

FORDING RIVER PROJECT - SOUTHEASTERN BRITIS

SUMMARY REPORT - UTAH CO.

Introduction

A further investigation into the coal prospects held under license by Utah Co. of the Americas was made during 1957 - 1958. This investigation consisted of four parts:

Part	I	-	Geology & Reconnaissance
Part	II		Samoling & Analysis
Part	III	-	Preliminary Railway Reconnaissance
Part	IV	-	Coal Beneficiation Test Work

Part I - Geology & Reconnaissance

Introduction - Late in the 1956 field season an aerial and ground reconnaissance, carried out north of Smith Creek, disclosed nine coal occurrences, of which three were thought to be worthy of a more detailed inspection. As a result, Utah Co. acquired nine additional coal lots (6400 acres) adjoining the northern extent of the companies 1956 holdings, and subsequently surrendered further interest in twelve lots (8960 acres) at the southern border (Map VC-70-B-2-36). These nine additional lots covered the following coal areas:

Coal Area No. 3 - Turnbull Mountain. One half mile north of Area 2, between Clode Creek and Moore Creek. <u>Preparations</u> - The 1957 investigation had the following objectives:

- To prepare topographic and geologic maps of coal areas 2 and 3
- 2. To ascertain the quantity of coal underlain by the area amenable to:
 - (a) a stripping operation
 - (b) an underground mining operation
- To examined and determine the quality of coal in each coal area.

The field season commenced in mid-May, when preparations were made to establish a suitable camp near the work areas. Since the three aforementioned coal areas were situated approximately ten miles beyond the road limit, it was necessary to employ a packer and eight horses to move supplies into the area.

A rough camp, consisting of tents, two unframed and one framed, was established on Brownie Creek, one mile above its confluence with Kilmarnock Creek. After camp was established, four horses were retained and used on weekly supply trips.

<u>Field Work</u> - Under supervision from the Vancouver office, four field men (one geologist, one surveyor and two assistants) commenced actual mapping on June 2, 1957. A total of seven weeks were spent in the field, during which time the following was accomplished:

Field Work (Cont'd)

- An areal coverage of approximately one square mile was mapped in detail in conjunction with a plane table survey on a scale of one inch to 40 feet.
- Within each area the underlying coal seams were uncovered by hand trenching and their respective thicknesses, qualities and lithologies determined.
- 3. Three geological sections were measured (Eagle Mountain, Castle Mountain and Turnbull Mountain) and correlated.

Compilation of field date was begun in the field and finalized in the Vancouver office.

<u>Results</u> - The Turnbull mountain coal area is underlain by five coal seams, having an aggregate thickness of 90 feet. On Eagle mountain, a distance of 1/2 mile south of the above area, six seams outcrop, which have a total thickness of 88 feet.

The following list of maps and drawings, included herein, illustrate the geology and structure of these two areas:

#/1. Map VE-70B-2-37 - Turnbull mountain
#2. Figure 3-3 - Details of coal seam Alpha
#3. Figure 3-4 - Details of coal seams Gamma and Beta
#4. Figure 3-5 - Details of coal seams Epsilon and Delta
#5. Map VE-70B-2-41 - Eagle mountain
#6. Vertical cross-sections of Map BE-70B-2-41
#7. Figure 2-1 - Details of Eagle mountain coal seams
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#4. Figure 2-1 - Details of Eagle mountain Coal seams
#4. Figure 2-1 - Details of Eagle mountain Figure 2-1 - Details

Part II - Sampling and Analysis

<u>Introduction</u> - A bulk sampling program of coal seams I, R and S*, initiated in late November and completed in early December had the following objectives:

- To acquire a bulk sample of fresh coal** for shipment to prospective Japanese clients for their own blending, grinding and washing tests.
- To acquire representative bulk samples from the three selected seams for washability tests to be conducted through the U.S. Bureau of Mines.

<u>Tunneling and Sampling</u> - A camp, suitable to accommodate a mining crew of five, was established at a logging mill situated on Smith Creek.

