



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel. ~~264-9120~~ 276 - 9138

ret

Report of Analysis of

HAT CREEK BULK SAMPLE Z

604H-11029

Submitted, November 4, 1977

John Kay, C. Eng., M. Inst. F.
Manager of Laboratory



Warnock Hersey Professional Services Ltd.

1423 D 45th Avenue N.E. Calgary Alberta T2E 2P3 Tel 264-9120 276 - 9138

November 4, 1977

Dr. Batu Dutt
Senior Coal Geologist
Thermal Division
B.C. Hydro and Power Authority
500 - 744 West Hastings Street
Vancouver, B.C.

80 - 2 encls.

SEE 1501.2	THERMAL DIV.	NOV 09 1977	ROUTE	DIV. NO.	PROD. CONTROL	POWER PLANT	MINING	CONSTRUCTIVE	Sen. Staff E	TEAM
A 80 - 2 encls. JUF DYN REPORT FILE S PRW										

Dear Dr. Dutt:

Please find a copy of our report on Hat Creek Coal. It is complete now apart from the Wet Attrition tests and in view of the fact that Mr. Butcher is in the East for a couple of weeks, we are not likely to get very much further.

We have run a trial sample through the apparatus but the size of coal suggested by Simon Carves was not compatible with the Australian patentees ideas and from the data supplied I find we are working outside the calibration curves (which have to be used to determine the tumbling time) which are based on the Hardgrove Index.

The test has been designed to provide data on coal of much larger particle size than the 1/2" x 0" which we used and in view of this, I'm not to sure what the results will mean. Perhaps we could consider running a coal thro' of known performance in terms of breakdown, to use as a standard, but we are moving into an area of research with this approach, and no doubt the results obtained would be interesting but the inevitable question of "who would pay for what" would arise, and until this is settled we have a stalemate.

I think we are in a position of having the only Wet Attrition apparatus in Canada and it would be a pity not to make use of it.

At this time, until a policy is evolved between the interested parties, I will await your reaction with interest.

Yours truly,

John Kay, C. Eng., M. Inst. F.
Manager of Laboratory

JK/kc

encl.

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. Hydro

Sample - W 77 Z - Hat Creek Bulk Sample

LAB. NO. 77 - 8073

RAW COAL SIZE/ASH DISTRIBUTION

Dry Screen (Square Hole)

<u>SIZE</u>	<u>WT. %</u>	<u>DRY ASH %</u>	<u>CUM. WT. %</u>	<u>CUM. ASH %</u>
+ 4 "	3.1	25.6	3.1	25.6
4" x 2"	6.4	27.1	9.5	26.6
2" x 1"	24.8	27.9	34.3	27.5
1" x 1/2"	32.8	26.1	67.1	26.8
1/2" x 1/4"	12.7	28.5	79.8	27.1
1/4" x 1/8"	10.1	28.5	89.9	27.3
1/8" x 1/16"	4.8	30.6	94.7	27.4
1/16" x 28M	2.6	32.4	97.3	27.6
28 M x 0	2.7	33.9	100.0	27.7
TOTAL	100.0	27.7		

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. HYDRO

SAMPLE - HAT CREEK - Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

RAW COAL FRACTIONS - ANALYSIS % - Dry Screened

Size	<u>+ 4"</u>	<u>4" x 2"</u>	<u>2" x 1"</u>	<u>1" x 1/2"</u>	<u>4" x 0</u>	<u>1/2" x 0</u>
Wt. % Head	3.1	6.4	24.8	32.8	96.9	32.9
Air Dried Loss	4.6	6.8	6.4	4.0	7.1	7.5
Inherent Moisture	21.0	19.3	20.4	21.0	21.5	22.8
Total Moisture	24.6	24.8	25.5	24.2	27.1	28.6
Ash (Air Dried)	22.3	21.8	22.2	20.6	21.1	22.0
Sulphur (Air Dried)	0.16	-	-	-	0.24	0.33
Btu / lb. (Air Dried)	6,856	-	-	-	6,966	6,805
<u>DRY BASIS</u>						
Ash	25.6	27.1	27.9	26.1	26.9	29.1
Sulphur	0.20	-	-	-	0.31	0.42
Btu / lb.	8,681	-	-	-	8,873	8,695
<u>DRY, ASH FREE BASIS</u>						
Btu / lb.	12,087	-	-	-	12,142	12,259

