Plate III-4
Mine Opening Backfill Plan

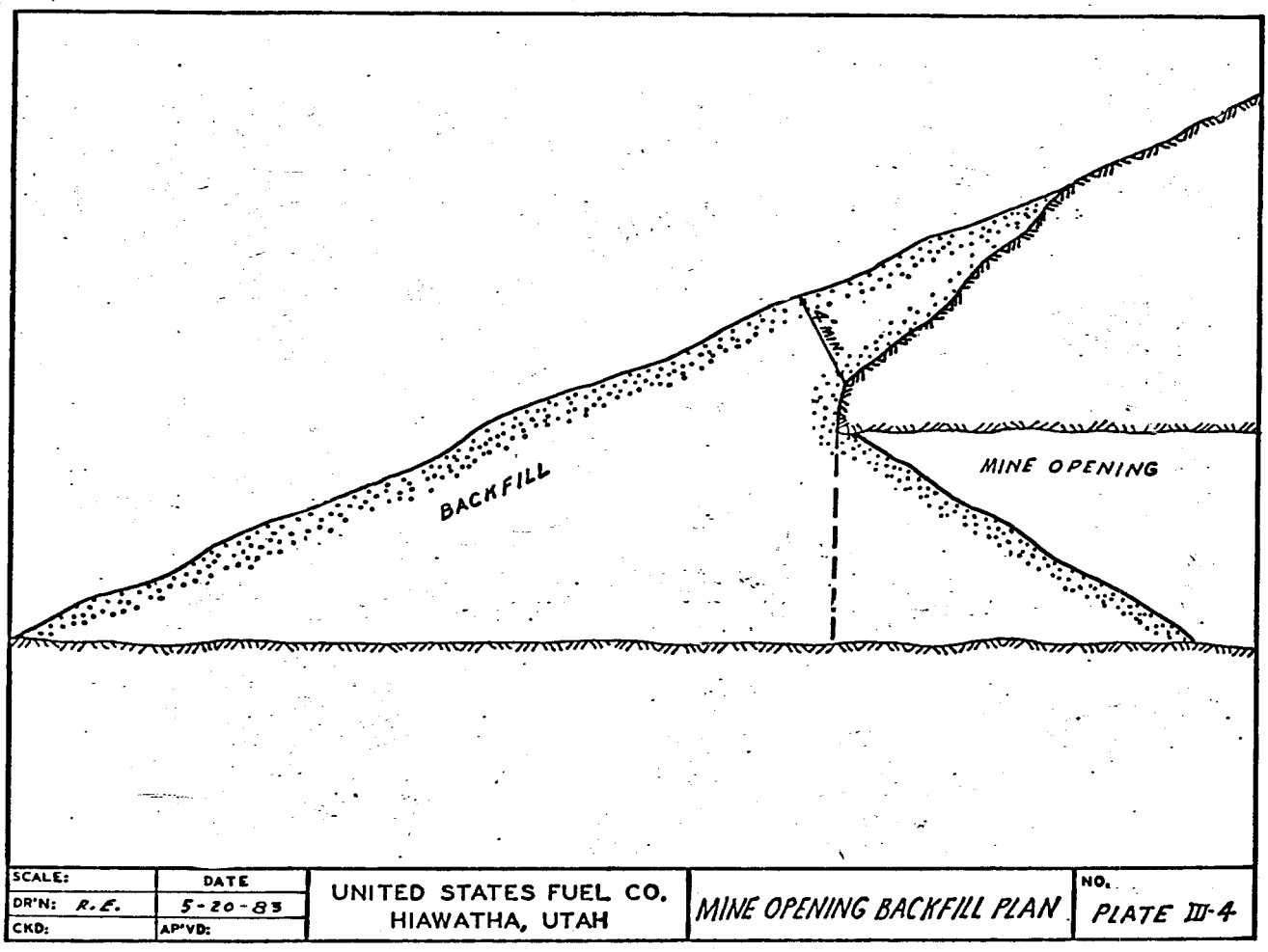
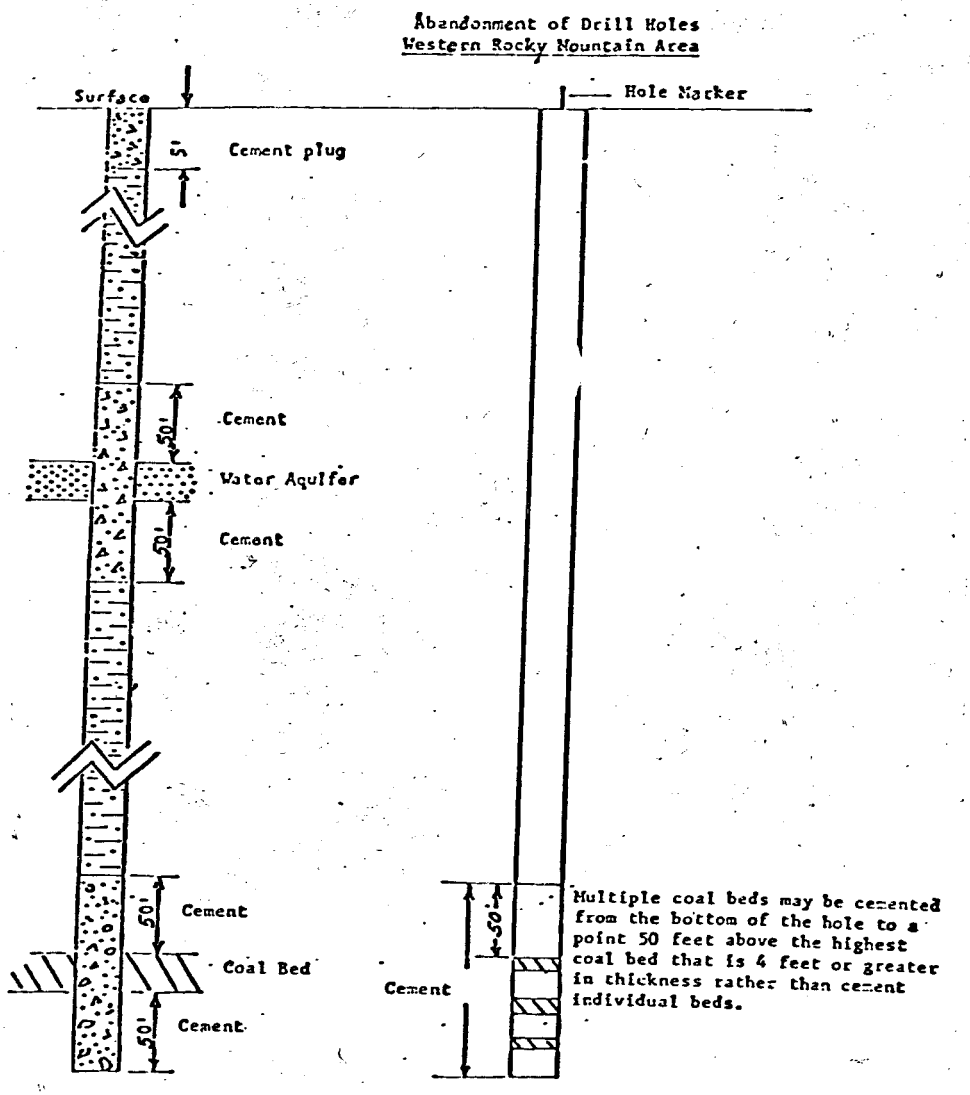


Plate III-5
Borehole Sealing Plan



UNITED STATES FUEL CO. HIAWATHA, UTAH	BOREHOLE SEALING METHOD	NO. PLATE III-5

4/28/89 Seed Mixes begin on page 109 of DOA Response.

UMC 784.13 (b)(5) Revegetation

Four seed mixtures intended for revegetation of specific reclamation situations are provided in Tables IX-1, IX-2, IX-3, and IX-4 of the discussion of UMC 786.19 in Chapter IX. These are for reclamation of (1) the areas affected by coal refuse and other coal materials, (2) the alluvial-fan sites, (3) the mine pads, approaches, and other similar areas in South, Middle, and North Fork, and (4) riparian areas. Mixture No. 3 also includes nursery grown stock for trees. Mixture No. 4 includes nursery grown stock for both trees and shrubs.

Two basic methods used for seed planting are drilling and broadcasting. Hyudroseeding is another method sometimes used. Drilling distributes and covers the seed in one operation and consequently gives the best results where topographic conditions allow. The drilling rate is to be one-half the broadcast rate shown in Tables IX-1 through IX-4.

Middle Fork Reclamation Plan

Mining in Middle Fork Canyon had commenced in the early 1900's. Surface areas related to mining in King 4 and 5 were disturbed prior to the Surface Mining Control and Reclamation Act therefore, no topsoil was removed and stockpiled for future reclamation. At the time of reclamation substitute topsoil material from the pad itself will be salvaged. Surface structures will be removed and the foundations backfilled. Compacted topsoil will be scarified before revegetating. Highwalls connected with portals, embankments and benches will be terraced in the form of highwall slope reduction to control erosion. Portals will be back filled and graded to prevent access.

Middle Fork Area

Proposed post-mining grading plans for the Middle Fork area are shown on Exhibits III-11 (Contour map), III-11.1, and III-11.2 (cross sections). No contour maps which show predisturbance surface configuration are available for this area; therefore, the proposed final surface configuration was developed to provide a balanced cut and fill situation and configuration similar to other canyons in the area. A shrink factor of 5 percent was used in balancing the cut and fills.

Calculations for the earthwork volumes are based on the cross-sections shown on Exhibits III-11.1 and III-11.2. Quantity computations, based on

Topsoil substitute must be substantiated. What about the other disturbance areas?

planimetered Cross-section areas and the average end-area method, are included in Appendix III-5. The total cut volume calculated is 74,115 cubic yards and the fill volume is 73,477 cubic yards. If, during regrading operations, it is found that the earth work volumes will not balance as planned, the grading plans will be adjusted to achieve a balanced condition.

After completion of surface facility removal and sealing of all the entry portals except for the Hiawatha II mine portal, the regrading operations will commence. Fill material will be pushed up against the highwalls as high as possible. All fills will be constructed at a slope of 2 horizontal to 1 vertical. The mind pad will be covered with the best available material (substitute topsoil material) salvaged from the mine pad area. The existing culverted stream diversions will be removed during the regrading operation. The existing diversion cut-off ditches and sediment pond will be left in place until the end of the regrading. Prior to removal of the sediment ponds, traps will be constructed in the existing stream bed below the site. The traps will not be removed but will be allowed to fill in with sediment from the reclaimed site.
The sediment traps are shown on Exhibit III-11.

UMC 784.22 Diversions

After the existing culverted stream diversions have been removed the channel will be restored as an open channel. Peak flow for the Middle Fork of Miller Creek was determined using the SCS triangular unit hydrograph methodology. Table VII-9a, Ch. VII shows the data inputs and results. Based on a 100 year 24-hour design storm, the expected peak flow is approximately 94.2 cubic feet per second (cfs).

Stability of the restored channel was evaluated using Manning's equation. As shown in Table VII-9b, Ch. VII the gradient of the restored channel causes a rather high velocity of 9.4 feet per second (ft/s). Therefore the channel will be riprapped with angular to sub-angular material with a mean diameter (d50) of 2.0 feet.

Due to the size of the riprap, a filter blanket will be required to prevent wash-out around the coarse riprap. The filter blanket will consist of two layers over the sandy soils and fill materials. As determined by the U. S. Department of Transportation Methodology, (U. S. DOT, 1978), the first layer will be a well-graded fine gravel with a d50 of 7 millimeters. A coarse gravel will be the second layer with a d50 of 80 millimeters.

The restored channel will be revegetated using Seed Mix No. 4 and the area will be mulched using tacked hay to prevent excessive erosion in the newly restored channel.

784.13 Soil Removal, Storage, Sampling and Redistribution

Six samples of soils in the Middle Fork Area (three from the upper pad and three from the lower pad Exhibit IX-3B) were collected in December 1983 and analyzed for physical and chemical characteristics (Table VIII-9, Ch. VIII) to determine their suitability for use during reclamation. Each sampling location was chosen based on the criteria that: the area was representative (visual observation) for both soils and aspect, the area could be protected if chosen for a test plot site, and the area had not been contaminated with toxic materials (oil, hydraulic fluid or other solid or fluid which is toxic to vegetation). The accumulated depth of snow from the seasonal snowfall was removed from the sampling site. A spud bar, shovel and hand auger were then used to collect samples from an 8 inch diamter hole excavated to 18 inches in depth. As the hole was advanced from the surface to 18 inches, representative portions of the excavated soils were collected as a composite sample and saved for laboratory analyses. Approximately 9 pounds of soil was collected from each of the 12 holes (3 holes located on each mine pad) and submitted to Western Analytical Laboratory and GARCO Testing Laboratory for analyses of physical and chemical properties. Additionally, the samples were analyzed for the presence of acid forming and toxic materials. Information contained in the discussion on the samples indicates that the soils will be suitable for substitute topsoil materials. See details on the mine pad soils located in Chapters VIII. As a result, since there was no topsoil removed and stored for general reclamation of the Middle Fork Area during initial contruction, the best available material currently on the site (as determined visually by a high percentage of fines, high organic matter content, and low coarse fraction) will be separated during the regrading operations and placed in a layer supplemented by the topsoil stockpiles from the new proposed intake air portals in Middle Fork. On steep slope areas (those greater or equal to 2:1), the regraded surface will be roughened (by hand or using equipment depending on accessibility) to facilitate bonding of the substitute and stockpiled topsoil to the fill materials.

Middle Fork Area: Upper and Lower Pads

The areas delineated on Exhibit IX-3B depict the areal extent of the proposed substitute topsoil. The minimum volumes avialable for the Middle Fork area are shown in Table III-8. It is important to restate that these volumes indicate only the materials that have been identified as suitable on the surface, and that additional suitable materials are expected to be found during regrading and reclamation of the pad areas. These will be temporarily stockpiled during regrading operations to be redistributed to achieve a 6 inch cover layer after the final grade and the previously described (Chapter III reclamation plan) have been emplaced.

Only 6" topsoil redistributed? What's the ppt? Surrounding veg? Slope + aspects

Don't mix salvaged topsoil w/ substitute topsoil

Prior statement (III-36) saying no A and T"

784.13 Soil Removal, Storage, Sampling and Redistribution

Six samples of soils in the Middle Fork Area (three from the upper pad and three from the lower pad Exhibit IX-3B) were collected in December 1983 and analyzed for physical and chemical characteristics (Table VIII-9, Ch. VIII) to determine their suitability for use during reclamation. Each sampling location was chosen based on the criteria that: the area was representative (visual observation) for both soils and aspect, the area could be protected if chosen for a test plot site, and the area had not been contaminated with toxic materials (oil, hydraulic fluid or other solid or fluid which is toxic to vegetation). The accumulated depth of snow from the seasonal snowfall was removed from the sampling site. A spud bar, shovel and hand auger were then used to collect samples from an 8 inch diamter hole excavated to 18 inches in depth. As the hole was advanced from the surface to 18 inches, representative portions of the excavated soils were collected as a composite sample and saved for laboratory analyses. Approximately 9 pounds of soil was collected from each of the 12 holes (3 holes located on each mine pad) and submitted to Western Analytical Laboratory and GARCO Testing Laboratory for analyses of physical and chemical properties. Additionally, the samples were analyzed for the presence of acid forming and toxic materials. Information contained in the discussion on the samples indicates that the soils will be suitable for substitute topsoil materials. See details on the mine pad soils located in Chapters VIII. As a result, since there was no topsoil removed and stored for general reclamation of the Middle Fork Area during initial contruction, the best available material currently on the site (as determined visually by a high percentage of fines, high organic matter content, and low coarse fraction) will be separated during the regrading operations and placed in a layer supplemented by the topsoil stockpiles from the new proposed intake air portals in Middle Fork. On steep slope areas (those greater or equal to 2:1), the regraded surface will be roughened (by hand or using equipment depending on accessibility) to facilitate bonding of the substitute and stockpiled topsoil to the fill materials.

Middle Fork Area: Upper and Lower Pads

The areas delineated on Exhibit IX-3B depict the areal extent of the proposed substitute topsoil. The minimum volumes avialable for the Middle Fork area are shown in Table III-8. It is important to restate that these volumes indicate only the materials that have been identified as suitable on the surface, and that additional suitable materials are expected to be found during regrading and reclamation of the pad areas. These will be temporarily stockpiled during regrading operations to be redistributed to achieve a 6 inch cover layer after the final grade and the previously described (Chapter III reclamation plan) have been emplaced.

TABLE III-8
Soil Volumes Available From
The Middle Fork Pad

Area	Acres	Depth (ft)	Volume (yd)
A	2.55	1.5	6,169
B	0.66	1.5	1,596
C	1.18	1.5	2.855

A total of 10,621 cubic yards is available to cover the 20.6 acre disturbed area in the Middle Fork area. The volume would allow a minimum cover of 4 inches (with the remaining 2 inches of cover coming from suitable material segregated during regrading as discussed above).

After placement of the substitute topsoil (best available onsite material) and the stockpiled topsoil, the entire area will be scarified and fertilized to prepare the soil for planting. Scarification will be done on the contour where feasible with patrol graders and farm-type disc equipment.

The Middle Fork operation is not projected to disturb [illegible] amount of new area for the life of the mining co[illegible] from the [illegible] mine for intake air has been appro[illegible] Appendix [illegible] disturbance due to [illegible] less than [illegible] be stripped from t[illegible] of portal[illegible] Topsoil from this [illegible] to an av[illegible]es and stored in [illegible] Exhibit [illegible] 1,137 cubic yards [illegible] stockpile [illegible] be left uncompacted [illegible] resulting [illegible]d to place the topso[illegible] The topsoil will be stripp[illegible] ansported to, and placed in, the stockpile with a frontend loader.

Need map of different soils, descriptions, lab analyses

What? Discussed above? Scarification of spoils not soil

A cutoff ditch will be constructed above the new topsoil stockpile to divert overland storm runoff away from the stockpile. A ditch/berm will be constructed below the stockpile to collect runoff and sediments from the stockpile. One topsoil pile already exists at this site and is protected by berms such as described above and has been revegetated.

Middle Fork Topsoil Storage

One soil sample, a composite of the surface to 4.0 foot depth, was collected from the existing topsoil storage pile and submitted to Utah State University for analyses. The results of these analyses are given in Table VIII-16a, Ch. VIII.

TABLE III-8
Soil Volumes Available From
The Middle Fork Pad

Area	Acres	Depth (ft)	Volume (yd)
A	2.55	1.5	6,169
B	0.66	1.5	1,596
C	1.18	1.5	2.855

A total of 10,621 cubic yards is available to cover the 20.6 acre disturbed area in the Middle Fork area. The volume would allow a minimum cover of 4 inches (with the remaining 2 inches of cover coming from suitable material segregated during regrading as discussed above).

After placement of the substitute topsoil (best available onsite material) and the stockpiled topsoil, the entire area will be scarified and fertilized to prepare the soil for planting. Scarification will be done on the contour where feasible with patrol graders and farm-type disc equipment.

The Middle Fork operation is not projected to disturb any substantial amount of new area for the life of the mining complex. A new breakout from the King 4 mine for intake air has been approved and is contained in Appendix III-7. The additional disturbance due to the breakout will be less than .5 acre. Topsoil will be stripped from the area where a new set of portals will be constructed. Topsoil from this area will be strippped to an average depth of 18 inches and stored in the location shown on Exhibit VIII-4. Approximately 1,137 cubic yards will be removed and stockpiled. This topsoil will be left uncompacted except for compaction resulting from the equipment used to place the topsoil. The topsoil will be stripped with a dozer and transported to, and placed in, the stockpile with a frontend loader.

A cutoff ditch will be constructed above the new topsoil stockpile to divert overland storm runoff away from the stockpile. A ditch/berm will be constructed below the stockpile to collect runoff and sediments from the stockpile. One topsoil pile already exists at this site and is protected by berms such as described above and has been revegetated.

Middle Fork Topsoil Storage

One soil sample, a composite of the surface to 4.0 foot depth, was collected from the existing topsoil storage pile and submitted to Utah State University for analyses. The results of these analyses are given in Table VIII-16a, Ch. VIII.

The topsoil materials stockpiled in the Middle Fork Canyon have an overall good suitability rating for reclamation (Table VIII-19, Ch. VIII. Those parameters which have good suitability ratings are: organic matter, saturation percentage, electrical conductivity, SAR, texture and moist consistency.

The available water capacity value of 5.5 percent has fair reclamation suitability. Mulch, which will be added to all reclaimed surfaces , will increase the infiltration rate and decrease temperature and evaporation through soil shading.

The pH of 8.0 has fair reclamation suitability. The addition of sulfur coated urea and potassium nitrate will lower the pH into a more neutral position which would then receive a good suitability rating.

The 22 percent coarse fraction is noted as fair for reclamation suitability. No mitigation will be done for the coarse fraction.

The topsoil will require soil nutrients and amendments to enhance the establishment of vegetation.

The nitrate nitrogen level of 2.5 ppm will be increased by the addition of 40 pounds per acre of sulfur coated urea.

The 4.9 ppm level pf phosphorus will be increased by the application of 30 pounds per acre of treble super phosphate.

Potassium at 55 ppm is considered good, one ton per acre of mulch will be applied to the reclaimed surfaces. The mulch will either be straw, native grass hay or hydromulch.

Following construction, the topsoil stockpile will be revegetated (seeded and mulched) in the subsequent September or October using seed mixture no. 3 and Conwed 2000 mulch at a rate of one ton per acre.

A suitably permanent, diverse vegetative cover, as described in Chapter IX Vegetation Resources, will be established on all affected areas. Should the Middle Fork access road be required for postmining maintanance of the underground reservoir, it will remain intact and be maintained by the town of Hiawatha. (See maintanance agreement in Appendix III-8).

Table III-9

Reclamation Timetable

Middle Fork Mining Operations

Activity	Start	Finish	Year
Cease Operation			1
Remove Mining Equipment	May 1	July 1	1
Dismantle Surface Buildings Structures and Equipment	July 1	Aug 15	1
Remove Exposed Concrete	Aug 15	Sept 15	1
Seal Portals	Aug 15	Sept 30	1
Install Sediment Traps	May 1	June 1	2
Regrade Site	May 15	June 1	2
Remove Stream Diversions	May 15	June 1	2
Stockpile Substitute Topsoil Material	June 1	Aug 15	2
Remove Sediment Pond	Aug 1	Aug 15	2
Place Substitute Topsoil	Aug 1	Sept 1	2
Soil Nutrient Tests	Aug 15	Sept 1	2
Surface Scarification and Preparation	Aug 15	Sept 1	2
Nutrient/Fertilizer Placement	Sept 1	Sept 15	2
Seeding and Planting	Sept 15	Sept 30	2
Mulching	Sept 30	Oct 15	2
Final Acceptance		Within 5 Years	

TABLE III-10

MIDDLE FORK RECLAMATION COST ESTIMATE

JOB	MATERIAL	LABOR M/HRS	EQUIPMENT	AREA ACRES	VOLUME CU. YD.	PRODUCTION	UNIT COST	TOTAL COST
STRUCTURE REMOVAL (See Table III-10A)								202,000
BACKFILL AND GRADING								
Move Contaminated Material			End Loader (7 Cy)	5	4,028	159 Cy/Hr	145.06/Hr	3,675
Cut and Fill Site			D9U Dozer	21.07	73,796	523 Cy/Hr	163.54/Hr	23,076
TOTAL								26,076
TOPSOIL REPLACEMENT			End Loader (7 Cy)	21.07	17,000	159 Cy/Hr	145.06/Hr	15,510
			D6 Dozer	21.07	17,000	346 Cy/Hr	76.87/Hr	3,777
			Farm Tractor	21.07		0.5 Ac/Hr	31.95/Hr	1,346
TOTAL								20,633
REVEGETATION								
Scarification and			Farm Tractor	21.07		0.5 Ac/Hr	31.95/Hr	1,346
Fertilization	Fertilizer			21.07		125 Lb/Ac	0.34/Lb	895
Soil Testing		8	Labor				21.95/Hr	176
			4 WD Pickup			8 Hours	5.05/Hr	40
	Sample Analyses					40 Samples	100/Sample	4,000
Drill Seeding				21.07			1,200/Ac	25,284
Mulching	Hay Mulch			21.07		1.5 Ton/Ac	100.00/Ton	3,161
			Farm Tractor	21.07		0.5 Ac/Hr	31.95/Hr	1,346
Tree Planting	12,544 Plants						.67/Plant	8,404
		84	Labor			150 Plt/Hr	21.95/Hr	1,844
TOTAL								46,496
RESTORE STREAM CHANNEL								
	Sort Riprap		D6 Dozer			32 Hours	76.87/Hr	2,460
	Sand & Gravel				1,300		8 Cu.yd.	10,400
TOTAL								12,860
RECLAIM ROAD								
Pavement Removal (8,600' Long 24' Wide)				4.74			6,679/Ac	31,659
Backfilling (3 Cu.yd./ft.)			D6 Dozer		25,800	346 Cy/Hr	76.87/Hr	5,732
Scarification and			Farm Tractor	13.2		0.5 Ac/Hr	31.95/Hr	843
Fertilization	Fertilizer			13.2		125 Lb/Ac	.34/Lb	561
Drill Seeding				13.2			1,200/Ac	15,840
Mulching	Hay Mulch			13.2		1.5 Ton/Ac	100/Ton	1,980
			Farm Tractor	13.2		0.5 Ac/Hr	31.95/Hr	843
TOTAL								57,458
MAINTANANCE								
Inspector		50					37.58/Hr	1,879
Repair Rills & Gullies			Farm Tractor			40 Hours	31.95/Hr	1,278
Reseeding (20% of Area For 2 Years)			Hydroseeder	4.21			500.00/Ac	4,210
TOTAL								7,367
TOTAL ESTIMATED RECLAMATION COST FOR MIDDLE FORK								373,565

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TABLE III-10A

STRUCTURE REMOVAL COST FOR THE MIDDLE FORK FACILITIES AREA

STRUCTURE	SIZE	MATERIAL	COST
Water Tank	200 Cu. Yd. 314 Sq. Ft.	Steel Concrete Slab	810 720
Change House	8,300 Cu. Yd. 9,000 Sq. Ft.	Steel Concrete Slab	33,600 20,600
Foreman Building	300 Cu. Yd. 800 Sq. Ft.	Steel Concrete Slab	1,200 1,830
Transfer Building	440 Cu. Yd. 400 Sq. Ft.	Steel Concrete Slab	1,780 915
Misc. Shacks Near Changehouse (2)	300 Cu. Yd. 800 Sq. Ft.	Steel Concrete Slab	1,210 1,830
Fan (2)	740 Cu. Yd. 1,000 Sq. Ft.	Steel Concrete Slab	3,000 2,290
Concrete Structure Near Belt Portal	40 Cu. Yd. 100 Sq. Ft.	Concrete Concrete Slab	230 229
Portals (8 Active Plus 1 For The New Area, Estimated At $2700 Per Portal, Also 4 Portals With Bulkheads, To Be Reclaimed With Drain Pipes, Assume $2700 Per Portal)	20 Ft. x 10 Ft.	(Backfill 25 Feet Into The Portal Against A Concrete Stopping Or Or Existing Bulkhead	
Switch Stations (2)	170 Cu. Yd.	Steel	688
Substation - 24 KVA	330 Cu. Yd.	Steel	1,340
Substations (2)	80 Cu. Yd.	Steel	324
Rock Dust Bin	260 Cu. Yd. 177 Sq. Ft.	Steel Concrete Slab	1,050 405
Conveyor (Foundations To Be Covered)	3000 Cu. Yd.	Steel	12,200
Rail Into The Mine Ballast To Be Removed During Grading	700 Ft.		8,160
Stacker (Foundation To Be Covered)	2,200 Cu. Yd.	Steel	8,910
Reclaim (Foundation To Be Covered)	740 Cu. Yd.	Steel	3,000
Culverts - 24" Diameter (Will Be Uncovered During Backfilling Operations)	2,200 Ft.	Steel	1,040
Culverts - 36" Diameter (Will Be Uncovered During Backfilling Operations)	1,300 Ft.	Steel	1,380
Sewage Drain Field	10,000 Sq. Ft.	(Assume Removal Will Occur During The Backfilling Operations)	
Sediment Pond	2,700 Cu. Yd.	Earth	2,200
Powerline	7,600 Ft.		27,500
Road To Bathhouse (24 Ft. Paved Width, 39 Ft. Subbase (6", Assume Material Is Pushed Against The Side Of The Road To Be Backfilled With A Dozer During Backfilling and Grading)	3,300 Ft.		12,100
Parking And Equipment Area	5,900 Sq. Yds. Of Pavement		8,100
Misc. Equipment	2,000 Cu. Yd.		8,100
TOTAL			$202,000

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Chapter IX presents details on the revegetation plan and procedures including monitoring. Table III-9 presents the Reclamation Timetable for the Middle Fork Operations.

Abandoned mine portals of the Hiawatha #2 mine, sealed by concrete bulkheads, are closed off by gates and posted. One of the portals connects the underground reservoir impounded by the bulkheads to a six inch pipeline which supplies the King 4 and 5 mine facilities and the alternate water supply for the town of Hiawatha. Appendix III-6 contains additional information on this impoundment as well the "Hazard Analysis of the Diversion of Water into the Hiawatha No. 2 Mine".

The proposed overland belt conveyor, from King 4 and 5 to the Hiawatha Preparation Plant, has been removed from this submittal and is not being proposed at this time.

A cost estimate for reclamation of the Middle Fork operation is included in Tables III-10 and III-10A.

North Fork Reclamation

The intake ventilation portal in North Fork was constructed in 1979-80 for the King 4 mine. Trees and large brush were cleared from the site before topsoil was removed. Topsoil was salvaged and redistributed on the regraded slopes after completion of the portal. Following the topsoil redistribution, the site was seeded to protect against erosion. A list of the seed mix applied, as recommended by the Division of Oil, Gas and Mining, is included in Appendix III-1 along with the plan approval by DOGM and OSM.

Postmining grading plans for the North Fork portal area are shown on Exhibits III-13 (contour map) and III-13.1 (cross-sections). Pre-disturbance contour maps of this area were not available, therefore, the proposed final surface configuration was developed to provide a balanced cut and fill situation and a configuration consistent with the surrrounding area.

A shrink factor of 5 percent was used in balancing the cut and fill. Calculations for the earthwork volumes are based on the cross-sections shown on Exhibit III-13.1. Quantity computations, based on planimetered cross-section areas and the average end method are included in Appendix III-5. The total calculated cut volume is 3,100 cubic yards. If during the regrading operations, it is found that the earthwork volumes will not

Topsoil map?
Profile descriptions?
Volume?
Stripping depth?

Table III-11

Reclamation Timetable
North Fork Mining Operations

Activity	Start	Finish	Year
Cease Operation			1
Seal Portal	June 1	June 15	1
Install Sediment Traps	June 15	July 1	1
Regrade Site	July 1	Aug 15	1
Place Topsoil*	July 1	July 15	1
Soil Nutrient Tests	July 15	Aug 1	1
Nutrient/Fertilizer Placement	Aug 1	Aug 15	1
Seeding and Planting	Sept 1	Sept 15	1
Mulching	Sept 15	Oct 1	1
Final Acceptance		Within 5 Years	

*Topsoil will be borrowed from the substitute topsoil borrow areas located east of the Hiawatha plant and loadout facility.

Borrow area
1) Soil map
2) Profile description
3) analysis of soil to be planted
excavation depth
4) volume of material (in place & loose)
5) reclamation plan

Table III-12

NORTH FORK RECLAMATION COST ESTIMATE

JOB	MATERIAL	LABOR M/HRS	EQUIPMENT	AREA ACRES	VOLUME CU. YD.	PRODUCTION	UNIT COST	TOTAL COST
RECLAIM VENT PORTAL								2,700
BACKFILL AND GRADING			D6 Dozer	1.1	3,290	346 Cy/Hr	76.87/Hr	769
TOPSOIL REPLACEMENT			End Loader (7 Cy.)			2 Hours	145.06/Hr	290
			2 - 20 Cy. Trucks		887	100 Cy/Hr	78.12/Hr	1,386
			D6 Dozer		887	346 Cy/Hr	76.87/Hr	231
			Farm Tractor	1.1		0.5 Ac/Hr	31.95/Hr	96
			Road Grader			8 Hours	83.25/Hr	666
TOTAL TOPSOIL REPLACEMENT								2,669
REVEGETATION								
Scarification and			Farm Tractor	1.1		0.5 Ac/Hr	31.95/Hr	96
Fertilization	Fertilizer			1.1		125 Lb/Ac	0.34/Lb	47
Soil Testing		4	Labor				21.95/Hr	88
			4 WD Pickup			0.5 Day	48.00/Day	24
	Operating Cost					4 Hours	5.05/Hr	20
	Sample Analysis					4 Samples	100/Sample	400
Drill Seeding				1.1			1,200/Ac	1,320
Mulching	Hay Mulch			1.1		1.5 Tons/Ac	100.00/Ton	165
			Farm Tractor	1.1		0.5 Ac/Hr	31.95/Hr	96
Tree Planting	2,533 Plants						0.67/Plant	1,697
		17	Labor			150 Pits/Hr	21.95/Hr	373
TOTAL REVEGETATION								4,326
RECLAIM NORTH FORK ROAD								
Backfilling (15,800 Ft. @ 0.3 Cy/Ft)			D6 Dozer	7.4	4,750	346 Cy/Hr	76.87/Hr	1,053
Scarification and			Farm Tractor	7.4		0.5 Ac/Hr	31.95/Hr	473
Fertilization	Fertilizer			7.4		125 Lb/Ac	0.34/Lb	315
Drill Seeding				7.4			1,200/Ac	8,880
Mulching	Hay Mulch			7.4		1.5 Tons/Ac	100.00/Ton	1,110
			Farm Tractor	7.4		0.5 Ac/Hr	31.95/Hr	473
TOTAL NORTH FORK ROAD								12,304
MAINTENANCE								
Inspector		50					37.58/Hr	1,879
Repair Rills and Gullies			Farm Tractor			40 Hours	31.95/Hr	1,278
Reseeding (20% Of Area For 2 Years)			Hydroseeder	1.7			500.00/Ac	1,700
TOTAL MAINTENANCE								4,857
TOTAL ESTIMATED RECLAMATION COST FOR NORTH FORK								27,625

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balance as planned, the grading plans will be adjusted to achieve a balanced condition or substitute soil material can be hauled to this area from borrow area D.

The only surface structure which exists on the North Fork Intake Portal pad is a ventilation portal. After the ventilation portal has been sealed, regrading of the pad will be done. Soil will be pushed up against the highwall. All fills will be constructed on 2:1 slopes or greater.

Seeding, fertilizing and mulching will be done during the first September or October following the site regrading. Refer to Table III-11, Reclamation Timetable for the North Fork Mining Operation for the reclamation schedule. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or hand broadcast and raked. All seeded areas will be mulched, as described in the general reclamation plan. A cost estimate for the North Fork area reclamation is presented in Table III-12.

Reclamation will be monitored for erosion and when gullies occur they will be regraded and reseeded.

South Fork Reclamation

South Fork Mine yard is located on a previously disturbed area from the King 3 mine which halted operations in 1975. U.S. Fuel Company reconditioned the facilities when starting operations in the King 6 mine in 1981. Previously disturbed areas in South Fork will be reclaimed in the same manner as the Middle Fork mine yard. Following mining operations, projected past the year 2000, the surface structures will be dismantled and removed. The mine yard will be disced and foundations covered with backfill material. Portal openings for the King 6 mine will be backfilled to the angle of repose. No hydraulic mine seals will be necessary. Sedimentation ponds and diversion channels will be regraded.

Revegetation will consist of native species selected from the reference areas on the U.S. Fuel Company property. These areas can be found in Chapter IX, Vegetation. Planting will occur during periods of greatest moisture conditions.

Most of the facilities in the South Fork area were constructed prior to the current regulations. Therefore, no topsoil was stockpiled for reclamation. The overland conveyor and loadout facilities shown on Exhibits III-12B and III-4A were constructed after the regulations were in force.

Need specific plans for South Fork Recl

"Reveg during peri of greatest moisture"? Oh yeah

Areas mapped where drill seeding occurs

Depth of gullies which will be regraded

Topsoil was stripped and stockpiled for these areas. The locations of the stockpiles are shown on Exhibit III-4B. The topsoil stockpiles, the cut and fill slopes of the conveyor and loadout area, and the sediment pond embankment have been revegetated. The areas which have been reclaimed are shown on Exhibit III-12B.

817.23 Topsoil Storage

Detailed data concerning the origin, storage, physical and chemical characteristics, stockpile protection and redistribution plans are available for the soil stockpiles in the South Fork Area. They are contained in the "Topsoil Plan for the King VI Mine and Revegetation Plan for the King VI Mine. Both reports were prepared for U.S. Fuel by Bio West, Inc.

The stockpiled topsoil will be used in the reclamation of the King IV and V pads to enhance vegetative regrowth and will be redistributed as discussed in the Reclamation chapter.

The topsoil stockpile was constructed to have 2:1 side slopes and a flat top. Immediately after the topsoil stockpile was emplaced and shaped, a drainage diversion was circumscribed around the stockpile. The stockpile was then seeded with a previously approved DOGM seed mix. The stockpile is located in a relatively flat area and is not subject to erosion from concentrated channel flows. The stockpile is clearly identified with signs. Native grasses and shrubs cover the surface. Any future reseeding that may required will be done using seed mixture no. 1, exluding the shrub species. The seeds will be applied by broadcasting using the rates given in Table IX-1 (Chapter IX). Hydromulch (Conweb-2000) with tackifiers (binding agents) will be applied at a rate of one ton per acre. The rationale for using seed mixture no.1 (less shrubs) is that it is best to use a seed mixture for interim reclamation that will also be used in final reclamation. The proposed seed mixture no.1 contains legumes for nitrogen fixation, and forbs and grasses for soil stabilization. Regulations permit soil stockpiles in Utah to be stabilized with a siingle plant species or even none if some other method of soil stabilization and protection is used such as a straw mulch tied down by a nylon net.

An 8 x 20 foot breakout is found in the left fork of South Fork. The breakout was excavated from within the mine, so little disturbance away from the breakout occurred. Surface disturbance associated with this breakout amounts to approximately 300 square feet. Upon completion of mining, the hole will be plugged and the disturbed area will be bermed by hand and reseeded by hand broadcasting. Because access to this area is

impossible without causing significant damage to the surface, U.S. Fuel proposes no further reclamation of this small area.

Six soil samples were collected from the South Fork Area (Exhibit IX-4A) in December 1983 (three from the upper pad and three from the lower pad, areas A and B respectively). These samples were analyzed for physical and chemical characteristics (Table VIII-9, Ch. VIII) to determine their suitability for use during reclamation. Information contained in the discussion in Chapter VIII indicates that the soils will be suitable for substitute topsoil materials.

Based on the depth of the soil samples and the test results, a total of 6,337 cubic yards of substitute topsoil material is available for reclamation of the South Fork mine yard and bathhouse area from areas A and B on Exhibit IX-4A. This volume will allow for a minimum of six inches of substitute material to be distributed over the mine yard area. Refer to Table III-13 for the breakdown according to area.

Table III-13

Soil Volumes Available From The South Fork Pad

Area	Acres	Depth (ft)	Volume (yd)
A	1.49	1.5	3,605
B	1.13	1.5	2,734

It is important to note that these volumes indicate the materials that are available on the surface and that the best available material from regrading and reclamation activities of the entire pad area will be temporarily stockpiled until the regrading and reclamation activities are complete. The salvaged materials will then be distributed to achieve a six inch cover according to the reclamation plans for both Middle Fork and South Fork. Once reclamation starts it will be a continuous operation and will be completed during one growing season. Because the substitute topsoil stockpile will be added to on a continuous basis during regrading and reclamation it is impractical to try to vegetate the topsoil stockpile. The stockpiles will be protected from erosion by diverting channel flows away from the stockpile.

During reclamation and regrading of the site, those materials suitable for use as a topsoil substitute (as determined visually by a high

percentage of fines, high organic matter content and low coarse fraction) will be segregated. The regraded slopes will be roughened either by hand or using equipment depending on the steepness of the slope. This will be undertaken to provide for bonding the topsoil to the regraded materials. The topsoil substitute will then be spread on the site along with the stockpiled topsoil. A uniform layer of six inches of soil material will be spread over the entire regraded site unless test plot results show that less can be used. During spreading operations equipment travel will be held to a minimum to reduce compaction of the topsoil.

After spreading, the topsoil will be scarified with a grader or farm type disc. Scarification will be done on the contour where feasible. Fertilizer will also be distributed during this operation.

Based on the results of analyses of the soil samples collected in the South Fork area, soils in the area are low in organic matter, nitrogen, phosphorus and potassium (see Table VIII-9, Ch. VIII). Soil amendments required to make the pad soils suitable for revegetation are provided in Table VIII-5, Ch. VIII

Seeding, fertilizing and mulching will be done during the first September or October following regrading of the site. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. Refer to Table III-14 Reclamation Timetable for South Fork Operations.

The South Fork conveyorline, coal pile and truck loadout will be reclaimed with topsoil salvaged during construction. The salvaged topsoil has been stockpiled and protected. It is located in the area designated on Exhibits III-4B and VIII-4 as the Lamb's Trailer Soil Stockpile Area. The total volume available from these piles is 1,206 cubic yards.

Exhibit III-4A was submitted prior to construction of the conveyorline and coal loadout to show proposed disturbance. However, the actual, as constructed disturbed area at the South Fork truck loadout amounts to 3.0 acres, including the loadout sediment pond. This acreage determination can be found in Table 1, page two of the June 18, 1982 Interim Revegetation Plan in Chapter III under Appendix III-13 and Exhibit III-12B.

Sufficient material is available in the Southfork loadout sediment pond embankments for the pond itself. This amounts to .5 acre which will be reclaimed after the revegetation period.

Table III-14

Reclamation Timetable
South Fork Mining Operation

ACTIVITY	START	FINISH	YEAR
Cease Operating			1
Remove Mining Equipment	May 1	July 1	1
Dismantle Surface Buildings Structures and Equipment	July 1	Aug 15	1
Remove Exposed Concrete	Aug 15	Sept 15	1
Seal Portals	Aug 15	Sept 30	1
Install Sediment Traps	May 1	June 1	2
Remove Sediment Pond	June 1	June 15	2
Remove Stream Diversions	June 1	July 1	2
Regrade Site	June 1	Aug 15	2
Stockpile Substitute Topsoil	June 1	Aug 15	2
Clear Topsoil Stockpiles	Aug 1	Aug 15	2
Strip Topsoil From Past Interim Reclamation Areas	Aug 1	Aug 15	2
Place Topsoil and Topsoil Substitute Material	Aug 15	Sept 1	2
Final Surface Scarification and Preparation	Sept 1	Sept 15	2
Soil Nutrient Tests	Sept 1	Sept 15	2
Nutrient/Fertilizer Placement	Sept 15	Oct 1	2
Seeding and Planting	Oct 1	Oct 15	2
Mulching	Oct 15	Nov 1	2
Final Acceptance		Within 5 Years	

The other 2.5 acres of the loadout will be covered with a minimum of six inches of stockpiled topsoil material. The 1,206 cubic yards of topsoil stored at the Lamb's Trailer site will cover 1.5 acres. The residual area will be covered with 806 cubic yards of substitute material obtained from the borrow site A east of slurry pond no. 5.

South Fork Regrading Plans

Proposed post-mining grading plans for the South Fork area are shown on Exhibits III-12A and III-12B (contour maps) and III-12.A.1 and III-12.B.1 (cross-sections). Predisturbance contour maps of the area are not available, therefore, the proposed final surface configuration was developed to provide a balanced cut and fill situation and a configuration consistent with other canyons in the area.

A shrink factor of 5 percent was used in balancing the cut and fills. Calculations for the earth work volumes are based on the cross-sections shown on Exhibits III-12.A.1 and III-12 B.1. Quantity computations, based on planimetered cross-sectional areas and the average end area method, are included in Appendix III-5. The total calculated cut volume for the mine yard and truck loadout is 39,426 cubic yards.

The total calculated fill volume is 38,755 cubic yards. If, during regrading operations, it is found that the earth work volumes will not balance as planned, the grading plans will be adjusted to achieve a balanced condition.

After completion of surface facility removal and sealing of the portals, the regrading operation will commence. Fill material will be pushed up against the highwalls as high as possible. All fills will be constructed at a slope of 2:1. The mine pad and disturbed areas will be covered with the best available material (substitute topsoil) salvaged from the mine pad during recontouring. Regrading and redistribution will be performed as described previously for Middle Fork.

Currently, the South Fork of Miller Creek flows beneath the area in a corrugated metal pipe. During reclamation, this diversion will be removed and the channel reclaimed in open form.

The peak flow of the South Fork of Miller Creek was determined using the SCS triangular unit hydrograph methodology. Table VII-8a, Ch. VII shows the data inputs and results. Based on a 100 year, 24 hour design storm, the peak flow is approximately 130 cubic feet per second (cfs).

TABLE III-15
SOUTH FORK RECLAMATION COST ESTIMATE

JOB	MATERIAL	LABOR M/HRS	EQUIPMENT	AREA ACRES	VOLUME CU. YD.	PRODUCTION	UNIT COST	TOTAL COST
STRUCTURE REMOVAL (See Table III-12A)								223,000
BACKFILL AND GRADING								
Move Contaminated Material			End Loader (7Cy.)	7.4	5,967	159 Cy/Hr	145.06/Hr	5,444
Cut and Fill Sites			D9U Dozer	12.3	39,091	523 Cy/Hr	163.54/Hr	12,223
TOTAL BACKFILL AND GRADING								17,667
TOPSOIL REPLACEMENT								
			End Loader (7 Cy.)		8,716	159 Cy/Hr	145.06/Hr	7,952
			Scraper (20 Cy.)		2,420	84 Cy/Hr	125.55/Hr	3,617
			D6 Dozer		9,922	346 Cy/Hr	76.87/Hr	2,204
			Farm Tractor	12.3		0.5 Ac/Hr	31.95/Hr	786
TOTAL TOPSOIL REPLACEMENT								14,559
REVEGETATION								
Scarification and			Farm Tractor	12.3		0.5 Ac/Hr	31.95/Hr	786
Fertilization	Fertilizer			12.3		125 Lb/Ac	0.34/Lb	523
Soil Testing			4 WD Pickup			1 Day	48.00/Day	48
		8	Labor				21.95/Hr	176
	Operating Cost					8 Hours	5.05/Hr	40
	Sample Analysis					20 Samples	100.00 ea	2,000
Drill Seeding				12.3			1,200/Ac	14,760
Mulching	Hay Mulch			12.3		1.5 Tons/Ac	100.00/Ton	1,845
			Farm Tractor	12.3		0.5 Ac/Hr	31.95/Hr	786
Tree Planting	5,811 Plants						.67/ Plant	3,893
		39	Labor			150 Pits/Hr	21.95/Hr	856
TOTAL REVEGETATION								25,713
RESTORE STREAM CHANNEL	Sort Riprap		D6 Dozer			24 Hours	76.87/Hr	1,845
	Sand and Gravel				921		8.00/Cu.Yd.	7,368
TOTAL STREAM CHANNEL								9,213
RECLAIM SOUTH FORK ROAD								
Pavement Removal (9100' Long x 24' Wide)				5.0			6,679/Ac	33,395
Backfilling (3 Cu.Yd./Ft)			D6 Dozer		27,300	346 Cy/Hr	76.87/Hr	6,065
Scarification and			Farm Tractor	12.3		0.5 Ac/Hr	31.95/Hr	786
Fertilization	Fertilizer			12.3		125 Lb/Ac	0.34/Lb	523
Soil Testing		8	Labor				21.95/Hr	176
			4 WD Pickup			1 Day	48.00/Day	48
	Sample Analysis					20 Samples	100.00 ea	2,000
Drill Seeding				12.3			1,200/Ac	14,760
Mulching	Hay Mulch			12.3		1.5 Tons/Ac	100.00/Ton	1,845
TOTAL SOUTH FORK ROAD								59,598
MAINTENANCE								
Inspector		50					37.58/Hr	1,879
Repair Rills and Gullies			Farm Tractor			40 Hours	31.95/Hr	1,278
Reseeding (20% of Area For 2 Years)			Hydroseeder	4.9			500.00/Ac	4,900
TOTAL MAINTENANCE								8,057
TOTAL ESTIMATED RECLAMATION COST FOR SOUTH FORK								357,807

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TABLE III-15A
STRUCTURE REMOVAL COST FOR THE SOUTH FORK FACILITIES AREA

STRUCTURE	SIZE	MATERIAL	COST
Water Tank	200 Cu. Yd.	Steel	810
	314 Sq. Ft.	Concrete Slab	720
Change House	4,400 Cu. Yd.	Steel	17,800
	6,000 Sq. Ft.	Concrete Slab	13,700
Heating Plant	92 Cu. Yd.	Steel	370
	250 Sq. Ft.	Concrete Slab	570
Storage Shed	780 Cu. Yd.	Steel	3,160
	1050 Sq. Ft.	Concrete Slab	2,400
Shop	2,700 Cu. Yd.	Steel	10,900
	3,600 Cu. Yd.	Concrete Slab	8,200
Fan	360 Cu. Yd.	Steel	1,460
	975 Sq. Ft.	Concrete Slab	2,200
Pump Station	20 Cu. Yd.	Steel	80
	64 Sq. Ft.	Concrete Slab	150
Conveyor Portal Steel Arch Cover	400 Ft @ 20' Dia.	Steel	9,400
Intake Air Portal Structure	50 Ft @ 20' Dia.	Steel	1,180
Portals (5) (Estimated At $2700 Per Portal, Includes Backfilling Of The Breakout From Within The Mine. Backfill 25 Feet Into The Portal Against A Concrete Stopping.)	20 Ft x 10 Ft	Earth	13,500
Substation Shed	330 Cu. Yd.	Steel	1,300
Substation	890 Cu. Yd.	Steel	3,600
Conveyor Shed	670 Cu. Yd.	Steel	2,700
Conveyor	10,400 Cu. Yd.	Steel	42,100
Retaining Wall	180 Cu. Yd.	Steel	730
Stacker (Foundation To Be Covered)	2,200 Cu. Yd.	Steel	8,910
Reclaim (Foundation To Be Covered)	740 Cu. Yd.	Steel	3,000
Misc. Buildings In Loadout Area (2)	278 Cu. Yd.	Steel	1,120
Coal Pile Retaining Wall	890 Cu. Yd.	Steel, Wood	3,600
Culverts (24" Diam.)	60 Ft. (Assume Incidental To Road Removal)		
Culvert (96" Diam.) (Will Be Uncovered During Backfilling Operation)	310 Ft.	Steel	2,520
Culvert (42" Diam.) (Will Be Uncovered During Backfilling Operation)	245 Ft.	Steel	350
Sewage Drain Field	2,400 Sq. Ft. (Assume Removal Will Occur During The Backfilling Operation)		
Sediment Pond (Facilities Area)	5,600 Cu. Yd.	Earth	4,590
Sediment Pond (Loadout Area)	4,600 Cu. Yd.	Earth	3,770
Power Line (To Junction With The Line To Middle Fork)	10,520 Ft.		38,100
Water Line	3,320 Ft.		2,990
Roads (In The Facilities Area) 24 Ft. Paved Width, 39 Ft. Subbase (6", Assume Material Is Pushed Against The Side Of The Road To Be Backfilled With A Dozer)	1,800 Ft.		6,600
Parking Lot	32,500 Sq. Ft., 50% Paved, 4" Thick		2,470
Misc. Equipment	2,000 Cu. Yd.		8,100
TOTAL			$223,000

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Stability of the restored channel was evaluated using Manning's equation. As shown in Table VII-8b, Ch. VII, the gradient of the restored channel causes a rather high velocity of 9.7 feet per second (ft/s). Therefore, the channel will be riprapped with angular to sub-angular material with a mean diameter (d_{50}) of 2.2 feet.

