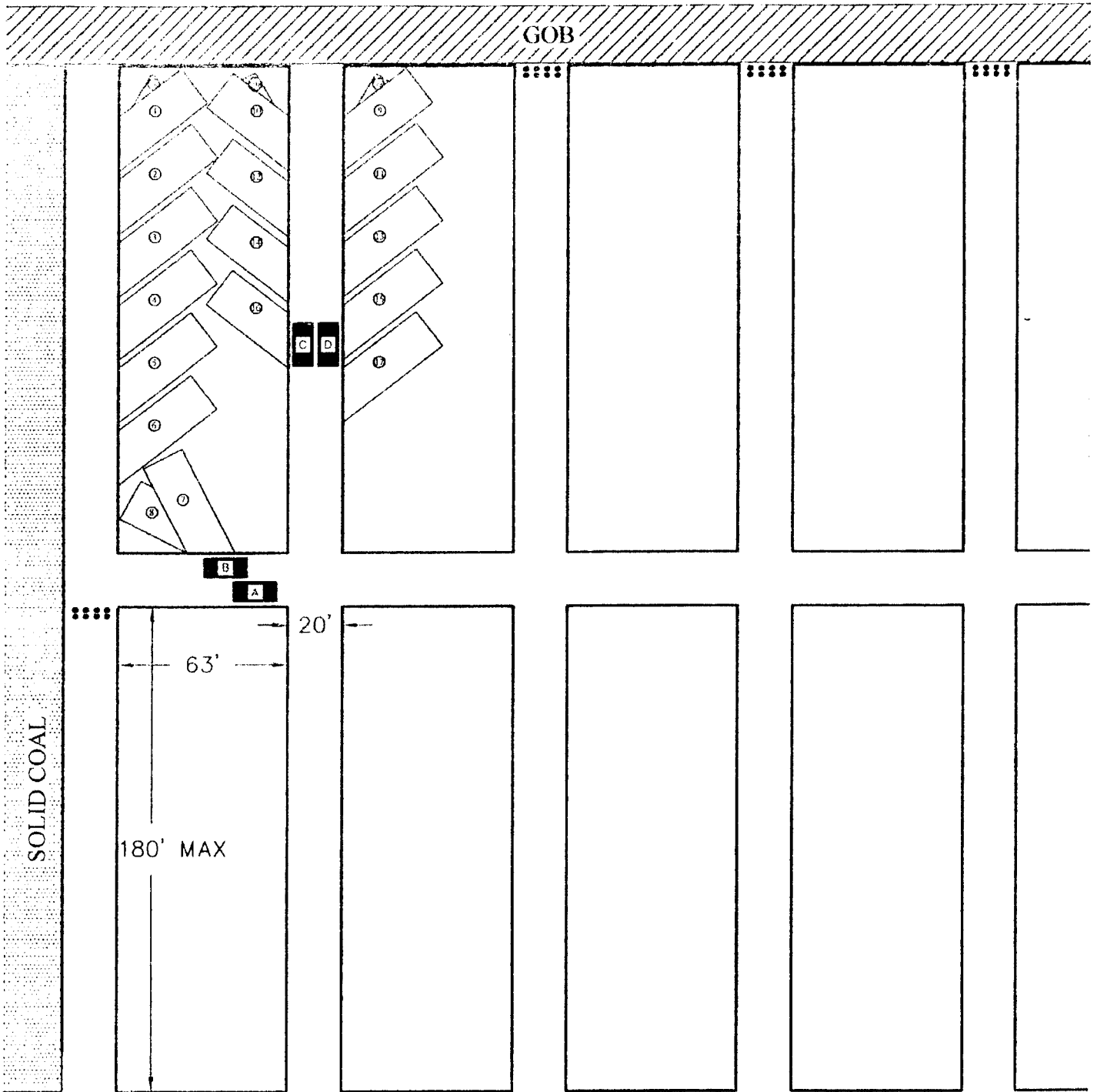


FIGURE 16
Pillar Extraction - No Splits - Cut No. 17



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

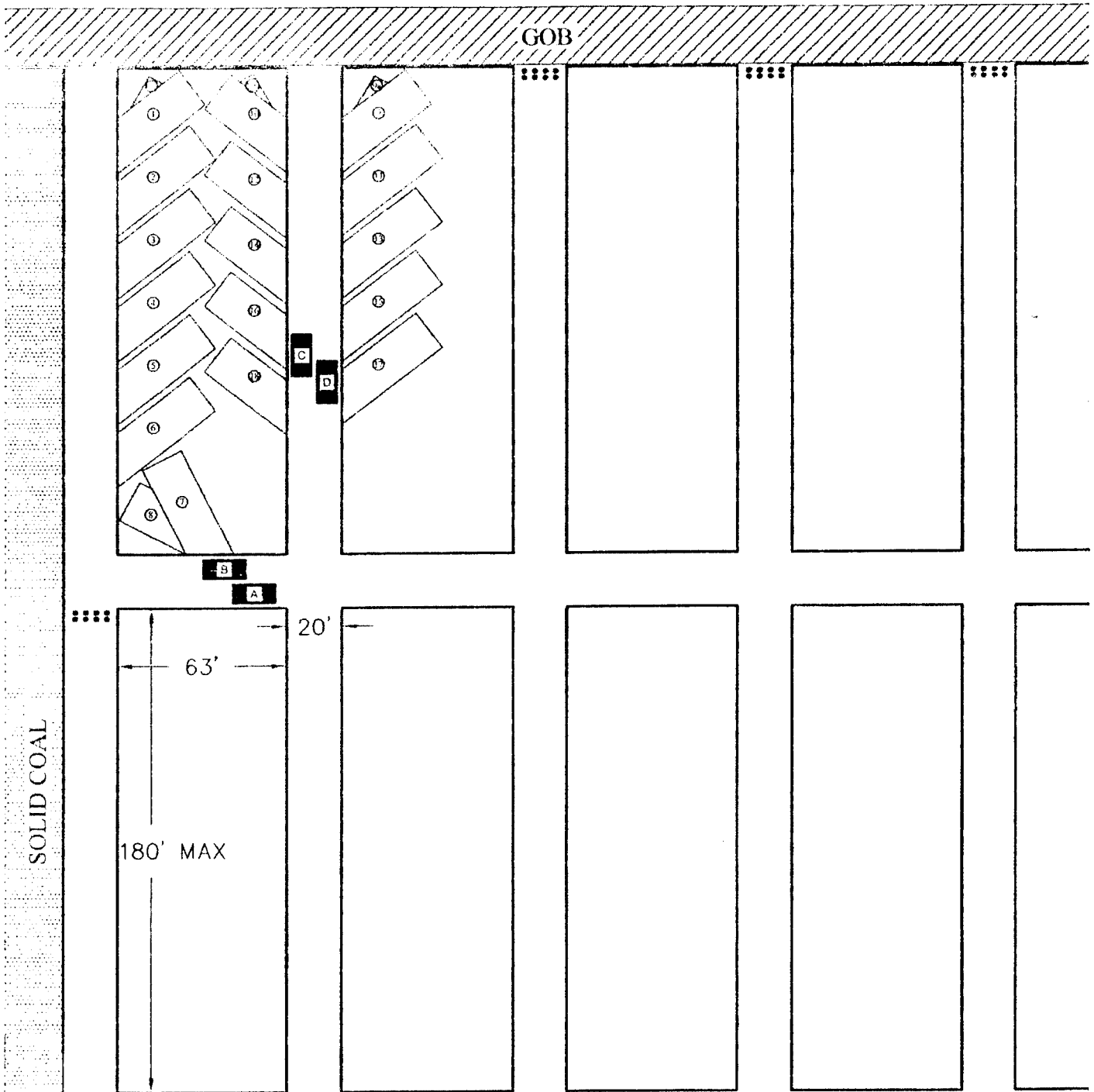
Note:



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 17
Pillar Extraction - No Splits - Cut No. 18



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

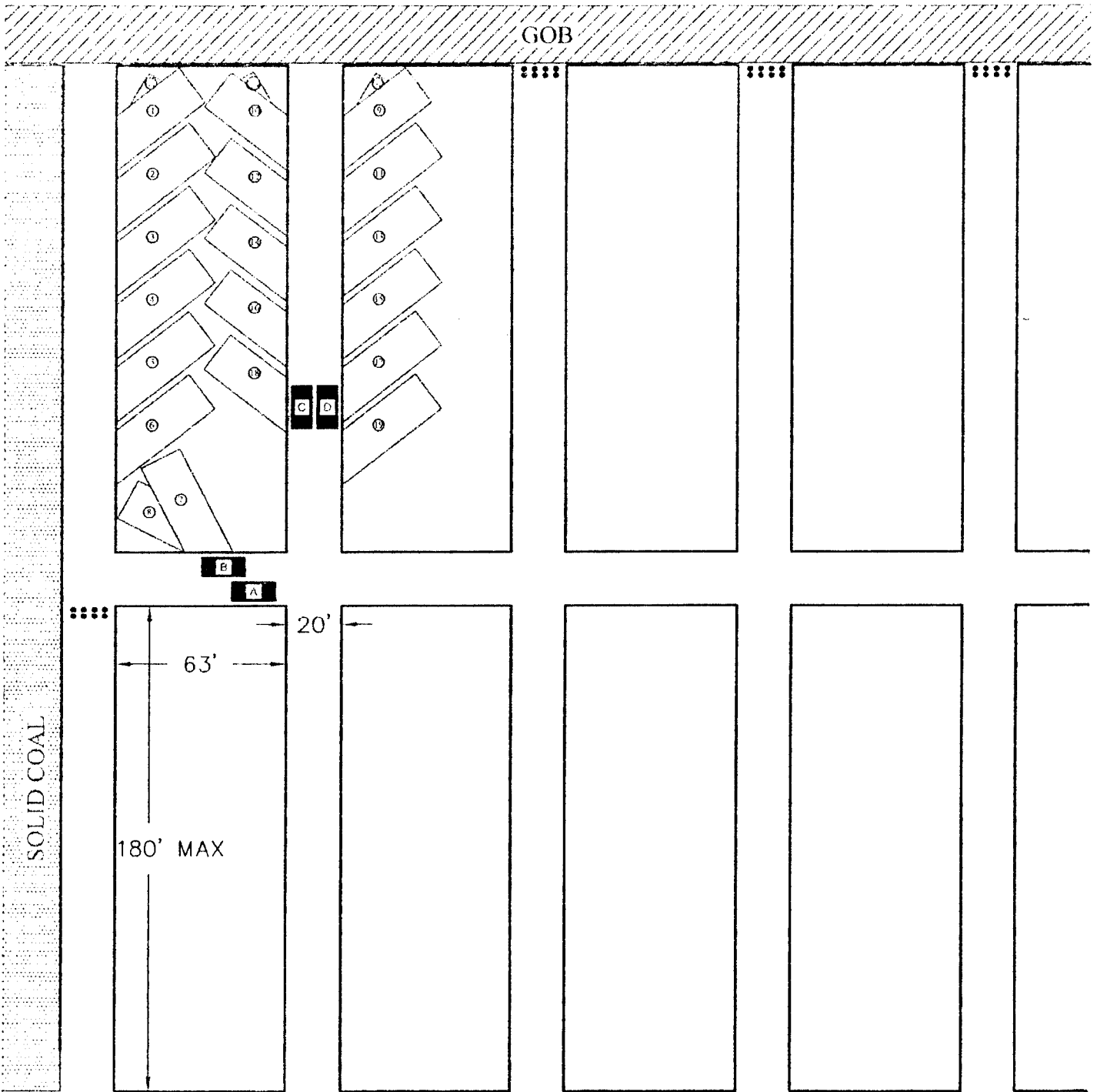
Note:



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 18
Pillar Extraction - No Splits - Cut No. 19



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

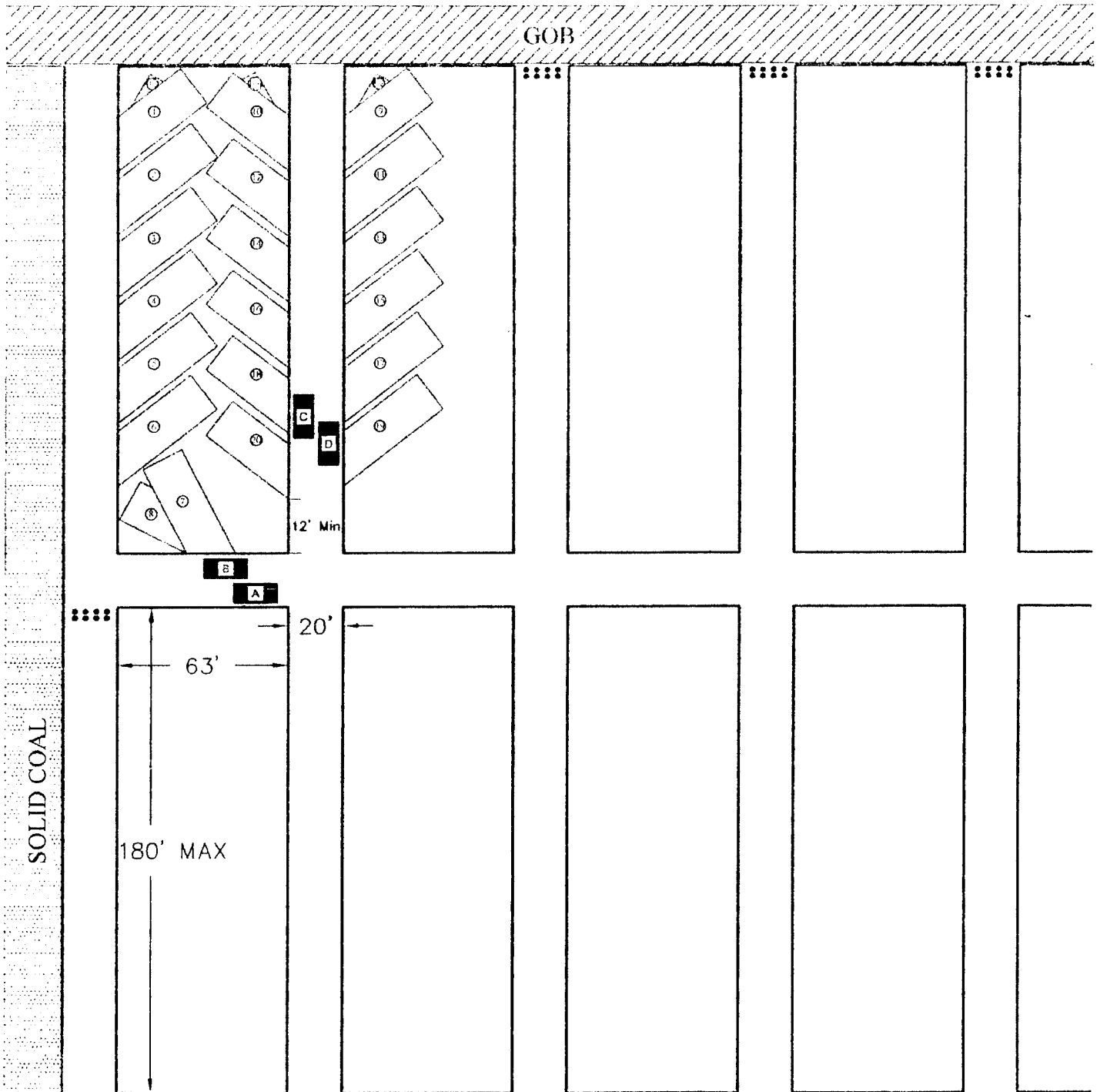
Note:






MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. Breaker rows which are replaced by the MRS units as shown will not be reset. A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 19
Pillar Extraction - No Splits - Cut No. 20

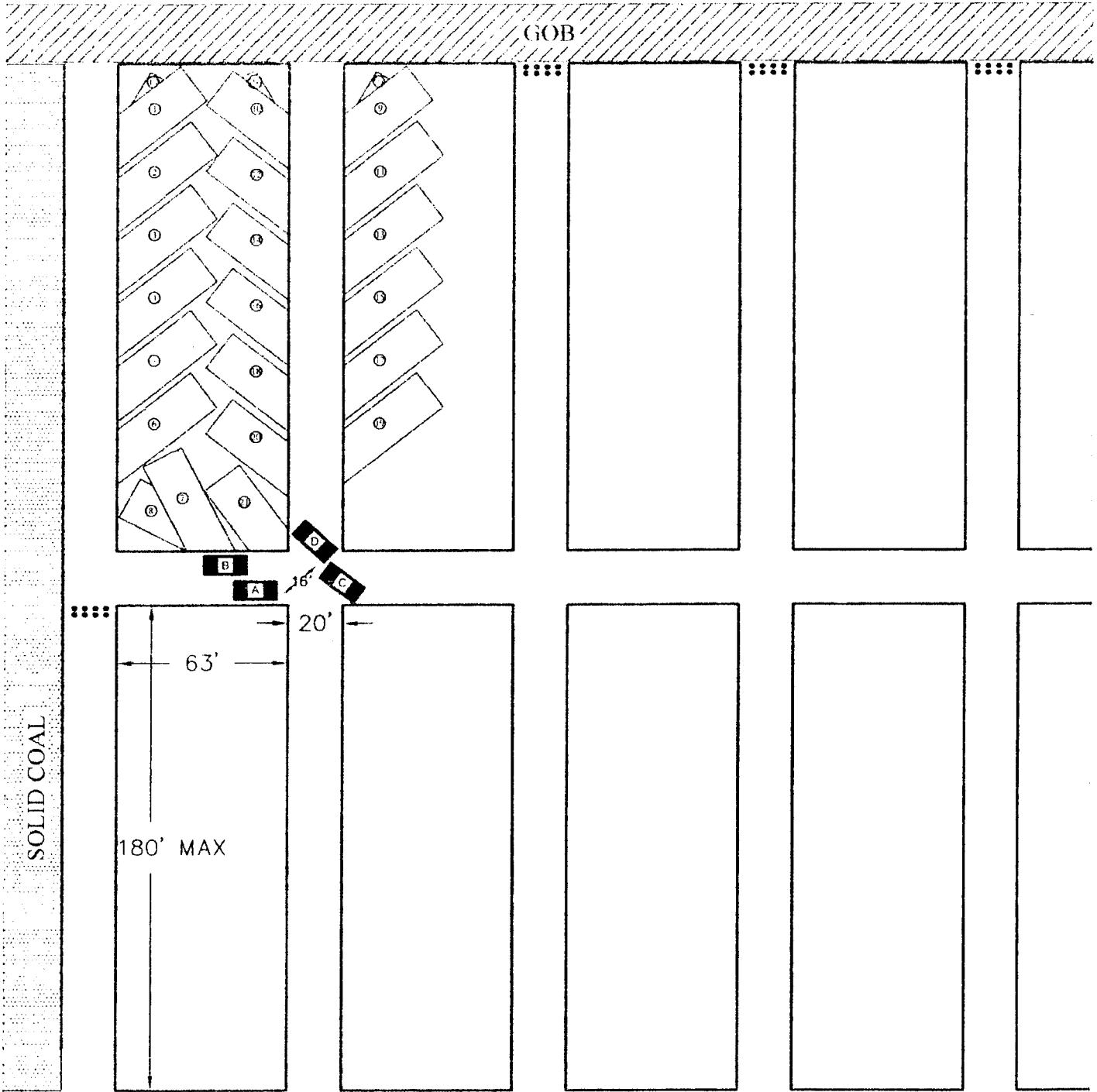


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 20A
Pillar Extraction - No Splits - Cut No. 21



Note:

LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE: 1" = 50'



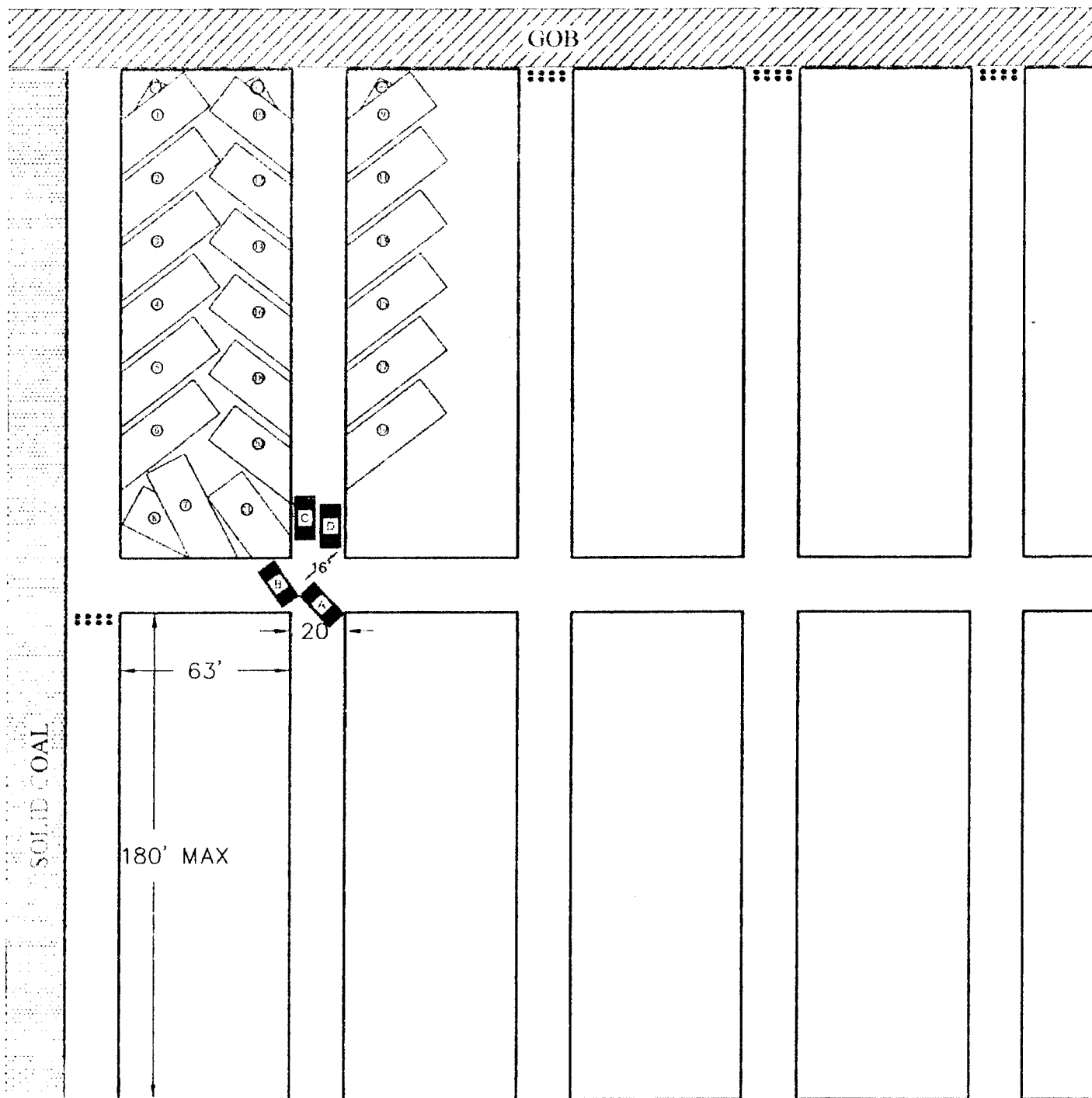
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
MRS Units A, B, C, & D will then be positioned for the next sequential pillar as shown in Figure 7, and the next pillar will be started as shown in cuts 7 & 8.
Breaker rows which are replaced by the MRS units as shown will not be reset.
No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection.
The shuttle car operator, under canopy, may be an exception.

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FIGURE 20B
Pillar Extraction - No Splits - Cut No. 21



Note:

LEGEND

GOB

MRS UNIT

MINEWAY

TURNER

SCALE 1" = 50'



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
MRS Units A, B, C, & D will then be positioned for the next sequential pillar as shown in Figure 7, and the next pillar will be started as shown in cuts 7 & 8.

Breaker rows which are replaced by the MRS units as shown will not be reset.
No miners will be in the intersection during the mining of the final lift, unless additional support has been installed in the intersection.

The shuttle car operator, under canopy, may be an exception.

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**Remote Control Pillar Extraction Plan using Mobile Roof Supports 63' X 180'
Pillars (With Barrier)**

The mobile roof supports shall be installed at location A, B, C, and D as shown on Figures 1 prior to mining lift No. 1 and lift No. 1a. MRS C and D will be advanced to the location as shown on figure 2 for cuts 2 and 2a. MRS C and D will be advanced to the location as shown on figure 3 for cut 3. MRS C and D will be advanced to the location as shown on figure 4 for cut 4. MRS C and D will be advanced to the location as shown on figure 5 for cut 5. MRS C and D will be advanced to the location as shown on figure 6 for cut 6. MRS C and D will be advanced to the location as shown on figure 7 for cut 7. MRS C and D will be advanced to the locations as shown on figure 8 for cut 8. MRS C and D will be advanced to the locations as shown on figure 9 for cut 9. MRS C and D will be advanced to the locations as shown on figure 10 for cut 10. MRS C and D will be advanced to the locations as shown on figure 11 for cut 11. MRS C and D will be advanced to the locations as shown on figure 12 for cut 12. MRS C and D will be advanced to the locations as shown on figure 13 for cut 13. MRS C and D will be advanced to the locations as shown on figure 14 for cut 14. MRS C and D will be advanced to the locations as shown on figure 15 for cuts 15 and 16.

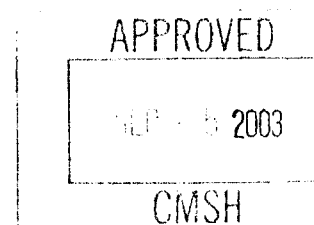
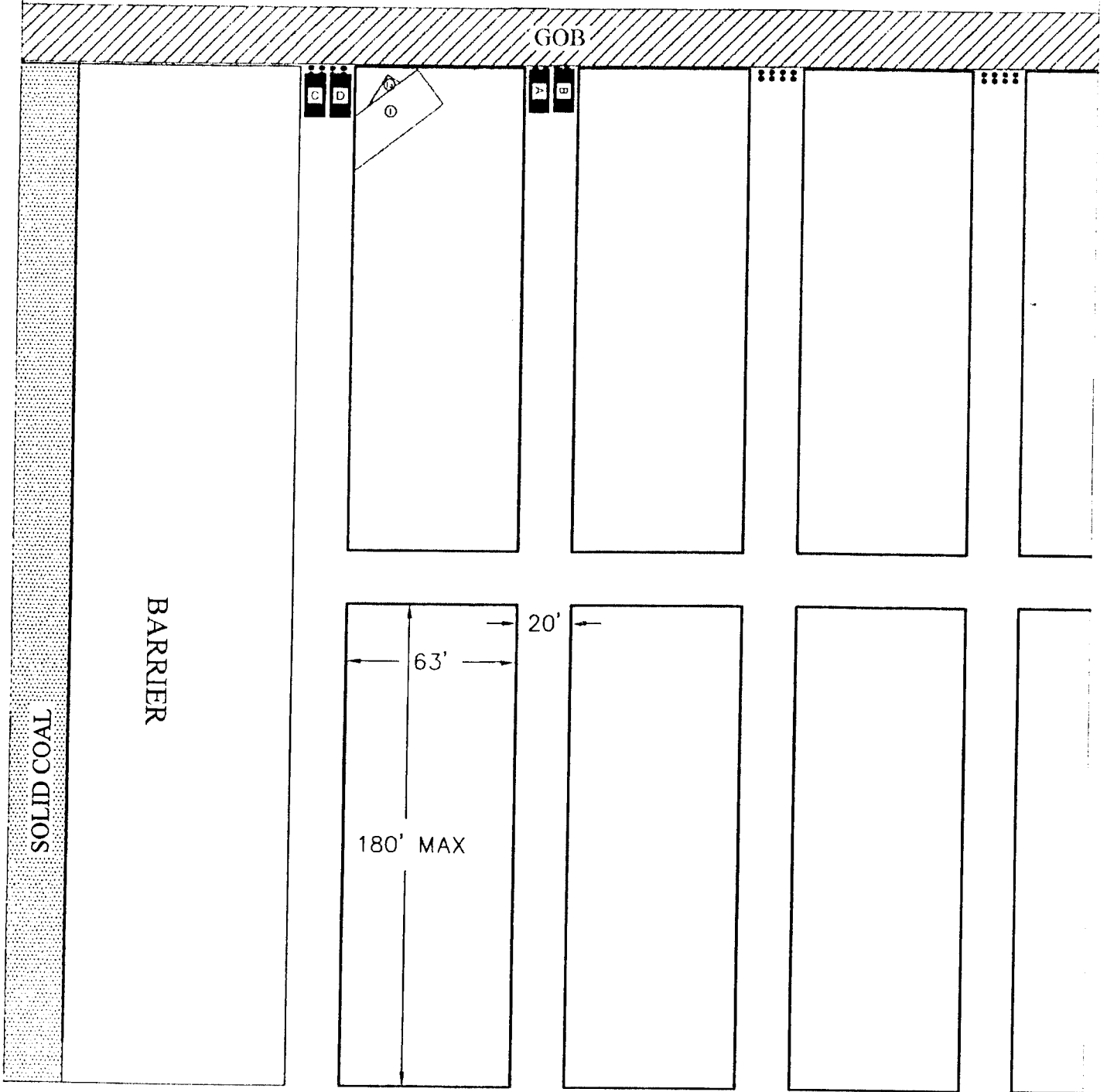




FIGURE 1
Pillar Extraction - with barrier - Cut No. 1



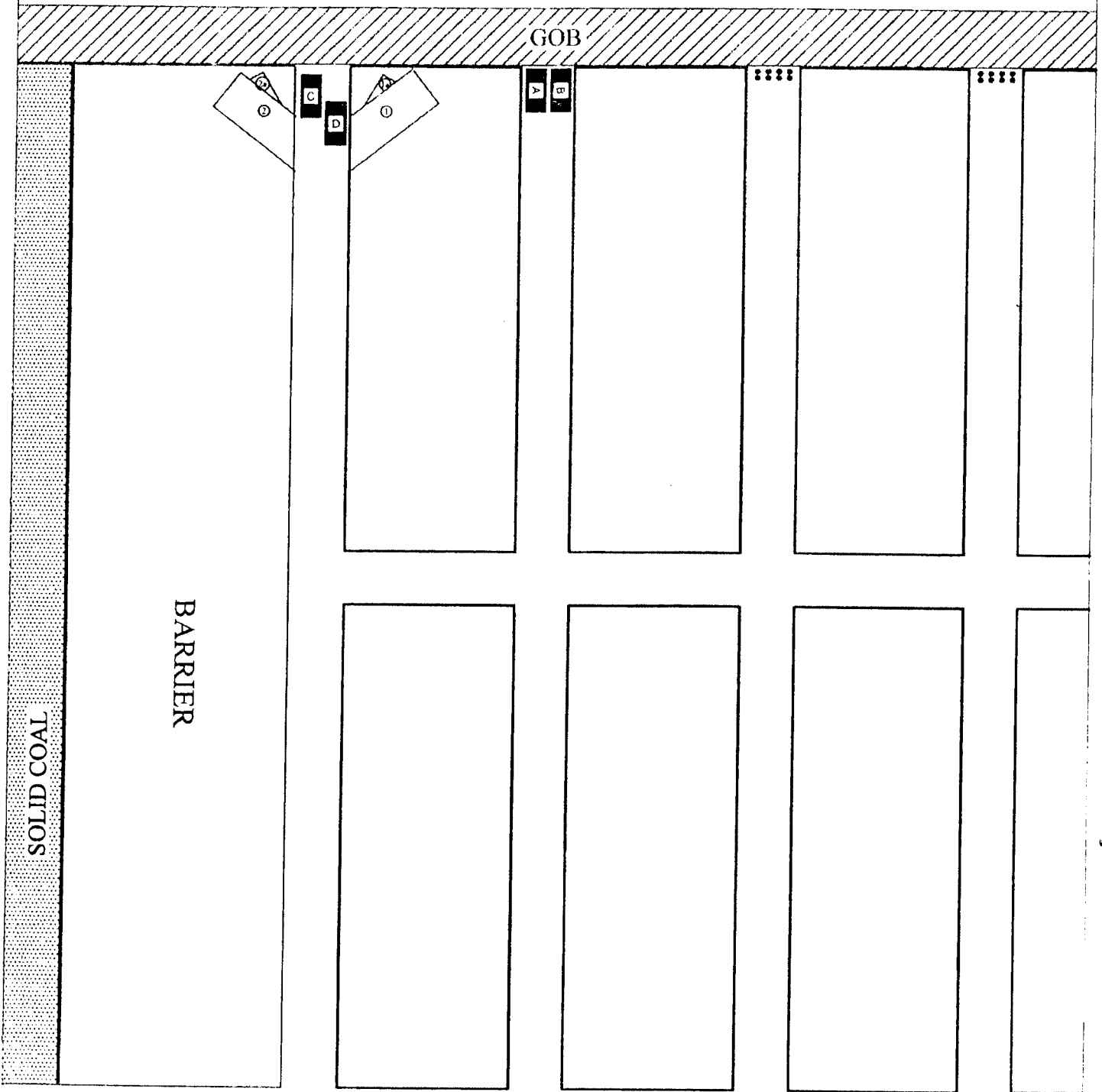
LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 2
Pillar Extraction - with barrier - Cut No. 2



LEGEND

GOB

MRS UNIT

MINING LIFT

TIMBER

SCALE 1"=50'

Note:



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. Breaker rows which are replaced by the MRS units as shown will not be reset.

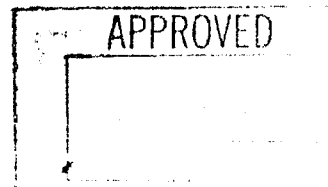
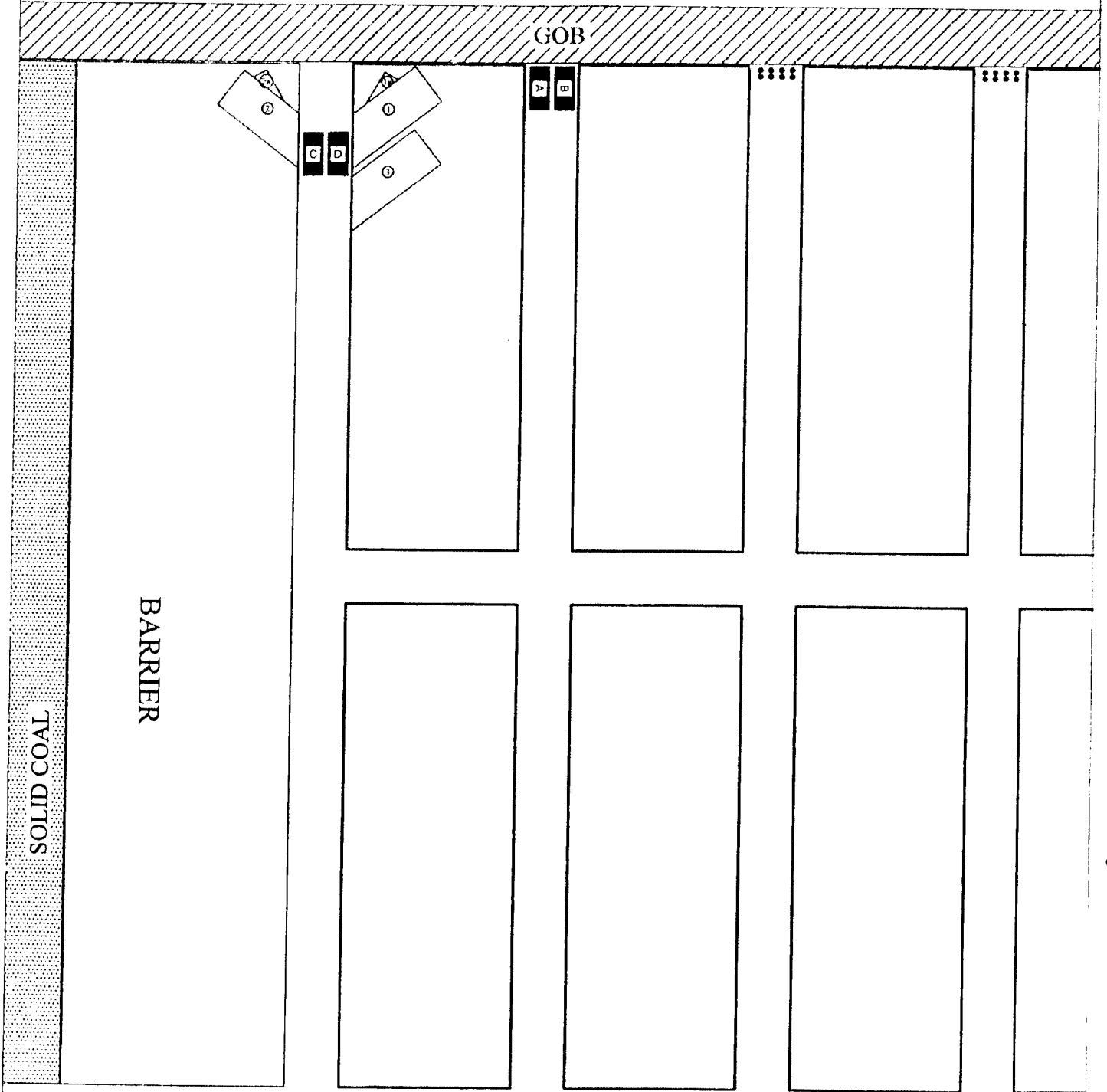




FIGURE 3
Pillar Extraction - with barrier - Cut No. 3

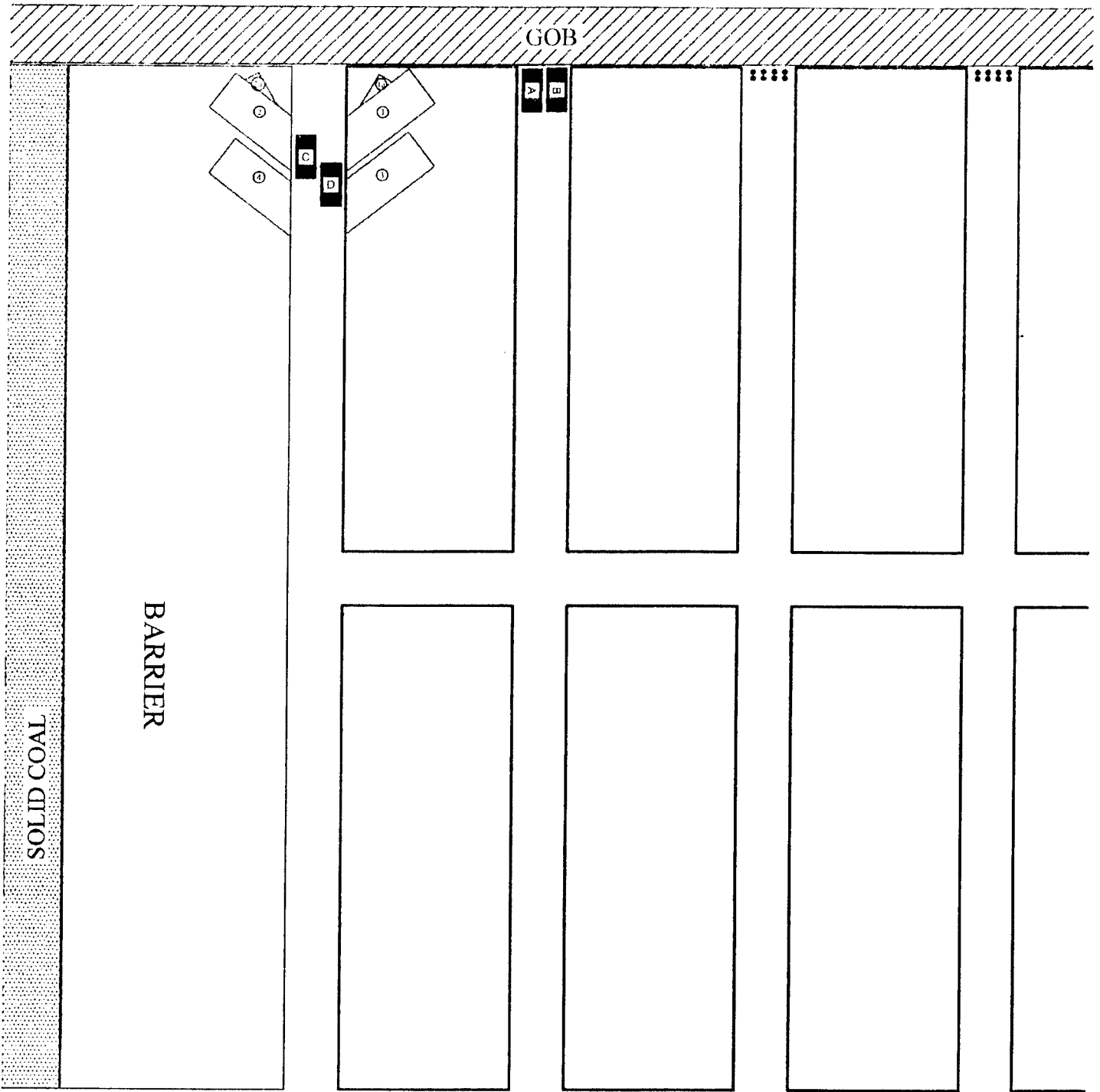


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

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FIGURE 4
Pillar Extraction - with barrier - Cut No. 4



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:

-  MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
-  Breaker rows which are replaced by the MRS units as shown will not be reset.
-  A minimum fender thickness of 5' between lifts, left side of entry, will apply.
-  .

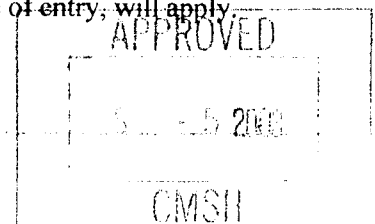
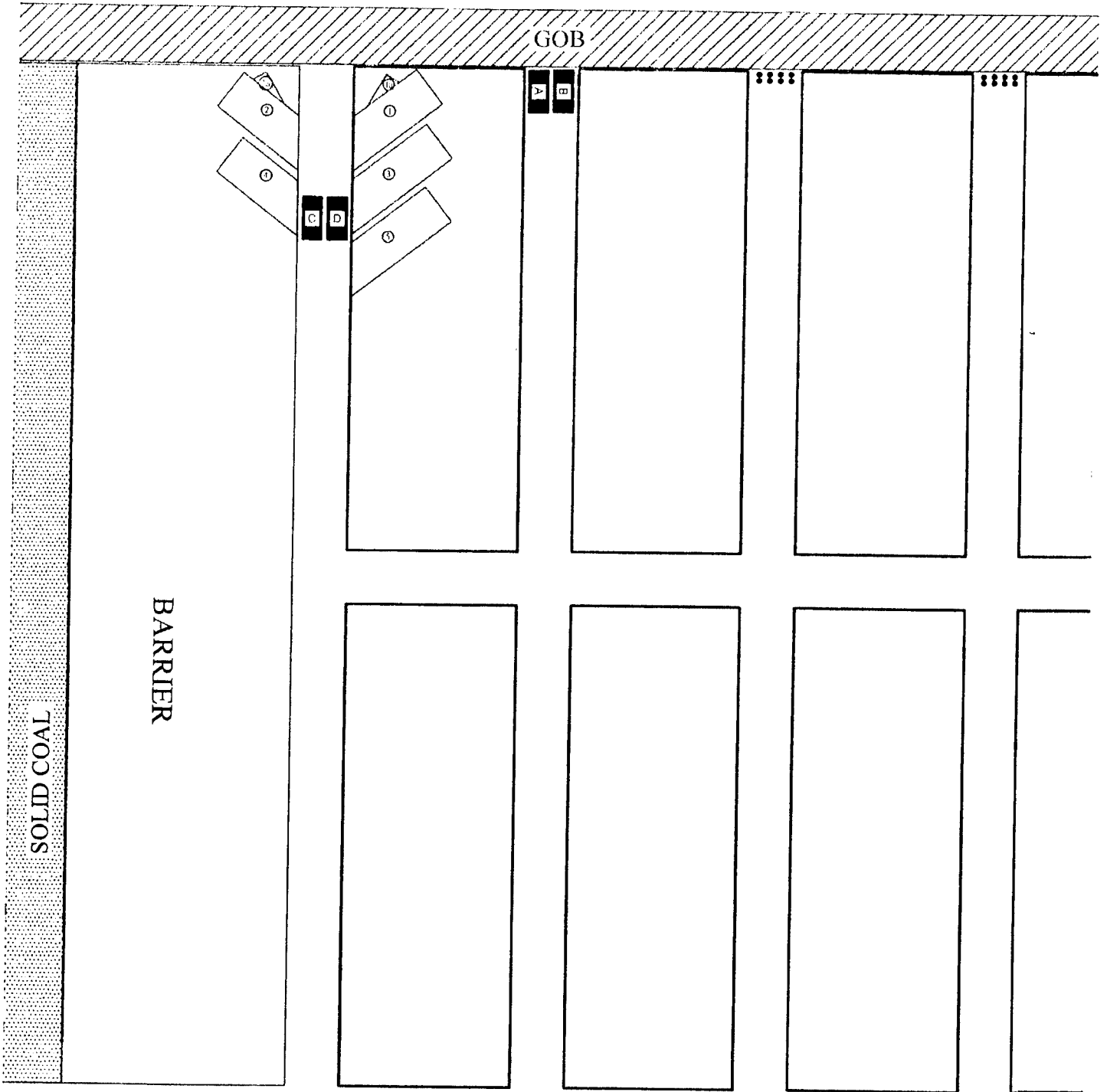


FIGURE 5
Pillar Extraction - with barrier - Cut No. 5



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:

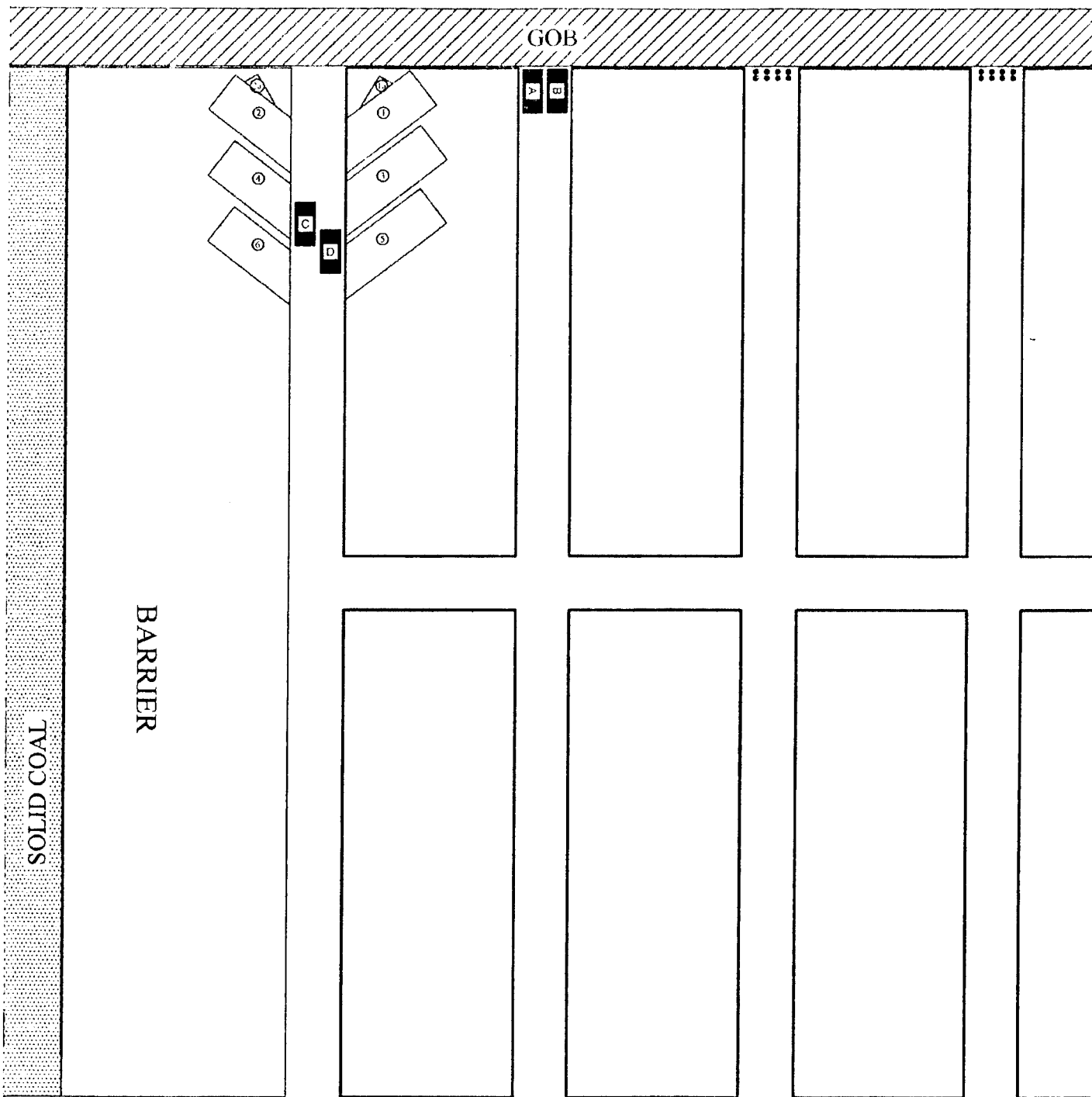


MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 6
Pillar Extraction - with barrier - Cut No. 6



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:



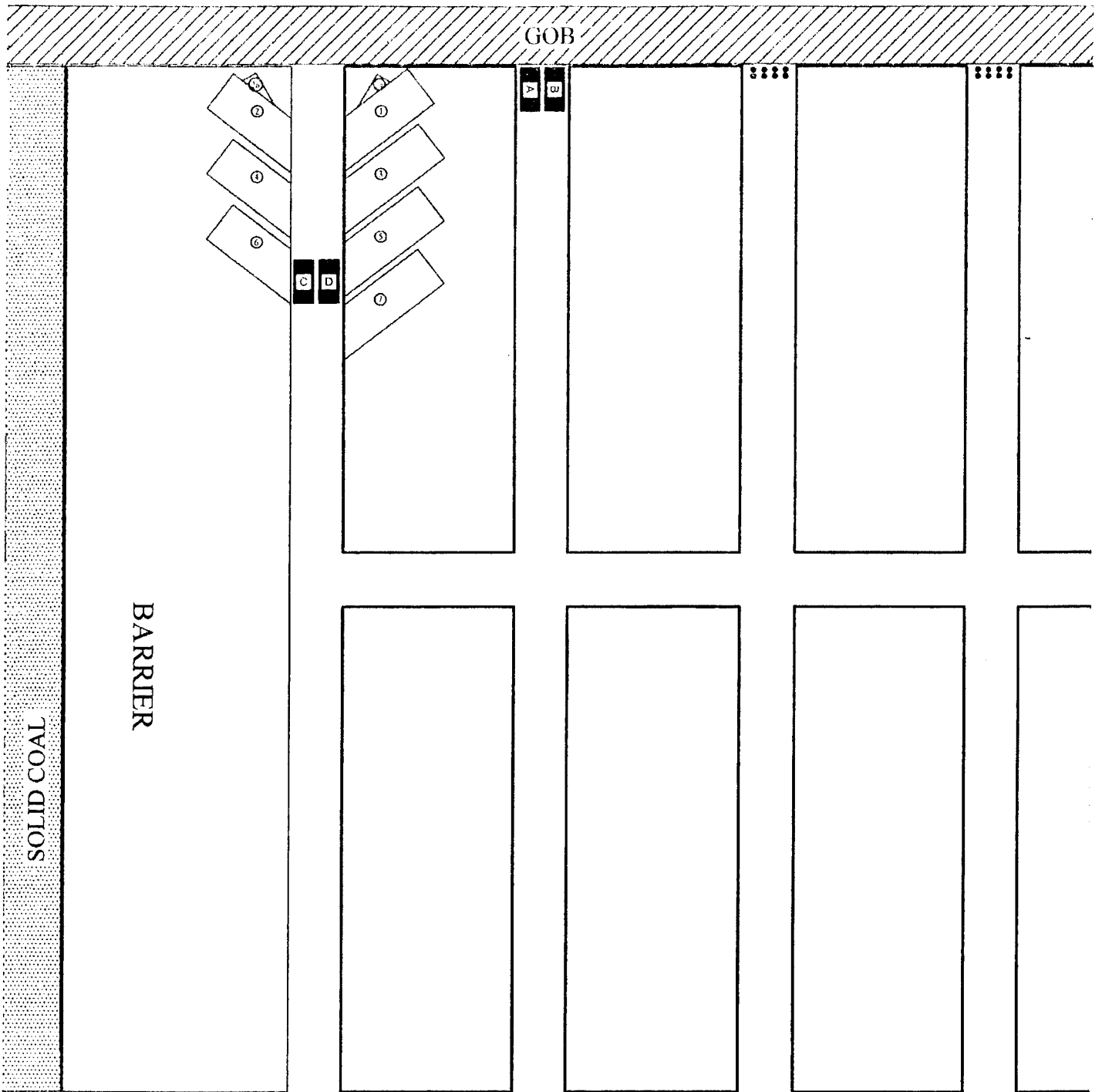
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut. Breaker rows which are replaced by the MRS units as shown will not be reset. A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 7
Pillar Extraction - with barrier - Cut No. 7



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'



Note:

MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker rows which are replaced by the MRS units as shown will not be reset.
A minimum fender thickness of 5' between lifts, left side of entry, will apply.

