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AN INVESTIGATION OF THE COKING PROPENSITIES OF BLENDS OF COAL SAMPLES FROM THE FRAME AND SHIKANO PITS QUINTETTE PROJECT, NORTH EASTERN BRITISH COLUMBIA

SUBMITTED BY DENISON MINES LIMITED

Project No. 03-5-1/6-24 Part 2
Job No. 3401R

J. G. Jorgensen, T. A. Lloyd and A. B. Fung
Combustion and Carbonization Research Laboratory
Coal Research Laboratories

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ENERGY RESEARCH PROGRAM
ENERGY RESEARCH LABORATORIES
DIVISION REPORT 83-48 (CF)

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Ce rapport traite une evaluation sur le potential à la fabrication du coke de charbons du "Quintette Exploration Program" de 1982 tels que soumis par "Denison Mines Limited".

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INTRODUCTION

The evaluation of coals for Denison Mines Limited is a continuing divisional project in which periodic investigations are undertaken as requested by the company.

The investigation includes evaluation data of blends composed of coals from the Frame and Shikano Pits as part of the Quintette Project in North Eastern British Columbia and was initiated in a letter dated June 29, 1982 from W. R. Leeder, Process Plant Development, Coal Division, Denison Mines Limited. In a letter dated December 16, 1982 from Ms C. Dionne the project was extended to include the testing of additional blend samples. Copies of both the letters appear in Appendix 1.

A description of the samples tested from Pit Shikano and Pit Frame appeared in Table 1 and Table 2, respectively, in Division Report ERP/ERL 83-27 (CF) "An Investigation of the Coking Propensities of Coal Samples from the Frame and Shikano Pits, Quintette Projects, North Eastern British Columbia"; Submitted by Denison Mines Limited. An outline of the blends tested appears in Table 1 of this report.

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*Head, Coal Petrography Section, **Head, Conventional Cokemaking Section, Combustion and Carbonization Research Laboratory, Energy Research Laboratories, ***Carbonization Engineer, Coal Research Laboratories, CANMET, Energy, Mines and Resources Canada, Ottawa, Canada K1A 0G1

The cleaned coal samples received from Birtley Coal and Mineral Testing, Calgary, were crushed, blended and carbonized in the 460 mm width Carbolite movable-wall coke oven, located at the Coal Research Laboratories at Edmonton. Representative samples were taken for chemical, physical, thermal rheological and petrographical analyses which were carried out at the Energy Research Laboratories located at the CANMET Bells Corners Complex near Ottawa. The results of the testing program are tabulated in Tables 2 to 13.

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Table 1 - Percentage coal in blend tests

Pit & Coal Information	T	Seam	Actual Ash	82-1	82-2	82-2A	82-3	82-4	82-5	82-6	82-7	82-8
Syncline												
Raw	-	D	16.1							1.50	.30	
		E	26.9							1.65	.33	
		F	18.2							1.85	.37	
		J	20.1							2.50	.50	
Clean	7.5	D	7.7	10.10				2.02		8.59	1.72	
		E	7.8	11.00				2.20		9.35	1.87	
		F	7.4	12.20				2.44		10.37	2.07	
		J	7.0	16.70				3.34		14.19	2.84	
	9.5	D	8.3		10.10	12.12			2.02			
		E	9.5		11.00	13.21			2.20			
		F	9.0		12.20	14.65			2.44			
		J	8.7		16.70				3.34			
Frame												
Raw	-	D	19.2							.75	.15	
		E2	23.4							1.45	.29	
		F2	32.2							.95	.19	
		G2	23.4							1.65	.33	
		J3	15.2							2.70	.54	
Clean	7.5	D	7.1	5.00				1.00		4.25	.85	
		E2	7.2	9.50				1.90		8.08	1.61	
		F2	7.4	6.50				1.30		5.53	1.11	
		G2	7.6	11.10				2.22		9.43	1.89	
		J3	7.3	17.90				3.58		15.21	3.04	
	9.5	D	9.3		5.00	6.00			1.00			
		E2	9.2		9.50	11.40			1.90			
		F2	9.5		6.50	7.80			1.30			
		G2	9.3		11.10	13.33			2.22			
		J3	9.1		17.90	21.49			3.58			
Commercial hvb							80	64	64		64	75
Commercial lvb							20	16	16		16	25

