HAT CREEK PROJECT

CHARACTERISTICS OF COAL

AND

ASSOCIATED MATERIALS

RESEARCH SAMPLES AND TESTS

January 1979

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

THERMAL DIVISION

CONTENTS

INTRODUCTION

This bibliography was compiled to record the multitude of tests which have been performed on the wide range of materials derived from the Hat Creek deposit.

As will be seen from an examination of the individual sheets, tests range from those associated with early attempts to identify the limiting factors connected with exploratory excavations, through analyses of the various grades of coal and coaly wastes, to sophisticated investigation of raw materials eligible for use in industry.

A request for a sample which is approved is sufficient to initiate a one-sheet statement of the test purpose, sample origin and description and notation of a Hydro contact for the investigating authority to whom the material has been sent.

The original compilation is dated January 1979, as indicated by "Revision 0 - January 1979" on each index page; individual sample pages are numbered consecutively and dated by report date. It should be noted that in instances where multiple samples have been requested, pages detailing these have been alphabetically suffixed to the first sheet. As further tests are performed, additions will be located in an extra section of both index and body until general revisions are carried out.

This original issue has been prepared by C.R. Welton, of the Thermal Division, to whom enquiries may be addressed (663-3864), from information provided by Dolmage Campbell and Associates Ltd. who initiated the recording process.

Reference may also be made to the "Sample Coordination File" prepared and maintained by C.R. Welton, which comprises copies of correspondence associated with sample requests and identification of the selection of materials held in storage by B.C. Hydro.

DISTRIBUTION

Internal:

Thermal Division
- Master Copy (Report File #604H-M58)
- Mining Department
- Thermal Engineering Department
  (C.R. Welton)

Generation Planning Department

External:

Dolmage Campbell and Associates Ltd.

HAT CREEK PROJECT - COAL CHARACTERISTICS

TEST LISTING BY RESEARCH ESTABLISHMENT

		Page
(Western Research Labs)	Lab. tests for Canmet water-only washing	35
	Preliminary washing tests	36
Energy, Mines & Resources (Ottawa)	Verification of coal fusion temperatures	45
	Pilot scale washing tests	57
	Proximate, ultimate & ash fusion	58
Environmental Research & Technology	Trace element study	43
General Testing Laboratories	Establish reference samples	52
Golder Associates	Feasibility and cost of mine	13
Inco Metals Co.	Liquefaction of coal	94
Institute of Sedimentary and Petroleum Geology	Coal petrography	64
Klohn Leonoff Consultants Ltd.	Diggability of clay	51
	Atterberg limits, natural moisture content	3
	Atterberg limits, friction tests	6
Loring Laboratories	Establish reference samples	52
Lurgi	Gasification	10
Lurgi Chemie & Huettenechnik	Suitability of Hat Creek coal for Lurgi gasifiers	7
Merkir, J.	Filtration research	101
Mitsubishi Heavy Industries	Combustion tests	56
Mitsui SRC	Liquefaction of coal	65
Mitsui & Co. (Canada)	Petrographic analysis	65
National Coal Board	Lab. tests for fluid bed combustors (Flucogas)	38
PD-NCB		13
Research Cottrell	Flyash chemical analysis, particle size distribution	40
Rouse, G. Dr.	Palynological analysis	14, 83
S.F. Products (Commercial Testing)	Chemical analysis of flyash	39
Saskatchewan Power Corporation	Flyash utilization assessment	100
Saskatchewan Research Council	Coal-oil slurries investigation	87
Sasol (South Africa)	Gasification tests	60
Simon-Carves (Warnock Hersey)	Washability tests	54
Simon Fraser University	Trace element analysis	92
Stock Equipment Company	Handling characteristics	59
Syntron Inc.	Pilot Coking coal process applicability	82
Texaco Research Centre	Lab. tests for Texaco gasifiers	15

ASH

CLAYS ETC.

COAL & COALY WASTES

		Page
Rouse, G. Dr.	Palynological Studies	14
Saskatchewan Research Council	Coal-oil slurries investigation	87
Sasol (South Africa)	Casification tests	60
Simon Carbes (Warnock Hersey)	Washability tests	54
Stock Equipment Co.	Handling characteristics	59
Syntron Inc.	Pilot coking coal process applicability	82
Texaco Research Centre	Lab tests for Texaco gasifiers	15
University of British Columbia	Leaching tests (coal, coaly claystone)	26
University of British Columbia	Misc. tests on coal, laboratory pulps	31
University of British Columbia	Mineralogy/carbon content of coaly waste	49
University of British Columbia	Mineral matter content & gross properties of Hat Creek coal	31
University of Strathclyde	Correlation of coal seams/partings	11
University of Victoria	Coal ranking & trace element analyses	61
University of Western Ontario	Electrostatic beneficiation	88, 98
U.S. Dept. of Interior	Electrolytic oxidation re humic acid extraction	105

Page

MISCELLANEOUS TESTS & MATERIALS

COSTS ASSOCIATED WITH TESTING OF COAL SAMPLES ETC.

Unless otherwise indicated, sample preparation and transportation costs have been assumed by B.C. Hydro. Details of other funding appears below:

Reference	Issued To	For	Amount	Date	Page No.
PO 749907	Acme Analytical Labs	Analyses	153	24 Aug. 77	62
PO 651096	Babcock & Wilcox	Coal testing	9 000	6 Aug. 76	29
PO 546219	Birtley Engr.	Compos. coal analyses	3 000	25 Apr. 75	System Engrg.
PO 648783	Birtley Engr.	Hat Creek sample tests	46 412	3 June 76	22, 27
PO 847934	British Columbia Research	Clay evaluation	3 900	7 June 78	85
VR 104575	Can. Test Ltd.	Analyses for trace elements	435	27 July 78	85
VR 104661	Chemex Labs Ltd.	Analyses for trace elements	170	27 July 78	85
VR 127812	Chemex Labs Ltd.	Analyses for trace elements	572	27 Sept 78	91
PO 859811	Commercial Testing & Engr.	Analytical services	1 968	3 Apr. 78	85
VR 116250	Dr. G. Rouse	Prof. services	750	28 Aug. 78	14
VR 53314	E.M.R.	Geological analyses	318	23 Nov. 77	58
PO 651415	E.M.R.	Combustion test prog.	111 276	12 Aug. 76	45

COSTS ASSOCIATED WITH TESTING OF COAL SAMPLES ETC.

Unless otherwise indicated, sample preparation and transportation costs have been assumed by B.C. Hydro. Details of other funding appears below:

Reference	Issued To	For	Amount	Date	Page No.
PO 759822	E.M.R.	Washability analyses	22 500	8 June 77	35, 36, 57
VR 77140	E.M.R.	Combustion test	7 000	11 Aug. 76	45
PO 759856	Environ. Research	Analytical services	10 278	2 Sept.77	
PO 859807	Gen. Testing Lab.	Testing coal samples	2 772	16 Mar. 78	52
PR 001	U.B.C.	Research on Kaolin clays	20 000	14 Dec. 77	74, 76
PR 015	U.B.C.	Funding of research	12 000	30 Sept 76	30, 31, 47 49, 68
PR 016	U.B.C.	Funding of research	3 000	16 Nov. 76	
PR 018	U.B.C.	Payment for research	10 000	18 Apr. 77	
VR 91309	Wilson Snyder Pumps	Flyash Miller No.	250	26 June 78	70
		Beneficiation Freight	2 617	27 Oct. 77	
		Freight EMR wash. coal to BUT	855		
		Freight coal/limestone to UK	17 574		89

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 1957-59; 1974-75 Drilling Periods

Forwarded To: Dolmage Campbell & Associates Ltd.

Authorized/Requested By: B.C. Hydro

Funding: B.C. Hydro

Purpose: Establish preliminary estimates of coal quality

Sample Origin: Various as detailed in report

Sample Description: Various as above

Stratigraphic Zone: Various as above

Remarks:

RESEARCH REPORT

Date: 15 July 1975 B.C.H. File No: 604H-M2

Reported To: B.C. Hydro

Reported By: Dr. L.T. Jory, Dolmage Campbell & Associates

Title: Hat Creek Coal Deposits, Proposed #1 Openpit - Statistical Tables of Proximate Analysis Data

Description: 1 volume report & tables

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 1974

Forwarded To: CMJV (Cominco-Monenco Joint Venture)

Authorized/Requested By: B.C. Hydro

Funding: B.C. Hydro

Purpose: To determine coal quality, mine costs and environmental constraints

Sample Origin: Various as detailed in Volume II (Geology & Coal Quality)

Sample Description: Various as above

Stratigraphic Zone: Various as above

Remarks:

RESEARCH REPORT

Date: July 1978

Reported To: B.C. Hydro

Reported By: CMJV

Title: Hat Creek Project, Mining Feasibility Report

Description: Eight volumes including two appendicies
(Vol. 7 - App. A; Vol. 8 - App. B)
See particularly Vol. II, Geology & Coal Quality

B.C.H. File No: 604H M52/1
M52/2
M52/3
M52/4
M52/5
M52/6
M52/7
M52/8

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: February, 1975

Forwarded To: Klohn Leonoff Consultants Ltd.
Vancouver, B.C.

Authorized/Requested By: Dr. H.M. Ellis (B.C. Hydro)

Purpose: Atterberg limits, natural moisture content.

Sample Origin:

DDH No.	Sample No.	Depth
75-50	50- 1	540'
	6	625'
	7	645'
	8	661'
	9	683'
	11	722'
	16	809'
	23	947'
	24	957'
	25	987'

Sample Description: Siltstone, claystone

Stratigraphic Zone: Footwall

Remarks: NQW core samples, approximately 15 cm in length.

RESEARCH REPORT

Date: 6 Feb./75 B.C.H. File No: 604H-1301.3

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: Mr. W. Shukin of Klohn Leonoff.

Title: None.

Description: 2-page letter report; 10 graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: March, 1975

Forwarded To: Prof. R.M. Quigley
Head, Soil Mechanics Section
University of Western Ontario
London, Ontario

Authorized/Requested By: Dr. H.M. Ellis (B.C. Hydro)

Purpose: Qualitative x ray analyses for clay mineralogy

Sample Origin:

DDH No.	Sample No.	Depth
75-49	49-13	447'
	22	620'
	38	918'
	42	999'
75-50	50- 1	540'
	2A	570'
	5A	615'
	7	644'
	8	661'
	16	809'
	19	869'

DDH No.	Sample No.	Depth
75-50	50-20	889'
	23	947'
	24	957'
	25	981'

Samples, No. 1 Trench
S-1, 2, 3 and 4
Trench location: 82,400'N
19,300'E

Sample Description: Siltstone, claystone

Stratigraphic Zone: DDH 75-49: Hanging wall; DDH 75-50: Footwall; Trench No. 1: Footwall.

Remarks: NQW core samples approximately 15 cm in length.

RESEARCH REPORT

Date: 14 May/75 B.C.H. File No: 604H-1301.3

Reported To: Dolmage Campbell and Associates Ltd.

Reported By: Prof. Quigley

(cont.)

RESEARCH REPORT (cont.)

Title: Preliminary Mineralogical Analyses, Hat Creek Coal Measures, British Columbia

Description: 6-page bound report, 7 figures, 1 Appendix.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: April, 1975

Forwarded To: Babcock and Wilcox Canada Ltd.
Attention: Mr. C. Eask

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Laboratory tests to establish effect of coal washing.

Sample Origin:

Hole No.	Sample No.	Depth
RH 75- 4	1 to 11	125'-450'

Sample Description: Coal from rotary drill-hole chips.

Stratigraphic Zone: D

Remarks: All laboratory pulps combined to form single composite sample which was further treated to provide:
Two, 45 kg raw coal samples.
Two, 45 kg float samples at 1.6 specific gravity

RESEARCH REPORT

Date: 18 July 1975 B.C.H. File No: 604H-1301.1 (File 1)

Reported To: M.H. French

Reported By: R.L. Saunders

Title: --

Description: Cover letter plus 10 page report (Incl. graphs)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: April, 1975

Forwarded To: Klohn Leonoff Consultants Ltd., Vancouver

Authorized/Requested By: Dr. H.M. Ellis (B.C. Hydro)

Purpose: Atterberg limits and, on two samples, friction tests.

Sample Origin:

1)

DDH No.	Sample No.	Depth	Strat. Zone
75-49	49-13	447'	Hanging wall
	22	620'	Hanging wall
	38	918'	Hanging wall
	42	999'	Hanging wall
75-50	50-2A	570'	Footwall
	19	869'	Footwall

2) Grab Samples, No. 1 Trench
S-1, 2, 3 and 4
Trench location: 82,400'N, 19,300'E

Sample Description: Siltstone, claystone; NQW core samples.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 24 April/75 B.C.H. File No.: 604H-1301.3

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: A.P. Joseph, Neil H. Wade of Klohn Leonoff

Title: Laboratory Testing of Rock Cores, Hat Creek, B.C.

Description: 3 page bound report; 3 appendices with graphs, tables and photographs. Supplementary letter, dated 29 May/75 contains corrections to some coefficient of friction values given in the report.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: June 30, 1975

Forwarded To: Lurgi Chemie and Huettenechnik
West Germany

Authorized/Requested By: Dr. H.M. Ellis (B.C. Hydro)

Purpose: Tests to establish suitability of Hat Creek coal for Lurgi gasifiers.

