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Mines Branch Information Circular IC 248

CHEMICAL ANALYSES OF THE ASH OF CANADIAN COALS

by

W.J. Montgomery*, J.Z. Skulski**, G.C. Anderson***, and J.G. Jorgensen**

INTRODUCTION

The Solid Fuels Laboratory of the Fuels Research Centre is responsible for all the analytical work required for this publication. Analytical data on samples analysed during a given year have been published in Mines Branch Information Circulars, "Analyses of Coal and Coke During the Year _____", from 1960 to the present. This Information Circular deals specifically with the chemical composition of coal ash, and includes, where available, data on ash fusibility.

The analyses are arranged by Province, Area, and Mine, from east to west. The exact seam or location is indicated, when that information is available. The percentage of ash in the dry coal is indicated. The analyses are from samples concerned with specific projects collected by Divisional Officers or mine officials from 1964 to 1968.

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Direction des mines

Circulaire d'information IC 248

ANALYSES CHIMIQUES DES CENDRES DES CHARBONS CANADIENS

par

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INTRODUCTION

Le Laboratoire des combustibles solides du Centre de recherche sur les combustibles est responsable de tous les travaux d'analyse nécessaires à la présente publication. Les résultats des analyses pratiquées sur divers échantillons sont publiés annuellement depuis 1960 dans les circulaires d'information de la Direction des mines intitulées "Analyses de houille et de coke effectuées en ____". La présente circulaire traite plus particulièrement de la composition chimique de la cendre de houille et donne, dans la mesure du possible, des données sur la fusibilité des cendres.

Les analyses sont réparties selon la province, la région et la mine, de l'est à l'ouest. Quand c'est possible, on indique également l'emplacement et la couche précise. Est également indiquée la teneur en cendre de la houille à l'état sec. Les analyses portent sur des échantillons recueillis aux fins d'études particulières par des agents de la division ou des employés de mines entre 1964 et 1968.

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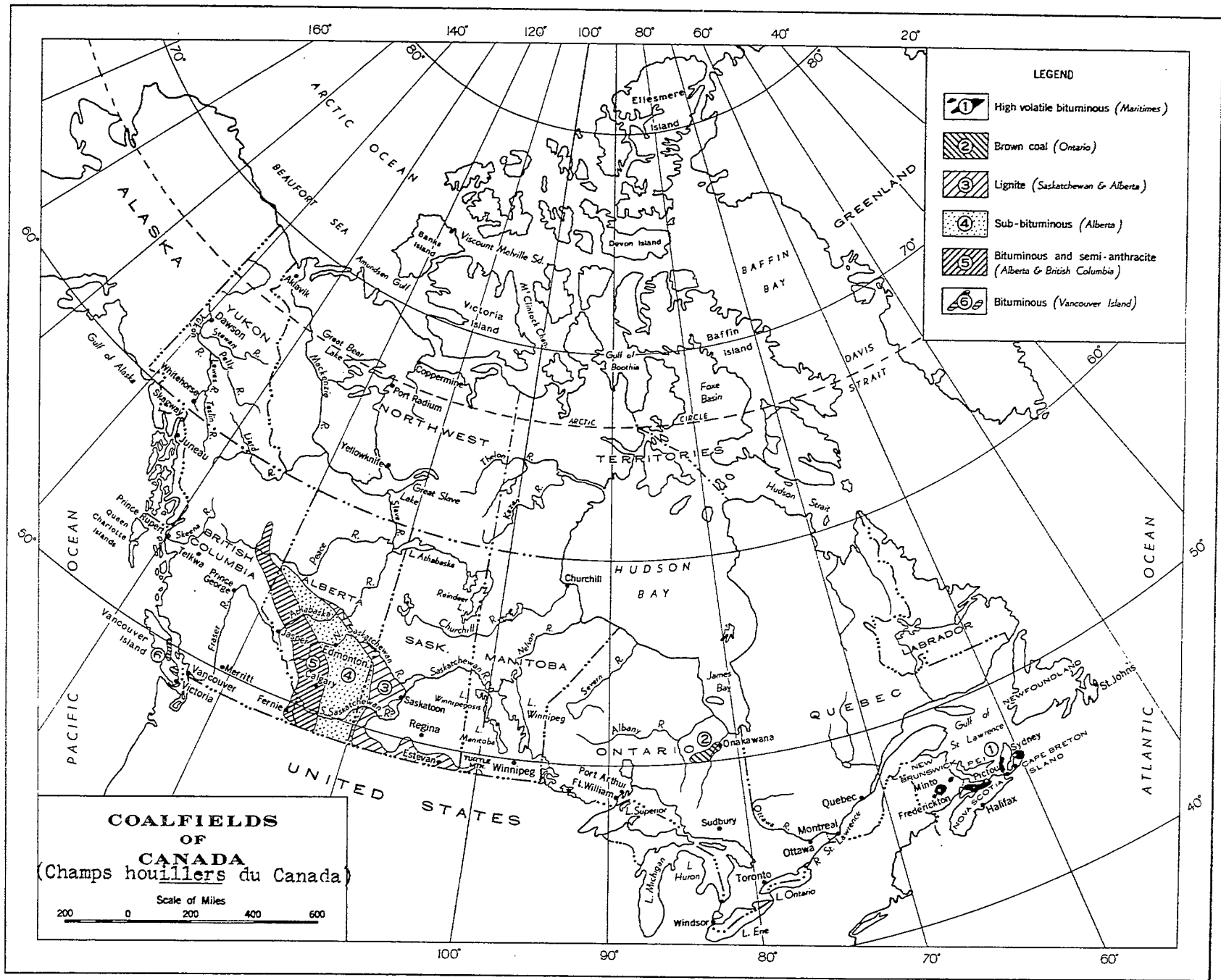
GLOSSARY AND EXPLANATION OF ABBREVIATED TERMS

- S - Stoker, refers to a double-screened coal within the limits of the screens indicated.
- sl - slot, refers to a screen with rectangular openings.
- T - Tipple, refers to the location where the output of the mine is dumped, screened and loaded.
- sp - special
- sq - square, refers to a screen with a square opening
- med - medium
- N/Slack - Nut Slack, defined in Canadian Government Specifications Board, Standard 18-GP-7, as from 2 to 1 1/4 inch, top size limit, with a zero bottom size limit.
- C/Slack - Coarse Slack, a mine designation within the limits of the screens indicated.
- rd - round, refers to a screen with round openings.
- W/Slack - Washed Slack, a slack coal which has been beneficiated by washing.
- Slack - Slack, defined in Canadian Government Specifications Board, Standard 18-GP-7, as less than 1 1/4 to and including 1/2 inch, top size limit, with a zero bottom size limit.
- Splint - Splint coal, as described in Thiessen's Description of (Coal) Types is a "fine- or microbanded coal with a compact, hard, irregular fracture and having a dull luster". It is normally high-ash material.
- M - Mine, refers to a sample taken in the mine from a particular location by mine officials or Departmental officers.
- NOTE: - Unless otherwise designated all screen openings are round.

GLOSSAIRE ET EXPLICATION DES TERMES ABRÉGÉS

- S - Braisettes, désigne un charbon de grosseur intermédiaire et dont les dimensions sont entre les deux cribles indiqués.
- sl - Crible à fente, désigne un crible à trous rectangulaires.
- T - Recette et chargement, désigne l'endroit où la production d'une mine est déchargée, criblée et rechargée.
- sp - Spécial.
- sq - Carré, désigne un crible à trous carrés.
- med - Moyen
- N/Slack - Noix à fines, défini par la norme 18-GP-7 de l'Office des normes du gouvernement canadien, comme étant du charbon dont la grosseur maximale est de 2 à 1 1/4 pouces et la grosseur minimale est de zéro.
- C/Slack - Gros à fines, désignation de la mine dans les limites des cribles indiqués.
- rd - Rond, désigne un crible à trous ronds.
- W/Slack - Fines lavées, fines de charbon enrichies par lavage.
- Slack - Fines, terme défini par la norme 18-GP-7 de l'Office des normes du gouvernement canadien comme étant du charbon dont la grosseur maximale est inférieure à 1 1/4 pouce et peut aller jusqu'à 1/2 pouce, et dont la grosseur minimale est zéro.
- Splint - Houille flambante, décrite dans la Description des types de charbon de Thiessen comme étant un "charbon menu ou microrubané ayant une cassure compacte, dure et irrégulière et un éclat terne". Il s'agit normalement d'un charbon qui donne beaucoup de cendres.
- M - Mine, désigne un échantillon prélevé dans la mine à un endroit particulier par les employés de la mine ou les fonctionnaires du ministère.

NOTE: Sauf indication contraire, tous les trous des cribles sont ronds.



COMPOSITION OF MINERAL MATTER AND ASH

Ash from burning coal is derived from the mineral matter content of the coal. The mineral matter is composed of intrinsic and extrinsic mineral matter. The intrinsic mineral matter originated from inorganic salts present in vegetation from which coal was formed, from inorganic salts concentrated by absorption and adsorption, and from dust brought down by wind and rain. The extrinsic mineral matter consists of dirt partings of shale or clay; films of iron sulphide (FeS_2) as pyrite or marcasite; bands of carbonates of lime, magnesia and iron; and films of sulphate of lime as gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). Part of this was deposited with the organic vegetation, part was introduced later by percolating solutions, and part during mining from the roof and floor of the seam. Most of the extrinsic mineral matter can be removed by cleaning as it is not as intimately associated with the coal as intrinsic mineral matter. On burning coal the following changes in the composition of the mineral matter occur:

The hydrated silicates of aluminum (shale) and the quartzose silt lose combined water.

Carbonates of lime, magnesia and iron are decomposed with a loss of carbon dioxide, leaving oxides of calcium (CaO), magnesium (MgO) and iron (Fe_2O_3).

Iron sulphide is oxidized to ferric oxide (Fe_2O_3).

Part of the sulphide is removed as sulphur trioxide, and part is combined with the oxides of lime and alkali metals to form sulphates.

The alkali metal chlorides may be completely volatilized.

Analysis of Coal Ash

A coal ash is generally analysed for silica (SiO_2), alumina (Al_2O_3), iron (Fe_2O_3), titanium (TiO_2), calcium (CaO), magnesium (MgO), sodium (Na_2O), potassium (K_2O), sulphur trioxide (SO_3), and phosphorus pentoxide (P_2O_5). These constituents usually account for upward of 99 per cent of the material. Numerous other oxides may occur in coal ash, such as those of Mn, Li, Rb, Cs, Cu, Ag, Au, Sr, Ba, Zn, Ge, Te, Th, B, Va, As, Sb, Bi, Cr, Mo, and Ni. These elements if present

are normally found in quantities in the order of one tenth of one per cent or less. Occasionally these trace elements may be found in much greater amounts.

Methods of Analysis

In recent years, the classical wet chemical methods have been superseded by more rapid instrumental methods employing spectrophotometry and flame photometry. Complete details of the methods are given in the proposed ASTM Standard D 2795 and BS 1016. An outline of the methods is shown in Figures 1 and 2.

COMPOSITION DE LA MATIÈRE MINÉRALE ET DES CENDRES

La cendre produite par la combustion de la houille provient des substances minérales qu'elle renferme. On distingue les substances minérales intrinsèques et extrinsèques. Les premières proviennent des sels inorganiques présents dans les substances végétales qui ont formé la houille, des sels inorganiques concentrés par absorption et adsorption, et des poussières apportées par le vent ou la pluie. Les substances minérales extrinsèques proviennent de couches d'argile ou de schiste; de dépôts de sulfure de fer (FeS_2) sous la forme de pyrite ou de marcasite; de bandes de carbonates de chaux, de magnésie ou de fer; et de dépôts de sulfate de chaux sous forme de gypse ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). Ces matières ont été déposées en partie par la végétation organique, en partie par les infiltrations de solutions, et en partie lors de l'extraction à proximité du toit ou du mur de la couche. Le lavage élimine la plus grande partie de la matière extrinsèque puisqu'elle n'est pas aussi étroitement liée à la composition de la houille que la matière intrinsèque. Lors de la combustion, la composition du charbon subit les modifications suivantes:

- les silicates hydratés d'aluminium (schiste) et la vase quartzeuse perdent leur eau de composition;
- les carbonates de chaux, de magnésie et de fer se décomposent et perdent du bioxyde de carbone, ce qui laisse des oxydes de calcium (CaO), de magnésium (MgO) et de fer (Fe_2O_3);
- le sulfure de fer, par oxydation, se transforme en oxyde ferrique (Fe_2O_3).

Une partie du sulfure est éliminée sous forme de trioxyde de soufre, l'autre partie s'allie aux oxydes de chaux et aux métaux alcalins pour former des sulfates.

Les chlorures de métaux alcalins peuvent être entièrement volatilisés.

Analyse de la cendre de houille

En général, on analyse la cendre de houille pour en déterminer la teneur en silice (SiO_2), en alumine (Al_2O_3), en fer (Fe_2O_3), en titane (TiO_2), en calcium (CaO), en magnésium (MgO), en sodium (Na_2O), en potassium (K_2O), en trioxyde de soufre (SO_3) et en pentoxyde de phosphore (P_2O_5), composés qui constituent d'ordinaire plus de 99 p. 100 de la matière. Les oxydes de plusieurs autres éléments peuvent se retrouver dans la cendre de houille, dont ceux de Mn, Li, Rb, Cs, Cu, Ag, Au, Sr, Ba, Zn, Ge, Te, Th, B, Va, As, Sb, Bi, Cr, Mo, et Ni. Lorsqu'ils sont présents, ces éléments n'apparaissent normalement que dans une proportion de un dixième de 1 p. 100 ou moins, parfois en plus fortes quantités.

Méthodes d'analyse

Depuis quelques années, les méthodes classiques d'analyse chimique par voie humide ont été remplacées par les méthodes instrumentales plus rapides comme la spectrophotométrie et la photométrie à émission de flammes. Ces méthodes sont décrites en détail dans la norme ASTM proposée D 2795 et dans BS 1016. On en trouvera un bref exposé dans les figures 1 et 2.