T = Pilot-scale Wash Target Ash

Table 2 - Chemical analyses

Identification						
Laboratory Number.....	2173-82	2171-82	2172-82	2190-83	2243-83	2244-83
Description.....						
Blend No.	82-1	82-2	82-2A	82-3	82-4	82-5
Classification						
Rank (ASTM).....						
International System.....						
Specific Volatile Index....						
Carbon (dmmfb).....%						
Proximate Analysis (db)						
Ash.....%	7.5	9.2	9.2	3.9	4.6	4.9
Volatile Matter.....%	22.8	21.6	22.7	32.4	30.0	30.2
Fixed Carbon.....%	69.7	69.2	68.1	63.7	65.4	64.9
Gross Calorific Value (db)						
MJ/kg.....	33.41	32.67	32.65	35.08	34.37	34.33
Btu/per pound.....	14360	14050	14035	15080	14775	14760
Ultimate Analysis (db)						
Carbon.....%	83.1	81.5	80.7	84.9	84.2	84.0
Hydrogen.....%	4.3	4.2	4.2	5.1	4.9	4.8
Sulphur.....%	0.51	0.48	0.53	1.11	0.93	0.91
Nitrogen.....%	1.1	1.0	1.0	1.9	1.7	1.5
Ash.....%	7.5	9.2	9.2	3.9	4.6	4.9
Oxygen (by difference)....%	3.5	3.6	4.4	3.1	3.7	3.9
Ash Analysis (db)						
SiO_2.....%	56.6	57.2	57.5	39.2	44.9	45.7
Al_2O_3.....%	24.5	24.2	24.7	21.4	22.3	22.4
Fe_2O_3.....%	7.7	7.7	6.9	28.1	20.9	20.2
TiO_2.....%	1.2	1.2	1.2	1.2	1.1	1.1
P_2O_5.....%	1.3	1.1	1.1	0.7	0.8	0.8
CaO.....%	2.3	2.2	1.9	2.5	2.5	2.4
MgO.....%	0.7	0.6	0.8	1.1	0.9	0.9
SO_3.....%	1.5	2.0	1.4	2.1	2.3	2.2
Na_2O.....%	0.7	0.8	0.5	0.9	0.9	0.8
K_2O.....%	0.8	0.7	0.8	0.7	0.7	0.8

Table 3 - Chemical analyses

Identification					
Laboratory Number.....	2412-83	2413-83	2394-83	2392-83	2393-83
Description.....					
Blend No.....	82-6	82-7	82-8	McIntyre	Devco
Classification					
Rank (ASTM).....				lvb	hvAb
International System.....				331	635
Specific Volatile Index....				217	176
Carbon (dmmfb).....%				93.2	87.6
Proximate Analysis (db)					
Ash.....%	9.9	5.0	4.1	8.5	2.9
Volatile Matter.....%	22.0	30.4	31.7	17.1	35.8
Fixed Carbon.....%	68.1	64.6	64.2	74.4	61.3
Gross Calorific Value (db)					
MJ/kg.....	32.58	34.52	34.87	33.28	35.13
Btu/per pound.....	14010	14840	14990	14305	15105
Ultimate Analysis (db)					
Carbon.....%	81.3	83.7	85.1	84.5	84.7
Hydrogen.....%	4.2	4.9	5.1	4.2	5.4
Sulphur.....%	0.48	0.90	0.98	0.40	1.23
Nitrogen.....%	1.4	1.7	1.8	1.3	2.1
Ash.....%	9.9	5.0	4.1	8.5	2.9
Oxygen (by difference)....%	2.7	3.8	2.9	1.1	3.7
Ash Analysis (db)					
SiO_2.....%	59.0	45.9	40.1	55.6	31.4
Al_2O_3.....%	24.4	22.5	22.1	26.0	19.4
Fe_2O_3.....%	5.7	20.6	25.9	4.3	41.1
TiO_2.....%	1.3	1.1	1.2	1.3	1.0
P_2O_5.....%	1.0	0.7	0.7	1.2	0.2
CaO.....%	2.1	2.2	2.7	3.7	1.7
MgO.....%	0.6	1.0	0.7	0.6	1.1
SO_3.....%	1.7	2.4	2.5	2.4	1.7
Na_2O.....%	0.6	0.8	1.0	1.3	0.7
K_2O.....%	1.0	0.8	0.7	0.7	1.0

Table 4 - Physical tests and fusibility of ash

Identification							
Laboratory Number.....		2173-83	2171-82	2172-82	2390-83	2243-83	2244-83
Description.....							
Blend No.		82-1	82-2	82-2A	82-3	82-4	82-5
Coal Pulverization							
Sieve Analysis							
Passing	Retained On						
	6.3 mm %	6.1	4.9	1.9		3.6	3.4
6.3 mm	3.35 mm %	13.0	11.6	7.0		12.8	11.2
3.35 mm	1.70 mm %	21.9	23.8	23.2		22.9	22.4
1.70 mm	850 µm %	19.0	20.5	24.8		18.5	17.8
850 µm	.....%	40.0	39.2	43.1		42.2	45.2
Total Passing	3.35 mm %	80.9	83.5	91.1		83.6	85.4
Grindability							
Hardgrove Index		80	79	81	65	68	67

Fusibility of Ash

Initial Deformation Temp.....°C
Softening Temp Spherical.....°C
Softening Temp Hemispherical.°C
Fluid Temp.....°C