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. HYDRO

SAMPLE - HAT CREEK - - Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

RAW COAL FRACTIONS - ANALYSIS % - Dry Screen

Size	<u>1/2" x 1/4"</u>	<u>1/4" x 1/8"</u>	<u>1/8" x 1/16"</u>	<u>1/16" x 28M</u>	<u>28 M x 0</u>
Wt. % Head	12.7	10.1	4.8	2.6	2.7
Air Dried Loss	5.4	3.8	4.6	6.7	1.8
Inherent Moisture	21.1	22.0	19.0	17.5	18.0
Total Moisture	25.4	25.0	22.7	23.0	19.5
Ash (Air Dried Basis)	22.5	22.2	24.8	26.7	27.8
Sulphur (Air Dried Basis)	0.22	0.24	0.32	0.48	0.86
Btu / lb. (Air Dried Basis)	6,696	6,638	6,648	6,600	6,479
<u>DRY BASIS</u>					
Ash	28.5	28.5	30.6	32.4	33.9
Sulphur	0.28	0.30	0.39	0.58	1.05
Btu / lb.	8,484	8,510	8,207	8,001	7,901
<u>DRY, ASH FREE BASIS</u>					
Btu / lb.	11,872	11,896	11,829	11,829	11,954

Warnock Hersey Professional Services Ltd.

CLIENT - B. C. HYDRO

Sample Identification - Hat Creek - Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

RAW COAL SIZE / ASH DISTRIBUTION

Wet Screen Analysis of 1/2" x 0

Size	<u>Wt. %</u>	<u>Dry Ash %</u>	<u>Cum. Wt. %</u>	<u>Cum. Ash %</u>	<u>Wt. % Head</u>
1/2 x 1/4 "	46.9	27.2	46.9	27.2	15.4
1/4 x 1/8"	5.3	28.0	52.2	27.3	1.7
1/8 x 1/16"	5.1	28.2	57.3	27.4	1.7
1/16 x 28M	3.8	29.6	61.1	27.5	1.3
28 x 45 M	3.5	28.9	64.6	27.6	1.2
45 x 65 M	7.1	27.2	71.7	27.5	2.3
65 x 100 M	7.1	39.8	78.8	28.6	2.3
100 x 200 M	10.6	38.9	89.4	29.9	3.5
200 x 0	10.6	45.3	100.0	31.5	3.5
Total	100.0	31.5			32.9

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. HYDRO

SAMPLE - HAT CREEK - Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

RAW COAL FRACTIONS - ANALYSIS % - Wet Screened

Size	<u>1/2 x 1/4 "</u>	<u>1/4 x 1/8"</u>	<u>1/8 x 1/16"</u>	<u>1/16 x 28 M</u>	<u>28 x 45 M</u>
Wt. % Head	15.4	1.7	1.7	1.3	1.2
Inherent Moisture	15.7	18.5	9.4	14.2	4.7
Ash (Air Dried)	23.0	22.8	25.6	25.4	27.6
Sulphur (Air Dried)	0.22	0.27	0.40	0.64	0.95
Btu / lb. (Air Dried)	7,319	6,972	7,702	7,228	8,032
<u>DRY BASIS</u>					
Ash	27.2	28.0	28.2	29.6	28.9
Sulphur	0.26	0.33	0.44	0.75	1.00
Btu / lb.	8,679	8,552	8,500	8,420	8,431
<u>DRY, ASH FREE BASIS</u>					
Btu / lb.	11,924	11,878	11,838	11,961	11,862