Sample Origin:

DDH No.	Sample No.	Depth
74-38	25- 8	916'-1036'

Sample Description: Coal

Stratigraphic Zone: D

Remarks: Composite sample, weighing about 34 kg, of split NQW drill core (one-half of core).

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title: see Page 8.

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: July, 1975

Forwarded To: Dr. B.N. Church
B.C. Ministry of Mines and Petroleum Resources,
Victoria, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Petrographic and chemical studies.

Sample Origin:

Samples collected by Dr. Church and Professor Duff.

Origin and quantities of samples not known.

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title:

Description:

1) T. McCullough has:
Report, No. T-03-WSH-1977 (Geol. Surv.of Canada)

2) Data generated by these studies has appeared in or contributed to other papers:-
Canadian Journal of Earth Science V.16 #9 pp 1882-1887
Geological Fieldwork 1979

3) Some analyses are still being carried out.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: July, 1975

Forwarded To: Dr. B.N. Church
B.C. Ministry of Mines and Petroleum Resources
Victoria, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Palynology studies.

Sample Origin:

Samples collected by Dr. Church.

Origin and quantities of samples not known.

Sample Description:

Stratigraphic Zone:

Remarks: Samples forwarded to the Institute of Sedimentary and Petroleum Geology (G.S.C.), Calgary for examination.

RESEARCH REPORT

Date: April 1977 B.C.H. File No: 1301.1 (File 4)

Reported To: Dr. P.T. McCulloch

Reported By: W.S. Hopkins

Title: --

Description: Two page palynological report plus comments

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: July , 1975

Forwarded To: Lurgi Chemie and Huettenechnik,
West Germany

Authorized/Requested By: Mr. C.B. Guelke (B.C. Hydro)

Purpose: Laboratory tests for Lurgi Gasification

Sample Origin:

		Analyses at 20% Moisture		
Hole	Footage	Ash	Calorific Value	S
74-25	271 - 291	27.93	6013	.59
	750 - 770	27.37	6104	.49
	910 - 930	27.11	6255	.56
	1030 - 1050	29.18	6007	.32
26	59 - 88.5	27.17	6128	.57
37A	938 - 958	28.45	5899	.52
38	1256 - 1263	29.39	6066	.37
39	158 - 178	27.45	6192	.18
44	1031 - 1061	29.36	5727	.72
	1896 - 1926	27.54	6167	.14
46	866 - 896	28.93	5877	.26
	1026 - 1066	27.88	5974	.16
	1517 - 1528	29.44	6043	.41
Unweighted Means		28.25	6035	.41

Sample Description: Two small samples of split NQW core taken at random from each interval, above. Total composite sample weight about one kg.

Stratigraphic Zone:

Remarks: Sample taken by hand by Mr. Guelke.

RESEARCH REPORT

Date: September 1976 B.C.H. File No: 604H-C 6/2 (Study B, App. 1)

Reported To: Dolmage, Campbell & Assoc. Ltd.

(cont.)

RESEARCH REPORT (cont.)

Reported By: Lurgi Mineralötechnik GMBH

Title: Analytical Test Report No. 112/75

Description: Report on studies of advanced electric power generation techniques and coal gasification

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: August, 1975

Forwarded To: Prof. D. Duff,
University of Strathclyde,
Glasgow

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Correlation of coal seams/partings

Sample Origin:

Samples were collected by Dr. Duff who was on loan to the B.C. Ministry of Mines.

Origin and quantities of samples not known.

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To: No report as of February 18th, 1980

Reported By:

Title:

Description:

Date: August, 1975

Forwarded To: Dr. D.E. Pearson
B.C. Ministry of Mines and Petroleum Resources
Victoria, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Scientific investigation into the nature of materials in coal (sulphides/sulphates)

Sample Origin:

Origin and quantities of samples not known.

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To:

Reported By: No report to this date

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: September 1975

Forwarded To: Golder Associates (For PD-NCB)

Authorized/Requested By: B.C. Hydro

Funding: B.C. Hydro

Purpose: Determine feasibility and cost of mine

Sample Origin: *Various as detailed in report*

Sample Description: Various as above

Stratigraphic Zone: Various as above

Remarks:

RESEARCH REPORT

Date: November 1975

Reported To: B.C. Hydro

Reported By: PD-NCB Consultants Ltd.

Title: For complete listing see next page

Description: 13 volumes in all

See particularly Report #9, Volume 1 (M17/1)
Report #6, Volume 2 (M18/2)

B.C.H. File No: 604H M4
M5/1
M5/2
M6/1
M6/2
M13
M16
M17/1
M17/2
M18/1
M18/2
M18/3
M18/4

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

604H - M4	Interim Report on Geological & Geotechnical Exploration at Hat Creek
- M5/1	Preliminary Report on Hat Creek Openpit #1 - Vol. 1
- M5/2	" " " " " " " - Vol. 2
- M6/1	Preliminary Report on Hat Creek Openpit #2 - Vol. 1
- M6/2	" " " " " " " - Vol. 2
- M13	Hat Creek Geotechnical Study Interim Conclusions
- M16	Combined Pit Operation Study for 500 MW Power Plant
- M17/1	Revised Report on Hat Creek Openpit #1 - Vol. 1
- M17/2	" " " " " " " - Vol. 2
- M18/1	Hat Creek Geotechnical Study - Vol. 1
- M18/2	" " " " - Vol. 2
- M18/3	" " " " - Vol. 3
- M18/4	" " " " - Vol. 4

Date: September 1975 - March 1977

Forwarded To: Dr. G. Rouse,
University of British Columbia,
Vancouver, B.C.

Authorized/Requested By: Dr. P. T. McCullough (B.C. Hydro)

Purpose: Palynology studies to establish stratigraphic sequence and age of sedimentary horizons.

Sample Origin:

Small core chips from numerous locations as listed in reports by Dr. Rouse.

Sample Description: Carbonaceous and coaly shale.

Stratigraphic Zone: All

Remarks:

RESEARCH REPORT

Date: 5 Mar./76; 17 Jan./77;
26 Mar./77; 15 June/77

B.C.H. File No: 604H-1301.1-2

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: Dr. Rouse

Title: Palynological Zonation and Correlation of Hat Creek Core Samples.

Description: Four, 1-2 page letter reports with accompanying charts.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 27 October, 1975

Forwarded To: Mr. W.R. Hancky,
Texaco Research Centre,
Old Glenham Road,
Glenham, New York
12527

Authorized/Requested By: Mr. C. Guelke (re: request from Mr. A. Weiss of Lummus Co.)

Purpose: Laboratory tests for Texaco gasifiers.

Sample Origin:

DDH No.	Sample No.	Depth
74-25	25- 8	291'-311'

Sample Description: Coal

Stratigraphic Zone: A

Remarks: 7 kg of split NQW drill core.

RESEARCH REPORT

Date: September 1976 B.C.H. File No: 604H-C6/2

Reported To: E.M.R.

Reported By: Integ, EPD, Shawinigan & Lummus

Title: Studies of advanced electric power generation techniques &coal gasification

Description: See P. 382 "A summary of the TEXACO process will be submitted following receipt of information from the Texaco Development Corporation"

This information was not received as Texaco considered their process to be proprietary

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 27 November 1975

Forwarded To: Alcan International Ltd.
P.O. Box 6090, Montreal, Quebec.

Authorized/Requested By: Dr. P.T. McCulloch

Funding:

Purpose: Investigation of Al_2O_3 recovery by H_+ process.

Sample Origin:

D.H. 74-37A	Shale overlying coal
D.H. 74-26	Shale overlying coal
D.H. 74-37A	Shale interbedded in coal seam

Sample Description: Three series of chip samples

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 18 March 1976

B.C.H. File No: 1301.1 (File 1)

Reported To: E.H. Martin

Reported By: E.W. Grieg

Title: Waste shales, Hat Creek, B.C.

Description: 2 page letter

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: November, 1975

Forwarded To: Dr. B.N. Church
B.C. Ministry of Mines and Petroleum Resources
Victoria, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Age dating.

Sample Origin:

Sample Description: Volcanic rocks.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To: No formal report submitted to B.C. Hydro

Reported By:

Title:

Description: Geology of the Hat Creek Coal Basin in
"Geology in British Columbia 1975"
(B.C. Ministry of Mines Report)

Date: December, 1975; May, 1977

Forwarded To: Dr. T.L. Coulthard
Dept. of Bio-Resource Engineering,
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Mr. R.M. Woodley (B.C. Hydro)

Purpose: Filtration research

Sample Origin:

1. DDH 74-39 Single composite sample of laboratory pulp composed of field samples 39-1 to 20 (33 to 93 ft. and 98 to 438 ft.)

2. 90 kg surface sample obtained by backhoe from approximately 82,000'N, 19,270'E.

A second 90 kg sample from the same location was forwarded in May, 1977.

Sample Description: Coal.

Stratigraphic Zone: D, some C

Remarks: The surface sample was subsquently found to contain 85 percent SiO_2 in the ash which makes it unique in that respect for Hat Creek.

RESEARCH REPORT

Date: October 1977 B.C.H. File No: See M.M. Papic

Reported To:

Reported By: Samia M. Fadl

Title: "The Basis of Absorption of Water Pollutants by Coal"

Description: Ph.D. Thesis ; 2 Volumes

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: December, 1975

Forwarded To: B.C. Research

Authorized/Requested By: Mr. C.B. Guelke(B.C. Hydro)

Purpose: Gasification

Sample Origin:

Sample Description: 20 lb. NQW core sample.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 March 1976 B.C.H. File No: 604H-1301.2-2

Reported To: E.M.R.

Reported By: M.M. Papic

Title: Gasification of Hat Creek Coal

Description: B.C. Research Project #2402

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: January 1976; April 1976

Forwarded To: Dr. K. Fletcher, Dr. H.V. Warren
Dept. of Geological Services,
University of British Columbia
Vancouver

Authorized/Requested By: Mr. C. Guelke (B.C. Hydro)

Purpose: Sulphide element analyses

Sample Origin:

Group 1: DDH 74-25 Sample Nos. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57 60 and 63. Also Nos. 401, 402, 404, 406 and 411.

Group 2:

DDH No.	Sample No.	DDH No.	Sample No.
74-23	401-407 (incl)	74-43	401
25	403, 405, 407, 408	44	401-405 (incl)
	409 and 410	46	401-406 (incl)
26	401-405 (incl)	75-50	401-403 (incl)
37A	401-408 (incl)	51	401, 402
38	401-408 (incl)	53	401, 402
39	401, 402	106	401-409 (incl)
41	401	107	401

Sample Description: Coal, laboratory pulps. The 400 series samples are laboratory composite samples.

Stratigraphic Zone: A, B, C, D.

Remarks: Group 1: Analysed for Cu, Mo, Mn, Ni, Pb, Zn and Fe.
Group 2: Analysd for Cu and Mo.

Sample 74-25-24 and the enclosing composite sample 74-25-404 were found to be contaminated with extraneous copper.

RESEARCH REPORT

Date: (1) 2 April/76; (2) 17 June/76 B.C.H. File No: 604H-1301.1 (File 1) (cont.)

RESEARCH REPORT (cont.)

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: (1) Dr. K. Fletcher; (2) Dr. H.V. Warren

Title: (1) Analyses of Hat Creek Coals.

Description: (1) 5-page report, 8 tables, 1 Appendix.
(2) 3 pages of tables only. Submitted to B.C. Hydro with covering letter to H.J. Goldie from L.T. Jory, June 17, 1976.

Date: 20 February, 1976

Forwarded To: Dr. D.K. Grubbs,
Alcoa Laboratories,
P.O. Box 772
New Kensington, Pennsylvania, 15068

Authorized/Requested By: Dr. P.T. McCullough. (B.C. Hydro)

Purpose: Research on alumina recovery.

Sample Origin: See below.

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 10 December 1976 B.C.H. File No: 1301.1 (File 2)

Reported To: P.T. McCullough

Reported By: J.F. Ralphe

Title: --

Description: One page table of analysis

Sample Origin

Group 1: (unpulverized assay rejects)

Sample No.	From	To	Thickness	%Ash*	Approximate Weight
74-46- 3	522	542	20	35.8	2 kilos
74-46- 5	562	582	20	51.2	0.4 kilos
74-46- 8	670	690	20	47.3	1 kilo
74-46-11	754	744	20	53.8	2 kilos
74-46-12	744	802	28	61.8	2 kilos
74-46-15	831	851	20	51.1	2 kilos
74-46-20	956	986	30	33.0	4 kilos
74-46-24	1106	1146	40	33.9	3 kilos
74-46-36	1528	1540.5	12.5	61.9	4 kilos

* Ash content shown is at 20% moisture

(cont.)

Group 2: Unpulverized assay sample rejects - low ash coal.
DDH 75-106: Samples 33 to 42, inclusive (1490' to 1835' inclusive). Approximately 18 kilograms total.

Group 3: Claystone core samples, composed of one foot of split core at five-foot intervals, from the folowing (total weight approximately 45 kilograms):

Hole No.	Footage
74-27	431 - 531
74-37A	619.5 - 711.5
74-44	164 - 272
75-106	80 - 185.5
75-106	891 - 957

Group 4: Three bags each of surface coal and limestone collected by Alcoa geologists. Limestone probably from south end of valley near 31,400'N, 26,750'E. Coal probably from near 81,360'N, 19,670'E (near DDH 25-2).