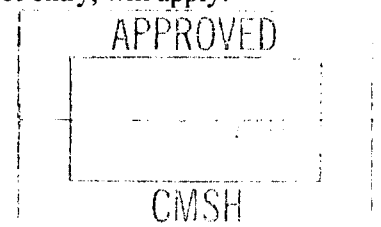
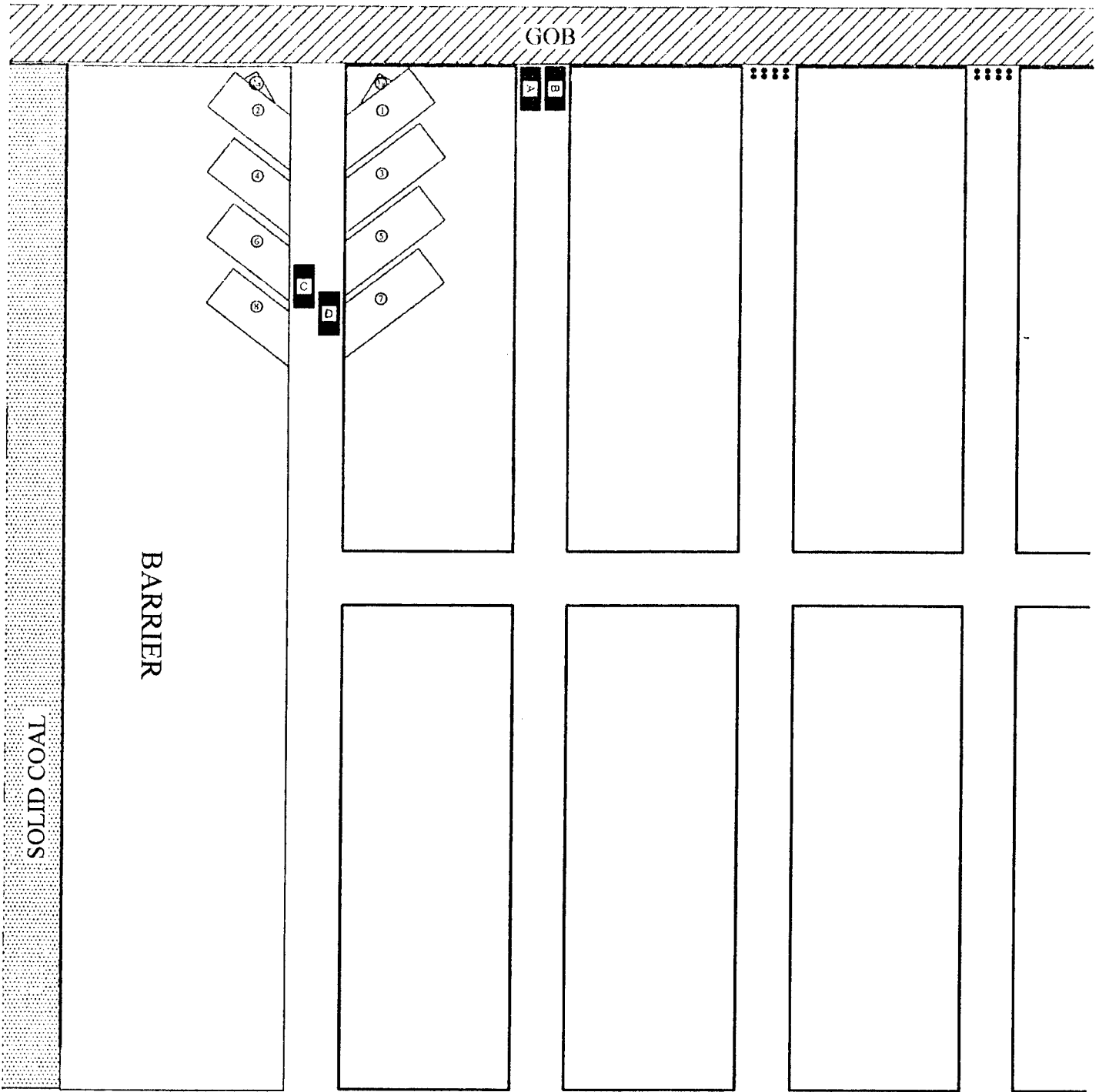


FIGURE 8
Pillar Extraction - with barrier - Cut No. 8



LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:



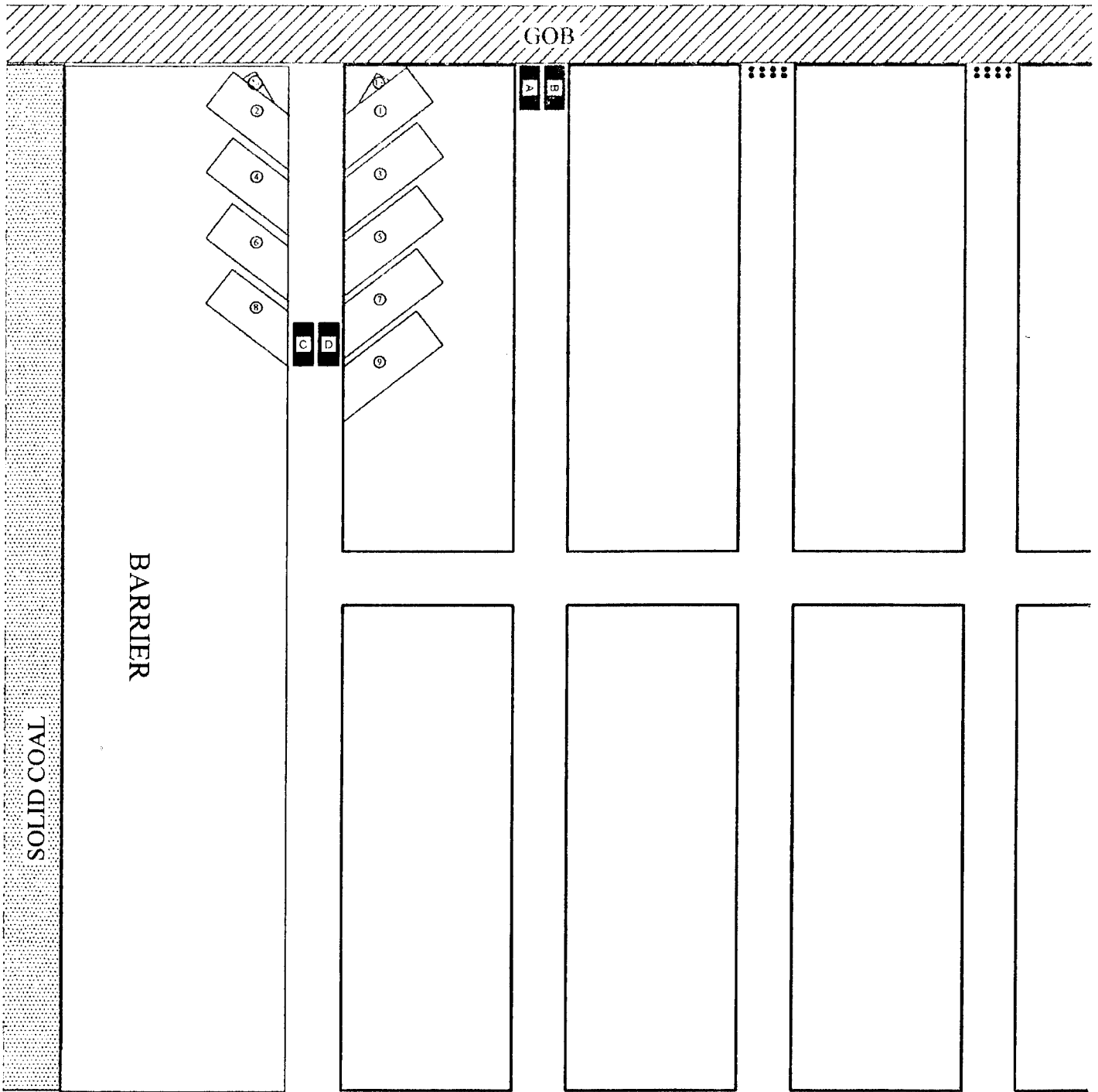
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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FIGURE 9
Pillar Extraction - with barrier - Cut No. 9



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

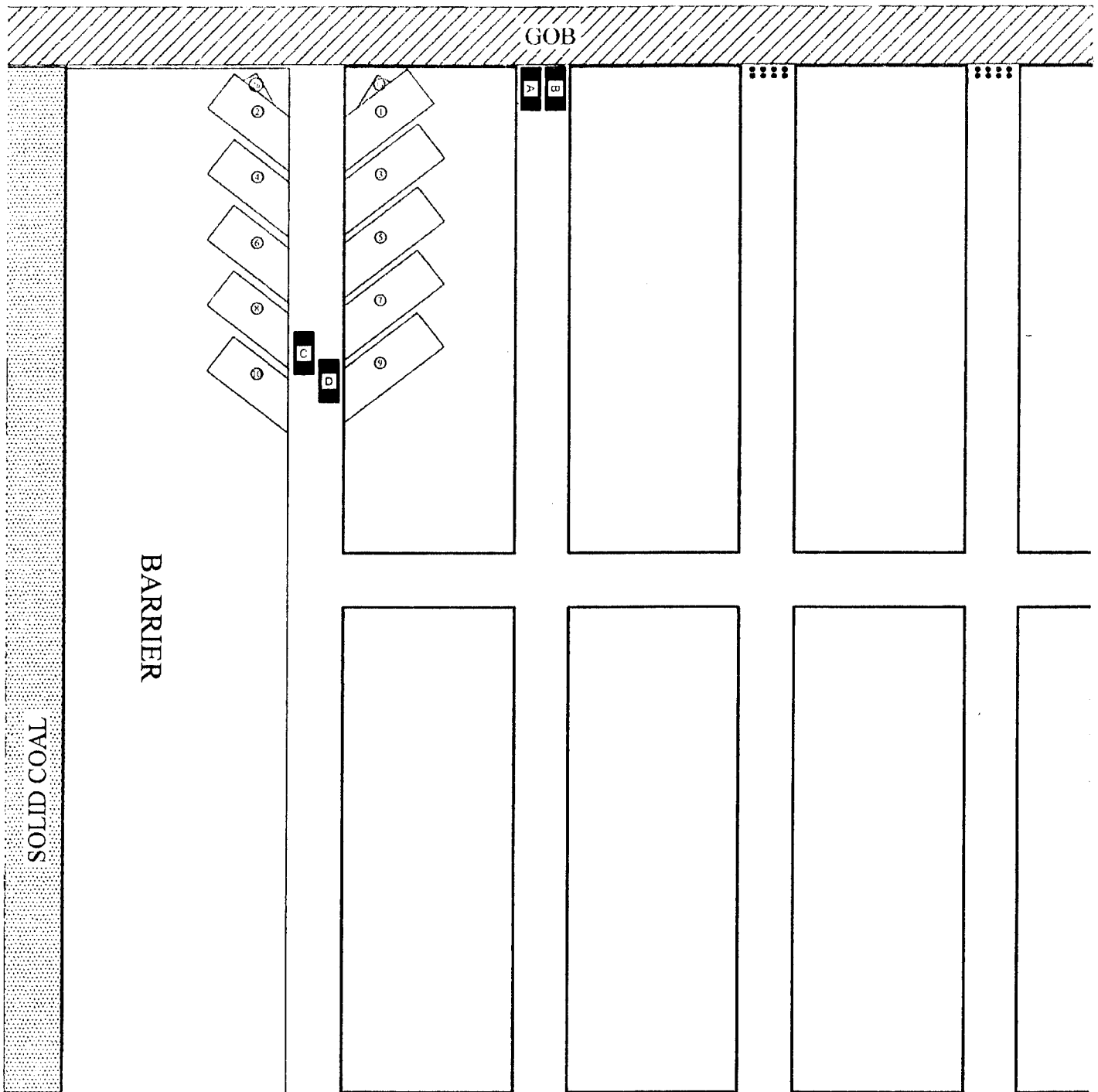
Note:

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MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker rows which are replaced by the MRS units as shown will not be reset.
A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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



FIGURE 10
Pillar Extraction - with barrier - Cut No. 10



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

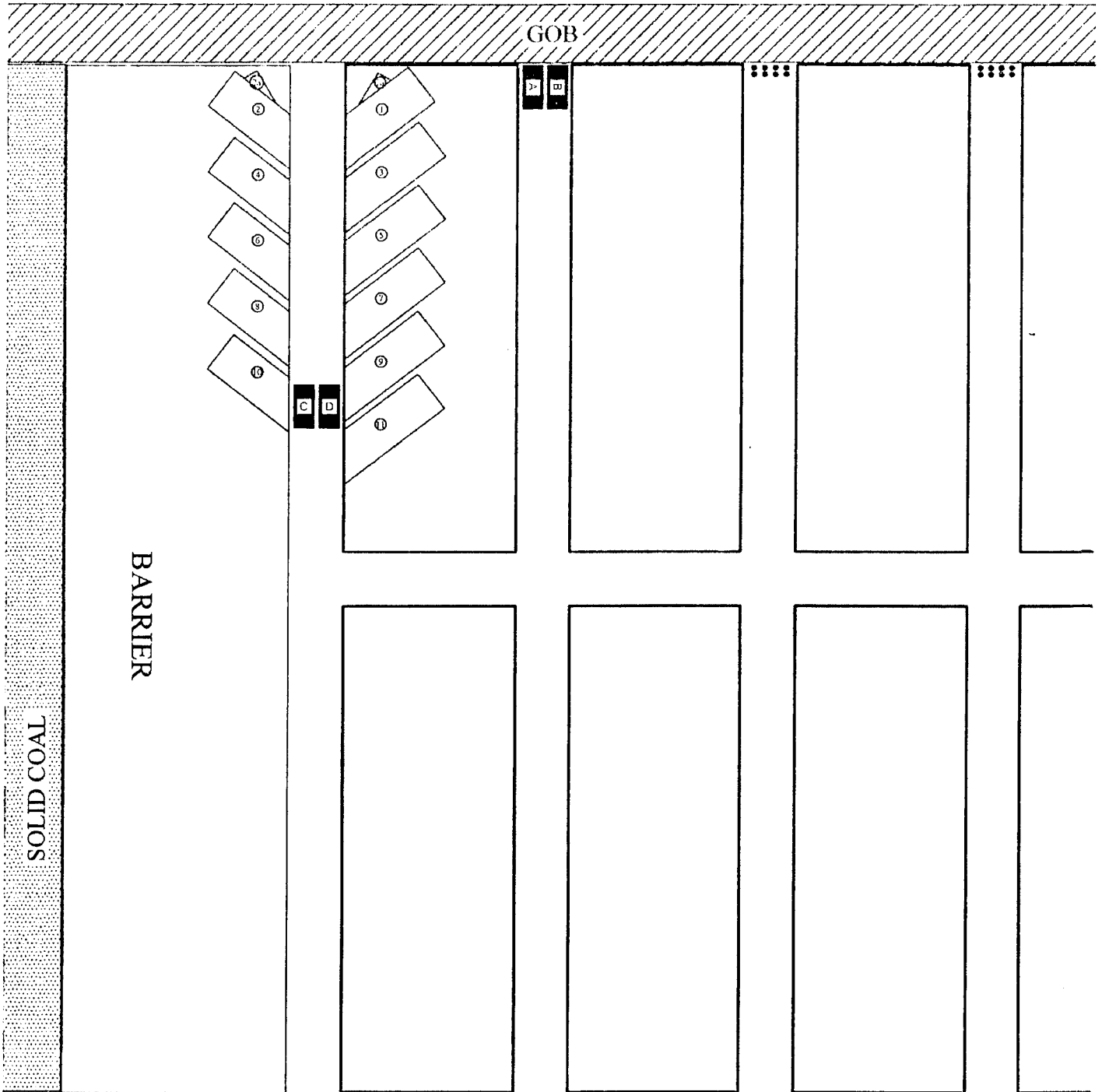
Note:

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- 
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MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker rows which are replaced by the MRS units as shown will not be reset.
A minimum fender thickness of 5' between lifts, left side of entry, will apply.




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FIGURE 11
Pillar Extraction - with barrier - Cut No. 11



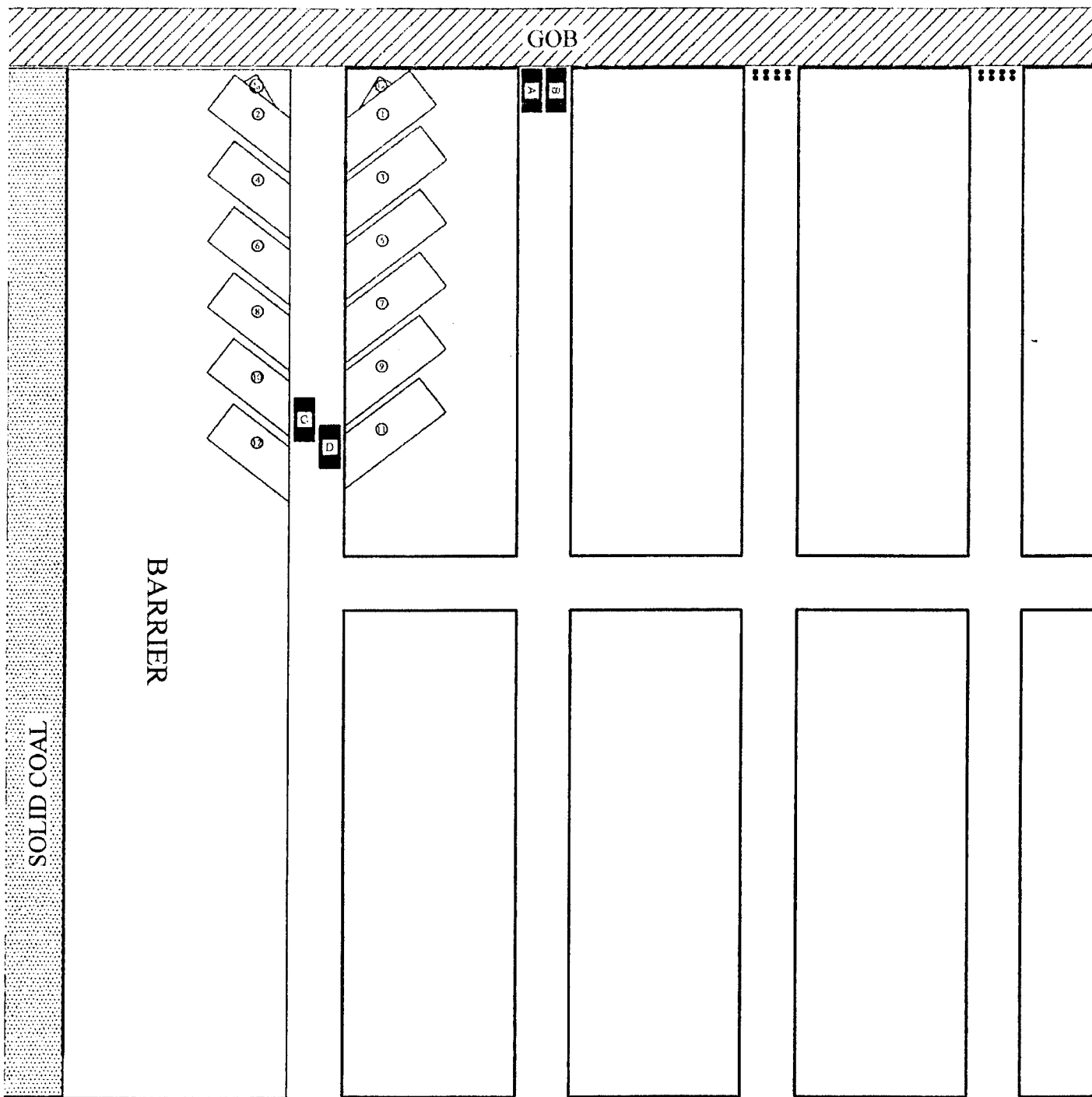
LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1" = 50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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



FIGURE 12
Pillar Extraction - with barrier - Cut No. 12



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:

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- 
- 
- 

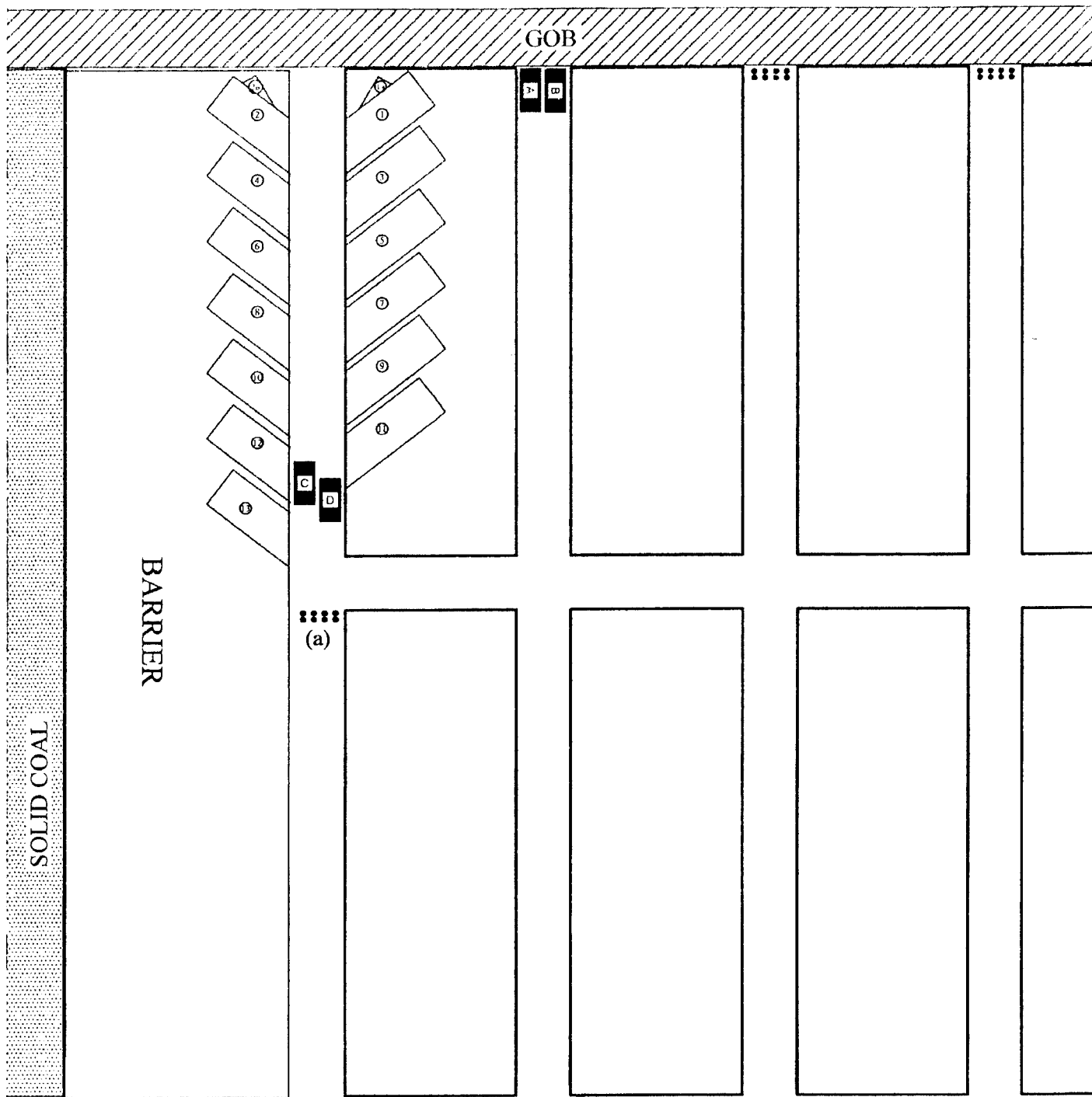
MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
Breaker rows which are replaced by the MRS units as shown will not be reset.
A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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



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FIGURE 13
Pillar Extraction - with barrier - Cut No. 13



LEGEND

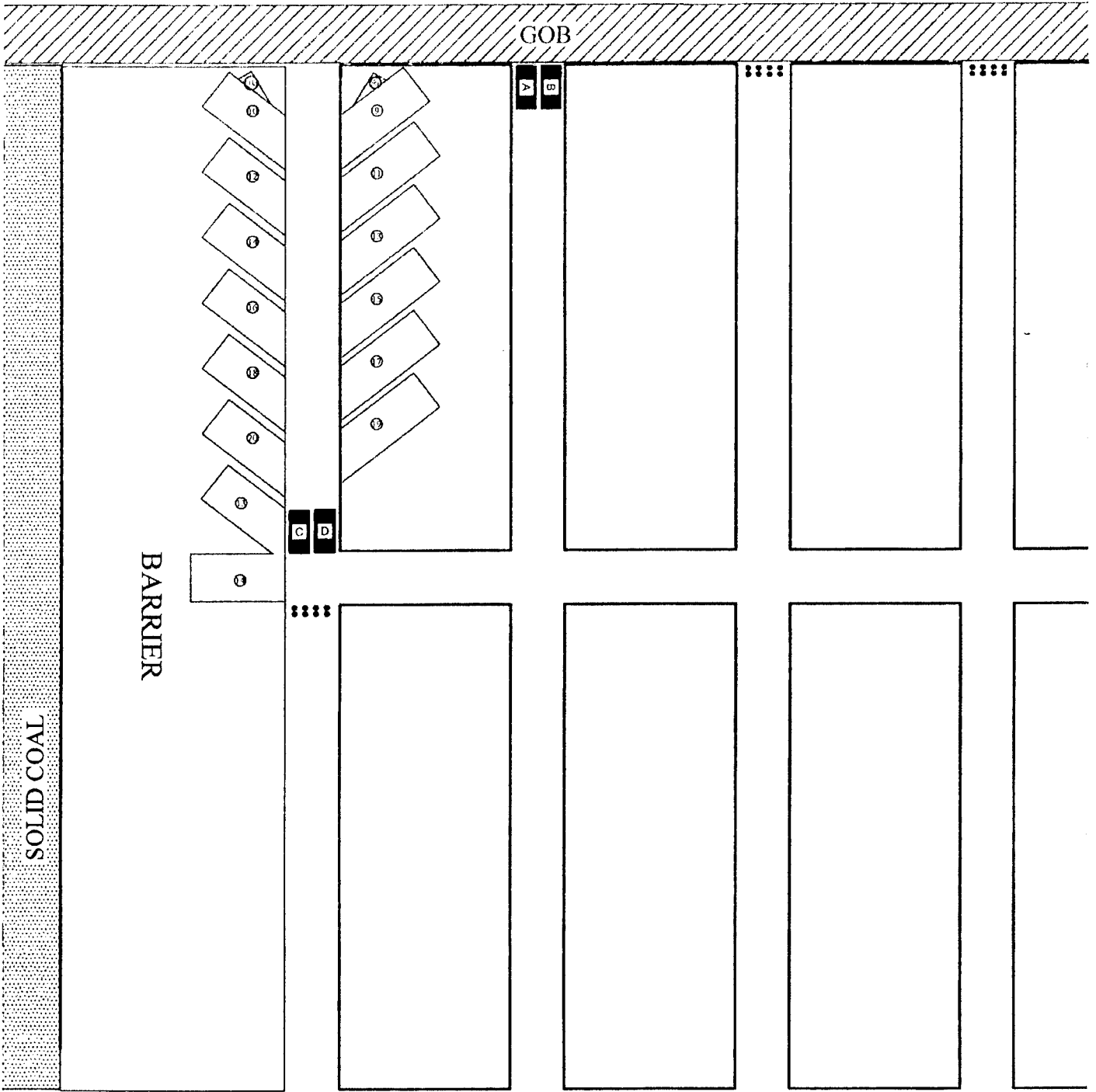
- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.
 Double Breaker row (a) to be set as shown prior to initiating cut 13.
 A minimum fender thickness of 5' between lifts, left side of entry, will apply.

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


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FIGURE 14
Pillar Extraction - with barrier - Cut No. 14



LEGEND

- GOB
- MRS UNIT
- MINING LIFT
- TIMBER
- SCALE 1"=50'

Note:
 MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 Breaker rows which are replaced by the MRS units as shown will not be reset.

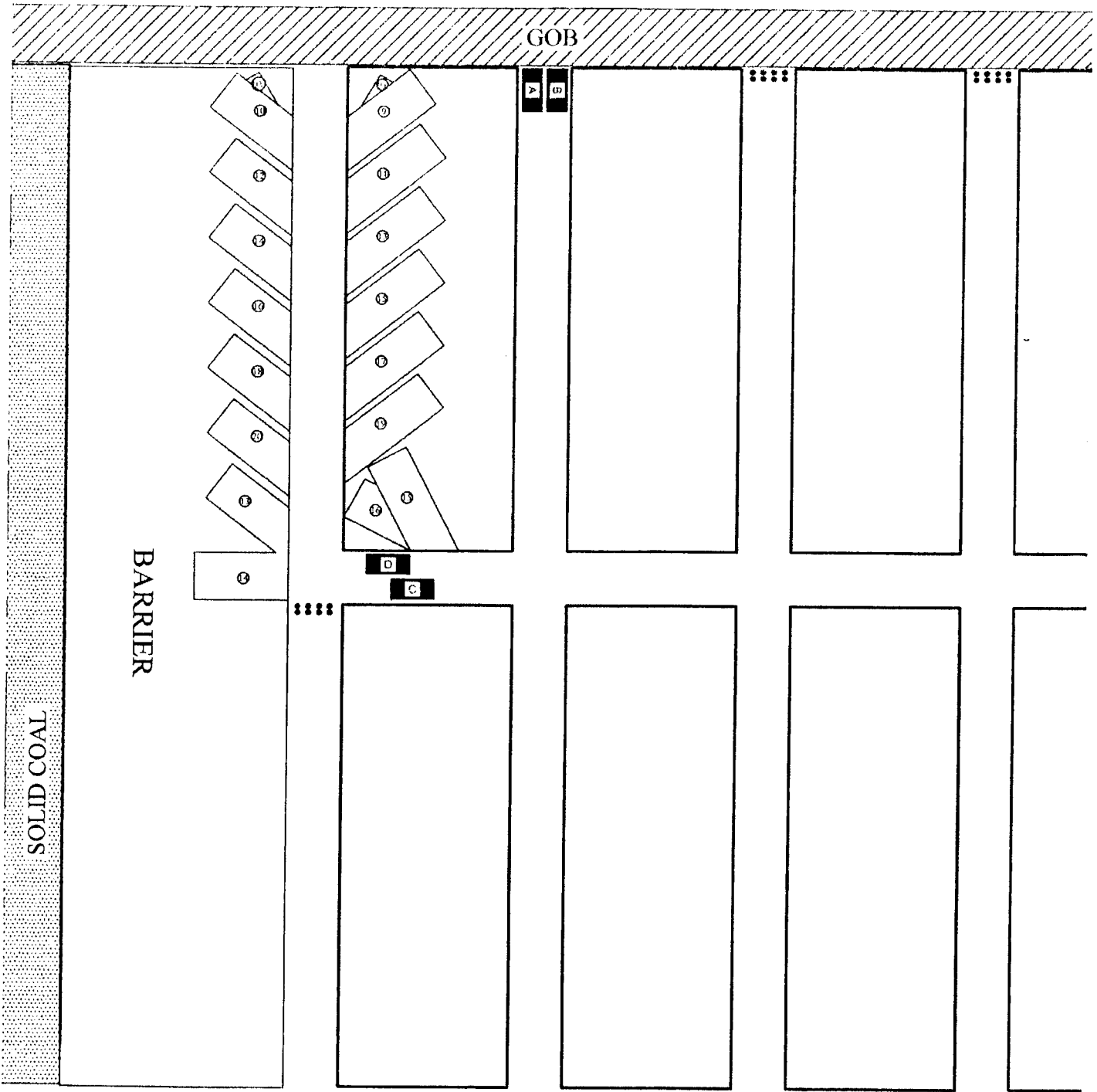
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FIGURE 15
Pillar Extraction - with barrier - Cut No. 15 & 16

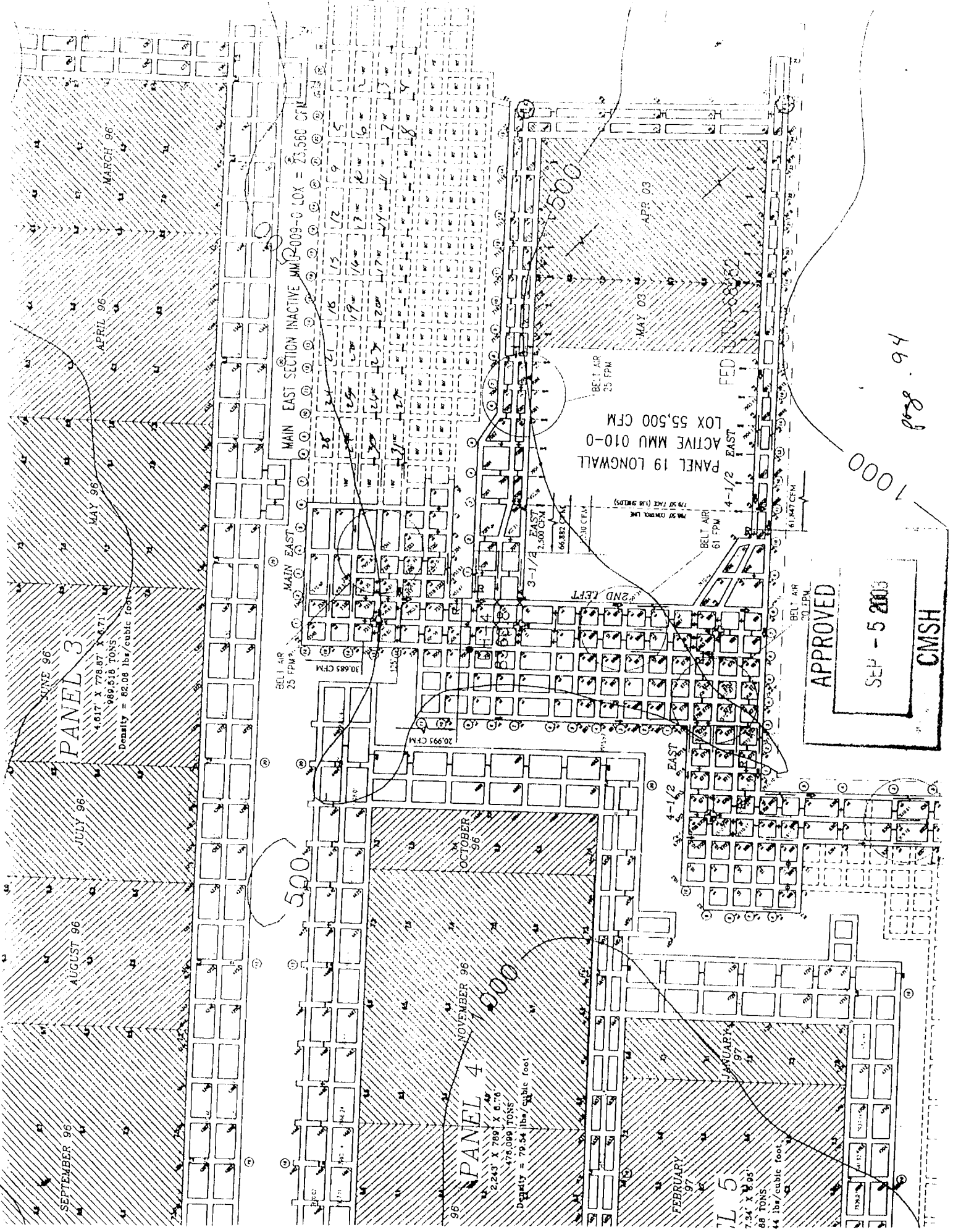


LEGEND
 GOB
 MRS UNIT
 MINING LIFT
 TIMBER
 SCALE 1"=50'

Note:



MRS Units A, B, C, & D shall be positioned as shown above prior to starting the cut.
 MRS Units A, B, C, & D will then be positioned for the next sequential pillar as shown in Figure 7, page 63, and the next pillar will be started as shown for cuts 7 & 8 page 63 and identified this page as cuts 15 & 16.
 Breaker rows which are replaced by the MRS units as shown will not be reset.



PANEL 3

4,617 X 778.87 X 6.71
989,516 TONS
Density = 82.08 lbs/cubic foot

MAIN EAST SECTION INACTIVE MMU 009-0 LOX = 23,550 CFM

PANEL 19 LONGWALL
ACTIVE MMU 010-0
LOX 55,500 CFM

PANEL 4

2,243 X 789 X 6.76
970,089 TONS
Density = 79.54 lbs/cubic foot

PANEL 5

7.54 X 8.66
68 TONS
44 lbs/cubic foot

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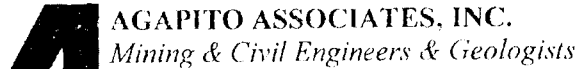
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Page 94

AGAPITO ASSOCIATES, INC.

ENGINEERING ANALYSIS

SUBMITTED BY COMPANY

APRIL 18, 2007



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April 18, 2007

226-20

Mr. Laine Adair
General Manager
UtahAmerican Energy, Inc.
794 North C Canyon Road
Price, UT 84501

Re: **GENWAL Crandall Canyon Mine Main West South Barrier Mining Evaluation**

Dear Laine,

Agapito Associates, Inc. (AAI) has completed the geotechnical analysis of GENWAL Resources, Inc.'s (GENWAL) plan for room-and-pillar mining in the Crandall Canyon Mine Main West south barrier. AAI recommended the use of pillars on 80-ft by 92-ft¹ centers for retreat mining in both the north and south Main West barriers based on an earlier analysis documented in our July 20, 2007, report.² The design proved successful on development in the north barrier panel under maximum cover reaching 2,200 ft deep.

The panel was successfully retreated to crosscut (XC) 138 under approximately 2,100 ft of cover when poor roof conditions motivated moving the face outby and skipping pulling pillars between XCs 135 and 138. The retreat was re-initiated by pulling the two pillars between XCs 134 and 135 in early March 2007. A large bump occurred at this point resulting in heavy damage to the entries located between XCs 133 and 139. The remaining north panel was abandoned in favor of mining the south barrier.

AAI engineers () visited the bump location on March 16, 2007, under the escort of Mr. Gary Peacock, GENWAL Mine Manager and Mr. Laine Adair, General Manager, UtahAmerican Energy, Inc. GENWAL commissioned AAI to refine the pillar design for the south barrier based on the response of the north panel pillars. AAI was able to analyze the stress and convergence conditions at the time of the bump and modify the pillar design accordingly to control the potential for similar events in the south barrier. The results of the analysis and recommendations for south barrier mining are summarized in the following letter.

¹ Pillar geometry stated in terms of center dimensions; entries typically mined 17 ft wide.

² Agapito Associates, Inc. (2006), "DRAFT—GENWAL Crandall Canyon Mine Main West Barrier Pillar Mining Evaluation," prepared for Andalex Resources, Inc.

ANALYSIS

Ground conditions were simulated using the calibrated NIOSH LAMODEL³ displacement discontinuity model used in the preceding study.² The complete model area is illustrated in Figure 1. Simulated conditions at the time of the bump are shown in Figures 2, 3, and 4. Figure 2 describes the vertical stress distribution in the pillars leading up to the bump. Figures 3 and 4 show the corresponding degrees of coal yielding and roof-to-floor convergence. The figures incidentally show retreat mining in the south barrier, although this did not exist at the time of the bump. The two retreats were simulated in the same model for convenience, which is possible because the two areas are geomechanically isolated from one another in the model.

At the time of the bump, the cave was reported to be lagging inby XC 138. Also, the new start-up cave was minimally developed above the two pillars pulled between XCs 134 and 135. These lagging caves were simulated in the model by limiting load transfer through the gob, which causes higher abutment loads to be transmitted to surrounding pillars. The lagging caves can be recognized in Figure 1 by the white colored gob areas.

Model results show that high stresses were placed on the pillars from three contributing sources: (1) abutment loads from the main cave (inby XC 138), (2) abutment loads from the start-up cave (between XCs 134 and 135), and, to a lesser extent, (3) abutment loads from longwall Panel 12. Peak stresses were concentrated on the pillars located between the two caves (between XCs 135 and 138). Figure 3 shows significant yielding in these pillars indicative of overloading. Modeling suggests that the start-up cave contributed on the order of 5,000 psi additional stress to some parts of the surrounding pillars. This, coupled with the other abutment loads, is believed to have created a high stress region that allowed a localized bump in the pillars somewhere between XCs 134 and 135 to propagate to pillars over a much wider area.

Figures 2, 3, and 4 show stress, yielding, and convergence levels in the same sized pillars (80-ft by 92-ft¹) in the south barrier for ordinary retreat conditions, where no pillars are skipped. The figures show that high-stress conditions attenuate quickly away from the face and that protected conditions exist as close as one crosscut outby the face.

Figures 5, 6, and 7 illustrate the benefit of increasing pillar size from 80-ft by 92-ft¹ to 80-ft by 129-ft¹. The added 37 ft length, approximately equivalent to an extra full cut, increases the size and strength of the pillars' confined cores, which helps to isolate bumps to the face and reduce the risk of larger bumps overrunning crews in outby locations. For conservatism, a lagging cave was also assumed in the south panel. Plans are to slab the south barrier to a depth of about 40 ft. The wider span is expected to improve caving conditions compared to the north panel and reduced concentrated loads at the face.

The south barrier will be mined to about 97 ft wide (rib-to-rib) after slabbing. The slabbed barrier will be subject to side abutment loads from gob on both sides, resulting in elevated stress levels through the core. Model results indicate that the barrier will yield to a

³ Heasley, K.A. (1998), *Numerical Modeling of Coal Mines with a Laminated Displacement-Discontinuity Code*, Ph.D. Thesis, Colorado School of Mines, 187 p.

Mr. Laine Adair
April 18, 2007
Page 3

depth of about 20 ft along the ribs, but that the core will remain competent. This is likely to result in some bumping in the gob, but is not considered to pose unusual risk to crews working at the face.

RECOMMENDATIONS

Based on the evidence from the Main West north barrier retreat and results of numerical modeling, we recommend mining with 80-ft by 129-ft¹ pillars, or similar, in the south barrier. This size of pillar is expected to provide a reliable level of protection against problematic bumping for retreat mining under cover reaching 2,200 ft. Pillars should be robbed as completely as is safe to promote good caving. Slabbing the south-side barrier is expected to benefit caving. Skipping pillars should be avoided in the south barrier, particularly under the deepest cover.

Please contact me to discuss these results, at your convenience, or if you have any questions.

Sincerely,



Leo Gilbride
Principal
gilbride@agapito.com

L.G/smvf:klg
Attachments(7): Figures 1-7

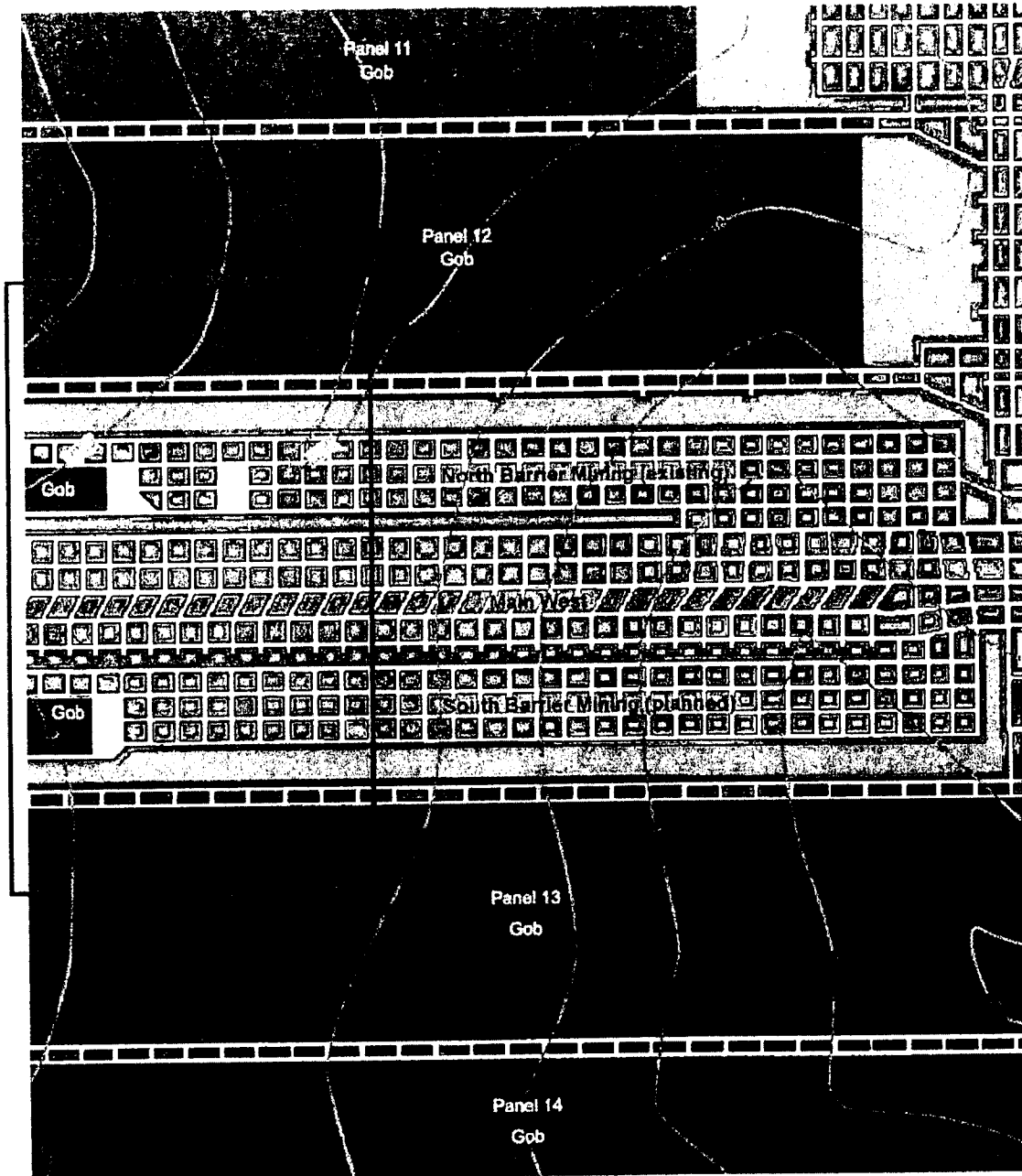


Figure 1. Geometry of LAMODEL Model

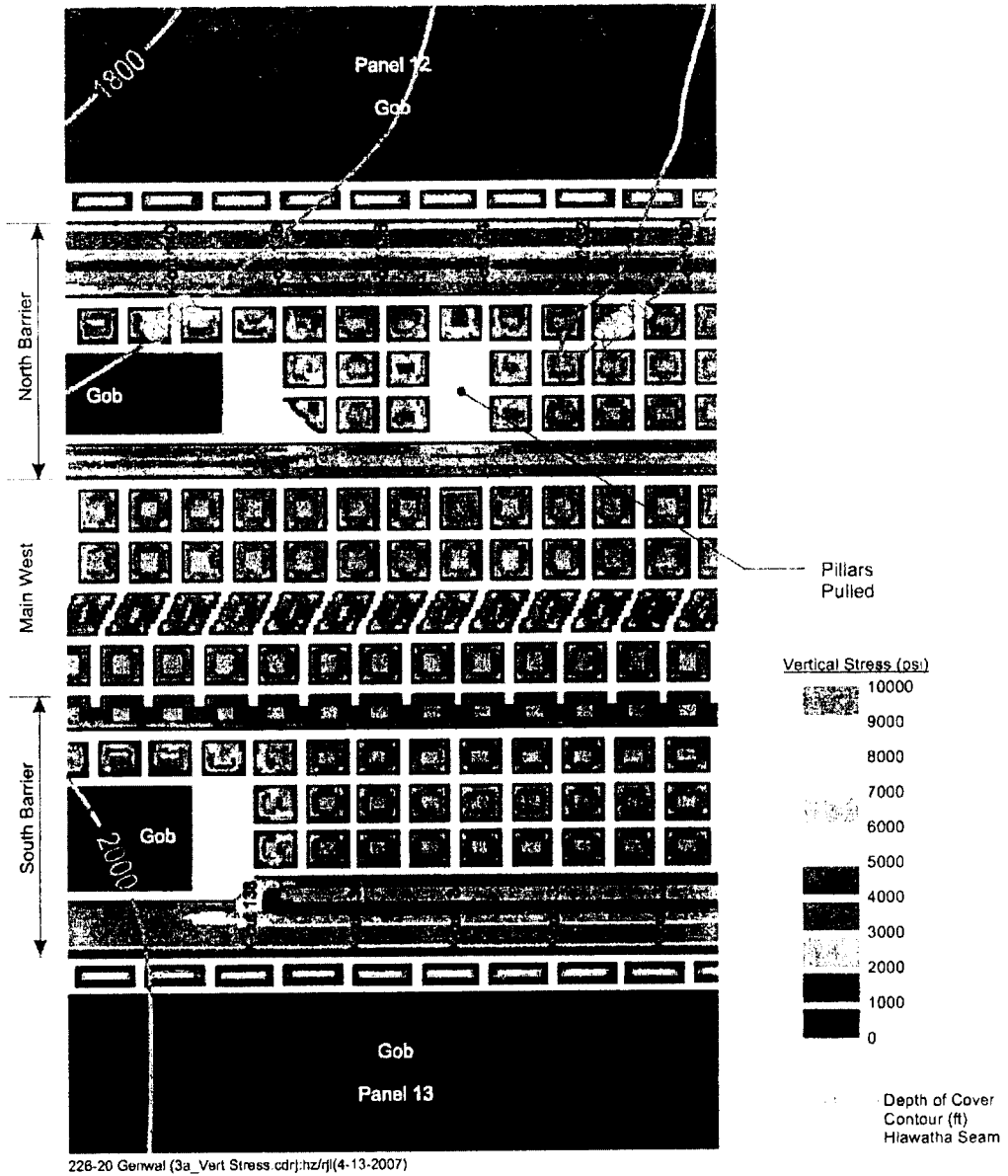


Figure 2. Modeled Vertical Stress—Existing Mining in the North Barrier and Optional Mining with 80-ft by 92-ft Pillars in the South Barrier

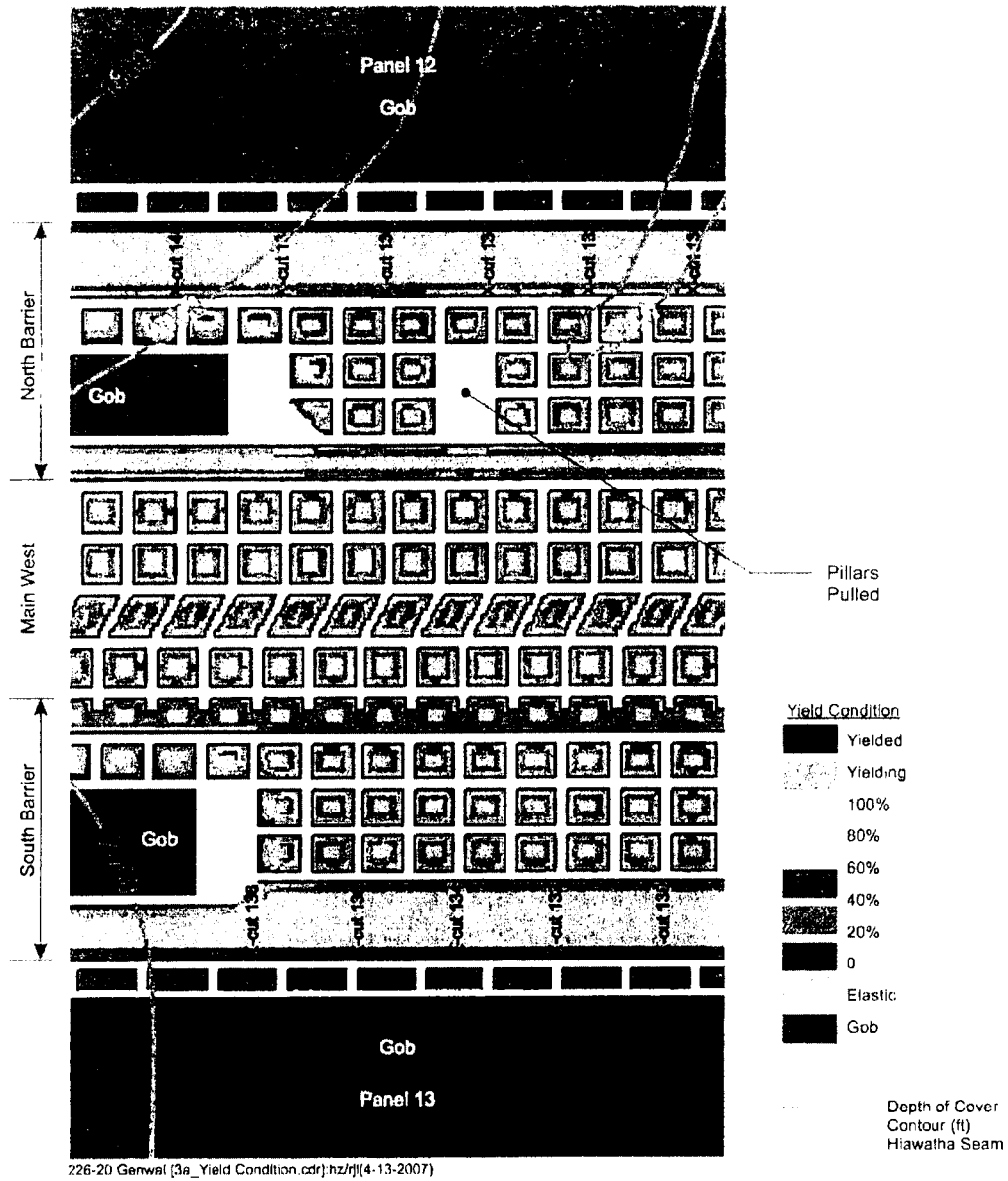


Figure 3. Modeled Coal Yielding—Existing Mining in the North Barrier and Optional Mining with 80-ft by 92-ft Pillars in the South Barrier

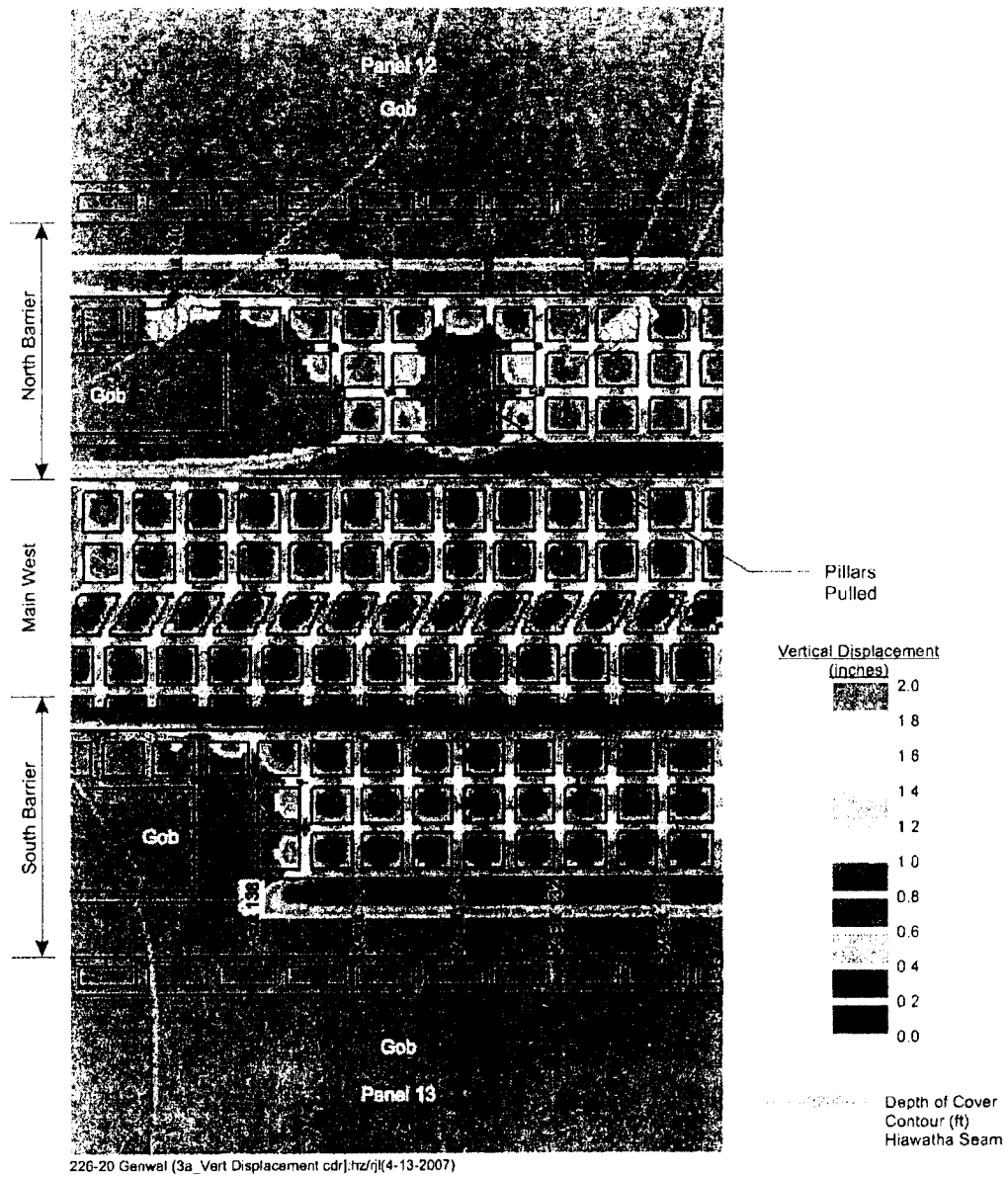


Figure 4. Modeled Roof-to-Floor Convergence—Existing Mining in the North Barrier and Optional Mining with 80-ft by 92-ft Pillars in the South Barrier

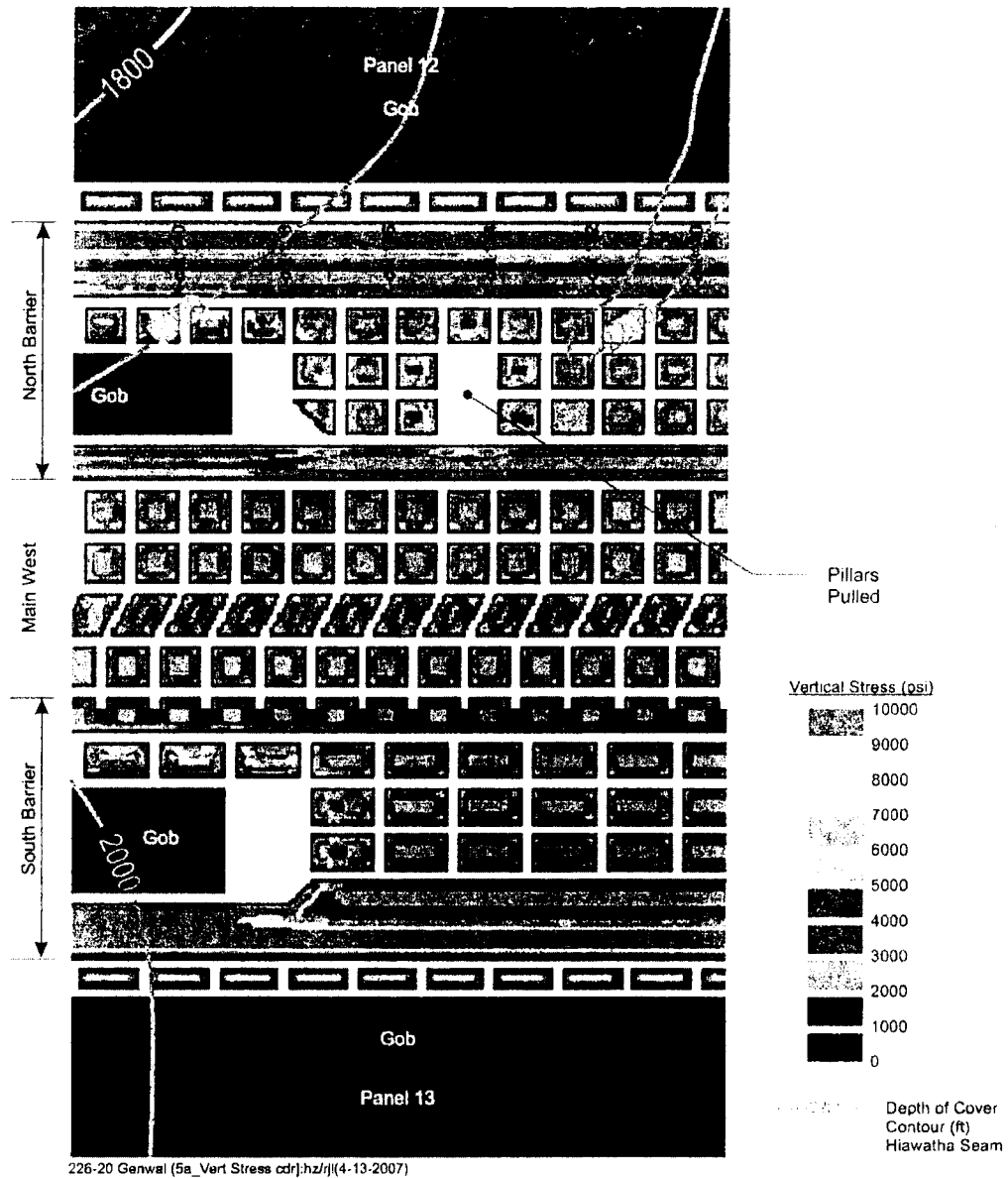


Figure 5. Modeled Vertical Stress—Existing Mining in the North Barrier and Optional Mining with 80-ft by 129-ft Pillars in the South Barrier

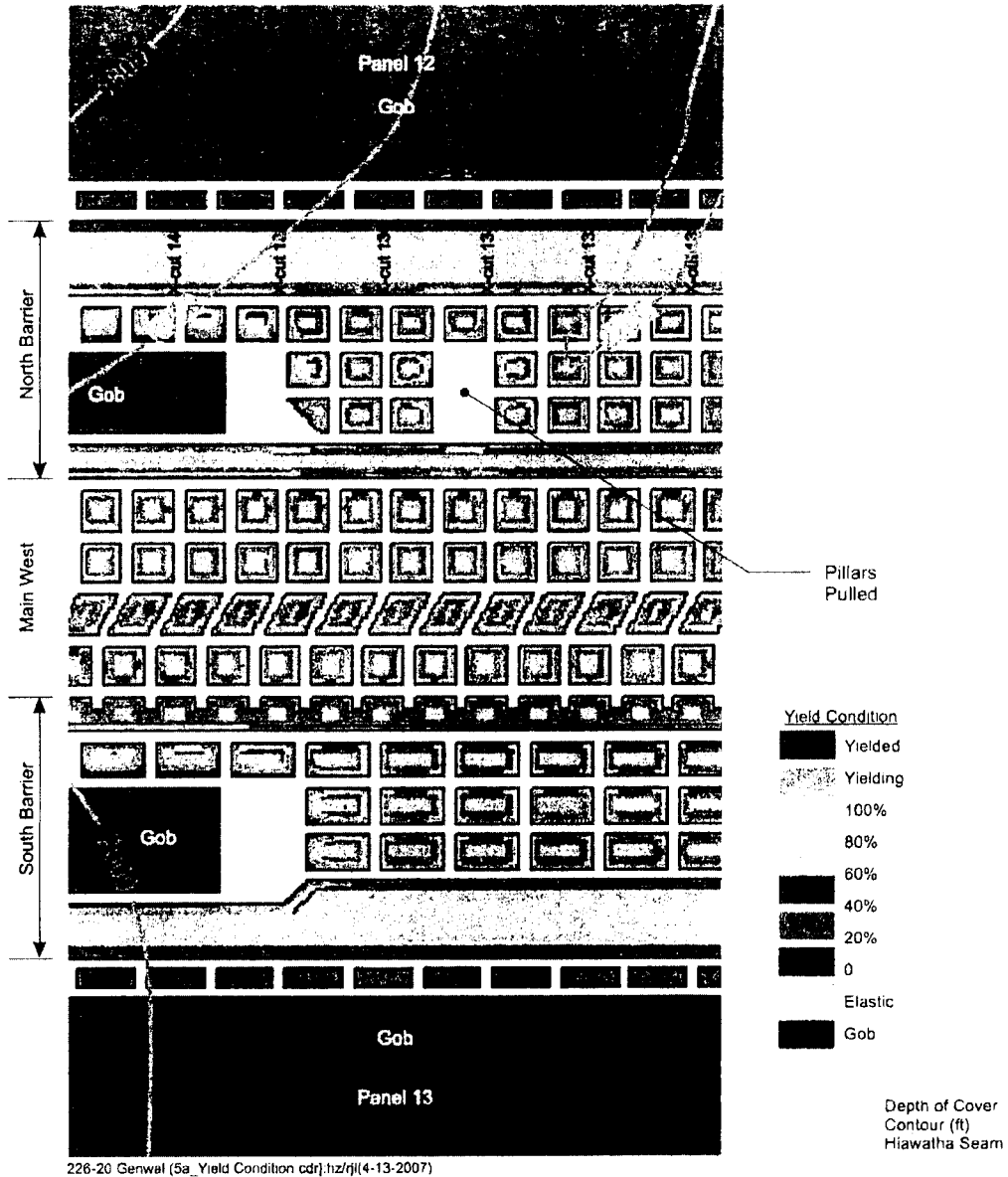


Figure 6. Modeled Coal Yielding—Existing Mining in the North Barrier and Optional Mining with 80-ft by 129-ft Pillars in the South Barrier

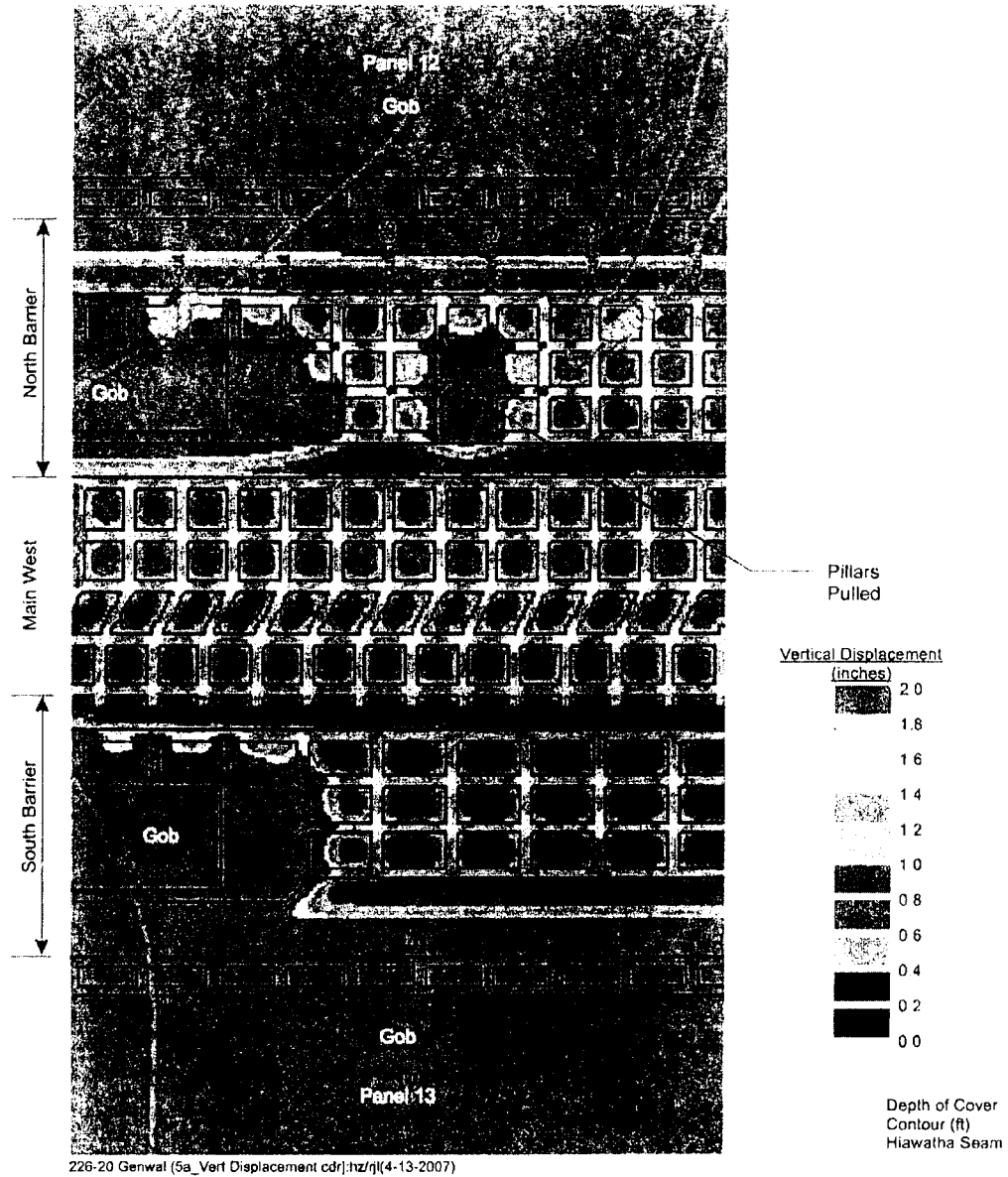


Figure 7. Modeled Roof-to-Floor Convergence—Existing Mining in the North Barrier and Optional Mining with 80-ft by 129-ft Pillars in the South Barrier

Engineering materials prepared by Agapito Engineering Co. Inc,
and submitted to MSHA in support of mining the North Barrier
Pillar at Crandall Canyon Mine.



