Cominco Ltd./Managers, Fording Coal Limited
Box 108/Sparwood, British Columbia, Canada/Tel. (604) 425-6263

Cominco

OI Johnson
Manager, Fording Operations

Mr. S.S. Holland
Chief, Mineralogical Branch
Department of Mines and Petroleum Resources
Victoria, B.C.

January 8, 1973

Dear Sir:

Re: Summary of Exploration and Development Work Performed in 1972.

The attached information is submitted on behalf of Can Pac Minerals Limited and Fording Coal Limited, and covers activities at the Fording property in 1972.

If you require any further information please call us.

Yours truly,

OIJ:lam

Cominco Ltd./Managers, Fording Coal Limited
Box 108/Sparwood, British Columbia, Canada/Tel. (604) 425-6263

OI Johnson
Manager, Fording Operations

Mr. S.S. Holland
Chief, Mineralogical Branch
Dept. of Mines and Petroleum Resources
Victoria, B.C.

March 28, 1973

Dear Mr. Holland:

Re: Summary of Exploration and Development Work in 1972.

Further to my January 8 letter I enclose more maps and descriptive data pertinent to the 1972 work at Fording on behalf of Can Pac Minerals Limited and Fording Coal Limited.

Yours truly,

OIJ:lam

Encl.

COMINCO LTD.
FORDING OPERATIONS

SUMMARY REPORT OF 1972 EXPLORATION & DEVELOPMENT

The following is a summary description of the geological exploration and development work done at Fording Operations in 1972, together with a brief resume of some of the results achieved. Attached prints show the hole locations and pertinent structural features. All work was done by Fording crews with Fording equipment. The work was restricted to areas adjacent to the current operating pits. Actual expenditures are combined with those for mine development for the purpose of coal license group rental credits, and are not listed here.

Clode Pit Area

Work done in this area consisted mainly of 128 auger sample holes drilled in the respective seams exposed on and between benches. Distribution of the holes was as follows:

Seam 11	- 69	holes, total	1,427.5 ft.
Seam 9	49	"	978.0
Seam 7	5	"	162.0
Seam R-4	5	"	123.0
Sub-Total	128	"	2,690.5 ft.

All auger holes were 4½ inch diameter and were drilled with Fording's B-50 Mobile Drill. The auger samples were analyzed to provide coal quality data for mining forecasts and coal reserves. Proximate analyses plus % sulphur were done for 2 feet to 5 feet sections and for total seam composites. Average seam analyses were plotted in charts on sample location plans.

Bulk channel samples consisting of several barrels representative of the entire seam were collected for seams 11, 9. Washability tests were done to determine lab scale recoveries.

Greenhills Pit Area

Only a few auger holes (7 in total) were drilled in this area for Coal Quality, because the actual pit exposed seams are rarely accessible for a drill. However, 35 rotary holes were drilled to provide seam outline data adjacent to the dragline cuts. The rotary holes consist of nos. 547 to 581 inclusive, with distribution as follows:

E seam	6 holes
D seam	8 holes
B seam	21 holes

Of these, the B seam holes were the most important, particularly nos. 576 to 581 as they indicated nearly 500,000 long tons of additional reserves in place. Section 485,500 N illustrates the extension to previous reserves.

Numerous test holes were also drilled with the 60-R production drill for detail seam outlines and coal thicknesses, often in conjunction with blast-hole drilling patterns.

None of the rotary seam outline holes provided samples for analysis, because only single wall drill stem was used.

Repeat-4 Turnbull

A modest program of 'fill-in' seam outline drilling was started for the northward extension of Repeat 4 seam on the lower slope of Turnbull Mountain. Holes 210 to 213 inclusive were completed by year end for a total of 910 feet. Attached print of section 497,250 N illustrates the structural picture. About 6 additional holes are proposed to complete the data required for planning of a potential pit in this area.

Mine Stockpile Auger Sampling

A total of 47 auger sample holes were drilled in mine stockpiles 1 to 6, to assess the coal quality represented here. Proximate analyses plus % sulphur were determined for 5 foot and 10 foot sections, also for total hole composites. Results were found to be consistent for layered zones of the stockpiles.

A. C. Taplin

A. C. Taplin
Mine Geologist.

ACT/hvm
Fording Office
March 13, 1973

cc: OIJ JBD CanPac Minerals RAS
B.C. Dept. of Mines
File

Attachments ✓

Plates 5B,9A Top of "B" Contours
Sections 485,500 N ✓
497,250 N ✓
Seam 11 Sample Location Plan ✓
Seam 9 Sample Location Plan ✓ & SEAM 7 ✓
Drill Hole Logs

Note 5B missing

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MINERALOGICAL BRANCH, DEPARTMENT OF MINES AND PETROLEUM RESOURCES
VICTORIA, BRITISH COLUMBIA

SUMMARY OF EXPLORATION AND DEVELOPMENT WORK PERFORMED IN 1972 NONPRODUCING COAL PROPERTIES

This return is designed to provide data for long-term compilations of the mineral industry, and will be on permanent file with the department. Confidential information is not solicited.

Please complete as soon as possible and mail, in the enclosed self-addressed envelope, not later than January 15.

NOTE—A SMALL SKETCH-MAP GREATLY ENHANCES THE VALUE OF THE INFORMATION.

Exploration work done in 1972? Yes ☐ No ☒

Property name: Fording Coal Limited

Former name(s): CanPac Minerals (Canadian Pacific Oil & Gas), Cominco C. G.

Land district: Kootenay

Lat. 50 ° 10 to 12 ′ Long. 114 ° 52 to 54 ′ N.T.S. Map Sheet (e.g., 82N/9E): 82J/2W

Locality: Upper Fording River Area

Approx. altitude of showings: 5500' - 7000'

Coal Licence Nos.: CanPac: Nos. 314-364 incl. 419, 420, 507-511 incl. 536-538 incl. 554-560 incl.

Fording Coal: Nos. 801-804 incl. 943, 944, 964.

Access—From: Natal By: Paved and gravel all-weather road Distance: 41 miles

Owner: Fording Coal Ltd. (Cominco and CanPac Minerals)

Mailing address: Box 108, Sparwood, B. C.

Operator (company paying for the work): Cominco Ltd., Fording Operations

Mailing address: Box 108, Sparwood, B. C.

Is property optioned? No Under agreement?

ESSENTIAL GEOLOGY

Brief geological description: Kootenay Formation coal measures are present in 2 north-south trending synclines, one on either side of the Fording River which is the locus of a regional fault. Ten seams of significant thickness are present.

FOR DEPARTMENTAL USE ONLY

Work supervised by: J. B. Donald Position: Superintendent, Mining, Fording Operations.

Previous work done when? 1967-1971 incl. By whom? CanPac Minerals 1967,68 Fording Operations (Cominco Ltd.) 1969-1971 incl.

TOPOGRAPHICAL AND LEGAL SURVEYS MADE IN 1972

Legal claims survey? No Topo. map? Yes Scale: 1 in.= 100 ft.

Surface workings surveyed? Yes Scale: 1 in.= 100 ft.

Underground workings surveyed? No Scale:

GEOLOGICAL [illegible] DONE [illegible] 1972

SURFAC HE

COMPANY	GEOLOGIST	AREA MAPPED (LICENCE NOS.)	SCALE
Fording Operations	A.C. Taplin	(346, 341, 419	1 in. = 100 ft.
" "	A.J. Bertrand A.J. Parent	((345, 350	

UNDERGROUND

None

GEOPHYSICAL WORK DONE IN 1972

METHOD AND BY WHOM?	AREAS (LICENCE NOS.)	LINE-MILES
None		

SAMPLING WORK DONE IN 1972

METHOD AND BY WHOM?	AREAS (LICENCE NOS.)	NO. OF SEAMS SAMPLED
Auger drill hole samples of coal	346, 341,419, 345, 350	4
seams - by Fording, also stratigraphic channel samples.		
Bulk samples for washability tests	346, 341,350	3

MILES OF ROAD CONSTRUCTED IN 1972 0.8 miles Location Lower haul road replacements.

SURFACE WORK DONE IN 1972

Trenching, total footage Nil Areas (Licence Nos.)

Stripping, total area Nil Areas (Licence Nos.)

UNDERGROUND WORK DONE IN 1972

Total footage None No. of adits None

DRILLING DONE IN 1972

SURFACE DIAMOND DRILLING—BY WHOM?	NO. OF HOLES	TOTAL FOOTAGE	LICENCE NOS.
Nil			
UNDERGROUND DIAMOND DRILLING—BY WHOM?			
Nil			
ROTARY DRILLING—BY WHOM?			
Fording Operations	40	3659	345, 350, 537, 419
Auger ~~PERCUSSION~~ DRILLING—BY WHOM?			
Fording Operations	182	4510	346, 341, 419, 350

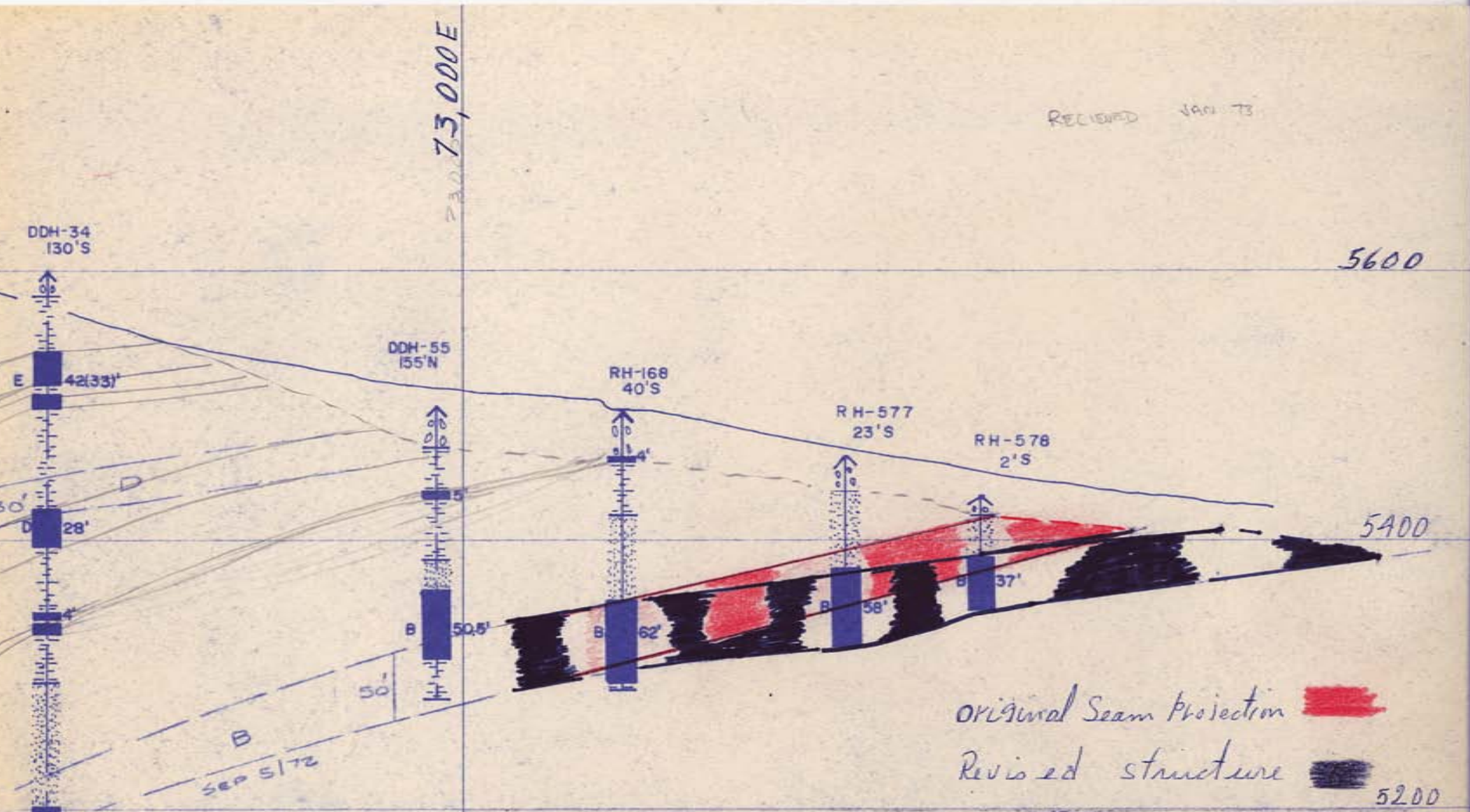
REPORTS FILED IN LIEU OF RENTAL (Section 26, Coal Act) Yes ☐ No ☒ Summary Report in Preparation.

FOR DEPARTMENTAL USE ONLY

References

Date January 8, 1973 Signature A.D. Johnson

Company Cominco Ltd./Fording Operations Official position ✓ Manager



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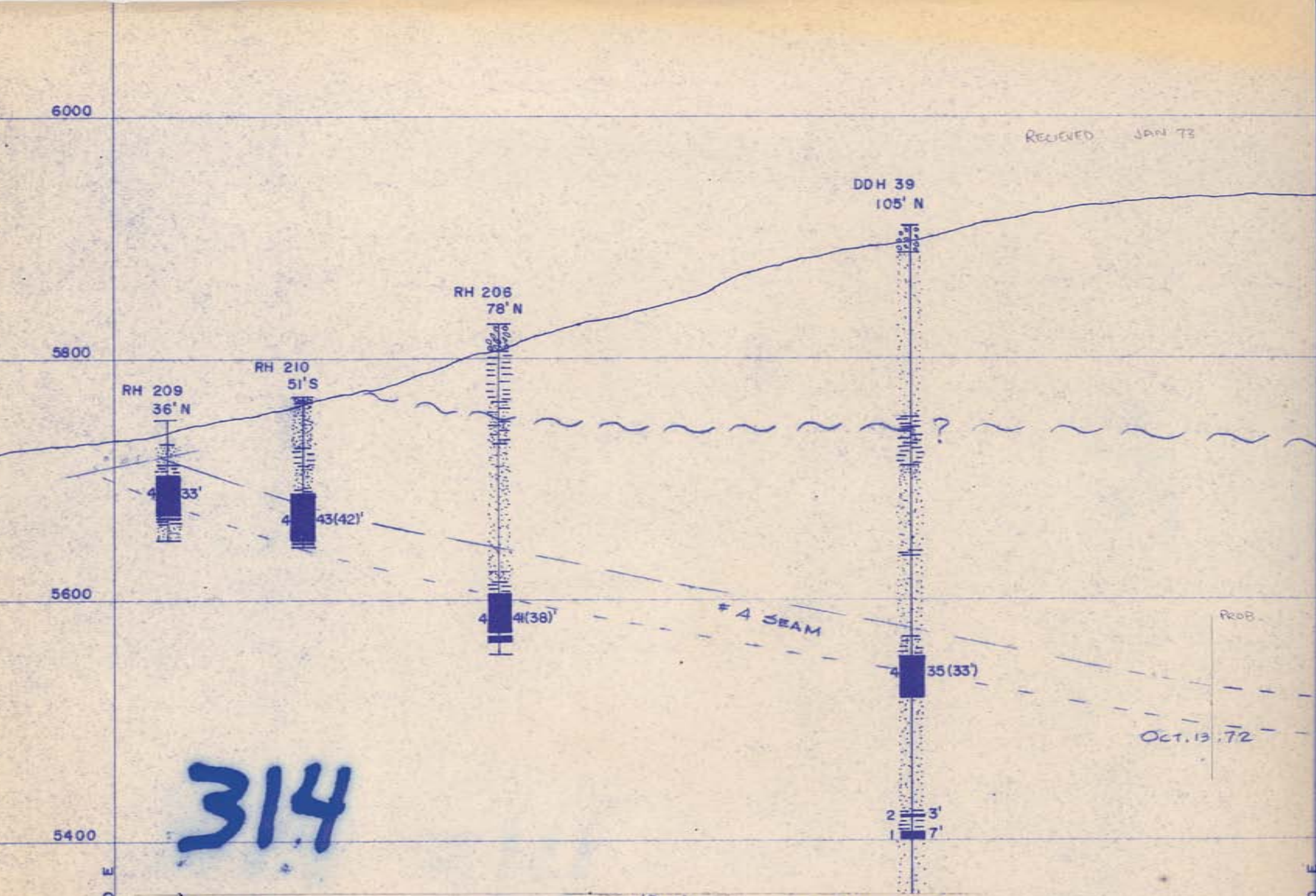
GEOLOGICAL SECTIONS

GREENHILLS = 485,500 N

Scale 1 Inch = 100 Feet

Drawing No.

G-S-8 FR-72(2)A



GEOLOGICAL SECTIONS		Scale 1 Inch = 100 Feet	
TURNBULL	497,250 ° N	Drawing No. T-S-2	FR 72 (2)A

PROB 30620

493,000 N

494,000 N

495,000 N

496,000 N

73,000 E

74,000 E

A10

A6

A7

22

95

182

37 5045

73 5093

31 5153

186 5134

187 5186

20 5049

34 5202

55 5364

576 5356

168 5357

579 NO COAL TO 5387

577 5380

188 5301

528 5387

72 5294

581 5387

185

184 5235

580 5363

56 5265

183 5255

74

83 5351

5040
5080
5100
5120
5140
5160
5180
5200
5220
5240
5260
5280
5300
5320
5340
5360
5380
5400

1 R.K. SEP.11,72 REVISED ON HOLE #'S & INFORMATION

A.P. 2 AUG, 72 Fording Operations

Cominco

Top of Seam Contours
Seam B
Greenhills

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FILE Nº FR 72(2)A

Scale 1 Inch = 100 Feet

Drawing No. 9A

KEY MAP

496,000 N

495,000 N

494,000 N

81,000 E

80,000 E

79,000 E

101
102
103
104
105
306
301
131
302
132
133
136
300
137
138
139
11
15
106
6
4

A-14
A-9
A-5

HOLE	ASH	V.C.M.	F.S.I.	S.	FEET
137	26.4	20.4	5.5	0.36	24.0
A-9	23.7	21.1	6.61	0.47	23.5
106	21.8	21.8	6.4	0.41	32.0
300	19.4	21.8	6.6	0.36	25.0
301	16.9	24.4	7.7	0.38	22.5
302	20.7	22.3	5.64	0.39	23.5
306	21.8	21.1	4.43	0.33	18.0
104	25.7	22.8	5.3	0.39	20.0
105	17.8	21.0	4.75	0.76	18.0
131	16.5	22.5	7.7	0.29	40.0
15	17.1	24.9	7	0.41	22.5
A-7-1	12.7	—	1%	0.82	82
A-7-4	16.6	—	+	0.89	82%
A-7-3	15	part	sample	& lost	
A-7-2	24.7	—	7	0.98	82
A-7-5	20.9	—	7	0.91	82%

HOLE	ASH	V.C.M.	F.S.I.	S.	FEET

HOLE	ASH	V.C.M.	F.S.I.	S.	FEET

HOLE	ASH	V.C.M.	F.S.I.	S.	FEET

Revisions

No.	Made by	Date	Description

Revisions

No.	Made by	Date	Description

Revisions

No.	Made by	Date	Description

Drawn by A.J.B. Sept 21 1972

Fording Operations

Sample Location Plan
Clode Area
Seam 2

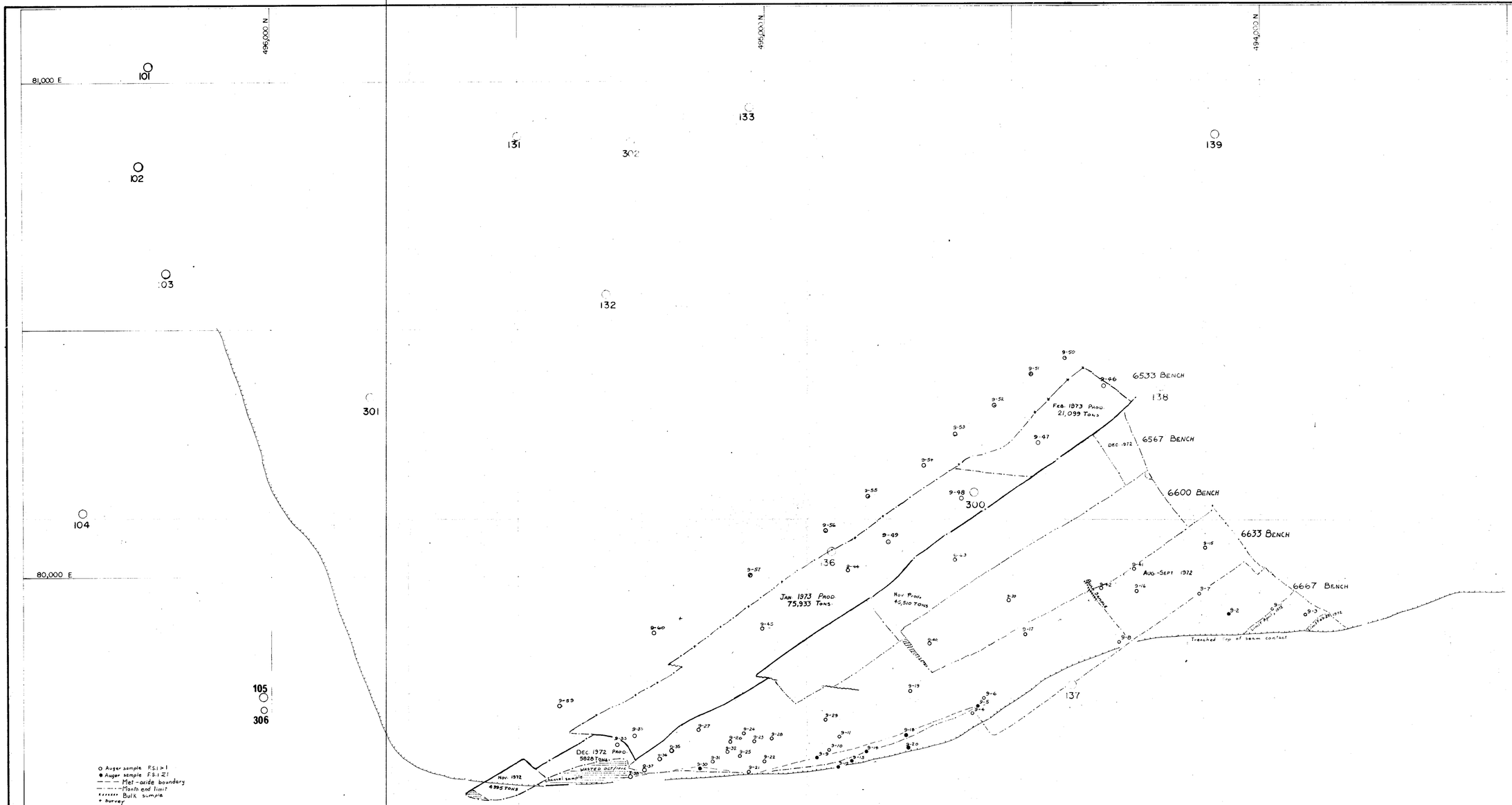
Scale 1" = 1000'

KEY MAP

Drawing No.