The entire program of drilling, blasting, mucking, facing, timbering and sampling required 64-3/4 hours, for a total gain in advance of 30.7 feet, or 10 feet per seam.

Each of the three coal seams were channel sampled at each five feet of advance and the samples retained for proximate analysis. Both proximate and ultimate analyses were conducted on the "ten-foot advance" samples.

Results

- 1. A two-ton sample of coal was shipped to Japan
- A large sample was shipped to the U.S. Bureau of Mines, Seattle, Washington, for beneficiation tests
- 3. The results of the proximate and ultimate analyses are shown on the enclosed copies of reports received from G.S. Eldridge & Co.

*These three coal seams, tunneled and sampled during the 1956 field season, were selected for this program on their coking merits.

**To assure that these samples would not be of a weathered nature, a 10-foot advance beyond the existing entry face was made.

Part III - Preliminary Railway Reconnaissance

From September 9 - 16 a study was made of the Fording River coal area by a representative of Utah Co. to determine a suitable site for a treatment plant and rail loading facilities. This survey was made in conjunction with an analyses of the economics of mining and marketing the coal.

To supplement this survey a reconnaissance was made of possible rail routes from Natal to Smith Creek as a basis for estimating the cost of constructing a railroad spur. This survey was made by a C.P.R. Divisional Engineer, accompanied by a representative of Utah Co. during the period November 11 - 15, 1957. From a consideration of land purchase, land clearing and grading, track construction and bridgework, the cost of completing this rail spur would approximate \$100,000 per mile.

Part IV - Coal Benefication Test Work

<u>Introduction</u> - The follow-up test work on the samples sent to the U.S. Bureau of Mines, Northwest Experimental Station, Seattle, Washington, began February 9, 1958 and continued for the following two weeks.

Under the direction of Mr. M.R. Geer, Chief, Coal Branch, Region II, two Utah Co. staff geologists and three laboratory technicians of the Experimental Station, conducted float and sink tests on coal samples I, R and S.

Object and Procedure - The objectives of the tests were:

- To show the yield which may be expected when the coals are subjected to a washing process to gain a certain desirable ash content at any given fraction.
- 2. To learn the specific gravity at which any desired ash content of any given fraction could be obtained.
- 3. To find the amount of near-gravity material in a given fraction. The resultant values of No. 3 are applicable to the choice of plant equipment which may be used to gain a desired yield and ash content of the three coal seams.

The procedures followed for the float and sink tests are outlined in the accompanying flow sheets.

Results - The results are tabulated on the summary charts included herein.

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REPRESENTATIVES IN RADUESI GARADA, UNIVED SYATER, SURGPE AND JAPAN CABLE ADDREDS "ELDRICO" FILE NO. 211155

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G. S. ELDRIDGE & CO. LTD.

STANDARD TESTING LABORATORIES

VANCOUVER AND VICTORIA

SAN HORNEY ATREET

EXAMPLES OF GANADIAN HERTITUTE OF CHEMISTRY ASEDCIATION OF OFFICIAL RACING CHEMISTS CANADIAN INSTITUTE MINING AND METALLUNGY CANADIAN STANDARDS ASEOCIATION AMERICAN SOCIETY FOR TESTING MATERIALS AMERICAN SOCIETY FOR METALLS CANADIAN WELDING BOCIETY AMERICAN WOOD PRESERVERS ASSOCIATION

December 16, 1957

Mt. Andrew Mining Co., 1011 - 1030 West Georgia St., Vancouver, B.C.

