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ENERGY RESEARCH LABORATORIES  
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CANADIAN CARBONIZATION RESEARCH ASSOCIATION  
FIFTY-FOURTH TECHNICAL COMMITTEE MEETING  
ENERGY RESEARCH LABORATORIES

by

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CANADIAN CARBONIZATION RESEARCH ASSOCIATION  
FIFTY-FOURTH TECHNICAL COMMITTEE MEETING  
ENERGY RESEARCH LABORATORIES  
January 22 - 23, 1975.

1.0 ATTENDANCE

The Fifty-Fourth Technical Committee Meeting of the Canadian Carbonization Research Association (CCRA) was held at the Canadian Metallurgical Fuel Research Laboratory, Bells Corners, Ontario, on January 22 - 23, 1975.

Committee Members

Mr. J.T. Collier, Chairman	Sydney Steel Corporation
Mr. R.C. Zavitz	Dominion Foundries and Steel Ltd.
Mr. P.J. Readyhough, Alternate Member	The Steel Company of Canada Ltd.
Mr. W.P. Dowhaniuk	Algoma Steel Corporation Ltd.
Dr. D.A. Reeve, Secretary	CANMET

Association Members Represented

Mr. A.M. Cameron, Chairman	Algoma Steel Corporation Ltd.
Mr. J.C. Botham, Secretary	CANMET
Mr. I.T. Lau	CCRA Research Associate

Others Present

Dr. J. Strasser	Sydney Steel Corporation Ltd.
Mr. P. Aldous	Sydney Steel Corporation Ltd.
Mr. A. Hampson	Dominion Foundries and Steel Ltd.
Dr. W.R. Leeder	CANMET
Mr. S.M. Ahmed	CANMET
Mr. W. Gardiner	CANMET
Mr. D. Di Credico	CANMET
Mr. J.G. Jorgensen	CANMET

In addition, other staff members from CMFRL were present together with representatives from the Canadian Coal Petrographer's group which had met prior to the present meeting.

The Chairman, Mr. J.T. Collier welcomed Mr. W.P. Dowhaniuk to the meeting as the new member for the Algoma Steel Corporation Ltd., replacing Mr. N.R. Farkas. Dr. J.H. Walsh joined the meeting for lunch on Jan. 23rd.

2.0 REVIEW OF PREVIOUS MINUTES

The minutes of the 53rd Technical Committee Meeting were adopted as circulated,

### 3.0 INDUSTRIAL DEVELOPMENTS

(1) Mr. A.M. Cameron reported on a recent tour of operational and pilot plant coal preheating installations to obtain knowledge of current state of the art. Based on this tour, the Algoma Steel Corporation has postponed addition of preheating facilities to their existing coke oven batteries and have decided to build Battery No. 10 (5 metre ovens, 1068 cu. ft., the same as Battery No. 9). The tour had indicated that the main problem experienced in current preheating installations is the handling of coal fines. The pipeline-charged Coaltek system at Inland Steel (Koppers ovens, 75% Illinois coal giving a stability of 60) has experienced problems because of high coal fines recirculation. The same problem has been experienced at the Semet-Solvey plant (Wilputte ovens) at Detroit where slurry ponds are used to recover the coal fines. The coal fines system at the Alabama By-Products plant in Birmingham which uses Wilputte ovens and the Coaltek system, is being redesigned. Algoma's experiences with the Precarbon Process at the Emil pilot plant in West Germany have been reported in previous minutes. The Simon-Carves larry-car charging system for preheated coal was rejected because of problems in emptying the larry-car, excessive aspiration on the collecting main being required. The British Steel Corporation feel that the Simon-Carves Process is not commercially viable at present.

(2) CanPac Minerals Ltd. of Calgary plan to open a mining operation in the Shaughnessy area 15 miles west of Lethbridge, Alberta, mining sub-bituminous or high-volatile B or C coal.