314

File No.



- O Auger sample F.S.I. > 1
- ⊕ Auger sample F.S.I. ≤ 1
- — — Met-oxide boundary
- — — — Month end limit
- ····· Bulk sample
- + Survey

HOLE	ASH	V.C.M.	F.S.I.	S.
132	26.0	20.7	4½	0.44
136	26.7	20.9	4½	0.47
138	34.2	19.4	2½	0.41
300	24.8	21.1	5½	0.54
301	28.2	20.6	3	0.52
131	20.3	22.1	3½ 3½	0.36
302	28.3	19.8	3½ 3½	0.41
130	24.3	21.6	2.5	0.52
101	28.0	21.8	3-4	0.42
102	22.9	19.7	2-2	0.47
133	18.5	21.4	3.5.5	0.37
139	25.9	24.8	2½ 2½	0.33
9-1	18.6	21.5	2-2½	0.39
9-2	18.7	22.1	1.1	0.40
9-3	17.5	22.1	3½-4	0.38
9-4	20.8	22.4	1½ 1½	0.36
9-5	20.2	22.1	3	0.33
9-6	16.5	22.1	2.2	0.37
9-7	20.5		4½ 4½	0.40
9-8	19.1		2½	0.33
9-9	22.0		1½	0.36
9-10	22.3		1½	0.33
9-11	19.8		1½	0.25
9-12	24.3		0.0	0.25
9-13	20.8		1-½	0.25
9-14	22.1		0.2	0.31
9-15	18.6		3½ 3½	0.36
9-16	17.6		3.3	0.37
9-17	18.7		3½ 3½	0.40
9-18	17.1		1 1	0.31
9-19	17.6		4-4	0.36
9-20	16.7		2-2	0.32
9-21	22.3		1-1½	0.37
9-22	25.6		2.2½	0.34
9-23	22.3		4-4	0.36
9-24	22.7		4½ 4	0.41
9-25	25.6		2½ 2	0.41
9-26	21.6		3.5½	0.41
9-27	16.8		6.6	0.41

HOLE	ASH	V.C.M.	F.S.I.	S.	FELT
9-28	23.9		4½ 5	0.41	20°
9-29	26.0		4½ 4½	0.38	20°
9-30	21.8		5	0.46	20°
9-31	18.9		4 4½	0.36	20°
9-32	17.4		5.5½	0.39	18°
9-33	16.7		4½ 5	0.40	18°
9-34	25.9		6.6	0.38	10°
9-35	23.5		6.6½	0.45	20°
9-36	17.3		4½ 5½	0.53	20°
9-37	0.0		2 2	0.38	20°
9-38	20.3		5.5	0.36	20°
9-39	19.3		4½ 4½	0.37	20°
9-40	17.9		5½ 5½	0.38	20°
9-41	24.4		5	0.41	20°
9-42	16.0		5	0.41	17°
Bulk					
9-43	19.9		5½	0.35	20°
9-44	24.1		5	0.37	20°
9-45	21.6		5½	0.40	19°
9-46	20.0		3	0.39	20
9-47	18.5		4	0.38	20°
9-48	16.0		5	0.35	15
9-49	18.5		4½	0.39	20
9-50	23.9			0.51	20°
9-51	16.8				20°
9-52	17.4			0.44	20°
9-53	21.2			0.48	20°
9-54	23.5			0.48	20°
9-55	24.9			0.45	20°
9-56	21.5			0.46	20°
9-57	21.2			0.46	20°
9-58					
9-60					

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FILE No FR 72(2)A

Revisions			
No.	Made by	Date	Description

Drawn by A. J. B. June 23, 1972.

Fording Operations

Dominion

Sample Location Plan
Clode Area
Seam 9

3a3b
3c3d
KEY MAP

Scale 1 Inch 100 Feet
Drawing No.

3D - 9

81,000 E

80,000 E

79,000 E

496,000 N

495,000 N

494,000 N

493,000 N

101 102 104 105 306 131 133 302 132 136 300 139 4 138 11 137 106 6 15

← 6533 BENCH

Fee 1378 86,580 Tons

Wasted Old Wkg.

July prod.

May prod.

April production

Limit Dec. 31, 1970

Limit Feb. 28, 1971

Limit Dec. 31, 1971

Oxidized Coal

Trenched top of Seam under cover

A-14 A-9 A-5

○ Auger sample FSI > 1
● Auger sample FSI ≤ 1
C.S. Channel sample
Tear end limit

HOLE	ASH	VCM	FSI	S	FEET
138	24	23	7.7	0.74	
300	25.5	22	7.7	0.69	
136	31	20	9½	4	0.70
132	22	22	8	7½	0.79
130	37	19	4	4	1.15
11-1	26.3	22	6½	0.69	20.0
11-2	28.5	22	6½	0.62	20.0
11-3	29.6	21	5-6	0.59	20.0
11-4	31.0	22	6	0.60	20.0
11-5	31.7	21	5½	0.63	22.0
11-6	28.4	21.5	5-6	0.60	23.0
11-7	24.1	22	6½	0.66	17.0
11-8	20.7	2	9½	0.80	20.0
11-9	32.5	20	0	0.49	20.0
11-10	24.4	23	2	0.58	15.0
11-11	30.2	21	2	0.58	14.0
11-12	25.2	21	2	0.53	23.0
11-13	32.4	20	0	0.52	16.0
11-14	30.5	19	1.1	0.51	19.0
11-15	24.8	20	3.3	0.54	22.0
11-16	32	19	1.3	0.58	20.0
11-17	32.4	20	6.7	0.70	23.0
11-18	20.4	21	7.7	0.64	23.0
11-19	26.3		3.1		22.0
11-20	26.9	21	2	0.55	12.0
11-21	28.4	21	1.1	0.55	17.0
11-22	30.4	20	1.2	0.56	20.0
11-23	27.4	21	1.8	0.60	20.0
11-24	21.4	22	0.0	0.48	22.0
11-25	27.4	21	4½	6½	0.89	25.0
11-26	34.9		1.3	0.47	23.0
11-27	35.8		2.2	0.51	24.0
11-28	33.4		4½	4½	0.58	23.5
11-29	30.4		5½	0.55	24.0
11-30	35.4		3½	4½		15.0
11-31	12.9		3.2	1		20.0
11-32	3		3.1	—		23.0
11-33	22.		5½	6		21.5
11-34	28.0		3½	4		23.0
11-35	26.0		9½	5		20.0
11-36	26.		3½	3½		22.0
11-37	32.5		2.3	3		20.0
11-38	26.5		5.5	—		20.0
11-39	30.7		3.1	0.50		23.0
11-40	29.7			0.53		23.0
11-41	30.7		6½	6½	0.62	22.0
11-42	30.1		3.5	3	0.75	23.5

HOLE	ASH	VCM	FSI	S	FEET
11-63	26.7	—	6½		20.0
11-64	28.7	—	4	1½	20.0
11-65	29.7	—		0	20.0
11-66	23.1	—	2	5½	20.0
11-67	27.3	—	3.3	5½	20.0
11-68	23	—	4½		20.0
11-69	25	—	2½		20.0
11-70	28	—	2½	4	0.57	20.0
2001	21	24	4	—	0.63	
11-71	29.6	—	7	0.62	20.0
11-72	27.6	—	5	0.58	11.5
11-73	27.3	—	5	5½	0.64	20.0
11-74	30.6	—	3½	4	0.65	22.0
11-75	29.2	—	3	4	0.64	—
11-76	28.2	—	3	3½	0.59	22.0
11-77	30.7	—	2½	3½	0.57	20.0
11-78	NS	Sample lost				
11-79	30.2	—	2½	3	0.59	22.0
11-80	28.9		3½	3	0.60	20.0
11-81						
11-82						
11-83						
11-84						
11-85						
11-86						

HOLE	ASH	VCM	FSI	S	FEET
15					
11-43	36.4		3	0.64	20.0
11-44	34.3		2.1	0.64	20.0
11-45	24.9		1.1	0.39	22.0
11-46	21.7		0.0	—		18.0
11-47	30.4		0.0	—		15.0
11-48	24.4		2.3	0.53	23.0
11-49	24.9		21.3	0.66	12.0
11-50	29.1		6.6	0.58	22.5
11-51	20.1		94.2	0.59	21.5
11-52	23.		5.43	0.54	23.0
11-53	32.2		33.33	.72	23.0
11-54	31.1		4.1	.67	21.0
11-55	31.4		43.54	.48	23.0
11-56	30.6		22.5	.58	10.0
11-57	30.2		3.3	0	87.	20.0
11-58	29.8		43.42	0	62	20.0
11-59	29.1		22.21	0	60	22.5
11-60	23.		1.1	0	62	23.0
11-61	22.		5½	6	0.69	17.0
11-62	33.		6	5½	0.75	15.0

Pic

314

FILE Nº FR 72 (2) A

Revisions			
No.	Made by	Date	Description

Revisions			
No.	Made by	Date	Description

Revisions			
No.	Made by	Date	Description

Drawn by

Fording Operations

Sample Location Plan
Clode Area
Seam 11

KEY MAP

Scale 1 inch = 100 Feet

Drawing No. 3D-11

Diamond Drill Geological Log

Cominco

K-Forcing 72/31A

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Objective: To determine position and thickness of Seam

Sampled: None

Logged By: B.L. and A.J.P. Date: Sept. 28, 1972

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
		Turnbull		-90°	125'

From	To	Discard: Reason:
0	4	Overburden
4	44	Sandstone very hard
44	58	Shale Soft
58	76	Sandstone very hard
76	80	Shale medium hard
80	120	Coal Seam Repeat 4
120	121	Shale parting
121	123	Coal
123	125	Sandstone very hard

End of Hole at 125'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size: 4 1/2" Tricone

Hole No.: R.H. 210

Page: 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K - FORDING 72(3)A

394

Objective: To locate and determine thickness of Repeat 4 Seam

Sampled: None

Logged By: AJP

Date: Nov. 19, 1972

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
2A		Turnbull Mtn.		-90°	205'

From	To	Discard: Reason:
0		
	41	Sandstone hard
41	42	Coal
42	43	Shale parting
43	44	Coal
44	135	Sandstone hard
135	156	Mudstone and shale med. hard
156	200	Coal — Repeat 4
200	205	Mudstone and sandstone
		End of Hole at 205'

Core Size 4 ½" Tricone

Hole No. RH 211

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOROING 72(3)A

314

Objective: To locate and determine thickness of Repeat 4 seam

Logged By: B.L., AJP Date: Oct. 20, 1972

Sampled: None

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
2		Turnbull Mtn.		-90°	

From	To	Discard:	Reason:
0	1	Overburden	
1	60	Sandstone hard	
60	65	Shale soft or shattered zone	
65	300	Sandstone very hard	
300	301	Coal	
301	345	Shale and siltstone soft	
345	350	Siltstone	
350	355	Coal	Repeat 4 seam
		End of Hole	
		(Rods plugged at 355')	

Core Size 4 1/2" Tricone

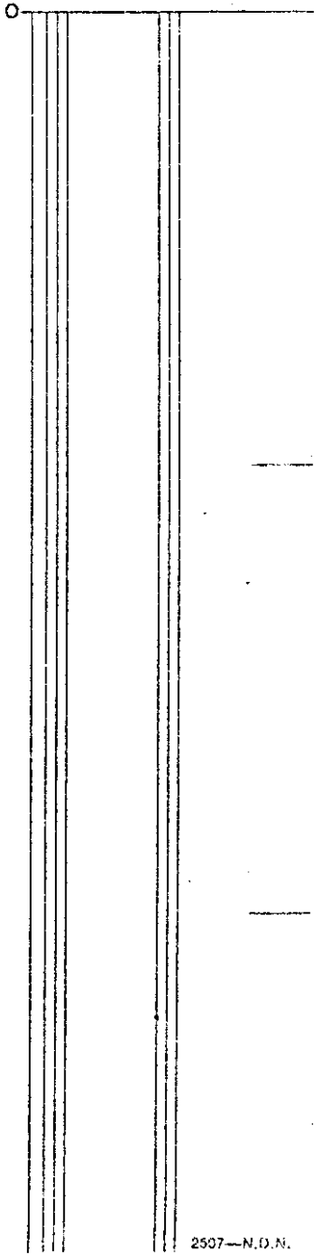
Hole No. RH 212

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0



2507—N.D.N.

K-FOOTING 72(3)A

Diamond Drill Geological Log

Cominco

314

Objective: To locate and determine thickness of Repeat 4 Seam

Sampled: None

Logged By: AJP Date: Nov. 30, 1972

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
2A	488,000 N	Mt. Turnbull		-90°	225

From	To	Discard: Reason:
0	5	Till
5	34	Sandstone hard
34	35	Coal
35	125	Sandstone hard
125	130	Siltstone softer
130	176	Sandstone Hard
176	185	Coal
185	195	Sandstone Hard
195	205	Coal
205	225	Sandstone hard

END of HOLE @ 225'

Core Size 4½" Tricone

Hole No. RH213

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-Fording 72/3/A

314

CONFIDENTIAL

Objective: To determine location of Coal Seam				Sampled: None		
Logged By: AJP		Date: February 21, 1972		Composites:		
Block: 5A	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 85'	

From	To	Discard:	Reason:
0	25	Mudstone fine grain	
25	25.5	Coal trace	
25.5	28	Mudstone	
28.0	31.0	Mudstone hard	
31.0	39.0	Mudstone soft trace of Coal at 39.0	
39.0	39.5	Siltstone bed	
39.5	40.0	Mudstone soft	
40.0	45.0	Silstone hard, medium gn.	
45.0	61.0	Mudstone, hard and soft beds	
61.0	82.5	Mudstone, soft	
82.5	85.0	Coal "E"	
		End of hole at 85' in coal	

40 Scale •

Color Plot & Dips	Ore Classes & Aver.
0	

Core Size
4½" Tri-cone bit

Hole No. R.H. 547A Page 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FORDING 72(3)A

Objective: To determine location of coal seam			Sampled: None		
Logged By: AJP	Date: February 18, 1972		Composites:		
Block: 5A	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 49.0'

From	To	Discard:	Reason:
0	21	Mudstone	
21	34	Coal	
34	36	Parting of limonite - rich bone coal	
36	40	Coal	
40	41	Parting of mudstone	E
41	43	Coal	
43	44	Parting of dirty coal or clay	
44	45	Coal	
45	46	Coal and clay	
46	48	Soft brown clay	
		End of hole at 48'	

Core Size 4½" Tricone Bit

Hole No. R.H.548 Page 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOROINE 72(3)A

Objective: To determine location of coal seam			Sampled: None			
Logged By: AJP	Date: February 18,1972		Composites:			
Block: 5A	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 62'	

From	To	Discard:	Reason:
0	12	Mudstone fine grain	
12	13	Mudstone very hard, fine grain	
13	18	Mudstone soft and fine grain	
18	20	Mudstone very hard and fine grain	
20	21	Shale very soft	
21	24	Mudstone hard	
24	57	Mudstone fine grain,soft	
57	58	Mudstone hard bed	
58	59	Mudstone, soft	
59	62	Coal "E"	
		End of hole at 62' in coal	

Core Size $4\frac{1}{2}$" Tricone Bit

Hole No. R.H. 549 Page 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FORDING 72(3)A

Objective: To determine location of coal seam			Sampled:		
Logged By: AJP	Date: February 19, 1972		Composites:		
Block: 5A	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.:	Length:

From	To	Discard: Reason:
0	14.5	Sandstone, very hard, med. grain
14.5	15.0	Mudstone softer, fine grain
15.0	19.5	Sandstone, very hard med. grain
19.5	25.0	Mudstone, very soft, fine grain
25.0	25.5	Mudstone hard bed
25.5	29.5	Mudstone, very soft, fine grain
29.5	30.0	Mud layer (drill dropped quickly)
30.0	34.0	Mudstone soft
34.0	35.0	Mudstone very soft
35.0	64.0	Mudstone soft, fine grain
64.0	65.0	Mudstone hard bed
65.0	70.0	Mudstone soft
70.0	76.0	Coal "E"
		End of hole at 76' in coal

Core Size $4\frac{1}{2}$ Tricone Bit

Hole No. R.H. 550 Page 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K - FORDING 72(3)A

[redacted]

Objective: To determine location and thickness of coal seam				Sampled: None		
Logged By: AJP	Date: February 22, 1972			Composites:		
Block: 5A	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 45'	

From	To	Discard:	Reason:
0	1	Shattered rock	
1	22.5	Coal	
22.5	23.0	Parting of hard coal } E	
23.0	31.0	Coal	
31.0	39.0	Bone coal or carbonaceous shale	
39.0	45.0	Shattered rock; mudstone, sandstone and much pyrite fragments	
		End of hole at 45'	

40 Scale

Color Plot & Dips	Ore Classes & Aver.
0	

Core Size: 4½" Tricone bit

Hole No.: R.H. 551

Page: 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOREING 72(3)A

Objective: To determine location of coal seam

Sampled:

Logged By: AJP Date: February 23,1972

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5A		Lower Greenhills			

From	To	Discard: Reason:
0	8	Mudstone, soft, fine grain
8	13	Mudstone hard and soft beds
13	14	Mudstone very soft bed
14	19	Mudstone hard and soft beds
19	31	Siltsone very hard beds, med. grain
31	35	Mudstone hard and soft beds
35	36	Mudstone soft
36	44	Mudstone hard with several very thin soft beds 2"-3" thick
44	50	Mudstone, soft
50	61	Mudstone very soft
61	63	Very soft mud and shattered rock
63	81	Mudstone soft
81	83	Coal and carbonaceous shale
83	84	Hard Coal
84	86	Coal E
		End of hole at 86' in coal

Core Size

4½" Tricone Bit

Hole No. R.H.552 Page 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K - FORDING 72(3)A

314

Objective: To determine location and thickness of Coal seam

Sampled: No

Logged By: A.J.P. Date: 16/3/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5A		Lower Greenhills			60'

From	To	Discard:	Reason:
0	12	Mudstone soft	
12	13	Coal	
13	14.5	Mudstone soft	
14.5	29	Mudstone hard	
29	48	Coal	"D" Seam
48	50	Coal - poor quality	
50	55	Mudstone	
55	56.5	Coal?	
56.5	60	Mudstone medium hardness	
		End of hole	

Core Size
$4\frac{1}{2}$" Tricone Bit

Hole No R.H.553 Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K- FORDING 72(3)A

Objective: To determine location and thickness of Coal Seam

Sampled: No

Logged By: A.J.P. Date: March 16, 1972

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Lower Greenhills			76'

From	To	Discard: Reason:
0	12	Mudstone hard
12	15	Mudstone soft clayey material
15	43	Mudstone hard and soft beds
43	74	Coal "D" Seam
74	75	Shale arbonaceous or bone coal
75	76	Shale carbonaceous
		End of hole

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size

Hole No. R.H.554

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K. FORDING 72(3)A

Objective: To determine location of coal seam			Sampled: NONE		
Logged By: RBA	Date: 30/3/72		Composites:		
Block: 5B	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 68'

From	To	Discard:	Reason:
0	15	Mudstone med. hard	
15	59	Mudstone hard	
59	66	Mudstone soft	
66	68	Coal	Seam "D"
		End of hole at 68' in coal.	

Core Size: 4½" Tri-cone bit

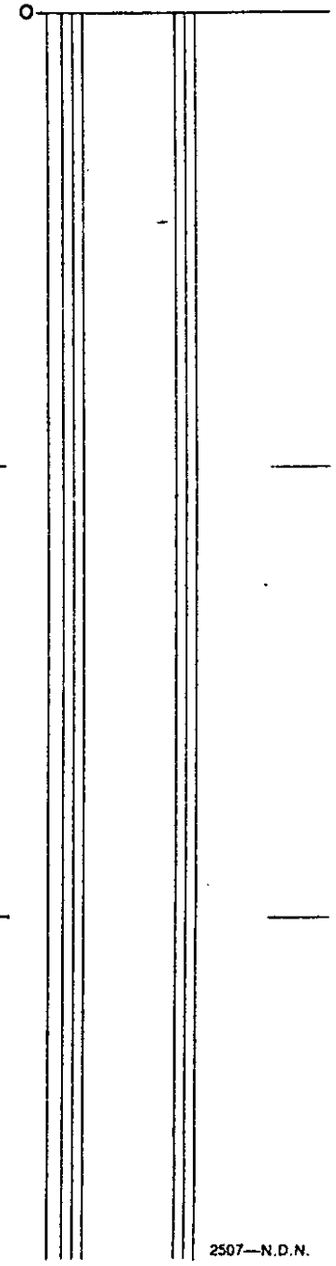
Hole No.: R.H. 555

Page 1 Of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0



2507—N.D.N.