Date: May, 1976

Forwarded To: Birtley Engineering Co., Calgary for processing and forwarding to CanMet, Ottawa.

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Washability tests by Birtley.
Burn tests by EMR, Ottawa.

Sample Origin: see below:

Sample Description: Various grades of coal. Class "A" coal lowest grade, Class "C" coal highest grade.

Stratigraphic Zone:

Remarks: Shipment to Birtley comprised 459 barrels, each containing approximately 400 lbs. of coal.

The Class "A", "B" and "C" coal relates only to the bucket auger hole samples and is not to be confused with stratigraphic zone A, B, C and D coal. The apprxoiamte locations from which the samples were collected are as follows:

Class A: 79,130'N, 18,300'E (near DDH 74-46)
Class B: 80,120'N, 18,850'E (near DDH 59-18)
Class C: 80,250'N, 20,020'E (near DDH 59-19)

Some additional Class B coal was collected from 79,034'N, 20,519'E (near DDH 57-8) but was not included in the above shipment.

RESEARCH REPORT

Date: (1) 13 Aug/76; (2) Oct./77 B.C.H. File No: 604H-M9 / 604H-P8/1, P8/2

Reported To: B.C. Hydro.

Reported By: (1) D.F. Symonds, Frank J. Horvat of Birtley Engineering
(2) F.D. Friedrich, et al of Canadian Combustion Research Laboratory.

(cont.)

RESEARCH REPORT (cont.)

Title: (1) The Analysis and Beneficiation of Bulk Samples "A", "B" and "C" from the Hat Creek Deposit.
(2) Pilot-scale Combustion Studies with Hat Creek Coal.

Description: (1) 155-page bound report with 107 tables and 18 figures.
(2) Vol 1: Project Report; 114 pages.
Vol 2: Appendix-Test Data; 18 sub-reports providing test data.

Sample Origin

1976 Bucket Auger Holes:

Material Class	Total Tonnage Recovered	Total Tonnage Shipped To Birtley	Total Tonnage Shipped To Commercial	Total Tonnage On Site*
A	41.4 tons	38.5 tons	0.2 tons	5.4 tons
B	38.2 tons	28.0 tons	-	10.2 tons
C	39.4 tons	28.0 tons	-	11.4 tons
Totals	119.0 tons	91.8 tons	0.2 tons	27.0 tons

* June, 1976

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: May, 1976

Forwarded To: Commercial Testing and Engineering Co.
North Vancouver, B.C.

Authorized/Requested By: Mr. C. Guelke (B.C. Hydro)

Purpose: Screen and washability tests.

Sample Origin:

Bucket auger hole No. 76-2, barrel No. 15
Hole location: 79, 107'N; 18, 312'E, elevation 3190' A.S.L.

Sample Description: Class "A" Coal; approximately 400 lbs.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: June, 1976 B.C.H. File No: 604H-M10

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: Mr. R.A. Houser, Commercial Testing.

Title: Hat Creek Coal Development, Sample BAH 76-2.

Description: 32-page report, principally tables and graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: May, 1976

Forwarded To: Energy Mines and Resources, Ottawa.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Petrographic analyses

Sample Origin: Bucket auger coal sampling drill holes as follows:

Hole No.	Sample No.	Depth
BAH 76- 2	3	45'-50'
	6	60'-65'
	9	75'-80'
BAH 76- 5	3	50'-55'
	4	55'-60'
BAH 76- 6	3	59'-64'
	6	74'-79'
	9	89'-94'
BAH 76- 9	2	23'-28'
	3	28'-33'
	4	33'-38'
BAH 76-10	1	32'-37'
	2	37'-42'

Sample Description: Coal.

Stratigraphic Zone:

Remarks: Small chip samples collected immediately after recovery from the drill hole and placed in water in one gallon cans for shipment.

One of the samples from BAH 76-10 destroyed but not known which one.

RESEARCH REPORT

Date: April 1977 B.C.H. File No: 604H-M21

Reported To: BCHPA

Reported By: E.M.R. (Nandi & Brown)

(cont.)

RESEARCH REPORT (cont.)

Title: "Petrographic Studies of Hat Creek Coals"

Description: 9 page report plus two pages of photographs
(See page 27, 27A)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: Spring 1976

Forwarded To: Dr. A.J. Sinclair, UBC

Authorized/Requested By: Dr. L.T. Jory (Dolmage Campbell)

Funding: B.C. Hydro (through Dolmage Campbell)

Purpose: Establish a basis for design of a sampling plan

Sample Origin: DDH 76 - 135
DDH 76 - 136

Sample Description:

Stratigraphic Zone: A, B, C & D

Remarks:

RESEARCH REPORT

Date: March 1977 B.C.H. File No: 604H-M37

Reported To:

Reported By: Dr. A.J. Sinclair, UBC

Title: Evaluation of Analytical Data from D.D.H. 76 - 135 and 76 - 136

Description: One volume

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 14 June, 1976

Forwarded To: Mr. H. Hawthorne (Dr. I Warren)
Department Metallurgy
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Mr. C. Guelke (B.C. Hydro)

Purpose: Leaching tests

Sample Origin:

DDH 76-120

Sample No	Footage	Strat. Zone	Sample Description
1	180'-185'	A	Clean coal.
2	522'-526'	A	Carbonaceous to coaly claystone.
3	535'-889'	A	Clean and silty coal.
4	1227'-1230'	D	Clean coal.
5	1432'-1435'	D	Silty coal and carbonaceous claystone.
6	1557'-1561'	D	Clean coal with silty coal.

Sample Description: Samples about 1.5 kg each, collected from core chips.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title:

Description: No report issued - Part of generalised studies on coal at that time.

Date: --

Forwarded To: Core Laboratories Canada Ltd.
P.O. Box 5670, Postal Stn. 'A' Calgary
Authorized/Requested By: M.H. French

Funding:

Purpose: Analysis of free clay samples

Sample Origin: B.C. Hydro sample A-7365/66

Sample Description:

Stratigraphic Zone:

Remarks: Sample preparation by Core Labs; analyses by Univ. of Calgary

RESEARCH REPORT

Date: 7 July 1976

B.C.H. File No: 1301.1
(File 2)

Reported To: Birtley Engineering (Canada) Ltd.

Reported By: J.R. Jackson

Title: Analysis of Clay Samples from B.C. Hydro Sample A-7365/66

Description: X-ray diffraction analysis of four samples for quartz, feldspar, pyrite, siderite, kaolinite, montmorillonite

Date: June - September, 1976

Forwarded To: Prof. R.M. Quigley
The University of Western Ontario
London, Ontario

Authorized/Requested By: Mr. G. Rawlings (Golder, Brawner & Associates Ltd.)

Purpose: Qualitative X ray and carbonate analyses of inorganic constituents in the No. 1 Coal Deposit area.

Sample Origin: Five shipments; see below.

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: March 1977 B.C.H. File No: 604H-M18/3 (Appendix 3)

Reported To: B.C. Hydro

Reported By: Golder Associates

Title: Hat Creek Geotechnical Study (Report #6)

Description: Volume 3, Appendices 2 to 6

(cont.)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Sample Origin

Shipment No. 1

DDH No.	Sample No.	Depth (ft.)
	MUD BOIL	
803	Not given	595.0-596.0
804	1A	50.0- 51.7
806	7	16.8- 18.8
803	28	135.0-136.0
803	29	316.0-317.7
805	16	61.5- 62.5
807	12	22.0- 24.0
807	14	158.3-159.5

Shipment No. 2

DDH No.	Sample No.	Depth (ft.)
74- 28	1	480.0
74- 28	2	644.5
74- 28	3	738.0
74- 28	4	763.0
74- 28	5	767.5
74- 28	6	789.5
74- 28	7	451.0
74- 28	8	537.0
74- 28	9	586.0

Shipment No. 3

DDH No.	Sample No.	Depth (ft.)
76-815	7	431.0-431.5
76-815	9	447.8-448.1
76-815	12	482.3-482.6
76-815	14	505.6-506.0
76-815	18	541.5-542.0
76-815	20	561.7-562.3
76-815	22	582.7-583.2
76-815	29	669.0-669.7

Shipment No. 4

DDH No.	Sample No.	Depth (ft.)
76-808	40	11.5- 12.0
76-808	10	30.8- 33.3
76-809	2	14.8- 16.0
76-809	4	32.6- 33.8
76-816	19	472.9-473.7
Slide Headwall	T1	
Slide Headwall	T2	
Slide Headwall	T3	

Shipment No. 5

DDH No.	Sample No.	Depth (ft.)
74-27	27-1	569.2-569.9
76-806	-	135.0-135.6
76-806	-	325.0-325.5
76-808	-	276.0-276.5
76-808	-	392.0-392.6
76-811	5	41.5- 42.5
76-811	-	112.5-113.0
76-811	-	176.5-177.0
76-812	43	157.0
76-818	4	28.3- 29.6

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 8 July 1976

Forwarded To: Babcock & Wilcox Research Dept., Alliance, Ohio

Authorized/Requested By: M.H. French

Funding:

Purpose: Investigate Burning Profile etc.

Sample Origin: From C.C.R.L. Pilot Burn Tests (Originally part of Birtley Engr. washed coal sent to C.C.R.L.)

Sample Description: 2 x 350 Lb.: 1 Drum Sample 'A' Raw; 1 Drum Sample 'A' Washed

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 15 December 1976

B.C.H. File No: 1301.1 (File 2)

Reported To: M.H. French

Reported By: R.L. Sanders

Title: -

Description: 7 Pages; 3 pages analysis and 4 pages graphs.

Date: September 1976 - May 1977

Forwarded To: Dr. A.C.D. Chaklader
Department of Metallurgy,
University of British Columbia,
Vancouver

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: X ray analyses to determine the mineralogy of the non-carbonaceous material

Sample Origin:

Numerous small coal and waste samples as listed in reports by Dr. Chaklader.

Sample Description:

Stratigraphic Zone: All.

Remarks:

RESEARCH REPORT

Date: (1) Dec./76; (2) July/77 B.C.H. File No: 604H-M46

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: Dr. A.C.D. Chaklader, Dr. I.H. Warren, Miss M. Lau.

Title: (1) Mineral Matter Content and Gross Properties of Hat Creek Coal, First Report-Quarterly (Sept. 15 - Dec. 15, 1976)
(2) As above. Third Report-Quarterly (April 1 - June 30, 1977)

Description: (1) 13 pages, 1 Appendix. Includes graphs, tables and photographs.
(2) 10 pages, 35 tables, 6 graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: September, 1976

Forwarded To: Dr. A.C.D. Chaklader
Dept. of Metallurgy,
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Numerous tests including inorganic mineralogy, thermogravimetric analysis, heat content by pressure differential scanning calorimetry, and ash fusion temperature by differential thermal analysis.

Sample Origin:

DDH No.	Sample No.	Depth	Strat. Zone
76-135	135-41	685 - 695	A
	43	695 - 705	A
	91	935 - 945	A
	93	945 - 955	A
	135	1185 - 1195	B
	137	1195 - 1205	B
	163	1325 - 1330	B
	164	1330 - 1335	B
76-136	136-120	905 - 910	B
	121	910 - 920	B

Sample Description: Coal-laboratory pulps.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: March, 1977 B.C.H. File No: 604H-M32

Reported To: Mr. M.H. French, B.C. Hydro

Reported By: Dr. A.C. Chaklader, Dr. I. Warren, Miss M. Lau.

(cont.)

RESEARCH REPORT (cont.)

Title: Mineral Matter Content and Gross Properties of Hat Creek Coal, Second Report-Quarterly (January - March 31, 1977)

Description: 28 pages including tables and graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: September, 1976

Forwarded To:

Mr. R.W. Bryers,
Foster Wheeler Energy Corp.,
Research Division,
12 Peach Tree Hill Road,
Livingston, New Jersey 07039

Mr. S. Vecci,
Babcock & Wilcox Co.,
Alliance Research Centre,
1562 Beeson Street,
Alliance, Ohio 44601

Mr. David Windship,
Combustion Engineering Canada,
1140 de Maisonneuve Blvd., West,
Montreal, Quebec H3A 1N2

Mr. W.A. Summers,
Ebasco Services Inc.,
2 Rector Street,
New York, N.Y.

Authorized/Requested By: Mr. M.A. Favell (B.C. Hydro)

Purpose: Bench tests for burning characteristics.

Sample Origin:

Bucket auger hole 76-12, barrel #20, 33 ft. in depth. Hole location: 79,120'N, 18,240'E, elevation 3190' A.S.L.

Sample Description: Class "A" coal containing a relatively high percentage of clay.

Stratigraphic Zone:

Remarks: Two 9 kg samples to each of four companies. Samples obtained by quartering and requartering barrel No. 20.

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title: No report - tests not performed.

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: September - October, 1976

Forwarded To: Acres Consulting Services Ltd.
850 West Hastings Street,
Vancouver, B.C.

Authorized/Requested By: Mr. R.M. Woodley (B.C. Hydro)

Purpose: Laboratory leachate and growth tests.