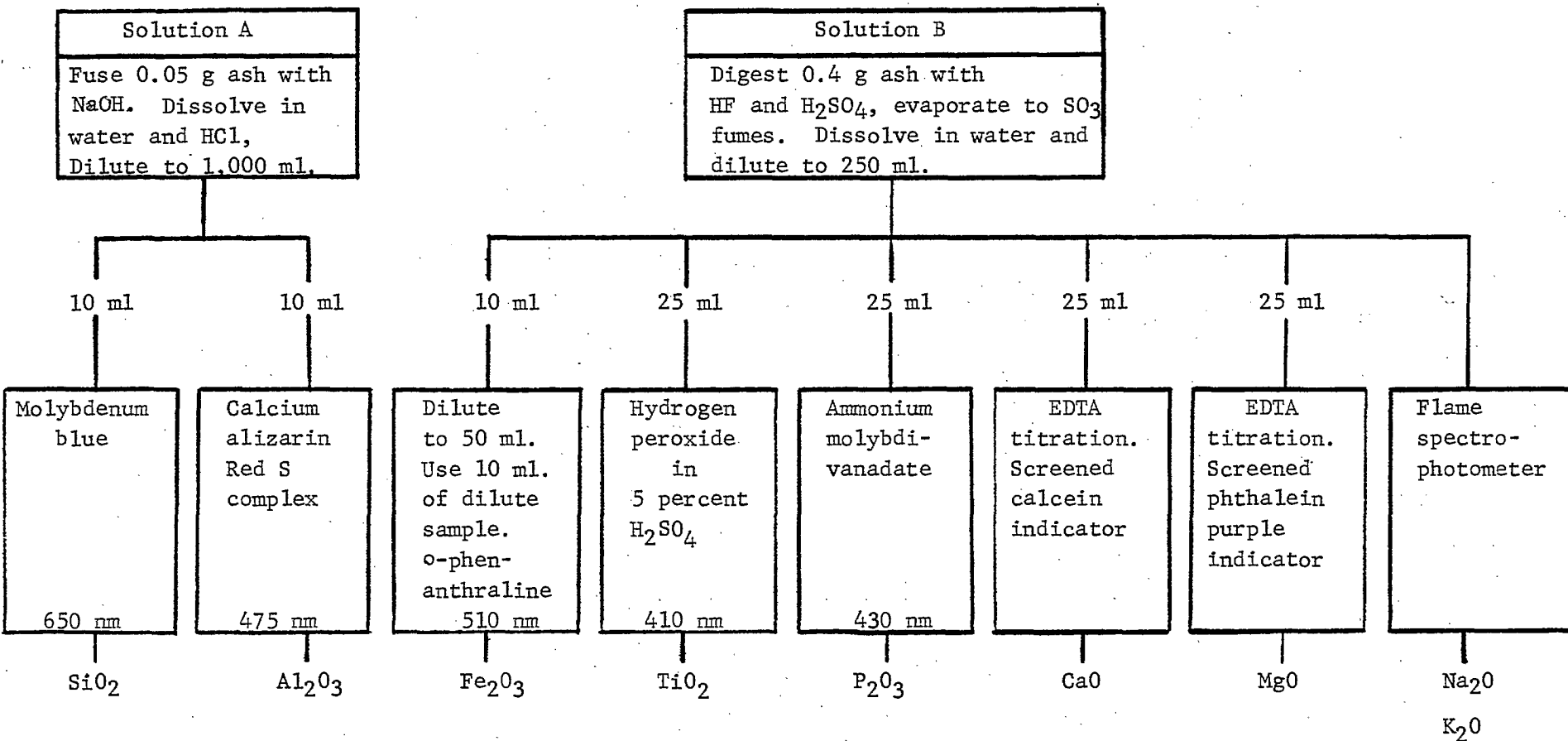
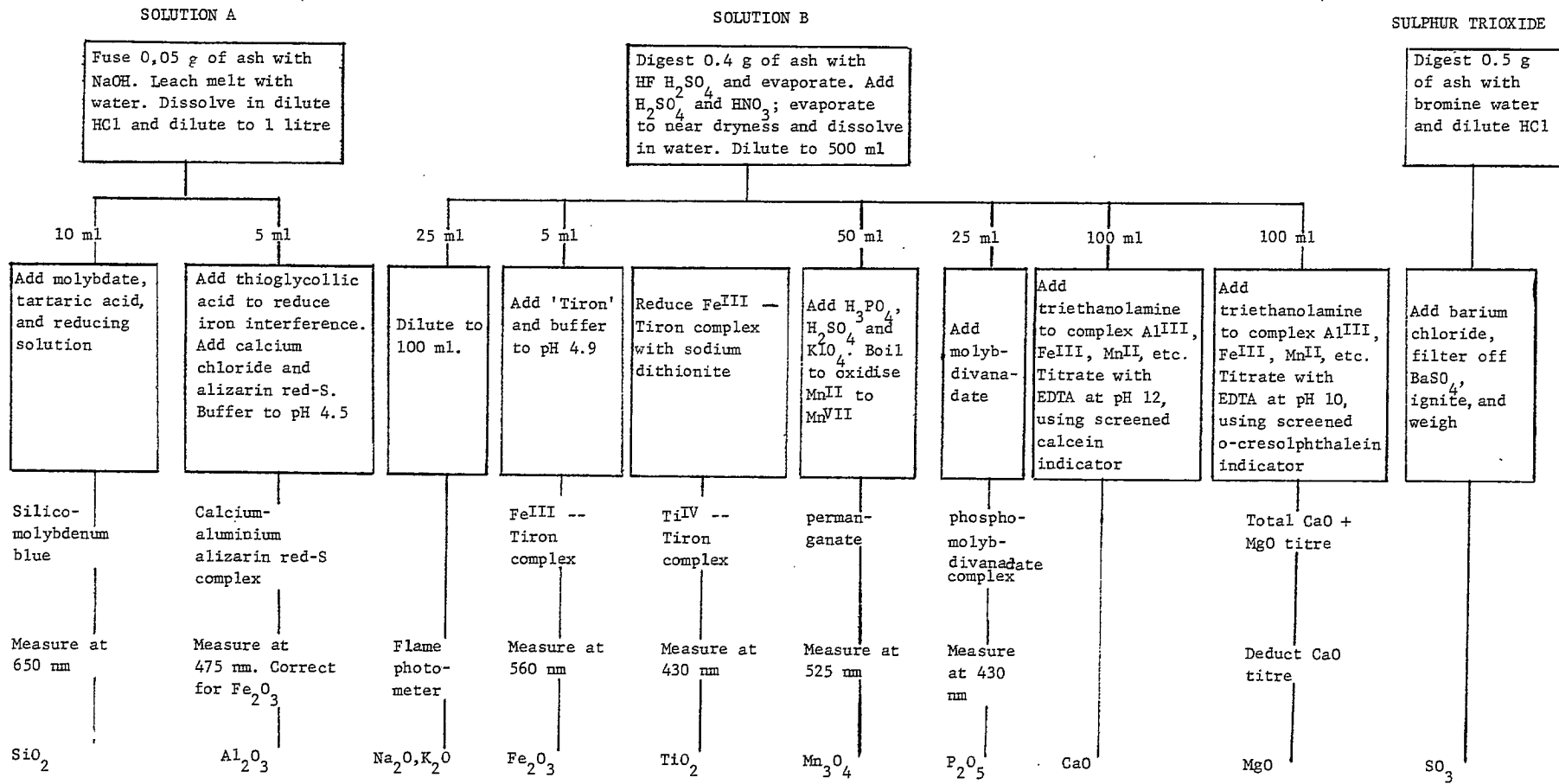


Figure 1 - Outline of Rapid Methods for Analysis of Coal Ash.
 Figure 1 - Abrégé des méthodes rapides d'analyse des cendres de charbon.



(B.S. 1016: Part 14: 1963)

Figure 2 - Scheme of Analysis of Coal Ash and Coke Ash.
Figure 2 - Schéma d'analyse de la cendre de charbon et de la cendre de coke.

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA

Sample Number	Description of Sample Size: Mine Designation Screener Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture-free coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F

AREA SYDNEY COAL FIELD

CAPE BRETON COAL FIELDS

MINE OR TRADE NAME: PRINCESS & DOMINION
OPERATOR: CAPE BRETON DEVELOPMENT CORP. (DEVCO)

2949-65	Egg + 1 3/4 rd	T	4.69	19.44	14.38	58.46	0.47	0.40	2.38	0.50	2.11	0.58	0.52	2000	2050	2080	2320
2235-66	Egg + 1 3/4 rd	T	4.61	23.21	13.91	53.58	0.55	0.19	1.89	0.37	2.01	0.00	0.00	1920	1950	1980	2030
3147-77	Egg + 1 3/4 rd	T	5.89	31.81	21.22	41.74	0.66	0.30	2.52	0.81	2.24	0.97	1.62	1970	2030	2180	2240
3556-66	Egg + 1 3/4 rd	T	6.57	21.50	17.06	53.94	0.59	0.36	1.40	0.45	1.50	0.77	0.74	1950	2030	2070	2360
2963-67	Egg + 1 3/4 rd	T	4.47	21.20	16.38	59.20	0.76	0.29	1.13	0.95	1.15	0.48	0.44	1860	2120	2200	2260
3557-67	Egg + 1 3/4 rd	T	6.16	23.55	18.35	45.84	0.50	0.47	4.06	1.43	4.54	0.48	0.88	1840	1930	2140	2250
2722-68	Egg + 1 3/4	T	8.56	23.51	14.06	31.87	0.68	0.13	9.97	5.92	13.91	0.53	0.52	1940	1980	2020	2250
2854-65	Nut 1 3/4 x 3/4 rd	T	4.29	22.64	17.15	57.76	0.56	0.46	2.55	0.28	2.35	0.61	0.66	1860	2050	2140	2200
2236-66	Nut 1 3/4 x 3/4 rd	T	4.67	32.39	15.08	49.08	0.89	0.09	1.96	0.70	1.86	0.00	0.13	1920	1960	1980	2000
3148-66	Nut 1 3/4 x 3/4 rd	T	5.29	18.19	13.48	64.19	0.49	0.18	1.82	0.81	1.67	1.26	0.81	2010	2080	2100	2430
3557-66	Nut 1 3/4 x 3/4 rd	T	5.10	15.22	14.84	62.85	0.33	0.66	1.82	0.30	0.74	0.87	0.59	2000	2090	2210	2550
2964-67	Nut 1 3/4 x 3/4 rd	T	5.68	20.15	18.15	57.23	0.44	0.33	1.54	1.18	1.81	0.48	0.59	1970	2090	2210	2290
3558-67	Nut 1 3/4 x 3/4 rd	T	5.23	16.78	14.75	55.87	0.39	0.27	4.41	0.87	5.63	0.29	0.29	1850	1950	2150	2510
2723-68	Nut 1 3/4 x 3/4 rd	T	3.83	25.27	19.48	45.90	0.69	0.46	2.97	1.09	1.61	0.68	1.03	2000	2240	2260	2290
2237-66	C/Slack 1 3/4 x 0	T	5.73	35.30	16.32	38.39	0.68	0.07	4.62	1.21	5.15	0.15	0.40	1910	1920	1970	2200
3149-66	C/Slack 1 3/4 x 0	T	6.72	35.75	23.54	34.28	0.60	0.24	2.24	1.01	2.22	1.26	2.13	1920	2050	2240	2260
3558-66	C/Slack 1 3/4 x 0	T	17.24	49.11	20.59	18.08	0.76	0.51	0.98	1.21	0.66	0.97	3.24	2030	2260	2400	2500
2965-67	C/Slack 1 3/4 x 0	T	5.44	27.59	21.47	43.96	0.62	0.35	2.24	1.31	2.56	0.29	0.59	1970	2040	2120	2310
3559-67	C/Slack 1 3/4 x 0	T	7.16	40.80	27.49	22.92	0.70	0.24	2.16	1.47	2.46	0.58	2.06	1950	2170	2320	2410
2724-68	C/Slack 1 3/4 x 0	T	5.37	27.86	18.64	35.49	0.43	0.24	5.32	3.44	7.70	0.68	0.88	1980	2090	2170	2260
2855-65	Pea	T	3.41	23.25	19.49	48.45	0.46	0.45	3.36	0.89	3.62	1.45	0.74	1920	2340	2410	2450
2238-66	S/Pea 3/4 x 1/4 sl	T	4.96	23.64	13.44	56.24	0.57	0.06	2.38	0.00	1.73	0.12	0.18	2010	2030	2060	2260
3151-66	S/Pea 3/4 x 1/4 sl	T	4.85	17.66	12.93	59.27	0.49	0.21	2.03	0.65	2.59	0.77	0.88	2000	2080	2140	2420
3559-66	Pea 3/4 x 1/4	T	4.47	28.87	19.75	42.79	0.53	0.31	2.17	1.16	1.71	0.58	1.18	1890	2080	2230	2350
2966-67	Pea 3/4 x 1/4	T	4.75	16.74	15.35	61.02	0.39	0.31	1.86	0.73	1.95	0.19	0.00	1990	2230	2280	2480
3560-67	Pea 3/4 x 1/4	T	5.21	18.94	15.33	50.50	0.39	0.29	4.91	1.89	6.56	0.29	0.44	1970	2140	2150	2240
2725-68	Pea 3/4 x 1/4	T	2.99	24.05	20.16	44.84	0.63	0.37	3.56	2.17	4.35	0.68	0.52	1950	2210	2270	2410

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, inches Shape of Screen Opening sq, rd, slot.		Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
					SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, F	Softening Temperature, F	Hemispherical Temperature, F	Fluid Temperature, F
AREA <u>SYDNEY COAL FIELD</u>					CAPE BRETON COAL FIELDS										MINE OR TRADE NAME: <u>PRINCESS & DOMINION (CONT'D)</u> OPERATOR: CAPE BRETON DEVELOPMENT CORP. (DEVCO)			
3150-66	W/Slack	3/4 x 0	T	6.90	34.17	20.99	36.83	0.56	0.23	2.80	1.01	2.86	1.16	1.84	2010	2110	2140	2250
3561-67	W/Slack	3/4 x 0	T	9.08	31.78	23.14	34.54	0.50	0.22	2.94	1.21	3.76	0.58	1.62	1850	2070	2130	2260
2950-65	Fines	1/4 sl x 0	T	8.09	26.90	32.75	37.37	0.63	0.22	3.22	0.96	4.20	-	-	1880	1970	2010	2250
2239-66	Fines	1/4 sl x 0	T	7.36	31.74	18.48	31.95	0.68	0.08	8.23	1.13	7.44	0.29	0.69	1950	2070	2150	2280
3560-66	Fines	1/4 x 0	T	25.84	51.38	26.43	14.28	0.84	0.20	0.98	1.21	1.03	0.78	3.24	2130	2380	2480	2520
2967-67	Fines	1/4 x 0	T	16.63	43.24	29.67	19.67	0.54	0.27	1.64	1.54	1.91	0.48	2.50	1980	2220	2300	2450
3562-67	Fines	1/4 x 0	T	10.52	30.73	20.39	37.69	0.56	0.22	3.67	1.08	4.79	0.58	1.47	1840	2010	2120	2170
2726-68	Fines	1/4 x 0	T	7.36	24.51	17.62	36.37	0.61	0.18	8.37	1.18	8.66	0.73	0.81	1930	2080	2210	2280
					MINE OR TRADE NAME: <u>OLD SYDNEY COLLIERIES</u> OPERATOR: CAPE BRETON DEVELOPMENT CORP. (DEVCO)													
2745-64	Egg		T	5.33	20.80	14.14	55.72	0.96	0.56	2.90	0.18	1.34	-	2.70	1970	2100	2240	2320
2736-64	Egg		T	5.51	26.72	13.77	47.33	1.01	0.71	5.19	0.28	1.91	0.46	1.76	1890	2100	2160	2300
2746-64	Nut		T	4.15	24.66	15.07	51.54	0.88	0.50	3.64	0.51	1.03	-	1.74	1940	2190	2260	2340
2737-64	Nut		T	5.72	27.37	15.19	46.75	0.80	0.26	3.87	1.23	2.02	0.69	0.85	1870	2070	2120	2290
2738-64	Pea		T	4.00	21.31	15.82	58.14	0.81	0.24	2.60	0.60	1.12	0.64	1.03	1880	2100	2120	2240
2747-64	Pea		T	3.08	23.17	17.38	49.90	0.62	0.57	4.00	0.17	1.12	-	2.21	2000	2210	2290	2400
2797-65	Egg + 1	3/4 rd	T	5.07	16.56	13.61	62.77	0.45	0.37	1.92	0.29	2.46	0.97	0.63	1930	2010	2070	2500
2798-65	Nut 1	3/4 x 3/4 rd	T	3.22	20.45	20.67	49.24	0.61	0.46	2.81	0.27	2.30	1.27	0.96	1910	1950	2070	2510
2799-65	C/Slack	1 3/4 rd x 0	T	6.62	34.25	27.83	29.79	0.50	0.39	3.64	0.62	2.47	0.85	2.58	1930	2040	2380	2480
2800-65	Pea	3/4 rd x 1/4 sl	T	3.87	18.50	17.44	55.46	0.59	0.44	2.25	0.29	1.96	1.63	1.18	1820	1950	2010	2510
2801-65	Fines	1/4 sl x 0	T	9.08	34.79	25.06	32.70	0.49	0.30	3.33	1.12	4.40	1.57	2.36	1930	1980	2200	2480
2739-64	C/Slack		T	6.56	34.72	19.77	32.85	1.01	0.29	4.88	1.51	1.19	1.57	1.45	1980	2120	2280	2320
2748-64	C/Slack		T	5.77	29.98	19.91	37.52	0.78	0.53	5.06	0.07	2.41	-	2.98	1990	2110	2300	2360
2740-64	Fines		T	9.30	37.08	22.11	27.35	0.74	0.48	5.20	2.15	1.37	-	2.84	1990	2120	2290	2340
2749-64	Fines		T	9.95	36.06	21.91	28.13	0.61	0.55	5.11	0.26	2.11	-	4.59	2110	2340	2410	2460
3152-66	Fines	1/4 sl x 0	T	15.35	38.89	26.91	25.07	0.55	0.14	1.68	1.27	2.17	0.97	2.58	2080	2200	2230	2440

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen: Opening sq, rd, slot.		Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
					SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, F	Softening Temperature, F	Hemispherical Temperature, F	Fluid Temperature, F
AREA <u>SYDNEY COAL FIELD</u>												OPERATOR: <u>CAPE BRETON DEVELOPMENT CORP. (DEVCO)</u>						
2322-68	Lump 2 x 0	T	5.84	27.98	18.85	40.78	0.59	0.39	3.29	1.59	3.96	0.48	1.10	1880	2120	2150	2210	
2721-64	Nut	T	6.51	27.78	15.83	47.62	0.78	0.56	2.14	0.39	0.77	0.11	1.72	1890	2050	2210	2290	
2722-64	Screen	T	4.81	25.79	18.24	50.29	0.61	0.41	1.79	0.78	0.49	0.06	1.47	2140	2270	2340	2460	
2723-65	Screen + 1 1/4 sq	T	5.13	29.38	22.39	37.78	0.54	0.34	1.96	0.75	1.77	1.09	1.55	1990	2110	2180	2200	
3139-66	Screen + 1 1/4 sq	T	5.51	29.32	20.51	46.34	0.62	0.25	1.40	0.97	1.66	0.68	1.40	1970	2040	2130	2230	
2986-67	Screen	T	4.07	19.14	15.16	44.88	0.45	0.75	5.14	2.03	8.05	0.48	0.59	1900	1970	2000	2420	
2989-67	Screen + 1 1/4 rd	T	3.79	27.66	21.55	37.82	0.71	0.28	4.17	2.03	5.24	0.58	0.74	1910	1970	2080	2450	
2321-68	Screen + 2	T	3.42	30.12	22.16	39.18	0.81	0.45	2.66	1.66	2.62	0.58	0.52	1910	2110	2150	2230	
2728-68	Screen + 2	T	3.50	28.58	17.14	44.70	0.69	0.57	3.36	1.86	3.32	0.48	0.44	1850	2190	2270	2400	
3177-68	Screen + 2	T	4.92	37.19	25.00	29.57	0.86	0.61	2.07	0.83	3.21	0.48	1.03	2100	2210	2230	2260	
2991-67	Pea 1 x 1/4	T	4.05	38.80	25.53	25.56	0.63	0.13	3.15	1.53	2.62	0.39	1.62	2000	2160	2260	2400	
2723-64	Slack 1 1/4 x 0	T	9.69	35.37	19.10	32.95	0.78	0.41	3.18	0.62	1.36	0.63	3.22	1970	2280	2360	2440	
2724-65	Slack 1 1/4 sq	T	10.40	38.15	29.20	25.68	0.52	0.68	4.06	0.27	1.54	1.45	3.13	2000	2180	2200	2410	
3140-66	Slack 1 1/4 sq	T	6.90	30.55	18.26	41.18	0.47	0.20	1.76	1.23	2.33	1.02	2.06	1920	2040	2220	2440	
2987-67	Slack 2"	T	7.03	29.13	18.02	42.58	0.66	0.44	2.52	3.42	3.09	0.39	0.88	1910	1990	2020	2300	
2988-67	Slack 1/2 x 0	T	10.00	30.39	19.29	36.94	0.52	0.08	4.37	1.04	5.56	0.40	1.47	1920	2050	2100	2260	
2990-67	Slack 1 1/4 x 0	T	4.84	34.71	23.13	25.12	0.57	0.25	7.24	1.54	7.03	0.58	1.18	1960	2040	2080	2280	
2729-68	Slack 2 x 0	T	5.50	36.08	18.72	36.52	0.56	0.38	1.96	1.32	2.26	0.48	1.18	1800	2120	2210	2280	
2730-68	sp/Slack 2 x 0	T	5.37	33.74	18.68	33.47	0.66	0.45	2.59	1.30	4.21	0.40	1.03	1800	2040	2100	2300	
3178-68	sp/Slack 2 x 0	T	8.37	40.31	26.49	26.04	0.62	0.17	1.26	1.13	1.94	0.77	2.21	2100	2250	2270	2310	
2724-64	Fines	T	9.57	33.68	25.48	27.34	0.62	0.35	2.07	0.48	0.53	1.53	3.62	1920	2020	2220	2310	
2323-68	Fines 1/4 x 0	T	4.82	27.70	18.60	43.33	0.50	0.10	2.52	1.41	2.75	1.74	2.50	1910	2160	2180	2220	
3179-68	Fines 1/4 x 0	T	9.12	35.12	27.39	32.04	0.53	0.14	0.98	1.18	1.58	0.97	2.65	2000	2240	2250	2310	