Table 5 - Physical tests and fusibility of ash

Identification						
Laboratory Number.....		2412-83	2413-83	2394-83	2392-83	2393-83
Description.....						
Blend No.		82-6	82-7	82-8	McIntyre	Devco
Coal Pulverization						
Sieve Analysis						
Passing	Retained On					
	6.3 mm %	3.8	4.5	3.6		
6.3 mm	3.35 mm %	11.6	15.5	14.1		
3.35 mm	1.70 mm %	21.3	22.6	23.7		
1.70 mm	850 µm %	18.3	16.2	16.9		
850 µm	.....%	45.0	41.2	41.7		
Total Passing	3.35 mm %	84.6	80.0	82.3		
Grindability						
Hardgrove Index		78	65	65	91	62
Fusibility of Ash						
Initial Deformation Temp.....°C						
Softening Temp Spherical.....°C						
Softening Temp Hemispherical.°C						
Fluid Temp.....°C						

Table 6 - Thermal rheological properties

Identification						
Laboratory Number.....	2173-82	2171-82	2172-82	2390-83	2243-83	2244-83
Description.....						
Blend No.	82-1	82-2	82-2A	82-3	82-4	82-5
Linear Expansion						
Bd. 833 kg/m^3 at 2% moisture....%	-9.4	-14.7	-15.2	-13.0	-13.0	-12.4
Gieseler Plasticity						
Start.....°C	438	441	433	398	402	402
Fusion Temp .....°C	454	461	450	410	413	414
Max Fluid Temp .....°C	463	462	459	445	443	443
Final Fluid Temp .....°C	480	479	478	479	480	479
Solidification Temp .....°C	483	487	484	482	483	483
Melting Range .....°C	42	38	45	81	81	77
Max Fluidity.....dd/m	7.6	5.7	8.0	5340	1775	1590
Dilatation						
Ti - Softening Temp .....°C	408	413	405	363	372	377
Tii - Max Contraction Temp...°C	458	461	456	418	421	422
Tiii - Max Dilatation Temp....°C	483	482	479	466	467	465
Contraction.....%	22	22	16	25	23	23
Dilatation .....%	1	-12	-1	157	117	105
Free Swelling Index						
F.S.I.	6½	6½	7	7	7½	7½

Table 7 - Thermal rheological properties

Identification					
Laboratory Number.....	2412-83	2413-83	2394-83	2392-83	2393-83
Description.....					
Blend No.	82-6	82-7	82-8	McIntyre	Devco
Linear Expansion					
Bd. 833 kg/m^3 at 2% moisture....%	-14.4	-10.6			-16.1
Gieseler Plasticity					
Start.....°C	441	405	400	477	391
Fusion Temp .....°C	-	417	411	-	405
Max Fluid Temp .....°C	464	445	446	480	442
Final Fluid Temp .....°C	480	481	480	486	479
Solidification Temp .....°C	487	484	482	497	482
Melting Range .....°C	39	76	80	9	88
Max Fluidity.....dd/m	4.5	1540	3480	1.1	20,900
Dilatation					
Ti - Softening Temp .....°C	407	372	365	443	359
Tii - Max Contraction Temp...°C	463	422	420	484	408
Tiii - Max Dilatation Temp....°C	482	465	467	-	462
Contraction.....%	23	24	25	16	22
Dilatation .....%	-16	86	120	nil	244
Free Swelling Index					
F.S.I.	7	8	8	5½	8½

Table 8 - Petrographic analysis

Identification						
Laboratory Number.....	2173-82	2171-82	2172-82	2390-83	2243-83	2244-83
Description						
Blend No.	82-1	82-2	82-2A	82-3	82-4	82-5
Distribution of Vitrinite Types						
V-6.....%						
V-7.....%				2.7	4.2	3.2
V-8.....%		0.5		13.4	11.1	10.7
V-9.....%		2.8	0.5	24.3	23.0	17.7
V-10.....%	5.5	5.2	9.0	14.0	13.9	15.1
V-11.....%	16.9	15.6	19.0	4.8	5.6	4.4
V-12.....%	14.8	7.1	11.6	0.0	3.5	1.9
V-13 .....%	8.7	10.9	9.5	0.7	2.1	1.9
V-14.....%	8.2	4.3	3.2	1.0	1.4	1.9
V-15.....%	0.5	0.9		2.4	4.9	4.4
V-16.....%				4.1		1.9
V-17.....%				1.0		
V-18.....%						
Reactive Components						
Total Vitrinite.....%	54.6	47.4	52.7	68.5	69.6	63.1
Reactive Semi-fusinite (1/3)....%				4.6	4.0	6.2
Reactive Semi-fusinite (1/2)....%	16.1	18.0	16.3			
Exinite.....%	0.2	0.4	0.0	6.8	6.0	5.1
Total.....%	70.9	65.8	69.0	79.9	79.6	74.4
Inert Components						
Inert Semi-fusinite (2/3).....%				9.1	8.0	12.5
Inert Semi-fusinite (1/2).....%	16.1	18.0	16.3			
Micrinite.....%	4.1	3.8	3.7	6.1	5.3	6.2
Fusinite.....%	4.8	7.3	5.9	2.6	4.4	4.0
Mineral Matter.....%	4.1	5.1	5.1	2.3	2.7	2.9
Coke.....%						
Total.....%	29.1	34.2	31.0	20.1	20.4	25.6
Petrographic Indices						
Mean Reflectance.....%	1.24	1.22	1.20	1.04	1.03	1.06
Balance Index.....	1.64	1.95	1.63	0.73	0.75	1.03
Strength Index.....	5.08	4.85	4.76	3.99	3.98	4.13
Stability Index.....	57.9	52.4	55.4	54.3	54.3	56.8

Table 9 - Petrographic analysis

Identification					
Laboratory Number.....	2412-83	2413-83	2394-83	2392-83	2393-83
Description					
Blend No.	82-6	82-7	82-8	McIntyre	Devco
Distribution of Vitrinite Types					
V-6.....%			0.4		
V-7.....%		3.2	2.6		6.3
V-8.....%		9.1	11.0		12.6
V-9.....%	0.5	21.3	24.3		29.1
V-10.....%	7.3	12.3	18.8		28.3
V-11.....%	16.8	5.2	5.2		2.4
V-12.....%	13.6	4.5	0.0		
V-13 .....%	7.3	2.6	0.7	2.2	
V-14.....%	4.7	3.2	1.5	6.6	
V-15.....%	2.1	1.9	3.7	22.1	
V-16.....%		1.3	4.8	22.7	
V-17.....%			0.7	1.7	
V-18.....%					
Reactive Components					
Total Vitrinite.....%	52.5	64.7	73.5	55.4	78.7
Reactive Semi-fusinite (1/3)....%		5.4	3.1		1.8
Reactive Semi-fusinite (1/2)....%	15.6			15.1	
Exinite.....%	0.0	6.3	6.1		6.6
Total.....%	68.1	76.4	82.7	70.5	87.1
Inert Components					
Inert Semi-fusinite (2/3).....%		10.8	6.2		3.6
Inert Semi-fusinite (1/2).....%	15.6			15.1	
Micrinite.....%	7.7	5.8	5.5	4.7	3.7
Fusinite.....%	3.1	4.1	3.2	5.0	3.8
Mineral Matter.....%	5.5	2.9	2.4	4.7	1.8
Coke.....%					
Total.....%	31.9	23.6	17.3	29.5	12.9
Petrographic Indices					
Mean Reflectance.....%	1.23	1.05	1.07	1.58	0.96
Balance Index.....	1.79	0.91	0.62	4.15	0.39
Strength Index.....	4.88	4.11	4.06	7.00	3.32
Stability Index.....	54.4	57.1	54.1	48.3	33.7

Table 10 - Carbonization conditions

Test Identification Number	C-183	C-176	C-180	C-191	C-187	C-186
Date of Test	83-01-11	82-12-09	82-12-21	83-02-16	83-01-25	83-01-24
Coke Oven Identification						
Description						
Blend No.	82-1	82-2	82-2A	82-3	82-4	82-5
Charge Properties						
Proximate Analysis (db) Ash....%	7.5	9.2	9.2	3.9	4.6	4.9
Volatile Matter ....%	22.8	21.6	22.7	32.4	30.0	30.2
Fixed Carbon.....%	69.7	69.2	68.1	63.7	65.4	64.9
Moisture in Charge ....%	2.6	3.0	2.4	2.3	2.3	2.2
Minus 3.35 mm ....%	80.9	83.5	91.1	85.5	83.6	85.4
Other						
Sulphur ....%	0.51	0.48	0.53	1.11	0.93	0.91
Carbonization Conditions						
Net Weight of Charge (wet)....kg	652.2	654.3	653.8	647.2	653.5	655.0
ASTM Cone Bulk Density (wet)....kg/m^3	49.2	48.4	49.2	49.1	49.6	49.2
Calc. Charge Dry Bulk Density in Oven... kg/m^3	51.2	51.2	51.5	51.0	51.5	51.8
Carbonization Results						
Gross Coking Time (at Push)....h:min	18:33	17:26	17:48	17:43	17:39	18:01
Final Centre Temp....°C	1035	1049	1044	1040	1063	1032
Time to 900°C Centre Temp....h:min	14:41	13:39	13:55	14:06	13:57	14:37
Time to 950°C Centre Temp....h:min	15:33	14:26	14:48	14:43	14:39	15:01
Time to 1000°C Centre Temp....h:min	16:37	15:56	16:04	16:22	15:24	16:15
Maximum Wall Pressure....kPa	0.42	0.78	0.50	0.60	0.30	0.41
Coke Yield Actual ....%	78.0	76.3	76.5	70.2	71.0	72.5

Table 11- Coke properties

Test Identification Number.....	C-183	C-176	C-180	C-191	C-187	C-186
Screen Analysis of Coke (cum. % retained on)						
100 mm sieve.....%	3.2	8.5	4.8	2.2	1.9	1.5
75 mm sieve.....%	16.3	27.5	20.7	11.8	13.0	12.8
50 mm sieve.....%	62.7	69.4	63.6	61.6	62.8	62.2
37.5 mm sieve.....%	84.2	82.0	81.1	86.5	86.0	84.9
25.0 mm sieve.....%	92.6	91.1	92.0	95.2	94.7	95.1
19.0 mm sieve.....%	94.1	92.6	93.5	96.8	96.4	96.3
12.5 mm sieve.....%	95.3	93.5	95.6	97.9	97.4	97.3
Total -12.5 mm (breeze).....%	4.7	6.5	4.4	2.1	2.6	2.7
Mean Coke Size.....mm	57.9	62.5	58.9	57.2	57.4	57.2
Coke Chemical Analysis						
Proximate Analysis (db)						
Ash.....%	9.4	11.3	11.5	5.3	6.2	6.5
Volatile Matter.....%	1.2	0.9	0.8	0.7	0.8	0.7
Fixed Carbon.....%	89.4	87.8	87.7	94.0	93.0	92.8
Sulphur (db).....%	0.47	0.47	0.52	0.91	0.80	0.78
Coke Apparent Specific Gravity.....	0.971	0.975	0.976	0.886	0.906	0.927
ASTM Coke Tumbler Test						
Stability Factor (cum. % + 25.0 mm).	55.4	44.5	51.0	56.1	58.3	57.9
Hardness Factor (cum. % + 6.3 mm).	67.5	60.4	64.1	67.2	68.4	67.7
JIS Coke Tumbler Test (cum. % retained on)						
30 revs: 50 mm sieve.....%	12.7	14.8	16.5	22.1	19.4	17.9
25 mm sieve.....%	88.1	84.0	83.5	88.7	89.3	90.2
15 mm sieve.....%	93.8	89.8	92.5	93.5	94.1	94.1
150 revs: 50 mm sieve.....%	3.7	3.0	2.6	5.8	4.7	3.9
25 mm sieve.....%	70.6	63.6	65.1	73.4	76.7	75.6
15 mm sieve.....%	81.2	75.7	76.9	82.6	84.4	84.1

Table 12 - Carbonization conditions

Test Identification Number	C-194	C-196	C-188
Date of Test	83-02-28	83-03-7	83-02-02
Coke Oven Identification.....			
Description.....			
Blend No.	82-6	82-7	82-8
Charge Properties			
Proximate Analysis (db) Ash.....%	9.9	5.0	4.1
Volatile Matter ....%	22.0	30.4	31.7
Fixed Carbon.....%	68.1	64.6	64.2
Moisture in Charge .....%	2.4	2.5	2.3
Minus 3.35 mm .....%	84.6	80.0	82.3
Other			
Sulphur .....%	0.48	0.90	0.98
Carbonization Conditions			
Net Weight of Charge (wet).....kg	649.0	655.0	652.4
ASTM Cone Bulk Density (wet).....kg/m^3	48.5	48.8	49.0
Calc. Charge Dry Bulk Density in Oven... kg/m^3	51.1	51.7	51.4
Carbonization Results			
Gross Coking Time (at Push).....h:min	18:08	17:40	17:37
Final Centre Temp.....°C	1047	1050	1037
Time to 900°C Centre Temp.....h:min	14:35	14:08	14:04
Time to 950°C Centre Temp.....h:min	15:08	14:40	14:37
Time to 1000°C Centre Temp.....h:min	16:24	15:50	15:42
Maximum Wall Pressure.....kPa	0.57	0.61	0.35
Coke Yield Actual .....%	77.1	73.4	70.9

Table 13- Coke properties

Test Identification Number.....	C-194	C-196	C-188
Screen Analysis of Coke (cum. % retained on)			
100 mm sieve.....%	10.3	0.9	2.2
75 mm sieve.....%	32.6	10.8	13.3
50 mm sieve.....%	67.6	60.7	64.3
37.5 mm sieve.....%	83.0	84.0	86.3
25.0 mm sieve.....%	89.6	94.5	95.1
19.0 mm sieve.....%	91.4	96.0	96.4
12.5 mm sieve.....%	92.4	96.9	97.4
Total -12.5 mm (breeze).....%	7.6	3.1	2.6
Mean Coke Size.....mm	63.8	55.9	57.9
Coke Chemical Analysis			
Proximate Analysis (db)			
Ash.....%	11.5	6.6	5.6
Volatile Matter.....%	0.9	0.5	0.7
Fixed Carbon.....%	87.6	92.9	93.7
Sulphur (db).....%	0.46	0.80	0.90
Coke Apparent Specific Gravity.....	0.991	0.924	0.895
ASTM Coke Tumbler Test			
Stability Factor (cum. % + 25.0 mm).	39.0	56.3	58.7
Hardness Factor (cum. % + 6.3 mm).	60.7	67.6	67.9
JIS Coke Tumbler Test (cum. % retained on)			
30 revs: 50 mm sieve.....%	9.1	19.9	15.7
25 mm sieve.....%	76.6	88.2	88.0
15 mm sieve.....%	86.8	93.8	93.8
150 revs: 50 mm sieve.....%	0.5	4.2	3.8
25 mm sieve.....%	51.9	72.6	73.8
15 mm sieve.....%	71.2	82.4	84.0

