Energy, Mines and Resources Canada
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Canada Centre for Mineral and Energy Technology
Centre canadien de la technologie des minéraux et de l'énergie

PETROGRAPHIC ANALYSIS OF CLEANED COAL SAMPLES FROM THE DONKIN OFFSHORE DRILLING PROGRAM SUBMITTED BY CAPE BRETON DEVELOPMENT CORPORATION SYDNEY, NOVA SCOTIA

Project No. 03-1-3/10-12
Job No. 3248R

J. G. Jorgensen
Combustion and Carbonization Research Laboratory

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ENERGY RESEARCH PROGRAM
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by

J. G. Jorgensen

INTRODUCTION

The investigation involved the petrographic analyses of eight cleaned coal samples from the Donkin Area Offshore Drilling Program. The project was initiated by J. C. Campbell, P. Eng., Product Engineer, Cape Breton Development Corporation, Sydney, Nova Scotia in a letter dated 11 October 1979. A copy of the letter appears in Appendix 1.

The core samples were prepared by Warnock Hersey Professional Services Ltd, Calgary, Alberta. A description of the samples analyzed appears in Table 1. The petrographic analyses of the samples are tabulated in Tables 2 and 3.

This report is intended primarily for record purposes and results were transmitted to the company during the course of the investigation.

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*Head, Carbonization Evaluation, Combustion and Carbonization Research Laboratory, Energy Research Laboratories, CANMET, Energy, Mines and Resources Canada, Ottawa, Canada K1A 0G1

Table 1 - Description of Coal Samples

Laboratory No.		Description
4282-79	79-9011-9024	Clean Composite
4283-79	79-9061-9070	Clean Composite
4284-79	79-10007-10032	Clean Composite
4285-79	79-10036-10053	Clean Composite
2298-80	79-10062-10080	Clean Composite
3142-80	80-1026-1043	Clean Composite
3143-80	80-1084-1102	Clean Composite
3144-80	80-1118-1128	Clean Composite

Table 2 - Petrographic Analysis of Component Coals

Identification				
Laboratory Number.....	4282-79	4283-79	4284-79	4285-70
Description	79-9011-9024 Clean Comp	79-9061-9070 Clean Comp	79-10007-10032 Clean Comp	79-10036-10053 Clean Comp
Distribution of Vitrinite Types				
V-6.....%				
V-7.....%		1.6	6.4	4.8
V-8.....%	30.3	34.5	35.4	54.3
V-9.....%	41.9	40.7	38.7	20.7
V-10.....%		1.5		
V-11.....%				
V-12.....%				
V-13 .....%				
V-14.....%				
V-15.....%				
V-16.....%				
V-17.....%				
V-18.....%				
Reactive Components				
Total Vitrinite.....%	72.2	78.3	80.5	79.8
Reactive Semi-fusinite (1/3)....%	2.5	1.2	1.1	1.7
Exinite.....%	5.1	6.3	5.3	3.2
Total.....%	79.8	85.8	86.9	84.7
Inert Components				
Inert Semi-fusinite (2/3).....%	5.1	2.4	2.2	3.3
Micrinite.....%	2.8	2.2	5.2	2.4
Fusinite.....%	5.8	2.5	3.8	3.6
Mineral Matter.....%	6.5	7.1	1.9	6.0
Total.....%	20.2	14.2	13.1	15.3
Petrographic Indices				
Mean Reflectance.....%	0.90	0.91	0.88	0.87
Balance Index.....	0.68	0.45	0.41	0.50
Strength Index.....	3.29	3.13	3.06	3.01
Stability Index.....	39.2	31.0	27.3	29.0

Table 3 - Petrographic Analysis of Component Coals

Identification				
Laboratory Number.....	2298-80	3142-80	3143-80	3144-80
Description	79-10062-10080 Clean Comp	80-1026-1043 Clean Comp	80-1084 1102 Clean Comp	80-1118-1128 Clean Comp
Distribution of Vitrinite Types				
V-6.....%	6.5			
V-7.....%	57.1		8.6	4.7
V-8.....%	18.0	32.3	53.9	34.2
V-9.....%		50.4	23.1	38.8
V-10.....%				
V-11.....%				
V-12.....%				
V-13 .....%				
V-14.....%				
V-15.....%				
V-16.....%				
V-17.....%				
V-18.....%				
Reactive Components				
Total Vitrinite.....%	81.6	82.7	85.6	77.7
Reactive Semi-fusinite (1/3)....%	0.8	0.8	1.0	1.7
Exinite.....%	4.3	5.9	3.8	3.4
Total.....%	86.7	89.4	90.4	82.8
Inert Components				
Inert Semi-fusinite (2/3).....%	1.6	1.7	1.9	3.3
Micrinite.....%	5.8	3.0	2.6	5.6
Fusinite.....%	4.3	3.4	2.4	4.2
Mineral Matter.....%	1.6	2.5	2.7	4.1
Total.....%	13.3	10.6	9.6	17.2
Petrographic Indices				
Mean Reflectance.....%	0.76	0.91	0.86	0.89
Balance Index.....	0.47	0.32	0.29	0.56
Strength Index.....	2.74	3.06	2.87	3.18
Stability Index.....	18.3	21.3	11.0	34.6

BIBLIOGRAPHY

1. ASTM Designation: D388-66; "Classification of Coals by Rank".

2. ASTM Designation: D720-67; "Test for Free Swelling Index of Coal".

3. ASTM Designation: D2639-71; "Test of Plastic Properties of Coal by the Constant-Torque Gieseler Plastometer". (Constant torque plastometer used with a torque of 40 gram-inch; start, 1 dd/m; fusion, 55 dd/m; final, 1 dd/m; solidification, no movement; range-temp., between start and final temperatures).

4. Burrough, E. J. "Specific Volatile Index"; Fuels Division Memorandum 97/58-CG, Fuels and Mining Practice Division, Mines Dept. of M. and T.S., Ottawa, Canada.

5. German Industrial Specification No. DIN 51739/March 1951.

6. ASTM Designation: D2797-72; "Preparing Coal Samples for Microscopical Analysis by Reflected Light".

7. ASTM Designation: D2798-72; "Determining Microscopically the Reflectance of the Organic Components in a Polished Specimen of Coal".

8. ASTM Designation: D2799-72; "Microscopical Determination of Volume Percent of Physical Components of Coal".

9. Schapiro, N. and Gray, R. J. "Petrographic Classification Applicable to Coals of All Ranks"; Proc. Ill, Min. Inst., 1960, 83-97.

APPENDIX 1

Letter dated October 11, 1979 from

J. C. Campbell, P. Eng., Product Engineer

Cape Breton Development Corporation, Coal Division

Sydney, Nova Scotia

CAPE BRETON
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CANADA

SOCIÉTÉ DE DÉVELOPPEMENT
DU CAP-BRETON
DIVISION DES CHARBONNAGES
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SYDNEY, NOUVELLE-ÉCOSSE
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October 11, 1979

Mr. J.C. Botham
Manager
Coal Resource & Processing Laboratory
Dept. of Energy, Mines & Resources
Canada Centre for Mineral & Energy Technology
555 Booth Street
Ottawa, Canada
K1A 0G1

Dear Jack:

Re: Drill Core Samples
1979 Offshore Drilling Program
Devco P.O. # 15226

A further program of offshore drilling was begun in the late summer of 1979 to extend the exploration and definition of coal reserves in the Donkin area.

As was done in previous years a portion of the cores is being sent to Warnock Hersey for chemical analysis and physical testing. Sink-float and flotation tests are being done as well to determine the possibilities for upgrading the raw coal.

A portion of the floats plus flotation product, mixed in the proper proportion will be sent to you at varying intervals for determination of the various petrographic properties as described in the purchase order.

Yours very truly,

J.C. Campbell, P.Eng.
Product Engineer

JCC:mlm