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. HYDRO

SAMPLE - HAT CREEK - Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

RAW COAL FRACTIONS - ANALYSIS % - Wet Screened

Size	<u>45 x 65 M</u>	<u>65 x 100 M</u>	<u>100 x 200 M</u>	<u>200 x 0</u>
Wt. % Head	2.3	2.3	3.5	3.5
Inherent Moisture	5.2	6.7	5.5	4.9
Ash (Air Dried)	25.8	37.1	36.8	43.1
Sulphur (Air Dried)	1.23	0.81	0.57	0.34
Btu / lb. (Air Dried)	8,110	6,556	6,680	5,529
<u>DRY BASIS</u>				
Ash	27.2	39.8	38.9	45.3
Sulphur	1.30	0.87	0.60	0.36
Btu / lb.	8,556	7,026	7,071	5,813
<u>DRY, ASH FREE BASIS</u>				
Btu / lb.	11,764	11,672	11,573	11,098

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. Hydro

Sample Identification - Hat Creek Bulk Sample, W 77 Z

LAB. NO. - 77 - 8073

ANALYSIS OF CLEAN CCAL - 4" x 1" Size Fraction

Cum. Float	1.40	1.45	1.50	1.60	1.80	1.80
Wt. % (Cum.)	6.45	76.8	87.9	95.9	99.1	Sink 100.0
<u>Air Dried Basis</u>						
Inherent Moisture	21.1	21.1	20.5	18.3	18.1	5.0
Ash	13.3	15.4	18.4	20.8	21.9	68.0
Sulphur	0.19	0.20	0.21	0.20	0.18	-
Btu / lb.	7,641	7,437	7,248	7,087	6,970	-
<u>Dry Basis</u>						
Ash	16.8	19.5	23.2	25.5	26.7	71.6
Sulphur	0.24	0.25	0.26	0.24	0.22	-
Btu / lb.	9,686	9,425	9,117	8,676	8,510	-
<u>Dry, Ash Free Basis</u>						
Btu / lb.	11,648	11,710	11,863	11,647	11,611	---
Cum. Sink						
<u>Air Dried Basis</u>						
Wt. %	35.5	23.2	12.1	4.1	0.9	
Moisture	19.6	18.6	16.6	10.5	5.0	
Ash	37.6	42.7	45.2	56.0	68.0	
<u>Dry Basis</u>						
Ash	46.8	52.4	54.3	62.5	71.6	

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. Hydro

Sample Identification - Hat Creek Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

ANALYSIS OF CLEAN COAL 1" x 1/2" Size Fraction

Cum. Float	1.40	1.45	1.50	1.60	1.80	1.80 Sink
Wt. % (Cum.)	60.8	74.1	85.8	94.5	97.8	100.0
<u>Air Dried Basis</u>						
Inherent Moisture	19.8	19.5	19.2	20.1	16.8	9.6
Ash	14.6	16.0	18.6	19.9	21.8	68.5
Sulphur	0.23	0.22	0.20	0.23	0.21	-
Btu / lb.	7,698	7,551	7,478	7,185	7,273	-
<u>Dry Basis</u>						
Ash	18.1	19.9	23.0	24.9	26.2	75.8
Sulphur	0.29	0.27	0.25	0.29	0.25	-
Btu / lb.	9,592	9,375	9,260	8,997	8,737	-
<u>Dry, Ash Free Basis</u>						
Btu / lb.	11,717	11,705	12,025	11,980	11,838	-
Cum. Sink						
Wt. %	39.2	25.9	14.2	5.5	2.2	
<u>Air Dried Basis</u>						
Moisture	9.8	8.9	10.5	8.2	9.6	
Ash	37.4	43.8	47.0	61.2	68.5	
<u>Dry Basis</u>						
Ash	41.5	48.1	52.5	66.6	75.8	

Warnock Hersey Professional Services Ltd.