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture - Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA SYDNEY COAL FIELD		CAPE BRETON COAL FIELDS										MINE OR TRADE NAME: <u>DOMINION NO. 18</u> OPERATOR: CAPE BRETON DEVELOPMENT CORP. (DEVCO)					
2726-65	Screen + 1 3/4 sq	T	6.56	28.41	19.99	37.47	0.63	0.40	2.94	0.12	4.16	1.45	0.59	1900	2000	2030	2200
2849-65	Screen + 1 3/4 sq	T	11.84	29.36	22.68	36.76	0.44	0.16	3.92	0.93	5.17	1.45	2.21	1800	2000	2030	2310
2244-66	Screen + 1 3/4 sq	T	3.58	23.45	16.68	49.14	0.47	0.11	1.68	1.11	1.95	0.97	1.18	2000	2050	2080	2420
2769-64	Screen	T	5.83	22.88	14.78	52.31	0.91	0.34	2.34	0.64	2.85	-	2.50	1970	2240	2320	2380
2049-65	Slack 1 3/4 x 0	T	7.32	32.43	21.35	36.44	0.60	0.29	3.92	0.96	5.18	2.18	1.10	1900	1960	2000	2200
2245-66	Slack 1 3/4 x 0	T	6.47	23.76	14.21	47.55	0.36	0.12	3.78	1.01	5.20	1.45	1.03	1980	2000	2010	2120
2727-65	Slack 1 3/4 sq	T	7.20	21.10	19.21	38.83	0.42	0.97	4.06	0.70	5.60	2.00	1.69	1900	2000	2170	2230
2770-64	Slack	T	7.10	28.43	19.38	43.66	0.89	0.26	1.44	0.24	1.53	-	3.58	1970	2230	2300	2370
														MINE OR TRADE NAME: <u>DOMINION NO. 20</u> OPERATOR: AS ABOVE			
2728-64	Screen	T	6.66	34.18	25.80	31.13	0.72	0.23	10.29	0.92	4.09	1.17	1.26	1900	2000	2080	2190
2733-64	Screen	T	5.02	28.41	15.25	46.10	0.70	0.40	3.11	1.11	0.16	0.46	1.79	1960	2180	2240	2370
2850-65	Slack 1 1/2 x 0 sq	T	9.00	39.44	24.21	30.52	0.57	0.61	4.62	1.56	5.84	0.48	1.80	1890	1950	2000	2200
2243-66	Slack 1 1/2 x 0 sq	T	9.72	27.31	16.34	35.69	0.39	0.12	5.39	1.76	7.07	0.97	1.77	1980	2010	2020	2160
3144-66	Slack 1 1/2 x 0 sq	T	9.44	36.96	18.26	30.46	0.50	0.08	4.07	1.19	4.18	0.97	2.13	1930	2030	2220	2330
3563-66	Slack 1 1/2 x 0 sq	T	10.80	39.73	25.18	26.30	0.59	0.15	2.28	1.38	2.88	0.48	2.36	1860	2020	2200	2420
3180-68	Slack 1 1/2 x 0 sq	T	6.82	27.86	21.87	33.99	0.43	0.86	5.82	0.96	5.90	0.77	1.18	2040	2080	2120	2250
2729-65	Slack 1 1/2	T	8.92	35.39	24.50	30.66	0.39	1.11	4.31	1.08	5.06	0.73	1.91	1980	2000	2030	2300
2729-64	Slack	T	8.53	26.39	12.69	39.67	0.74	0.35	10.29	0.92	4.09	1.17	1.26	1900	2000	2080	2190
2731-68	Slack	T	6.68	23.43	14.24	50.13	0.38	0.24	4.76	0.70	5.19	0.48	0.74	1900	2090	2150	2360
2730-64	Fines	T	6.42	31.02	19.18	40.29	0.61	0.43	3.38	0.49	0.51	0.44	1.14	1960	2200	2260	2370
														MINE OR TRADE NAME: <u>DOMINION NO. 26</u> OPERATOR: SAME AS ABOVE			
2731-65	Screen + 1 1/4 slot	T	4.08	15.91	18.23	55.96	0.54	0.20	1.58	0.17	2.20	1.45	1.03	1980	2010	2040	2200
2851-65	Screen + 1 1/4 slot	T	4.49	30.39	19.92	46.37	0.43	0.28	3.15	0.70	3.77	1.45	1.10	1870	2080	2120	2200
2240-66	Screen + 1 1/4 slot	T	6.53	32.71	16.80	43.18	0.99	0.03	2.83	0.68	3.28	0.34	0.19	1840	1910	1940	2420
3142-66	Screen + 1 1/4 slot	T	4.70	25.98	20.12	51.34	0.65	0.14	1.82	1.06	2.00	0.87	1.18	1920	2020	2070	2200
3564-67	Screen + 1 1/4 slot	T	4.51	17.24	14.45	63.11	0.38	0.20	1.22	0.74	1.20	0.19	0.59	1960	2090	2150	2210

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA <u>SYDNEY COAL FIELD</u>			CAPE BRETON COAL FIELDS										MINE OR TRADE NAME: <u>DOMINION NO. 26 CONT'D</u> OPERATOR: CAPE BRETON DEVELOPMENT CORP. (DEVCO)				
2732-68	Screen + 1 1/4	T	3.46	26.55	18.72	41.80	0.53	0.25	2.87	2.06	3.55	0.48	1.03	186D	2100	2160	2300
2853-65	Pea 1 sq x 3/8 slot	T	6.86	49.08	22.97	29.02	0.50	0.21	1.33	0.65	0.67	1.45	2.10	1990	2120	2190	2210
2242-66	Pea 1 sq x 3/8 slot	T	5.26	42.50	21.64	27.90	0.58	0.12	3.92	1.46	4.66	0.73	1.91	1920	2000	2060	2380
3561-66	Pea 1 sq x 3/8 slot	T	5.04	33.39	22.46	38.17	0.71	0.20	1.54	0.88	1.73	0.58	1.62	1920	2150	2260	2440
3566-67	Pea 3/4 x 5/16	T	5.56	32.08	21.99	38.92	0.56	0.24	1.40	1.29	1.78	0.58	1.77	1910	2010	2090	2280
2734-68	Pea 3/4 x 1/4	T	3.06	30.62	20.12	37.85	0.79	0.22	2.38	1.27	2.59	1.06	1.91	1840	2020	2140	2340
2732-65	Slack 1 1/4 slot x 0	T	5.70	39.28	35.28	25.82	0.50	0.33	2.05	0.98	3.43	1.33	2.50	2010	2040	2060	2250
3143-66	Slack 1 1/4 slot x 0	T	8.47	41.26	25.82	21.65	0.62	0.15	4.34	1.66	4.27	1.06	2.72	1990	2160	2240	2400
3565-67	Slack 1 1/4 slot x 0	T	8.94	44.22	26.95	19.46	0.70	0.15	1.58	1.50	1.93	0.58	2.65	1930	2110	2200	2420
2733-68	Slack 1 1/4 x 0	T	3.71	39.83	20.12	26.06	0.85	0.18	3.36	1.46	3.50	0.87	1.77	1850	2100	2200	2340
2852-65	Slack 1 1/4 x 0	T	6.16	41.05	27.92	22.23	0.70	0.15	2.91	0.28	2.61	2.42	2.65	1990	2120	2210	2380
2241-66	Slack 1 1/4 x 0	T	5.33	40.87	21.43	31.68	0.58	0.19	2.45	1.46	3.03	0.48	2.06	1920	2000	2060	2380
2734-64	Slack	T	6.70	43.25	23.00	22.97	1.21	0.35	3.26	0.29	1.36	0.35	2.62	2000	2220	2280	2390
													MINE OR TRADE NAME: <u>FOUR STAR MINE</u> OPERATOR: BRAS D'OR COAL CO. LTD.				
3552-66	Lump + 2	T	7.95	19.61	17.02	50.10	0.48	1.03	2.94	1.16	4.65	3.10	1.03	1940	2070	2110	2210
2973-67	Lump + 2	T	12.98	16.93	12.88	57.15	0.47	0.82	3.92	0.86	4.58	0.19	1.32	1960	2280	2310	2430
3553-67	Lump + 2	T	12.79	23.09	17.26	40.19	0.49	0.61	7.70	0.79	9.94	0.19	1.32	1830	2000	2050	2150
2562-68	Lump + 2	T	14.48	24.47	16.37	37.50	0.52	0.84	7.70	0.97	9.83	0.15	1.40	1980	2130	2200	2310
2713-64	Nut 2 x 3/4 rd	T	11.55	23.22	20.92	42.26	0.73	0.99	6.95	0.49	2.52	1.01	2.08	1940	2080	2260	2330
2847-65	Nut 2 x 3/4 rd	T	14.93	24.83	19.35	39.68	0.28	0.82	6.16	0.38	7.50	0.97	2.10	1940	2080	2100	2200
3553-66	Nut 2 x 3/4 rd	T	18.77	24.01	16.48	48.63	0.40	0.95	3.78	0.70	4.24	0.58	1.47	1930	2060	2160	2180
2974-67	Nut 2 x 3/4 rd	T	12.78	27.05	19.82	41.46	0.82	0.65	4.03	0.89	4.28	0.19	1.91	1880	1950	2010	2310
3554-67	Nut 2 x 3/4 rd	T	15.65	33.10	21.62	33.22	0.59	0.76	3.89	1.11	5.08	0.10	2.06	1750	1940	2110	2220
3554-66	Pea 3/4 x 5/16	T	9.89	23.85	16.69	45.29	0.44	1.33	3.64	0.91	5.42	2.61	1.18	1860	2070	2160	2220
2975-67	Pea 3/4 x 5/16	T	11.85	21.52	15.76	45.32	0.49	0.87	5.61	0.94	6.87	0.19	1.32	1950	2000	2060	2250
3555-67	Pea 3/4 x 5/16	T	10.46	23.71	17.34	43.78	0.46	1.00	5.53	0.81	6.86	1.10	1.18	1780	1990	2120	2280

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample		Kind of Sample	Ash % of Moisture free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
	Size: Mine Designation	Screen Opening, Inches			Shape of Screen Opening	sq. rd, slot.	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F
AREA <u>SYDNEY COAL FIELD</u>				CAPE BRETON COAL FIELDS										MINE OR TRADE NAME: <u>FOUR STAR MINE CONT'D</u> OPERATOR: <u>BRAS D'OR COAL CO. LTD.</u>				
2803-65	Pea	3/4 x 5/16 rd	T	11.47	28.15	19.92	39.61	0.47	0.86	6.52	0.35	7.59	0.85	1.66	1930	2020	2060	2120
2804-65	Fines	5/16 rd x 0	T	12.26	26.40	19.25	35.93	0.32	0.70	7.91	0.60	8.66	0.97	2.21	1930	2020	2060	2100
2714-64	Stoker	3/4 x 5/16	T	10.46	20.11	18.81	50.52	0.74	0.94	4.77	0.62	1.10	0.28	1.43	1890	2180	2370	2570
2715-64	Slack	3/4 x 0	T	10.18	28.51	16.62	38.53	0.81	1.17	7.53	0.44	2.57	1.50	1.18	1920	2030	2200	2300
3707-67	Fines	3/4 x 0	T	14.37	30.17	19.25	35.02	0.57	0.87	5.04	0.91	6.07	0.19	1.18	1830	1940	2050	2160
2716-64	Fines	5/16 x 0	T	9.92	22.71	13.05	46.33	0.96	1.27	8.86	0.20	3.50	1.46	1.43	1880	1940	2190	2260
3555-66	Fines	5/16 x 0	T	10.51	18.99	15.42	43.71	0.37	1.14	8.40	0.96	10.53	0.77	1.18	1860	2000	2100	2140
2976-67	Fines	5/16 x 0	T	12.08	24.05	19.23	36.47	0.38	0.66	6.79	1.07	8.69	0.10	1.62	1900	1980	2100	2250
3556-67	Fines	5/16 x 0	T	12.49	23.09	16.59	41.01	0.45	0.90	6.93	0.93	9.23	0.10	1.18	1770	1950	2010	2100
3093-66	N/D		T	13.75	29.97	18.42	35.49	0.50	0.54	2.94	1.11	3.21	0.39	2.06	1920	1990	2080	2200
2993-66	N/D		T	13.91	30.72	17.73	39.81	0.35	0.60	2.94	1.12	3.68	0.48	2.13				
3112-68	N/D		M	13.84	18.70	13.12	51.73	0.38	0.78	5.67	0.45	7.45	0.24	1.10				
2727-68	Mine Run		T	10.28	23.29	17.45	44.23	0.59	1.30	5.32	0.91	5.11	0.29	1.18	1800	2120	2150	2270
AREA <u>INVERNESS COAL FIELD</u>														MINE OR TRADE NAME: <u>ST. ROSE, EVANS</u> OPERATOR: <u>EVANS COAL MINES, LTD.</u>				
2806-64	Med Lump		T	11.71	29.83	13.52	38.39	0.54	0.40	8.53	0.29	6.55	-	1.33	1940	2120	2180	2250
2956-65	Med Lump	4 x 2	T	8.77	23.60	11.69	45.56	0.31	0.56	7.77	0.35	10.02	1.21	1.03	1810	1850	1870	1910
3204-66	Med Lump		T	8.75	26.89	11.21	45.99	0.48	0.67	5.36	1.19	6.38	0.97	0.81	1860	1900	1950	2000
3383-66	Med Lump	4 x 2	T	9.88	25.12	11.78	44.59	0.44	0.42	7.03	1.19	9.10	0.87	0.88	1890	1950	1980	2000
2968-67	Med Lump	4 x 2	T	8.52	27.12	13.71	47.61	0.44	0.53	3.71	1.31	4.70	0.58	0.00	1840	1930	1980	2180
2316-68	Med Lump	4 x 2	T	9.83	27.46	14.65	47.54	0.49	0.48	1.86	2.13	2.45	0.78	0.88	1820	1870	1900	2170
2717-68	Med Lump	4 x 2	T	9.27	26.29	12.40	47.07	0.33	1.02	3.22	0.96	5.12	0.53	0.22	1890	2050	2080	2310
2807-64	Egg		T	9.19	22.52	13.68	41.70	0.53	0.51	10.13	0.14	11.36	-	0.00	1950	2100	2150	2220
2957-65	Egg	2 x 1	T	9.11	24.05	12.19	47.74	0.31	0.48	6.58	0.45	8.33	1.07	1.18	1810	1850	1900	2000
3384-66	Egg	2 x 1	T	10.17	22.16	10.15	43.71	0.31	0.41	9.07	1.03	11.72	0.58	0.44	1880	1950	1980	2010
2969-67	Egg	2 x 1	T	10.38	29.29	15.52	40.91	0.43	0.51	4.69	1.45	5.92	0.48	0.29	1820	1950	2020	2180