(3) The Mines Branch of the Department of Energy, Mines and Resources has a new name effective January 1st, 1975: Canada Centre for Mineral and Energy Technology. The new method of matrix management being instituted in CANMET which combines elements of programming and functional areas was explained. The three programs are: Information, Minerals, and Energy. Dr. D.S. Montgomery is in charge of the Energy Program.

### 4.0 CANADIAN COAL PETROGRAPHER'S GROUP

Mr. R.C. Zavitz reported on the meeting of the above group which had been held immediately prior to the present meeting. The Petrographer's have resolved to seek affiliation with CCRA under Article 2, Section 7 (Affiliate Members) as discussed at the last Board of Directors meeting. This affi-

liation has the advantage that the Petrographer's Group can operate as a semi-autonomous body.

Mr. Zavitz reported that an initial round-robin test series of coal samples for petrographic analysis had given wide variation in results and a second test series also using samples prepared at CANMET will be undertaken. He anticipated that there will be future collaboration between the group and the CCRA Technical Committee on aspects relating to preheating and antifissurants.

The new Chairman of the group is Dr. Alex Cameron of the Geological Survey of Canada, Calgary, and the Secretary is Dr. B.N. Nandi of CANMET. The next meeting is scheduled to be held in Calgary early in June.

## 5.0 PROGRAMS

### 5.1 Formed-Coke

The stainless steel shell has been installed in the sandcoker, allowing higher temperatures to be obtained. Problems have still persisted in the hydraulic system of the laboratory automatic batch press but progress was slow over the Christmas period. The preparation of closely sized feed materials for the formed coke mixer-feeder system has required the use of an elutriation technique, as described in the previous minutes. Several sources of industrial char have been investigated and one source looks promising. It is hoped that the inaugural run on the pilot-scale mixer-feeder hot-briquetting system will take place in the near future.

### 5.2 Antifissurants

The STELCO antifissurant program has now been completed.

The canister-Red Devil shatter test method for the evaluation of coking properties of small samples of metallurgical coal (Item 4.2 previous minutes) has been applied to the STELCO antifissurant series using -35 and -65 mesh coke breeze at bulk densities of 46 and 51 lb/cu. ft. and in base blends containing 18 and 25% lv coal. Trends were similar to those obtained in the 18 and 12-inch oven series in that optimum breeze replacement was between 3 and 6%. However, it should be noted that results to obtain all of these experimental parameters were obtained from only two side-charge 12-inch MW oven tests.

The high temperature dilatometer, which has special application to antifissurant studies, is still presenting difficulties with regard to repeatability of results.

### 5.3 Preheating

Results were presented for two preheating programs done in the Edmonton gas-fired Koppers oven (Appendix I).

The ALGOMA test series indicated a slight drop in stability but showed an increase in carbonization pressure on preheating to 470°F. The DOFASCO preheat series, which incorporated 5% coke fines, indicated a marked increase in stability with preheating although there was little change in carbonization pressure. Oven centre temperature profiles for one of the tests from the ALGOMA series are shown in Appendix II. Compared with the Precarbon Process in which coke is pushed at a centre temperature of 1650°C, the decrease in carbonization time when a preheated charge was used was equivalent to 21.5%.

### 5.4 Automatic Gieseler Plastometer

Tests have been run to compare fluidity as measured by the completely automatic plastometer and the standard ASTM automatic method. It would appear that a linear correlation between the two methods will be obtained, although more correlation tests are required.

### 5.5 CCRA Sponsored ASTM Round-Robin Coke Tumbler Test Series

The last part of this test series is now almost complete with one outstanding sample.

Stabilities of several cokes have been measured using the regular ASTM method and the newly proposed modified method which uses 50% 1½ by 2 inch and 50% 2 by 2½ inch coke. Statistical analysis of the results reveals that these test methods give the same stability (Appendix III). Apparently the U.S. Steel Corporation have now adopted the modified ASTM stability test.

### 5.6 Coke Oven By-Product Analysis

Following discussions at the last Technical Committee meeting, work is continuing on the breaking of tar-water and water-tar emulsions. One possible explanation why water-tar emulsions are so stable may be found in the action of finely divided solids, e.g. carbon. Apparently, commercial emulsion breakers are not suitable for every case and small quantities of zinc in tars from coke ovens play a part in emulsification.