Due to the size of the riprap, a filter blanket will be required to prevent washout around the coarse riprap. The filter blanket will consist of two layers over the sandy soils and fill materials. As determined by the U.S. Department of Transportation methodology, the first layer will be a well graded fine gravel with a d_{50} of 7 millimeters. A coarse gravel will be the second layer with a d_{50} of 80 millimeters.

During the regrading period, the culverted diversion flowing under the South Fork mine pad will be removed and the area regraded. The stream channel will be re-established as an open channel. See Exhibit III-12.A.1 for a cross-section view of the restored channel. The existing diversion ditch and sediment pond will be left in place at least until the end of regrading. Prior to the removal of the sediment pond, sediment traps will be constructed in the existing stream bed below the regraded site. The traps will not be removed but will be allowed to fill in with sediment from the reclaimed site.

The timetable for reclamation of the South Fork mining operations is presented in Table III-14. A cost estimate for reclamation of the South Fork mine, loadout and associated sediment ponds is presented in Tables III-15 and III-15A.

Hiawatha Reclamation

The Hiawatha coal processing plant and loadout facility have been in operation since 1939. U.S. Fuel Company intends to dismantle and remove all coal processing, loadout and support facilities. Office buildings will be turned over to the town of Hiawatha. There has been no topsoil or fill material salvaged and stockpiled for reclamation as operations preceded the Surface Mining Control and Reclamation Act. The majority of disturbed area in Hiawatha is slurry ponds, refuse piles (from the preparation plant) and sedimentation ponds. To reclaim this area U.S. Fuel Company will regrade the slurry and refuse piles and cover them with available topsoil from substitute soil borrow sites east of the preparation plant and slurry ponds. Because of the volume of slurrry and refuse, regrading will not be done to original contour. The embankment slopes will be made less steep in order to reduce erosion. Structural foundations will be covered with available backfill material.

Sedimentation ponds and diversion structures will be removed and backfilled. Topsoil has been salvaged in the cases of the sedimentation ponds. Once they are regraded topsoil will be redistributed.

Revegetation will be primarily native species selected from reference areas on the property. Chapter IX provides a complete list of the seed mixes to be used. Planting will occur during periods of greatest moisture conditions.

A plan to construct a unit train loadout is also submitted within this application. See Appendix III-9. The proposed facility would be located within the disturbed area between the tipple and lower rail yard. This new system will be located within the present disturbance at the Hiawatha preparation plant site. The unit train loadout will be reclaimed at the time of final abandonment of the area. The existing and proposed Hiawatha facilities will remain in operation as long as coal is mined from the property. There are mining operations projected on the U.S. Fuel Company property to continue past the year 2000. A timetable for the reclamation of the Hiawatha processing plant and loadout are presented in Table III-16. Tables III-17 and III-17A estimate the cost in 1984 dollars for reclaiming the Hiawatha coal processing plant and loadout facility.

Backfilling and Grading: Covering Coal and Refuse Materials

The disturbed limits shown on Exhibit III-3 will remain unchanged over the next five years. Exhibit III-3 depicting refuse storage areas is representative of the coal refuse storage areas for the next five years. Exhibit III-14A depicts the projected regrading of the ponds when the fines from slurry ponds 1 and 4 are sold and removed, and the coal refuse is regraded and recontoured. Negotiations are currently in progress for the sale of the coal slurry in the ponds. The new coal refuse generated in the next five years will be placed on top of the existing coal refuse piles and embankments. Based on an average mining rate of one million tons per year, with 30 percent of the materials mined being immediately non-salvageable (20 percent is coal fines and is deposited in the slurry ponds and 10 percent being coal refuse), the mine will produce approximately 100,000 tons of coal refuse and 200,000 tons of coal fines. The coal fines have an approximate inplace density of 80 pounds per cubic foot and the coal refuse has an average inplace density of 90 pounds per cubic foot. Over a five year period the mine will produce 1,086,956 cubic yards of coal fines, which will easily fit into existing Slurry Pond No. 5, now empty and No. 1, when the fines are sold. (Pond No. 5 has a 500 acre-foot capacity and Pond No. 1 has a 230 acre-foot capacity).

Table III-16

Reclamation Timetable
Hiawatha Processing Plant and Loadout Facility

ACTIVITY	START	FINISH	YEAR
Cease Operating			1
Dismantle Surface Buildings Structures and Equipment	May 1	Oct 1	1
Remove Exposed Concrete	Sept 1	Nov 1	1
Regrade Site	May 1	Aug 15	2
Non-toxic Fill Placement	July 15	Aug 15	2
Place Topsoil	Aug 1	Sept 1	2
Remove Sediment Ponds	Aug 1	Sept 15	2
Soil Nutrient Tests	Aug 1	Aug 15	2
Nutrient/Fertilizer Placement	Aug 15	Sept 15	2
Seeding and Planting	Sept 1	Oct 15	2
Mulching	Oct 15	Nov 1	2
Final Acceptance		Within 5 Years	

Table III-17

PREPARATION PLANT FACILITIES AREA*
RECLAMATION COST ESTIMATE

JOB	MATERIAL	LABOR M/HRS	EQUIPMENT	AREA ACRES	VOLUME CU. YD.	PRODUCTION	UNIT COST	TOTAL COST
STRUCTURE REMOVAL (See Table III-13A)								599,389
BACKFILL & GRADING								
Cut and Fill Sites			D9U Dozer	210.2	1,452,215	425 Cy/Hr	163.54/Hr	558,812
TOPSOIL REPLACEMENT			End Loader (7 Cy.)		376,995	437 Cy/Hr	145.06/Hr	125,142
			3 - 20 Cy. Trucks		376,995	437 Cy/Hr	78.12/Hr	202,179
			D6 Dozer		376,995	346 Cy/Hr	76.87/Hr	83,756
			Farm Tractor	203		0.5 Ac/Hr	31.95/Hr	12,972
TOTAL TOPSOIL REPLACEMENT								424,049
REVEGETATION								
Scarification and			Farm Tractor	203		0.5 Ac/Hr	31.95/Hr	12,972
Fertilization	Fertilizer			203		125 Lb/Ac	0.34/Lb	8,627
Soil Testing		8	Labor				21.95/Hr	176
			4 WD Pickup			1 Day	48.00/Day	48
	Operating Cost					8 Hours	5.05/Hr	40
	Sample Analysis					60 Samples	100/Sample	6,000
Drill Seeding				203			1,200/Ac	243,600
Mulching	Hay Mulch			203		1.5 Ton/Ac	100.00/Ton	30,450
			Farm Tractor	203		0.5 Ac/Hr	31.95/Hr	12,972
TOTAL REVEGETATION								314,885
MAINTENANCE								
Inspector		50					37.58/Hr	1,879
Repair Rills and Gullies			Farm Tractor			40 Hours	31.95/Hr	1,278
Resoeding (20% Of Area For 2 Years)			Hydroseeder	40.6			500.00/Ac	40,600
TOTAL MAINTENANCE								43,757
TOTAL ESTIMATED RECLAMATION COST FOR PREPARATION PLANT FACILITIES AREAS								1,940,892

*Does Not Include Equipment Yard East Of Slurry Pond No. 5

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TABLE III-17A

STRUCTURE REMOVAL COST FOR THE PREPARATION PLANT FACILITES AREA

STRUCTURE	SIZE	MATERIAL	COST
Preparation Plant	45,900 Cu. Yd.	Steel	185,900
	24,800 Sq. Ft.	Concrete Slab (6")	78,700
Thickner	1,090 Cu. Yd.	Concrete	6,180
Steel Hopper Loadout	2,955 Cu. Yd.	Steel	24,118
	205 Cu. Yd.	Concrete	1,871
Conveyor From Stockpile To Loadout	1,914 Cu. Yd.	Steel	7,750
Conveyor In Stockpile Area And Under Stockpile	2,000 Cu. Yd.	Steel	8,100
Concrete Structures At Center Of Stockpiles (2)	520 Cu. Yd.	Concrete	2,950
Pre-loading Tower	830 Cu. Yd.	Steel	3,400
	500 Cu. Yd.	Concrete Slab	1,140
Pre-storage Tower	830 Cu. Yd.	Steel	3,360
	500 Cu. Yd.	Concrete Slab	1,140
Carpenter Shop	1,750 Cu. Yd.	Steel	7,090
	3,150 Sq. Ft.	Concrete Slab	7,200
Resin Plant	1,780 Cu. Yd.	Steel	7,200
	3,200 Sq. Ft.	Concrete Slab	7,320
Heavy Equipment Shop	3,330 Cu. Yd.	Steel	13,500
	4,500 Sq. Ft.	Concrete Slab	10,300
Electrical Shop	1,167 Cu. Yd.	Steel	4,730
	2,100 Sq. Ft.	Concrete Slab	4,800
Warehouse	3,600 Cu. Yd.	Steel	14,600
	6,500 Sq. Ft.	Concrete Slab	14,900
Shop	7,100 Cu. Yd.	Steel	28,800
	9,600 Sq. Ft.	Concrete Slab	22,000
Truck Unloading Facility	220 Cu. Yd.	Steel	890
Misc. Buildings East Of Shop	440 Cu. Yd.	Steel	1,780
	1,200 Sq. Ft.	Concrete Slab	2,740
Misc. Buildings West Of Shop	300 Cu. Yd.	Steel	1,220
	800 Sq. Ft.	Concrete Slab	1,830
Substations (2)	5,720 Cu. Yd.	Steel	23,200
Misc. Buildings South Of The Substations	630 Cu. Yd.	Steel	2,550
	1,700 Sq. Ft.	Concrete Slab	3,890
Misc. Buildings North Of Truck Loadout	460 Cu. Yd.	Steel	1,860
	1,250 Sq. Ft.	Concrete Slab	2,860
Misc. Buildings North-east of Prep. Plant	220 Cu. Yd.	Steel	890
	600 Sq. Ft.	Concrete Slab	1,340
Equipment Storage Yard	2,050 Ft. of Fence		2,320
Powerlines	4,320 Ft		15,600
Sedimont Ponds (5)	66,000 Cu. Yd.	Earth	54,100
Road To The Truck Loadout	4,100 Ft., 24 Ft. Paved Width		15,100
TOTAL FACILITIES REMOVAL COST			$599,389

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The 411,522 cubic yards of coal refuse produced in the five year period will be placed on the southern and eastern portion of Slurry Pond #5 and over Slurry Pond #4, except over the slurry itself. These measures will increase the top width and height of the existing refuse piles without going beyond the existing disturbed boundaries. It is anticipated that after the fines have been removed from Slurry Pond #5a that this area will be used to store coal refuse.

Five coal refuse banks currently exist and act as embankments for the slurry ponds. After mining activities have ceased and the preparation plant has been shut down, any water contained in the ponds will be allowed to evaporate. As has been the ongoing practice, the remaining coal fines and associated materials within the slurry ponds will then be sold and removed. (The current and long term coal market indicates that all of the material within the slurry ponds is highly marketable and will remain so).

For final reclamation, after the slurry ponds have been cleaned out, the coal refuse embankments will be used to fill in the ponds. Starting at the top of the slurry pond embankments the coal refuse material will be moved to the bottom of the slurry ponds then spread and compacted. Activities will continue until a uniform, positive grade has been established. The final surface will be slightly convex with the outer slopes stabilized at a maximum slope of 2 horizontal to 1 vertical. The surface of the stabilized graded coal refuse pile will be scarified to prevent slippage of the subsequent topsoil layer and to aid in revegetation. The final thickness of the stabilized refuse piles will vary from 0 to approximately 20 feet in depth.

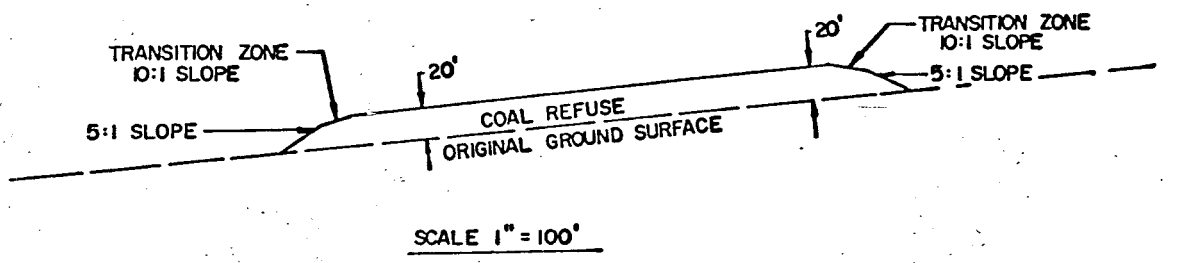
A typical generalized cross-section of the stabilized coal refuse pile is shown in Figure III-1. (Note that the thickness of the refuse under the side slopes diminishes in thickness from the crest of the pile to the toe). The final regraded slopes will generally repose at 4:1 or 5:1, or greater, horizontal to vertical scale: however due to variable topography, in a few places the slope could be as high as 2:1. The steepest measured slope has been 8 percent (see Exhibits III-14A, III-14A.1 and III-14A.2). To ensure geomorphic stability a 10:1 transition zone will be installed at the contact between the nearly flat top and the 5:1 side slope.

Vegetation is currently growing on the coal refuse embankments and on areas contiguous to the embankments. The presence of vegetation plus the laboratory analysis substantiate that higher than acceptable limits of toxic or acidic elements are not present in the refuse or slurry.

FIGURE III-1

Stablilized Coal Refuse Pile

TYPICAL CROSS SECTION
OF
STABILIZED COAL REFUSE PILE



SCALE 1" = 100'

Four representative samples of the coal refuse materials were collected from test pits (Exhibit IX-2A) excavated in the embankments of Slurry Ponds 1, 3, 4 and 5 during October 1983, and two additional samples from Slurry Pond #1 were collected on March 4, 1984. The test pits were excavated by hand to a depth of 18 inches. As the hole progressed in depth representative samples were collected thereby producing a composite sample of the refuse material. Approximately 15 pounds of samples were collected from each hole. The composite sample was well mixed and then split into two samples one of which was submitted to an EPA certified laboratory for analysis of trace metals to determine the level of concentration, if any, of acid or toxic forming materials present in the refuse material. The results of these tests are presented in Table VIII-11, Ch. VIII (Exhibit IX-2A sampled as above). The results of these analyses confirm that there are not sufficient concentrations present to affect revegetation or plant growth adversely. The pH levels which ranged from 6.8 to 7.8 are considered to be very good. At these levels both the cations and anions are relatively inactive. At these pH's, even higher concentrations of biologically active trace metals would be inactive. However, irrespective of the pH, the trace metal concentrations are considered to be low. Almost all of the concentrations of the biologically active trace metals are considered low, having no toxicity to plants or animals. The selenium concentrations do approach the moderate levels, however, these levels are considered to be suitable for plant root growth and no significant dilatory effects are expected (Donahue, 1977). In Slurry Pond #4, the iron concentration at 15.8 ppm is considered on the high side of optimum, however, with a corresponding pH of 6.8 the iron is considered to be inert. Additionally the carbonate value for Slurry Pond #4, calcium 21.1 meq/l, magnesium 43.0 meq/l and bicarbonate 3.2 meq/liter, are sufficiently high to possess a buffering capacity to prevent acid formation (White, 1982).

The effects of the dark colored coal refuse and the respective higher temperatures which does affect plant growth will be eliminated by covering the coal refuse with the six inch layer of light colored substitute topsoil.

The other representative samples of the slurry ponds were submitted to an approved agricultural laboratory for analyses of physical and chemical characteristics (Table VIII-12, Ch. VIII). The major characteristics which affect suitability for plant root growth are shown in Table VIII-13, Ch. VIII. The salt concentrations determined by ECe, SAR, sodium, calcium and magnesium are all within the acceptable plant tolerance ranges (Donahue and others, 1977). The ECe values ranged from 1.7 to 4.3 mmhos/cm. Values of 0 to 4.0 mmhos/cm are considered non-saline and from 4.0 to 8.0 mmhos/cm as slightly to moderately saline. The 4.3 meq/liter value is considered to be slightly saline and is not expected to affect plant root growth.

The sodium adsorption ratio (SAR) is an indicator of plant tolerance for sodium. Soils are generally considered non-sodic if SAR values are below 10 (Richards, 1954). The values range from .1 to .2 and are well within plant tolerance ranges.

Values for calcium range from 14.5 to 23.8 meq/liter and are well within the general ranges found in topsoil.

Magnesium values range from 7.8 to 43.0 milli-equivalents per liter and are sufficient in quantities for plant growth (Empleton, 1966).

The macronutrient levels for nitrogen are considered low with values of less than .1 to 3.8 ppm and require the addition of 40 pounds per acre of sulfur coated urea (Saltanpour, 1975). Phosphorus levels are also considered low with values ranging from less than .5 to 4.6 ppm. Thirty pounds per acre of treble superphosphate will be added as a supplement. Potassium levels range from 34 to 75 ppm. The two potassium levels of 34 and 44 ppm in Slurry Ponds 1 and 3 respectively will need a supplement of 30 pounds per acre of potassium nitrate or potassium chloride. The other two levels 75 and 64 ppm of potassium for Slurry Ponds 4 and 5 respectively are adequate for plant growth. In all cases the fertilizers will be added to the redistributed substitute topsoil and not the refuse since leaching will carry the nutrients to the subsurface. The rates of application of nutrients in this seciton corresponds with those in Table VIII-7, Ch. VIII (UMC 784.13).

The available water holding capacity values range from 0.7 to 1.3 inches per foot (Erickson, 1973). The value of .7 inches per foot for Slurry Pond #1 is considered low, marginally suitable for plant root growth.

"Soil" texture is an important parameter to plant growth, however the main concern with the texture of a material it it's water holding capacity which was previously described.

As proven by laboratory analyses of trace metals, the coal refuse in non-toxic and non-acid forming, therefore does not require burial. Field test plot studies based on a 6, 12 and 16 inch cover of topsoil have been suggested for implementation. A sixteen inch cover of topsoil will be used for the purpose of costing reclamation and then obtaining a reclamation bond. It is the full intent of U.S. Fuel to demonstrate, over the next five years, that the coal refuse can successfully be revegetated utilizing six inches of substitute topsoil over the "worst case" coal refuse materials. The 12 and 16 inch thick layers of substitute topsoil

suggested in the field trial demonstration is provided for the purpose of a comparative study only. It is anticipated that at the end of the five year permit period, sufficient data will be available to allow revision of the permit application and reduction of the reclamation bond to correspond with a decreased cover of topsoil.

Therefore, U.S. Fuel plans to cover the 37.69 acres at the preparation plant and the 111.5 acre area associated with the coal refuse banks and slurry ponds with the needed amount of substitute topsoil as determined by the test plot studies. For the purpose of establishing a worst case condition to determine the reclamation bond, a sixteen inch cover has been suggested. To place a 16 inch cover of substitute topsoil material over the area will require 313,723 cubic yards. The substitute topsoil will come from Borrow Area A, B, C and D. These borrow areas are located as shown on Exhibit VIII-4A.

The substitute topsoil will be transported to the slurry pond area by scrapers, belly dumps, and/or dump trucks and spread by a road type grader. Grade stakes will be placed on 200 foot centers to aid in establishing a uniform layer. After the topsoil has been spread over the area, random smaples will be collected to determine the required amounts of nutrients and soil amendments for the redistrubuted topsoil and/or to confirm that the designated applications of nutrients and soil amendments have been applied. A minimum of twelve random samples will be submitted for laboratory analyses to determine the nutrient levels. This sampling will also serve as a final check to verify that the designated minimum of topsoil has been uniformly spread over the area.

Immediately prior to fertilizing, mulching and seeding, the soil will be disced along the contour to eliminate the detrimental effects of compaction which occurred during distribution; to reduce erosion potential; and to promote root penetration. Fertilizer will also be applied during this operation. Mulch and seed will be applied either by hand, with farm type equipment, or by hydroseeding. The necessary amounts of nutrients and soil amendments based on the December 1983 laboratory test results are listed in Table VIII-7, Ch. VIII.

Two refuse samples were collected from Slurry Pond #1. The representative sample, collected from each test pit is a composite for the interval between the surface and a 2.5 foot depth level. The samples were submitted to Utah State University's Soil Laboratory (an approved agricultural laboratory) and Western Analytical Laboratory (an approved EPA certified laboratory) for analysis of the physical and chemical characteristics, (Table VIII-16, Ch. VIII) and biologically active trace metals, respectively (Table VIII-22, Ch. VIII).

An assessment of the laboratory test data shows that the pH is considered to have good reclamation suitability. The key biologically active trace metals, which have been shown to be potentially toxic to plants and/or animals, have sufficiently low concentrations to be classified as non-toxic and non-acid producing.

The coal refuse material has good reclamation suitability for the following parameters (Table VIII-18, Ch. VIII): pH, electrical conductivity, SAR, saturation percentage, texture and the percent organic mattter.

The available water holding capacity with values of 6.4 and 7.8 is rated as fair. The surface of the six inches of redistributed topsoil will be covered by one ton per acre of mulch. The mulch will increase infiltration and reduce evaporation and soil temperature through shading. The percentage of coarse fragments ranges from 27.5 to 54.2 and is rated as fair to poor respectively. The vegetative test plot for the refuse material will be located in the area of Sample A to show that the coal refuse material will support acceptable standards of vegetation.

The loose moist consistency is rated as fair. No mitigation will be made for the loose, moist consistency.

Data from previous laboratory analyses and those presented in Table VIII-12 and VIII-13, Ch. VIII substantiate that the refuse materials can be used as a plant root growth medium.

When discussing coal refuse it is important to remember that coal refuse is derived from the overburden and underburden immediately contiguous to the coal and from partings within the coal itself. As such, coal refuse is site specific to a particular coal field or area. The lithostratigraphic characteristics of the coal refuse at Hiawatha are primarily carbonaceous shales and siltstones, bone coal (impure silty/shaly coal) and, to a much lesser extent, sandstone (less than one percent of the total amount of refuse). Even though in areas much of the coal refuse appears to be of a coarse nature, and based on size gradation alone might be classified as a gravelly material, it would be erroneous to assume that it would behave as a gravelly textured subsoil. Many factors account for the gravelly appearance of the refuse material which is visible on the surface of the refuse piles at Hiawatha, and the corresponding laboratory data which would characterize the materials as having the physical properties of a fine grained soil. They are: 1) the rate at which the continuous miner is advancing and cutting the face materials; 2) the depositional and stratigraphic characteristics of the lithologic unit; 3) the cleaning and segregating process in the preparation plant; 4) the method of hauling and placement of the coal

refuse on the disposal pile; 5) the degree to which the coal refuse is disturbed by machinery after being emplaced on the disposal pile; 6) if exposed on the surface, the amount of fines which have been transported by wind and water erosion leaving the coarse material in place; and 7) the length of time the coal refuse has weathered, and whether it has been buried or left exposed on the surface.

The overall physical characteristics of the coal refuse at Hiawatha are; carbonaceous, laminated to thin bedded series of siltstones, claystones and shales. The material slakes readily and after a one to three year period it weathers significantly, to the point of being very friable with little inherent strength remaining. After a three to seven year period the boundary of the particle is still visible, however it is no longer indurated and the particle can't be segregated intact from the other refuse material. Materials which have been emplaced for thirty years or more have started forming a soil structure.

Inspections conducted in test pits excavated in two year old refuse materials revealed a significant amount of root hairs firmly attached to the surface of the coarse particles and intwined within the numerous fractures which develop in these shaley materials and coal. Numerous species of plants grow on the refuse piles and slurry ponds. The roots of these plants were traced to over two feet in depth. The abundance and vitality of the roots and root hairs appeared to be consistent; being very abundant and very healthy. Additionally a test pit was excavated in the area on the north-east sideslope of Slurry Pond #1 (the sideslopes of Slurry Pond #1 are approximately one and a half horizontal to one vertical). The area was covered with six inches of soil material ranging from a sandy loam to a gravelly sandy loam some four years previously and was subsequently seeded with crested wheatgrass. The plant roots examined in the test pit did not show any variance in overall appearance or abundance between the soil material and the underlying coal refuse and there was no observable matting of the roots or root hairs at the soil-coal refuse interface. With the exception of the close grazing of the plants by wildlife, the plants were healthy and provided good surface coverage.

Vegetation is currently growing on the refuse piles. The following species were observed growing on the refuse: rabbitbrush, sagebrush, Indian ricegrass, Russian thistle, yucca and beeplant. When digging the test pits to obtain representative samples of the refuse, roots and roothairs were numerous. In many areas over 50 percent coverage by vegetation growth was observed and documented. It is emphasized that refuse piles have not been seeded. These plants are strictly voluntary and have been observed on all areas of the refuse piles except where continued disturbance prohibits their growth.

When the coal refuse was sampled, roots classified as common to many, very fine to fine, root hairs and roots were present (in Slurry Ponds 4 and 5) from the surface to approximately three feet in depth. (Root hairs were also present in the two representative samples obtained from Slurry Pond #1 on March 8, 1984). It is impractical to segregate the coal fines from the other organic matter. Irrespective of the percentage of organic matter or the suitability rating for the level of organic matter present, one ton per acre of mulch will be added to the reclaimed surface of the areas in question. Mulch added to the surface will increase infiltration, reduce erosion, lower the soil temperature through shading, reduce evaporation and add nutrients to the soil as they are released during decomposition of the mulch. The recommended rate of application of the mulched is sufficient in quantity and quality to sustain plant growth and enhance the probability of vegetative success by the parameters previously mentioned.

Laboratory test results conducted to determine the physical and chemical characteristics of the coal refuse support the field observations. The saturation percentage for all of the samples was rated as having good suitability for reclamation. The available water capacity, which is the percent of water held at one-third atmosphere, minus the amount of water held at fifteen atmospheres, was rated as having a fair reclamation suitability. These same coal refuse samples were texturally classified as a loam to a gravelly-sandy loam. Additionally all of the other parameters concerning reclamation suitability were rated as either good or fair. Thus based on field observations and laboratory tests the coal refuse materials do have a sufficient water holding capacity to support acceptable stands of vegetation. U.S. Fuel will document, through the use of test plot studies, that the available water capacity of the refuse is more than adequate to support vegetation.

The test plot will be located as designated on Exhibit IX-2A. It will be placed on a minimum of two feet of new refuse which has been emplaced and compacted by a minimum of three passes of a large track mounted tractor. After it is compacted and the proposed grade and slope are met, then the upper twelve inches will be ripped to promote root penetration, increase water infiltration and to provide a good bond with the overlying topsoil.. The three trial thicknesses of topsoil; 6, 12 and 16 inches, will then be distributed. The topsoil will be disced along contour, then the seed and fertilizer will be applied plus the required amount of mulch.

The results of monitoring the test plots will be evaluated each year soon after observations are taken. Each plant response will be tested. A report summarizing all observations will be prepared at the conclusion of the fifth year.

Slurry Ponds No. 2 and 3

Old Slurry Ponds #2 and #3 (Exhibit III-3) have been determined by OSM to be covered by reclamation regulations even though they predate the Act. This is because they are used for diversion of storm water to the sediment pond. Therefore, they will be reclaimed by the company at the time of final reclamation. Since both ponds have the ability to trap sediments and route runoff they will be used for refuse storage and diversion of disturbed area runoff. Placing the test plots on these sites would not be representative for the reclamation studies. Clearly the worst case situation is the new refuse now being generated from the preparation plant. The samples of coal refuse which have been collected in the past are representative of the overall characteristics and volumes of the coal refuse, including the new refuse. It is important to remember that none of the data from the laboratory tests have shown levels of biologically active, water soluble trace metals or other significant parameters which even come close to being toxic, hazardous or acid forming to either plants or animals. The analyses then progressed to classifying the material as a subsoil for use as a plant root growth medium.

UMC 784.13 Reclamation Plan: Topsoil Requirements

U.S. Fuel Company proposes to utilize topsoil and substitute topsoil materials from borrow areas A, B, C and D (Exhibit VIII-4A) to reclaim the 91.4 acre area associated with the Hiawatha Preparation Plant, the 111.5 acre area associated with the slurry ponds and coal refuse embankments, and the 1.1 acre area associated with the North Fork area. Of the 91.4 acres at the Preparation Plant, 53.45 acres will be reclaimed utilizing the insitu disturbed soils. Sufficient volumes of topsoil and substitute topsoil are available so that the remaining 37.69 acres could be covered with sixteen inches of topsoil or substitute topsoil materials. However, the sixteen inch cover depth is presented here only to show that adequate volumes of suitable materials are available, and for determining the worst case conditions for reclamation. The final reclamation plan will be revised to incorporate the results of the test plot studies. Using sixteeen inches would require 79,032 cubic yards for the 37.69 acres of coal refuse area at the Preparation Plant; 233,804 cubic yards for the refuse piles and slurry ponds east of the railroad tracks; and 887 cubic yards (utilizing a six inch cover) for the North Fork area, for a total of 313,723 cubic yards of materials required for reclamation.

The results of detailed pedon descriptions as contained in the discussion of UMC 817.22(e) and laboratory tests (Table VIII-1a, VIII-1 and VIII-16, Ch. VIII) confirm that six feet (194,043 cubic yards) of suitable topsoil or substitute topsoil materials are available from Area A; that 4.5 feet (89,642 cubic yards) are available from Borrow Area B; that 4.5 feet (64,237 cubic yards) are available from Area C; and 1.83 feet

(29,960 cubic yards) from Area D. The minimum amount of topsoil or substitute topsoil material available for reclamation is, therefore, 377,882 cubic yards leaving 34,782 cubic yards as a contingency volume. The results of analyses for the major and minor constituents used to determine the suitability of substitute topsoil for reclamation, and the volumes available from each horizon, are given in Table VIII-2, Ch. VIII. These data support the proposed reclamation plan which calls for removal of the upper horizons in Area A to a depth of 72 inches and leaving 6 inches (the 72 to 78 inch layer and underlying layers) of the C_2 horizon for subsequent reclamation of the borrow area. In Area D, the upper horizons will be removed to a depth of 22 inches, leaving 12 inches (from the 22 to 34 inch depths) of the C_3 horizon in place for subsequent reclamation of the borrow area.

The results of laboratory tests indicate that, while the substitute topsoil material has the desired characteristics for a plant growth medium, some nutrients and soil amendments are necessary to enhance the revegetation effort (see Tables VIII-6 and VIII-7, Ch. VIII). Soil tests will be conducted immediately prior to seeding the redistributed topsoil to ensure that fertilizer mixes and application rates are based on the soil conditions at the time of reclamation.

U.S. Fuel Company proposes to leave the two substitute topsoil borrow sites in their current in-situ condition until reclamation activities have commenced. Area A will be initially utilized and then Area D until the needed volumes of substitute topsoil materials have been obtained. Prior to commencing with soil salvage activities in Area D or developing the access road through the riparian zone U.S. Fuel will consult with the regulatory authority to determine if any design changes in connection with the stream crossing are required.

Each borrow area will be cleared of vegetation immediately prior to utilizing the substitute topsoil material from that area. The vegetation will be stacked near the perimeter of the borrow area to provide for additional wildlife habitat.

A combination of scrapers, front end loaders, track mounted tractors, belly dumps, and/or trucks will be used to load, transport and redistribute the substitute topsoil material. When the desired volumes have been obtained and removed from the borrow areas, reclamation procedures will commence.

Reclamation of Borrow Area A

It is the plan of U.S. Fuel Company to remove 194,043 cubic yards of substitute topsoil material from Borrow Area A, which includes the equipment storage yard, by excavating the 20.05 acre area to a depth of six feet. After the borrow materials have been removed, Borrow Area A will be prepared for reclamation by: shaping and grading the side slopes and floor of the borrow area; installing diversion and erosion control features (as detailed subsequently); seedbed preparation, including the addition of nutrients and soil amendments; and revegetation.

To eliminate the deleterious effects of compaction from the machinery used to remove the substitute topsoil material, to promote root penetration, to aerate the soil, and to increase permeability, the in-situ soil remaining in the borrow area will be ripped, using a large track-mounted tractor. The soil will be ripped along the contour to a depth of 12 inches.

Immediately prior to the application of the soil nutrients and amendments, a minimum of six soil samples will be collected and submitted for laboratory analyses to identify any fertility deficiencies. This will ensure that plans are based on soil conditions at the time of reclamation and not on conditions as they exist at the present time. The area will then be disced, along the contour, as the final step in preparing the seedbed. The necessary amounts of soil nutrients and amendments for current soil conditions which would be used for reclamation of Borrow Area A are shown in Table VIII-3, Ch. VIII.

Based on the results of current laboratory tests, the C_2 horizon in Borrow Area A (i.e., that horizon to be reclaimed following borrowing) has inadequate levels of nitrogen. With less than 0.1 ppm of nitrate nitrogen (NO_3-N) in horizon C_2, a 45-0-0 mix of sulfur coated urea is recommended. Approximately 88 pounds per acre would need to be broadcast prior to seeding the area. At 1.05 percent, the organic material present in the C_2 horizon is only fair. Application of approximately 2000 pounds per acre of straw or native grass hay will be applied by either broadcasting and crimping into the soil by discing or by hydroseeding and adding a binder to the hydroseed mixture.

The phosphorus level in the C_2 horizon (at 3.1 ppm) is very low. Approximately 65 pounds per acre of a 0-46-0 treble superphosphate, or similar mixture, needs to be applied by broadcasting prior to, or in conjunction with, seeding. The potassium level at 38 ppm is relatively low. Approximately 68 pounds per acre of a potassium chloride 0-0-60 or potassium nitrate 13-0-44 needs to be added to the soil to enhance vegetation. The reclamation cost estimate for this borrow site is shown in Table VIII-19, Ch. VIII.

Reclamation of Borrow Area D

U.S. Fuel Company proposes to remove approximately 30,108 cubic yards of substitute topsoil material from Borrow Area D by excavating the 10.2 acre area to a depth of 1.83 feet. After the borrow materials have been removed, Borrow Area D will be prepared for reclamation by: shaping and grading the side slopes and floor of the borrow area; installing diversions and erosion control features; seedbed preparation, including the addition of nutrients and soil amendments; and revegetation.

To eliminate the deleterious effects of excessive compaction created by the machinery used to remove the substitute topsoil material, to promote root penetration, to aerate the soil, and to increase the permeability, the in-situ soil will be ripped, using a large cat track-mounted tractor. The soil will be ripped along the contour to a depth of 12 inches.

Immediately prior to the application of nutrients and soil amendments, a minimum of six samples will be collected and submitted for laboratory analyses to identify any fertility deficiencies and to provide a final basis for the application of nutrients and soil amendments. Again, this will ensure that reclamation efforts are based on soil conditions at the time of reclamation. The area will be disced, along the contour, as the final step in preparing the seedbed. The necessary amounts of nutrients and soil amendments for reclamation of Borrow Area D are found in Table VIII-4, Ch. VIII.

The C_3 horizon in Borrow Area D (i.e. that horizon to be reclaimed following borrowing) has inadequate levels of nitrogen. With less than 0.3 ppm of nitrate nitrogen (NO_3-N) in horizon C_3, 88 pounds per acre of sulfur coated urea needs to be broadcast on the area prior to planting. At 1.21 percent, the organic matter present in the C_3 horizon is fair. To promote more rapid revegetation, to control erosion, and to increase the efficiency of the fertilizer, approximately 2000 pounds per acre of organic materials will be added. The organic materials will be either native grass hay, straw or some other appropriate material. The organic material will be applied by either broadcasting and crimping into the soil by discing, or by hydroseeding and adding a binder to the hydroseed mixture.

The phosphorus level at less than 0.5 ppm is very low. Approximately 30 pounds per acre of a 0-46-0 treble superphosphate, or similar mixture, needs to be applied by broadcasting prior to, or in conjunction with seeding.

The potassium level at 48 ppm is relatively low. Approximately 30 pounds per acre of potassium chloride 0-0-60 or potassium nitrate 13-0-44 needs to be added to the soil by either broadcasting prior to, or in conjunction with, seeding. The reclamation cost estimate for this site is included in Table III-19.

Access to Borrow Areas B and C

The access to both borrow areas A and D will be accomplished by using existing Class III roads (Exhibit VIII-4A). However, if borrow materials are needed from area B and C, only an instream crossing (ford) currently exists from borrow area D to area B and C, which are located on the north side of Miller Creek. In order to minimize disturbance and obtain access, U.S. Fuel proposes to improve and utilize this crossing.

Crossing of Miller Creek to gain access to borrow sites B and C will be accomplished by installing a 30 inch CMP culvert. This culvert is capable of passing the one year, six hour runoff event of 10.8 CFS, as required by UMC 817.173 (see calculations in Appendix III-14).

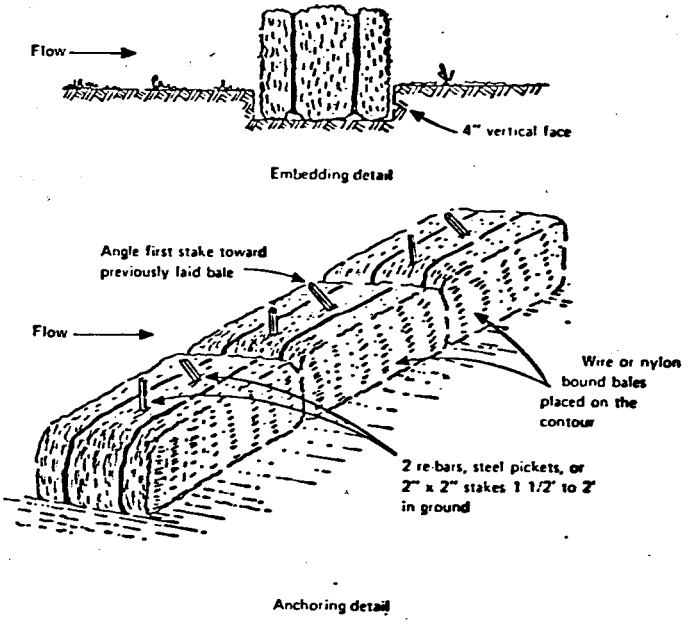
Installation of the culvert will be initiated with emplacement of a silt fence undertaken across the channel below a gravel pad to be placed in the bottom of the channel. The culvert will be laid on the pad and the gravel fill material will be placed on both sides of the culvert and compacted in 8 inch lifts. The stream crossing fill will be brought to a level grade with the flood plain surfaces on both sides of the creek and will have a top width of 16 feet.

Sediment control for the crossing will consist of both berms and straw bale dikes. The 12 inch berms will be placed one on each side of the top of the stream crossing pad to contain runoff on the road and possible spillage from the haul trucks from entering the creek. The straw bale dikes will be emplaced in the face of the embankments above the culvert on both the upstream and downstream sides (see Figure III-2). These dikes will protect against significant sedimentation problems from the small areas of the embankment faces.

The stream crossing will be strictly temporary and will only be in place during the removal of the borrow materials from areas B and C. (To avoid the potential for significant erosion, reclamation activities which involve the disturbance and removal of borrow will be coordinated with the late summer-early fall dry season). After the needed volumes of borrow materials are obtained, then the fill materials and culvert would be removed and the area reclaimed. The thin gravel layer which was emplaced directly on the stream bottom will be left in place to help protect the existing stream bottom. Also, removal could cause significant erosion and/or channel degradation.

Figure III-2

Straw Bale Dike



Construction Specifications

1. Bales shall be placed in a row with ends tightly abutting the adjacent bales.
2. Each bale shall be embedded in the soil a minimum of 4".
3. Bales shall be securely anchored in place by stakes or re-bars driven through the bales. The first stake in each bale shall be angled toward previously laid bale to force bales together.
4. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
5. Bales shall be removed when they have served their usefulness so as not to block or impede storm flow or drainage.

FIGURE III STRAW BALE DIKE (FOR DRAINAGE AREA LESS THAN 1/2 ACRE).

While the roads for any of the borrow areas are in use, storm water runoff from the roads will be diverted to the sediment ponds located within each borrow area and/or by appropriately placed straw bale dikes. During the dry periods the roads will be watered regularly to control fugitive dust.

As the roads which will be used for haul roads currently exist and have been in place for at least 30 years, no topsoil was salvaged. Except for one short section (200 feet) of cutslope, the topsoil is still in place, although it is highly compacted. Therefore, substitute topsoil materials will be distributed over the regraded road areas only where needed. After the borrow materials from each borrow area have been utilized, then the area will be reclaimed. After completing the reclamation of the given borrow area, the haul road leading to that borrow area will be reclaimed. The roads will be backfilled and/or regraded where necessary to blend with the existing topography. Only the access roads leading directly to the borrow area will be reclaimed, specifically the short access road between the paved highway and borrow area A and the section of road which leads from the top of the bench down to Borrow Areas D, B and C. The road which leads from the paved highway to the top of the bench will continue to be used for access to other properties after mining operations have ceased. Prior to distributing topsoil, in the areas where it will be required (in most of the areas the road runs directly on the in-situ soil profile and this material will be used for the reclamation of that section of road and seeding), the roadbed will be ripped to a 12 inch depth and then disced. In areas where topsoil is needed, from 6 to 12 inches of topsoil will be distributed to supplement the existing disturbed soils. The exact depth distributed will depend on the amount of topsoil that has been lost since the installation of the road. The road will then be seeded and fertilized at the prescribed rate of applicable seed mix which was used for the borrow area. Mulch will be applied at the rate of 2,000 pounds per acre and will either be crimp-disced or hydroseeded. The total acreage for reclamation associated with the haul roads is one acre.

Reclamation of Borrow Areas B and C

U.S. Fuel has available 153,880 cubic yards of substitute material from the combined 21.2 acre area of Borrow Areas B and C, 12.35 and 8.85 respectively. To obtain this volume will involve stripping the upper 4.5 feet from each of the two areas. Since gemorphically, pedogenically, geologically, physically and chemically the soils are the same, the area will be treated as one unit for obtaining substitute topsoil and for reclamation. After the borrow materials have been removed, Borrow Areas B and C will be prepared for reclamation by: shaping and grading the side slopes and floor of the borrow area; installing diversions and erosion control features; seedbed preparation, including the addition of nutrients and soil amendments; and revegetation.

To eliminate the deleterious effects of compaction, to promote root penetration, to aerate the soil and to increase permeability, the in-situ soil, remaining in the borrow area will be ripped, using a large track-mounted tractor. The soils will be ripped along the contour to a depth of 12 inches.

Immediately prior to the application of nutrients and soil amendments, a minimum of six soil samples will be collected, submitted to a laboratory for analyses, and the laboratory test results analyzed to identify any fertility deficiencies and to provide a final basis for the application of nutrients and soil amendments. This will ensure that reclamation designs are based on the soil conditions at the time of reclamation. The area will then be disced along the contour as the final step in seedbed preparation. The necessary amounts of nutrients and soil amendments for reclamation of Borrow Areas B and C are listed in Table VIII-3a, Ch. VIII.

The C_4 horizon in Borrow Area B and C has inadequate levels of nitrogen and requires the addition of 40 lbs/acre of nitrogen which can be obtained by adding 88 pounds per acre of a sulfur coated urea 45-0-0. The organic matter will be applied by broadcasting and will be firmly fixed to the soil by either disc-crimping or by hydroseeding and adding a binder to the hydroseed mixture.

Revegetation of the Borrow Areas

Revegetation of the borrow sites themselves, after borrowing is completed, will rely on leaving soil behind that is suitable for supporting vegetative growth. The deeper horizons are not very differnt from the shallow horizons except that N, P and organic matter are lower. These deficiencies will be remedied by the application of fertilizer, mulches and other amendments as stated previously. After borrowing is completed, the borrow sites will be graded to suitable contours (see Exhibit III-14a) ripped, disced, raked, seeded, fertilized and mulched. Seed mixtures number 1 and/or 2 will be utilized (see Table IX-1, IX-2 and IX-5 under UMC 786.19, Chapter IX) with application rates of 43.5 pounds per acre (pure live seed) and/or 63.6 pounds per acre (PLS) respectively. Since no trees are presently found in the borrow areas, no nursery stock will be planted. The seed mixtures contain seed for shrubs and therefore no nursery stock for shrubs will be utilized either.

Seed will be drilled or hand broadcast as required by slopes and sizes of area. All seeded areas will be mulched and monitored for success.

Mitigation of Air Quality Impacts

The steps taken to mitigate air quality impacts in reclamation of the borrow areas are designed to reduce fugitive dust resulting from wind erosion. During reclamation work (recontouring, earthmoving, etc.) water sprinkling will be used to reduce fugitive dust.

After final contours are established, areas to be revegetated will be seeded using one of the appropriate seed mixes suggested in the revegetation field trial discussion (UMC 786.19). The seed mixes are designed to provide good soil binding characteristics (thereby reducing fugitive dust) with high forage and cover value. A balance of shrub, grass and forb species is included and careful attention has been given to the selection of the best broadcasting rate for each so as to achieve the desired revegetation success in terms of plant density, diversity and cover. After seeding, a hydromulch with internal chemical binders (Conweb-2000) or a native hay or straw mulch will be broadcast on the reclaimed area to reduce wind erosion. The hay or straw mulch will be anchored with a staked down netting material for stability or crimped into the soil by discing.

Mitigation of Water Quality Impacts

Borrow areas A, B, C and D are on tributaries of, or adjacent to, Miller Creek, a perennial stream. Borrow Area A is located on an ephemeral tributary of Miller Creek with Borrow areas B, C and D located on an alluvial terrace contiguous to Miller Creek. It is planned to utilize Borrow Area A, D, B and C in succession with only one borrow site being utilized at any given time. Erosion control plans have been formulated to limit the amount of sediment delivered to Miller Creek.

Sedimentation from the borrow areas will be controlled using a combination of straw bale dikes and sediment ponds. Prior to borrow area disturbance, straw bale dikes will be constructed immediately downslope from the borrow area. These dikes will be keyed and anchored into the soil as outlined in Figure III-2.

For Borrow Area A, the existing sediment pond will be removed and a new pond will be constructed at the base of the borrow area prior to removal of the topsoil. The pond will be designed to contain the runoff from the 10 year, 24 hour storm from the recontoured drainage area (see Exhibit III-14A). This runoff volume and all other design calculations are included in Appendix VII-3.

The pond and spillway were sized in accordance with the requirements of DOGM. Design storm data for the 10 year, 24 hour and the 25 year, 24 hour storms were obtained from Richardson (1971). The precipitation value used for the 10 year, 24 hour storm was 2.25 inches. For the 25 year, 24 hour storm, the precipitation depth is 2.60 inches.

The required sediment storage volume for the new sedimentation pond below Borrow Area A was determined using the Universal Soil Loss Equation. Parameter values and calculations are contained in Appendix VII-3. Using the SCS runoff equation and a curve number of 85, the runoff volume resulting from the 10 year, 24 hour storm was calculated as 5.6 acre-feet. Hence, the total storage volume for the new sedimentation pond was determined to be 6.03 acre-feet. As noted in Exhibit III-14B, the sedimentation pond will have a design height of 8.2 feet with 3:1 inslopes and 3:1 outslopes.

Peak discharge rates for spillways and diversion structures were calculated using the rainfall-runoff program developed by Dr. Richard H. Hawkins for the Utah Division of Oil, Gas and Mining. As detailed in Appendix VII-3, the peak inflow rate to the sedimentaiton pond resulting from the 25 year, 24 hour storm was determined to be 18.6 cubic feet per second. For the spillway for sediment pond A, it was determined that a 30 inch CMP drop inlet culvert would pass the 18.6 cfs peak with 0.8 foot of head. The spillway will also include an antivortex device and trash rack with a skimmer on the side of the spillway inlet and dewatering orifice (see Exhibit III-14B).

Following removal of the borrow material, Borrow Area A will consist of a six foot excavation with a 3:1 sideslope on the west and 2:1 sideslopes on the north and south (see Exhibit III-14B). The floor of the excavation will be sloped from the north and south to the middle at a 1 to 2 percent grade. A riprapped trapezoidal channel will then convey runoff to the sedimentation pond. Runoff from the area above the borrow area will be conveyed over the 3:1 slope on the west by a riprapped trapezoidal drop structure. Both structures will require a two layer filter blanket of a well graded sand and a well graded gravel (see Appendix VII-3).

All diversion ditch sizings were based on methods presented in Chapter VI of the OSM "Surface Water Hydrology and Sedimentology Manual". Riprap sizing and filter blanket design were based on methods of the U.S. Environmental Protection Agency and the U.S. Department of Transportation, Federal Highway Administration.

For Borrow Area D, a sedimentation pond will be constructed to contain a runoff volume of 0.84 acre-feet and a sediment volume of 0.05 acre-feet. Design calculations are, again, contained in Appendix VII-3.

The embankment required to store the required 0.9 acre-feet will be 6.0 feet high with 2:1 inslopes and 3:1 outslopes. A 12 inch CMP drop inlet spillway culvert will be used to pass the 3.1 cfs peak flow. The spillway will also include an antivortex device trash rack and skimmer device.

Runoff from the borrow area will be conveyed to the pond by a berm and trapezoidal ditch along the edge of the Miller Creek buffer zone. A 50 foot buffer zone will be maintained between the borrow site and the creek.

Water running off the undisturbed drainage above the borrow site will be diverted around the borrow site by a trapezoidal channel and conveyed to Miller Creek.