Sample Origin:

Six shipments comprising numerous samples. See below.

Sample Description: Overburden, waste rock, coal, and coaly waste.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: June 1978 B.C.H. File No: 604H-E15/6

Reported To: J.C. Edwards

Reported By: T.M. Wardle

Title: Hat Creek Project Detailed Environmental Study; Solid Waste Disposal, Coal Storage, Land Reclamation

Description: One volume

(cont.)

Sample Origin

Shipment No. 1, September 15, 1976

Sample Type	Sample No.	DDH No.	Previous Sample No.	Footage From	Footage To
Coal	A	76-134	134-06	606'	626'
		76-125	125-07	211'	217'
		76-122	122-05	346'	351'
		76-138	138-05	286'	306'
	B	76-134	134-09	658'	672'
		76-128	128-13	620'	640'
		76-120	120-18	437'	457'
		76-120	120-19	457'	477'
	C	76-134	134-02	551'	564'
		76-128	128-01	337'	357'
		76-126	126-02	825'	838'
		76-122	122-01	271'	291'
		76-120	120-05	207'	227'
Non-carbonaceous waste	A	76-127		90'	100'
		76-124		170'	180'
		76-153		810'	820'
		76-134		291'	301'
		76-155		290'	300'
		76-144		140'	150'
Coaly waste	A	76-134	134-07	626'	646'
		76-128	128-06	425'	430'
		76-125	125-13	256'	260'
		76-122	122-06	351'	358'
		76-120	120-21	488'	508'

Sample No.	Approximate Location		Depth From Original Ground Surface
Overburden 1	72810 N	20610 E	0.5'
2	77950 N	21425 E	1.0'
3	79000 N	17270 E	0.5'
4	82010 N	18985 E	1.0'
5	78000 N	24000 E	0.5'
6	81478 N	21495 E	2.0'
7	83000 N	20575 E	1.0'

(cont.)

Shipment No. 2, September 17, 1976

One barrel of representative overburden from drill hole BAH 76-1.

Shipment No. 3, September 27, 1976

BAH 76-1

Sample No.	Depth (ft)	Weight Pounds
TR- 1	0 - 8	4
TR- 2	8 - 9	6
TR- 3	9 -11	6
TR- 4	11 -13	6
TR- 5	13 -14	6
TR- 6	14 -16.5	8
TR- 7	16.5-20	8
TR- 8	20 -23	8
TR- 9	23 -26	10
TR-10	26 -30.5	9
TR-11	30.5-35	5
TR-12	35 -39	10
TR-13	39 -41	15

BAH 76-13

Sample No.	Depth (ft)	Weight Pounds
TR- 1	0 - 8	4
TR- 2	8 - 9	4
TR- 3	9 -11	4
TR- 4	11 -12	4
TR- 5	12 -36	4
TR- 6	36 -38	4
TR- 7	38 -46	4
TR- 8	46 -50	4
TR- 9	50 -53	4
TR-10	53 -54	4
TR-11	54 -55	4
TR-12	55 -58	4

Shipment No. 4, October 4, 1976

Barrel #1 constitutes the topsoil sample from Region No. 1, Sites 1, 2 and 3 as layed out by Mr. J. Forrester of Canadian Bioresources Consultants Ltd. Barrel #2 constitutes the topsoil sample from Region No. 2, Sites 1, 2 and 3. The location of each site is given below:

		LOCATION		DEPTH
Region No. 1	Site 1	77480 N	21540 E	0" to 18"
	Site 2	80890 N	21290 E	0" to 12"
	Site 3	78800 N	22530 E	0" to 12"
Region No. 2	Site 1	76970 N	22240 E	0" to 24"
	Site 2	79480 N	21350 E	0" to 10"
	Site 3	82080 N	19750 E	0" to 8"

(cont.)

Shipment No. 5, October 12, 1976

Drill Hole	Sample No.	Depth (ft) From	To	Length (ft)	No. of Bags
76-170	WR- 1	630	700	70	2
76-171	WR- 2	120	180	60	1
76-168	WR- 3	770	840	70	3
76-165	WR- 4	670	750	80	3
76-163	WR- 5	470	510	40	2
76-161	WR- 6	730	800	70	2
76-160	WR- 7	496	536	40	2
76-158	WR- 8	620	690	70	3
76-157	WR- 9	750	800	50	1
76-156	WR-10	520	570	50	2
76-155	WR-11	190	280	90	3
76-154	WR-12	400	500	100	3
76-152	WR-13	330	400	70	2
76-150	WR-14	120	220	100	2
76-149	WR-15	200	300	100	3
76-149	WR-16	400	500	100	3
		TOTALS		1,160	37 bags

Shipment No. 6, October 13, 1976

LOW GRADE WASTE SAMPLES FOR LABORATORY GROWTH TEST STUDIES

Drill Hole	Sample No.	Depth (ft) From	To	Length (ft)	% of NQ Core	No. of Bags
76-134	LG 1	575	586	11	50	1
	LG 2	626	646	20	25	1
	LG 3	646	658	12	25	1
76-125	LG 4	67	236	169	50	4
76-122	LG 5	346	351	5	50	1
76-120	LG 6	408	417	9	25	1
	LG 7	508	526	18	25	1
	LG 8	632	649	17	25	1
	LG 9	757	764	7	25	1
76-118	LG 10	427	437	10	50	1
	LG 11	558	587	29	50	1

(cont.)

Shipment No. 6, October 13, 1976 (cont.)

Drill Hole	Sample No.	Depth (ft) From	Depth (ft) To	Length (ft)	% of NQ Core	No. of Bags
76-118	LG 12	660	678.5	18.5	50	1
	LG 13	827	856	29	25	1
76-117	LG 14	641	657	16	50	1
76-113	LG 15	765.5	774.5	9	50	1
75-101	LG 16	634	648	14	25	1
	LG 17	699	752	53	25	1
75- 97	LG 18	617	633	16	50	1
	LG 19	662	678	16	25	1
75- 93	LG 20	91.5	108	16.5	25	1
75- 92	LG 21	110	148	38	25	1
	LG 22	196	230.5	34.5	25	1
	LG 23	230.5	257	26.5	25	1
	LG 24	547	567	20	50	1
	LG 25	618	639	21	25	1
	LG 26	639	647	8	50	1
	LG 27	701.5	715.5	14	25	1
75- 91	LG 28	220	230	10	25	1
	LG 29	244.5	254	9.5	25	1
75- 89	LG 30	676	713	37	50	1
75- 85	LG 31	736	750	14	50	1
75- 82	LG 32	440	476.5	36.5	50	1
75- 81	LG 33	616	632	16	25	1
	LG 34	737	768	31	25	1
75- 79	LG 35	600	646	46	50	2
	LG 36	646	656	10	25	1
75- 77	LG 37	629.5	649.5	20	50	1
	LG 38	697	717	20	25	1
75- 74	LG 39	437	446	9	25	1
	LG 40	694	724	30	25	1
75- 73	LG 41	677	692.5	15.5	50	1
	LG 42	708	765	57	25	1
75- 68	LG 43	298	308	10	50	1
	LG 44	308	338	30	50	1
	LG 45	338	349	11	25	1
	LG 46	681	699	18	50	1
75- 62	LG 47	180	210	30	50	1
75- 61	LG 48	600	658	58	50	1
75- 57	LG 49	417	522	105	50	3
	LG 50	556	600	44	50	1
75- 56	LG 51	422	437	15	25	1
	LG 52	437	444	7	50	1
	LG 53	444	471	27	25	1

(cont.)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Shipment No. 6 (cont.)

Drill Hole	Sample No.	Depth (ft) From	To	Length (ft)	% of NQ Core	No. of Bags
75- 56	LG 54	471	547	76	50	2
	LG 55	547	561	14	25	1
	LG 56	561	574	13	25	1
	LG 57	574	582	8	50	1
75- 53	LG 58	420	439	19	25	1
	LG 59	446	474.5	28.5	25	1
	LG 60	153	158	5	50	1
	LG 61	190	214	24	25	1
	LG 62	214	220	6	50	1
	LG 63	220	257	37	50	1
	LG 64	313	320	7	50	1
	LG 65	320	335	15	25	1
	LG 66	335	365	30	50	1
	LG 67	365	402	37	50	1
	LG 68	439	446	7	50	1
			TOTAL	1,700		75 bags

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 7 October, 1976

Forwarded To: Mr. G.K. Lee,
Canadian Combustion Research Laboratory,
555 Booth Street,
Ottawa, Ontario

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Petrographic analyses

Sample Origin: See below.

Sample Description: Small chip samples from NQW core.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: April, 1977 B.C.H. File No.: 604H-M21

Reported To:

Reported By: B.N. Nandi, T.D. Brown (CanMet)

Title: Petrographic Studies of Hat Creek Coals.

Description: 9-page report plus two pages of photographs. (See page 20, 20A)

Sample Origin

Sample No.	Strat. Zone	DDH No.	Depth (ft)	Description
CCRL 1	A	76-135	570	clean coal
2			602	clean coal
3			841	silty coal
4			900	clean coal
5			1012	silty coal

(cont.)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Sample No.	Strat. Zone	DDH No.	Depth (ft)	Description
CCRL 7	B	76-135	1131	clean coal
8			1181	clean coal
9			1188	coaly siltstone
10			1238	coaly siltstone
11			1229	clean coal
12			1308	clean coal
CCRL 13	C	76-135	1500	clean coal
14			1506	silty coal
15			1589	clean coal
16			1636	silty coal
17			1541	coaly siltstone
18			1620	silty coal
CCRL 19	D	76-135	1695	slightly silty coal
20			1754	clean coal
21			1781	clean coal
22		76-136	1455	clean coal
23			1507	clean coal
24			1598	silty coal

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 29 October, 1976

Forwarded To: Western Research Laboratories (Energy Mines and Resources)
Alberta Research Council Building
Highway 16 East
Edmonton, Alberta

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Laboratory tests for CanMet water only washing system.

Sample Origin:

BAH 76-12; two bags prepared by homogenizing, quartering and re-quartering a single barrel.

Sample Description: Coal recovered by bucket auger.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: November/76 B.C.H. File No: --

Reported To: M.H. French

Reported By: J.L. Picard

Title: ---

Description: Letter report. Satisfactory float-sink analyses to substantiate request for larger sample of coal for the pilot plant test.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 10 November, 1976

Forwarded To: Western Research Laboratory (E.M.R. Ottawa)
Alberta Research Council Building
Highway 16 East
Edmonton, Alberta

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Preliminary washing test.

Sample Origin:

Material Class	Hole No.	Location		Barrel No.	Depth
A	BAH 76-12	79,120 N	18,290 E	43	56
				45	57.5
				47	59
				49	60
B	76- 6	80,093 N	18,857 E	74	95
				75	95

Sample Description: Coal recovered by bucket auger. Approximate weight 2400 lbs.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: December, 1976 B.C.H. File No: --

Reported To: M.H. French

Reported By: J.L. Picard

Title:

Description: Letter report. Preliminary pilot plant tests to substantiate request for a larger sample of coal for additional pilot plant tests

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 16 November, 1976

Forwarded To: B.C. Research Laboratory
3650 Westbrook Mall
Vancouver, B.C.

Authorized/Requested By: Mr. F.G. Hathorn (B.C. Hydro)

Purpose: Gasification tests

Sample Origin: Bucket auger holes as follows:

Material Class	Hole No.	Location		Barrel No.	Depth
A	BAH 76-12	79120 N	18290 E	1	31
				3	32
				8	35.5
				13	39
				15	40
				17	41.5
				19	42.5
				25	46
				29	48.5
				35	52
				39	54
B	76- 6	80093 N	18857 E	10	56
	76- 7	80114 N	18854 E	95	58
C	76-11	80256N	20011E	80	29
	76-15	80267 N	20019 E	8	16

Sample Description: Coal. Approximate weight three tons.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: April 1977 B.C.H. File No: 604H-C7

Reported To: H.J. Goldie

(cont.)

RESEARCH REPORT (cont.)

Reported By: Dr. D.W. Duncan

Title: Gasification of Hat Creek Coal

Description: 20 Page report including tables.

Date: 10 December, 1976

Forwarded To: Dr. G.G. Thurlow (via Johnston Scanstar)
National Coal Board
Coal Research Establishment
Stoke Orchard
Cheltenhan, Glos.
England

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Laboratory tests for fluid bed combustors. Flucogas program.

Sample Origin:

Material Class	Drill Hole	Barrel No.	Depth
A	BAH 76-12	2	31.5'
		7	35.0'
		9	36.0'
B	BAH 76-7	85	51.0'
		105	64.0'
		115	69.0'

Sample Description: Coal from bucket auger sampling program. Approximately 2400 lbs. total sample weight.

Stratigraphic Zone:

Remarks: Class "A" and "B" coal not to be confused with stratigraphic zone A and B coal. Class "A" coal is lower grade than class "B" coal.