Dear Sirss

INSPECTING AND TESTING

ENGINEERS

INDUSTRIAL CHEMISTS

REGISTERED CHEMICAL

METALLURGICAL AND CORROBION

ENGINEERS

PROVINCIAL ASSAYERS

We have made analyses on six samples of coal submitted and report as follows:

MARKS :	1-5	Ber	S-5	Dear	I-S	Deve
Moisture	1.81 19.42 61.9% 16.9%	19.8% 63.0% 17.2%	2.75 20.05 56.95 10.45	20.5% 58.8% 10.7%	3.25 28.3% 59.15 9.15	29.25 61.15 9.75
	100.05	100.05	100.0%	100.0%	100.05	100.05
Sulphur (S)	0.53%	0.54%	0.57%	0.59%	0.63%	0.65%
B.T.U's per 1b Free Swelling Index	12,630	12,860	13,670	14,050	13,560 88	14,010
	the second se		the second se	the second	the second se	the second data and the second second data and the second data and
	R-10	Dry	S-10 As Rec.	Day	I-10	• Day
Moisture	R-14 As Rec. 3.25 20.65	22.35	S-10 As Rec. 2.9%	Day 80.3%	I-10 <u>As Res</u> 2.53 29.95	<u>. Day</u> 30.75
Moisture	R-14 As Rec. 3.25 20.65 67.14 8.85	21.3% 69.6% 9.1%	S-10 <u>As Res</u> 2.9% 19.7% 67.0% 10.1%	Day 20.3% 69.0% 10.7%	I-10 As Res 2.55 29.95 58.65 9.05	<u>. Day</u> 30.7% 60.1% 9.2%
Moisture Volatile Matter Fixed Carbon Ash	R-14 As Rec. 3.23 20.65 67.16 8.85 100.05	DET 223% 69.6% 9.1%	S-10 As Rec. 2.9% 19.7% 67.0% 10.4%	Dry 20.3% 69.0% 10.7%	I-10 As Res 2.55 29.9% 58.6% 9.0%	<u>. Day</u> 30.7% 60.1% 9.2%
Moisture Volatils Matter Fixed Carbon Ash Sulphur (S)	R-14 As Rec. 3.25 20.65 67.16 8.85 100.05 0.685	D DTY 21.3% 69.6% 9.1% 100.0% 0.70%	S-10 As Res. 2.9% 19.7% 67.0% 10.1% 10.1%	Day 20.3% 69.0% 10.7% 100.0%	I-10 <u>As Res</u> 2.5% 29.9% 58.6% 9.0% <u>100.0%</u> 0.78%	<u>. Dry</u> 30.7% 60.1% 9.2% <u>109.0%</u> 0.80%

Respectfully submitted, G.S. ELDRIDGE & CO, LTD. per

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INSPECTING AND TESTING

ENGINEERS

INDUSTRIAL CHEMISTS

REGISTERED CHEMICAL

METALLURGICAL AND CORROSION

ENGINEERS

PROVINCIAL ASSAYERS

REPRESENTATIVES IN EASTERN CANADA. UNITED STATES, EUROPE AND JAPAN CABLE ADDRESS "ELDRICO" FILE NO. 24455

G. S. ELDRIDGE & CO. LTD.

STANDARD TESTING LABORATORIES

VANCOUVER AND VICTORIA

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OFFICE AND LABORATORIES 533 HORNBY STREET VANCOUVER 1, B.C. HENBERS OF GANADIAN INSTITUTE OF CHEMISTRY GANADIAN INSTITUTE MINING AND METALLURGY AMERICAN SOCIETY FOR TESTING NATERIALS AMERICAN SOCIETY FOR METALS AMERICAN CHEMICAL SOCIETY ASSOCIATION OF OFFICIAL RACING CHEMISTS

February 11, 1958

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Ht. Andrew Mining Co., 1011 - 1030 West Georgia St., Vansouver, B.C.

Dear Sirst

We have made analyzes on three samples of coal submitted and report as follows:

Moisture	att Brz
Auh	x 00 x 81.0% x 4.5% x 0.8% x 0.8% x 9.1% x 3.6%

Sample Mark S. Moisture Condition	-10 As Reald	Drz
Moisture Ultimate Analyzis Carbon Rydrogen Salphur Nitrogen Ash Caygen (by diff)	2.9% 77.2% 4.5% 0.6% 1.2% 10.1% 3.2%	00 79.6% 1.6% 1.2% 10.7% 3.3%

continued

THIS REPORT IS SUBMITTED FOR THE EECLUSIVE USE OF THE PERSON, PARTNERSHIP, OR CORPORATION TO WHOM IT IS ADDRESSED, SUBSEQUENT USE OF THE NAME OF THIS COMPANY OR ANY MEMBER OF ITS STAFF IN CONNECTION WITH THE ABVERTISING OF SALE OF ANY PRODUCT OR PROCESS WILL BE GRANTED ONLY ON CONTRACT. THIS COMPANY ACCEPTS NO RESPONSIBILITY EXCEPT FOR THE DUE PERFORMANCE OF INSPECTION AND/OR ANALYSIS IN GOOD FAITH AND ACCENDING TO THE RULES OF THE TRADE AND OF SCIENCE. ANY LIABILITY ATTACHED THERETO IS LIMITED, TO THE FRE CHARGED.

Mt. Andrew Mining Co. re - Analyzes on three samples of scal.

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File #2h820 February 11, 1958

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manufactor.

Page Two

Sample Mark I-10 Moisture Condition	As Reald	REC.
Moisture Ultimate Analysis Garbon Nydrogen Sulphur Mitrogen Ash Maygon (by diff)	2.5% 74.9% 5.00% 2.40% 9.0% 6.3%	00 76.8x 5.3x 0.7x 1.5x 9.25 6.5x
The state of the	100.0%	100.05

RIMaI#11

Respectfully submitted, 6.8. KLDRIDE & CO. LTD. per





FIL'S SHEET NO. 2



SUMMARY CHART

YIELD AT INDICATED ASH, %

	And the second s	and in case of the local division of the	and the second second second				
	SIZE	5%	6 %	7 %	8%	9%	10%
	2×1	54	64	71	75.5	80	83.5
Ň	1 × 14	63	72	78.5	83	87	90
	Y4 x 20	73.5	79	83	86	88.5	91
4 6	20 × 0	86	88	90	92	93.5	95
8.6	2 × 1/4	60.5	70	76.5	81	85	88
×	14×0	77	82	85	88	90	92.5
	ż×0	70.5	77	8/	85	88.5	9/
	SPECIFIC	GRA	NITY A	T INL	DICATEL	RSA	4
	SIZE	5%	6%	7 %	8%	9%	10%
	2×1	1.32	1.36	1.42	1.485	1.56	1.63
N	1 × 1/4	1.34	1.38	1.43	1.48	1.54	1.62
	Y4 x 20	1.38	1.44	1.52	1.6	1.69	1.81
34	20 X O	1.59	1.7	1.85	>1.9	>1.9	>1.9
8	2 × 1/4	1.33	1.38	1.43	1.48	1.56	1.63
K	Y4XO	1.40	1.49	1.57	1.67	1.78	1.94
	2×0	1.365	1.42	1.48	1.56	1.66	1.76
	± 10 Near-gra	ind s	aterial preifie	at in gravit	dicated y	ash	content
	512E	5%	6%	7%	8%	9%	10%
-	2×1	71?	45	22.5	13.5	11	10
m	1 × Y4	80?	40	25	17	11	7
4	Y4 x 20	36	17	8.5	7	5	3.5
0	20 × 0	4.5	3	2	?	?	?
15	2 × 14	77?	39	24	15	10	7
1	Y4 X O	26.5	12.5	7	5	3.5	?
	2 × 0	47	22.5	13	8.5	6	3.5