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July 20, 2006

226-20

Mr. Laine Adair
Andalex Resources, Inc.
195 North 100 West
Huntington, UT 84520

Re: **DRAFT—GENWAL Crandall Canyon Mine Main West Barrier Mining Evaluation**

Dear Laine,

Agapito Associates, Inc. (AAI), has completed the geotechnical analysis of GENWAL Resources, Inc.'s (GENWAL) plan for room-and-pillar mining in the Main West barriers at the Crandall Canyon Mine (Figure 1). Current plans include developing four entries in the barriers north and south of the existing mains in the area west of the 1st Right/2nd North submains under cover ranging from about 1,300 ft to 2,200 ft. Barrier mining is also planned to the east between the 1st Right/2nd North and 1st North submains under generally shallower cover. Figure 1 shows the existing mine in green and planned mining in black. The objective of the analysis was to evaluate the potential for high-stress conditions caused by a combination of deep cover and side-abutment loads from the adjacent longwall gobs, and any load transferred onto the barriers from the existing pillars in Main West. Findings of the analysis and implications for pillar design and ground control are discussed.

CONCLUSIONS

Conclusions are that the proposed Main West 4-entry layout with 60-ft by 72-ft (rib-to-rib) pillars should function adequately for short-term mining in the barriers (i.e., less than 1 year duty). Model results indicate that planned mining in the barriers will avoid the majority of the side-abutment stress transferred from the adjacent longwall panel gobs. Stress conditions are expected to be controlled by the depth of cover and not by abutment loads.

The proposed 60-ft by 72-ft pillars are not intended for long-term performance and, therefore, can accept a reduced design safety margin compared to typical life-of-mine mains pillars. Analytical results indicate that the proposed pillars result in only incrementally more geotechnical risk than associated with the historical pillars in Main West. The historical 70-ft by 72-ft pillars in Main West have performed adequately for many years longer than will be required for mining the barriers. Because rib yielding and roof sag are time-dependent effects, it is probable that mining will be completed in the barriers before rib and roof conditions show

advanced deterioration. The modern mining practices of GENWAL, including systematic bolting rapidly after excavation, bolting with 6 bolts per row, tight geometric control, mining with narrow entries (18 ft wide), and mining to rock instead of leaving top coal, should make this a workable design and limit geotechnical risk to an acceptable level. Increasing crosscut spacing is not expected to significantly improve ground control.

ANALYSIS

Ground conditions were simulated using the NIOSH displacement discontinuity code, LAMODEL.¹ The approach involved two stages of modeling, first, simulation of historical mining in the 1st North Left block of room-and-pillar panels and, second, simulation of future conditions in Main West. The historical and future mining areas modeled are highlighted in Figure 1. The models were used to calculate three parameters: (1) in-seam vertical stress, (2) roof-to-floor convergence, and (3) pillar (coal) yielding. These parameters provide the principal quantitative basis for comparing historical and future conditions.

Both models (historical and future mining areas) incorporated the mining geometry, sequence of mining, and variable depth of cover. To provide realistic pillar behavior, a high-resolution model was created using 5-ft-square elements. Coal strength was specified for eight levels of increasing confinement based upon depth into the rib, ranging from 2.5 to 37.5 ft.

In LAMODEL, the “method of slices” is applied to approximate the load bearing capacity of the pillars. This method assumes that the strength of any pillar element is a function of its distance from the nearest pillar rib and element size by:

$$\sigma_v = S_l[0.71 + 1.74(x/h)] \quad (\text{Eqn. 1})$$

where σ_v = Confined coal strength
 S_l = In situ rock mass unconfined strength
 x = Distance from the nearest pillar rib
 h = Pillar height

Peak strain in each element is calculated by:

$$\varepsilon_v = \sigma_v / E \quad (\text{Eqn. 2})$$

where ε_v = Peak strain
 E = Coal elastic modulus

Upon yielding, the residual stress and residual strain within a pillar element are calculated by:

¹ Heasley, K.A. (1998), *Numerical Modeling of Coal Mines with a Laminated Displacement-Discontinuity Code*, Ph.D. Thesis, Colorado School of Mines, 187 p.

$$\sigma_r = 0.2254 \times \ln(x) \times \sigma_v \quad (\text{Eqn. 3})$$

and

$$\varepsilon_r = 4 \times \varepsilon_v \quad (\text{Eqn. 4})$$

where σ_r = Residual stress
 ε_r = Residual strain

The in situ unconfined coal strength and elastic modulus are estimated to be 1,640 psi, and 0.5×10^6 psi, respectively, for a 5-square-ft element. An average 8-ft pillar height, representative of actual and planned mining, was used in all models. The eight levels of confined coal strength and corresponding strain for a typical pillar, using Equations 1 through 4, are listed in Table 1.

Table 1. LAMODEL Confined Coal Strength

Confined Coal Distance into Rib (ft)	Confined Strength (psi)	Peak Strain	Residual Strength (psi)	Residual Strain
2.5	2,059	0.004	425	0.017
7.5	3,845	0.008	1,746	0.032
12.5	5,631	0.012	3,206	0.047
17.5	7,417	0.016	4,785	0.062
22.5	9,203	0.019	6,459	0.077
27.5	10,989	0.023	8,209	0.092
32.5	12,775	0.027	10,025	0.107
37.5	14,562	0.031	11,896	0.122

Other model properties are summarized in Table 2 and are based principally on previous modeling studies for the Crandall Canyon Mine.^{2,3,4,5}

1st North Left Panels Back-Analysis

The historical mining area is relevant for calibrating the model for predicting future conditions in Main West because of (1) similar geologic conditions to that in Main West,

² Agapito Associates, Inc. (1995), "Technical Review of Longwall Feasibility," prepared for GENWAL Resources, Inc., November.

³ Agapito Associates, Inc. (2000), "Barrier Pillar to Protect Bleeder for Panel 15, South of West Mains," prepared for GENWAL Resources, Inc., May 5.

⁴ Agapito Associates, Inc. (1997), "Panel 6th Right Experiment Back Analysis and Model Calibration," prepared for GENWAL Resources, Inc., November 20.

⁵ Agapito Associates, Inc. (2004), "GENWAL South Crandall Canyon Mine Gateroad Alternatives Geotechnical Study," prepared for GENWAL Resources, Inc., December 17.

Table 2. Input Parameters for LAMODEL

Overburden	
Deformation Modulus of Roof Rock (psi)	2,000,000
Poisson's Ratio of Overburden	0.25
Lamination Thickness of Overburden (ft)	25
Unit Weight of Overburden (pcf)	158
Coal	
Elastic Modulus of Coal (psi)	470,000
Poisson's Ratio of Coal	0.34
Strain Hardening Gob	
Initial Modulus (psi)	100
Final Modulus (psi)	76,000
Final Stress (psi)	4,000
Gob Height Factor	1
Poisson's Ratio of Gob	0.25

(2) significant depth of cover (up to 1,800 ft), and (3) similar mine geometry. The historical model area includes a barrier separating the mains from gob in the 9th Left panel at depths reaching 1,800 ft, which represents the same type of high-stress, side-abutment load transfer onto a barrier mechanism anticipated in Main West.

The 1st North Left model describes an area where room-and-pillar panels were retreated under relatively deep cover during the late 1990s. Ground conditions are reported to have been good during primary mining even with side-abutment loading from adjacent gob. Occasional pillars were left behind during retreat because of locally difficult ground conditions, mainly related to peeling top coal. This was compounded by large center-entry roof spans (reaching 22 to 23 ft) mined to accommodate the continuous haulage system in use at that time. Also, short 5-ft bolts and only 5 bolts per row were used in the panels, which is considered substandard for retreat mining compared to the mine's current practice. Conclusions are that, while retreat mining was overall successful, ground conditions could have been improved by mining the top coal. It is believed that this would have eliminated the need for leaving pillars in some locations.

Main West was recently mined northward into the barrier separating the mains from Panel 9th Left—1st North, leaving a 145-ft to 170-ft-wide barrier at a depth of about 1,600 to 1,800 ft. Ground conditions in the new entries are reported to be very good with no obvious effects of side-abutment load override across the barrier. Good conditions are also attributed to better mining practices than used in the historical panels to the north, including mining the top coal (rock roof), narrower entries (nominally 18-ft wide), and better roof bolting (6 bolts per row).

Modeling results presented in Figures 2 through 10 show vertical stress, coal yielding, and convergence for three stages of mining in Panel 9th Left, (1) when the panel was fully mined on the advance, and after the panel was (2) partly and then (3) fully retreated.

Figures 2, 3, and 4 show vertical stress, yielding, and seam convergence, respectively, during the first stage. Almost all remnant pillars in the north panels are shown to be fully yielded. The stresses in the centers of these pillars exceeded 10,000 psi, resulting in convergence greater than 2.0 inches. Pillars in Panel 9th Left show limited rib yielding. Seam convergence in the panel is computed by the model to be less than 1.6 inches and average vertical stresses within the pillars around 3,000 psi, reflecting an increase of about 800 psi above in situ stress levels.

At the second mining stage, pillars next to the gob at the retreat line are shown to be yielded (Figure 6) and converged more than 2.0 inches (Figure 7) in response to abutment stresses. Based on the experience in the panel with peeling top coal, 2.0 inches of convergence is considered an indicator of potential roof and rib instability in the model.

The third stage of mining in Figures 8, 9, and 10 shows 9th Left fully retreated and Main West mined into the barrier per the current geometry. The results show no significant side-abutment stress override across the barrier on to the mains pillars, consistent with actual conditions. Pillar rib yielding is shown to be minimal and roof convergence less than 1.0 inch in the vicinity of the barrier. This behavior is considered an indicator in the model of good ground conditions.

Main West Barrier Mining Predictive Model

Future mining in the north barrier of Main West was simulated using the same model properties from the back-analysis model. The Main West model was adjusted to include the actual depth of cover which ranges from about 1,600 to 2,200 ft. The area encompassed by the model is considered representative of the range of conditions expected throughout Main West, including planned mining in the barrier south of the mains.

Results of the model are shown in Figures 11 through 19. Mining was simulated in three stages: (1) current conditions before any new mining (Figures 11 through 13), (2) early during planned mining with development part way into the barrier (Figures 14 through 16), and (3) after the barrier is fully mined (Figures 17 through 19). Planned mining includes 18-ft-wide rooms with 60 ft by 72 ft (rib-to-rib) pillars. These dimensions were rounded to 20 ft and 60 ft by 70 ft, respectively, in the model because of the 5-ft element size. Notably, the models show mining into the existing Main West entries. This may or may not be the final design. This is a conservative assumption useful for analyzing the highest pillar loading.

For the current geometry, the model shows side-abutment stresses reaching as high as 30,000 psi in the northern interior of the existing 450-ft-wide barrier. Figure 20 shows two stress profiles (A-A') through the barrier, one for the current geometry (magenta) and a second with planned mining in the barrier (blue). The location of Profile A-A' is shown in Figure 14. For the current geometry, stress levels taper to near pre-mining (in situ) stress levels approximately 100 ft into the barrier, indicating that the proposed 130-ft-wide barrier will limit exposure of the

planned entries and pillars to most of the abutment. Mining conditions are expected to reflect stress levels normally associated with development mining away from abutment stresses. Stress levels are expected to be controlled by the depth of cover, and not side-abutment stresses. This is consistent with the recent experience mining across the barrier from Panel 9th Left.

The proposed 60-ft by 72-ft (rib-to-rib) mains pillars are predicted to be about 7% weaker on average than the existing 70-ft by 72-ft pillars in Main West. This is based on five widely recognized empirical pillar strength formulas which show anywhere from a 1% to 12% drop in pillar strength with the 10 ft narrower pillar. Pillar strengths predicted by the various methods are summarized in Table 3.

Table 3. Reduction in Pillar Strength Based on Empirical Design Formulas

Empirical Formula	Pillar Design Strength		Existing to Planned Pillar Strength Change	
	Existing 70-ft × 72 ft Pillars	Planned 60-ft × 72-ft Pillars		
1,600 ft Deep				
Wilson Method	4,960 psi	4,800 psi	-160 psi	-3%
Abel Method	5,740 psi	5,690 psi	-50 psi	-1%
Bieniawski Method	3,910 psi	3,450 psi	-460 psi	-12%
ALPS-Bieniawski Method	3,410 psi	3,010 psi	-400 psi	-12%
Holland Method	3,060 psi	2,830 psi	-230 psi	-8%
			Average	-7%
2,200 ft Deep				
Wilson Method	6,730 psi	6,510 psi	-220 psi	-3%
Abel Method	7,370 psi	7,290 psi	-80 psi	-1%
Bieniawski Method	3,910 psi	3,450 psi	-460 psi	-12%
ALPS-Bieniawski Method	3,410 psi	3,010 psi	-400 psi	-12%
Holland Method	3,060 psi	2,830 psi	-230 psi	-8%
			Average	-7%

This reduced strength translates to slightly increased rib yielding (sloughage) and increased roof convergence. Figure 18 shows rib yielding predicted by the model. In the figure, rib yielding is limited to the corners of the existing 70-ft by 72-ft pillars (bottom two rows of pillars). In the proposed smaller pillars (top four rows of pillars), yielding occurs in the skin all the way around the pillar. However, the pillar cores are shown to remain competent in all locations, indicating acceptable pillar performance.

Figure 19 shows predicted roof convergence. Figure 21 compares centerline convergence along an entry in the existing mains (Profile B-B') with an entry central to the new mining (Profile C-C'). Profile locations are shown in Figure 19. The figures show that the proposed smaller pillars result in up to a 0.15 inch increase in roof convergence in the intersections, or about a 15% increase, compared to historical conditions in Main West. This reflects the increased rib yielding around the smaller pillars.

Mr. Laine Adair
July 20, 2006
Page 7

Based on modeled convergence, ground conditions are expected to be heavier compared to conditions in the mains across from Panel 9th Left, and only slightly heavier than conditions in the existing Main West entries. This suggests there will be an increased reliance on roof support, particularly under the deeper cover (>1,800 ft). However, convergence is far below the 2.0-inch level associated with roof and rib instability established by the back-analysis model.

The existing 70-ft by 72-ft pillars in Main West have performed reliably over the long-term (several years) and are considered a successful design, including under the deepest 2,200-ft cover. Some deterioration has occurred locally in Main West. This is attributed to the same historical mining practices responsible for poor roof conditions in the 1st North panel, namely, leaving variable top coal, mining extra wide entries to accommodate the continuous haulage system, using short bolts, and only bolting with 5 bolts per row. Also, where angled crosscuts were mined, disintegration of the sharp pillar corners produced spans 10 to 20 ft wider than normal. In spite of some localized time-dependent roof falls, the 70-ft by 72-ft pillar design has demonstrated its success for ensuring long-term stability when properly mined. Given the reliability of the existing mains pillars and the results of modeling, the narrower 60-ft by 72-ft pillars are not expected to substantially increase geotechnical risk for short-term mining.

Model results indicate that increasing crosscut spacing does not significantly improve conditions. Figures 22 through 24 show stress, yielding, and convergence for a 60-ft by 80-ft pillar, representing about a 20-ft increase in pillar length (between crosscuts) over the proposed design. The increased length only incrementally reduces rib yielding, corresponding to a modest decrease in entry convergence of about 2% to 4%, as shown by comparison of convergence profiles in Figure 21.

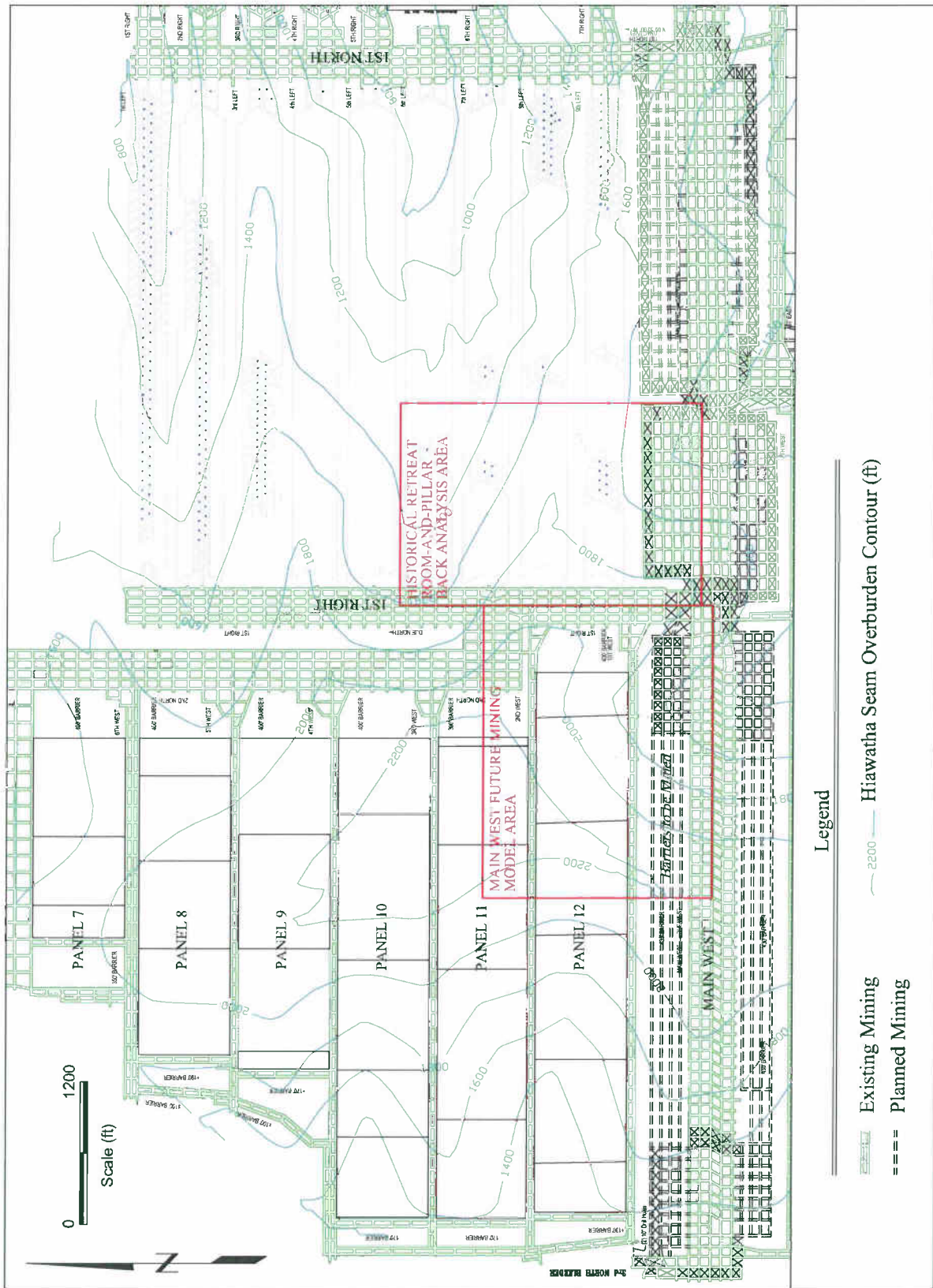
Please contact me to discuss these results, at your convenience, or if you have any questions.

Sincerely,



Leo Gilbride
Principal
gilbride@agapito.com

LG/smvf
Attachments(24): Figures 1-24



226-20 Cenwal [Cenwal_Plan Modeled Area.dwg Layout: AAL_Plan Model] by: rj(07-20-2006)

Figure 1. Main West Location Map Showing Existing and Future Mining and Modeled Areas

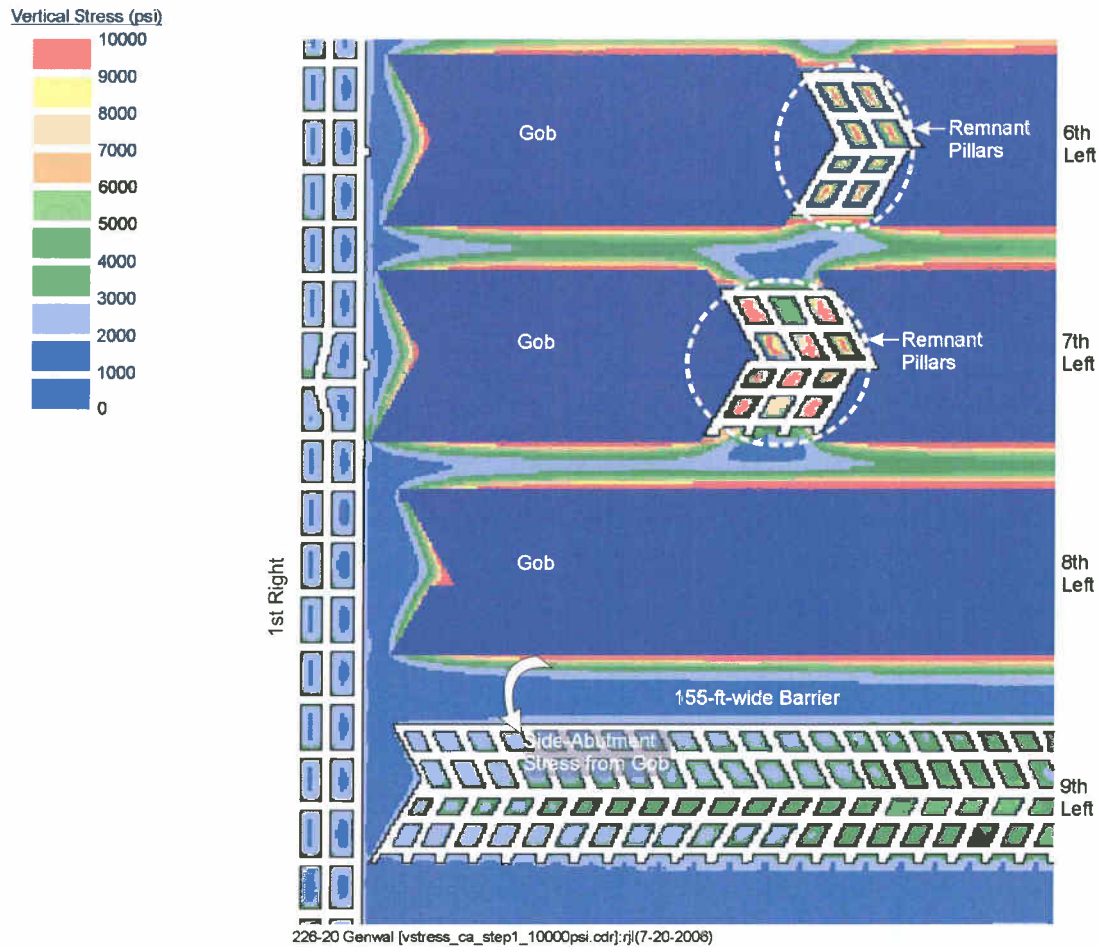


Figure 2. Modeled Vertical Stress—Primary Mining Completed in Panel 9th Left—1st North

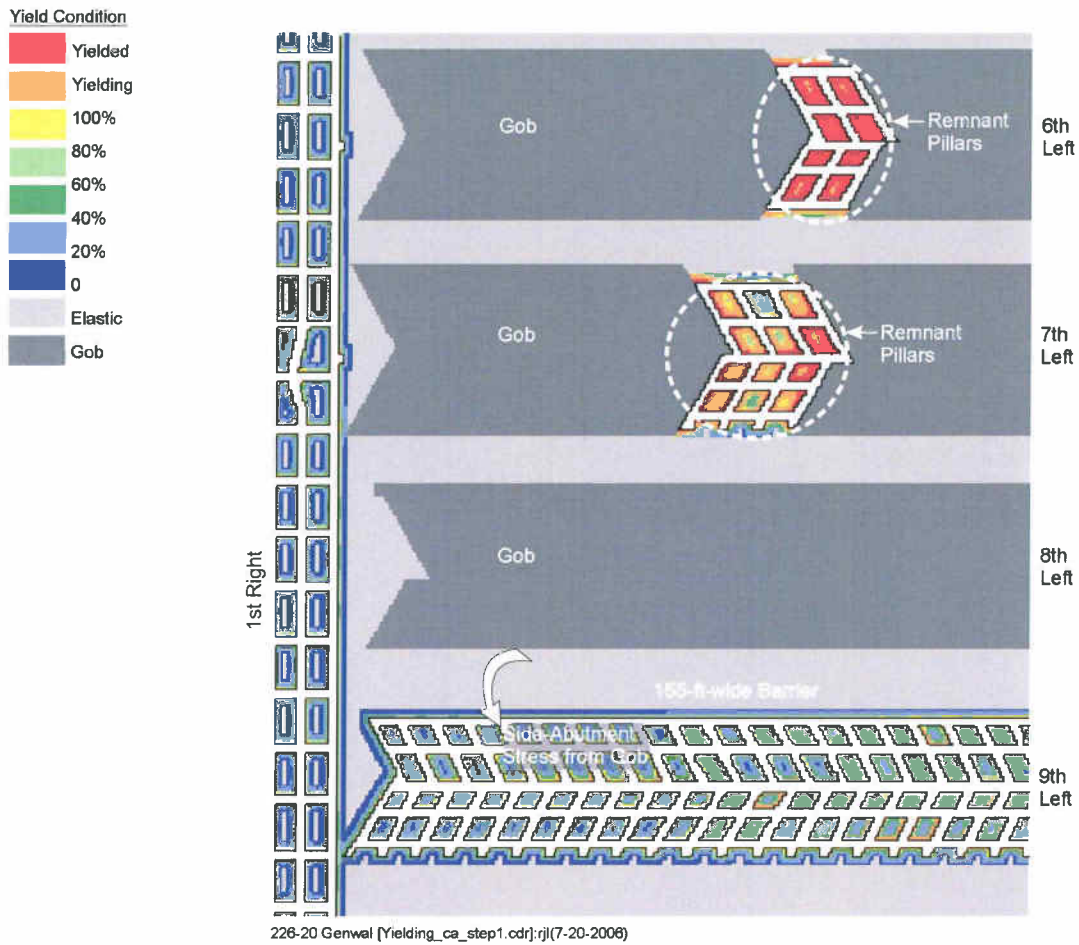


Figure 3. Modeled Coal Yielding—Primary Mining Completed in Panel 9th Left—1st North

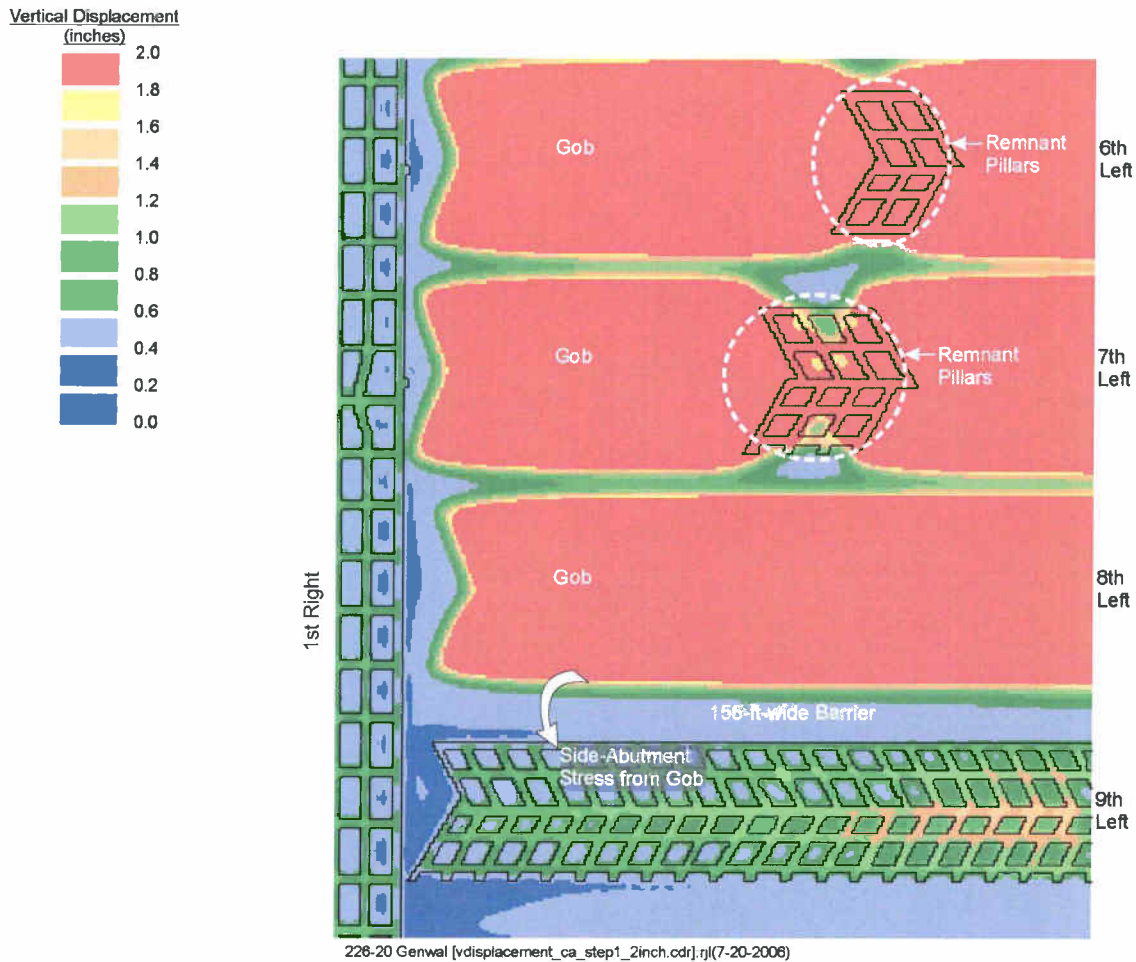


Figure 4. Modeled Roof-to-Floor Convergence—Primary Mining Completed in Panel 9th Left—1st North

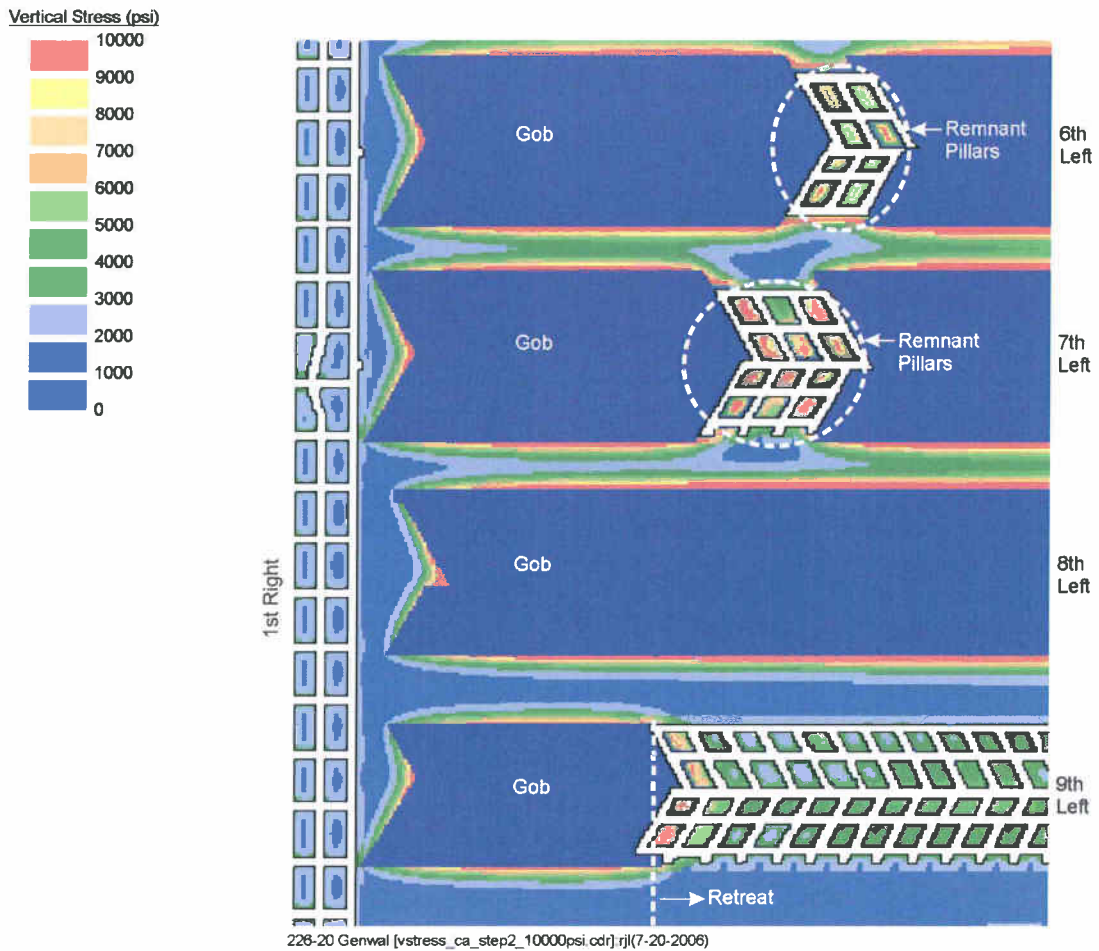


Figure 5. Modeled Vertical Stress—Partial Retreat in Panel 9th Left—1st North

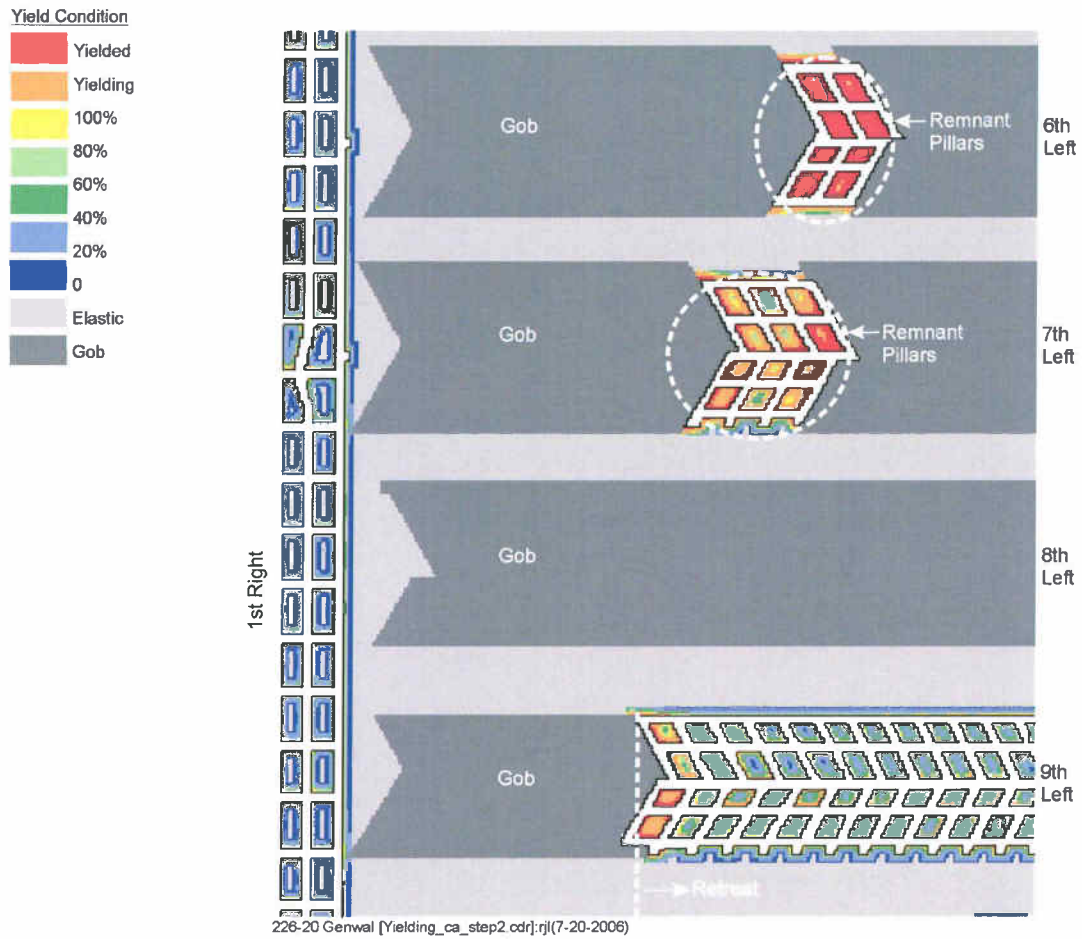


Figure 6. Modeled Coal Yielding—Partial Retreat in Panel 9th Left—1st North

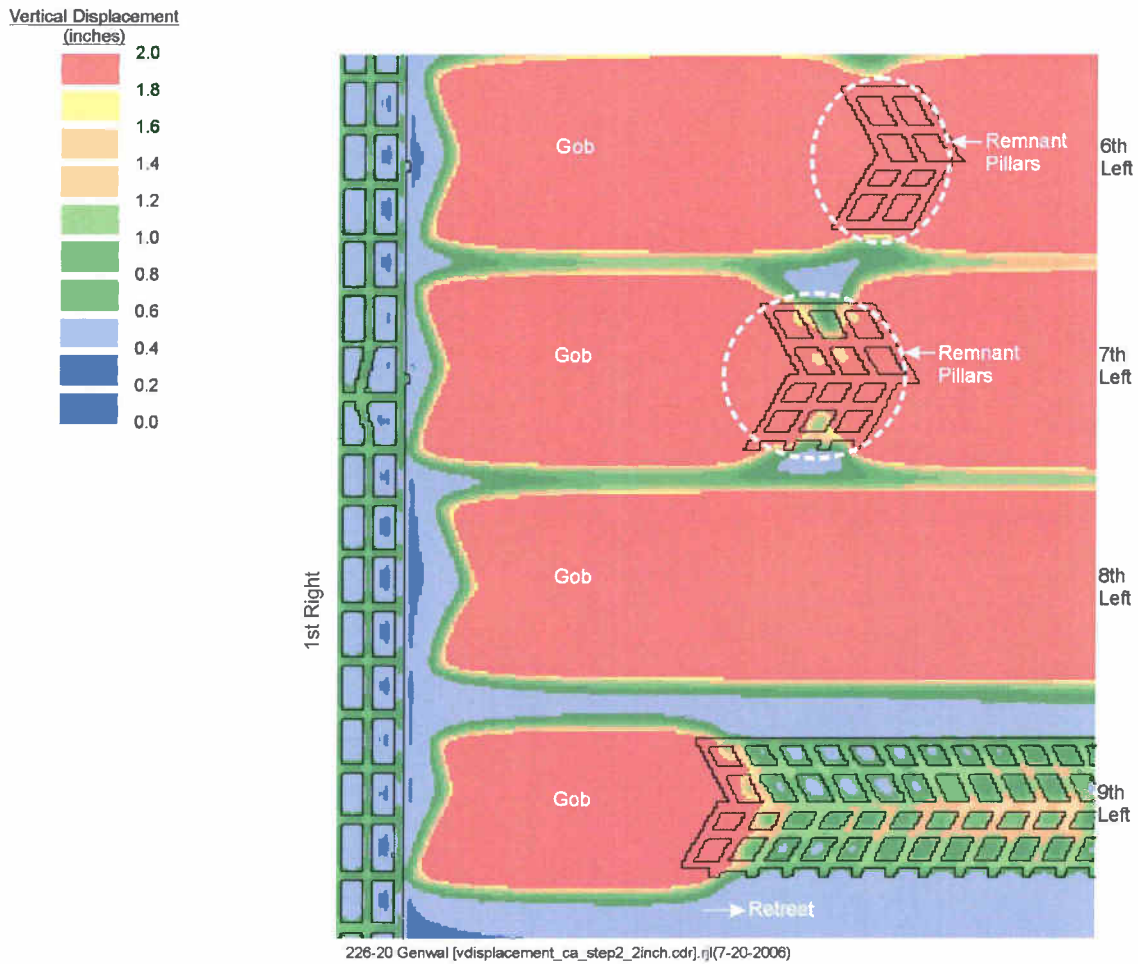


Figure 7. Modeled Roof-to-Floor Convergence—Partial Retreat in Panel 9th Left—1st North

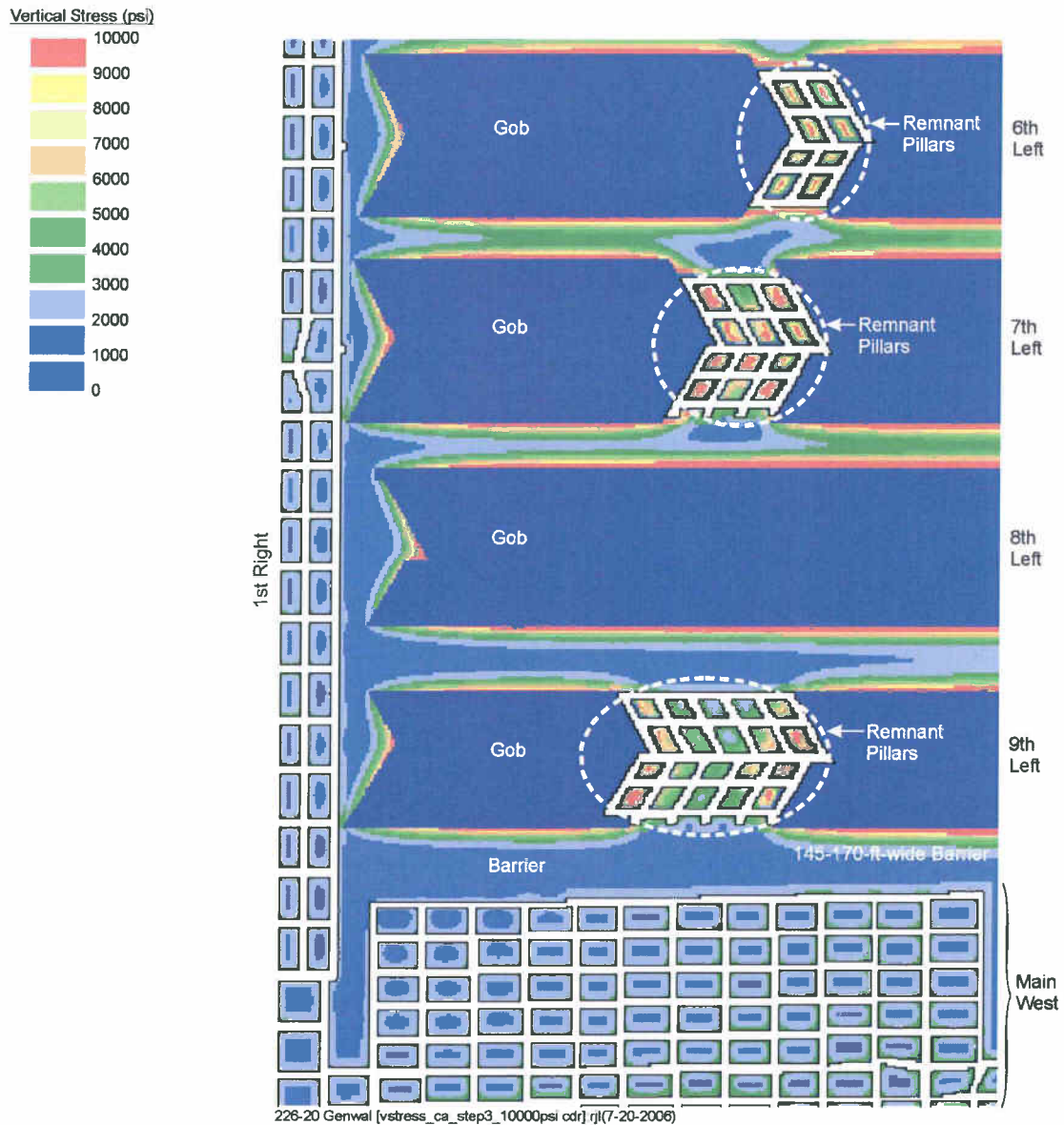


Figure 8. Modeled Vertical Stress—Retreat Completed in Panel 9th Left—1st North

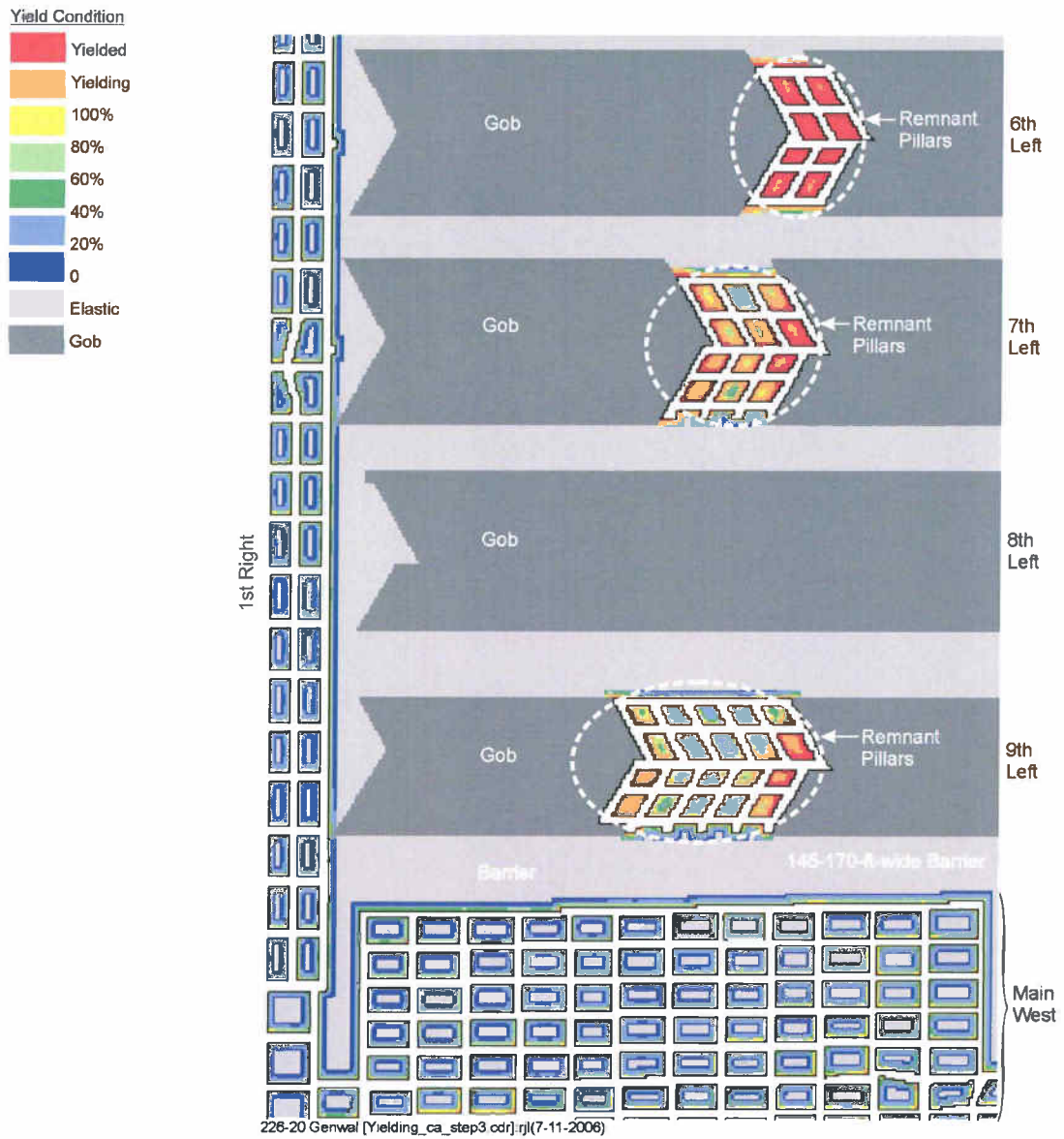


Figure 9. Modeled Coal Yielding—Retreat Completed in Panel 9th Left—1st North

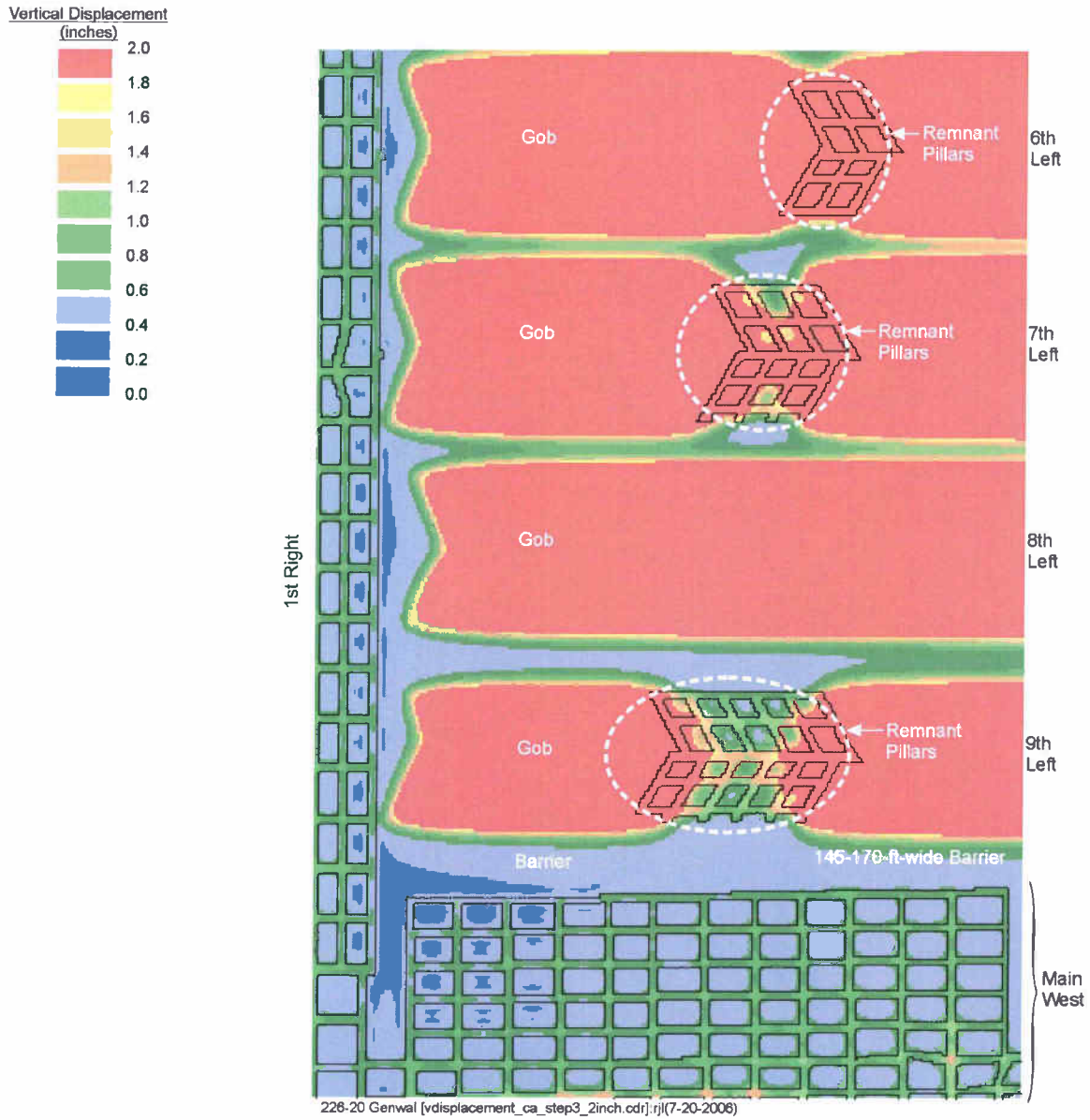


Figure 10. Modeled Roof-to-Floor Convergence—Retreat Completed in Panel 9th Left—1st North