Borrow area B and C will require 1.95 acre-feet of storage for runoff and sediment storage (1.73 acre-feet runoff and 0.22 acre-feet sediment). The drainage area is shown on Exhibit VIII-4A.1 and the design calculations are presented in Appendix VII-3.

The embankment will be 10.8 feet high with a 2:1 inslope and a 3:1 outslope. An 18 inch cap drop inlet spillway culvert will be used to pass the 3.31 CFS 25 year, 24 hour peakflow. An anti-vortex type trash rack and skimmer device will be installed on the structure.

Runoff from the borrow area will be conveyed to the pond by a berm and trapezoidal ditch along Miller Creek. A 50 foot buffer zone will be maintained between the borrow site and Miller Creek.

Undisturbed area drainage will be diverted around the borrow site by a trapezoidal channel. This runoff will be conveyed to Miller Creek.

Following successful revegetation, the sediment control facilities will be removed and temporary sediment control measures (straw bales, silt fences, and/or mulching) will be used while the sediment control areas are reclaimed.

The reclamation plans call for the preparation plant and associated facilities and equipment to be salvaged and/or destroyed and removed. Backfilling and grading operations would then be conducted to provide for a stabilized area, with positive drainage. Prior to the distribution of the topsoil and substitute topsoil materials from Borrow Areas A, B, C and D, the surface would be scarified to aid in the stability of the topsoil and to assist in the revegetation activities. The topsoil would be carried to the site from the borrow areas in belly dumps, scrapers or dump trucks. Patrol graders would be used to evenly spread the topsoil over the area. Grade stakes indicating the necessary depth of fill would be placed on 200 foot centers. After the topsoil has been evenly spread over the area, random samples will be collected as a final check to ensure that topsoil has been uniformly spread over the area.

Immediately prior to seeding, mulching and fertilizing, the soil will be disced parallel to the contours to eliminate any detrimental compaction which occurred during topsoil distribution and to reduce erosion potential. Seed, mulch and fertilizer would be applied by hand, with farm type equipment or with hydroseeders. Mulch (either hydromulch, straw or native grass hay) will be applied at the rate of 1.0 ton per acre. If applied by hand or by farm type equipment, a nylon overnet will be placed directly on the mulch and tacked to the soil, or crimped into the soil by discing. If hydroseeding is utilized, a binder or adhesive additive would be utilized to ensure the seed, mulch and amendments remain in place. In either case the recommended application is critical to reducing the erosion potential, controlling runoff and reestablishing vegetation. Topsoil would be applied during late August and the month of September to miss the seasonal high intensity summer thunderstorms.

The preparation plant area has approximately 91.14 acres associated with it. Of this amount 37.69 acres are covered with coal refuse, so the reclamation will be identical to that of the other coal refuse and slurry pond areas. A 53.4 acre area at the preparation plant is relatively free of coal refuse and can be reclaimed by utilizing the in-situ soils. In order to evaluate the reclamation suitability of these soils, a total of eight representative soil samples were collected from the disturbed areas associated with the preparation plant and the upper storage yard. The laboratory test results (Table VIII-21, Ch. VIII) indicate that the soils have a good overall reclamation suitability and will support acceptable stands of vegetative growth.

Sample 1 (Exhibit III-3) was taken from a hand dug test pit which was excavated some 2.5 feet in depth. Only the upper 8 inches showed signs of previous disturbance. Beginning at the surface, as the test pit was advanced, a representative sample of the material was collected and placed in the sample bag until a composite sample for the total excavated depth was obtained.

Sample 2 was taken from a hand dug test pit which was excavated 3.0 feet in depth. Only the upper 4 to 6 inches showed signs of previous disturbance. A composite sample for the total excavation depth was collected.

Sample 3 was collected from an undisturbed, in-situ soil profile on the upper side of a shallow road bank. The exposed face of the soil was removed and a channel sample of the upper three feet was collected and composited.

Sample 4 was collected from a hand dug test pit which was excavated 2.0 feet in depth. The upper 6 to 8 inches of the soil profile was previously disturbed. A composite sample was collected as the test pit was excavated.

Sample 5 and 6 were collected from the upper storage yard and represent the disturbed soils in the Upper Coal Storage Yard. Both test pits were excavated to a depth of 1.5 feet and composite samples from each pit were collected as the hole was advanced.

Sample 7 was collected from a bucket auger hole excavated in an undisturbed soil profile. The pit was excavated to a depth of 3.5 feet and a composite sample was collected.

Sample 8 was collected from a hand dug test pit excavated in a moderately disturbed soil profile. The pit was excavated to a depth of 2.5 feet and a composite sample collected as the test pit was advanced.

When all mining operations have ceased and the facilities in the preparation plant are no longer required, then the facilities will be dismantled. After the facilities are dismantled, all foreign debris and materials will be removed and disposed of, as previously described, in preparation for final reclamation. As shown in Exhibit III-14A, only selected portions of the preparation plant and upper storage yard areas will need to be backfilled as a part of the reclamation activity. Therefore, prior to any post-mining reclamation activity which would significantly harm or destroy the topsoil resources in these areas, a minimum of the upper 1.5 feet of topsoil and appropriate subsoil materials will be removed and temporarily stockpiled and protected. The soil to be temporarily stockpiled will be removed using both front end loaders and large track mounted dozers. The soil thus removed will be taken to a temporary stockpile, to be located near the North and Middle Fork road junction (as shown on Exhibit VIII-4) and protected from the deleterious effects of erosion by installation of strawbale dikes or temporary runoff diversions around the perimeter of the stockpile.

After the appropriate areas have been backfilled or significantly regraded, the stockpiled topsoil will be redistributed. It is anticipated that only a very small percentage of the total area will require these measures. A majority of the area can achieve the final grade without significant regrading and without temporarily stockpiling the topsoil, as only the upper few inches of topsoil have been previously disturbed, the present grade is near the proposed final grade and the soils present have sufficient chemical and physical properties to support vegetative regrowth and enhance reclamation. Laboratory tests (Table VIII-21, Ch. VIII) substantiate that the soil materials in the preparation plant area are adequate (both chemically and physically) to support vegetation and that no additional soils will need to be added to the area to enhance reclamation.

When the final grade has been achieved with a stable area having positive drainage, then the area will be prepared for seeding. Initially the soils will be ripped, to a depth of 12 inches, and disced along the contour. Next, the seed and fertilizer will be applied by either broadcasting, drilling or hydroseeding. Mulch will be applied at the rate of one ton per acre and will be either crimp-disced into the soil or bound to the soil with a binding agent added in the hydroseed mixture.

Equipment Storage Yard East of Slurry Pond No. 5

The Equipment Storage Yard is a 5.5 acre fenced storage area located east of Slurry Pond #5. It is shown on Exhibit III-3.

Topsoil removal: The Equipment Storage Yard was constructed in 1978. Prior to using the area to store equipment, the upper six inches of topsoil materials were excavated and stockpiled. A patrol grader was used to remove a uniform depth of soil. During each pass of the grader the blade would be set on an angle. As the grader moved forward the soil would be excavated and windrowed on the side. A large scraper would then move along the windrow picking up the soil. The soil was then hauled to the stockpile and stabilized. Between two or three passes were made by the grader before topsoil salvage activities were completed. On the upper portion of the equipment storage yard over six inches of soil was excavated to create a relatively flat surface for the site. A total of 4,480 cubic yards of topsoil was salvaged and stockpiled.

Topsoil stockpile and protection measures: The topsoil is stockpiled in a long low berm immediately west of the Equipment Storage Yard. The stockpile has a broad twelve foot top width and two and one-half horizontal to one vertical sideslopes. The stockpile is located on a relatively flat slope (less than 8 percent). The topsoil was emplaced with sufficient compaction to ensure stability but still allow the growth of vegetation. The topsoil storage area has limited access which protects

it from vehicular traffic and is not located on any drainage ways. Native plant species have been established and protect the stockpile from adverse effects of wind and water erosion. The stockpile has been stable since it's construction six years ago. The area is inspected regularly to ensure the detection of any adverse conditions.

This area will be used as a substitute topsoil borrow site for final reclamation and is included within Borrow Area A. The physical and chemical characteristics of the soils in the Equipment Storage Yard are identical, the same soil series and phase of that series, to the soils in Borrow Area A. Therefore, the laboratory test results, located in Table VIII-23, Ch. VIII, are representative of the soils in the Equipment Storage Yard.

During April, 1985 a seven foot deep test pit was dug in the middle of the Equipment Storage Yard and a channel sample of the soil was taken for laboratory analysis to verify its similarity to those samples taken for Borrow Area A. The sample results are presented in Table VIII-23, Ch. VIII and can be compared with those in Table VIII-1, Ch. VIII. The results show that the two sites are quite similar and can be treated as a single borrow area.

Equipment Storage Yard Sediment Control and Reclamation

The 5.5 acre storage area is to be included as part of the disturbed area (see Exhibit III-3). To provide sedimentation control for this small area, a silt fence sediment catch basin with associated conveyence structures will be constructed (see Figure VII-8).

The catch basin and ditch-berms have been designed to handle runoff volume from the 10 year, 24 hour storm from the 5.5 acre drainage area (see Exhibit VII-23). This runoff volume and all other design calculations are included in Appendix VII-3.

Design storm data for the 10 year, 24 hour and the 25 year, 24 hour storms were obtained from Richardson (1971) for the Hiawatha, Utah Recording Station. The precipitation depth used for the 10 year, 24 hour storm was 2.24 inches. For the 25 year, 24 hour storm, the precipitation depth was 2.6 inches.

Peak discharge rates for the diversion structures and the catch basin were calculated using the rainfall-runoff problem developed by Dr. Richard H. Hawkins of Utah State University for the Utah Division of Oil, Gas and Mining. As detailed in Appendix VII-3, the peak inflow rate to the catch basin resulting from the 25 year, 24 hour storm was determined to be 1.52 cubic feet per second. This flow will be passed from the catch basin through a silt fence supported by a chain link fence (see Figure VII-8). The silt fence fabric is specified to be capable of passing water at 0.4 cfs/ft while retaining No. 100 sieve and coarser materials carried by the water. Review of the textural analyses of the surface soils in the area show 50% of the particles would be stopped by the silt fence. A portion of the finer particles would be settled by the ponding of water in the catch basin, so a relatively small amount of sediment would be released with the overflow water to the ephemeral drainage adjacent to the storage yard.

During operations, monthly inspections of the catch basin and silt fence will be undertaken. Fabric wear and sediment caking on the silt fence fabric will be evaluated and if needed, maintenance activities will be undertaken.

All diversion ditch sizings were based on triangular shaped ditches and determined using Manning's Equation solved for flow depth. The calculations are presented in Appendix VII-3.

Following construction of the catch basin and ditch-berms, the outslopes will be revegetated to prevent erosion. During reclamation the sediment control facilities will be left inplace. Following reclamation of the Equipment Storage Yard, the sediment catch basin and ditch-berms will be filled in and the areas occupied will be revegetated.

A reclamation timetable for the reclamation of the substitute topsoil borrow sites (which includes the Equipment Storage Yard) is presented in Table III-18. Reclamation will be conducted on each borrow area immediately following regrading.

Table III-18

Reclamation Timetable

Substitute Topsoil Borrow Sites

Activity	Start	Finish	Year
Cease Operation (Hiawatha Facility)			1
Install Cutoff and Sediment Trap Ditches	June 1	July 1	2
Clear and Grub Sites	July 1	Aug 1	2
Excavate/Remove Topsoil and Nontoxic Fill	July 15	Sept 1	2
Scarify and Prepare Final Surface	Sept 1	Sept 15	2
Nutrient/Fertilizer Placement	Sept 15	Oct 1	2
Seeding and Planting	Oct 1	Oct 15	2
Mulching	Oct 15	Nov 1	2
Final Acceptance	Within Five Years		

TABLE III-19

BORROW AREAS A, B, C, D AND EQUIPMENT YARD RECLAMATION COST ESTIMATE

JOB	MATERIAL	LABOR M/HRS	EQUIPMENT	AREA ACRES	VOLUME CU. YD.	PRODUCTION	UNIT COST	TOTAL COST
BACKFILL AND GRADING								
(Assume 2 Cy/Ft Of Perimeter)			D9U Dozer		22,400	1,512 Cy/Hr	163.54/Hr	2,423
TOPSOIL REPLACEMENT								
Equipment Storage Area			D6 Dozer		4,480	47 Cy/Hr	76.87/Hr	7,327
REVEGETATION								
Rip Existing Surface			D9U Dozer /Ripper		83,006	1,625 Cy/Hr	163.54/Hr	8,354
Scarification and			Farm Tractor	51.5		0.5 Ac/Hr	31.95/Hr	3,291
Fertilization	Fertilizer			51.5		221 Lb/Ac	0.34/Lb	3,870
Drill Seeding				51.5			1,200/Ac	61,800
Mulching	Hay Mulch			51.5		1 Ton/Ac	100.00/Ton	5,150
TOTAL REVEGETATION								82,465
RECLAIM BORROW AREA ROAD								
Backfilling (600 Ft At 2 Cy/Ft)			D6 Dozer		1,200	346 Cy/Hr	76.87/Hr	267
Install And Remove Stream Culvert								3,000
Scarification And			Farm Tractor	0.3		0.5 Ac/Hr	31.95/Hr	20
Fertilization	Fertilizer			0.3		221 Lb/Ac	0.34/Lb	23
Drill Seeding				0.3			1,200/Ac	360
Mulching	Hay Mulch			0.3		1.5 Tons/Ac	100.00/Ton	45
TOTAL BORROW ROAD								3,715
SEDIMENT CONTROL								
Pond A					789		4.05/Yd	3,195
Pond B and C					100		4.05/Yd	405
Pond D					382		4.05/Yd	1,547
Riprap Channel						40 Feet	6.27/Ft	251
TOTAL SEDIMENT CONTROL								5,398
MAINTENANCE								
Inspector		50					37.58/Hr	1,879
Repair Rills and Gullies			Farm Tractor			40 Hours	31.95/Hr	1,278
Reseeding (20% Of Area For 2 Years)			Hydroseeder	10.4			500.00/Ac	5,200
TOTAL MAINTENANCE								8,357
TOTAL ESTIMATED RECLAMATION COST FOR BORROW AREAS								109,685

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UMC 784.14 Reclamation Plan: Protection of the Hydrologic Balance

The primary source of the Hiawatha town culinary water supply is derived from the old Mohrland portal in Cedar Creek canyon. Water from this source is piped approximately 4 miles along the Utah Railway right of way. The old Mohrland portal is presently sealed with backfilled earth material. Water is derived from an opening near the portal where a small inlet structure is housed under a metal covering. This water supply system is proposed to be turned over to the town of Hiawatha upon final abandonment of mining operations.

A secondary branch of the Hiawatha culinary water supply system extends from the town water tank to the King 3 mine portal. From there it is connected via a 4 inch pipeline through the old King 3 mine and Hiawatha No. 1 mine to a reinforced concrete bulkhead in the Hiawatha No. 2 mine manway portal. Water stored behind the bulkhead in the Hiawatha No. 2 mine is derived through an old ventilation opening and a 10 inch pipeline from a diversion point on the North Fork of Miller Creek. The ventilation opening is inaccessible due to natural caving of the portal over time. Water diverted into the underground reservoir is covered under Certificate of Appropriation No. 2159. The reservoir has the capacity to store 100 million gallons. The actual volume stored at any given time can be estimated by the known extent of mine workings and water pressure indicated on a gauge at the bulkhead.. (See Appendix III-6).

Upon final abandonment, the King 3 portal and the old Mohrland portal will be sealed by backfilling as shown on Plate III-4. Water lines extending from these portals are proposed to be left in place to serve the Hiawatha town which will be responsible for water system maintenance at that time. The Hiawatha No. 2 portal will not be sealed in front of the bulkhead since access will be needed to service valves, check pressure gauges and maintain a chlorination unit within the portal.

Should the town of Hiawatha cease to exist prior to or simultaneously with the mining operation, U.S. Fuel provides the following reclamation plan for the reclamation of the access roads to the diverison facility and underground reservoir.

UMC 784.13 Plan For The Reclamation Of Roads And Underground Reservoir

The roads which lead to the mine entries and water supply facilities, as well as the underground impoundment and it's diversion, located on the North Fork, Middle Fork and South Fork areas will be reclaimed after mining activities have ceased and upon the positive determination that the Town of Hiawatha will no longer exist after mining operations have ceased. Therefore, U.S. Fuel commits to reclaim the roads, diversions and

underground impoundment, with the understanding that at a future date, the utilization of the area as a water supply for a postmining land use may be accepted (after a resubmission by U.S. Fuel) by the appropriate regulatory authority, (Division of Oil, Gas and Mining or Office of Surface Mining), when it can be shown that the Town of Hiawatha will remain viable.

If at the time of abandonment of mining operations it is determined that the Town of Hiawatha will remain as a viable community, then water in the underground reservoir will be drawn down and the lower seal inspected and tested for integrity. If tests prove unfavorable then the seals will be adequately reinforced or otherwise upgrade for safe continued use.

If at the time of abandonment of mining operations, it is determined that the Town of Hiawatha will no longer exist, then the underground reservoir will be drained. The seals will be left in place to help prevent access and the portals backfilled as described in our plan for Sealing of Mine Openings and Bore Holes.

A determination of the amount of water that is actually made in the Hiawatha #2 mine can not be made until after mining operations cease and the reservoir has been drained. At this time the lowest seal will be monitored for mine water build up. It is very likely that if any water is made in the mine it will meet all applicable state and federal effluent limitations and could be discharged. (Water discharged from the Mohrland mine portal is acceptable and come from underground works similar to the Hiawatha #2 mine).

If the mine is found to produce water of an unacceptable quality, hydraulic seals will be replaced or restored on any open portals and the portals will be backfilled, regraded and reclaimed.

The roads will be reclaimed after the mine pads and portals have been reclaimed. Some portals may temporarily be left open for disposal of abandoned materials. Reclamation activities for the roads will begin at the upper end of the roads and progressively proceed toward the Town of Hiawatha until the entire length of the haul and access roads have been completed.

The initial step in reclaiming the roads will involve removing the asphalt and hauling it to the slurry ponds for disposal. The guard rails and corregated metal culverts will be removed from each section, after the asphalt is removed, and prior to commencement of earthwork. The guardrails and culverts will be disposed of in the abandoned mine openings prior to sealing.

The gravel roadbase will be regraded and compacted against the base of the cut slope as a foundation for the remainder of the fill material. The roadfill material will then be worked back into place until the original natural topography is achieved.

It is difficult to anticipate what the actual configuration of the regraded surfaces will be. However, the entire length of the road will be seeded by either drilling where grade permits, hydroseeding in steeper sloped sections or possibly hand broadcasting and hand raking in the event some area has a particularly steep slope. To break seeding down into individual acreages would be of little practicality at this time. It may be best to determine the most applicable technique as the regrading is being done. A rough estimation of the type of reseeding to be done percentage-wise has been made however and is included under the discussion of each area.

Seed will be applied using the rates given in Table IX-4 (located in Chapter IX). Hydromulch (Conweb-2000) with tackifiers, when used, will be applied at a rate of one ton per acre on regraded areas. Only on the steep slopes, where deemed necessary to prevent erosion, will a tacked hay mulch be applied also at a rate of one ton per acre.

The fill will be covered with the best available material (substitute topsoil) which will be salvaged from the road area during the regrading process. When the backfilling is completed, the surface will be scarified prior to spreading the substitute topsoil. The substitute topsoil will be applied to achieve a uniform distribution of a minimum of six inches of vegetative growth medium.

The soils in the road fill have the same general characteristics as the materials in the mine pads which were sampled (Table VIII-9 and VIII-10, Ch. VIII). Therefore, the same nutrients and soil amendments will be applied to enhance vegetative regrowth. Additionally, seed mix #4 will be utilized to revegetate the regraded surfaces. The seed mix and fertilizer will be applied to the prepared surface, prior to placing 2,000 pounds per acre of mulch over the top. The mulch will either be applied by hand and held in place using netting which will be stapled to the soil or will be bound by a tackifier to the soil.

North Fork Road

Approximately 7.4 acres of remedial action measures will be associated with the reclamation of the North Fork road and the diversion pipeline. The North Fork road was constructed in the bottom of the canyon on the existing narrow floodplain and terraces. Because of this, only

limited excavation was necessary in order to construct the road. The road will be reclaimed by ripping the surface of the road and then scarifying the disturbed surface parallel to the contour. Seed mix # 4 will be applied with the appropriate application of soil nutrients and amendments. The seeds will be drilled where the slopes are conducive to such. Other areas will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched at the rate of 2,000 pounds per acre. Soil samples will be taken of the North Fork road prior to reseeding in order to determine what soil amendments, if any, are necessary.

Approximately 2,110 feet of 12 inch pipe leads from the North Fork diversion to the old mine entry. Of this length, the pipe is buried for 610 feet and exposed for 1,500 feet. The buried pipe will be left in place and will be capped by welding steel plate on both ends. The exposed pipe will be removed and disposed of.

The diversion structure and catch basin in North Fork will remain in place as it was designed as a permanent structure. Over time, the structure has filled in with sediment and assists in stabilizing the stream.

U.S. Fuel originally applied in 1958 for an Application of Diversion from the State Engineer's Office. They were granted this diversion indefinitely for the use of water in the town of Hiawatha. The company has always maintained that this water supply would remain available for the town after the cessation of mining operations.

In August of 1984, U.S. Fuel received violation N84-8-1-3, 3 of 3 from the Division of Oil, Gas and Mining requesting them to submit appropriate calculations and plans for the spillway of the diversion.

On August 21, 1984, detailed plans for reconstruction of the spillway as a stable, permanent structure, capable of passing the 100 year, 24 hour event were submitted to and approved by the Division. This plan is compatible with the mine permit application discussion of Chapter III which indicates the water system will remain in operation after the cessation of mining.

U.S. Fuel proposed to treat this diversion as a permanent structure and let it exist after cessation of mining operations because it is already in close similarity to the natural stream channel and will have a stabilizing effect. In the approved plan the capacity of the altered section is greater than the unmodified channel immediately upstream and downstream.

Riparian habitat will be maintained on the diversion and stream embankments. A natural meandering shape for the stream will be maintained by the diversion structure. The stream gradient, modified by the diversion spillway, is less than the gradient above and below. Appropriately sized rip rap in the diversion spillway will preclude erosion or downcutting even during the 100 year, 24 hour event. The path and configuration of the diversion presently approximates natural stream channel characteristics.

Since this diversion does not impound water, it does not present any threat to the environment and structures downstream.

Only a small portal opening exists for entry into the underground reservoir when entering from the North Fork drainage. This entry will be sealed and the contiguous surface area will be reclaimed.

Middle Fork Road

Reclamation of the Middle Fork road will involve removal and disposal of approximately 5,100 cubic yards of asphalt. As previously described all guard rails and culverts will be removed and the material worked back into place to achieve the near original contour. The best available substitute topsoil material will be salvaged and spread over a scarified surface. Seed will be drilled on areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched. The method of seeding the Middle Fork road can be broken down percentage-wise. Approximately 50% of the road will be drilled, basically this is the lower half. 40% will be hydroseeded and 10% will be hand seeded and raked.

The portal in Middle Fork canyon which leads to the underground reservoir will be sealed to prevent entry as previously described. The buried pipeline which leads from the reservoir to South Fork and then to the Town of Hiawatha will be sealed by welding steel plates on the exposed ends.

The Middle Fork road culverts and any supporting structures will be removed and disposed of within the King 4 mine portals prior to sealing. The stream channel area and areas where road culverts presently exist will be reshaped to blend with the upstream and downstream cross sections and grade. The regraded areas will be seeded with the riparian seed mix (mix #4) and hydromulched or drilled. The channel capacity, in the case of culvert #29, will be re-established to the capacity of the unmodified stream channel immediately up and down stream from the affected portion.

TABLE III-20

UNIT COST REFERENCE FOR BOND ESTIMATE

ITEM	UNIT COST
1. STRUCTURAL REMOVAL*	
A. Steel	$ 4.05/Cu.Yd.
B. Concrete	$ 5.67/Cu.Yd.
C. 4" Concrete Slab (Demolition)	$ 2.23/Sq.Ft.
D. 4" Concrete Slab (Disposal)	$ 4.63/Cu.Yd.
E. 6" Concrete Slab (Demolition)	$ 3.09/Sq.Ft.
F. 6" Concrete Slab (Disposal)	$ 4.63/Cu.Yd.
G. Pavement	$ 1.38/Sq.Yd.
H. Waterlines	$ 0.90/Lin.Ft.
I. Powerlines	$ 3.62/Lin.Ft.
J. Chain Link Fence	$ 1.13/Lin.Ft.
2. Equipment Costs* (Including Operator)	
A. D9 Bulldozer	$163.54/Hr
B. D6 Bulldozer	$ 76.87/Hr
C. Front End Loader (7 Cu. Yd.)	$145.06/Hr
D. Truck (20 Cu. Yd. on Highway)	$ 78.12/Hr
E. Scraper (20 Cu. Yd.)	$125.55/Hr
F. Farm Tractor	$ 31.95/Hr

*Costs Taken From OSM's Reclamation Bond Calculations For The Hiawatha Mine Complex, June 14, 1985 (1984 Prices).

0033J

Because of the short distance that each of the present culverts occupy, development of a meandering stream configuration or a pattern of riffles, pools and drops would not be practical upon their removal.

South Fork Road

Reclamation of the South Fork road will involve removal and disposal of approximately 2,400 cubic yards of asphalt. As previously described, all guard rail and culverts will be removed and the earthen materials worked back into place to achieve the near original contour. The best available substitute topsoil material will be salvaged during the back-filling process and spread over the scarified surface. Seed will be drilled on all areas where the slope allows. Steeper slopes will be hydroseeded or broadcast and hand raked. All seeded areas will be mulched except when the seeds are drilled.

In an approximate breakdown, 65% of the regraded South Fork road will be seeded by drill while 35% will be hydroseeded due to the steeper slope.

The areas where road cross-culverts presently exist will be reshaped to blend with the upstream and downstream cross-sections and grade. Regraded areas will be seeded with the riparian seed mix and hydromulched or drilled.

~~3.8 Appendices~~

III-1 North Fork Ventilation Approved Construction Plans

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

APPENDIX III-1

North Fork Ventilation Portal
Approved Construction Plans

RECEIVED
JUL 1983
DIVISION OF
OIL, GAS & MINING

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

Important : Remove Appendix III-1 "North Fork Ventilation Approved Construction Plans" from Volume 1, March ~~1982~~ / Permit Application and insert here.

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JUL 1983
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OIL, GAS & MINING

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

UNITED STATES FUEL COMPANY

HIAWATHA, UTAH 84527

June 13, 1979

Mr. Cleon B. Feight, Director
Utah Department of Natural Resources
Division of Oil, Gas and Mining
1588 West North Temple
Salt Lake City, Utah 84116

RE: Plan for construction of a fan portal facility and related structures near Hiawatha, Utah. (Mining and Reclamation Plan No.Act/007/011)

Dear Mr. Feight:

United States Fuel Company proposes to construct a mine ventilation fan facility in the Right Fork canyon of Miller Creek near Hiawatha, Utah. This facility is needed to provide additional ventilating capacity for the King 4 Mine which is being developed west of this area. The location of the proposed fan site is shown on a quadrangle map included with this plan. A system of ventilating entrys is presently being driven in an easterly direction to break out at the proposed site. Following is an outline of proposed construction.

SITE CONSTRUCTION

Figure 1 is a contour map of the site area showing proposed construction. There is an existing jeep road in Right Fork canyon extending from the town of Hiawatha to within 800 feet of the break out point. We propose to extend this road and construct a pad to facilitate a fan portal, fan housing, motor control building, and electrical substation. The size of the pad area will be approximately ½ acre.

The extended jeep road will only be wide enough to provide infrequent service to the fan installation. Drain culverts will be installed as shown in Figure 1.

KING COAL

Quotations subject to immediate acceptance. Coal will be sold and invoiced at price in effect on date of shipment, at gross weights of railroad cars at place of shipment, unless otherwise specifically agreed in writing. Agreements are not binding in cases of delay beyond our control, including strikes, accidents, riots, acts of God, lockouts, fire, the inability to secure cars or equipment

A pole mounted electrical power transmission line will be installed from Hiawatha to the fan facility. It is anticipated that little surface disturbance will be caused by this installation since the existing jeep road can be used as access.

TOPSOIL HANDLING AND REVEGETATION

Trees and large brush will be cleared from the site before topsoil is removed. Topsoil will be removed as a separate operation and stockpiled in the area shown in figure 1. Topsoil will be redistributed immediately after surface structures have been completed or protected and redistributed upon final abandonment of the area, whichever is recommended.

Upon final abandonment of the area, all surface structures will be removed and disturbed lands, excluding road surfaces, will be seeded to achieve a permanent vegetative cover of native plants.

SEDIMENT CONTROL MEASURES

Due to the small size (½ acre) of the area to be disturbed, and the small drainage area contributing runoff to the site, no sedimentation pond is proposed. Sediment will be controlled by the use of straw dikes placed in drain ditches. The distrubed area and topsoil stockpile will be seeded with a temporary cover of grasses or legumes immediately after surface facilities are constructed in order to control erosion.

Yours truly,

Robert Eccli

Robert Eccli,
Engineer

RE/jl

Attachment:

'COTT M. MATHESON
Governor

GORDON E. HARMSTON
Executive Director,
NATURAL RESOURCES

CLEON B. FEIGHT
Director

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
1588 West North Temple
Salt Lake City, Utah 84116
(801) 533-5771

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July 5, 1979

Mr. Robert Eccli
Mine Engineer
U.S. Fuel Company
Hiawatha, Utah 84527

RE: Fan Portal Facility & Related Structures
U.S. Fuel Company
ACT/007/011

Dear Bob:

The Division has reviewed the plans for the proposed fan facility in the right fork Miller Creek of U.S. Fuel's Hiawatha operations. The following comments are offered:

1. The proposed access to the fan site by way of the existing jeep road and its extention is acceptable to the Division. It is felt that U.S. Fuel Company can use the Class III Road Standards as this will minimize the amount of disturbance to the area. The limited use the road will receive during its life is also a factor in this determination.

2. The Division recommends the temporary stockpiling of topsoil and redistribution immediately following completion of surface structures. For such a plan the Division would require the prompt seeding and mulching of the area to protect it against erosion.

3. Sediment control can be accomplished, for the small area to be distubed, by the use of prompt revegetation along with strawdikes or some sort of sediment control fabric.

4. A seeding list with the species and rates of the temporary and the permanent seed mixes will be required.

The Division awaits U.S. Fuel's response on these comments.

A copy of the plans are being forwarded to the Office of Surface Mining along with a copy of this letter. By so doing they are informed of the Division's position.

If you have any questions, please contact the Division.

Sincerely,

Ronald W. Daniels

RONALD W. DANIELS
COORDINATOR OF MINED LAND DEVELOPMENT

RWD/te

cc: John Hardaway, Office of Surface Mining

UNITED STATES FUEL COMPANY

HIAWATHA, UTAH 84527

August 1, 1979

Mr. Ronald W. Daniels
Coordinator of Mined Land Development
Utah Department of Natural Resources
Division of Oil, Gas and Mining
1588 West North Temple
Salt Lake City, Utah 84116

Dear Ron:

This letter is submitted in response to your comments of July 5, 1979 relating to our proposed fan portal facility in the Right Fork of Miller Creek near Hiawatha, Utah.

The following information is provided to supplement and modify our plan according to your recommendations.

1. U.S. Fuel Company will extend and maintain the existing jeep road according to Class III road standards as you recommend.

2. Topsoil will be temporarily stockpiled and redistributed immediately following completion of surface structures. Seeding and mulching will be done promptly once topsoil is redistributed.

3. Sediment control measures will include prompt revegetation along with straw dikes or sediment control fabric.

4. We request your recommendations as to seed species and rate of distribution. The proposed site is located in aspen woodland at approximatley 8300 ft. elevation. Rainfall is approximately 16 inches per year.

Yours truly,

Robert Eccli

Robert Eccli,
Engineer

RE/jl

KING COAL

'COTT M. MATHESON
Governor

GORDON E. HARMSTON
Executive Director,
NATURAL RESOURCES

CLEON B. FEIGHT
Director

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
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(801) 533-5771

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E. STEELE McINTYRE

October 12, 1979

Mr. Robert Eccli
Chief Engineer
U.S. Fuel Company
Hiawatha, Utah 84527

RE: Hydro-mulched Areas and Fan Portal
Facility and Related Structures
U.S. Fuel Company
ACT/007/011

Dear Bob:

Enclosed is a copy of the memo from a Division site inspection of the slurry pond reconstruction and the proposed fan portal area.

The Office of Surface Mining and the Division concur that reseeding of the areas connected to the slurry pond reconstruction is required. Hand broadcasting methods will be sufficient. Some vegetation may result from past seeding of these areas so that a full reseeding may not be necessary.

The following comments are offered, in relation to the proposed fan portal facility, in addition to those made by Mr. Ron Daniels in his July 5, 1979 letter to you.

1. As stated in the memo, the right fork of the north fork of Miller Creek appears to be perennial and this observation has been verified by the Hydrologic Monitoring Plan which was submitted by U.S. Fuel to the U.S. Geological Survey in November, 1977. Since this tributary is perennial and will be used for very limited access, the Division recommends that the two lower stream crossings be redesigned as stream fords with a low gravel pad. This will allow the filtration of low flows through the gravel pad and high flows to top over the pad and cause less erosion and sedimentation than if a culvert were washed out. The upper crossing will need to be culverted to handle the 10 year-24 hour storm, as regrading of the stream banks will cause excessive amounts of material to be moved.

2. The jeep trail which is proposed to be upgraded to a Class III Road also crosses four small draws, as noted in the memo. In order to minimize the disturbances to the hydrologic system due to erosion problems, the Division requires that appropriately sized culverts, to handle runoff from the 10 year-24 hour event, be installed at these locations. Appropriately constructed trash racks shall be installed on all culverts so that the function of these structures will not be imparred.

3. After a field inspection of the site it is suggested that it may be possible and desireable, for ease of handling, to relocate the proposed topsoil stockpile closer to the site disturbance. This matter, however, would be left to the judgement of U.S. Fuel.

4. The following is a list of suggested species for the site. Only grasses and forb species have been suggested because of MSHA requirements on vegetation surrounding fans.

It is felt that a mixture of grasses to forbs with a ratio of 3:1, from the species list, at a rate of 20 pounds per acre would be good for local conditions. A selection of 5-7 species should be sufficient.

GRASSES SPECIES LIST	FORBS
Western Wheatgrass*	Alfalfa (Nomad or Ladak)
Thickspike wheatgrass*	Utah sweetvetch*
Canada Wildrye*	Arrowleaf balsamroot*
Bluebunch wheatgrass*	Small burnet*
Big Bluestem*	
Basin wildrye*	
Smooth Brome	
Orchard grass	
Fairwaycrested wheatgrass	
Standardcrested wheatgrass	
Bearded blu ebunch wheatgrass	
Bluestem wheatgrass	
Intermediate wheatgrass	
Pubescent wheatgrass	
Russian wildrye	

*Indicates native species.

The Division awaits U.S. Fuel Company's response to these comments. If there are any questions, please contact the Division.

Sincerely,

MARY ANN WRIGHT
RECLAMATION BIOLOGIST

AND

THOMAS J. SUCHOSKI
RECLAMATION HYDROLOGIST

Enclosure: Memo

cc: John Hardaway
Office of Surface Mining
Region V

MAW/TJS:te

UNITED STATES FUEL COMPANY

HIAWATHA, UTAH 84527

December 16, 1979

Ronald W. Daniels
Coordinator of Mined Land Development
Utah Department of Natural Resources
Division of Oil, Gas and Mining
1588 West North Temple
Salt Lake City, Utah 84116

Dear Ron:

This letter is submitted in response to stipulations set forth in the letter from Mary Ann Wright and Thomas Suchoski on October 12, 1979. The stipulations relate to hydro-mulched areas near slurry impoundment No. 1 and the proposed fan portal facility in the north fork of Miller Creek.

United States Fuel Company agrees to comply with the stipulations and recommendations set forth in the above mentioned letter.

Approval of our plan for construction of the north fork fan portal facility, submitted June 13, 1979, is requested.

Yours truly,

Robert Eccli

Robert Eccli,
Mine Engineer

RE/dl

Quotations subject to immediate acceptance. Coal will be sold and invoiced at price in effect on date of shipment. At mine weights and prices at place of shipment unless otherwise specifically agreed in writing. Agreements are contingent upon causes of delay beyond our control, including strikes, accidents, acts of God, breakdowns, fire, flood, inability to secure cars or transportation.

OTT M. MATHESON
Governor

GORDON E. HARMSTON
Executive Director,
NATURAL RESOURCES

CLEON B. FEIGHT
Director

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING
1588 West North Temple
Salt Lake City, Utah 84116
(801) 533-5771

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February 28, 1980

REGISTERED - RETURN RECEIPT REQUESTED

Mr. Don Crane
Regional Director
Office of Surface Mining
Brooks Towers
1020 15th Street
Denver, Colorado 80202

RE: Right Fork Fan Portal
U.S. Fuel Company
ACT/007/011

Dear Don:

The Division will be approving U.S. Fuel Company's plans for the fan portal to be located in the right fork of Miller Creek. The Division will be sending out an approval letter 3 weeks after this registered letter is received by the Office of Surface Mining. It would be helpful if the Office of Surface Mining could have its comments to the State within 2 weeks of receipt.

The Division feels that this deadline is acceptable as the plans and State comments were forwarded to the Office of Surface Mining on August 7, 1979, and again on January 9, 1980. The January letter requests the review of the portal plans and the Office of Surface Mining's comment, though no deadline was set.

The reason for the need of this approval is again set forth as the need for ventilation of the underground workings as required by M.S.H.A.

I hope that this will expedite the approval of this much needed facility.

Sincerely,

Ron Daniels

RONALD W. DANIELS
COORDINATOR OF MINED
LAND DEVELOPMENT

RWD/te

cc: U.S. Fuel Company, Bob Eccli

SCOTT M. MATHESON
Governor

GORDON E. HARMSTON
Executive Director,
NATURAL RESOURCES

CLEON B. FEIGHT
Director

STATE OF UTAH
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April 11, 1980

Mr. Robert Eccli
Mine Engineer
U.S. Fuel Company
Hiawatha, Utah 84527

RE: Fan Portal Approval
U.S. Fuel Company
King #4 Mine
ACT/007/001

Dear Bob:

Enclosed is a copy of the Office of Surface Mining's approval for construction of the fan portal and related facilities for the King #4 Mine.

Call us if you have any questions about this correspondence.

Sincerely,

Thomas J. Suchoski

THOMAS J. SUCHOSKI
ENGINEERING GEOLOGIST

TJS/te

Enclosure: Approval Letter

cc: Don Crane, O.S.M.

United States Department of the Interior
OFFICE OF SURFACE MINING
Reclamation and Enforcement
BROOKS TOWERS
1020 15TH STREET
DENVER, COLORADO 80202

OFFICE OF THE REGIONAL DIRECTOR

21 MAR 1980

RECEIVED
MAR 27 1980
DIVISION OF
OIL, GAS & MINING

Mr. Ron Daniels
Coordinator of Mined Land Development
Department of Natural Resources
Division of Oil, Gas and Mining
1588 West North Temple
Salt Lake City, Utah 84116

Dear Ron:

This office has reviewed the proposal from the U.S. Fuel Company to construct a mine ventilation fan for the King No. 4 Mine. You mentioned in your letter of February 28, 1980 that the State comments were forwarded to this office on August 7, 1979. This office does not have a record of this letter. We received information of the fan portal proposal through correspondence with Mr. Suchoski, of your staff, dated January 9, 1980. Enclosed with this correspondence was your letter of July 5, 1979 to the U.S. Fuel Company. In this letter, you offered the concerns of your office about the fan facility. After consultation with the U.S. Bureau of Land Management, we give our approval to the construction of the fan portal and related facilities provided that the conditions noted below are met.

Disturbance associated with the fan facilities will include the fan portal pad (about a half-acre in size), an 800 foot extension to the existing jeep road, and the power transmission line. The two lower stream crossings are designed as stream fords using a gravel pad. The upper crossing will be culverted with a 36-inch corrugated metal pipe. These criteria meet the the requirements of 30 CFR 717.17(j). It is suggested that since no drainage ditches are anticipated for the road, drainage should be provided by surface dips at a spacing adequate to minimize erosion on the roadbed.

OSM is concerned about the installation of the electric power transmission lines. Power lines should be constructed to minimize impacts on the environment and upon wildlife. The applicant is referred to the two enclosed reports for information on the design and construction of electric power transmission lines.

On October 12, 1979, Ms. Wright and Mr. Suchoski, of your staff, sent a list of concerns to U.S. Fuel Company. Included in this list was a suggested seed mixture. After reviewing this mixture, it is recommended that crested wheatgrass, smooth brome, orchard grass, and alfalfa be either omitted from the mixture or extremely limited in their application.

A copy of this letter is enclosed for transmittal to the applicant by your office. If you have any questions regarding this review, contact John Nadolski (303) 837-3773 of my staff.

Sincerely,

DONALD A. CRANE

Enclosures

cc: Berggren, BLM, Price

~~3.8 Appendices~~

III-2 King 4 "MSHA" Approved Roof and Ventilation Plans

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

APPENDIX III-2

King 4 "MSHA" Approved Roof
and Ventilation Plans

RECEIVED
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DIVISION OF
OIL, GAS & MINING

Important: Remove contents of Appendix III-2 from the March 1982, Vol. 1 Permit Application and place here. Discard cover page.

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

MASTER

U.S. DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

Mailing Address:
P.O. Box 25367, DFC
Denver, Colorado 80225

Street Address:
730 Simms
Lakewood, Colorado

Coal Mine Health and Safety
District 9

April 25, 1979

Mr. Duane Wise
United States Fuel Company
Hiawatha, Utah 84527

Re: King Mine
I. D. No. 42-00098
Roof Control Plan

Dear Mr. Wise:

The supplement submitted April 6, 1979, has been reviewed and approved and will be appended to the plan approved May 19, 1977. Since the plan appears to be satisfactory, it will be extended for another six month period.

Sincerely yours,

for John W. Barton
District Manager

ROOF CONTROL PLAN

General Information

Date: April 24, 1979 Mine I.D. No.: 42-00095

A. Company: U.S. Fuel Company

Address: Hiawatha, (CITY) Utah (STATE) 84527 (ZIP CODE)

B. Mine: King Mine

Mine Location:

Hiawatha, (CITY) Carbon (COUNTY) Utah (STATE) 84527 (ZIP CODE)

C. Locations (Reference to nearest highway route, direction, and distance).

11 Miles West of Junction of Route 10 and Route 122

D. Type(s) of Plan: Convention Plan with spot bolting

E. Area(s) of Mine Covered by the Plan: Entry, Rooms, Crosscuts, and Intersections, and Pillar Splits

F. Maximum Cover (feet): 1500 feet

Main Roof	Massive Sandstone	Variable
Immediate Roof	Sandy Shale	10 ft.
Coalbed	Carbonaceous Shall	0-2 ft.
Bottom	Coal B Seam Carbonaceous Shale Sandy Shale	5-7 ft. 0-2 ft. 8 ft.

G. Vice President and General Manager

Roof Control Investigator(s): _____

Approved By: _____ Date: _____

Title: _____

Manufacturer: CF&K STEEL CORPORATION Designa: CF&I Grade 75
OR OTHER MANUFACTURERS WITH EQUIVALENT MATERIAL (MECH. OR RESIN)

Minimum Length: 48" Mechanical and Resin

Diameter: 3/4" REBAR (RESIN) AND 7/8" REBAR (RESIN) OR 5/8" (THREADED)

Type Steel: 3/4" REBAR (RESIN) 30 MIN. Grade Type Thread CUT OR ROLLED
5/8" MECH. Grade 75

Length of Thread 4" CUT OR ROLL R20 (MIN.)

Type Head: HEX OR SQUARE (STANDARD)

Dimensions Of Bolt Head: Nut: 1-1/8" Flange: 1-1/2"

I. Bearing Plates

Manufacturer: CF&I STEEL CORP. OR OTHER MANUFACTURERS WITH EQUIVALENT MATERIAL Manuf's Designa:

Dimensions: 6"x6"x1/4" - EMBOSSED - DOUBLE EMBOSSED OR FLAT
18"x6"x1/4" - HEADER PLATES

Shape: SQUARE Center Hole Size: 13"/16 NOMINAL FOR CONVENTIONAL BOLTS, 1" NOMINAL FOR RESIN BOLTS

J. Washers

Manufacturer: Equivalent Manuf's Desgna
Type Steel: Size
Shape: Hole Size

K. Anchorage Unit

Manufacturer: OHIO BRASS Manuf's Designa 22378
PATTIN "D" D-1
BETHLEHEM: ANY EQUIV. APPROVED SHELL C-1 or K-1
DUPONT FASLOC RESIN CARTRIDGE FASTLOC A, B, C, or D
G.E. RESIN CARTRIDGE or
THE CETITE CARTRIDGE, OR OTHER APPRVD. CELITE 2212, 2512, or 2812
CARTRIDGES

Type: Expansion - Resin Size Of Finished Hole: 1-3/8" (Mech.) 1",1 1/8", 1 1/4" (Resin) also add 1 1/8" bit for stoper Method of Drilling: Pneumatic or Rotary
Dust Control: Water or Vacuum, Installed Torque: 150-250 foot Pounds

Materials Used in Conjunction With Roof Bolts
TREATED OR COTTON WOOD CAP PIECES IN AREAS OVER 3 YRS. LIFE. 24"x6"x3½"x2" NOMINAL. 7"x3/8" TRIANGULAR FLAT STEEL PLATES AND 60"x8"x14" MATS

BEARINGS PLATES: Airplane landing mats, or wide steel sheets (16 gage Minimum and gthened by at least two corrugations), or No. 9 chain-link wire fencing in combination 6 inch square by 3/8 inch flat or 1/4 inch embossed steel plates; or steel straps (3/8 inch minimum thickness by 5 inch width) or steel channels (4 inch minimum width) in combination with 3 inch square by 3/8 inch flat steel plates in main travelways where immediate top requires continuous support. Material used should give sufficient coverage of the roof span.

M. Face Equipment and Section Haulage Equipment Associated with each:

1. Continuous Miners
2. Shuttle Cars
3. Stoper - Percussion - Rotary - Drills
4. Roof Bolters
5. Front-end Loaders
6.
7.
8.
9.

N. Sequence of Mining and Installation of Supports including temporary supports:

PLAN DRAWING SHOWING SEQUENCE OF MINING INCLUDING PILLAR MINING WHERE APPLICABLE, SEQUENCE OF INSTALLATION AND SPACING OF SUPPORTS INCLUDING TEMPORARY SUPPORTS AND MAXIMUM WIDTH OF ENTRIES, ROOMS INTERSECTIONS, CROSSCUTS, AND PILLAR LIFTS ARE ATTACHED.

Track and Belt Entry 22 ft.

Entry Width: 20 ft.

Entry Centers: 80 ft. and 100 ft.

Crosscut Width: 20 ft.

Crosscut Centers: Min. 40 ft. and Max 100 ft.

Room Width: 20 ft.

Room Centers: Min. 40 ft. and Max. 100 ft.

Room Crosscut Width: 20 ft.

Room Crosscut Centers: 80 ft. and 100 ft.

Pillar Mining: The provisions of 75.200-11 shall apply

[illegible] TEMPORARY AND SUBSTANTIAL

[illegible] required

Diameter of post 1 inch for each 15 inches in length but not less than 4 inches - Split posts shall have a cross section area equal to that required for round posts of equivalent length.

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 24" x 4" x 2"

Wedges, size and shape 12" x 4" x 2" Wedge Shape

Crossbars, type Straight grain solid wood

Crossbars, size A minimum of 3 inches by 8 inches of varying length

Planks, size A minimum of 1 inch by 8 inches of varying length

Cribbing blocks, size A minimum of 30 inches in length of varying cross section

BEARING PLATES

Airplane landing mats, or wide steel sheets (16 gage minimum and strengthened by at least two corrugations), or No. 9 chain link wire fencing in combination with 6-inch square by 3/8 inch flat or 1/4 inch embossed steel plates; or steel straps (3/8 inch minimum thickness by 5 inch width) or steel channels (4 inch minimum width) in combination with 3 inch square by 3/8 inch flat steel plates in main travelways where immediate top requires continuous support. Material used should give sufficent coverage of the roof span.

Spot Bolting Safety Precautions To Be Taken

1. Spot roof bolting shall be used only as a supplement to the approved Roof Control Plan.

2. Roof bolts (spot bolting) shall be installed in accordance with roof conditions, but in no case shall spacing exceed 5 feet lengthwise and crosswise.

3. Where spot bolts are installed, roof bolting shall begin under safe roof and continue for the length of the adverse roof condition until safe roof is again encountered.

4. All components of the roof bolt assembly shall comply with the American National Standards Institue "Specifications for Roof Bolting Material in Coal Mines."

5. When wooden material such as planks, header blocks, or crossbars are used between the bearing plate and the roof for additional bearing, the use shall be limited to short-life openings (not to exceed 3 years) unless treated. Bearing plates used in conjunction with wooden materials shall be not less than 4 inches square or of equivalent area.

6. Finishing bits shall be easily identifiable by sight or feel and the diameter shall be within a tolerance of plus 0.030 inch minus zero of the manufacturer's recommended hole diameter for the anchor used.

7. An approved calibrated torque wrench that will indicate the actual torque on the roof bolts by a direct reading shall be provided on each roof bolting machine or in the place where bolts are being installed.

8. Immediately after each area has been spot bolted, at least one roof bolt out of every four shall be tested by a qualified person. If at least one-half of the bolts tested do not fall within the indicated torque range, the remaining bolts shall be tested. If the majority of the bolts tested still fall outside the indicated range, necessary adjustments in the equipment used for tightening the bolts shall be made immediately. If, after these adjustments are made, the indicated torques are still not obtained, supplementary supports such as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars shall be installed.

9. When roof bolts (spot bolting) are installed inby the outby corner of the last open crosscut, spot-check on torques shall be made on a daily basis on at least one roof bolt out of every 10 from the outby corner of the last open crosscut to the face. The results of these tests shall be recorded in the onshift examination book. The record shall show the number of bolts tested and the number above and below the indicated range. If the results show that the majority of the bolts are not maintaining at least 105 foot pounds of torque or have loaded up to where they exceed 375 foot pounds of torque, supplementary support such as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars shall be installed.

10. At least two temporary supports on not more than 5 foot centers shall be installed before roof bolts are installed at spot locations.