CLIENT - B.C. Hydro

Sample Identification - Hat Creek Bulk Sample W 77 Z

LAB. NO. - 77 - 8073

ANALYSIS OF CLEAN COAL ½" x ¼" Size Fraction

Cum. Float	1.40	1.45	1.50	1.60	1.80	1.80
Wt. % (Cum.)	61.9	65.9	83.9	93.6	99.6	Sink 100.0
<u>Air Dried Basis</u>						
Inherent Moisture	19.3	20.9	19.7	19.8	19.9	5.1
Ash	14.2	14.2	19.1	21.3	22.9	68.9
Sulphur	0.24	0.23	0.26	0.26	0.22	-
Btu / lb.	7,921	7,755	7,331	7,020	6,823	-
<u>Dry Basis</u>						
Ash	17.6	17.9	23.8	26.5	28.6	72.6
Sulphur	0.30	0.29	0.32	0.32	0.27	-
Btu / lb.	9,816	9,800	9,134	8,750	8,518	-
<u>Dry, Ash Free Basis</u>						
Btu / lb.	11,915	11,937	11,981	11,904	11,930	-
Cum Sink						
Wt. %	38.1	34.1	16.1	6.4	0.4	
<u>Air Dried Basis</u>						
Moisture	16.0	14.4	14.7	9.4	5.1	
Ash	39.5	42.7	47.5	56.3	68.9	
<u>Dry Basis</u>						
Ash	47.0	49.9	55.6	62.2	72.6	



Sample Identification Hat Creek Bulk Sample Z Size fraction + 4"
 Lab. No. (s) 77 - 8073 Wt % of head sample 3.1

Specific Gravity

FLOAT AND SINK ANALYSIS % FROTH FLOTATION

<u>Sink</u>	<u>Float</u>	<u>Elementary</u>			<u>Cumulative Float</u>			<u>Cumulative Sink</u>		
		<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Sulphur</u>	<u>Weight</u>	<u>Ash</u>	<u>Shulphur</u>
	1.40	67.4	17.3		67.4	17.3		100.0	22.0	
1.40	1.45	18.5	28.4		85.9	19.7		32.6	31.8	
1.45	1.50	9.7	31.8		95.6	20.9		14.1	36.4	
1.50	1.60	4.4	46.5		100.0	22.0		4.4	46.5	
1.60	1.80	0.0	-		-	-		-	-	
1.80		0.0	-		-	-		-	-	
	TOTAL	100.0	22.0							



Warnock Hersey Professional Services Ltd.

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Sample Identification Hat Creek Bulk Sample Z Size fraction 4" x 1"
 Lab. No. (s) 77 - 8073 Wt % of head sample 31.2

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Subst	Weight	Ash	Subst	Weight	Ash	Subst
	1.40	64.5	16.8		64.5	16.8		100.0	27.1	
1.40	1.45	12.3	33.6		76.8	19.5		35.5	45.7	
1.45	1.50	11.1	48.8		87.9	23.2		23.2	52.1	
1.50	1.60	8.0	51.3		95.9	25.5		12.1	55.1	
1.60	1.80	3.2	60.1		99.1	26.7		4.1	62.6	
1.80		0.9	71.6		100.0	27.1		0.9	71.6	
TOTAL		100.0	27.1							



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Sample Identification Hat Creek Sample Z

Size fraction 1' x 1/2"

Lab. No. (s) 77 - 8073

Wt % of head sample 32.8

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Shulphur
	1.40	60.8	18.1		60.8	18.1		100.0	27.3	
1.40	1.45	13.3	28.1		74.1	19.9		39.2	41.7	
1.45	1.50	11.7	42.8		85.8	23.0		25.9	48.6	
1.50	1.60	8.7	43.9		94.5	24.9		14.2	53.4	
1.60	1.80	3.3	63.7		97.8	26.2		5.5	68.5	
1.80		2.2	75.8		100.0	27.3		2.2	75.8	
TOTAL		100.0	27.3							



Warnock Hersey Professional Services Ltd

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Sample Identification Hat Creek Bulk Sample Z

Size fraction 1/2" x 1/4"

Lab. No. (s) 77-8073

Wt % of head sample 12.7

Specific Gravity

FLOAT AND SINK ANALYSIS %

Sink	Float	Elementary			Cumulative Float			Cumulative Sink		
		Weight	Ash	Sulphur	Weight	Ash	Sulphur	Weight	Ash	Shulphur
	1.40	61.9	17.6		61.9	17.6		100.0	28.8	
1.40	1.45	4.0	22.5		65.9	17.9		38.1	46.9	
1.45	1.50	18.0	45.4		83.9	23.8		34.1	49.8	
1.50	1.60	9.7	49.8		93.6	26.5		16.1	54.7	
1.60	1.80	6.0	61.4		99.6	28.6		6.4	62.1	
1.80		0.4	72.6		100.0	28.8		0.4	72.6	
	TOTAL	100.0	28.8							