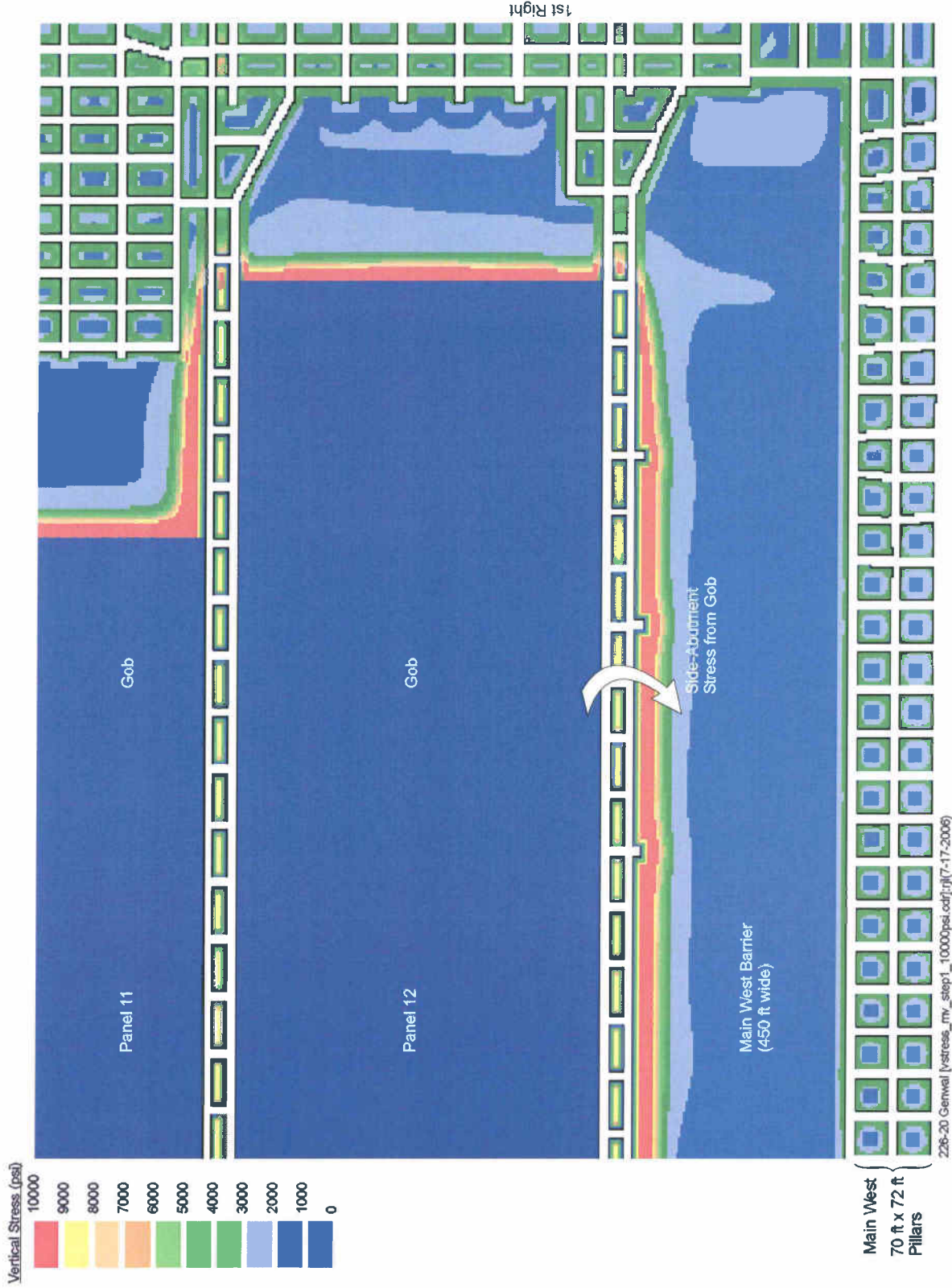


Figure 11. Modeled Vertical Stress—Current Conditions in Main West Barrier

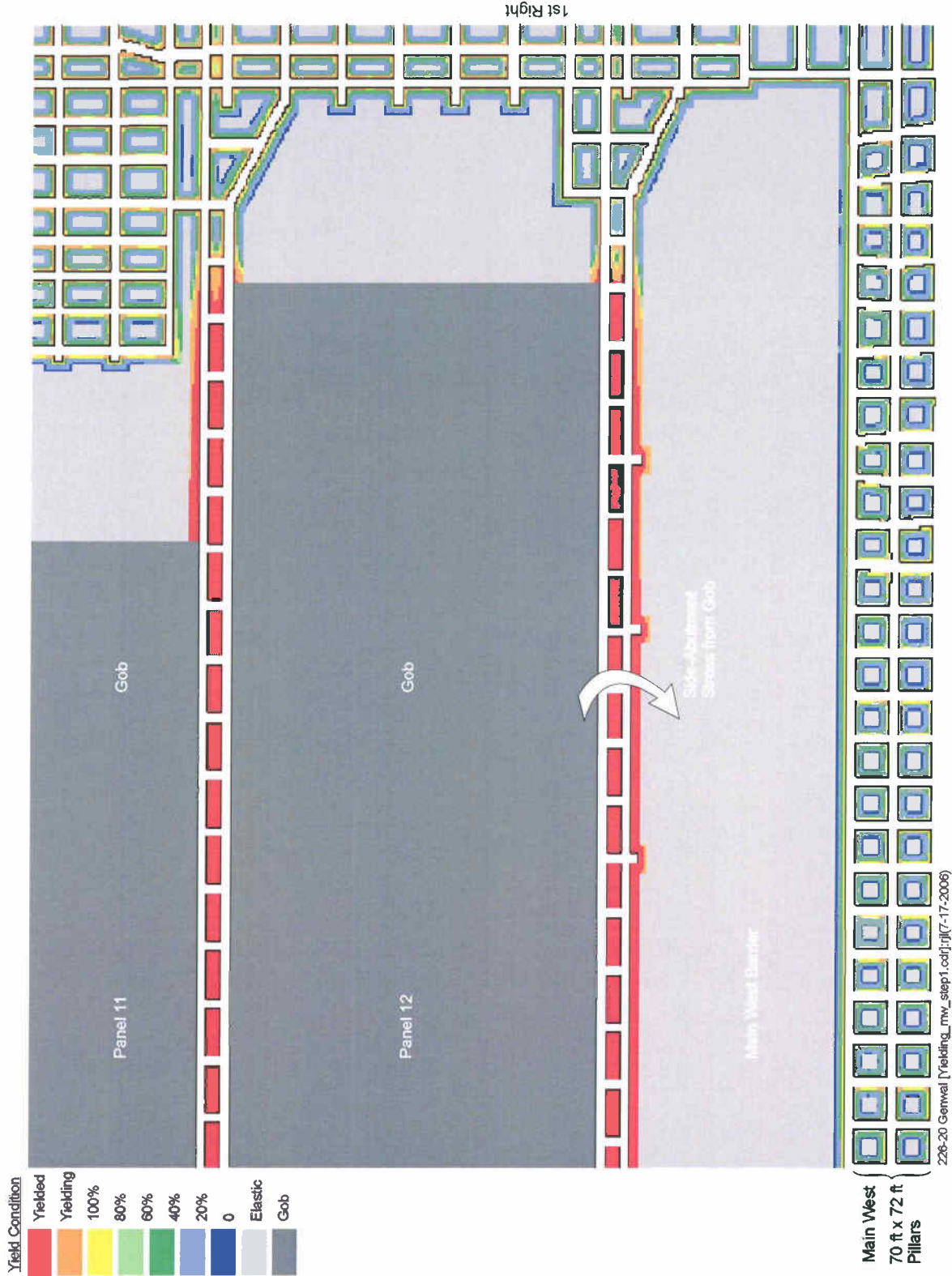


Figure 12. Modeled Coal Yielding—Current Conditions in Main West Barrier

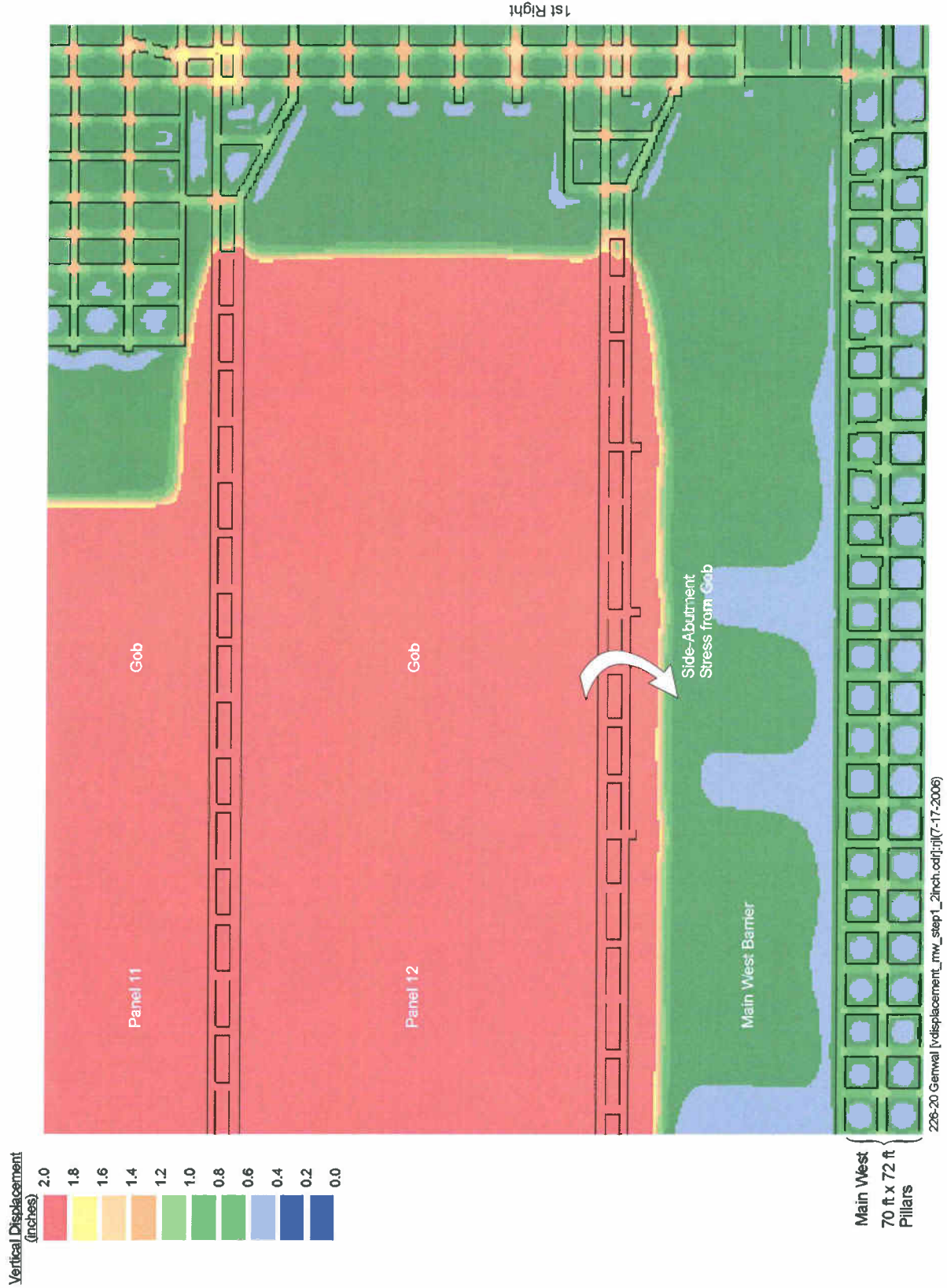


Figure 13. Modeled Roof-to-Floor Convergence—Current Conditions in Main West Barrier

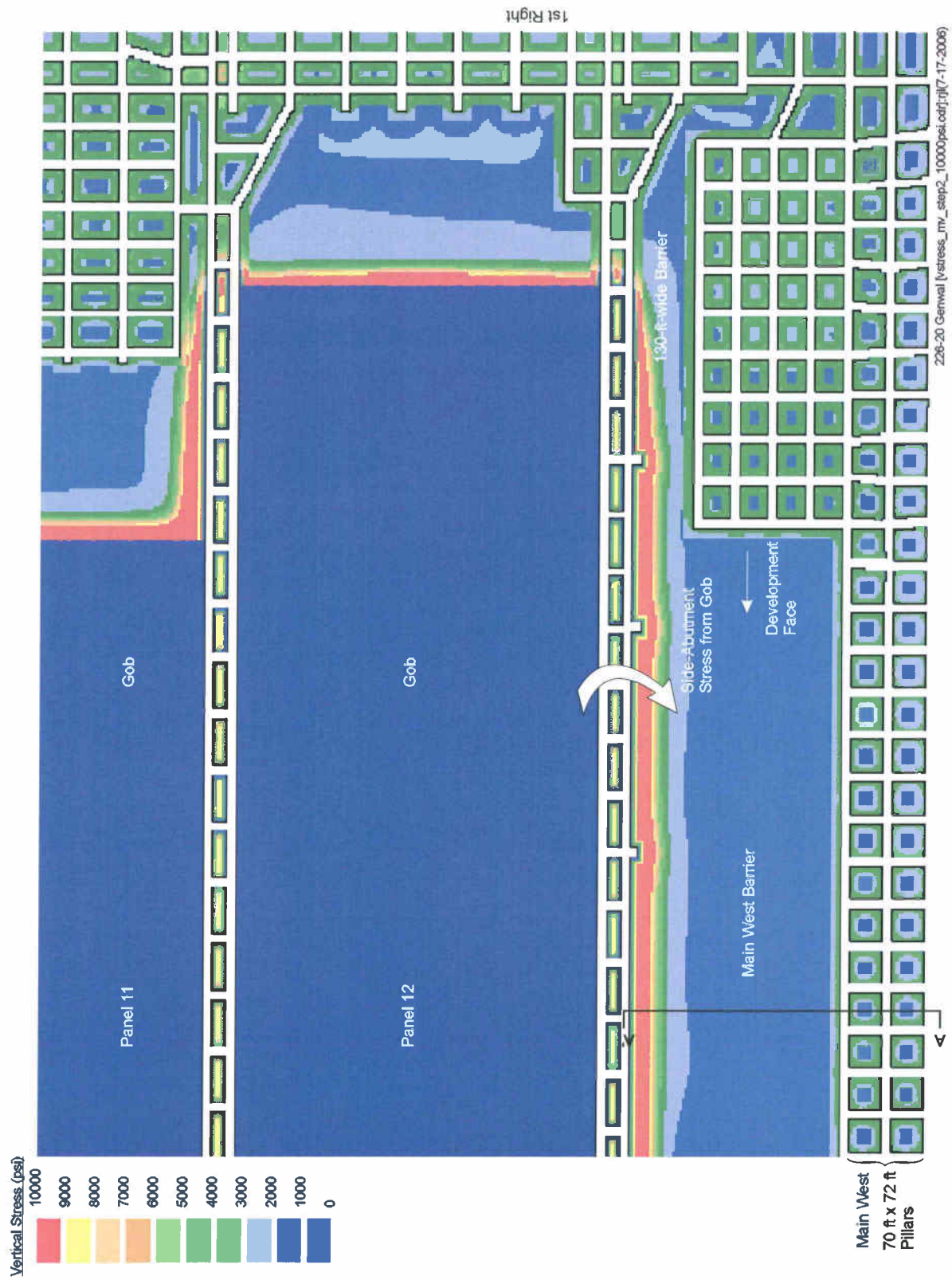


Figure 14. Modeled Vertical Stress—Partial Mining in Main West Barrier

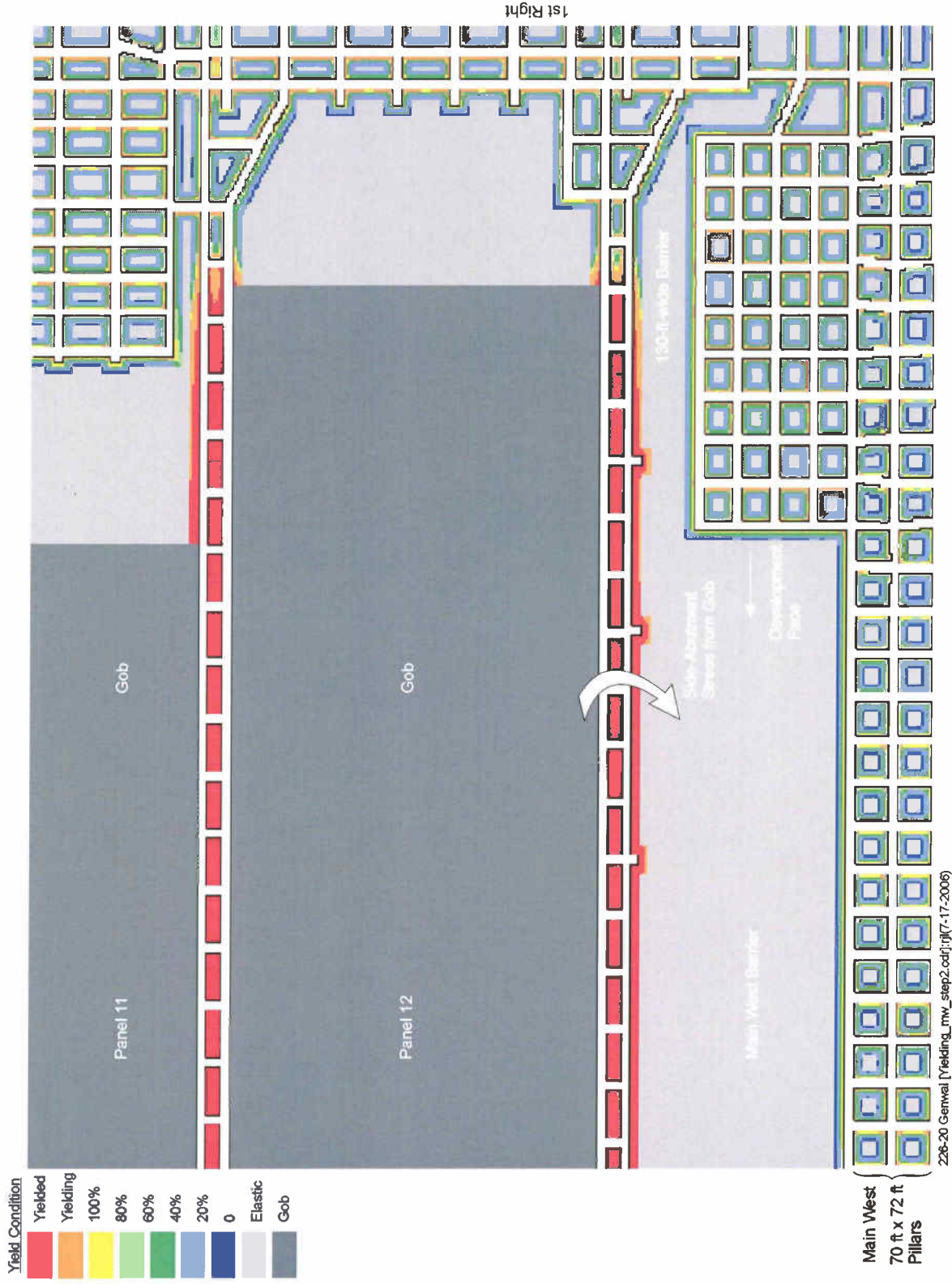


Figure 15. Modeled Coal Yielding—Partial Mining in Main West Barrier

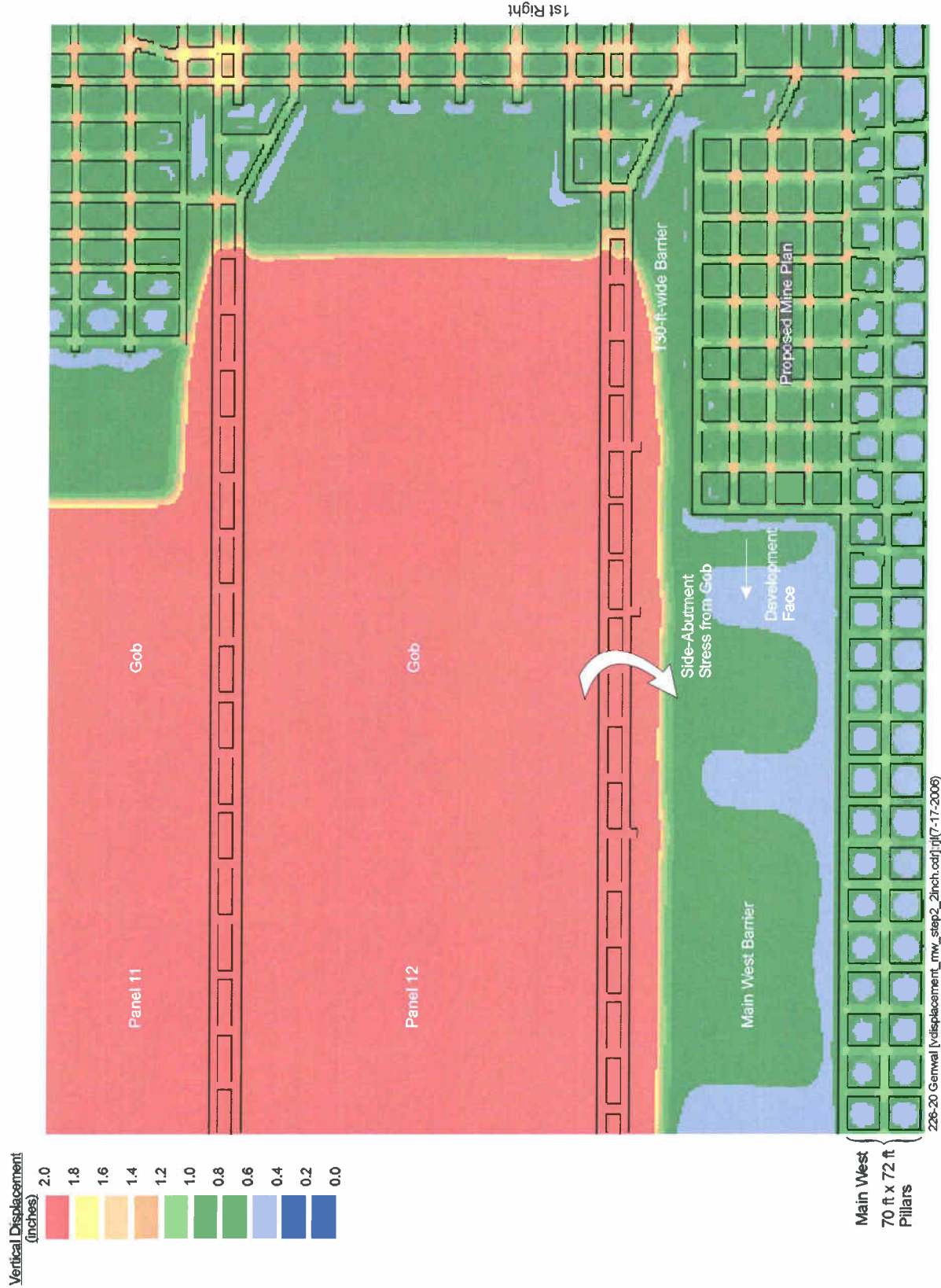


Figure 16. Modeled Roof-to-Floor Convergence—Partial Mining in Main West Barrier

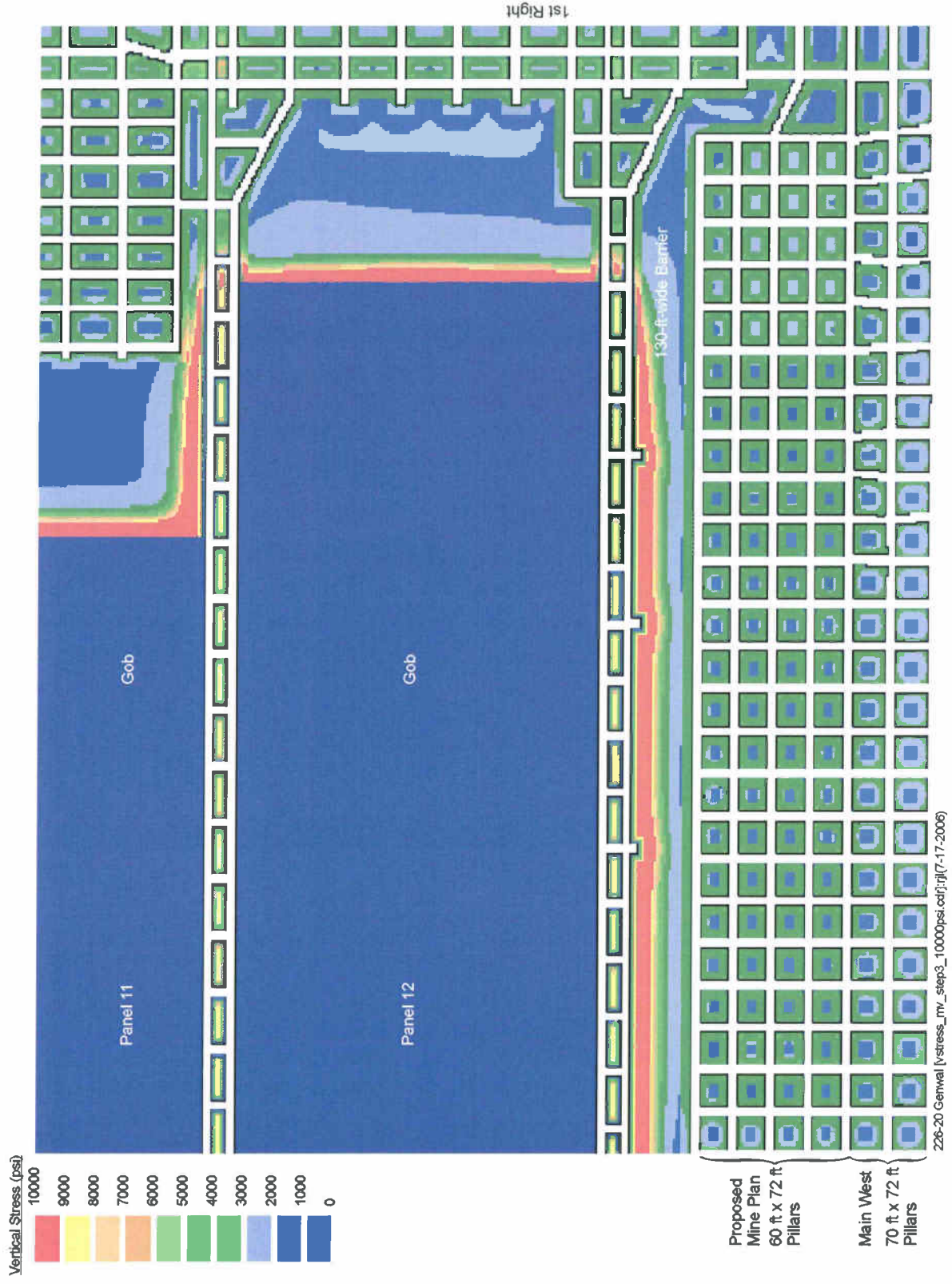


Figure 17. Modeled Vertical Stress—Mining Completed in Main West Barrier

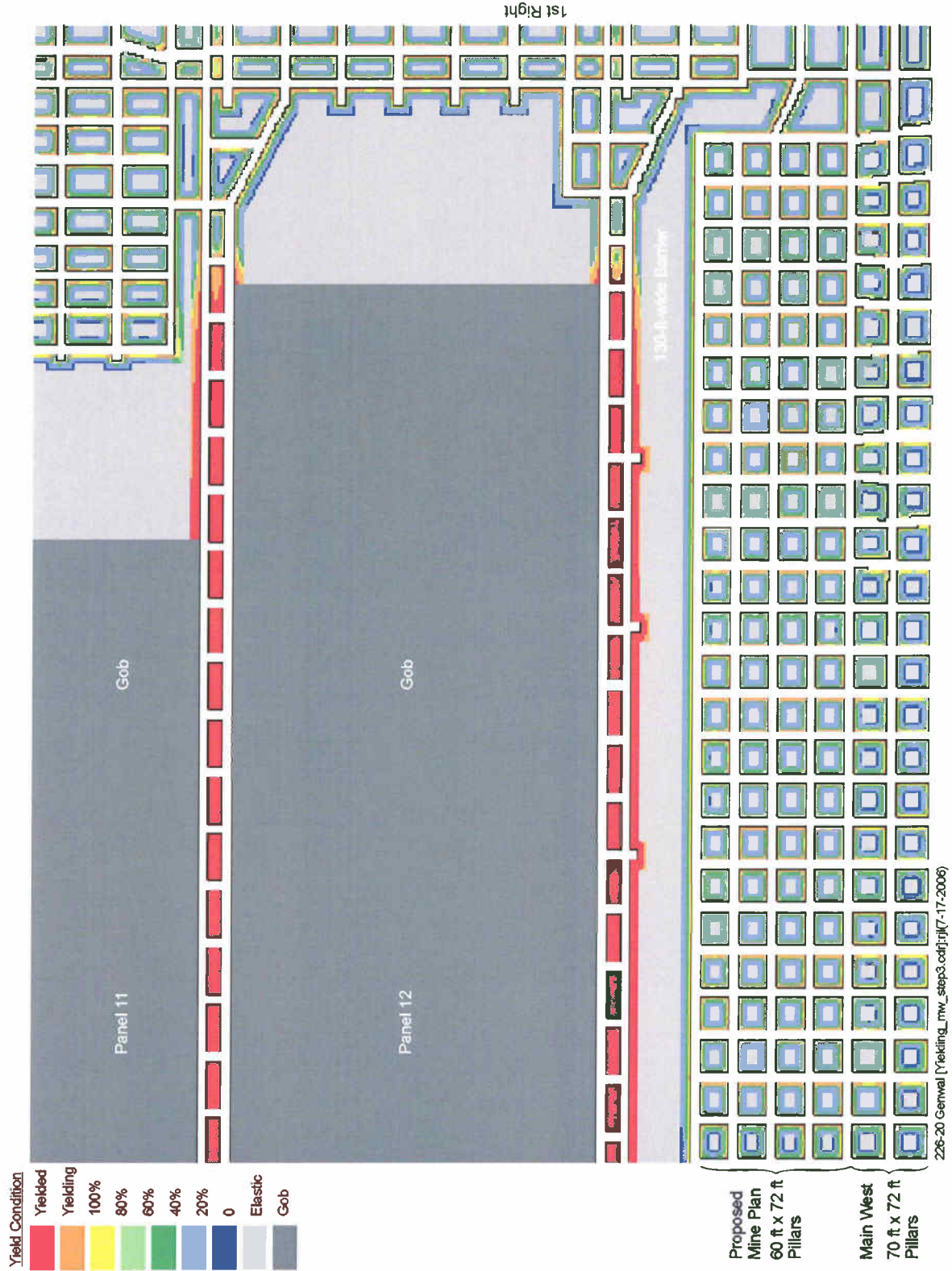


Figure 18. Modeled Coal Yielding—Mining Completed in Main West Barrier

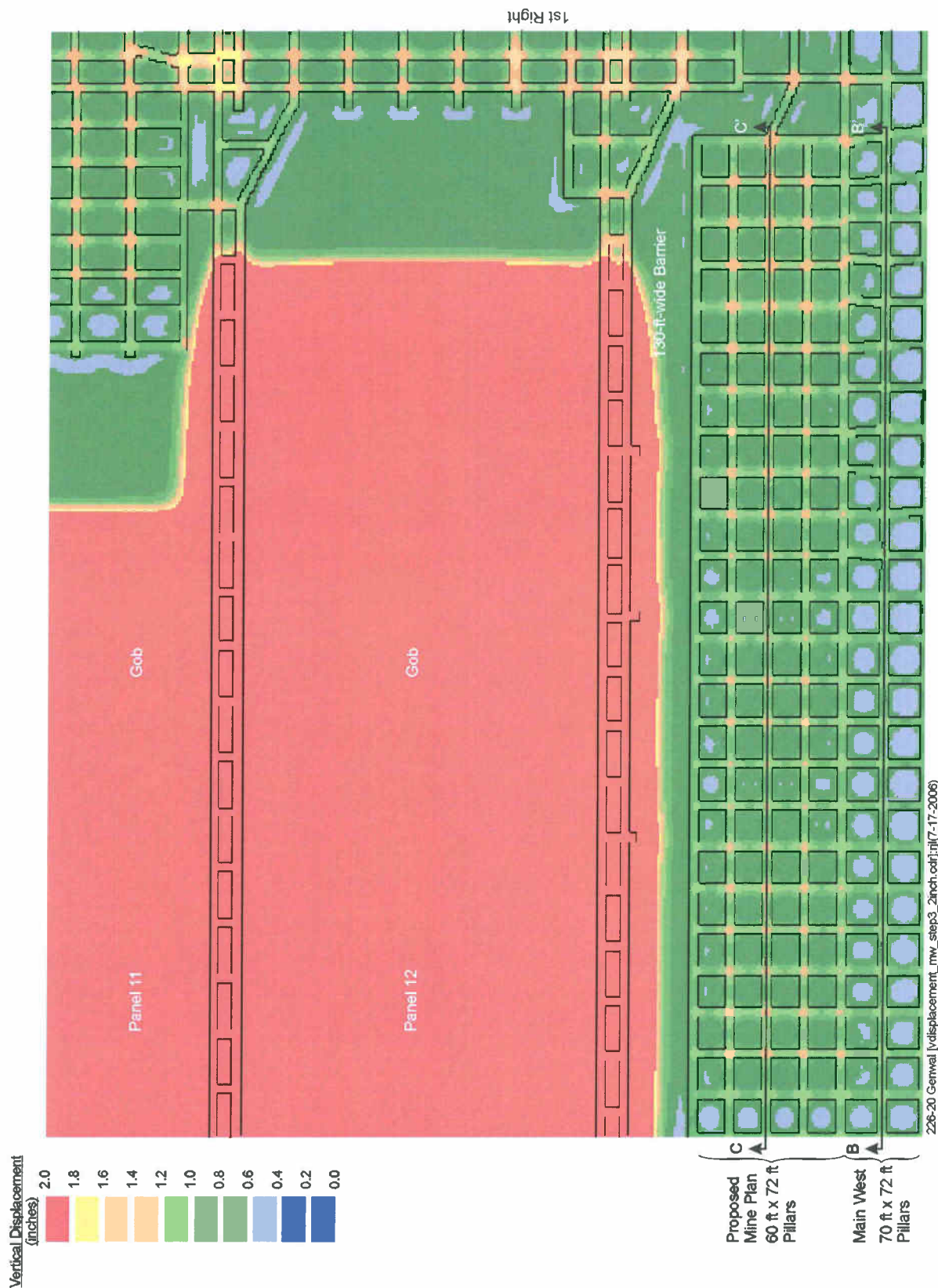


Figure 19. Modeled Roof-to-Floor Convergence—Mining Completed in Main West Barrier

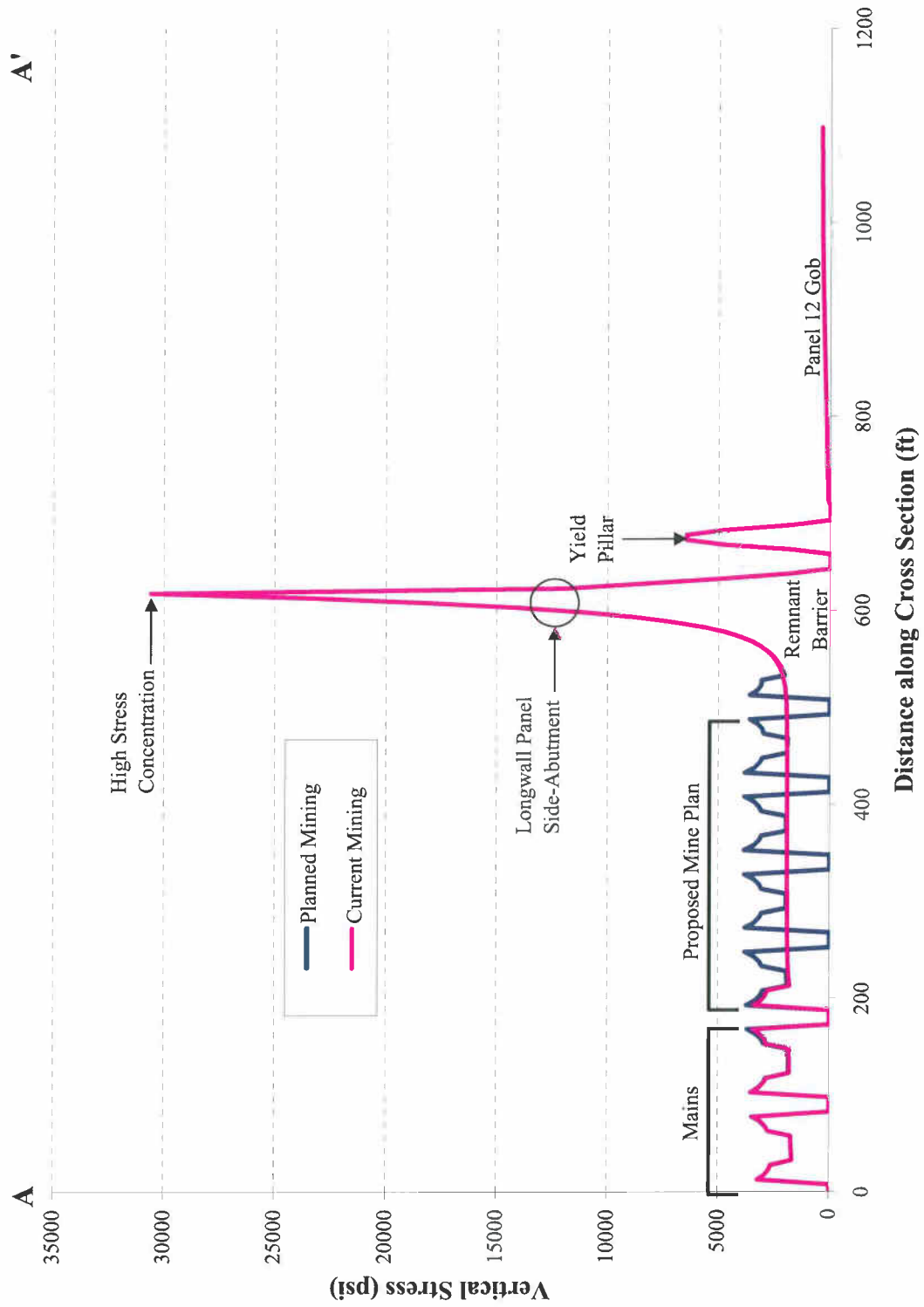


Figure 20. Modeled Vertical Stress Profiles Across Main West Barrier—Profile A-A' (profile location shown in Figure 14)

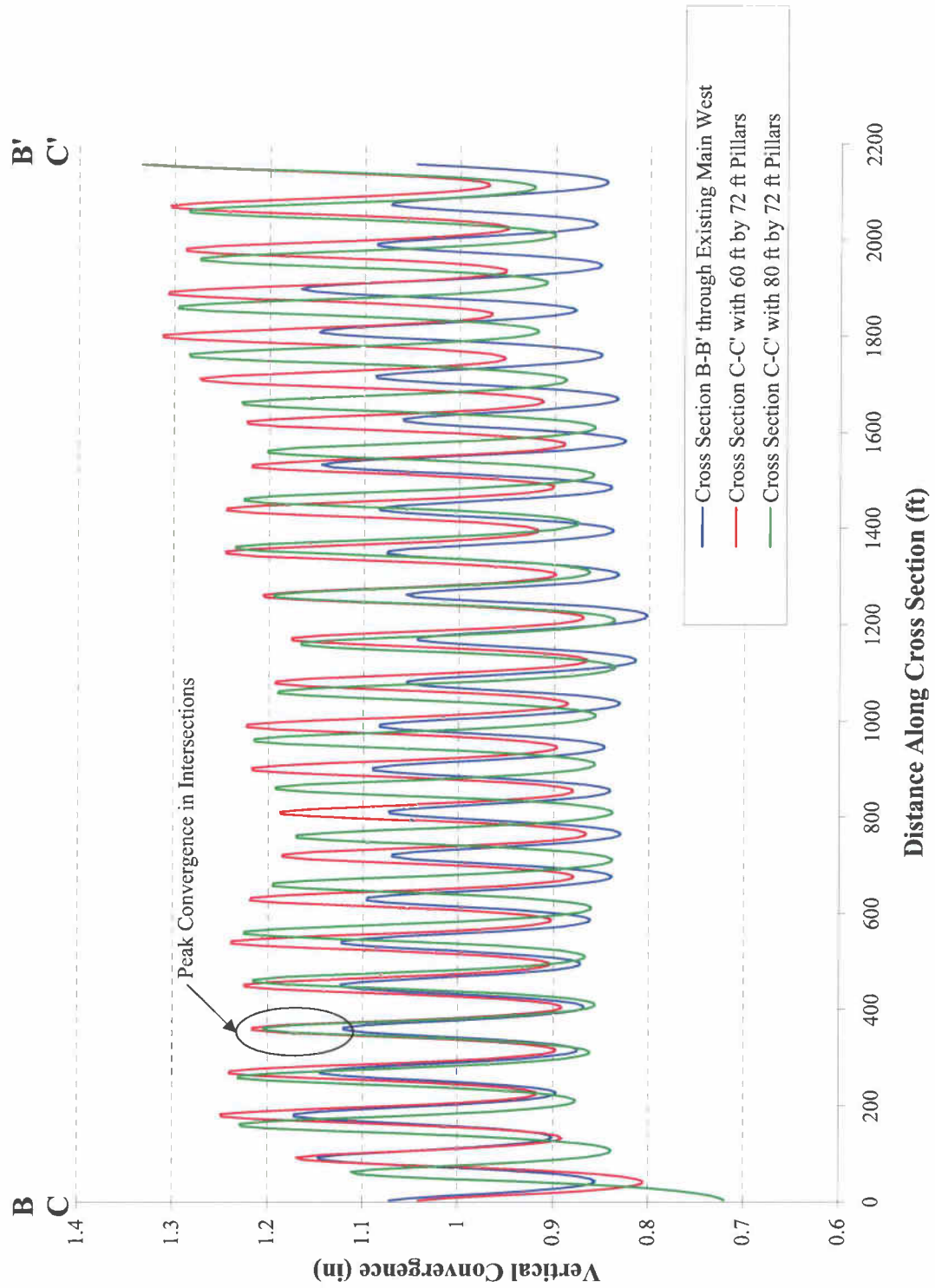


Figure 21. Modeled Roof-to-Floor Convergence Profiles Along Main West Entries—Profiles B-B' and C-C' (profile locations shown in Figure 19)

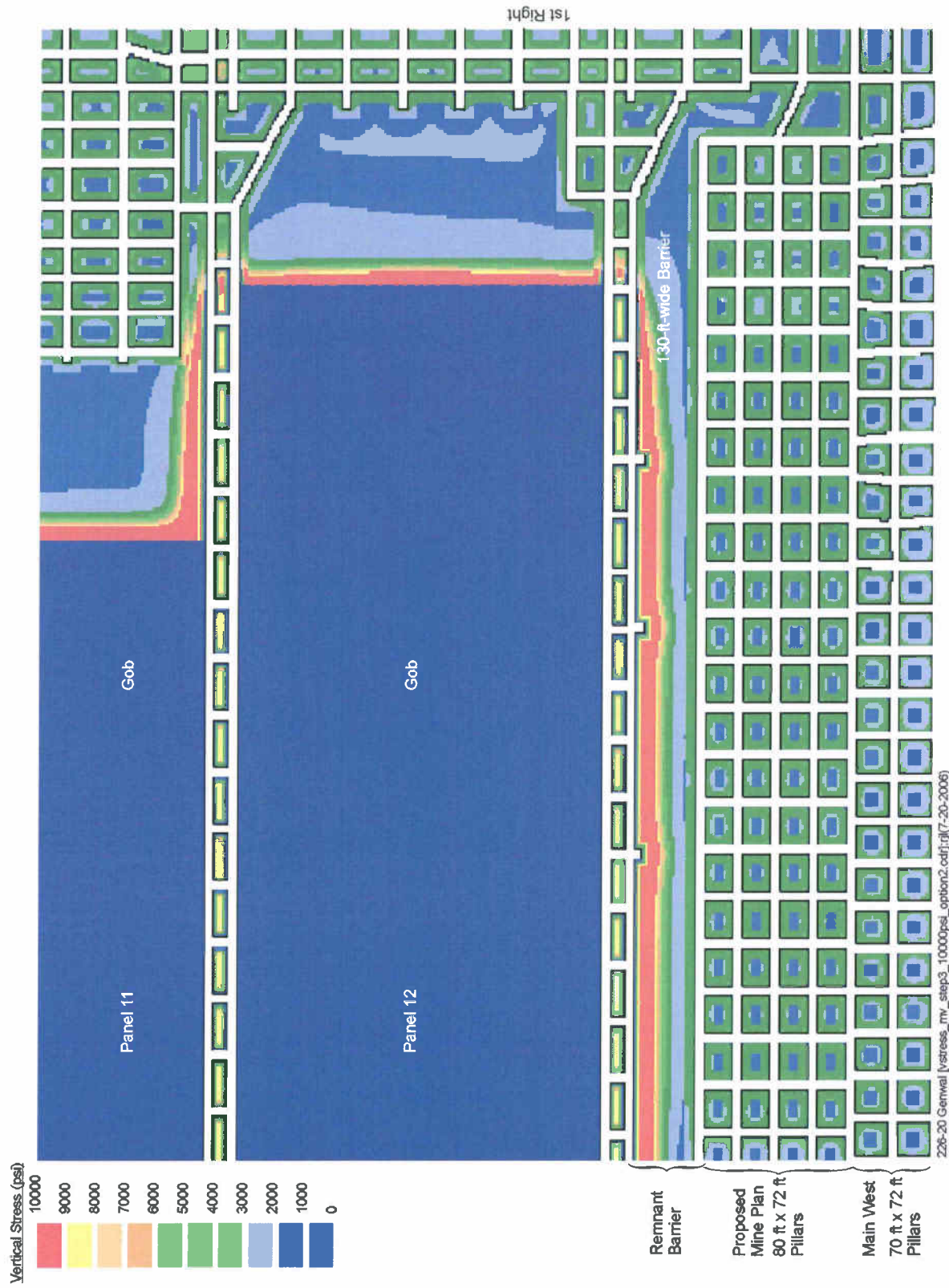


Figure 22. Modeled Vertical Stress—Main West Barrier Mining with 60-ft by 80-ft Pillars

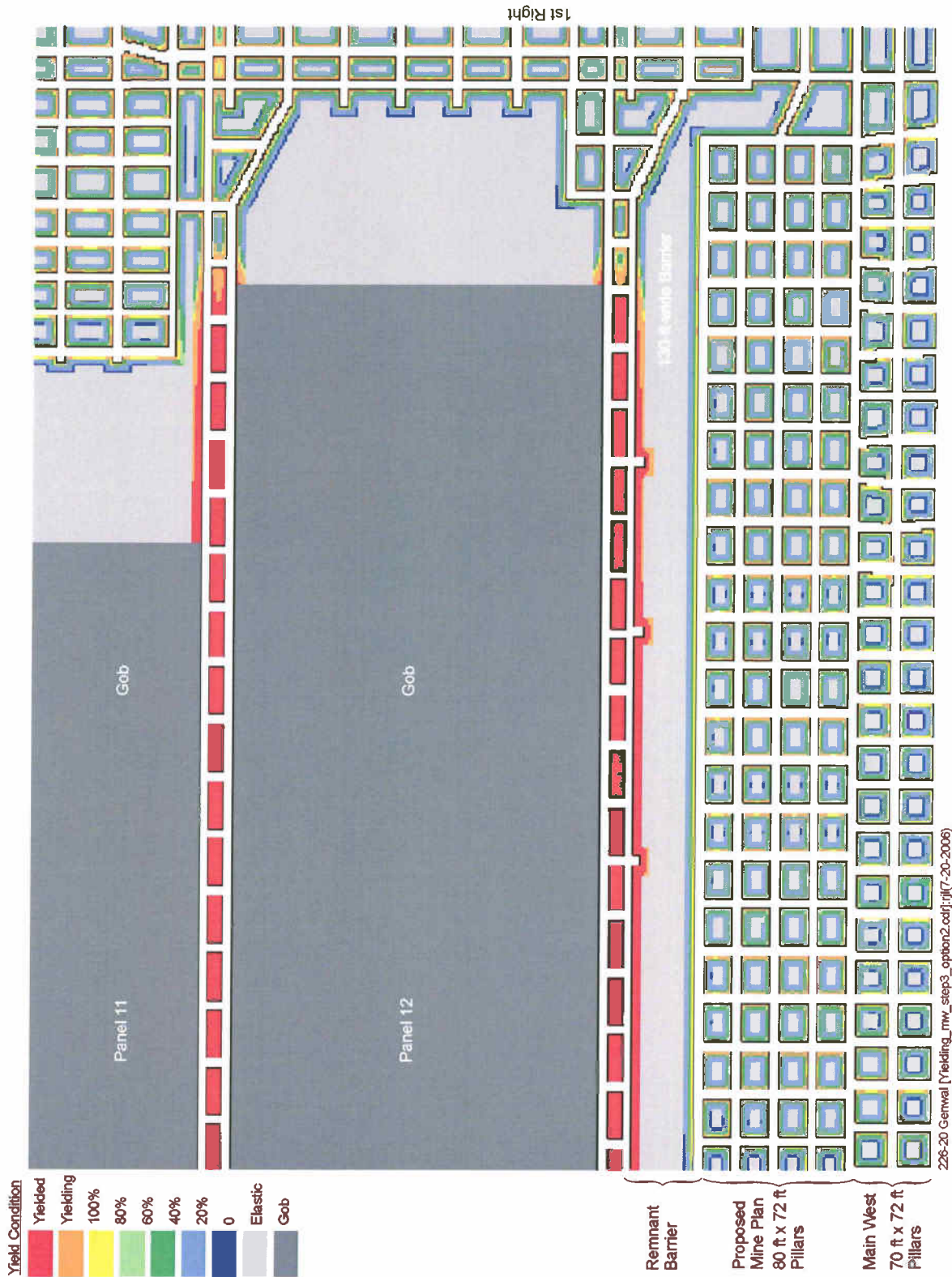


Figure 23. Modeled Coal Yielding—Main West Barrier with 60-ft by 80-ft Pillars

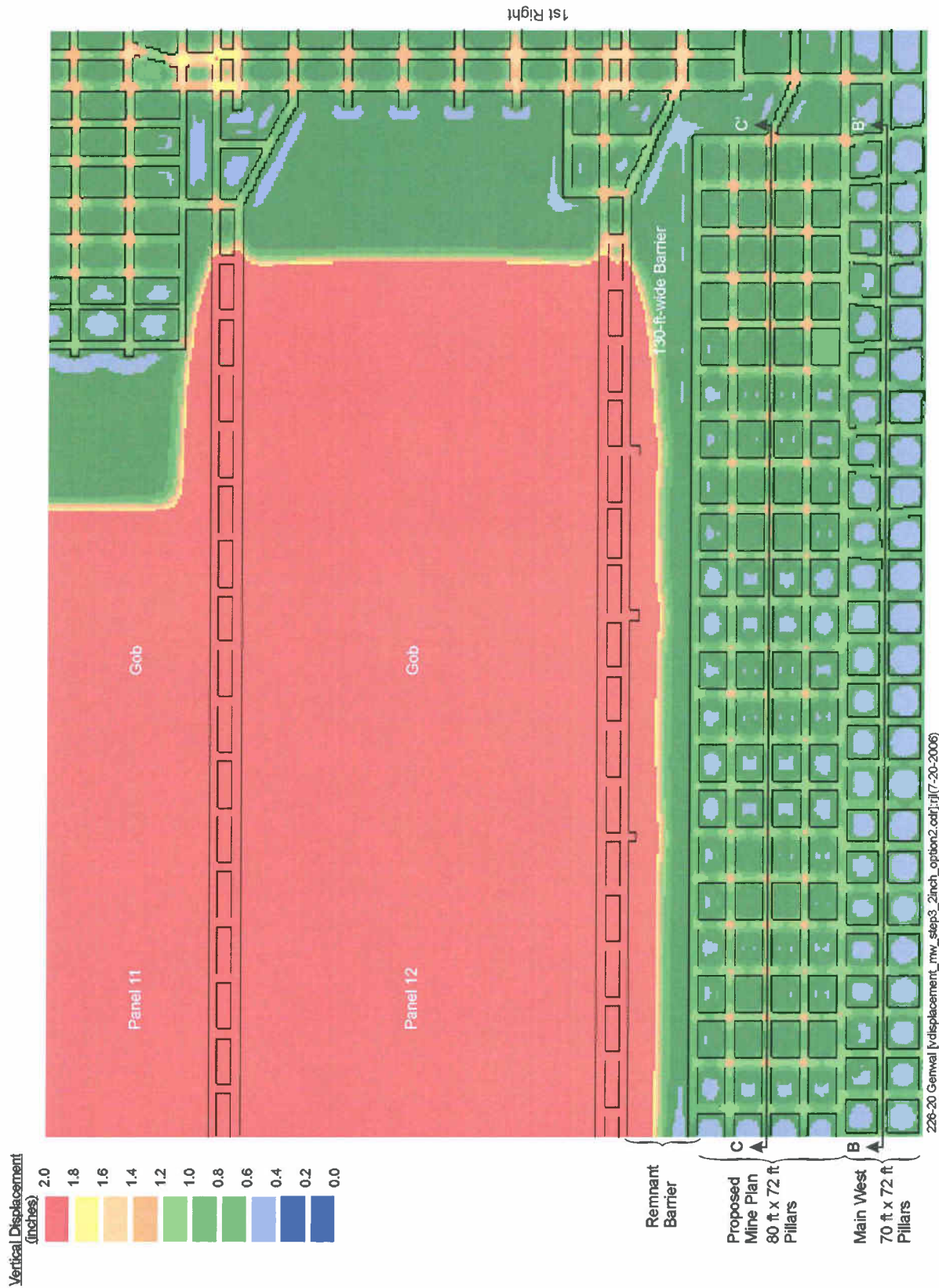


Figure 24. Modeled Roof-to-Floor Convergence—Main West Barrier with 60 ft by 80 ft Pillars

Laine Adair - (226-30) GENWAL Main West Retreat Analysis--Preliminary Results

From: "Leo Gilbride" <gilbride@agapito.com>
To: "Laine Adair" <ladair@andalex.com>
Date: 8/9/2006 12:45 PM
Subject: (226-30) GENWAL Main West Retreat Analysis--Preliminary Results
CC: "AAI Archive" <archive@agapito.com>

Laine,

I have prepared this email to summarize our preliminary analytical results for the proposed retreat mining sequence in the Main West barriers at GENWAL. We analyzed ground conditions using (1) the NIOSH ARMPS empirical design method and (2) the same LAMODEL stress and convergence model used in our Jul-20, 2006 analysis. Figure 1 shows the modeled areas.

ARMPS Modeling

The ARMPS method is an empirical design method developed by NIOSH based on 250 pillar retreat case histories. The database contains numerous cases representing ground conditions in the western U.S. and mining depths up to 2,000 ft, which makes the method relevant for conditions at GENWAL. The method computes a Stability Factor (SF) based on the ratio of pillar strength to pillar load averaged over the pillars within the active mining zone (near the edge of the gob). Lower SFs are supposed to indicate lower safety margins. Figure 2 plots the SFs as a function of mining depth for all the ARMPS case histories. The plot distinguishes between "satisfactory" and "unsatisfactory" case histories, where "unsatisfactory" case histories involved the following types of ground failures: excessive squeezing, bumps, and/or roof failure. The historical retreat panels in the 1st North Left block at GENWAL are computed to have a SF of 0.37 at a depth of 1,750 ft. Figure 3a shows the ARMPS model geometry used to compute the SF. The ARMPS database shows that industry experience is mixed for mines reporting similar SFs (0.16 to 1.05) at comparable depths (1,500 to 2,000 ft). Of these cases, slightly more than half were successful, while the remainder encountered ground control problems.

A SF of 0.53 is computed for the proposed retreat sequence in the Main West barriers under the deepest cover (Figure 3b). The ARMPS method recommends basing the depth of cover on sustained cover, and not on peak cover if the peak cover occurs over a limited area. Over Main West, 2,000 ft is the maximum sustained cover that is appropriate for the ARMPS calculation. Although a narrow ridge increases cover to 2,200 ft, this is too limited an area to significantly affect abutment loads in the ARMPS calculation. Elsewhere in the barriers and mains, a higher SF is computed. A SF of 0.67 is computed for pillaring east of the existing Main West seals (XC 118-119).

The ARMPS method recommends designing pillars for a 0.90 SF (for intermediate-strength roof) if site-specific data are not otherwise available. The authors of ARMPS suggest that the method is increasingly conservative at depth and that site-specific experience should be used to establish design SFs whenever possible. At GENWAL good success has been achieved at SFs below 0.90. Retreat conditions in the 1st North Left block were generally successful with a SF of 0.37, suggesting that a SF of about 0.40 is a reasonable lower limit for retreat mining at GENWAL. This is considered a lower limit because occasional problems with peeling top coal were encountered in the 1st North Left block. This required skipping pillars on retreat in some locations. Top coal is currently mined to minimize this

risk and is not expected to be a problem in Main West.

The lowest SF for the proposed retreat sequence in Main West barriers is 0.53 under the deepest cover, which is approximately 43% higher than the "satisfactory" SF of 0.37 for the 1st North Left block. Implications are that the proposed retreat sequence in Main West will be successful in terms of ground control, even under the deepest cover (2,200 ft).

LAMODEL Modeling

The Main West retreat sequence was modeled in 9 steps, as shown in Figures 4 through 30. The model includes the actual variable depth of cover ranging from 1,200 to 2,200 ft, as shown on the map in Figure 1. The figures present modeled (1) vertical stress, (2) coal yielding, and (3) roof-to-floor convergence. Results show that convergence will be less than 2.0 inches in and around the active pillaring sections in the barriers. Results of the 1st North Left back-analysis model, discussed in the Jul-20, 2006 letter, concluded that convergence less than 2.0 inches is indicative of stable roof and pillar conditions in the model. Conclusions from LAMODEL corroborate the ARMPS results, principally that convergence can be adequately controlled with the proposed mine plan and that ground conditions should be generally good on retreat in the barriers, even under the deepest cover (2,200 ft).