A small retort (500 grams) to carbonize coal, with an attached by-product analysis train, is being assembled in an attempt to characterize preheated coals by their by-products. Hopefully, coke quality parameters will

be able to be correlated with by-product analysis for both normal and preheated coals.

#### 5.7 Current Evaluation Studies at Clover Bar

The CMFRL satellite carbonization facilities in Edmonton are actively engaged in evaluation of western Canadian coal sources and research studies on preheated coals. Approximately 80 tests have been carried out in the Koppers oven since the date of commissioning. Committed projects now include evaluation studies for Kaiser Resources Limited, the Grandridge Mining Company Limited, and Rio Algom Mines Limited and also preheated coal studies on coal samples submitted by Algoma, Dofasco and Stelco. The tests for these projects are scheduled for completion in early summer.

#### 5.8 CMFRL Projects

Current projects "on the books" for the Ottawa facilities are almost up-to-date, perhaps with the exception of the 18-inch oven Clover Bar correlation program. In the near future the following projects will start:

- (a) Selected pulverization project including oiling, for the Steel Company of Canada. This project requires a large amount of coal preparation for 35-38 MW oven tests.
- (b) Four to six 18-inch oven tests of Lingan-DEVCO coals.
- (c) Kaiser Resources Limited 1974 Exploration Program (12-inch oven)
- (d) Fording-Algoma test series (12-inch oven). In this series, parameters studied will be bulk density, coking rate, particle size and preheating.

#### 6.0 AIME IRONMAKING PAPER

The CCRA contribution to this conference to be held in April 1975 is entitled "The Evaluation of Coal Blends Containing Antifissuring Agents for Cokemaking", by D.A. Reeve and H.N. Paulencu. A first draft of this paper has been prepared and the final copy should be available soon.

#### 7.0 COMPUTERIZATION OF CARBONIZATION DATA

Available data for Western Canadian coals is being stored in the EMR computer memory. The application of this storage of carbonization data to the EMR Earth Resources Data System (ERDS) was explained. ERDS

8.0 is a projected data storage system encompassing all aspects of earth sciences.

#### 8.0 FACILITIES AND OPERATIONS

The old Booth Street 12-inch oven is now partially installed next to the Koppers oven in the Edmonton laboratory of CMFRL. The opinion was expressed that this oven be re-commissioned using high density silica brick rather than silicon-carbide wall tiles, with an 18-inch slot width. The Algoma Steel Corporation very kindly offered to donate sufficient bricks for this oven.

A motion was proposed by Mr. W.P. Dowhaniuk and seconded by Mr. R.C. Zavitz that the Technical Committee should support the commissioning of a second oven at the Clover Bar laboratories of CMFRL.

Although it is not clear whether any CCRA funds will be required for this re-commissioning, the Technical Committee will forward this recommendation to the Board of Directors. Carried

#### 9.0 PERSONNEL AND CCRA BUSINESS

- (1) Mr. Kevin Jonasson, a CCRA sponsored Waterloo University Co-Operative student who had recently joined CMFRL, was introduced to the meeting.
- (2) Mr. R.R. Bell previously a CCRA employee, had accepted a position on CANMET staff. Thus, two of the coke oven crew are now on CANMET staff.
- (3) Mr. A.M. Cameron, Chairman of the Board, relayed the outcome of a dinner meeting held with the Director of CANMET (Dr. D.F. Coates) held on the evening of the 22nd. The purpose of the meeting was to discuss the new CANMET guidelines on cost recovery as applied to CCRA. Dr. Coates was optimistic that "business as usual" would continue although some paper changes may be necessary. He expressed satisfaction with the manner in which CCRA business has been handled in the past.