11. The following items are to be incorporated into the plan, either on a sketch or in the sheet listing the materials to be used:

    a. Bearing plates used directly against the mine roof shall be not less than 6 inches square or of equivalent area. In exceptional cases where the mine roof is firm and not susceptible to sloughing, bearing plates 5 inches square or of equivalent area may be used.

    b. Roof bolts shall be installed as close as possible to, but not more than, 5 feet from the rib before a sidecut is started.

    c. Roof bolts shall be installed as close as possible to, but not more than, 5 feet from the face before starting conventional cutting or a continuous miner run, except where the bolter is an integral part of the mining machine.

    d. Devices shall be used to compensate for the angle when roof bolts are installed at angles greater than 5° from the perpendicular to the roof line.

All unintentional roof falls defined in Title 30, CFR Part 80, shall be investigated and the results of the investigation recorded in a book provided for that purpose. Such falls shall also be shown on a map of the mine.

Conventional Safety Precautions

1. This is the minimum Roof Control Plan and was formulated for the roof conditions and mining system(s) described. In areas where doubtful roof conditions are encountered, indicated, or anticipated, the plan shall be supplemented with either longer and/or additional roof bolts, posts, or crossbars. If changes are made in the mining system, the plan shall be revised accordingly.

2. All personnel required to install roof supports shall be trained by a qualified supervisor designated by mine management before being made solely responsible for such work. This training shall insure that such persons are familiar with the functions of the support being used, proper installation procedures, and the approved Roof Control Plan. A record of this training shall be kept at the mine.

3. Only those persons engaged in installing temporary supports shall be allowed to proceed beyond permanent supports until such temporary supports are installed, and such persons shall examine the roof visually and by the sound and vibration method before proceeding to install temporary supports.

4. Where it is necessary to extend line curtains and other ventilating devices inby the permanent supports or to make methane tests inby the permanent supports, a minimum of two temporary supports on not more than 5 foot centers shall be installed. This minimum is applicable only if they are within 5 feet of the face or rib and the work is done between such supports and the nearest face or rib. Other methods of providing temporary supports for this work will be accepted if they provide equivalent protection.

5. Where loose material is being taken down, a minimum of two temporary supports on not more than 5 foot centers should be installed between the workmen and the material being taken down, unless such work can be done from an area supported by permanent roof supports installed in sound roof.

6. All metal jacks shall be installed with a cap block between the jack and the roof unless an oversize bearing plate is provided.

7. The roof in the face of an entry or room shall be supported according to the approved plan before any sidecuts are started.

8. All posts installed under roof that is disturbed or susceptible to sloughing shall have a wooden cap block, plank, or crossbar between them and the roof. Where crossbars or planks are installed, they shall be blocked to equally distribute the load across their length.

9. All posts shall be installed on a tight footing and not more than two wooden wedges shall be used to install a post.

10. Posts shall be of solid, straight grain wood with the ends sawed square and free from defects which would affect their strength.

11. The diameter of round posts shall be at least one inch for each 15 inches of length, but in no case less than 4 inches. Split posts should have a cross sectional area equal to that required for round posts of equivalent length.

12. Wooden cap blocks and footers shall have flat parallel sides and be not less than 2 inches thick, 4 inches wide, and 12 inches long.

13. An additional supply of supplementary roof support material shall be provided at the dumping point or within 500 feet of the faces, whichever is closer. Such supplementary support shall consist of at least 20 posts with sufficient cap pieces and wedges and minimum of two crossbars for each active place or at least six per section.

14. A bar of a length suitable for prying down loose material shall be provided on all mobile face equipment, except haulage equipment.

15. A suitable roof sounding device shall be provided with all mobile face equipment, except haulage equipment. If face workmen who are not operators or helpers on such equipment do not carry a roof sounding device, such device shall be available within 50 feet of their working area.

16. When an opening is no longer needed for storing of supplies or for travel of equipment, the roof at the entrance of all such openings along travelways shall be supported by extending the post line across the opening.

17. The roof where falls have occurred shall be considered unsupported, and if persons are required to enter such areas, either to travel over the fall or clean it up, the roof shall be supported. Where falls or blasted roof materials are cleaned up, management shall devise and have in writing at the scene of the fall, a plan incorporating the following procedures:

    a. Such work shall be under the direct and, unless the workmen are specially trained to do such work, constant supervision of a Company official.

    b. Adequate temporary support on not more than 5 foot centers shall be set at the edge of the fall where work is to be started. A minimum of four posts or jacks shall be used.

    c. Temporary support mentioned above shall be replaced by permanent supports (roof bolts and/or posts) and advanced as cleanup work progresses.

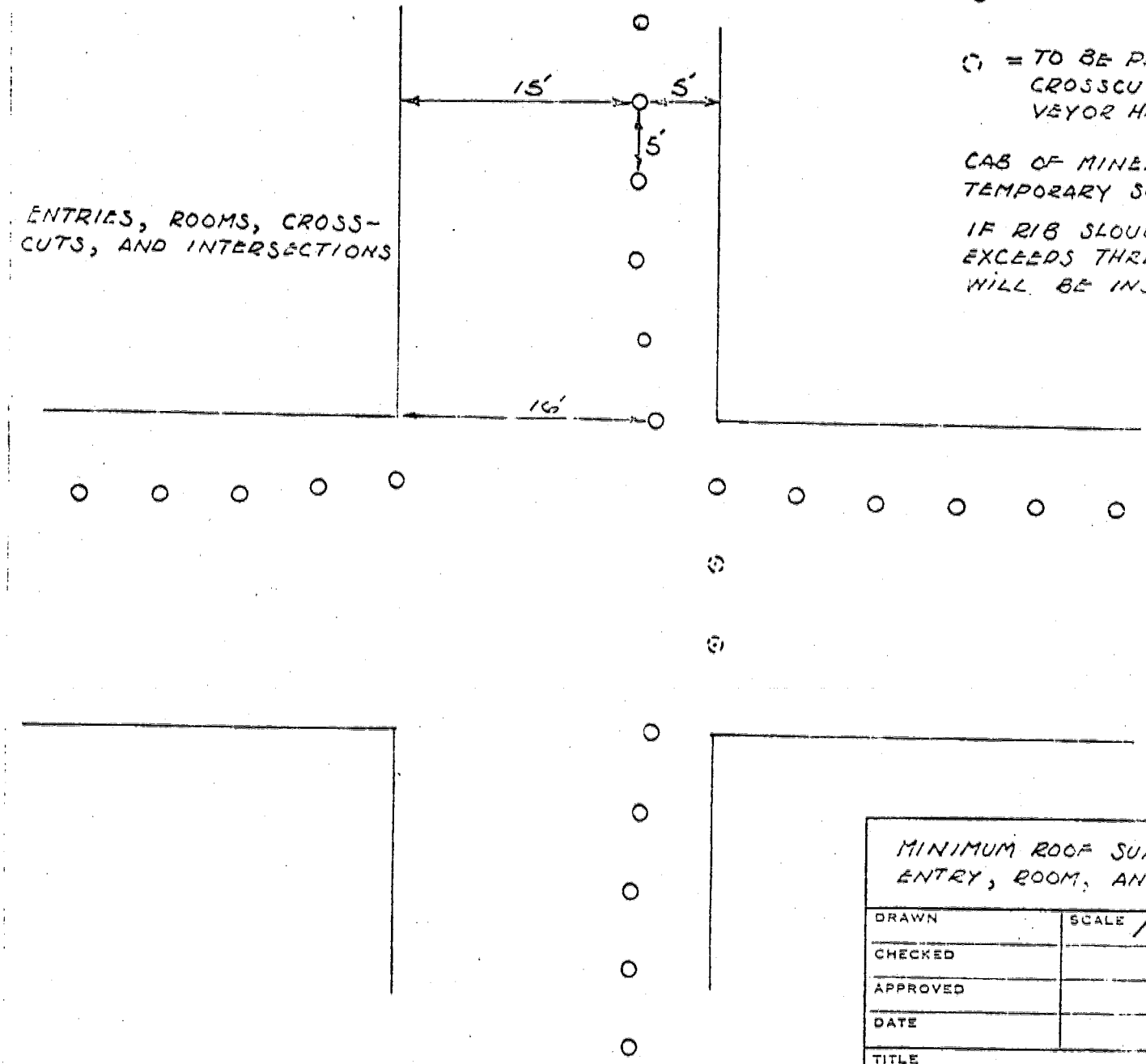
    d. Bolting or timbering shall proceed from permanently supported roof to the temporary supports before other work is performed and roof supports shall be advanced as the cleanup work progresses.

    e. Where necessary to load material before support can be set, such loading shall be done from areas of permanent support, with the operator and other persons in the area under supported roof at all times.

    f. Where feasible, permanent supports shall be placed in the entire fall area before loading starts.

All unintentional roof falls defined in Title 30, CFR Part 80, shall be investigated and the results of the investigation recorded in a book provided for that purpose. Such falls shall also be shown on a map of the mine.

NO. PILLAR EXTRACTION



ENTRIES, ROOMS, CROSS-CUTS, AND INTERSECTIONS

○ = PROP WITH CAP PIECE

◌ = TO BE PLACED ACROSS MOUTH OF UNUSED CROSSCUTS ALONG TRAVELWAYS AFTER CONVEYOR HAS BEEN ADVANCED PAST THEM

CAB OF MINER NEVER BEYOND A PERMANENT OR TEMPORARY SUPPORT.

IF RIB SLOUGHAGE ON THE OFF TIMBER SIDE EXCEEDS THREE FT., ADDITIONAL TIMBERS WILL BE INSTALLED.

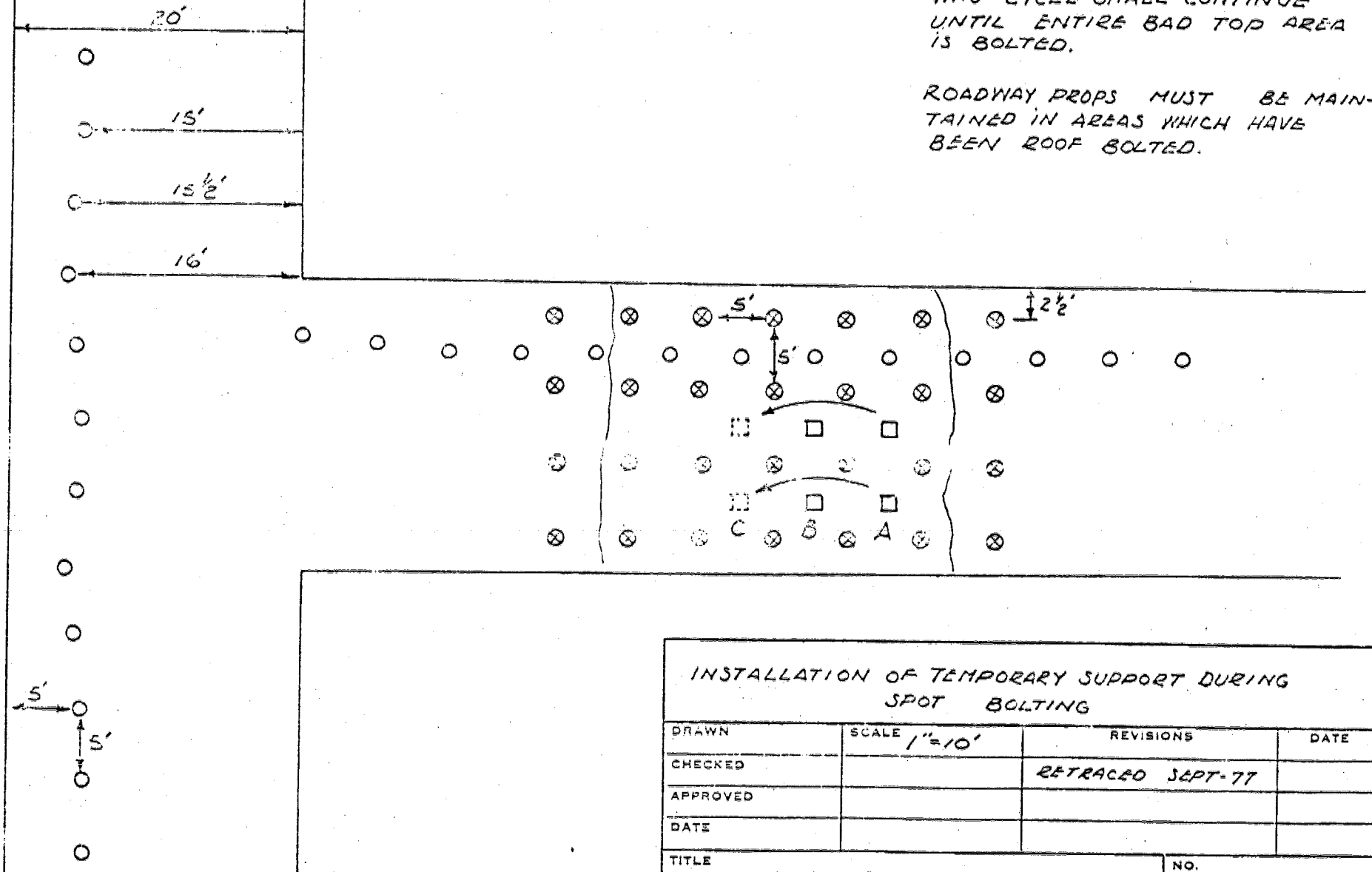
MINIMUM ROOF SUPPORT PLAN ON 20 FT. WIDTH ENTRY, ROOM, AND CROSSCUT.

DRAWN	SCALE 1"=10'	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			
TITLE		NO. L-604	

○ = PROP WITH CAP PIECE
⊗ = ROOF BOLT
□ = TEMPORARY SUPPORT IN ROW A SHALL BE ADVANCED TO ROW C AFTER THE SECOND ROW OF ROOF BOLTS ARE INSTALLED.

THIS CYCLE SHALL CONTINUE UNTIL ENTIRE BAD TOP AREA IS BOLTED.

ROADWAY PROPS MUST BE MAINTAINED IN AREAS WHICH HAVE BEEN ROOF BOLTED.

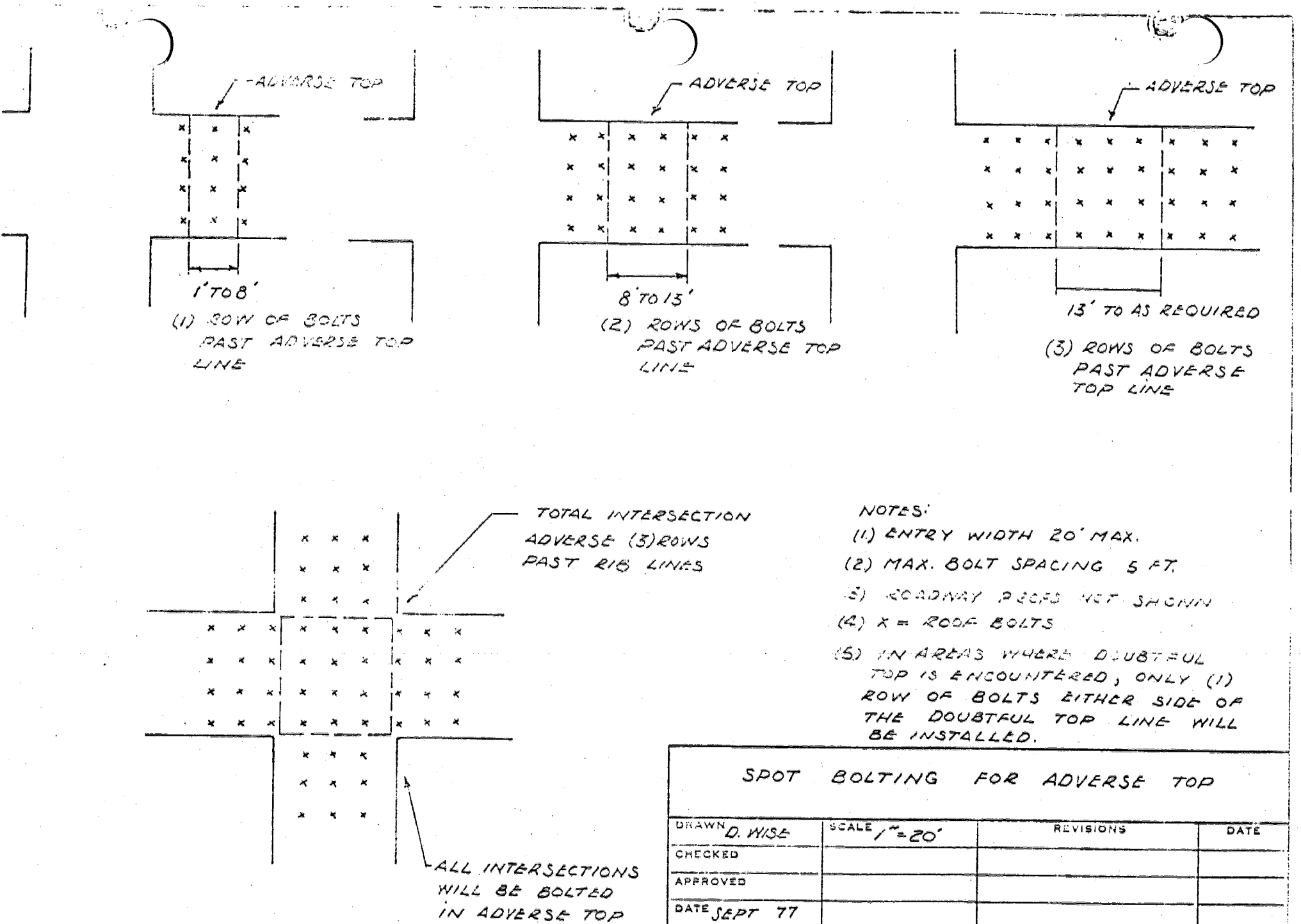


INSTALLATION OF TEMPORARY SUPPORT DURING SPOT BOLTING

DRAWN	SCALE 1"=10'	REVISIONS	DATE
CHECKED		RETRACED SEPT-77	
APPROVED			
DATE			

TITLE ADVERSE TOP

NO. L-605



NOTES:

(1.) ENTRY WIDTH 20' MAX.

(2) MAX. BOLT SPACING 5 FT.

(3) ROADWAY PROFILE NOT SHOWN

(4) X = ROOF BOLTS

(5) IN AREAS WHERE DOUBTFUL TOP IS ENCOUNTERED, ONLY (1) ROW OF BOLTS EITHER SIDE OF THE DOUBTFUL TOP LINE WILL BE INSTALLED.

SPOT BOLTING FOR ADVERSE TOP

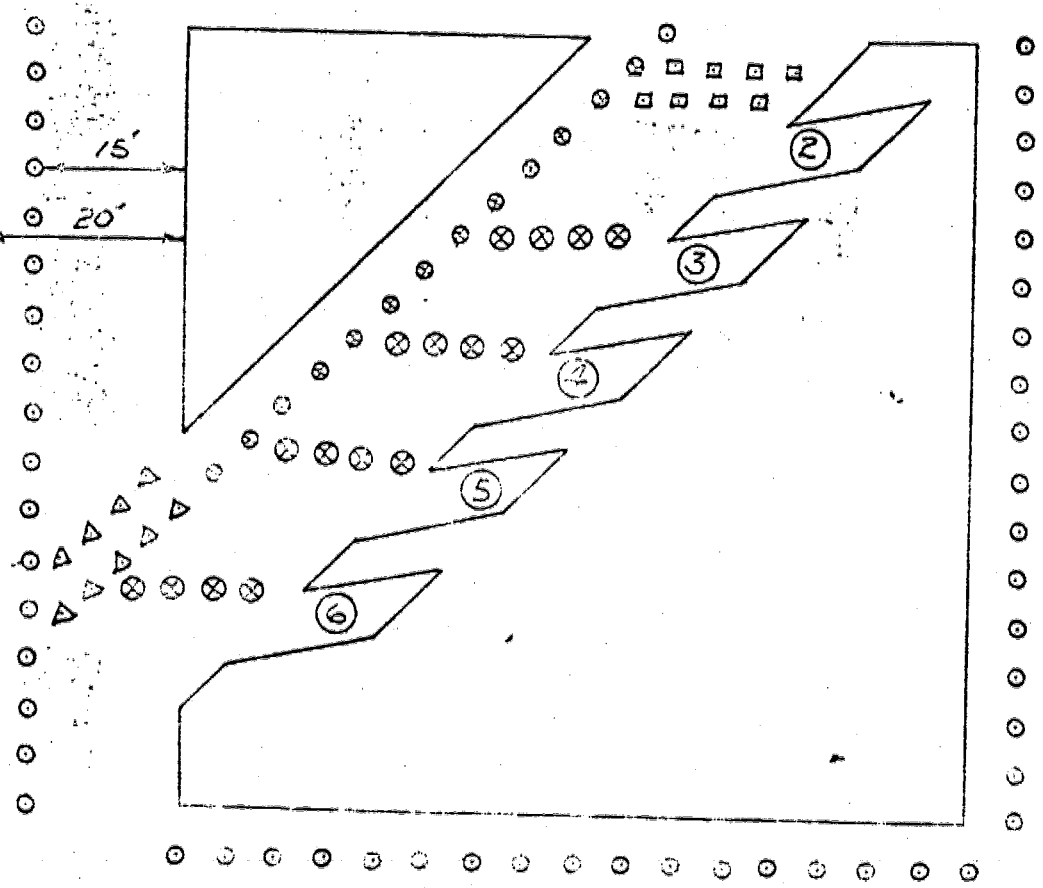
DRAWN D. WISE	SCALE 1" = 20'	REVISIONS	DATE
CHECKED			
APPROVED			
DATE SEPT 77			
TITLE		NO. REPLACES L606 – L608	

⊙ PROPS WITH CAP PIECE ON 5 FT. CENTERS.

△ - TURN BREAKER PROPS ON 4 FOOT CENTERS INSTALLED BEFORE SPLIT IS BEGUN.

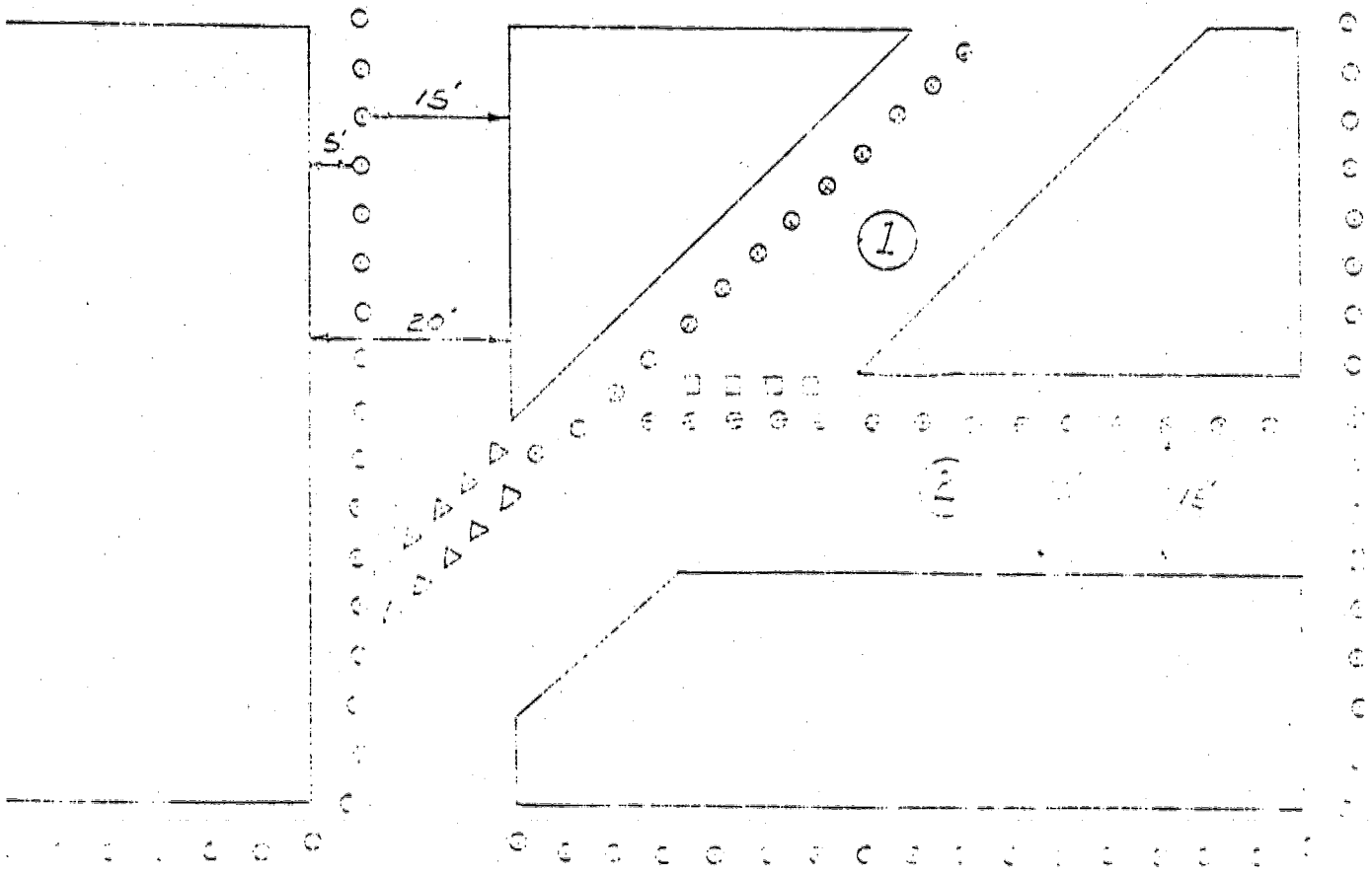
⊡ = TURN BREAKER PROPS ON 4 FT. CENTERS INSTALLED AFTER SPLIT IS COMPLETED.

⊗ TURN PROPS ON 4 FT. CENTERS AND ROADWAY PROPS



PILLAR SPLIT

DRAWN R.B.	SCALE 1" = 20'	REVISIONS	DATE
CHECKED		RETRACED SEPT-77	
APPROVED		ADDED ROADWAY PROPS	APR-75
DATE			
TITLE		NO. 6-611	



⊙ = PROPS WITH CAP PIECE ON 5 FT CENTERS

△ = TURN BREAKER POSTS ON 4 FT CENTERS INSTALLED BEFORE SPLIT #2 IS BEGUN

⊡ = TURN BREAKER POSTS ON 4 FT CENTERS INSTALLED BEFORE SPLIT #2 IS BEGUN

TURN BREAKER BEAMS INDICATED TO BE INSTALLED BETWEEN GOB AND LEFT BANK STARTED

⊙ = TIMBERS MOVED [illegible] OUT [illegible] SPLIT [illegible] BANK [illegible]

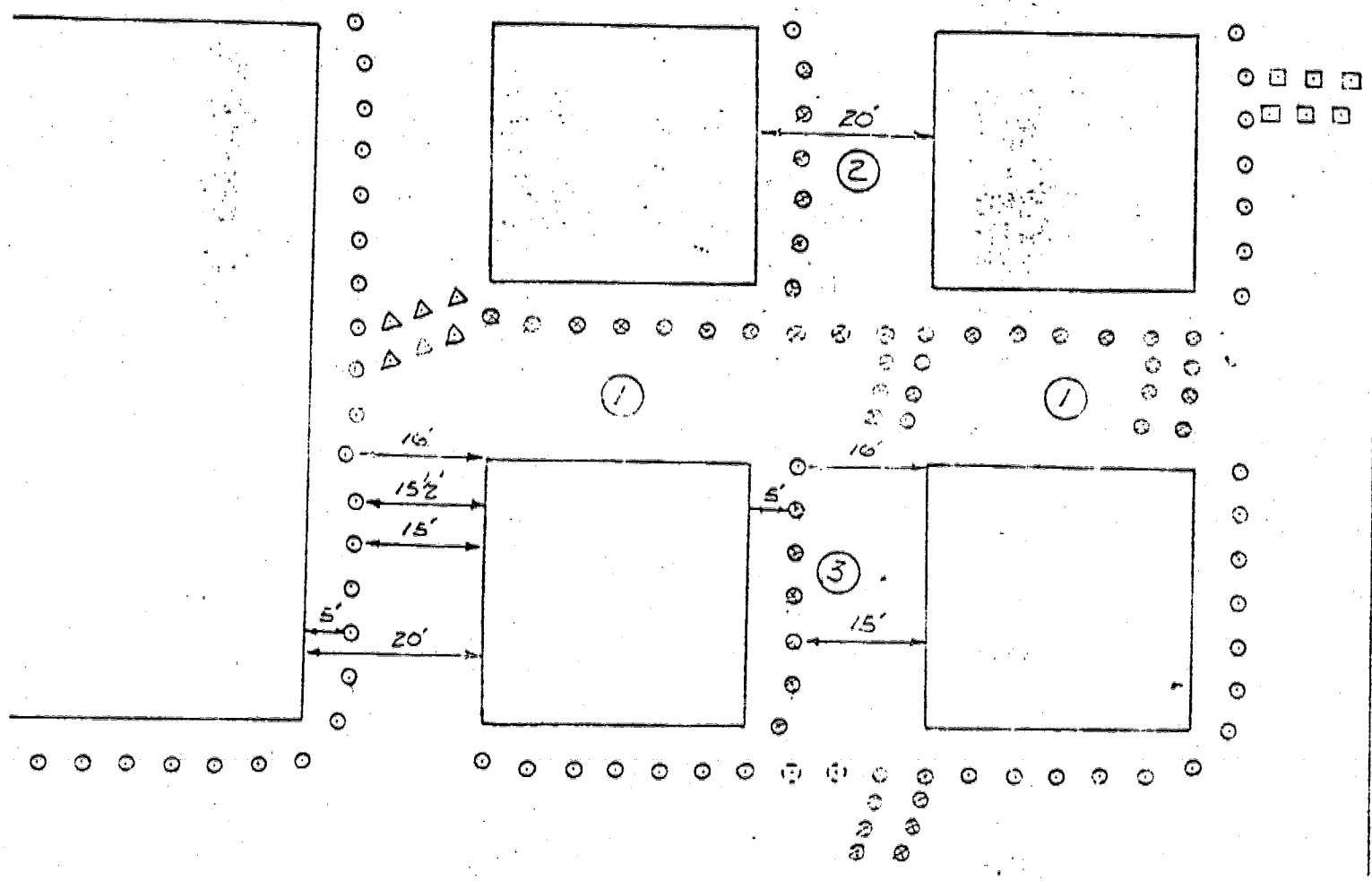
⊙ PROPS ON [illegible] CENTERS

PILLAR SPLIT

DRAWN	[illegible]	REVISIONS	DATE
CHECKED		2ND TRACED	[illegible]
APPROVED		ADDED PROPS	[illegible]
DATE			
TITLE			No. L-610

GOB

GOL



⊙ = PROP CAP PIECE ON FIVE FT. CENTERS.

△ = TURN BREAKER PROPS ON FOUR FT. CENTERS INSTALLED BEFORE SPLIT #1 IS STARTED.

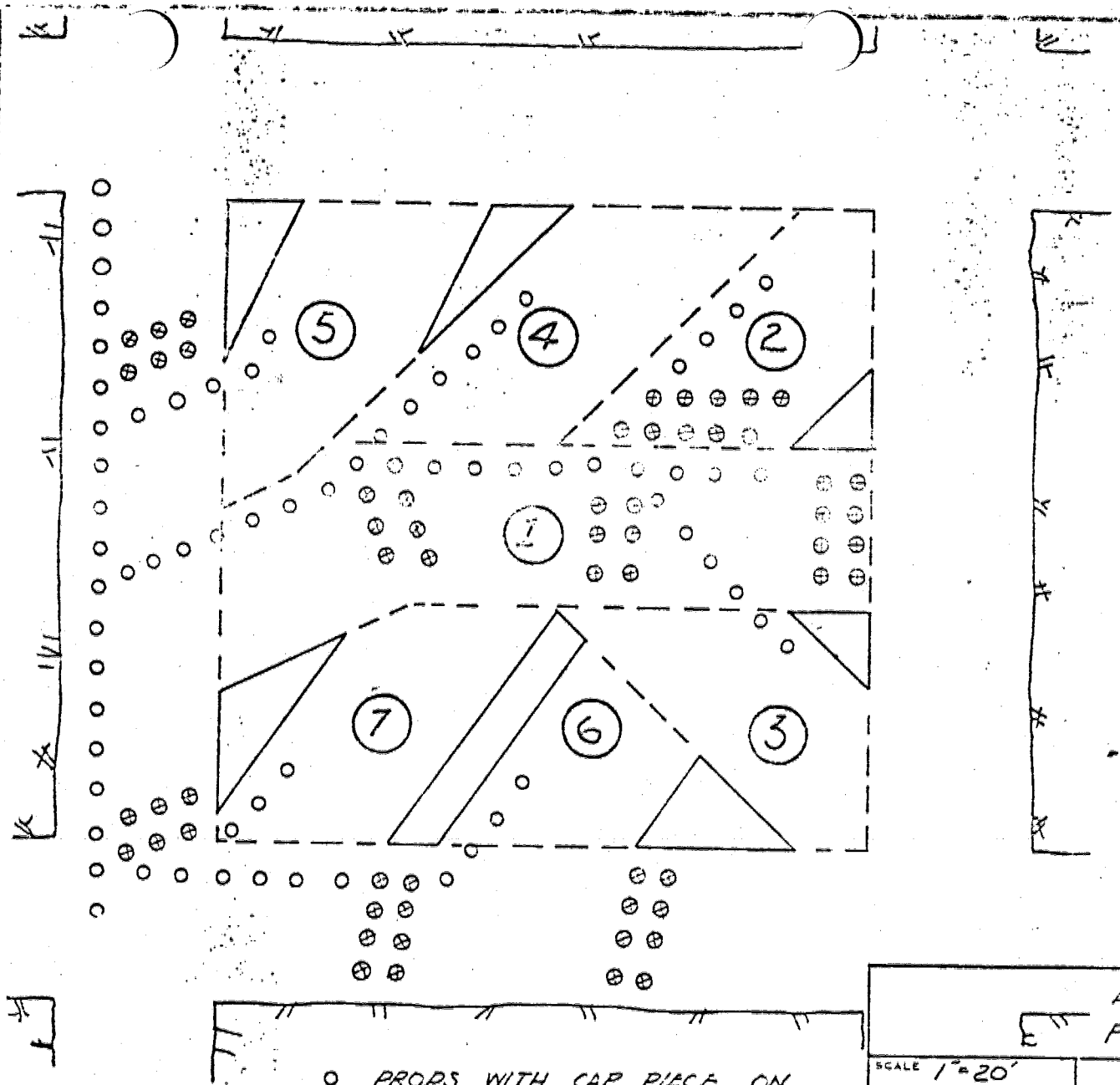
⊡ = BREAKER ROWS AS INDICATED INSTALLED BETWEEN THE GOB AND THE LIFT BEING STARTED.

(⊙) = PROPS REMOVED SO CUTS 2 & 3 CAN BE MADE.

⊗ PROPS ON 4 FT. CENTERS

PILLAR SPLIT.

DRAWN	SCALE 1"=20'	REVISIONS	DATE
CHECKED		RETRACED	SEPT-77
APPROVED		ADDED ⊗ PROPS	APR-79
DATE			
TITLE		NO. 4-609	



NOTE:

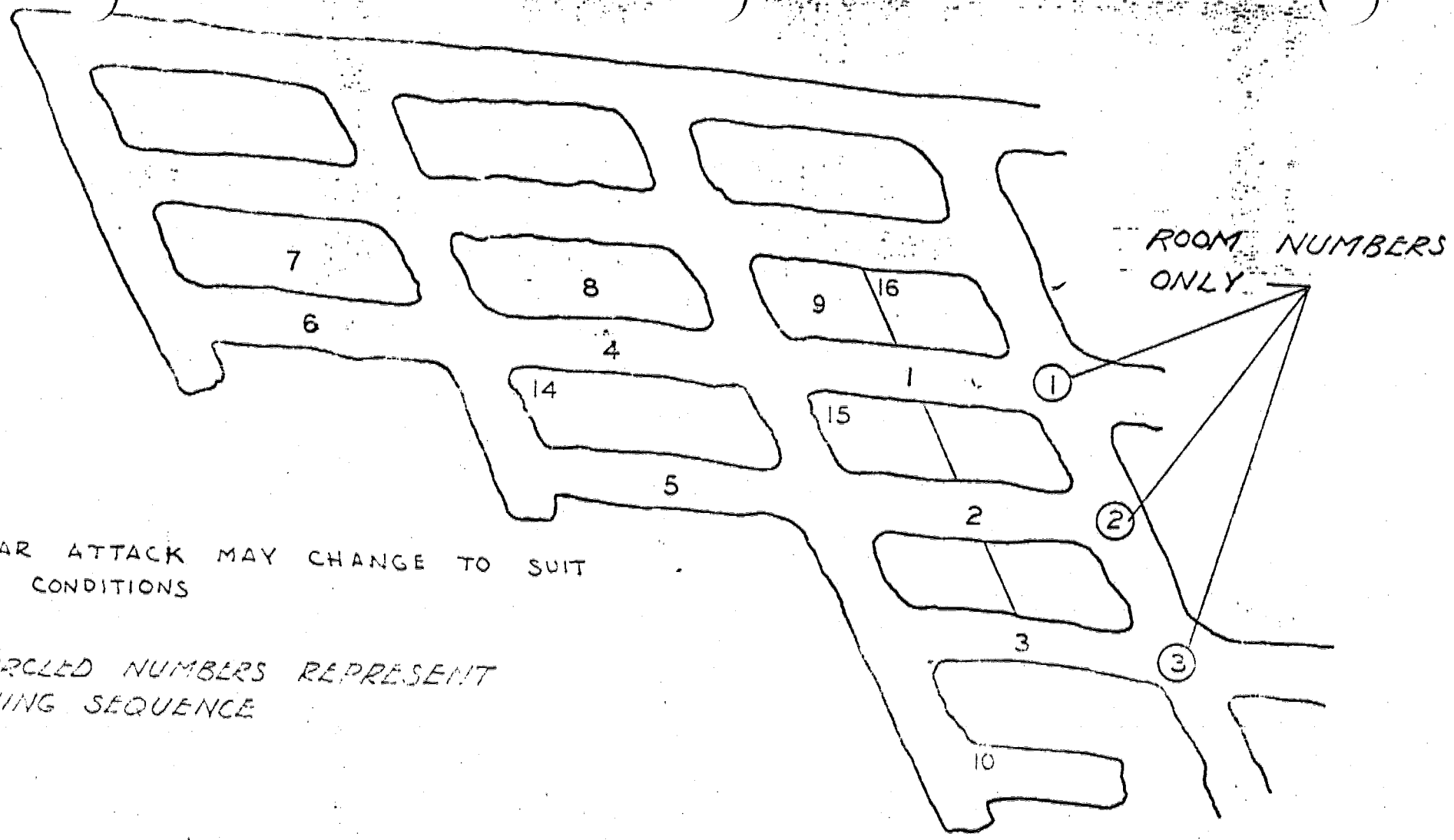
PILLAR ATTACK MAY CHANGE TO SUIT ROOF CONDITIONS.

○ PROPS WITH CAP PIECE ON 5 FT. CENTERS.

⊗ BREAKER AND TURN POSTS INSTALLED ON 4 FT. CENTERS, IN ACCORDANCE WITH 75.200-11(A-G)

ALTERNATE PLAN
FULL PILLAR RECOVERY

SCALE 1" = 20'	REVISIONS	BY	DATE
DATE MAY - 78			
DR'N. CKD			
AP'VD.			
TITLE ROOF CONTROL PLAN KING 4 MINE.		NO.	



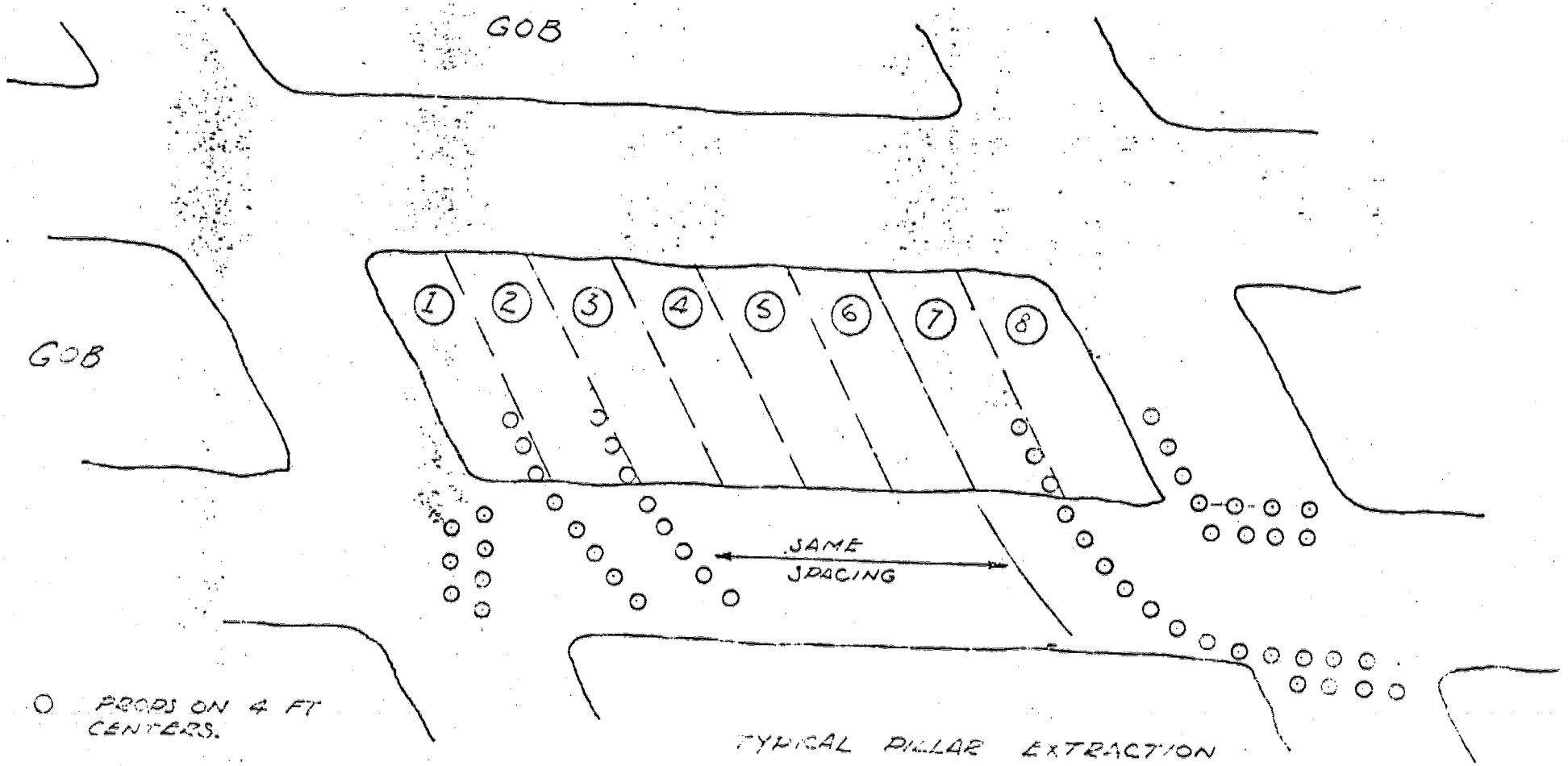
PILLAR ATTACK MAY CHANGE TO SUIT ROOF CONDITIONS

UNCIRCLED NUMBERS REPRESENT MINING SEQUENCE

⊕ BREAKER AND TURN POSTS INSTALLED ON 4 FT. CENTERS IN ACCORDANCE WITH 75.200-11 PILLAR RECOVERY.

SECOND MINING FULL PILLAR RECOVERY

SCALE 1" : 50'	REVISIONS	BY	DATE
DATE April, 5 /1979			
DR'N. CKD.			
AP'VD			
TITLE KING-4 AND KING-5 MINE		NO. A	



NOTE:

IF OPEN END PILLARING IS DONE SECTION (75.200-11 (h)(1)(2) SHALL APPLY

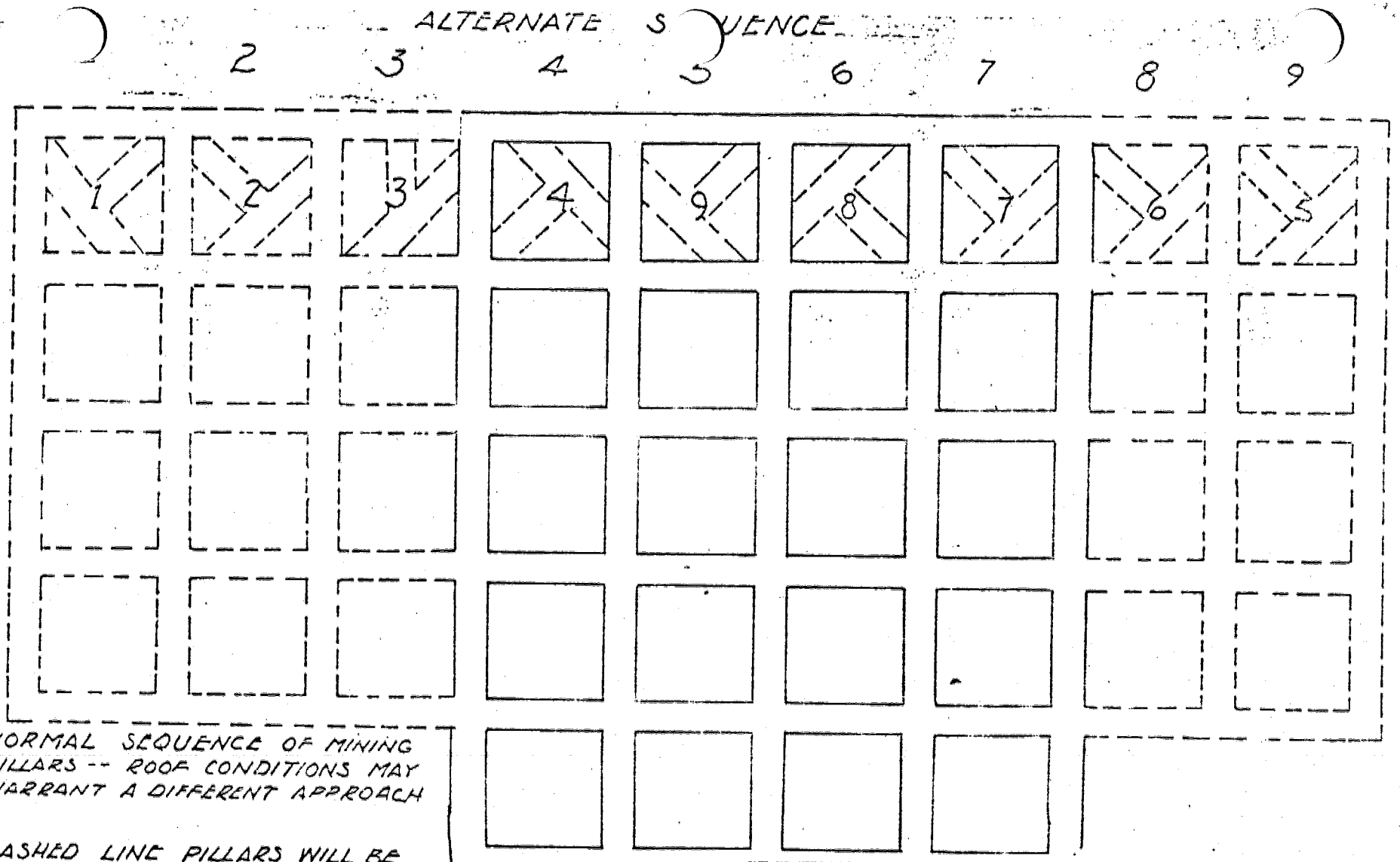
SECOND MINING
FULL PILLAR RECOVERY

SCALE 1"=20'	REVISIONS	BY	DATE
DATE APR-79			
DR'N. CKD.			
APVD.			

TITLE KING MINE ~ KING 5 MINE

NO.

ALTERNATE SEQUENCE



NORMAL SEQUENCE OF MINING PILLARS -- ROOF CONDITIONS MAY WARRANT A DIFFERENT APPROACH

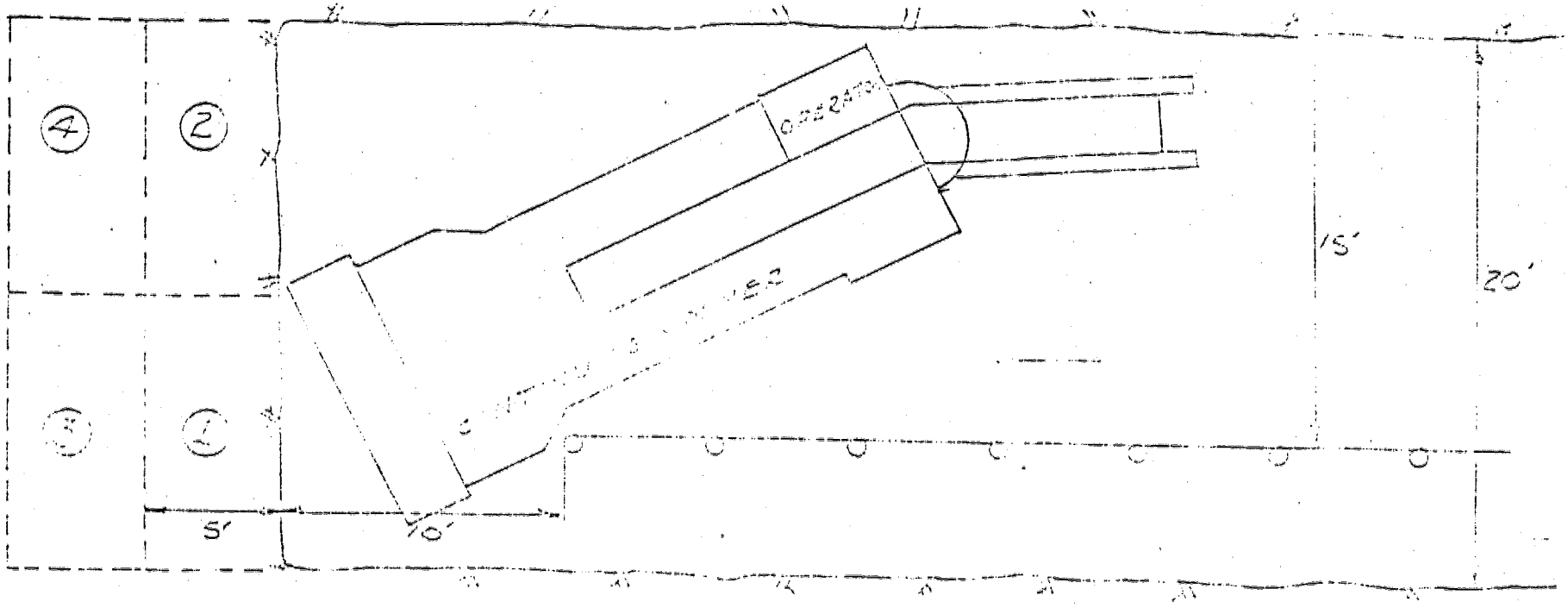
DASHED LINE PILLARS WILL BE PICKED UP DURING RETREAT.