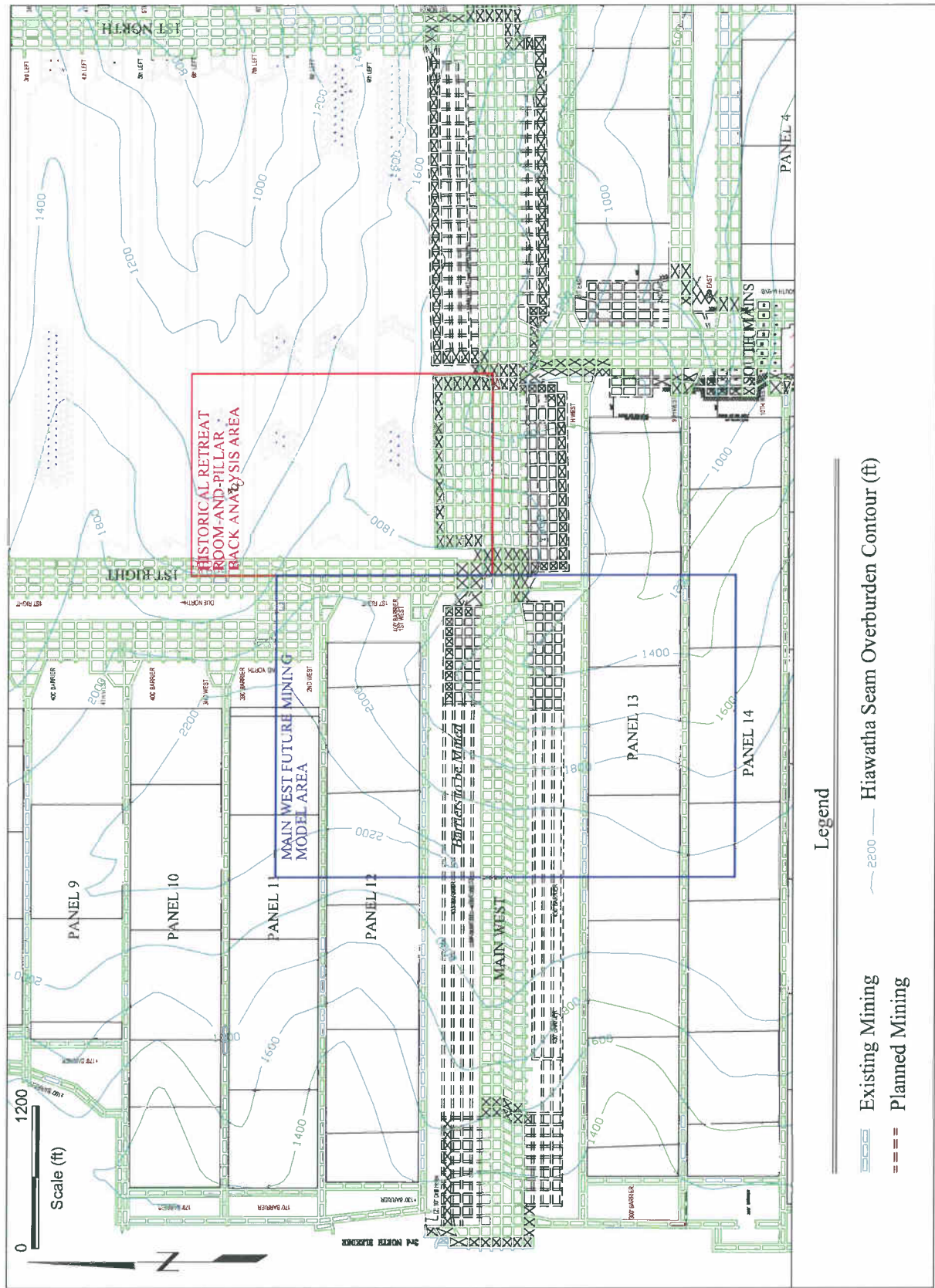
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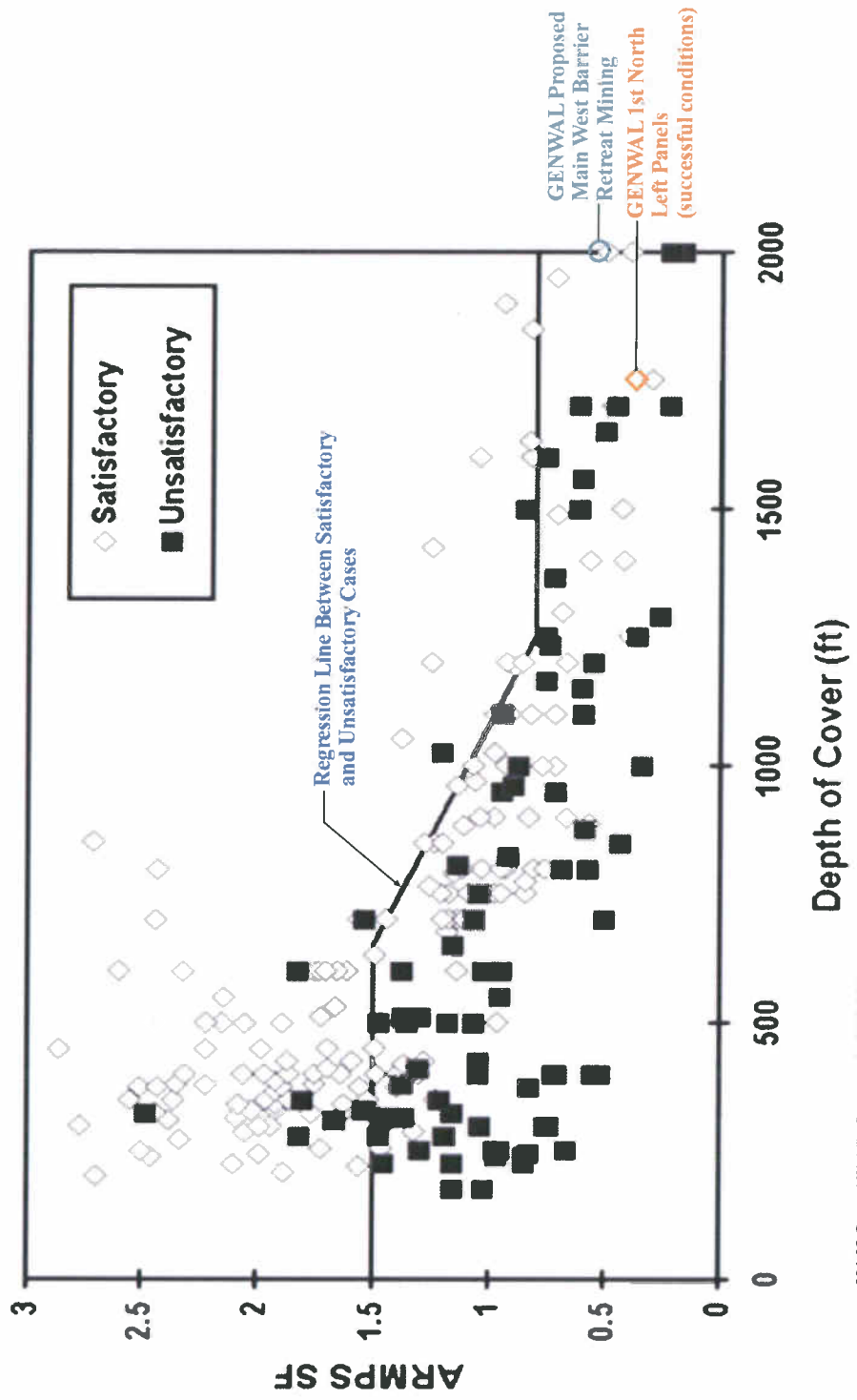
Leo Gilbride, PE
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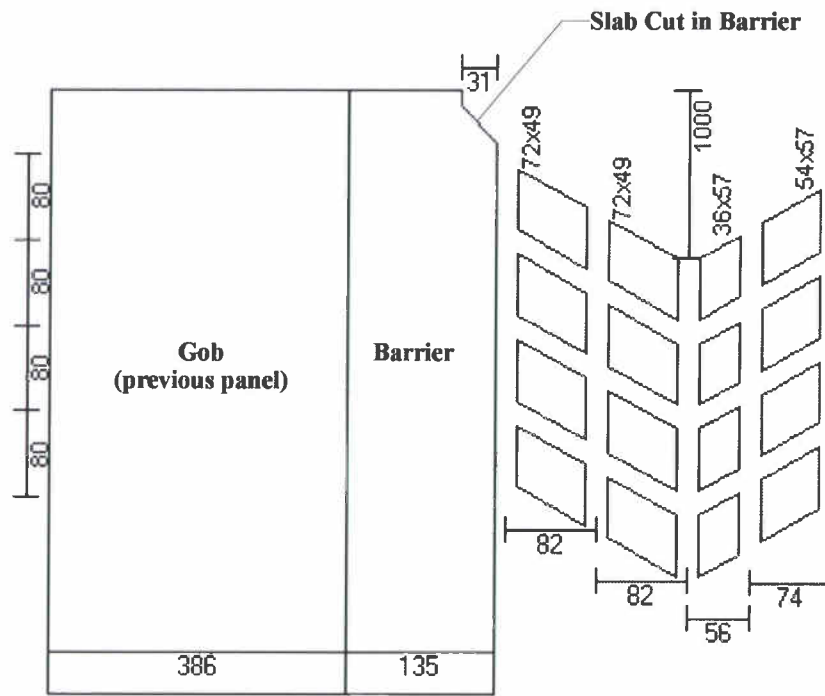
226-20 Genwal [Genwal_Plan Modeled Area.dwg Layout:AA_Plan Model Additional]:by/rj(08-08-2006)

Figure 1. Main West Location Map Showing Existing and Future Mining and Modeled Areas

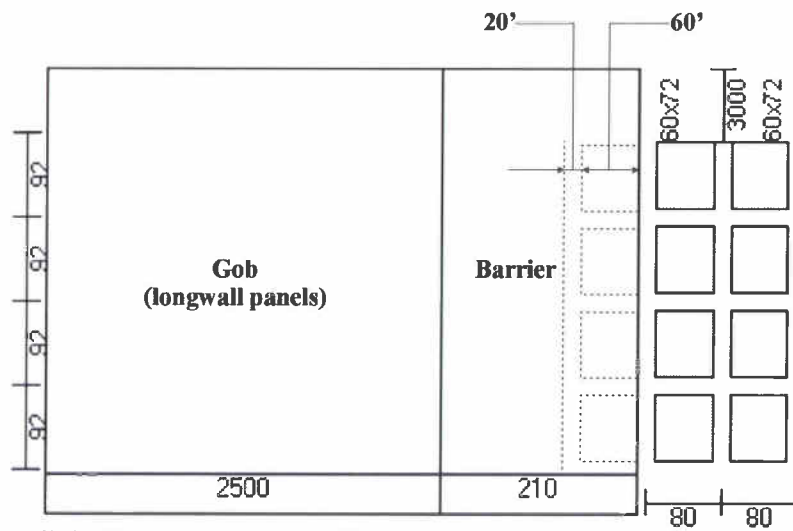


226-20 Genwal | Stability Factors.cdf | (8-8-2006)

Figure 2. Comparison of GENWAL Past and Proposed Retreat Mining Stability Factors with ARMPs Case Histories



a) 1st North Left Typical Panel Retreat Geometry

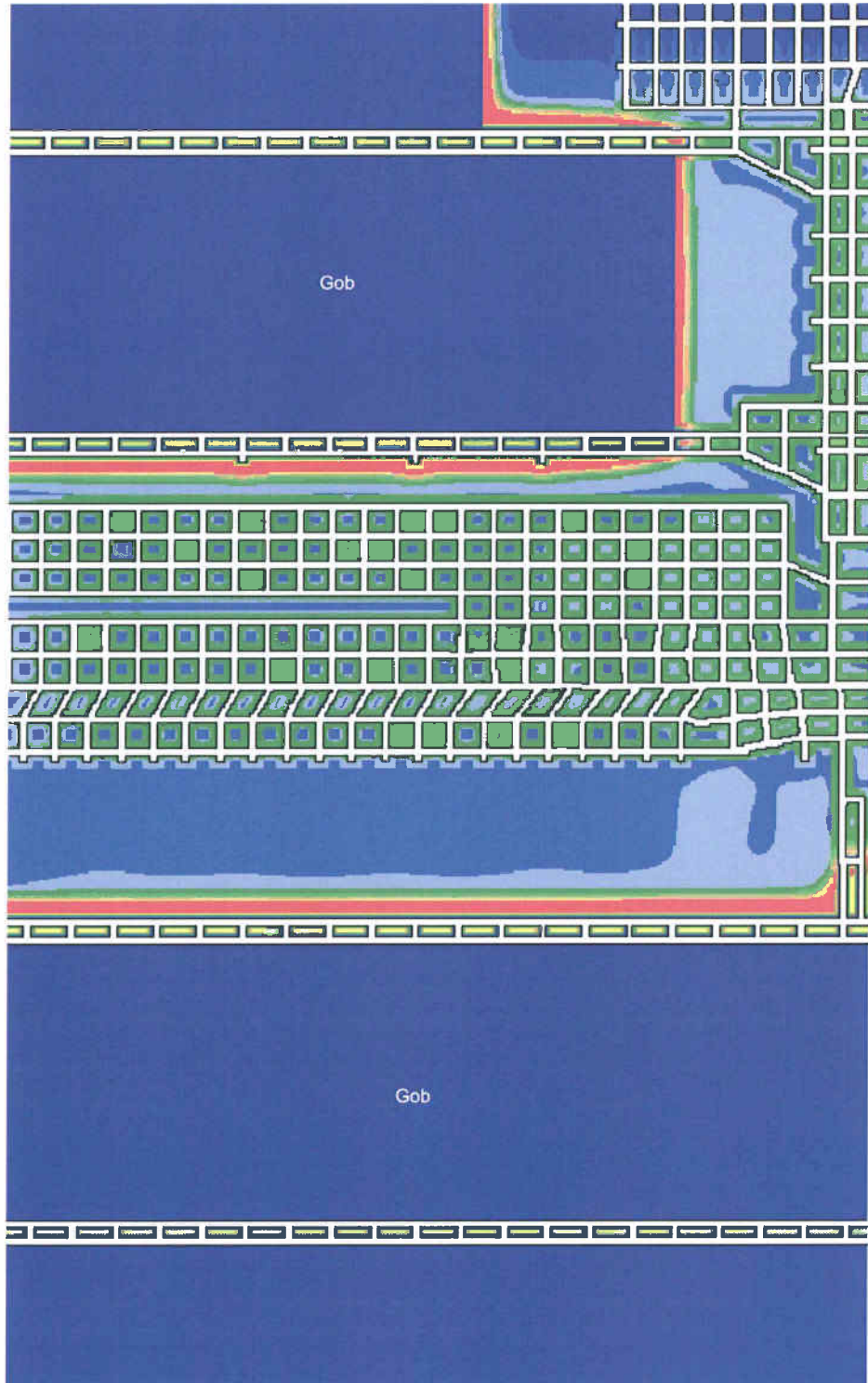


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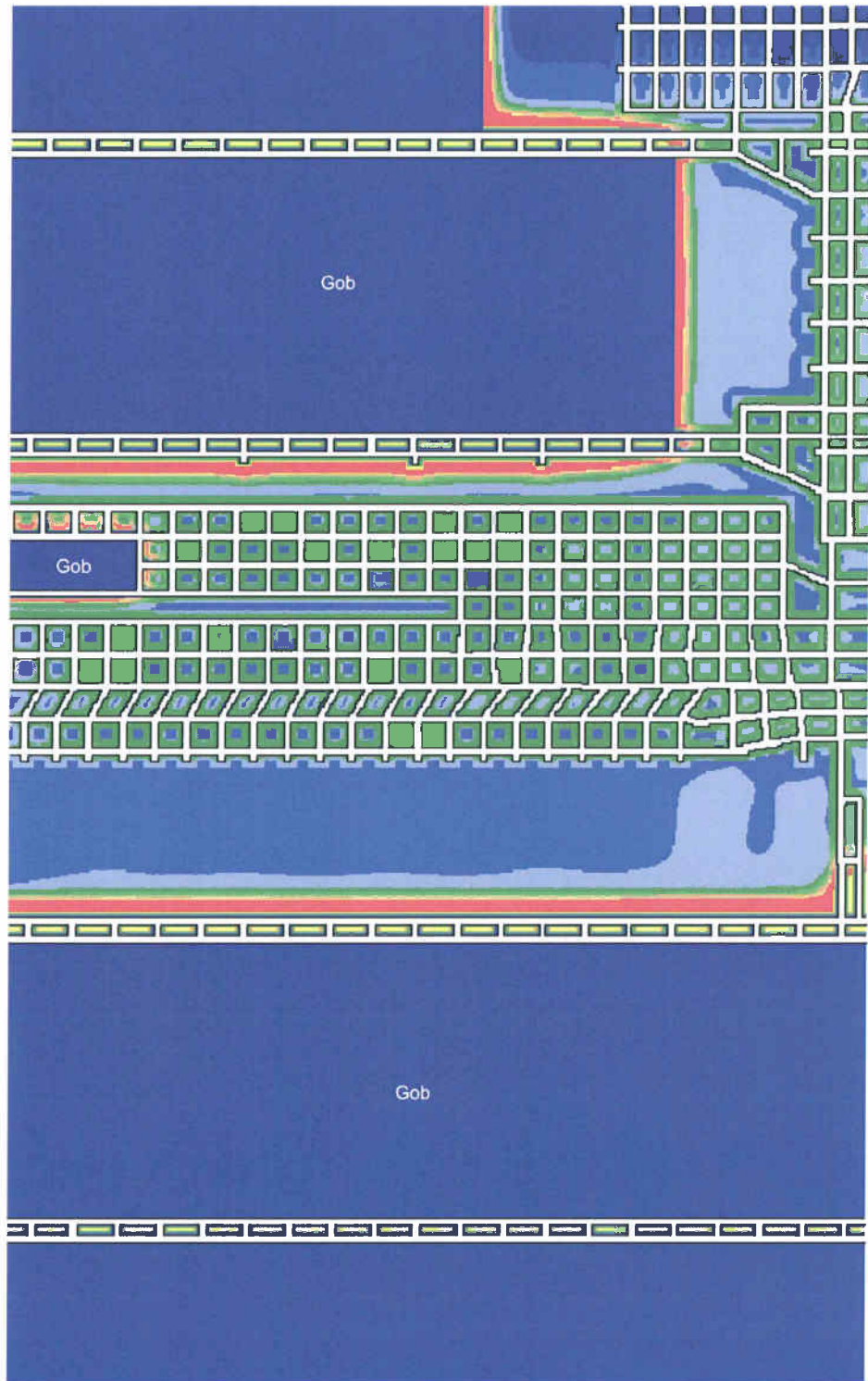
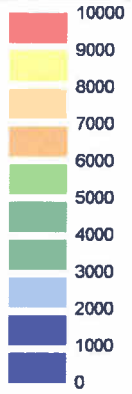
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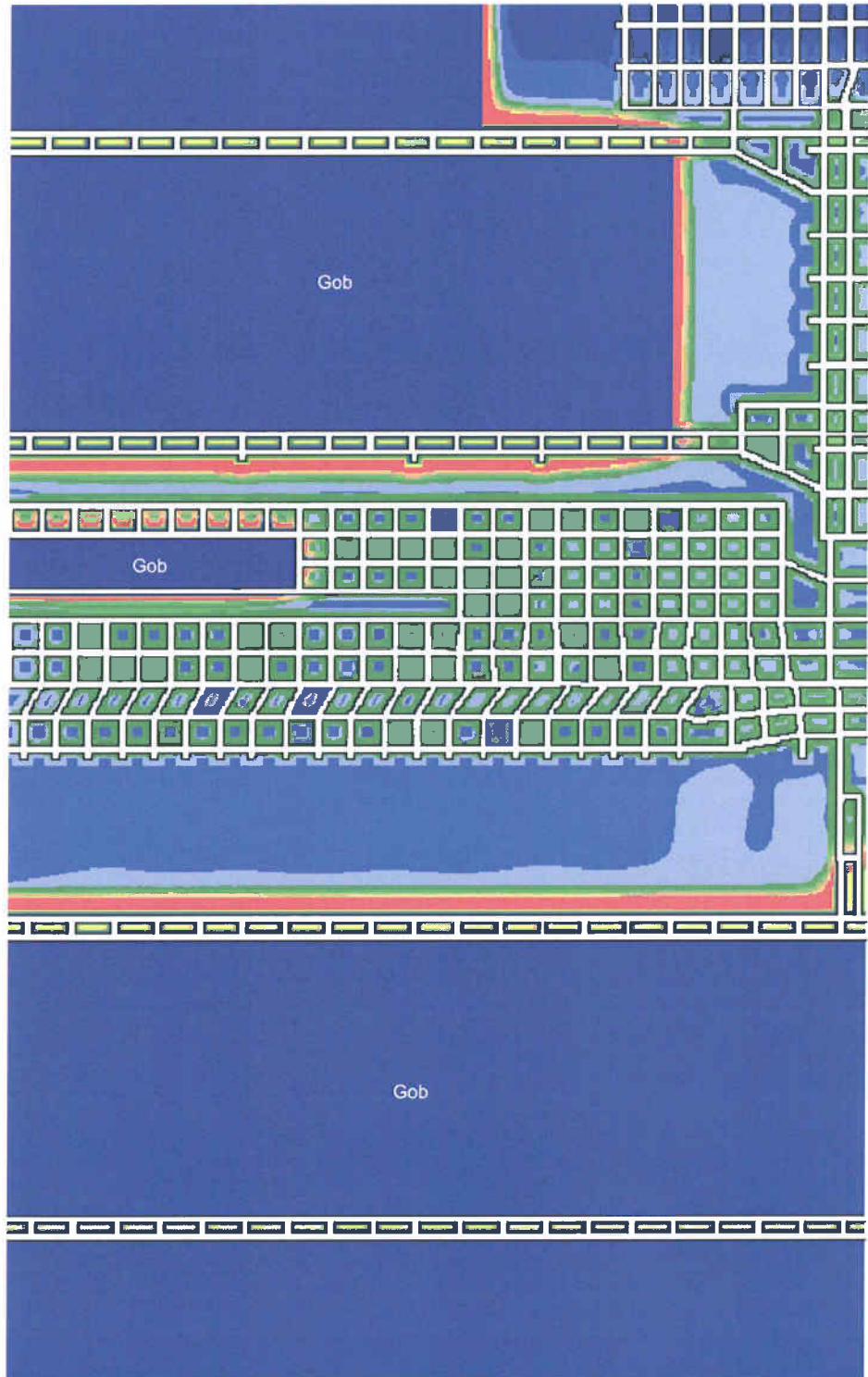
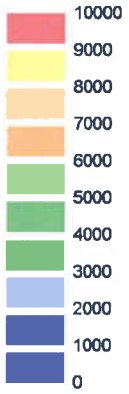
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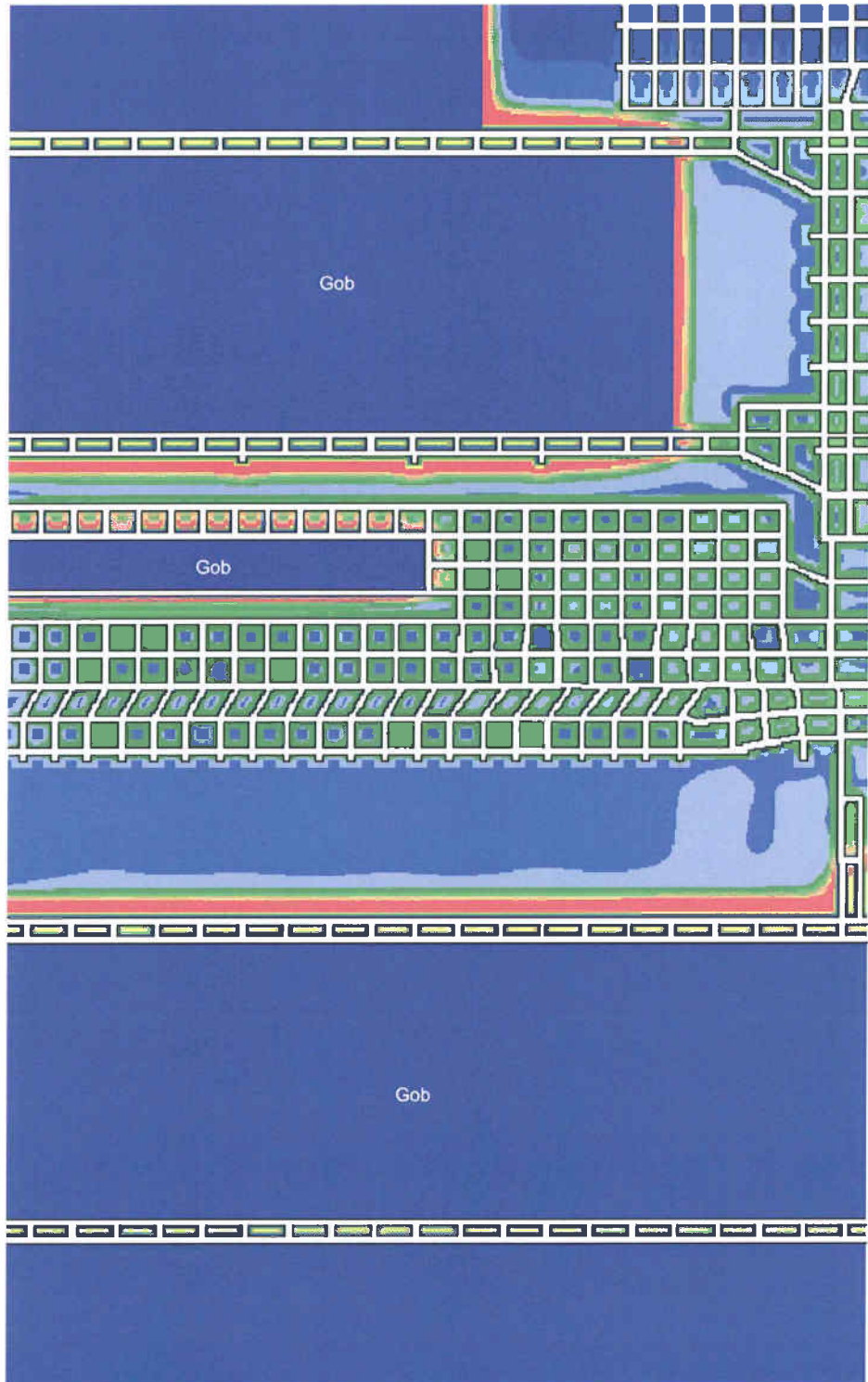
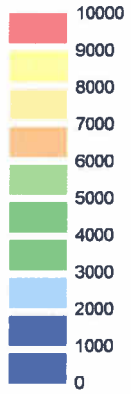
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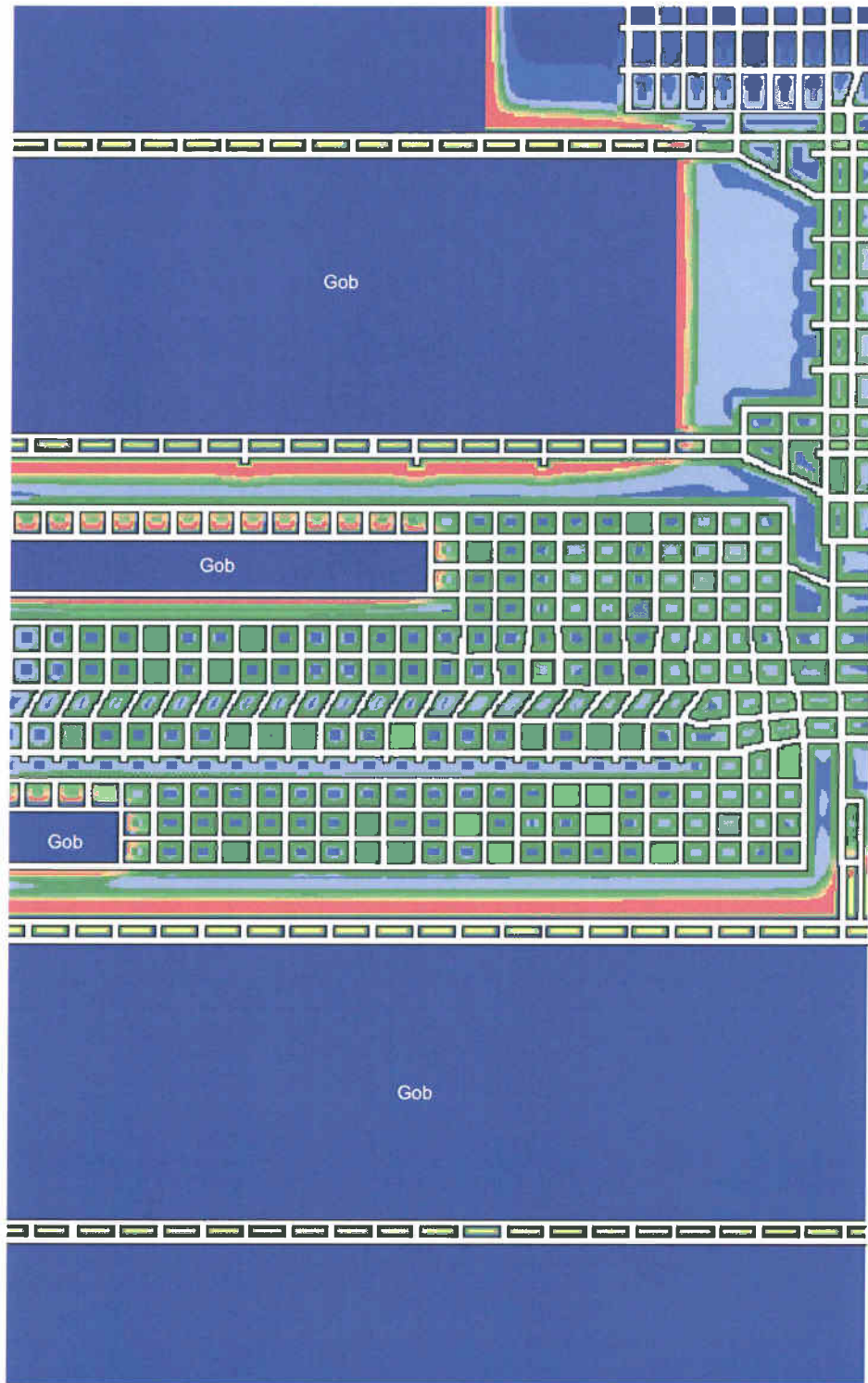
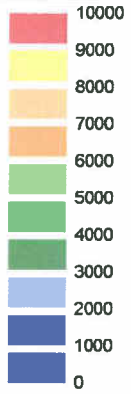
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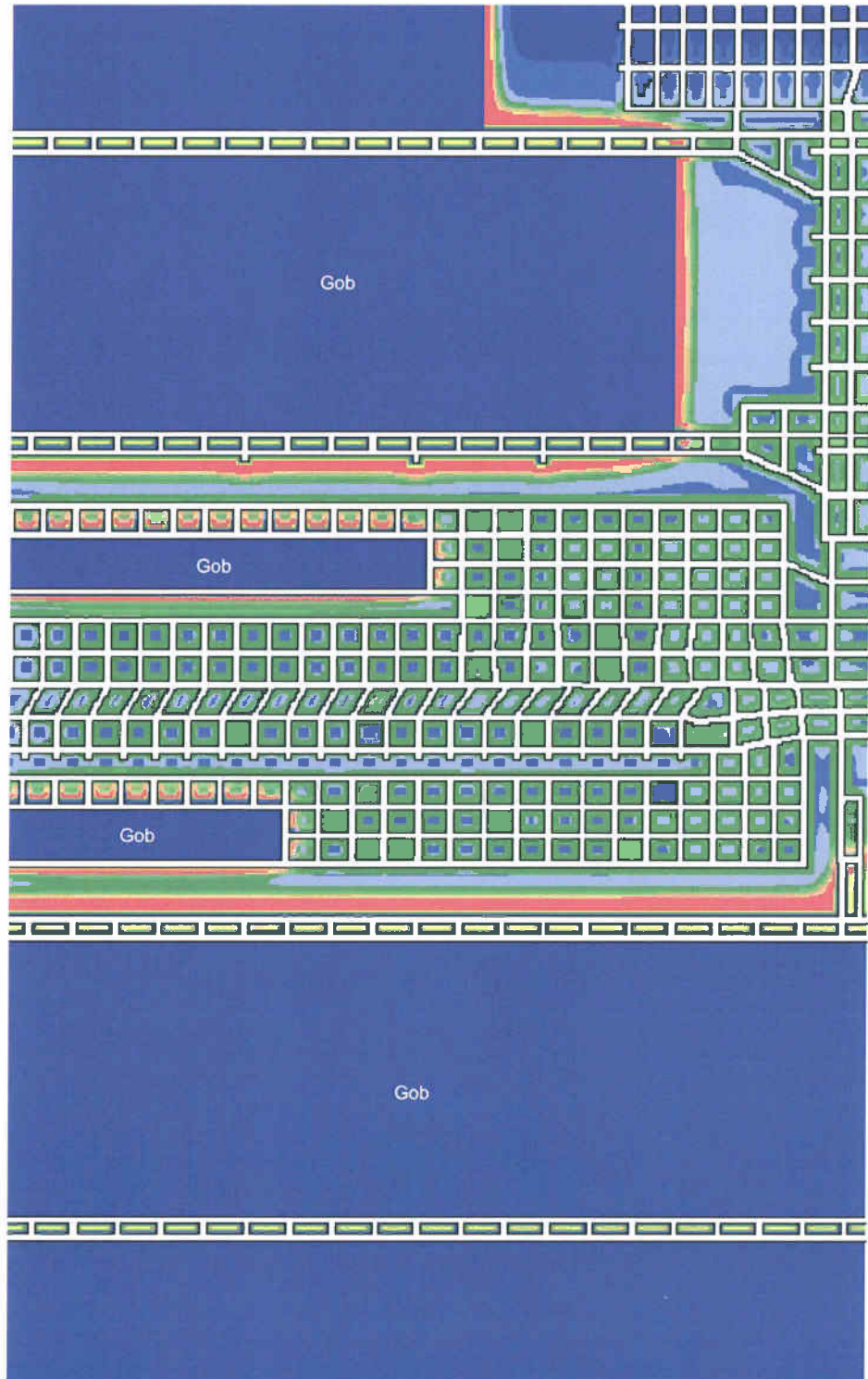
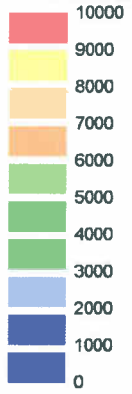
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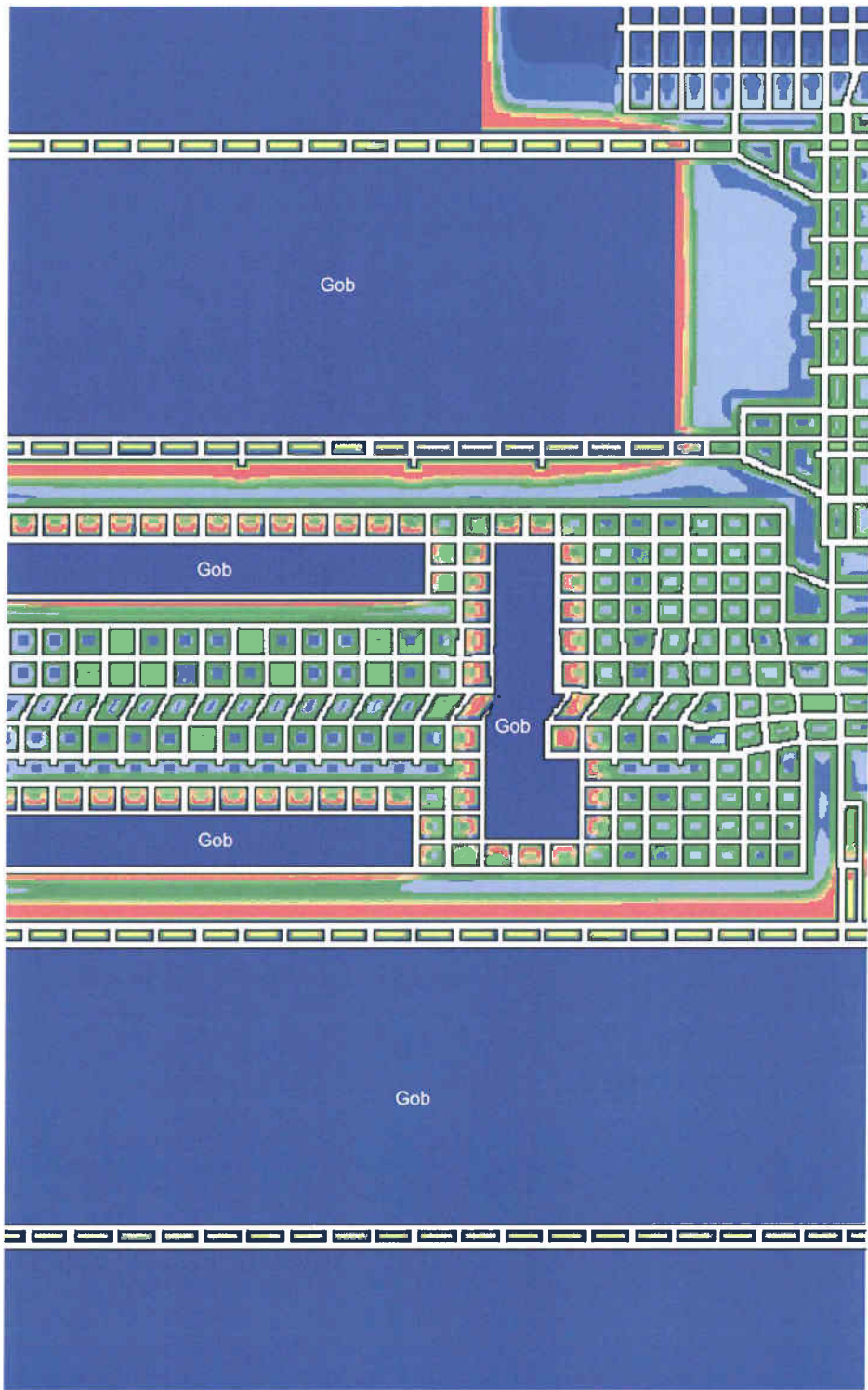
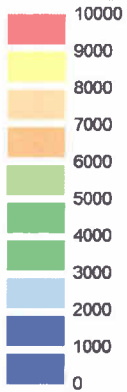
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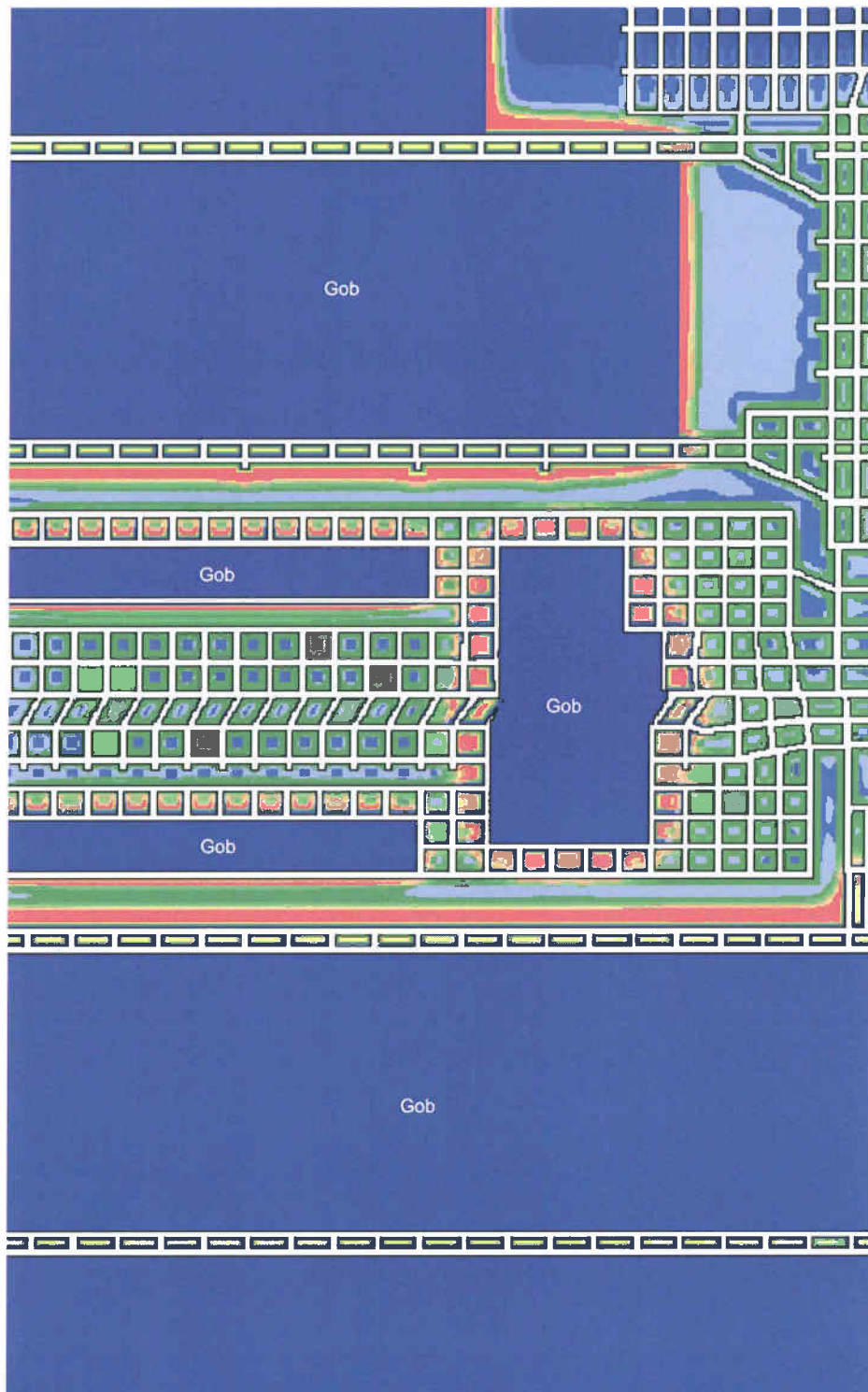
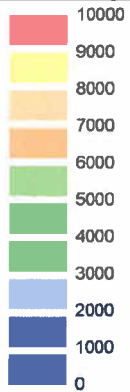
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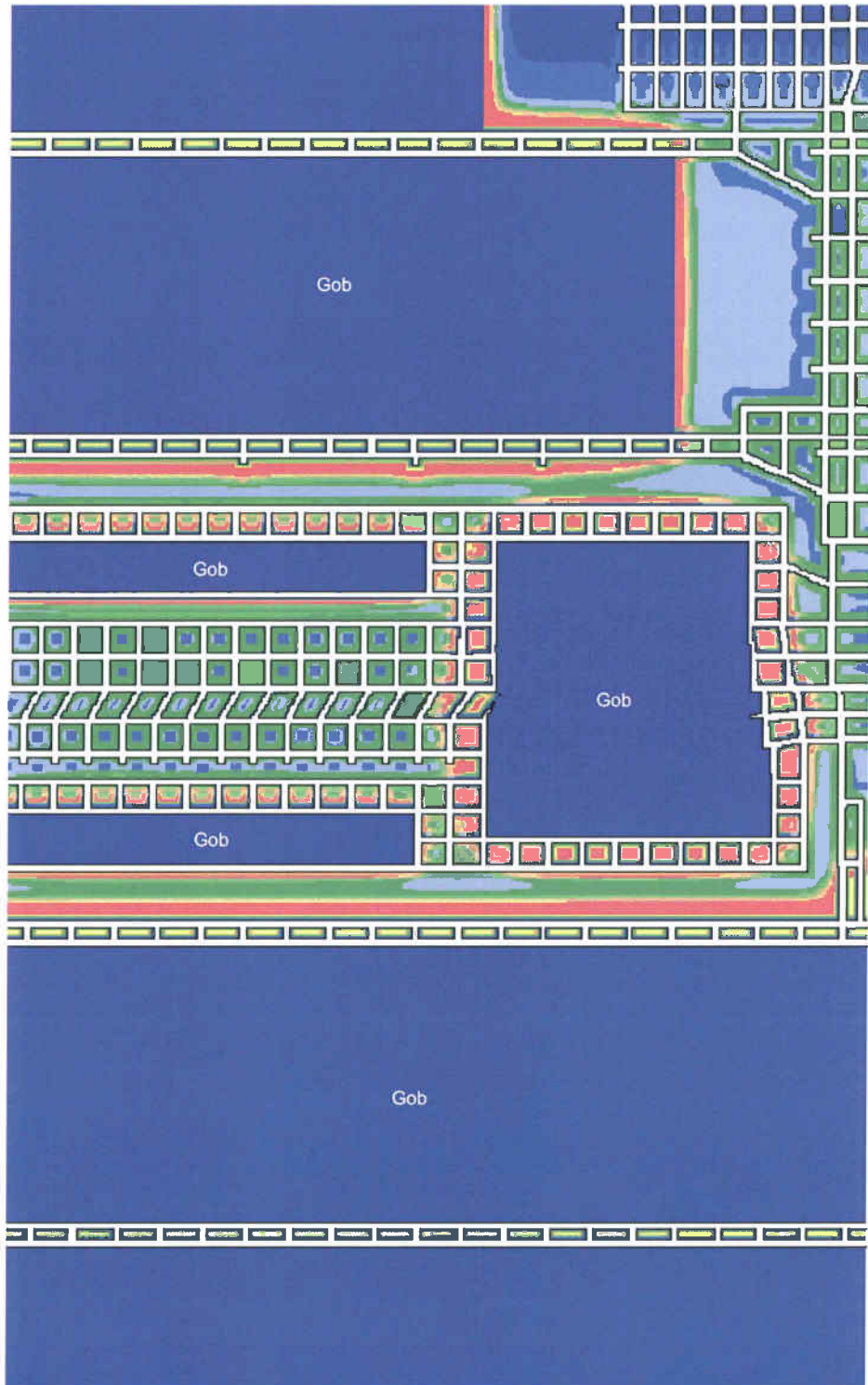
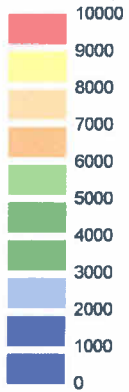
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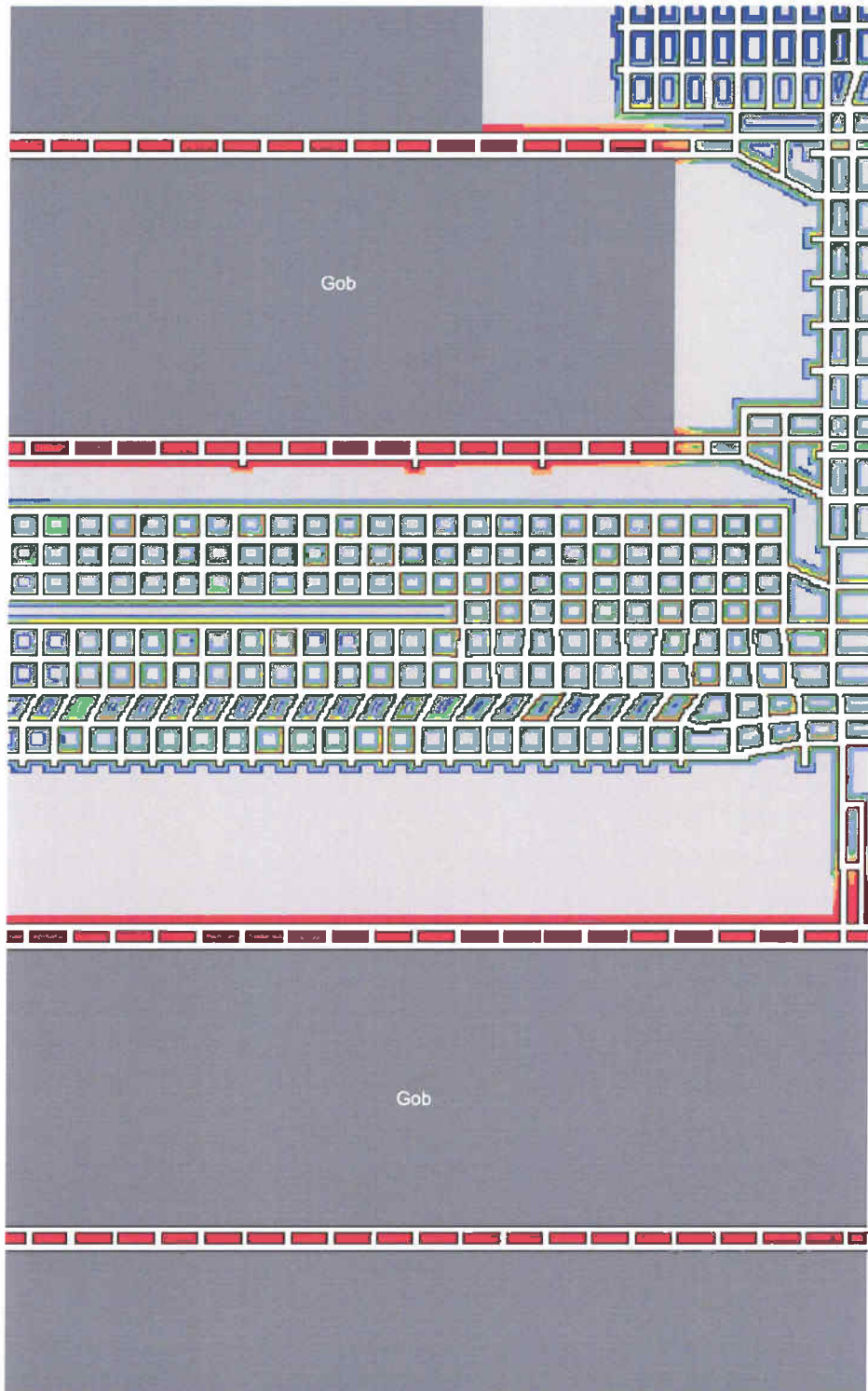
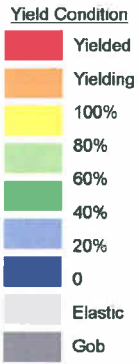


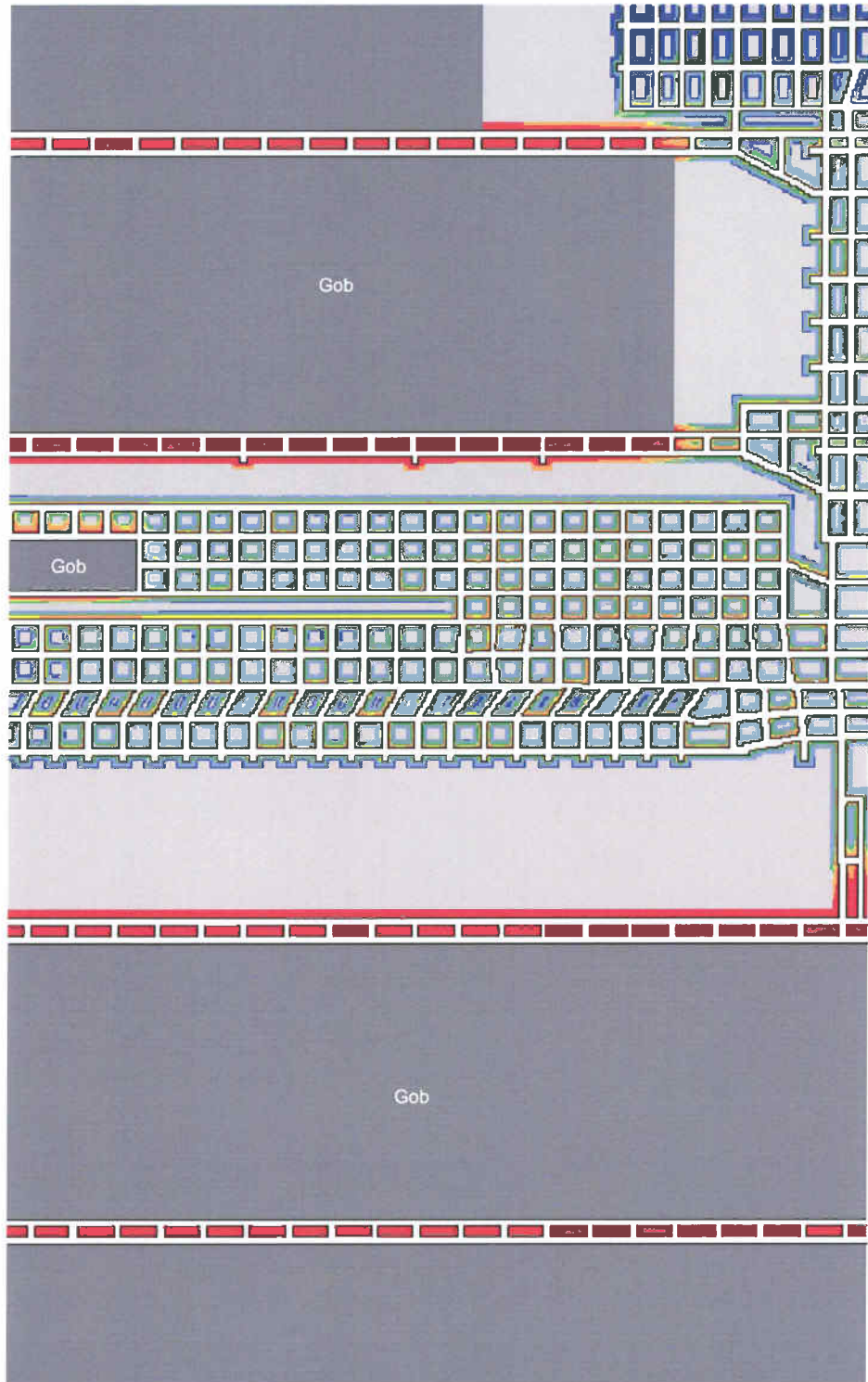
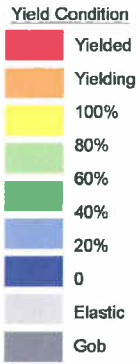
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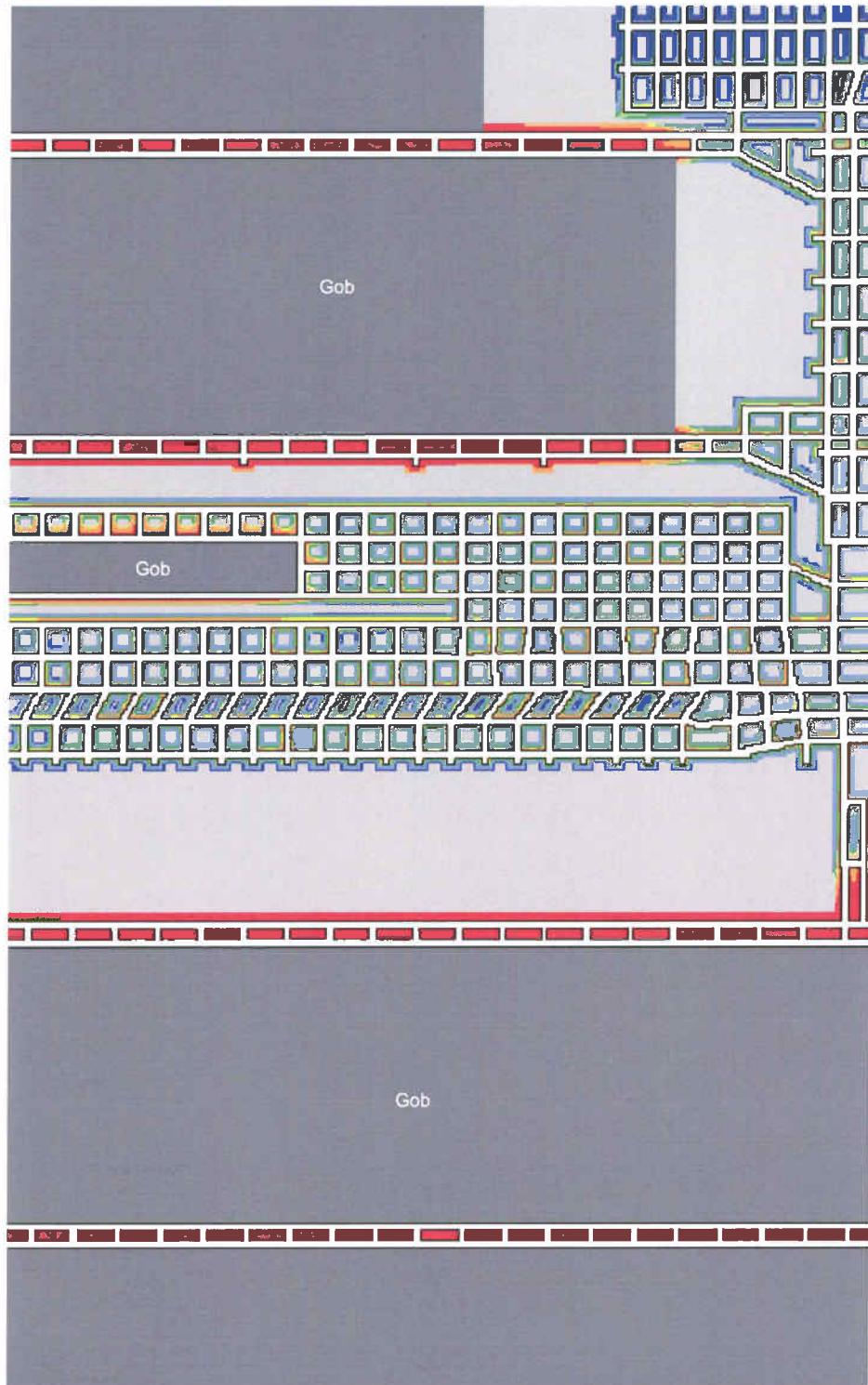
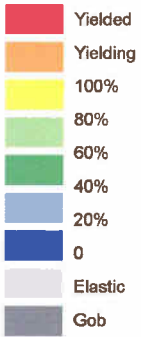
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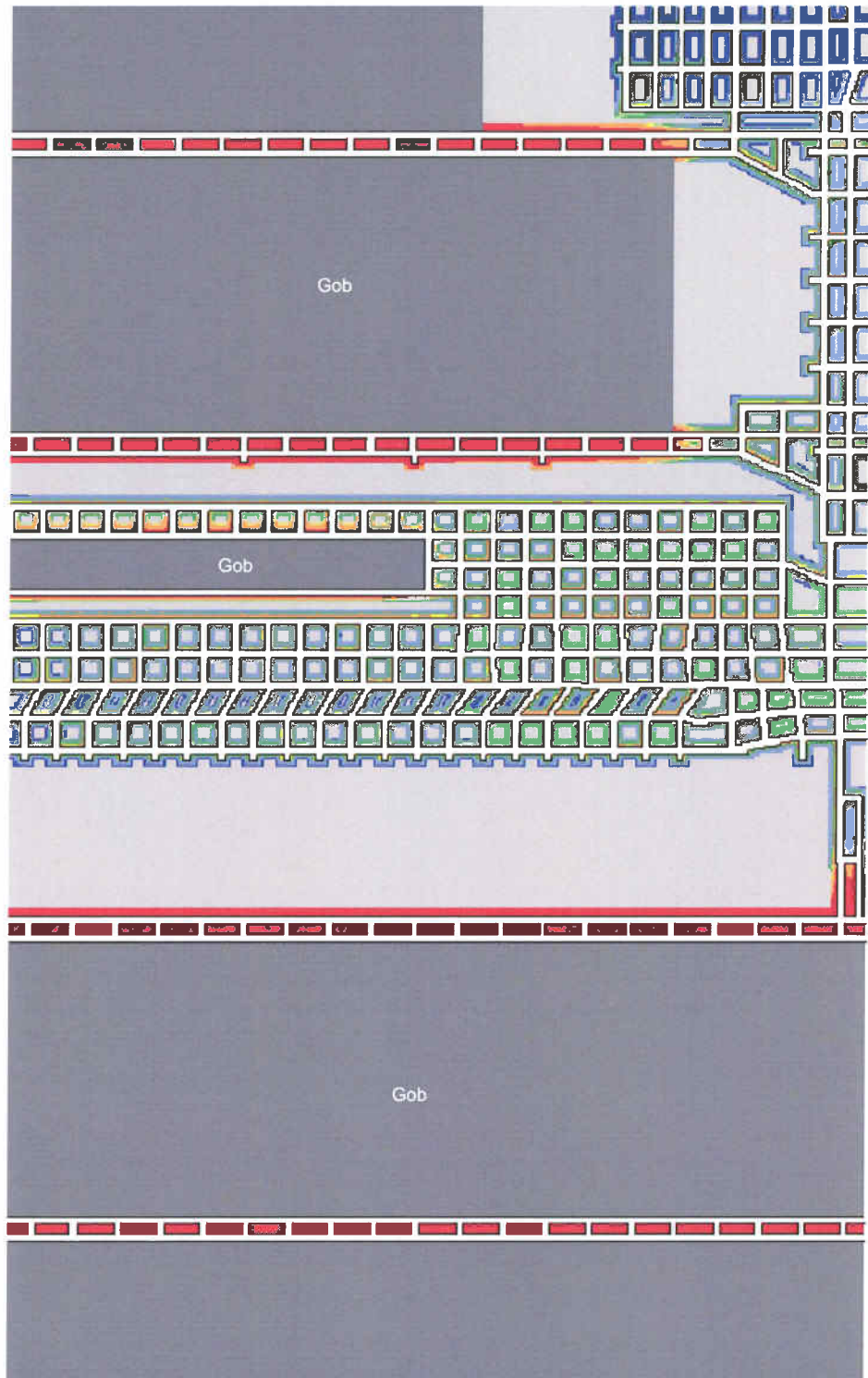
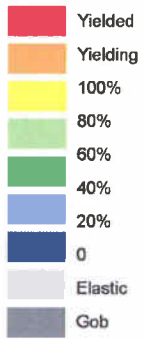