SUMMARY CHART

	YIELD I	9T INDI	CATED	MSH,	~/0		
	SIZE	5%	6 %	7%	8%	9%	107.
Ń	2×1	52.5	72.5	82	87	90.5	93
	1 × 14	44	59.5	75	82.5	87	90.5
4	14×20	72	84.5	90.5	94	97	98.5
76	20 × 0	95	98	99.5	100	100	100
è	2 × 1/4	45	61	78	84.5	89	92
8	Y4 X O	78.5	88.5	93.5	96	98.5	99.5
	2×0	64	78	86	90.5	93.5	96
	SPE	CIFIC C	RAVIT	A AT	INDICA	FE0 .	ASH.
	SIZE	5%	6%	7%	8%	9%	10%
Ŷ	2×1	1.325	1.365	1.455	1.55	1.67	1.79
	1 X 44	1.345	1.365	1.40	1.465	1.55	1.65
4	1/4 × 20	1.36	1.42	1.50	1.62	1.85	1.98
34	20×0	1.54	1.8	>1.9	>1.9	>1.9	>1.9
0×	2 × 1/4	1.34	1.36	1.42	1.49	1.6	1.71
K	1/4×0	1.375	1.455	1.57	1.73	>1.9	21.9
	2×0	1.355	1.395	1.475	1.58	1.7	1.8
	±.10 Neor.gra	unty me	teriol a cific s	gravity	cabed i	ash co	ontent
	SIZE	5%	6%	7%	8%	9%	10%
m	2×1	79.5?	82.5	16.5	8.5	5	4
	1 × 1/4	80.5?	82.5	76	26.5	9.5	6.5
4	1/4 × 20	88	50.5	12	4	2	?
8	20 x 0	5.5	1.5	0	0	0	0
8	2 × 1/4	80.5	82	60	15	7	4.5
	14×0	77	22	5.5	2.5	7	?
	2×0	84.57	73.5	16.5	6.5	6	3.5

SUMMARY CHAIRT

YIELD AT INDIGATED ASH, To

SIZE	5%	6 %	7%	8%	9%	10%
2×1	13	34	44.5	52	58	62.5
1 × Y4	41	54	63.5	71	78	83
14 × 20m	53	65.5	78	86	91	94
20 X O	73	82.5	88.5	93	96	98
2 × ¥4	29	42	55	66	74	79
Y4 ×0	58	69.5	80	86.5	91.5	95
2×0	49	60	71.5	79.5	85	89.5

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SPECIFIC GRAVITY AT INDICATED ASH

	SIZE	5%	6%	7%	8%	9%	10%	
× -	2×1	1.3	1.35	1.38	1.415	1.45	1.49	
	1 × 1/4	1.35	1.375	1.395	1.415	1.46	1.515	
4	V4 x 20	1.34	1.37	1.415	1.47	1.55	168	
2	20× 0	1.39	1.425	1.47	1.585	1.8	>1.9	
8	2× 44	1.33	1.36	1.38	1.41	1.4.55	1.51	
	14×0	1.36	1.38	1.42	1.48	1.57	1.74	
	2×0	1.34	1.365	1.4	1.455	1.51	1.62	

±.10 Near-gravity material at indicated ash content and specific gravity

	SIZE	5%	6 %	7%	8%	9%	10%	
	2×1	49?	58?	59	44.5	32	23.5	
m -	1 × Y4	77?	73	68.5	59.5	39.5	17.	
w	Y4x20	82?	86?	49.5	26	10.5	3	
18	20×0	56	44.5	27.5	6	3	1.5?	
8	2 × 44	70.5?	74.5?	71.5	59	40.5	18	
	14 × 0	857	71	52	24	8	2.5	
	2×0	77?	81?	61.5	30	17.5	6	



LAMINATED RUST WEATHERING, MEDIUM GRAINED, QUARTZ SANDSTONE

3 CLEAN BRIGHT BLACK COAL

BONY COAL

18 FIRM BLACK LUSTROUS CLEAN COAL



2' COAL WITH MINOR BONE are grey shale EPSILON 2' COAL WITH MINOR BONE are grey shale EPSILON FIGURE 3-5 COAL SEAMS EPSILON & DELTA MAP AREA 3 DrawnEGT.14AUG57 Traced Approved Revised No. 1' = 4'







BLACK SHALE

4' BONY COAL

8'HARD, GOOD QUALITY COAL

2'BONY COAL

6'GOOD QUALITY COAL

4'SOFT, CLEAN COAL

BLACK SHALE

SHALE & SANDSTONE, INTERBEDDED 2' HARD, GOOD QUALITY COAL

·

3'BONY TO SHALY COAL

I' SOFT, GOOD COAL BLACK SHALE

BETA