Diamond Drill Geological Log

Cominco

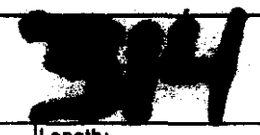
K - FORDING 72(3)A

Objective: To determine location and thickness of coal seam

Logged By: RBA Date: 30/3/72

Sampled: None

Composites:



Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Lower Greenhills		-90°	87'

From	To	Discard:	Reason:
0	23	Mudstone soft	
23	25	Coal	
25	45	Mudstone hard	
45	54	Mudstone soft	
54	85	Coal SEAM "D"	
85	87	Mudstone Med. Hard	
		END OF HOLE @ 87'	

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size

$4\frac{1}{2}$" Tricone bit

RH 556

Hole No.

Diamond Drill Geological Log

Cominco

K-FORDING 72/3A

Objective: To determine location and thickness of Seam B			Sampled: NONE			
Logged By: A.J.P.	Date: 20/4/72		Composites:			
Block: 5B	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 44'	

From	To	Discard: Reason:
0	10	Coal
10	13	Soft parting
13	14	Coal
14	16	Shale very soft
16	19	Siltstone very hard
19	25	Shale very soft with thin brown clay layers 2" - 3" thick
25	28	Siltstone hard
28	44	Mudstone medium hardness
		ABANDONED HOLE AT 44' BIT KEPT PLUGGING FROM SOFT CAVE-IN MATERIAL

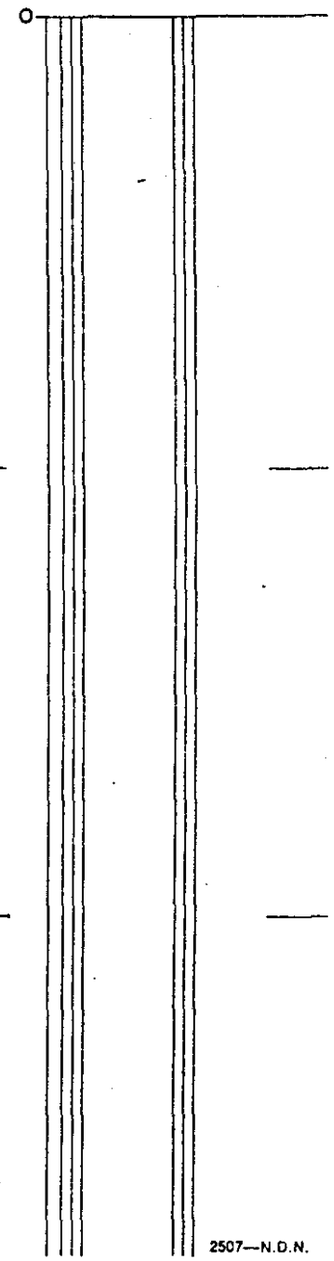
Core Size

4½" Tricone Bit

Hole No. 558

40 Scale

Color Plot & Dips | Ore Classes & Aver.



2507—N.D.N.

K-foreink 72/3A

Diamond Drill Geological Log

Cominco

314

Objective: To determine location and thickness of coal seam

Logged By: RBA Date: 31/3/72

Sampled: NONE

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5A		Lower Greenhills		-90'	60'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Discard: Reason:
0	14	Mudstone Med. Hard
14	15	Coal
15	16	Mudstone Med. Hard
16	30	Mudstone Hard
30	33	Mudstone Soft
33	58	Coal SEAM "D"
58	60	Mudstone Med. Hard
		END OF HOLE @ 60'

Core Size

4½' Tricone bit

Hole No. R.H.557

Page 1 Of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FORDING 72(3)A

Objective: To determine position thickness of Seam B			Sampled: NONE		
Logged By: AJP	Date: 20/4/72		Composites:		
Block: 5B	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 72

From	To	Discard: Reason:
0	9	Mudstone medium hardness
9	18	Mudstone very soft and shaley
18	25	Mudstone hard
25	26	Mudstone soft
26	34	Mudstone shattered with brown clay very soft
34	34.5	Coal
34.5	36	Clay and shattered rock very soft
36	44	Mudstone soft
44	68	Coal
68	71	Coal harder
71	72	Mudstone Med. Hardness
		END OF HOLE

Core Size: 4" Tricone Bit

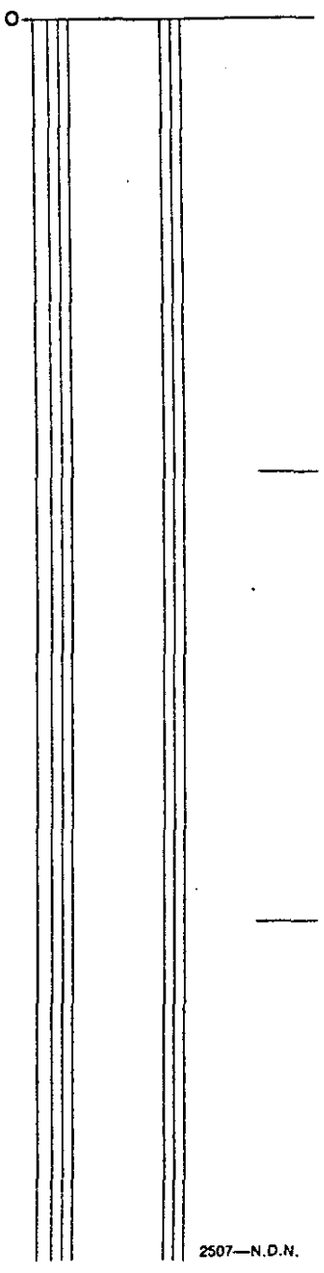
Hole No. 559

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0



2507—N.D.N.

Diamond Drill Geological Log

Commco

K-FORDING 72(3)A

Objective: To determine location and thickness of seam

Sampled: None

Logged By: AJP Date: 12/4/72

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	80'

From	To	Discard: Reason:
0	25	Siltstone hard
25	30	Mudstone soft
30	49	Siltstone hard
49	51	Mudstone very soft
51	80	Coal "B" Seam
		End of hole

Hole No. 560	Elev. 5421.3	
Lat. 488,564.6 N	Dep. 72,979.6 E	
	Elev.	Th.
Top of B @	5370.3	29'
Top of @		'
Top of @		'
Top of @		'

Gamma Ray Neutron Log ☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 560 Page 1 of 1

40 Scale

Color Plot & Dips	Ore Classes & Aver.

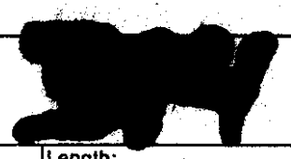
0

2507—N.D.N.

Diamond Drill Geological Log

K - FOREING 72/3A

Cominco



Objective: To determine location and thickness of seam

Sampled: None

Logged By: RBA Date: 20/5/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	72'

From	To	Discard:	Reason:
0	27.5	Mudstone hard and medium hard	
27.5	66.5	Coal Seam "B"	
66.5	72	Mudstone medium hard	
		End of hole at 72'	

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Hole No. 561 Elev. 5417.3		
Lat. 488,496.0 Dep. 72,993.9		
	Elev.	Th.
Top of B @ 5390	39.0'	
Top of ____ @ ____		'
Top of ____ @ ____		'
Top of ____ @ ____		'

Gamma Ray Neutron Log

☐ Yes ☑ No

Core Size 4½" Tricone Bit

Hole No. RH 561

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Comineo

K-FORDING 72(3)A

Objective: To determine location and thickness of seam

Sampled: None

Logged By: AJP Date: 12/4/72

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	90'

From	To	Discard: Reason:
0	10	Coal
10	19	Mudstone parting
19	27	Coal
27	46	Mudstone soft
46	56	Siltstone very hard
56	61	Coal
61	62	Mudstone hard
62	64	Sandstone very hard
64	73	Coal with shale
73	90	Sandstone very hard
		End of Hole

Hole No. 562 Elev. 5415'

Lat. 488,355 Dep. 72,750

E.C.V. Th.

Top of _____ @ _____ | '

Top of _____ @ _____ | '

Top of _____ @ _____ | '

Top of _____ @ _____ | '

Gamma Ray Neutron Log ☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 562 Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOROING 72(3)A

Objective: To determine location and thickness of seam

Sampled: None

Logged By: AJP Date: 12/4/72

Composites:

37

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	76'

From	To	Discard: Reason:
0	7.5	Siltstone soft
7.5	20	Coal
20	23.5	Shale brown and very soft
23.5	25	Coal
25	30	Shale brown and very soft
30	32	Coal
32	38	Mudstone soft
38	47	Coal
47	52	Shale soft and flakey
52	61	Coal and rock fragments Fault zone
61	63	Mudstone medium hard
63	76	Siltstone very hard
		End of hole

Hole No. 563 Elev. 5468
Lat. 488,212 Dep. 73,822
Ecv. Th.

Top of ____ @ ____ | '
Top of ____ @ ____ | '
Top of ____ @ ____ | '
Top of ____ @ ____ | '

Gamma Ray Neutron Log
☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 563 Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

K - FORCING 72(3)A

Cominco

[redacted]

Objective: To determine location and thickness of coal seam

Sampled: None

Logged By: AJP Date: 12/4/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	

From	To	Discard: Reason:
0	7	Mudstone medium hard
7	8	Coal
8	16	Shale soft and flakey
16	48	Coal "B" Seam
48	51	Mudstone medium hard
51	56	Mudstone soft traces of coal
		End of hole

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Hole No. 564 Elev. 5425.0

Lat. 488,265.0 Dep. 72,960.0

	Elev.	Th.
Top of B @	5409	32' '
Top of @		'
Top of @		'
Top of @		'

Gamma Ray Neutron Log

☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 564 Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K- FORDING 72(3)A

Objective: To determine location and thickness of coal seam

Sampled: None

Logged By: AJP Date: 16/5/72

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

From	To	Discard:	Reason:
0	7	Siltstone hard	
7	12	Shale soft and flakey	
12	13	Shale medium hard	
13	21	Sandstone very hard	
21	29	Mudstone soft	
29	55	Coal "B" Seam	
55	57.5	Shale soft	
57.5	65	Coal with thin shale partings of 2-3 inches	
65	76	Sandstone medium hard	
		End of hole	

Hole No. 565 Elev. 5426.9

Lat. 487,748.8 Dep. 72,833.4

	Elev.	Th.
Top of "B" @	5398	26 '
Top of @		'
Top of @		'
Top of @		'

Gamma Ray Neutron Log ☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 565

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

K - FOROING 72(3)A

Objective: To determine location and thickness of coal seam

Sampled: None

Logged By: AJP

Date: 16/5/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	94'

From	To	Discard: Reason:
0	4	Sandstone very hard
4	4.5	Shattered sandstone
4.5	9	Sandstone very hard
9	11	Sandstone med. hard
11	20	Sandstone hard and soft layers
20	22.5	Mudstone soft
22.5	23.5	Coal
23.5	28	Sandstone medium hard
28	28.5	Coal Trace
28.5	60	Sandstone hard
60	61	Sandstone medium hard
61	64.5	Shale soft
64.5	77	Coal "B" Seam
77	81.5	Siltstone hard
81.5	85	Siltstone soft
85	86	Coal
86	87	Mudstone
87	89	Soft shattered rock and coal
89	91	Soft shattered siltstone
91	94	Sandstone very hard
		End of hole

Hole No. 566 Elev. 5438.0
Lat. 487,718.9 Dep. 72,722.5

	Elev.	Th.
Top of B @ 12.5		12.5'
Top of ____ @ ____		'
Top of ____ @ ____		'
Top of ____ @ ____		'

Gamma Ray Neutron Log ☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 566

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

K-Faceing 72(3)A

Cominco

Objective: To determine location and thickness of coal seam

Sampled: None

Logged By: AJP

Date: 17/5/72

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	84'

From	To	Discard: Reason:
0	5	Sandstone hard
5	19	Shattered rock with numerous carbonate filled fractures
19	26	Shale soft
26	28	Sandstone hard
28	31	Sandstone very hard
31	31.5	Coal Trace
31.5	48	Mudstone
48	70	Coal Seam "B"
70	75	Siltstone and sandstone
75	84	Shale
		End of hole

40 Scale

Color Plot & Dips | Ore Classes & Aver.

Hole No. 567 Elev. 5422.9

Lat. 487,589.6 Dep. 72,743.4

	Elev.	Th.
Top of B @	5379.5	22 '
Top of @		'
Top of @		'
Top of @		'

Gamma Ray Neutron Log ☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 567

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K - FOREING 72(3)A

Objective: To determine location and thickness of coal seam

Sampled: None

Logged By: AJP

Date: 24/5/72

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip:	Length:
58		Greenhills Pit		0 -90	69'

From	To	Discard:	Reason:
0	10	Sandstone very hard	
10	11	Coal	
11	38	Sandstone hard	
38	39	Sandstone medium hard	
39	45	Shale very soft and flakey	
45	53	Sandstone med. .hard	
53	59	Shale soft	
59	69	Coal Seam "B"	
		End of hole at 69' in coal	

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Hole No. 568 Elev. 5431.5

Lat. +87,498.5 Dep. 72,748.8

	Eff.	Th.
Top of B @ 5372.5	'	'
Top of ____ @ ____	'	'
Top of ____ @ ____	'	'
Top of ____ @ ____	'	'

Gamma Ray Neutron Log

☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 568

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOREING 72(3)A

Objective: To determine location and thickness of coal seam

Sampled: None

Logged By: AJP Date: 25/5/72

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	105'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

From	To	Discard: Reason:
0	8	Sandstone very hard
8	14	Sandstone medium hard
14	15	Shale soft
15	60	Sandstone hard
60	66	Sandstone med. hard
66	74	Sandstone hard
74	79	Shale or mudstone soft
79	105	Coal
		End of coal at 105' in coal

Hole No. 569 Elev. 5448.9

Lat. 487,246.4 Dep. 72,618.5

	Elev.	Th.
Top of "B" @	5370	26'
Top of @		'
Top of @		'
Top of @		'

Gamma Ray Neutron Log

☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 569

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-forcing 72/31A

Objective: To determine location and thickness of coal seam			Sampled: None		
Logged By: RBA	Date: 26/5/72		Composites:		
Block: 5B	Sect.:	Place: Greenhills Pit	App. Bear:	App.: Dip.: -90°	Length: 105'

From	To	Discard:	Reason:
0	12	Sandstone soft	
12	17	Sandstone med. hard	
17	24	sandstone hard	
24	26	Mudstone soft	
26	40	Sandstone hard	
40	50	Sandstone medium hard	
50	55	Mudstone or shale soft	
55	85	Coal good quality	Seam "B"
85	103	Coal with thin partings at 85', 89', 92', 97'	
103	105	Hard coal	
		End of hole at 105' in hard coal	

Hole No. 570	Elev. 5443.2	
Lat. 487,230.3	Dep. 72,755.4	
	Elev.	Th.
Top of B	@ 5388.2	30'
Top of	@	'
Top of	@	'
Top of	@	'

Gamma Ray Neutron Log ☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 570 Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K - FORDING 72(31A

314

Objective: To determine position and thickness of coal seam		Sampled: None			
Logged By: AJP	Date: 31/1/72	Composites:			
Block: 5B	Sect.:	Place: Greenhills Pit	App. Bear:	App.: Dip.: -90°	Length: 110'

From	To	Discard:	Reason:
0	10	Mudstone soft to medium hard	
10	13	Mudstone soft	
13	17	Shattered rock very soft	
17	23	Mudstone soft	
23	32	Sandstone hard	
32	62	Mudstone medium hardness	
62	78	Mudstone soft	
78	110	Coal Seam B	
		End of hole at 110' in coal	

Hole No. 571 Elev. 5452.2
Lat. 486,946.6 Dep. 72,635.7

	Elev.	Th.
Top of "B"	@ 5374	32+'
Top of	@	'
Top of	@	'
Top of	@	'

Gamma Ray Neutron Log
☐ Yes ☑ No

Core Size 4½" Tricone

Hole No. RH 571

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOREING 72L3A

Objective: To determine location and thickness of coal sea | Sampled: NONE

Logged By: AJP | Date: 1/6/72 | Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills Pit		-90°	78'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Discard: Reason:
0	6	Mudstone soft and flakey
6	34	Sandstone hard
34	36	Mudstone very soft
36	44	Mudstone medium hard
44	47	Mudstone very soft
47	54	Sandstone hard
54	70	Shale or mudstone soft
70	78	Coal Seam "B"
		End of hole at 78' in coal

Gamma Ray Neutron Log
☐ Yes ☑ No

Hole No. 572	Elev. 5452.5
Lat. 486,688.1	Dep. 72,790.7
	Elev. Th.
Top of B	@ 5482.5 ,
Top of	@ ,
Top of	@ ,
Top of	@ ,

Core Size 4 3/4" Tricone

Hole No. RH 572 Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FROOKS 72(3A

Objective: To determine location and thickness of Coal Seam

Sampled: None

Logged By: RBA & ACT

Date: 23/6/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills		-90°	106'

From	To	Discard: Reason:
0	22	Overburden 20' casing left in the hole
22	86	Mudstone and siltstone
86	99	Coal "D" Seam
99	100	Shale parting
100	106	Coal shaly "D" Seam
		End of hole at 106' in Coal

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size

$4\frac{1}{2}$" Tricone bit

Hole No. 573

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-FOREING 72(3)A

Objective: To determine thickness and location of Coal seam

Sampled: None

Logged By: AJP Date: 27/6/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills		-90°	82'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Discard: Reason:
0	14	Over burden, clay & rock till 14' casing left in the hole
14	22	Very soft rock, weathered zone
22	35	Mudstone medium hard
35	38	Coal and carbonaceous shale
38	45	Mudstone and siltstone soft and hard alternating bands
45	53	Sandstone very hard
53	81	Coal Seam "D"
81	82	Hard Coal and black shale
		End of Hole at 82'

Core Size $4\frac{1}{2}$" Tricone bit

Hole No. 574

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K. FORDING 72(3)A

314

Objective: To determine location and thickness of Coal seam

Sampled: None

Logged By: AJP Date: 28/6/72

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
5B		Greenhills			63'

From	To	Discard: Reason:
0	22	Clay and rock over burden 22' Casing left in hole
22	41	Mudstone and siltstone hard and soft layers alternating
41	43	Shale very soft and flakey
43	60	Coal Seam "D"
60	63	Sandstone medium hard
		End of hole at 63'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size $4\frac{1}{2}$" Tricone

Hole No. 575

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

Cominco

K-foregoing 72(3)A

Objective: To locate and determine thickness of Seam B

Sampled: NONE

Logged By: AJP

Date: Sept. 1, 1972

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
9A		Lower Greenhills		-90°	165'

From	To	Discard:	Reason:
0	13	Overburden	
13	25	Mudstone medium hard	
25	31	V. Soft brown shale Coal Trace at 31'	
31	35	Mudstone hard and soft layers Trace of Caol at 35'	
35	55	Mudstone soft and hard	
55	85	Sandstone very hard	
85	90	Mudstone medium hard	
90	94	Sandstone medium hard	
94	106	Sandstone very hard	
106	111	Sandstone medium hard	
111	117	Sandstone medium and hard layers	
117	119	Shale very soft	
119	164	Coal Seam B	45'
164	165	Shale soft	
		End of Hole at 165'	

Hole No. 576 Elev. 5474.8

Lat. 465,743.7 Dep. 75,079.1

	Elev.	Th.
Top of B @ 5355.8		45'
Top of ____ @ ____		'
Top of ____ @ ____		'
Top of ____ @ ____		'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size: 4 1/2 Tricone Bit

Hole No. R.H. 576

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

K-FORDING 72(3)A

Cominco

Objective: To locate and determine thickness of Seam B

Sampled: None

Logged By: AJP Date: Sept. 8, 1972

Composites:

[redacted]

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
9A		Lower Greenhills		-90°	140

From	To	Discard: Reason:
0	26	Over burden; course till
26	50	Med. to hard sandstone
50	82	Sandstone hard
82	140	Coal Seam B
		End of Hole @ 140'

Hole No. 577 Elev. 5461.6

Lat. 485,476.7 Dep. 73,284.4

	Elev.	Th.
Top of B @	5380	58'
Top of @		'
Top of @		'
Top of @		'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

Core Size: 4 1/2" Tricone

Hole No. RH 577

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

K - FOOTING 72(3A

Cominco

394

Objective: To locate and determine thickness of Seam B			Sampled: None		
Logged By: AJP	Date: Sept. 11, 1972		Composites:		
Block: 9A	Sect.:	Place: Lower Greenhills	App. Bear:	App.: Dip.: -90°	Length: 85'

From	To	Discard: Reason:
0	14	Overburden: course till
14	45	Sandstone hard
45	82	Coal
82	84	Parting of shale and hard coal
84	85	Coal hard
		Rods became plugged @ 85' however was at bottom of seam
		End of Hole at 85'

Hole No. 578 Elev. 5431.6		
Lat. 49,192.8 Dep. 73,386.1		
	Ft.	Th.
Top of B @ 5387	37'	
Top of ____ @ ____		'
Top of ____ @ ____		'
Top of ____ @ ____		'

40 Scale

Color Plot & Dips	Ore Classes & Aver.
0	

Core Size: 4 1/2" tricone

Hole No. RH 578

Page 1 of 1

2507—N.D.N.

Diamond Drill Geological Log

K-FORDING 22(3)A

Cominco

374

Objective: To locate and determine thickness of Seam B.