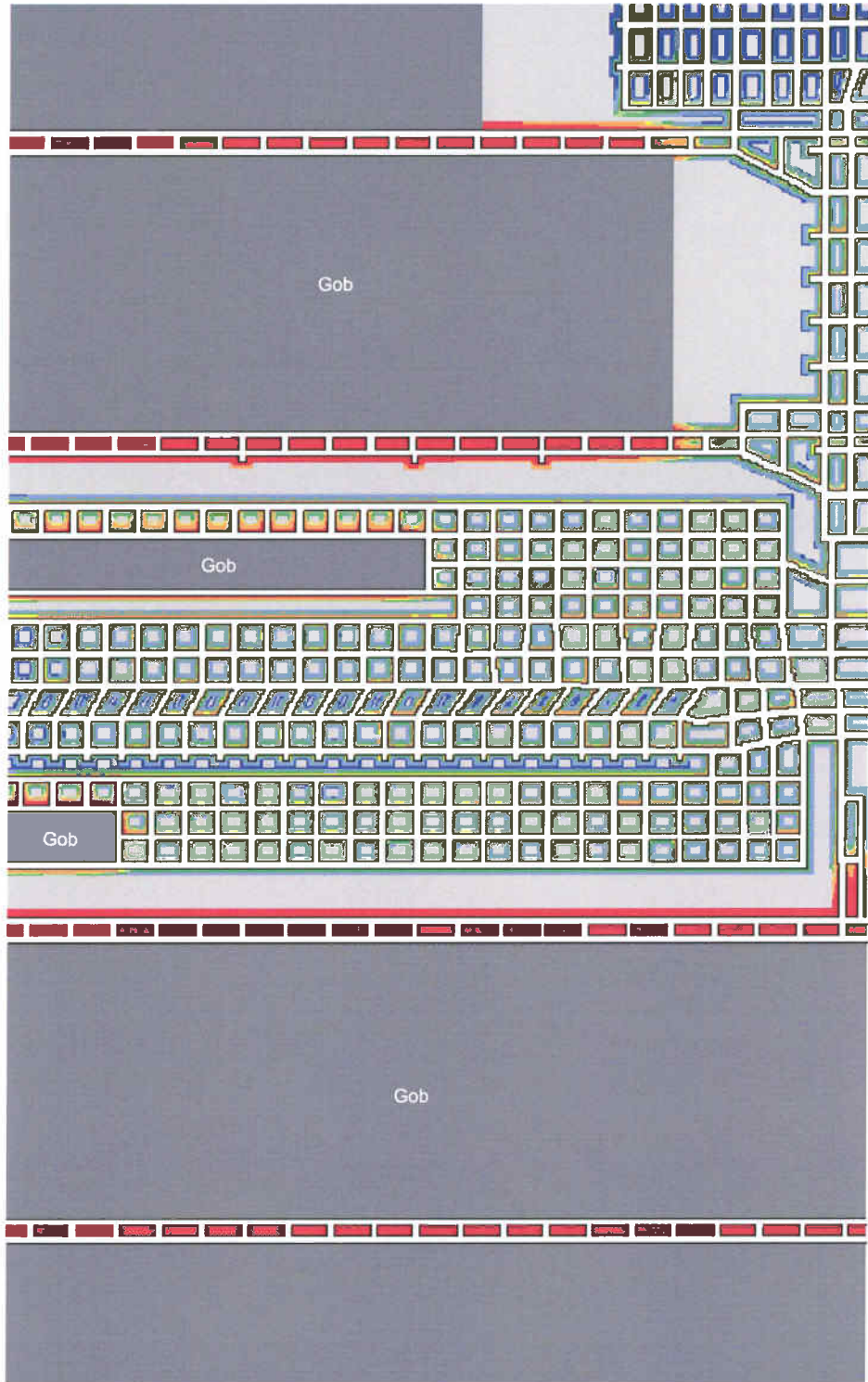
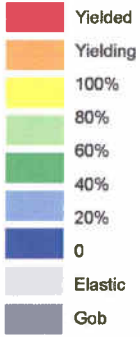
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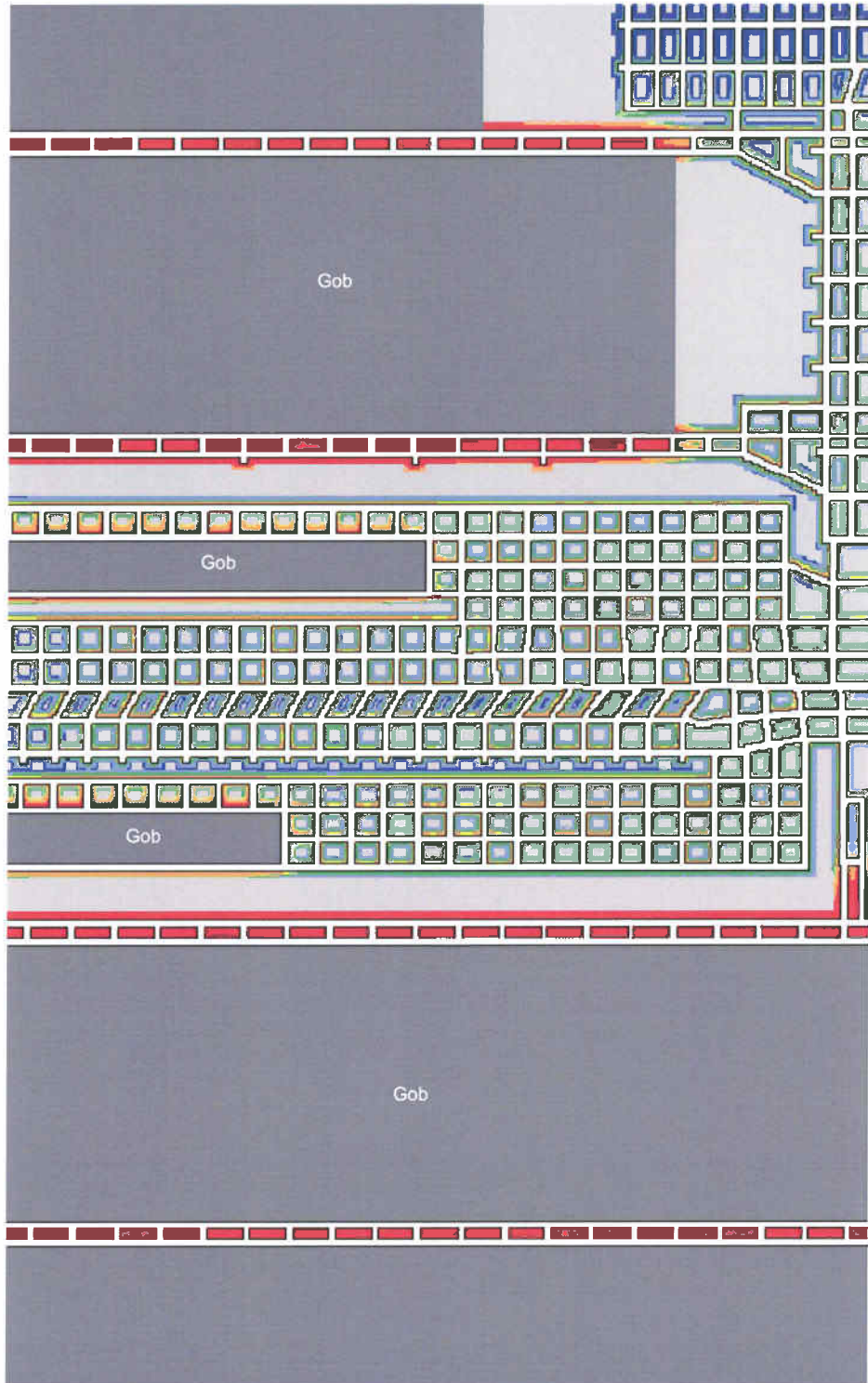
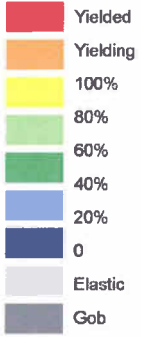
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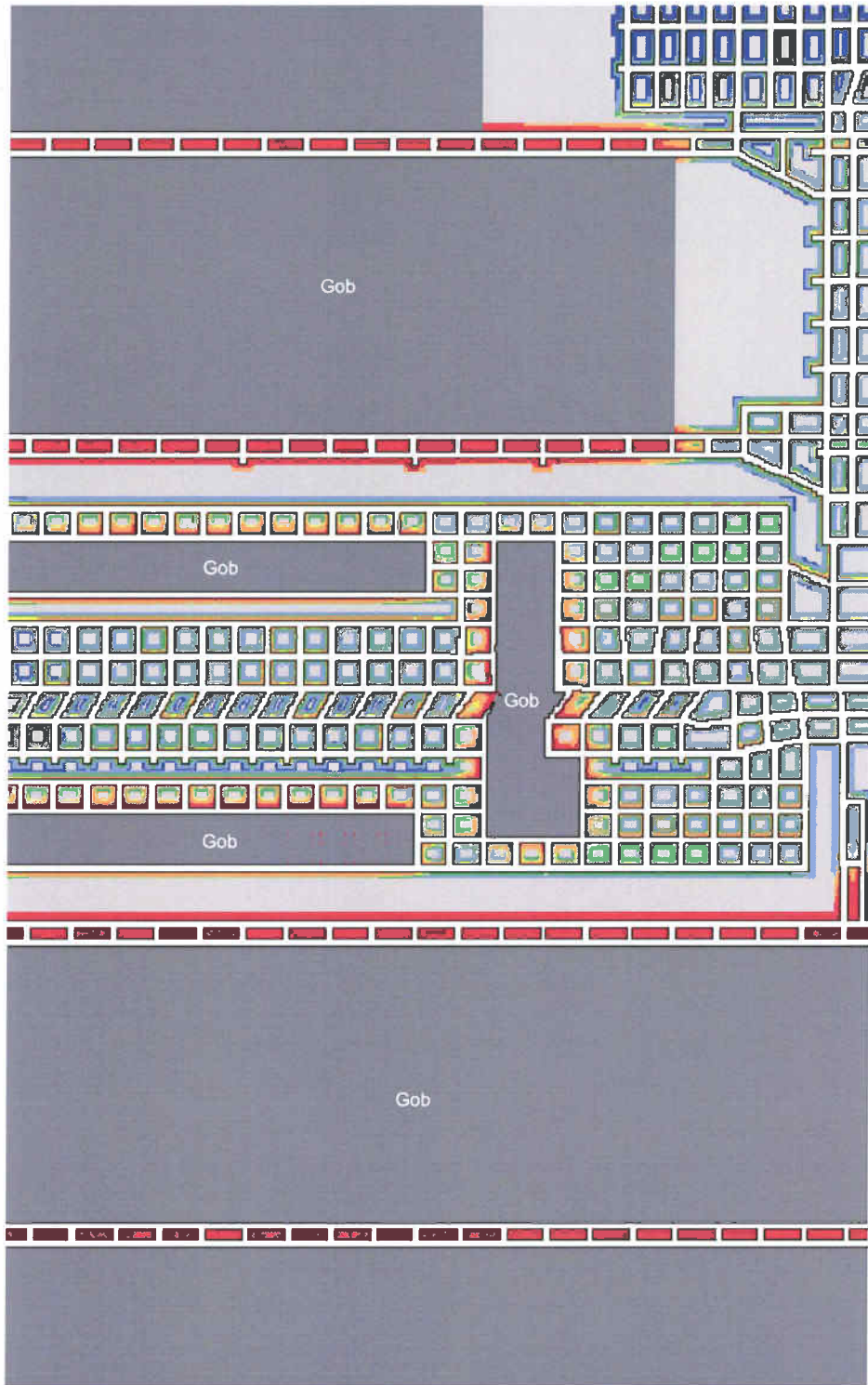
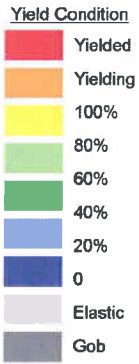


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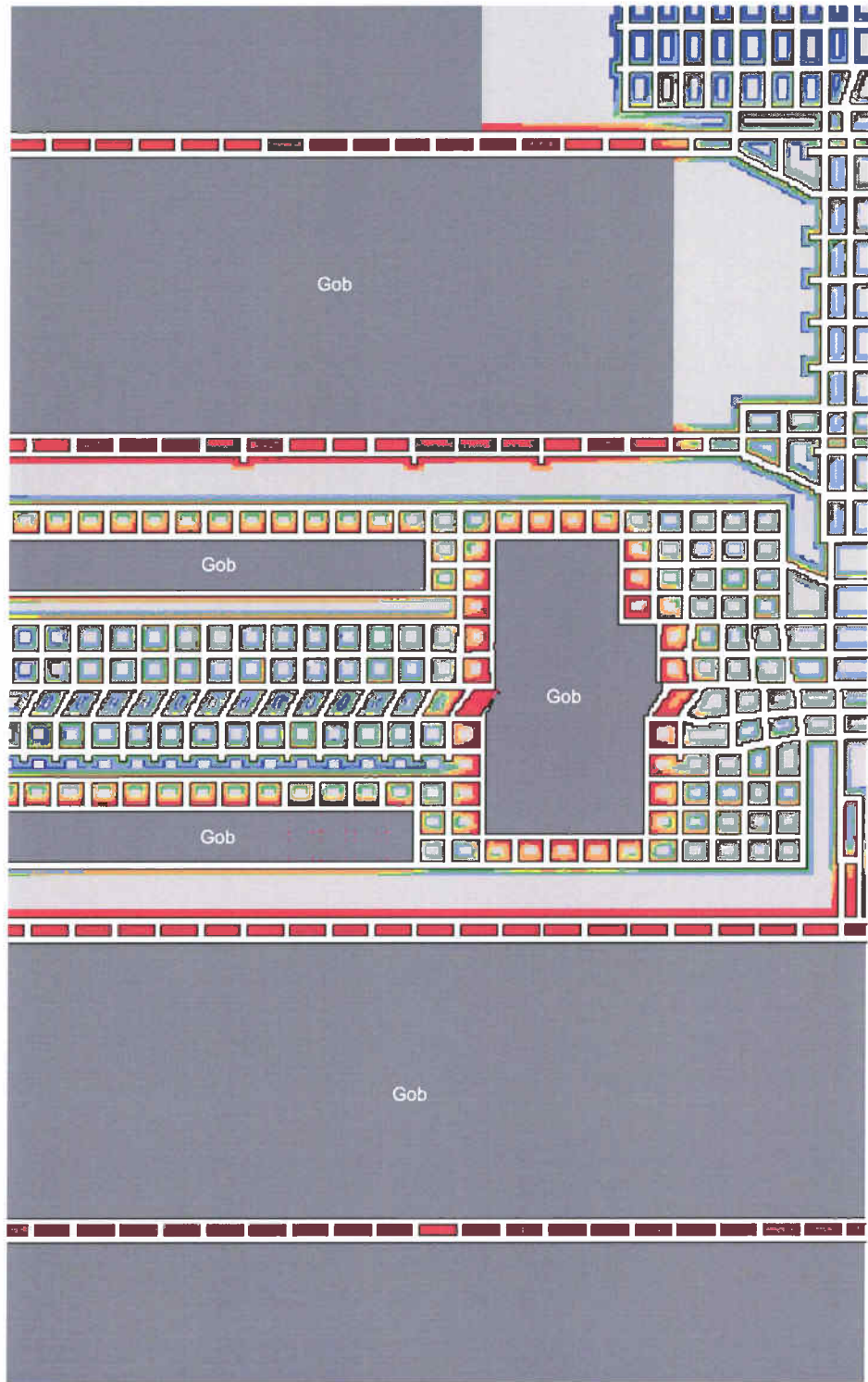
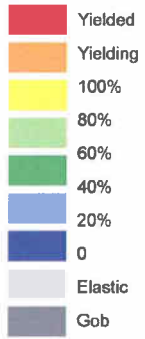


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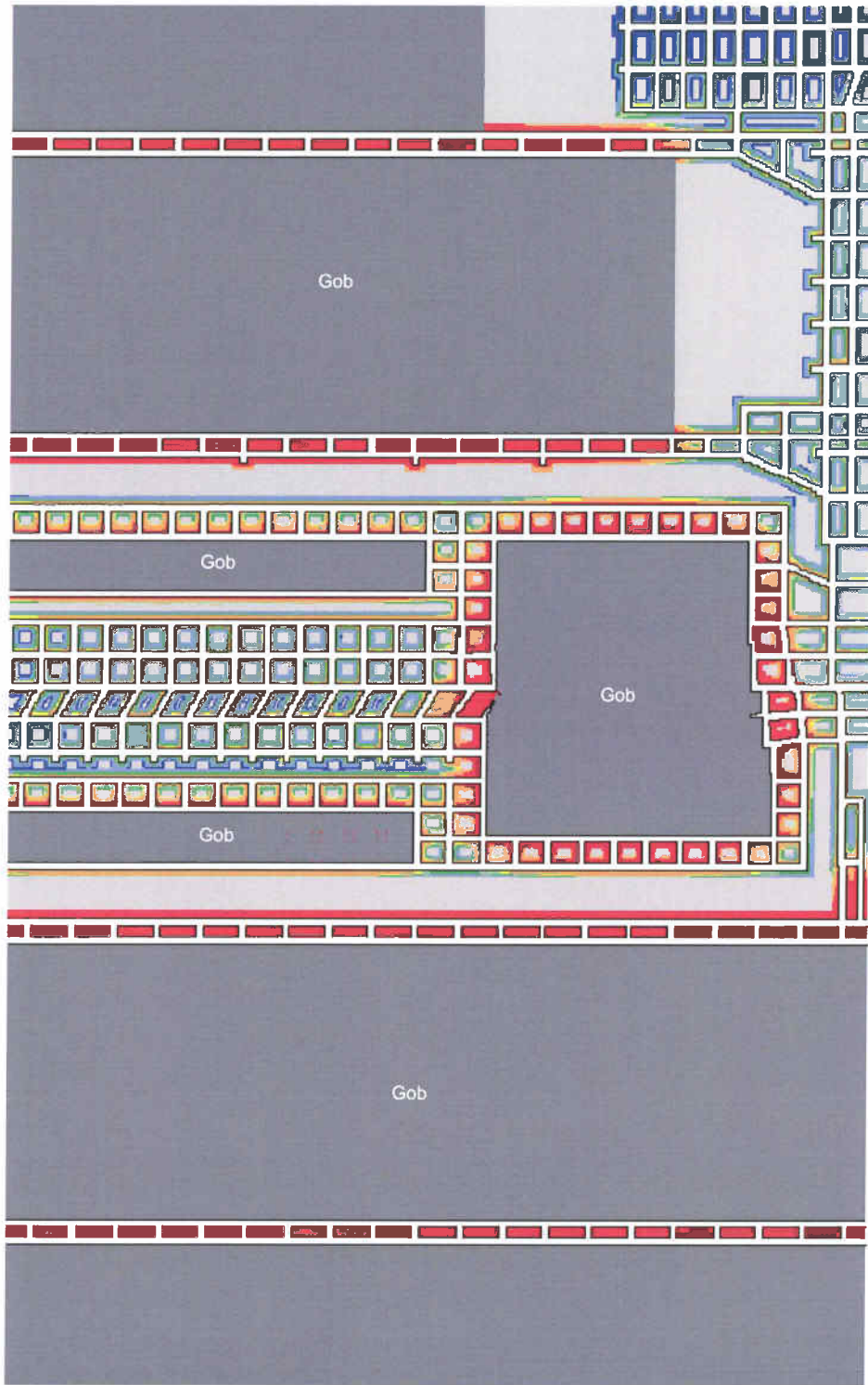
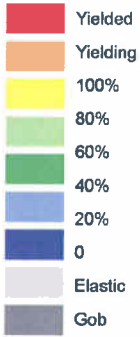




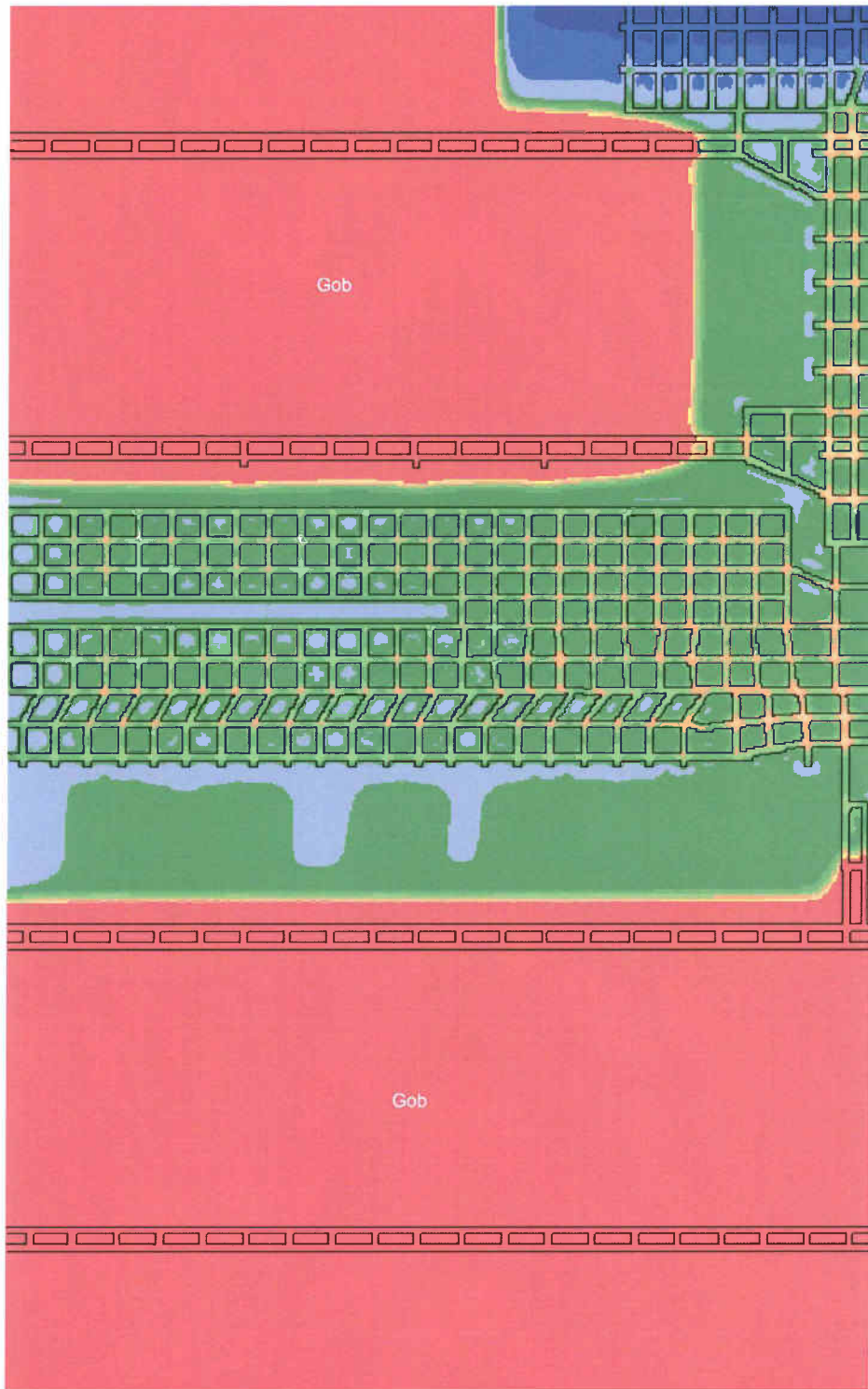
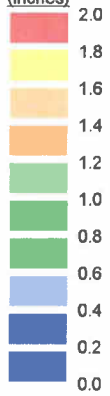
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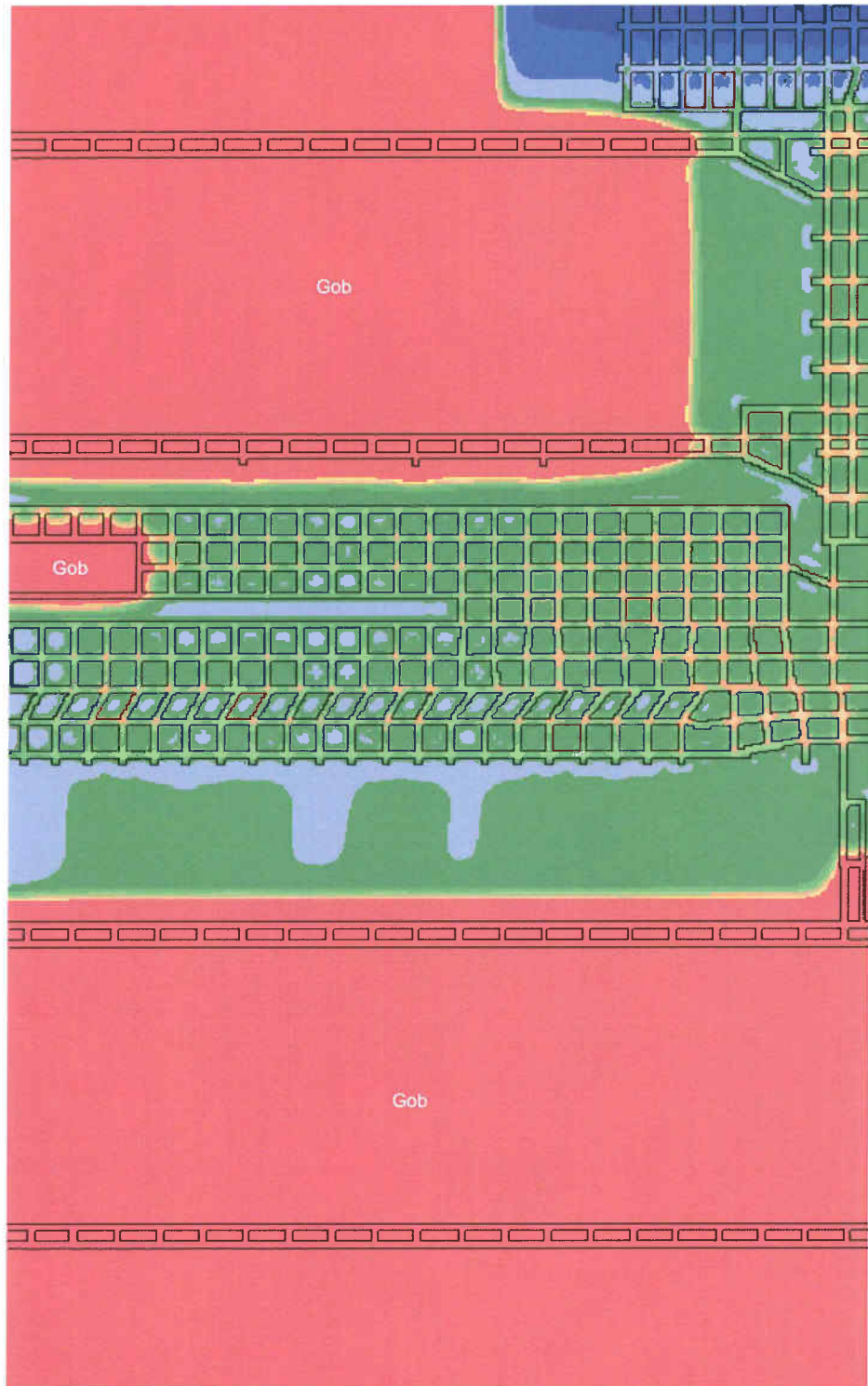
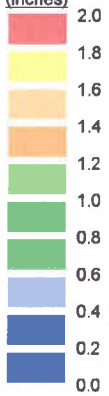
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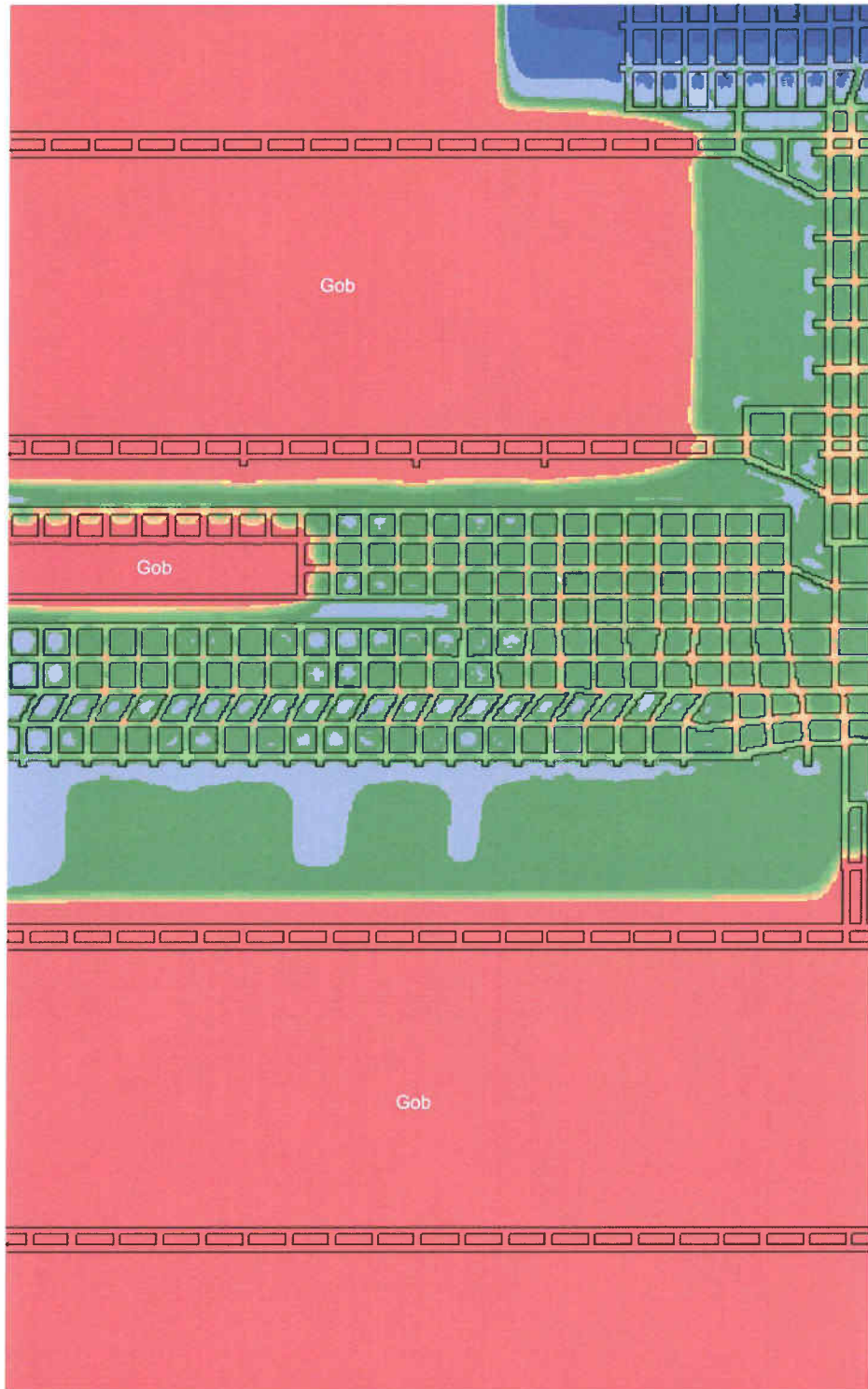
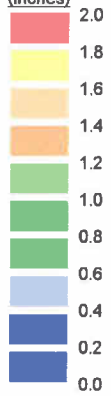
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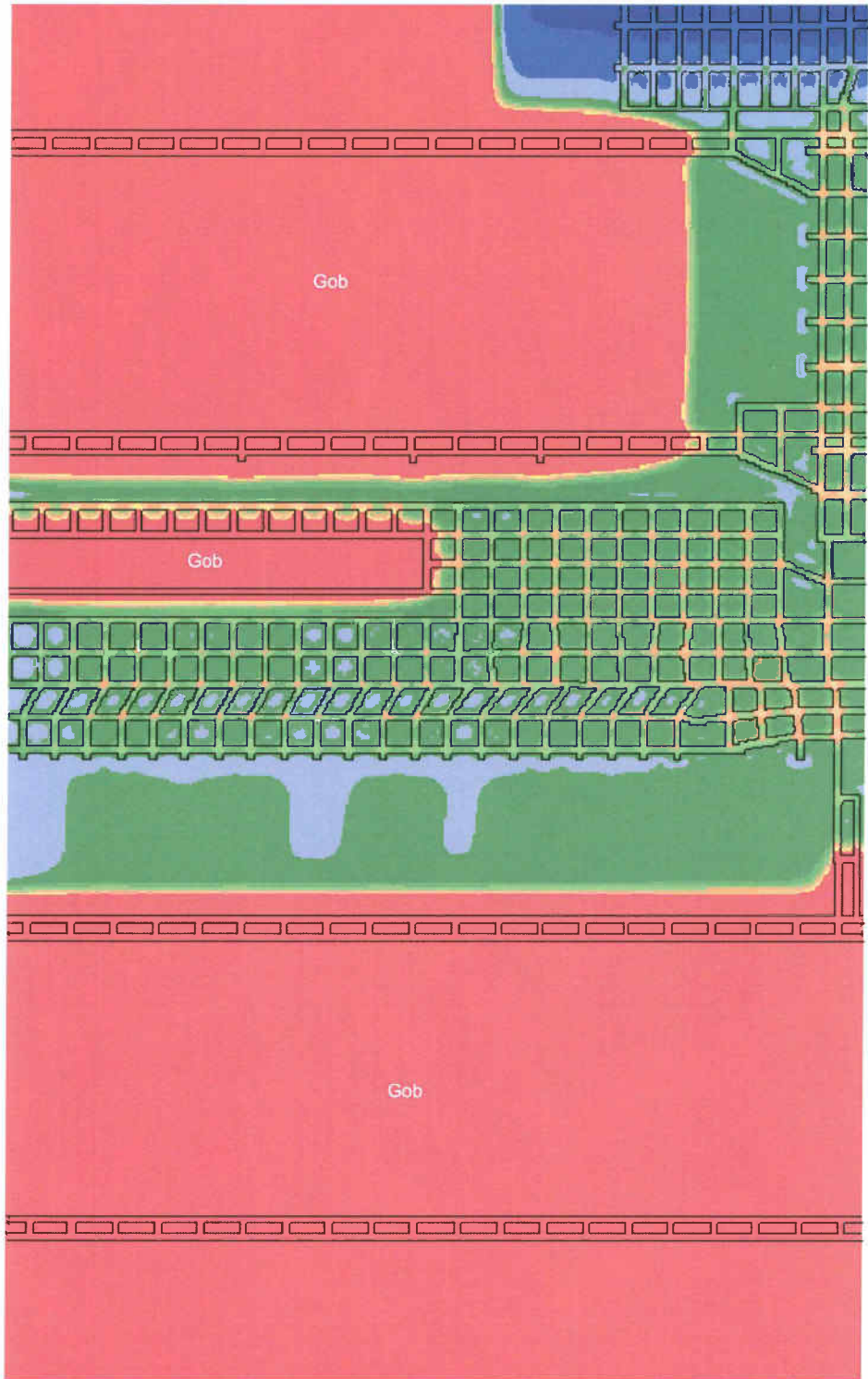
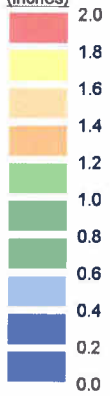
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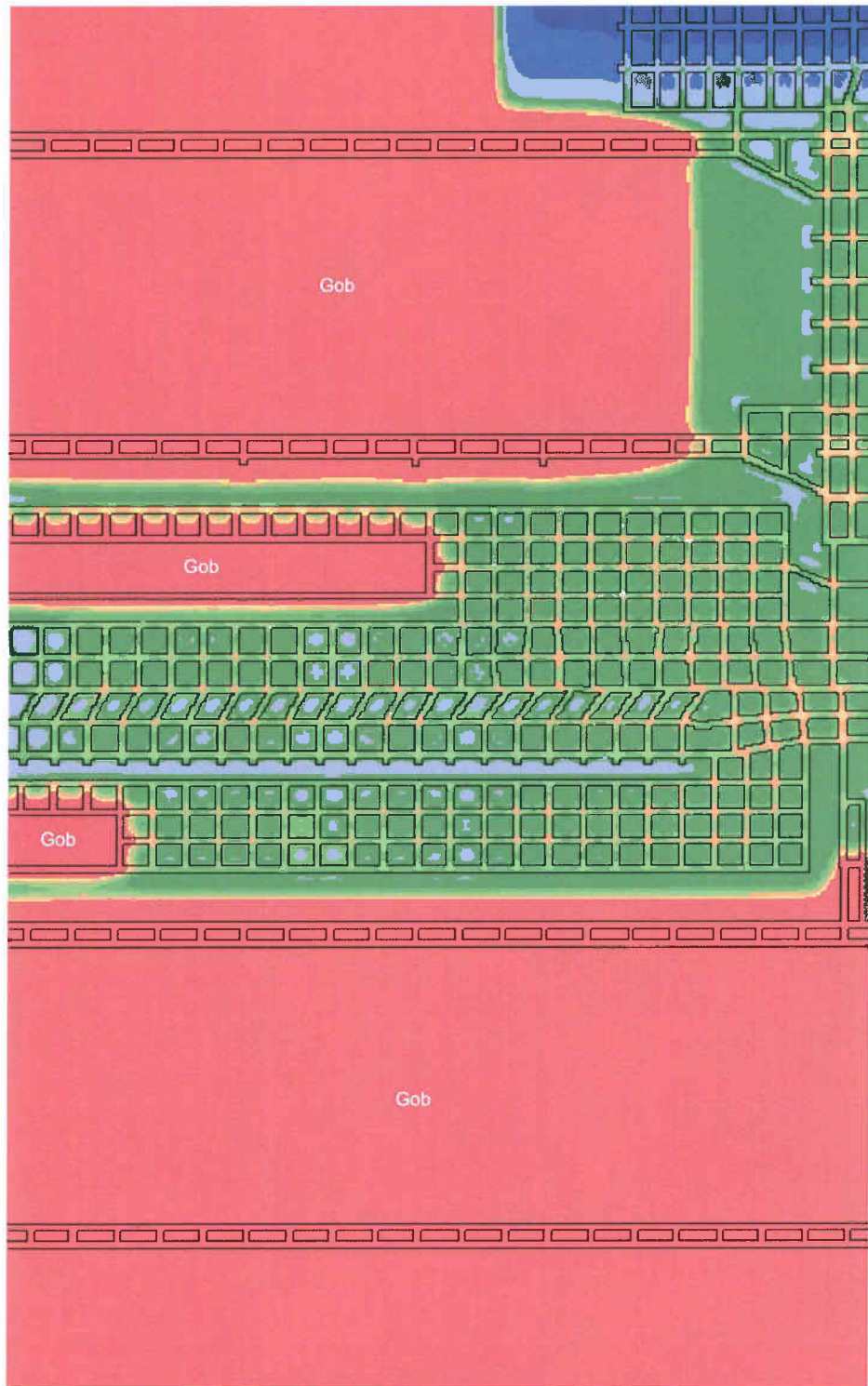
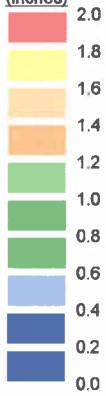
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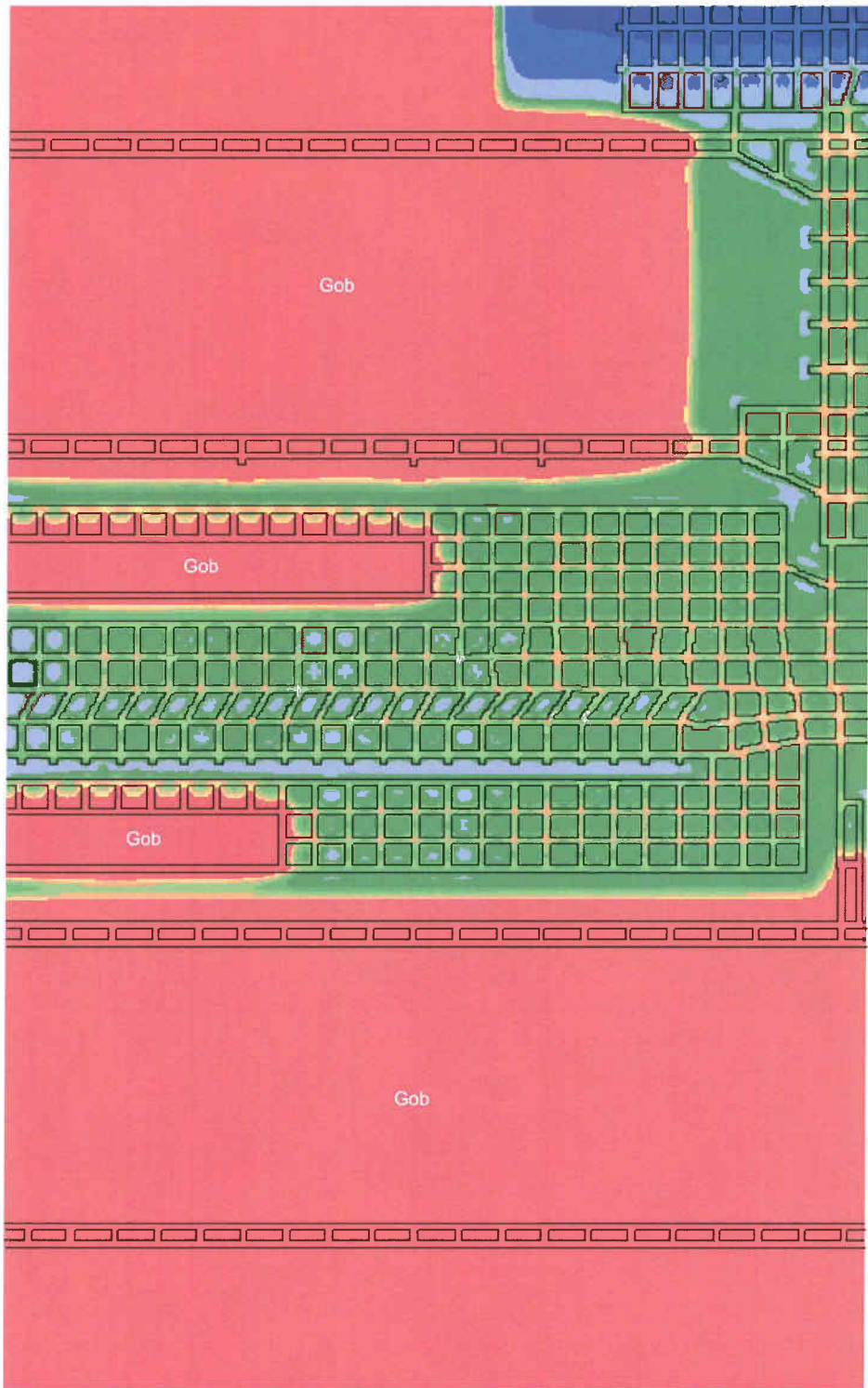
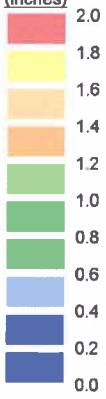
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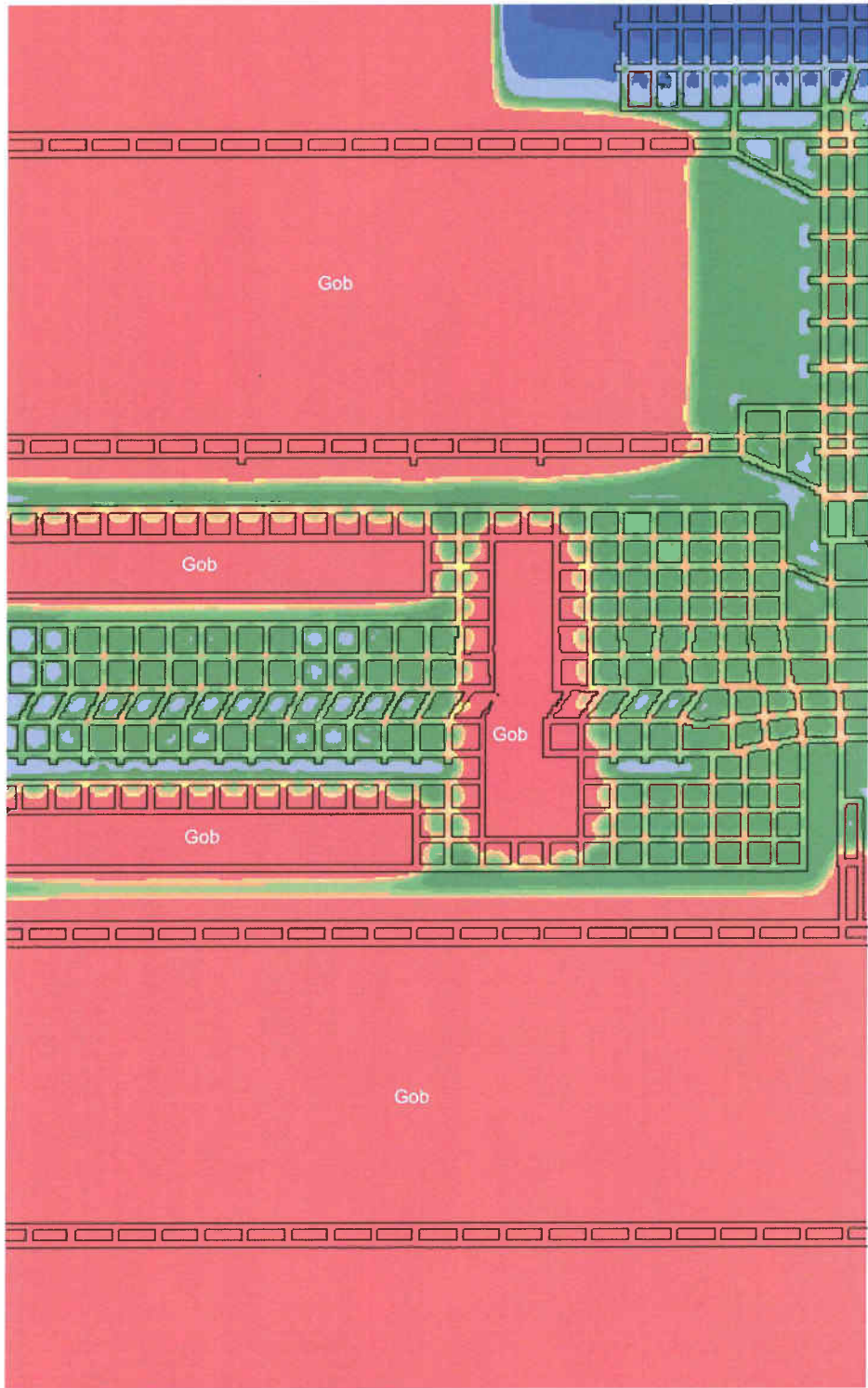
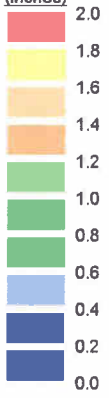
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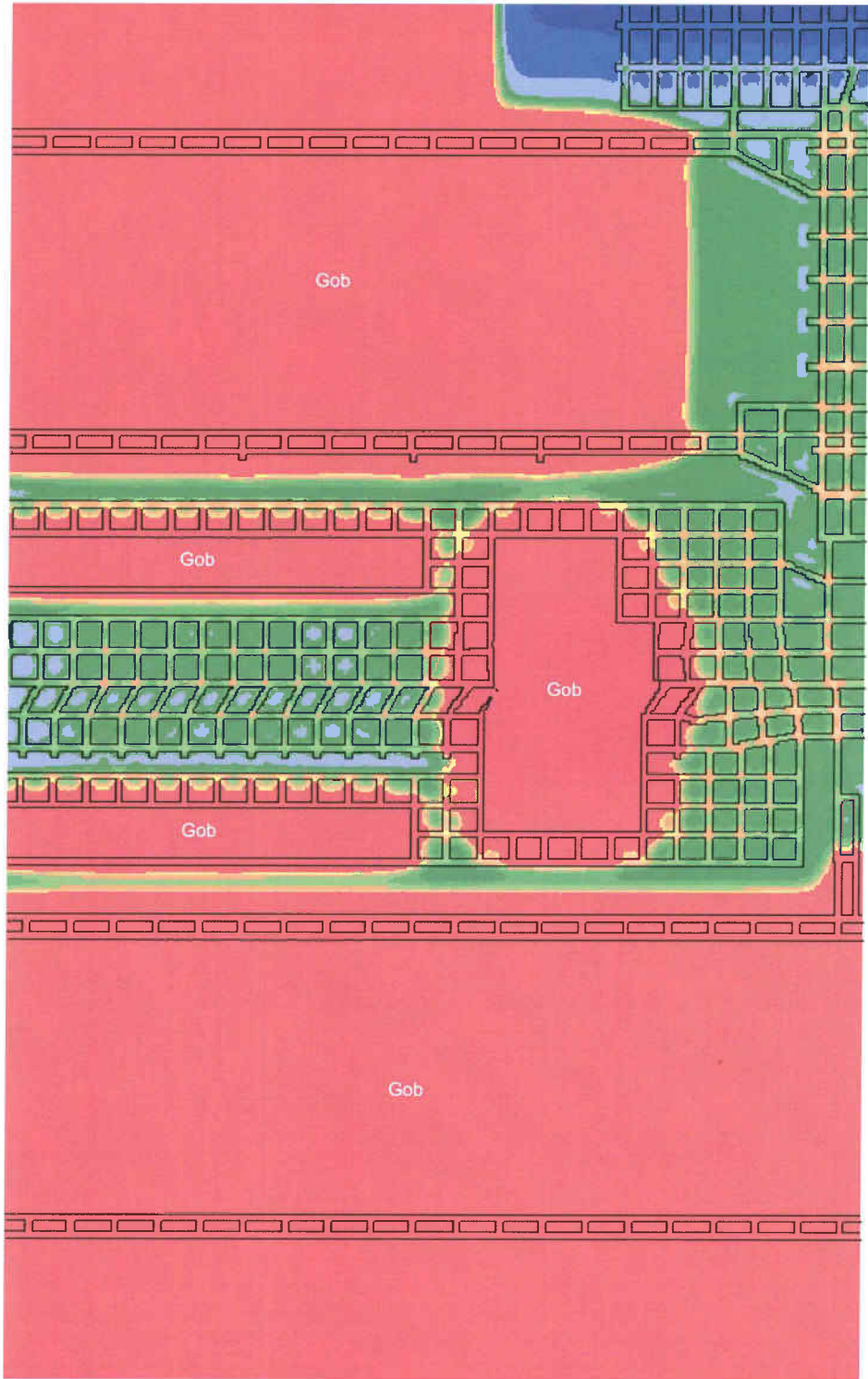
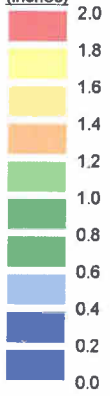
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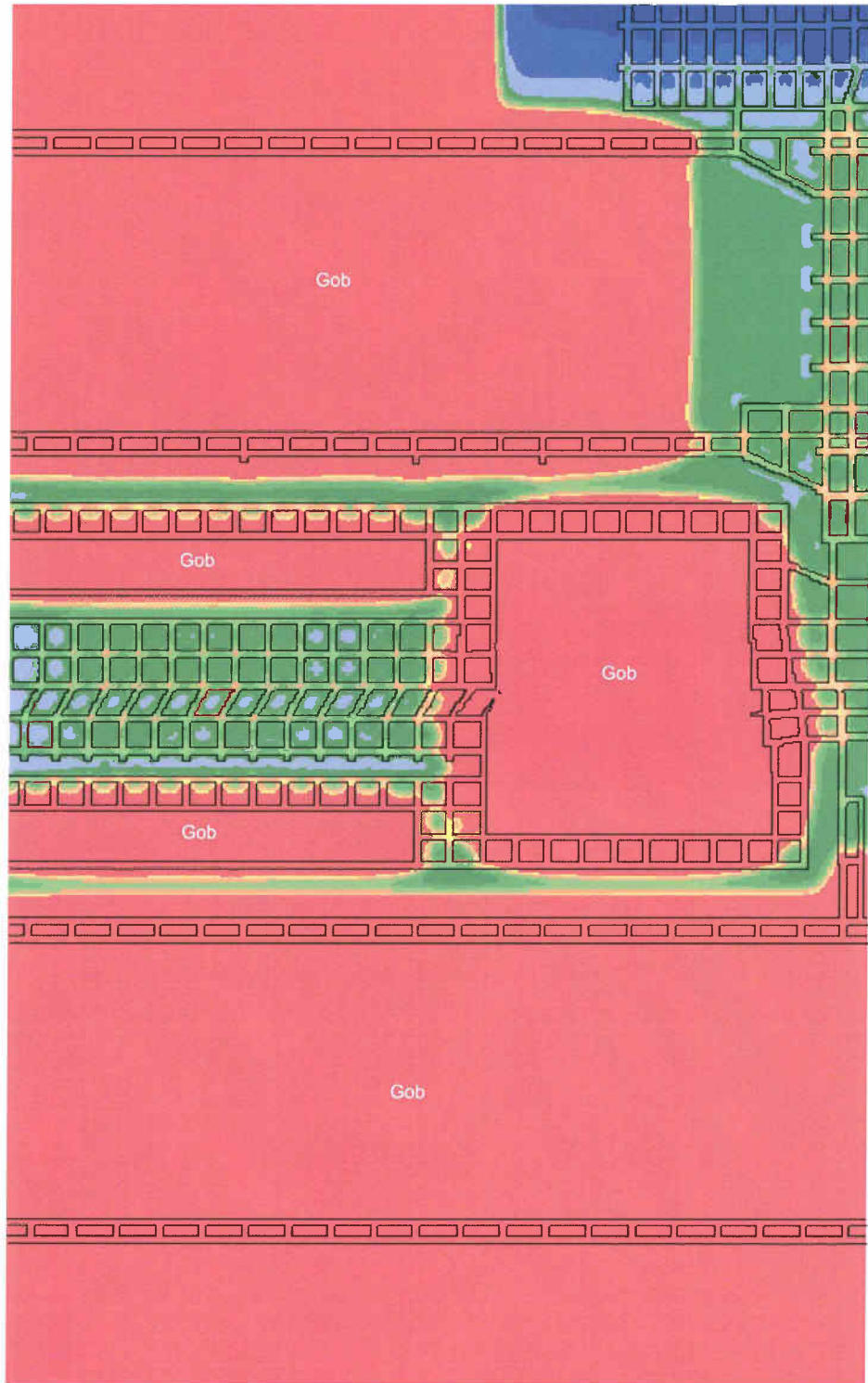
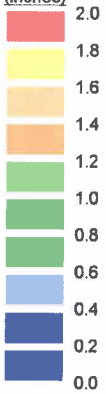
Vertical Displacement
(inches)



Vertical Displacement
(inches)



Vertical Displacement
(inches)



Laine Adair - (226-30) GENWAL Main West Retreat Analysis--Preliminary Results

From: "Leo Gilbride" <gilbride@agapito.com>
To: "Laine Adair" <ladair@andalex.com>
Date: 8/9/2006 12:45 PM
Subject: (226-30) GENWAL Main West Retreat Analysis--Preliminary Results
CC: "AAI Archive" <archive@agapito.com>

Laine,

I have prepared this email to summarize our preliminary analytical results for the proposed retreat mining sequence in the Main West barriers at GENWAL. We analyzed ground conditions using (1) the NIOSH ARMPS empirical design method and (2) the same LAMODEL stress and convergence model used in our Jul-20, 2006 analysis. Figure 1 shows the modeled areas.

ARMPS Modeling

The ARMPS method is an empirical design method developed by NIOSH based on 250 pillar retreat case histories. The database contains numerous cases representing ground conditions in the western U.S. and mining depths up to 2,000 ft, which makes the method relevant for conditions at GENWAL. The method computes a Stability Factor (SF) based on the ratio of pillar strength to pillar load averaged over the pillars within the active mining zone (near the edge of the gob). Lower SFs are supposed to indicate lower safety margins. Figure 2 plots the SFs as a function of mining depth for all the ARMPS case histories. The plot distinguishes between "satisfactory" and "unsatisfactory" case histories, where "unsatisfactory" case histories involved the following types of ground failures: excessive squeezing, bumps, and/or roof failure. The historical retreat panels in the 1st North Left block at GENWAL are computed to have a SF of 0.37 at a depth of 1,750 ft. Figure 3a shows the ARMPS model geometry used to compute the SF. The ARMPS database shows that industry experience is mixed for mines reporting similar SFs (0.16 to 1.05) at comparable depths (1,500 to 2,000 ft). Of these cases, slightly more than half were successful, while the remainder encountered ground control problems.

A SF of 0.53 is computed for the proposed retreat sequence in the Main West barriers under the deepest cover (Figure 3b). The ARMPS method recommends basing the depth of cover on sustained cover, and not on peak cover if the peak cover occurs over a limited area. Over Main West, 2,000 ft is the maximum sustained cover that is appropriate for the ARMPS calculation. Although a narrow ridge increases cover to 2,200 ft, this is too limited an area to significantly affect abutment loads in the ARMPS calculation. Elsewhere in the barriers and mains, a higher SF is computed. A SF of 0.67 is computed for pillaring east of the existing Main West seals (XC 118-119).

The ARMPS method recommends designing pillars for a 0.90 SF (for intermediate-strength roof) if site-specific data are not otherwise available. The authors of ARMPS suggest that the method is increasingly conservative at depth and that site-specific experience should be used to establish design SFs whenever possible. At GENWAL good success has been achieved at SFs below 0.90. Retreat conditions in the 1st North Left block were generally successful with a SF of 0.37, suggesting that a SF of about 0.40 is a reasonable lower limit for retreat mining at GENWAL. This is considered a lower limit because occasional problems with peeling top coal were encountered in the 1st North Left block. This required skipping pillars on retreat in some locations. Top coal is currently mined to minimize this

risk and is not expected to be a problem in Main West.

The lowest SF for the proposed retreat sequence in Main West barriers is 0.53 under the deepest cover, which is approximately 43% higher than the “satisfactory” SF of 0.37 for the 1st North Left block. Implications are that the proposed retreat sequence in Main West will be successful in terms of ground control, even under the deepest cover (2,200 ft).

LAMODEL Modeling

The Main West retreat sequence was modeled in 9 steps, as shown in Figures 4 through 30. The model includes the actual variable depth of cover ranging from 1,200 to 2,200 ft, as shown on the map in Figure 1. The figures present modeled (1) vertical stress, (2) coal yielding, and (3) roof-to-floor convergence. Results show that convergence will be less than 2.0 inches in and around the active pillaring sections in the barriers. Results of the 1st North Left back-analysis model, discussed in the Jul-20, 2006 letter, concluded that convergence less than 2.0 inches is indicative of stable roof and pillar conditions in the model. Conclusions from LAMODEL corroborate the ARMPS results, principally that convergence can be adequately controlled with the proposed mine plan and that ground conditions should be generally good on retreat in the barriers, even under the deepest cover (2,200 ft).

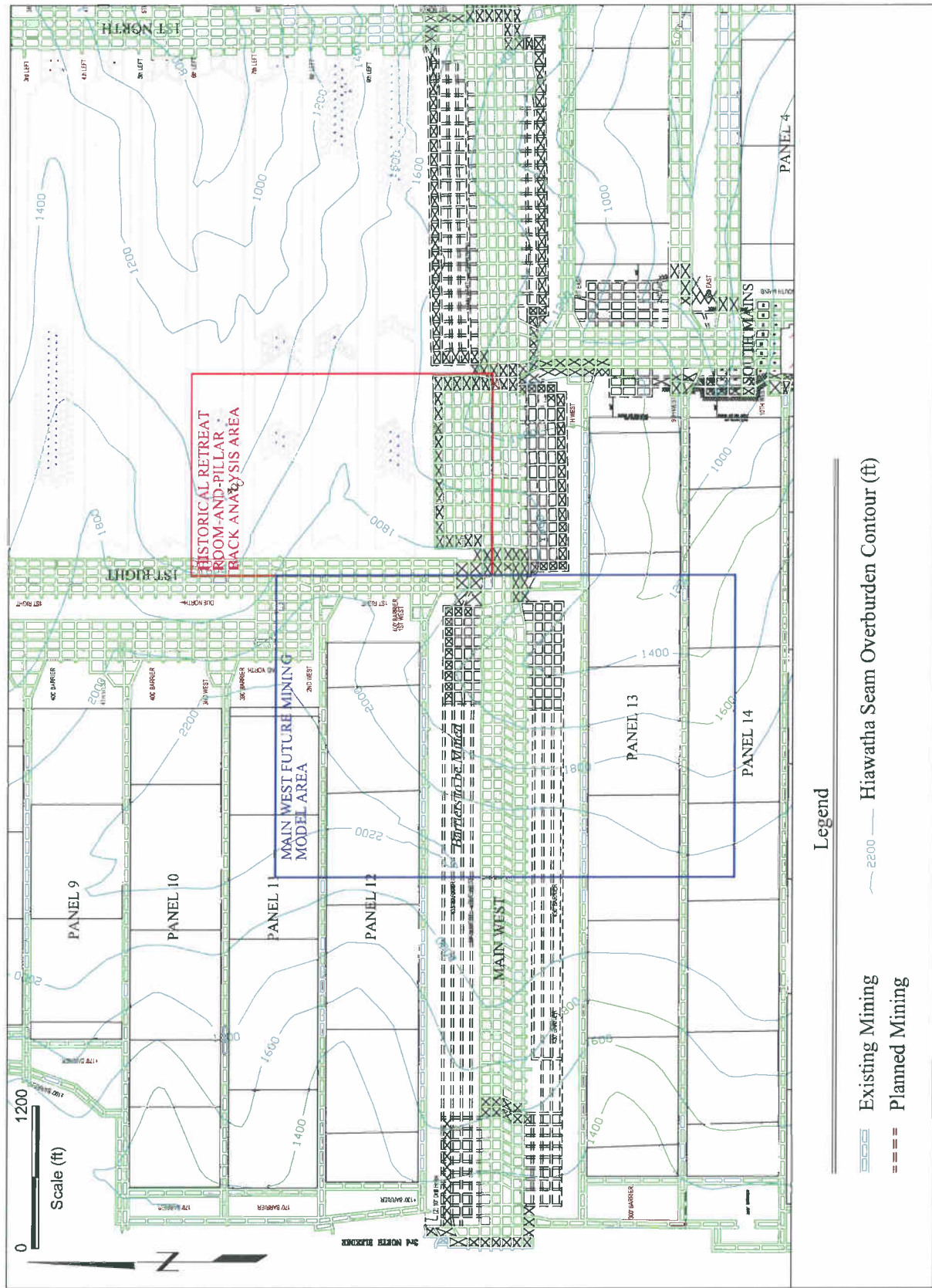
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We can prepare a letter report to present these results at your discretion. In the meantime, please contact me at any point if you wish to discuss these results and recommendations.

Sincerely,

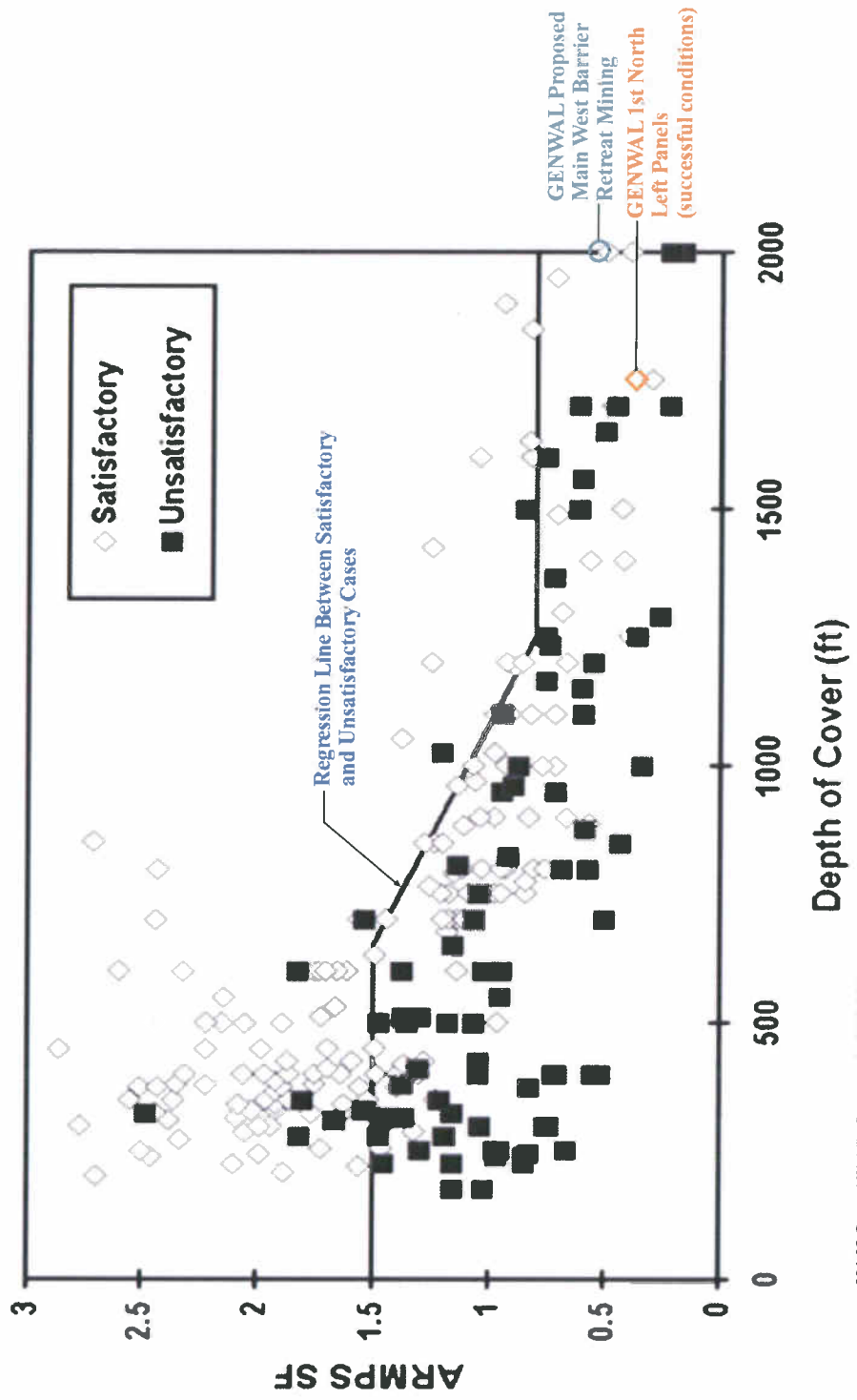
Leo Gilbride, PE
Principal

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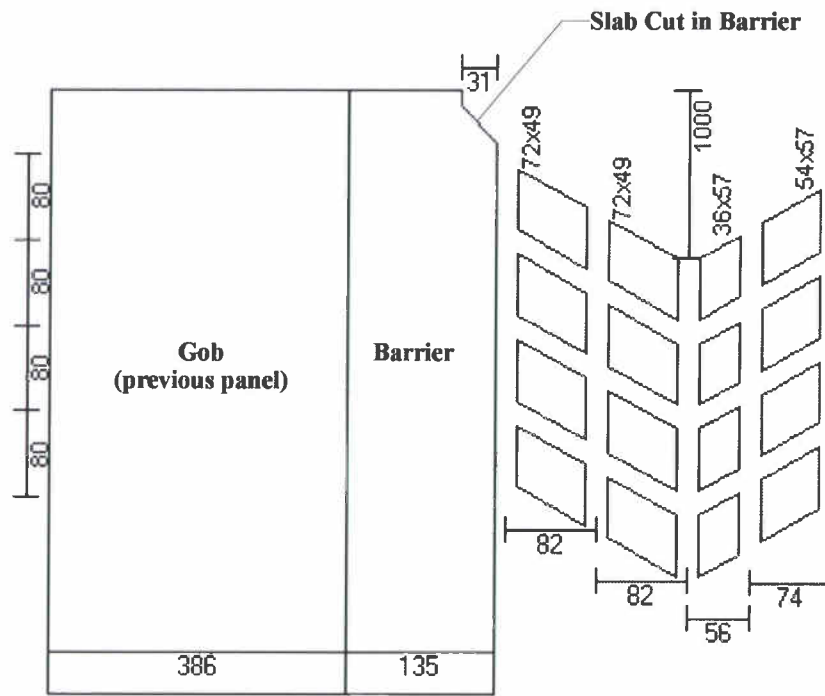
226-20 Genwal [Genwal_Plan Modeled Area.dwg Layout:AA_Plan Model Additional]:by/rj(08-08-2006)

Figure 1. Main West Location Map Showing Existing and Future Mining and Modeled Areas

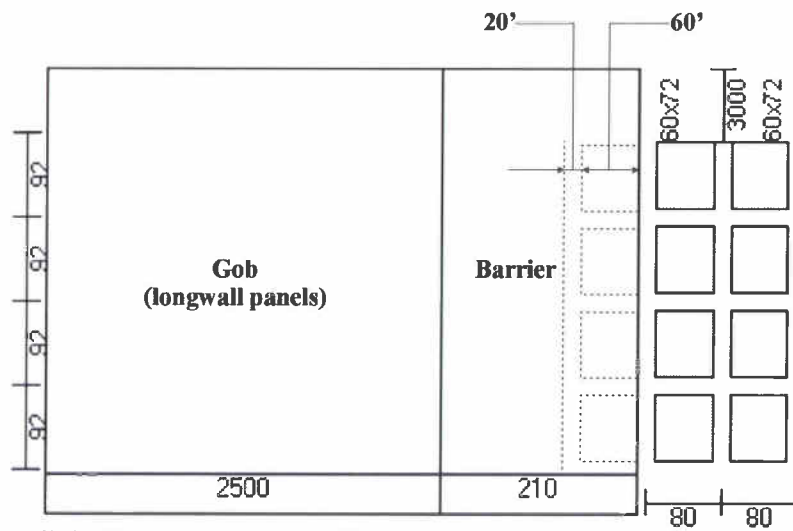


226-20 Genwal | Stability Factors.cdf | (8-8-2006)

Figure 2. Comparison of GENWAL Past and Proposed Retreat Mining Stability Factors with ARMPs Case Histories



a) 1st North Left Typical Panel Retreat Geometry

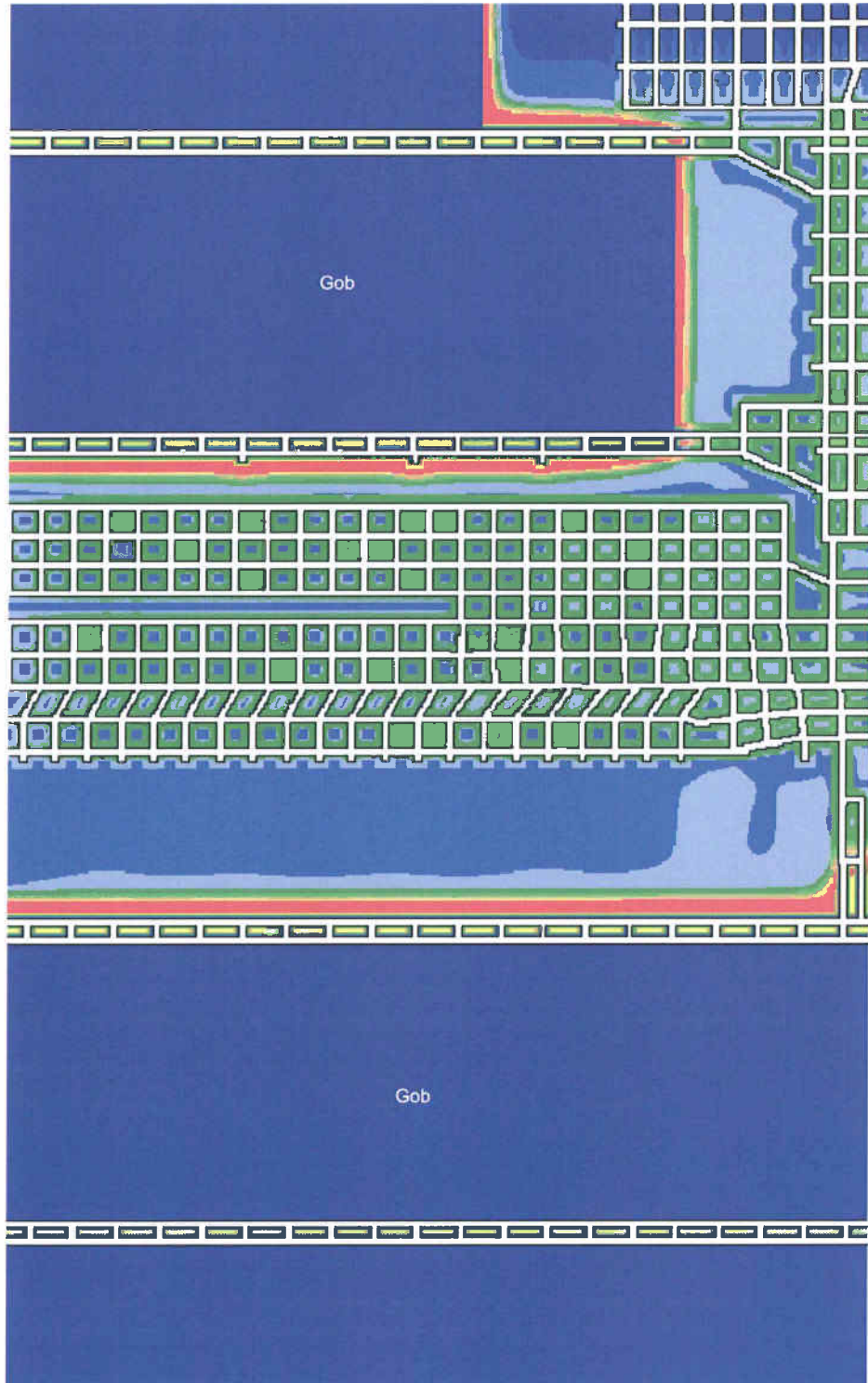


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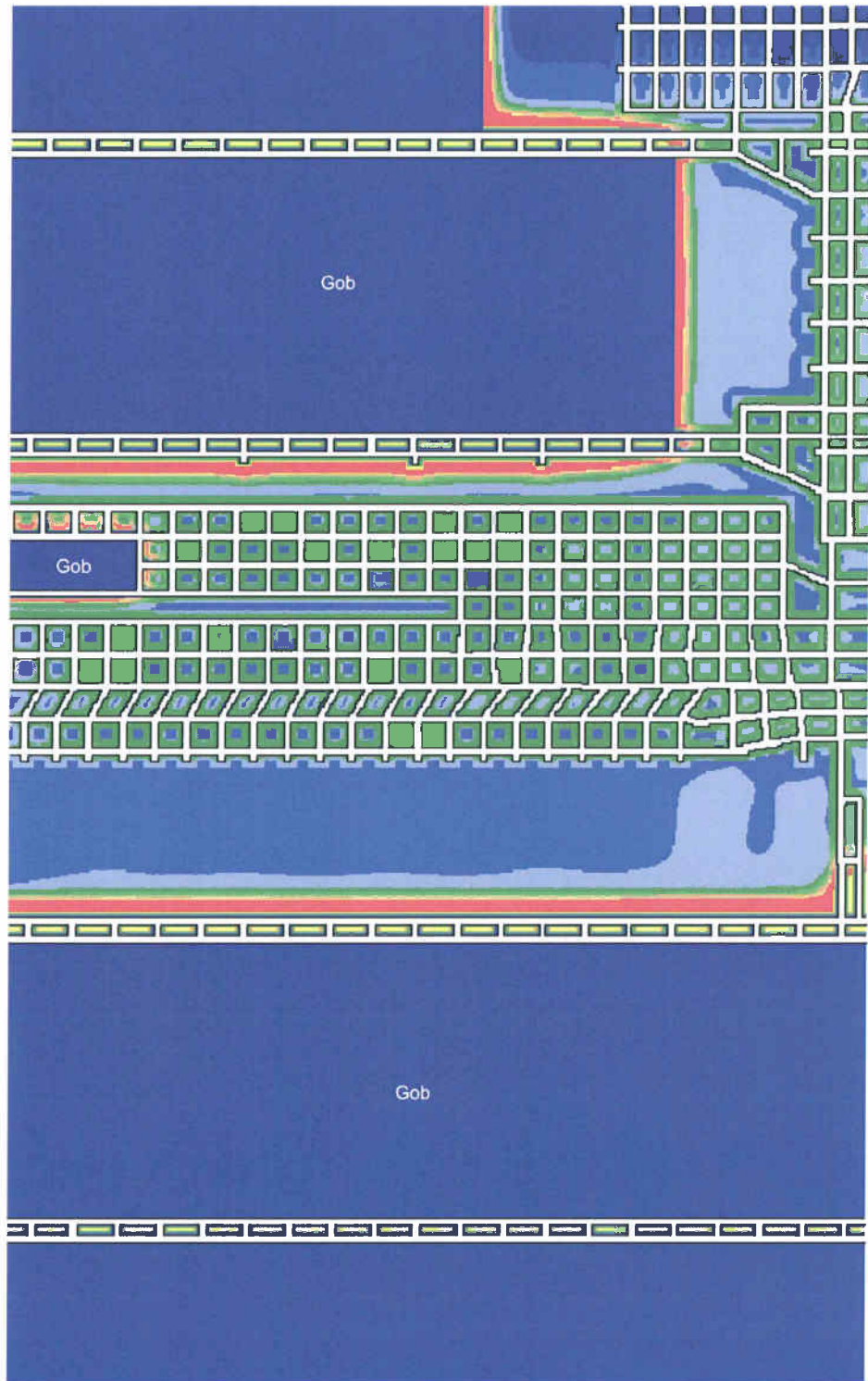
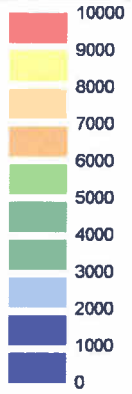
b) Main West Proposed Retreat Geometry

Figure 3. ARMP5 Retreat Model Schematics

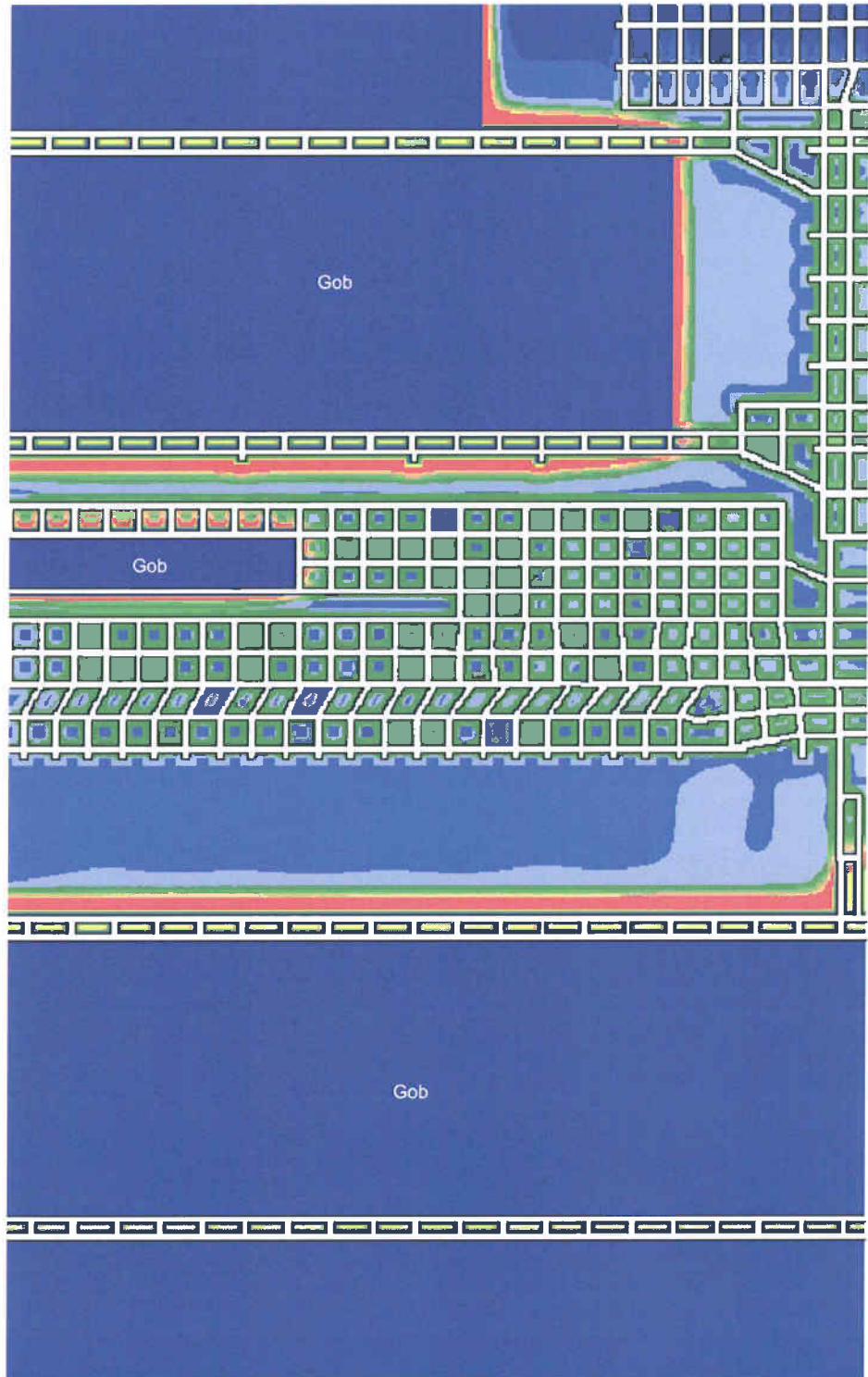
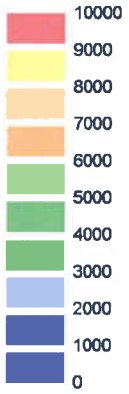
Vertical Stress (psi)



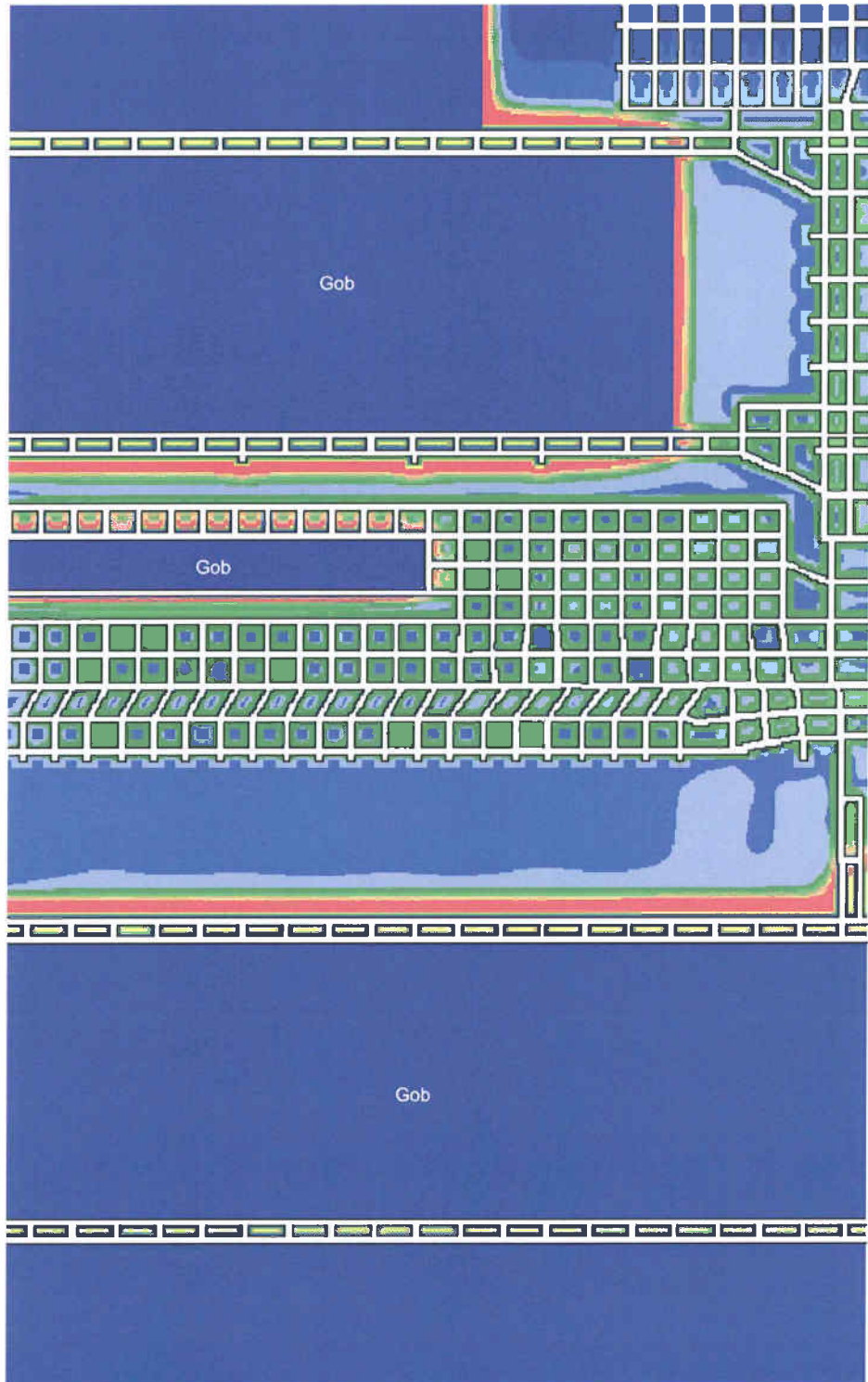
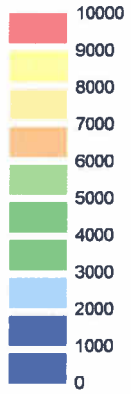
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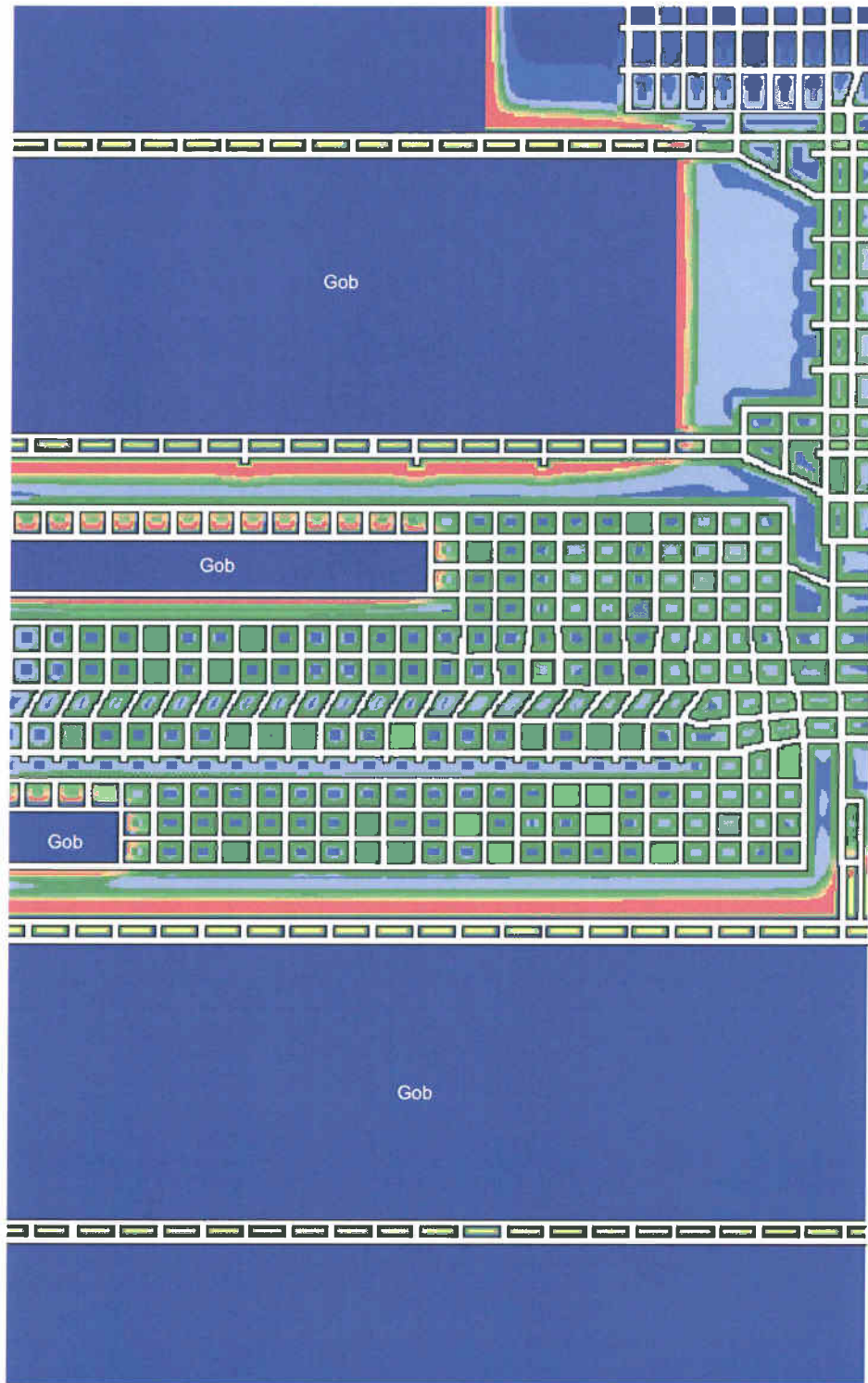
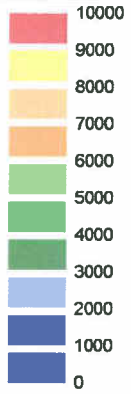
Vertical Stress (psi)



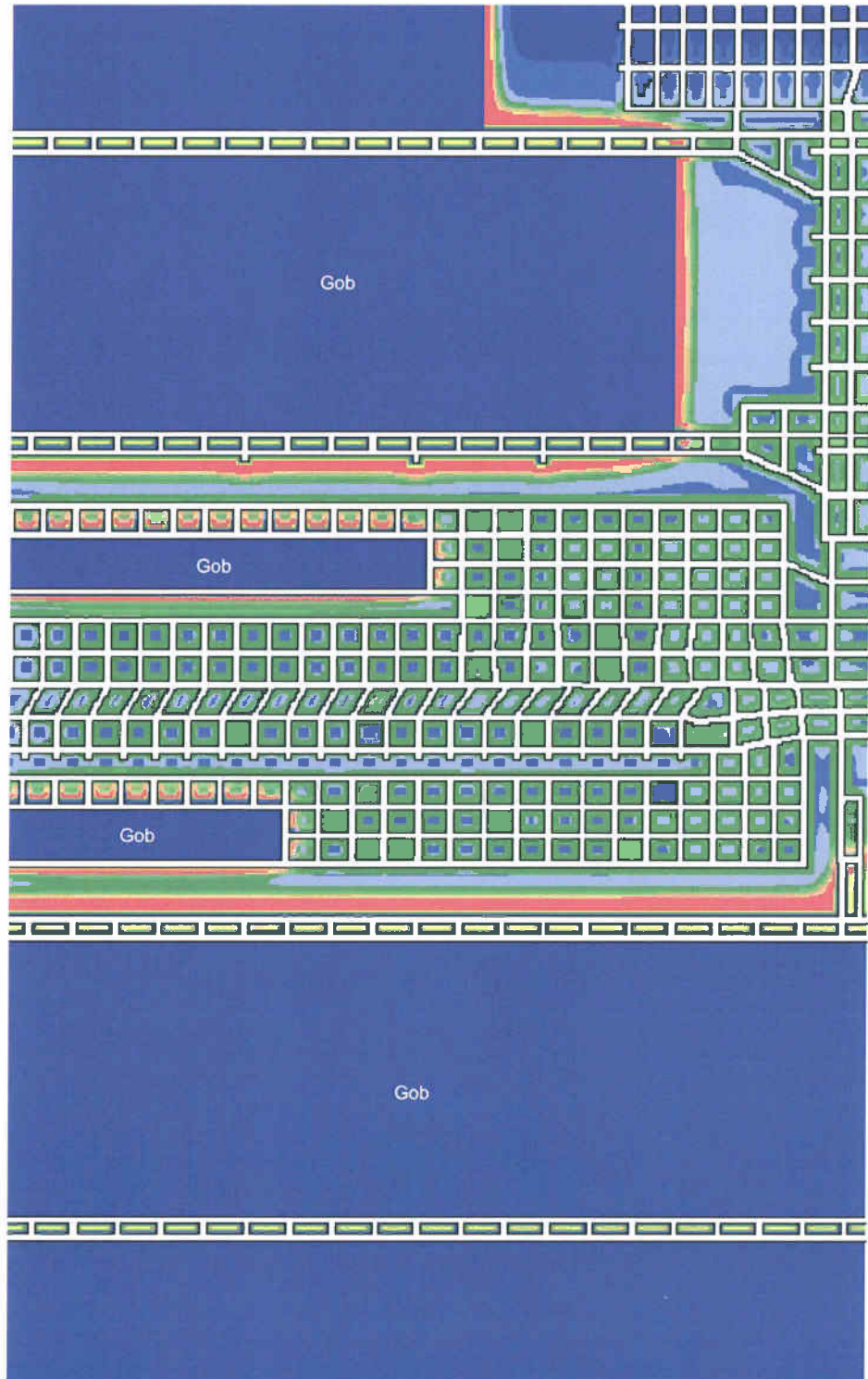
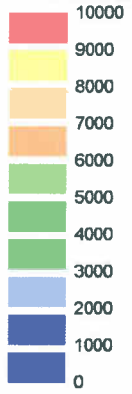
Vertical Stress (psi)



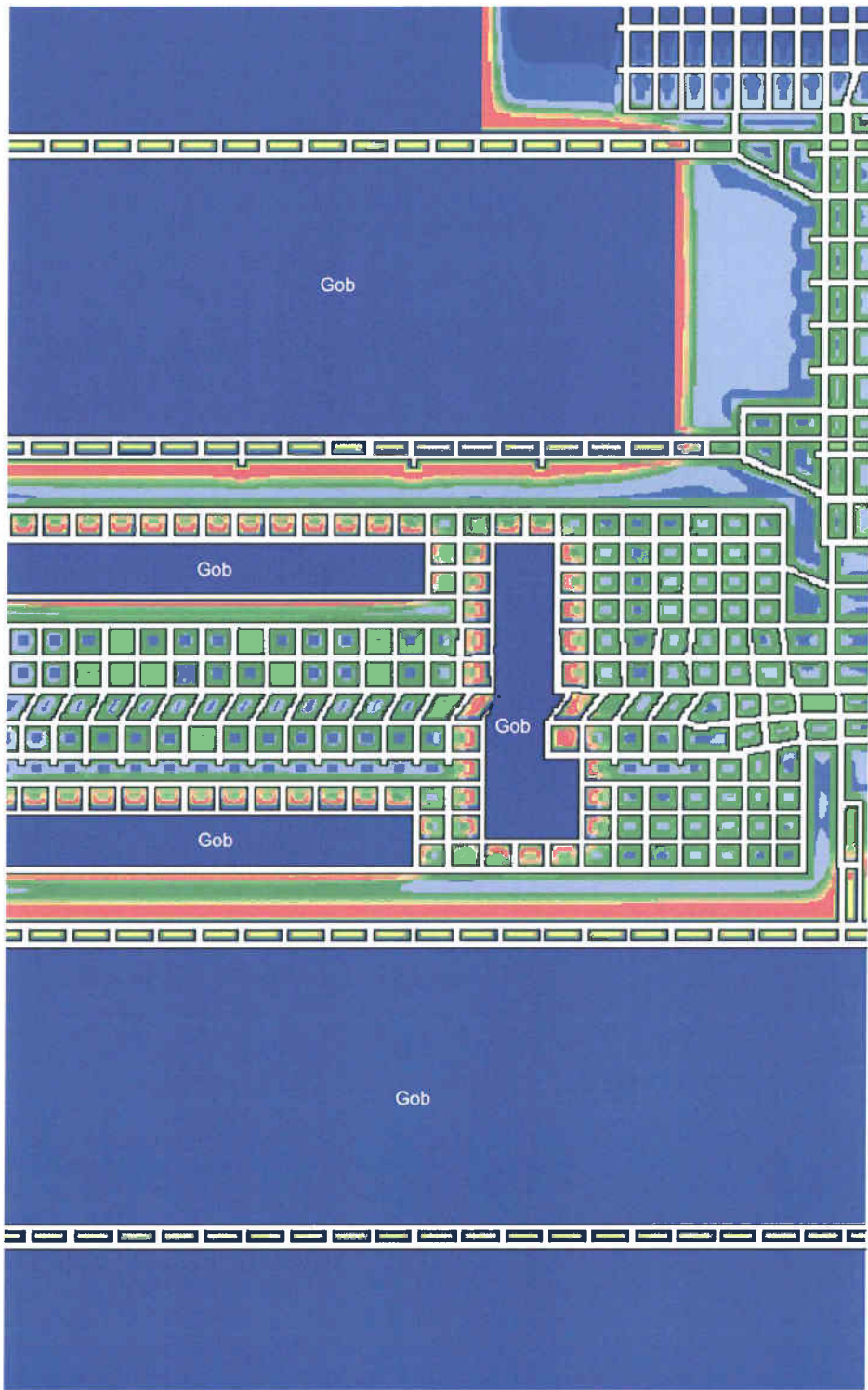
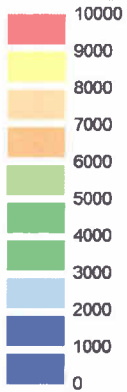
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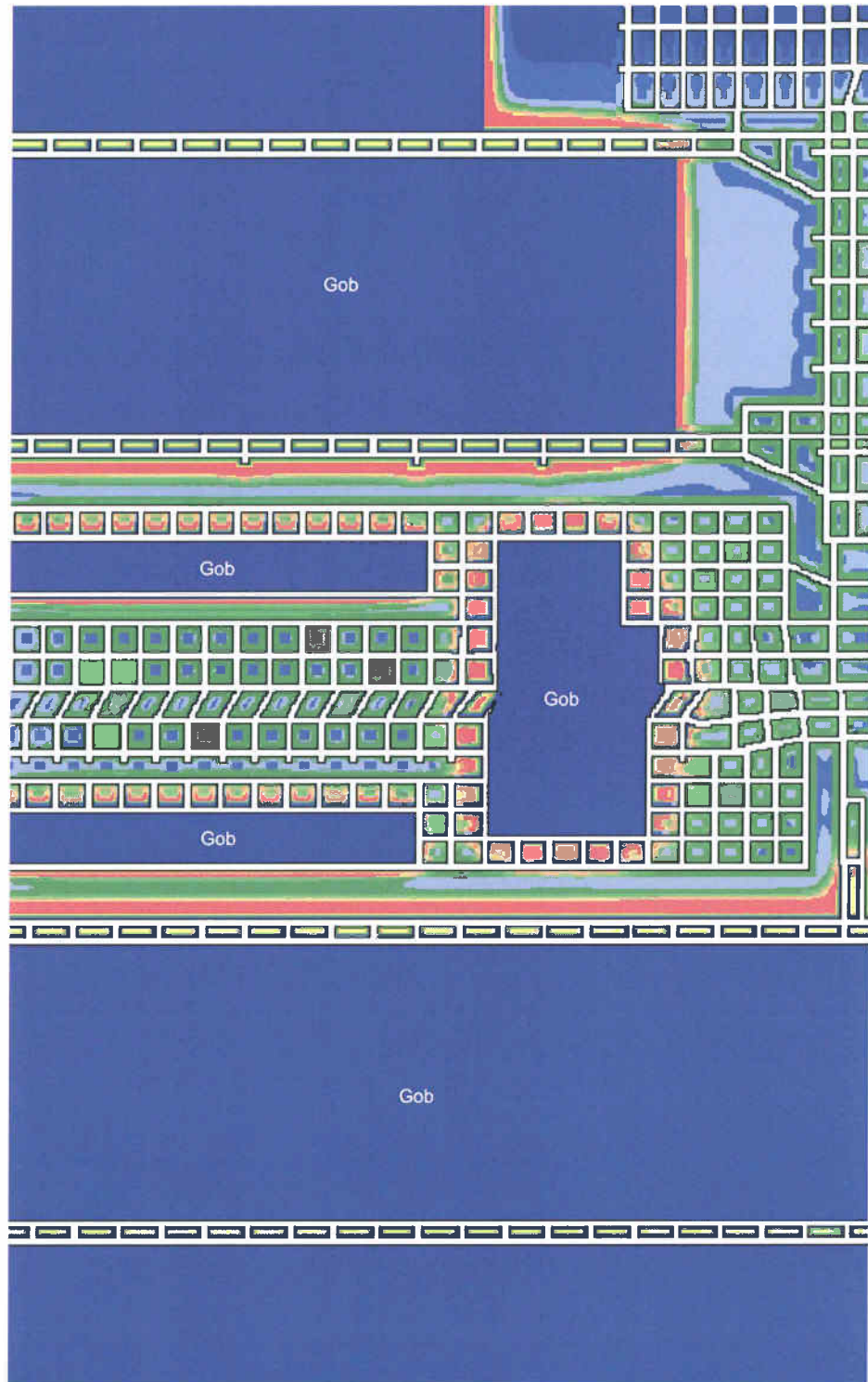
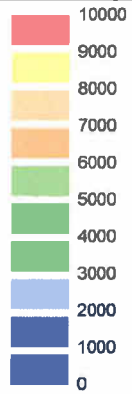
Vertical Stress (psi)



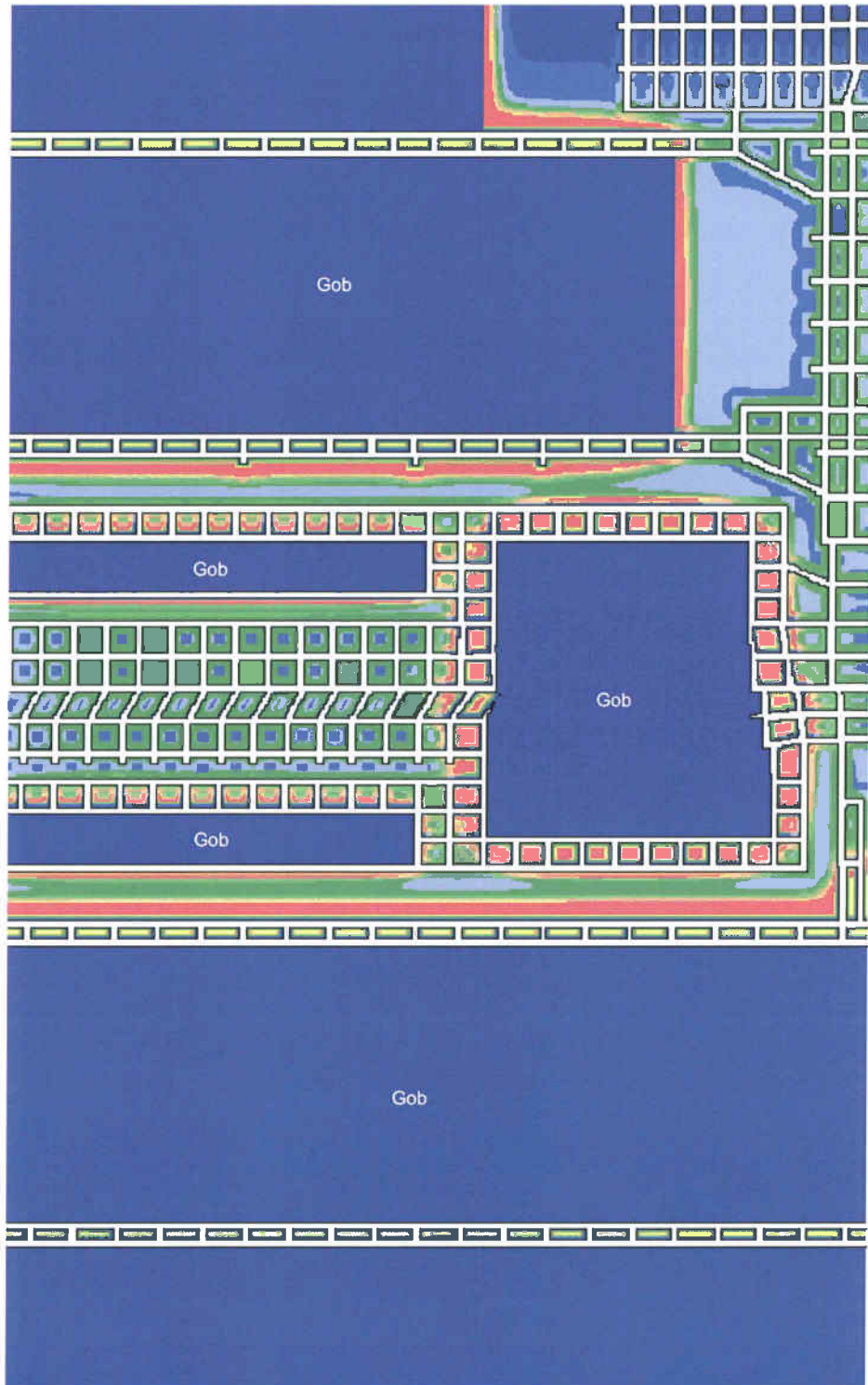
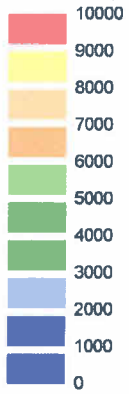
Vertical Stress (psi)

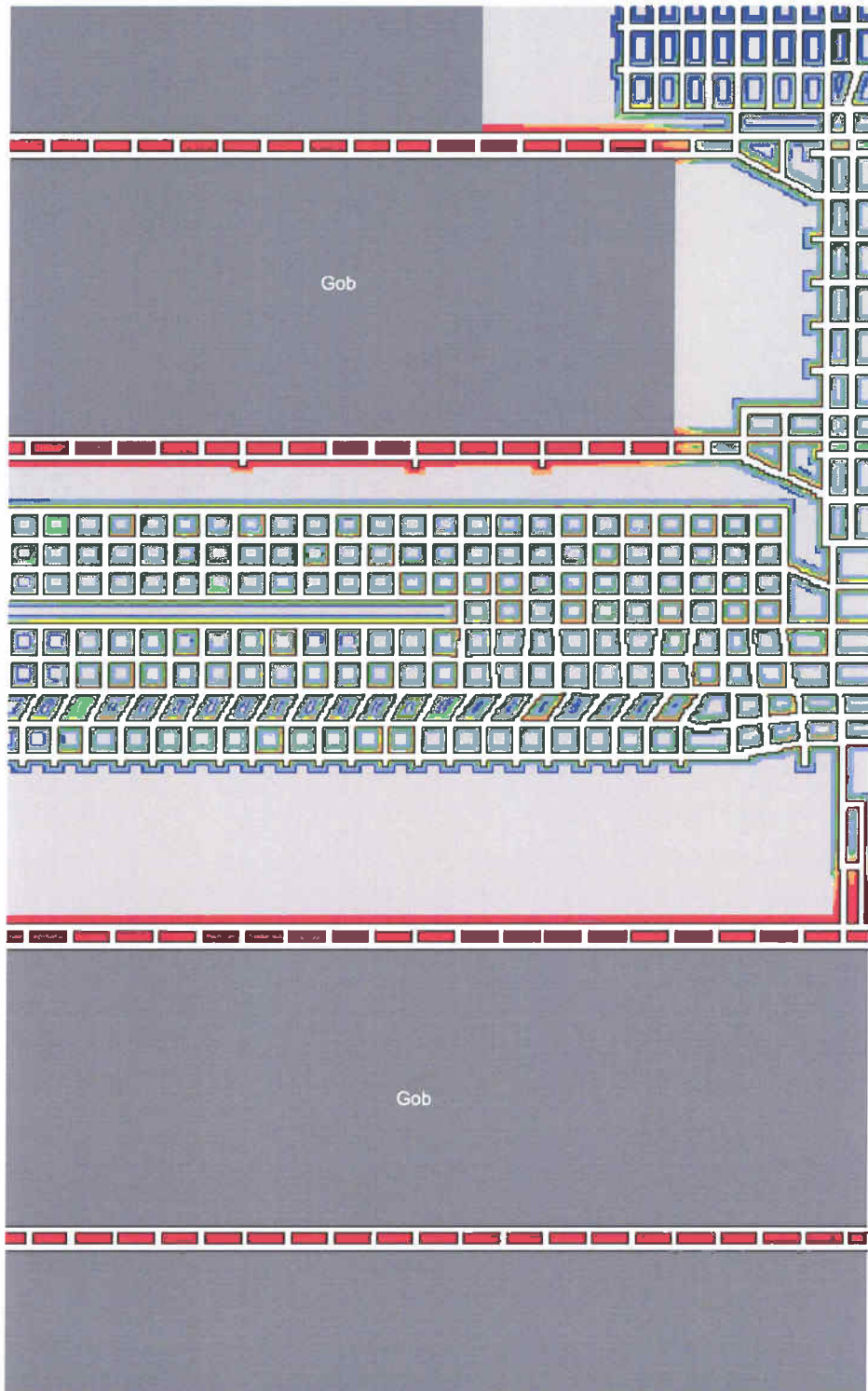
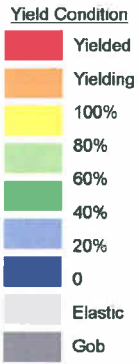


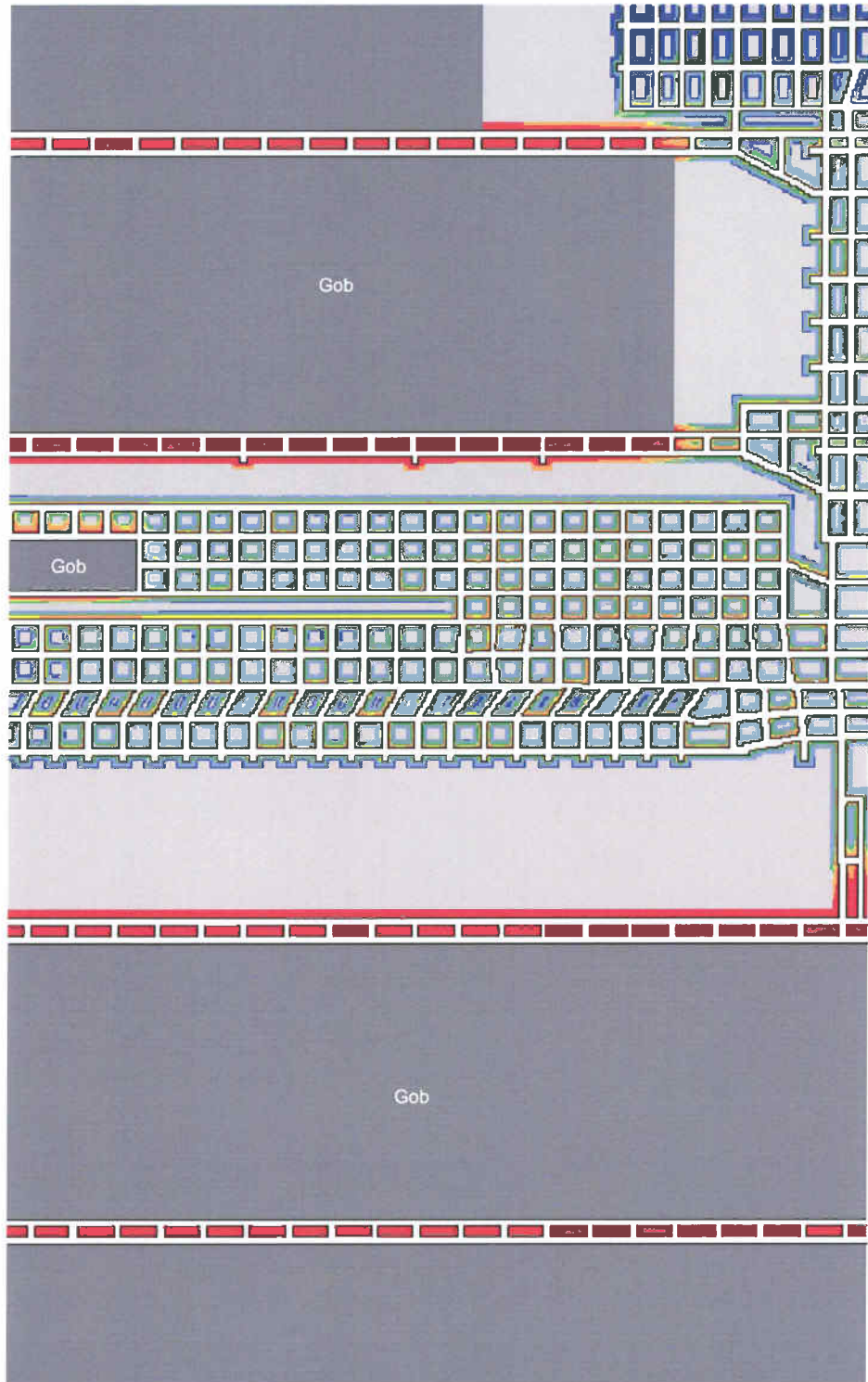
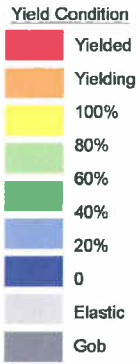
Vertical Stress (psi)



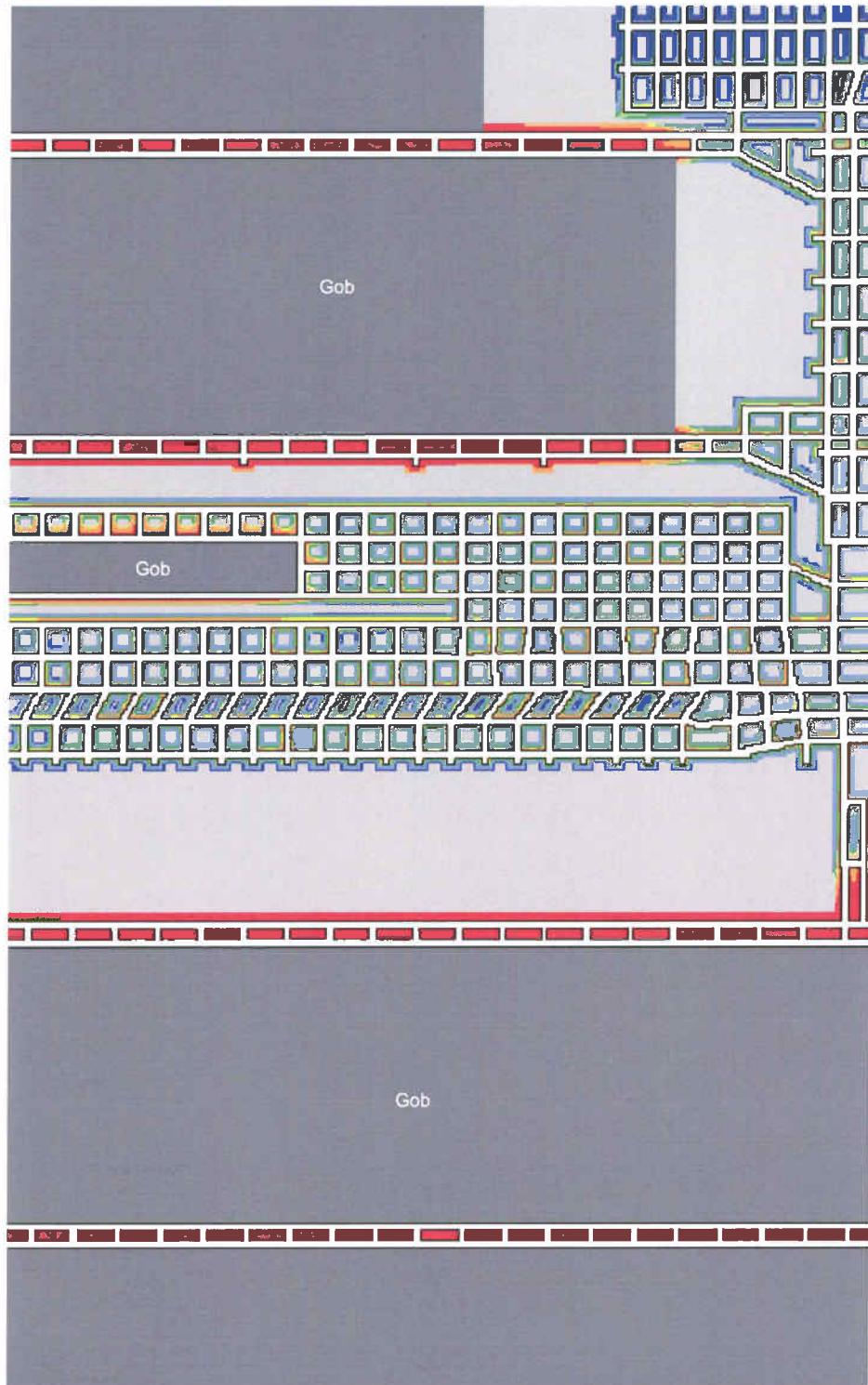
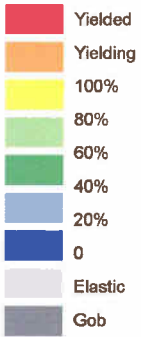
Vertical Stress (psi)



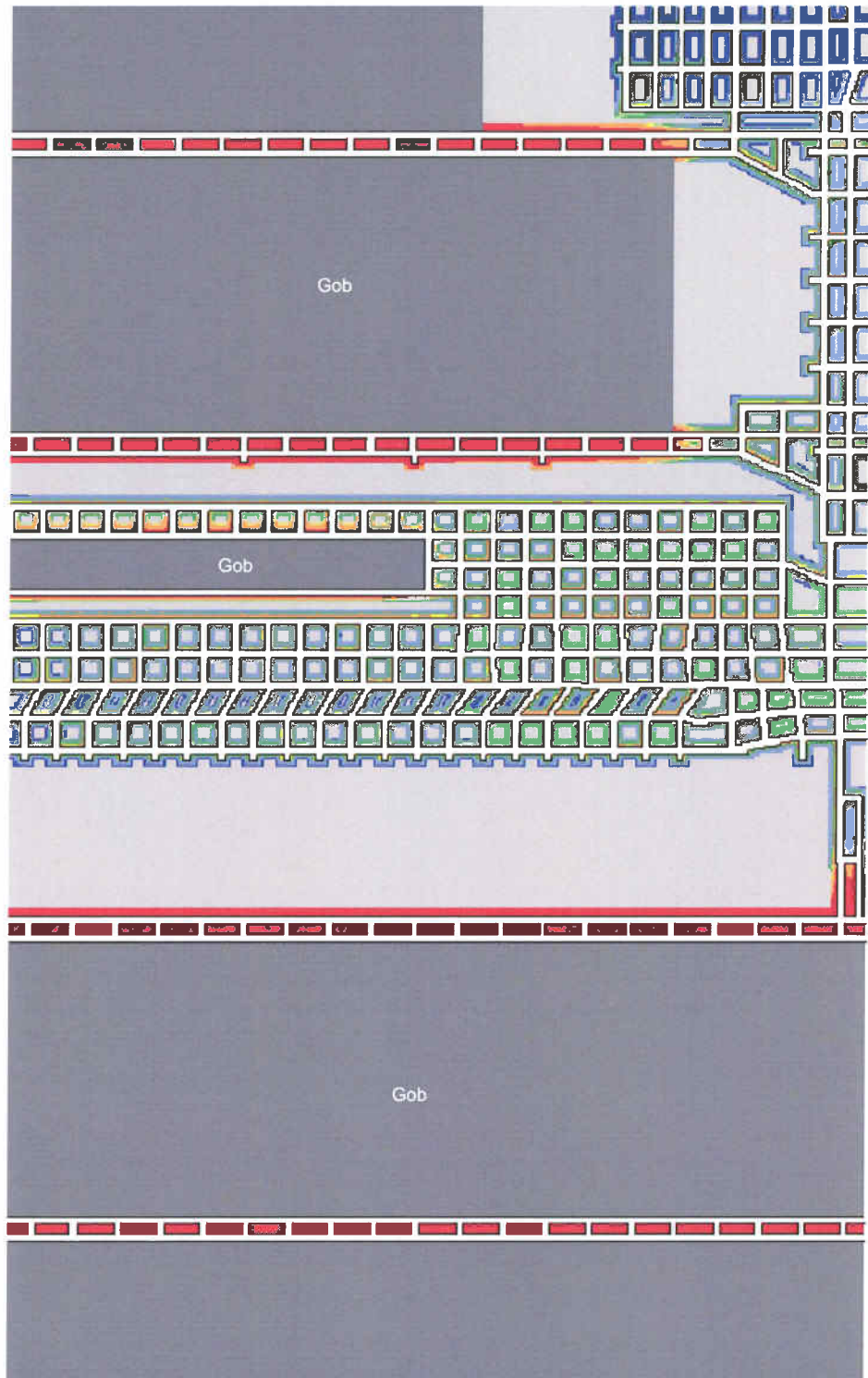
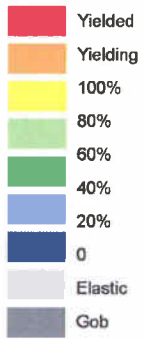




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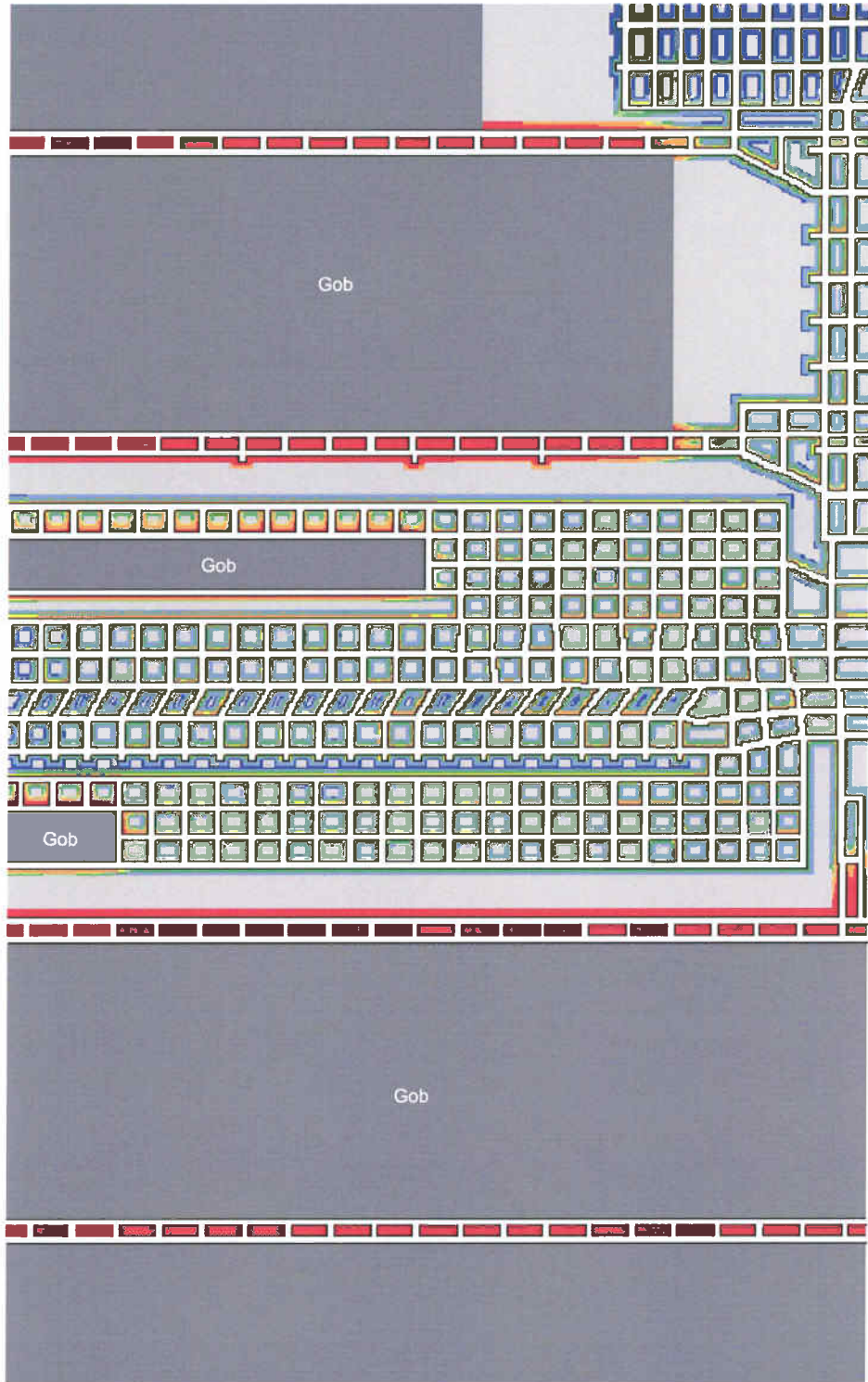


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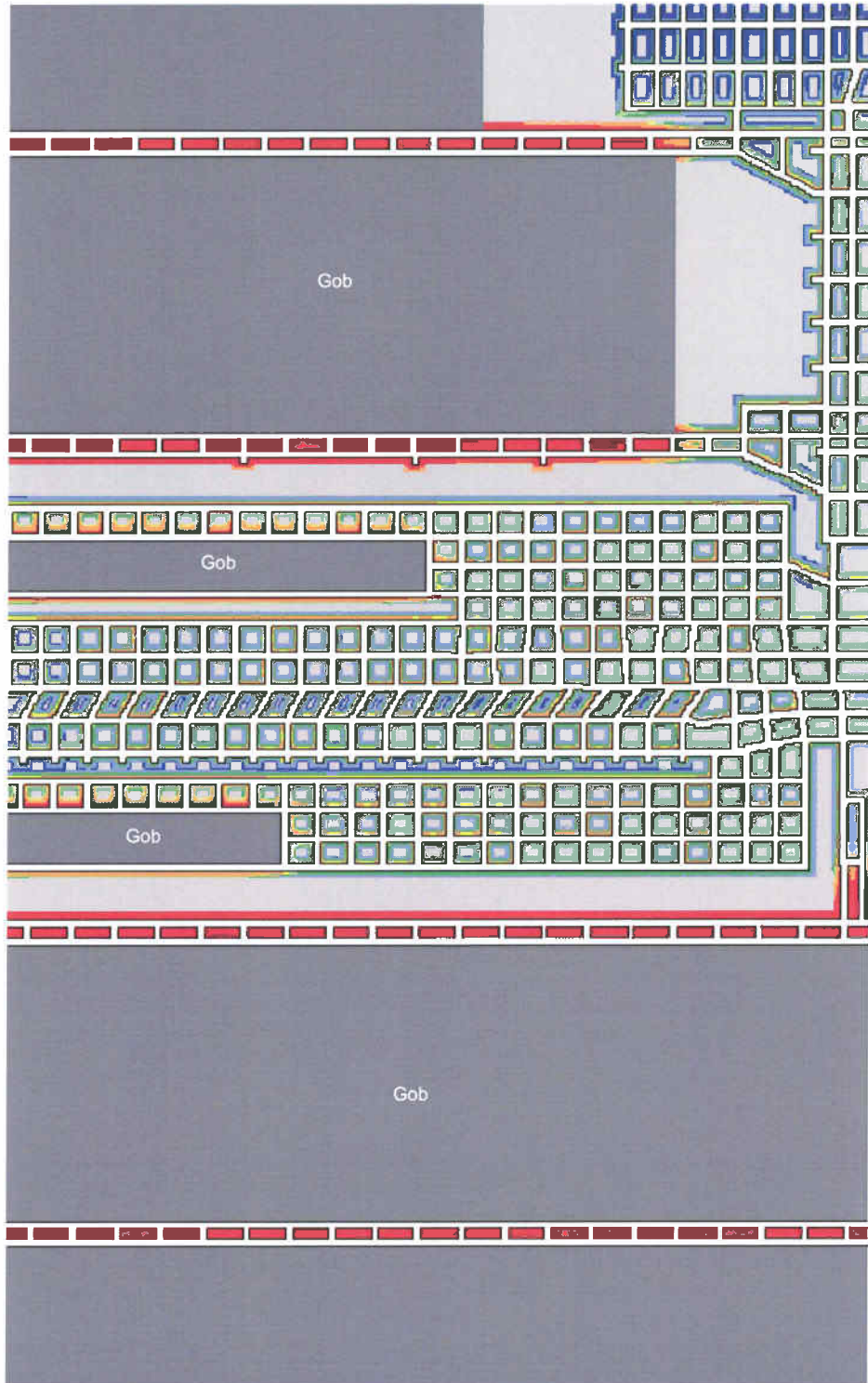
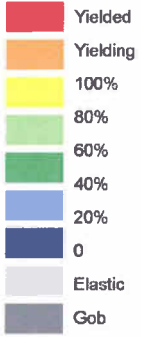


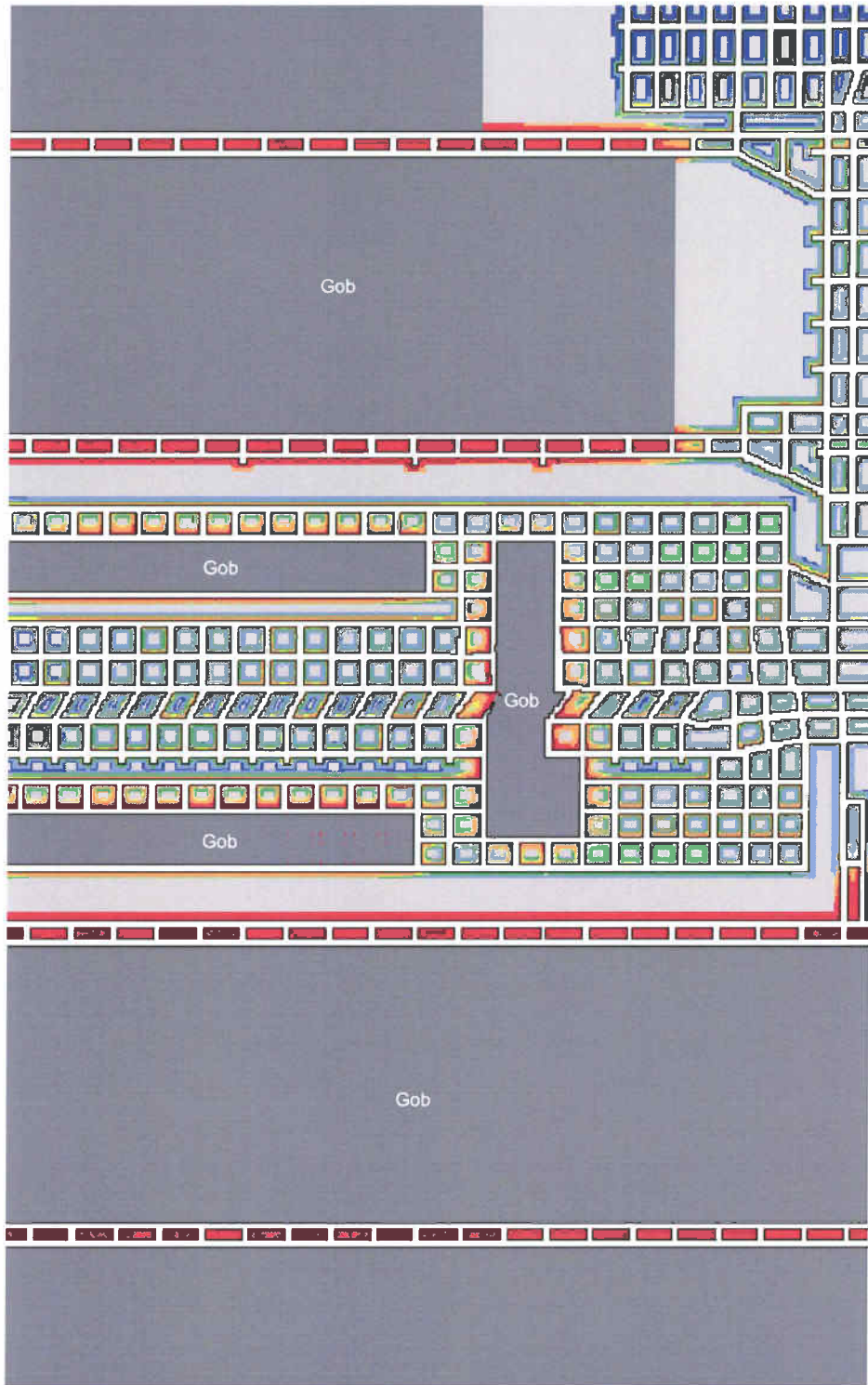
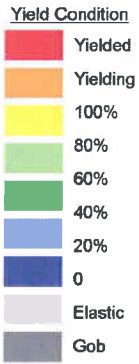
Yield Condition

- Yielded
- Yielding
- 100%
- 80%
- 60%
- 40%
- 20%
- 0
- Elastic
- Gob

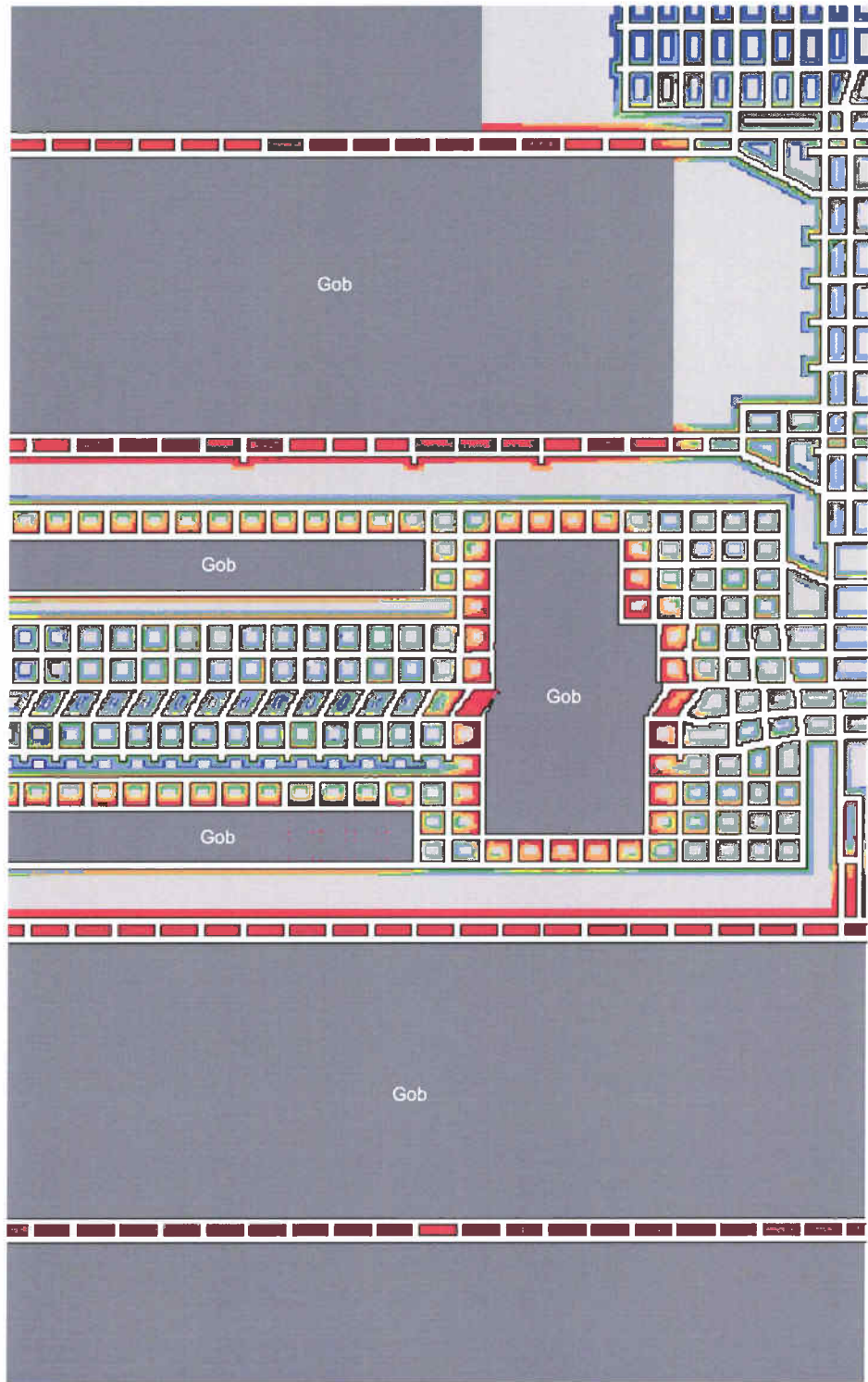
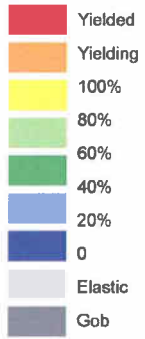


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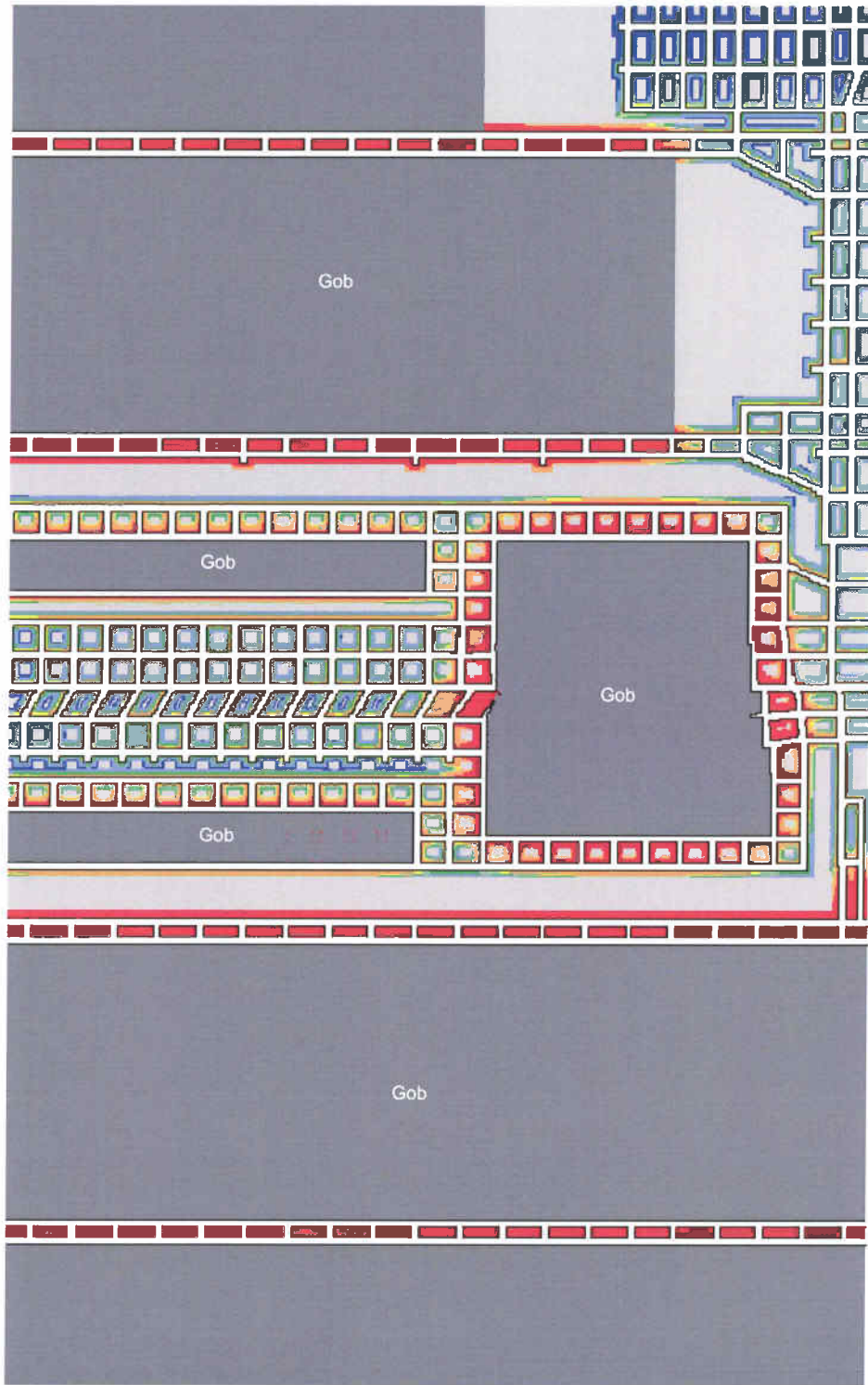
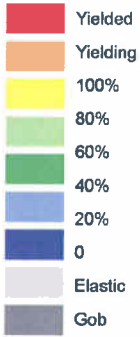




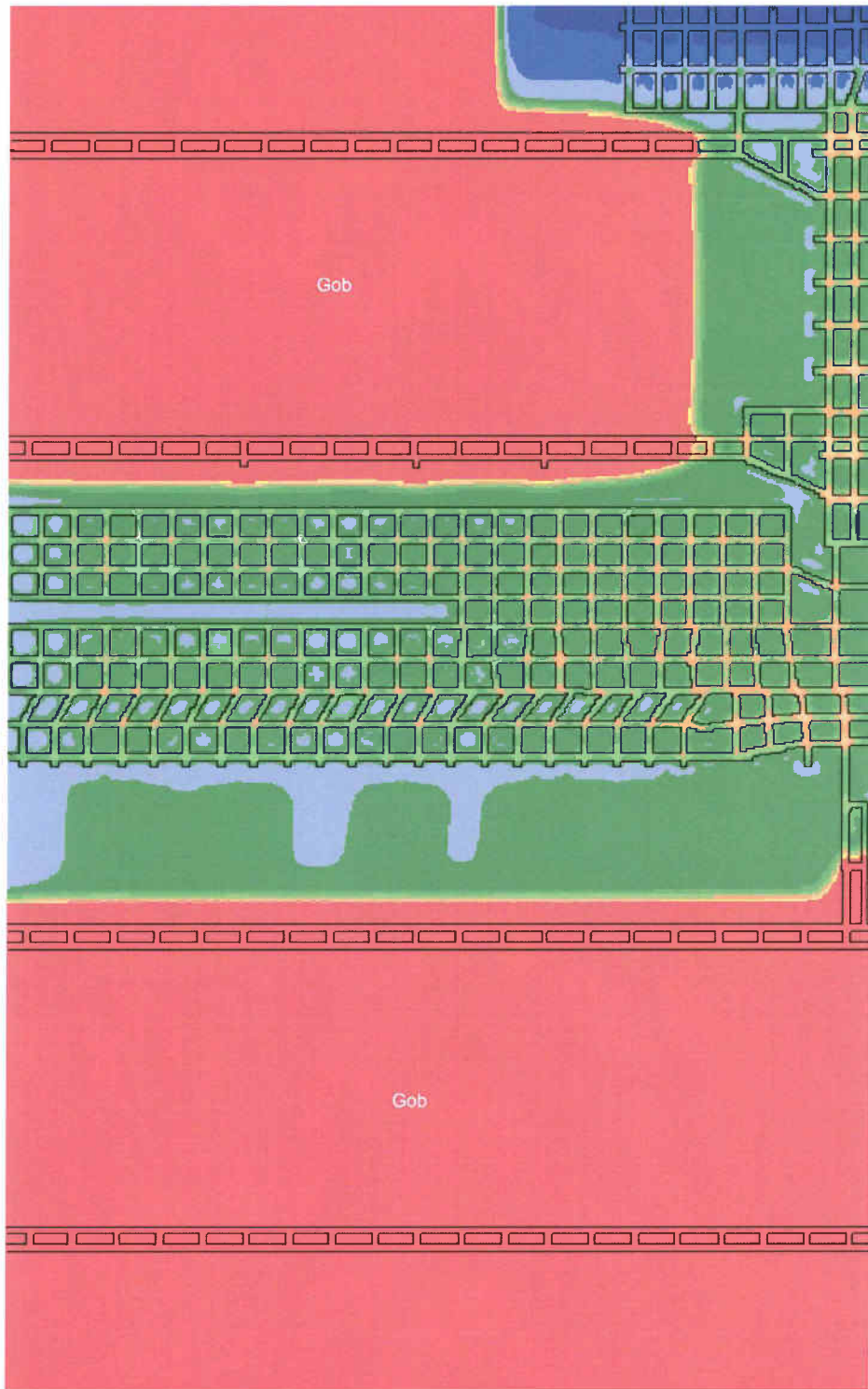
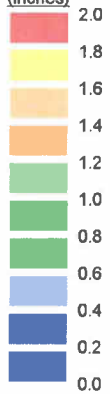
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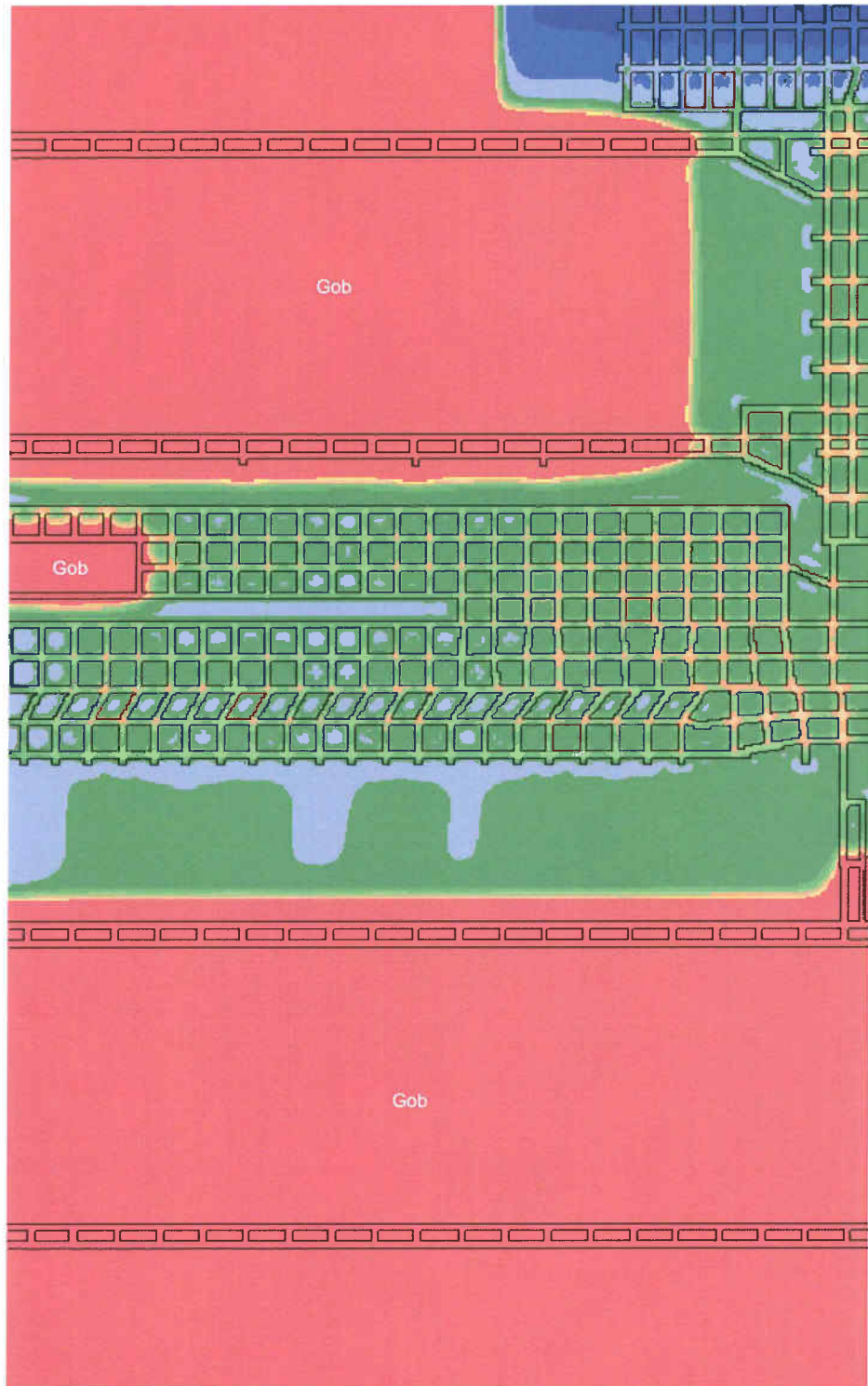
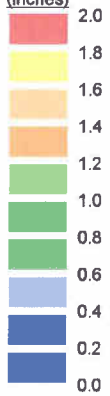
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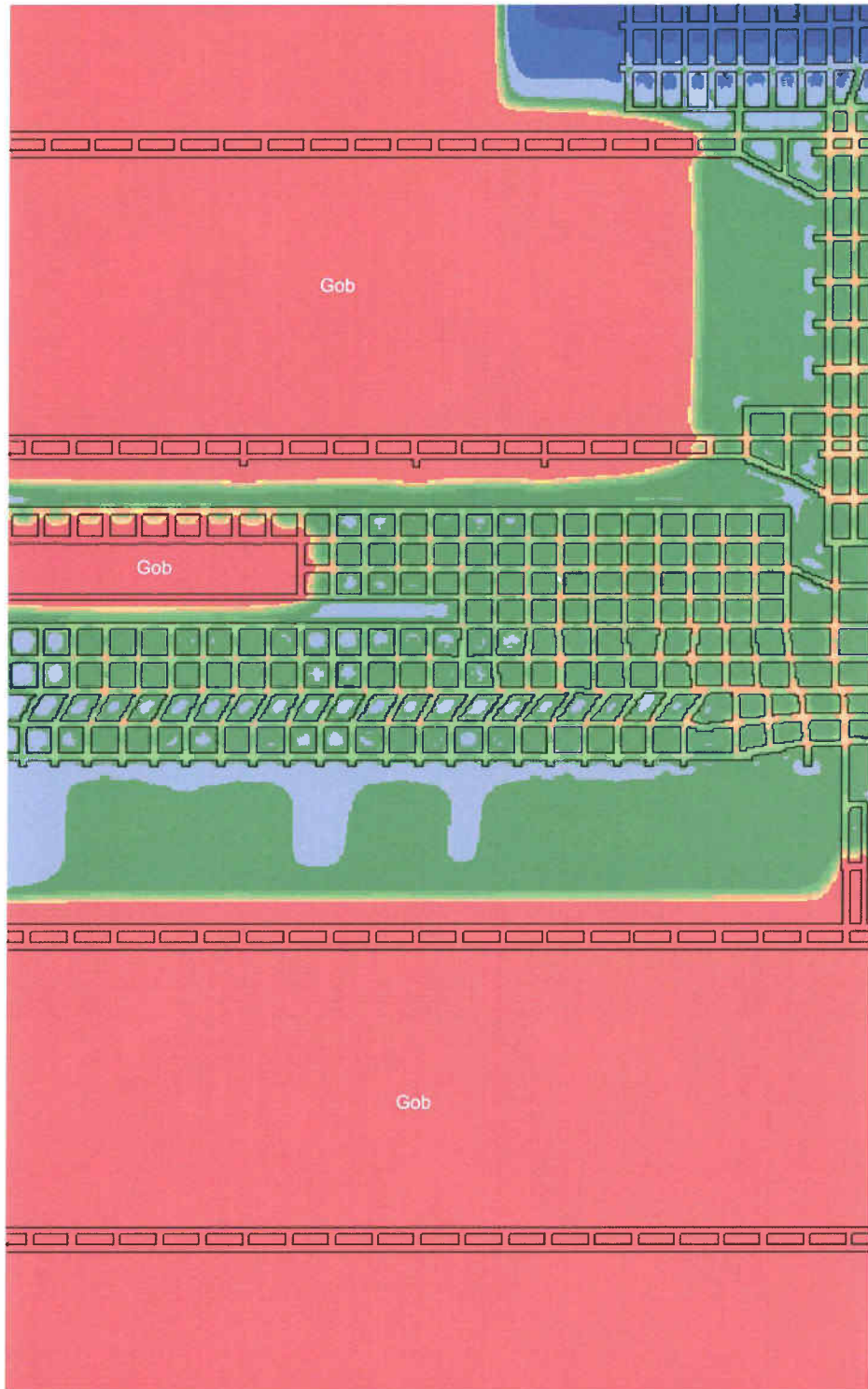
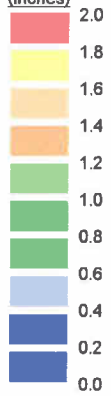
Vertical Displacement
(inches)



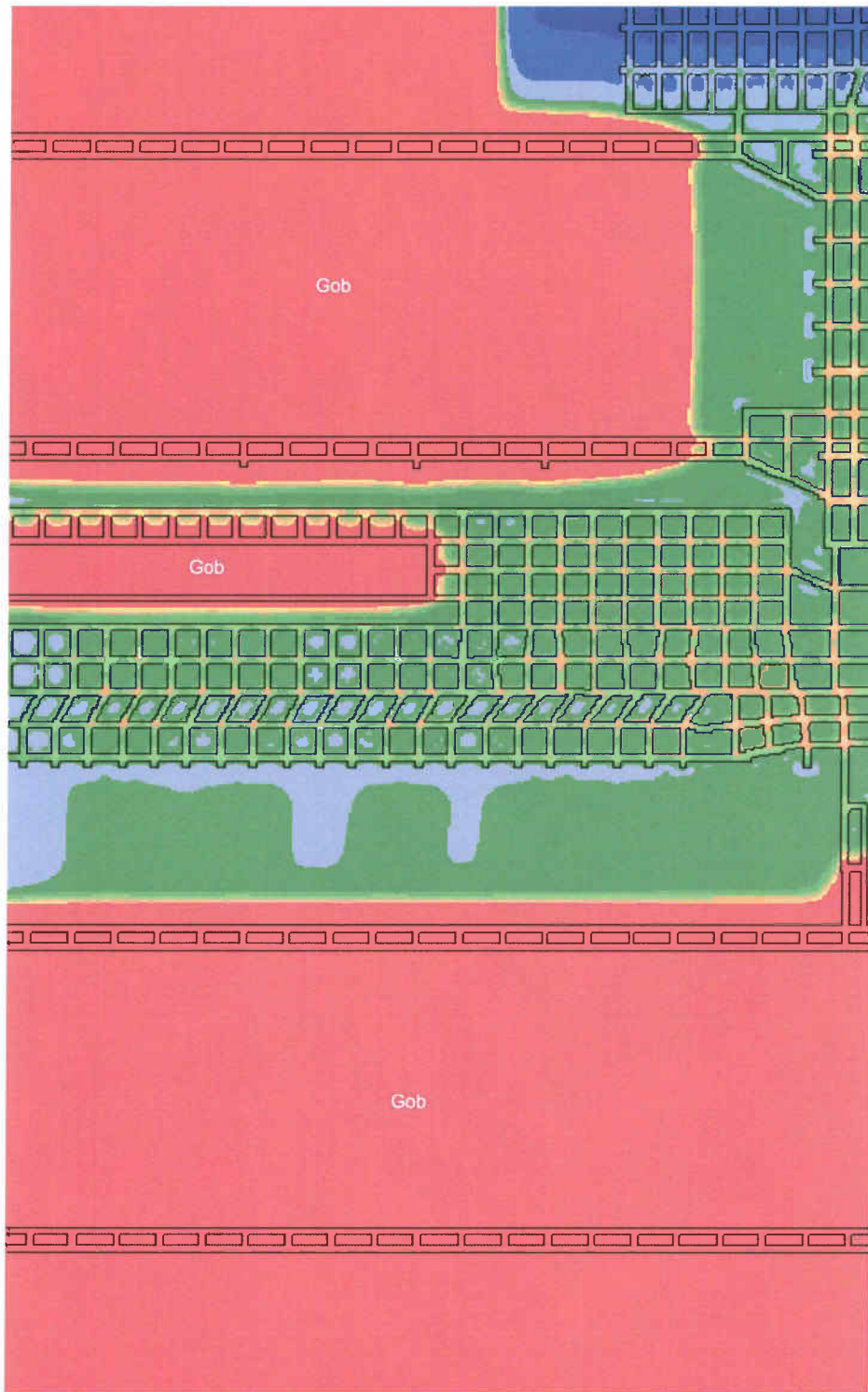
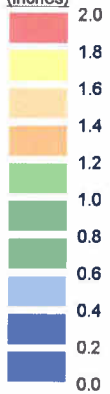
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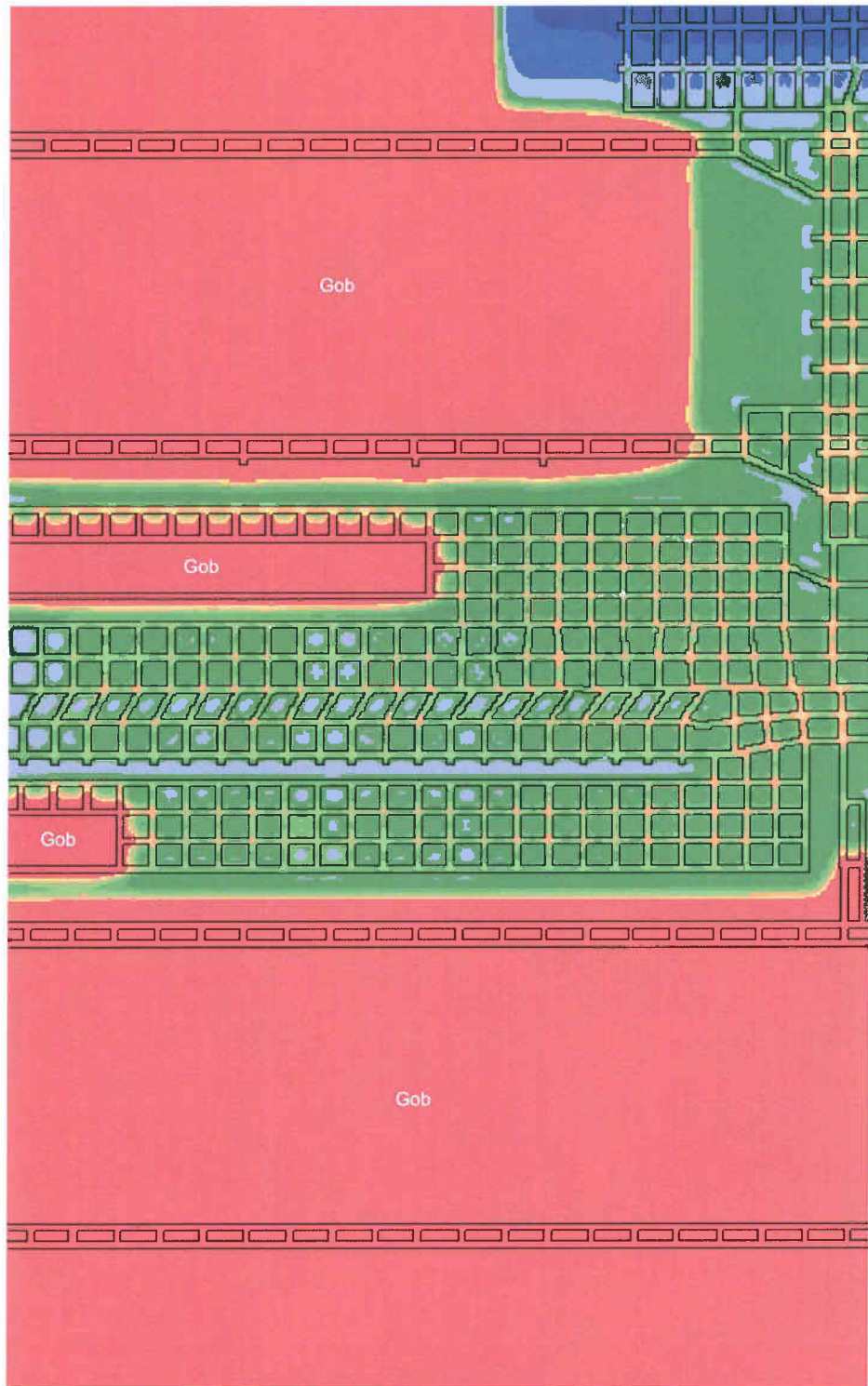
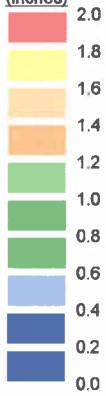
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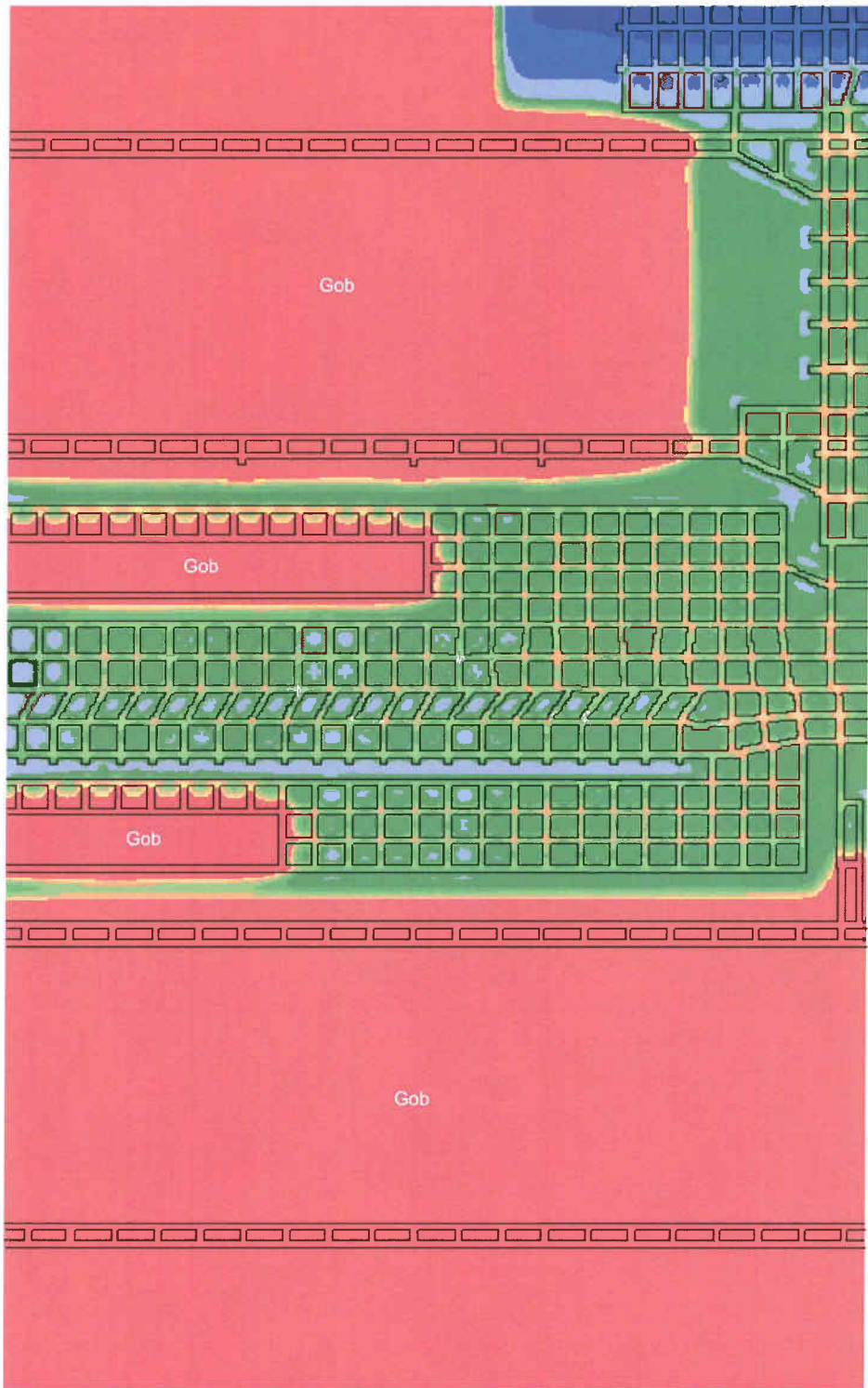
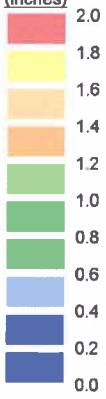
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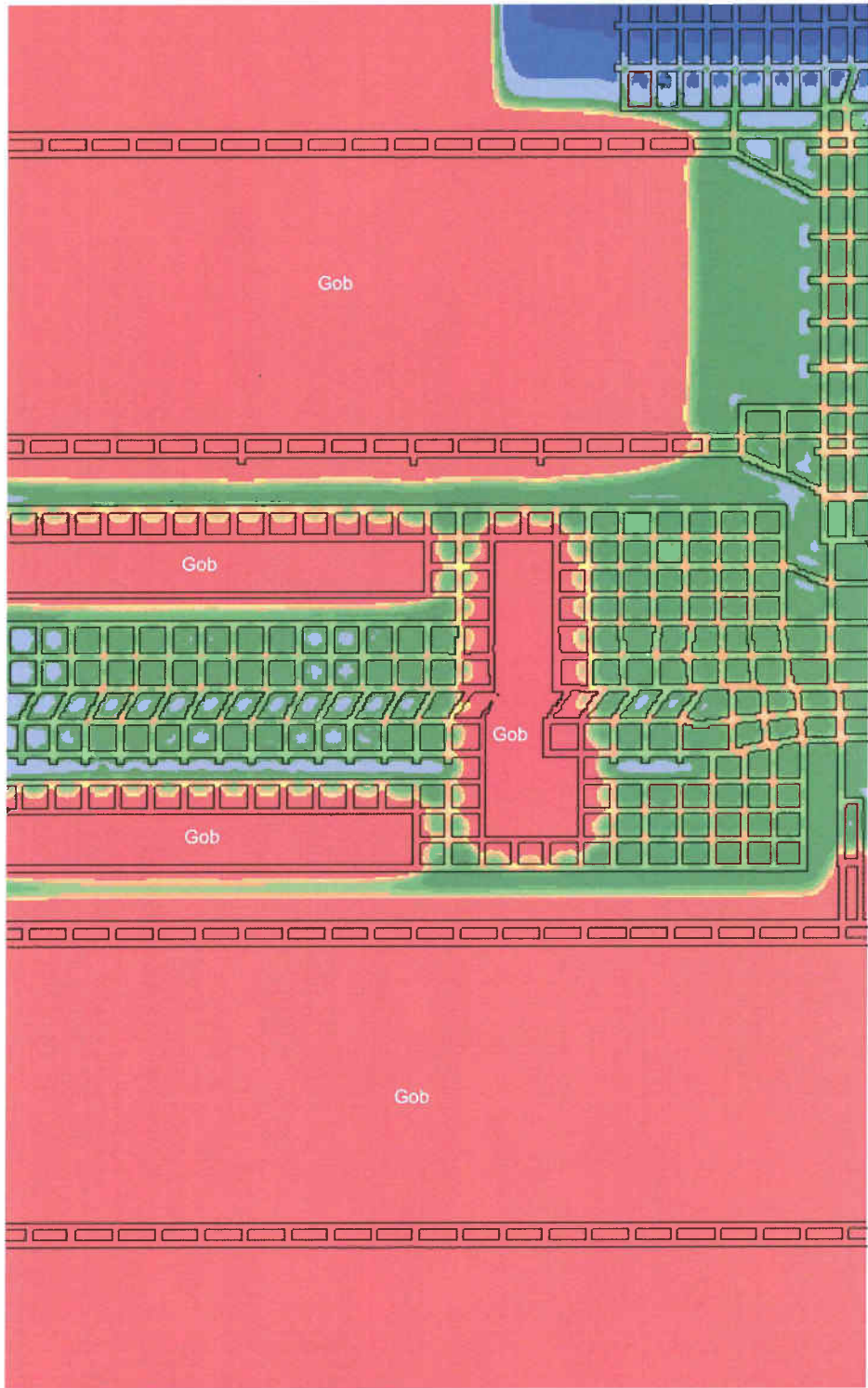
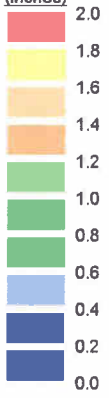
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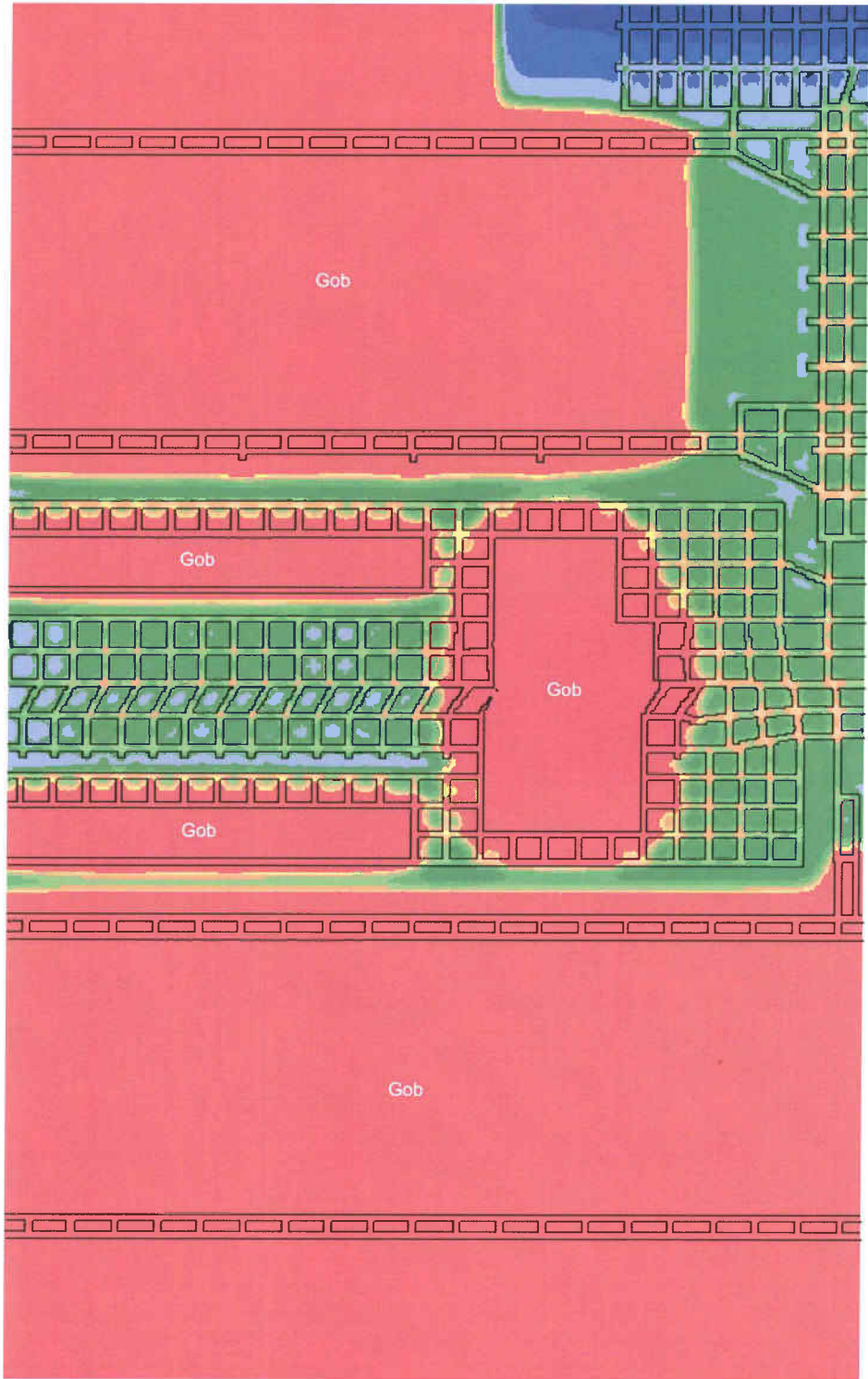
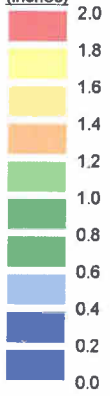
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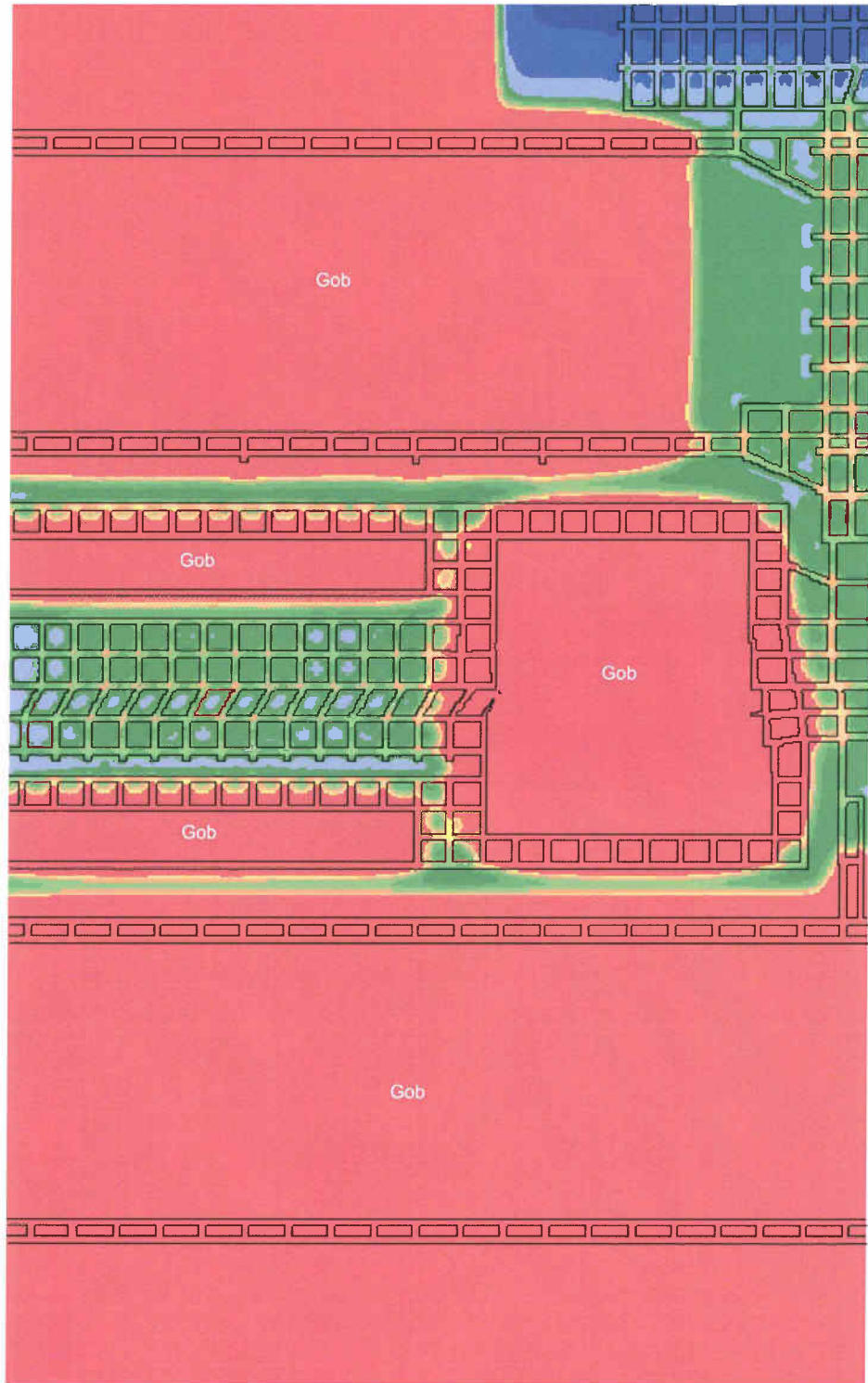
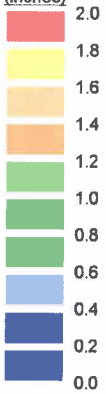
Vertical Displacement
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Vertical Displacement
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Vertical Displacement
(inches)



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December 8, 2006

226-20

Mr. Laine Adair
GENWAL Resources, Inc.
195 North 100 West
P. O. Box 1420
Huntington, UT 84528

Re: **Crandall Canyon Mine Ground Condition Review for Mining in the Main West North Barrier**

Dear Laine,

On December 1, 2006, Agapito Associates, Inc. (AAI), personnel, Michael Hardy, Gary Skaggs, and Bo Yu visited Crandall Canyon Mine to review the ground conditions of the room-and-pillar mining in the north barrier pillar along Main West. AAI personnel were escorted by Laine Adair.

Current plans in Main West include developing four entries in the north barrier west of the 1st Right Submains under cover ranging from approximately 1,300 ft to 2,200 ft. The mine plans were previously evaluated by AAI,^{1,2} and the proposed mine plan with 60-ft by 72-ft (rib-to-rib) pillars was judged to be adequate for short-term recovery mining in the barriers.

At the time of our visit, four entries with 60-ft by 72-ft (rib-to-rib) pillars were developed in the Main West north barrier to Crosscut 123, where the depth of cover was almost 2,000 ft (See Figure 1). Entry widths were cut at 17 ft and were about 20 ft wide at pillar mid-height. Roof support included systematic bolting and rib-to-rib meshing. To the north and south of the mining area, 130-ft and 60-ft barriers were left, respectively, for the purpose of protection.

Good to excellent ground conditions were observed at all locations visited. Stable roof, floor, and ribs with only minor rib sloughage were observed in the recently mined areas in the

¹ Agapito Associates, Inc. (2006), "DRAFT—GEWNALL Crandall Canyon Mine Main West Barrier Mining Evaluation," prepared for Andalex Resources, Inc., July 20.

² Agapito Associates, Inc. (2006), "(226-30) GENWAL Main West Retreat Analysis—Preliminary Results," E-mail from Leo Gilbride to Laine Adair, August 9.

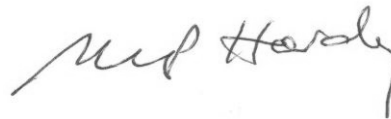
Mr. Laine Adair
December 8, 2006
Page 2

West Main barrier. Photo 1 shows only minor rib sloughing at Crosscut 123 in the entry immediately north of the West Mains. Photo 2 shows the second entry below longwall Panel 12 with minor sloughing at the rib between Crosscut 122 and Crosscut 121. The conditions of ribs along the north remnant barriers were good and consistent as shown in Photo 3. The rib was mildly yielded, but showed no evidence of blowouts, indicating that the 130-ft-wide remnant barrier pillar is wide enough to accommodate the load transfer from Panel 12 for short-term mining. The abutment load is expected to have alleviated since the time that Panel 12 was retreated in 1999 due to ground settlement and subsidence.

In summary, current ground conditions in Main West agree with our previous analysis. Roof, floor, and rib conditions were consistent with analytical predictions. There was no indication of problematic pillar yielding or roof problems that might indicate higher-than-predicted abutment loads. Conditions should continue to be carefully observed as mining progresses to the west under deeper cover.

We appreciate the opportunity to visit this area and directly observe ground conditions in the West Mains barrier. Please contact us if you have any questions.

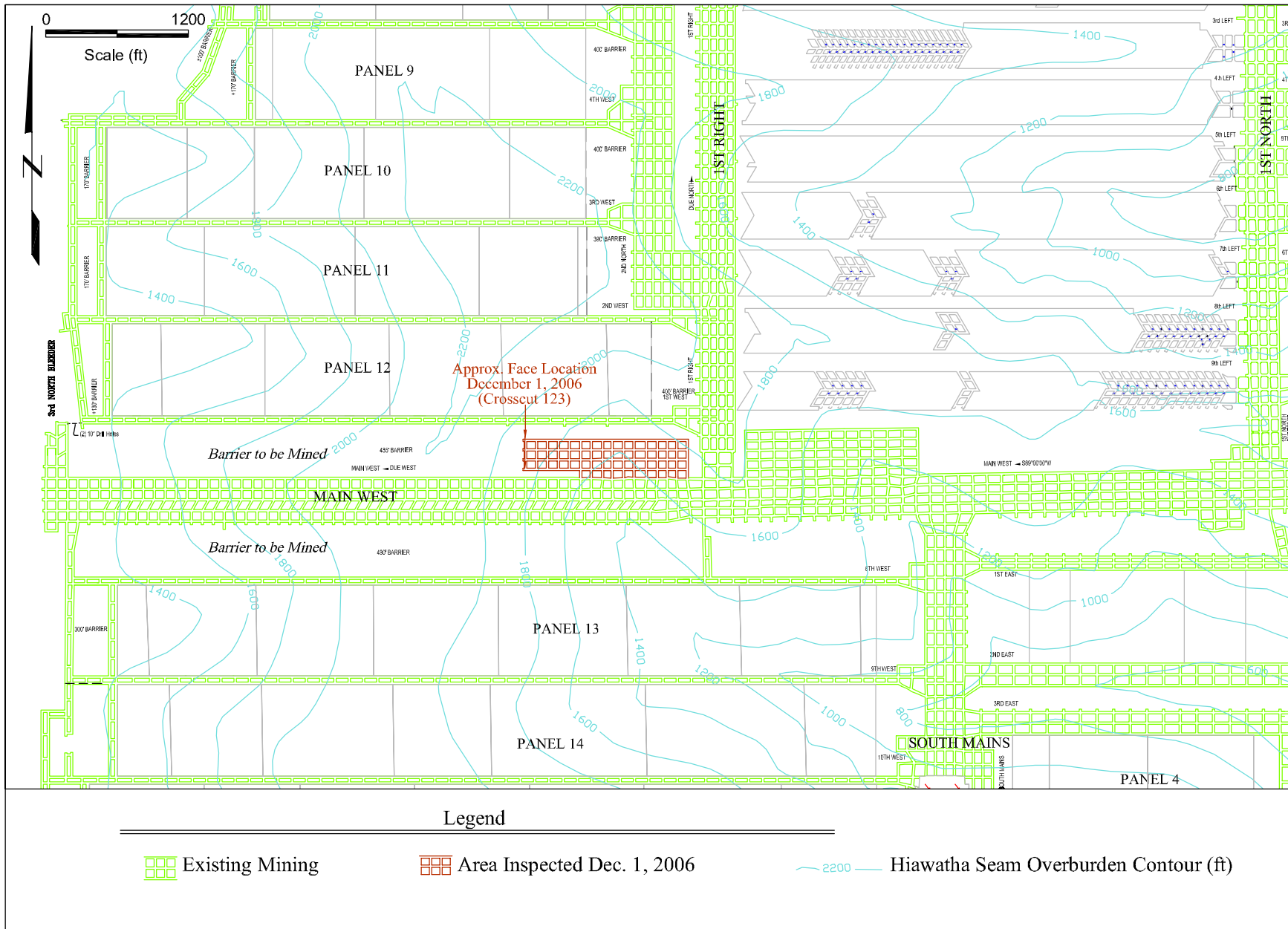
Sincerely,



Michael Hardy
Principal
mhardy@agapito.com

BY:MPH/smvf

Attachments(4): Figure 1
Photos 1-3



226-20 Genwal [Genwal_Plan Modeled Area_Dec 2006 Visit.dwg Layout:1]:by/rjl(12-08-2006)

Figure 1. Main West Location Map Showing Extent of Main West North Barrier Mining at Time of Dec 1, 2006 Visit



Photo 1. Rib Sloughing Near Crosscut 123 in the Entry North to the South Remnant Barrier Pillar



Photo 2. Minor Rib Sloughing at Crosscut 122 in the Second Entry from North Remnant Pillar



Photo 3. North Remnant Barrier Pillar Rib Condition Between Crosscuts 120 and 119