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample	Kind of Sample	Ash % of Moisture Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere:			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Temperature, °F.	Final Temperature, °F.	Sintering Temperature, °F.	Hemispherical Temperature, °F.
AREA <u>INVERNESS COAL FIELD</u>				CAPE BRETON COAL FIELDS										MINE OR TRADE NAME: <u>ST. ROSE, EVANS CONFD.</u> OPERATOR: <u>EVANS COAL MINES, LTD.</u>			
2317-68	Egg 2 x 1	T	9.30	27.63	14.56	46.92	0.50	0.49	2.08	0.98	3.59	0.70	0.29	1790	1850	1890	2100
2718-68	Egg 2 x 1	T	9.02	23.49	12.68	52.53	0.76	0.73	2.83	0.95	4.68	0.63	0.59	1900	2160	2190	2270
2808-64	Nut	T	10.12	21.02	11.13	42.30	0.49	0.47	10.35	0.32	10.43	-	1.11	1900	2140	2190	2270
2958-65	Nut 1 x 3/4	T	9.20	23.90	11.87	46.85	0.26	0.55	7.00	0.45	8.74	1.36	1.32	1850	1890	1900	1960
3385-66	Nut 1 x 3/4	T	9.50	26.52	12.45	43.89	0.33	0.50	5.60	0.50	7.24	0.97	0.74	1820	1980	2000	2060
2970-67	Nut 1 x 3/4	T	8.04	27.98	18.11	45.92	0.42	0.61	2.94	1.18	3.29	0.58	0.59	1950	1990	2010	2280
2318-68	Nut 1 x 3/4	T	10.40	26.49	13.71	47.90	0.48	0.56	2.52	0.97	3.57	0.97	0.59	1790	1850	1890	2040
2719-68	Nut 1 x 3/4	T	8.85	24.82	12.59	49.68	0.47	0.65	2.62	0.88	4.24	0.68	0.66	1830	2080	2140	2240
2809-64	Stoker	T	10.48	21.46	11.09	40.01	0.26	0.49	10.96	0.28	11.56	-	3.15	1910	2120	2190	2260
2959-65	Stoker 3/4 x 1/2	T	9.00	23.14	11.69	48.68	0.30	0.42	7.21	0.45	8.58	1.02	1.03	1850	1890	1910	2030
3386-66	Stoker 3/4 x 1/2	T	8.22	25.28	12.83	43.01	0.42	0.41	7.07	0.76	8.65	0.97	1.03	1840	1920	1950	2040
2971-67	Stoker 3/4 x 1/2	T	8.83	23.10	12.79	47.34	0.41	0.66	5.46	1.41	6.94	0.60	1.03	1880	1900	1940	2060
2319-68	Stoker 3/4 x 1/2	T	8.87	23.75	14.39	49.15	0.44	0.47	1.68	1.26	3.94	0.78	0.74	1900	2170	2240	2290
2720-68	Stoker 3/4 x 1/2	T	8.48	25.03	15.76	50.76	0.48	0.60	3.76	1.16	2.86	0.70	0.59	1950	2190	2230	2290
2960-65	Fines 1/2 x 0	T	12.04	12.03	6.74	29.33	0.19	0.20	23.45	0.15	25.90	0.77	0.88	2060	2100	2140	2150
3387-66	Fines 1/2 x 0	T	10.71	14.51	6.70	30.28	0.21	0.24	18.62	2.11	22.42	0.77	0.74	1980	2000	2050	2070
2972-67	Fines	T	14.75	18.83	13.22	26.74	0.54	0.15	14.70	1.83	19.38	0.39	1.18	1950	1990	2010	2280
2320-68	Fines 1/2 x 0	T	10.91	20.66	12.62	38.01	0.36	0.39	10.22	2.82	14.58	0.68	0.81	1780	2150	2200	2300
2721-68	Fines 1/2 x 0	T	11.77	25.88	15.50	39.81	0.41	0.45	7.56	2.06	7.49	0.68	0.81	1950	2150	2200	2280
														MINE OR TRADE NAME: <u>DELANEY'S MINE</u>			
2951-65	Blue Run	T	17.38	35.80	13.79	40.73	0.27	0.20	3.01	0.96	3.77	0.39	1.40	1950	2240	2270	2380
														MINE OR TRADE NAME: <u>MAC INNIS</u>			
2952-65	Blue Run	T	9.87	22.22	15.27	54.34	0.34	0.17	2.66	0.50	2.72	0.34	0.59	1910	1980	2000	2060
2611-64	Pea	T	13.80	29.40	18.10	49.28	0.64	0.02	2.24	0.46	0.11	2.16	1.01				

ANALYSIS OF GOAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample			Kind of Sample	Ash % of Moisture - Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
						SIO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
	Size: Mine Designation	Screen Opening, Inches	Shape of Screen Opening			sq, rd, slot.													
AREA <u>INVERNESS COAL FIELD</u>				CAPE BRETON COAL FIELDS										MINE OR TRADE NAME: <u>CHESTIGO</u> OPERATOR: CHESTIGO MINING CORP. LTD.					
2954-65	Nut 2 x 1	T	19.29	29.84	13.57	47.52	0.30	1.32	3.22	0.15	2.95	1.50	0.88	1950	2240	2260	2320		
2953-65	Crushed Screen + 2	T	24.23	30.45	13.70	45.38	0.30	1.45	4.06	0.15	3.02	1.36	0.88	1960	2240	2260	2320		
AREA <u>CUMBERLAND COAL FIELD</u>				MAINLAND COAL FIELDS										MINE OR TRADE NAME: <u>KIMBERLEY</u> OPERATOR: RIVER HEBERT COAL CO. LTD.					
3003-65	Lump + 1 1/8 sq	T	21.96	39.19	21.61	22.32	0.49	0.70	4.69	2.01	6.70	0.48	2.65	1840	2060	2170	2320		
3407-66	Lump + 1 1/8 sq	T	25.58	40.44	24.36	20.92	0.64	0.50	4.13	2.01	5.35	0.58	2.94	1860	2040	2170	2260		
2312-68	Lump + 1 1/8	T	15.38	34.73	20.56	23.50	0.42	0.98	5.46	2.24	7.80	0.48	1.32	1820	1980	2110	2290		
2314-68	Lump + 1 1/8	T	17.40	32.63	22.19	23.42	0.46	0.94	7.57	2.13	9.46	0.63	1.18	1980	2030	2100	2210		
2960-68	Lump + 1 1/8	T	19.30	37.37	22.34	22.40	0.54	0.83	6.13	1.63	7.28	0.58	2.21	1850	2100	2250	2350		
3005-65	Mine Run	T	24.61	40.73	22.28	25.71	0.55	0.85	2.66	1.91	2.81	0.58	3.39	1860	1940	2060	2380		
3405-66	*Channel	M	28.06	39.17	23.33	22.86	0.56	0.52	3.85	2.35	5.18	0.53	3.02	1970	2100	2220	2350		
3406-66	*Channel	M	35.37	43.35	26.33	19.18	0.43	0.38	3.08	1.91	4.41	0.48	3.09	1940	2180	2360	2450		
3004-65	Slack 1 1/8 x 0	T	23.65	37.03	22.76	18.59	0.51	0.73	6.23	2.37	9.06	0.68	2.80	1900	1960	2110	2150		
3408-66	Slack 1 1/8 sq	T	18.78	35.88	21.16	19.27	0.55	0.75	8.08	1.96	10.41	0.48	2.21	1930	2050	2110	2170		
2313-68	Slack 1 1/8 x 0	T	20.38	40.65	20.21	20.53	0.58	0.82	5.39	1.91	6.01	0.97	3.52	1810	1980	2120	2370		
2315-68	Slack 1 1/8 x 0	T	16.32	32.15	19.96	25.02	0.44	0.95	7.08	1.95	8.94	0.58	0.88	1880	2060	2160	2210		
2961-68	Slack 1 1/2 x 0	T	24.39	38.04	22.60	19.41	0.58	0.65	7.84	0.70	8.01	0.48	2.36	1940	2020	2150	2220		
AREA <u>SPRINGHILL COAL FIELD</u>				MINE OR TRADE NAME: <u>SYNDICATE MINE</u> OPERATOR: SPRINGHILL COAL MINES LTD.															
2998-65	Lump 6 x 1 1/2	T	21.94	46.12	22.47	13.78	0.80	0.21	7.38	1.64	8.38	0.53	1.69	1970	2090	2170	2200		
3398-66	Lump 6 x 1 1/2	T	22.38	50.92	24.41	14.36	0.84	0.23	4.20	1.76	3.48	0.48	1.77	2020	2180	2280	2370		
2308-68	Lump 6 x 1 1/2	T	22.73	50.05	25.70	13.35	1.05	0.22	3.36	2.22	3.90	0.44	1.18	1850	2080	2250	2340		
2957-68	Lump 6 x 1 1/2	T	23.37	48.82	26.05	13.43	1.04	0.24	3.53	2.68	3.68	0.58	1.62	1860	2010	2110	2420		
3001-65	*Channel	M	13.68											1920	2010	2200	2320		
2311-68	Mine Run	T	24.56	48.18	21.18	14.00	0.88	0.20	3.85	3.02	4.83	0.29	1.03	1900	2080	2180	2290		
2999-65	Stoker 1 1/2 x 3/8 slot	T	27.42	48.21	23.88	14.78	0.86	0.17	4.48	2.49	5.30	0.39	1.55	1940	2060	2150	2370		
3399-66	Stoker 1 1/2 x 3/8 slot	T	22.46	47.37	23.23	15.80	0.84	0.18	5.46	2.10	5.58	0.39	1.47	1990	2150	2200	2280		

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample: Size, Mine Designation, Screen Opening, Inches, Wash or Screen, Particle Size, etc.	Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Reforming Temperature, F.	Softening Temperature, F.	Hemispherical Temperature, F.	Fluid Temperature, F.
AREA <u>SPRINGHILL COAL FIELD</u>				MIDLAND COAL FIELDS										MINE OR TRADE NAME: <u>SYNCRATE MINE CONT'D</u> OPERATOR: <u>SPRINGHILL COAL MINES LTD.</u>			
2309-68	Stoker 1 1/2 x 3/8 slot	T	19.20	49.99	20.31	16.53	0.95	0.14	3.71	0.76	4.12	0.19	1.03	1850	2000	2210	2350
2958-68	Stoker 1 1/2 x 3/8 slot	T	24.50	47.31	23.94	14.67	0.94	0.20	5.29	1.85	5.25	0.39	1.48	1810	2000	2160	2420
3000-65	Slack 3/8 x 0	T	21.36	40.60	21.40	15.47	0.82	0.18	9.31	0.00	11.02	0.48	1.40	1940	2030	2140	2330
3400-66	Fines 3/8 x 0	T	20.84	40.58	20.06	14.58	0.77	0.13	9.77	2.64	0.29	1.40	11.22	1990	2100	2150	2220
2310-68	Fines 3/8 x 0	T	22.48	40.65	19.01	15.91	0.74	0.08	0.96	2.47	11.19	0.19	1.47	1900	2020	2110	2300
3002-65	Blue Run	T	8.81	49.45	22.65	19.41	0.95	0.30	2.66	0.76	2.68	0.39	1.40	1840	2120	2240	2360
1401-66	Blue Run	T	23.93	52.71	26.93	11.65	1.06	0.29	1.89	3.59	2.45	0.53	1.84	2110	2240	2410	2450
AREA <u>SPRINGHILL COAL FIELD</u>				MINE OR TRADE NAME: <u>ROGERS FIELD</u> OPERATOR: <u>SPRINGHILL COAL MINES LTD.</u>													
3404-66	Lump 1 Fine	T	28.33	47.02	21.87	10.37	0.72	0.16	8.73	2.17	9.05	0.24	1.55	2010	2180	2200	2360
3402-66	Lump 6 x 1 1/2	T	22.00	42.50	20.47	13.77	0.80	0.20	9.59	2.17	8.84	0.34	1.25	2050	2110	2200	2260
3403-66	Fines 3/8 x 0	T	15.63	53.09	25.56	11.74	0.86	0.22	2.80	1.76	2.02	0.44	2.43	2040	2260	2370	2440
AREA <u>PICTOU COAL FIELD</u>				MINE OR TRADE NAME: <u>GREENWOOD NO. 2</u> OPERATOR: <u>GREENWOOD COAL CO., LTD.</u>													
2767-64	Blue Run	T	28.48	50.90	27.58	10.54	0.62	0.28	2.26	0.25	0.19		6.77	2050	2280	2340	2480
3020-65	Blue Run	T	29.17	51.38	30.70	9.52	0.73	0.09	1.68	1.31	2.12	0.51	3.31	2240	2410	2600+	Fluo
AREA <u>PICTOU COAL FIELD</u>				MINE OR TRADE NAME: <u>ACADIA</u> OPERATOR: <u>CAPE BRETON DEVELOPMENT CORP. (DEVCO)</u>													
2756-64	Egg	T	10.31	53.46	20.39	4.82	0.90	0.19	24.06	0.52	3.78	0.38	1.61	2290	2340	2420	2510
3010-65	Egg 1 1/4 sq	T	11.27	53.62	21.52	3.78	0.73	0.14	11.20	0.78	6.39	1.45	1.91	2110	2160	2200	2350
3388-66	Egg 1 1/4 sq	T	11.65	56.64	22.12	3.64	0.72	0.06	9.38	0.93	5.05	1.16	1.62	2200	2360	2450	2650
3547-67	Egg 1 1/4 sq	T	12.15	48.45	19.21	5.18	0.53	1.24	15.26	1.16	6.72	0.97	1.77	2040	2120	2200	2450
2968-68	Egg 1 1/4 sq	T	11.96	44.95	20.93	6.54	0.65	0.14	18.74	1.64	5.05	0.52	0.96	2000	2110	2170	2180
2755-64	Hot	T	10.95	53.40	19.37	5.00	0.84	0.16	6.51	0.08	2.37	0.91	1.40	1970	2390	2450	2540
3011-65	Hot 1 1/4 x 3/4 sq	T	10.43	58.40	21.89	2.94	0.76	0.14	7.56	0.30	4.62	1.06	1.47	2200	2420	2400	2600
3389-66	Hot 1 1/4 x 3/4 sq	T	10.53	66.50	21.23	2.34	0.82	0.08	4.76	1.01	2.80	0.73	1.10	2240	2450	2560	2670
3540-67	Hot 1 3/4 x 3/4 sq	T	12.23	52.87	20.02	4.41	0.60	0.82	10.64	0.81	6.30	0.87	1.32	2140	2200	2380	2450

ANALYSIS OF COAL ASH
PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample				Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
	Size: Mine Designation	Screen Opening, inches	Shape of Screen Opening	sq, rd, slot.			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
MAINLAND COAL FIELDS																				
AREA <u>PICTOU GOAL FIELD</u>																				
MINE OR TRADE NAME: <u>ACADIA CONT'D.</u>																				
OPERATOR: <u>CAPE BRETON DEVELOPMENT CORP. (DEVCO)</u>																				
2969-68	Nut 1 3/4 x 3/4 sq	T	11.62	56.73	27.65	3.12	0.73	0.15	5.88	1.24	3.55	0.68	1.47	2230	2340	2370	255D			
2756-64	Stoker	T	11.36	58.81	21.50	5.58	0.81	0.22	8.18	0.83	0.75	0.63	1.49	2000	2400	2460	2570			
3012-65	Stoker 3/4 x 3/16 sq	T	11.96	57.40	22.65	3.43	0.78	0.10	7.70	0.81	4.68	1.06	1.77	2260	2370	2450	2550+			
3390-66	Stoker 3/4 x 3/16 sq	T	11.59	58.61	19.19	3.31	0.78	0.08	8.05	1.06	4.04	0.63	1.40	2060	2400	2430	2550			
3549-67	Stoker 3/4 x 3/16 sq	T	20.90	52.11	20.97	7.00	0.57	0.56	7.07	1.11	5.80	0.87	2.36	2140	2200	2400	2460			
2970-68	Stoker 3/4 x 3/16 sq	T	12.22	52.47	24.53	5.79	0.70	0.16	7.56	1.48	5.86	0.82	1.69	2150	2250	2280	2480			
2758-64	Splint	T	15.37	52.66	15.14	7.35	0.96	0.21	12.58	0.94	0.95	0.23	1.81	1880	2300	2370	2470			
3013-68	Splint 1 1/2 x 0	T	25.53	38.99	16.71	4.61	0.51	0.13	21.84	0.90	6.19	0.77	1.84	2030	2100	2150	2190			
3391-66	Splint 1 1/2 x 0	T	22.90	55.81	19.70	5.08	0.78	0.23	8.47	1.50	4.27	0.73	1.99	2070	2360	2430	2550			
3550-67	Splint 1 1/2 x 0	T	30.27	52.26	20.34	8.47	0.61	0.47	7.63	1.31	4.98	0.97	2.50	2050	2180	2300	2500			
2971-68	Splint 1 1/2 x 0	T	25.68	35.18	18.80	11.89	0.43	0.12	21.70	2.28	9.07	0.73	1.55	1870	1930	1950	2070			
3552-67	Slack 1 1/2 x 0	T	16.21	50.28	20.07	5.85	0.55	0.41	8.68	1.21	9.19	1.02	1.84	2130	2200	2300	2520			
2757-64	Fines	T	13.11	53.52	20.00	7.57	0.96	0.23	11.44	0.91	1.29	0.92	1.21	1890	2280	2340	2440			
3014-65	Fines 3/16 x 0	T	13.46	51.23	20.68	4.41	0.70	0.11	12.39	0.96	7.16	1.11	1.84							
3392-66	Fines 3/16 x 0	T	16.08	52.58	18.68	4.86	0.63	0.15	8.33	1.37	6.04	1.40	2.13	2200	2360	2440	2620			
3551-67	Fines 3/16 x 0	T	22.81	52.26	20.65	7.41	0.57	0.36	6.30	1.21	5.79	1.16	2.65	2100	2190	2330	2560			
2972-68	Fines 3/16 x 0	T	18.14	49.13	25.96	6.59	0.65	0.13	7.70	1.81	6.47	1.02	2.06	2060	2210	2250	2300			
2668-65	N/D	T	18.78	47.90	21.15	7.70	0.48	0.14	12.67	0.50	7.88	2.18	2.36							
MINE OR TRADE NAME: <u>DRUMMOND NO. 1</u>																				
OPERATOR: <u>DRUMMOND COAL CO., LTD.</u>																				
3015-65	Lump + 1 1/2 sq	T	13.45	68.35	21.72	3.90	0.88	0.19	1.40	1.01	0.94	0.34	1.32	2280	2550+	Plus	Plus			
3542-67	Lump + 1 1/2 sq	T	13.15	53.30	24.70	13.09	0.59	0.72	3.85	0.96	2.25	0.48	1.25	1960	2200	2380	2560			
2964-68	Lump + 1 1/2 sq	T	11.03	61.82	22.42	9.40	0.83	0.58	1.12	1.91	0.72	0.39	1.03	2150	2360	2530	2550+			
3016-65	Nut 1 1/2 x 3/4 sq	T	15.97	61.63	20.37	5.80	0.69	0.21	5.18	0.91	4.80	0.24	1.25	2200	2380	2410	2600			
3543-67	Nut 1 1/2 x 3/4 sq	T	14.10	57.06	23.89	12.87	0.68	0.49	2.10	0.98	1.55	0.39	1.10	2050	2250	2450	2610			
2965-68	Nut 1 1/2 x 3/4 sq	T	14.77	28.90	23.86	9.88	0.66	0.43	2.03	1.56	2.23	0.29	1.32	1960	2380	2440	2600			
3017-65	Slack 3/4 x 0	T	22.51	56.58	30.29	6.29	0.59	0.24	1.19	1.46	0.63	0.73	2.43	2030	2210	2330	2500			

ANALYSIS OF COAL ASH
 PROVINCE OF NOVA SCOTIA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq. rd. slot.	Kind of Sample	Ash % of Moisture - Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F

AREA PICTOU COAL FIELD

MAINLAND COAL FIELDS

MINE OR TRADE NAME: DRUMMOND NO. 1 CONT'D.
 OPERATOR: DRUMMOND COAL CO., LTD.