RESEARCH REPORT

Date: January 1978 B.C.H. File No: 604H-F6/1

Reported To: B.C. Hydro

Reported By: Coal Processing Consultants

Title: Study of Fluidized Combustion and Gasification of Coal Demonstration Plant

Description: Coal and limestone tests (Section 3, pages 35-211)
(0.15m Diam. atmospheric pressure combustor)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: December 1976

Forwarded To: Commercial Testing & Engineering,
228 N. Lasalle St., Chicago, Ill.
Authorized/Requested By: M.H. French

Funding:

Purpose: Mineral Analysis

Sample Origin: Collected Isokinetically by S.F. Products at
C.C.R.L. Test Burn

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 5 April/28 March 1977

B.C.H. File No: 1301.1 (File 4)

Reported To: S.F. Products

Reported By: R.A. Houser

Title: -

Description: 7 Pages: Mineral Analysis

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: December 1976

Forwarded To: Research - Cottrell

Authorized/Requested By: M.H. French

Funding:

Purpose: Investigate Qualities of Flyash For Design of Precipitator

Sample Origin: C.C.R.L. Burn Test

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 3 February 1977/March 23, 1977

B.C.H. File No: 1301.1 (File 3)
1301.1 (File 4)

Reported To: M.H. French

Reported By: G. Cooper

Title: -

Description: i) 6 Pages Analysis of Resistivity/Temperature
ii) 8 Pages Analysis of Resistivity/Temperature Plus Asme P.T.C.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: December, 1976

Forwarded To: Patrick A. Hill
Department of Geology
Carleton University
Ottawa

Authorized/Requested By:

Purpose: X ray analysis of mineral matter in coal and fly ash.

Sample Origin:

Three composite samples, one each of Class "A", "B" and "C" coals. Samples prepared by CanMet (EMR, Ottawa) from bucket auger sample shipment of May, 1976.

Sample Description: Approximately 500 gm each.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 March/77 B.C.H. File No: 604H-M20

Reported To:

Reported By: Patrick Hill

Title: The Mineralogy of Coal From Hat Creek, British Columbia.

Description: 31 pages with tables, graphs and photographs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 21 January, 1977

Forwarded To: Ministry of Mines and Petroleum Resources.
Victoria, B.C.
Attention: Dr. D.E. Pearson.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: X ray analysis of minerals in ash.

Sample Origin:

Description	Drill Hole	Footage	Strat. Zone
coaly shale	74-25	1578	Footwall
dirty coal	75-53	200	C
dirty coal	75-106	562	A
clean coal	"	416	A
dirty coal	"	1090	B
clean coal	"	1001	B
dirty coal	"	1450	C
clean coal	"	1570	C
dirty coal	"	1834	D
clean coal	"	1740	D
dirty coal	76-208	420	C

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To:

Reported By: No report to this date

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: March, 1977

Forwarded To: Environmental Research and Technology

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Trace element study.

Sample Origin:

DDH No.	Depth	Samples In Composites
76-127	317- 502	1 - 10
76-138	226- 507	2 - 11
76-141	204- 526	1 - 17 excluding 11, 12, 13.
76-141	931-1131	35 - 44
76-144	609-1024	23 - 42 excluding 33.
76-152	25- 291	1 - 14
76-155	404- 709	1 - 21
76-156	216- 483	1 - 13
76-196	30- 258	1 - 26 excluding 22, 25.
76-196	258- 461	27 - 38
76-202	99- 273	1 - 4 excluding 5.

Sample Description: Composite samples from laboratory rejects; approximately 0.5 kg for each sample.

Stratigraphic Zone: A, B, C and D.

Remarks: Excluded samples are high ash samples.

RESEARCH REPORT

Date: 3 August 1977 B.C.H. File No: 604H-296.13

Reported To: J. Alesi

Reported By: R. Krablin

Title: --

Description: Cover letter plus two pages

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 8 March, 1977

Forwarded To: British Coal Research Association, (via Johston Scanstar)
Randalls Road,
Leatherhead, Surrey, England.
Attention: Mr. H.R. Hoy

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Fluid bed combustion tests for Flucogas program.

Sample Origin:

	Barrel No.	Depth		Barrel No.	Depth
B.A.H. 76-6	2	50.0'	B.A.H. 76-12	14	39.5'
80,125'N	7	54.0	79,122'N	16	41.0
18,876'E	11	57.0	18,290'E	18	42.0
Elev. 3092'	15	59.0	Elev. 3190'	28	47.5
Class 'B' coal	21	62.5	Class 'A' coal	30	49.0
	24	65.0		36	52.5
	30	68.0		38	53.0
	40	73.0		40	54.5
	45	77.0			
	55	82.0			
	60	85.0			
	70	91.0			

Sample Description: Coal. Total sample weight approximately four tons.

Stratigraphic Zone:

Remarks: Class "A" and "B" coal not to be confused with stratigraphic zone A and B coal.

RESEARCH REPORT

Date: January 1978 B.C.H. File No: 604H-F6/1

Reported To: B.C. Hydro

(cont.)

RESEARCH REPORT (cont.)

Reported By: Coal Processing Consultants

Title: Study of Fluidized Combustion and Gasification of Coal Demonstration Plant

Description: Coal & limestone tests (Section 3, Pages 135-211) (0.3m diam. pressurized combustor)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 28 April, 1977

Forwarded To: E.M.R., Ottawa

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Funding: 1/3 E.M.R., 2/3 B.C. Hydro

Purpose: Verification of coal fusion temperatures.

Sample Origin:

DDH 76-135, Samp. Nos. 41, 43, 91, 93, 137, 163 and 164
DDH 76-136, Samp. Nos. 120 and 121

Sample Description: Small laboratory pulp samples.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: October 1977 B.C.H. File No: 604H-P8

Reported To: BCHPA

Reported By: C.C.R.L.

Title: "Pilot Scale Combustion Studies with Hat Creek Coal"

Description: Two volumes

Date: June - August, 1977

Forwarded To: Battle River Thermal Station
Alberta

Authorized/Requested By: J.J. Fitzpatrick (B.C. Hydro)

Funding: B.C. Hydro

Purpose: Combustion tests

Sample Origin:

1. Trench A - 6500 tons
2. Trench B - 500 tons

Sample Description: 1. H.H.V. - 5300 Btu/lb @ 20% moisture
2. H.H.V. - 5000 Btu/lb @ 20% moisture

Stratigraphic Zone: 1. A and B
2. D

Remarks: Calorific value of Trench B sample low because of large amount of waste contamination during mining.

RESEARCH REPORT

Date: August 1978

B.C.H. File No: 604H-G14

Reported To: --

Reported By: Thermal Division

Title: Bulk Sample Program Final Report

Description: One volume including list of bibliography

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 21 June, 1977

Forwarded To: Dr. A.C.D. Chaklader.
Department of Metallurgy
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Investigation into Hat Creek coal washing, in particular the potential value of clays obtained.

Sample Origin:

Samples of coal and waste collected from Trench A by Dr. Chaklader.

Sample Description: Small hand samples; total weight on the order of 100 kg.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: December 1977 B.C.H. File No: 604H-M47

Reported To: BCHPA

Reported By: Dr. A.C.D. Chaklader & Dr. T.H. Warren

Title: "Removal of Inorganic Minerals & Washability of Hat Creek Coal"

Description: Washability tests, float-sink analyses to establish the nature of the minerals that would be rejected by a washing process.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 24 June 1977

Forwarded To: Can-Met; C.C.R.L., Ontario

Authorized/Requested By: M.H. French

Funding:

Purpose: Fluidized Bed Tests

Sample Origin: 'Coaly waste' from test trench

Sample Description: 5 drums, 2000 - 3000 Btu/lb

Stratigraphic Zone:

Remarks: This sample was considered unsuitable - having oxidized.
See page 40.

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 13 July, 1977

Forwarded To: Dr. A.C.D. Chaklader
Department of Metallurgy
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose:
1. Study mineralogy and carbon content of coaly waste.
2.
3. Determine if portions of the deposit contain white kaolanitic clay.

Sample Origin:

1. Four 15-kg samples of coaly waste.
2. 45 kg of coal from Trench A Bradford breaker pile.
3. Four 6 cm long pieces of white to light grey NQW drill core.

Sample Description:

Stratigraphic Zone:

Remarks: All samples from Group 3 proved to be feldspathic.

RESEARCH REPORT

Date: December 1977 B.C.H. File No: 604H-M47

Reported To: BCHPA

Reported By: Drs. Chaklader & Warren

Title: "Removal of Inorganic Materials and Washability of Hat Creek Coal"

Description: Above tests included in the program reported on page 38

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 19 July, 1977

Forwarded To: Mr. G.K. Lee,
Canadian Combustion Research Laboratory,
Highway 7, West of Bell's Corner,
Ontario

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: Fluid bed combustion tests for the alumina extraction program.

Sample Origin: Trench A

Sample Description: Five drums (approximately 2000 lbs.) of coaly waste from a low grade stockpile.

Five grab samples, one from each drum, ranged from 1800 to 4600 Btu/lb., dry basis.

Stratigraphic Zone:

Remarks: Shipment was a replacement for five drums shipped in June and averaging about 6800 Btu/lb.

An attempt was made to exclude oxidized coal from the sample.

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title: Coal samples sent at the request of E.M.R. for a project associated with Alcan Aluminum Ltd.

Description: -- Report not issued to B.C. Hydro

Date: July, 1977

Forwarded To: Klohn Leonoff Consultants Ltd. & Prof. R.M. Quigley, Head,
Vancouver Soil Mechanics Section,
The University of Western Ontario,
London, Ontario.

Authorized/Requested By: Mr. D. Fawcett (B.C. Hydro)

Purpose: Obtain data on "diggability". Analyses included Atterberg limits, moisture, X ray for mineral content, unconfined compressive strength and vane shear strength.

Sample Origin:

Sample No. 77 S-5 from bulldozer trench at 80,550'N, 16,300'E

Sample Description: Clay; approximately three kg.

Stratigraphic Zone: Disturbed (slumped) Coldwater footwall rocks.

Remarks: Sample divided into two parts and one-half sent to each of the above laboratories.

RESEARCH REPORT

Date: (1) 5 Aug./77; (2) 11 Aug./77 B.C.H. File No: 604H-1301.3 (File 3)

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: (1) Prof. R.M. Quigley, The University of Western Ontario.
(2) Mr. Walter Shukin, Klohn Leonoff Consultants Ltd.

Title: (1) Mineral Analyses of Overburden Material, Hat Creek Trench Sample 77 S-5.

Description: (1) 3-page letter report plus table and graph.
(2) 2-page letter report.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: July, 1977

Forwarded To:
1. General Testing Laboratories, Vancouver.
2. Loring Laboratories Ltd., Calgary.
3. Commercial Testing & Engineering Ltd., Vancouver.
4. Chemical and Geological Laboratories Ltd., Edmonton.
5. Dept. of Energy Mines and Resources, Ottawa.
6. Warnock Hersey Professional Services Ltd., Vancouver.
7. Alberta Research Council, Edmonton

Authorized/Requested By: Dr. B. Dutt (B.C. Hydro)

Purpose: Establish reference samples for inter- and intra-laboratory comparisons of the following analyses: proximate, ultimate, sulphur forms, carbon dioxide, ash fusion temperatures and ash minerals.

Sample Origin:

TAR-1	A trench, good quality coal
TAR-2	A trench, low quality coal
TBR-1	B trench, high quality coal

Sample Description: Three 10-kg samples subdivided into 300 gram aliquots.

Stratigraphic Zone:

Remarks: Sample TAR-2 "spiked" with carbonates.

RESEARCH REPORT

Date: August - October, 1977 B.C.H. File No: 604H-1301.1-2

Reported To: Dolmage Campbell & Associates Ltd.

Reported By: Laboratories as listed.

Title: Hat Creek Development - Reference Samples

Description: Complete results from laboratories 1 to 4, partial results from laboratories 5 and 6, no results from laboratory 7.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: July, 1977

Forwarded To: Vangeochem Lab, N. Vancouver

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Trace element studies.

Sample Origin:

West of Houth Meadows.

Sample Description: Soils.

Stratigraphic Zone: Mount Marley Stock; Marble Canyon Limestone

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title:

See Page 62

Description:

Date: July 27, August 11, 1977

Forwarded To: Simon-Carves

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Washability tests.

Sample Origin:

Sample X: Trench A; 79,290'N, 18,340'E; 5 tons.
Sample Y: Trench A; 79,290'N, 18,440'E; 5 tons.
Sample Z: Trench B; 82,140'N, 19,715'E; 10 tons.

Sample Description:

X: HHV 5980 Btu/lb., 30% ash @ 20% moisture.
Y: HHV 5580 Btu/lb., 38% ash @ 20% moisture.
Z: HHV 7100 Btu/lb., 22% ash @ 20% moisture.

Stratigraphic Zone:

Remarks: Samples were crushed; passed through Bradford breaker and both breaker product and reject sent to Warnock-Hersey in Calgary for washability testing.

RESEARCH REPORT

Date: 24 February 1978

B.C.H. File No: 604H-M38

See also 604H-M27 604H-M41
M33/1
M33/2
M33/3
M39
M40

Reported To: O. Johnson ; CMJV

Reported By: S. Butcher ; SCAN

Title: "Washability Testwork of 1977 Bulk Samples"

Description: One volume including appendices and analyses by Warnock-Hersey

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 28 July, 13 Sept., 1977

Forwarded To: Dresser Industrial Products, 1102 Franklin St., Vancouver

Authorized/Requested By: Mr. O.L. dela Cuesta (B.C. Hydro)

Purpose: Microbit penetration tests.

