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DIV. OF OIL, GAS & MINING

ANDALEX RESOURCES, INC.

ABERDEEN MINE

CARBON COUNTY, UTAH

RESOURCE RECOVERY AND PROTECTION PLAN

FEDERAL LEASE UTU-79975

SUMMIT CREEK TRACT

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
P.O. Box 45155
Salt Lake City, UT 84145-0155
http://www.blm.gov

TAKE PRIDE IN AMERICA

IN REPLY PLEASE REFER TO:
3482
UTU-79975
(UT-923)

AUG 12 2004

Pamela Grubaugh-Littig
Permit Supervisor
State of Utah
Division of Oil Gas and Mining
1594 West North Temple Street, Suite 1210
Salt Lake City, Utah 84114-5801

Re: Resource Recovery and Protection Plan (R2P2), Federal Coal Lease Addition, UTU-79975, Aberdeen Mine, ANDALEX Resources, Inc. C/007/0019

Dear Ms. Grubaugh-Littig:

The Bureau of Land Management (BLM) has received and reviewed the subject R2P2 as part of the permit application package for adding Federal coal lease UTU-79975 to the approved Centennial Mine Complex Permit. This letter documents the BLM's finding for the R2P2.

ANDALEX has submitted mining and reclamation plans (the R2P2 being part of the submission) to add the new Summit Creek coal lease (UTU-79975) to the existing Centennial Mine Complex Permit. Underground mining using longwall mining methods will continue north into the new lease from the existing Aberdeen Mine workings (part of the Centennial Mine Complex) and will not change any of the existing surface facilities. Mining to the east extent of the lease will extend as far as economically and operationally practical to achieve Maximum Economic Recovery (MER) as approved by BLM.

This 703 acre lease addition, along with an adjacent fee coal addition, will allow Andalex to possibly mine 3 extra longwall panels under extremely deep cover. Mining this lease will avoid bypass of this coal resource and extend the mine life by about 6 years. BLM has reviewed the submitted R2P2 and has determined it to be complete and a logical plan to mine the Federal coal.

Please note that ANDALEX has first submitted an Incidental Boundary Change (IBC) to allow longwall development entries to be mined across a corner of the lease before full permit approval of the whole lease can be given. Since these development entries are part of the R2P2, our recommendation for R2P2 approval is the same for the IBC as the full lease permit.

The BLM finds the submitted R2P2 in compliance with the Mineral Leasing Act of 1920, as amended, the lease terms and conditions, the regulations at 43 CFR 3480, and will achieve maximum economic recovery of the Federal coal. We therefore recommend that the Secretary approve the R2P2 as part of the Federal Mine Plan.

If you have any questions, please contact Jeff McKenzie of my staff at (801) 539-4038 or Stephen Falk at the Price Field Office at (435) 636-3605.

Sincerely,

James F. Kohler
Chief, Solid Minerals Branch

Enclosure
R2P2 for Federal Lease UTU -79975
with BLM Utah State Office Approved Mine Plan

cc: Office of Surface Mining (with enclosure)
P.O. Box 46667
Denver, Colorado 80201-6667

Price Field Office, UT-070 (w/o enclosure)

ANDALEX Resources, Inc. (w/o enclosure)
P. O. Box 902
Price, Utah 84501

ANDALEX RESOURCES, INC.

ABERDEEN MINE

CARBON COUNTY, UTAH

RESOURCE RECOVERY AND PROTECTION PLAN

FEDERAL LEASE UTU-79975

SUMMIT CREEK TRACT

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FIGURES:

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Figure 2 -- Typical 5 Entry Mains

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PLATES:

Plate 1 Aberdeen Seam Structure and Surface Ownership

Plate 2 Mining Plan with Thickness, Depth of Cover and Mineral Ownership

Plate 3 Surface Facilities

Plate 4 Aberdeen Mine Topography

ATTACHMENTS

A. Rock Mechanics

B. MSHA Roof Control Plan

CFR 3482.1 (c)(1)

The applicant, ANDALEX Resources Inc. will also be the operator/lessee

Notices and orders should be delivered to the following persons:

1. ANDALEX Resources Inc.
   P.O. Box 902
   Price, Utah 84501
   (435) 888-4000
   Laine Adair – General Manager

2. ANDALEX Resources Inc.
   P.O. Box 902
   Price, Utah 84501
   (435) 637-5385
   Mike Glasson– Geologist and Resident Agent

Employer Identification #: 61-0931325, MSHA I.D. # 42-02028

The Summit Creek Tract federal coal lease number is UTU-79975. The following is a legal description of the leases:

Lease Serial Number	Acreage	Legal Description	
UTU-79975	703.0	T12S, R11E, SLM, Carbon County, Utah	
		Section 29:	SW¼ SW¼, SW¼ SE¼.
		Section 30:	Lots 4, 12 and 14-16.
		Section 31:	Lots 1, 2 and 7-11.
		Section 32:	W½NE¼, E½NW¼, NW¼NW¼ and NE¼SW¼.

Refer to Plates 1 & 2 for specific surface and mineral ownership boundaries. Please note that the conversion factor to be used to convert these maps to state plane sea level coordinates (NAD 27) is 0.99966298462.

Subsurface mineral rights owner(s) addresses are as follows:

Bureau of Land Management
Utah State Office
324 South State Street
Suite 400
Salt Lake City, Utah 84114

Surface owner(s) addresses are as follows:

Bureau of Land Management
Utah State Office
324 South State Street
Suite 400
Salt Lake City, Utah 84114

Lois Critchlow
2217 South 1620 East
Price, Utah 84501

David R. Cave et al
3379 East US Highway 50 and 6
Price, Utah 84501

Mathis Land Company
% Dale Mathis
2699 East Highway 50 and 6
Price, Utah 85401

Funnon T. Shimmon
1551 East North Coal Creek Road
Wellington, Utah 84542

CFR 3482.1 (c)(2)

Regional Geology

The Book Cliffs coal field consists of Tertiary and Cretaceous strata, mostly limestone, sandstone, and shale that differ in resistance to erosion. Limestones and sandstones generally form cliffs, whereas the shales form recessive slopes. The lithologies present include fluvial, deltaic, and marine sandstones, mudstones and shales.

Stratigraphic units present in the vicinity of the Summit Creek area include from youngest to oldest: (1) the Flagstaff Limestone (limestone, mudstones and sandstones) (2) the North Horn Formation (mudstones, shales, conglomerates and sandstones); (3) the Upper Price River Formation (steep slope-forming sandstone with minor interbeds of pebble conglomerate and shale of fluvial origin); (4) the Lower Price River Formation which consists of the basal Castlegate Sandstone Member (cliff-forming sandstones, conglomerates, and minor amounts of shale (deltaic origin)); (5) the Blackhawk Formation (cliff-forming sandstone underlain by slope-forming mudstone, shale and coal, of paludal origin); (6) the Aberdeen Sandstones and (7) the Mancos Shale (slope-forming marine shales).

Stratigraphy of Lease Area

The coal-bearing unit is the Upper Cretaceous Blackhawk Formation. The Blackhawk Formation is composed of gray sandstone, siltstone, shale, and coal. There are various more or less distinct coal beds or zones which are listed below from top to bottom according to stratigraphic position.

Sunnyside Coal Bed
Centennial Coal Bed
Rock Canyon Coal Bed
Fish Creek Coal Bed
Gilson Coal Bed
Kenilworth Coal Bed
Castlegate "B" Bed
Castlegate "A" Bed (Aberdeen)

These zones are lenticular and reach minable thickness only in certain areas. Within the UTU-79975 lease area the Castlegate "A" Bed (Aberdeen coal seam) is the only mineable bed.

See Figure 1 for cross-section based upon drill hole MC-150.

Structure

The Book Cliffs are basically a homocline (dip slope) dipping into the Uintah Basin to the north, with the cliff front roughly paralleling the strike of this feature.

Occasional faults cut the coal measures but are of small displacement and have been of little consequence in mining. The most serious group of faults lies in the Sunnyside area, which is 20 miles to the east of the UTU-79975 lease area.

Formations in this portion of the Book Cliffs coal field generally dip 3-8 degrees to the north and northeast. The lease area dips northeastward at approximately 6 degrees. The strike is generally parallel with the face of the Book Cliffs.

Hydrology

The surface streams present on the lease area drain to the north and west. The streams are generally either ephemeral or intermittent.

Small seeps are also present in the Summit Creek Tract. The geological formations in the lease area could contain isolated perched groundwater aquifers in lenticular sandstones interbedded within the shales. The variability and small volume of these seeps reflect the small recharge area, the minimal groundwater extent and the less permeable strata.

The shales of the Blackhawk Formation are only slightly permeable; consequently, ground water within the formation is perched. If perched water is encountered from the Blackhawk Formation, due to drilling or from the strains associated with subsidence, its vertical flow to deeper strata would be altered and flow into the active mine (the source of some of the mine water discharge. None of this groundwater would ever become springs and are too deep to access by water wells.

Perched water from the Flagstaff Limestone and North Horn Formation is the groundwater which release water under topographic conditions (springs) and is found on the surface of the lease area and should not be affected by mining. This is due to the fact that the cover of the UTU-79975 lease area is in excess of 2,500 ft. Mining conducted south of the UTU-79975 lease in the Aberdeen seam has not resulted in any measurable surface subsidence, where the depth of cover is in excess of 1,000 ft.

A complete discussion of the springs and seeps encountered within the permit area is found in ANDALEX MRP.

Plate 3 shows the surface facilities. Plate 4 shows topography above the Aberdeen mine area.

CFR 3482.1 (c)(3)(i)

Quality Information

The Summit Creek tract has one minable seam: the Castlegate "A" or Aberdeen Seam. The UTU-79975 lease area has no core holes with quality data. However, the Mathis Tract just to the west has Drill Hole MC-104 with quality data.

Aberdeen Seam In-Place Coal Quality Adjusted for Moisture (based on drill hole MC-104)

Characteristic	Expected Value
Btu	12,632
Sulfur	0.49%
Ash	5.98%
Inherent Moisture	3.5%
Expected Total Moisture	7.0%
MAF Btu	14,517

During the mining sequence, out of seam dilution will occur. The out of seam dilution rate for the longwall is estimated at a 0.75% increase of ash. Continuous miners typically have a greater amount of out of seam dilution, which is estimated at a 2.0% increase of ash. Considering the ratio of continuous miner production to longwall production the overall increase in ash is expected to be approximately 1.0%. Therefore, the mine run coal quality for the Aberdeen Seam is projected to be:

Characteristic	Expected Value
Btu	12,485
Sulfur	0.50%
Ash	7.00%
Moisture	7.0%
MAF Btu	14,517

CFR 3482.1 (c)(3)(ii)

1) Mining Method to be used on Federal Lease UTU-79975:

Both longwall and continuous miner methods will be employed to recover the coal resource. Longwall will be the primary production method, while continuous miners will be used mainly for mine development to support the longwall. The longwall panels have been laid out to maximize recovery of the primary coal reserves.

After the gateroad entries have been driven the length of the longwall panel, longwall equipment will be moved in to the set up room at the back end of the panel. The equipment on a longwall face consists of a panline with a chain conveyor to move the mined coal, a shearer which will cut the coal from the coal face and hydraulic shield supports which hold the roof while the shearer cuts the coal. The shearer cuts the coal from the face as it travels along the panline across the width of the panel (face). The conveyor passes the coal on to a stageloader with a crusher, which in turn transfers the coal onto the mine belt conveyor system that carries the coal outside.

The projected life of the Aberdeen Mine is estimated at 10 years. After the economically recoverable reserves have been depleted, the portals will be sealed and the surface facility area will be reclaimed in conjunction with the other Andalex Mines.

The longwall is projected to produce a rate of 1.5 million tons per year. The longwall equipment employed in the Aberdeen mine has an effective mining range of 6.5 ft. to 9.5 ft. The mine is expected to produce approximately 3.04 million tons from the federal lease.

2) Basic mining equipment to be used on the Summit Creek Lease:

Continuous Mining System:

Drum type continuous mining machine
Shuttle cars
Roof bolter
Diesel scoop tractor
Feeder breaker
Section power center

Longwall Mining System:

Double drum shearer machine
Armored face conveyor
Hydraulic Shield Roof Supports
Stage loader and crusher
Longwall power center
High Pressure hydraulic pump system

3) Mining Sequence:

Refer to Plate 1 for the proposed mining sequence.

4) Production Date:

The Aberdeen mine is currently developing gateroad entries toward federal lease UTU-79975. The projected start date of mining in the federal lease is October 2004. The longwall is projected to begin production on UTU-79975 in August 2005. The mine is expected to operate thru 2014 when reclamation will begin.

5) Estimated Recovery Factors:

The recovery factor for the lease area will depend on a number of factors, including: coal quality, coal thickness, roof conditions, floor conditions, and other variables. As a result, the recovery factor cannot be predicted accurately. However, if the lease can be mined as proposed the recovery factor could approach 50%.

6) Stripping Ratio:

No surface mining will be done, thus no stripping ratio.

7) Highwall Limits:

No surface mining will be done, thus no highwall limits.

8) Number of acres to be affected:

Approximately 5,500 acres will be within the permit boundary, which includes the federal lease. None of the surface on federal lease U-79975 will be used for surface facilities.

CFR 3482.1 (c)(3)(iii)

Federal Lease Reserves:

The Federal Lease UTU-79975 coal reserve base is estimated at 24,000,000 tons.

Federal Lease UTU-79975 minable reserve base is estimated at 8,145,000 tons.

Recoverable Federal Lease UTU-79975 coal reserves are estimated at 3,040,000 tons in the Aberdeen Seam.

The Aberdeen Mine is covered by an LMU application, that was submitted several years ago but has never been approved. Some private and state lands will be mined.

CFR 3482.1 (c)(3)(iv)

Method of Abandonment

The mine will be abandoned and reclaimed in accordance with the Mining and Reclamation Plan approved by the Utah Division of Oil, Gas and Mining (DOGM), the U.S. Office of Surface Mining and the U.S. Bureau of Land Management. The mining and reclamation plan is described in detail in Permit Application Package C/007/019 filed with DOGM.

The mine is designed with the main entries being driven on the western boundary of the mine permit. The longwall panels will extend from the mains to the east to the point that the coal thickness is 6.5 feet or less.

The main entries are protected by barrier pillars, where each longwall panel is finished. Bleeder entries at the back end of the longwall panel are also protected by barrier pillars.

There is no unmined federal coal reserves or resources that require protection.

CFR 3482.1 (c)(4)(i)(A)

Refer to Plate 1.

CFR 3482.1 (c)(4)(i)(B)

Andalex Resources, Inc has submitted an LMU application for the existing mines and leases, however this application does not include the Summit Creek tract.

CFR 3482.1 (c)(4)(i)(C)

No surface improvements exist or are planned within federal lease UTU-79975.

Refer to Plate 1 for surface ownership and boundaries.

CFR 3482.1 (c)(4)(i)(D)

Refer to Plate 1 for the coal outcrop showing dips and strikes.

CFR 3482.1 (c)(4)(i)(E)

There are no abandoned mines in the vicinity of Federal Lease UTU-77975.

CFR 3482.1 (c)(4)(ii)

See Plates 1 and 2.

CFR 3482.1 (c)(4)(iii)

Figure 1 depicts the typical structure cross-section based on drill hole MC-150 showing all the coal contained in the coal reserve base.

CFR 3482.1 (c)(4)(iv)(A)

No surface mining is planned so a general layout of surface mine is not applicable.

CFR 3482.1 (c)(4)(i)(B)

No surface mining is planned so a general layout showing location and width of coal fenders is not applicable.

CFR 3482.1 (c)(4)(iv)(C)

No surface mining is planned so a general layout showing cross section of typical pit is not applicable.

CFR 3482.1 (c)(4)(v)(A)

Plate 1 shows a general layout of the existing and proposed underground mining with a planned sequence for the first 5 years and for the life of the mine.

CFR 3482.1 (c)(4)(v)(B)

Plate 1 shows a general layout of the proposed underground mine including the locations of main development entries and barrier pillars, panel development, bleeder entries and permanent barrier pillars. No surface shafts or slopes are planned. The size of mains pillars, bleeder pillars, interpanel barriers, and end panel barriers has been evaluated by Agapito & Associates using empirical calculation and numerical modeling techniques (see Attachment A). The size of gateroad pillars is based upon numerous studies and actual operational experience. The size(s) of mains pillars, bleeder pillars, gateroad pillars, interpanel barriers, and end panel barriers may be adjusted as mining progresses, data is collected, observations are documented, and mining experience is gained.

CFR 3482.1 (c)(4)(v)(C)

Recovery of pillars is not planned for Federal Lease UTU-79975 due to the depth of cover being in excess of 2,500 ft. of the entire lease area.

CFR 3482.1 (c)(4)(v)(D)

Figure 2 depicts typical five entry mining for mains.
Figure 3 depicts typical three entry for bleeders.
Figure 4 depicts typical two entry longwall gateroad development entries
Figure 4 also depicts typical two entry longwall set-up face and bleeder entries.

CFR 3482.1 (c)(4)(v)(E)

Typical longwall panel recovery, and the sequence of development and retreat are shown on Plate 1.

Attachment B is a copy of the approved MSHA roof control plan. No pillar extraction is proposed on Federal Lease UTU-79975 since the depth of cover is in excess of 2,500 ft. Pillar extraction is not economical or practical at this depth of cover. Further, the Mine Safety and Health Administration (MSHA) typically will not approve pillar extraction at depths in excess of 1,500 ft.

CFR 3482.1 (c)(4)(vi)(A)

No auger mining is being proposed requiring a plan map of area to be auger mined.

CFR 3482.1 (c)(4)(vi)(B)

No auger mining is being proposed requiring details of auger operations.

CFR 3482.1 (c)(5)

The reclamation plan for the Tower Mines is presented in the ANDALEX Permit Application Package C/007/019. Chapter 5 contains the reclamation plan and schedule.

Reclamation activities will not begin until all underground mining activities are complete.

All surface equipment, structures and facilities not designated to be left in conjunction with the post-mining land use plan will be removed. The affected surface area will then be reclaimed.

The portals will be sealed and backfilled according to the approved sealing plan. The highwall will be backfilled and reclaimed to original contour. The bypass culvert will be removed and the natural drainage re-established.

The re-graded area will be topsoiled and re-vegetated.

Schedule:

Year 1 -- demolition, sealing, backfilling, bypass culvert removal and regrading.

Year 2 -- topsoiling and revegetation activities.

Year 3 thru 10 -- monitoring activities

Year 11 -- Bond Release

CFR 3482.1 (c)(6)

The Aberdeen Mine is presently operating the mine under the following plans approved by the Mine Safety and Health Administration (MSHA):

a) Ventilation Plan
b) Roof Control Plan
c) Smoking Prohibition Plan
d) Fire Fighting and Evacuation Plan
e) High Voltage Petition (Longwall Face)
f) Unintentional Fan Stoppage Plan
g) Training Plan
h) Hearing Conservation Plan

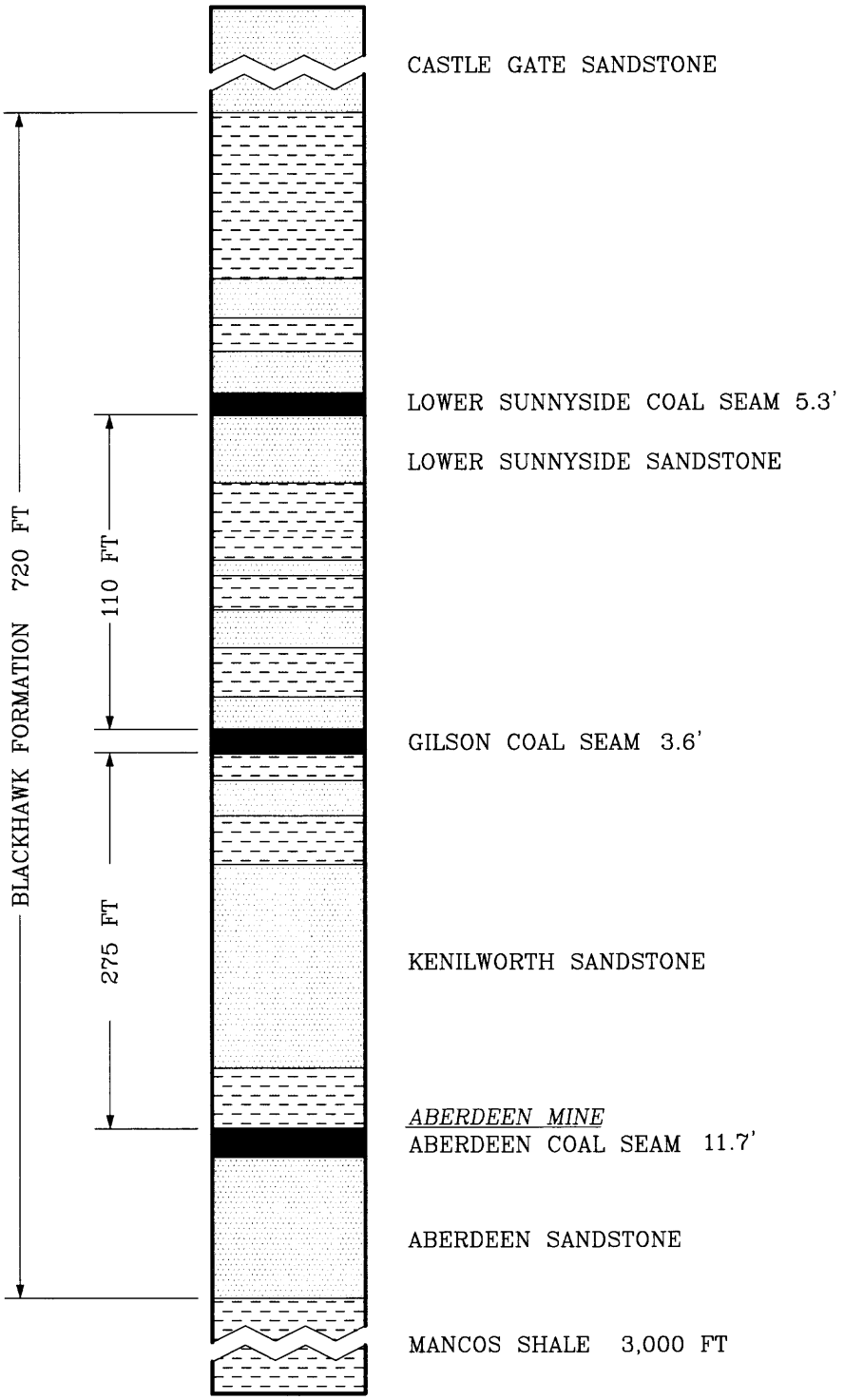
The above plans (except the roof control plan) do not provide any additional information necessary beyond that, which has been provided in this R2P2 submittal.

CFR 3482.1 (c)(7)

The mine plan has been designed to provide Maximum Economic Recovery of federal coal according to the following precepts:

1) Longwall Mining: Longwall mining has proven to provide the greatest overall recovery of the coal resource of any other mining method. The mine is designed to maximize the use of the longwall mining method.
2) Upper/lower seams: The lease area has only one recoverable coal seam, the Aberdeen (Castlegate "A") seam.
3) Old works: Old mine workings do not complicate the mining of the UTU-79975 lease area.
4) Outcrop Coal: No outcrops exist on federal lease UTU-79975. The mine plan utilizes longwall panels, and continuous miner development to maximize the recovery of this coal resource.
5) Main Entry Orientation: The main entries are driven north along the western boundary of the permit boundary. This allows longwall panel length to be maximized, thus maximizing the coal resource recovery.

Summit Creek Tract
Drill Hole MC-150



GENERALIZED SECTION, BLACKHAWK FORMATION

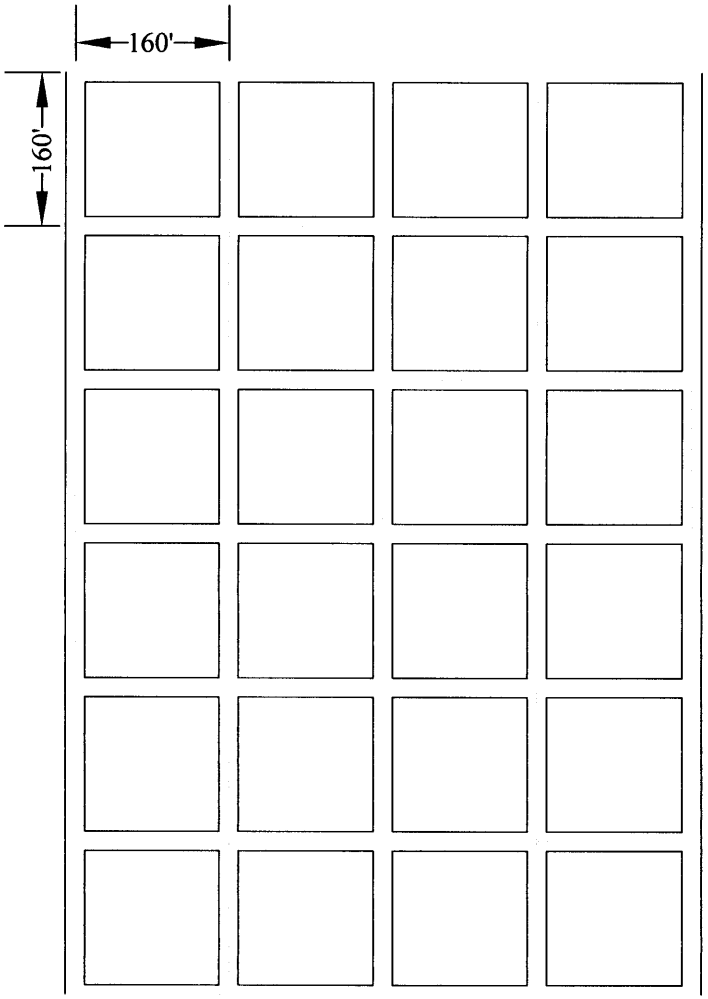
NOT TO SCALE

Figure 1

Date: 6-28-04
Ref: MC-150 Column R2P2

ANDALEX RESOURCES, INC.
Tower Division

TYPICAL FIVE ENTRY MAINS/ROOMS



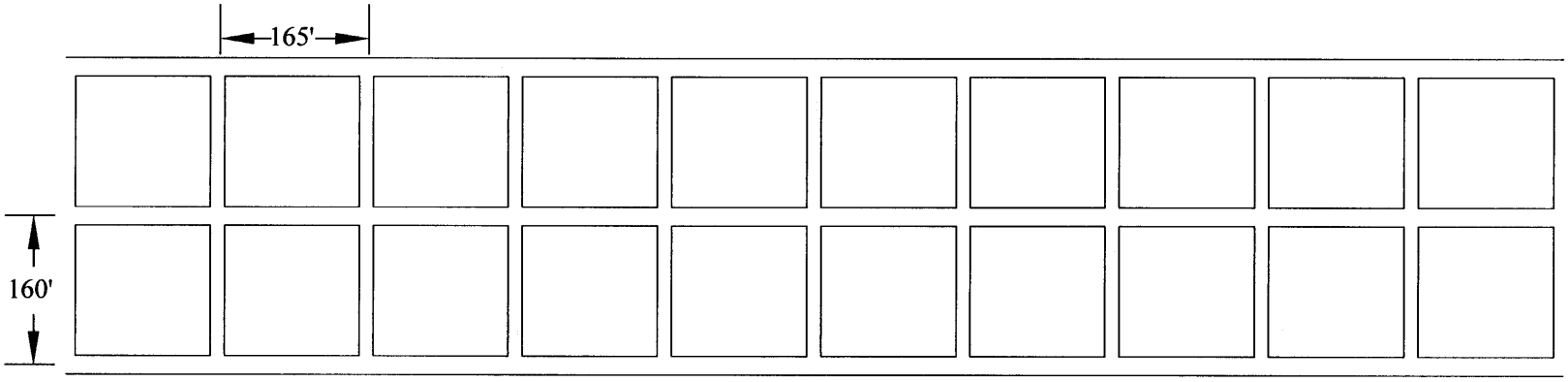
Aberdeen Mine
Summit Creek Lease
Figure #2
Mains

ANDALEX
RESOURCES, INC.
Tower Division

ACAD REF: ABPILLARS

DATE: 6-30-04 SCALE: 1" = 200'

TYPICAL THREE ENTRY BLEEDER



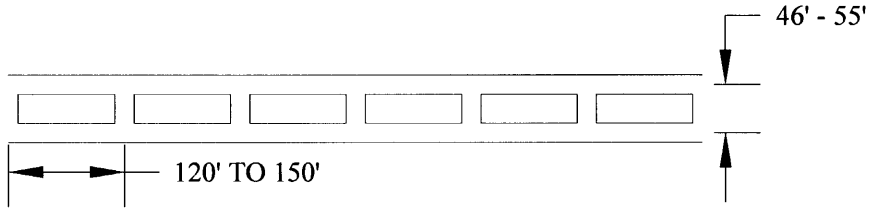
Aberdeen Mine
Summit Creek Lease
Figure #3
Bleeder

ANDALEX
RESOURCES, INC.
Tower Division

ACAD REF: ABPILLARS

DATE: 6-30-04 SCALE: 1" = 200'

TYPICAL TWO ENTRY GATEROAD/SET-UP FACE



Aberdeen Mine
Summit Creek Lease

Figure #4
2-entry Gateroad/set-up face

ANDALEX
RESOURCES, INC.
Tower Division

ACAD REF: ABPILLARS

DATE: 6-30-04 SCALE: 1" = 200'

Attachment A

ABERDEEN MINE ROCK MECHANICS NUMERICAL ANALYSIS CORRESPONDENCE
FEBRUARY 15, 2002

In response to our telephone discussion on January 22, we have completed a second round of stress modeling for the Aberdeen Mine longwall Panels 6, 7, 10, and 11. Our current analysis focuses on design recommendations for the following: (1) mains and bleeder pillar sizes, (2) interpanel barrier width, (3) end panel barrier width, and (4) gateroad neck-off layout. The model area is shown in Figure 1. Our design recommendations are summarized in Table 1, followed by discussion supporting these conclusions in the next section.

Table 1. Deep Longwall Panel Mining Plan Design Recommendations

Design Parameter	Recommendation
Mains and Bleeder Pillar Sizes	140 ft x 140 ft (rib to rib)
Interpanel Barrier Width	Panels 5-6 and 6-7: 500 ft Panels 7-10 and 10-11: 600 ft
End Panel Barrier Width	Panels 6 and 7: 500 ft Panels 10 and 11: 600 ft
Gateroad Neck-off Layout	Avoid using transitional pillars ranging in width from 30 to 80 ft to prevent uncontrolled behavior. Rectangular pillars are preferred.

DISCUSSION

Mains & Bleeders Pillar Sizes

From our first round of analyses (transmitted via email on January 18), we concluded that the 100 ft x 110 ft (rib to rib) pillar design used in the existing Main West (future mains) and Main North (future bleeder) is inadequate for deeper mining. Modeled pillar stresses and strength:stress ratios for existing Main West pillars are summarized in Table 2. The table shows that predicted pillar stress levels are all less than 4,000 psi and strength:stress ratios are above 1.1. Table 3 shows the same parameters at greater depth. Because of the increase in depth to the north, pillar stress levels are all predicted to exceed 4,000 psi. Correspondingly, pillar strength:stress ratios are predicted to approach 1.0, indicating only marginal stability.

Based on mining experience at the Aberdeen Mine and back-calculated stresses and strength:stress ratios for existing pillars, it is our opinion that prudent mains pillar design should be guided by a minimum strength:stress ratio of, nominally, 1.4. This is to promote long term performance. We recommend a minimum 140 ft x 140 ft (rib to rib) pillar design for the mains and bleeders up to a depth of 3,100 ft (i.e., to Panel 11).

Modeled stress levels and strength:stress ratios for this design are summarized in Table 4. The table shows that the 140 ft x 140 ft design reaches a 1.4 strength:stress ratio limit near the north end of the proposed mains. At shallower depths, even higher, more

favorable ratios are achieved. This is considered beneficial for partially offsetting the longer performance life of the shallower pillars, which will be developed sooner.

Figure 1 illustrates one layout option for transitioning from 100 ft x 110 ft to 140 ft x 140 ft pillars in Main West immediately north of Panel 5. A similar transition is recommended north of Panel 5 in the bleeders (Main North).

Interpanel Barrier Width

Of the empirical barrier pillar design methods common to the United States[1], only the North American method is applicable at depths greater than 2,000 ft. At 2,800 ft, the application limit of the North American method, a minimum 490 ft interpanel barrier is suggested for the proposed 740-ft-wide panels at Aberdeen. We constructed numerical models to evaluate the benefit of increasing the barriers from, nominally, 500 ft to 600 ft wide north of Panel 7. The model considers the slight increase in depth of Panels 10 and 11 caused by widening the barriers.

Model results are summarized in Figure 2. The figure shows west-east stress profiles in the unmined coal seam along various gateroads, first, prior to any mining (dashed line) and, second, after retreating the adjacent panel to the south (solid line). The profiles represent stress levels that would exist in unmined ground. Higher stress levels translate to increased loading in the tailgate. The difference between the dashed and solid lines (of the same color) indicates the rise in stress due to load override across a particular barrier after adjacent longwall mining. The figure also clearly illustrates the significant rise in *in situ* stress levels with increasing depth, i.e., from Panel 5 to 11.

Figure 2 shows that increasing the barrier from 500 ft to 600 ft north of Panel 7 results in a small (less than 30 psi) decrease in overriding loads. This difference is small in comparison to the 3,000+ psi pre-mining stress levels at the proposed mining depths. In spite of this small decrease in load override indicated by the model, it is our engineering judgment that there is benefit to increasing the two deepest barriers to 600 ft, principally for decreasing the risk of tailgate damage and, to a lesser extent, improving barrier stability. This recommendation considers the uncertainty of some factors affecting barrier performance, including cave quality, overburden stiffness, coal strength, and the sensitivity of local ground to damage from overriding loads. We do not deem it prudent to plan on the basis of smaller barriers until local longwall experience at such depths can justify otherwise.

End Panel Barrier Width

Based on model results, the proposed 500-ft-wide end panel barrier protecting the mains and bleeders is able to limit abutment stress override on to the mains/bleeders pillars to less than 200 psi (increase in average pillar stress), as indicated in Table 4. We

---

[1] Includes North American method, Holland rule of thumb, Holland Convergence method, and Pennsylvania Mine Inspector's formula.

recommend increasing this barrier to 600 ft in Panels 10 and 11. This design recommendation is consistent with the recommended interpanel barrier design.

Gateroad Neck-off Layout

The current three-entry gateroad neck-off layout consists of five rigid pillars that transition to a 30-ft-wide yield pillar. This requires two pillars to be non-rectangular, the smaller of which measures 100 ft long by 33 to 68 ft wide (or 50 ft wide on average). This geometry is potentially problematic, particularly at depth. We consider this to be a "critically sized" pillar because it is too large to act as a yield pillar, but too small to function reliably as an abutment pillar. Pillars in this intermediate range are prone to uncontrolled behavior and may be subject to bursting under heavier loading. Transitional pillars with critical geometries pose increasing risk with depth and, in our opinion, should be avoided. We recommend avoiding critically-sized pillars in Panels 6 though 11.

A four-pillar neck-off layout comprised of non-critical pillars is shown in Figure 1. This layout, using at least 140-ft-wide pillars, is expected to perform reliably through Panel 11. Rectangular pillars are preferable to irregularly-shaped pillars. Other layouts affording similar or better reliability are possible.

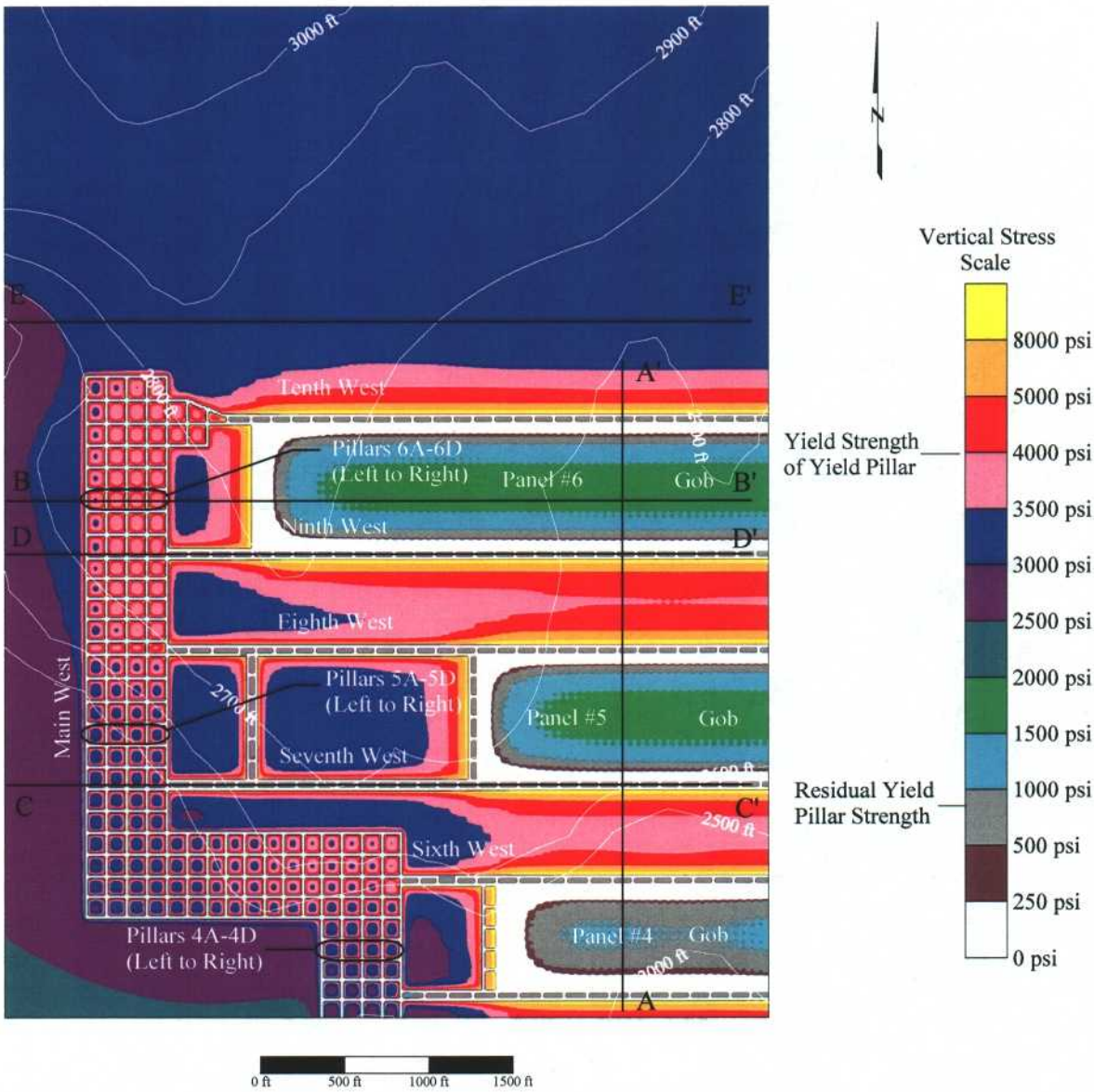


Figure 1. Stress Model

TABLE 2. MAINS WEST PILLAR LOADING - EXISTING MAINS, PANELS 4 AND 5

Location	Mains Depth (ft)	Pillar ID	[1]Pillar Stress (psi)		Pillar Width (ft)	Pillar Length (ft)	[2]Average Pillar Strength (psi)	Strength : Stress Ratio		Change in Stress Due to Longwall Mining	
			Developed	[3]Mined				Developed	[3]Mined	psi	(%)
Panel #4	2250	4A	3,498	3,637	100	100	4,630	1.32	1.27	139	3.98%
		4B	3,549	3,714	100	100	4,630	1.30	1.25	165	4.65%
		4C	3,530	3,726	100	100	4,630	1.31	1.24	196	5.55%
		4D	3,505	3,741	90	100	4,220	1.20	1.13	236	6.74%
Panel #5	2500	5A	3,748	3,808	100	110	4,630	1.24	1.22	60	1.60%
		5B	3,857	3,923	100	110	4,630	1.20	1.18	66	1.72%
		5C	3,917	3,990	100	110	4,630	1.18	1.16	73	1.85%
		5D	3,919	3,997	100	110	4,630	1.18	1.16	78	2.00%

[1]The pillar stresses from EXPAREA output.

[2]Average pillar strength calculated using ALPS method (USBM 1992, IC 9315).

[3]Adjacent longwall panel fully retreated.

TABLE 3. MAINS WEST PILLAR LOADING - 100 FT BY 110 FT PILLAR OPTION, PANELS 6, 7, 10 AND 11

Location	Mains Depth (ft)	Pillar ID	[1]Pillar Stress (psi)		Pillar Width (ft)	Pillar Length (ft)	[2]Average Pillar Strength (psi)	Strength : Stress Ratio		Change in Stress Due to Longwall Mining	
			Developed	[3]Mined				Developed	[3]Mined	psi	(%)
Panel #6	2750	6A	4,103	4,158	100	110	4,630	1.13	1.11	55	1.33%
		6B	4,220	4,292	100	110	4,630	1.10	1.08	72	1.70%
		6C	4,237	4,332	100	110	4,630	1.09	1.07	96	2.25%
		6D	4,178	4,309	100	110	4,630	1.11	1.07	131	3.14%
Panel #7	2900	7A	4,297	4,350	100	110	4,630	1.08	1.06	54	1.25%
		7B	4,435	4,506	100	110	4,630	1.04	1.03	71	1.59%
		7C	4,466	4,560	100	110	4,630	1.04	1.02	94	2.10%
		7D	4,412	4,540	100	110	4,630	1.05	1.02	129	2.92%
Panel #10	3020	8A	-	4,592	100	110	4,630	-	1.01	-	-
		8B	-	4,727	100	110	4,630	-	0.98	-	-
		8C	-	4,758	100	110	4,630	-	0.97	-	-
		8D	-	4,719	100	110	4,630	-	0.98	-	-
Panel #11	3050	9A	-	4,612	100	110	4,630	-	1.00	-	-
		9B	-	4,762	100	110	4,630	-	0.97	-	-
		9C	-	4,807	100	110	4,630	-	0.96	-	-
		9D	-	4,779	100	110	4,630	-	0.97	-	-

[1]The pillar stresses from EXPAREA output.

[2]Average pillar strength calculated using ALPS method (USBM 1992, IC 9315).

[3]Adjacent longwall panel fully retreated.

TABLE 4. MAINS WEST PILLAR LOADING - 140 FT BY 140 FT PILLAR OPTION, PANELS 6, 7, 10 AND 11

Location	Mains Depth (ft)	Pillar ID	[1]Pillar Stress (psi)		Pillar Width (ft)	Pillar Length (ft)	[2]Average Pillar Strength (psi)	Strength : Stress Ratio		Change in Stress Due to Longwall Mining	
			Developed	[3]Mined				Developed	[3]Mined	psi	(%)
Panel #6	2750	6A	3,841	3,922	140	140	6,250	1.63	1.59	82	2.13%
		6B	3,905	4,007	140	140	6,250	1.60	1.56	101	2.60%
		6C	3,931	4,061	140	140	6,250	1.59	1.54	130	3.31%
		6D	3,917	4,092	140	140	6,250	1.60	1.53	176	4.48%
Panel #7	2900	7A	4,042	4,134	140	140	6,250	1.55	1.51	91	2.26%
		7B	4,121	4,235	140	140	6,250	1.52	1.48	114	2.76%
		7C	4,145	4,291	140	140	6,250	1.51	1.46	146	3.51%
		7D	4,113	4,308	140	140	6,250	1.52	1.45	195	4.74%
Panel #10	3020	10A	4,217	4,305	140	140	6,250	1.48	1.45	88	2.09%
		10B	4,270	4,381	140	140	6,250	1.46	1.43	110	2.59%
		10C	4,280	4,422	140	140	6,250	1.46	1.41	142	3.32%
		10D	4,248	4,440	140	140	6,250	1.47	1.41	192	4.52%
Panel #11	3050	11A	4,246	4,318	140	140	6,250	1.47	1.45	72	1.69%
		11B	4,320	4,411	140	140	6,250	1.45	1.42	91	2.11%
		11C	4,344	4,463	140	140	6,250	1.44	1.40	119	2.74%
		11D	4,321	4,486	140	140	6,250	1.45	1.39	165	3.81%

[1]The pillar stresses from EXPAREA output.

[2]Average pillar strength calculated using ALPS method (USBM 1992, IC 9315).

[3]Adjacent longwall panel fully retreated.

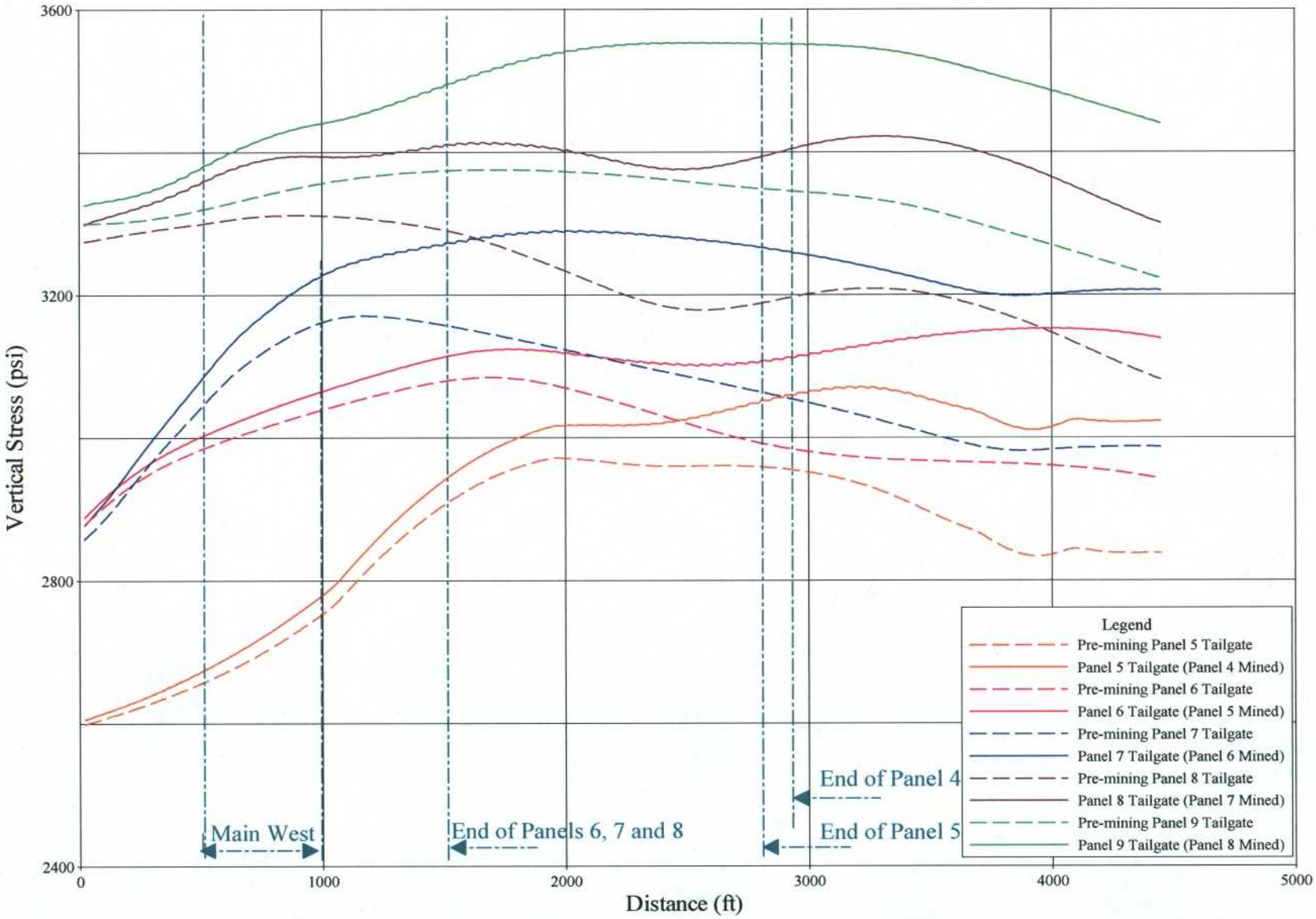


Figure 2. Gateroad Stress Profiles

Attachment B

ROOF CONTROL PLAN

General Information

Date: 03/23/89 Mine I.D. No.: 42-02028

A. Company: Andalex Resources, Inc.

Address: P.O. Box 902, Price, Utah 84501

B. Mine: Aberdeen Mine

Mine Location:

Price	Carbon	Utah
City	County	State

C. Location (reference to nearest highway route, direction, and distance)

10 Miles North Off Route No. 6

D. Type(s) of Plan: Full Roof Bolting System with 20' face advance

E. Area(s) of mine covered by the Plan: Entire Mine

F. Maximum Cover: 2,500 Feet

G. Official in charge of health and safety at the mine:

Jed Giacoletto, Safety Manager
Name and Title

Person to be contacted concerning the roof control plan:

Tom May, Safety Director
Name and Title

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ROOF SUPPORT MATERIALS - All components of the roof bolt assembly shall comply with specifications of ASTM F432-83 standards.

H. MECHANICAL ROOF BOLTS

Manufacturer	Mikco Industries, Burmingham
Manufacturer's Designation	Mikco = K, KW, M, MK Birmingham = B, UB
Minimum Length	42"
Diameter	3/4" or 5/8"
Type Steel	Grade 55 or 75
Type Thread	Rolled or cut
Length of Thread	3-3/4" minimum
Type Head	Standard
Dimensions of Bolt Head:	Nut 1-1/8" Flange 1-1/2"
Hole Diameter	1.375" (1-3/8") ± .030" tolerance
Installed torque	5/8" rod: 150-240 ft.-lb. 3/4" rod: 150-250 ft.-lb.

I. BEARING PLATES

Manufacturer	Mikco Industries, Birmingham Rocky Mountain Bolt Co.
Manufacturer's Designation	Mikco = notched, K, KW, M, MK Birmingham = B, UB Rocky Mountain = R
Dimensions	6" x 6" x 3/16" 18" x 6" x 3/16"
Shape	Square or rectangular embossed, double-embossed or flat.
Center Hole Sizes	11/16" to 13/16"

J. WASHERS

Manufacturer	Jenmar, Mikco Industries
Type Steel	Hardened, 35 to 45 per Rockwell, c scale.
Size	2" OD
Shape	Round-flat
Hole Size	Bolt diameter + 1/8" maximum

K. ANCHORAGE UNIT

Manufacturer	Frazer Jones
Manufacturer's Designation	D1, D8, D8S, D8B, F2B, OB1
Type	Expansion
Size Finishing Bit	1-3/8" ± .030
Installed Torque	3/4" = 150-250 ft. lbs., 5/8" = 150 to 240 ft. lbs., WHW 3/4" = 125 to 170 ft. lbs., WHW 5/8" = 125 to 165 ft. lbs.

L. MATERIALS USED IN CONJUNCTION WITH ROOF BOLTS (where required)

Cottonwood blocks	2" x 6" x 12" minimum
Roof Mats	16 gauge minimum
Dimensions of Post	As per 75.206
Type of Post	Round or split of solid straight grain wood with the ends sawed square and free from defects which would affect their strength.
Cap blocks, size, and shape	As per 75.206

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Wedges, size, and shape	3-1/2" wide x 6" long x 1" thick, tapered. (minimum)
Crossbars, type and size	As per 75.206
Planks, size	As per 75.206
Wire Mats	
Chain Link, Wire Mesh, Steel Cables	
Cribbing blocks, size and shape	As per 75.206
Steel crossbars	4"x4"x1/4" minimum

ROOF SUPPORT MATERIALS FOR RESIN GROUTED RODS

M. RODS

Manufacturer	Mikco Industries, Birmingham Rocky Mountain Bolt Co.
Manufacturer's Designation	Mikco = K, KW, M, MK Birmingham = B, UB Rock Mountain = R
Minimum Length	36"
Diameter	3/4" or 7/8"
Type Steel	ASTM A615 Grade 60 or Grade 40 rebar
Type Head	Hex or square
Dimensions of Rod	Head 1-1/8"
Flange	2"

N. BEARING PLATES

Manufacturer	Mikco Industries, Birmingham Rocky Mountain Bolt Co.
Manufacturer's Designation	Mikco = notched, K, KW, M, MK Birmingham = B, UB Rocky Mountain = R
Dimensions	6" x 6" x 3/16"
Shape	Square
Center Hole Size	#6 rebar = 15/16" #7 rebar = 1-1/8"

O. RESIN

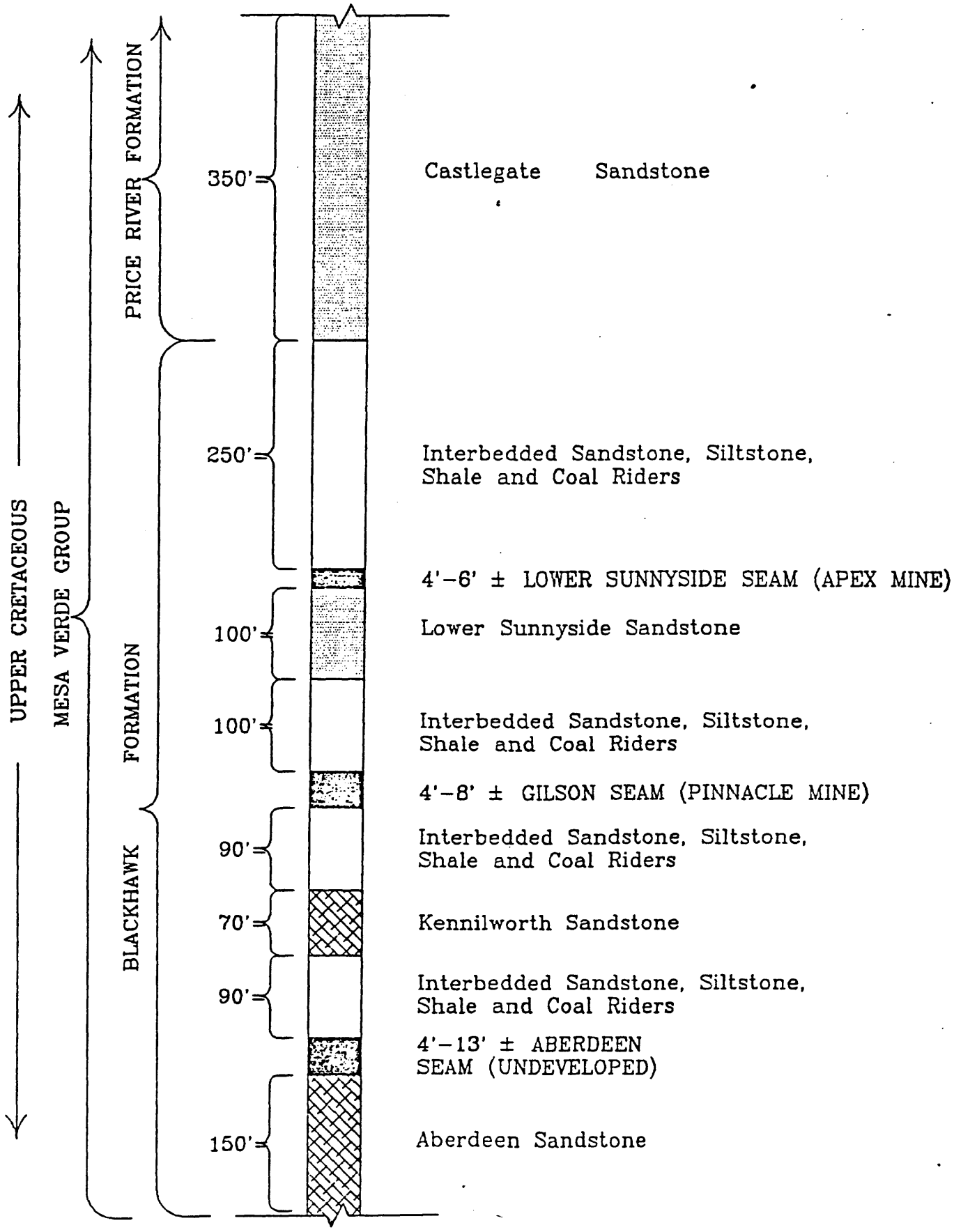
Manufacturer	Dupont Faslock, Celtite,
Manufacturer's Designation	Dupont Faslock - A, H Celtite - "Mine" or "Standard"
Type	Resin
Size of Finishing Bit	1" ± .030 for a 3/4" bolt 1-3/8" ± 0.30 for a 7/8" bolt

P. SEQUENCE OF MINING AND INSTALLATION OF SUPPORTS INCLUDING TEMPORARY SUPPORTS:

Drawings shall be attached showing the maximum width of entries, rooms, intersections, crosscuts, and (if applicable) pillar splits; the sequence of support installation -- including temporary supports; the spacing of supports; and where applicable, the sequence of mining pillars, including cut sequence in those pillars necessary to establish a uniform pillar line that eliminates pillar points and pillars that project inby the breakline.

Entry Width	20 feet	Centers	120' Max. 60' Min.
Crosscut Width	20 feet	Centers	120' Max. 60' Min.
Room Width	20 feet	Centers	120' Max. 60' Min.
Room Crosscut Width	20 feet	Centers	120' Max. 60' Min.

Typical Mine Strata



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SAFETY PRECAUTIONS FOR A FULL BOLTING PLAN

1. This is the minimum roof control plan and was formulated for normal roof conditions while using the mining system(s) described. In areas where subnormal roof conditions are encountered, indicated or anticipated, the operator shall provide additional support 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. In each active working place where tensioned roof bolts are installed, at least one roof bolt hole shall be drilled to a depth of at least 12 inches above the anchorage horizon of the bolts being used to determine the nature of the strata. Such test holes shall be drilled at intervals not to exceed 20 feet. The test hole shall be either left open for examination or a roof bolt of a length equal to (or greater than) the required test hole depth may be installed and tightened, provided adequate anchorage is obtained. Does not apply to resin grouted bolts.

3. (a) Sidecuts shall be started only in areas that are supported with permanent roof supports. Once the sidecut has been completed, the sidecut shall be supported by either temporary or permanent supports prior to working in the intersection.

   (b) During development, except where old workings are involved, mine openings shall not be holed through into an area devoid of permanent or temporary supports. Work shall not be done in or inby the adjacent place until:

      (1) The newly created opening is permanently supported as indicated in the approved roof control plan or;

      (2) The newly created opening is timbered off with at least one row of posts installed on not more than 5 foot centers across the opening.

4. All posts and cribs shall be installed on solid footing.

5. Mine drift openings that act as entrances for men and material shall be provided with a properly designed steel canopy or similar concrete or earth structure of sufficient length to protect men from falling highwall material.

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6. When mining within 150 feet of the coal outcrop or known faults or burns, and adverse roof is encountered or anticipated, additional roof support such as longer and/or more roof bolts, and/or timber, and/or cross bars, will be installed.

7. In areas where loose ribs present a hazard, the rib will be taken down and/or adequately supported with timber and/or planks, wire mesh, or chain link.

8. Long life entries shall be properly designed and supported in order to serve the purpose for which they are designed or intended. If adverse roof conditions are encountered or develop, additional roof support such as longer and/or more roof bolts, and/or timber, and/or cross bars will be installed.

APPROVED OMS & H ADD 2E 100

SAFETY PRECAUTIONS FOR RESIN GROUTED RODS

1. Persons responsible for installation of resins shall be instructed in safe handling precautions for such materials.

2. The relationship between the hole dimensions, rod size, and the size and number of resin cartridges is critical; therefore, adequate training and supervision shall be provided to assure proper installation.

3. Resin grouted rods and conventional roof bolts shall not be intermixed in the normal production cycle. Where roof deterioration or falls have occurred, and at all overcasts and other construction sites that require removal of mine roof materials, these two types of bolts may be used in combination to adequately secure the roof.

4. Drill steel shall be equivalent in length to the rods used or adequately marked to assure the proper hole depth. Each drill hole shall be filled the entire length with resin.

5. (a) The resin shall not be used if manufacturer's recommended shelf life is exceeded.

   (b) Resin packages shall be protected from excessive heat and cold during storage, and shall not be used in areas where the ambient temperature falls outside the range recommended by the manufacturer.

   (c) Broken cartridges or resin or cartridges that show signs of deterioration shall be removed from the underground portion of the mine.

   (d) Resin grouted rods shall be installed in accordance with the manufacturer's recommendations.

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AUTOMATED TEMPORARY ROOF SUPPORT (ATRS) SAFETY PRECAUTIONS

A.

	Roof Bolter Manufacturer	Model Number	Serial Number	Minimum Load Carrying Capacity
1.	Lee Norse Co.	TD2-34	21577	11,250 lbs.
2.	Simmons-Rand	TD2-30	21929	11,250 lbs.
3.	Fletcher	HDDR-13	94001-02	38,250 lbs.
4.				
5.				
6.				

B. A registered professional engineer shall certify that each ATRS is capable of supporting the above minimum load carrying capacities. The certifications shall be made available to an authorized representative of the secretary and representative of the miners.

C. All roof bolting machines operated in a working section shall be equipped with an approved ATRS system. If this approved ATRS system becomes mechanically disabled, the bolting machine shall not be used until the ATRS is repaired.

D. The automated temporary support system shall be placed firmly against the roof not more than 5 feet inby the last row of permanent supports, before any person proceeds inby permanent support.

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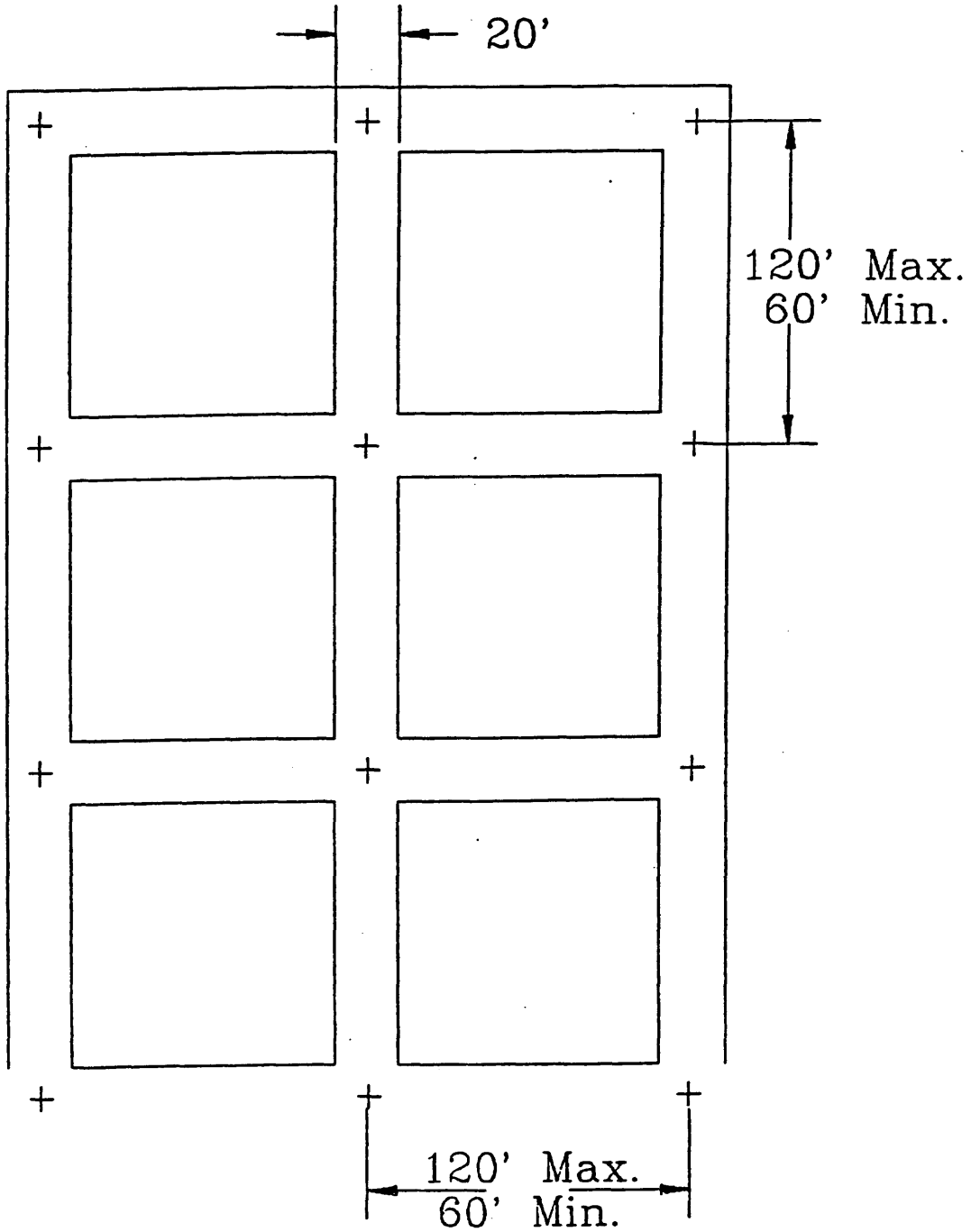
Pillar and Entry Dimensions



Scale: 1" =60'0"

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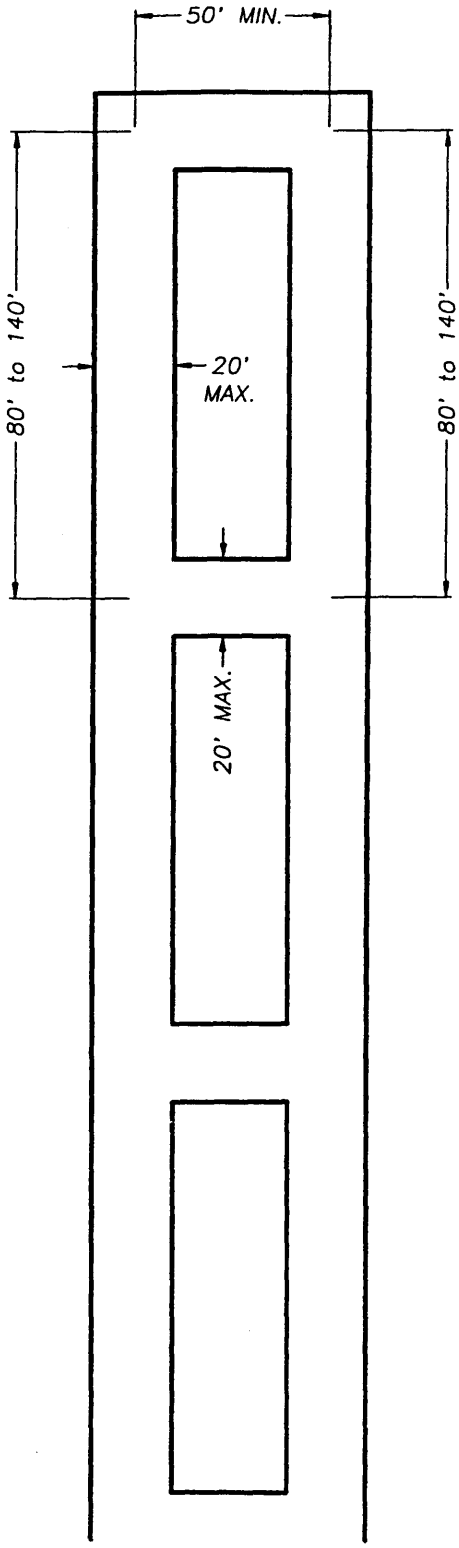
TYPICAL 2 ENTRY DEVELOPMENT



SCALE: 1"=50'

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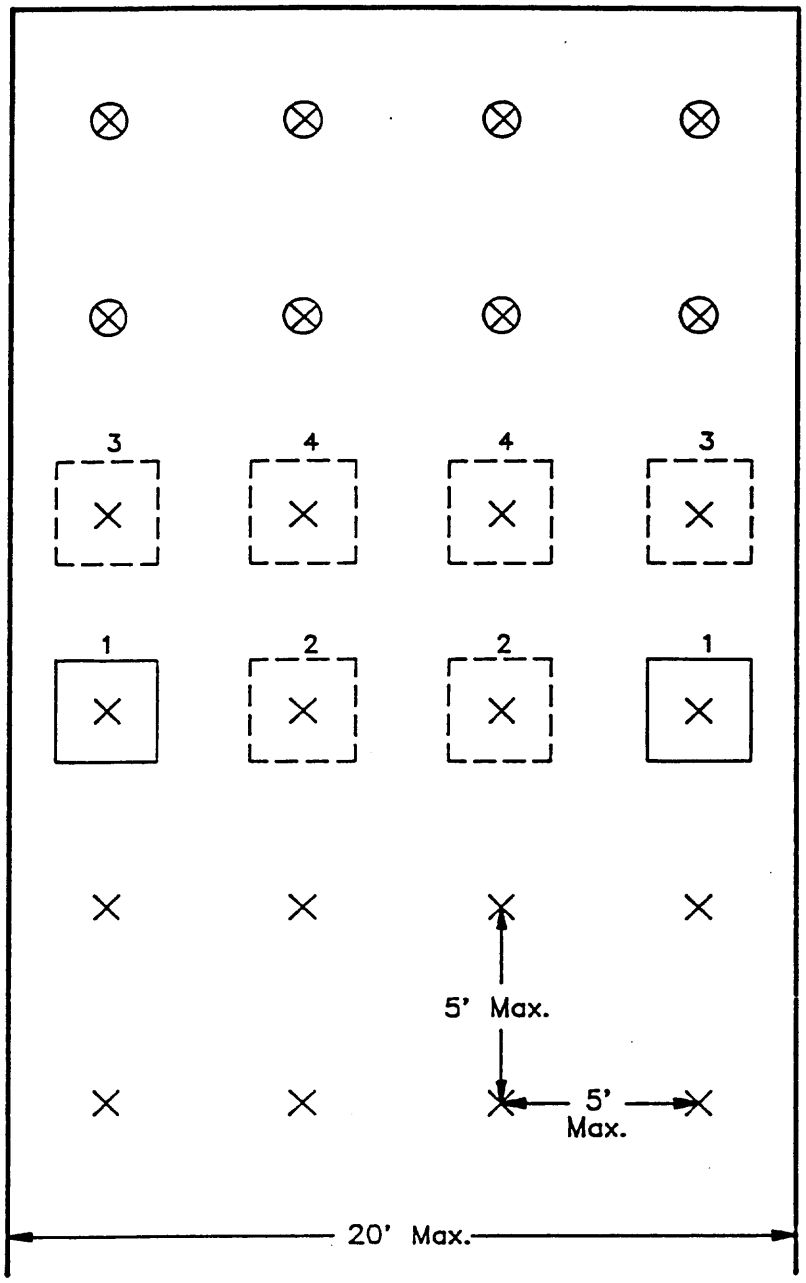
ACAD REF: 54TE2
Date: 10/23/96

Typical Entry
Bolting Sequence
Lee Norse or *Simmons-Rand*
Double Boom Roof Bolter
w/ Outboard Operator Controls



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LEGEND

Permanent Supports ×

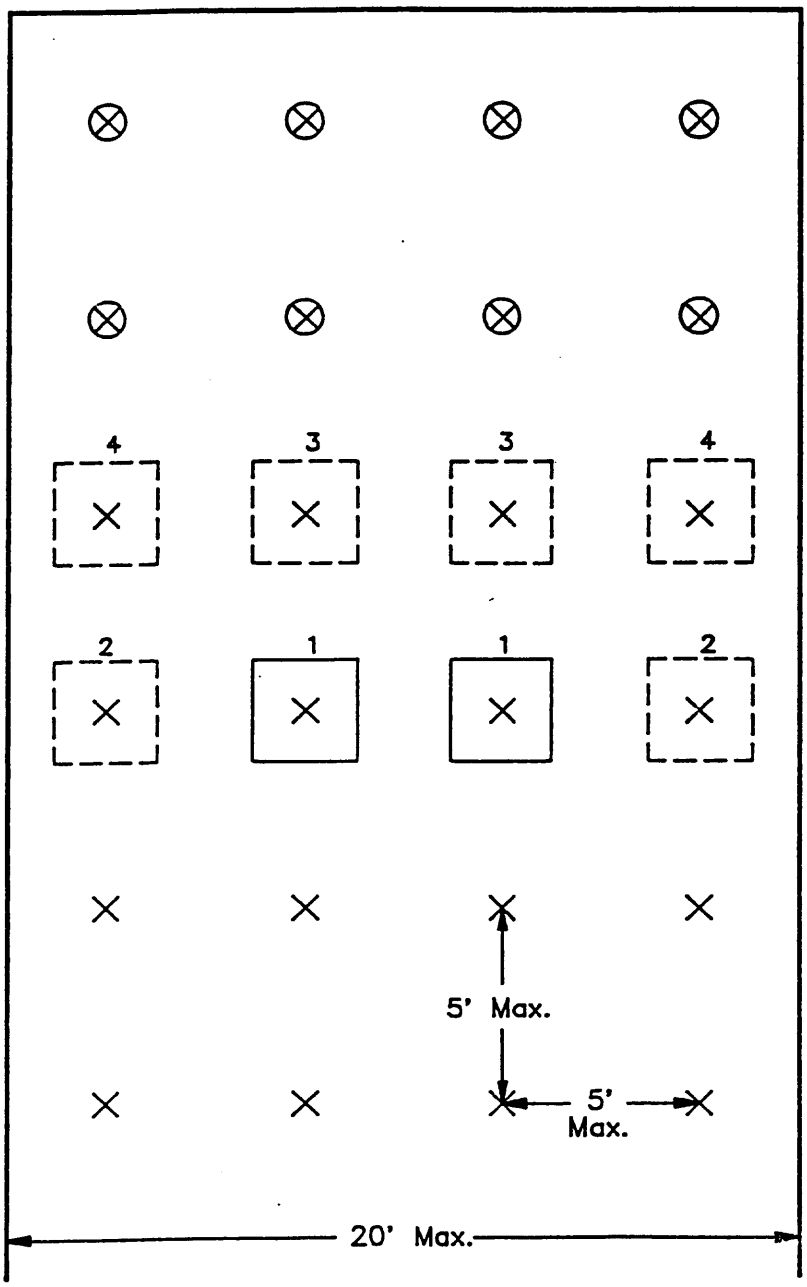
Proposed Bolt Locations ⊗

ATRS on Roof Bolting Machine □

SCALE: 1"=5'

ACAD REF: 4ROOFA

Typical Entry Bolting Sequence
Fletcher
Double Boom Roof Bolter w/ Inboard Operator Controls



LEGEND

Permanent Supports ×

Proposed Bolt Locations ⊗

ATRS on Roof Bolting Machine □

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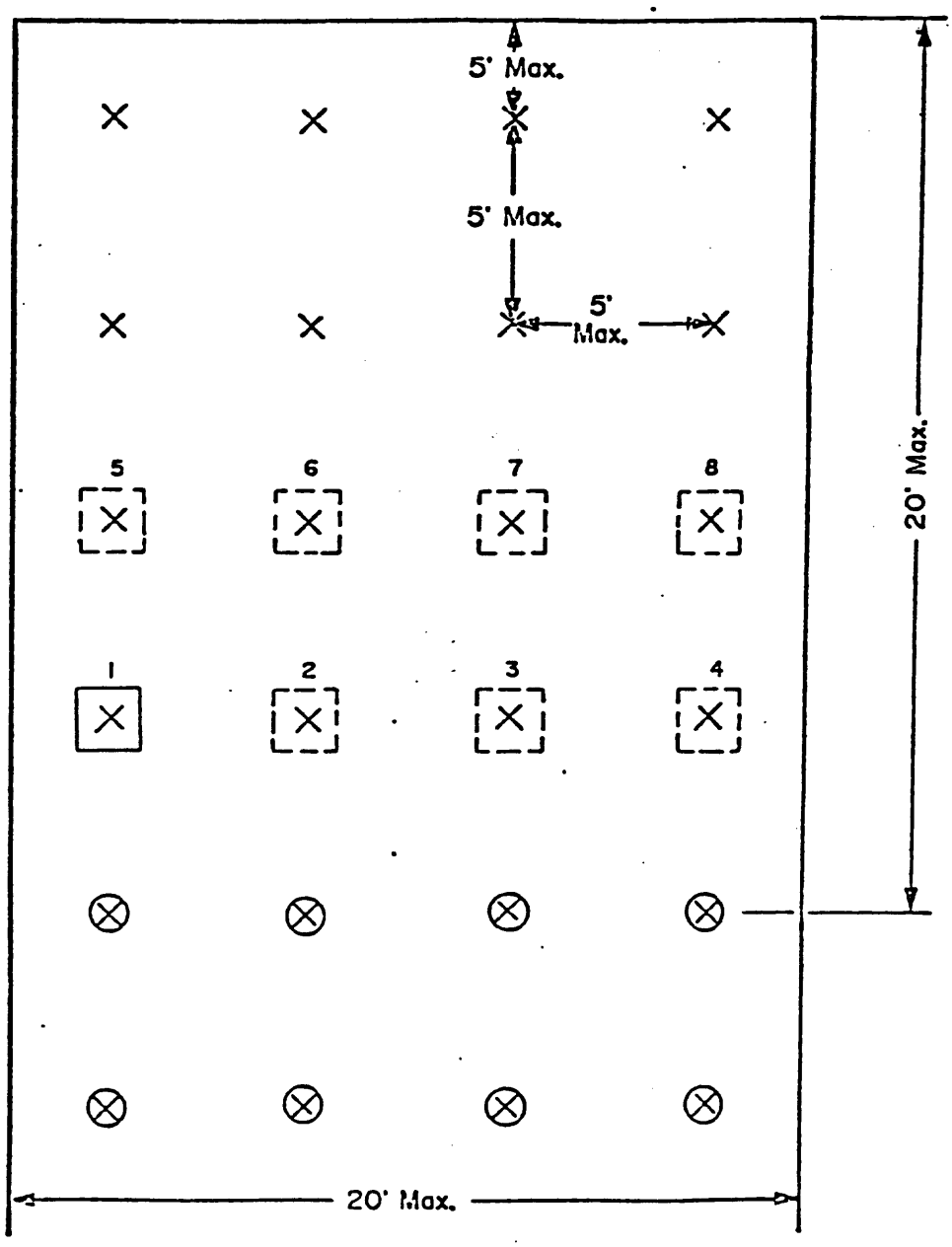
SCALE: 1"=5'

ACAD REF: 4ROOFB

Typical Entry Bolting Sequence Single Boom Roof Bolter



Legend:

Permanent Supports ⊗

Proposed Bolt Locations ×

ATRS on Roof Bolting Machine □

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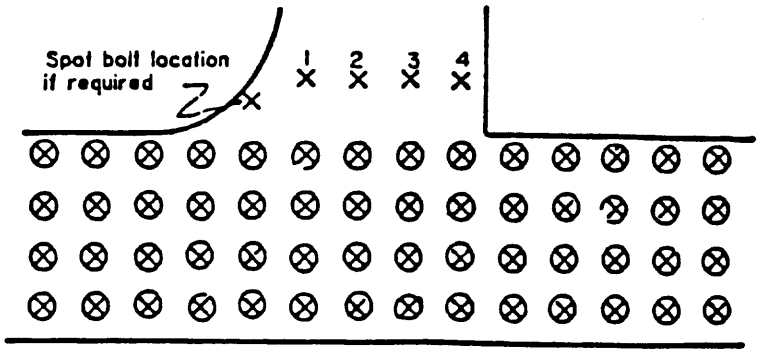
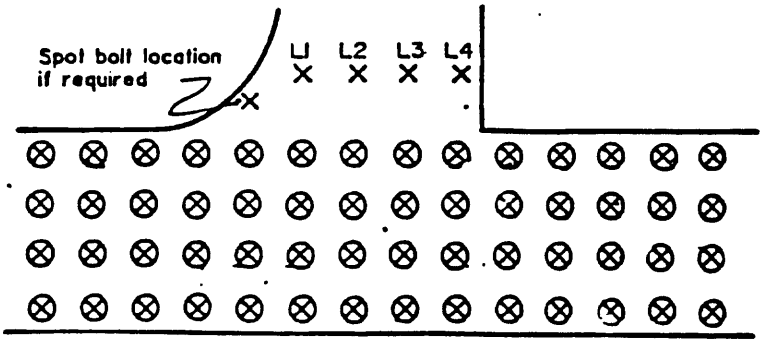
Scale: 1" = 5'0"

Typical Intersection Bolting Sequence

Single Boom Roof Bolter



Double Boom Roof Bolter



APPROVED CMS & H FEB 28 94

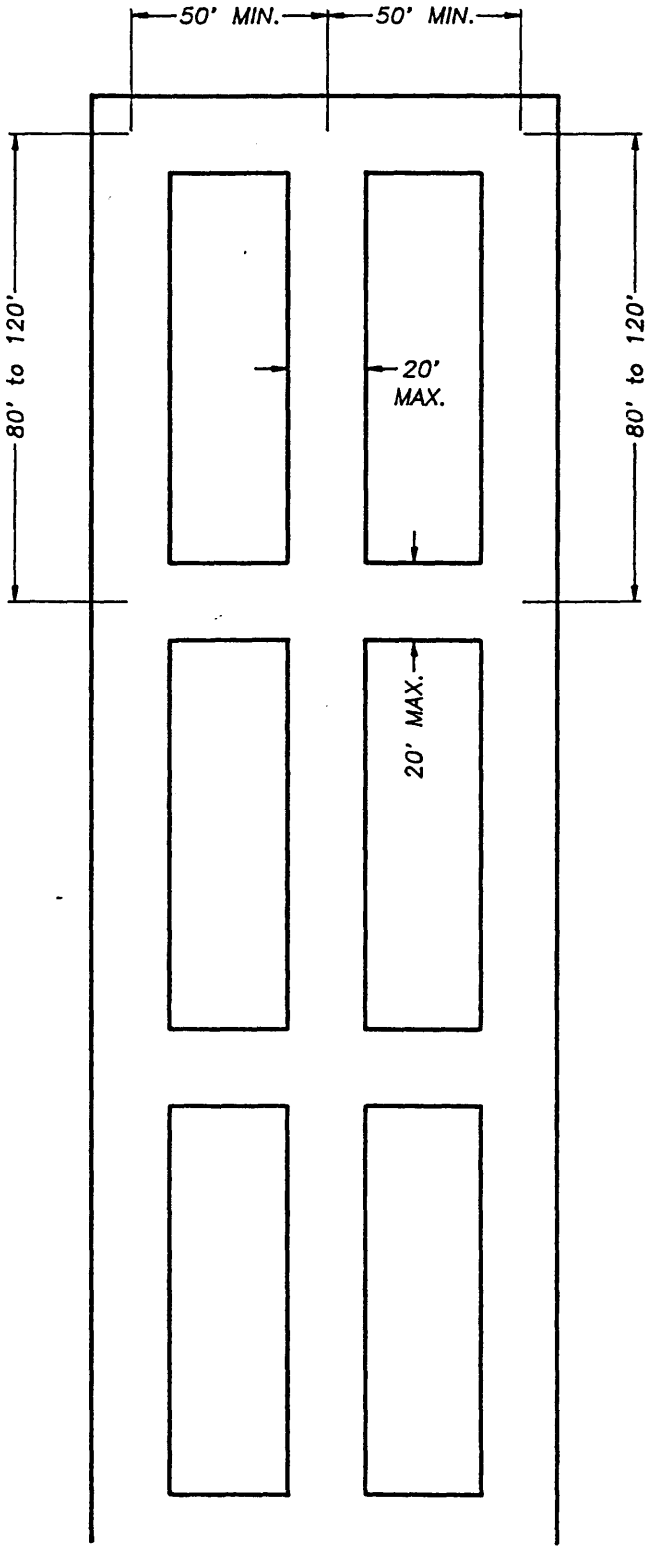
13a

Legend:

⊗ Permanent Supports
× Proposed bolt location
L Left bolt head
R Right bolt head

Scale: 1"= 20'0"

LONGWALL GATE ENTRIES



APPROVED CMS & H MAY 10 '94

SCALE: 1"=50'

ACAD REF: GATE1

LONGWALL SECTION- SHIELD RECOVERY

A) Shields will be recovered according to the attached diagrams entitled "Shield Recovery Plan" or "Alternate Shield Recovery Plan", or "Alternate Shield Recovery Plan 2".

B) Roof bolting of the recovery area will be performed with a stoper or other portable roof drill without an integral ATRS system.

C) Roof bolts will be installed on 5 foot maximum spacing.

D) Extraction of shields will be from headgate to tailgate or tailgate to headgate.

E) Trailing shields will be turned parallel to the face to provide roof support while the other shields are being extracted.

F) Supplemental roof supports such as cribs, timber, square sets, wire mesh and wire rope, etc. will be installed in the place of the shield extracted

   a) If 3 walking shields are used as shown on the enclosed sketch "Alternate Shield Recovery Plan 2", no cribs will be required to be used in the place of shields that are removed.

G) Shields may be extracted in sequential order (1,2,3,4, etc.) or in staggered sequence (2,1,4,3, etc.).

H) The installation of wire ropes and wire mesh will begin approximately 27' ahead of the cutting of the recovery room.

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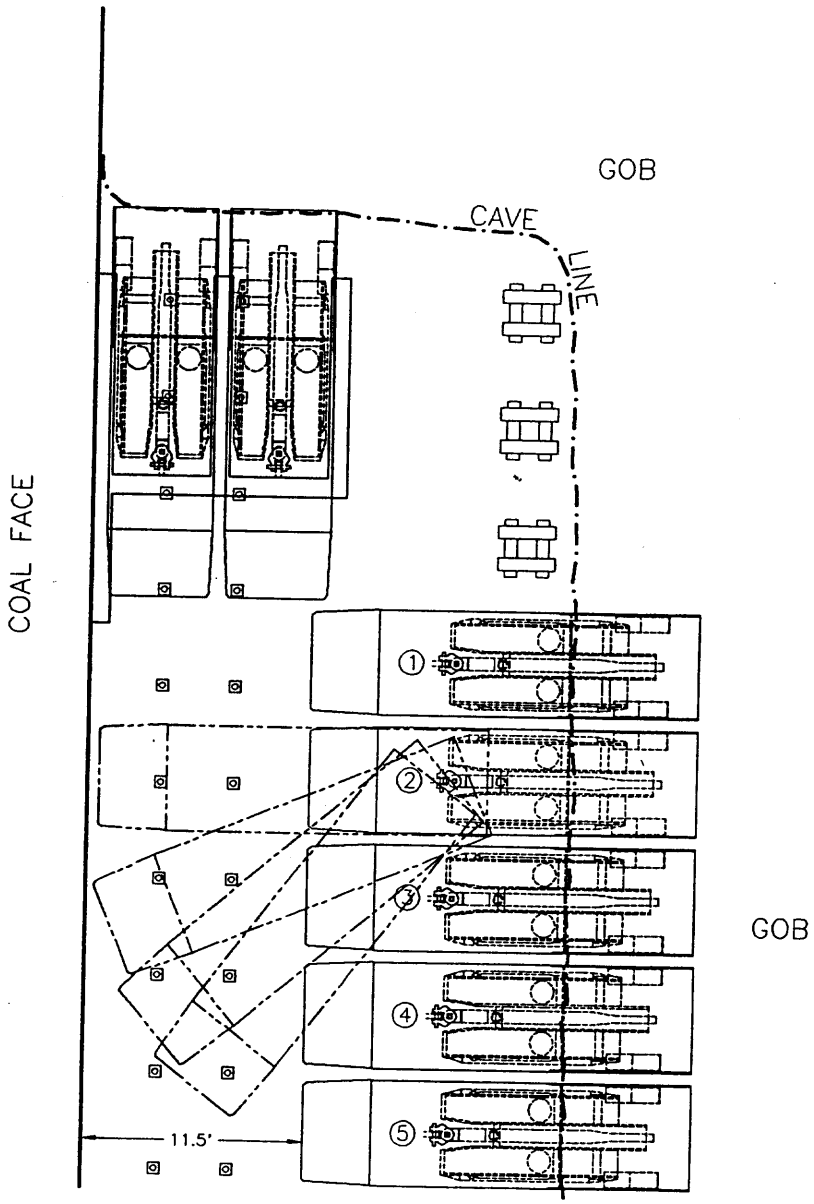
FIELD MINE FILE

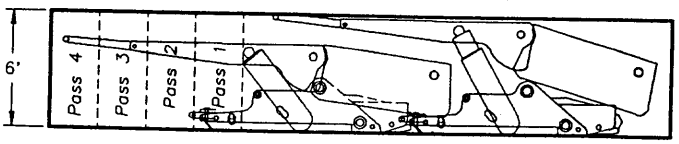
DATE FILED _____

INITIALS _____

REC - 1

ALTERNATE SHIELD RECOVERY PLAN





LEGEND

Roof Bolts ⊡

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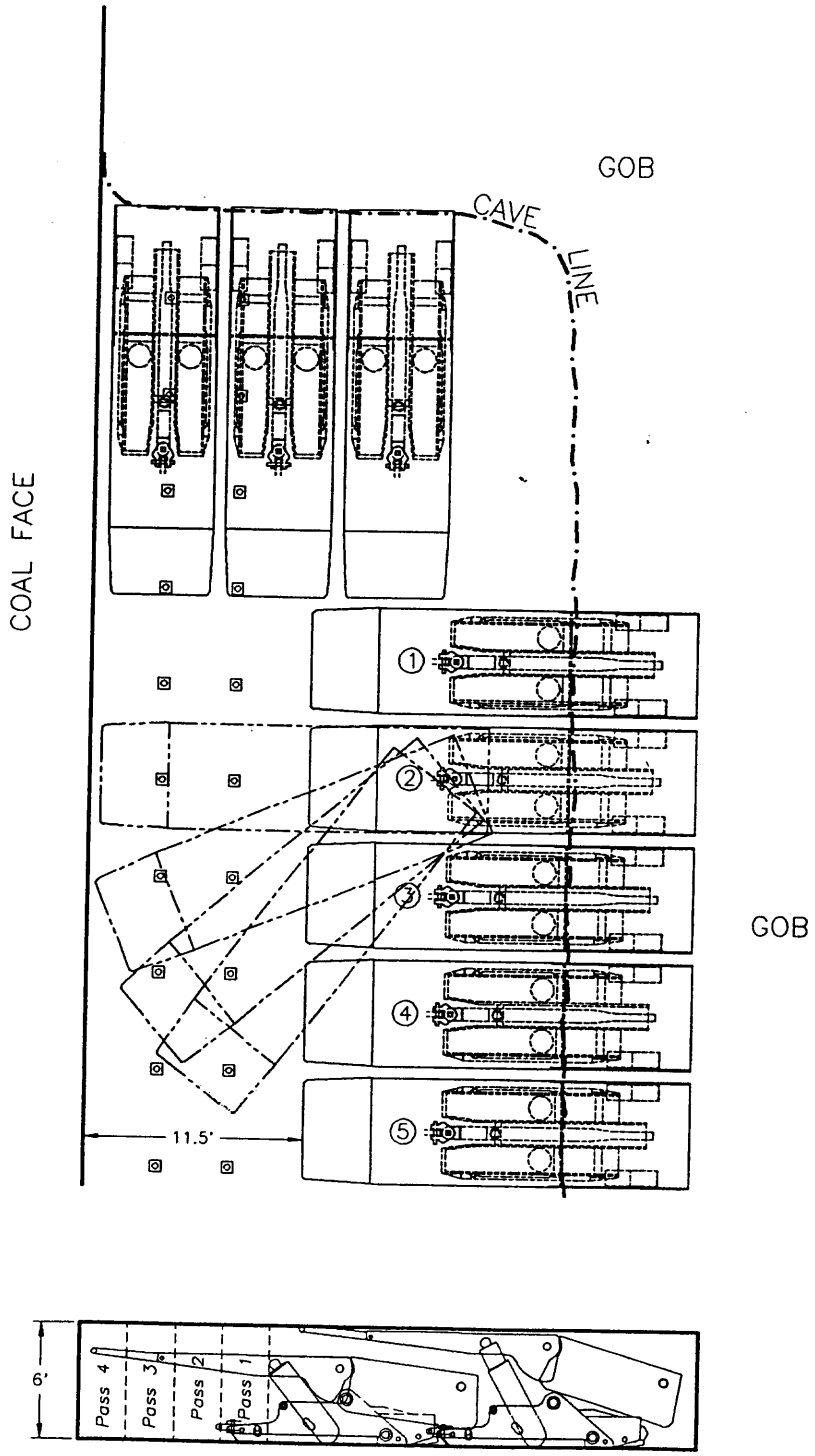
2.5' 0' 5' 10'

January 3, 1995
ACAD REF: SH-MOVE5

REC-3

ALTERNATE SHIELD RECOVERY PLAN 2



LEGEND

Roof Bolts ⊡

APPROVED CMS & H Aug 2 '96

2.5' 0' 5' 10'

January 3, 1995
ACAD REF: SH-MOVE6

REC-4

LONGWALL ROOF SUPPORT

A) 1) A safe travelway will be maintained out of the tailgate of the first longwall panel by roof supports installed according to the attached drawing labeled "Tailgate Entry Support Adjacent to Barrier Pillar".

2) The tailgate entry located between adjacent pillar panels will be supported according to the attached drawing labeled "Tailgate Entry Support Between Adjacent Longwall Panels with Cable Bolts" or "Tailgate Entry Support Adjacent to Longwall Panels Without Cable Bolts".

B) When a ground failure occurs which prevents travel out of a longwall section through the tailgate side of the longwall section, longwall mining shall cease immediately unless mining is required to protect the longwall face equipment. The appropriate MSHA office shall be notified at once. Evaluation shall be made by MSHA and the operator to determine the course of action taken to correct the condition. Rehabilitation of the blocked area may proceed while mining if conditions permit.

If an alternate travelway cannot be established and the ground failure is extensive and rehabilitation is considered as unsafe by MSHA and the mine operator the following procedure will be implemented prior to resumption of mining:

1) All miners on all shifts will be notified that the tailgate travelway is blocked and informed of the corrective action being taken.

2) Miners in the affected section will be re-instructed on escapeways, escape procedures, and the location and use of SCSR's in the event of an emergency.

3) Air entering the longwall section will be monitored and evaluated for carbon monoxide concentrations and air-flow.

4) The communication systems between the headgate to tailgate and headgate to the surface will be checked for effectiveness of operation.

5) A mantrip will be kept within 500 feet of the working section at all times during mining.

6) Plan will remain in effect until a travelway is established on the tailgate side of the longwall panel.

APPROVED OMS & H NOV 03 '97

C) Roof support along the longwall face will be provided by Hemsheidt shields: Model MHW G 738 - 13.72/33.53. The shield center to center distance is 1.75 meters. Yield capacity per each shield is 813 tons. The collapsed length is approximately 21 feet.

D) In the event movement requires the use of the manual in-shield controls, the person moving the shield will position himself in a safe area on the shield before it is moved. If the shield electrical controls become totally inoperable, two persons will be used to move the shield. One person will be positioned in a safe area off the shield being moved to observe for possible hazards and to provide a warning in the event of an emergency. The person operating the disabled shield will be positioned in a safe area before the shield is moved.

E) In the event of coal or rock bursts along the longwall face, no persons other than the shearer operators will be allowed to work or travel in the area of the face where coal or rock bursts are occurring.

F) The shearer is equipped with a deflector plate guard installed as shown on the enclosed drawing (Drawing #4). In the event of coal or rock bursts along the longwall face, shields in the area where the bursts are occurring will be equipped with conveyor belt guarding installed as shown on the enclosed drawings. (Drawings #1 and #2)

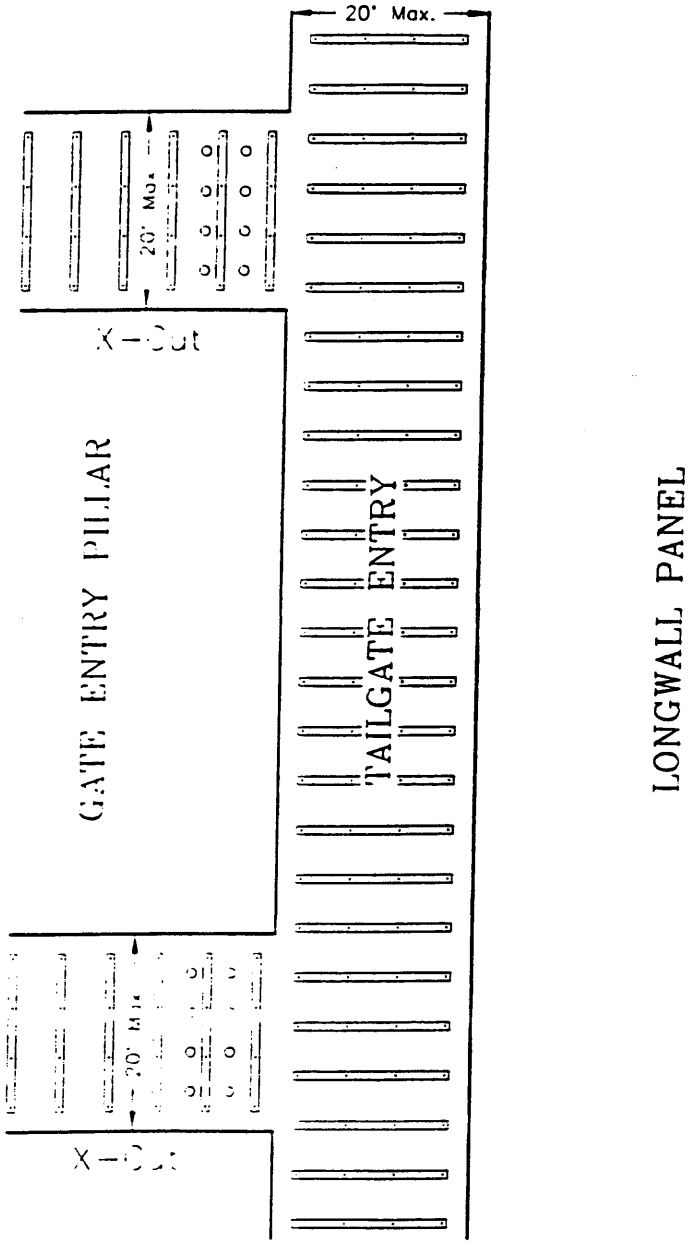
G) In the event of coal or rock bursts, the shearer operators will be position themselves in a safe location behind the shearer guard or the shield guards when the shearer is cutting in the area where bursts are occurring.

H) When the shearer is cutting in the area where coal or rock bursts are occurring, the shields may be advanced using the automatic system (i.e., "shearer initiation" or "batching") which does not require a person to be in the zone. If the automatic system is not in use, the movement of shields will be delayed until the shearer has moved out of the area where coal or rock bursts are occurring unless the shearer has been shut off and is not cutting coal.

CHANGES MADE AS PER
Tom May
IN A PHONE CONVERSATION WITH
Carl Schmuck
ON 10/31/97

APPROVED OMS & H NOV 03 '97

TAILGATE ENTRY SUPPORT
ADJACENT TO BARRIER PILLAR



DEC - 8 1995

NOTES:

1. The tailgate entry will be supported with a minimum of 60" fully grouted roof bolts. Roof bolts will be on a maximum of 5' centers. There will be a minimum of 4 bolts per row. Steel mats will be used on each row of bolts.

2. Two rows of timbers on a maximum of 4' centers will be installed in the crosscut leading into the tailgate entry.

APPROVED CMS & H DEC 1 5 1995

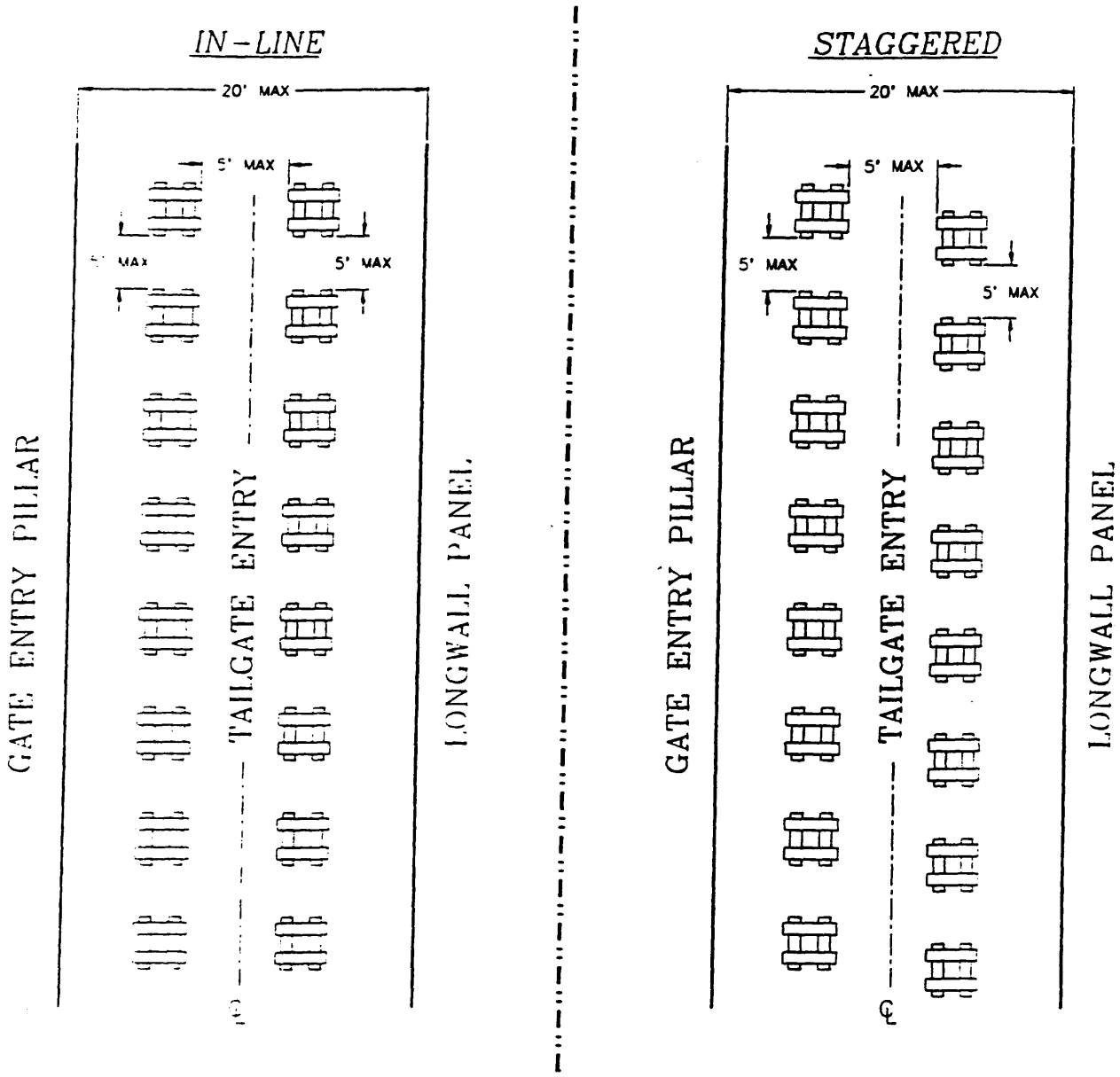
LEGEND	
Timber	o
Roof Bolts & Mats	═══

Scale: 1" = 20'

ACAD REF: TIMBER2

TAILGATE ENTRY SUPPORT

BETWEEN ADJACENT LONGWALL PANELS WITHOUT CABLE BOLTS



NOTES:

1. The tailgate entry will be supported with a minimum of 60" fully grouted roof bolts. Roof mats will be on a maximum of 5' centers. There will be a minimum of 4 bolts per row. Steel mats will be used on each row of bolts.
2. The tailgate entry will be supported with cribbing set to the spacing shown.
3. The amount of cribbing stagger may vary.

APPROVED CMS & H DEC 13 '95

RECEIVED DEC - 8 1995

LEGEND

Crib Block

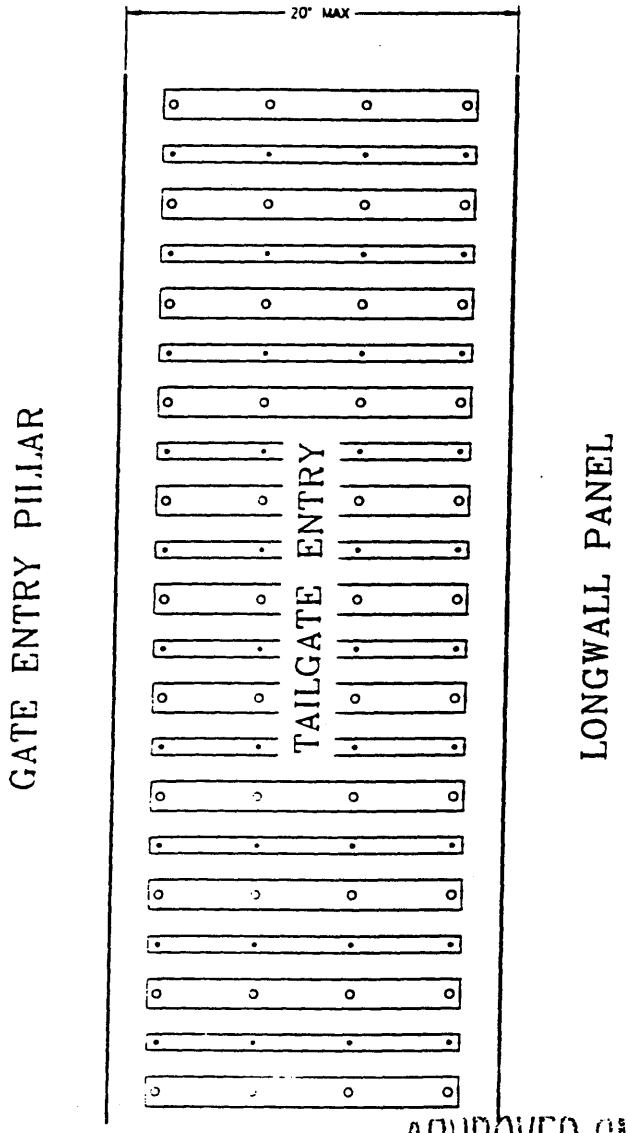
Scale: 1" = 10'

ACAD REF: CRIB5

LW-4

TAILGATE ENTRY SUPPORT

BETWEEN ADJACENT LONGWALL PANELS WITH CABLE BOLTS



APPROVED CMS & H DEC 1 5 '95

NOTES:

1. The tailgate entry will be supported with a minimum of 60" fully grouted roof bolts. [illegible] will be on a maximum of 5' centers. There will be a minimum of 4 bolts per row. Steel mats will be used on each row of bolts.

2. The tailgate entry will be supported with a minimum of 10' long cable bolts (5' min. grouting). Cable bolts will be on a maximum of 5' centers. There will be a minimum of 4 bolts per row. Steel mats will be used on each row of cable bolts.

RECEIVED

DEC - 8 1995

LEGEND

10' Cable Bolts & Mats

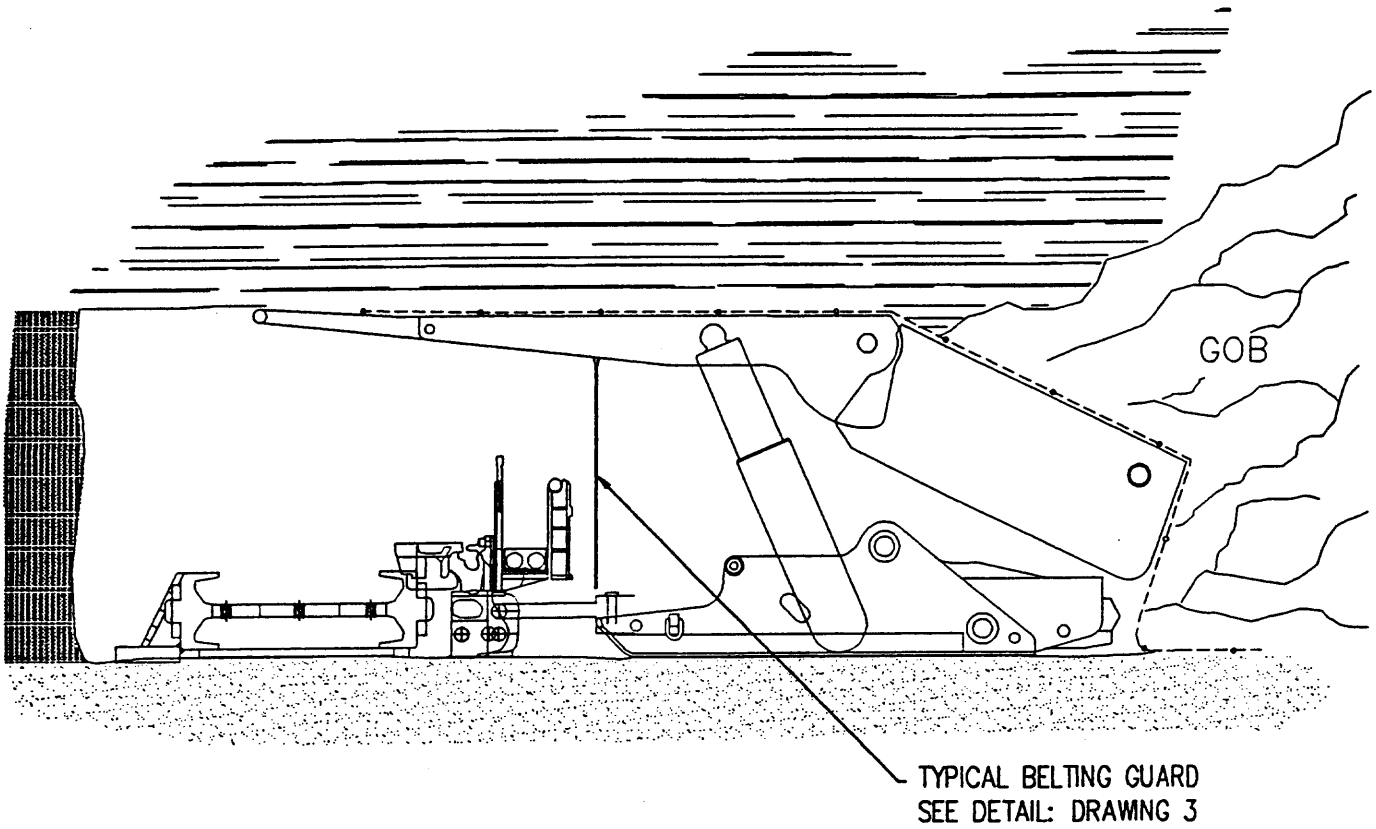
Roof Bolts & Mats

Scale: 1" = 10'

ACAD REF: CABLE1

1 W/-5

Longwall Face Shield
Side View
with Belting Guard

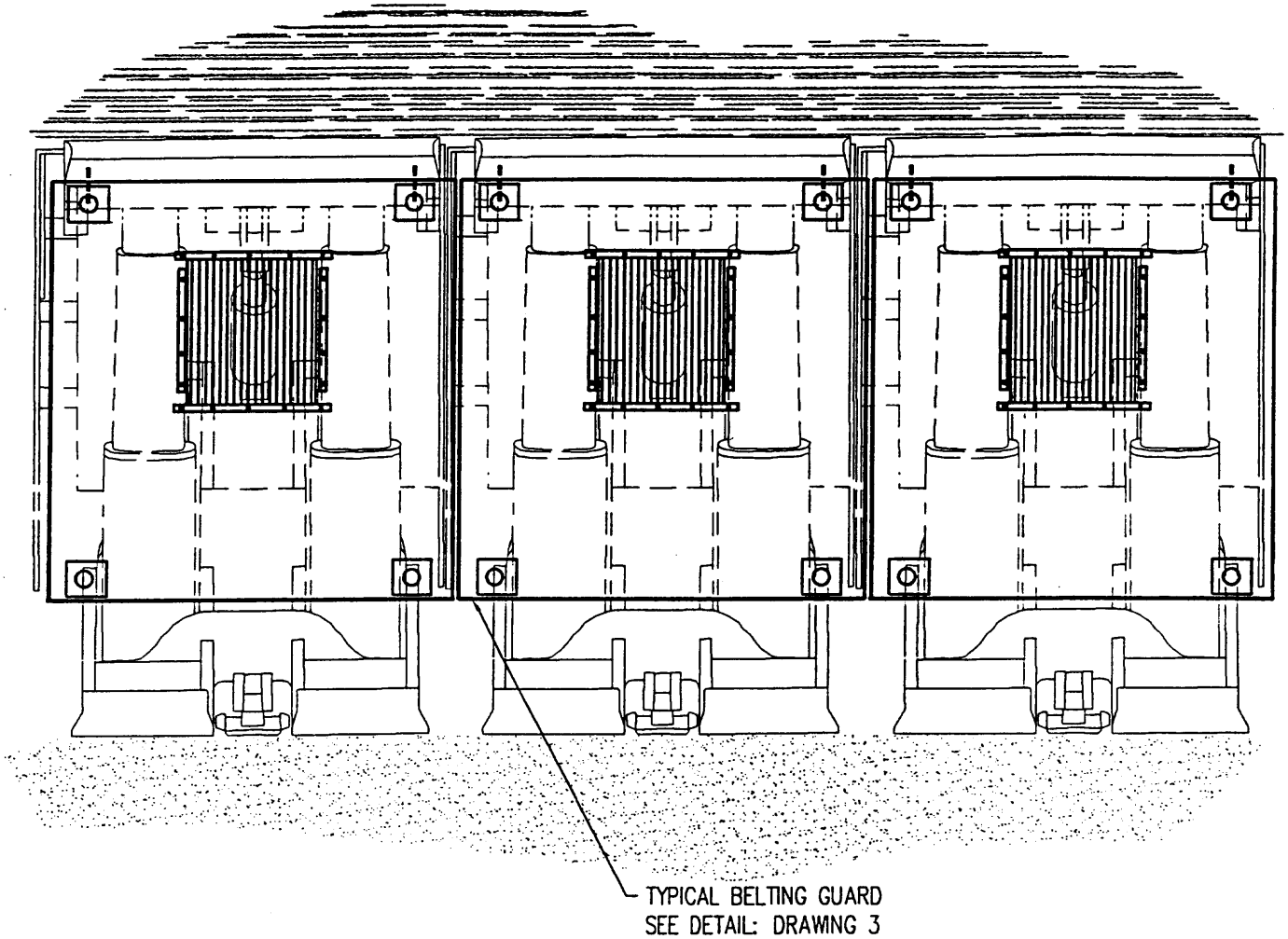


NOTE: BELTING GUARD SHOWN IN GENERAL LOCATION
SEE DRAWING 2 FOR FRONTAL VIEW
BELTING GUARD TO BE HUNG WITH SUITABLE MATERIAL (i.e. CHAIN, HOOKS, BUCKLE, CLEVIS)

APPROVED CMS & H NOV 03 97

Aberdeen Mine DRAWING 1	SCALE: 1' 0' 2' 4' NOVEMBER 19, 1996 ACAD REF= GUARD1 PLOT= TO FIT	ANDALEX RESOURCES, INC. Tower Division

Longwall Face Shield Front View with Belting Guard



APPROVED CMS & H NOV 03 97

NOTE: BELTING GUARD SHOWN IN GENERAL LOCATION
SEE DRAWING 1 FOR FRONTAL VIEW
BELTING GUARD TO BE HUNG WITH SUITABLE MATERIAL (i.e. CHAIN, HOOKS, BUCKLE, CLEVIS)

Aberdeen Mine DRAWING 2	SCALE: .5' 0' 1' 2' NOVEMBER 19, 1996 ACAD REF= GUARD2 PLOT=TO FIT	ANDALEX RESOURCES, INC. Tower Division

ANDALEX
RESOURCES, INC.
Tower Division

P.O. BOX 902
PRICE, UTAH 84501
PHONE (801) 637-5385
TELECOPIER (801) 637-8860

Fex 801 9 1471 9792
RC

RECEIVED
MAR 22 1999
RC 40-26
USDL-MSHA-C.MS&H
DISTRICT 9-EC

March 19, 1999

Mr. John A. Kuzar
MSHA - Coal Mine Safety & Health
P.O. Box 25367
Denver, CO 80225

RE: Aberdeen Mine
ID #42-02028
Roof Control Plan Amendment

Dear Mr. Kuzar:

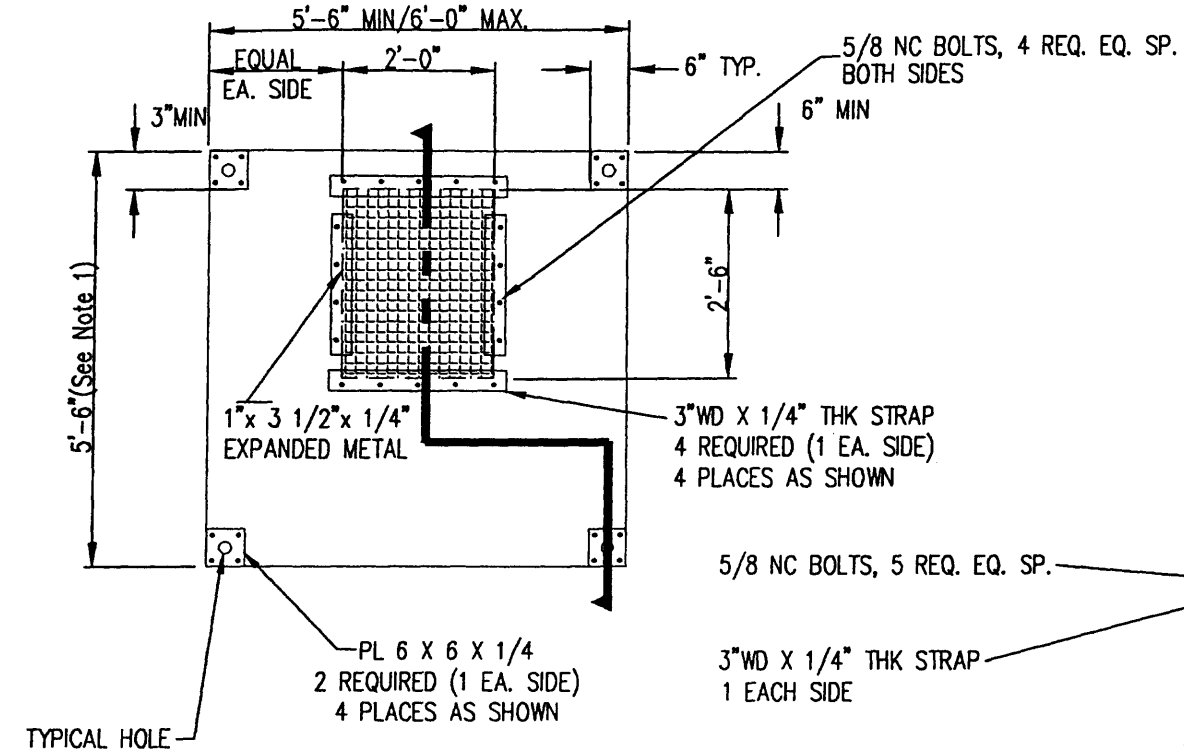
Enclosed is a one page drawing entitled "Belting Guard Detail - Drawing 3". We ask that this drawing replace the drawing by the same name which was approved by your office on November 3, 1997 as an amendment to the Roof Control Plan for the Aberdeen Mine. The only change from the original drawing and this submittal is item #3 which would make the installation of windows in the belt guards optional.

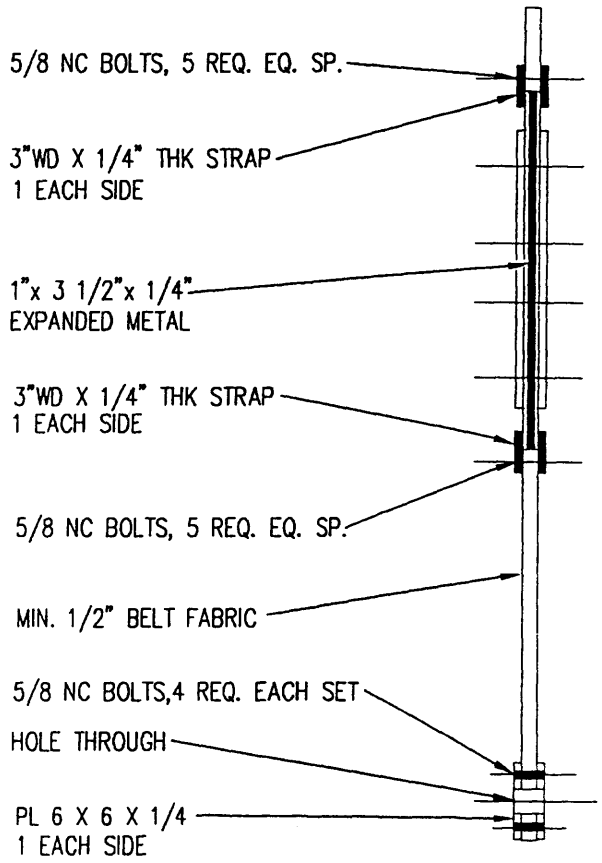
If you have any questions concerning this matter, I can be reached at (435) 637-5205.

Sincerely,

Thomas R. May

Thomas R. May
Safety Manager





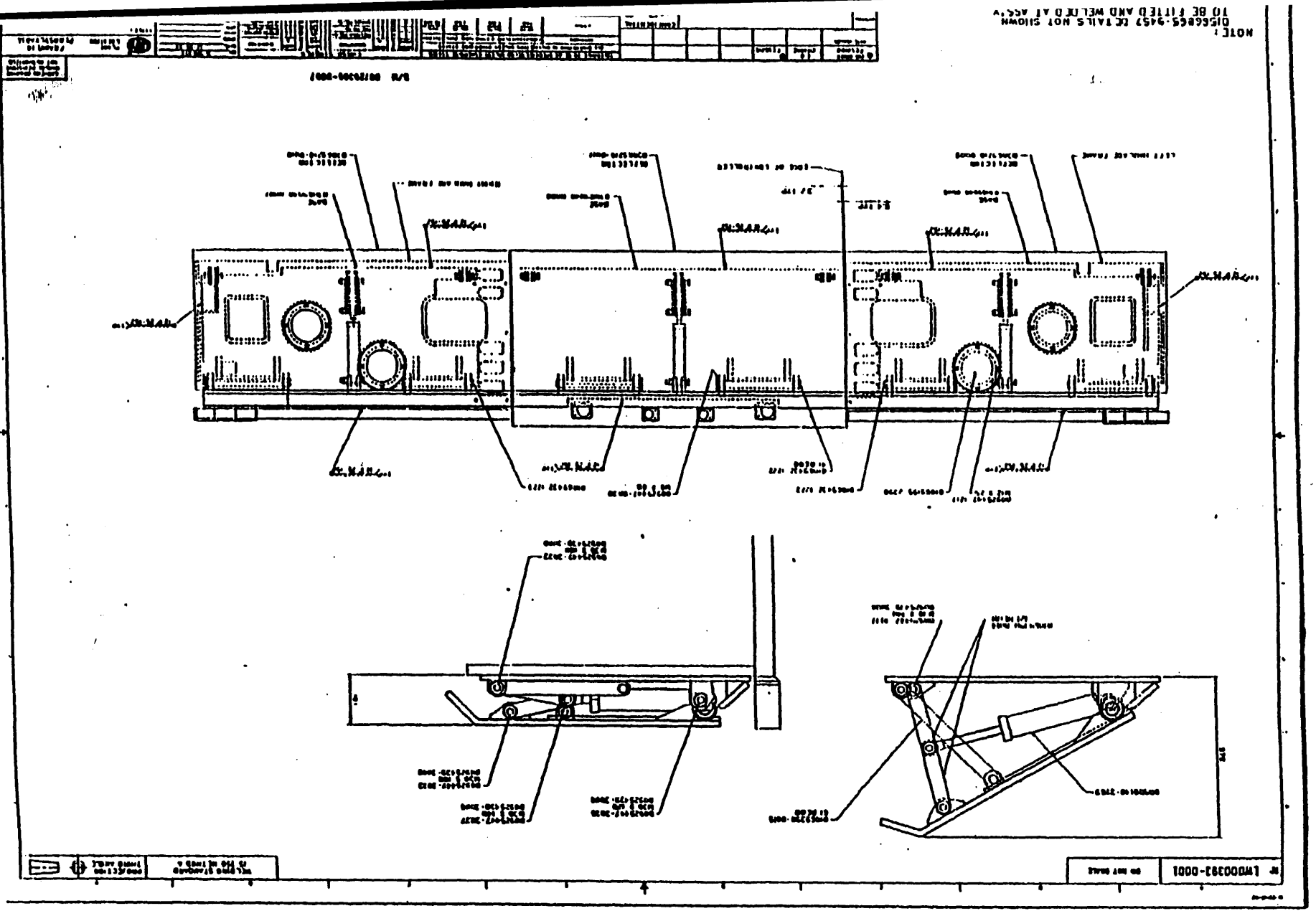
SECTIONAL
(not to scale)

NOTE:

1. LENGTH CAN INCREASE DEPENDING ON SEAM THICKNESS.
2. EXPANDED METAL CAN BE BOLTED OR WELDED.
3. THE INSTALLATION OF EXPANDED METAL WINDOWS IS OPTIONAL

APPROVED CMS & H MAR 25 '99

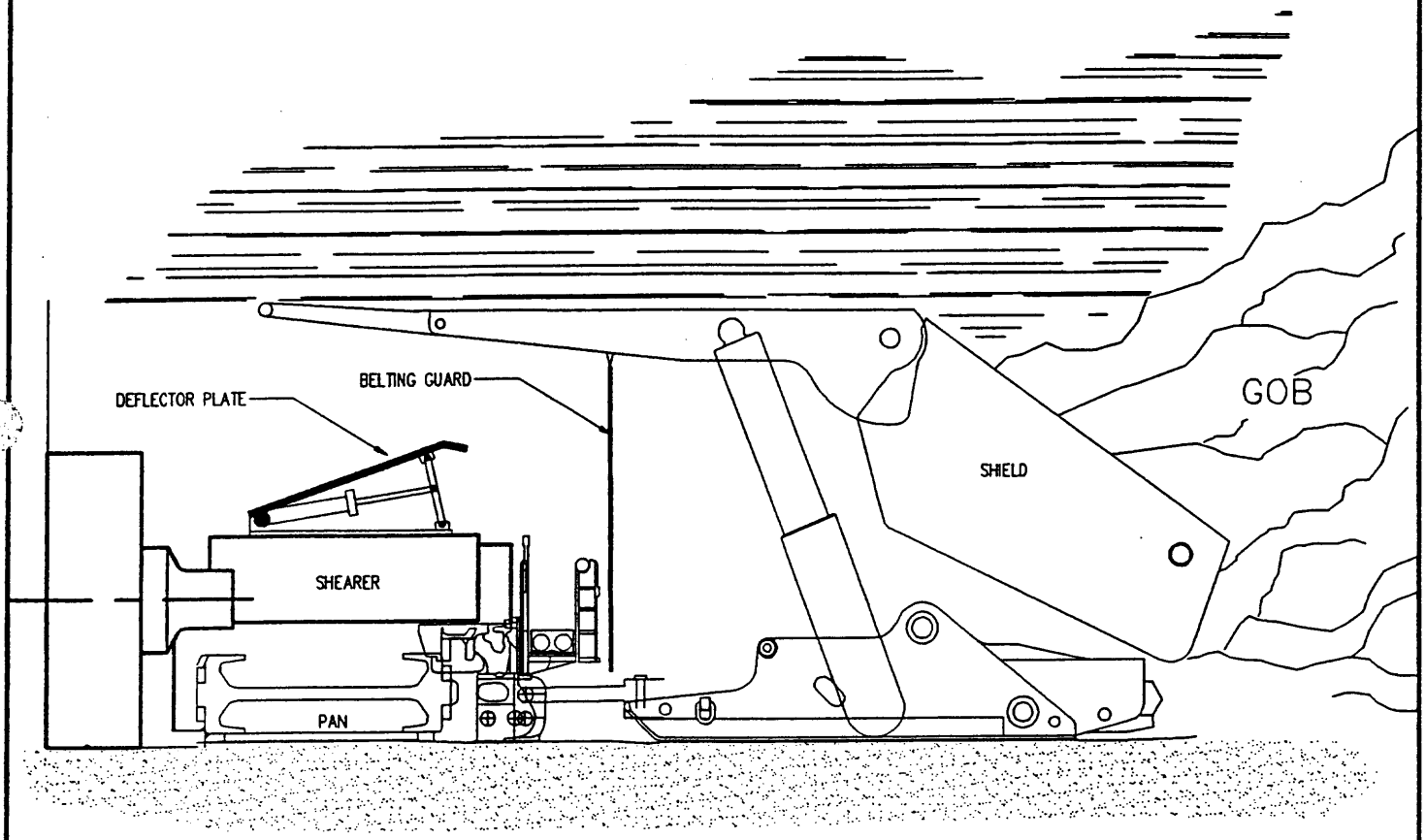
Aberdeen Mine Belting Guard Detail Drawing 3	SCALE: .5' 0' 1' 2' MARCH 19, 1999 ACAD REF= GUARD3 PLOT=TO FIT	**ANDALEX RESOURCES, INC.** Tower Division



DRAWING 4

APPROVED OWS & H AND 07 /07

Longwall Section General Arrangement With Deflector Plate And Belting Guard



APPROVED CMS & H NOV 03 97

Aberdeen Mine
DRAWING 5

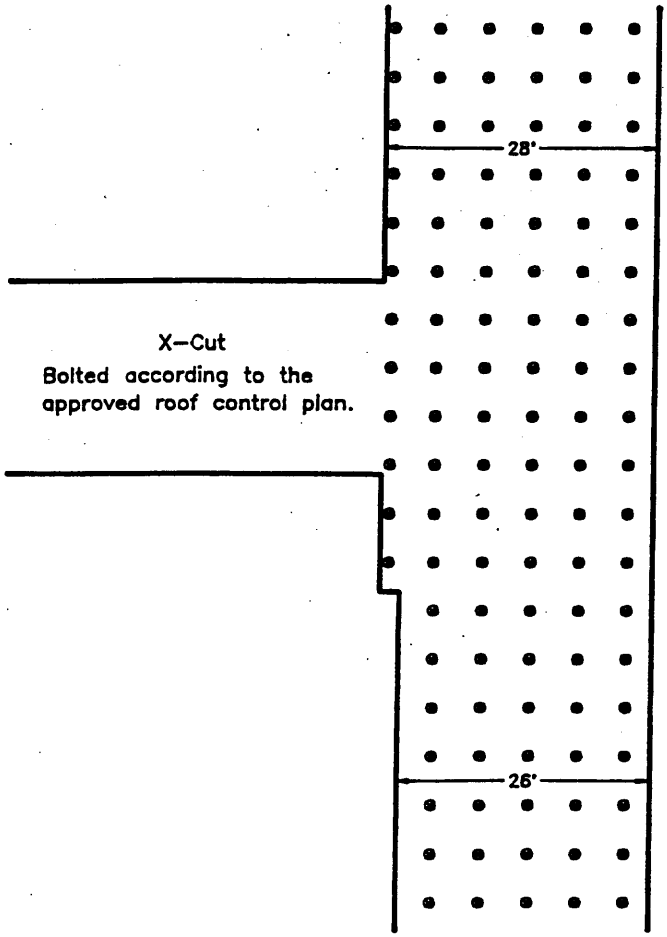
SCALE:
NTS

NOVEMBER 19, 1996

ACAD REF= GUARDS
PLOT= TO FIT

ANDALEX RESOURCES, INC.
Tower Division

Longwall Set–Up Room
Mining and Roof Support Sequence



RECEIVED
AUG – 2 1995
DIVISION OF ASSESSMENTS

NOTES:

1. The set–up room will be mined to the approved width during development of the set–up entries.
2. The depth of cuts will not exceed 20'.
3. 7' long fully grouted resin bolts will be installed on not more than 5' centers to support the set–up room.

APPROVED CMS & ' AUG 1 '95

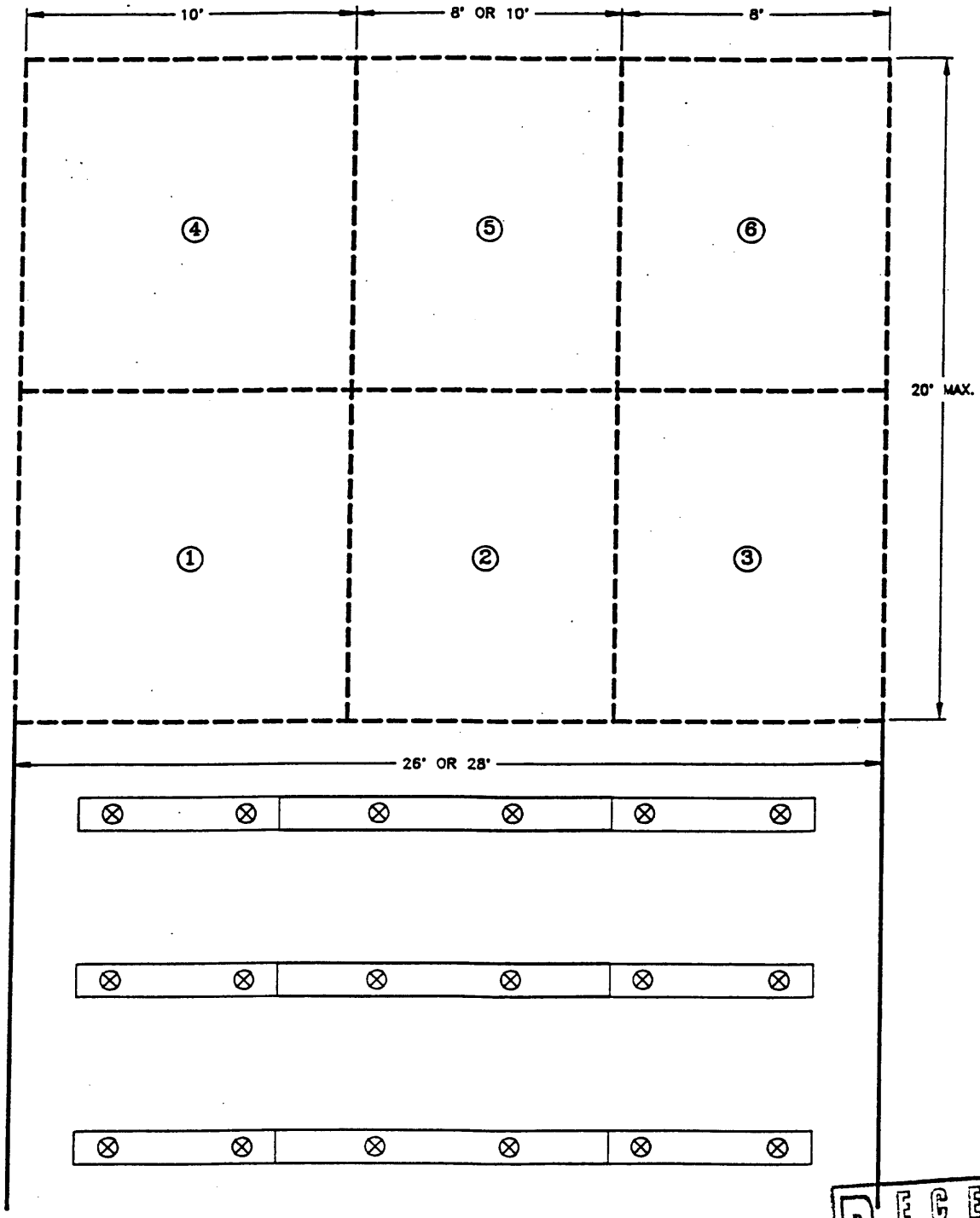
LEGEND

Roof Bolt •

Scale: 1"=20'

ACAD REF: ABSUPP1

MINING SEQUENCE FOR A TYPICAL 26' OR 28' ENTRY SETUP ROOM FOR LONGWALL DEVELOPMENT



LEGEND

Permanent supports with roof mats, mesh, or chain link

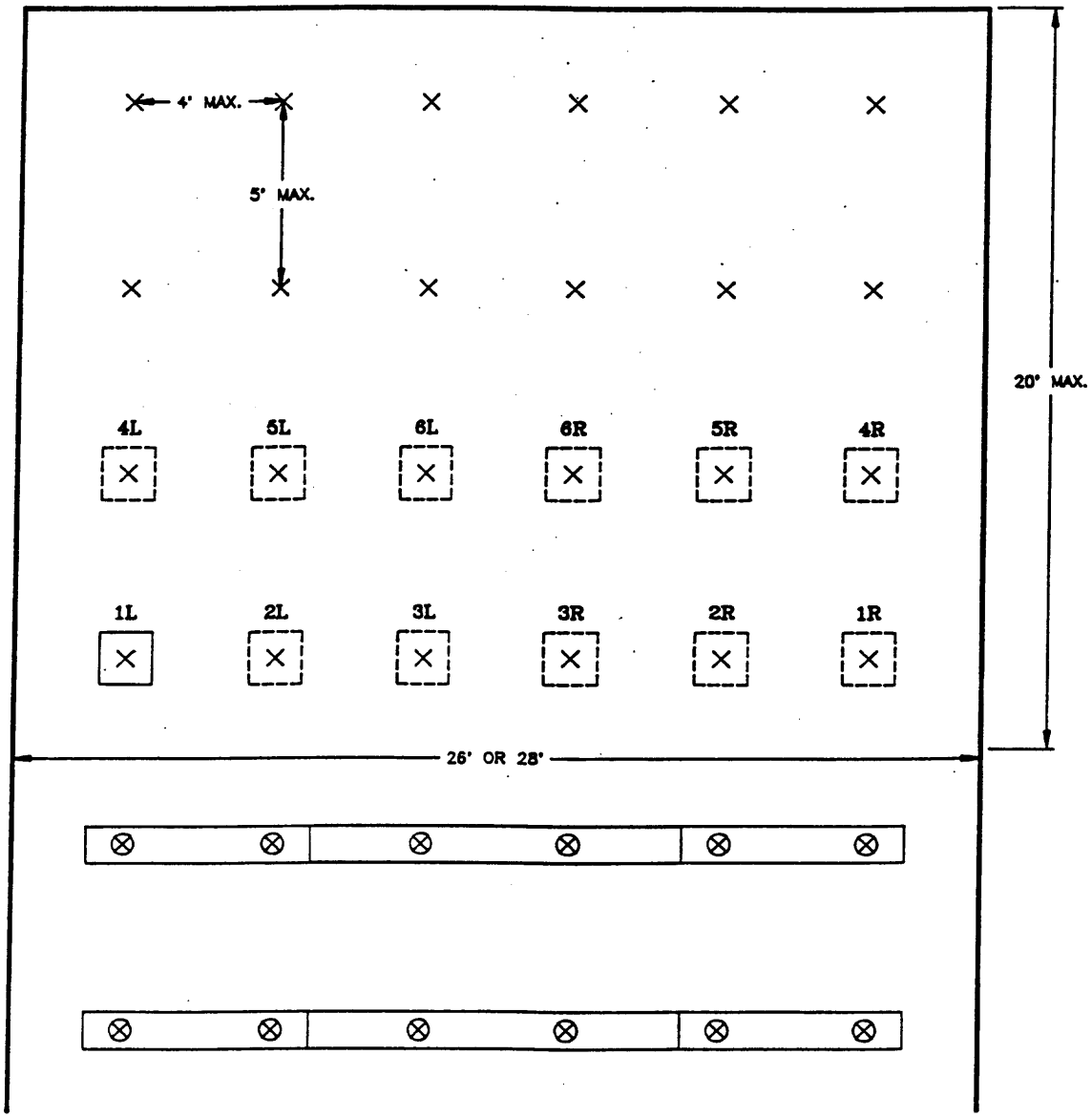
RECEIVED
AUG - 2 1995

Acad Ref: ABCUT1

SCALE: 1"=5'

BOLTING SEQUENCE FOR A TYPICAL 26' OR 28' ENTRY SETUP ROOM FOR LONGWALL DEVELOPMENT

Double Boom Roof Bolter
Option #1



NOTE:
Left side roof bolter will install bolt 1L, then operators will reposition the machine so the remaining row can be installed with both booms. This sequence will be the same for the next rows of bolts.

RECEIVED
AUG - 2 1995
USDL MSHA CMS&H
DISTRICT 9

LEGEND

Permanent supports with roof mats, mesh, or chain link ⊗ ⊗

Proposed bolt location ×

ATRS on roof bolting machine □

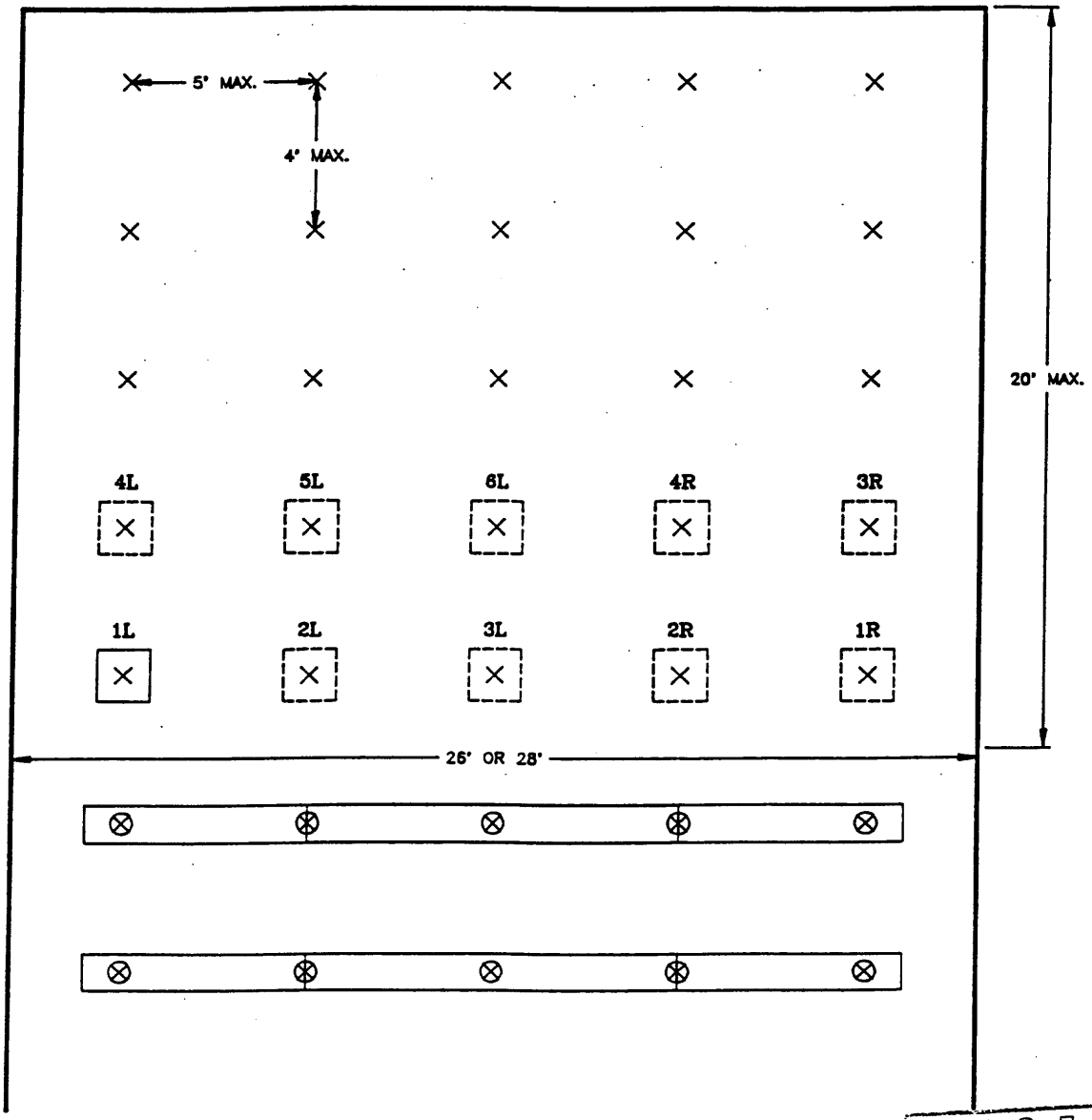
Acad Ref: ABBOLT1

APPROVED CMS & H AUG 17 '95

SCALE: 1"=5'

BOLTING SEQUENCE FOR A TYPICAL 26' OR 28' ENTRY SETUP ROOM FOR LONGWALL DEVELOPMENT

Double Boom Roof Bolter
Option #2



NOTE:
Left side roof bolter will install bolt 1L, then operators will reposition the machine so the remaining row can be installed with both booms. This sequence will be the same for the next rows of bolts.

RECEIVED
AUG - 2 1995
USDL MSHA-ASH
CENTER

LEGEND

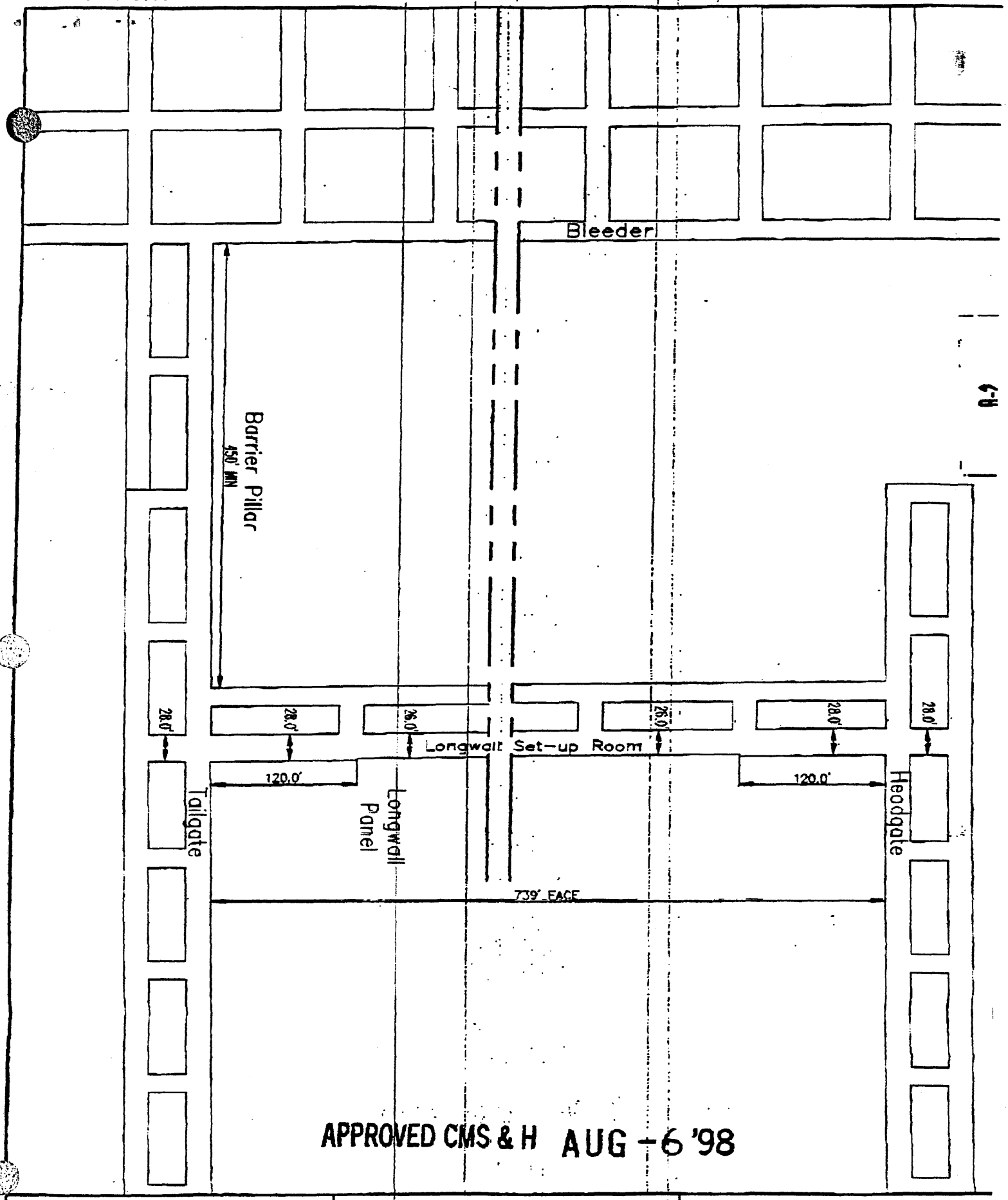
Permanent supports with roof mats, mesh, or chain link

Proposed bolt location

ATRS on roof bolting machine

Acad Ref: ABBOLT2

SCALE: 1"=5'

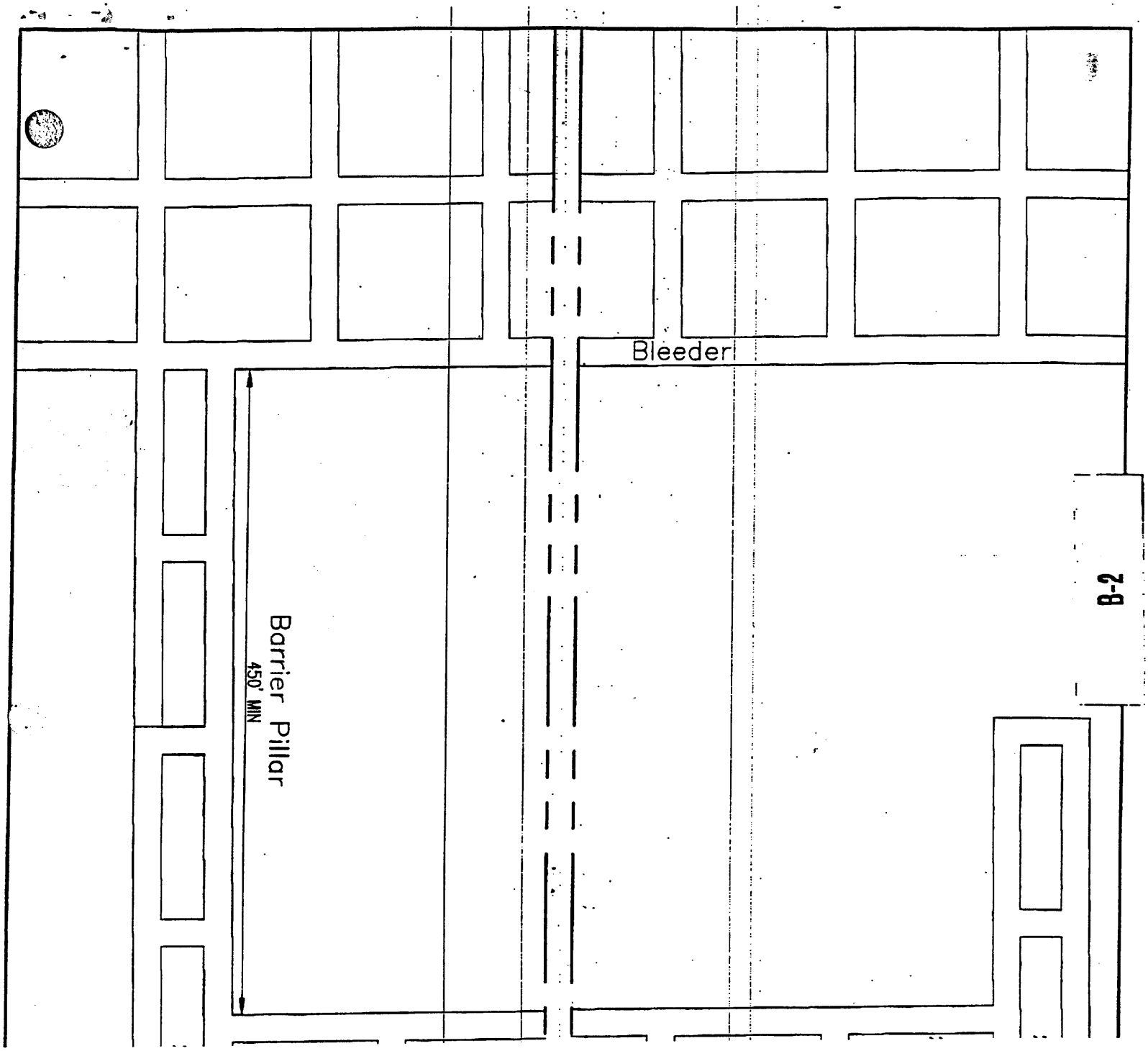


APPROVED CMS & H AUG -6 '98

Aberdeen Mine
Longwall Panel
Set-up Rooms

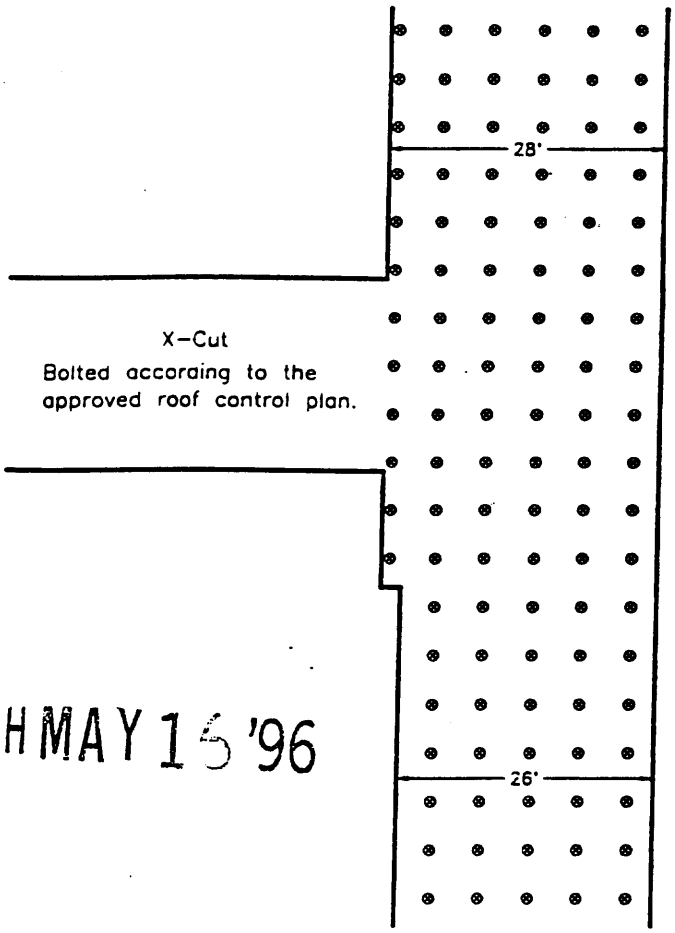
SCALE: 25' 0' 50' 100'

ANDALEX RESOURCES, INC.
Tower Division



APPROVED CMS & H AUG -6 '98

Longwall Set-Up Room
Mining and Roof Support Sequence



APPROVED CMS & H MAY 15 '96

RECEIVED
APR 12 1996

NOTES:

1. The set-up room will be mined to the approved width during development of the set-up entries.
2. The depth of cuts will not exceed 20'.
3. 7' long fully grouted resin bolts will be installed on not more than 5' centers to support the set-up room.

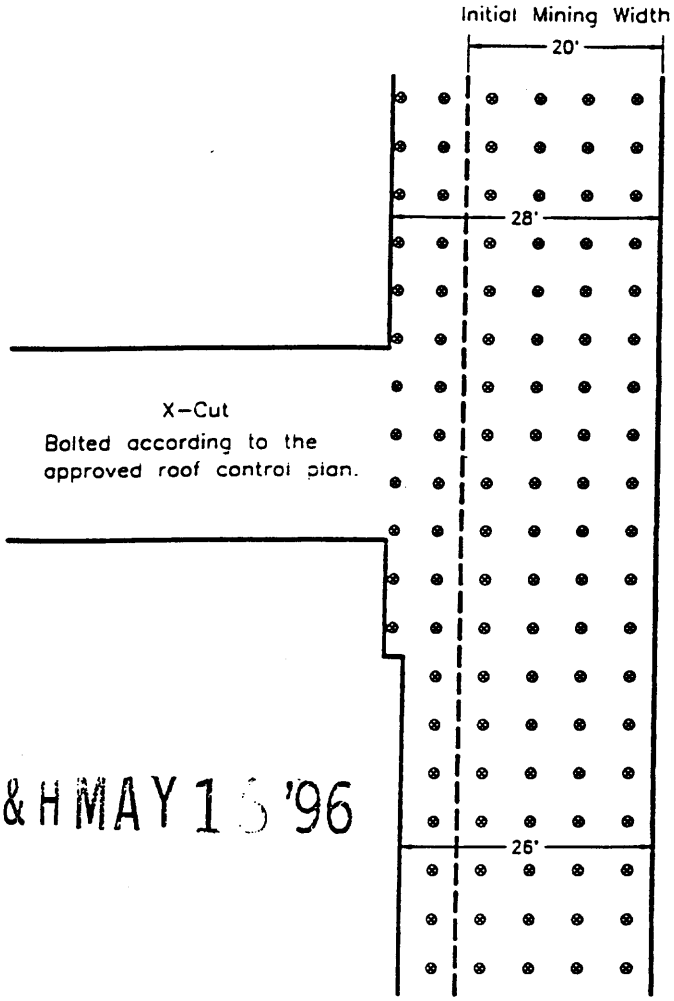
LEGEND

Roof Bolt ⊗

Scale: 1" = 20'

ACAD REF: ABSUPP1

Longwall Set-Up Room
Mining and Roof Support Sequence
When Initial Mining Width is 20'



APPROVED CMS & H MAY 1 6 '96

RECEIVED
APR 1 2 1996
USDL MSHA-OPS&H
DISTRICT 5

NOTES:

1. The set-up room will be initially mined 20' wide with 7' long fully grouted resin bolts on not more than 5' centers.

2. The entry will then be widened to the approved widths.

3. The cuts taken to widen the set-up room will not exceed 40' in length.

4. After each 40' cutting cycle is completed, Additional 7' long fully grouted resin bolts will be installed on not more than 5' centers to support the set-up room.

LEGEND

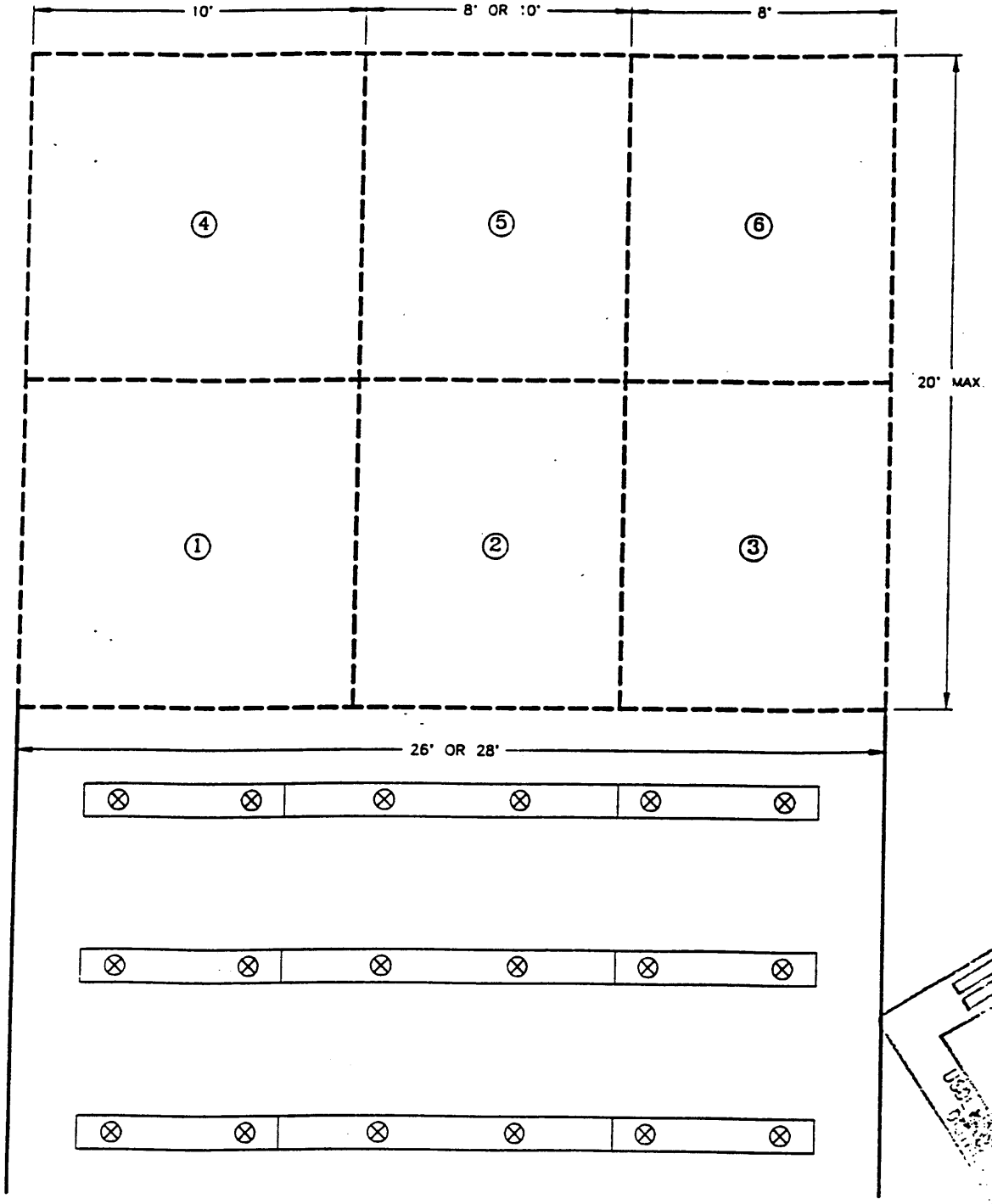
Roof Bolt ⊗

Scale: 1" = 20'

ACAD REF: ABSUPP2

MINING SEQUENCE FOR A TYPICAL 26' OR 28' ENTRY SETUP ROOM FOR LONGWALL DEVELOPMENT

APPROVED CMS & H MAY 16 '96



RECEIVED APR 17 1996

LEGEND

Permanent supports with roof mats, mesh, or chain link

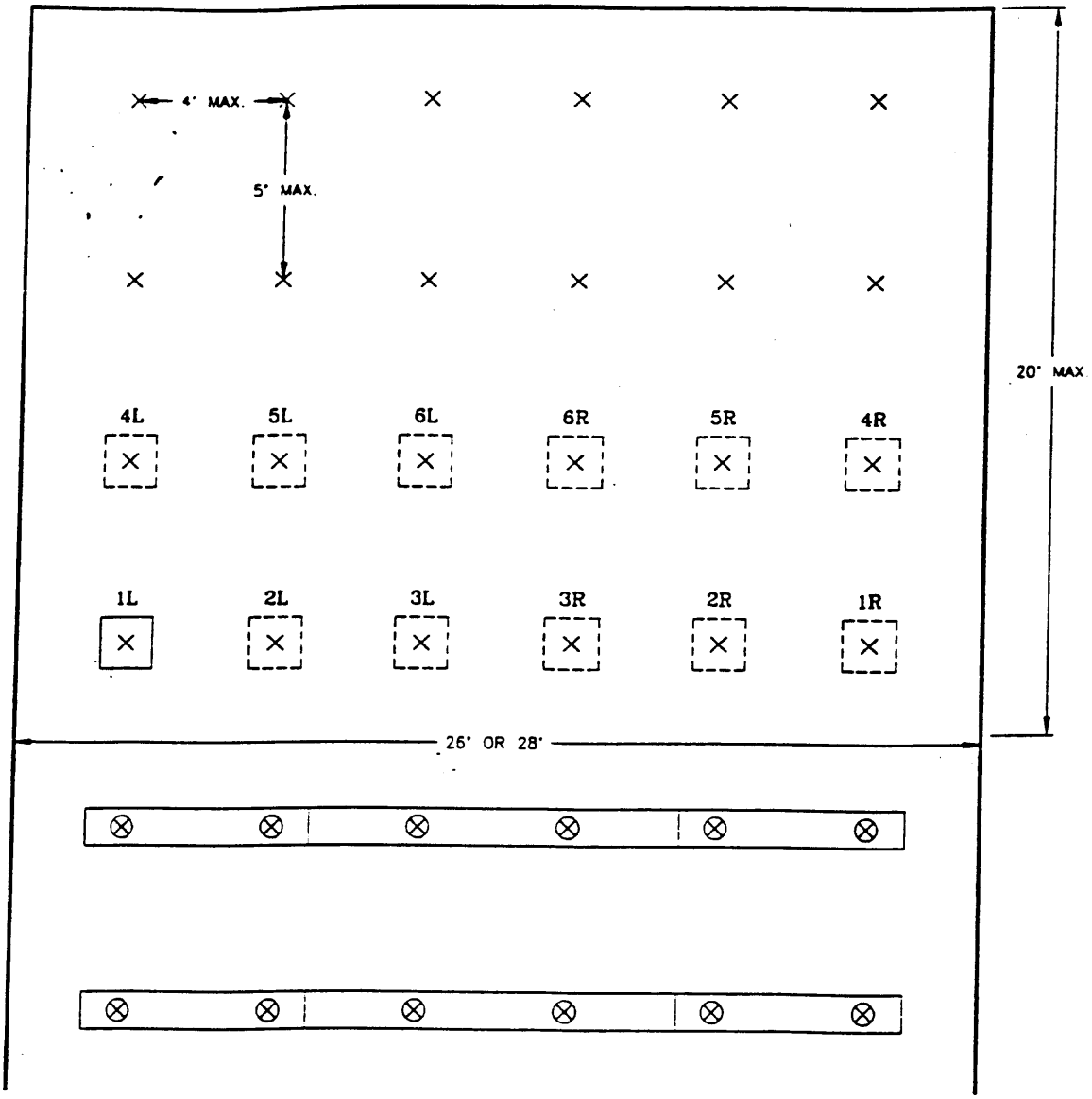
Acad Ref: ABCUT1

SCALE: 1"=5'

BOLTING SEQUENCE FOR A TYPICAL 26' OR 28' ENTRY SETUP ROOM FOR LONGWALL DEVELOPMENT

Double Boom Roof Bolter
Option #1

APPROVED CMS & H MAY 16 '96



NOTE:
Left side roof bolter will install bolt 1L, then operators will reposition the machine so the remaining row can be installed with both booms. This sequence will be the same for the next rows of bolts.

RECEIVED
APR 12 1996

LEGEND

Permanent supports with roof mats, mesh, or chain link ⊗ ⊗

Proposed bolt location ×

ATRS on roof bolting machine ⬚

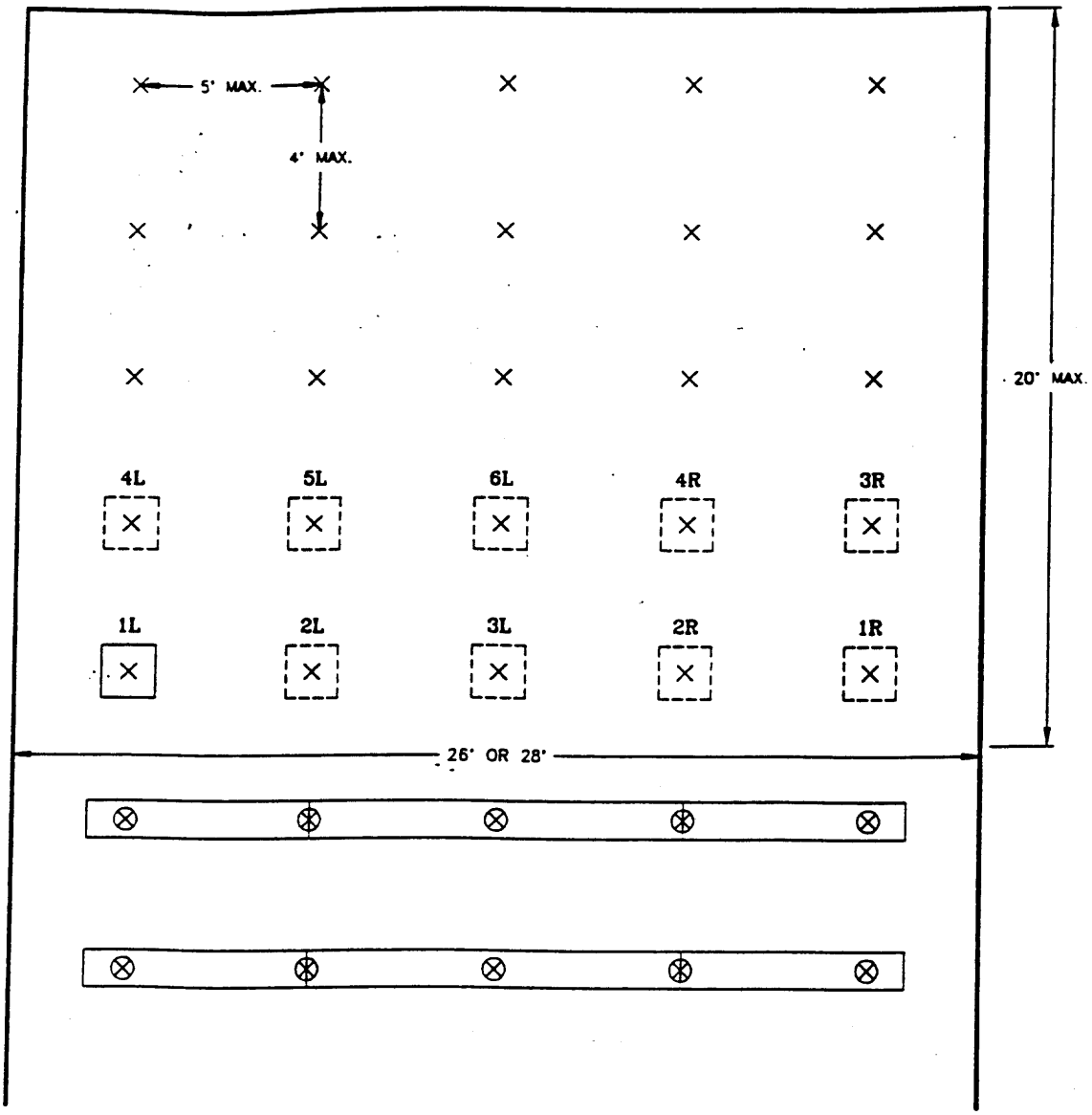
Acad Ref: ABBOLT1

SCALE: 1" = 5'

BOLTING SEQUENCE FOR A TYPICAL 26' OR 28' ENTRY SETUP ROOM FOR LONGWALL DEVELOPMENT

Double Boom Roof Bolter
Option #2

APPROVED CMS & H MAY 16 '96



NOTE:
Left side roof bolter will install bolt 1L, then operators will reposition the machine so the remaining row can be installed with both booms. This sequence will be the same for the next rows of bolts.

RECEIVED
APR 12 1996
USBM

LEGEND

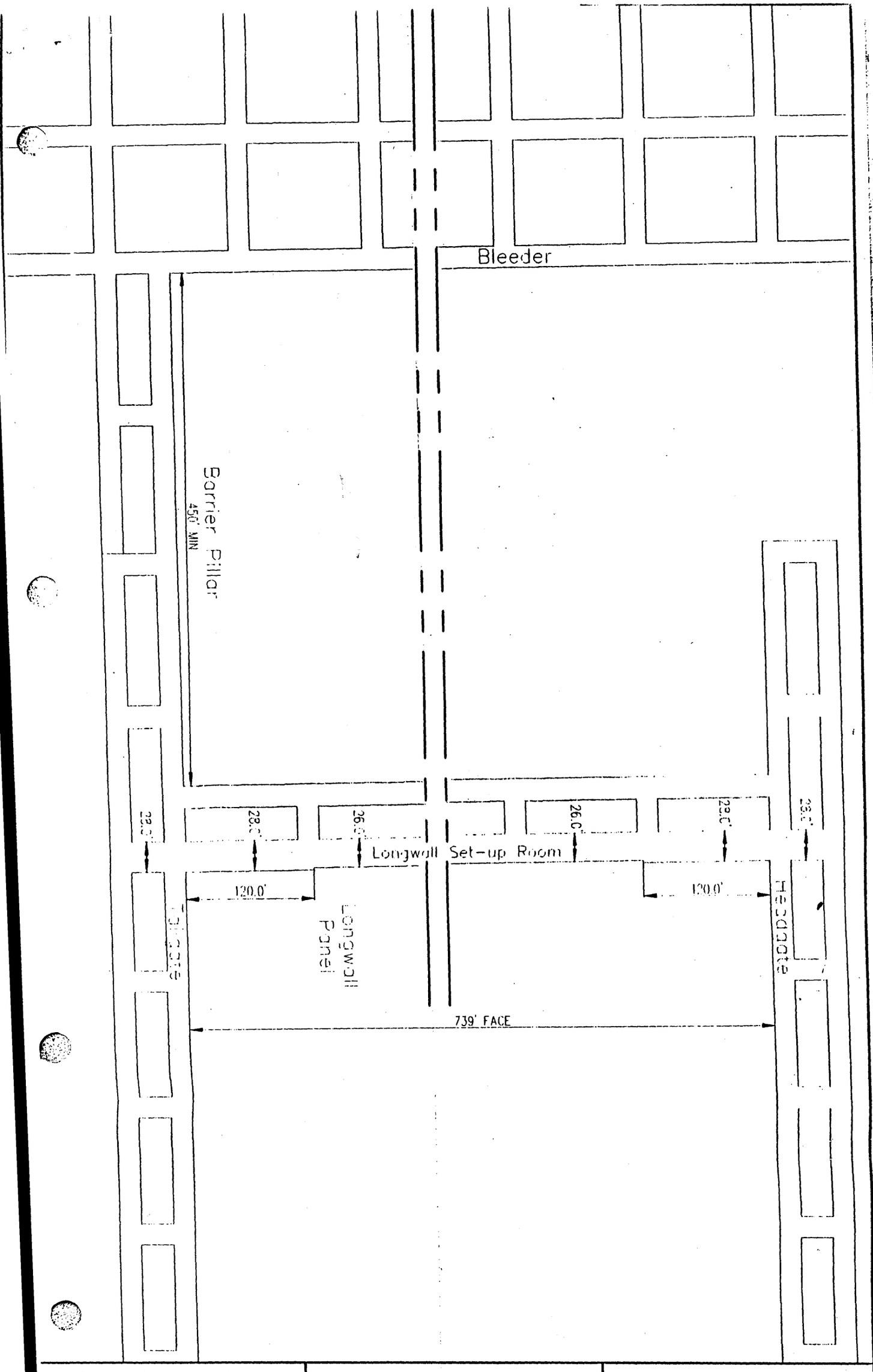
Permanent supports with roof mats, mesh, or chain link ⊗ ⊗

Proposed bolt location ×

ATRS on roof bolting machine ☐

Acad Ref: ABBOLT2

SCALE: 1" = 5'



Aberdeen Mine

Longwall Panel

Set-up Rooms

SCALE:

25' 0' 50' 100'

August 5, 1998

Acad Ref: Setup.dwg

ANDALEX RESOURCES, INC.

Tower Division