CANADIAN CARBONIZATION RESEARCH ASSOCIATION

ERP/ERL 77-101 (TR)

ANNUAL REPORT

Fiscal Year Ending July 31, 1977

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Fiscal Year Ending July 31, 1977

ENERGY RESEARCH PROGRAM
ENERGY RESEARCH LABORATORIES
REPORT ERP/ERL 77-101 (TR)

FOREWORD

The Annual Report of the Canadian Carbonization Research Association for the fiscal year ending July 31, 1977 was prepared for the 25th Regular Meeting of the Board of Directors. The meeting was held in the Main Office, Kaiser Resources Limited, Sparwood, British Columbia on September 29, 1977.

C O N T E N T S

CANADIAN CARBONIZATION RESEARCH ASSOCIATION

BOARD OF DIRECTORS

1977-1978

OFFICERS

Chairman - Mr. J.T. Collier,
Manager, Coke Oven Department,
Sydney Steel Corporation,
P.O. Box 1450,
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Vice-Chairman - Mr. W.J. Riva,
Vice-President, Mining Operations,
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(604) 425-8221

Treasurer - Mr. G.A. Chapman,
Sr. Research Investigator,
The Steel Company of Canada,
Hamilton, Ont. L8N 3T1
(416) 528-2511

Secretary - Mr. J.C. Botham,
CANMET,
Dept. of Energy, Mines & Resources,
555 Booth Street,
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(613) 996-4570 Ext. 191

CANADIAN CARBONIZATION RESEARCH ASSOCIATION

BOARD OF DIRECTORS
1977-1978

MEMBERS

The Canmore Mines Ltd.,
Canmore, Alberta.
MR. C.W. GREGORY
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(403) 678-5531

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MR. P.J. URSO (Alternate)
General Manager

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and Utilization Division.
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Superintendent, Coke Plant.
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CANADIAN CARBONIZATION RESEARCH ASSOCIATION

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MR. T.J. CASSIDY,
Honorary Member,
706-1212 Pine Ave. W.,
Montreal, Quebec.

TECHNICAL COMMITTEE

Chairman - MR. J.C. WILSON
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MR. W.S. WILSON,
Marketing Manager,
Fording Coal Limited,
Suite 206,
205 - 9th Avenue S.E.,
Calgary, Alberta. T2G 0R4

REVIEW OF THE YEAR

BY

CHAIRMAN, BOARD OF DIRECTORS

CANADIAN CARBONIZATION RESEARCH ASSOCIATION

(Fiscal Year ending July 31, 1977)

The Board of Directors meets today for the twenty-fifth time, which numerically suggests an anniversary or milestone in Government-Industry relationship in the field of carbonization.

In light of the current importance of our coking coal resources, it is appropriate that we are holding this meeting in Sparwood in the offices of the largest coal producing company in Canada. The Board of Directors is grateful to Kaiser Resources Ltd. in hosting this meeting, and we would particularly like to extend our thanks to Mr. W.A. Riva, our Deputy Chairman, for his efforts concerning the necessary arrangements for the meeting. Incidentally, this is the fourth meeting of the Board held in Western Canada since the inception of CCRA in 1965, the last meeting being held in Calgary in September of 1974.

Dr. B.I. Parsons, Chief of the Energy Research Laboratories, had good intentions of attending today's meeting, but had to cancel his arrangements at the last minute. He has extended his good wishes and cooperation, and tentatively plans to attend the next meeting of the Board.

On behalf of the Board I would like to welcome two new member companies with representation on the Board; namely Mr. A.A. Johnson, Denison Mines Limited, and Dr. H. Gruss, Elco Mining Limited. Formal approval of their memberships is an Agenda item of this meeting.