#### 10.0 ELECTION OF OFFICERS

As is the custom, Technical Committee Officers for the coming two-year period were selected at this meeting for presentation to the Board of Directors meeting. Mr. R.C. Zavitz nominated Mr. W.P. Dowhaniuk of the Algoma Steel Corporation Ltd. as Chairman of the Technical Committee.

This nomination was seconded by Mr. P.J. Readyhough.

Dr. D.A. Reeve will continue as Secretary.

10.0 Mr. Zavitz also proposed a vote of thanks to the outgoing Chairman, Mr. J.T. Collier, for his efforts over the last two years. This vote of thanks was warmly seconded by all present. Mr. Collier will be missed on the Technical Committee when he moves to represent the Sydney Steel Corporation on the Board of Directors, his place on the Technical Committee being taken by Dr. J. Strasser.

11.0 OTHER BUSINESS

Mr. J.L. Hart of the Department of Industry, Trade and Commerce who had attended the last Technical Committee meeting had written to the Secretary expressing his appreciation for the invitation to attend. His letter is appended to the minutes (Appendix IV).

12.0 NEXT MEETING

(1) Board of Directors

The interim meeting of the Board of Directors will be held in Ottawa on February 27 (not 28 as previously advertised) 1975.

(2) Technical Committee Meeting

The next meeting is tentatively scheduled for Thursday, April 3, 1975, in Ottawa.



KOPPERS OVEN (CLOVER BAR) TEST RESULTS

Showing results obtained when sample blends were carbonized under normal, and preheat conditions. Two blends were tested - Algoma and Dofasco.

ALGOMA

	AMBIENT		PREHEAT To approximately 470°F.	
Moisture in Charge.....%	5.9	3.2	-	-
Coking Time.....Hr:Min	8:28	8:39	7:46	7:40
Bulk Density (db).....lb/ft <sup>2</sup>	44.8	50.6	51.4	53.9
Yield.....%	64.3	69.1	69.1	70.7
Max. Pressure.....lb/in <sup>2</sup>	0.74	0.84	0.67	1.06
Stability.....	49.1	51.2	51.1	48.8
Hardness.....	63.9	67.6	68.5	67.3
Production.....lb/hr	27.2	31.5	34.5	37.5

NOTE: - The two tests conducted at ambient temperature were at different moisture levels.

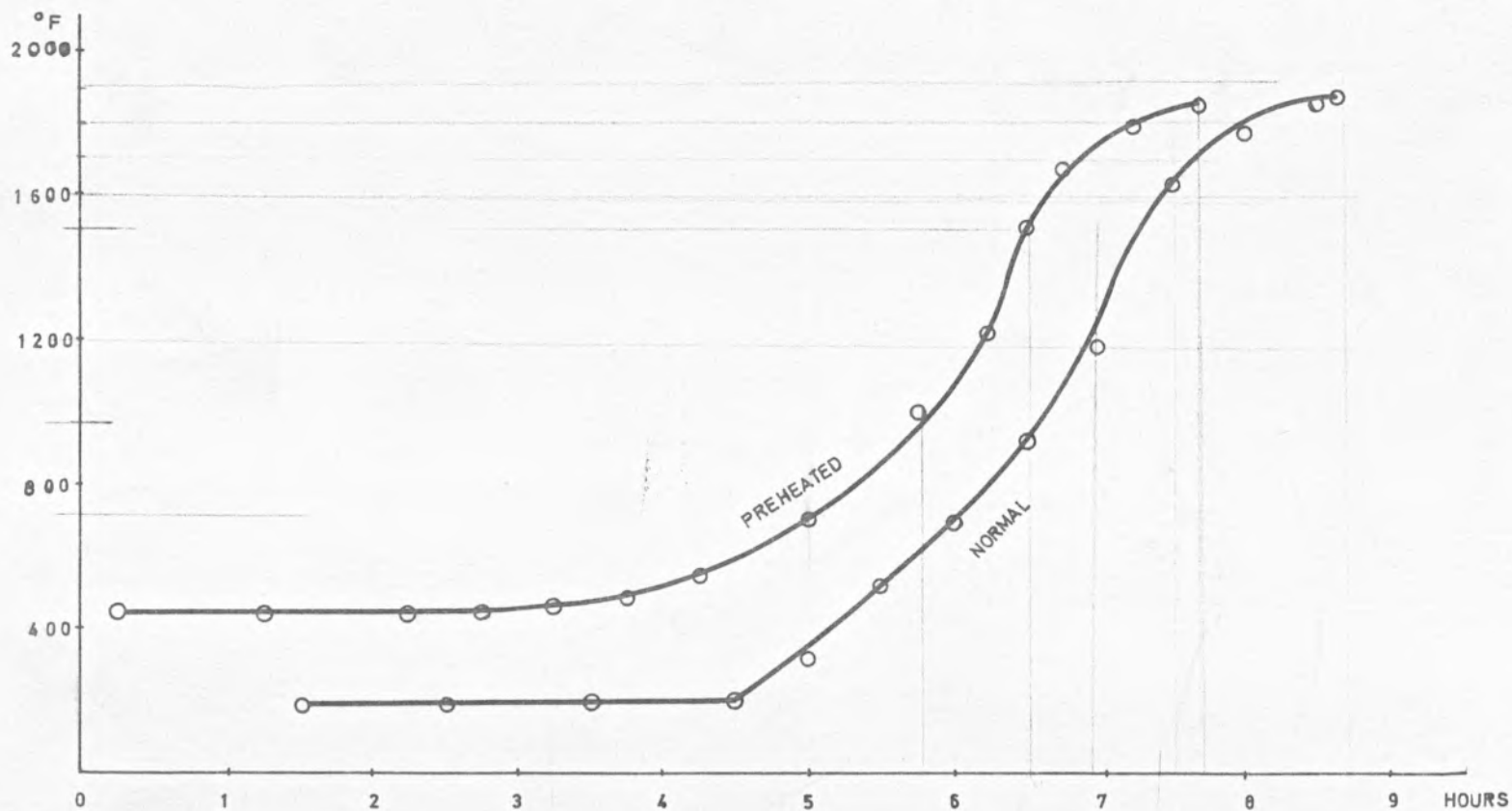
DOFASCO

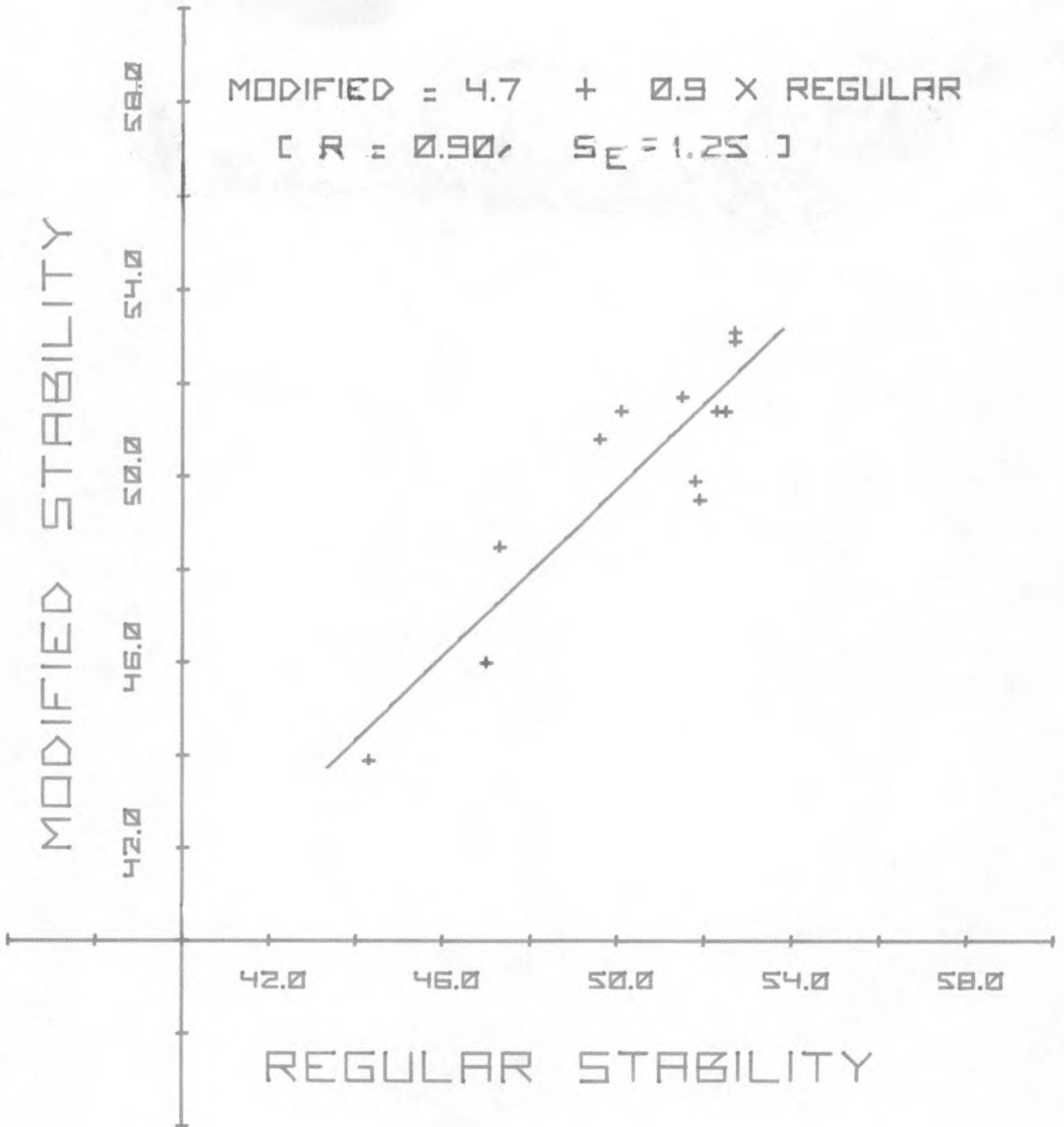
	AMBIENT		PREHEATED	
	100% Blend as Received	95% Blend 5% Coke Fines	100% Blend as Received	95% Blend 5% Coke Fines
Moisture in charge.....%	5.8	5.5	-	-
Coking Time.....Hr:Min	8:17	8:15	7:29	7:29
Bulk density (db).....lb/ft <sup>3</sup>	45.1	44.7	53.3	54.4
Yield.....%	69.8	72.1	71.5	73.3
Max Pressure.....lb/in <sup>2</sup>	0.43	0.52	0.40	0.40
Stability.....	50.7	51.5	54.5	56.8
Hardness.....	61.5	68.1	66.6	67.1
Production.....lb/hr	28.7	29.5	38.0	40.1

NOTE: - This project also involved the addition of coke fines.

GRAPH 1

CENTRAL TEMPERATURE PROFILES OF PREHEATED AND NORMAL ALGOMA 23 CARBONIZATION TESTS







Industry, Trade  
and Commerce

Industrie  
et Commerce

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January 20, 1975

Mr. J. C. Botham,  
Energy Research Laboratories,  
Canadian Metallurgical Fuel  
  Research Laboratory,  
Mines Branch,  
Ottawa, Ontario

Dear Mr. Botham:

Thank you for your letter of December 30th and the enclosed Technical Committee minutes and copy of the annual report of the Canadian Carbonization Research Association.

I enjoyed being present at your meeting in November and especially appreciated the efforts made to make me feel at home in your technical discussions. I would be pleased to repeat the visit sometime when there may be areas of mutual benefit on your agenda.

Your association is of particular interest to us as an example of government/industry co-operation. If you have any questions regarding our DITC programs for industry, I would be pleased to discuss them with you.

Yours sincerely,

J. L. Hart,  
Science Adviser,  
Office of Science  
and Technology (61)

c.c. Dr. D. A. Reeve  
Dr. E. S. Sanderson

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