Sample Origin:

D Zone coal from Trench B.
Harder rock zones, Trench A

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: October 17th 1977/ Feb. 3rd 1978 B.C.H. File No: 1301.3/1301.1-2

Reported To: O.L. dela Cuesta

Reported By: J.T. Austin (Boyles Operation : Dresser Industrial Products Ltd)

Title: Drillability Report

Description: Three pages in each report.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 2 Aug., 1977

Forwarded To: Mitsubishi Heavy Industries, Japan

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Combustion tests.

Sample Origin:

Trench A: Approximately 300 lbs.
Trench B: Approximately 100 lbs.

Sample Description: Uncrushed coal.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 December 1978 B.C.H. File No: 604H-1301.1-2

Reported To: C.R. Welton

Reported By: T. Aoyama

Title: --

Description: 2 page analysis & combustion report

Date: 5 August, 1977

Forwarded To: Energy Mines & Resources.
Ottawa

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Pilot-scale washing tests.

Sample Origin:

Bradford breaker sample, totaling about 80 tons, form Trench A. Sample collected from the following locations:

1. 79,305'N; 18,335'E
2. 79,305'N; 18,445'E

Sample Description: Analytical samples:

2 samples from breaker: Average HHV 5680 Btu/lb., 30% ash @ 20% moisture.
5 samples from representative barrels: Average HHV 5330 Btu/lb., 31% ash @ 20% moisture.

Stratigraphic Zone:

Remarks: Crushed sample shipped in a rail car lined with plastic.

RESEARCH REPORT

Date: April 1978 B.C.H. File No: 604H-M51/1
M51/2

Reported To: B.C. Hydro

Reported By: Canmet - ERL

Title: "Pilot-Scale Preparation Studies with Hat Creek Coal"

Description: Two volumes

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 11 August 1977

Forwarded To: EMR Energy Research Laboratories,
555 Booth St., Ottawa
Authorized/Requested By: B.K. Dutt

Funding:

Purpose: Proximate, ultimate, calorific value & ash fusibility

Sample Origin:

Sample Description: 3 samples marked TBR-1; TAR-1; TAR-2.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 14 September 1977 B.C.H. File No: 1301.1 (File 5

Reported To: B.K. Dutt

Reported By: B.I. Parsons

Title: --

Description: 3 page (analysis sheets)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 17 August, 1977

Forwarded To: Stock Equipment Ltd.
Chagrin Falls
Ohio

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Tests on handling characteristics.

Sample Origin:

Trench A stockpiles - 6 tons.

Sample Description: H.H.V. - 4500 Btu/lb., 39% ash.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 1 February 1978 B.C.H. File No: 604H-M53

Reported To: C.R. Welton

Reported By: A.L. Bennett / R.R. Hastings

Title: Flowability of Coal From Hat Creek Mine, British Columbia

Description: 23 pages including tabulated data & graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 19 August, 1977

Forwarded To: Sasol,
South Africa

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Gasification tests.

Sample Origin: Trench B - 100 lbs.

Sample Description: H.H.V. - 7000 Btu, 27% ash @ 20% moisture.

Stratigraphic Zone: D

Remarks: Coal crushed before shipment.

RESEARCH REPORT

Date: September 1977 B.C.H. File No: 604H-1301.2-2

Reported To: R. Blakeley (BCH Gas Division)

Reported By: Sasol (S.A.)

Title: --

Description: Two page analysis

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: August 1977

Forwarded To: University of Victoria, Dr. P. West (Dept. of Chemistry)

Authorized/Requested By: M.H. French

Funding:

Purpose: Coal ranking & trace element analysis

Sample Origin:

Sample Description:

Stratigraphic Zone:

Remarks: Samples not sent at this time

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: August, 1977

Forwarded To: Acme Analytical Laboratories Ltd.
6455 Laurel Street
Burnaby, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Determine limestone quality.
Analyses: MgO, CaO, FE_2O_3, SiO_2, Loss on Ignition.

Sample Origin: Limestone on the northern margin of Houth Meadows.,

Sample Description: Random chip samples.

Stratigraphic Zone: N/A

Remarks: 4 samples were taken.

RESEARCH REPORT

Date: 22 November 1978 B.C.H. File No:

Reported To:

Reported By: P.T. McCullough

Title: "Minerals & Petroleum"

Description: In final draft form, and in P. T. McCullough's possession. No further work anticipated.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: August, 1977

Forwarded To: Thurber Consultants Ltd.
1623 MacKenzie St.,
Victoria, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Engineering tests:

Fine Specific Gravity	Seive Analysis
Coarse Specific Gravity	Soundness (Coarse Agg.)
Petrographic Examination	Soundness (Fine Agg.)
Organic Impurities	Los Angeles Abrasion
Unit Weight	

Sample Origin:

1. Gravel Quarry - Department of Highways.
2. Near Hat Creek Bridge, north of No. 1 Deposit.

Sample Description:

1. Gravel.
2. Gravelly sand.

Stratigraphic Zone: N/A

Remarks: Samples were taken from hand dug trenches.

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title: See page 62

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: August, 1977

Forwarded To: Dr. A.R. Cameron
Dr. A. Sweet
Institute of Sedimentary and Petroleum Geology (G.S.C.)
Calgary

Authorized/Requested By: Mr. J.J. Fitzpatrick (B.C. Hydro)

Purpose: Coal Petrography & palynology

Sample Origin: Samples collected by Drs. Cameron & Sweet. Details not known.

Sample Description: i) Coal & Claystone samples from bore 75-106 throughout length of bore (700 samples)

ii) Vitrain samples at 200' to 300' intervals in bores 76.135, 76.191, 76.196, 76.152, 76.127, 76.124, 74.25

Stratigraphic Zone:

Remarks: Group (1) samples to provide for detailed petrographic & palynologic studies of the full coal sequence
Group (11) samples to provide for a study of rank variation within the deposit, based on Vitrinite reflectance determinations

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To:

Reported By:

See Page 95

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 30 September 1977

Forwarded To: Mitsui & Co. (Canada) Ltd.

Authorized/Requested By: P.R. Willis

Funding: Mitsui

Purpose: 1) Petrographic analysis
2) Tests in solvent refined coal (S.R.C.) process

Sample Origin: Washed coal from E.M.R. pilot washability study

Sample Description: 1 drum approx. 400 lbs.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 18 July 1978/1 November 1978

B.C.H. File No: 1301.1-2(c)

Reported To: B.K. Dutt

Reported By: K. Komaki

Title: 1) Test result of Hat Creek washed coal sample
2) "SRC Test Report on Hat Creek Coal"

Description: 1) Single page analysis
2) 10 pages including graphs & tables

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 5 October, 1977

Forwarded To: Coal Processing Consultants
London, England

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Gasification tests.

Sample Origin: Trench A - 400 lbs.

Sample Description: HHV 4500 Btu/lb., 48% ash @ 20% moisture.

Stratigraphic Zone:

Remarks: Coal crushed before shipment.

RESEARCH REPORT

Date: March 1978 B.C.H. File No: 604H-1301.2-2

Reported To: B.C. Hydro

Reported By: British Gas Corporation

Title: Report by the British Gas Corp. on the Assessment of the Hat Creek Coal for Slagging Gasification

Description: 19 page report

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 7 October, 1977

Forwarded To: Can Test Ltd.
Vancouver

Authorized/Requested By: F.G. Hathorn (B.C. Hydro)

Purpose: Trace element analysis.

Sample Origin: One "representative" lump of coal from Trench B.

Sample Description: One kg.

Stratigraphic Zone: D

Remarks: Sample not sent on this occasion

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 26 October, 1977

Forwarded To: Dr. A.C.D. Chaklader
Department of Metallurgy
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Mr. M.H. French (B.C. Hydro)

Purpose: See page 47

Sample Origin:

1. Trench A: Bradford breaker coal storage pile.
2. Trench B: Bradford breaker coal storage pile.

Sample Description: Weight of each sample approximately 15 kg.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By: Test results included in program reported on page 47

Title:

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 26 October, 1977

Forwarded To: Mr. D. Albon
Clayburn Industries.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Testing quality of in situ burn zone (clinker) material for making grog.

Sample Origin: Trench A - 4 channel samples, two on each side of trench in burn zone.

Sample Description: "Clinker". Each sample approximately 7 kg.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: January 30th, 1978 B.C.H. File No: 1301.1-2

Reported To: H.G. Goldie

Reported By: D. Albon

Title: --

Description: Info. letter - Research continuing

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 31 October 1977

Forwarded To: Wilson-Snyder Pumps , 1 Penn. Plaza, Ste. 3410, 250 W. 34th St., NY
Authorized/Requested By: M.A. Favell

Purpose: Establish Miller number of flyash

Sample Origin: Battle River burn test

Sample Description: 100 gm.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 2 December 1977 B.C.H. File No: 1308.17 (File2

Reported To: M.A. Favell

Reported By: E.J. Tauber

Title: Miller Number Report

Description: Cover letter plus 3 page report & photograph.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 14 November, 1977

Forwarded To: Canada Cement Lafarge Ltd.
1051 Main Street
Vancouver, B.C.
Attention: L. Russell

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Cement extender tests.

Sample Origin: Bulk test burn, Battle River, Alberta

Sample Description: 400 lbs fly ash.

Stratigraphic Zone: N/A

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To:

Reported By:

Title:

Description: C. C. L. has put project on hold.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 14 November, 1977

Forwarded To: Wescon Products (Ocean Cement)
New Westminster, B.C.

Authorized/Requested By: D.M. MacLeod (B.C. Hydro)

Purpose: Experiments on lightweight aggregate and concrete block manufacture.

Sample Origin: Bulk test burn, Battle River, Alberta

Sample Description: 400 lb. fly ash.

Stratigraphic Zone: N/A

Remarks:

RESEARCH REPORT

Date: 23 March 1978 B.C.H. File No: 1301.1-2

Reported To: P.T. McCullough

Reported By: J.S. Burns

Title: --

Description: Cover note plus 3 pages
(2 - semi-quantative spectrographic analyses)
(1 - Mgo, SiO_2, Fe_2O_3, Assay)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 18 November, 1977

Forwarded To: United Conveyor Corporation
300 Wilmont Road
Deerfield, Illinois
Attention: G.T. Monahu

Authorized/Requested By: P.R. Willis (B.C. Hydro)

Purpose: Slurry conveying velocity tests

Sample Origin: Bulk test burn, Battle River, Alberta

Sample Description: 5 gallon fly ash

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 12 January 1978 B.C.H. File No: 1301.1-2

Reported To: Integ-Ebasco

Reported By: G.T. Monahu

Title: --

Description: Two page letter with test results plus Asme Test Code

Date: 22 November, 1977

Forwarded To: Dr. A.C.D. Chaklader
Department of Metallurgy
University of British Columbia
Vancouver, B.C.

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Examine possibility of kaolinite extraction.

Sample Origin: Claystone from Trench B.

Sample Description: Hand sorted sample from Trench B waste dump. Chosen for high clay content.

Stratigraphic Zone: C with perhaps some D. (east central part of the deposit)

Remarks: 45 gallon drum, approximately 180 kg.

RESEARCH REPORT

Date: October 1978 B.C.H. File No: 604H-M55

Reported To: P. T. McCullough and M. H. French

Reported By:

Title: Characteristics and Utilization of the Kaolin Clays in Hat Creek Coal

Description: Explains uses of Hat Creek raw clay, sedimented clay, sedimented bleached clay and washery rejects for uses ranging from refractory bricks to cement and building bricks.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 1 December, 1977

Forwarded To: Allen-Sherman-Hoff Co.
Route US 322
Honeybrook, Penn.
Attention: H. Lownes

Authorized/Requested By: P. Gurney (Integ-Ebasco)

Purpose: Conveying tests.

Sample Origin: Bulk test burn, Battle River, Alberta.

Sample Description: 400 lb fly ash.

Stratigraphic Zone: N/A

Remarks:

RESEARCH REPORT

Date: 8 January 1979 B.C.H. File No: 604H-1301.1-2

Reported To: B. C. Hydro

Reported By: Diamond CANAPOWER Ltd.

Title: B. C. Hydro Fly Ash Sample

Description: Cover Letter plus 2 Page Analysis

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: January 1978

Forwarded To: Wescon Products Ltd. (J.S. Burns)

Authorized/Requested By: C.R. Welton

Funding: Wescon (except transportation)

Purpose: Investigate use of bottom ash in manufacture of lightweight aggregate and concrete blocks

Sample Origin: Battle River Bulk Test Burn

Sample Description: 1 x 45 gallon drum

Stratigraphic Zone: --

Remarks:

RESEARCH REPORT

Date: 12 December 1978 B.C.H. File No:

Reported To: C.R. Welton

Reported By: J.S. Burns

Title: --

Description: No report available-
High interest in unquenched bottom ash and in future of Hat Creek Project

Date: 27 January, 1978

Forwarded To: B.C. Ministry of Mines & Petroleum Resources
Victoria, B.C.
Attention: Dr. D.E. Pearson

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Funding: B.C. Ministry of Mines (except transportation)

Purpose: Distribution of calcium sulphate in Hat Creek coal.