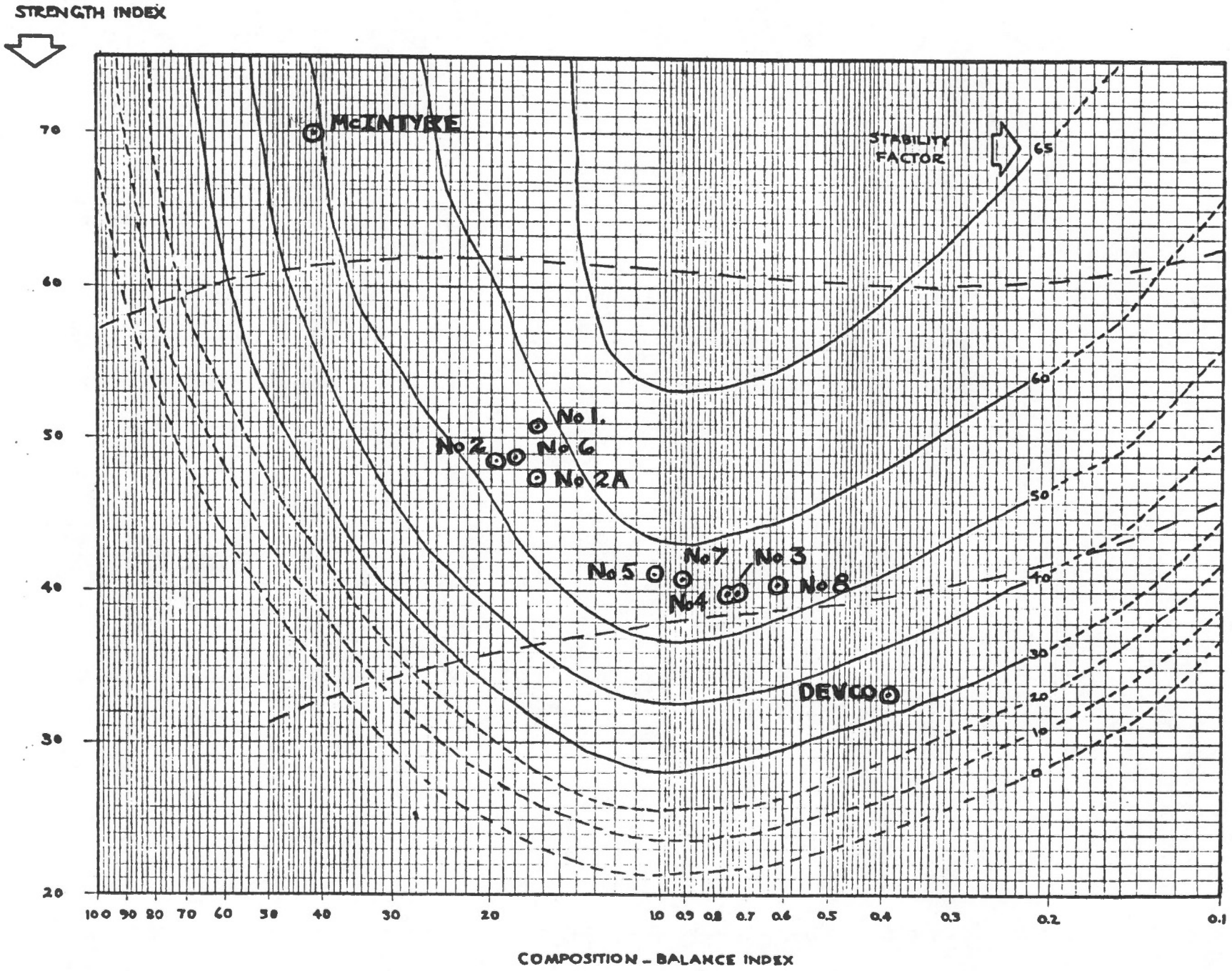
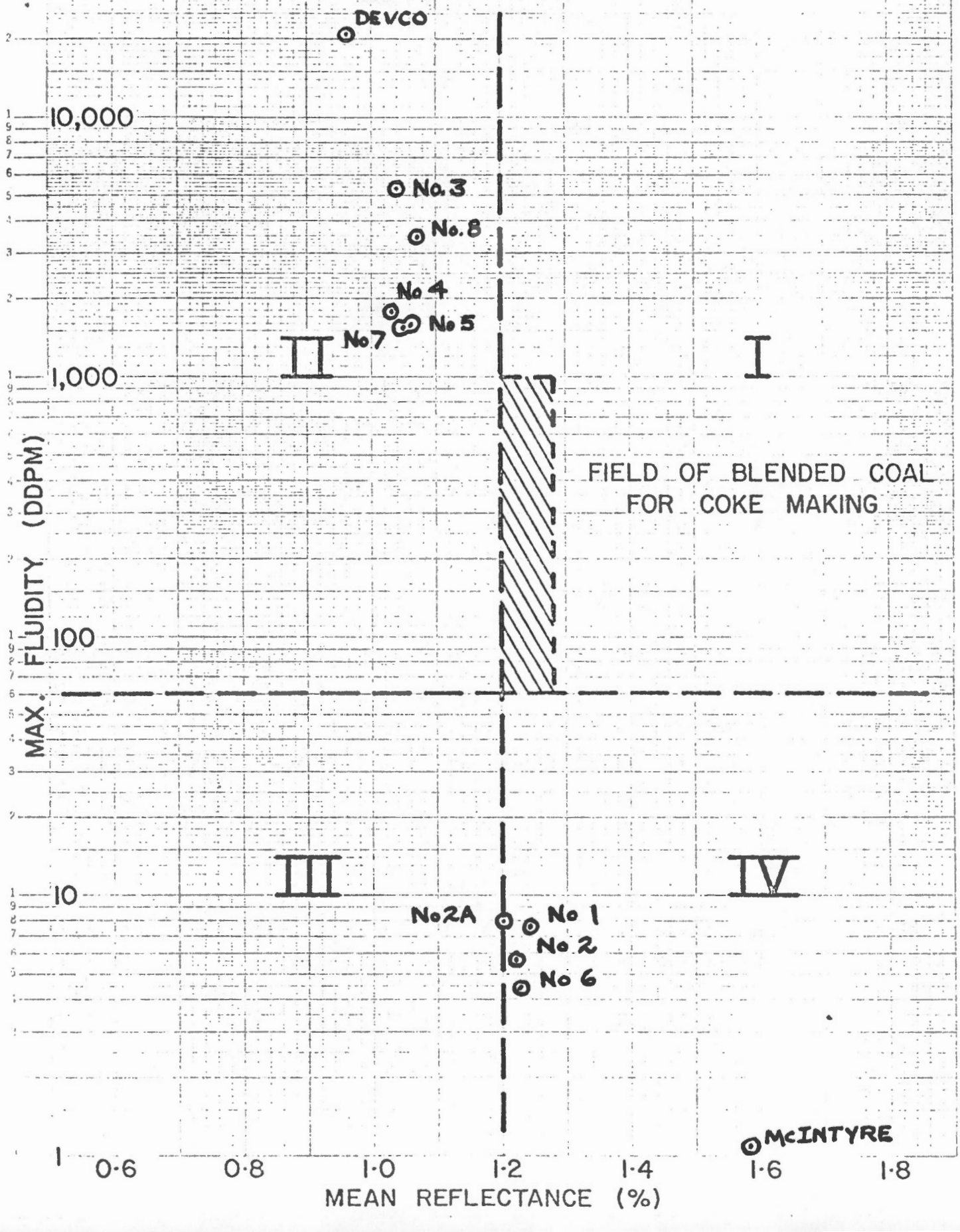


Fig. 1 - Predicted stability factors from petrographic data

Figure 2. RELATIONSHIP BETWEEN MAX. FLUIDITY AND MEAN REFLECTANCE.



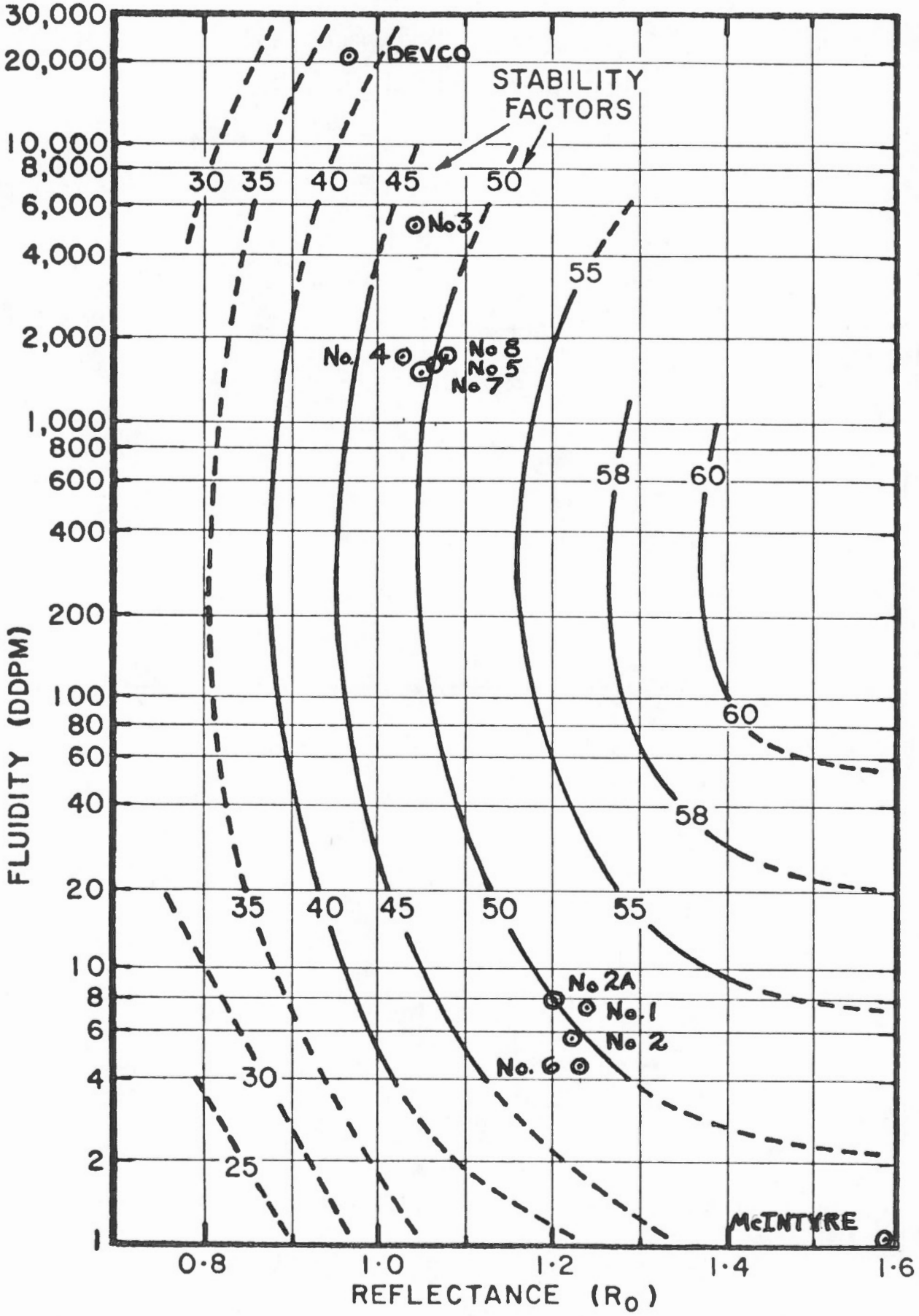


Figure 3. PREDICTION OF COKE STABILITY FACTORS.
– REGRESSION RESULTS FROM CANMET DATA ON WESTERN CANADIAN COALS.

APPENDIX 1

Letters dated June 29, 1982 from W. R. Leeder and
December 16, 1982 from C. Dionne
Process Plant Development, Coal Division
Denison Mines Limited
Vancouver, British Columbia

APPENDIX 1

DENISON MINES LIMITED
COAL DIVISION

P.O. BOX 11575
650 WEST GEORGIA STREET
VANCOUVER, B.C. CANADA V6B 4N7
TEL. (604) 669-2226
TELEX 04-51547

June 29, 1982

Dr. B. I. Parsons
Director
Energy Research Labs.
CANMET
555 Booth Street
Ottawa, Ontario

Dear Basil:

Denison Mines Limited is presently conducting a sampling program on their Quintette Coal Limited property. We would request cost recovery coke oven tests and complete support analysis for at least 8 samples that should be prepared for shipping to CANMET commencing mid-July. Analyses should include pilot scale coke oven tests in the Edmonton carbolite oven, complete chemical analysis and rheology, petrography and sole heated oven testing. In a telephone discussion with A. B. Fung, he felt CANMET would be able to conduct about one oven test per week through August and perhaps two per week in September, for a tentative completion of end September for the coke oven tests. This will be confirmed with him as samples are prepared and shipped.

Yours truly,
DENISON MINES LIMITED

W. Ross Leeder
Process Plant Development
Coal Division

WRL:sjg

cc: D. Johnson (Dawson Creek)
A. B. Fung (CANMET, Edmonton)
J. Jorgenson (CANMET, Ottawa)

DENISON MINES LIMITED
COAL DIVISION

P.O. BOX 11575
650 WEST GEORGIA STREET
VANCOUVER, B.C. CANADA V6B 4N7
TEL. (604) 689-2226
TELEX 04-51547

December 16, 1982

Dr. B. I. Parsons, Director
Energy Research Labs
CANMET
555 Booth Street
Ottawa, Ontario K1A 0G1

Dear Dr. Parsons:

Re: Evaluation of Coking Properties of Frame and Syncline Extension Deposits, Project 03-5-1/6-24, Job No. 3401R

Up to nine blend tests are being requested, in addition to the previous single seam tests, for the coking test program associated with our 1982 Quintette Project. As the composition of each blend is still under consideration it is probable that some of the nine proposed blends (see attached) will be changed or omitted and that additional blends may be added. A. Fung and J. Jorgensen will be contacted by telephone and telex regarding which blends are being requested. We will give adequate notice as we are aware of the scheduling and preparation time constraints in Edmonton. If A. Fung is concerned about the complexity of some blends, a Denison representative will go to Edmonton to ensure there is a clear understanding.

Attached is a table of the blends proposed, 82-2 and 82-2-A are the highest priority.

A Carbolite coke oven test in Edmonton, a 12-inch coke oven test in Ottawa and a full lab analysis on each blend including proximate, ultimate, HGI, thermal rheology (FSI, dilatation, fluidity), petrography, ash mineral analysis and sole heated oven tests are requested.

Should you have any further questions we would be more than pleased to assist you. We appreciate the assistance that your laboratory is providing in the evaluation of our coking coals and hope the current blends can be fitted into your schedule at your earliest convenience.

Yours truly,
DENISON MINES LIMITED

C. Dionne

C. Dionne
Technical Assistant for
Ross Leeder
Process Plant Development

CD:sjg
cc: J. Jorgensen (CANMET, Ottawa)
A. Fung (CANMET, Edmonton)
R. Leeder