In previous meetings we have kept the Board Members informed of relevant changes which occur frequently within the CANMET organization. In this vein I might mention that Dr. D.A. Reeve, formerly Assistant Manager of the Coal Resource and Processing Laboratory (CRPL) has now been promoted to Director of the CANMET Energy Research Program. Dr. Reeve brings to the Energy Office his experience in CCRA matters and his knowledge and expertise in cokemaking. This new situation should be advantageous to CCRA in terms of future proposed research proposals sponsored by the Association. The Board extends their good wishes to Dr. Reeve in his future endeavours, and hopes that he will be able to continue as Secretary of the CCRA Technical Committee. Dr. W.R. Leeder is presently on a leave of absence from CRPL, partaking in a six-month technical exchange arrangement with the Coal Research Establishment (CRE) of the National Coal Board (NCB) in Stoke Orchard (UK). The exchange has been made under the auspices of the EMR/NCB Bilateral Coal Agreement, and Dr. T. Peirce of CRE is now with CRPL as his exchange partner. Recent communications from Dr. Leeder indicate that the exchange has proved most worthwhile. In addition to his carbonization-related projects at CRE, he has visited several establishments in the UK associated with this field. At the present time he is on the Continent where he will cover a circuit of similar coal and coke oriented activities and technology. The experience to be gained by Dr. Leeder should be reflected in future CCRA-sponsored work.

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Dr. Peirce, his counterpart now in Ottawa, will be carrying out research studies in conjunction with the CCRA-sponsored project on self-sufficiency. It is anticipated that his contribution, based upon the experience and the viewpoints of a coal carbonization scientist of the UK, will enhance and broaden the scope of this project. The Laboratories in Ottawa (CRPL) spend a significant amount of their time on similar technology exchanges and training. This matter is not normally conveyed to the members, but since it has an indirect bearing on the CCRA activities, I might mention some of the training which the Laboratory has participated in during the past year.

Dr. A.A. Afonja	-	Department of Chemical Engineering, University of Ife, Nigeria - one year with Dr. Leeder on formed coke as post doctorate fellow.
Dr. Arabinda Gosh	-	Professor of Geology, Carleton University, Ottawa - two months with Dr. Nandi on coal petrography on a UNESCO/UNDF Fellowship.
Mr. Raul E. Olmos	-	Sena, Colombia S.A. - 6 months with CRPL on CIDA grant.
Dr. T.J. Peirce	-	CRE, National Coal Board (UK) - 6 months with CRPL on EMR/NCB coal agreement.
Mr. Shigeru Narata	-	Coking Coal Dept., Mitsuibishi Corp., Tokyo - two weeks general training at CRPL.

Incidentally, Mr. Yukio Ida of Mitsuibishi accompanied the CCRA Technical Committee representatives as an interpreter during their recent post NKK/CCRA Technical Meeting Tour. Two years ago Mr. Ida spent a training period in Ottawa and recommended similar training for other members of his company dealing in coal and coke.

As some of you are well aware, the National Advisory Committee for Mining and Metallurgical Research (NACMR) is composed of senior representatives from industry with the purpose of advising the Minister of the Department of Energy, Mines and Resources (EMR) on relevant research. I make reference to this committee in relation to pertinent comments from the NACMR Sub-Committee on Energy Processing. Members of CRPL made presentations to the Sub-Committee Meeting held in Ottawa on March 17, 1977. I would like to quote a specific comment of the Sub-Committee as given in the Minutes to their meeting:

> *The expertise in conventional cokemaking provided to the Canadian steel industry through the CCRA by the Coal Resource and Processing Laboratory of the Energy Research Laboratories has been invaluable. This has been a first class example of a very beneficial cooperation between industry and government. The petrography has been invaluable, for example.*

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A large investment in formed coke development would not seem to be wise. Work on formed coke is already in progress in several plants outside Canada.

The characterization of coals can be very beneficial to the industry where a dollar value can be put on the various ingredients of the coals, i.e. as the Japanese do. We need to be able to characterize our coals for quality, quantity and economics.

It is only through comments such as these from high levels of industry that our activities are brought to the attention of those in the senior echelons of the Department. In the past, ineffective communication may be responsible for a low-key attitude towards carbonization by those in the Department concerned with high level planning and budget appropriation. This type of expression from industry should be encouraged when it is deserving. The following general statements concerning our activities are extracted from the recommendations of the sub-committee:

(a) *CANMET should not concentrate its efforts in fewer areas, but should develop expertise in other areas comparable to the present expertise in carbonization;*

(d) *CANMET should continue coal research in the full scope outlined in the reports;*

(f) *More effort should be devoted to resource assessment and evaluation, which is vitally important. Closer cooperation between GSC and CANMET is a must.*

(l) *It is imperative that EMR determine what are the coking coal reserves and set limits to exports to prevent the sale of too much of our best coal;*

(n) *Work on formed-coke should be centered on specific problems related to Canadian supply and utilization and not on process development since several demonstration plants are now being built.*

The latter recommendations may be somewhat redundant in relation to the specific comment, but are given herein for the consideration of the Board in relation to the existing projects and proposals of the Technical Committee, which will be presented in detail by the Technical Committee Chairman in his report. I might point out that CRPL has placed an order for a new 18-in. MW coke oven from the Carbolite Company in the UK for use at the ERL Edmonton Laboratory. This new acquisition should assist materially in recommendations (d) (f) and (l) of the NACMR Sub-Committee.

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The second CCRA/NKK technical meeting was held in Japan May 24-25, 1977 with reported success. The CCRA-TC Chairman will report to you on this matter. The NKK representatives have expressed a desire to continue with the meetings on a regular basis (next meeting tentatively slated for mid-1978), and I would like to solicit your opinions regarding the frequency of such meetings and the subject of papers for presentation.

The period under review concludes the first full year of CCRA operation under the joint CCRA-CANMET funding arrangement. The fiscal status of the Association will be given by the Treasurer in his report, after which Board Members must consider the financial arrangements for the Association year of 1977-1978.

I would like to extend my thanks to the Technical Committee, the staff of CRPL and other officers of the Association for their efforts during the past year

J. F. Collins

TECHNICAL COMMITTEE

CHAIRMAN'S REPORT

REPORT OF THE TECHNICAL COMMITTEE OF THE CANADIAN CARBONIZATION RESEARCH ASSOCIATION

1976 - 1977

1. Introduction

A highlight of the Technical Committee's activities was the continuation of the technical exchange with NKK which began in 1976. The second exchange was held at the head office of NKK in Tokyo. Following the exchange with NKK, the group toured selected integrated steelworks and research facilities in Japan.

Many changes in representation took place this year on the Technical Committee; all four integrated steelworks had new members. Additionally, Elco Mining was also accepted as a member of CCRA at the last meeting of the Board of Directors.

Research studies have continued on selective pulverization, partial briquetting of coke oven charges, and the documentation and correlation of the 18" moveable wall oven at Bells Corners. All of these studies will continue into the next fiscal year. These research studies and confidential studies have allowed the experimental coke ovens in Ottawa and Edmonton to maintain full operation.

2. Meetings

As in previous years, the Technical Committee met five times. The meetings were as follows:

Technical Committee Meeting Number	Location	Dates
62	Ottawa	Sept. 9, 10, 1976
63	Ottawa	Nov. 4, 5, 1976
64	Ottawa	Jan. 13, 14, 1977
65	Ottawa	Mar. 3, 1977
66	Ottawa	May 5, 6, 1977

In the past, Technical Meetings have been held occasionally in locations other than Ottawa to promote attendance and interest by the coal producers. The present committee feels a continuance of this policy is worthwhile so that the needs of both the coal producers and coal users are fully represented.

The Technical Committee solicits the advice of the Board of Directors on this point.

3. Personnel

As noted in the introduction, all four integrated steel producers changed representatives on the Technical Committee. The representatives now are as follows:

Algoma - Mr. N. Farkas

Dofasco - Mr. J. C. Wilson

Stelco - Mr. A. W. Kay

Sysco - M.P.G. Aldous

Elco Mining was also accepted as a member of CCRA.

In addition, Dr. D. A. Reeve, Secretary for the CCRA, was appointed Director of Energy Research.

4. Computerization of Carbonization Data

This work continues and has proven as a valuable asset when drawing relationships between coal properties and coke strength. An example of this was the paper by J. C. Botham and D. A. Reeve, "The Quality of Canadian Metallurgical Coals in the Japanese and World Markets."

5. Joint NKK-CCRA Technical Exchange

The second NKK-CCRA technical exchange was held at the head office of NKK on May 24-25, 1977. In addition to the technical exchange with NKK, a trip to the new Ogishima Works was also scheduled. Other facilities visited on the tour were:

a) Sumitomo Wakayama Works

b) Nippon Steel Tobuta, Yawata Works

c) Nippon Steel Oita Works

d) MITI

e) Tokyo University

A complete report of the trip is attached for reference; however, some of the points of interest are as follows:

a) All plants visited were using non-coking coals. This was accomplished by partially briquetting part of the coke oven charge and/or using special caking substances.

b) All coals are kept separate, shipment by shipment, and blended by petrography. Up to 18 different coals may be blended together.

c) Each company has the capacity to selectively pulverize. Coals are grouped by their relative hardnesses and pulverized accordingly. Sumitomo previously used the Savaco process to selectively grind their high inert Canadian and Australian coals, but have taken the system out and opted for a second partial briquetting plant believing they can get at least the same strength increase with fewer problems.

d) Only Sumitomo are presently using special caking substances on a commercial basis, although NKK and NSC are investigating this material. Theoretically, 2%-3% ASP + 7%-8% non-coking coal will produce 10% coking coal; although in practice, Sumitomo are replacing 7% coking coal with 2%-3% ASP and 4%-5% non-coking coals.

e) All companies are working on formed coke, yet Sumitomo are the only ones who feel confident that have a commercially viable process (DKS).

f) Each company has its own system of coal evaluation.

g) NKK, NSC and SMI are all investigating a strength-after-or-during-reaction test for coke. The intent is to more accurately predict the relative worth of a coke in the blast furnace. The problem is first to correlate all the coal and cokemaking variables which affect the hot strength and then correlate these properties with blast furnace operations.

For those who attended the technical exchange, the meetings and plant visits proved invaluable; however, NKK wish to continue the exchanges on a yearly basis. The Technical Committee feel that a minimum of two years between meetings is more realistic provided sufficient technical knowledge is available for exchange.

The advice of the Board of Directors is required in this matter.

6. Productivity

a) Ottawa

Oven	Total No. of Tests 1976-1977	1975-1976	1974-1975
18"	57	9	41
12"	76	67	89
30#	23	60	10
Sole Heated	52	73	96
Total	208	209	236

The tests carried out in the 18" moveable wall oven, the 12" oven and the 30-lb. oven which represent a total of 156 tests have been classified under the five headings as shown below.

A category noted as "work-up" tests has been included this year as a significant number of tests have been done to determine how the ovens have been working. These tests cannot be properly listed as either research or correlation, and, therefore, it seemed best to adopt this term to describe them.

Category	No.	Percentages 1976-1977	1975-1976	1974-1975
Confidential	39	25.0	73.3	35.0
Resource Evaluation	14	9.0	5.0	8.6
Research Studies	38	24.4	21.6	41.4
Correlation Tests	37	23.7	0.0	15.0
Work-up	28	17.9	0.0	0.0
	156	100.0	100.0	100.0

b) Clover Bar

There were 66 tests carried out in the Koppers' oven in this review period. These were classified as follows:

Category	No. of Tests	%
Confidential Studies	21	31.8
Resource Evaluation	15	22.7
Research	27	40.9
Correlation	-	-
Work-up	3	4.6
	66	100.0

7. Research Studies

a) Standardization and Correlation Studies:18" Moveable Wall Oven

The purpose of this study was to:

i) Establish whether the newly rebuilt 18" moveable wall oven in Ottawa was sensitive to cokemaking variables and ranges in predicted coke strength.

ii) Correlate the newly rebuilt 18" oven, the 12" oven, and the industrial scale ovens.

To date, 23 tests have been run in the 18" oven to test sensitivity to cokemaking variables. Relationships between coke strength and coking rate, bulk density and moisture have been determined as well as bulk density and hardness and specific gravity relationships.

The relationships developed are not new, but reconfirm work previously done and indicate that the newly rebuilt oven will be a useful tool for cokemaking investigations.

The remaining work is confined to correlating the 12" and industrial scale ovens with the 18" oven and sensitizing the new oven to ranges in coke stability (30 - 60 predicted stability). This work is expected to be completed by January, 1978.

b) Selective Pulverization

Phase I of the selective pulverization study has been completed and an interim report issued by A. W. Kay. The conclusions to date are as follows:

i) Coke stability can be improved either by conventional or selective pulverization. This can be accomplished by:

a) increasing the pulverization from 70 to 80 percent minus 6 mesh which will result in only marginally higher coke stabilities,

and

b) pulverizing the coal above 80 percent minus 6 mesh which can increase the coke stability by 3 units for every 10 percent increase in pulverization.

ii) In general, the practice of blending and pulverizing the coal blend produces higher stability coke than by selective pulverization of the component coals followed by blending.

iii) The only advantage that selective pulverization can claim is that the amount of bug dust in the blend can be reduced if only those coals which significantly affect coke stability are pulverized to a higher level.

iv) Grinding a high inert coal selectively increases coke stability. With the blend chosen, 30% Balmer, 35% Chisholm, 35% Madison, increasing the pulverization of Balmer coal from 65% -1/8" to 90% -1/8" while holding the balance of the blend to 80% -1/8" increased coke stability from 48.9 to 51.5.

Phase II, a series of 32 tests, will be used to determine the effect of coal fluidity, coal rank, and pulverization on the resultant coke strength. Contrary to the first set of experiments which selectively pulverized types of coal (high volatile, low volatile), phase II will selectively pulverize each coal separately.

This series of tests will be run at the Clover Bar Laboratories beginning in October, 1977.

c) Briquette Addition to the Coke Oven Charge

While waiting for the present studies on the 18" oven to be completed, preliminary work using the cannister test was done to establish those briquetting parameters which would most affect coke strength. The factors tested were:

i) Shape and density of briquette

ii) Amount of binder required

iii) Type of binder

iv) Degree of pulverization

v) Moisture level

The cannisters were evaluated using the small scale Red Devil test. Unfortunately, the only conclusion that could be drawn from the experiments was that briquetting 30% of the coke oven charge increased coke quality. The Red Devil test appears to be insensitive to the small changes associated with those parameters studied.

Large scale testing in the 18" oven will begin in January, 1978. The first phase of the work will:

i) Determine the merit of briquetting 30% of the coke oven charge with the conventional blends used at the steel plants; i.e. high fluid., 25% low volatile.

ii) Determine the effect of reducing the low volatile portion of the blend while briquetting 30% of the blend.

iii) Replace the blend with non-coking coal from 5%-20% with 30% briquettes in the blend.

Sections (ii) and (iii) will change the blend fluidities and R_o sufficiently to establish the effect on partial briquetting and coke strength.

d) Self-Sufficiency

This study is to begin by November 1977. All producing Canadian coal mines, except McIntyre, have expressed interest in the study. The Canadian Coal Petrographers will be doing considerable work with the coals once the study begins.

e) Degradation of Coke in the Blast Furnace - A Research Proposal by W-K Lu

Attached is a proposal by Dr. Lu of McMaster University to study the effects of alkali attack on coke and the resultant effect on coke strength. The intent of putting the proposal before the CCRA is to raise money for the project and for this reason, a decision by the Board of Directors is required.

8. Concluding Remarks

The CCRA trip to Japan this year reiterated what has already been said numerous times before. The Japanese are using inferior coals and producing acceptable coke for the world's largest blast furnaces.

The present work with selective pulverization, partial briquetting, and self-sufficiency will allow us to more fully understand the effect of this technology on our present and future situations. The Technical Committee is also considering investigating the use of petroleum-based coking additives which would expand the range of coals suitable to conventional cokemaking. Additionally, a hot strength for coke evaluation is currently being considered. Firm proposals for these will be presented at a later date.

J. C. Wilson
Chairman - CCRA Technical Committee

FINANCIAL REPORTS

THE CANADIAN CARBONIZATION RESEARCH ASSOCIATION

FINANCIAL STATEMENTS

JULY 31, 1977

DONALD W. KEITH

CHARTERED ACCOUNTANT

384 GUELPH LINE
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TELEPHONE:
632-5467

AUDITORS' REPORT

To The Members of
The Canadian Carbonization Research Association

I have examined the balance sheet of The Canadian Carbonization Research Association as at July 31, 1977 and the statement of operations for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

In my opinion, these financial statements present fairly the financial position of the association as at July 31, 1977 and the results of its operations for the year then ended in accordance with generally accepted accounting principles.

The auditor's report dated January 14, 1977 covering the fiscal year ended July 31, 1976 was qualified for the possible effect of any adjustments which might have been required had I been able to verify certain transactions summarized by the Department of Energy, Mines and Resources during that period.

Donald Keith

CHARTERED ACCOUNTANT

Burlington, Ontario
September 16, 1977

THE CANADIAN CARBONIZATION RESEARCH ASSOCIATION
BALANCE SHEET
AS AT JULY 31, 1977

	1977 $	Comparative 1976 $
ASSETS		
Current		
Cash	27239	19936
Accrued interest receivable	2131	1331
Investment in term deposits	62000	75000
	91370	96267
LIABILITIES		
Current		
Membership fees paid in advance	30000	12000
Due to The Department of Energy, Mines & Resources (Canmet)	-	32459
	30000	44459
MEMBERS' EQUITY		
Excess of revenues over expenses	61370	51808
	91370	96267

THE CANADIAN CARBONIZATION RESEARCH ASSOCIATION
STATEMENT OF OPERATIONS
YEAR ENDED JULY 31, 1977

	1977	Comparative 1976
	$	$
Revenue		
Membership fees	96000	99000
Test Revenue	14256	8906
Interest income	7088	3355
	117344	111261
Expenses		
Salaries and wages	-	81160
Canmet membership fees	93000	-
NKK	128	509
Bad debts	-	6000
Office supplies and expense	148	207
Replacement parts	-	660
Travel	-	532
Professional fees	250	-
Oven tests	14256	-
	107782	89068
Excess of Revenue over Expense for the year	9562	22193
Excess of Revenue over Expense, beginning of year	51808	29615
Excess of Revenue over Expense, end of year	61370	51808

Note 1

As at August 1, 1976 the association entered into an agreement with the Department of Energy, Mines and Resources (Canmet) whereby research investigation services are provided by the government at an annual rate of $93000 payable quarterly.

STATEMENT OF CANMET ACCOUNT NO. 024104*

- Canadian Carbonization Research Association -
(August 1, 1976 to July 31, 1977)

Revenue:

Member work orders (attached)	43,764.60	
Non-member work orders (attached)	34,989.00	
Membership Fees	93,000.00	
TOTAL Revenue		$171,753.60

Expenditures:

Salaries	67,973.25	
50% Overhead	56,311.75	
TOTAL Expenditures		$124,285.00
BALANCE remaining in account		$47,468.60

NOTE: The $47,468.60 surplus will remain in the CCRA Trust Account to be used for any incremental expenses.

*Cost accounting statement prepared by the Administrative Staff of the Energy Research Laboratories. A statement based upon cash accounting was prepared separately by the CANMET Comptroller's Office (see memorandum from Financial Officer, CANMET Administration to Energy Research Laboratories dated September 23, 1977).

WORK ORDERS COMPLETED AND TO BE CREDITED TO CANMET ACCOUNT NO. 024104

(August 1, 1976 to July 31, 1977)

Company	Job No.	Member	Non-Member
The Steel Company of Canada Limited	4095R	6,000.00	-
Kaiser Resources Limited	3005R	10,903.00	-
Cape Breton Development Corporation	3042R	1,276.00	-
Cape Breton Development Corporation	3061R	2,912.00	-
Dominion Foundries & Steel Limited	3063R	7,260.00	-
Fording Coal Limited	3075R	3,978.00	-
Fording Coal Limited	3086R	6,778.40	-
Sage Creek Coal Limited	3090R	-	1,843.00
Kaiser Resources Limited	3092R	3,448.80	-
Denison Mines (BC) Limited	3093R	-	14,740.00
Utah International	3094R	-	18,406.00
Cape Breton Development Corporation	3098R	620.40	-
The Algoma Steel Corporation	3099R	588.00	-
TOTAL		43,764.60	34,989.00

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

TO / *À*: Energy Research Laboratory,
Attn: C. Cameron.

FROM / *DE*: Financial Officer,
Administration,
CANMET.

SECURITY - CLASSIFICATION - *DE SÉCURITÉ*
OUR FILE - *N/RÉFÉRENCE*
YOUR FILE - *V/RÉFÉRENCE*
DATE: September 23, 1977.

SUBJECT / *OBJET*: C.C.R.A. Account - 024104

The account maintained by our office for the above mentioned Special Deposit Account indicate a balance of $24,769.34 at August 31, 1977.

Balance at July 31, 1977			$27,580.54
Less: Disbursement of July			
DND Pay	250777 - 070877	484.00	
DND Pay	" - "	484.00	
DND Pay	" - "	1843.20	2,811.20
Balance as of August 31, 1977.			$24,769.34

Note

OUTSTANDING INVOICES

3063R - 7260.00
3092R - 3448.80
3098R - 620.40 - 11,329.20
4095R - 6000.00 - 6000.00

$42,098.54

Claude Laberge

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