Sample Origin:

Drill Hole	Coordinates		Sample Depth		Strat. Zone
DDH 78-261 (vertical)	78,500'N	19,000'E	76.8 m	252'	A zone coal
			137.0	449	A zone coal
			182.2	598	A zone coal
			229.0	751	B zone coal
			286.5	940	B zone coal
DDH 78-266 (-70°, az. 270°)	79,000'N	18,780'E	81.7 m	268'	A zone coal
			108.3	355	B zone coal
			183.7	603	C zone coal
			223.0	732	Base of C or top of D zone coal
			265.5	871	D zone coal
			304.2	998	D zone coal

Sample Description: 7.5 cm lengths of split NQW drill core.

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To:

Reported By: No report to this date (cont.)

Date: 30 January, 1978

Forwarded To: Industrial Minerals Laboratory (EMR)
405 Rochester Street,
Ottawa
Attention: Mr. A. Winer

Authorized/Requested By: Dr. P.T. McCullough (B.C. Hydro)

Purpose: Studies of alumina content of montmorillonitic rocks.

Sample Origin:

DDH 76-126, 197 to 293 ft., inclusive:

A. Bulk sample - 1/2 of split NQW core. Total weight approximately 45 kg.
B. Small core chips - chips at 3-foot intervals except no sample at 230 ft.

Sample Description:

Stratigraphic Zone: Hanging wall shales in fault-block east of fault No. 8.

Remarks: Cores may be contaminated by bentonitic drilling mud.

RESEARCH REPORT

Date: November 20, 1978 B.C.H. File No:

Reported To:

Reported By:

Title:

See page 64

Description: Alumina content not very high - 24.9/25%

Date: 2 February, 1978

Forwarded To: Industrial Minerals Laboratory (EMR)
405 Rochester Street
Ottawa
Attention: Mr. A. Winer

Authorized/Requested By: Dr. P.T. McCullough

Purpose: Studies of alumina content of kaolinitic mineral matter in coal and partings.

Sample Origin:

1. DDH 76-191, 597-997 ft. inclusive.
   a. Composite sample from laboratory rejects.
   b. Chip samples of core at 3 to 7 ft. intervals throughout.

2. Trench A, middle of west wall of the bottom bench. Sample weight 45 kg.

Sample Description: Core chips selected principally from carbonaceous to coaly shale beds.

Stratigraphic Zone:

Remarks: Core samples may be contaminated by bentonitic drilling mud.

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To: B. C. Hydro

Reported By: A.H. Webster (Canmet)

Title: Evaluation of the Hat Creek, British Columbia Coal Deposits as potential sources of non-bauxitic alumina: A Preliminary Mineralogical Investigation

Description: Analyses conducted on the samples to determine the mineralogy and alumina content of Hat Creek Coal.

Date: 14 February 1978

Forwarded To: Dr. A.C.D. Chaklader, Dept. of Metallurgy, UBC

Authorized/Requested By: P.T. McCullough

Purpose: Examination of clay mineralogy to determine its potential for Koalin extraction or refractories

Sample Origin: Washery rejects; from storage at Burrard Thermal Plant

Sample Description: 1 kg for each sample, one sample from each drum
Fine rejects - 8 samples; coarse rejects - 24 samples; thickener sludge - 1 sample

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No: --

Reported To:

Reported By:

Title: See page 74

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: February 1978

Forwarded To: Dr. A. Winer; E.M.R. (Industrial Minerals Laboratory)

Authorized/Requested By: Dr. P.T. McCullough

Funding: B.C. Hydro - transportation only

Purpose: Investigate alumina extraction

Sample Origin: 1) Laboratory rejects from Commercial Testing Ltd. (DDH 76-191) (Kaolinite)
2) DDH 76-126)
3) Trench 'A') Bentonitic Clay

Sample Description: 1) 20.5 Kg + chip samples; 2) 45 Kg + chip samples; 3) 45 Kg

Stratigraphic Zone:

Remarks: Geological map & section showing sample location, drill logs & other supplementary data also sent

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title: See Page 79

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 8 March 1978

Forwarded To: Mr. E. Strand, Syntron Inc., c/o Dawson Metallurgy Laboratory, 5217 Major Street, Salt Lake City, Utah, USA 84170

Authorized/Requested By: P.R. Willis/W.C. Fothergill

Funding: J. Cosar, Vancouver Rep. (Including transportation)

Purpose: Special tests with new coking methods

Sample Origin: Stockpile of crushed coal from Trench B.

Sample Description: Coal, crushed to 1 7/8" minus by Bradford Brkr (5000 - 6500 Btu/lb @ 20% moisture)

Stratigraphic Zone: D

Remarks: 400 lbs in a 45 gallon barrel, sealed

RESEARCH REPORT

Date: 24 May 1978

B.C.H. File No: 604H-1301.2

Reported To: M.A. Favell

Reported By: J. Cosar

Title: --

Description: Origin, macroscopic inspection, preparation, heat treatment, chemical analysis of coal sample from Hat Creek. (4 pages)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 15 March 1978

Forwarded To: Dr. G. Rouse, Ph.D.,
2134 West 53rd, Vancouver
Authorized/Requested By: H. Kim

Funding:

Purpose: Palynological Studies

Sample Origin:

DDH 76 - 187	100'-350'
	560'-650'
	720'-820'
DDH 76 - 151	132'-220'
	500'-550'
DDH 77 - 235	13m- 43m
	205m-217m

Sample Description: Highly carbonaceous to coaly shale and volcanic ash

Stratigraphic Zone: 'D' zone coal

Remarks:

RESEARCH REPORT

Date: 3 May 1978 B.C.H. File No: 1301.1-2

Reported To: J.J. Fitzpatrick

Reported By: Dr. G. Rouse

Title: Palynological Analysis of Hat Creek Core Samples Submitted in March

Description: Cover note plus two pages
See also page 11

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 22 March 1978

Forwarded To: Mr. Ivor Watson (Consultant) c/o 714 - 510 W. Hastings Street Vancouver, B.C.

Authorized/Requested By: P.T. McCullough Representing (Allied Chemical Ltd.)

Funding:

Purpose: Examine the quality of bentonite from the hangine wall claystones.

Sample Origin:

76-126-170	76-130-235-238*	76-136-119.5*
178-182	323*	119.5-120.5
200-205	338*	219-221*
205-208*	342*	76-170-703.8-705*
208-210*	76-130-1620.1-1621.1	703 -704*
210-212*	1621.1-1621.4*	705 -706*
	1621.4-1622	
	1791.5	

Sample Description: Chip samples from diamond drill core.

Stratigraphic Zone: Hanging wall

Remarks: Sampling locations are based on the results of Dr. A.C.D. Chaklader's work. Samples were taken from intervals adjacent to high bentonite intervals identified by Dr. Chaklader.

RESEARCH REPORT

Date: 9 May 1978

B.C.H. File No: Sample Coordination File

Reported To: P.T. McCullough

Reported By: I.M. Watson

Title: --

Description: Two pages; tests on * items above.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: March 1978

Forwarded To: 1) Cantest 2) Chemex 3) CTE Labs Ltd.

Authorized/Requested By: Dr. P.T. McCullough

Funding: B.C. Hydro

Purpose: Establish accuracy of trace element analysis

Sample Origin: 76 - 137 (1 - 8)
76 - 180 (17 - 28 - A)
76 - 187A(1 - 9)

Sample Description: Coal

Stratigraphic Zone: 76-137 - C; 76-180 - D; 76-187A - D

Remarks:

RESEARCH REPORT

Date: May 1978 B.C.H. File No: 296.13

Reported To: Dr. P.T. McCullough

Reported By: Laboratories as above

Title: --

Description: Data sheets of analyses available on request from P.T. McCullough statistical analysis report being compiled by B.C. Hydro

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: April 1978

Forwarded To: University of Leeds, England (Dr. P.E. Baker)

Authorized/Requested By: Dr. G.E. Rawlings, Golder Associates

Funding: University of Leeds

Purpose: Investigation into the origin of fused clays

Sample Origin: Trench 'A' burn zone

Sample Description: 6 ozs

Stratigraphic Zone: --

Remarks:

RESEARCH REPORT

Date: 13 July 1978, 16 August 1978 B.C.H. File No: 604H-1301.1

Reported To: Dr. G.E. Rawlings

Reported By: Dr. P.E. Baker

Title: --

Description: Single page letters, informal report only

Date: 25 May 1978

Forwarded To: Saskatchewan Research Council
c/o Michael Small
1630 Quebec Avenue
Saskatoon, Saskatchewan
S7K 1V7

Authorized/Requested By: P. R. Willis

Purpose: Rheological Investigations Coal-Oil Slurries

Sample Origin: Loose Coal Pile #1 (Compacted)

Sample Description:

700 lbs. (2 Drums)
4000 BTU/lb. (Wet) 40% Ash

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: November 20, 1978 B.C.H. File No: --

Reported To: C.R. Welton

Reported By: Randy Gillies

Title: --

Description: Research suspended by instruction of EMR

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 25 May 1978

Forwarded To: Dr. Ion I. Inculet, Faculty of Engineering Science
University of Western Ontario, London, Ontario N6A 5B9
Authorized/Requested By: P.R. Willis

Funding: University of Western Ontario (except transportation)

Purpose: Electrostatic Beneficiation

Sample Origin: Loose Coal Pile #1 (Compacted)

Sample Description: 2 Ton (10 Drums)
3800 - 4500 BTU/lb (wet)
23 - 25% Moisture
0.4 - 0.8 Sulphur
36 - 39% Ash

Stratigraphic Zone: B

Remarks:

RESEARCH REPORT

Date: 1) 5 September 1978
2) 6 November 1978

B.C.H. File No: 604H-1301.1-3

Reported To: M.A. Favell

Reported By: Prof. I. Inculet

Title: 1) Progress Report (June 28 - August 28, 1978) Electrostatic Beneficiation of Coal Mined At Hat Creek, B.C.

Description: Seventeen Pages Including Tables, Graphs and Photographs

2) Progress Report (August 28 - October 28,1978)
Twenty-five pages including tables and graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: June 1, 1978

Forwarded To: Coal Processing Consultants
Leatherhead, England

Authorized/Requested by: E.H. Martin

Purpose: Fluidized Bed Tests

Sample Origin: Loose Coal Pile #1 (compacted) from Trench A
Bulk Sample Program

Sample Description:

130 tons
3800 - 4500 Btu/lb (wet)
23 - 25% moisture
0.4 - 0.8 Sulphur
36 - 39% Ash

Stratigraphic Zone: B

Remarks:

RESEARCH REPORT

Date: January 1979 B.C.H. File No.: See P.R. Willis

Reported To: B.C. Hydro

Reported By: C. P. C.

Title: Testwork on H.C. Coal and Marble Canyon Limestone on the three feet by two feet pressurized combustor at the NCB coal utilization research laboratories.

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: June 1978

Forwarded To: Dr. J. Howard, B.C. Research

Authorized/Requested By: Dr. P.T. McCullough

Funding: B.C. Hydro - Generation Planning

Purpose: Evaluation of Hat Creek Kaolinite in paper applications

Sample Origin: From material collected by Dr. A.C.D. Chaklader

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 21 March 1979 B.C.H. File No: 604H-M61

Reported To: P.T. McCullough

Reported By: J. Howard

Title: Project 204-505 Hat Creek Clay

Description: 8 page report and tables & appendices

Date: 9 June 1978

Forwarded To: Chemex Labs. Ltd.

Authorized/Requested By: Dr. P.T. McCullough

Funding: B.C. Hydro

Purpose: Trace element analysis

Sample Origin:

DDH 76-134 (2-15)	DDH 76-180 (1-12)
76-13A (1-8)	76-181 (1-11)
76-139 (1-5,7-19)	76-201 (28-42)
76-161 (14-29)	76-246 (52.4 - 163.7m)
76-179 (17-21)	76-247 (58.5 - 155m)

Sample Description: Coal

Stratigraphic Zone / Remarks:

76-134 - A/C	180 - D
-13A - A/C	181 - B
-139 - A	201 - D
-161 - D	246 - A
-179 - D	247 - A

RESEARCH REPORT

Date: July 1978

B.C.H. File No: See P.T. McCullough

Reported To: Dr. P.T. McCullough

Reported By: Chemex Labs Ltd.

Title:

Description: Results reported in letter from Chemex to P.T. McCullough dated 20 April 1978.
Statistical analyses reported in memo from I. Cheng to P.T. McCullough dated 6 December 1978.
Additional reports: M. le Geyt., 1979: an evaluation of various analytical methods used for the generation of trace element data for the proposed Hat Creek Project.
System Eng. Div., 1979: trace elements in coal and effects of redistribution in the environment from the proposed Hat Creek Project.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 9 June 1978

Forwarded To: Dr. J. Dauria, Chemistry Dept., Simon Fraser University

Authorized/Requested By: Dr. P.T. McCullough

Funding: --

Purpose: Trace element analysis

Sample Origin:
DDH 76-137; 1-8
DDH 76-180; 17-28
DDH 76-187; 1-9

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To:

Reported By:

Title: Analyses are completed, however no results received as yet.