3397-66	Slack 3/4 x 0	T	16.96	49.68	19.78	9.08	0.63	0.23	9.35	1.38	9.66	0.39	1.62	2090	2210	2240	2340
3544-67	Slack 3/4 x 0	T	19.91	52.69	27.80	10.96	0.55	0.64	2.52	1.41	2.02	0.39	1.55	2210	2410	2560	2620
2966-68	Slack 3/4 x 0	T	17.06	27.35	27.65	9.79	0.62	0.41	0.87	1.79	0.77	0.34	1.47	2370	2520	2590	2610+

MINE OR TRADE NAME: DRUMMOND NO. 2
 OPERATOR: DRUMMOND COAL CO., LTD.

3395-66	Lump + 1 1/2 sq	T	17.81	53.51	10.75	12.00	0.61	0.15	7.11	1.79	6.18	0.24	0.81	2000	2160	2220	2510
2763-64	Mine Run	T	21.20	52.51	27.34	7.41	0.62	0.53	4.18	0.25	1.48	-	5.14	2440	2500	2570	2650
3018-65	Mine Run	T	21.75	55.51	28.93	8.54	0.56	0.44	1.96	1.61	1.25	0.48	1.47	2460	2520	2560	2600+
3393-66	Mine Run + 3/4 sq	T	23.12	53.71	28.22	9.96	0.58	0.32	2.14	1.93	2.02	0.58	1.84	2390	2550	2580	2640
2134-66	Mine Run	T	21.53	57.22	26.99	8.23	0.55	0.36	2.27	1.46	2.03	0.00	1.77	2320	2510	2570	2610
3396-66	Nut 1 1/2 x 3/4 sq	T	15.58	58.48	24.32	7.07	0.65	0.26	4.45	1.29	4.17	0.39	1.62	2200	2400	2460	2600
3545-67	Screen + 3/4	T	19.63	50.43	21.28	16.56	0.47	0.78	2.73	1.36	1.69	0.58	1.77	2000	2320	2440	2550
2967-68	Screen + 3/4	T	22.22	50.68	28.66	13.80	0.48	0.5c	1.85	1.46	1.27	0.29	1.55	1970	2400	2450	2530
2764-64	Slack	T	22.74	52.54	26.04	9.50	0.61	0.36	5.07	0.54	2.13	-	2.67	2030	2260	2310	2460
3019-65	Slack 3/4 x 0	T	21.03	52.60	28.09	9.32	0.55	0.41	2.80	1.61	3.53	0.53	1.84	2220	2380	2400	2520
3394-66	Slack 3/4 x 0	T	21.94	53.97	24.30	10.59	0.53	0.38	1.75	2.00	2.01	0.24	1.40	2340	2540	2550	2560
3546-67	Slack 3/4 x 0	T	20.52	53.32	21.37	12.92	0.49	0.71	2.73	1.46	1.92	0.58	2.06	2170	2400	2520	2620

ANALYSIS OF COAL ASH
PROVINCE OF NEW BRUNSWICK

Sample Number	Description of Sample		Kind of Sample	Ash % of Moisture - free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
					SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
	Size: Mine Designation	Screen Opening, Inches																
MINTO COAL FIELDS																		
AREA		MINTO																
MINE OR TRADE NAME: AVON OPERATOR: AVON COAL CO., LTD.																		
2081-66	Lump + 3"	sq	T	17.73	28.53	12.23	50.42	0.60	1.24	2.80	0.00	2.33	0.48	0.66	1830	1840	1890	2090
3439-66	Lump + 3"	sq	T	21.59	21.83	11.12	60.46	0.22	1.87	2.31	0.30	1.93	0.39	0.47	1940	1980	2040	2060
2015-68	Lump + 3"	sq	T	17.51	26.57	12.90	54.83	0.34	1.35	3.15	0.00	1.91	0.10	0.74	1940	2010	2020	2080
2937-68	Lump + 3"		T	13.46	20.13	11.38	56.90	0.28	1.49	3.99	0.12	3.53	0.19	0.59	1750	2240	2300	2410
2087-66	Mine Run		T	19.04	24.14	10.19	55.72	0.55	1.59	3.39	0.10	2.95	0.58	0.77	1880	1920	1930	1950
3445-66	Mine Run Mix		T	29.84	38.05	15.07	38.57	0.52	0.85	2.59	0.31	2.58	0.29	1.21	1800	1930	1950	2040
2021-68	Mine Run		T	23.28	32.14	16.98	40.43	0.47	0.80	2.66	0.91	3.57	0.19	1.18	1900	2000	2100	2280
2943-68	Mine Run		T	18.95	28.71	13.83	48.67	0.50	1.12	3.15	0.55	3.54	0.24	1.03	1820	2060	2210	2280
2083-66	Stoker 1 1/4 x 1/4		T	17.40	31.06	13.32	50.33	0.62	1.28	2.55	0.36	2.13	0.36	0.93	1820	2060	2080	2100
3441-66	Stoker 1 1/4 x 1/4		T	16.37	25.94	11.63	54.47	0.32	1.24	2.80	0.00	2.54	0.58	1.18	1880	1970	2000	2020
2950-67	Stoker 1 1/4 x 1/4		T	14.33	34.10	15.15	14.07	0.50	1.70	2.80	0.76	1.28	0.19	0.74	1830	1840	1880	2080
2017-68	Stoker 1 1/4 x 1/4		T	14.89	25.98	12.33	49.38	0.36	1.35	5.74	0.00	2.50	0.19	0.81	1800	1940	1960	2070
2939-68	Stoker 1 1/4 x 1/4		T	15.55	26.48	14.19	48.90	0.43	1.51	3.08	0.25	2.48	0.19	1.18	1820	1920	2020	2300
2082-66	Nut 3 x 1 1/4		T	15.63	28.52	11.81	54.34	0.49	1.36	3.00	0.16	2.10	0.44	0.59	1820	1850	1880	1900
3440-66	Nut 3 x 1 1/4		T	14.83	23.65	11.12	55.37	0.28	2.19	3.74	0.23	3.39	0.87	0.47	1910	2000	2010	2050
2954-67	Nut 2 x 1		T	15.91	32.86	14.81	42.60	0.42	1.51	3.26	0.67	3.18	0.19	0.89	1810	1880	1910	2030
2016-68	Nut 3 x 1 1/4		T	16.82	27.02	12.50	50.66	0.38	1.41	4.62	0.00	3.78	0.10	0.74	1930	1970	2050	2100
2938-68	Nut 3 x 1 1/4		T	12.37	22.85	12.83	53.34	0.40	1.60	3.50	0.30	3.14	0.29	1.18	1740	2220	2260	2350
2084-66	N/Slack 1 1/4 x 0		T	14.70	28.84	12.61	51.85	0.51	1.26	2.69	0.05	2.39	0.46	0.47	1830	1840	1890	2040
3442-66	N/Slack 1 1/4 x 0		T	14.87	25.33	10.93	54.03	0.33	1.47	3.15	0.05	2.80	0.48	1.03	1900	1980	2000	2100
2951-67	N/Slack 1 1/4 x 0		T	16.30	31.78	16.33	46.25	0.62	1.32	2.52	0.65	1.83	0.19	0.89	1800	1840	1900	2080
2018-68	N/Slack 1 1/4 x 0		T	15.06	26.57	12.94	52.04	0.35	1.44	3.50	0.00	0.21	0.74	3.49	1850	1870	1920	2060
2940-68	N/Slack 1 1/4 x 0		T	14.40	26.94	14.15	48.10	0.48	1.51	3.36	0.35	3.12	0.19	0.88	1800	1980	2200	2250
2085-66	Slack 3/4 x 0		T	17.45	31.82	15.03	46.32	0.64	1.15	2.52	0.35	1.96	0.51	1.30	1860	1890	1910	2080
3443-66	Slack 3/4 x 0		T	17.28	33.87	15.42	40.63	0.43	1.33	2.87	0.76	2.57	0.77	1.77	1870	1950	1990	2150
2952-67	Slack 3/4 x 0		T	20.52	33.33	16.83	40.51	0.52	1.11	3.05	0.78	4.45	0.29	1.48	1850	1910	1940	2070
2019-68	Slack 3/4 x 0		T	13.73	28.22	13.95	47.07	0.58	1.40	3.61	0.36	3.82	0.19	0.59	1900	1940	1970	2030

Note: Coal mines in New Brunswick are currently operated by N.B. Coal Limited for the Grand Lake Development Corporation

ANALYSIS OF COAL ASH
 PROVINCE OF NEW BRUNSWICK (CONT'D)

Sample Number	Description of Sample				Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere					
	Size: Mine Designation	Screen Opening, Inches	Shape of Screen	Opening sq. rd. slot.			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F		
MINTO COAL FIELDS																			MINE OR TRADE NAME: <u>AVON CONT'D</u> OPERATOR: AVON COAL CO., LTD.			
2941-68	Slack	3/4 x 0			T	14.92	25.42	14.02	50.23	0.43	1.44	3.08	0.40	2.71	0.19	1.18	1800	2140	2180	2290		
2955-67	C/Slack	2 x 0			T	17.46	33.02	16.58	42.94	0.53	1.48	2.93	0.71	2.74	0.19	0.74	1810	1890	1920	2040		
2086-66	Fines	1/4 x 0			T	12.03	26.18	11.47	51.58	0.46	1.61	3.36	0.10	2.98	0.58	0.80	1830	1840	1870	1980		
3444-66	Fines	1/4 x 0			T	13.67	25.01	12.14	54.21	0.35	1.97	3.19	0.16	2.52	0.29	0.77	1910	1980	2000	2110		
2953-67	Fines	1/4 x 0			T	18.07	34.25	17.76	40.07	0.49	1.14	2.10	0.81	2.37	0.19	1.03	1820	1910	1930	2040		
2020-68	Fines	1/4 x 0			T	13.53	30.72	12.78	45.96	0.48	1.15	4.07	0.49	4.81	0.19	0.44	1900	1950	2000	2180		
2942-68	Fines	1/4 x 0			T	12.48	30.52	16.19	44.81	0.55	1.17	2.90	0.65	2.53	0.29	1.25	1820	2050	2130	2270		
MINE OR TRADE NAME: <u>MILLS, MINTO</u> OPERATOR: D.W. & R.A. MILLS LTD.																						
2092-66	Mine Run				T	15.70	35.60	13.67	40.43	0.40	1.84	4.75	0.41	3.74	0.58	1.24	1890	1950	1970	2080		
3450-66	Mine Run				T	27.40	40.51	17.83	34.08	0.45	1.03	2.41	0.20	1.46	0.29	2.50	1870	1960	2000	2190		
2052-68	Mine Run				T	16.50	29.29	12.96	43.52	0.51	2.41	4.20	0.45	3.82	0.10	0.74	1800	1820	2050	2270		
2917-68	Mine Run				T	14.77	27.74	11.94	50.35	0.37	1.70	4.13	0.05	2.88	0.00	0.74	1850	2210	2220	2250		
2921-68	Mine Run				T	13.93	28.60	11.91	49.08	0.40	1.84	3.30	0.44	2.32	0.19	0.74	1880	2100	2130	2170		
2088-66	Nut	2 x 3/4 sq			T	15.90	36.08	14.07	40.48	0.38	2.29	4.20	0.22	2.83	0.31	1.24	1900	1930	1960	2090		
3446-66	Nut	2 x 1 sq			T	17.28	31.99	13.17	45.18	0.32	3.42	3.54	0.57	2.31	0.58	0.77	1840	1920	1950	2020		
2048-68	Nut	2 x 3/4			T	11.47	31.89	13.81	45.26	0.57	2.41	4.07	0.49	1.75	0.00	0.44	1820	1900	2000	2220		
2090-66	Stoker	3/4 x 1/4			T	15.17	34.81	14.47	41.40	0.38	2.05	3.85	0.35	3.14	0.44	1.31	1880	1940	1960	2090		
3448-66	Stoker	1 x 3/4			T	16.66	31.70	12.65	46.24	0.39	2.23	3.36	0.30	1.23	2.42	0.75	1840	1940	1960	2040		
2956-67	Stoker	1 x 3/4			T	18.59	34.64	15.85	42.00	0.62	2.09	3.23	0.70	1.01	0.10	1.03	1820	2030	2110	2230		
2050-68	Stoker	3/4 x 1/4			T	12.79	29.75	13.05	47.88	0.36	2.15	3.75	0.42	2.41	0.10	0.88	1950	2370	2390	2400		
2919-68	Stoker	3/4 x 1/4			T	11.50	27.90	11.86	51.06	0.38	1.71	3.43	0.40	2.47	0.19	0.59	1890	2130	2170	2230		
2089-66	C/Slack	2 x 0			T	18.51	37.82	15.27	37.12	0.66	2.43	3.99	0.53	2.42	0.36	1.40	1880	1940	1990	2090		
3447-66	C/Slack	2 x 0			T	16.21	32.44	13.41	43.94	0.40	2.22	3.00	0.46	2.35	0.41	1.13	1860	1950	2010	2050		
2049-68	C/Slack	2 x 0			T	20.55	40.43	16.43	32.21	0.57	2.03	3.51	0.90	2.39	0.10	1.62	1800	1860	2090	2290		
2918-68	C/Slack	2 x 0			T	21.81	22.41	12.07	58.98	0.27	1.08	1.75	0.50	0.96	0.00	0.44	2160	2240	2310	2450		
2091-66	Fine Slack	3/4 x 0			T	17.63	39.24	17.51	33.71	0.66	1.77	3.50	0.91	3.21	0.52	2.05	1840	1980	2150	2180		

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ANALYSIS OF COAL ASH
PROVINCE OF NEW BRUNSWICK (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture - free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
MINTO COAL FIELDS																	
AREA <u>MINTO</u>		MINE OR TRADE NAME: <u>MILLS, MINTO CONT'D.</u> OPERATOR: <u>D.W. & R.A. MILLS LTD.</u>															
3449-66	Fines 3/4 x 0	T	14.36	37.46	15.06	38.51	0.46	1.43	2.80	0.30	2.34	0.29	1.32	1800	1890	1920	2050
2957-67	Fines 3/4 x 0	T	26.30	42.55	20.32	29.69	0.66	0.91	1.68	1.36	2.27	0.19	2.36	1880	2110	2180	2210
2051-68	Fines 1/4 x 0	T	16.70	31.74	14.74	41.78	0.47	1.52	3.64	0.50	3.88	0.10	1.32	1800	1900	2050	2110
2920-68	Fines	T	12.47	25.86	11.43	53.70	0.30	1.49	3.01	0.35	2.92	0.19	0.59	1800	2120	2260	2350
MINE OR TRADE NAME: <u>DUFFERIN</u> OPERATOR: <u>DUFFERIN MINING LTD.</u>																	
3460-66	Screen	T	17.55	35.83	15.08	40.82	0.37	1.56	3.08	0.60	2.06	0.19	1.03	1880	1980	2060	2150
2044-68	Screen	T	17.03	26.92	14.15	28.47	0.31	7.04	7.57	2.17	3.65	0.00	0.45	1760	1800	2000	2270
2100-66	Mine Run	T	20.91	35.46	12.67	39.12	0.52	1.45	5.14	0.51	3.53	0.00	0.96	1830	1900	1920	2000
3461-66	Slack	T	25.94	41.53	18.72	31.34	0.45	0.97	2.66	0.75	2.31	0.77	2.06	1890	2070	2180	2220
2045-68	Slack	T	19.86	40.42	17.41	33.25	0.65	1.41	2.38	1.66	0.00	1.03	2.93	1730	1830	1880	2180
MINE OR TRADE NAME: <u>MINTO-MIRAMICHI</u> OPERATOR: <u>MIRAMICHI LUMBER CO., LTD.</u>																	
2024-68	#1 Rump; Screen + 2	T	11.05	22.73	12.91	58.95	0.29	1.41	2.65	0.35	1.20	0.29	0.59	1870	1950	2050	2220
2025-68	#1 Rump; Not 2 x 1/4	T	15.98	27.59	13.00	48.85	0.37	1.74	3.09	0.59	2.02	0.29	0.88	1890	1960	2000	2110
2047-68	#1 Rump; Fines 1/4 x 0	T	18.52	32.70	17.33	40.18	0.46	1.46	1.82	2.01	3.20	0.19	1.03	1840	1950	2190	2270
2721-67	#2 Rump; Screen + 2	T	16.58	16.97	8.32	66.80	0.28	0.81	2.80	1.61	3.15	0.10	0.59	1940	2000	2010	2160
2026-68	#2 Rump; Screen + 2	T	14.29	13.48	7.73	71.56	0.12	1.57	1.71	2.90	1.48	0.10	0.29	2050	2300	2400	2440
2722-67	#2 Rump; Slack 2 x 0	T	18.15	24.07	11.35	56.27	0.33	0.86	3.05	0.57	3.42	0.19	0.88	1860	1940	1980	2170
2027-68	#2 Rump; Slack 2 x 0	T	33.92	36.83	20.27	32.83	0.35	1.69	1.33	4.09	1.49	0.00	2.65	1860	2040	2200	2260
2028-68	#30 Shaft; Screen + 1 1/4	T	18.78	30.38	14.33	41.71	0.25	3.08	3.01	5.57	2.43	0.00	0.88	1850	1870	1920	2110
2724-67	#30 Shaft; Slack 1 1/4 x 0	N	27.65	46.44	21.44	22.47	0.60	0.73	2.10	1.61	2.75	0.29	3.39	1900	2020	2110	2410
2029-68	#30 Shaft; Slack 1 1/4 x 0	T	44.43	49.29	25.96	16.47	0.35	1.28	0.87	2.21	1.40	0.10	3.97	1980	2180	2330	2380
2922-68	N/D	T	15.72	13.47	8.00	67.75	0.20	1.74	2.30	0.01	1.39	0.19	0.74	2280	2470	2540	2600+
2923-69	Slack	T	21.44	29.36	15.69	43.74	0.36	1.49	2.80	0.89	2.13	0.29	1.47	1900	2100	2160	2230

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ANALYSIS OF COAL ASH
PROVINCE OF NEW BRUNSWICK (CONT'D)

Sample Number	Description of Sample				Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
	Size: Mine Designation	Screen Opening, Inches	Shape of Screen Opening	sq, rd, slot.			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
MINTO COAL FIELDS																				
AREA <u>MINTO</u>															MINE OR TRADE NAME: <u>NO. 2 KNOX</u> OPERATOR: <u>MIDLAND MINING CO., LTD.</u>					
2096-65	Mine Run				T	21.48	27.63	13.53	44.14	0.77	0.97	4.80	0.02	5.62	0.58	1.10	1980	2110	2180	2220
3455-66	Mine Run				T	33.10	32.50	15.28	47.68	0.43	0.60	1.44	0.37	1.01	0.68	1.32	1800	1950	1980	2010
2916-68	Mine Run				T	20.21	25.71	12.79	52.99	0.30	1.02	1.96	0.10	0.79	0.00	0.88	1900	2230	2240	2260
MINE OR TRADE NAME: <u>HOYT</u> OPERATOR: <u>MIDLAND MINING CO., LTD.</u>																				
2095-66	Mine Run				T	18.55	28.10	13.12	52.01	0.69	1.20	2.34	0.41	2.78	0.58	1.00	1880	1970	1990	2090
3454-66	Mine Run				T	22.92	37.30	14.43	39.86	0.50	0.82	2.62	0.63	2.76	0.68	1.77	1890	1950	2000	2040
2046-68	Mine Run				T	15.37	21.83	10.61	57.07	0.28	2.45	3.85	0.15	2.44	0.00	0.29	1720	1840	1880	2180
2915-68	Mine Run				T	20.90	26.49	12.49	51.94	0.27	0.99	1.71	0.28	0.84	0.00	1.18	1910	2240	2250	2280
MINE OR TRADE NAME: <u>NICHOLS - MINTO</u> OPERATOR: <u>C.H. NICHOLS CO., LTD.</u>																				
2020-68	Lump + 1 1/4				T	21.83	42.32	18.63	29.88	0.66	1.41	3.33	0.88	2.23	0.29	1.62	1850	1960	2200	2250
2910-68	Lump				T	20.92	38.43	16.76	32.00	0.53	1.18	4.62	1.30	4.85	0.10	1.77	1820	1880	1990	2150
2093-66	Screen + 1 1/4 sq				T	18.21	36.39	15.57	35.92	0.58	1.81	4.31	0.83	3.19	0.53	1.38	1880	1940	1990	2230
3451-66	Screen + 1 1/4 sq				T	21.38	37.62	16.67	34.16	0.42	1.14	3.95	0.42	3.68	0.68	1.91	1920	2010	2130	2160
2094-66	Slack 1 1/4 x 0				T	26.07	40.15	21.52	25.42	0.89	0.79	2.80	0.64	3.51	0.80	2.53	1940	1990	2010	2230
3452-66	Slack 1 1/4				T	31.33	46.11	19.39	23.73	0.54	0.75	1.90	1.59	2.41	0.77	3.24	1900	2030	2140	2210
2023-68	Slack 1 1/4 x 0				T	29.66	46.24	22.87	22.69	0.65	0.80	1.99	1.31	1.66	0.48	3.09	1940	2100	2260	2400
2911-68	Slack				T	34.89	46.96	22.97	21.25	0.66	0.60	1.47	1.71	2.10	0.34	3.24	1880	2060	2200	2250
3453-66	Mix				T	24.47	45.15	18.86	25.77	0.49	1.08	3.22	0.70	2.69	1.06	2.94	1890	2000	2110	2220
2053-68	Mix				T	22.57	42.42	18.64	28.20	0.69	0.96	2.94	1.17	3.06	0.19	2.21	1820	1930	2080	2300
2912-68	Mine Run				T	23.44	40.50	19.91	29.07	0.55	1.07	3.43	1.26	3.59	0.15	1.99	1800	1910	2000	2160
MINE OR TRADE NAME: <u>SWIFT - MINTO</u> NORMAN I. SWIFT LTD.																				
2099-66	Mine Run				T	20.66	31.74	15.22	42.51	0.59	1.34	4.20	0.54	3.16	0.48	1.09	1970	2080	2150	2230
3456-66	Mine Run				T	25.99	37.63	17.29	38.67	0.45	1.06	2.03	0.03	2.15	0.29	1.62	1930	2130	2300	2360

Note: Coal mines in New Brunswick are currently operated by N.B. Coal Limited for the Grand Lake Development Corporation

ANALYSIS OF COAL ASH
PROVINCE OF NEW BRUNSWICK (CONT'D)

Sample Number	Description of Sample		Kind of Sample	Ash % of Moisture - Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
					SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
	AREA	<u>MINTO</u>			MINTO MINTO COAL FIELDS										MINE OR TRADE NAME: <u>McMANN</u> OPERATOR: V.C. McMANN LTD.			
2097-66	Mine Run		T	21.28	34.50	18.45	36.00	0.72	1.22	2.80	1.15	3.17	0.58	2.06	1970	2050	2220	2240
2041-68	Mine Run		T	16.40	29.14	12.72	42.52	0.28	4.02	3.36	5.84	2.42	0.00	0.59	1950	2270	2380	2390
2042-68	Mine Run		T	16.34	28.74	13.98	44.56	0.26	4.10	3.07	3.21	2.73	0.00	0.59	1960	2360	2390	2400
2043-68	Mine Run		T	24.01	42.61	19.89	28.71	0.55	1.29	3.92	0.20	2.25	0.10	2.21	1980	2070	2260	2380
2913-68	Mine Run		T	22.72	38.43	19.91	33.41	0.51	1.23	2.10	1.33	1.42	0.39	2.28	1800	1820	1880	2130
2914-68	Mine Run		T	20.69	38.56	16.56	34.15	0.43	1.32	2.77	1.03	2.47	0.29	1.77	1900	2200	2220	2250
3459-66	Mix		T	18.53	35.68	16.46	39.37	0.41	1.51	3.08	0.50	2.72	0.19	1.32	1900	1970	2050	2140
3457-66	Screen + 1 1/4		T	21.71	30.13	14.03	50.02	0.33	1.27	2.80	0.20	2.00	0.29	0.88	1890	2000	2050	2170
2098-66	Slack 1 1/4 x 0		T	18.37	35.51	15.93	36.90	0.74	1.58	4.20	0.16	5.09	0.58	1.81	1820	1920	2000	2100
3458-66	Slack 1 1/4		T	18.56	34.33	16.00	41.20	0.40	1.44	3.00	0.86	3.01	0.29	1.47	1800	1960	2070	2140

Note: Coal mines in New Brunswick are currently operated by N.B. Coal Limited for the Grand Lake Development Corporation

ANALYSIS OF COAL ASH
PROVINCE OF ONTARIO

Sample Number	Location designated by Mining Company	Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F

NORTHERN ONTARIO COAL FIELD

AREA ONAKAWANA

MINE OR TRADE NAME: ONAKAWANA LIGHTITE
OPERATOR: BATTLE RIVER COAL CO. LTD.

3095-67	16' East End of Pit	M	19.85	37.63	15.38	9.98	0.61	0.34	16.86	4.20	15.01	0.97	0.74	1970	2030	2070	2140
2239-68	16' East End of Pit	M	13.07	26.23	15.43	6.75	0.62	0.08	14.97	4.28	28.48	0.58	1.47	1970	2010	2020	2110
2612-68	Crushed	M	22.50	48.85	14.35	7.13	0.97	0.30	14.01	3.82	10.22	0.97	0.81	1980	2030	2060	2170
3093-67	0 to 8'	M	18.84	42.09	13.55	9.81	1.19	1.03	14.10	4.07	15.25	0.48	0.15	1990	2020	2050	2210
3094-67	8' to 12'	M	9.76	13.36	13.88	17.01	0.44	0.16	20.97	6.27	26.97	1.36	0.15	2220	2260	2300	2340

ANALYSIS OF COAL ASH
PROVINCE OF SASKATCHEWAN

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F

SOURIS VALLEY DISTRICT

AREA BIENFAIT

MINE OR TRADE NAME: M & S SOO
OPERATOR: MANITOBA AND SASKATCHEWAN COAL CO., LTD.

2942-65	Bugdust-1/2 sq	T	9.84	25.00	13.20	6.23	0.35	0.61	20.86	4.83	14.23	10.36	0.44	1980	2030	2090	2130
3450-67	Bugdust-1/2 sq	T	11.14	33.10	13.30	6.24	0.48	0.46	19.33	5.02	12.44	5.72	0.44	1860	2050	2100	2200
3075-68	Bugdust-1/2 sq	T	11.89	30.77	21.17	5.23	0.59	0.22	18.20	4.70	11.25	5.71	0.44	1880	1950	1980	2000
3447-67	Stove 4 x 2 sq	T	7.58	16.55	14.67	7.29	0.45	0.66	29.29	6.04	14.78	9.88	0.15	2000	2150	2230	2400
3072-68	Stove 4 x 2 sq	T	9.53	25.51	19.97	7.32	0.48	0.56	20.37	5.21	14.58	6.39	0.29	2050	2090	2120	2170
2940-65	Booker 2 x 1 1/4	T	7.89	18.05	14.87	6.43	0.32	0.66	24.22	5.65	16.27	12.49	0.59	2120	2130	2150	2200
3448-67	Booker 2 x 1 1/4 sq	T	8.61	24.37	13.56	6.29	0.45	0.71	25.63	6.27	8.04	0.15	13.43	1990	2070	2100	2120
3073-68	Booker 2 x 1 1/4 sq	T	9.24	25.82	22.12	5.90	0.49	0.51	21.70	5.54	12.00	7.55	0.44	2030	2100	2130	2170
2941-65	Pea 1 1/4 x 1/2	T	8.50	24.53	13.59	6.06	0.41	0.64	24.57	5.84	13.44	12.20	0.66	2030	2080	-	2130
3449-67	Pea 1 1/4 x 1/2 sq	T	8.47	21.15	13.73	6.51	0.44	0.76	26.74	6.40	14.49	8.04	0.29	1850	2000	2040	2070
3074-68	Pea 1 1/4 x 1/2 sq	T	10.12	30.00	21.52	5.34	0.59	0.51	20.23	4.98	11.09	7.45	0.15	1890	2060	2080	2130

AREA ESTEVAN

MINE OR TRADE NAME: UTILITY
OPERATOR: UTILITY COALS LTD.

3442-67	Mine Run	T	13.36	36.97	21.34	3.36	1.00	0.24	16.10	3.73	8.01	6.98	0.44	1990	2020	2040	2190
3443-67	Egg 4 x 2 sq	T	7.82	13.73	16.94	5.12	0.21	0.88	30.38	6.73	16.17	7.94	0.29	2180	2230	2300	2360
3444-67	Booker 2 x 1 1/8 sq	T	8.73	21.85	17.84	4.61	0.47	0.62	27.30	6.06	14.10	6.78	0.44	2010	2140	2190	2200
3076-68	Booker 2 x 1 1/8 sq	T	8.58	20.41	19.36	4.34	0.51	0.93	27.44	5.59	13.81	7.45	0.29	1940	2050	2080	2110
3445-67	Pea 1 1/8 x 1/2 sq	T	9.34	22.16	16.94	5.34	0.51	0.61	27.45	6.33	14.12	6.20	0.29	1980	2070	2160	2340
3077-68	Pea 1 1/8 x 1/2 sq	T	8.66	22.11	20.14	4.47	0.53	0.90	27.58	5.53	12.61	6.97	0.44	1890	2050	2100	2130
3446-67	Bugdust-1/2 sq	T	10.38	24.50	16.94	6.59	0.45	0.44	22.40	5.54	15.63	4.94	0.29	1850	2090	2150	2190
3078-68	Bugdust-1/2 sq	T	10.39	21.65	18.68	6.68	0.40	0.76	23.66	5.14	16.66	5.52	0.29	1800	2000	2080	2150

MINE OR TRADE NAME: KLIMAX
OPERATOR: BATTLE RIVER COAL CO. LTD.

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA

Sample Number	Description of Sample Size: Nine Designation Screen Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture - free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere					
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F		
AREA <u>CASCADE</u>			MINE OR TRADE NAME: <u>CANMDRE - MINE NO. 2</u>													OPERATOR: <u>THE CANMDRE MINES LTD.</u>			
2553-63	N/D	T	13.17	55.01	32.40	6.12	1.84	0.82	0.09	0.40	0.19	0.46	1.14						
2480-65	*Channel	M	11.54	63.50	27.00	2.84	0.56	0.65	1.34	0.79	0.98	1.45	2.65	2750+	Plus	Plus	Plus		
2481-65	*Channel	M	6.23	52.79	35.72	5.61	0.63	0.78	1.26	0.49	0.93	1.25	2750+	Plus	Plus	Plus			
2908-65	Cobble 5 x 2 1/2	T	6.49	53.14	35.22	5.24	1.06	1.02	0.48	0.45	1.27	0.00	0.66	2650+	Plus	Plus	Plus		
3501-67	Cobble 5 x 3 Slot	T	3.01	55.79	36.67	2.10	0.98	0.72	0.35	0.65	0.68	0.48	0.00	2520+	Plus	Plus	Plus		
2909-65	Stove 2 1/2 x 1 1/4	T	7.97	52.20	34.07	7.04	0.81	0.86	1.01	0.71	1.02	0.48	0.74	2700+	Plus	Plus	Plus		
2911-65	Stove 1 1/4 x 1/2	T	7.53	54.62	20.55	4.41	0.94	1.29	0.84	0.40	2.13	0.48	0.59	2700+	Plus	Plus	Plus		
3502-67	Stove 3 x 2 Slot	T	8.39	60.73	27.94	6.37	0.77	0.96	0.70	0.91	1.45	0.39	1.25	2520+	Plus	Plus	Plus		
2910-65	Chestnut 2 x 1 1/4	T	8.51	54.08	32.04	6.61	0.87	0.62	0.95	0.34	1.59	0.24	1.32	2700+	Plus	Plus	Plus		
3503-67	Chestnut 2 Slot x 1 1/4 rd	T	10.39	55.86	31.14	8.36	0.80	0.76	0.77	1.41	1.48	0.10	1.25	2450	2600	2660	2660		
2912-65	Slack 3/16	T	7.96	56.76	20.79	2.42	0.94	1.03	1.12	0.00	1.60	0.48	0.59	2700+	Plus	Plus	Plus		
3506-67	Slack 1/4 sq x 0	T	7.92	57.22	33.10	4.19	0.97	0.99	0.87	0.95	0.88	0.39	1.77	2660+	Plus	Plus	Plus		
3504-67	Stoker 2 Slot x 1 1/4 rd	T	6.09	55.41	34.65	5.04	0.84	1.31	0.90	0.84	1.23	0.19	0.74	2660+	Plus	Plus	Plus		
3089-68	Slack 1/4 sq x 0	T	7.96	56.78	35.46	2.44	1.18	0.91	0.74	0.64	0.93	0.48	1.18	2580+	Plus	Plus	Plus		
2913-65	Buckwheat 1/2 x 3/16	T	7.08	57.52	20.65	3.56	0.92	1.17	0.49	0.35	0.43	0.87	2.36	2650+	Plus	Plus	Plus		
3505-67	Buckwheat 9/16 x 5/16 sq	T	6.55	55.86	34.22	4.51	0.96	1.31	1.18	0.52	1.09	0.19	0.96	2660+	Plus	Plus	Plus		
3088-68	Buckwheat 9/16 x 5/16 sq	T	5.86	56.71	33.84	3.77	0.82	0.82	0.52	0.41	1.19	0.39	0.88	2580+	Plus	Plus	Plus		
AREA <u>CROWNEST</u>			MINE OR TRADE NAME: <u>TENT MOUNTAIN - MINE NO. 1695</u>													OPERATOR: <u>COLEMAN COLLIERIES LTD.</u>			
2882-65	Stoker 1 1/4 x 1/4	T	9.85	41.51	36.67	5.89	1.40	2.73	4.87	0.05	3.57	1.33	0.48	2590	2750+	Plus	Plus		
3453-67	Stoker 1 1/4 x 1/4	T	13.09	47.97	34.90	4.35	1.55	2.78	4.34	1.21	3.09	0.19	0.15	2530+	Plus	Plus	Plus		
3135-68	Stoker 1 1/4 x 1/4	T	11.13	57.72	35.31	3.71	1.45	1.87	3.28	0.95	2.44	0.19	0.44	2600+	Plus	Plus	Plus		
3134-68	1/4 x 0	T	9.72	48.60	37.46	3.51	2.01	2.27	2.80	0.42	1.29	0.19	0.44	2600+	Plus	Plus	Plus		
			MINE OR TRADE NAME: <u>VICARY CREEK - MINE NO. 1747</u>													OPERATOR: <u>COLEMAN COLLIERIES LTD.</u>			
2589-63	Export Coal	T	8.51	47.71	36.13	4.48	2.77	2.91	4.78	0.22	0.45	0.43	0.76						
2880-65	Export 1 1/4 x 1/4	T	8.49	36.67	35.71	9.58	1.42	3.98	5.14	0.40	1.91	0.48	0.29	249D	2590	2700+	Plus		

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA (CONT'D)

Sample Number	Description of Sample			Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent									Reducing Atmosphere				
	Size: Mine Designation	Screen Opening, Inches	Shape of Screen Opening			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA <u>CROWNEST</u>				MINE OR TRADE NAME: <u>TENT MOUNTAIN - MINE NO. 1695 CONT'D.</u> OPERATOR: <u>CDLEMAN COLLIERIES LTD.</u>															
3881-65	Export	1/4 x 0		T	8.85	44.94	38.60	2.19	1.20	1.00	2.97	0.33	0.79	0.00	0.44	2750+	Plus	Plus	Plus
3451-67	Export	2 x 1/4 sq		T	8.65	40.15	35.99	7.29	1.40	4.58	6.79	0.60	2.42	0.29	0.15	2400	2500	2530+	Plus
3452-67	Export	1/4		T	8.45	46.74	36.52	7.24	1.94	2.78	3.15	0.60	0.93	0.29	0.15	2530+	Plus	Plus	Plus
3133-68	Export	2 x 1/4		T	8.52	39.42	36.47	10.17	1.51	3.48	5.15	0.62	2.63	0.53	0.66	2350	2520	2600+	Plus
2458-65	Blending			T	8.77	40.71	37.43	5.67	1.87	3.90	4.63	0.22	2.02	1.09	0.44				
AREA <u>ARDLEY</u>				MINE OR TRADE NAME: <u>SISSONS - MINE NO. 809</u> OPERATOR: <u>SISSONS R.C.</u>															
2996-65	*Channel			N	10.81	47.61	15.48	2.80	0.08	3.05	18.87	1.33	6.33	3.39	0.22	1840	1990	2160	2290
AREA <u>BROOKS</u>				MINE OR TRADE NAME: <u>BIRNVEL - MINE NO. 1404</u> OPERATOR: <u>THE KLEENBIRN COLLIERIES LTD.</u>															
2994-65	*Channel			M	10.30	39.28	20.49	4.90	0.55	2.19	11.20	1.31	9.05	5.61	1.18	2060	2150	2170	2460
3079-68	Lump			T	11.12	38.19	34.04	3.90	0.57	3.07	10.19	1.58	8.00	4.55	0.59	2020	2130	2160	2360
AREA <u>CAMROSE</u>				MINE OR TRADE NAME: <u>BURNSTAD - MINE NO. 724</u> OPERATOR: <u>BURNSTAD COAL LTD.</u>															
2997-65	Ehannel			N	6.17	28.51	24.76	5.88	0.35	1.76	19.04	2.82	13.72	4.55	0.37	1990	2030	2060	2130
AREA <u>CASTOR</u>				MINE OR TRADE NAME: <u>ALL-FIRE - MINE NO. 1614</u> OPERATOR: <u>STETTNER COAL CO. LTD.</u>															
3120-65	Lump +	1 7/8 sq		T	7.31	30.13	21.54	7.49	0.48	1.92	22.12	2.77	12.11	1.06	0.59	1940	2020	2050	2120
3121-65	Nut	1 7/8 x 3/8 sq		T	8.95	32.19	19.20	6.18	0.26	1.44	17.50	2.62	12.26	1.06	0.96	2050	2120	2140	2320
3122-65	Stoker	1 3/8 x 1/2 sq		T	9.25	31.71	19.27	9.05	0.33	1.12	16.10	2.52	15.55	1.02	1.18	2080	2120	2140	2260
3123-65	Pea	1/2 x 1/4 sq		T	7.74	28.54	19.06	7.93	0.30	1.12	19.46	2.92	15.86	0.77	0.74	1910	2080	2110	2180
3124-65	Slack	1/4 x 0 sq		T	11.52	38.23	23.82	6.27	0.40	0.91	14.98	0.30	12.66	1.79	1.10	1940	2020	2050	2120
				MINE OR TRADE NAME: <u>VESTA - MINE NO. 1046</u> OPERATOR: <u>ALBERTA COAL LTD.</u> (FORMERLY BATTLE RIVER COAL CO. LTD.)															
3110-65	Lump +	4 1/2 rd		T	7.59	31.14	20.74	6.17	0.36	1.08	17.15	1.76	11.52	8.13	0.59	1940	2000	2060	2110
3109-66	Lump +	4 1/2 rd		T	9.08	31.13	25.77	12.21	0.64	0.35	16.45	2.57	10.45	2.86	0.88	1920	1990	2160	2160
3311-67	Lump +	4 1/2 rd		T	6.59	24.61	19.55	6.97	0.33	1.49	20.72	1.81	12.74	7.85	0.15	1890	1950	2030	2050

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA (CONT'D)

Sample Number	Description of Sample		Kind of Sample	Ash % of Moisture - Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
	Size: Mine Designation Screen Opening, Inches	Shape of Screen Opening sq, rd, slot.			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA <u>CASTOR</u>				MINE OR TRADE NAME: <u>VESTA - MINE NO. 1046 CONT'D.</u> OPERATOR: <u>ALBERTA COAL LTD.</u> (FORMERLY BATTLE RIVER COAL CO. LTD.)														
3111-65	Egg	4 1/2 x 2 rd	T	7.63	30.84	22.19	6.15	0.24	0.87	17.75	2.64	12.05	8.13	0.59	1930	1950	1970	2350
3110-66	Egg	4 1/2 x 2 rd	T	8.38	27.77	24.08	12.10	0.57	0.54	19.11	1.76	11.28	3.00	0.88	1950	2020	2080	2180
3312-67	Egg	4 1/2 x 2 rd	T	7.27	26.73	21.05	6.41	0.33	1.93	18.90	1.91	11.67	7.17	0.00	1860	1990	2060	2070
3118-68	Egg		T	8.09	21.00	18.33	19.97	0.35	0.66	18.31	3.14	14.09	1.94	0.15	1950	1980	2000	2060
3112-65	Nut	2 x 1/4 rd	T	9.99	34.79	25.41	4.71	0.38	0.73	13.02	0.10	12.73	6.97	0.88	1890	1990	2010	2110
3111-66	Nut	2 rd x 1 1/4 sq	T	8.00	29.45	24.50	8.48	0.50	0.44	19.46	1.86	11.76	3.20	0.88	1980	2060	2110	2200
3313-67	Nut	2 x 1 1/4 sq	T	8.02	31.75	22.38	6.08	0.26	1.24	16.80	1.71	10.82	6.49	0.44	1750	1990	2030	2070
3119-69	Nut		T	8.74	23.60	19.43	19.22	0.41	0.64	17.99	3.91	13.57	1.45	0.29	1920	1970	1990	2010
3113-65	Stoker	1 1/4 x 3/4 rd	T	9.52	32.66	24.71	4.94	0.30	0.87	13.58	0.81	13.88	7.36	1.18	1900	1930	1970	2260
3112-66	Stoker	1 1/4 x 1/2 sq	T	8.17	30.36	25.13	7.63	0.53	0.45	18.76	2.01	12.35	3.44	0.88	1950	2040	2120	2160
3314-67	Stoker	1 1/4 x 5/8 sq	T	8.24	31.46	21.41	6.02	0.28	1.30	19.46	1.11	11.92	7.17	0.59	1820	1990	2020	2130
3120-68	Stoker		T	8.49	24.06	19.18	17.78	0.49	0.67	16.90	3.30	15.46	1.36	0.29	1810	1930	1950	1980
3114-65	Slack	3/4 rd	T	8.77	30.88	23.44	4.97	0.00	0.80	14.97	1.41	15.28	6.58	0.59	1930	1960	1980	2100
3113-66	Slack	1/2	T	8.82	29.29	23.23	9.91	0.54	0.36	15.82	1.81	2.62	0.81	14.76	1930	2020	2110	2150
3315-67	Slack	5/8 x 0	T	8.34	30.52	21.31	6.42	0.29	0.99	19.46	1.21	12.40	6.98	0.59	1800	1980	2010	2130
3121-68	Slack		T	9.74	22.53	18.84	19.44	0.41	0.62	15.95	3.35	16.30	1.36	0.29	1820	1910	1930	1970
AREA <u>DRUMHELLER</u>				MINE OR TRADE NAME: <u>DIPLOMAT - MINE NO. 1578</u> OPERATOR: <u>FORESTBURG COLLIERIES LTD.</u>														
3115-65	Lump	4 1/2 rd	T	7.99	29.08	22.78	5.65	0.37	1.59	19.25	1.76	11.61	7.65	0.37	1870	2010	2060	2080
3306-67	Lump	4 1/2 rd	T	8.38	36.82	19.76	6.33	0.38	0.61	15.54	1.81	10.18	7.16	0.15	1840	1910	1950	1960
3116-65	Stove	4 1/2 x 2 rd	T	7.35	29.23	21.26	5.16	0.23	1.30	19.22	2.22	13.94	7.41	0.52	1950	2010	2040	2110
3307-67	Egg	4 1/2 x 2 sq	T	8.34	35.55	20.78	6.63	0.36	0.49	15.40	1.91	10.53	6.59	0.15	1850	1920	1970	2240
3117-65	Nut	2 rd x 1 sq	T	7.86	31.48	21.92	4.68	0.31	1.47	19.69	1.81	11.15	7.41	0.59	1870	1970	1980	2060
3308-67	Nut	2 x 1 sq	T	8.23	38.43	17.60	6.90	0.39	0.51	14.98	1.71	10.78	6.49	0.15	1700	1900	1970	2150
3118-65	Stoker	1 sq x 3/8 slot	T	8.18	31.93	23.06	5.01	0.69	1.37	17.29	1.66	12.57	6.97	0.66	1940	2000	2060	2100
3309-67	Stoker	1 x 1/2 sq	T	8.05	35.70	18.84	6.23	0.40	0.66	15.54	2.01	11.37	6.78	0.44	1720	1940	1980	2080
3119-65	Slack	3/8 slot	T	9.55	31.78	22.78	5.28	0.32	1.14	20.17	0.30	11.30	6.29	0.59	1900	1930	1970	2080
3310-67	Slack	1/2 sq x 0	T	11.33	33.57	14.51	8.93	0.36	0.34	15.40	1.51	13.68	4.46	0.29	1690	1890	1900	1970
AREA <u>DRUMHELLER</u>				MINE OR TRADE NAME: <u>SUBWAY - MINE NO. 1666</u> OPERATOR: <u>SUBWAY COAL COMPANY</u>														
3070-65	* #1	Channel Top	M	7.37	47.85	16.64	4.53	0.79	1.09	10.29	2.01	11.07	3.97	0.88	1880	1970	2080	2450
3070-65	* #2	Channel Bottom	M	14.49	57.72	20.77	3.93	0.32	0.85	6.51	1.96	4.64	3.53	0.81	2000	2150	2300	2500
3122-68	* #1	Channel Top	M	19.57	55.18	22.76	6.80	0.31	0.16	4.44	1.69	5.88	2.03	0.74	2050	2120	2210	2380
3123-68	* #2	Channel Lower	M	13.27	56.63	19.43	4.92	0.69	0.50	5.70	1.29	7.38	2.13	1.62	1870	2100	2270	2450

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq. rd, sloc.	Kind of Sample	Ash % of Moisture - free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA <u>DRUMHELLER</u>				MINE OR TRADE NAME: <u>FOX COULEE - MINE NO. 1756</u> OPERATOR: <u>FOX COULEE COALS LTD.</u>													
3512-67	2 1/2 x 0 sq	T	11.98	45.51	26.73	4.01	0.50	2.00	8.33	1.28	6.38	2.52	0.96	2200	2260	2500	2550
				MINE OR TRADE NAME: <u>WESTERN MONARCH - MINE NO. 1573</u> OPERATOR: <u>CHARTER COALS LTD.</u>													
3060-65	Lump 1/4 rd	T	7.39	37.92	26.52	4.92	0.51	1.99	11.76	1.56	8.98	6.49	0.74	1920	1990	2030	2140
3507-67	Lump + 4 1/2 rd	T	10.13	43.97	29.98	3.23	0.59	1.74	8.96	1.37	6.15	0.48	1.32	2070	2180	2370	2640
3124-68	Lump	T	8.72	35.78	27.16	7.23	0.23	3.08	10.64	2.06	8.52	5.81	0.59	1860	1980	2050	2180
3061-65	Egg 4 x 2 rd	T	9.13	41.04	25.98	7.62	0.36	1.18	9.66	1.31	8.34	5.47	1.18	1920	2050	2120	2280
3508-67	Egg 4 1/2 x 2 rd	T	9.73	43.08	30.39	3.38	0.45	1.19	8.96	1.41	6.25	5.04	0.74	1930	2100	2350	2600
3125-68	Egg	T	9.44	38.13	29.50	5.97	0.65	1.27	9.63	1.73	7.62	5.52	0.74	1940	2050	2100	2230
3062-65	Nut 2 rd x 1 1/8 sq	T	11.71	43.69	28.11	6.96	0.36	0.92	9.52	0.25	6.36	4.65	1.47	2040	2140	2210	2450
3509-67	Nut 2 x 1 1/4 rd	T	10.44	45.16	29.72	3.52	0.39	1.29	7.88	1.53	5.63	4.65	0.59	2040	2170	2400	2660
3126-68	Nut	T	12.15	44.89	32.01	3.62	0.43	1.05	7.14	1.49	5.38	4.46	0.96	2170	2250	2270	2390
3063-65	Stoker 1 1/8 x 5/8 sq	T	12.28	43.69	28.54	7.42	0.46	0.90	9.06	0.55	6.13	4.45	1.32	2080	2140	2150	2400
3510-67	Stoker 1 1/4 x 5/8 rd	T	12.57	45.83	30.39	3.36	0.45	0.82	7.03	1.24	5.12	4.07	0.88	2070	2200	2380	2660
3127-68	Stoker	T	10.91	41.02	27.91	7.93	0.43	1.04	8.90	1.77	7.61	4.65	0.88	1820	2020	2080	2200
3064-65	Slack 5/8 sq x 0	T	12.24	42.91	28.54	7.09	0.34	0.94	9.03	0.70	6.02	4.40	0.88	2120	2160	2220	2340
3511-67	Slack 5/8 rd x 0	T	12.79	46.29	28.55	3.34	0.38	0.76	7.56	1.66	5.59	4.26	1.10	2210	2250	2390	2550
3128-68	Slack	T	13.36	42.08	30.92	5.75	0.62	1.02	7.17	1.57	7.61	3.58	1.10	2160	2250	2280	2380
AREA <u>EDMONTON</u>				MINE OR TRADE NAME: <u>EGG LAKE - MINE NO. 1582</u> OPERATOR: <u>EGG LAKE COAL CO. LTD.</u>													
3721-67	Stock Pile	M	11.50	47.41	22.93	4.48	0.46	0.86	12.74	2.43	6.34	0.58	0.44	2070	2190	2210	2280
				MINE OR TRADE NAME: <u>RED HOT - MINE NO. 1727</u> OPERATOR: <u>WHITEMUD CREEK COAL CO. LTD.</u>													
3723-67	*Channel	M	9.36	42.50	25.19	5.10	0.38	1.60	12.91	1.30	5.63	4.55	0.15	1860	2100	2300	2360

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq. rd, slot.	Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Final Temperature, °F
AREA <u>EDMONTON</u>			MINE OR TRADE NAME: <u>STAR-KEY - MINE NO. 1626</u>											OPERATOR: <u>STAR-KEY MINES LTD.</u>			
3724-67	Lump + 4 rd	T	10.62	43.84	28.21	3.81	0.41	0.78	12.03	1.00	5.35	4.75	0.00	1980	2270	2340	2410
3725-67	Stove 4 rd x 2 sq	T	11.49	45.53	25.12	4.34	0.22	0.20	10.64	0.91	5.29	5.42	1.03	1960	2180	2310	2400
3726-67	Nut 2 x 1 1/4 sq	T	11.59	44.79	25.55	4.37	0.30	0.25	10.43	0.91	8.13	4.45	0.81	1930	2070	2250	2350
3727-67	Stoker 1 1/4 x 3/8 sq	T	10.77	44.19	25.90	4.61	0.42	0.28	12.39	0.50	5.61	5.23	0.88	2050	2140	2330	2500
3726-67	Slack 3/8 x 0	T	16.22	44.79	28.90	4.46	0.39	0.70	9.59	0.86	5.21	3.58	0.59	2250	2300	2400	2560
AREA <u>LETHBRIDGE</u>			MINE OR TRADE NAME: <u>GALT AND CADILLAC - MINE NO. 1263</u>											OPERATOR: <u>LETHBRIDGE COLLIERIES, LTD.</u>			
3360-64	Lump 4 1/2 rd	T	10.40	38.30	22.42	5.20	0.42	2.54	10.35	0.40	8.19	3.63	0.74	2200	2320	2380	2460
3361-64	Stove 4 1/2 x 2 rd	T	10.14	48.95	27.50	5.11	0.56	1.43	7.49	1.04	7.17	3.39	0.44	2210	2320	2390	2480
AREA <u>PEMBINA</u>			MINE OR TRADE NAME: <u>PINTER - MINE NO. 1670</u>											OPERATOR: <u>WARBURG COAL CO. LTD.</u>			
2995-65	Channel	M	9.24	36.42	28.30	6.32	0.39	0.10	14.21	1.66	7.06	4.02	0.52	2100	2120	2130	2300
			MINE OR TRADE NAME: <u>VICTORY - MINE NO. 1757</u>											OPERATOR: <u>ALBERTA COAL LTD.</u>			
2775-64	*Drill Hole #1 Bighorn	M	16.59	58.09	20.69	6.62	1.36	0.87	5.15	1.04	1.39	0.02	1.07				
3722-67	Stock Pile	M	12.53	47.85	22.83	5.52	0.45	0.26	15.85	2.19	4.18	0.19	0.00	2110	2200	2270	2440
AREA <u>SMOKEY RIVER</u>			MINE OR TRADE NAME: <u>McINTYRE-PORCUPINE - MINE NO. 1765</u>											OPERATOR: <u>McINTYRE COAL MINES LTD.</u>			
2313-67	Mine #1	M	5.86	56.91	30.79	2.33	0.96	2.88	4.27	0.83	0.98	0.87	0.88	2280	2600	2650+	Plus
2314-67	Mine #2	M	4.62	44.54	33.76	4.25	0.94	2.89	6.37	1.00	4.08	1.36	0.29	2330	2480	2570	2650+
2315-67	Mine #3	M	7.35	48.25	31.04	7.15	0.90	1.97	5.43	1.43	3.50	1.26	0.44	2230	2460	2550	2650+

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq, rd, slot.	Kind of Sample	Ash % of Moisture - Free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA <u>SHEERNESS</u>				MINE OR TRADE NAME: <u>ROSELYN - MINE NO. 443</u> OPERATOR: <u>ALBERTA COAL LTD.</u> FORMERLY <u>GREAT WEST COAL CO. LTD.</u>													
3065-65	Lump 4 1/2 rd	T	8.71	27.15	16.08	18.57	0.44	0.59	16.52	2.22	13.28	3.00	0.59	1800	1870	1880	1890
3316-67	Lump 4 1/2 rd	T	8.90	25.92	19.77	14.31	0.32	0.77	20.93	3.47	12.81	1.55	0.59	1890	1930	1960	2200
3066-65	Egg 4 1/2 x 2 rd	T	8.79	22.31	16.18	23.85	0.38	0.47	16.31	1.01	13.24	3.15	0.88	1870	1880	1890	1930
2935-65	Egg 5 x 3	T	8.33	24.11	15.88	4.04	0.44	0.93	21.63	4.23	11.96	8.81	1.18	2070	2080	2140	2220
3317-67	Egg 4 1/2 x 2 rd	T	8.93	29.34	20.04	10.69	0.33	0.71	20.79	3.02	12.80	1.65	0.88	1880	1930	1950	2160
2936-65	Booker 2 x 1/8 sq	T	8.66	25.18	17.61	4.37	0.31	0.97	23.10	3.27	11.97	7.65	1.91	2080	2140	2170	2280
3067-65	Nut 2 x 1 1/4 sq	T	9.49	30.90	18.21	15.29	0.40	0.53	15.33	2.22	12.45	2.61	0.88	1820	1920	1930	1950
3318-67	Nut 2 x 1 1/4 sq	T	9.22	30.67	21.31	10.29	0.37	0.46	19.25	3.12	12.47	1.36	0.74	1960	2060	2080	2270
3068-65	Stoker 1 1/2 x 1/2 sq	T	9.31	27.95	18.66	17.58	0.53	0.50	16.31	1.86	11.97	2.90	0.74	1770	1800	1820	1880
3319-67	Stoker 1 1/4 x 5/8 sq	T	8.86	28.85	20.67	9.05	0.33	0.55	20.58	3.12	13.92	1.60	0.88	1940	2030	2080	2250
2937-65	Pea 1 1/2 x 1/2 sq	T	10.27	28.08	17.14	4.72	0.57	0.88	23.94	3.73	7.36	0.44	14.05	1970	2020	2140	2250
3069-65	Slack 1/2 sq	T	10.52	32.51	18.66	13.87	0.47	0.40	12.81	1.51	14.82	2.52	0.88	1900	1970	2070	2120
3320-67	Slack 5/8 sq x 0	T	12.51	33.64	23.72	11.18	0.48	0.32	14.14	1.06	13.42	1.07	0.88	1970	2070	2090	2200
2938-65	Bugdust 1/2 sq	T	11.23	25.77	16.65	6.06	0.59	0.97	23.31	4.53	15.15	7.16	0.44	1980	2100	2120	2210
AREA <u>TOFIELD</u>				MINE OR TRADE NAME: <u>RED FIAME - MINE NO. 215</u> OPERATOR: <u>DOBDS COAL MINING LTD.</u> FORMERLY <u>JET CONSTRUCTION LTD.</u>													
2006-65	*Channel	M	9.95	35.47	24.53	4.20	0.36	1.91	14.88	2.08	11.98	1.94	0.88	2100	2280	2360	2420
AREA <u>TABER</u>				MINE OR TRADE NAME: <u>AJAX - MINE NO. 1604</u> OPERATOR: <u>HENRY MILLER</u>													
3720-67	*Channel	M	14.46	51.35	27.53	6.09	0.82	0.63	5.18	1.41	5.78	2.81	0.15	2200	2350	2370	2550
				MINE OR TRADE NAME: <u>MAJESTIC - MINE NO. 1604A</u> OPERATOR: <u>HENRY MILLER</u>													
2902-65	Lump + 4 1/2 rd	T	11.31	44.83	28.18	7.33	0.70	1.04	6.30	1.40	6.03	4.36	0.96	2030	2220	2260	2400
2903-65	Egg 4 1/2 rd x 2 sq	T	11.27	39.97	27.79	8.20	0.78	1.06	6.57	1.03	7.75	2.91	0.48	2030	2200	2260	2400

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF ALBERTA (CONT'D)

Sample Number	Description of Sample Size: Mine Designation Screen Opening, Inches Shape of Screen Opening sq. rd. slot.	Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F

AREA TABER

MINE OR TRADE NAME: MAJESTIC - MINE NO. 1604A CONT'D.
OPERATOR: HENRY MILLER

2904-65	Nut 2 x 1/2 sq'	T	12.78	45.46	28.95	7.77	0.66	0.68	5.88	1.01	5.11	2.91	0.59	2130	2200	2260	2390
2905-65	Stoker 1 1/2 x 1/2	T	12.62	45.46	27.21	8.20	0.74	0.56	6.16	1.49	6.37	0.34	0.74	2130	2190	2260	2390
2906-65	Slack 1/2	T	13.15	46.71	25.38	8.18	0.63	0.47	7.21	1.18	8.35	4.36	1.18	2130	2190	2230	2360

AREA WESTLOCK

MINE OR TRADE NAME: NORTH POINT - MINE NO. 1562
OPERATOR: NORTH POINT COAL CO., LTD.

2109-65	Lump + 5 Slot	T	5.03	10.80	12.63	13.36	0.47	0.13	41.03	6.23	11.84	2.91	0.59	1970	2340	2400	2460
2110-65	Stove 5 x 2 3/4 sq	T	5.72	20.19	13.36	11.32	0.56	0.11	36.05	5.54	9.58	2.91	0.66	2300	2320	2360	2420
2111-65	Nut 2 3/4 x 1 sq	T	6.59	21.81	13.95	9.94	0.47	0.09	27.30	4.35	14.28	2.42	0.74	2260	2320	2360	2410
2112-65	Stoker 1 x 3/8 Slot	T	8.79	35.96	16.80	9.03	0.52	0.13	21.98	3.42	9.89	2.06	0.88	1890	2100	2160	2220
2113-65	Slack 3/8 slot	T	6.94	18.96	11.79	10.29	0.41	0.15	26.74	3.42	16.06	2.06	0.66	2260	2310	2350	2390

ANALYSIS OF COAL ASH
PROVINCE OF BRITISH COLUMBIA

Sample Number	Description of Sample				Kind of Sample	Ash % of Moisture - free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere			
	Size: Mine Designation	Screen Opening, Inches	Shape of Screen Opening	sq, rd, slot.			SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F
AREA <u>TELKWA</u>				NORTHERN DISTRICT (WESTERN)										OPERATOR: <u>BULKLEY VALLEY COLLIERIES LTD.</u>						
2996-64	N/D			M	12.52	56.72	33.18	2.78	1.71	0.09	5.41	0.45	1.38	0.00	0.63	2750	Plus	Plus	Plus	
2708-64	* Bulk Channel # 1			M	9.57	44.01	26.04	16.30	1.60	1.47	5.81	1.31	3.33	0.20	1.02	2100	2160	2220	2330	
2709-64	Bulk Channel # 2			M	9.27	44.69	20.81	16.22	1.44	1.79	9.04	2.17	3.26	0.88	0.47	1980	2120	2160	2280	
2657-64	Egg 4 x 2 sq			T	14.31	50.46	23.71	19.52	0.78	0.85	5.04	0.14	0.74	0.85	0.48	1890	2020	2190	2290	
2015-64	Stoker			T	11.18	42.18	19.26	19.81	0.93	1.70	6.51	0.51	5.12	3.64	1.37	2180	2340	2410	2490	
2659-64	Stoker 1 sq x 1/8 slot			T	12.09	48.15	23.03	20.75	1.02	0.73	5.20	0.85	1.03	0.67	0.93	1890	2070	2220	2310	
2658-64	Nut 2 x 1 sq			T	14.65	49.36	23.85	19.25	0.92	0.80	4.26	0.72	0.28	0.32	0.70	1900	2040	2220	2340	
2660-64	Fines 1/8 slot			T	10.04	46.93	24.20	15.74	1.22	1.14	9.29	1.67	2.52	0.58	0.70	1900	2010	2190	2270	
AREA <u>CROWSNEST</u>				EAST KOOTENAY DISTRICT										MINE OR TRADE NAME: <u>MICHEL COLLIERY</u> OPERATOR: <u>CROWS NEST INDUSTRIES LTD.</u>						
2491-63	P/S 1 5/8 x 1/4			T	15.45	57.43	28.62	5.30	1.11	0.57	2.74	0.43	1.84	0.19	0.87					
2466-63	* 1 1/2 Cobble			T	15.76	56.32	27.01	5.38	1.58	1.70	3.01	0.42	1.74	0.00	0.82					
2441-63	Slack 1 1/4 x 0			T	14.33	55.81	-	7.29	1.62	2.35	0.57	1.09	2.21	0.29	0.70					
2438-65	Blending			T	9.16	57.38	30.26	3.18	1.45	0.86	3.78	0.10	3.03	0.97	0.85					
2638-63	* #1 & #2 Seams			M	12.05	61.06	25.61	5.37	1.21	1.47	2.63	0.69	0.27	4.06	1.95					
2678-63	* #1 & #2 Seams			M	18.15	57.06	31.62	3.94	1.08	1.88	1.18	0.84	0.43	0.98	1.22					
2037-64	* Upper "C" Seam			M	8.50	62.53	26.03	2.08	0.95	1.60	4.58	1.43	0.06	0.29	0.65	2390	2750	Plus	Plus	
2038-64	* Lower "C" Seam			M	7.73	53.25	33.42	3.32	1.62	2.56	2.88	0.02	0.43	0.65	0.56	2580	2750	Plus	Plus	
2039-64	* "D" Seam			M	9.87	51.42	26.34	5.83	1.38	4.59	5.09	0.04	1.74	0.21	0.21	2140	2340	2380	2650	
2118-64	* Channel			M		55.40	38.72	3.90	1.70	0.42	2.26	0.31	1.32	0.85	1.02					
2119-64	* Channel			M		47.72	36.37	6.42	1.77	0.37	5.46	0.71	4.08	1.44	1.12					
2024-66	* #7 Seam			M	8.09	5.42	21.29	1.24	19.69	0.40	5.46	0.00	0.59	0.24	0.59	2600+	Plus	Plus	Plus	
2445-66	* Balmer Adit 29			M	9.88	70.13	30.91	0.81	1.55	0.40	0.70	0.35	0.00	0.00	0.74	2650+	Plus	Plus	Plus	
2478-66	* Balmer Adit 29			M	7.48	59.86	27.74	0.63	1.26	1.11	2.24	1.11	0.08	1.94	0.88	2600+	Plus	Plus	Plus	
2530-66	* Rock Tunnel #1			M	7.21	55.24	27.06	2.17	1.33	1.26	5.46	0.70	1.03	1.45	0.59	2460	2650+	Plus	Plus	
2548-66	* Rock Tunnel #1			M	7.05	62.49	26.38	1.27	1.35	1.44	4.06	1.11	0.73	2.18	0.88	2650+	Plus	Plus	Plus	
2884-65	Balmer N/S 2 x 0			T	9.19	57.58	33.29	2.65	1.82	2.48	2.72	0.00	1.65	1.94	0.74	2700+	Plus	Plus	Plus	
2883-65	N/Slack 2 x 0			T	8.10	53.06	33.78	1.87	1.40	1.99	1.65	0.09	0.59	0.36	0.81	2700+	Plus	Plus	Plus	

* Location designated by Mining Company

ANALYSIS OF COAL ASH
PROVINCE OF BRITISH COLUMBIA (CONT'D)

Sample Number	Description of Sample				Kind of Sample	Ash % of Moisture-free Coal	Analysis of Ash, Per Cent										Reducing Atmosphere					
	Size: Nine Designation	Screen Opening, Inches	Shape of Screen: Opening sq. rd., slot.				SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	P ₂ O ₅	CaO	MgO	SO ₃	Na ₂ O	K ₂ O	Initial Deformation Temperature, °F	Softening Temperature, °F	Hemispherical Temperature, °F	Fluid Temperature, °F		
EAST KOOTENAY DISTRICT																			OPERATOR : KAISER COALS LTD.			
3129-69	AREA	CROWSNEST			T	13.59	52.96	30.92	1.68	1.43	1.51	6.72	0.96	4.41	0.29	0.59	2350	2570	Plus	Plus		
3130-68					T	11.68	55.02	31.76	2.24	1.27	1.41	4.20	1.06	3.26	0.24	0.52	2530	2600+	Plus	Plus		
3131-68					T	8.86	54.26	31.51	2.77	1.18	1.30	3.92	1.21	3.35	0.34	0.59	2500	2600+	Plus	Plus		
3132-68					T	7.77	58.70	30.57	2.18	1.19	2.18	3.64	0.64	1.77	0.39	1.18	2350	2600+	Plus	Plus		
MINE OR TRADE NAME: <u>ELK RIVER</u>																						
OPERATOR: CANADIAN PACIFIC OIL & GAS CO. LTD.																						
3279-67	*Channel A				M	19.77	53.81	37.35	2.36	1.81	0.25	1.71	0.33	0.30	0.10	0.15	2670+	Plus	Plus	Plus		
3280-67	*Channel B				M	35.11	63.66	30.32	1.74	0.71	0.10	1.26	0.70	0.02	0.19	1.77	2670+	Plus	Plus	Plus		
3281-67	*Channel C				M	17.03	55.17	36.92	1.15	1.65	0.09	1.50	0.13	0.12	0.19	0.15	2670+	Plus	Plus	Plus		
3282-67	*Channel D				M	10.35	53.96	35.98	4.89	1.35	0.65	2.24	1.06	0.43	0.00	0.00	2670+	Plus	Plus	Plus		
3283-67	*Bony Coal from Section D				M	17.59	20.25	12.43	50.01	0.17	3.24	7.70	3.27	3.25	0.48	0.15	1950	2080	2220	2260		
3223-68	*ER-8				M	12.08	51.76	36.00	5.02	1.19	1.37	1.71	0.78	0.96	0.34	0.59						
3233-68	*ER-7				M	8.84	54.96	31.51	3.29	1.24	2.19	2.49	1.22	0.38	0.24	1.69						
3234-68	*ER-9				M	9.15	53.74	35.41	2.98	1.45	2.01	2.24	0.79	0.29	0.10	1.03						
3235-68	*ER-12				M	11.05	57.09	33.88	2.36	1.17	1.31	1.79	0.75	0.54	0.10	0.96						
3250-68	*ER-11				M	9.13	54.05	35.16	3.27	1.40	2.05	2.69	0.52	0.40	0.10	0.59						
3099-68	*ER-4				M	8.72	53.72	32.96	4.45	1.02	1.47	2.80	0.38	1.35	0.58	1.18						
YUKON TERRITORY																						
MINE OR TRADE NAME: <u>TANTALUS BUTTE</u>																						
OPERATOR: YUKON COAL CO., LTD.																						
3039-66	*Bull Dozer Trenching				M	14.75	49.09	39.13	5.21	2.42	0.45	1.67	0.21	0.92	0.87	0.88						

* Location designated by Mining Company

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