TIMBERS WILL BE INSTALLED ON 5 FT. CENTERS WITH BREAKER ROWS INSTALLED WHERE NEEDED.

SEQUENCE OF MINING PILLARS

DRAWN	SCALE 1" = 100'	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			
TITLE		NO. L-612	

CHARLES BRUNING CO. - FIVE HUNDRED



1. LINE CANVAS IS ALLOWED AFTER CONNECTING SUCK CUT #2
2. BOTH FANS MUST BE WORKING AT ALL TIMES OF ONE STATIONED TO THE WORKING FACE
3. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.

FACE VENTILATION DURING MINING CYCLE

7-6-87		BY	DATE
MAY-79			

U. S. Department of Labor

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225
Coal Mine Safety and Health
District 9

September 11, 1980

Errol M. Gardiner
Vice President
United States Fuel Company
PO Box A
Hiawatha UT 84527

Re: King #4 Mine
I.D. No. 42-00098
Ventilation System and Methane
and Dust Control Plan

Dear Mr. Gardiner:

The ventilation system and methane and dust control plan dated August 25, 1980, for the subject mine has been approved in accordance with Section 75.316, 30 CFR 75. The plan is subject to revision at any time and shall be reviewed by the operator and MSHA at least once every six months. Before any changes are made in the approved ventilation system, they shall be submitted to and approved by the District Manager prior to implementation.

The mine map appears acceptable and will be distributed as such.

This plan supersedes any previously approved plans and a copy of this plan shall be made available to the miners.

Sincerely yours,

John W. Barton
District Manager

Enclosure

VENTILATION PLAN

The operator of the King 4 Mine hereby adopts and will follow the following ventilation system and methane and dust control plan and any approved supplements and/or revisions thereof:

A. GENERAL

The following information shall be submitted to the District Manager:

1. Company Name: United States Fuel Company

   Mine Name: King Mine No. 4

   Post Office Address (Town, County, State): Hiawatha, Carbon, Utah 84527

   Identification Number: 42-00098

   Operator's Name: Errol M. Gardiner

   Operator's Title: Vice President & General Manager

   Operator's Address: P. O. Box "A"
   Hiawatha, Utah 84527

   Operator's Telephone No.: (801) 637-1226

2. Indicate if life of mine is: less than one year.
   greater than one year.

3. Number of employees:

Surface	75	
Underground	167	projected
Total	242	

4. The type of face equipment used on each section in the Mine.

   Initial Development

   Continuous Miners, Shuttle Cars, Roof Bolters or Stopers, Diesel Scoops, Diesel Mantrips and Front-end Loaders.

5. We are mining the "B" seam (5' - 8' high).

RECEIVED AUG 25 1980 DISTRICT 9 DENVER

B. MAIN FAN INSTALLATIONS

1. All main fan installations shall meet or exceed all criteria established in Sections 75.300-2 and 75.300-3, 30 CFR 75.

C. DUST CONTROL PLAN, OUTBY AREAS

1. The following is a description of dust control practices at:

(a) Float dust at transfer points, loading points, and feeder breakers.

A minimum of one spray will be positioned and pointed at the area of greatest dust generation, usually between the top and bottom belt in front of the bottom roller. Recent experiments have indicated the spray system ¼TT 65050 nozzle operating at 60 p.s.i. will adequately abate float dust; however, we reserve the right to substitute nozzles with better performance characteristics at any location.

(b) Haulageways will be maintained well compacted and in a damp condition.

(c) Underground crushers: Does not apply.

(d) Underground dumps: Does not apply.

(e) Along belt haulage systems: Areas are cleaned and rock dusted as needed.

(f) Face areas: Rock dust is applied and maintained to within 40' of faces.

(g) All other problem areas: Clean and rock dusted as needed.

2. Methane and Dust Control Practices at Face Area

(a) Line brattice or tubing will be installed at a distance no greater than 15' from the area of deepest penetration to which any portion of the face has been advanced in working faces from which coal is being cut, mined, or loaded; necessary line brattice will be maintained to within 15' of the face in idle places of active sections to insure adequate ventilation of face areas. Perceptible movement of air will be maintained at idle faces of active sections.

(b-c) A minimum mean entry face velocity of 60 ft./min. will be maintained at all working faces and at no time shall there be less than 6,000 CFM of air reaching all working faces where coal is cut, mined, or loaded.

(d) The minimum quantity of air reaching the last open crosscut in any pair or set of developing entries and the last open crosscut in any pair or set of rooms will be 12,000 CFM and the minimum quantity of air reaching the intake end of a pillar line will be 12,000 CFM.

(e) All roof bolters are equipped with either dust collection systems or wet drilling heads. If water is encountered where a dry dust collection system is installed, auger steel may be used with water to control dust.

(f)

Equipment	Minimum Number of Sprays	Minimum Water Pressure & Sprays	Minimum Flow Rate & Sprays
#3 Miner	26	120 P.S.I.	0.30 gal/min.
#4 Miner	28	120 P.S.I.	0.30 gal/min.
#5 Miner	25	120 P.S.I.	0.30 gal/min.
#7 Miner	23	120 P.S.I.	0.30 gal/min.
#9 Miner	32	120 P.S.I.	0.30 gal/min.

NOTE: The pressure required is the actual operating pressure and will be measured at the first spray in the system. 90% of the actual number of sprays shall be maintained.

3. Bleeder Entries

Part 75.316-2 states that the purpose of bleeder entries is to control the methane content in active pillaring areas. A review of the existing King Mine ventilation history has indicated this mine to be clear of methane during its entire operations therefore:

> At our option second mining may or may not be done without the use of bleeder systems. However, if methane gas in a quantity of 1% by volume is ever detected in any working section, a bleeder entry system will be established and maintained for all future second mining. Work will be started immediately on sealing of all second mined areas after the completion of such mining. MSHA will make this determination and reevaluate the status every six (6) months.

". . . the methane content in any return air course other than an aircourse returning the split of air from a working section (as provided in Sections 75.309 and 75.310) shall not exceed 2.0 volume per centum. The methane content in the air in active workings shall be less than 1.0 volume per centum or more of methane changes or adjustments shall be made at once in the ventilation in the mine so that the air shall contain less than 1.0 volume per centum of methane."

4. Methane examinations are conducted by:

   (a) The examiner never goes beyond permanent or temporary support to make gas checks during the time that the face is being advanced.

5. The mining systems shall be designed in accordance with a plan that is adopted by the operator so that as each working section of the mine is abandoned, it can be isolated from the active workings of the mine with explosion proof seals.

   (a) Location of seals: See King 4 Mine map.

   (b) See attached drawing of our proposed seal.

6. Ventilation of an abandoned area - Work to seal off pillared sections will begin immediately following completion of production, and should be continued in a diligent manner until sealing is completed.

7. Maximum distance involved in a belt move will be 300 feet with temporary brattice stoppings installed immediately after a belt move to insure proper isolation. The work on permanent stoppings will begin immediately and continue in a diligent manner until completion.

D. SECTION AND FACE VENTILATION

1. See attached sketches for the complete section and face ventilation system.

2. See attached sketches for ventilation controls in belt haulage entries.

3. Control ventilation of adjacent pillaring to insure no air reversal onto an active section. Does not apply at this time.

4. Coal will not be permitted to accumulate at the outby end of the face equipment to the extent that ventilation of the working face is restricted.

E. PERMANENT STOPPINGS AND OTHER DEVICES

1. All ventilating devices such as stoppings, overcasts, undercasts, and shaft partitions shall be of substantial and incombustible construction installed in a workmanlike manner and maintained in a condition to serve the purpose for which they were intended, and any stopping leaking air excessively shall be repaired immediately.

2. Permanent stoppings shall be erected between the intake and return aircourse and shall be erected to and including the third connecting crosscut outby the faces of the entries. Whenever the third connecting crosscut is broken through, work shall be started on building the stopping as soon as possible and shall be completed within 48 hours.

3. Metal stoppings supported with approved fire retardant treated wood or wood coated with "Stoppit" may be used for belt isolation or intake escapeway separation stoppings. Timbers laid longitudinally "Skin to Skin", and packed with rock dust may be used in heavy squeezing areas. The face of the "Wood" Stopping must be given a complete coat of plaster.

(a) A complete list of all materials used in the construction of stoppings.

(1) Block Stoppings - Materials used: (3"x3"x16") cinder of cement blocks, mortor or cement mix. The stoppings are laid up on clean substantial bottom, ties into the ribs with staggered courses with mortaged joints. The periphery of the stopping is plastered with a mortar mix to make it air tight. (See attached sketch). If stoppings are to be laid without mortared joints, as in short lived entries, the intake side must be coated with at least 5/8" mortar, or both sides must be coated with at least 1/8" of Blockbond or Surewall, or both sides must be coated with at lease 1/2" of mortar.

(2) Kennedy Stoppings - Materials used. MP-526 Rib Angles, MP-511 Twist Clamp, Standard Pans, MP-506 Lap Over Clamp, MP-511 Twist Clamp, MP-530 Roof Pin. See attached sketch for construction detail.

(3) Temporary Stoppings - Plastic coated nylon is used as a temporary check-in breakthroughs, road checks and face ventilation.

(4) Permanent Stoppings - Will be used in the Mines. Estimated life: Life of the mine. Intended use: Belt isolation, return airways, intake airways, and track isolation.

F. DIESEL EQUIPMENT

1. This type of equipment is used, U. S. Fuel Company will:

(a) Comply completely with the manufacturer's operating instruction and maintenance manuals.

(b) The atmosphere in the operator's compartment shall be sampled daily with the engine running; and if the analyses of these samples exceed five parts per million NO_2 or fifty parts per million of carbon monoxide, or both, corrective measures must be taken immediately.

(c) The atmosphere in the return from any working place where diesel-powered equipment is being used shall be tested at least once each shift while the equipment is in operation, and if the analyses of these samples exceed five parts per million NO_2 or fifty parts per million CO, or both, corrective measures shall be taken immediately.

(d) The date, time of sampling, machine identification, and the analyses obtained should be recorded in a book maintained for this purpose.

G. USE OF AUXILIARY FANS AND/OR MACHINE-MOUNTED DIFFUSERS, UNDERGROUND

1. If this type of equipment is used, U. S. Fuel Company will adopt the following:

(a) The fan shall be of a permissible type, maintained in permissible condition, so located and operated to avoid any recirculation of air, and examined once every four hours when in use. The examiner shall place his initials, date, and the time near the fan.

(1) Fans operating blowing shall be installed in the positive intake air current of the place to be ventilated by the fan, and the volume of such positive intake air current shall be greater than the free discharge capacity of the fan.

(2) Fans operating exhausting shall be installed in the return air current from the place to be ventilated by the fans, and the volume of positive intake air current available at the entrance to the place (at the crosscut or other point of entry) to be ventilated with exhaust fans shall be greater than the free discharge capacity of the fan.

(b) All face ventilation systems using auxiliary fans and tubing or machine-mounted diffusers shall be approved under the provisions of Section 303 (o) of the Act. (Subsection 75.316 of the Federal Regulations.)

(c) If a machine-mounted diffuser is used in conjunction with fan tubing or exhaust line brattice, the intake end of the diffuser shall be located outby the intake end of the exhaust tubing or line brattice.

(e) List the manufacturer and model number of each different auxiliary fan machine-mounted diffuser fan. Include the fan motor, horsepower, RPM, blade position or positions during operation, and the free discharge capacity; the type and diameter of all ventilation tubing installation; and whether the fan will be operated exhausting or blowing.

(f) When machine mounted diffuser fans (auxiliary fans) are employed, indicate by drawing or sketch:

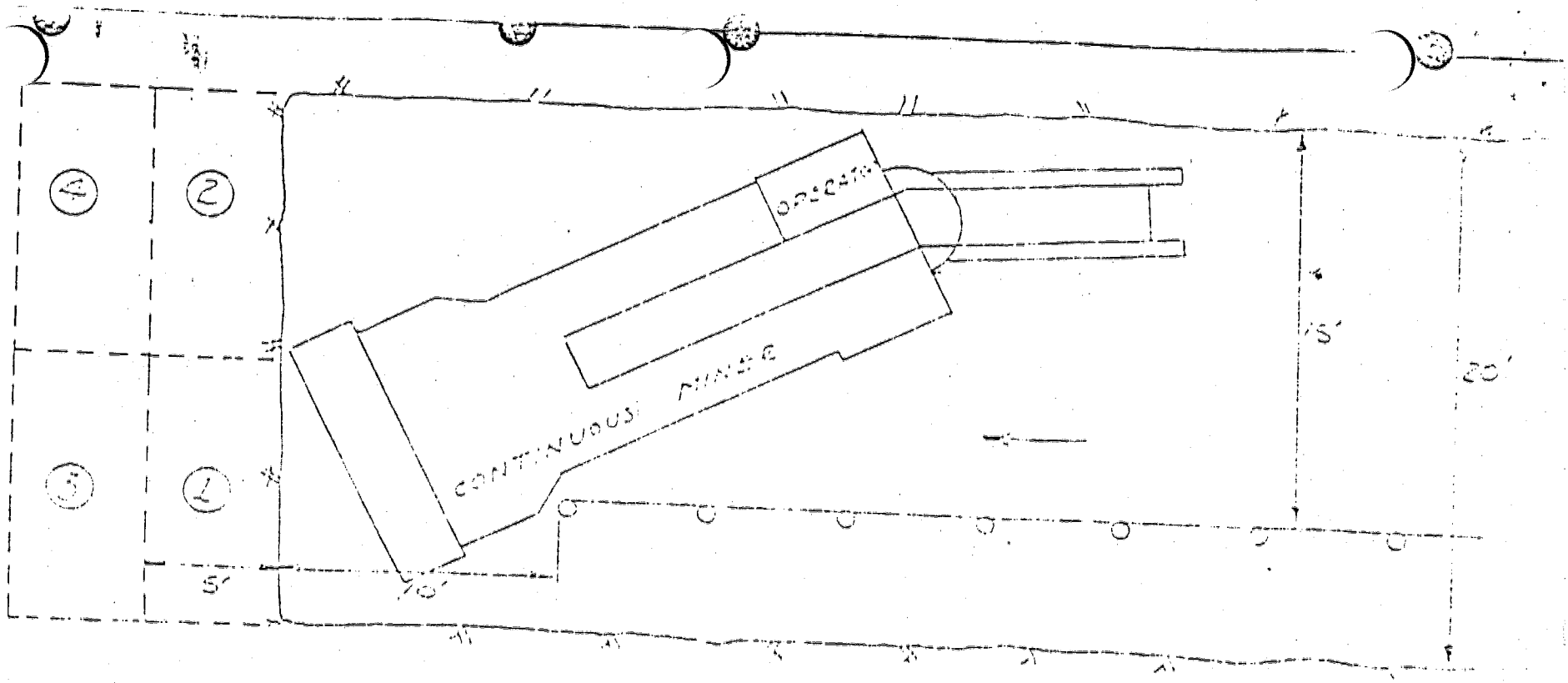
(1) The mining machine in the working place with all dimensions shown, and the positioning of the machine-mounted diffuser, continuous miner operator, and brattice or tubing of the face ventilation.

(2) The method and sequence of mining in each working face during the section production cycle, when driving entries, crosscuts, and pulling pillars, showing the position of the mining machine, position and location of the line brattice or other approved ventilation device, the quantity provided by the line brattice or other approved device under operating conditions.

H. MINE MAPS

1 & 2 Mine maps will be updated and submitted for the six month period ending June 30th and 31st.

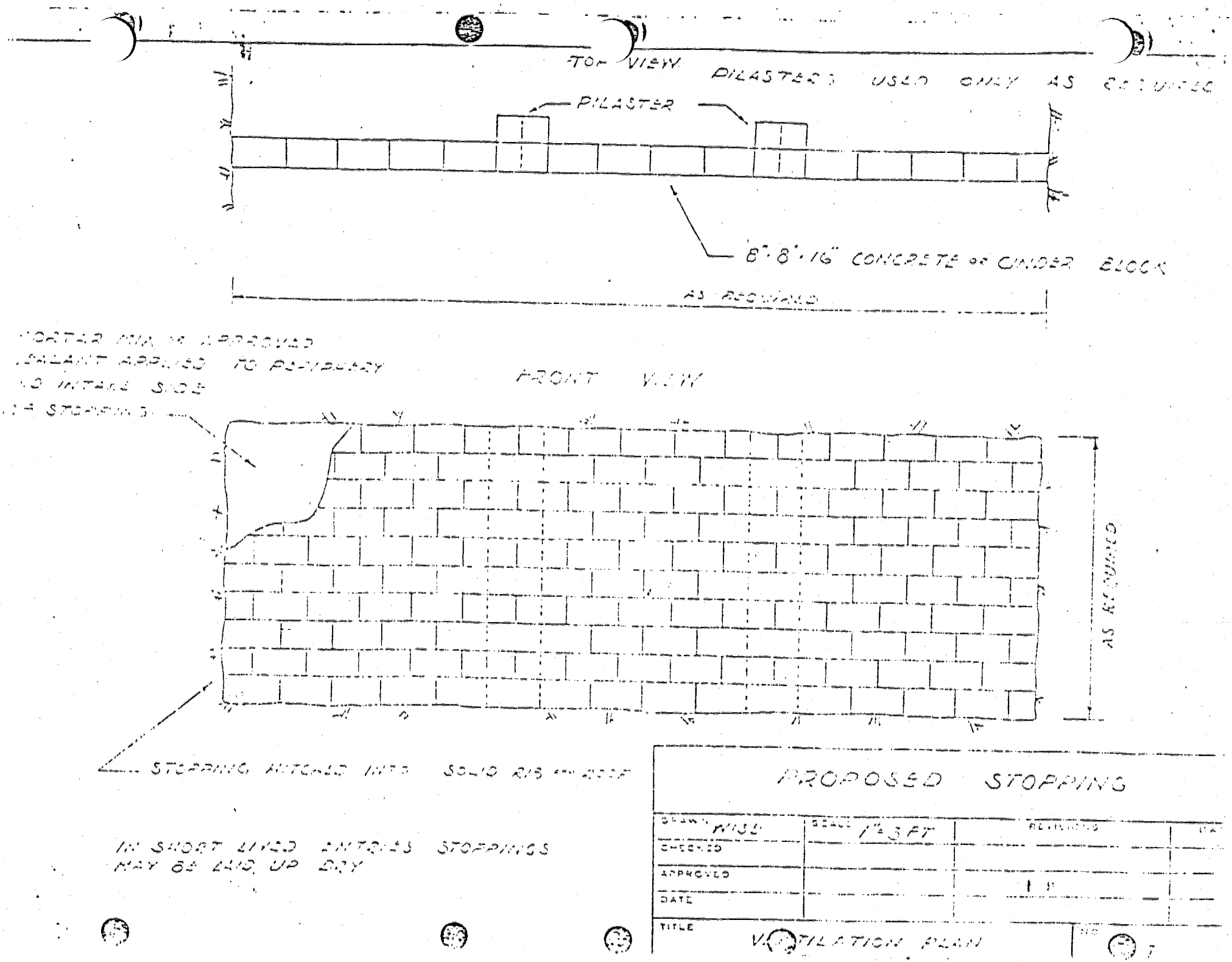
Errol M. Gardiner,
Vice President & General Manager



1. LINE CANVAS MAY BE ADVANCED AFTER COMPLETING 50% CUT #1
2. 6000 CFM MINIMUM AMOUNT OF AIR SUPPLIED TO THE WORKING FACE.
3. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.

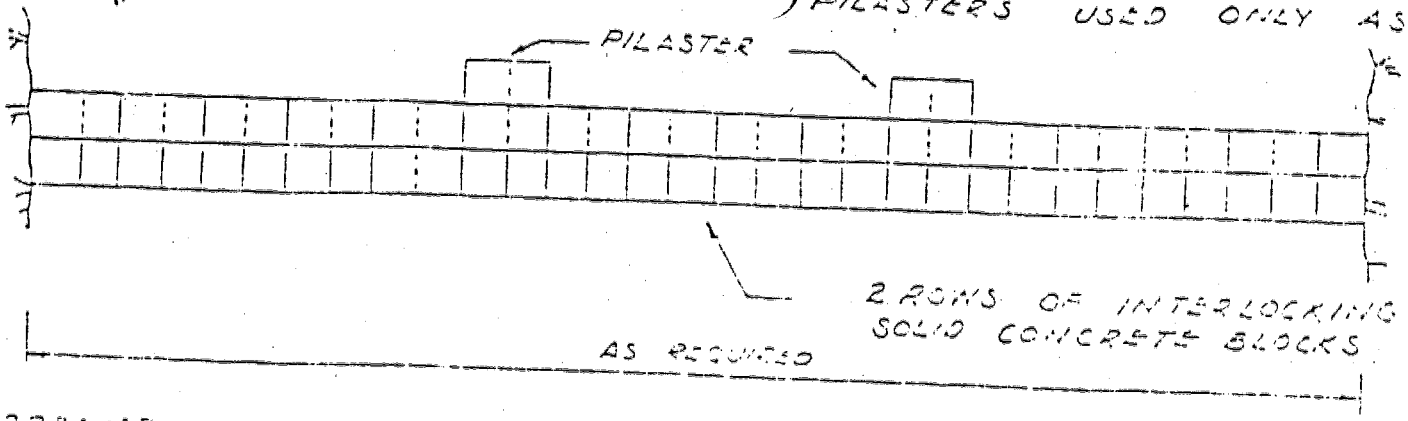
FACE VENTILATION DURING MINING CYCLE

SCALE 1" = 6 FT	REVISIONS	BY	DATE
DATE APR. 79			
DRAWN			
APPVD			
TITLE KING MINES			


TOP VIEW
PILASTERS USED ONLY AS REQUIRED
PILASTER
8"·8"·16" CONCRETE OR CINDER BLOCK
AS REQUIRED
MORTAR MIX AS APPROVED
SEALANT APPLIED TO PERIMETER
TO INTAKE SIDE
OF STOPPING
FRONT VIEW
AS REQUIRED
STOPPING KEYCHED INTO SOLID RIB AND ROOF
IN SHORT LIVED ENTRIES STOPPINGS
MAY BE LAID UP DRY
PROPOSED STOPPING
DRAWN WISE
SCALE 1" = 3 FT
CHECKED
APPROVED
DATE
TITLE
VENTILATION PLAN
NO. 7

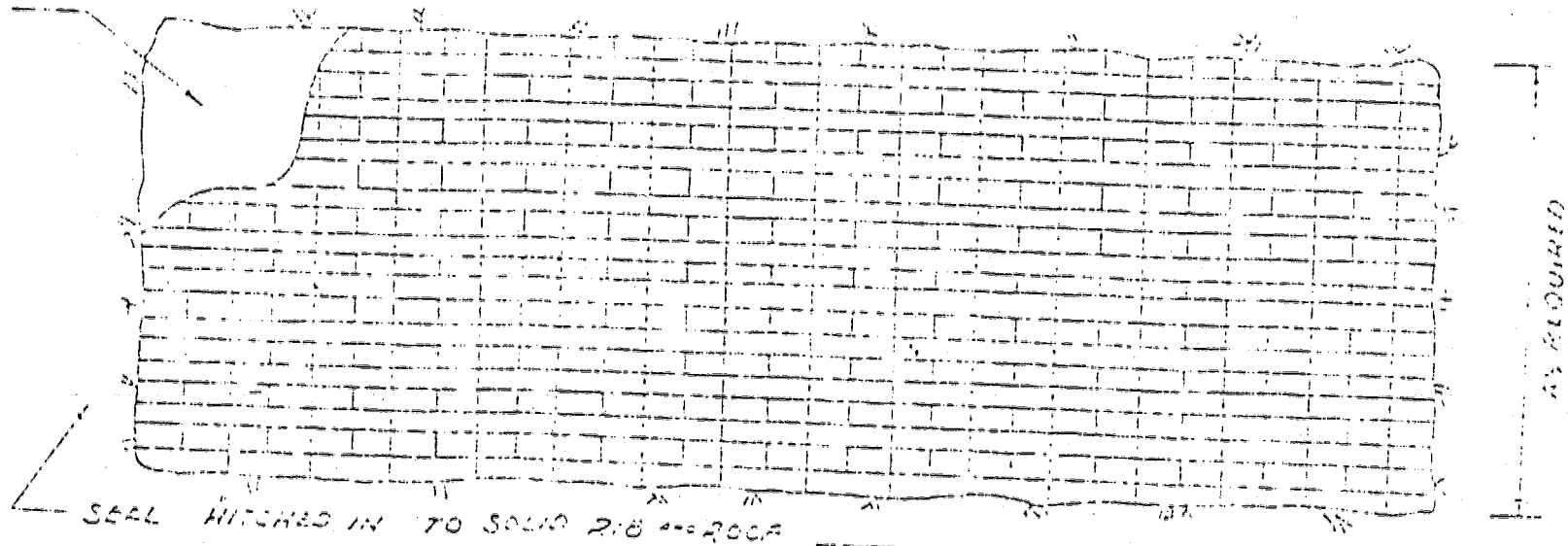
TOP VIEW

PILASTERS USED ONLY AS REQUIRED



THE MIX BE APPROVED
NOT APPLIED TO MACHINERY
TAKE SIDE

FRONT VIEW



SIDE DRAIN PIPE WHEN NECESSARY
MAINTENANCE TUBE TO BE INSTALLED IN HIGHEST SEAL
OF PARTICULAR SECTION BEING SEALED.
ALTERNATING COURSES, TO BE LAID STAGGERED AND
TRANSVERSE TO THE PRECEDING COURSE

DUE TO THE FACT THAT THERE HAS NEVER BEEN A METHANE
GAS AT THE KING MINE - VENTILATION PIPES WILL BE OMITTED

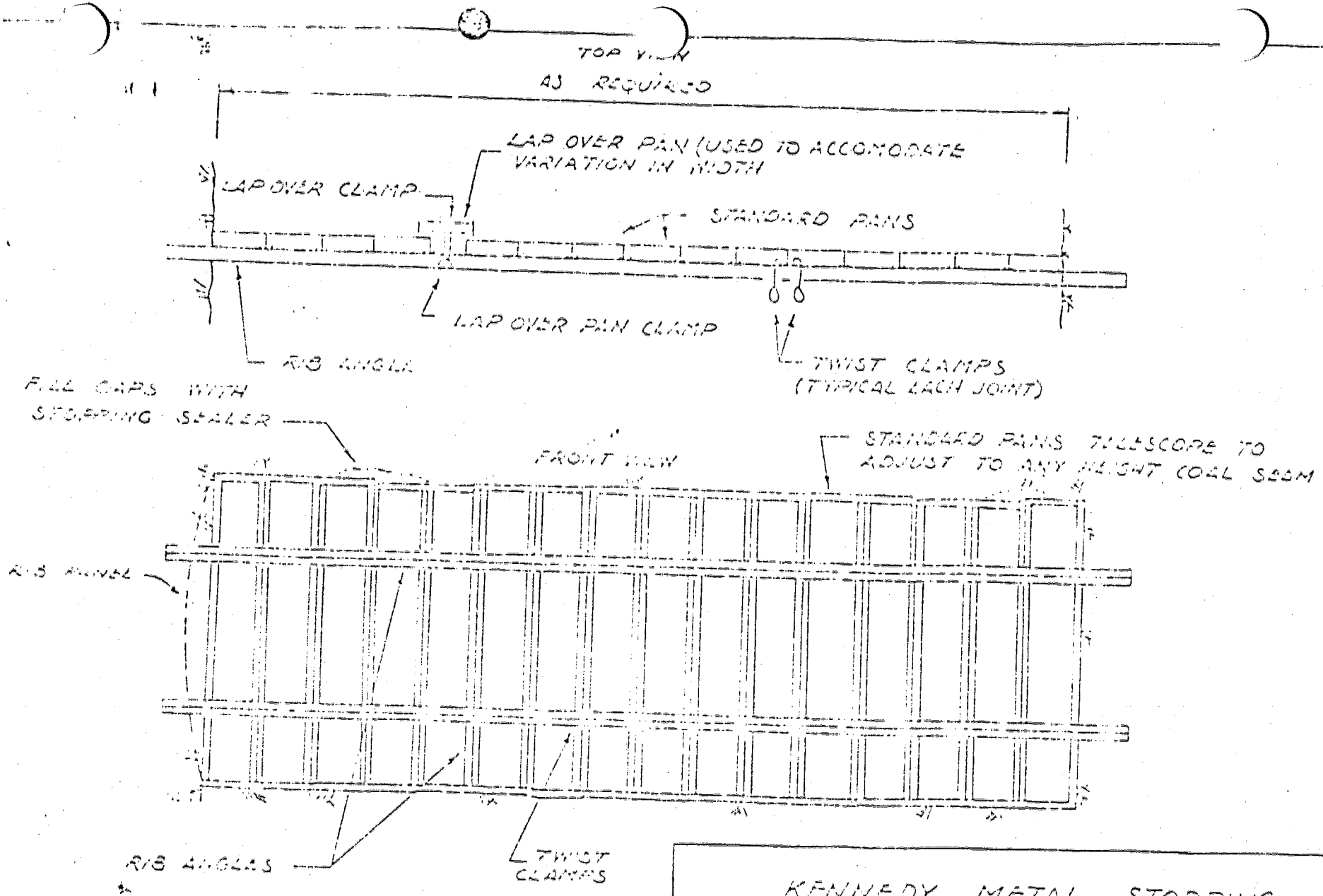
PROPOSED SEAL

PREVIOUSLY APPROVED FOR KING 4 MINE

DRAWN WISE	SCALE 1" = 5' FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE VENTILATION PLAN KING MINES

20



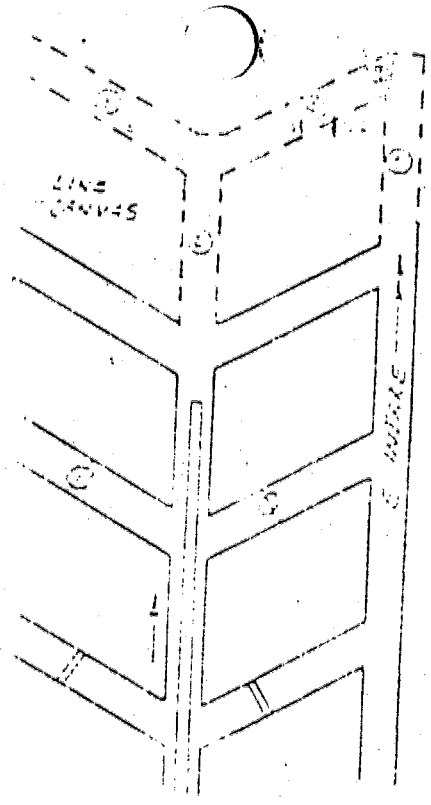
RIB PANELS MADE OF WOOD WILL BE COATED ON BOTH SIDES WITH AN APPROVED SEALANT.

KENNEDY METAL STOPPING

DRAWN WISE	SCALE 1" = 3 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE VENTILATION PLAN RIG MINES

NO. 3



NOTES:

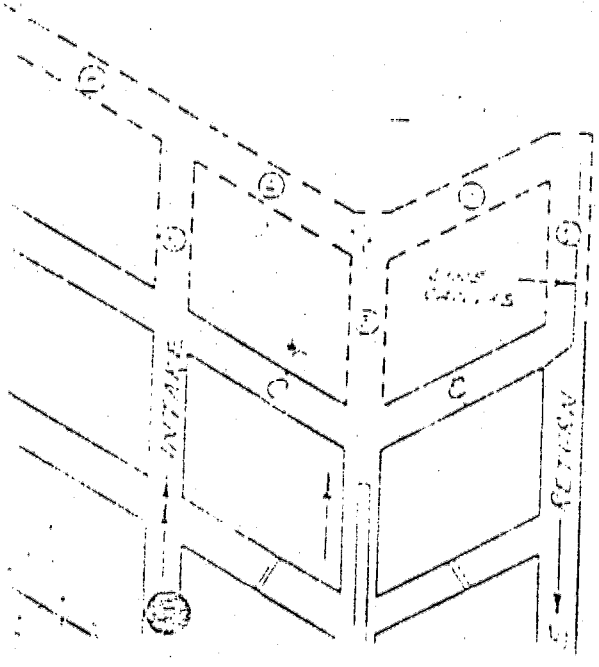
(1) STEP SEQUENCE MAY VARY TO SUIT MINING CONDITIONS ENCOUNTERED.

(2) POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 7

(3) FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQU ACCORDING TO THE BOX CUT MINING CYCLE SKETCH.

(4) AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.

(5) CHECK CURTAINS WILL BE PLACED ACROSS THE TRACK AND BELT ENTRY ONLY WHEN THE AIR IS NOT NEEDED TO VENTILATE THE FACES

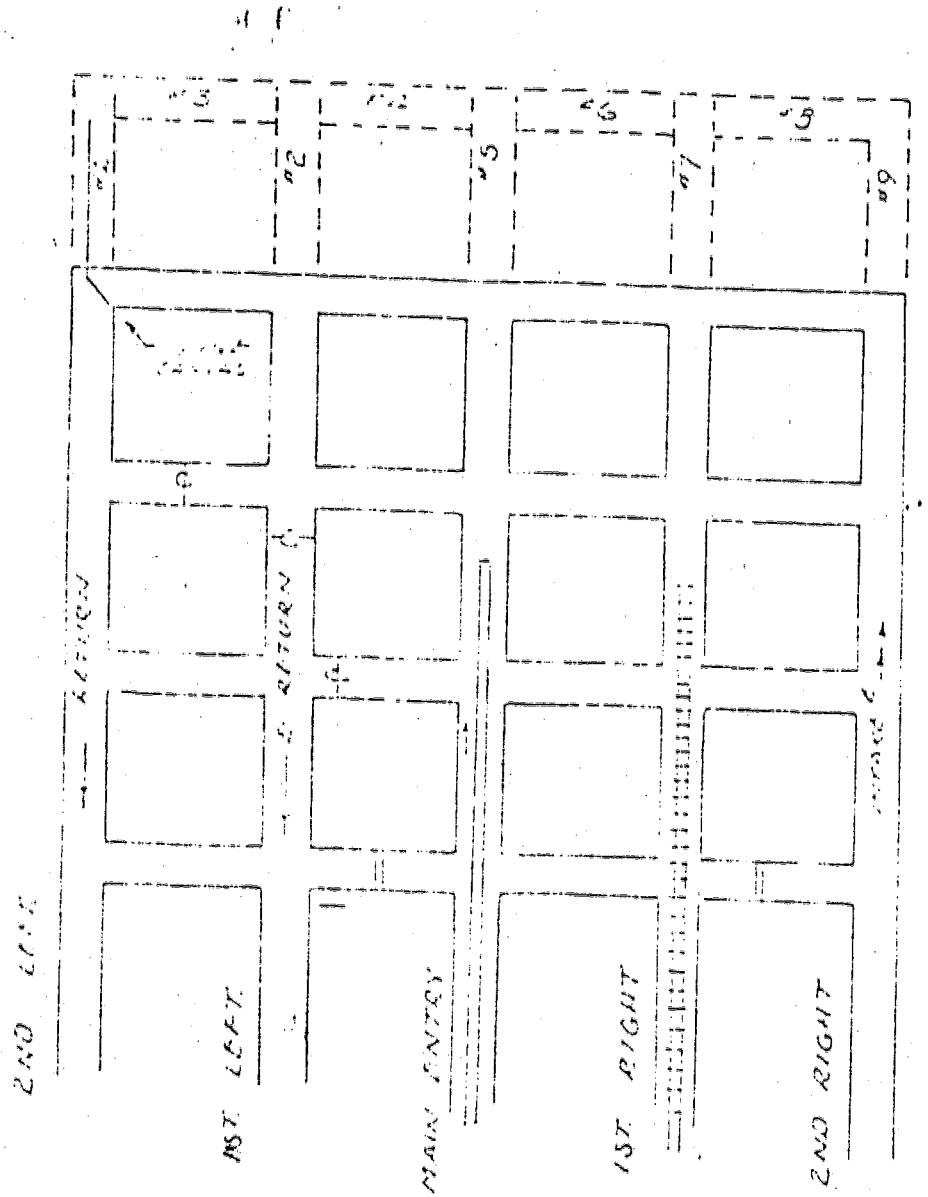


INTAKE
RETURN
CANVAS
E ESCAPEWAY

TYPICAL 3 AND 4 ENTRY DEVELOPME

DRWN WISE 1"=100'

FACE VENTILATION



NOTES:

1. STEP SEQUENCE MAY VARY SLIGHTLY TO SUIT MINING CONDITIONS ENCOUNTERED.
2. POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 9 (ALL SKETCHES)
3. FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUENCE ACCORDING TO BOX CUT MINING CYCLE SKETCH.
4. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.
5. CHECK CURTAINS WILL BE PLACED ACROSS THE TRACK AND BELT ENTRY ONLY WHEN THE AIR IS NOT NEEDED TO VENTILATE THE FACES

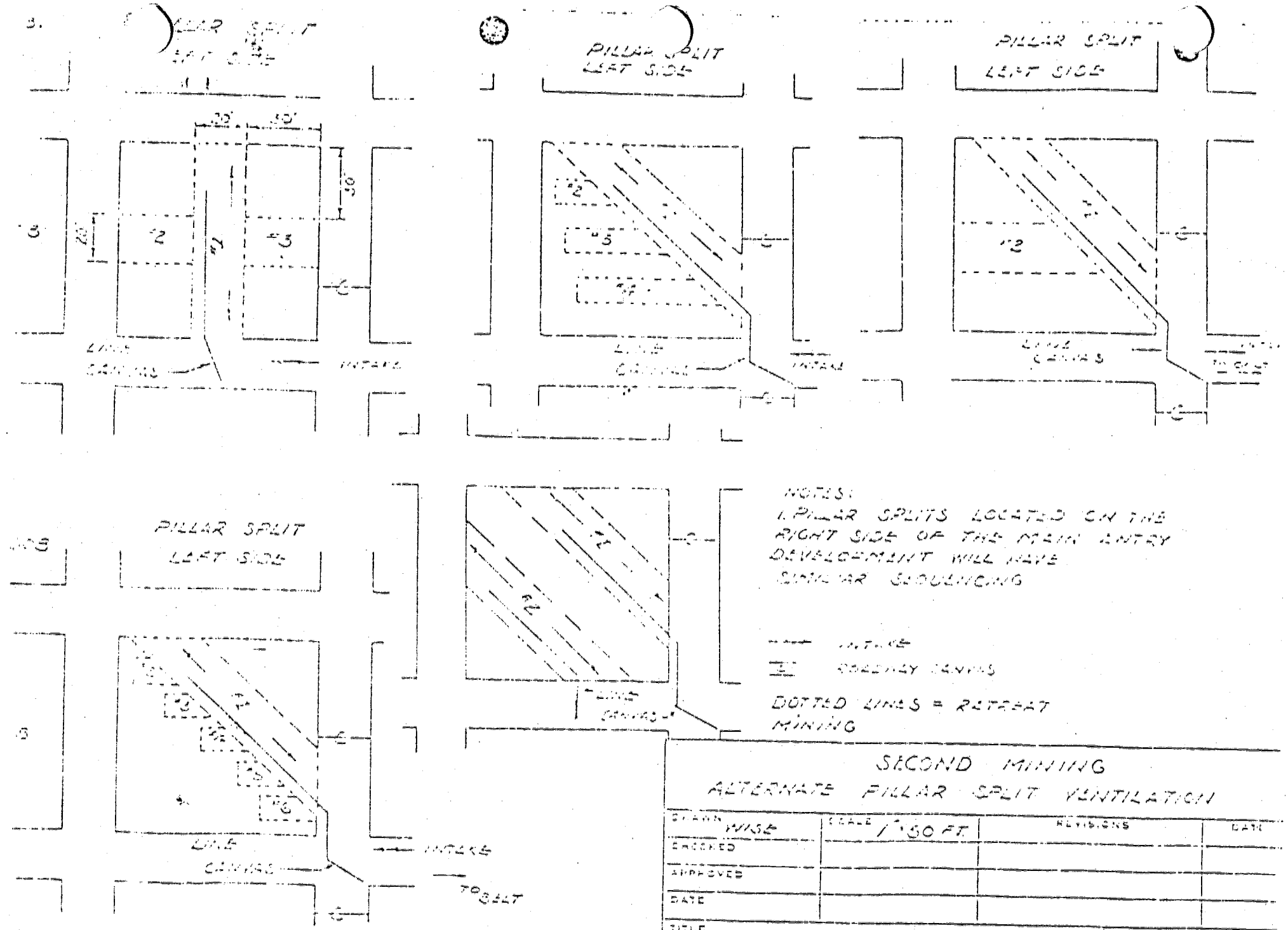
INTAKE
RETURN
CROSSING CANVAS
STOPPING
AIRWAY

TYPICAL 5 ENTRY DEVELOPMENT
STEP #2 THRU STEP 9

DRAWN MSE	SCALE/TRACE	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE FACE VENTILATION
KING MINE

NO. 7



SECOND MINING
ALTERNATE PILLAR SPLIT VENTILATION

DRAWN WISE	SCALE 1" = 50 FT.	REVISIONS	DATE
ENGINED			
APPROVED			
DATE			
TITLE FACE VENTILATION KING MINES		NO. 4	

~~3.8 Appendices~~

III-3 King 5 "MSHA" Approved Roof and Ventilation Plans

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

APPENDIX III-3

King 5 "MSHA" Approved Roof
and Ventilation Plans

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

Important : Remove contents of Appendix III-3 from the March 1982, Vol. 1 Permit Application and place here. Discard cover page.

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

Coal Mine Safety & Health
District 9

May 5, 1980

W. L. Wright
General Superintendent
United States Fuel Company
Hiawatha, UT 84527

Re: King No. 5 Mine
I.D. No. 42-01389
Roof Control Plan

Dear Mr. Wright:

The attached roof control plan made up with 14 pages and your cover letter dated April 25, 1980, has been reviewed and is approved.

This plan is the minimum approved support program for this mine and will be in effect until an evaluation reveals inadequacies or a justifiable request is made for modification.

Sincerely,

John W. Barton
District Manager

Enclosure

MSHA:JWB:SMiller:jfh
cc: Price Subdistrict Manager

UNITED STATES FUEL COMPANY

HIAWATHA, UTAH 84527

April 25, 1980

Mr. John Barton
District Manager
U. S. Dept. of Labor, MSHA
P. O. Box 25367, DFC
Denver, Colorado 80225

RE: King No. 5 Mine
I. D. No. 42-01389
Roof Control Plan

Dear Mr. Barton:

Pursuant to my meeting with Harold Dolan of your office on April 3, 1980 plus my subsequent phone conversations with him, and a mine visit by Steve Miller, I am enclosing a revised Roof Control Plan for King No. 5 Mine.

If you have any questions concerning the plan or procedures, please telephone me.

Yours very truly,

W. L. Wright

W. L. Wright,
General Superintendent

WLW/ds

Enclosure

RECEIVED
APR 30 1980
DISTRICT 9
MSHA
DENVER, CO.

Quotations subject to immediate acceptance. Coal will be sold and invoiced at price in effect on date of shipment, at mine weights f. o. b. cars at place of shipment, unless otherwise specifically agreed in writing. Agreements are contingent upon causes of delay beyond our control, including strikes, accidents, riots, acts of God, increase, fire, flood, inability to secure cars or transportation.

ROOF CONTROL PLAN

Mine I. D. No. 42-01389

King 5 Mine

U. S. FUEL COMPANY

ROOF CONTROL PLAN

General Information

Date: April 20, 1980 Mine I. D. No: 42-01389

A. Company: U. S. FUEL COMPANY

Address: Hiawatha (CITY) Utah (STATE) 84527 (ZIP CODE)

B. Mine: King 5

Mine Location:

Hiawatha (CITY) Carbon (COUNTY) Utah (STATE) 84527 (ZIP CODE)

C. Locations (Reference to nearest highway route, direction, and distance).

11 miles West of Junction of Route 10 and Route 122

D. Type(s) of Plan: Full Roof Support System - Special Roof Bolting

E. Area(s) of Mine Covered by the Plan: Entry, Rooms, Crosscuts, and Intersections.

F. Maximum Cover (feet): 1500 feet

Main Roof.	Massive Sandstone	Variable
Immediate Roof	Sandy Carbonaceous Shale	0-10 ft.
Coalbed.	B Seam	5-14 ft.
Bottom	Carbonaceous Shale Sandy Shale	0-2 ft. 8 ft.

G. Vice President and General Manager:

Roof Control Investigator(s):

Approved By: Date:

Title:

APR 30 1980 DISTRICT 9

H. Roof Support Materials - Conventional or Temporary and Supplemental

Length of Post: AS REQUIRED

Diameter of Post: 1 INCH FOR EACH 15 INCHES IN LENGTH BUT NOT LESS THAN 4 INCHES - SPLIT POSTS SHALL HAVE A CROSS SECTION AREA EQUAL TO THAT REQUIRED FOR ROUND POSTS OF EQUIVALENT LENGTH.

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: 24"x6"x3½"x2" (nominal)

Wedges, Size and Shape: 14"x4"x1½" to tapered (nominal)

Crossbars, Type: STRAIGHT GRAIN SOLID WOOD

Crossbars, Size: A MINIMUM OF 3 INCHES BY 8 INCHES OF VARYING LENGTH.

Planks, Size: A MINIMUM OF 1 INCH BY 8 INCHES OF VARYING LENGTH.

Cribbing Blocks, Size: A MINIMUM OF 30 INCHES IN LENGTH OF VARYING CROSS SECTION.

I. Roof Support Materials - Roof Bolts

Manufacturer: CF&I STEEL CORPORATION Design a: CF&I Grade 75 OR OTHER MANUFACTURERS WITH EQUIVALENT MATERIAL (MECH. OR RESIN)

Minimum Length: 48" Mechanical and Resin

Diameter: 3/4" REBAR (RESIN) AND 7/8" REBAR (RESIN) OR 5/8" (THREADED)
Grade Type

Type Steel: 3/4" REBAR (RESIN) Thread: CUT OR ROLLED
5/8" MECH Grade 75

Length of Thread: 4" CUT OR ROLL R20 (MIN.)

Type Head: HEX OR SQUARE (STANDARD)

Dimensions of Bolt Head: Nut: 1-1/8" Flange: 1-1/2"

J. Bearing Plates

Manufacturer: CF&I STEEL CORP. OR OTHER MANUFACTURERS WITH EQUIVALENT MATERIAL Design a _____

Dimensions: 6"x6"x1/4" - EMBOSSED - DOUBLE EMBOSSED OR FLAT
18"x6"x1/4"

Shape: SQUARE Center Hole Size: 13"/16 NOMINAL FOR CONVENTIONAL BOLTS, 1" NOMINAL FOR RESIN BOLTS

K. Washers

Manufacturer: D.N.A. Manuf's Design a: _____

Type Steel: _____ Size: _____

Shape: _____ Hole Size: _____

L. Anchorage Unit

Manufacturer: OHIO BRASS Manuf's Design a: _____

PATTIN: "D" D-1

BETHLEHEM: ANY EQUIV. APPROVED SHELL C-1 or K-1

DUPONT FASTLOC RESIN CARTRIDGE FASTLOC A, B, C, OR D OR

G. E. RESIN CARTRIDGE OR EQUIVALENT

THE CELTITE CARTRIDGE, OR OTHER APPRVD. CELTITE 2212, 2512, 1812

CARTRIDGES OR EQUIVALENT

Type: Expansion - Resin Size of Finished Hole: 1-3/8" (Mech. 1", 1-1/8" 1-1/4" (Resin) also add 1-1/8" bit for stoper Method of Drilling: Pneumatic or Rotary Dust Control: Water or Vacuum Installed Torque: 150-200 foot Pounds.

Materials Used in Conjunction with Roof Bolts: TREATED OR COTTON WOOD CAP PIECES IN AREAS OVER 3 YRS. LIFE 24"x6"x3½"x2" NOMINAL. 7"x3/8" TRIANGULAR FLAT STEEL PLATES AND 60"x8"x14" MATS OR EQUIVALENT.

Bearing Plates: Airplane landing mats, or wide steel sheets (16 guage min. and strengthened by at least two corrugations) or No. 9 chain-link wire fencing in combination with 6 inch square by 3/8 inch flat or 1/4 inch embossed steel plates; or steel strips (3/8 inch minimum thickness by 5 inch width) or steel channels (4 inch minimum width) in combination with 3 inch square by 3/8 inch flat steel plates in main travelways where immediate top requires continuous support. Material used should give sufficient coverage of the roof span.

M. Face Equipment and Section Haulage Equipment Associated with each:

1. Continuous Miners
2. Shuttle Cars
3. Stoper - Percussion - Rotary - Drills
4. Roof Bolters
5. Front-End Loaders
6. Diesel Scoops
7. Diesel Mantrips
8. Diesel Kubota
9. Diesel Ambulance

N. Sequence of Mining and Installation of Supports including temporary supports:

PLAN DRAWING SHOWING SEQUENCE OF MINING INCLUDING PILLAR MINING WHERE APPLICABLE, SEQUENCE OF INSTALLATION AND SPACING OF SUPPORTS INCLUDING TEMPORARY SUPPORTS AND MAXIMUM WIDTH OF ENTRIES, ROOMS, INTERSECTIONS, CROSSCUTS, AND PILLAR LIFTS ARE ATTACHED.

Track and Belt Entry: 20 ft.

Entry Width: 20 ft.

Entry Centers: 80 ft. and 100 ft.

Crosscut Width: 20 ft.

Crosscut Centers: Min. 40 ft. and Max. 100 ft.

Room Width: 20 ft.

Room Centers: Min. 40 ft. and Max 100 ft.

Room Crosscut Centers: 60 ft. to 100 ft.

Room Crosscut Width: 20 ft.

Pillar Mining: The provisions of 75.200-11 shall apply.

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. For the purpose of this plan, where the roof is strong and competent, as determined by a responsible person of higher authority than the section foreman, an entry may be advanced a maximum of 120 feet prior to roof bolting. A written record that defines the approved area and is dated and signed by the responsible official shall be kept in a book that is available for examination by interested persons.

3. In the absence of properly recorded approval as described above, an area is to be fully supported. All active faces in a section in an approved area shall automatically revert to a full overhead support if: (a) a roof fall occurs in or inby the last open crosscut in an active section; (b) roof bolts (or crossbars) are installed or needed for a distance in excess of 16 linear feet within such area; or (c) roof bolts (or cross-bars) are installed or needed frequently in the general area, regardless of the distance supported in each instance. The official immediately responsible for the area shall report such change to the mine foreman; and the mine foreman shall record the loss of approval for the area in the aforesaid record book. The area may be re-approved per preceding paragraph.

4. All personnel required to install roof supports shall immediately be informed of an approved roof control plan and any changes in a previously approved roof control plan, and all provisions of the plan or any revision thereof will be explained to all underground employees within three weeks.

5. Upon completion of the loading cycle, a reflectorized warning device, such as a "stop" sign, shall be conspicuously placed to warn persons approaching any area that is not permanently supported. It is to be emphasized that the warning device has been placed to cause the person to stop, examine, and evaluate the roof and rib conditions prior to entering the area---even though temporary supports have been installed.

6. After the loading cycle is completed, only those persons engaged in installing temporary supports or roof bolting shall be allowed to proceed beyond the last row of permanent supports. Before any person proceeds inby permanently supported roof, a thorough visual examination of the unsupported roof and ribs shall be made. If the visual examination does not disclose any hazardous condition, persons proceeding inby permanent supports for the purpose of testing the roof by the sound and vibration method and installing supports, shall do so with caution and shall be within 5 feet of a temporary of permanent support. If hazardous conditions are detected, corrective action shall be taken to provide adequate protection to the workmen in the area involved.

When installing permanent supports, the original temporary supports may be repositioned before permanent supports are installed. One or more temporary supports must be installed prior to removal of the original temporary supports. After permanent supports are installed, any or all temporary supports may be removed.

Work such as extending line curtains, other ventilation devices or making methane tests inby the roof bolts shall be done at the line of last temporary support. In an unbolted entry the fireboss shall travel between the row of temporary posts and the rib.

Where crossbars or roof bolts are being installed in an area where roof failure is indicated, a minimum of two rows of temporary supports shall be installed on not more than 5 foot centers across the place so that the work in progress is done between the installed temporary supports and adequate permanent supports in sound roof.

7. (a) Where loose material is being taken down, a minimum of two temporary supports on not more than 5-foot centers shall be installed between the workmen and the material being taken down unless such work can be done from an area supported adequately by permanent roof supports.

   (b) To enable miners to perform their duties from a safe position without exposure to falling material, a bar of suitable length and design shall be provided on all mobile face-equipment, except haulage equipment, and such bar shall be used when prying down loose material. (The length of bar shall be suitable for the area involved in its use, i.e., construction areas, roof falls, and other mining areas require a bar of suitable length.)

8. All metal jacks shall be installed with a cap block between the jack and the roof unless an oversized, non-metal bearing plate of not less than 36 square inches is provided.

9. In each active working place where 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 25 feet and will be drilled during the bolting cycle.

10. An approved calibrated torque wrench shall be provided on each roof bolting machine in operation. Does not apply to resin bolting.

11. (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.

    (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 two rows of posts installed on not more than 4 foot centers across the opening.

12. Immediately after the first bolt is installed in each place, the torque shall be tested and thereafter, at least one roof bolt out of every four shall be tested by a qualified person. If any of the bolts tested do not fall within the required torque range, the remaining previously installed bolts on this cycle shall be tested. Does not apply to resin bolting.

    If the majority of the bolts still fall outside the required torque range, necessary adjustments shall be made immediately. If after these adjustments are made, the required torque ranges are still not obtained, supplementary supports such as different length roof bolts with adequate anchorage, posts, cribs, or crossbars, will be installed.

13. A spot check on torques shall be made during each 24 hour period on at least one roof bolt out of every ten from the outby corner of the last open crosscut to the face. Such torque checks are necessary only in advancing sections in working places producing coal during any portion of the aforementioned 24 hour period. The results of these tests shall be recorded in the onshift examination book. The record shall show the number of bolts tested and the number above and below the required range. Not required for resin bolts.

    If the results show that the majority of the bolts are not maintaining at least 95 foot-pounds of torque supplementary support such as, additional roof bolts with adequate anchorage, posts, cribs, or crossbars shall be installed. Not required for resin bolts.

14. All posts installed under roof that is disturbed or susceptible to sloughing shall have a wooden cap block, plank or crossbar between them and the roof. When crossbars or planks are installed, they shall be blocked to equally distribute the load across their length and in active roadways shall be bolted to the roof.

15. All posts shall be installed on tight footing and not more than two wooden wedges shall be used to install a post.

16. An additional supply of supplementary roof support material to supply 120' of entry shall be provided within two crosscuts outby the working section.

17. (a) Where roof falls have occurred and at all overcasts, boom holes, and other construction sites that require removal of mine roof material, (e.g., by blasting, by ripping with a continuous mining machine, by cutting with a cutting machine, or any other means), the roof shall be considered unsupported. If miners are required to enter such areas, either to travel over the fallen material, to clean it up, or to perform other duties, the roof shall be supported adequately. Mine management shall devise and have posted in writing at the scene of such unsupported roof, a plan incorporating the following procedures:

    1) Such work shall be under the direct and, unless the miners are

specially trained to do such work, constant supervision of a certified person.

2) Adequate temporary support on not more than 5-foot centers should be set at the edge of the fall where work is to be started. A minimum of four posts or jacks shall be used.

3) Installation of supports shall proceed from permanently supported roof to the temporary supports before other work is performed and roof supports shall be advanced as clean-up work progresses.

5) Where necessary to load material before support can be set, such loading shall be done from areas of permanent support with the operator and other persons in the area under supported roof at all times.

6) Where feasible, permanent supports shall be placed in the entire fall area before loading starts.

(b) All roof falls in active working areas and other areas of unsupported roof that are not being cleaned up shall be posted off at each entrance to the fall and unsupported areas by at least two rows of posts (or the equivalent) installed on not more than 5-foot centers across the opening.

18. All roof falls in the active workings that have not been cleaned up and bolted, shall be posted off at each entrance to the area by a double row of posts installed on not more than 5-foot centers.

19. Devices such as spherical washers, angle washers, or slotted wood wedges, should be used to compensate for the angle when roof bolts are installed at angles greater than 5 degrees from the perpendicular to the roof line.

20. All roof bolt materials shall be stored and handled in such a manner that will minimize rusting and/or damaging.

21. Where rib sloughing causes entry dimensions in excess of 20 feet, additional support in the form of roof bolts or timbers will be installed. Entries in excess of 23' will be supported with timber as the additional support.

22. A suitable roof sounding device shall be provided with all mobile face equipment, except haulage equipment. If face workmen who are not operators or helpers on such equipment do not carry a roof sounding device, such device shall be available within 50 feet of their working area.

NOTE: Part 50, Title 30, Code of Federal Regulations, provides that all unintentional roof falls described therein shall be investigated and the results of the investigation shall be maintained in accordance with Section 50.11 30 CFR, Part 50. Such falls shall also be shown on a map of the mine. Failure to do so will be a violation of Part 50.

SAFETY PRECAUTIONS FOR RESIN GROUTED RODS

1. All safety precautions required in the regular roof control plan will be followed, except the torque test required for conventional-type roof bolts will not apply. If failure occurs, the bolting operation will discontinue until the reason for failure has been determined. If the reason for failure cannot be determined, changes in the roof bolting procedure will be made to adequately support the roof, or supplemental supports will be used.

2. Persons responsible for the installation of resin rods will be taught the installation procedures recommended by the manufacturer, including the safe handling precautions of the resin material.

3. Drill steels will be equivalent in length to the rods used or adequately marked to assure proper hole depth. Each drill hole will be filled the entire length with resin.

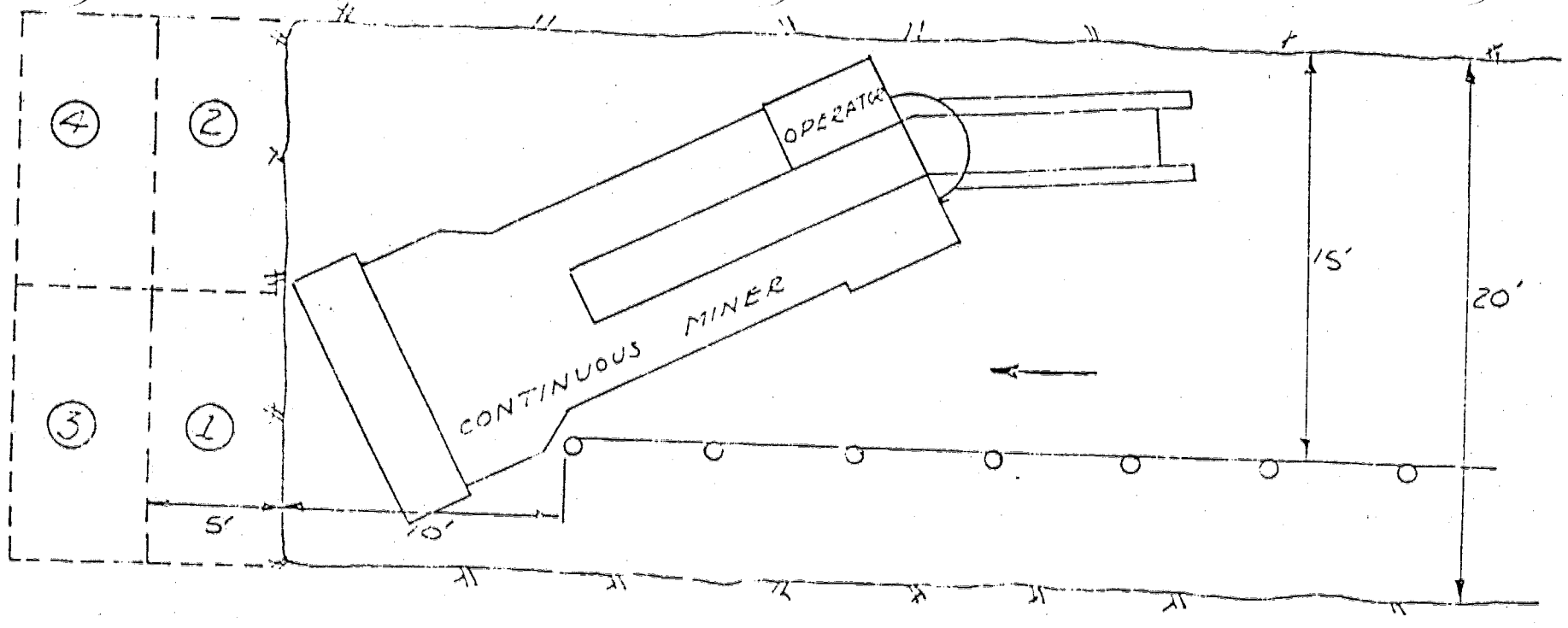
4. All resin grouted rods will be used with bearing plates approved for use. The bearing plate or the wood material between the bearing plate and the roof will be tight against the mine roof.

5. Resin packages will be stored in an area where the temperature is within the range recommended by the manufacturer.

6. Broken cartridges or cartridges which show signs of deterioration will not be used and will be removed from the mine.

7. Resin grouted rods and conventional roof bolts will not be intermixed during systematic bolting cycles, except that intermixing may occur in areas where supplementary supports are required.

8. Resin cartridges will not be used if the recommended shelf-line has been exceeded, unless written authorization for use is permitted by the manufacturer or an authorized representative of the manufacturer.

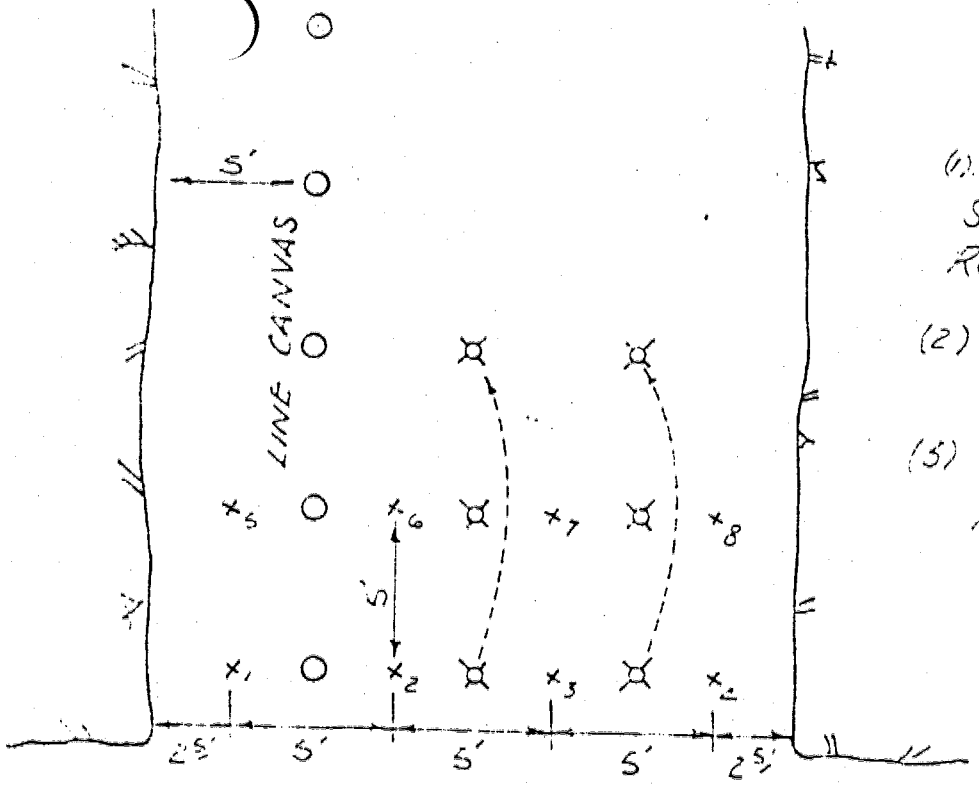


1. LINE CANVAS MAY BE ADVANCED AFTER COMPLETING BOX CUT #1

-11-

FACE VENTILATION DURING MINING CYCLE

SCALE 1" = 6 FT	REVISIONS	BY	DATE
DATE MAY - 79			
DR'N WISE / CKD			
APV'D			
TITLE KING MINES	NO		



(1) A MINIMUM OF FOUR TEMPORARY SUPPORTS SHALL BE SET AS SHOWN BEFORE ROOF BOLTING BEGINS

(2) ROOF BOLTS WILL BE INSTALLED IN THE SEQUENCE SHOWN

(3) TEMPORARY SUPPORTS SHALL BE INSTALLED ON 5' CENTERS

o = ROOF BOLT

⌘ = TEMPORARY SUPPORT

O = PROP REMOVED AFTER BOLT IS INSTALLED

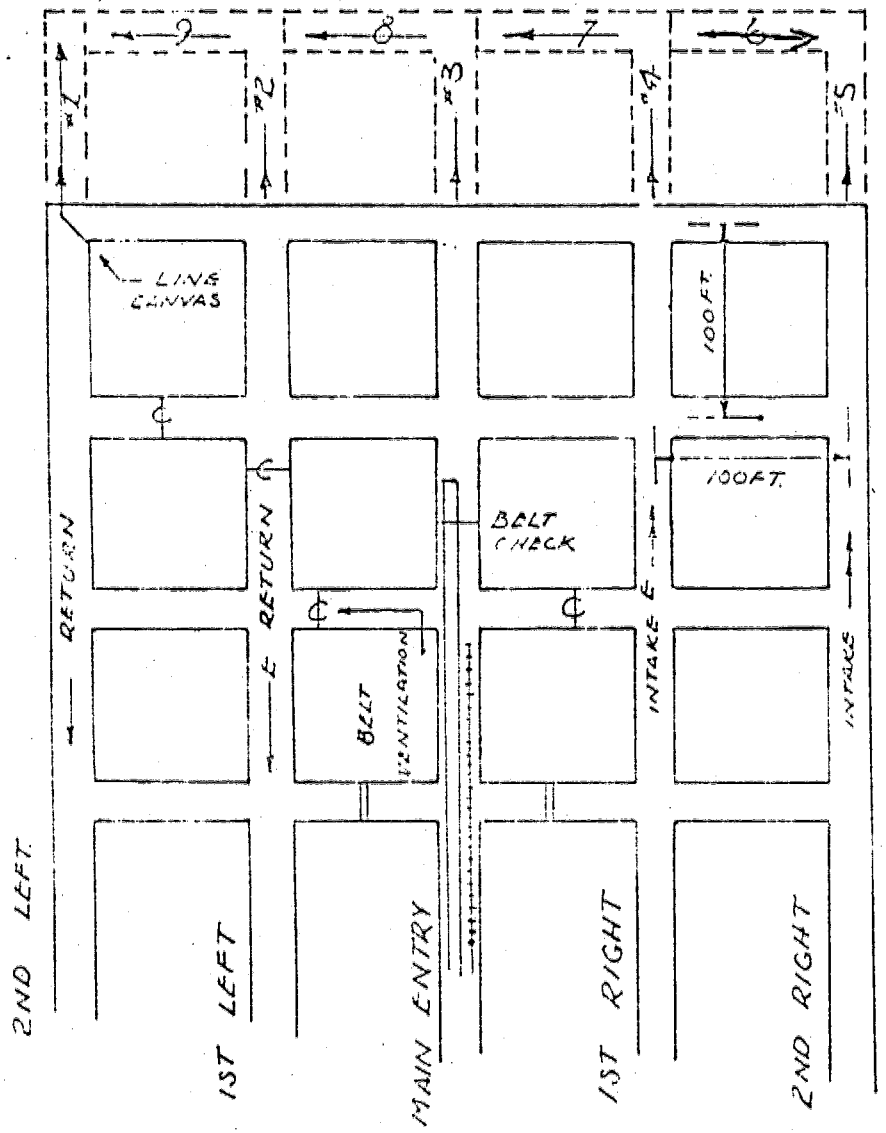
x = FUTURE ROOF BOLT.

-12-

TYPICAL ROOF BOLTING PLAN

DRAWN WISE	SCALE 1" = 6 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE APR-1980			
TITLE KING 5 MINE			NO.

EACH 1. MINING CYCLE WILL BE COMPLETED BEFORE ROOF BOLTING BEGINS



NOTES:

1. STEP SEQUENCE MAY VARY SLIGHTLY TO SUIT MINING CONDITIONS ENCOUNTERED.
2. POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 9 (ALL SKETCHES).
3. FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUENCE ACCORDING TO BOX CUT MINING CYCLE SKETCH.

INTAKE
RETURN
ROADWAY CANVAS
STOPPING
ESCAPE WAY

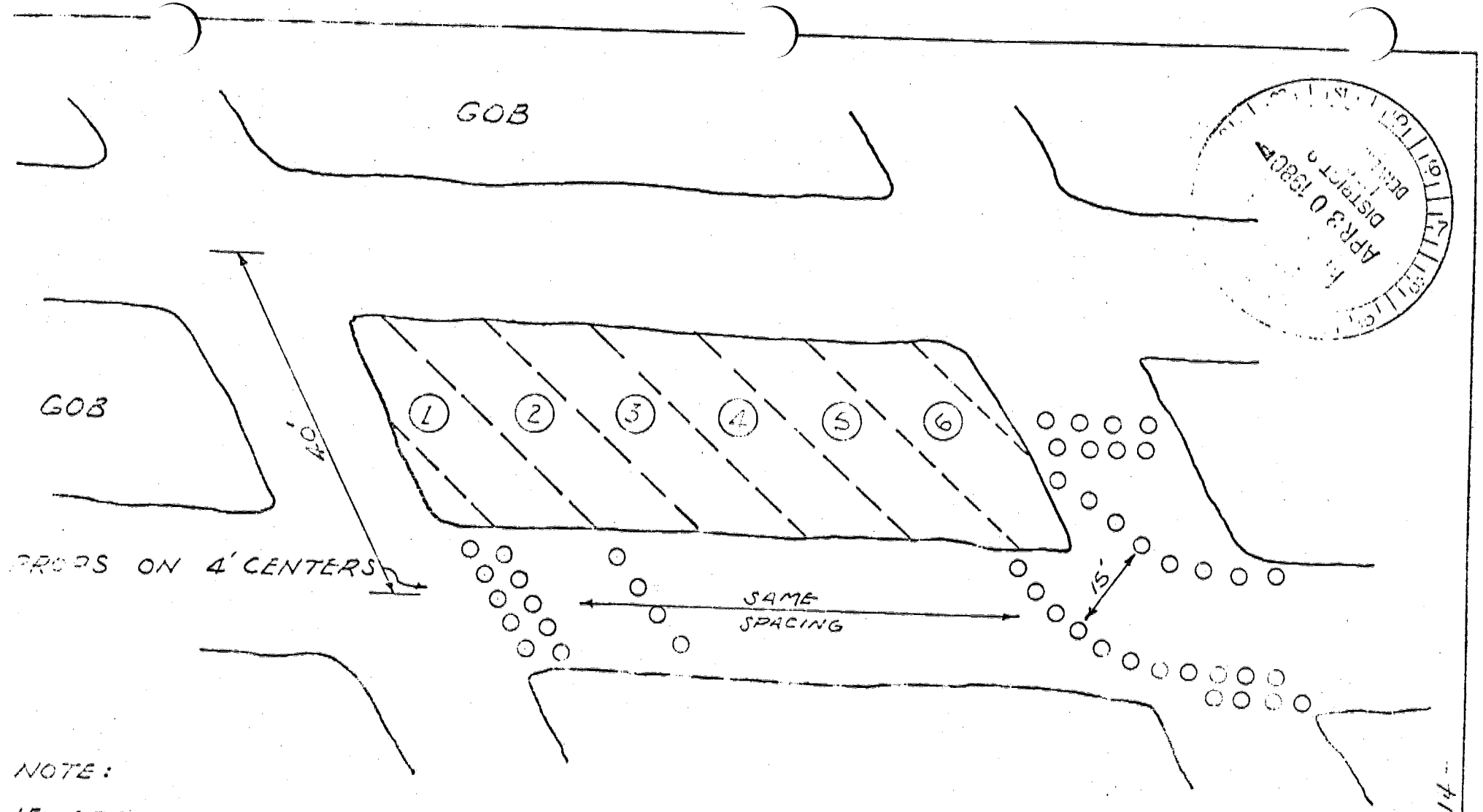
-13-

TYPICAL 5 ENTRY DEVELOPMENT
STEP #1 THRU STEP #5

DRAWN WISE	SCALE 1" = 100 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE: FACE DEVELOPMENT KING 5 MINE

NO. 6



NOTE:

IF OPEN END PILLARING IS DONE SECTION (75.200-11 (h)(1)(2) SHALL APPLY

ROOMS WILL BE BOLTED

RADIUS TIMBER WILL BE INSTALLED WITH EACH PILLAR LIFT TAKEN

TYPICAL PILLAR EXTRACTION

SECOND MINING FULL PILLAR RECOVERY	
1"=20' APR 79 A.E.	
KINGS MINES	

APR 30 1980
DISTRICT 6

U. S. Department of Labor

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225
Coal Mine Safety and Health
District 9

September 11, 1980

Errol M. Gardiner
Vice President
United States Fuel Company
PO Box A
Hiawatha UT 84527

Re: King #5 Mine
I.D. No. 42-01389
Ventilation System and Methane
and Dust Control Plan

Dear Mr. Gardiner:

The ventilation system and methane and dust control plan dated August 25, 1980, for the subject mine has been approved in accordance with Section 75.316, 30 CFR 75. The plan is subject to revision at any time and shall be reviewed by the operator and MSHA at least once every six months. Before any changes are made in the approved ventilation system, they shall be submitted to and approved by the District Manager prior to implementation.

This plan supersedes any previously approved plans and a copy of this plan shall be made available to the miners.

The mine map appears acceptable and will be distributed as such.

Sincerely yours,

Harold E. Fabian
for John W. Barton
District Manager

Enclosure

Knepp

VENTILATION PLAN

The operator of the King 5 Mine hereby adopts and will follow the following ventilation system and methane and dust control plan and any approved supplements and/or revisions thereof:

A. GENERAL

The following information shall be submitted to the District Manager:

1. Company Name: United States Fuel Company

   Mine Name: King Mine No. 5

   Post Office Address (Town, County, State): P. O. Box A
   Hiawatha, Carbon, Utah

   Telephone Number: (801) 343-2471

   Identification Number: 42-01389

   Operator's Name: Errol M. Gardiner

   Operator's Title: Vice President & General Manager

   Operator's Address: P. O. Box A
   Hiawatha, Utah 84527

   Operator's Telephone No.: (801) 637-1226

2. Indicate if life of mine is: ~~less than one year~~.
   greater than one year.

3. Number of employees:

Surface	0	
Underground	66	projected
Total	66	

4. The type of face equipment used on each section in the mine.

   Initial Development

   Continuous Miners, Shuttle Cars, Roof Bolters or Stopers, Diesel Scoops, Diesel Mantrips and Front-end Loaders.

5. We are mining the "B" Seam (5' - 8' high).

RECEIVED AUG 25 1980 DISTRICT 9 MINE DENVER, CO.

B. MAIN FAN INSTALLATIONS

1. All main fan installations shall meet or exceed all criteria established in Sections 75.300-2 and 75.300-3, 30 CFR 75.

C. DUST CONTROL PLAN, OUTBY AREAS

1. The following is a description of dust control practices at:

(a) Float dust at transfer points, loading points, and feeder breakers:

A minimum of one spray will be positioned and pointed at the area of greatest dust generation, usually between the top and bottom belt in front of the bottom roller. Recent experiments have indicated the spray system TT 65025 nozzle operating at 60 P.S.I. will adequately abate float dust; however, we reserve the right to substitute nozzles with better performance characteristics at any locations.

(b) Haulageways will be maintained well compacted and in a damp condition.

(c) Underground crushers: Does not apply.

(d) Underground Dumps: Does not apply.

(e) Along belt haulage systems: Areas are cleaned and rock dusted as needed.

(f) Face areas: Rock dust is applied and maintained to within 40' of faces.

(g) All other problem areas: Clean and rock dusted as needed.

2. Methane and Dust Control Practices at Face Area

(a) Line brattice or tubing will be installed at a distance no greater than 15' from the area of deepest penetration to which any portion of the face has been advanced in working faces from which coal is being cut, mined, or loaded; necessary line brattice will be maintained in idle places of active sections to insure adequate ventilation of face areas.

(b-c) A minimum mean entry face velocity of 60 ft/min. will be maintained at all working faces and at no time shall there be less than 6,000 CFM of air reaching all working faces where coal is cut, mined, or loaded.

(d) The minimum quantity of air reaching the last open crosscut in any pair or set of developing entries and the last open crosscut in any pair or set or rooms will be 12,000 CFM and

the minimum quantity of air reaching the intake end of a pillar line will be 12,000 CFM.

Equipment	Minimum Number of Sprays	Minimum Water Pressure & Sprays	Minimum Flow Rate @ Sprays
No. 6 Miner	32	125 p.s.i.	0.30 gal/min.
No. 8 Miner	32	125 p.s.i.	0.30 gal/min.

90% of the actual number of sprays shall be maintained.

3. Bleeder Entries

Part 75.316-2 states that the purpose of bleeder entries is to control the methane content in active pillaring areas. A review of the existing King Mine ventilation history has indicated this mine to be clear methane during its entire operation; therefore:

> At our option, second mining may or may not be done without the use of bleeder systems. However, if methane gas in a quantity of 1% by volume is ever detected in any working section, a bleeder entry system will be established and maintained for all future second mining. Work will be started immediately on sealing of all second mined areas after the completion of such mining. MSHA will make this determination and re-evaluate the status every six (6) months.

4. ". . .the methane content in any return aircourse other than an aircourse returning the split of air from a working section (as provided in Sections 75.309 and 75.310) shall not exceed 2.0 volume per centum. The methane content in the air in active workings shall be less than 1.0 volume per centum or more of methane, changes or adjustments shall be made at once in the ventilation in the mine so that the air shall contain less than 1.0 volume per centum of methane."

5. Methane examinations are conducted by:

   (a) The examiner never goes beyond permanent or temporary support to make gas checks during the time that the face is being advanced.

6. The mining system shall be designed in accordance with a plan that is adopted by the operator so that as each working section of the mine is abandoned, it can be isolated from the active workings of the mine with explosion proof seals.

   (a) Location of seals: Does not apply at this time.

   (b) See attached drawing of our proposed seal.

7. Ventilation of an Abandoned Area - Work to seal off pillared sections will begin immediately following completion of production, and shall continue in a diligent manner until sealing is complete.

8. Maximum distance involved in a belt move will be 300 feet with temporary brattice stoppings installed immediately after a belt move to insure proper isolation. Work on permanent isolation will begin immediately and shall continue in a diligent manner until completion.

D. SECTION AND FACE VENTILATION SYSTEM

1. See attached sketches for the complete section and face ventilation system.

2. See attached sketches for ventilation controls in belt haulage entries.

3. Control of ventilation of adjacent pillaring to insure no air reversal onto an active section - Does no apply at this time.

4. Coal will not be permitted to accumulate at outby end of the face equipment to the extent that ventilation of the working face is restricted.

D. PERMANENT STOPPINGS AND OTHER DEVICES

1. All ventilating devices such as stoppings, overcasts, undercasts, and shaft partitions shall be of substantial incombustible construction installed in a workmanlike manner and maintained in a condition to serve the purpose for which they were intended, and any stopping leaking air excessively shall be repaired immediately.

2. Permanent stoppings shall be erected between the intake and return aircourse and shall be erected to and including the third connecting crosscut outby the faces of the entries. Whenever the third connecting crosscut is broken through, work shall be started on building the stopping as soon as possible and shall be completed within 48 hours.

3. Metal stoppings supported with approved fire retardant treated wood or wood coated with "Stoppit" may be used for belt isolation or intake escapeway separation stoppings. Timbers laid longitudinally "Skin to Skin", and packed with rock dust may be used in heavy squeezing areas. The face of the "Wood" stopping must be given a complete coat of plaster.

G. USE OF AUXILIARY FANS AND/OR MACHINE-MOUNTED DIFFUSERS, UNDERGROUND

If this type of equipment is used, U. S. Fuel Company will adopt the following:

1. The fan shall be of a permissible type, maintained in permissible condition, so located and operated to avoid any recirculation of air, and examined once every four hours when in use. The examiner shall place his initials, date and the time near the fan.

   (a) Fans operating blowing shall be installed in the positive intake air current of the place to be ventilated by the fan, and the volume of such positive intake air current shall be greater than the free discharge capacity of the fan.

   (b) Fans operating exhausting shall be installed in the return air current from the place to be ventilated by the fans, and the volume of positive intake air current available at the entrance to the place (at the crosscut or other point of entry) to be ventilated with exhaust fans shall be greater than the free discharge capacity of the fan.

2. All face ventilation systems using auxiliary fans and tubing or machine-mounted diffusers shall be approved under the provisions of Section 303(o) of the Act. (Subsection 75.316 of the Federal Regulations).

3. If a machine-mounted diffuser is used in conjunction with fan tubing or exhaust line brattice, the intake end of the diffuser shall be located outby the intake end of the exhaust tubing or line brattice.

4. Indicate and illustrate by a step-by-step procedure the installation anduse of all auxiliary fans showing all distances and anticipated air quantities.

5. List the manufacturer and model number of each different auxiliary fan and machine-mounted diffuser fan. Include the fan motor, horsepower, RPM, blade position or positions during operation, and the free discharge capacity; the type and diameter of all ventilation tubing installation; and whether the fan will be operated exhausting or blowing.

6. When machine mounted diffuser fans (auxiliary fans) are employed, indicate by drawing or sketch:

   (a) The mining machine in the working place with all dimensions shown, and the positioning of the machine-mounted diffuser, continuous miner operator, and brattice or tubing of the face ventilation.

4. The following information shall be submitted for all types of stoppings:

(a) A complete list of all materials used in the construction of the stopping.

(1) Block Stoppings - Materials used: (8"x8"x16") cinder or cement blocks, mortar or cement mix. The stoppings are laid up on clean substantial bottom, tied into the ribs with staggered courses with mortared joints. The periphery of the stopping is plastered with a mortar mix to make it air tight. (See attached sketch). If stoppings are to be laid without mortared joints, as in short lived entries, the intake side must be coated with at least 5/8" of mortar, or both sides must be coated with at least 1/8" of BlockBond or Surewall, or both sides must be coated with at least 1/2" of mortar.

(2) Kennedy Stoppings - Materials used: MP526 Rib Angles, MP-511 Twist Clamp, Standard Pans, MP-506 Lap Over Clamp, MP-511 Twist Clamp, MP-530 Roof Pin. See attached sketch for construction detail.

(3) Temporary Stoppings - Plastic coated nylon is used as a temporary check-in breakthrough, road checks and face ventilation.

(4C) Permanent Stoppings - Will be used in the Mains. Estimated life: Life of the mine. Intended use: Belt isolation, return airways, intake airways, and track isolation.

F. DIESEL EQUIPMENT

If this type of equipment is used, U. S. Fuel Company will:

1. Comply completely with the manufacturer's operating instruction and maintenance manuals.

2. The atmosphere in the operator's compartment shall be sampled daily with the engine running; and if the analyses of these samples exceed five parts per million NO_2 or fifty parts million of carbon monoxide, or both, corrective measures must be taken immediately.

3. The atmosphere in the return from any working place where diesel-powered equipment is being used shall be tested at least once each shift while the equipment is in operation, and if the analyses of these samples exceed five parts per million NO_2 or fifty parts per million CO, or both, corrective measures shall be taken immediately.

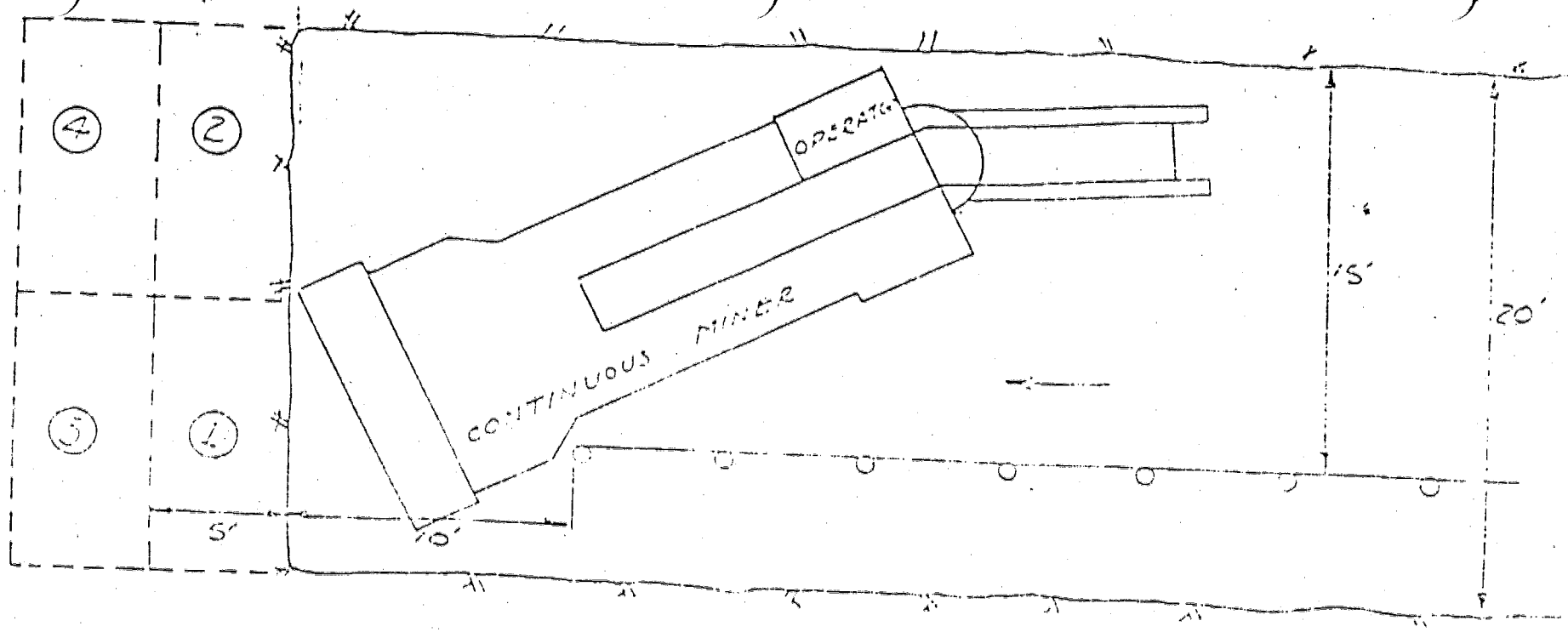
4. The date, time of sampling, machine identification, and the analyses obtained should be recorded in a book maintained for this purpose.

(b) The method and sequence of mining in each working face during the section production cycle, when driving entries, crosscuts, and pulling pillars, showing the position of the mining machine, position and location of the line brattice or other approved ventilation device, and the quantity of air passing through the machine-mounted diffuser, and the minimum air quantity provided by the line brattice or other approved device under operating conditions.

H. MINE MAPS

1 & 2 Mine maps will be updated and submitted for the six month period ending July 2, and January 1.

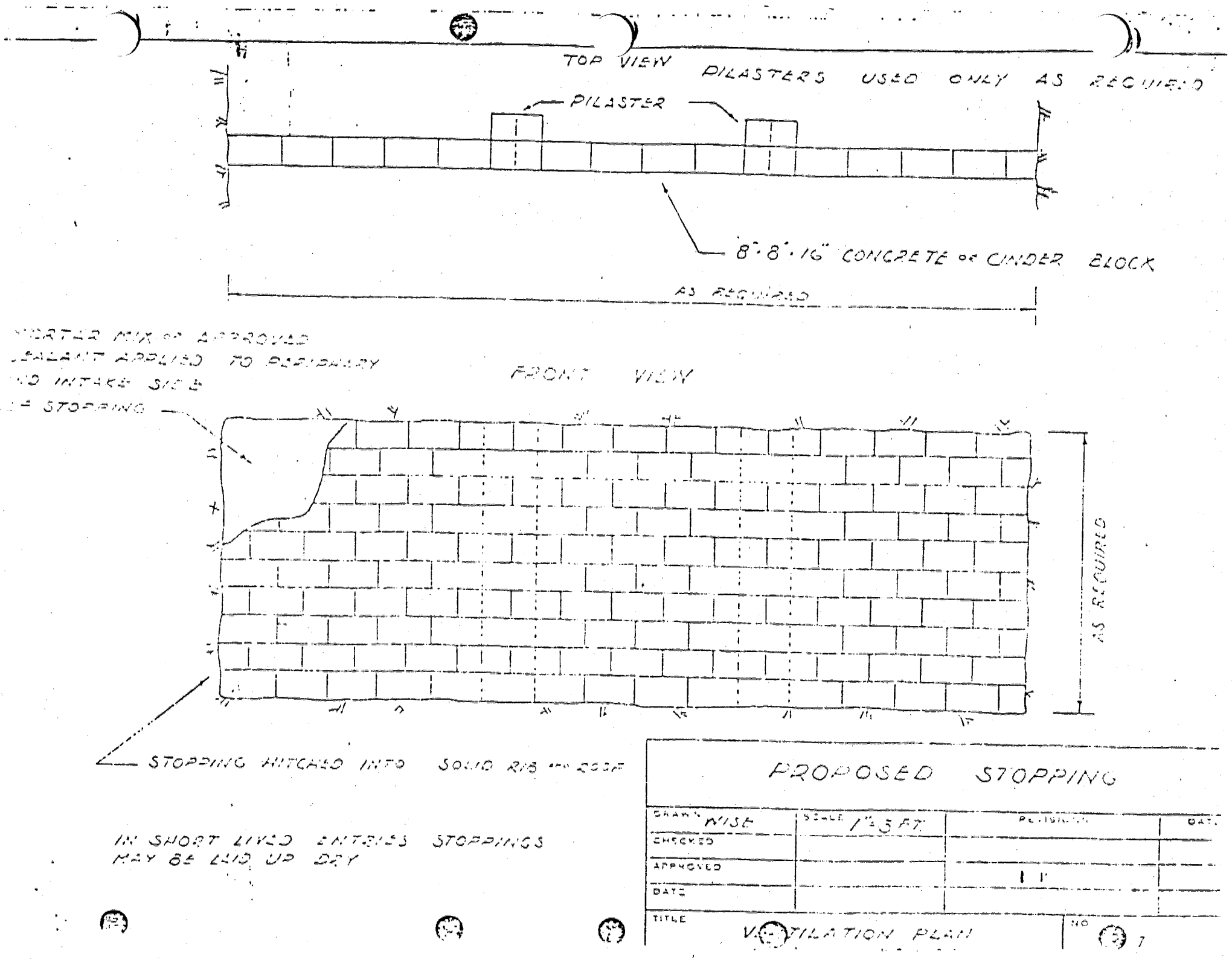
Errol M. Gardiner,
Vice President & General Manager



1. LINE CANVAS MAY BE ADVANCED AFTER COMPLETING 50X CUT #1
2. 6000 CFM MINIMUM AMOUNT OF AIR SUPPLIED TO THE WORKING FACE.
3. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.

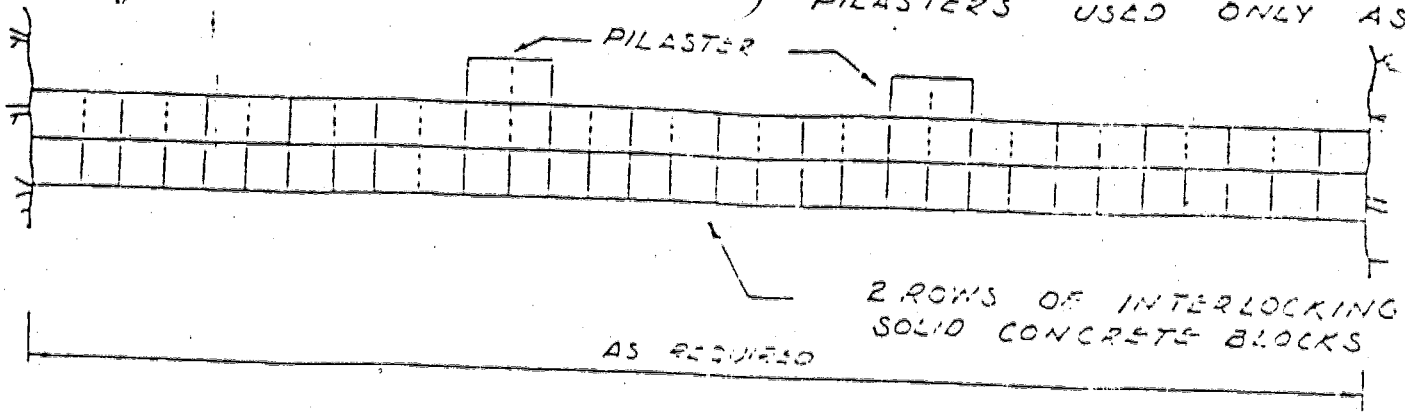
FACE VENTILATION DURING MINING CYCLE

SCALE 1"=6.FT	REVISIONS	BY	DATE
DATE AUG. 79			
DR BY WISE / CHD			
APVD			
TITLE KING MINES		NO	


TOP VIEW
PILASTERS USED ONLY AS REQUIRED
PILASTER
8"·8"·16" CONCRETE OR CINDER BLOCK
AS REQUIRED
MORTAR MIX OF APPROVED
SEALANT APPLIED TO PERIPHERY
AND INTAKE SIDE
OF STOPPING
FRONT VIEW
AS REQUIRED
STOPPING HITCHED INTO SOLID RIB OR ROOF
IN SHORT LIVED ENTRIES STOPPINGS
MAY BE LAID UP DRY
PROPOSED STOPPING
DRAWN WISE
SCALE 1" = 5 FT.
REVISION
DATE
CHECKED
APPROVED
DATE
TITLE
VENTILATION PLAN
NO 7

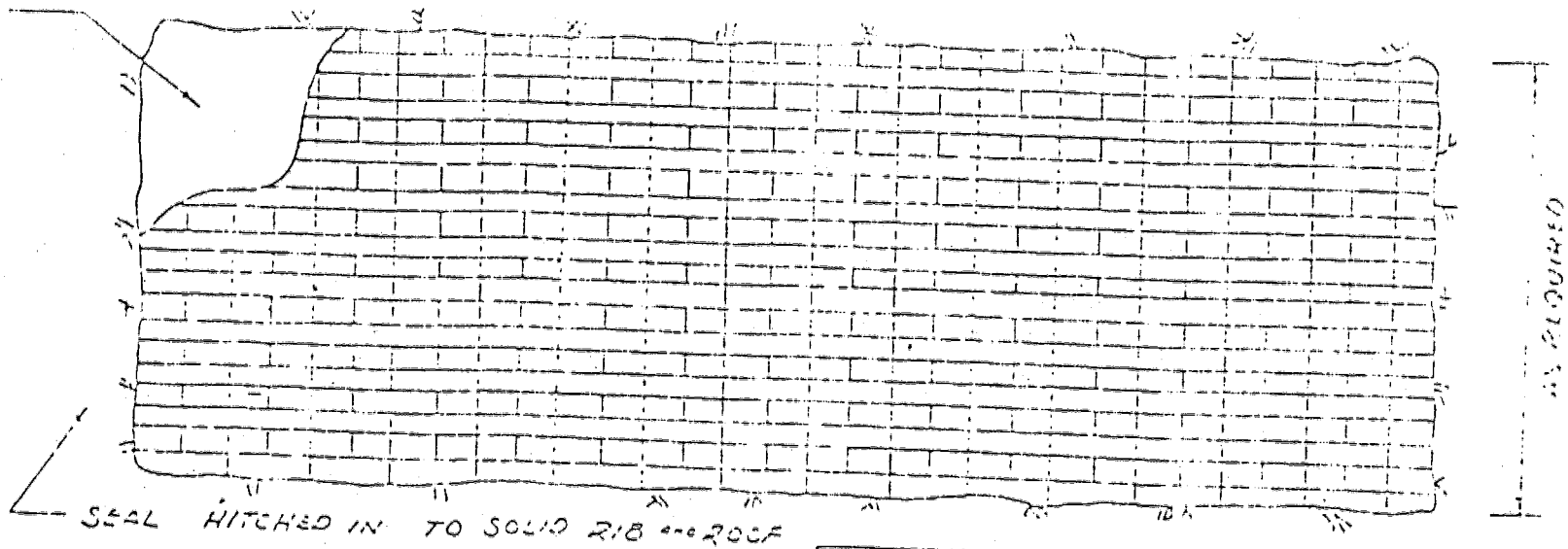
TOP VIEW

PILASTERS USED ONLY AS REQUIRED



TAR MIX BE APPROVED
ANT APPLIED TO PERIPHERY
INTAKE SIDE
SEAL

FRONT VIEW



ROVIDE DRAIN PIPE WHEN NECESSARY
RVEILLANCE TUBE TO BE INSTALLED IN HIGHEST SEAL
LY OF PARTICULAR SECTION BEING SEALED.
TERNATING COURSES TO BE LAID STAGGERED AND
NSVERSE TO THE PRECEDING COURSE

TO THE FACT THAT THERE HAS NEVER BEEN A METHANE
UP AT THE KING MINE - VENTILATION PIPES WILL BE OMITTED

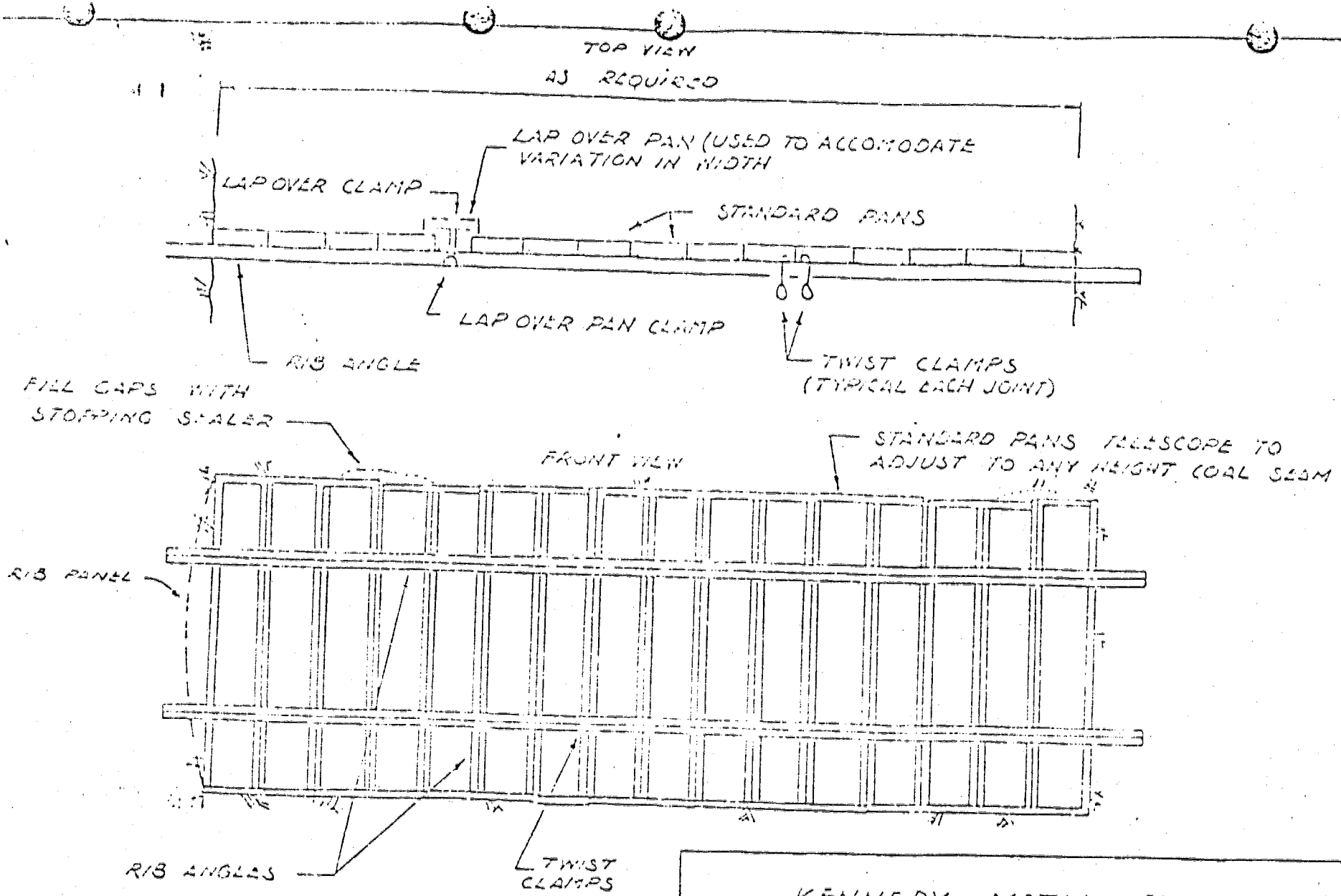
PROPOSED SEAL

PREVIOUSLY APPROVED FOR KING 4 MINE

DRAWN WISE	SCALE 1" = 8' FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE VENTILATION PLAN KING MINES

NO 2



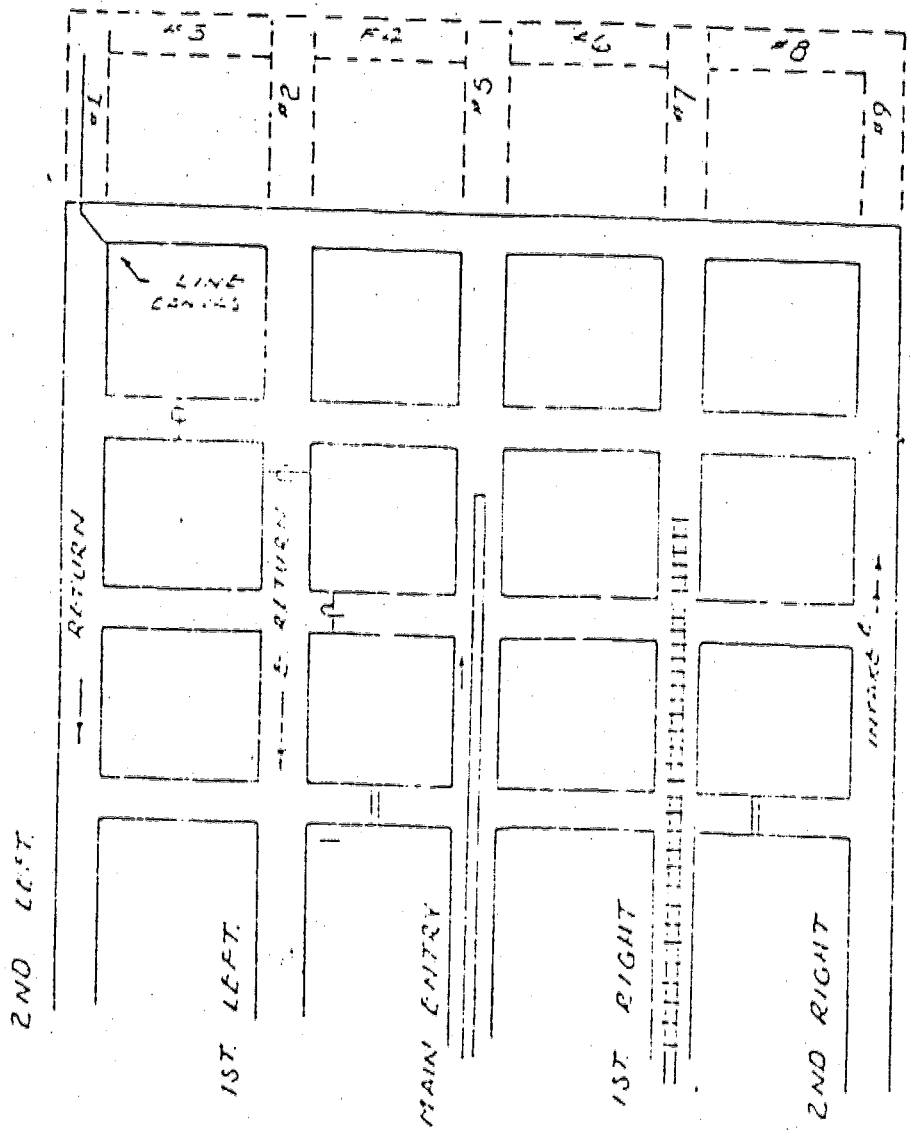
RIB PANELS MADE OF WOOD WILL BE COATED ON BOTH SIDES WITH AN APPROVED SEALANT.

KENNEDY METAL STOPPING

DRAWN WISE	SCALE 1" = 3 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE VENTILATION PLAN KING MINES

NO. 3



NOTES:

1. STEP SEQUENCE MAY VARY SLIGHTLY TO SUIT MINING CONDITIONS ENCOUNTERED.
2. POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 9 (ALL SKETCHES)
3. FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUENCE ACCORDING TO BOX CUT MINING CYCLE SKETCH.
4. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.
5. CANVAS CURTAINS WILL BE PLACED ACROSS THE TRACK TO EXIT ENTRY ONLY WHEN THE AIR IS NOT NEEDED TO VENTILATE THE FACES

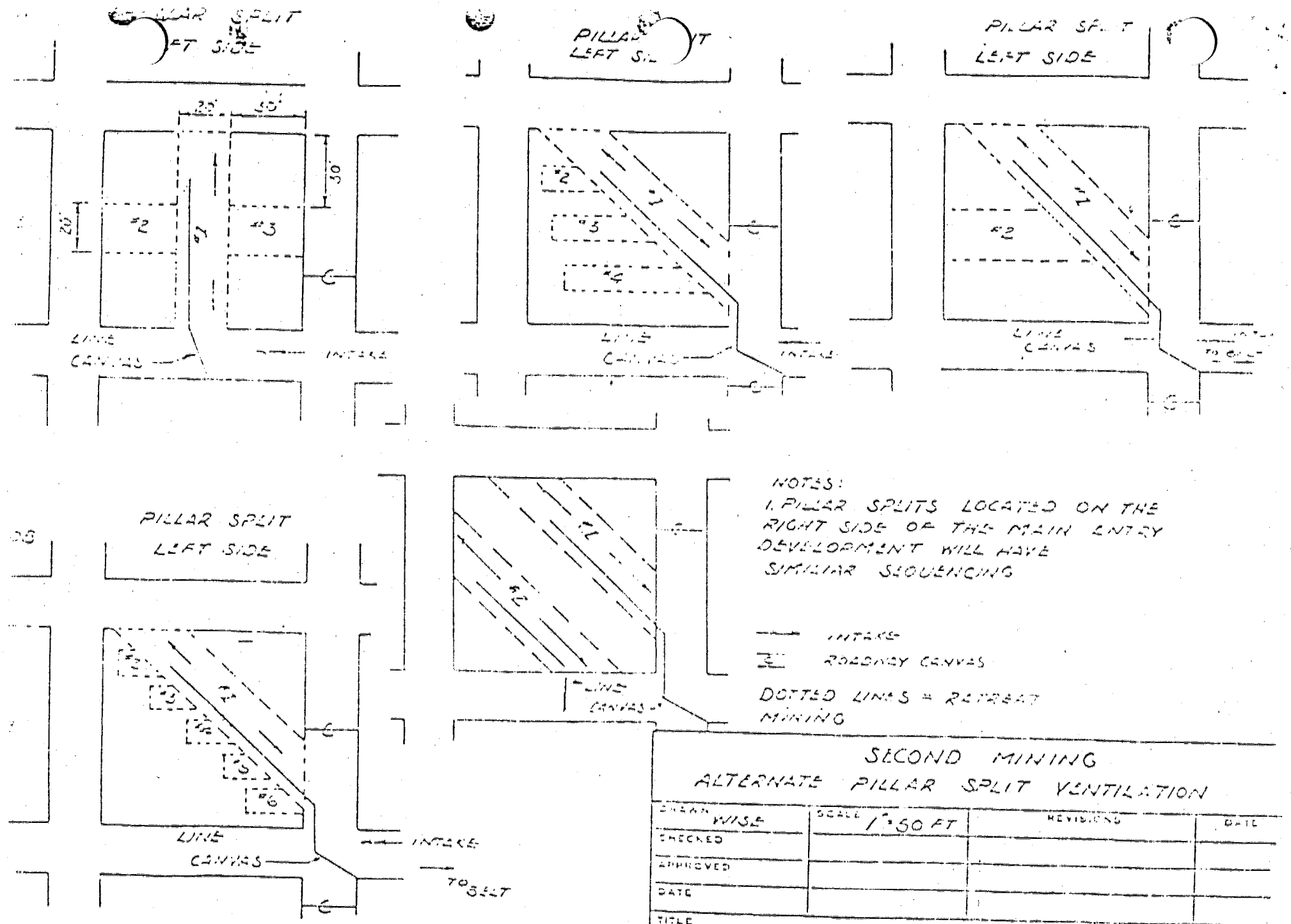
INTAKE
RETURN
ROADWAY CANVAS
STOPPING
E ESCARPMENT

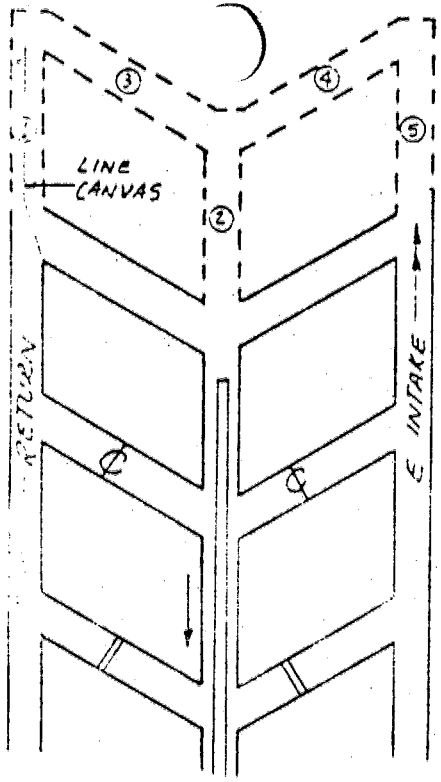
TYPICAL S ENTRY DEVELOPMENT
STEP #1 THRU STEP 9

DRAWN WISE	SCALE / FLOOR	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE
FACE VENTILATION
KING MINE

FIG. 7


PILLAR SPLIT
LEFT SIDE
25'
50'
30'
20'
#1
#2
#3
LINE CANVAS
INTAKE
PILLAR SPLIT
LEFT SIDE
#1
#2
#3
#4
LINE CANVAS
INTAKE
PILLAR SPLIT
LEFT SIDE
#1
#2
LINE CANVAS
TO BELT
PILLAR SPLIT
LEFT SIDE
#1
#2
#3
#4
#5
#6
LINE CANVAS
INTAKE
TO BELT
#1
#2
LINE CANVAS
NOTES:
1. PILLAR SPLITS LOCATED ON THE RIGHT SIDE OF THE MAIN ENTRY DEVELOPMENT WILL HAVE SIMILAR SEQUENCING
INTAKE
ROADWAY CANVAS
DOTTED LINES = RETREAT MINING
SECOND MINING
ALTERNATE PILLAR SPLIT VENTILATION
DRAWN WISE
SCALE 1" = 50 FT
REVISIONS
DATE
CHECKED
APPROVED
DATE
TITLE
FACE VENTILATION
KING MINES
NO.1
4



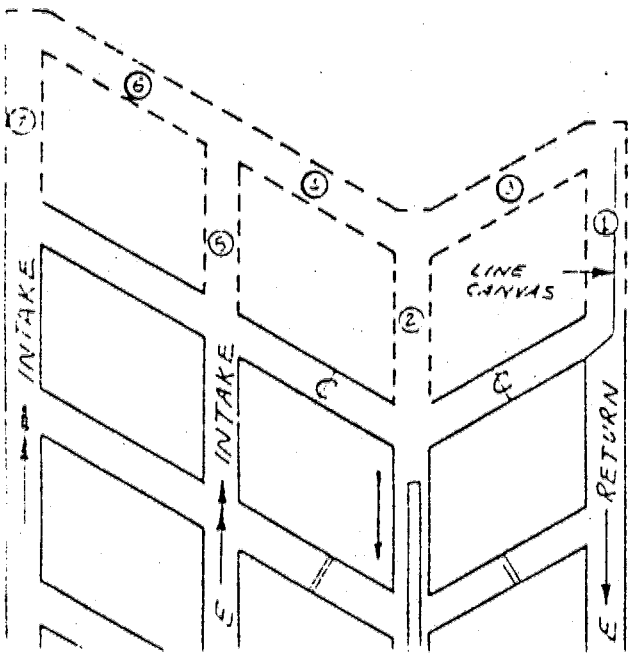
NOTES.

(1) STEP SEQUENCE MAY VARY TO SUIT MINING CONDITIONS ENCOUNTERED.

(2) POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 7

(3) FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUEN ACCORDING TO THE 8CX CUT MINING CYCLE SKETCH.

(4) AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.



INTAKE

RETURN

CANVAS

E ESCAPEWAY

TYPICAL 3 AND 4 ENTRY DEVELOPMEN

DRWN WISE 1"=100'

FACE VENTILATION
KING MINE

8

Appendices

III-4 King 6 "MSHA" Approved Roof and Ventilation Plans

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OIL, GAS & MINING

APPENDIX III-4

King 6 "MSHA" Approved Roof
and Ventilation Plans

RECEIVED
MAR 1981
DIVISION OF
OIL, GAS & MINING

Important : Remove contents of Appendix III-4 from the March 1982, Vol. 1 Permit Application and place here. Discard cover page.

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MAR 1981
DIVISION OF
OIL, GAS & MINING

ROOF CONTROL PLAN

General Information

Date: August 15, 1980 Mine I. D. No.: 42-01599

A. Company: U. S. FUEL COMPANY

Address: Hiawatha (CITY) Utah (STATE) 84527 (ZIP CODE)

B. Mine: KING 6

Mine Location:

Hiawatha (CITY) Carbon (COUNTY) Utah (STATE) 84527 (ZIP CODE)

C. Locations (Reference to nearest highway route, direction and distance).

11 miles West of Junction of Route 10 and Route 122

D. Type(s) of Plan: Dual Roof Support System

E. Area(s) of Mine Covered by the Plan: Entry, Rooms, Crosscuts, and Intersections.

F. Maximum Cover (Feet): 1500 feet.

Main Roof.	Massive Sandstone	Variable
Immediate Roof	Sandy Carbonaceous Shale	0-10 ft.
Coalbed.	Hiawatha Seam	5-14 ft.
Bottom	Carbonaceous Shale Sandy Shale	0-2 ft. 8 ft.

G. Vice President and General Manager:

Roof Control Investigator(s):

Approved By: Date:

Title:

H. Roof Support Materials - Conventional or Temporary and Supplemental

Length of Post: AS REQUIRED

Diameter of Post: 1 INCH FOR EACH 15 INCHES IN LENGTH BUT NOT LESS THAN 4 INCHES - SPLIT POSTS SHALL HAVE A CROSS SECTION AREA EQUAL TO THAT REQUIRED FOR ROUND POSTS OF EQUIVALENT LENGTH.

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: 24"x6"x3½"x2" (nominal)

Wedges, Size and Shape: 14"x4"x1½" to tapered (nominal)

Crossbars, Type: STRAIGHT GRAIN SOLID WOOD

Crossbars, Size: A MINIMUM OF 3 INCHES BY 8 INCHES OF VARYING LENGTH.

Planks, Size: A MINIMUM OF 1 INCH BY 8 INCHES OF VARYING LENGTH.

Cribbing Blocks, Size: A MINIMUM OF 30 INCHES IN LENGTH OF VARYING CROSS SECTION.

I. Roof Support Materials - Roof Bolts

Manufacturer: CF&I STEEL CORPORATION Design a: CF&I Grade 75 OR OTHER MANUFACTURERS WITH EQUIVALENT MATERIAL (MECH. OR RESIN)

Minimum Length: 48" Mechanical and Resin

Diameter: 3/4" REBAR (RESIN) AND 7/8" REBAR (RESIN) OR 5/8" (THREADED)
Grade Type

Type Steel: 3/4" REBAR (RESIN) Thread: CUT OR ROLLED
5/8" MECH Grade 75

Length of Thread: 4" CUT OR ROLL R20 (MIN.)

Type Head: HEX OR SQUARE (STANDARD)

Dimensions of Bolt Head: Nut: 1-1/8" Flange: 1-1/2"

J. Bearing Plates

Manufacturer: CF&I STEEL CORP. OR OTHER MANUFACTURERS WITH EQUIVALENT MATERIAL Design a

Dimensions: 6"x6"x1/4" - EMBOSSED - DOUBLE EMBOSSED OR FLAT
18"x6"x1/4"

Shape: SQUARE Center Hole Size: 13"/16 NOMINAL FOR CONVENTIONAL BOLTS, 1" NOMINAL FOR RESIN BOLTS

K. Washers

Manufacturer: D.N.A. Manuf's Design a:

Type Steel: Size:

Shape: Hole Size:

L. Anchorage Unit

Manufacturer: OHIO BRASS Manuf's Design a:

PATTIN: "D" D-1

BETHLEHEM: ANY EQUIV. APPROVED SHELL C-1 or K-1

DUPONT FASTLOC RESIN CARTRIDGE FASTLOC A, B, C, OR D OR

G. E. RESIN CARTRIDGE OR EQUIVALENT

THE CELTITE CARTRIDGE, OR OTHER APPRVD. CELTITE 2212, 2512, 1812

CARTRIDGES OR EQUIVALENT

Type: Expansion - Resin Size of Finished Hole: 1-3/8" (Mech. 1", 1-1/8" 1-1/4" (Resin) also add 1-1/8" bit for stoper Method of Drilling: Pneumatic or Rotary Dust Control: Water or Vacuum Installed Torque: 150-200 foot Pounds.

Materials Used in Conjunction with Roof Bolts: TREATED OR COTTON WOOD CAP PIECES IN AREAS OVER 3 YRS. LIFE 24"x6"x3½"x2" NOMINAL. 7"x3/8" TRIANGULAR FLAT STEEL PLATES AND 60"x8"x14" MATS OR EQUIVALENT.

Bearing Plates: Airplane landing mats, or wide steel sheets (16 guage min. and strengthened by at least two corrugations) or No. 9 chain-link wire fencing in combination with 6 inch square by 3/8 inch flat or 1/4 inch embossed steel plates; or steel strips (3/8 inch minimum thickness by 5 inch width) or steel channels (4 inch minimum width) in combination with 3 inch square by 3/8 inch flat steel plates in main travelways where immediate top requires continuous support. Material used should give sufficient coverage of the roof span.

M. Face Equipment and Section Haulage Equipment Associated with each:

1. Continuous Miners
2. Shuttle Cars
3. Stoper - Percussion - Rotary - Drills
4. Roof Bolters
5. Front-End Loaders
6. Diesel Scoops
7. Diesel Mantrips
8. Diesel Kubota
9. Diesel Ambulance

N. Sequence of Mining and Installation of Supports including temporary supports:

PLAN DRAWING SHOWING SEQUENCE OF MINING INCLUDING PILLAR MINING WHERE APPLICABLE, SEQUENCE OF INSTALLATION AND SPACING OF SUPPORTS INCLUDING TEMPORARY SUPPORTS AND MAXIMUM WIDTH OF ENTRIES, ROOMS, INTERSECTIONS, CROSSCUTS, AND PILLAR LIFTS ARE ATTACHED.

Track and Belt Entry: 20 ft.

Entry Width: 20 ft.

Entry Centers: 80 ft. and 100 ft.

Crosscut Width: 20 ft.

Crosscut Centers: Min. 40 ft. and Max. 100 ft.

Room Width: 20 ft.

Room Centers: Min. 40 ft. and Max 100 ft.

Room Crosscut Centers: 60 ft. to 100 ft.

Room Crosscut Width: 20 ft.

Pillar Mining: The provisions of 75.200-11 shall apply.

SAFETY PRECAUTIONS FOR A DUAL SUPPORT PLAN

1. This is the mimimum 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. For the purpose of this plan, where the roof is strong and competent, as determined by a responsible person of higher authority than the section foreman, an entry or crosscut may be advanced without roof bolting. A written record that defines the approved area and is dated and signed by the responsible official shall be kept in a book that is available for examination by interested persons.

3. In the absence of properly recorded approval as described above, an area is to be fully supported. All active faces in a section in an approved area shall automatically revert to a full overhead support if: (a) a roof fall occurs in or inby the last open crosscut in an active section; (b) roof bolts (or crossbars) are installed or needed for a distance in excess of 16 linear feet within such area; or (c) roof bolts (or crossbars) are installed or needed frequently in the general area, regardless of distance supported in each instance. The official immediately responsible for the area shall report such change to the mine foreman; and the mine foreman shall record the loss of approval for an area in the aforesaid record book. The area may be re-approved per preceding paragraph.

4. All personnel required to install roof supports shall immediately be informed of an approved roof control plan and any changes in a previously approved roof control plan, and all provisions of the plan or any revision thereof will be explained to all underground employees within three weeks.

WHERE ROOF BOLTS ARE REQUIRED:

1. Upon completion of the loading cycle, a reflectorized warning device, such as a "stop" sign, shall be conspicuously placed to warn persons approaching any area that is not permanently supported. It is to be emphasized that the warning device has been placed to cause the person to stop, examine, and evaluate the roof and rib conditions prior to entering the area----even though temporary supports have been installed.

2. After the loading cycle is completed, only those persons engaged in installing temporary supports or roof bolting shall be allowed to proceed beyond the last row of permanent supports. Before any person proceeds inby permanently supported roof, a thorough visual examination of the unsupported roof and ribs shall be made. If the visual examination does not disclose any hazardous condition, persons proceeding inby permanent supports for the purpose of testing the roof by the sound and vibration method and installing supports, shall do so with caution and shall be within 5 feet of a temporary or permanent support. If hazardous conditions are detected, corrective action shall be taken to provide adequate protection to the workmen in the area involved.

When installing permanent supports, the original temporary supports may be repositioned before permanent supports are installed. One or more temporary supports must be installed prior to removal of the original temporary supports. After permanent supports are installed, any or all temporary supports may be removed.

Work such as extending line curtains, other ventilation devices or making methane tests inby the roof bolts shall be done at the line of last temporary support. In an unbolted entry the fireboss shall travel between the row of temporary posts and the rib.

Where crossbars or roof bolts are being installed in an area where roof failure is indicated, a minimum of two rows of temporary supports shall be installed on not more than 5 foot centers across the place so that the work in progress is done between the installed temporary supports and adequate permanent supports in sound roof.

3. (a) Where loose material is being taken down, a minimum of two temporary supports on not more than 5-foot centers shall be installed between the workmen and the material being taken down unless such work can be done from an area supported adequately by permanent roof supports.

   (b) To enable miners to perform their duties from a safe position without exposure to falling material, a bar of suitable length and design shall be provided on all mobile face-equipment, except haulage equipment, and such bar shall be used when prying down loose material. (The length of bar shall be suitable for the area involved in its use, i.e., construction areas, roof falls, and other mining areas require a bar of suitable length.)

4. All metal jacks shall be installed with a cap block between the jack and the roof unless an oversized, non-metal bearing plate of not less than 36 square inches is provided.

5. In each active working place where 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 25 feet and will be drilled during the bolting cycle.

6. An approved calibrated torque wrench shall be provided on each roof bolting machine in operation. Does not apply to resin bolting.

7. (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.

   (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 two rows of posts installed on not more than 4 foot centers across the opening.

8. Immediately after the first bolt is installed in each place, the torque shall be tested and thereafter, at least one roof bolt out of every four shall be tested by a qualified person. If any of the bolts tested do not fall within the required torque range, the remaining previously installed bolts on this cycle shall be tested. Does not apply to resin bolting.

   If the majority of the bolts still fall outside the required torque range, necessary adjustments shall be made immediately. If after these adjustments are made, the required torque ranges are still not obtained, supplementary supports such as different length roof bolts with adequate anchorage, posts, cribs, or crossbars, will be installed.

9. A spot check on torques shall be made during each 24 hour period on at least one roof bolt out of every ten from the outby corner of the last open crosscut to the face. Such torque checks are necessary only in advancing sections in working places producing coal during any portion of the aforementioned 24 hour period. The results of these tests shall be recorded in the onshift examination book. The record shall show the number of bolts tested and the number above and below the required range. Not required for resin bolts.

   If the results show that the majority of the bolts are not maintaining at least 95 foot-pounds of torque supplementary support such as, additional roof bolts with adequate anchorage, posts, cribs, or crossbars shall be installed. Not required for resin bolts.

10. All posts installed under roof that is disturbed or susceptible to sloughing shall have a wooden cap block, plank or crossbar between them and the roof. When crossbars or planks are installed, they shall be blocked to equally distribute the load across their length and in active roadways shall be bolted to the roof.

11. All posts shall be installed on tight footing and not more than two wooden wedges shall be used to install a post.

12. An additional supply of supplementary roof support material to supply 120' of entry shall be provided within two crosscuts outby the working section.

13. (a) Where roof falls have occurred and at all overcasts, boom holes, and other construction sites that require removal of mine roof material, (e.g., by blasting, by ripping with a continuous mining machine, by cutting with a cutting machine, or any other means), the roof shall be considered unsupported. If miners are required to enter such areas, either to travel over the fallen material, to clean it up, or to perform other duties, the roof shall be supported adequately. Mine management shall devise and have posted in writing at the scene of such unsupported roof, a plan incorporating the following procedures:

    1) Such work shall be under the direct and, unless the miners are

specially trained to do such work, constant supervision of a certified person.

2) Adequate temporary support on not more than 5-foot centers should be set at the edge of the fall where work is to be started. A minimum of four posts or jacks shall be used.

3) Installation of supports shall proceed from permanently supported roof to the temporary supports before other work is performed and roof supports shall be advanced as clean-up work progresses.

5) Where necessary to load material before support can be set, such loading shall be done from areas of permanent support with the operator and other persons in the area under supported roof at all times.

6) Where feasible, permanent supports shall be placed in the entire fall area before loading starts.

(b) All roof falls in active working areas and other areas of unsupported roof that are not being cleaned up shall be posted off at each entrance to the fall and unsupported areas by at least two rows of posts (or the equivalent) installed on not more than 5-foot centers across the opening.

14. All roof falls in the active workings that have not been cleaned up and bolted, shall be posted off at each entrance to the area by a double row of posts installed on not more than 5-foot centers.

15. Devices such as sperical washers, angle washers, or slotted wood wedges, should be used to compensate for the angle when roof bolts are installed at angles greater than 5 degrees from the perpendicular to the roof line.

16. All roof bolt materials shall be stored and handled in such a manner that will minimize rusting and/or damaging.

17. Where rib sloughing causes entry dimensions in excess of 20 feet, additional support in the form of roof bolts or timbers will be installed. Entries in excess of 23' will be supported with timber as the additional support.

18. A suitable roof sounding device shall be provided with all mobile face equipment, except haulage equipment. If face workmen who are not operators or helpers on such equipment do not carry a roof sounding device, such device shall be available within 50 feet of their working area.

NOTE: Part 50, Title 30, Code of Federal Regulations, provides that all unitentional roof falls described therein shall be investigated and the results of the investigation shall be maintained in accordance with Section 50.11 30 CFR, Part 50. Such falls shall also be shown on a map of the mine. Failure to do so will be a violation of Part 50.

SAFETY PRECAUTIONS FOR RESIN GROUTED RODS

1. All safety precautions required in the regular roof control plan will be followed, except the torque test required for conventional-type roof bolts will not apply. If failure occurs, the bolting operation will discontinue until the reason for failure has been determined. If the reason for failure cannot be determined, changes in the roof bolting procedure will be made to adequately support the roof, or supplemental supports will be used.

2. Persons responsible for the installation of resin rods will be taught the installation procedures recommended by the manufacturer, including the safe handling precautions of the resin material.

3. Drill steels will be equivalent in length to the rods used or adequately marked to assure proper hole depth. Each drill hole will be filled the entire length with resin.

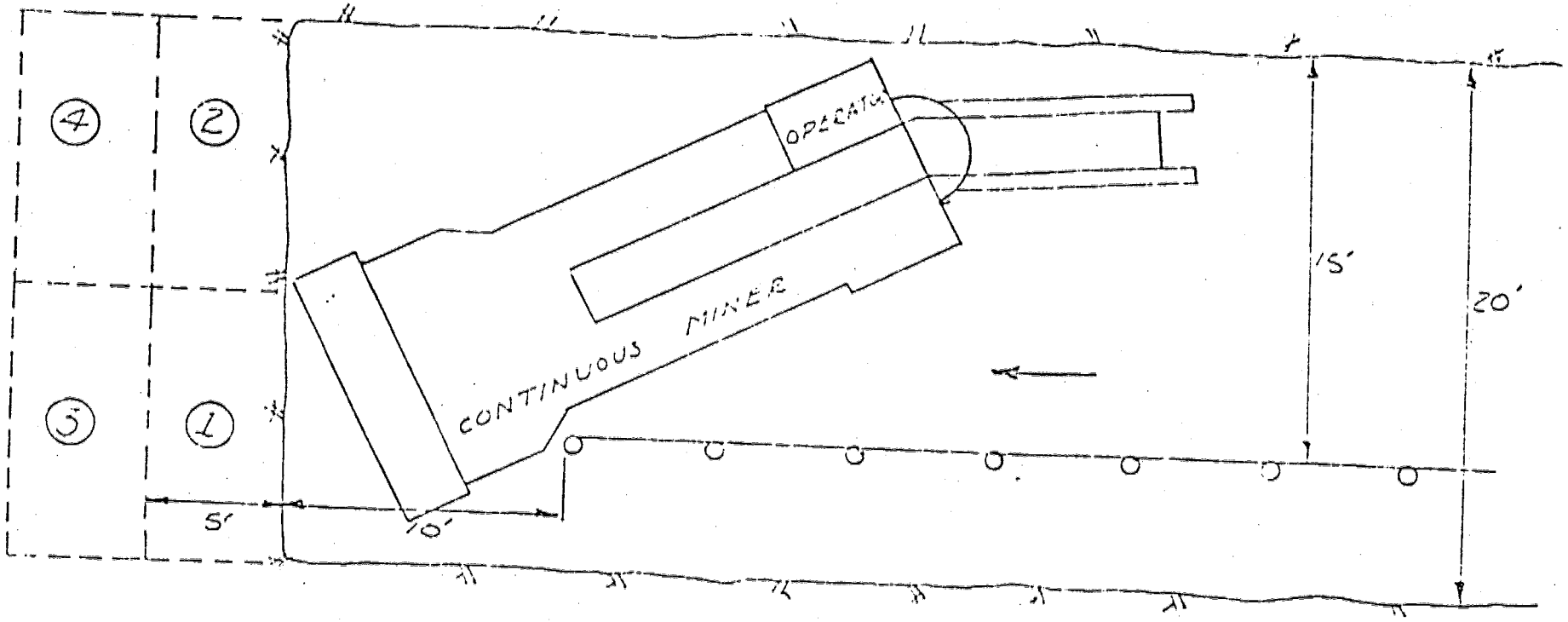
4. All resin grouted rods will be used with bearing plates approved for use. The bearing plate or the wood material between the bearing plate and the roof will be tight against the mine roof.

5. Resin packages will be stored in an area where the temperature is within the range recommended by the manufacturer.

6. Broken cartridges or cartridges which show signs of deterioration will not be used and will be removed from the mine.

7. Resin grouted rods and conventional roof bolts will not be intermixed during systematic bolting cycles, except that intermixing may occur in areas where supplementary supports are required.

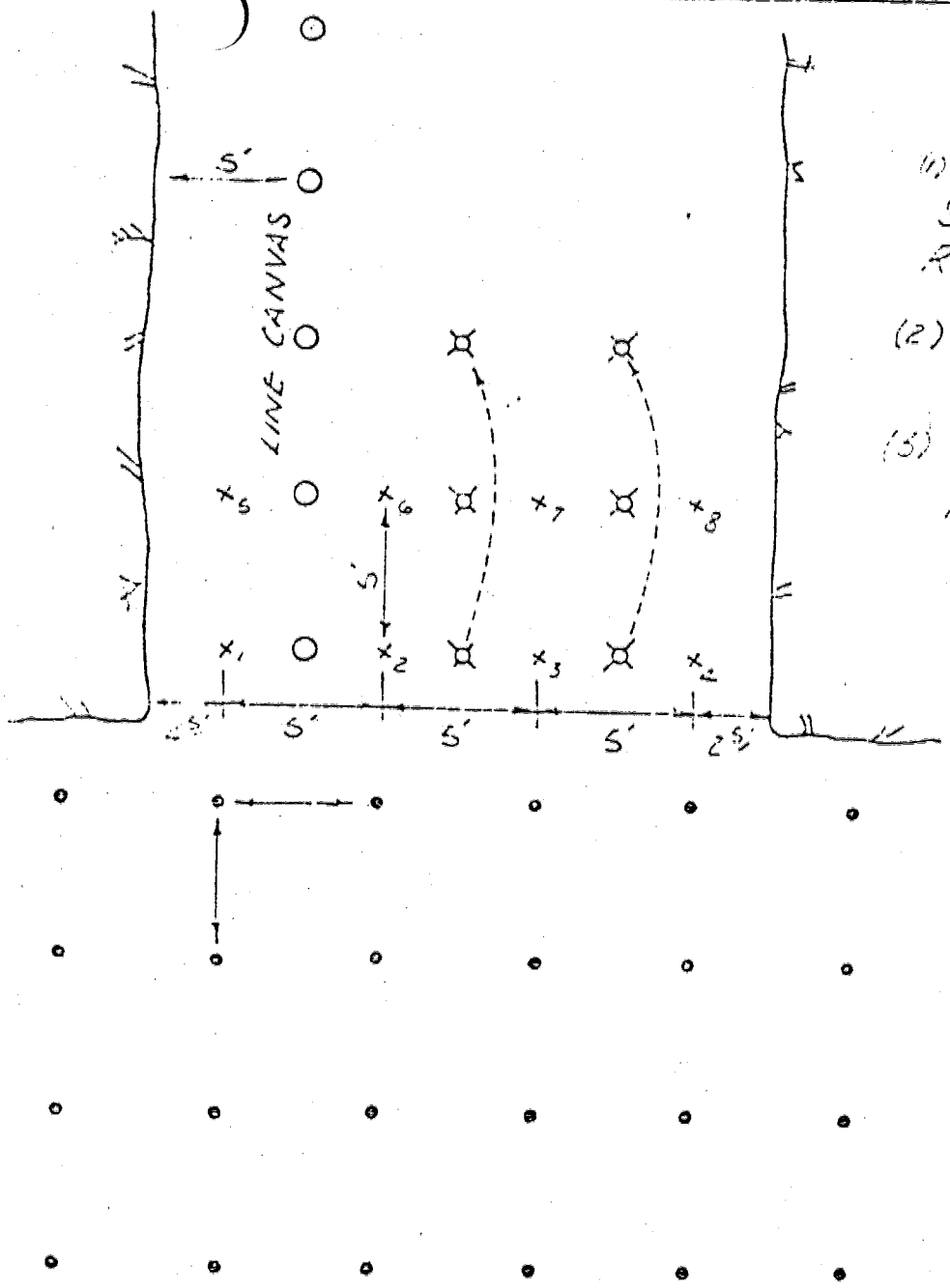
8. Resin cartridges will not be used if the recommended shelf-line has been exceeded, unless written authorization for use is permitted by the manufacturer or an authorized representative of the manufacturer.



1. LINE CANVAS MAY BE ADVANCED AFTER COMPLETING BOX CUT #1

FACE VENTILATION DURING MINING CYCLE

SCALE 1" = 6 FT	REVISIONS	BY	DATE
DATE MAY - 79			
DRN WISE / CKD			
APVD			
TITLE KING MINES		NO	



(1) A MINIMUM OF FOUR TEMPORARY SUPPORTS SHALL BE SET AS SHOWN BEFORE ROOF BOLTING BEGINS

(2) ROOF BOLTS WILL BE INSTALLED IN THE SEQUENCE SHOWN

(3) TEMPORARY SUPPORTS SHALL BE INSTALLED ON 5' CENTERS

• = ROOF BOLT

⌘ = TEMPORARY SUPPORT

O = PROP REMOVED AFTER BOLT IS INSTALLED

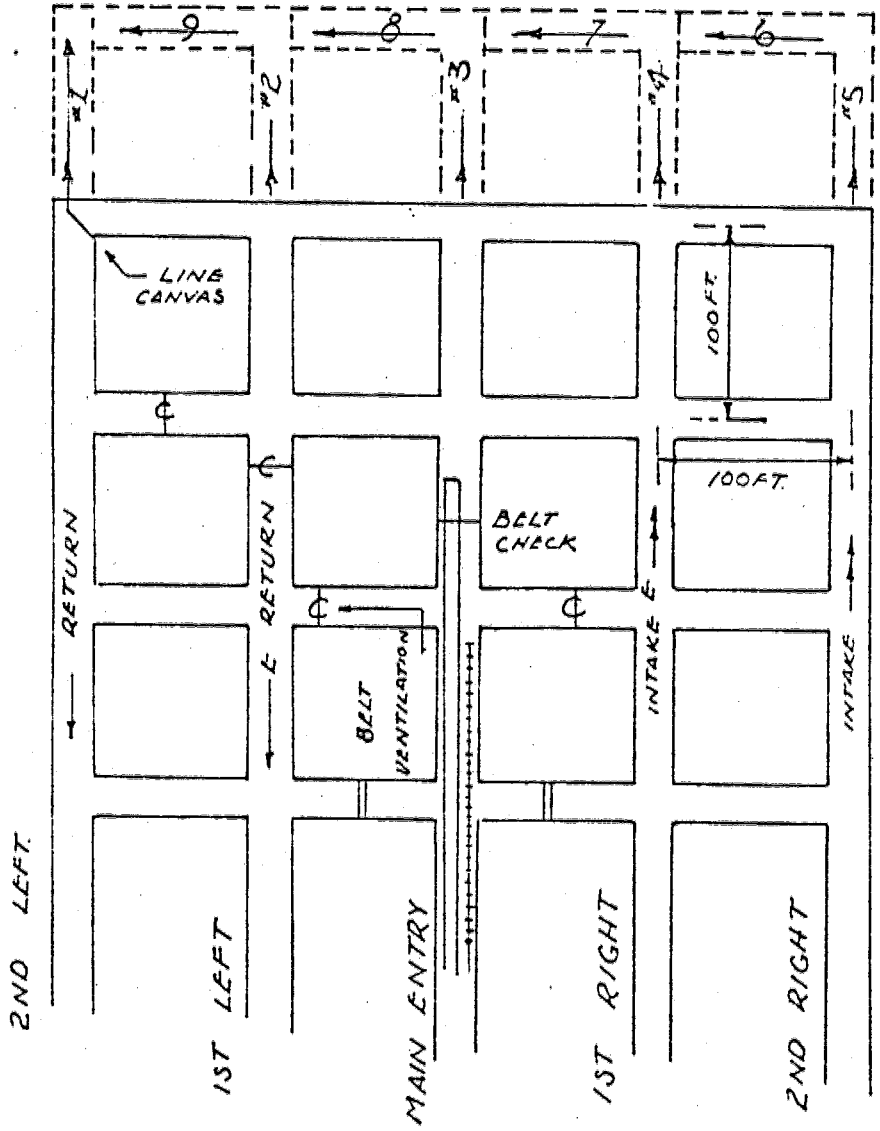
x = FUTURE ROOF BOLT.

TYPICAL ROOF BOLTING PLAN

DRAWN WISE	SCALE 1" = 6 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE APR-1980			

TITLE KING 5 MINE

NO.



NOTES:

1. STEP SEQUENCE MAY VARY SLIGHTLY TO SUIT MINING CONDITIONS ENCOUNTERED.
2. POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 9 (ALL SKETCHES).
3. FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUENCE ACCORDING TO BOX CUT MINING CYCLE SKETCH.

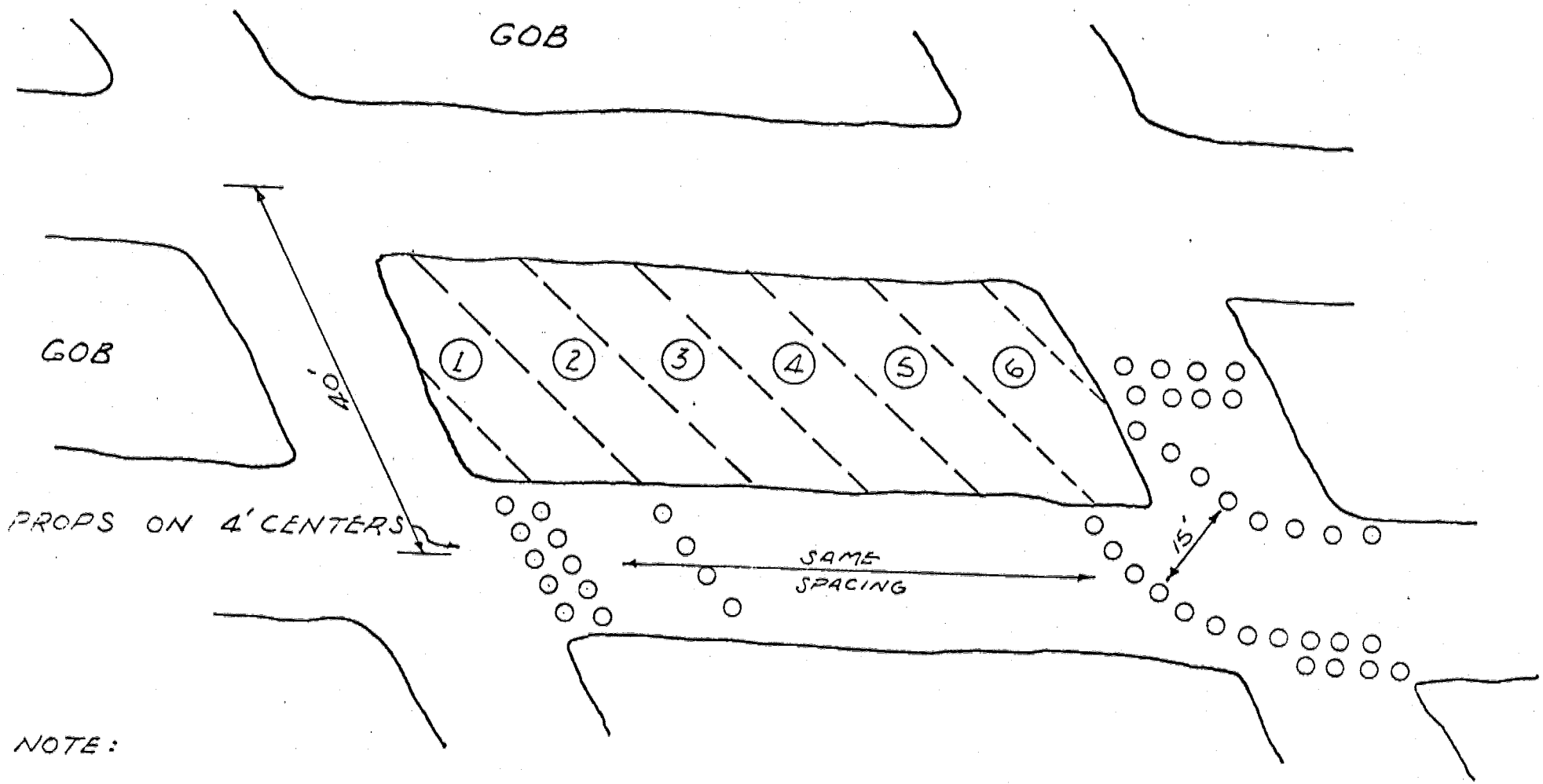
INTAKE
RETURN
ROADWAY CANVAS
STOPPING
ESCAPEWAY

TYPICAL 5 ENTRY DEVELOPMENT
STEP #1 THRU STEP #5

DRAWN WISE	SCALE 1" = 100 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE FACE DEVELOPMENT KING 5 MINE

NO. 6



NOTE:

IF OPEN END PILLARING IS DONE SECTION (75.200-11 (h)(1)(2) SHALL APPLY

ROOMS WILL BE BOLTED

RADIUS TIMBER WILL BE INSTALLED WITH EACH PILLAR LIFT TAKEN

TYPICAL PILLAR EXTRACTION

SECOND MINING FULL PILLAR RECOVERY	
1" = 20' APR 79 A.E.	
KINGS MINES	

Approved

U. S. Department of Labor

Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado 80225

Coal Mine Safety and Health
District 9

October 22, 1980

Errol M. Gardiner
Vice President and General Manager
United States Fuel Company
P. O. Box A
Hiawatha, Utah 84527

Re: King Mine No. 6
I. D. No. 42-01599
Ventilation System and Methane
and Dust Control Plan

Dear Mr. Gardiner:

The ventilation system and methane and dust control plan for the subject mine has been reviewed by MSHA as required by Section 75.316, 30 CFR 75, and is approved. The plan is subject to revision at any time and shall be reviewed by the operator and MSHA at least every six months. Also before any changes are initiated in the plan, they shall be approved by the District Manager.

Sincerely,

John W. Barton
District Manager

Enclosure

Approved 10/22/80
MSHA

VENTILATION PLAN

The operator of the Kine 6 Mine hereby adopts and will follow the following ventilation system and methane and dust control plan and any approved supplements and/or revisions thereof:

A. GENERAL

The following information shall be submitted to the District Manager:

1. Company Name: United States Fuel Company

   Mine Name: King Mine No. 6

   Post Office Address (Town, County, State): P. O. Box A
   Hiawatha, Carbon, Utah

   Telephone Number: (801) 343-2471

   Identification Number: 42-01599

   Operator's Name: Errol M. Gardiner

   Operator's Title: Vice President and General Manager

   Operator's Address: P. O. Box A
   Hiawatha, Utah 84527

   Operator's Telephone No.: (801) 637-1226

2. Indicate if life of mine is: ~~less than one year~~.
   greater than one year.

3. Number of employees:

Surface	0	
Underground	66	Projected
Total	66	

4. The type of face equipment used on each section in the mine.

   Initial Development

   Continuous Miners, Shuttle Cars, Roof Bolters or Stopers, Diesel Scoops, Diesel Mantrips and Front-end Loaders.

5. We are mining the Hiawatha Seam (5' - 9' high).

B. MAIN FAN INSTALLATIONS

1. All main fan installations shall meet or exceed all criteria established in Sections 75.300-2 and 75.300-3, 30 CFR 75.

C. DUST CONTROL PLAN, OUTBY AREAS

1. The following is a description of dust control practices at:

(a) Float dust at transfer points, loading points, and feeder breakers:

A minimum of one spray will be positioned and pointed at the area of greatest dust generation, usually between the top and bottom belt in front of the bottom roller. Recent experiments have indicated the spray system TT 65025 nozzle operating at 60 p.s.i. will adequately abate float dust; however, we reserve the right to substitute nozzles with better performance characteristics at any locations.

(b) Haulageways will be maintained well compacted and in a damp condition.

(c) Underground crushers: Does not apply.

(d) Underground Dumps: Does not apply.

(e) Along belt haulage systems: Areas are cleaned and rock dusted as needed.

(f) Face areas: Rock dust is applied and maintained to within 40' of faces.

(g) All other problem areas: Clean and rock dusted as needed.

2. Methane and Dust Control Practices at Face Area

(a) Line brattice or tubing will be installed at a distance no greater than 15' from the area of deepest penetration to which any portion of the face has been advanced in working faces from which coal is being cut, mined, or loaded; necessary line brattice will be maintained in idle places of active sections to insure adequate ventilation of face areas.

(b-c) A minimum main entry face velocity of 60 ft/min. will be maintained at all working faces and at no time shall there be less than 6,000 c.f.m. of air reachine all working faces where coal is cut, mined, or loaded.

(d) The minimum quantity of air reaching the last open crosscut in any pair of set of developing entries and the last open crosscut in any pair or set or rooms will be 12,000 c.f.m. and

the minimum quantity of air reaching the intake end of a pillar line will be 12,000 c.f.m.

Equipment	Minimum Number of Sprays	Minimum Water Pressure & Sprays	Minimum Flow Rate @ Sprays
No. 5 Miner	32	125 p.s.i.	0.30 gal/min.

90 % of the actual number of sprays shall be maintained.

3. Bleeder Entries

Part 75.316-2 states that the purpose of bleeder entries is to control the methane content in active pillaring areas. A review of the existing King Mine ventilation history has indicated this mine to be clear of methane during its entire operation; therefore:

> At our option, second mining may or may not be done without the use of bleeder systems. However, if methane gas in a quantity of 1% by volume is ever detected in any working section, a bleeder entry system will be established and maintained for all future second mining. Work shall be started immediately on sealing of all second mined areas after the completion of such mining. MSHA will make this determination and re-evaluate the status every six (6) months.

4. ". . .the methane content in any return aircourse other than an aircourse returning the split of air from a working section (as provided in sections 75.309 and 75.310) shall not exceed 2.0 volume per centum. The methane content in the air in active workings shall be less than 1.0 volume per centum or more of methane, changes or adjustments shall be made at once in the ventilation in the mine so that the air shall contain less than 1.0 volume per centum of methane."

5. Methane examinations are conducted by:

   (a) The examiner never goes beyond permanent or temporary support to make gas checks during the time that the face is being advanced.

6. The mining system shall be designed in accordance with a plan that is adopted by the operator so that as each working section of the mine is abandoned, it can be isolated from the active workings of the mine with explosion proof seals.

   (a) Location of seals: Does not apply at this time.

   (b) See attached drawing of our proposed seal.

7. Ventilation of an Abandoned Area - Work to seal off pillared sections will began immediately following completion of production, and shall continue in a diligent manner until sealing is complete.

8. Maximum distance involved in a belt move will be 300 feet with temporary brattice stoppings installed immediately after a belt move to insure proper isolation.

D. SECTION AND FACE VENTILATION SYSTEM

1. See attached sketches for the complete section and face ventilation system.

2. See attached sketches for ventilation controls in the belt haulage entries.

3. Control of ventilation of adjacent pillaring to insure no air reversal onto an active section - Does not apply at this time.

4. Coal will not be permitted to accumulate at outby end of the face equipment to the extent that ventilation of the working face is restricted.

5. Maintain 120 p.s.i. through all sprays on the miner.

E. PERMANENT STOPPINGS AND OTHER DEVICES

1. All ventilating devices such as stoppings, overcasts, undercasts, and shaft partitions shall be of substantial incombustible construction installed in a workmanlike manner and maintained in a condition to serve the purpose for which they were intended, and any stopping leaking air excessively shall be repared immediately.

2. Permanent stoppings shall be erected between the intake and return aircourse and shall be erected to and including the third connecting crosscut outby the faces of the entries. Whenever the third connecting crosscut is broken through, work shall be started on building the stopping as soon as possible and shall be completed within 48 hours.

3. Metal stoppings supported with approved fire retardant treated wood or wood coated with "Stoppit" may be used for belt isolation or intake escapeway separation stoppings. Timbers laid longitudinally "Skin to Skin", and packed with rock dust may be used in heavy squeezing areas. The face of the "Wood" stopping must be given a complete coat of plaster.

4. The following information shall be submitted for all types of stoppings:

   (a) A complete list of all materials used in the construction of the stopping.

(1) Block Stoppings - Materials used: (8"x8"x16") cinder or cement blocks, mortar or cement mix. The stoppings are laid up on clean substantial bottom, tied into the ribs with staggered courses with mortared joints. The periphery of the stopping is plastered with a mortar mix to make it air tight. (See ataached sketch). If stoppings are to be laid without mortared joints, as in short lived entries, the intake side must be coated with at least 5/8" of mortar, or both sides must be coated with at least 1/8" of BlockBond or Surewall, or both sides must be coated with at lease 1/2" of mortar.

(2) Kennedy Stoppings - Materials used: MP526 Rib Angles, MP-511 Twist Clamp, Standard Pans, MP-506 Lap Over Clamp, MP-511 Twist Clamp, MP-530 Roof Pin. See attached sketch for construction detail.

(3) Temporary Stoppings - Plastic coated nylon is used as a temporary check-in breakthrough, road checks and face ventilation.

(4C) Permanent Stoppings - Will be used in the Mains. Estimated life: Life of the mine. Intended use: Belt isolation, return airways, intake airways, and track isolation.

F. DIESEL EQUIPMENT

If this type of equipment is used, U. S. Fuel Company will:

1. Comply completely with the manufacturer's operating instruction and maintenance manuals.

2. The atmosphere in the operator's compartment shall be sampled daily with the engine running; and if the analyses of these samples exceed five parts per million NO_2 or fifty parts million of carbon monoxide, or both, corrective measures must be taken immediately.

3. The atmosphere in the return from any working place where diesel-powered equipment is being used shall be tested at least once each shift while the equipment is in operation, and if the analyses of these samples exceed five parts per million NO_2 or fifty parts per million CO, or both, corrective measures shall be taken immediately.

4. The date, time of sampling, machine identification, and the analyses obtained should be recorded in a book maintained for this purpose.

G. USE OF AUXILIARY FANS/OR MACHINE-MOUNTED DIFFUSERS, UNDERGROUND

If this type of equipment is used, U. S. Fuel Company will adopt the following:

1. The fan shall be of a permissible type, maintained in permissible

condition, so located and operated to avoid any recirculation of air, and examined once every four hours when in use. The examiner shall place his initials, date and the time near the fan.

(a) Fans operating blowing shall be installed in the positive intake air current of the place to be ventilated by the fan, and the volume of such positive intake air current shall be greater than the free discharge capacity of the fan.

(b) Fans operating exhausting shall be installed in the return air current from the place to be ventilated by the fans, and the volume of positive intake air current available at the entrance to the place (at the crosscut or other point of entry) to be ventilated with exhaust fans shall be greater than the free discharge capacity of the fan.

2. All face ventilation systems using auxiliary fans and tubing or machine-mounted diffusers shall be approved under the provisions of Section 303(o) of the Act. (Subsection 75.316 of the Federal Regulations).

* 3. If a machine-mounted diffuser is used in conjunction with fan tubing or exhaust line brattice, the intake end of the diffuser shall be located outby the intake end of the exhaust tubing or line brattice.

4. See attached drawing.

5. <u>Auxiliary Fan</u>

Manufacturer:	Spendrup & Associates
Model:	AMP-170-50
Motor:	Reliance 1.15 SF - 50 HP - 3550 RPM 460 V.A.C. 60 Cycle 3-phase Class F.
Blade Position:	18°
Free Dishcharge Capacity:	20,750 C.F.M.
Tubing:	Ventduct 62FR from Spendrup 24" Inside Diameter

The fan will operate exhausting.

6. When machine mounted diffuser fans (auxiliary fans) are employed, indicate by drawing or sketch:

(a) Mining machine in the working place with all dimensions shown, and the positioning of the machine-mounted diffuser, continuous miner operator, and brattice or tubing of the face ventilation.

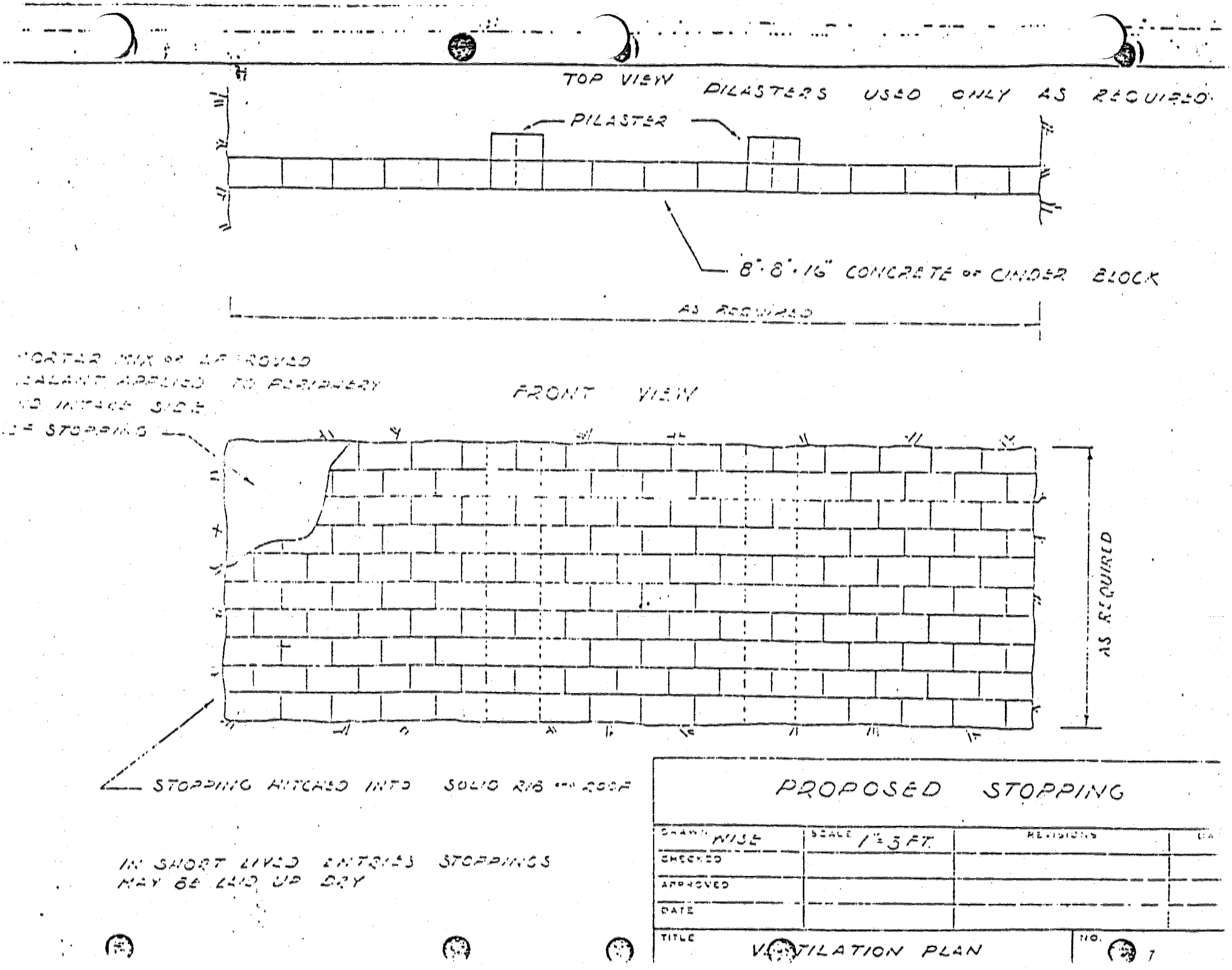
* A detailed plan must be approved prior to using any type of machine mounted ventilation unit [illegible]

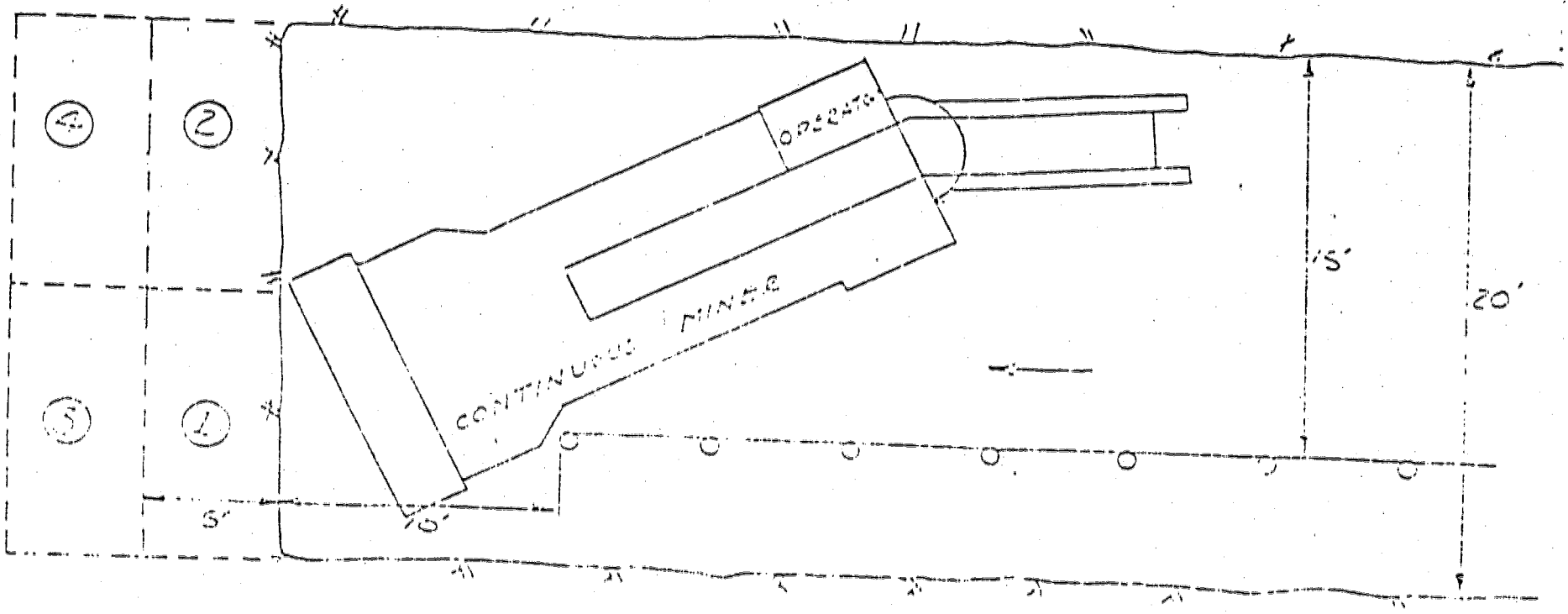
(b) The method and sequence of mining in each working face during the section production cycle, when driving entries, crosscuts, and pulling pillars, showing the position of the mining machine, position and location of the line brattice or other approved ventilation device, and the quantity of air passing through the machine-mounted diffuser, and the minimum air quantity provided by the line brattice or other approved device under operating conditions.

H. MINE MAPS

1 & 2 mine maps will be updated and submitted for the six month period ending July 2, and January 1.

Errol M. Gardiner,
Vice President & General Manager

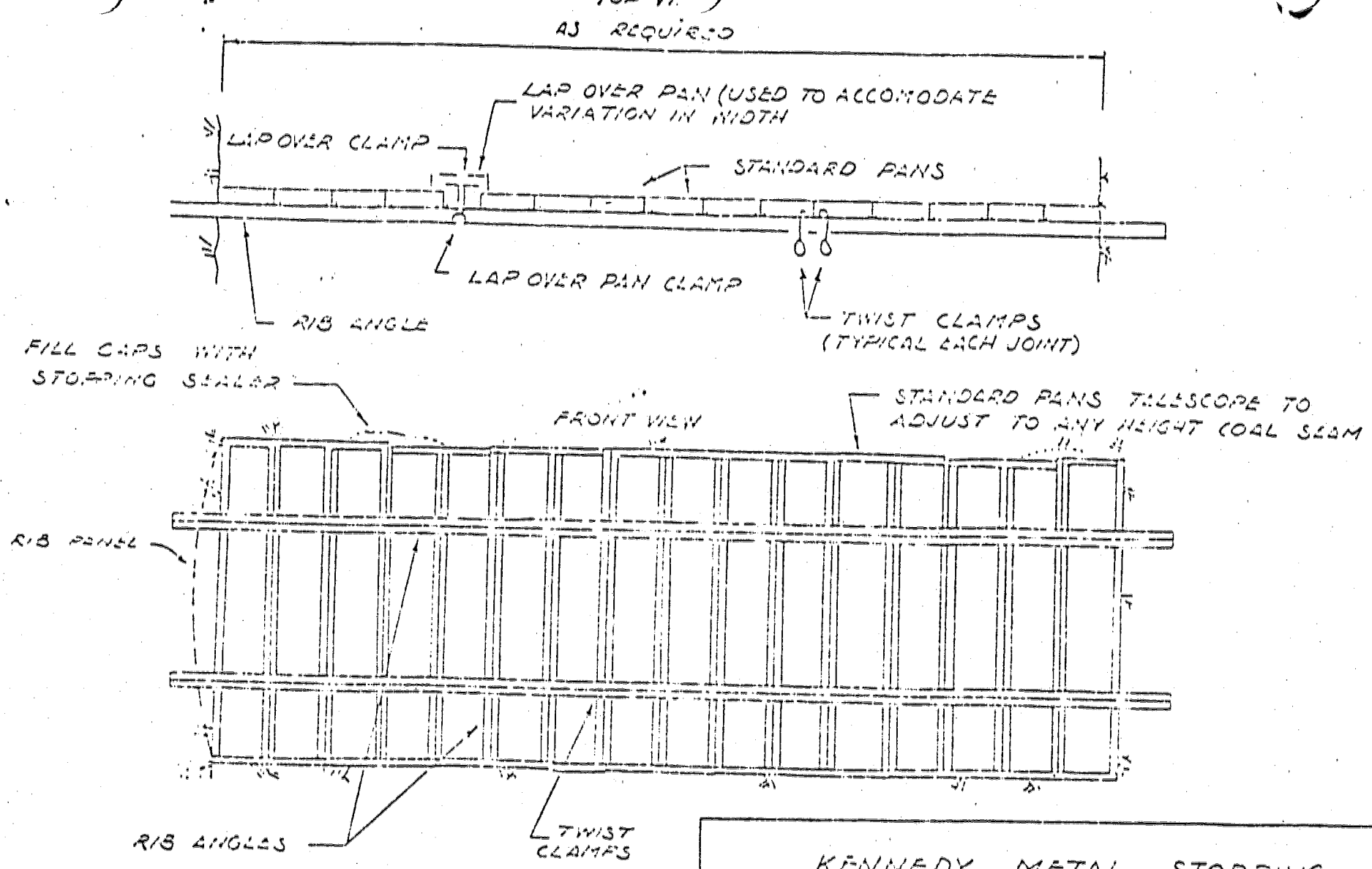

TOP VIEW
PILASTERS USED ONLY AS REQUIRED
PILASTER
8"·8"·16" CONCRETE OR CINDER BLOCK
AS REQUIRED
MORTAR MIX OR APPROVED
SEALANT APPLIED TO PERIPHERY
TO INTAKE SIDE
OF STOPPING
FRONT VIEW
AS REQUIRED
STOPPING HITCHED INTO SOLID RIB OR ROOF
IN SHORT LIVED ENTRIES STOPPINGS
MAY BE LAID UP DRY
PROPOSED STOPPING
DRAWN NISE
SCALE 1" = 5 FT.
REVISIONS
CHECKED
APPROVED
DATE
TITLE
VENTILATION PLAN
NO.
7



1. LINE CANVAS MAY BE ADVANCED AFTER COMPLETING BOX CUT #1
2. BOOD CAN MINIMUM AMOUNT OF AIR SUPPLIED TO THE WORKING FACE.
3. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.
4. Ventilation device shall be maintained to within 15 ft. of the face at all times. APK MSHA

FACE VENTILATION DURING MINING CYCLE

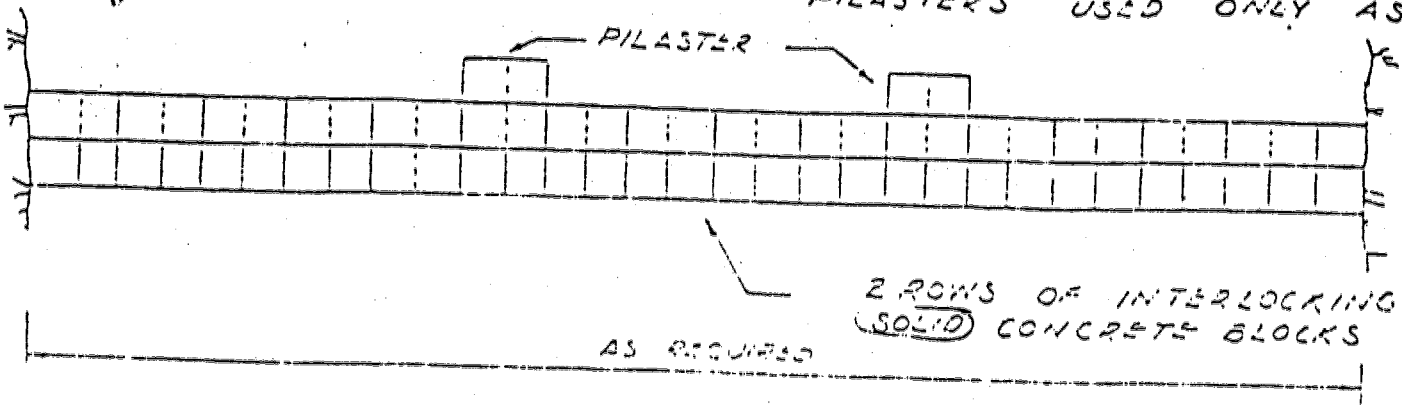
DRAWN Y. GIAT	REVISIONS	BY	DATE
DATE MAY 79			
SCALE NONE	CAD		
APPD			
TITLE KING MINES		NO	



RIB PANELS MADE OF WOOD WILL BE COATED ON BOTH SIDES WITH AN APPROVED SEALANT.

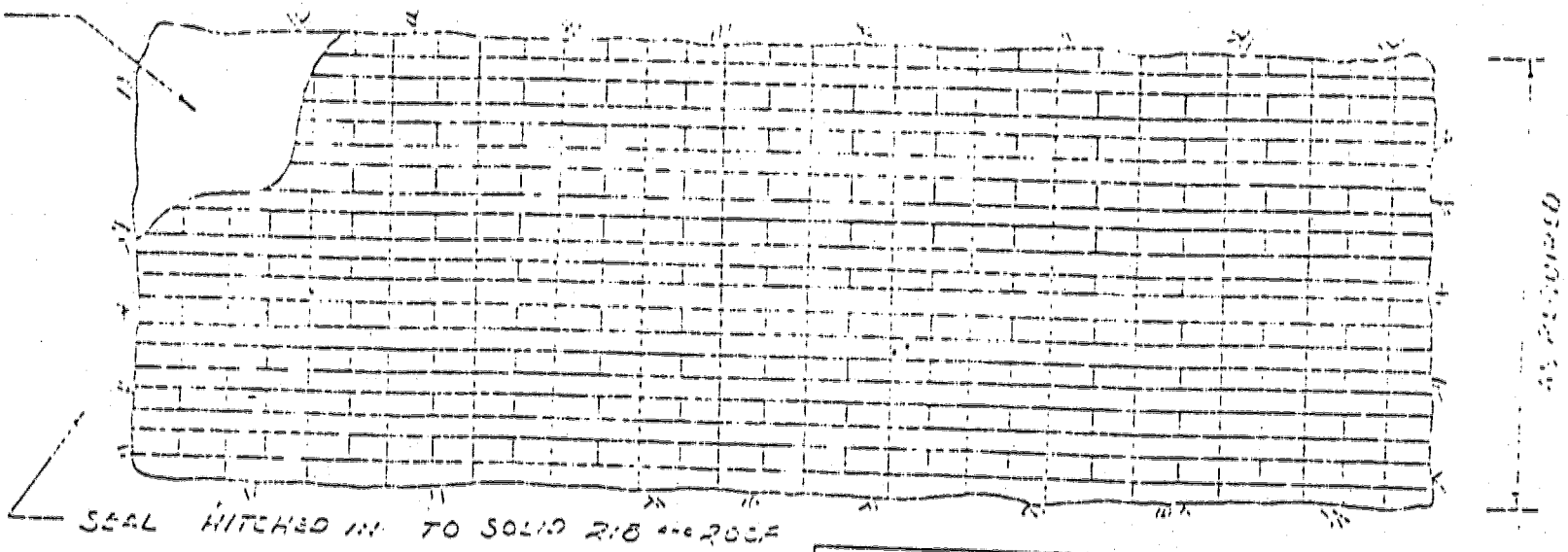
KENNEDY METAL STOPPING			
DRAWN WISE	SCALE 1" = 3 FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			
TITLE VENTILATION PLAN KING MINES			NO. 3

TOP VIEW PILASTERS USED ONLY AS REQUIRED



TAR MIX AS APPROVED
NOT APPLIED TO PERIPHERY
OF FACE SIDE
OF SEAL

FRONT VIEW



PROVIDE DRAIN PIPE WHEN NECESSARY
SURVEILLANCE TUBE TO BE INSTALLED IN HIGHEST SEAL
OF PARTICULAR SECTION BEING SEALED.
ALTERNATING COURSES TO BE LAID STAGGERED AND
TRANSVERSE TO THE PRECEDING COURSE

DUE TO THE FACT THAT THERE HAS NEVER BEEN A METHANE
BUILD UP AT THE KING MINE - VENTILATION PIPES WILL BE OMITTED

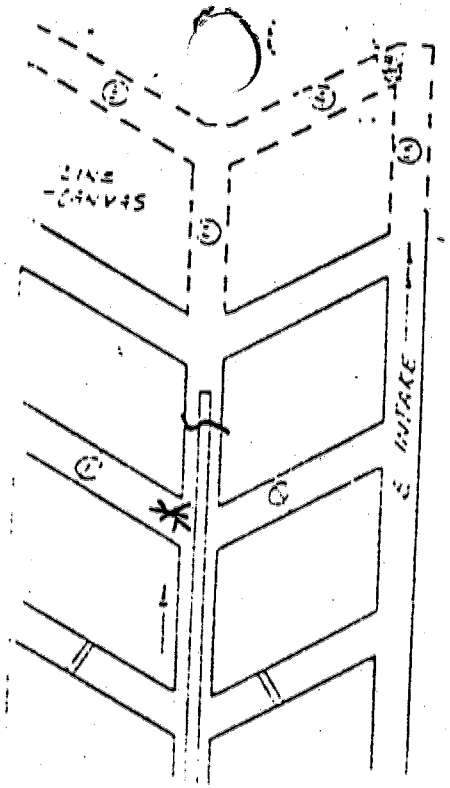
PROPOSED SEAL

PREVIOUSLY APPROVED FOR KING 4 MINE

DRAWN WISE	SCALE 1" = 3' FT.	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE VENTILATION PLAN KING MINES

NO. 2



NOTES:

(1) STEP SEQUENCE MAY VARY TO SUIT MINING CONDITIONS ENCOUNTERED

(2) POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 7

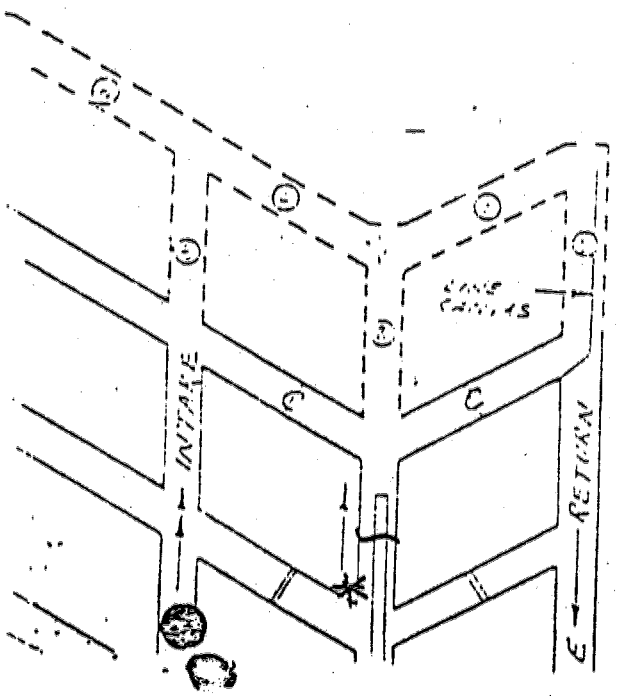
(3) FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUE ACCORDING TO THE BOX CUT MINING CYCLE SKETCH.

(4) AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.

(5) CHECK CURTAINS WILL BE PLACED ACROSS THE TRACK AND BELT ENTRY ONLY WHEN THE AIR IS NOT NEEDED TO VENTILATE THE FACES

* Belt entry shall not be used to ventilate the faces. 24PK MSHA 11/27/80

Kennedy stoppings may be used between the belt and intake entry.

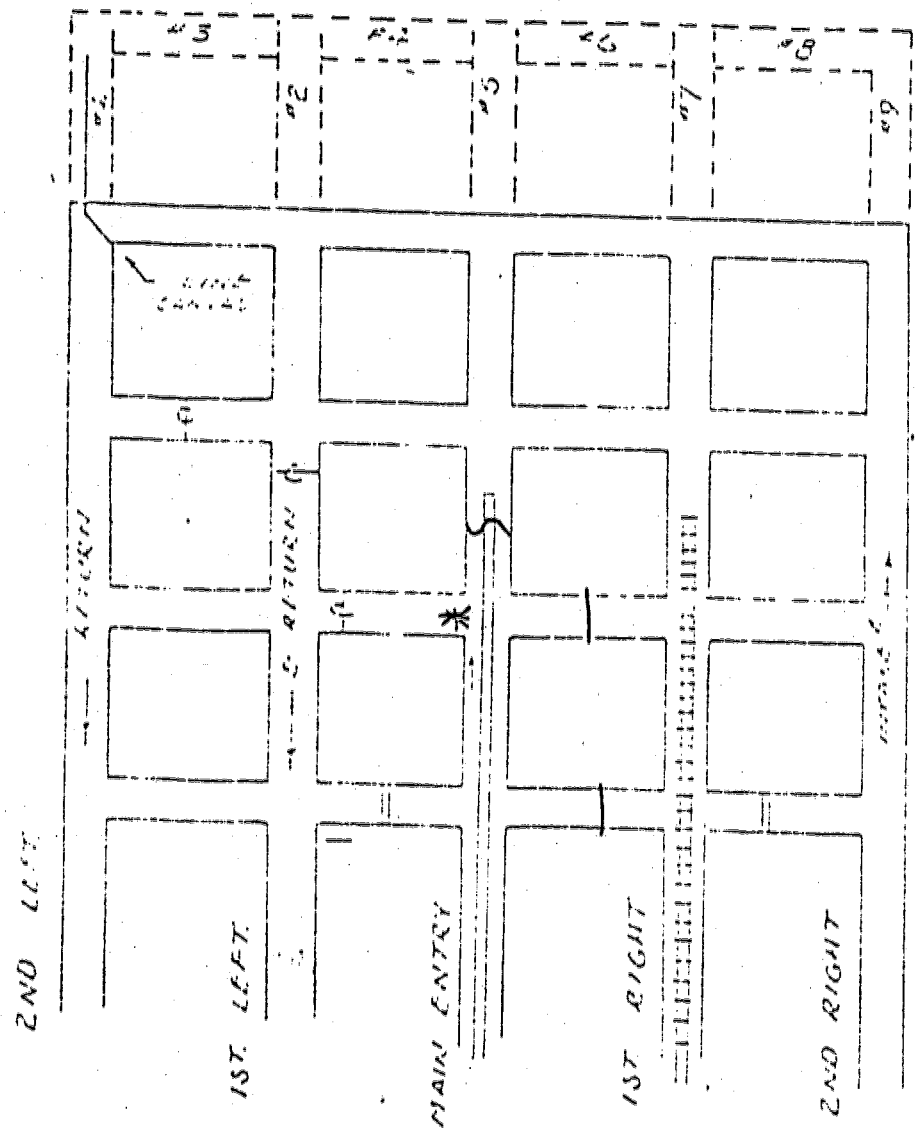


INTAKE
RETURN
CANVAS
E ESCAPEWAY

TYPICAL 3 AND 4 ENTRY DEVELOPME

DOWN MINE 1"=100'

FACE VENTILATION
RING MINE



* Belt air shall not be used to ventilate faces. SVPK MSHA 4/23/90

NOTES

1. STEP SEQUENCE MAY VARY SLIGHTLY TO SUIT MINING CONDITIONS ENCOUNTERED.
2. POSITION OF LINE CANVAS OMITTED FOR CLARITY - STEPS 2 THRU 9 (ALL SKETCHES)
3. FACE VENTILATION WILL BE MAINTAINED IN EACH MINING SEQUENCE ACCORDING TO BOX CUT MINING CYCLE SKETCH.
4. AUXILIARY FANS MAY BE USED IN PLACE OF LINE CANVAS.
5. CHECK CURTAINS WILL BE PLACED ACROSS THE TRACK TO BELT ENTRY ONLY WHEN THE AIR IS NOT NEEDED TO VENTILATE THE FACES.

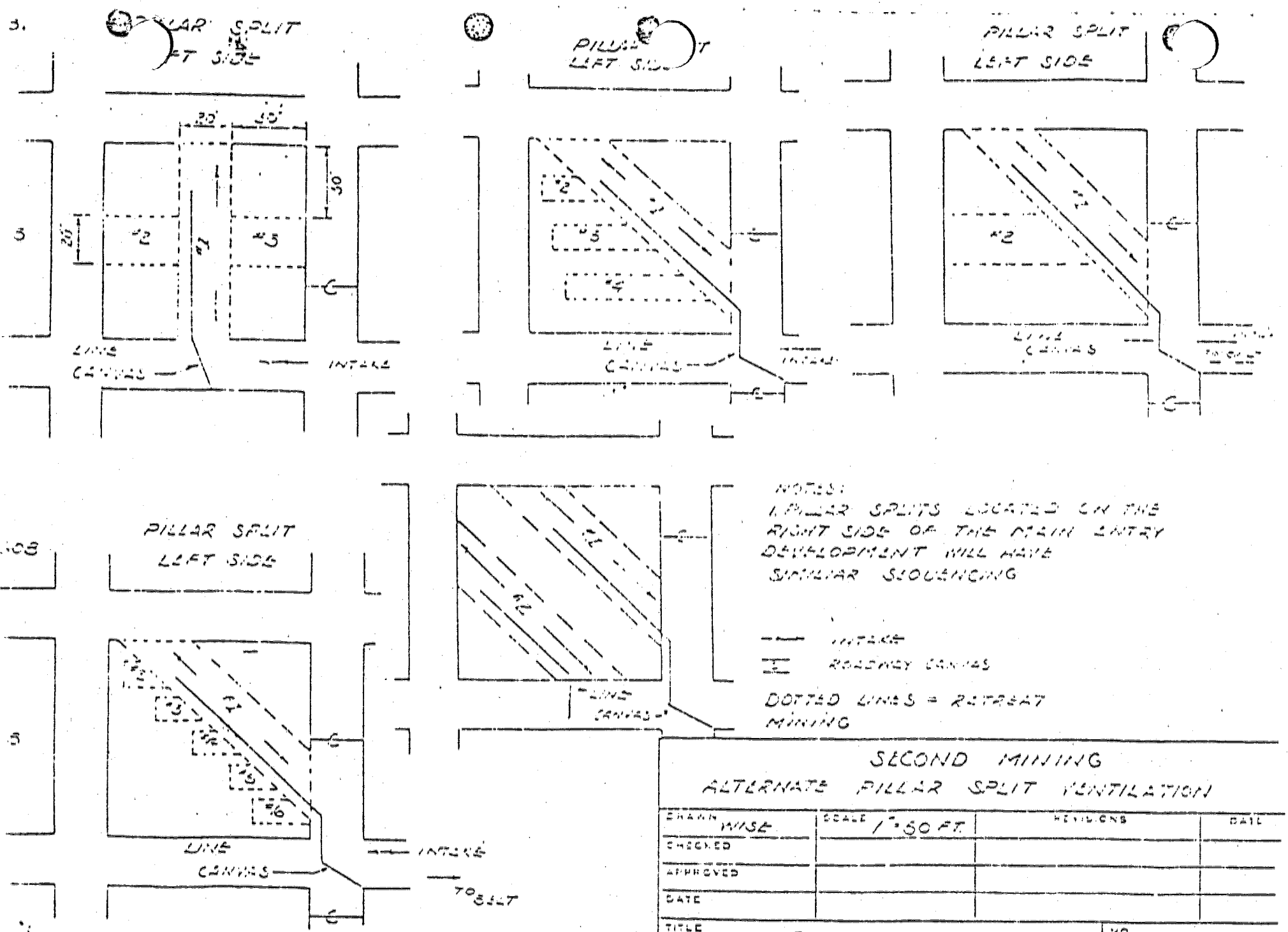
INTAKE
RETURN
SECONDARY CANVAS
STOPPING
ESCAPEWAY

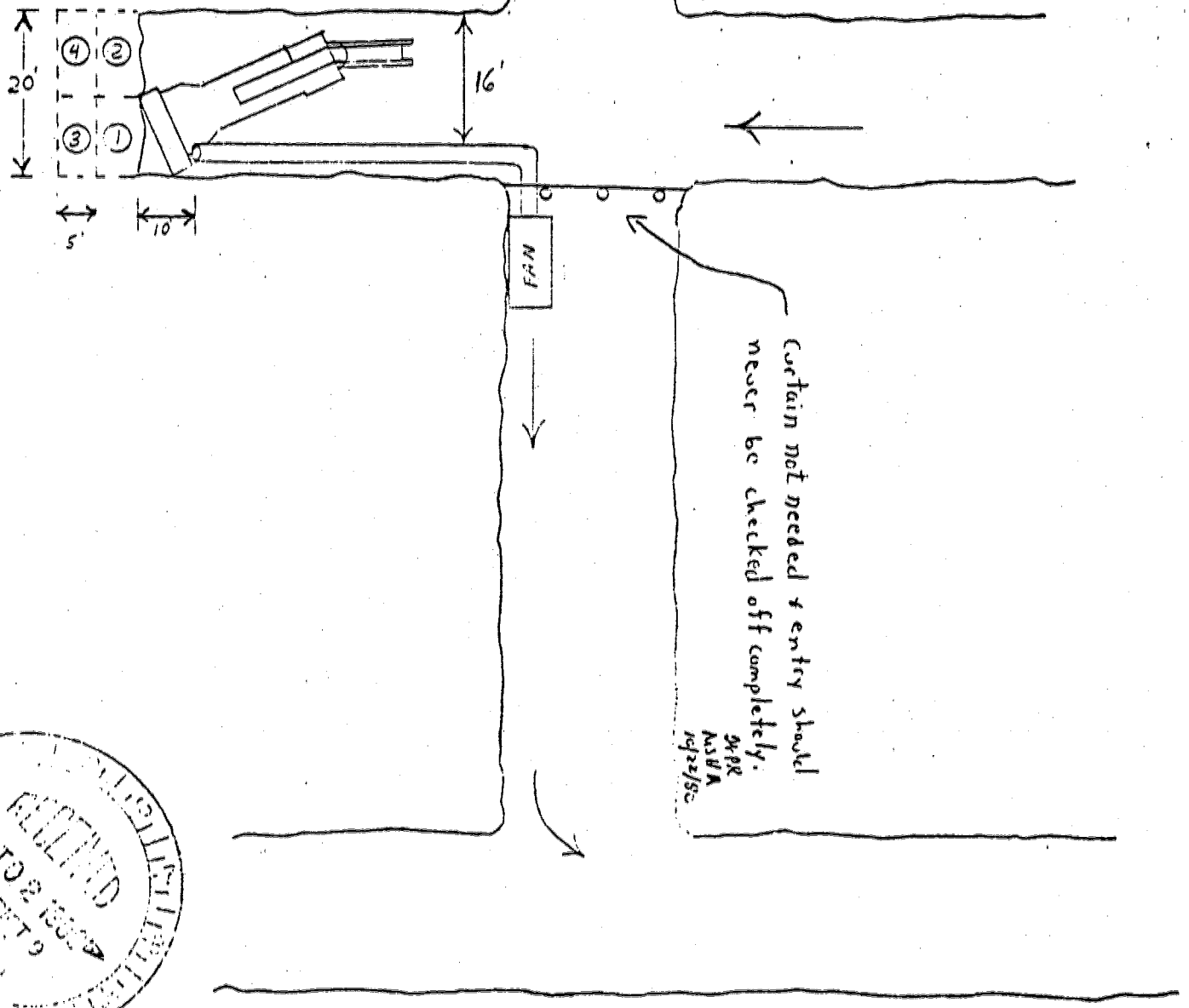
TYPICAL S ENTRY DEVELOPMENT
STEP #2 THRU STEP 9

DRAWN	SCALE/FORMAT	REVISIONS	DATE
CHECKED			
APPROVED			
DATE			

TITLE FACE VENTILATION KING MINE.

NO. 7


PILLAR SPLIT
LEFT SIDE
20'
40'
30'
20'
#2
#1
#5
LINE
CANVAS
INTAKE
PILLAR SPLIT
LEFT SIDE
#2
#3
#4
#1
LINE
CANVAS
INTAKE
PILLAR SPLIT
LEFT SIDE
#2
#1
LINE
CANVAS
TO BELT
PILLAR SPLIT
LEFT SIDE
#1
#2
#3
#4
#5
#6
LINE
CANVAS
INTAKE
TO BELT
#1
#2
LINE
CANVAS
NOTES:
1. PILLAR SPLITS LOCATED ON THE RIGHT SIDE OF THE MAIN ENTRY DEVELOPMENT WILL HAVE SIMILAR SEQUENCING
INTAKE
ROADWAY CANVAS
DOTTED LINES = RETREAT MINING
SECOND MINING
ALTERNATE PILLAR SPLIT VENTILATION
DRAWN WISE
SCALE 1" = 50 FT.
REVISIONS
DATE
CHECKED
APPROVED
DATE
TITLE
FACE VENTILATION
KING MINES
NO.
4



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OCT 28 1980
DIVISION OF OIL, GAS & MINING

SCALE: 1" = 20'	DATE	UNITED STATES FUEL CO. HIAWATHA, UTAH	Typical Auxiliary Fan installation Phase I King Six mine	NO.
DR'N: CM.	AUG. 14 1980			L-
CKD:	AP'VD:			

Appendix III -5

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APPENDIX III-5

Earthwork Quantity Calculations

-North Fork
-Middle Fork
-South Fork
-Hiawatha Site

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MAR 1985
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OIL, GAS & MINING

APPENDIX III-S

Ford, Bacon & Davis, Incorporated
UTAH DIVISION

CALCULATION COVER SHEET

JOB NO.	PROJECT	SITE OR PHASE	CALC. NO.
UC-528-302	U.S. FUEL PERMIT	NORTH FORK	C-1

TITLE/SUBJECT

EARTHWORK QUANTITY CALCULATIONS

STATEMENT OF PROBLEM

DETERMINE CUT AND FILL VOLUMES

SOURCES OF DATA

U.S. FUEL TOPS MAPS
RECLAMATION MAPS BY FB&D

SOURCES OF FORMULA & REFERENCES

REV. NO.	DATE	DESCRIPTION/STATUS	ORIGINATOR	CHECKER	PROJECT MGR.	QA	DATE

U.S. Fuels North Fork — PROJECT NAME
UC528 — JOB NO.
DMW — BY
CHECKED
OF SHEET

CUT END AREA	CUT SUM	CUT FACTOR	CUT DIST.	FILL END AREA	FILL SUM	FILL FACTOR	FILL DIST.	STATION	VOLUME IN CUBIC YARDS CUT	FILL	FILL + 5 %	BALANCE POINT	MASS DATA
0				0				F-F (-)	0	0			
0	0	.5	30	0	0	.5	30	F-F	133	343			
144	144	.5	50	370	370	.5	50	E-E	426	754			
316	460	.5	50	444	814	.5	50	D-D	1,036	788			
803	1,119	.5	50	407	851	.5	50	A-A	1,135	771			
423	1,226	.5	50	426	833	.5	50	B-B	392	410			
0	423	.5	50	17	443	.5	50	C-C	0	5			
0		.5	15	0	17	.5	15	C-C+					
									3,122	3,071	3,225		
				0				F-F (-)		6			
				10	10	.5	30	F-F		77			
				73	83	.5	50	E-E		140			
				78	151	.5	50	D-D		154			
				88	166	.5	50	A-A		153			
				77	165	.5	50	B-B		87			
				17	94	.5	50	C-C		5			
				0	17	.5	15	C-C+					
										622			

Ford, Bacon & Davis Utah Inc.
SALT LAKE CITY, UTAH
ENGINEERING / DESIGN MANUAL

SITE PREPARATION & DRAINAGE
STANDARD FORM
AREA VOLUME—BALANCE SHEET

4-SF-02
REV. 0
4/77
SHEET 1/1

51-SF-08

Ford, Bacon & Davis, Incorporated
UTAH DIVISION

CALCULATION COVER SHEET

JOB NO.	PROJECT	SITE OR PHASE	CALC. NO.
UC-528-302	U.S. FUEL PERMIT	HIAWATHA SITE	C-4

TITLE/SUBJECT

EARTHWORK QUANTITY CALCULATIONS

STATEMENT OF PROBLEM

DETERMINE CUT AND FILL VOLUMES

SOURCES OF DATA

U.S. FUEL TOPO MAPS
RECLAMATION MAPS BY FB&D

SOURCES OF FORMULA & REFERENCES

REV. NO.	DATE	DESCRIPTION/STATUS	ORIGINATOR	CHECKER	PROJECT MGR.	QA	DATE
1	6/8/86	New Sheet					

U.S. FUEL MIDDLE FORK SITE — PROJECT NAME
JOB NO.
R. E. — BY
CHECKED
1 OF 1 — SHEET

CUT				FILL				STATION	VOLUME IN CUBIC YARDS				MASS DATA
END AREA	SUM	FACTOR	DIST.	END AREA	SUM	FACTOR	DIST.		CUT	FILL	FILL + 1.05 %	BALANCE POINT	
0				0				0					
	0		50		1425		50		0	1319	1385		
0				1425				L-L					
	0		80		4375		80		0	6481	6806		
0				2950				C-C					
	0		125		7250		125		0	16782	17622		
0				4300				D-D					
	100		150		7125		150		278	19792	20781		
100				2825				B-B					
	3525		103		4625		103		6724	8822	9263		
3425				1800				E-E					
	7525		125		2375		125		17419	5498	5773		
4100				575				F-F					
	12 200		125		575		125		28241	1331	1398		
8100				0				G-G					
	8288		125		113		125		19 185	261	275		
188				113				H-H					
	313		250		1038		250		1449	4806	5046		
125				925				J-J					
	175		250		1050		250		810	4861	5104		
50				125				K-K					
	50		10		125		10		9	23	24		
0				0				O-					
									74,115	69,976	73,477		

REFERENCE DRAWINGS
EXHIBITS III-11, III-11.1
& III-11.2

SITE PREPARATION & DRAINAGE
STANDARD FORM
AREA VOLUME—BALANCE SHEET

4-SF-02
REV. 0
4/77
SHEET 1/1

Ford, Bacon & Davis, Incorporated
UTAH DIVISION

CALCULATION COVER SHEET

JOB NO.	PROJECT	SITE OR PHASE	CALC. NO.
UC-528-302	U.S. FUEL PERMIT	SOUTH FORK	C-3

TITLE/SUBJECT

EARTHWORK QUANTITY CALCULATIONS

STATEMENT OF PROBLEM

DETERMINE CUT AND FILL VOLUMES

SOURCES OF DATA

U.S. FUEL TOPO MAPS
RECLAMATION MAPS BY FB&D

SOURCES OF FORMULA & REFERENCES

REV. NO.	DATE	DESCRIPTION/STATUS	ORIGINATOR	CHECKER	PROJECT MGR.	QA	DATE
1	1/6/86	2 New sheets Mine Yard					
		Truck Loadout					

U.S. FUEL SOUTH FORK MINE YARD — PROJECT NAME | JOB NO. | BY | CHECKED | 1 OF 1 SHEET

CUT END AREA	CUT SUM	CUT FACTOR	CUT DIST.	FILL END AREA	FILL SUM	FILL FACTOR	FILL DIST.	STATION	VOLUME IN CUBIC YARDS CUT	FILL	FILL + 1.05 %	BALANCE POINT	MASS DATA
0				0				00					
	240		190		550		190		844	1935	2032		
240				550				C-C					
	1165		216		775		216		4660	3100	3255		
925				225				A-A					
	1525		132		1013		132		3728	2476	2600		
600				788				D-D					
	900		106		1463		106		1767	2872	3016		
300				675				E-E					
	600		150		1585		150		1667	4403	4623		
300				910				B-B					
	1100		130		1598		130		2648	3847	4039		
800				688				F-F					
	2200		191		1313		191		7781	4644	4876		
1400				625				G-G					
	1625		117		825		117		3521	1788	1877		
225				200				H-H					
	650		152		525		152		1830	1478	1552		
425				325				I-I					
	1275		64		1200		64		1511	1422	1493		
850				875				J-J					
	850		25		875		25		394	405	425		
0				0				J-J+					
									30,351		29,788		

REFERENCE DRAWINGS
EXHIBITS III-12A & III-12A.1

SITE PREPARATION & DRAINAGE
STANDARD FORM
AREA VOLUME—BALANCE SHEET

4-SF-02
REV. 0
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SHEET 1/1

SOUTH FORK TRUCK LOADOUT — PROJECT NAME | JOB NO. | BY | CHECKED | 1 OF 1 SHEET

CUT END AREA	CUT SUM	CUT FACTOR	CUT DIST.	FILL END AREA	FILL SUM	FILL FACTOR	FILL DIST.	STATION	VOLUME IN CUBIC YARDS CUT	FILL	FILL + ___ %	BALANCE POINT	MASS DATA
0				0				0					
	60		200		60		200		222	222	233		
60				60				A-A					
	135		200		135		200		500	500	525		
75				75				B-B					
	150		200		150		200		556	556	583		
75				75				C-C					
	135		200		135		200		500	500	525		
60				60				D-D					
	72		200		72		200		267	267	280		
12				12				E-E					
	12		100		12		100		22	22	23		
0				0				F-F					
	825		100		275		100		1528	509	535		
825				275				G-G					
	825		150		657		150		2292	1817	1916		
0				382				H-H					
	0		100		427		100		0	791	830		
0				45				I-I					
	350		192		395		192		1244	1404	1475		
350				350				J-J					
	350		300		350		300		1944	1944	2042		
0				0				0					
									9,075		8,967		

REFERENCE DRAWINGS
EXHIBITS III-12B & III-12B.1

SITE PREPARATION & DRAINAGE
STANDARD FORM
AREA VOLUME—BALANCE SHEET

4-SF-02
REV. 0
4/77
SHEET 1/1

5-SF-08

Ford, Bacon & Davis, Incorporated
UTAH DIVISION

CALCULATION COVER SHEET

JOB NO.	PROJECT	SITE OR PHASE	CALC. NO.
UC-528-302	U.S. FUEL PERMIT	MIDDLE FORK	C-2

TITLE/SUBJECT

EARTHWORK QUANTITY CALCULATIONS

STATEMENT OF PROBLEM

DETERMINE CUT AND FILL VOLUMES

SOURCES OF DATA

U.S. FUEL TOPS MAPS
RECLAMATION MAPS BY FB&D

SOURCES OF FORMULA & REFERENCES

REV. NO.	DATE	DESCRIPTION/STATUS	ORIGINATOR	CHECKER	PROJECT MGR.	QA	DATE
1	6/6/86	New Sheet					

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5/15/86

U.S. FUEL HIAWATHA SITE — PROJECT NAME
JOB NO.
R.E. — BY
CHECKED
1 OF 1 — SHEET

REFERENCE DRAWINGS
EXHIBITS III-14A, III-14A.1 & III-14A.2

SITE PREPARATION & DRAINAGE
STANDARD FORM
AREA VOLUME—BALANCE SHEET

CUT END AREA	CUT SUM	CUT FACTOR	CUT DIST.	FILL END AREA	FILL SUM	FILL FACTOR	FILL DIST.	STATION	VOLUME IN CUBIC YARDS CUT	FILL	FILL + 1.05 %	BALANCE POINT	MASS DATA
0				0				0+00					
	22,000	11,000	400				400		162,963		0		
22,000				0				A					
	30,000	15,000	800		25,940	12,970	800		444,444		403,511		
8,000				25,940				B					
	7,050	3,525	800		31,490	15,745	800		104,444		489,844		
250				5,550				C					
	5,750	2,870	800		6,200	3,100	800		85,185		96,444		
5,500				650				D					
	17,800	8,900	500		650	325	500		164,815		6,319		
12,300				0				E					
	12,300	6,150	150			0	150		34,166		0		
0				0				E+150					
									996,017		996,118		
0				0				E+150					
	3,900	1,950	850		3,600	1,800	850		61,389		59,500		
3,900				3,600				F					
	14,110	7,055	500		11,470	5,735	500		130,648		111,514		
10,210				7,870				G					
	16,860	8,430	500		17,270	8,635	500		156,111		167,903		
6,650				9,400				H					
	6,650	3,325	150		9,400	4,700	150		18,472		27,417		
0				0				H+150					
									366,620		366,334		
0				0				H+150					
	1,400	700	350		900	450	350		9,074		6,125		
1,400				900				J					
	1,580	790	770.		1,860	930	770		22,530		27,848		
180				960				K					
	380	190	400		960	480	400		2,815		7,467		
200				0				L					
	1,650	825	480		1,650	825	480		14,667		15,400		
1,450				1,650				M					
	3,050	1,525	640		2,450	1,225	640		36,148		30,489		
1,600				800				N					
	1,600	800	150		800	400	150		4,444		2,333		
0				0				N+150					
									89,678		89,662		
								TOTAL	1,452,315		1,452,114		

4-SF-02
REV. 0
4/77
SHEET 1/1

51-SF-08

Appendix III - 6

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