Sampled: None

Logged By: AJP

Date: Sept. 13, 1972

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
9A		Lower Greenhills			

From	To	Discard: Reason:
0	30	Overburden, boulders and course till, Coal bloom at 23'
30	60	Sandstone medium hard
		End of Hole at 60'
		Hole abandoned at 60', walls caved in below casing, or casing became damaged. Bit broke off rods when rods were recovered

	Elev.	Th.
Hole No. 579 Elev. 5442.1		
Lat. 415 852.9 Dep. 23,245.2		
Top of ~~Z~~ @		'
Top of @		'
Top of @		'
Top of @		'

Core Size

4 1/2" Tricone

Hole No. RH579

Page 1 of 1

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.O.N.

Diamond Drill Geological Log

Cominco

K-foreing 72(3)A

314

Objective: To locate and determine thickness of Seam B

Sampled: None

Logged By:

Date: Sept. 18, 1972

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
9A		South Greenhills		-90°	78'

From	To	Discard:	Reason:
0	6	Overburden, till	
6	29	Mudstone	
29	76	Coal	Seam B
76	78	Shale	
		End of Hole at 78'	

Gamma Ray Neutron Log

☐ Yes ☑ No

Hole No. RH 581 Elev. 5415.5

Lat. 985,175.5 Dep. 73,655.4

	Elev.	Th.
Top of B	@ 5386.5	47'
Top of	@	'
Top of	@	'
Top of	@	'

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

54'

Core Size 4 3/4" Tricone

Hole No. 581

Page 1 of 1

2507—N.D.N.

K- FR 72 (8)A

REPORT ON FORDING OPERATIONS RELATIVE TO SECTION 7 OF THE COAL MINES REGULATION ACT

Cominco

CONFIDENTIAL

OPEN FILE

FORDING OPERATIONS

January 21, 1972

F O R D I N G C O A L L I M I T E D

(MANAGED BY COMINCO LTD.)

FORDING OPERATIONS

APPLICATION FOR APPROVAL OF GENERAL MINING PLANS

UNDER SECTION 7

OF THE COAL MINES REGULATION ACT

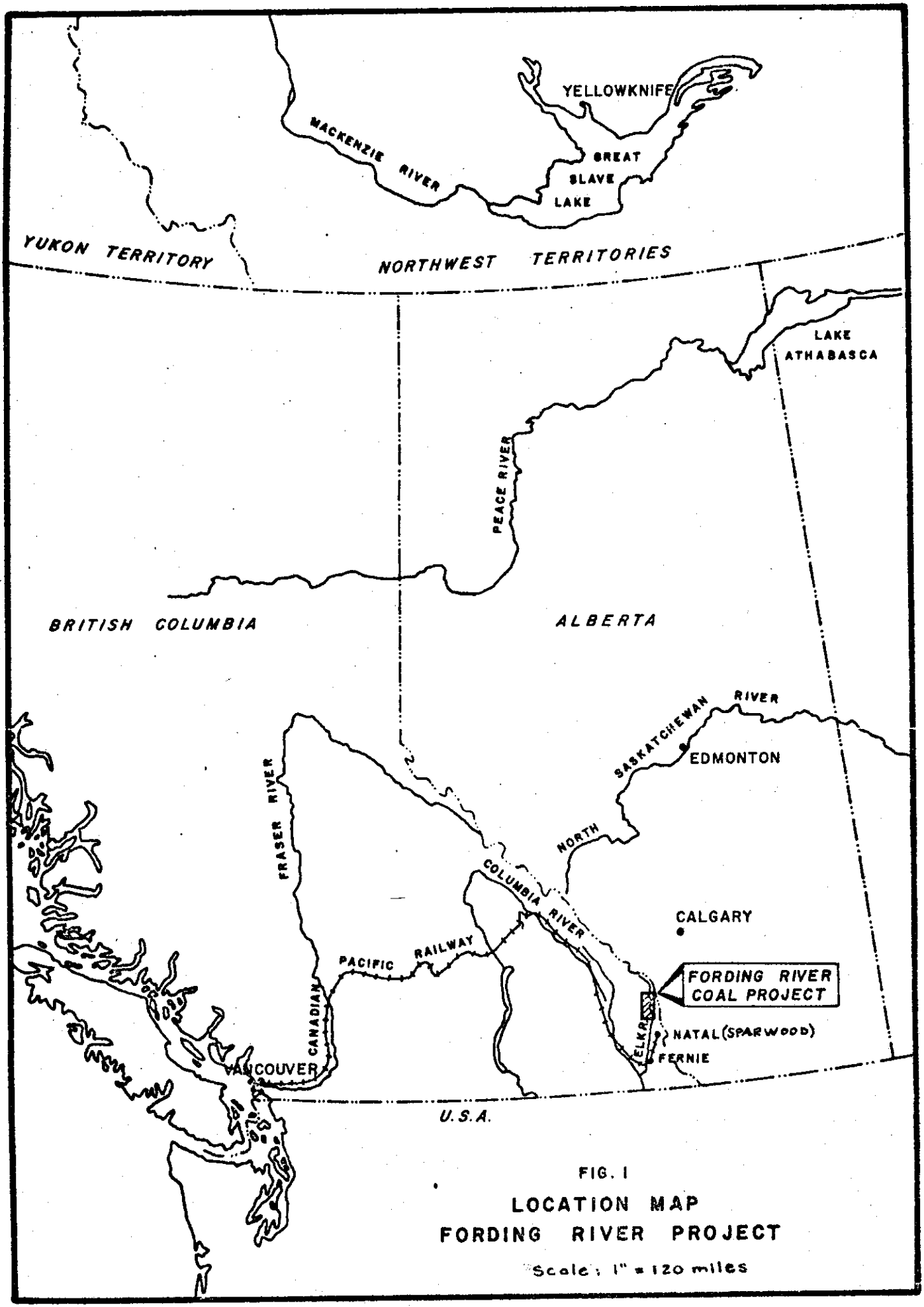


FIG. 1

LOCATION MAP

FORDING RIVER PROJECT

Scale: 1" = 120 miles

I N D E X

REPORT ON FORDING OPERATIONS MINING PLANS - JANUARY 1972

SECTION	DESCRIPTION
1	SUMMARY
2	HISTORY AND GEOGRAPHY
3	GEOLOGY AND COAL RESERVES
	I. GENERAL
	II. COAL RESERVES
	III. COAL RESOURCES
4	MINING
	I. GENERAL MINING PLANS
	a. Stability of Highwalls
	b. Stability of Waste Dumps
	c. Mine Drainage
	d. Reclamation
	II. MINING PRACTICES
	a. Pit Design
	b. Clode Creek Mining Practice
	c. Greenhills Mining Practice
	III. MAINTENANCE AND WAREHOUSE FACILITIES
	IV. MAJOR MINE EQUIPMENT
	V. MINING UNDERGROUND
5	COAL QUALITY AND COKE YIELD
6	PROCESSING
	I. COAL PROCESS PLANT
	II. OXIDIZED AND MIDDLING COAL
	III. UNIT TRAINS
7	MARKETS AND SALES CONTRACT
8	LABOUR AND SERVICES

APPENDIX

I.	LIST OF FIGURES
II.	LIST OF TABLES
III.	LIST OF MINE EQUIPMENT SPECIFICATIONS

SUMMARY

Fording Coal Limited hereby applies for approval of general mining plans under Section 7 of the Coal Mines Regulation Act.

The mine is located in the Fording Valley 42 miles north of Sparwood, B. C. The proposed mining is based on a contract to sell 3,000,000 long tons of metallurgical coal per year to Japanese consumers for 15 years for a total of 45,000,000 long tons. A coal preparation plant is being constructed at the property and C. P. Rail has built a branch line from Sparwood to the mine. A townsite is being developed at Elkford in the Elk Valley 18 road miles from the property.

The plan calls for open cut mining of four to seven coal seams which occur on each side of the valley; with an equal amount of production forecast from each side.

HISTORY AND GEOGRAPHY

HISTORY

The existance of coking coal in the Fording River Valley has been known since the turn of the century. The seams were investigated by the Canadian Pacific Railway Co., the Union Pacific Railway Co. and others but concentrated work was not done until 1967 when the property was acquired by Canadian Pacific Oil and Gas Ltd. This company embarked on an exploration program in 1967, with expanded work in 1968 which included 43 percussion drill holes, 65 trenches and 13 adits.

The exploration proved successful and Fording Coal Limited was incorporated in December, 1968. Exploration was continued under Cominco management in 1969 and a contract to sell coal was signed with twelve Japanese steel and gas companies in July, 1969. It provides for the delivery of 45,000,000 long tons of coking coal, less the short fall of up to one million tons in the first year, over a period of 15 years commencing April 1, 1972.

GEOGRAPHY

The property lies 42 miles north of Sparwood, British Columbia, and approximately 735 miles by rail from the port at Roberts Bank.

The mine lies in the north-south Fording Valley. At this point, the Fording River is 5,400 feet above sea level. The wide valley rises gently to the west to 7,500 feet and it rises to the east to about 8,000 feet.

The lower slopes of the valley are heavily forested; while open, alpine grasslands occupy the higher elevations.

GEOLOGY AND COAL RESERVES

I. GENERAL GEOLOGY

The coal occurs in upper Jurassic to lower Cretaceous Kootenay coal measures which are present in two synclines; one on either side of the Fording River which is the locus of a regional fault. Ten seams of significant thickness are present. A general geological section of the Fording Valley is shown in Figure 4.

II. COAL RESERVES

The proven plus probable clean coal reserves as of December 31, 1970, are 53,200,000 tons. Details are given in Table 1 following. This coal will be produced by surface mining and it is expected that the mining recovery will be high at 90%. Figure 5 shows a general plan of the proven and probable coal reserves.

The coal seams dip into the slopes on each side of the valley and large amounts of the seams will be left where they are too deep for profitable strip mining. Underground mining has been studied before selecting a surface method. The surface method has been designed so as to leave the underground coal intact for possible future underground mining.

Definition of Coal Reserves

The present coal reserves have been redefined to indicate the importance of feasibility studies which have confirmed the economics of mining an area of reserves. The following definitions have been adopted:-

1. Proven Reserves are those tonnages confirmed to a high degree of certainty geologically, and for which there appears to be a satisfactory, viable mining method. Proven reserves could include underground reserves if a feasible and presumably profitable operation is indicated.

2. Probable Reserves are coal reserves which are geologically established with a high degree of confidence, but about which there may be some question, or some need for further planning, before the economics of their extraction can be confirmed.

3. Possible Reserves are those reserves which are predicted geologically on less abundant information, the certainty of which is by no means clear.

4. Explanation of Coal Reserve Chart

L.T.R.C.:	Long Tons Raw Coal.
L.T.R.C. Delivered:	Allows for 10% mining loss and 10% allowance for oxidized coal.
L.T.C.C.:	Long Tons Clean Coal. (Assumes a yield in clean coal of 75% of plant in-put.)

III. COAL RESOURCES

The total resources of raw coal in place of the area have been estimated as 4,000,000,000 short tons, using procedures defined in the Geological Survey of Canada paper 70-58.

Under today's technology and economics only a small fraction of this resource can be recovered. However, the mining planned to take place

over the next 15 years should not materially affect the recovery of additional reserves should improved economics permit continued mining.

Details are given in Table 2 following, and areas referred to are shown in coal licence map, Figure 6. There is a fair potential to extend the surface mining in close proximity to the 15 year reserves on both sides of the Fording Valley. This potential includes the possibility of mining on the east side of Eagle Mountain, on Castle Mountain, and on Turnbull Mountain.

Preliminary feasibility studies have been completed on the upper Greenhills seams with viable surface mining conditions suggested.

Mining these upper seams would ultimately provide greater strippable reserves for the lower Greenhills dragline operations.

There is also the potential for development of economic coal reserves by surface mining at other locations within the boundaries of the present CanPac - Fording licences.

FORDING COAL RESERVES - (MILLIONS OF TONS) - **DECEMBER 31, 1970**

TABLE I

Area	SURFACE MINING PROVEN LTRC In Place	PROVEN LTRC Delivered	PROVEN LTCC	PROBABLE LTRC In Place	PROBABLE LTRC Delivered	PROBABLE LTCC	TOTAL PROVEN + PROBABLE LTRC In Place	TOTAL PROVEN + PROBABLE LTRC Delivered	TOTAL PROVEN + PROBABLE LTCC	POSSIBLE SURFACE MINING LTRC In Place	POSSIBLE SURFACE MINING LTRC Delivered	POSSIBLE SURFACE MINING LTCC	POSSIBLE U/G LTCC
WEST SIDE OF FORDING RIVER													
Greenhills Area													
Greenhills South	16.5	13.3	10.0	9.1	7.3	5.5	25.7	20.6	15.0	18	15	11	30
Greenhills S. Ext.	5.9	4.7	3.5	4.1	3.3	2.5	9.9	8.0	6.0	4	3	2	
Greenhills North										8	6	4	
Greenhills Upper Seams				4.0	3.1	2.2	4.0	3.1	2.2	10	8	6	
SUB-TOTAL	22.4	18.0	13.5	17.2	13.7	10.2	39.6	31.7	23.7	40	32	23	30
EAST SIDE OF FORDING RIVER													
Castle Mountain										10	8	6	
Eagle Mountain South										4	3	2	
Eagle Mountain West Face	9.0	7.3	5.5	1.6	1.3	1.0	10.6	8.6	6.5	3	2	1	10
Clode Creek	14.8	12.0	9.0	10.7	8.7	6.5	25.5	20.7	15.5	4	3	2	
Turnbull Mountain				12.3	10.0	7.5	12.3	10.0	7.5	12	10	8	
Brownie Creek										4	3	2	
SUB-TOTAL	23.8	19.3	14.5	24.6	20.0	15.0	48.4	39.3	29.5	47	29	21	10
T O T A L	46.2	37.3	28.0	41.8	33.7	25.2	88.0	71.0	53.2	87	61	44	40

TABLE 2

FORDING COAL RESOURCES

The total coal resources on the Fording property are estimated as follows:

Area Name	(Sq. miles) Area of Coal Measures	Total Coal Thickness	Total Resources in Place (Millions of Short Tons)	
Castle Mt.	5	100 ft.)	1550	
Eagle Mt. + Turnbull Mt.)	9	100 ft.)		
Greenhills	16	100 ft.	1800	
Henretta Mt.) to Aldridge Cr.)	10	60 ft.	650	4000

Minimum seam thickness used in this estimate was 5 feet; rock partings less than one foot thick were included in total seam thickness but thicker rock partings were excluded. These are the procedures used by Latour and Chrismas in G.S.C. paper 70-58. No recovery percentages were applied.

MINING

I. GENERAL MINING PLANS

Figure 7 illustrates the location of the mining areas in relation to the plant site. The generalized valley section, Figure 8, shows the mining areas in relation to the coal seams.

Basic principles governing the safe, economical, efficient handling of large amounts of material must be correlated to all phases of the mining operation. Pertinent elements that must be included in planning an open pit mine are: geology, topography, mining equipment, pit limits, stripping ratio, rate of production, pit slopes, bench heights, road grades, hydrology, and marketing considerations.

Fording has planned its surface operations and set its parameters with above mentioned elements in mind.

a. Stability of Highwalls

The stability of the proposed highwalls was studied and the consulting firm of Golder, Brawner and Associates were engaged to report on the subject. The major factors governing the stability of the proposed rock benches are:

1. The orientation and spacing of the joints.
2. The strength parameters on the joint surfaces.
3. The water pressure within the joints.

Subsequent field and laboratory investigations resulted in the formulation of design criteria as represented in Figure 9. The

basic design is bowl-shaped with the average slope of the pit wall flattening as the pit deepens.

b. Stability of Waste Dumps

The stability of the proposed waste dumps was studied by Golder, Brawner and Associates and several reports were prepared on this subject.

The principal factors influencing waste dump stability are:

1. The original gradient of the ground surface.
2. The strength characteristics of the materials at the base of the spoilpile.
3. The hydrostatic pressure at the base of the spoilpile.

Where it is necessary to dump on steeply sloping hillsides (20^{o} - 33^{o}) Fording follows a rigorous program to assure practical stability of spoilpiles. The following steps are taken to prepare the spoil area:

1. Clearing the area of timber and if feasible removing the layer of weathered soil towards the designed toe of the spoilpile.
2. Providing drainage channels.
3. Providing "keys" in the ground surface whenever feasible.
4. The construction of a base which will provide toe support for the waste materials placed during subsequent years of operation.

An example has been illustrated in Figure 10 where such a program was executed for Clode Creek Pit waste dump on the west face of Eagle Mountain.

c. Mine Drainage

All water courses have been diverted away from mining areas to prevent them from mixing with mine water.

In the Greenhills mining area it necessitated the construction of diversion dykes to re-route minor creeks.

Drainage plans in the Clode Creek mining areas called for diversion of Clode Creek and the construction of a retention basin for possible polluted mine water. Figure 7 shows their locations.

The amount of ground water to be encountered in the Greenhills mining area is not definitely known. Some water may have to be dealt with. If so, the plan is to pump the water to the tailings lagoon which is in closed circuit with the mill.

The above system of drainage was documented, submitted to and approved by the Comptroller of Water Rights.

d. Reclamation

General:

At the start of the project, a baseline ecological study of the Fording area was assigned to the B. C. Research Council to provide background data on living organisms, prior to commencement of operations. Extensive experimental work, which commenced in 1969, is being carried out by Cominco soil scientists and agronomists and is aimed at determining best methods of reclaiming and revegetating mined out areas. Results to date have suggested the types of grasses, legumes and trees that may grow successfully as well as the possible methods of seeding, planting and fertilizer application.

About 120 acres of land per year will be disturbed by the mining activity and the total area involved in the operation eventually will be approximately three square miles.

Fording reports regularly to the B. C. Department of Mines, Reclamation section under the terms of Reclamation Permit #3.

Planting of Waste Dumps:

Because surface mining will disturb a small area of alpine grassland of moderate importance as winter range, three types of experiments have been carried out.

1. The use of fertilizer to increase forage yield.
2. The test growing of 24 grass and legume species in crushed shale, sandstone and coal.
3. The effect of climate due to altitude.

The use of fertilizers increased the yield.

The test growing was found to need the addition of nitrogen and phosphorous, supplied as fertilizer.

Domestic grass and legumes were tested at altitudes of 5400, 6700 and 7300 feet.

The plan is to determine and apply the most suitable plant life to the surface waste dumps throughout the duration of the mining operations.

II. MINING PRACTICES

a. Pit Design

Because of topographical and geological considerations, two main pit designs have been adopted.

1. The more conventional bench mining by shovel and truck is employed in the Clode Creek mining areas.
2. A dragline operation is employed in the Greenhills mining area.

b. Clode Creek Mining Areas

The general mining method has been illustrated in Figure 11. The pit is mined in 33-1/3' benches with a berm left in the highwall every second bench.

The bench geometry at various pit slopes has been detailed in Figures 12 & 13 to conform to overall pit slopes as laid out previously in the section "Stability of Highwalls".

Drilling:

Blast holes are drilled with two Bucyrus-Erie 45R rotary drills. All holes are 9-7/8" diameter, drilled on a 20' x 35' pattern to a depth of 40'.

Blasting:

Canadian Industries Ltd. has contracted to provide all explosives delivered and mixed at the loading area. Both Anfo and slurry will be used as the blasting agent. A powder factor of approximately .75 lbs./BCY is adequate for good fragmentation.

Loading:

Waste is loaded by three 15 cu. yd. shovels. Where necessary 13 yd.^{3} front end loaders augment shovel capacity.

Coal is loaded by front end loaders equipped with 23 yd.^{3} buckets. Dozer work will be required to push coal towards front end loader face.

Hauling:

Hauling is done by a total of 21 Wabco, 120B, haul trucks. Eight trucks have been equipped with enlarged boxes for coal hauling.

Figure 14 indicates the haul profile for coal and waste.

c. Greenhills Mining Area

The general pit lay-out has been presented in Figure 15.

The orientation of cuts conforms roughly to the strike direction of the coal seams in order to:

1. Provide a relatively level pit bottom, and
2. To create as constant a cut depth and geometry as possible as the dragline proceeds along the length of the pit.

The dragline cut has been designed realizing the physical limitations of the machine and the positions it can safely and realistically occupy. A cut will always bottom at the top of a coal seam, have a 68° rock face on one side, have a spoil pile running in to the toe of the coal on the other side, and will generally be excavated by taking a key cut first to create a clean and stable highwall. Figure 16, "Summary of Cut Geometry", demonstrates above.

Drilling:

A Bucyrus-Erie 60R rotary drill provides the drill capacity by drilling 12-1/4" diameter holes on a pattern of 40' x 40'. Hole depths will vary, the average depth being 80' and with a maximum depth of 180'.

Blasting:

Both Anfo and slurry will be used as the blasting agent. A powder factor of .5 lbs./BCY has been planned. In general the charge will be decked into several smaller charges, each separated by a length of stemming.

Stripping:

All waste will be removed by the Marion 8400 dragline equipped with a 60 cu. yd. bucket. Rehandle of waste material is normal dragglining practice but will be kept to a minimum.

Coal Loading:

The coal will be dug directly out of the seam by front end loaders with 23 cu. yd. buckets and truck loaded for haulage to the breaker. The method of handling is presented in Figure 17. Ripping of the coal seam may be required to assist the front end loader.

In some cases the dragline may be required to lift some coal and if so the coal will be dumped on the dragline pad behind the machine from where front end loaders will load Wabco coal trucks.

Hauling:

Figure 14 indicates the haul profile for coal. Coal hauling is done

by 6 - 8 coal haulers, Wabco 120B trucks furnished with enlarged boxes accommodating 120 tons of coal.

III. MAINTENANCE AND WAREHOUSE FACILITIES

a. Mine Repair and Maintenance

Facilities for the field servicing of equipment will be provided in the pit areas.

Repairs to major equipment, such as draglines and shovels, will have to be done on site.

The main shop facilities are, however, located in the preparation plant area and whenever possible all mobile equipment, that is equipment that can travel over the service roads, will be brought to the shop area for repair and overhaul.

b. Warehousing

Provision has been made by Fording for substantial warehouse supplies including major equipment spares. In addition, equipment manufacturers will be setting up required service organizations and strengthening their parts supply.

TABLE 3

IV. MAJOR MINE EQUIPMENT LIST

PRODUCTION EQUIPMENT

Units	Description
13	Wabco 120B Haulage Truck - Rock Box
8	Wabco 120B Haulage Truck - Coal Box
3	Shovels, 15 yds.^{3}
1	170B, B.E. Shovel, 6 yds.^{3}
1	Marion 8400 Dragline, 60 yds.^{3}
3	LeTourneau Front End Loaders - L700, 13-1/2 yds.^{3} - 23 yds.^{3}
2	Dart Front End Loaders - D600, 13-1/2 yds.^{3} - 26 yds.^{3}
2	45R, B.E. Rot. Drill, 9-7/8" dia.
1	60R, B.E. Rot. Drill, 12-1/4" dia.
2	Napco, Perc. Drill, 3-1/2" - 4" dia.
2	Paydozer (Hough), Rubbertired
4	Cat. D-9-G Dozers
2	Cat. D-8-H Dozers
1	Cat. D-7-F Dozer

MISCELLANEOUS EQUIPMENT

4	35 ton, Haulpak Trucks (2 water, 1 gravel, 1 util.)
1	D-6 Dozer Drill
3	Graders (2-Cat. 16, 1-Champion)
2	Scrapers - Cat. 631 B
2	Loaders (1-Cat. 950, 1-Cat. 980)
1	Mobile Crane, Link Belt, 82 ton

NOTE: a. Photographs of major mining equipment units are shown in Figure 18.

b. Manufacturers' specifications for major mining equipment are included in the Appendix.

V. MINING - UNDERGROUND

Only a small part of Fording's coal resources appear at present to be amenable to surface mining. The possibility of underground mining methods have had preliminary consideration and increased attention to this aspect is expected as the surface operation becomes stabilized.

Two preliminary feasibility studies were made, one by Gordon Cook, P. Eng., Mining Consultant, Edmonton, Alberta, in December 1969. A second feasibility study was made by Fenco Limited in February 1970. Personnel assigned to the study were W. R. Holden, P. Eng., Senior Division Manager, Mining & Metallurgy, and H. S. Haslam, Coal Mining Engineering Consultant to Fenco (Foundation Engineering Company).

The Fenco report was mainly an economic study and reserves and underground conditions were assumed to be amenable to optimum longwall operations.

The report by Gordon Cook, P. Eng., was done in more depth. He considered the mining of the reserves on both Eagle and Greenhills mountains. He reviewed all available geological data and concluded that seams 4 and 7 on Eagle Mountain and B and E seams on Greenhills showed the necessary continuity and roof qualities for good mining conditions. He considered the top 9 feet of each seam should be mined for optimum results and maximum recovery. Recovery of this top 9 feet was estimated at 80%. On the basis of these assumptions the following Table 4 of inferred underground reserves was developed.

After the surface mining is well developed and in production, additional exploration of these reserves will be considered; such exploration may include underground development to establish continuity, roof conditions and coal quality. At the present time, geological data is not well defined outside of the surface mining area and should underground methods appear to be economically feasible then major development will be required to establish reserves on which to establish a viable operation.

For the first few years of surface operation, information on the mining of thick seams will be researched and information on alternate mining methods will be examined.

TABLE NO. 4

INFERRED UNDERGROUND RESERVES

EAGLE MOUNTAIN

(all figures in short tons, unless otherwise noted)

Seam	Mineable tons in place	Net tons @ 80% for mining losses	Plant Recovered	Product (Long Tons)	% of Total
4	15,300,000	12,240,000	10,530,000	9,400,000	62.5
7	10,300,000	8,240,000	6,340,000	5,660,000	37.5
Total	25,600,000	20,480,000	16,870,000	15,060,000	100.0

GREENHILLS

B	59,000,000	47,200,000	40,600,000	36,300,000	52.9
E	59,000,000	47,200,000	36,300,000	32,400,000	47.1
Total	118,000,000	94,400,000	76,900,000	68,700,000	100.00

TOTAL

4/B	74,300,000	59,440,000	51,130,000	45,700,000	54.5
7/E	69,300,000	55,440,000	42,640,000	38,060,000	45.5
Total	143,600,000	114,880,000	93,770,000	83,760,000	100.0

Source: Report by Gordon Cook, P. Eng., Mining Consultant
December 17, 1969

These reserve estimates are not accepted or rejected by Fording Coal Limited due to their feasibility not having been studied in sufficient depth.

METALLURGICAL COAL QUALITY AND COKE YIELD

The analyses of the Fording coals show them to be high-grade, medium volatile, bituminous coking coals with an A.S.T.M. rank of Mvb (medium volatile bituminous).

The coal on the property is consistent as to quality according to the seam in which it occurs. There is a moderate increase in volatile matter as one ascends from the lower to the upper seams. The range is from 21% to 30% volatiles. In actual fact the coals with a volatile range of 21% approach the low volatile rank designation. Tests indicate that these coals have many properties similar to low volatile coals.

Since the inherent ash in the raw coal is not high, external impurities can be released by crushing to provide a clean coal of approximately 8% ash.

On the basis of a clean coal product of 8% ash, a volatile of 21% to 24% (air dried basis) may be expected when seams are blended according to reserves. A sulphur content of .45% can be expected and the F.S.I. (free swelling index) of the washed coal product should be in the range from 5 to 8.

Based on a clean coal product of 8% ash, theoretical product recovery will be approximately 80%.

Gross calorific value on a dry mineral matter free basis weighted as to reserves will be approximately 15,000 Btu per pound, determined at the Fuels Research Centre, Ottawa.

Studies of the coal seams of the Clode-Eagle Mountain area and the correlated seams of the Greenhills area, in the proportions in which Fording Coal will

mine these seams show that the individual seams and the blend of these seams with other high volatile coals will make a strong, hard coke that can meet the requirements of modern iron blast furnace practice.

A large number of coking tests have been made on the various Fording coal seams and on blends with other high volatile coals, by the Japanese steel firms, by Mitsui of Japan and in Canada, by the Canadian Government Research Laboratories at Ottawa. These include petrographic analyses as well as chemical, physical and moveable wall oven tests for coke quality.

Petrographic studies by Dr. B. N. Nandi of the Fuels Research Centre at Ottawa show that the Fording coals are similar to other high quality Rocky Mountain Canadian coals with reactives in the 55% to 63% range.

The coals are contracting and show no pressure in moveable wall oven tests. As typical of low medium volatile coals, they produce high coke yield.

PROCESSING

I. THE FORDING COAL PROCESS PLANT

The raw coal will be delivered to a crushing station and the crushed raw coal will be stored in layered piles prior to the process plant. The plant will be rated at 750 short tons per hour, capable of producing approximately 600 short tons per hour of product coal. Product coal will be produced by means of dense medium separation and flotation and will be thermally dried by a gas fired dryer. A simplified process flowsheet is shown in Figure 19.

The process plant will be rated at 750 short tons per hour of 5" x 0 raw coal feed. This feed will be wet screened at 1/2" and at 28M to give 5" x 1/2", 1/2" x 28M, and 28M x 0 size fractions.

The 5" x 1/2" raw coal will be treated in two stages of dense medium (magnetite) baths to yield cleaned coal, middlings and reject. The cleaned coal will be crushed to -1-1/2" for outloading as final product. The middlings will be crushed to -1/2" and recirculated to the raw coal screens.

The 1/2" x 28M raw coal will be treated in two stages of dense medium (magnetite) cyclones to yield cleaned coal and reject. The cleaned coal will be centrifuged and delivered for thermal drying. The reject will be centrifuged and combined with the 5" x 1/2" reject and stored prior to back-haul to the pits.

The 28M x 0 raw coal will be treated by flotation with the addition of a frother and collector. The reagents used will probably be kerosene and methyl isobutylcarbinol. The frothed concentrate will be filtered by vacuum filters, assisted by the addition of a filter aid, probably of the polyelectrolyte type. The tailings from the flotation stage will enter a tailings pond from which clarified water will be recirculated for plant use. If it is found necessary to assist settling, a polyelectrolyte flocculent will be used. The filtered cleaned coal concentrate will also be delivered for thermal drying prior to outloading as final product.

The final product coal will be stored prior to unit train loading facilities.

II. OXIDIZED AND MIDDLING COAL

Based on present forecasts Fording could have 290,000 tons per year of oxidized and middling coal made up as follows:

Oxidized:	for sale on open market	160,000 S.T./yr.
Middlings:		130,000 S.T./yr.
	Total	290,000 S.T./yr.

It is impossible at this time for Fording to make any commitments until we have a better knowledge of the coal quality involved. This will become available as pre-production and production reach down to the lower seams and when middlings coal from the operating plant can be estimated.

III. UNIT TRAINS

Three 105-car unit trains will be used to haul the cleaned coal from the mine 735 miles to Roberts Bank.

The requirements are based on using 105-ton cars and 72 hours for a round trip with approximately 10,500 tons of coal per train load.

MARKETS AND SALES CONTRACT

The Fording project has proceeded on the basis of sales to the Japanese market for coking coals.

It was concluded that a share of the Japanese market was available and extensive negotiations led to signing of a contract by Fording Coal Limited with twelve Japanese steel and gas companies on July 29, 1969.

The general terms of the contract provide for delivery of 45,000,000 long tons of coking coal over a period of fifteen years commencing April 1, 1972. Annual rate is 3,000,000 long tons except for the first year when shipments may be reduced by an amount up to 1,000,000 long tons.

Delivery point is free on board vessel at Roberts Bank.

The product to be delivered to the loading port shall conform to the following specifications:

Size	100% minus 1-1/2"	As determined by A.S.T.M. methods
Free Swelling Index	5 - 7	
Volatile Matter (air dry basis)	21% - 24%	
Ash (air dry basis)	8% mx. (0.5% tolerance)	
Sulphur (air dry basis)	0.45% max.	
Total Moisture	6% max.	
Inherent Moisture (air dry basis)	Approx. 1%	
Calorific Value (moisture and mineral matter free basis)	Approx. 15,000 BTU/lb.	

LABOUR AND SERVICES

I. LABOUR CONTRACT AND TRAINING

In April 1971 a three-year Collective Agreement was signed between Cominco Ltd., the operating company, and local 2952 United Steelworkers of America.

Emphasis has been placed on the build up of reasonably skilled operators for the heavy mine equipment plus skilled maintenance crews. Canada Manpower approved training programs for equipment operators have been instituted with encouraging results. In addition, training programs for maintenance personnel are resulting in improvement in equipment availabilities.

The full crew for the property is forecast at 450 including staff.

II. SERVICES

Power

Power is provided from the British Columbia Hydro and Power Authority via a 5 mile 138 KV transmission line constructed by Fording from the Elk Valley.

Natural Gas

Columbia Natural Gas constructed a gas line to the plant site north from Sparwood and inter connected the Village of Elkford enroute.

Communications

B. C. Telephone have installed a permanent system.

Water

Process water will mainly come from recirculation of clarified flotation tailings. Makeup water and other fresh water requirements will be obtained from the Fording River under approval from the B. C. Comptroller of Water Rights.

Roads

An all-weather road connection has been established to join the main highway at Sparwood-Natal some 41 miles south of the mine site. The B. C. Department of Highways upgraded the first 23 miles of the Elk Valley highway to Elkford including completion of pulvi-mix in 1971, except for a few miles. Fording has completed construction of an all-weather gravel road from Elkford to the mine.

Townsite

Following detailed study in collaboration with consultants and the B. C. Department of Municipal Affairs, a townsite location was selected in 1970 at Boivin Creek in the Elk Valley, 18 road miles from the mine. The townsite is called Elkford. Mobile homes were established for key operating and construction personnel by late 1970. Building progressed in 1971 under legislation governing instant towns. Letters Patent were issued to incorporate as the Village of Elkford with the first council appointed August 2, 1971. A major detached housing development was approved offering attractive purchase incentives for all interested employees. By the end of 1971 extended single men's accommodation, a mobile home park and all townsite services were completed and substantial progress was made on 160 detached homes. These are scheduled for

occupancy by the spring of 1972. In addition, planning is proceeding for commercial development to provide employees with shopping facilities.

When completed, Elkford is expected to have a population of approximately 1,300.

APPENDIX I

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APPENDIX II

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A P P E N D I X III

LIST OF MAJOR MINE EQUIPMENT SPECIFICATIONS

UNIT	DESCRIPTION
60-R	Blast Hole Drill
45-R	Blast Hole Drill
280-B	15 cu. yd. Shovel
8400-11	60 cu. yd. Walking Dragline
L-700	13-1/2 - 23 cu. yd. Front End Loader
D-600	13-1/2 - 26 cu. yd. Front End Loader
120-B	120 Ton Rear Dump Haulage Truck (Wabco)

specifications

60-R

SERIES TWO

BUCYRUS-ERIE

Blast Hole Drill

WEIGHTS

WORKING WEIGHT — Less Tools

Electric	160,000 lbs.
Diesel	158,000 lbs.

DIMENSIONS

Length with standard mast down (dust enclosure folded)	77'-6"
Length with mast up	
Electric	46'-2"
Diesel	42'-10"
Height with standard mast up	76'-3"
Height with mast down (dust enclosure folded)	18'-4"
Width — Overall	19'
Width — Shipping	10'-6"

MOUNTING ..... Heavy Duty Crawler Type

Length of crawlers	21'
Width over treads	18'
Width of treads	
Standard	42"
Taconite service — optional	36"
Coal field service — optional	54"

MAST ..... End Mounted

Hoist ..... Two Hydraulic Cylinders

Tilts for angle hole drilling to 30° off vertical in 5° increments with optional angle hole equipment.

Mast for 50' drill pipe standard, Center pipe rack standard, R.H. and L.H. optional.

High mast for 55' drill pipe optional. Center pipe rack standard, R.H. and L.H. racks optional. Three 55' drill pipes can be racked with optional 55' mast.

High mast for 60' or 65' single pass drilling also available as optional equipment includes center pipe rack, R.H. pipe rack, back braces

Angle drilling to 15° off vertical optional with 60' and 65' masts.

HOLE DIAMETER AND PIPE SIZE COMBINATIONS

Hole Diameter	Pipe Diameter	Bailing Velocity	Joint Size
9"	7¼"	8,444 fpm	5½" API
9⅞"	8⅝"	10,387 fpm	6⅝" API
10⅝"	8⅝"	6,240 fpm	6⅝" API
12¼"	10¾"	6,960 fpm	8" Beco

DUST CONTROL EQUIPMENT

Fixed dust enclosure with hydraulically raised curtains

No. 12 Vortoclone, Skimmer, and Chip Boxes — Optional

Water Injection System — includes 800-gal. tank and turbine pump — Optional

BUCYRUS-ERIE

AIR COMPRESSOR ..... Allis-Chalmers Rotary

One Model 17-L water cooled, rated at 1310 cfm free air at 40 psi.
V-belt driven by 200 horsepower motor or from Diesel engine.
Equipped with Farr RotoPamic dry type filter.
Auxiliary compressor for 100 psi air for control functions.
Other main air compressors available as optional equipment.

PULL DOWN AND HOIST

Bit Loading to ..... 90,000 lbs.
Hydraulic Hoist ..... 75,000 lbs.
Electric Hoist —
Variable Speed A.C. Motor ..... 41,000 lbs. 89 FPM

ELECTRIC POWER ..... Standard 2400/4160 V.

Air Compressor — A.C. motor ..... 200 HP
Rotary Drive — D.C. motor ..... 35/70 HP at 230/460 V.
Hoist Propel — A.C. motor ..... 100 HP at 460 V.
Vortoclone — A.C. motor ..... 25 HP
Hydraulic Pump Motor — A.C. motor ..... 20 HP
Compressor Water Pump and Radiator Fan Motor — A.C. ..... 7½ HP
Auxiliary Compressor — A.C. motor ..... 5 HP
Utilities ..... 460 V.
Lighting ..... 115 V.

DIESEL POWER — OPTIONS

Diesel engine to power air compressor and alternator for A.C. power on drill.
Cummins VT-12, 480 HP net at 1750 RPM, equipped with Farr RotoPamic filter same as on standard compressor.
GMC 16V-71, 510 HP @ 1750 RPM, equipped with Farr RotoPamic filter same as on standard compressor.
Fuel Tank — 250-gal. capacity.
Starter — Direct Electric — 24 Volt.
Drive — V-belts.

LEVELING JACKS

Two — positioned outside mast on rear.
Two — positioned outside frame on front
Size — Front — 7" diameter x 66" stroke.
— Rear — 9" diameter x 54" stroke.
Machine Lift — Rear — 33".
Front — 37".
Jack Pads — Rear — 51" diameter.
Front — 44" diameter.

MACHINERY HOUSE

Totally enclosed, pressurized, and filtered with self-cleaning filters, louvers at front for air intake.
D.C. electrical cabinets pressurized and filtered.
Machinery house insulation and heaters — Optional.

OPERATORS CAB

Totally enclosed, pressurized, replaceable filter element.
Operator's seat — adjustable, at control console.
All controls power operated.
Heater — Standard.
Cab insulation — Optional.

HYDRAULIC SYSTEM

Oil Cooler and system filter.

GEARS

Totally enclosed and running in oil.

BEARINGS

Anti-friction throughout except in crawlers.

CENTRALIZED LUBRICATION

Available as Optional Equipment.

specifications 45-R

BUCYRUS-ERIE

Blast Hole Drill

WEIGHTS

WORKING WEIGHT — Less Tools

Electric	103,500 lbs.
Diesel	109,000 lbs.

DIMENSIONS

Length with standard mast down (dust enclosure folded)	58′-0″
Length with mast up	36′-7″
Height with mast up	57′-4″
Height with mast down (dust enclosure folded)	17′-4″
Width — Overall with Vortoclone	18′-3″
Width — Shipping	10′-6″

MOUNTING ..... Crawler Type

Length of Crawlers	18′-4″
Width over Treads	16′-1″
Width of Treads — Standard	36″
Optional	42″

MAST ..... End Mounted

Hoist ..... Two Hydraulic Cylinders

Tilts for Angle Hole Drilling to 30° off vertical in 5° increments with optional angle hole equipment.

Pipe Racks in Mast for three 32′-6″ Drill Pipe, Center Pipe Rack standard, RH or LH racks optional.

High mast for 44′ drill pipe optional. Center pipe rack standard, RH and LH racks optional.

High mast for 55′ single pass drilling only includes center pipe rack, RH pipe rack, back braces, center guide in mast to stabilize drill pipe. Drill Pipe in 27′-6″ section — LH pipe rack optional to store third 27′-6″ pipe. Angle drilling to 15° only with optional angle hole equipment.

HOLE & PIPE SIZE

Hole Size Inches	Pipe Size Inches	Bailing Velocity FPM	Beco Joint Size Inches
6¾	5½*	11,754	4
7⅜	5½*	7,458	4
7⅞	6¼*	7,842	4½
9	7¾**	8,596	6
9⅞	8⅝	7,786	6
10⅝	8⅝	4,677	6

*Traveling center guide required to stabilize drill pipe for any mast.
**Center guide required for 55′ lg. drill pipe for high mast.

DUST CONTROL EQUIPMENT

Fixed dust enclosure with hydraulically raised curtains

No. 12 Vortoclone, Skimmer, and Chip Boxes — Optional

Water Injection System — includes 450 gal. tank and turbine pump — Optional

BUCYRUS-ERIE

AIR COMPRESSOR ..... Allis Chalmers Rotary

One Model 12-L water cooled, Rated @ 982 cfm free air @ 40 PSI
V-belt driven by 150 HP motor or from diesel engine
Equipped with Farr RotoPamic dry type filter
Aux. Compressor for 100 PSI air for air controls
Optional compressor available for combination hammer and rotary drilling

PULL DOWN & HOIST

Bit Loading to	70,000 lbs.
Hydraulic Hoist	55,000 lbs.
Electric Hoist	90 FPM

ELECTRIC POWER ..... Standard 2400/4160 V.

Air Compressor — A.C. motor	150 HP
Rotary Drive — D.C. motor with variable output static supply	25/50 HP @ 230/460 V.
Hoist — Propel, Variable torque — A.C. motor	50 HP
Vortoclone — A.C. motor	7½ HP
Hydraulic Pumps — A.C. motor	15 HP
Compressor Water Pump — A.C. motor	1 HP
Compressor Radiator Fan — A.C. motor	5 HP
Auxiliary Compressor — A.C. motor	5 HP
Utilities	460 V.
Lighting	115 V.

DIESEL POWER OPTION

Diesel engine to power air compressor and alternator for AC power on drill
Cummins NT-380-IP, rated 320 HP net @ 2000 RPM, equipped with Farr RotoPamic filter (same size as Compressor Filter)
GM 12V-71, Rated 355 HP @ 1800 RPM
Fuel Tank — 245 gal. capacity
Starter — Electric start — 24 V.
Drive — V-belts

LEVELING JACKS

Two positioned outside mast on rear end
One in center on front end
Size — 7" dia. x 54" stroke
Machine Lift — 34" on rear, 30" on front
Jack Pads — 44" diameter

MACHINERY HOUSE

Totally enclosed with louvers at front end and R.H. side for air intake
D.C. electrical cabinets pressurized and filtered

OPERATORS CAB

Totally enclosed
Operator's seat — Adjustable, at control console
All controls power operated
Heaters and cab insulation — Optional

HYDRAULIC SYSTEM

Oil cooler and system filter

GEARS

Totally enclosed and running in oil

BEARINGS

Anti-friction throughout except in crawlers and propel shaft

CENTRALIZED LUBRICATION — Optional

specifications 280-B

BUCYRUS-ERIE

Standard Shovel

WEIGHTS:

Working weight, with dipper, approx., lbs.	940,000
Net weight, domestic, without ballast and without dipper, approx., lbs.	740,000
Dipper (15 cu. yd. — nominal) lbs. pin connected	50,000
*Ballast — furnished by purchaser, lbs.	150,000
*Export shipping weight — no ballast with dipper, approx., lbs.	804,000
Ship's option tons	621

*These weights will vary slightly depending upon dipper selection and optional equipment.

ELECTRICAL EQUIPMENT: Ward Leonard Drive

Control — simplified static (speed regulating)
Power — 3 phase, 60 cycle, 2400/4160 volts
Induction motor HP 700 continuous
1750 intermittent

DC Motors †
Hoist — blown 1 (750 HP @ 460 V.) 75 C
Swing — blown 2 (188 HP @ 460 V.) rise
Crowd — blown 1 (188 HP @ 460 V.) cont.

† Generators for Ward Leonard drive are equivalent in capacity to their respective motors.

MAIN MACHINERY:

Revolving frame
Length . . . . . 33'-0"
Width . . . . . 10'-6"

Hoist machinery
Hoist drum diameter . . . . . 42"
Drum grooves . . . . . flame hardened
Gearing . . . . . 1st reduction-herringbone (enclosed)
2nd reduction-helical (enclosed)
Dipper bail pull max. lbs. 245,000
Dipper speed — loaded dipper . . . . . 230 fpm

Crowd machinery
Crowd drum diameter . . . . . 34"
Drum grooves . . . . . flame hardened
Gearing . . . 1st & 2nd reduction helical (enclosed)
3rd reduction spur (open)

Swing machinery
Number of units 2
Gearing . . . 1st, 2nd & 3rd reduction helical (enclosed)
4th reduction spur — swing pinion — (protected)
Swing speed . . . . . 3.0 rpm
Propel machinery drive . . . . . from hoist motor
Hoist/propel engaging clutches . . . . . air
Brakes . . . . . spring set air released

BOOM:

Boom . . . . . welded high strength alloy steel
Boom point sheaves . . . . . twin grooved
flame hardened
Boom point sheaves diameter . . . . . 66"
Shipper shaft sheaves . . . . . twin grooved
flame hardened
Shipper shaft sheaves diameter . . . . . 54"
Handle diameter . . . . . 24"
Wall thickness . . . . . 2" nom.

CABLE DATA:

	No.	Length	Dia.	Type	Constr.
Hoist	2	255'	1¾	Twin Dual	6 x 37
Crowd	1	124	1¾	Single Dual	6 x 37
Retract	1	114'-6"	1¾	Single Dual	6 x 37
Boom Susp.	4	46'-11 1/16"	2¼	Equal-ized	Bridge Strand
Dipper Trip	1	60	½	Single	6 x 37

CRAWLER MOUNTING:

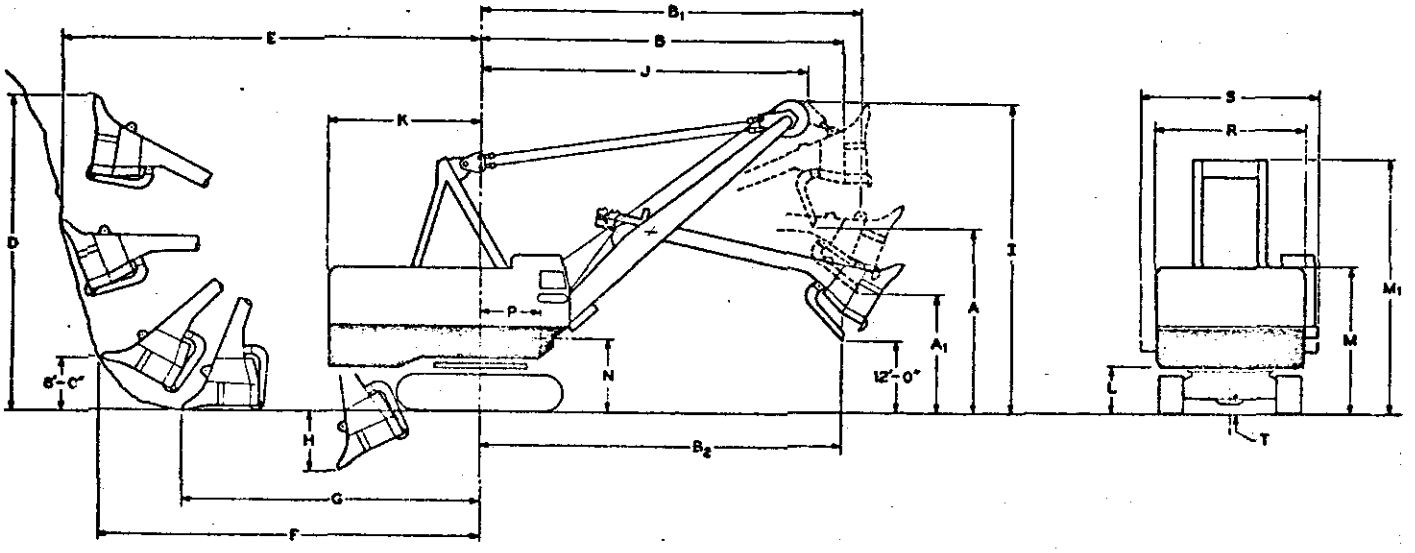
Crawlers — welded high strength alloy steel
Width of treads — standard . . . . . 42"
Width of treads — wide . . . . . 48"
Overall width of mounting (42" treads) . . . . . 21'-0"
Overall width of mounting (48" treads) . . . . . 21'-6"
Overall length of mounting . . . . . 26'-3"

	Sq. Ft.	Psi.
Total eff. bearing area (42" treads)	158	39.6
Total eff. bearing area (48" treads)	181	34.6

No. and diameter of rollers — lower . . . . . 8 — 42"
No. and diameter of rollers — upper . . . . . 6 — 19"
Driving tumblers diameter . . . . . 51⅛"
Take-up tumblers diameter . . . . . 52"
Number and pitch of treads . . . . . 84 — 16¼"
Propelling speed — normal, mph 0.93
Gradeability continuous 8%
maximum 28%

Truck frame — welded high strength alloy steel
Length . . . . . 12'-6¾"
Width . . . . . 11'-0"

Turntable
Cast alloy steel swing rack pitch diameter . . . 14'-4"
Teeth external cut . . . . . 8" face
Tapered forged alloy steel roller rails diameter 13'-3"
Number of tapered rollers 54
Tapered rollers diameter . . . . . 23"



Shovel Working Range

Dipper Capacity (Nominal) cu. yds.	15
Dipper Capacities (Range) cu. yds.	8-18
Length of boom	50'-0"
Effective length of dipper handle	31'-0"
Overall length of dipper handle	36'-0"

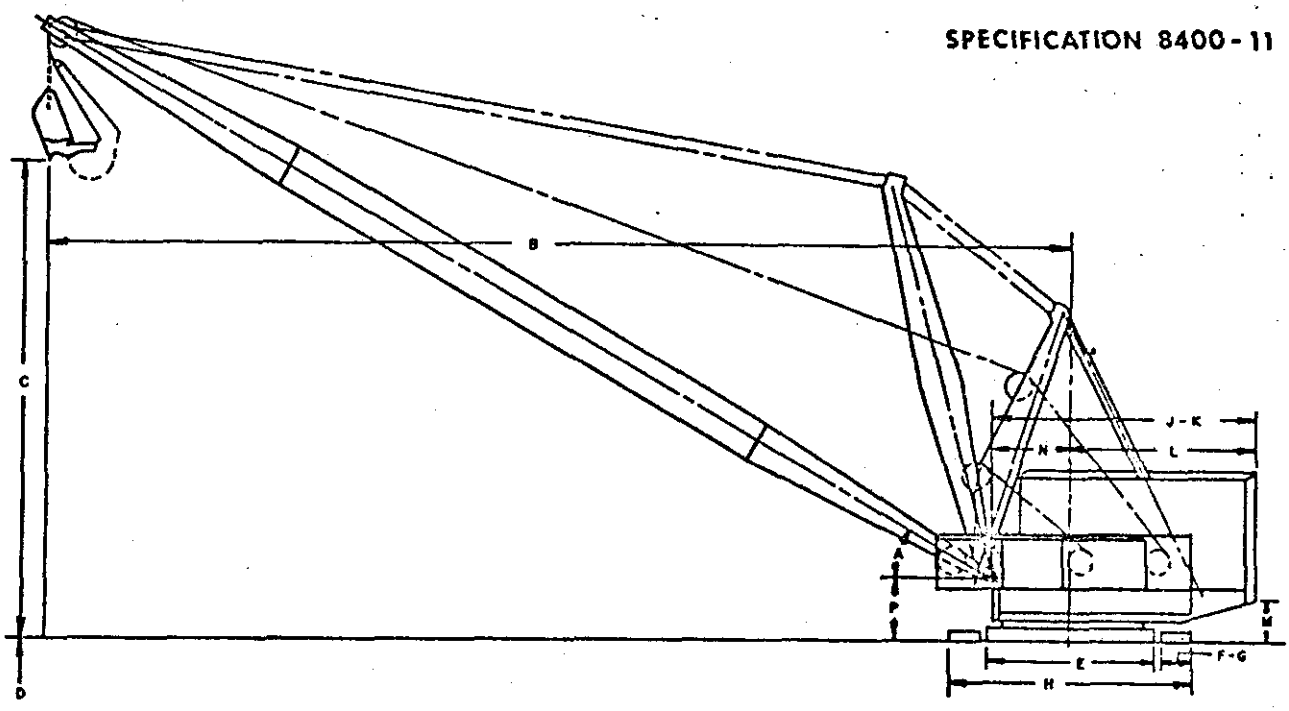
Range using 15 yd. general purpose dipper.

	Angle of boom	47	
A	Dumping height – maximum	30'-6"	A
A_1	Dumping height at maximum radius – B_1	22'-3"	A_1
B	Dumping radius at maximum height – A	49'-6"	B
B_1	Dumping radius – maximum	52'-6"	B_1
B_2	Dumping radius at 12'-0" dumping height	51'-6"	B_2
D	Cutting height – maximum	48'-3"	D
E	Cutting radius – maximum	62'-6"	E
F	Cutting radius at 8'-0" elevation	57'-9"	F
G	Radius of level floor	43'-3"	G
H	Digging depth below ground level – maximum	8'-6"	H
I	Clearance height – boom point sheaves	50'-6"	I
J	Clearance radius – boom point sheaves	46'-6"	J
K	Clearance radius – revolving frame	21'-6"	K
L	Clearance under frame – to ground	6'-7½"	L
M	Clearance height top of house	20'-10"	M
M_1	Height of A-frame	36'-7"	M_1
N	Height of boom foot above ground level	10'-11½"	N
P	Distance – boom foot to center of rotation	9'-5"	P
R	Width of machinery house without walkways	21'-0¾"	R
S	Overall width of machinery house	25'-0"	S
T	Clearance under lowest point in truck frame	17⅞"	T

8400 WALKING DRAGLINE

WARD LEONARD – STATIC CONTROL

SPECIFICATION 8400-11



WORKING RANGES

Boom Length	305'-0"
A - Boom Angle, Approx.	30-1/2°
B - Dumping Radius	290'-0"
C - Dumping Height	120'-0"
D - Depth	200'-0"
Maximum Allowable Load, lbs.	330,000
Hoist Drum, Pitch Dia.	126"
Hoist Ropes, Twin, Dia.	3-1/4"
Hoist Speed, Single Hitch, fpm	636
Drag Drum, Pitch Dia.	126"
Drag Rope, Twin, Single Hitch, Dia.	3-1/4"

BASE

E - Outside Diameter - Nominal	65'-0"	57'-0"
Bearing Area - Effective, sq.ft.	3320	2552
Rail Circle - Mean Dia.	48'-0"	48'-0"
Circle Rollers - Mean Dia.	12"	12"
Main Swing Gear - Pitch Dia. Approx.	39'-9"	39'-9"

WALKING TRACTION

F - Width of Shoe	12'-0"	11'-0"
G - Length of Shoe	55'-2"	55'-2"
H - Width Over Both Shoes	92'-0"	82'-6"
Bearing Area of Both Shoes, sq.ft.	1320	1210
Length of Step - Approx.	7'-3"	7'-3"
Walking Speed - Approx., mph	0.12	0.12

ROTATING FRAME

J - Width @ Rear End	66'-6"
K - Length	90'-0"
Depth Sill Members	130"
L - Clearance Radius - Rear End	66'-0"
M - Clearance Under Frame	13'-6"
N - Center Rotation to Boom Foot	23'-3"
P - Ground to Boom Foot	19'-2"

ELECTRICAL EQUIPMENT

Hoist Motors, Four, 1250 hp each @ 460 V, Total hp	5000
Drag Motors, Four, 1250 hp each @ 460 V, Total hp	5000
Swing Motors, Four, 750 hp each @ 460 V, Total hp	3000
Propel Motors, Four, 500 hp each @ 460 V, Total hp	2000
*AC Driving Motors, Total hp	7200

*Includes 200 hp Induction Motor for Exciter Set.

WEIGHTS

Domestic Shipping Weight (Inc. Bucket), lbs.	6,420,000
Working Weight, lbs.	7,120,000
Ballast (Furnished by Purchaser), lbs.	700,000

Add for 65'-0" Tub - 230,000 lbs.

Shipping Weight Subject to (± 5%) Variation.

MARION POWER SHOVEL COMPANY, INC. • MARION, OHIO, U. S. A.

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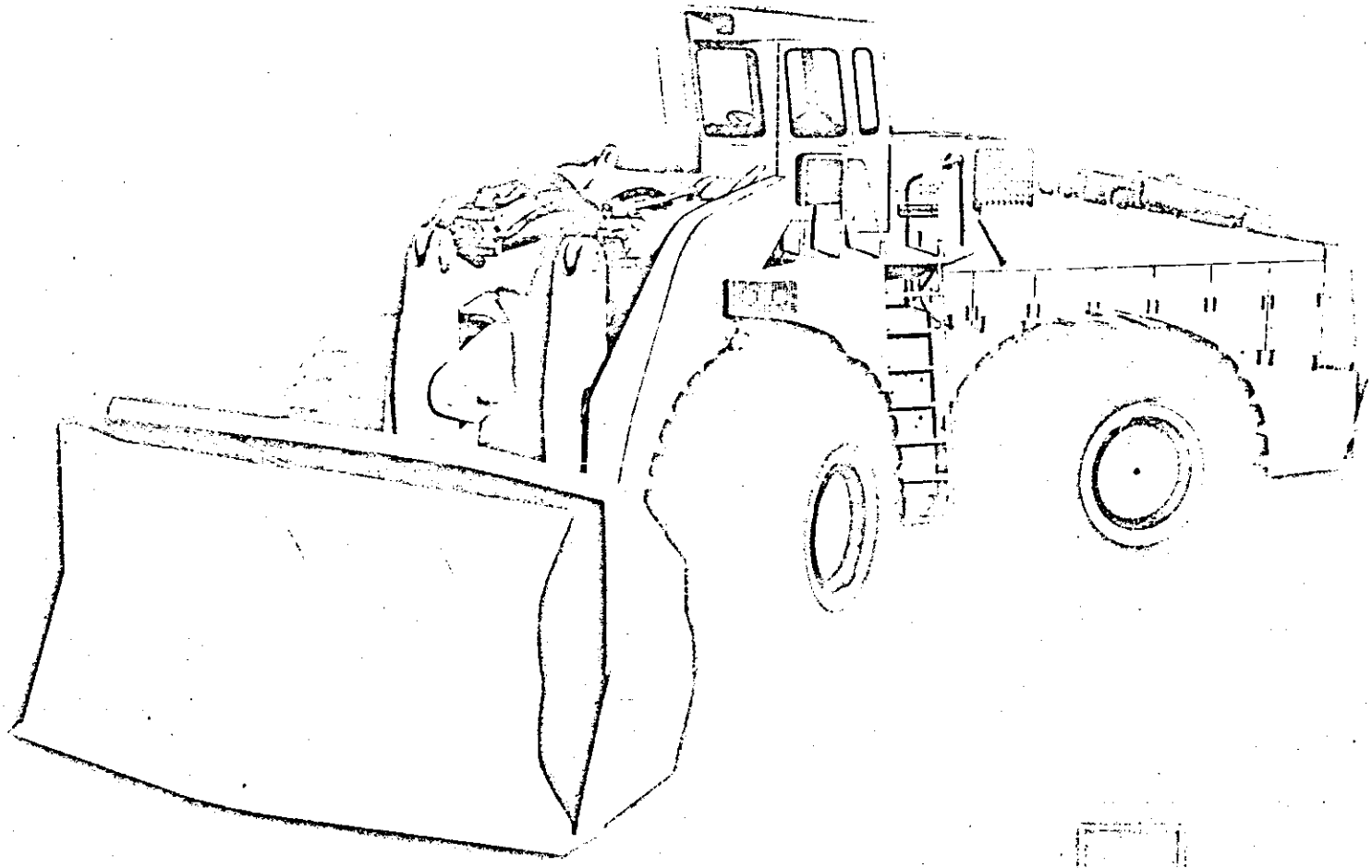
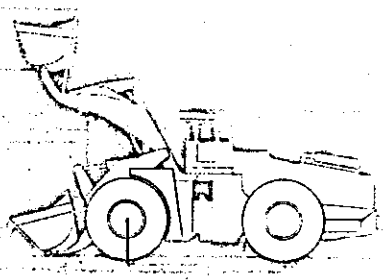
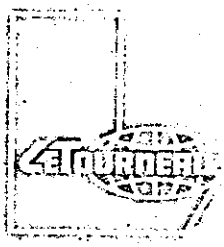
4ET ROADLOADER







	U.S.	METRIC
TIPPING LOAD (straight ahead)	110,000#	50006,0 kg.
TIPPING LOAD (SAE rated) (full turn)	102,000#	46267,0 kg.

BUCKET: Options	Struck	SAE Rated
180" Wide Rock Clip V 3000#	13 yd. 9,945M³	15 yd. 11,475M³
180" Wide Rock Straight 3000#	13 yd. 9,945M³	15 yd. 11,475M³
180" Wide Material 3000#	13 yd. 9,945M³	15 yd. 11,475M³
240" Wide Coal 1350#	26 yd. 19,890M³	30 yd. 22,950M³

OPERATING WEIGHT

Clip V Bucket	175,000#	79450,0 kg.

DIMENSION: (Clip V)

Overall Length Bucket on Ground	43'10"	13368,4 mm
Overall Length Carry-Ground	42' 3"	12877,8 mm
Wheelbase	18' 0"	5486,4 mm
Tread	11'7½"	3543,3 mm
Height — Bucket Fully Raised	29' 6"	8991,6 mm
Height of Drawbar	3' 4"	1016,0 mm
Height over cab	16' 0"	4876,8 mm
Height less cab	12'11"	3937,0 mm
Maximum Dump Height @ 56° max. dump	15' 5"	4699,0 mm
Reach from Tires @ max. height max. dump	7' 5"	2260,6 mm
Maximum Dump Height @ 45° dump angle	16' 0"	4876,8 mm
Reach from tires @ max. height 45° dump angle	8' 2"	2489,2 mm
Ground Clearance	1' 7"	482,6 mm
Digging depth @ 0° bucket angle	7½"	190,5 mm
Height of Hinge Pin	21' 8"	6604,0 mm

ENGINE:

Make	G.M.	CUMMINS	WAUKESHA
Model	16V-71T-N75	VTA-1710-C	L1616DSI
Rated Hp. @ Gov. R.P.M.	700	700	725
Governed R.P.M.	2100	2100	2100
Max. torque ft. lb.	1728	1925	1825
@ R.P.M.	1400	1500	1900
Bore and Stroke	4¼" x 5" 108 mm x 127 mm	5½" x 6" 140 mm x 152 mm	5-3/4" x 5-3/16" 146 mm x 131 mm
Number of Cylinders	16	12	12
Displacement Cubic Inches	1136 18600 ccm	1710 28026 ccm	1616 26486 ccm
Electrical System	24 Volts	24 Volts	24 Volts
Fuel Tank Capacity — Gal.	336 1271,8 Liters	336 1271,8 Liters	336 1271,8 Liters

TURNING RADIUS: (Rock Bucket)	@45°	
Inside Tires	17' 4"	5283,2 mm
Outside Tires	32' 4"	9855,2 mm
Outside bucket corner	32' 9"	9982,2 mm

TRAVEL SPEEDS MPH — Forward and Reverse
0 - 18 29 km/h

POWER TRAIN — LeTro-matic D.C.
LeTourneau D.C. 4 Wheel Electric Drive

AXLES:
Rear Axle Oscillation

BRAKES:
Service: Electro-dynamic and Air over Hydraulic operated Caliper disc.
Parking: Fail safe air operated Caliper disc on front.

WHEELS AND TIRES
Standard: Super X-tra Tred D & L 37.5 x 39 x 36 PR

FLUID POWER SYSTEM — Main
Type: Closed and Pressurized
Power Pack: LeTourneau A.C. Electric Motor Driven Pump — 2 power packs @ 190 gallons each. (719,2 Liters)
Filters: 100 mesh monel screen strainer on pump inlets. Instrument panel restriction indicators. 10 micron replaceable elements on return part.
Reservoir: Electric welded, Baffles, Cleaning port, and liquid level indicator.
Valve: Main Hydraulic System, LeTourneau Electric, Hydraulic Servo Bucket — Tip Back, Dump
Hoist — Two Speed Raise, Power Down, Float
Hoist Cylinders: 2 — 12" Dia. x 64" stroke chrome plated rod. (304,8 mm x 1625,6 mm)
Bucket Cylinders: 2 — 11" Dia. x 29½" stroke chrome plated rod. (279,4 mm x 749,3 mm)

FLUID POWER SYSTEM — Steering
Full Power Articulated — Center Pivot
Steering Angle — 45° each direction
Steering Power — Full Hydraulic
Steering Cylinders — 7½" Diameter x 30" stroke (190,5 mm x 762,0 mm)
Steering Pump — 160 GPM Engine Driven (605.6 Liters/M)
Reservoir — Electric Welded, Baffle, Cleaning Port and Liquid Level Indicator, 100 Mesh Strainer, 10 Micron Filter.

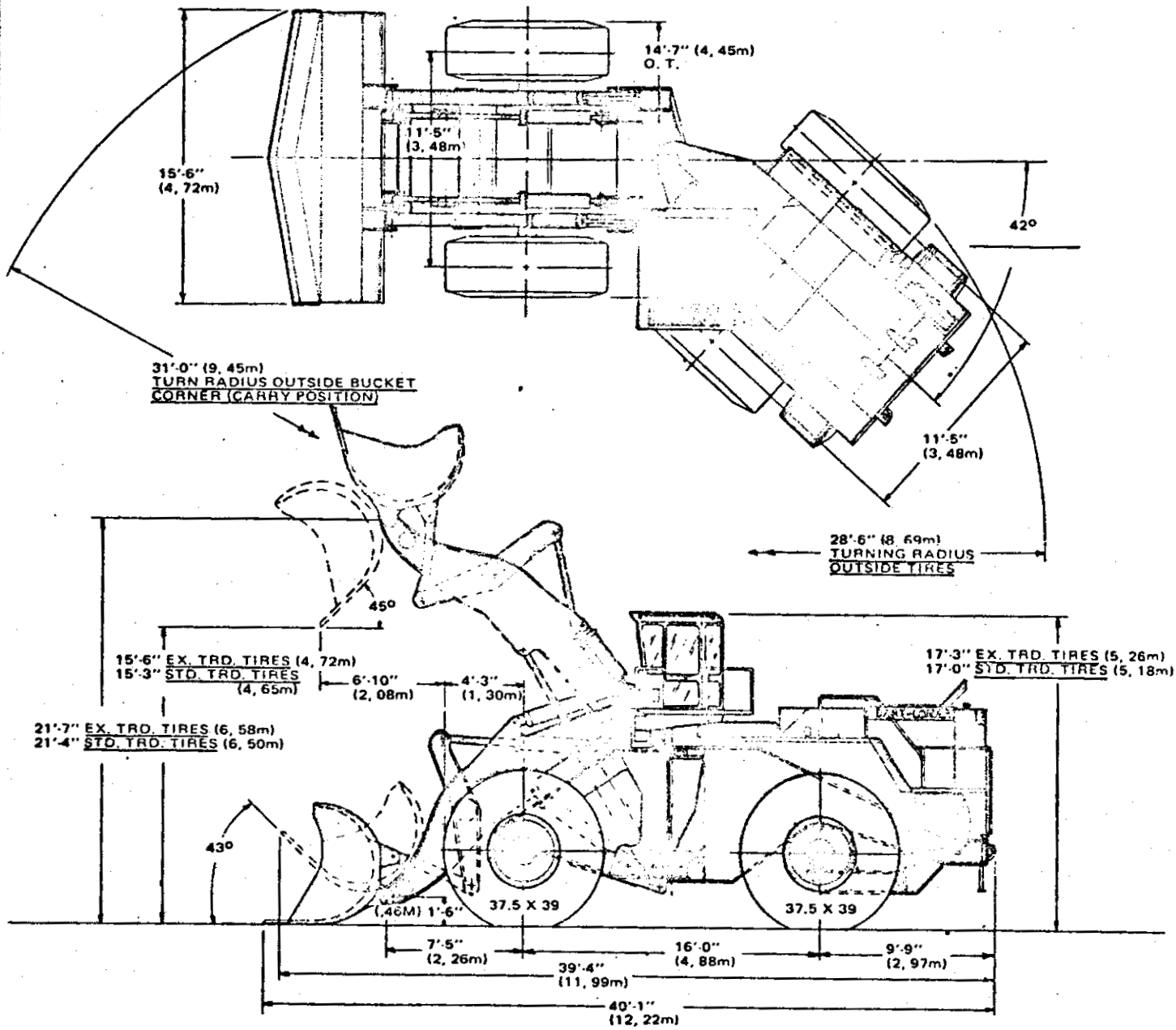
STANDARD EQUIPMENT:
Adjustable Bucket seat and suspension
Two-stage dry type air cleaners
Air Cleaner Service Indicator Lights
Engine oil filters
Fluid Power filter service lights
Fluid Power oil filter
Fluid Power Steering Temperature light
Drawbar
Suction fan
Air Horn
Ammeter
Hourmeter
Tachometer
Air Pressure Gauge
Engine oil pressure gauge (Mech.)
Engine low oil pressure warning light
Engine temperature gauge (Mech.)
Engine high temperature warning light
Fuel gauge
Ether Starting Aid
Fully enclosed cab
Winterization, Heater, Defroster
Windshield wiper
Automatic Adjustable Height Cutoff
Front and rear working lights
Front Fenders
Parking Brake Buzzer

OPTIONAL EQUIPMENT:
Special buckets
Air conditioning
Windshield instead of Cab
Engine Side Panels
Roll Bar
Bucket Teeth
Tire: X-tra Tread D & L
Hard Rock Lug D & L
LeTourneau 98" O.D.
Automatic Lubrication
Electric Heater
Radio

Please Address Inquiries To

Dart D600 LOADER Series B

Dimensions



NOTE: Dimensions are based on a 15 cubic yard bucket (SAE heaped).

Dart D600 LOADER Series B

Standard Specifications

CAPACITY

Bucket ratings (dependent on material density) cubic yards (SAE rating, nominal heaped)
13.5 (10, 3m³) to 30 (22, 9m³)

Operating load (SAE rating, heaped) Lbs.
45,000 (20412 Kg.)

Tipping load, (bucket hinge at max. reach 10:5 ft. above ground) Lbs. ..... (3, 18m)
Straight Ahead ..... 114,000 (51710 Kg.)
Full Turn ..... 102,000 (46267 Kg.)

Hydraulic lifting capacity, Lbs. (bucket hinge at max. height, 21 ft. ..... (6, 40m) 60,000 (27216 Kg.)

Breakout force, lbs. (Rear end tied down)
119,000 (53978 Kg.)

Tractive effort loaded, Lbs. ..... 143,000 (64864 Kg.)

OPERATING DIMENSION (Using 15 Cubic Yard Bucket)

Max. Dump height @ 45-degree dump angle, feet
15.5 (4, 72m)

Hinge pin max. height, feet 21.3 (6, 5m)

Reach when full raised, @ 45-degree dump angle, feet
6.8 (2, 07m)

Bucket rollback angle, degrees 43
Bucket max. dump angle, degrees @ full height 45
Steering articulation, degrees 84
Axle oscillation, degrees 30

BUCKET OPERATING SPEED (MAX.)

Raising time, seconds 9.3
Lowering time, seconds 4.7
Bucket tilt, seconds 2.3
Bucket dump, seconds 2.9

VEHICLE SPEEDS

	1st	2nd	3rd	4th
Forward and Reverse, MPH	3.6	7.0	12.0	22.0
Kms/Hr.	5,8	11,3	19,3	35,4

TURNING RADIUS, FEET

Outside bucket corner (carrying position with 15 cubic yard bucket) 31.0 (9,45m)
Outside wheel 28.5 (8,69m)

ENGINE

Detroit Diesel Model 16V-71T-N75
Max. HP @ Gov. RPM 700
Governed RPM 2100
Max. Torque, Lb.-Ft. ..... 1910 @ 1400 RPM
Bore and stroke, inches ..... 5.5 x 6 (140mm x 152mm)
Number of cylinders 16
Displacement, cubic inches 1136 (18,6Lit.)

OPTIONAL

Cummins Diesel Model VTA-1710-C700

TORQUE CONVERTER

Clark 16000, Multiplication at Stall 3.08

COOLING SYSTEM

Radiator area, sq. in. ..... 3196 (20621 (cm²)
Fan flow, cfm ..... 35,300 (999686 Lt./Min.)

TRANSMISSION

Clark 16000 Power Shift
Speeds forward 4
Speeds reverse 4
Power Shifting

AXLES

Front and Rear ..... Dart DS650
Rear ..... Dart DS650
Four wheel drive
Planetary reduction in wheels

TIRES

Front and Rear, Loader-Dozer (L-4) ... 37.5 x 39 x 36PR

BRAKES

Service ..... Four wheel, air over hydraulic
Parking ..... Drive Line, air released

FUEL SYSTEM

Diesel fuel capacity, gallons ..... 300 (1136 liters)

STEERING SYSTEM—Full Hydraulic

Relief valve setting, psi 2000 (140, 6Kg./Cm²)
Cylinder data (2 cylinders)
Bore, inches 7.5 (191mm)
Stroke, inches 27 (686mm)
Steer time for full turn, seconds at idle (1000 RPM) .. 4.5
At Gov. Speed (2100 RPM) 3.7

HYDRAULIC SYSTEM

Relief valve setting, psi 2000 (140, 6Kg./Cm²)
Two double acting tilt cylinders, diameter, inches 9 (229mm)
Two double acting lift cylinders, diameter, inches 10 (254mm)
Max. pump flow, gals. per minute ... 425 (1608 Lit./Min.)
Valve positions: (Air Assist)

TILT	LIFT
Raise	Raise
Neutral	Neutral
Lower	Lower

Hydraulic system air to oil heat exchanger—sq. inch area ..... 1177 (7594 Cm²)
Hydraulic system reservoir capacity, gallons
90 (341 liters)
Filters—3 micron, Externally mounted

STANDARD EQUIPMENT

Cab
Two air compressors
Air starting
Dry type air cleaner
Cab heater
Air horn
Gas charging kit
*Lubefiner Oil Filter (2)
*Cummins Engine Only
12-volt 60-amp alternator electrical system
Lights—front and rear
Gauges: ammeter, engine oil pressure, water temp., hourmeter, tachometer, conv. oil temp., conv. oil pressure, air pressure, hydraulic oil pressure
Windshield wipers
Filter Change Indicators

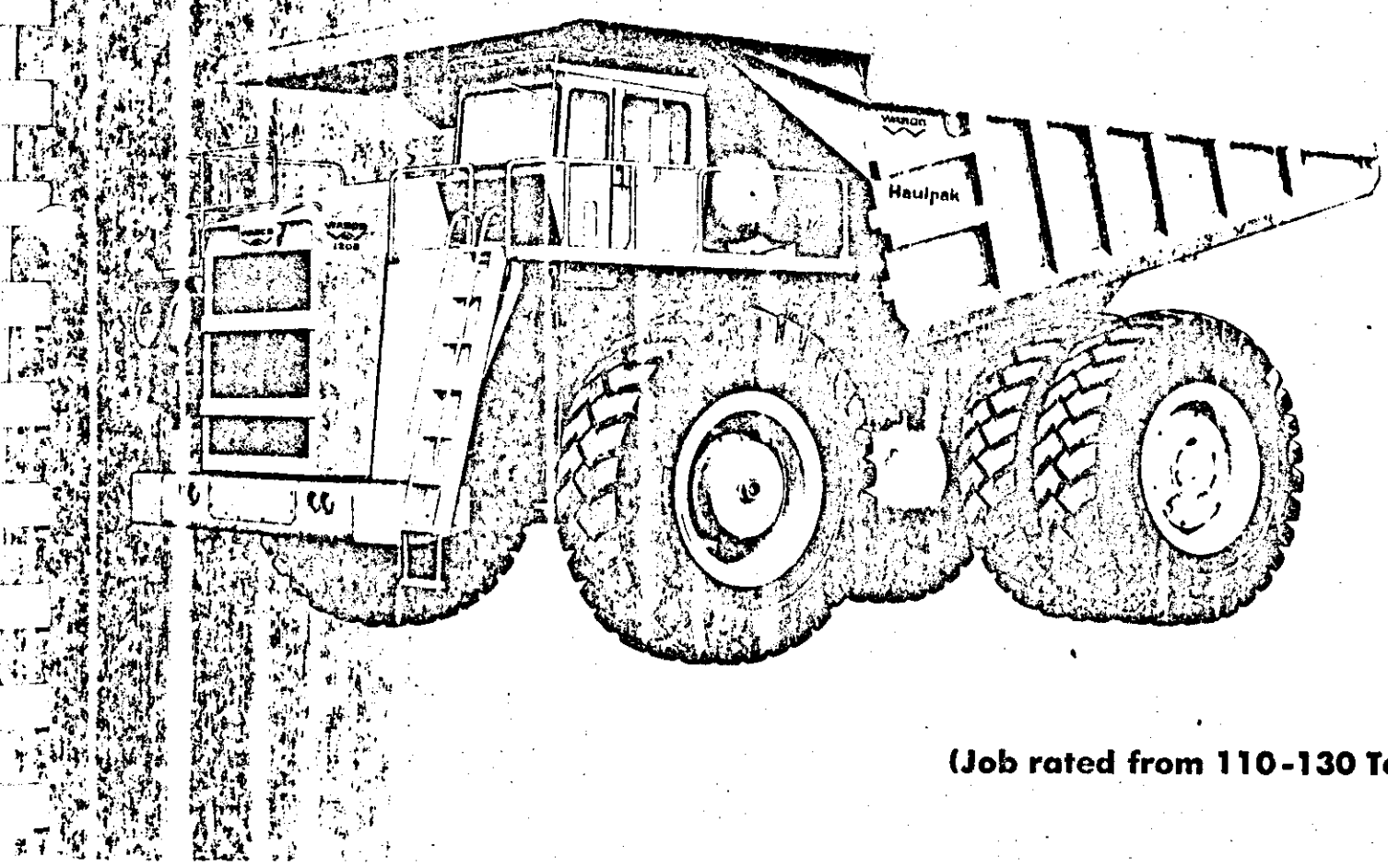
WEIGHT

Total approximate operating ... 201,080 Lbs. (91210 Kg)

WABCO

MODEL

ELECTRIC HAULPAK® REAR DUMP 120B



(Job rated from 110-130 Tons)

WABCO CONSTRUCTION EQUIPMENT DIVISION

WABCO

120B ELECTRIC HAULPAK REAR DUMP SPECIFICATIONS

Specifications are subject to change without notice or obligation.

GM 12V-149T ENGINE

Number of cylinders	12
Operating cycle	2 stroke
*Rated brake HP	1000 @ 1900 RPM
**Flywheel HP	920 @ 1900 RPM
Rating baseline	500 ft. C 85° F (152 m)
Maximum torque	2,940 ft. lbs. @ 1400 RPM
Bore	5¾" (146 mm)
Stroke	5¾" (146 mm)
Displacement	1788 cu. in. (29,3 liters)
Weight	8,589 lbs. (3.892 kg)

CAT 348 ENGINE

Number of cylinders	12
Operating cycle	4 stroke
*Rated brake HP	990 @ 2000 RPM +- 3%
**Flywheel HP	910 @ 2000 RPM
Rating baseline	500 ft. (152 m) @ 85° F.
Maximum torque	2,774 ft. lbs. @ 1600 RPM
Bore	5.4" (137 mm)
Stroke	6.5" (165 mm)
Displacement	1786 cu. in. (29,2 liters)
Weight	7,000 lbs. (3.175 kg)

*(Rated brake horsepower is the output of the engine as installed in this machine, at governed RPM and with manufacturer's approved fuel setting. Accessory losses included are water pump and lube oil pump. Output guaranteed within +-5%.)

**(Flywheel horsepower is the rated horsepower at the engine flywheel minus the average accessory losses. Accessories include fan, air compressor, generator, and hydraulic pump no load.)

ELECTRIC DRIVE SYSTEM — direct current

Generator	General Electric GT-603
Motorized wheel	General Electric 772
Ratio	28.85:1
Speeds	0 to 35 MPH (0) to (56,32 km/hr)

DYNAMIC BRAKE — 1600 HP (see WABCO curve)
Standard — 3-minute naturally ventilated grids

SERVICE BRAKES — internal expanding shoe type

Actuation	air-over-hydraulic
Front	30" x 10" (76,20 cm x 25,40 cm)
Rear	36" x 12" (91,44 cm x 30,48 cm)
Total contact area	3,114 sq. in. (20.091 cm²)

AIR SYSTEM

Compressor	Bendix-Westinghouse TU-FLO Cat eng. — 12 cfm (0.34 m³/min) GM eng. — 24 cfm (0.68 m³/min)
Starter	Ingersoll Rand 20BM
Main reservoir	capacity 17.4 cu. ft. (492,7 liters)
Emergency reservoir	capacity 3.2 cu. ft. (0,9 liters)

FUEL TANK — 500 U.S. standard gallons (1892 liters)

CAB — rubber mounted, fully enclosed, upholstered, offset to left, 60" (1,52 m) wide with adjustable ventilators

Windshield	safety, tinted, 4° tilt
Seat, drivers	fully adjustable
Heating and defrosting	all-weather heavy duty heater and full windshield defroster

FRAME — special alloy steel modified box section frame with integral front bumper and tubular cross member

Top and bottom plate thickness	1" (25,4 mm)
Side plate thickness	½" (12,7 mm)
Rear axle alignment	panhard rod between frame and axle

STEERING — full time power steering

Turning degree, each direction	36°
Turning circle on front wheel track	80'
Emergency power steering, standard	electrically driven hydraulic pump
Steering cylinders	two, 4¼" (108 mm) bore x 19" (482 mm) stroke

SUSPENSION, HYDRAIR® — variable rate hydro-pneumatic with integral rebound control, 13" (330 mm) bore

COOLING SYSTEM — continuous finned, flat tube type radiator, with 3525 sq. in. (22.743 cm²) of front area. 60" (1,52 m) diameter fan. Deaeration type top tank.

ELECTRICAL SYSTEM

Batteries	two 12 volt batteries in series 90 ampere-hour capacity
Alternator	24 volt, 50 amp output
Lighting	24 volt

BODY CONSTRUCTION

heavy bolster and sill

Steel	high strength 100,000 PSI (7.031 kg cm²) yield steel
Floor	three piece, ¾" (19 mm)
Front	½" (12,7 mm)
Sides	⅜" (9,5 mm)
Pivot pins	4.64" (117 mm) dia.

RIMS

extra heavy duty, interchangeable front and rear

Size 22" x 51" x 4½"

HYDRAULIC HOIST SYSTEM

working pressure of 1500 PSI (105 kg/cm²) at rated load. All components designed for 2500 PSI (175 kg/cm²) relief pressure.

TIRES

30.00-51, 40 ply rating
30.00-51, 46 ply rating
30.00-51, 52 ply rating

BODY CAPACITY and DIMENSIONS

Cubic yards, struck	S.A.E. heaped @ 3:1	62 (47,4 m³)	56 (42,8 m³)
	@ 2:1	73 (55,8 m³)	67 (51,2 m³)
	@ 1:1	80 (61,2 m³)	72 (55,0 m³)
		94 (71,9 m³)	89 (68,0 m³)
Length		22' 5" (6,84 m)	22' 5" (6,84 m)
Width, inside		16' 7" (5,05 m)	15' 7" (4,75 m)
Depth		7' 6" (2,28 m)	7' 5" (2,26 m)
Loading height		15' 8" (4,79 m)	15' 7" (4,75 m)
Dumping angle		45°	45°

STANDARD EQUIPMENT

- Ammeter and air pressure gauges
- Canopy rock rail
- Exhaust heated body, body pivot entry
- Headlights (4) with beam selector and indicator
- Heavy-duty heater and defroster
- Hourmeter and speedometer
- Mirrors, right and left hand
- Mud flaps
- Oil pressure and coolant temperature gauges
- Passenger seat, adjustable type
- Tinted glass in windshield

STANDARD SAFETY EQUIPMENT

- Air horns and back-up warning horn
- Emergency power steering
- Protective deck hand rails
- Rear brake, retarder, and back-up lights
- Wheel brake lock with hoist interlock

HYDRAULIC HOIST SYSTEM

Pump	160 GPM (606 liters/min) @ 2000 RPM
Cylinders	two, heavy-duty 3-stage, telescopic
First stage	10.5" (266 mm) bore 32" (812 mm) stroke
Second stage	8.5" (215 mm) bore 31" (787 mm) stroke
Third stage	6.8" (172 mm) bore 31" (787 mm) stroke
Tank	closed system design assures positive head on suction of pump
Capacity	120 U.S. standard gallons (454 liters)
Filtration	accessible, replaceable, elements
Suction	single, full-flow, 100 mesh
Return	quadruple, full-flow, 25 micron

TRUCK rating, tons	30 MPH rating (48,28 km/hr)
100-110	56,380 lbs. (25.574 kg) @ 60 PSI (4,2 kg cm²)
110-130	61,700 lbs. (27.987 kg) @ 70 PSI (4,9 kg cm²)
120-130	66,720 lbs. (30.264 kg) @ 80 PSI (5,6 kg/cm²)

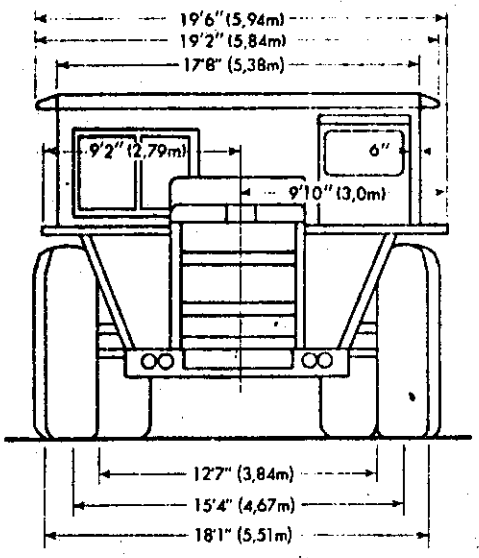
OPTIONAL EQUIPMENT

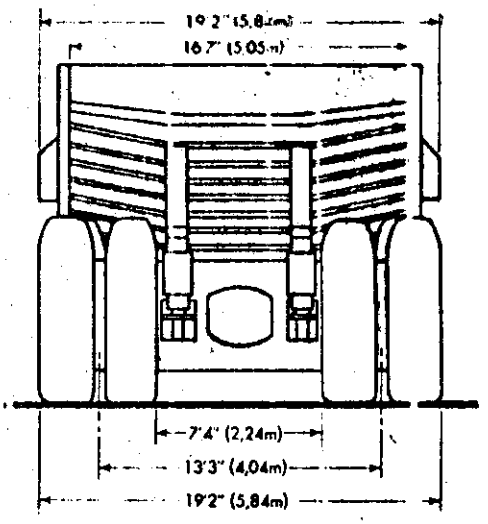
(Consult local WABCO Distributor for Price and Delivery.)

- Air conditioner
- Dry-break pressure fueling
- Extended range dynamic braking
- Fire extinguisher
- Hubometer
- Kim Hotstart, engine coolant
- Kim Hotstart, engine oil
- Mesabi type radiator core
- Radiator shutters
- Schrader tire inflation system
- Super blown dynamic braking grids
- 27.00-49 tires (100 ton rating)

(Note: For optional engines, turbines, trolley equipment, tire bodies, etc. Contact Factory.)

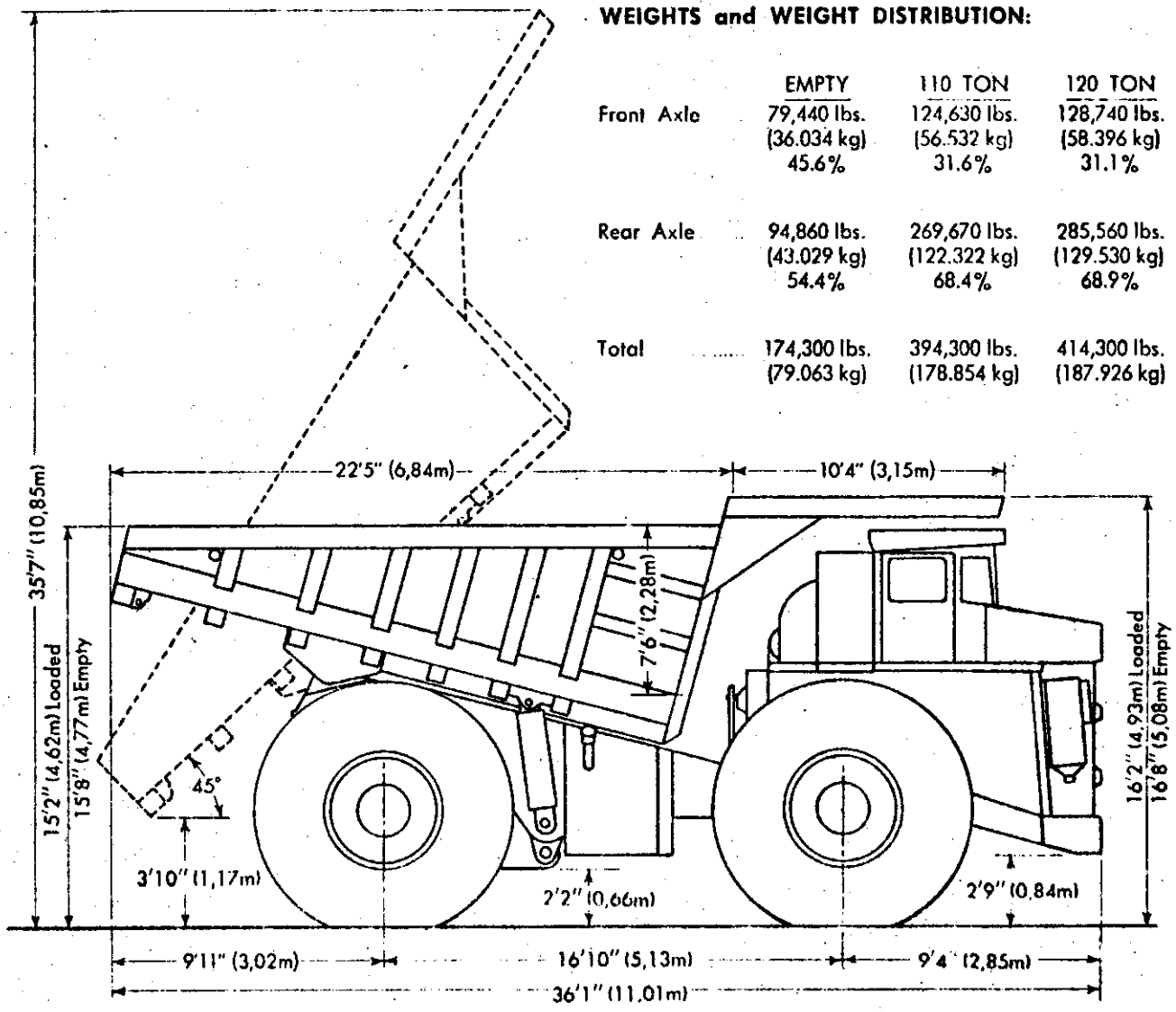
120B ELECTRIC HAULPAK REAR DUMP





WEIGHTS and WEIGHT DISTRIBUTION:

	EMPTY	110 TON	120 TON	130 TON
Front Axle	79,440 lbs. (36.034 kg) 45.6%	124,630 lbs. (56.532 kg) 31.6%	128,740 lbs. (58.396 kg) 31.1%	132,[illegible]50 lbs. (60.[illegible]61 kg) 3[illegible].6%
Rear Axle	94,860 lbs. (43.029 kg) 54.4%	269,670 lbs. (122.322 kg) 68.4%	285,560 lbs. (129.530 kg) 68.9%	301,[illegible]50 lbs. (136.[illegible]38 kg) 69.4%
Total	174,300 lbs. (79.063 kg)	394,300 lbs. (178.854 kg)	414,300 lbs. (187.926 kg)	434,[illegible]00 lbs. (196.[illegible]99 kg)



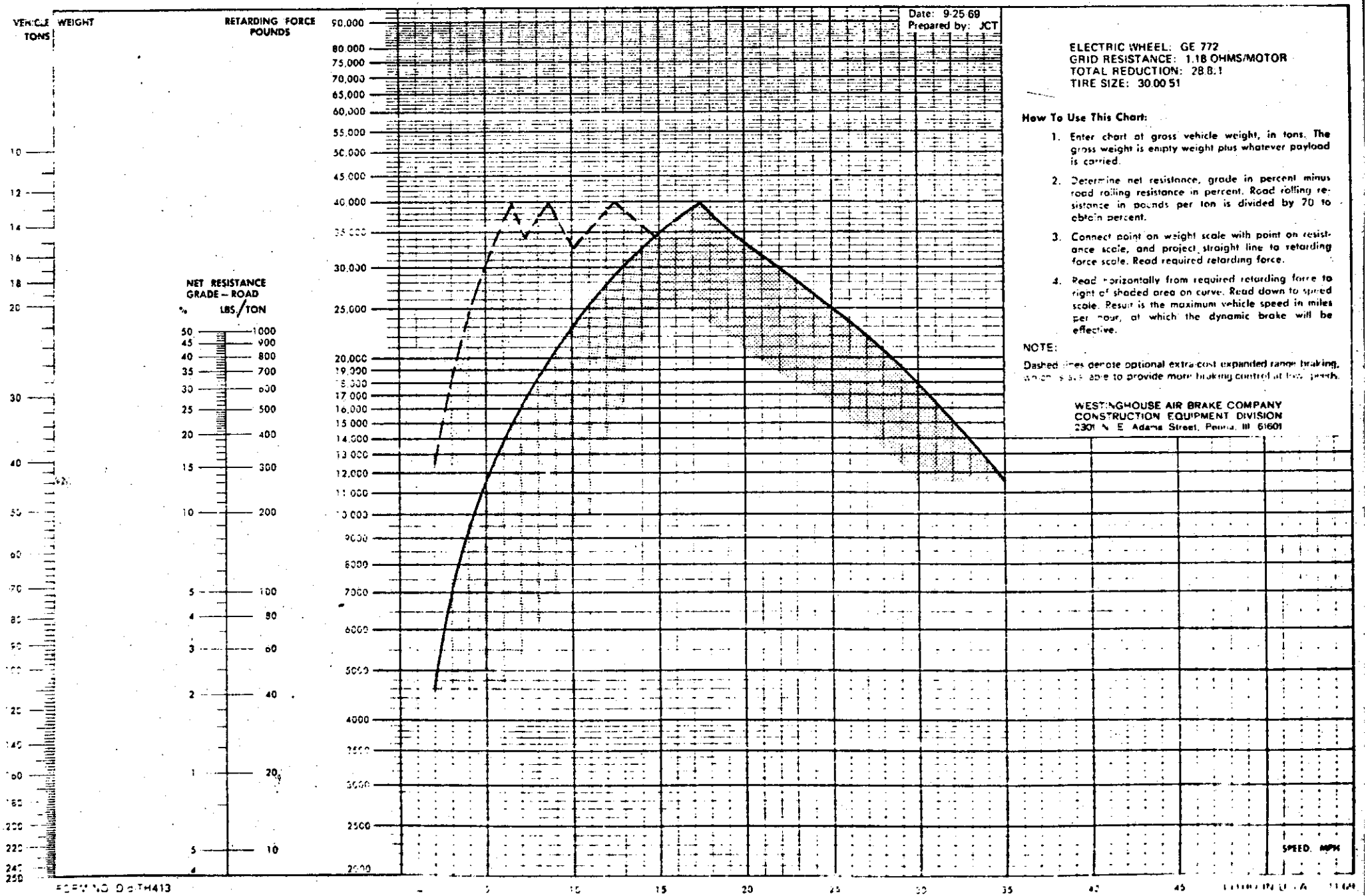
WABCO

An American-Standard Company

120B ELECTRIC HAULPAK® REAR DUMP

WABCO

An American-Standard Company



Date: 9-25-69
Prepared by: JCT

ELECTRIC WHEEL: GE 772
GRID RESISTANCE: 1.18 OHMS/MOTOR
TOTAL REDUCTION: 28.8:1
TIRE SIZE: 30.00 51

How To Use This Chart:

1. Enter chart at gross vehicle weight, in tons. The gross weight is empty weight plus whatever payload is carried.
2. Determine net resistance, grade in percent minus road rolling resistance in percent. Road rolling resistance in pounds per ton is divided by 20 to obtain percent.
3. Connect point on weight scale with point on resistance scale, and project straight line to retarding force scale. Read required retarding force.
4. Read horizontally from required retarding force to right of shaded area on curve. Read down to speed scale. Result is the maximum vehicle speed in miles per hour, at which the dynamic brake will be effective.

NOTE:

Dashed lines denote optional extra-cost expanded range braking, which is available to provide more braking control at low speeds.

WESTINGHOUSE AIR BRAKE COMPANY
CONSTRUCTION EQUIPMENT DIVISION
2301 N. E. Adams Street, Peoria, Ill. 61601

FORM NO. D-TH413

120B ELECTRIC HAULPAK® REAR DUMP

(1200 GROSS HP)

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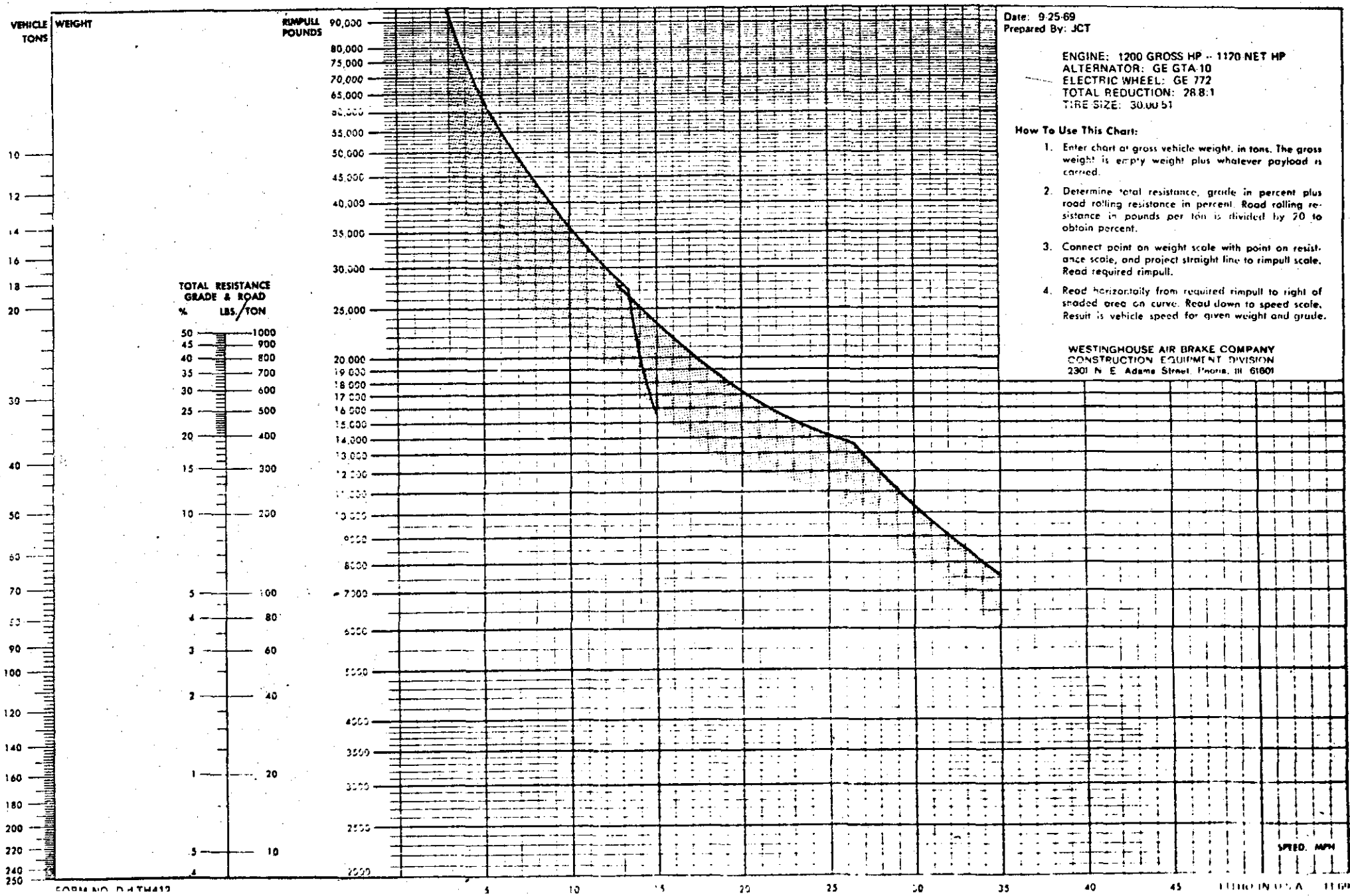


Date: 9-25-69
Prepared By: JCT

ENGINE: 1200 GROSS HP -- 1170 NET HP
ALTERNATOR: GE GTA-10
ELECTRIC WHEEL: GE 772
TOTAL REDUCTION: 28.8:1
TIRE SIZE: 30.00-51

How To Use This Chart:

1. Enter chart at gross vehicle weight, in tons. The gross weight is empty weight plus whatever payload is carried.
2. Determine total resistance, grade in percent plus road rolling resistance in percent. Road rolling resistance in pounds per ton is divided by 20 to obtain percent.
3. Connect point on weight scale with point on resistance scale, and project straight line to rimpull scale. Read required rimpull.
4. Read horizontally from required rimpull to right of shaded area on curve. Read down to speed scale. Result is vehicle speed for given weight and grade.

WESTINGHOUSE AIR BRAKE COMPANY
CONSTRUCTION EQUIPMENT DIVISION
2301 N. E. Adams Street, Peoria, Ill. 61601

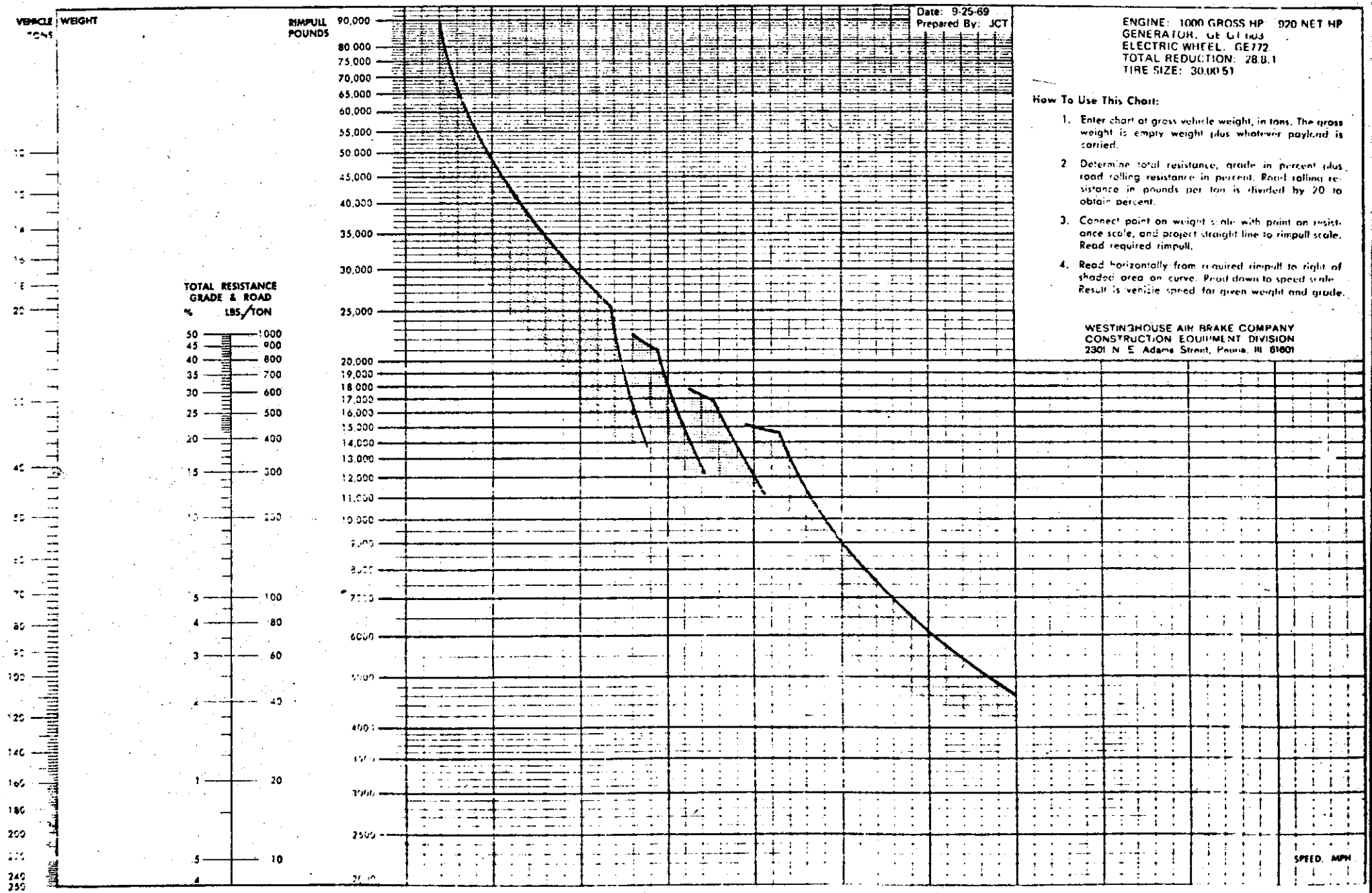
FORM NO. D-4TM412

120B ELECTRIC HAULPAK® REAR DUMP

(1000 GROSS HP)

WABCO

An American-Standard Company



Date: 9-25-69
Prepared By: JCT

ENGINE: 1000 GROSS HP 920 NET HP
GENERATOR: GE GT 603
ELECTRIC WHEEL: GE772
TOTAL REDUCTION: 28.8:1
TIRE SIZE: 30.00 51

How To Use This Chart:

1. Enter chart at gross vehicle weight, in tons. The gross weight is empty weight plus whatever payload is carried.
2. Determine total resistance, grade in percent plus road rolling resistance in percent. Road rolling resistance in pounds per ton is divided by 20 to obtain percent.
3. Connect point on weight scale with point on resistance scale, and project straight line to rimpull scale. Read required rimpull.
4. Read horizontally from required rimpull to right of shaded area on curve. Read down to speed scale. Result is vehicle speed for given weight and grade.

WESTINGHOUSE AIR BRAKE COMPANY
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