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 28 July 1978

Forwarded To: University of Saskatchewan, Dr. D.G. MacDonald

Authorized/Requested By: M.A. Favell/P.R. Willis

Funding: University of Saskatchewan

Purpose: Investigation into utilization of fly ash

Sample Origin: Battle River bulk test burn

Sample Description: 5 Gallon container

Stratigraphic Zone: --

Remarks:

RESEARCH REPORT

Date: 7 December 1978 B.C.H. File No: --

Reported To: C.R. Welton

Reported By: N. Bakshi, Prof. of Chem. Engineering, University of Saskatchewan

Title: --

Description: Research has been temporarily discontinued due to lack of funds. No tests on Hat Creek fly ash have been carried out to date.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 25 August 1978

Forwarded To: Inco Metals Co.
Mississauga, Ontario
Authorized/Requested By: P.R. Willis

Funding: Inco Metals

Purpose: Research on liquefaction of coal

Sample Origin: Trench B

Sample Description: 250 lbs, hand-picked large pieces from stockpile

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 21 November 1978 B.C.H. File No: --

Reported To: C.R. Welton

Reported By: Dr. D.L. Jones

Title: --

Description: Report not forthcoming at this time - work has not yet begun on the sample and the process may be considered to be patentable.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: Summer 1978

Forwarded To: E.M.R., Institute of Sedimentary & Petroleum Geology

Authorized/Requested By: Dr. P.T. McCullough

Funding: E.M.R.

Purpose: Expansion of study on vitrinite reflectance

Sample Origin: See list in Research Report

Sample Description:

Stratigraphic Zone:

Remarks: Hand-picked by D.L. Marchioni

RESEARCH REPORT

Date: 27 September 1978 B.C.H. File No: 604H-1301.1-2

Reported To: Dr. P.T. McCullough/Dr. B. Dutt

Reported By: Dr. D.L. Marchioni

Title: —

Description: Letters & list of samples, report to come.

19 Feb'80: Re sample sheet #64 - Dr. Marchioni has assumed Dr. Sweet's project and will provide further reports as these become available.

Date: 6 December 1978

Forwarded To: Dr. A. Winer; E.M.R. (Industrial Minerals Laboratory)

Authorized/Requested By: M.H. French

Funding: E.M.R. (B.C. Hydro - transportation only)

Purpose: Alumina extraction from coal ash

Sample Origin: Fluidized bed tests at Leatherhead, England
4 oz from primary cyclone; 4 oz from secondary cyclone

Sample Description: 2 x 4 oz pkgs.

Stratigraphic Zone: —

Remarks: See page 89

RESEARCH REPORT

Date: 14 June 1979 / 10 January 1980 B.C.H. File No: 604H-1301.1-2(c)

Reported To: P.T. McCullough

Reported By: A.H. Webster

Title: 1) Extraction of alumina from fluidized bed ash from Hat Creek Coaly waste by the modified lime sinter process.

2) Extraction and recovery of alumina from fly ash by hydrochloric acid-hydrofluoric acid leaching.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 8 December 1978

Forwarded To: Dr. P. West, Dept. of Chemistry, University of Victoria

Authorized/Requested By: M.A. Favell

Funding: B.C. Hydro; transportation only

Purpose: Investigation into use of ESR and endospectroscopic techniques in assessing variations in trace mineral content

Sample Origin:

DDH 78-274

		from:	to:
∿ 2 kg	'A' zone:	35m	331m
∿ 2 kg	'B' zone:	331m	397m
∿ 2 kg	'C' zone:	397m	468m
∿ 2 kg	'D' zone:	468m	572m

Sample Description:

Stratigraphic Zone: A, B, C and D

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To: C.R. Welton

Reported By: Dr. P. West

Title: -

Description: No work has been carried out on sample to date.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 23 January 1979

Forwarded To: Prof. I.I. Inculet, Univ. of Western Ontario
London, Ontario

Authorized/Requested By: M.H. French

Funding: B.C. Hydro (transportation)

Purpose: Further experimentation in electrostatic beneficiation of Hat Creek coal

Sample Origin: Barrel #157 from storage at Burrard Thermal (400 lbs of coal collected from Bulk Test Burn Surplus at Battle River)

Sample Description: Ash: 33.59% Volatiles: 33.47% Fixed Carbon: 32.94%
BTU/lb: 7344 Sulphur: 0.63%

Stratigraphic Zone: 'A'

Remarks:

RESEARCH REPORT

Date: July 1979 B.C.H. File No: 604H-M74

Reported To: B.C. Hydro

Reported By: Prof. I.I. Inculet

Title: Electrostatic Benficiation of Coal Mined at Hat Creek, B.C. to Make Low Ash Concentrates.

Description: 82 - page report inclu. tables, graphs.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 29 January 1979

Forwarded To: Alcan International Limited
Montreal (R.J. Lorer)

Authorized/Requested By: P.T. McCullough

Funding: B.C. Hydro - transportation only

Purpose: Investigate recovery of alumina from Hat Creek refuse

Sample Origin: As detailed on following pages

Sample Description: Coal, coaly waste, washery rejects, fly ash

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 29 November 1979 B.C.H. File No: 604H-1301.1-2(c

Reported To: P.T. McCullough

Reported By: S.M. Patterson

Title: Letter, including info. on shale qualities

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Sample Origin

Waste and coaly waste intervals as follows (20 g samples):

	Hole #	Sample	Interval(m)	Ash(%) (Dry basis)	Al_2O_3(%)	CaO(%)	Na_2O(%)	K_2O(%)	MgO(%)
(a)	DDH-75-106:	14	226.9-232.8	61.81					
		19	277.2-281.6	58.93					
		31	436.1-441.9	62.30					
(b)	DDH-76-124:	4	118.5-124.6	74.65					
		10	154.8-160.9	67.48					
(c)	DDH-76-191:	1	44.5- 50.5	67.62					
		2	50.5- 56.6	72.12					
		3	56.6- 59.1	43.99					
		4	59.1- 63.3	60.74					
		5	63.3- 63.8	82.05			0.28	0.33	
		6	63.8- 69.9	47.73	31.66	2.86	0.35	0.41	2.14
		7	69.9- 71.9	81.51					
		8	71.9- 72.5	82.26					
		23	149.3-155.4	55.73					
		24	155.4-157.5	55.09					
		26	158.4-161.2	81.69					
		27	161.2-162.1	86.44					
		28	164.5-165.5	85.18					
		29	165.5-171.6	56.81					
		31	174.6-175.8	53.55					
		67	253.5-259.6	51.02					
		68	259.6-265.7	77.78					
		69	265.7-271.8	87.68					

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Sample Origin

Continued ...

	Hole #	Sample #	Interval(m)	Ash(%) (Dry basis)	Al_2O_3(%)	CaO(%)	Na_2O(%)	K_2O(%)	MgO(%)
(d)	DDH-76-205:	16	97.2-100.8	76.91					
		17	100.8-102.7	75.39					
		34	175.5-181.6	83.45					
		35	181.6-184.7	85.21					
		36	184.7-187.4	62.39	20.70	11.40	0.97	0.79	2.30
		37	187.4-191.4	71.33	22.65	2.60	0.97	1.03	2.16
		38	191.4-192.3	88.07					
		39	199.3-200.2	88.97					
		40	200.2-202.3	78.08					
		41	202.3-206.0	69.91	23.48	1.70	0.86	1.02	2.09
		42	206.0-209.3	85.67					
		43	209.3-210.9	89.38					
		44	210.9-212.1	49.60	21.59	2.65	0.81	0.58	2.48
		45	212.1-213.9	84.18					
(e)	DDH-78-274:	--	62-64	69.67					
		--	116.7-120.3	74.01					
		--	431.3-433.0	68.83					
		--	433.0-434.1	63.38					

Battle River test burn samples as follows:

(a) Raw Coal from stockpile - sample #157
(b) Raw Coal - HC:T-VI Fu
(c) Raw coal - HC:T-VIII Fu
(d) Thickener Underflow - HC:T-VIII
(e) Fine Refuse - HC:T-VI FR

Sample Origin

(f) Fine Refuse - HC:T-VII FR
(g) Coarse Refuse - HC:T-VI CR
(h) Coarse Refuse - HC:T-VIII CR
(i) Fly Ash - A Field Test - sample #155
(j) Fly Ash - Test No. 11 - sample #116

CCRL - atmospheric fluidized bed samples: Two samples (approximately 0.5 kg each) are being sent by Dr. A. Winer of Can Met.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 15 February 1979

Forwarded To: Owen Smail, Saskatchewan Power Corp.: Regina

Authorized/Requested By: M. A. Favell

Funding: Saskatchewan Power Corp.

Purpose: Flyash Utilization

Sample Origin: Battle River Test Burn

a)	Flyash	14 oz.	BBL #155
b)	Bottom Ash	2 lb.	BBL # 81
c)	Coal	3½ lb.	BBL #156/160

Sample Description:

Stratigraphic Zone:

Remarks:

RESEARCH REPORT

Date: 7 January 1980 B.C.H. File No.:

Reported To:

Reported By:

Title: Preliminary Draft received for comments, may be distributed by C.E.A. after assessment in Ottawa.

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: April 1979

Forwarded To: J. Merkir, 13524 106th Ave., Surrey B.C. (584-8344)

Authorized/Requested By: P.R. Willis

Funding: --

Purpose: Fitration Research

Sample Origin: Part of coal sample held by Dr. A.C. Chaklader (UBC)

Sample Description: 50 lbs.

Stratigraphic Zone: Unknown

Remarks:

RESEARCH REPORT

Date: 20 February 1980 B.C.H. File No:

Reported To: C. R. Welton

Reported By: J. Merkir

Title: -

Description: Is awaiting information from Ottawa on participation in project. Preliminary experiment carried out at 'Tree-Top Cannery' in Yakama, Washington - greatly reduced BOD and COD in cannery effluent.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: April 1979

Forwarded To: Commercial Testing & Engineering Co. (Chicago)

Authorized/Requested By: P. Weir & Co. (J.J. Fitzpatrick)

Funding: B.C. Hydro

Purpose: Determine difference in sodium value by 2-stage determination vs direct ignition

Sample Origin: As detailed in File #1301.1-2

Sample Description: Cores

Stratigraphic Zone: As detailed in file #1301.1-2

Remarks:

RESEARCH REPORT

Date: 30 November 1979 B.C.H. File No: 604H-M71/3

Reported To: B. C. Hydro

Reported By: Paul Weir Company

Title: Review of Coal Fuel Specification Hat Creek Project For B. C. Hydro & Power Authority

Description: One Volume - 76 Pages.

(See also 604H-M71/1 - Report on Utilization of Hat Creek Coal)
(604H-M71/2 -)

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: May 1979

Forwarded To: Commercial Testing & Engineering Co. (Vancouver)

Authorized/Requested By: P. Weir & Co. (J.J. Fitzpatrick)

Funding: B.C. Hydro

Purpose: Determine Hardgrove grindability vs ash at constant moisture

Sample Origin: As detailed in File #1301.1-2

Sample Description: Cores

Stratigraphic Zone: As detailed in File #1301.1-2

Remarks:

RESEARCH REPORT

Date: B.C.H. File No:

Reported To:

Reported By:

Title: See Page 102

Description:

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 28 May 1979

Forwarded To: C. Hamer; Canmet, 555 Booth St., Ottawa, Ontario

Authorized/Requested By: P.T. McCullough

Funding: B.C. Hydro (Transportation only)

Purpose: Alumina Research

Sample Origin: Crushed coal pile of Trench 'A'

Sample Description: Approx. 5 lbs.

Stratigraphic Zone: 'B' (west side)

Remarks:

RESEARCH REPORT

Date: 19 February 1980 B.C.H. File No:

Reported To: P. T. McCullough

Reported By: C. Hamer

Title:

Description: Work proceeding on ordering of kaolinite mineral vs other inerts of similar diffractive indices. No formal report as yet.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 10 July 1979

Forwarded To: Dr. F.E. Senftle; U.S. Dept. of Interior, Restow, Virginia, U.S.A., 22092

Authorized/Requested By: B. Dutt

Funding: U.S.D.I.

Purpose: Study of Electrolytic Oxidation of Coal Re Extraction of Humic Acid

Sample Origin: Unknown

Sample Description: Approx. 2 lbs. low grade coal

Stratigraphic Zone: Unknown

Remarks:

RESEARCH REPORT

Date: 12 February 1980 B.C.H. File No: 604H-1301.1-2

Reported To: B. Dutt

Reported By: F. E. Senftle

Title: Telephone call to inform of progress to date.

Description: Hat Creek coal readily goes into solution (an ideal feature not usually found in sub-bituminous coals) therefore, it may be applied to solution mining. Many chemical applications and uses will emerge from this study.

HAT CREEK DEVELOPMENT
RESEARCH SAMPLES

Date: 20 July 1979

Forwarded To: Axel Meisen, Dept. of Chemical Engineering; UBC

Authorized/Requested By: C.R. Welton

Funding: UBC

Purpose: Investigate Collection of Micron Particles in Gas Streams

Sample Origin: Bulk Test Burn

Sample Description: Approx. 2 lbs. Fly Ash

Stratigraphic Zone:

Remarks: Research report promised (228-3701 ; 228-4343)

RESEARCH REPORT

Date: 7 January 1980 B.C.H. File No:

Reported To:

Reported By:

Title: Project temporarily in abeyance.

Description: