CANADA
DEPARTMENT OF MINES
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MINES BRANCH
JOHN MCLEISH, DIRECTOR

BULLETIN No. 25
(Revised, Nov. 11, 1921)

Analyses of Canadian Fuels

IN FIVE PARTS

PART IV

ALBERTA AND THE NORTHWEST TERRITORIES

COMPILED BY
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OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1922

No. 482.

32066—1

EXPLANATORY NOTES

The samples of fuel from Alberta and the Northwest Territories collected previous to 1910 were analysed at McGill University by the staff then engaged in a special "Investigation of the Coals of Canada." Early in 1910, however, this work was transferred to the Division of Fuels and Fuel Testing, Mines Branch, Department of Mines, Ottawa; and all subsequent samples have been tested there.

The coal samples are classified according to areas corresponding to the provincial mine inspection districts. In some instances two or more of the smaller districts are grouped to form single areas, which are named after the component districts.

The expressions "anal." and "calc." at the head of any column indicate whether the figures recorded were obtained directly by analysis, or by calculation. The usual practice was to analyse the fuels after air-drying, although, in some cases, determinations were made on samples either in the condition received, or after being completely dried.

Figures in columns "R" refer to fuels as received; in columns "AD" to air-dried fuels; and in columns "D" to those dried at 105° C.

In making the determinations, the necessary calculations were made to give one more significant figure than is reported. All deduced values were calculated before the rounding-off process took place.

A description of the Hoffmann Potash Test is given on page 65 of the Summary Report of the Mines Branch for the year 1916.

A "Commercial" sample of any grade of fuel is one representative of the corresponding product as shipped from any mine.

The "Mine" and "Prospect" samples were collected by technical officers of either the Federal or Provincial governments: the former term being applied to those procured from deposits already under development. "Prospect" samples are apt to be weathered, and may, therefore, only give an indication of the composition of the main body of the deposit.

It should be clearly understood that the compilers of this bulletin did not necessarily make all the analyses tabulated therein, although they made practically all the coal analyses. The gas and oil samples were analysed by R. C. Cantelo, V. F. Murray, F. E. Carter, and J. H. H. Nicolls.

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MISCELLANEOUS SAMPLES

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ALBERTA COAL FIELDS

Crowsnest Pass Area

Description	International Coal & Coke Co., Ltd., Coleman Denison colliery. Sec. 8, Tp. 8, R. 4										
Sample No.	M34			M234	M2034		M 34 SP			M 2034 SP	
Moisture condition (see note p. 2)	R	AD	D	D	R	D	R	AD	D	R	D
Loss on air-drying....%	1·3	....	....	....	....	....	1·4	....	....	....	....
Results obtained by.....	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.
Proximate analysis:— Moisture....%	2·0	0·7	....	....	1·4	....	1·9	0·6	....	2·4	....
Ash....%	19·4	19·7	19·8	11·6	20·9	21·2	15·9	16·1	16·2	18·3	18·7
Volatile matter....%	24·6	24·9	25·1	26·4	23·3	23·7	23·4	23·7	23·9	22·3	22·9
Fixed carbon....%	54·0	54·7	55·1	62·0	54·4	55·1	58·8	59·6	59·9	57·0	58·4
Ultimate analysis:— Carbon....%	67·1	68·0	68·5	76·5	....	....	71·2	72·2	72·6	....	....
Hydrogen....%	4·2	4·1	4·0	4·3	....	....	4·4	4·3	4·3	....	....
Ash....%	19·4	19·7	19·8	11·6	....	....	15·9	16·1	16·2	....	....
Sulphur....%	0·4	0·4	0·4	0·4	0·5	0·5	0·5	0·6	0·6	0·5	0·6
Nitrogen....%	1·0	1·0	1·0	1·0	....	....	1·0	1·0	1·0	....	....
Oxygen....%	7·9	6·8	6·3	6·2	....	....	7·0	5·8	5·3	....	....
Calorific value:— Calories per gram, gross	6380	6470	6510	7320	6360	6450	6820	6920	6960	6570	6730
B. Th. U. per lb., gross	11490	11640	11730	13180	11450	11610	12280	12450	12530	11820	12110
Fuel ratio....		2·20		2·35	2·35			2·50		2·55	
Carbon-hydrogen ratio..	16·1	16·7	17·0	17·8	....	....	16·1	16·7	17·0	....	....
Coking properties....	....	....	....	....	....	....	....	....	....	....	....
Hoffmann potash test...	....	....	....	....	....	....	....	....	....	....	....
Location in mine....	No. 2 Seam....		....		No. 2 seam...		No. 4 seam....			No. 4 seam.	
Kind of sample....	Commercial—15 tons.		....		Mine....		Commercial—1 ton...			Mine	
Quality of coal....	Run-of-mine....		Washed coal from M 34, yield 73%		Run-of-mine..		Run-of-mine....			Run-of-mine.	
Taken by....	T. Denis, Mines Branch, Ottawa.		....		E. Stansfield.		T. Denis, Mines Branch.			E. Stansfield.	
Date of sampling....	May 10, 1908....		....		July, 1909....		May 10, 1908....			July 27, 1909.	
Remarks....	....		....		....		....			....	

ALBERTA COAL FIELDS

Crowsnest Pass Area

Description	McGillivray Creek Coal and Coke Co., Ltd., Carbondale mine, Coleman. Sec. 17, Tp. 8, R. 4.					West Canadian Collieries, Ltd, Blairmore. Greenhill colliery, Blairmore. Secs. 2 and 11, Tp. 8. R. 24							
Sample No.	555			1351		439			551			1404	
Moisture condition (see note p. 2.)	R	AD.	D	R	D	R	AD	D	R	AD	D	R	D
Loss on air-drying, %	1·7	....	....	....	....	0·0	....	....	1·8	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis: Moisture....%	2·5	0·9	....	1·5	....	1·2	1·2	....	2·5	0·7	....	1·3	....
Ash....%	17·0	17·3	17·4	14·5	14·8	19·5	19·5	19·7	11·5	11·7	11·8	12·0	12·2
Volatile matter..%	24·0	24·4	24·6	24·7	25·0	23·1	23·1	23·4	24·9	25·3	25·5	23·0	23·3
Fixed carbon....%	56·5	57·4	58·0	59·3	60·2	56·2	56·2	56·9	61·1	62·3	62·7	63·7	64·5
Ultimate analysis:— Carbon....%	69·3	70·4	71·0	....	....	68·8	68·8	69·6	75·3	76·7	77·2	....	....
Hydrogen....%	4·4	4·3	4·3	....	....	4·6	4·6	4·6	4·6	4·5	4·5	....	....
Ash....%	17·0	17·3	17·4	....	....	19·5	19·5	19·7	11·5	11·7	11·8	....	....
Sulphur....%	0·7	0·7	0·7	1·2	1·2	0·5	0·5	0·5	0·6	0·6	0·6	0·5	0·5
Nitrogen....%	0·9	1·0	1·0	....	....	1·0	1·0	1·0	1·0	1·0	1·0	....	....
Oxygen....%	7·7	6·3	5·6	....	....	5·6	5·6	4·6	7·0	5·5	4·9	....	....
Calorific value:— Calories per gram, gross....	6690	6800	6860	7060	7160	6530	6530	6600	7300	7430	7480	....	....
B. Th. U. per lb., gross....	12040	12240	12350	12700	12890	11750	11750	11880	13140	13380	13470	....	....
Fuel ratio....	2·35			2·40		2·45			2·45			2·75	
Carbon-hydrogen ratio....	15·6	16·4	16·7	....	....	14·8	14·8	15·3	16·3	17·1	17·4	....	....
Coking properties....	Very poor coke.			Small lump of fair coke.		Small lump of fair coke.			Good coke with fair amount of swelling			Small lump of hard coke.	
Location in mine....	No. 2 seam....			....		No. 1 seam, main entry. No. 3 level.			No. 1 seam....			....	
Kind of sample....	Commercial — 50 tons.			Commercial..		Mine....			Commercial—car-load.			....	
Quality of coal....	....			Run-of-mine..		....			....			Blacksmith coal.	
Taken by....	Provincial mine inspector.			Submitted by purchasers.		F. Aspinall, provincial mine inspector			Provincial mine inspector.			Mine authorities.	
Date of sampling....	February 1914, Lab. sample April 19, 1915.			1918.		Dec., 1914....			Dec. 1914, Lab. sample April 14, 1915.			Dec. 1918.	
Remarks....	....			....		....			....			....	

ALBERTA COAL FIELDS

Crowsnest Pass Area

Description	Franco-Canadian Collieries, Ltd., Frank Sec. 36, Tp. 7, R. 4								
Sample No.	307			430			557		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying %	0·0	....	....	0·4	....	....	2·0	....	....
Results obtained by	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	1·2	1·2	....	1·3	1·0	....	2·8	0·8	....
Ash %	16·5	16·5	16·7	10·7	10·7	10·8	17·8	18·2	18·4
Volatile matter %	26·0	26·0	26·3	28·4	28·5	28·8	26·2	26·8	27·0
Fixed carbon %	56·3	56·3	57·0	59·6	59·8	60·4	53·2	54·2	54·6
Ultimate analysis:— Carbon %	70·6	70·6	71·4	77·1	77·4	78·2	68·0	69·4	70·0
Hydrogen %	4·8	4·8	4·7	5·0	5·0	4·9	4·4	4·3	4·2
Ash %	16·5	16·5	16·7	10·7	10·7	10·8	17·8	18·2	18·4
Sulphur %	0·6	0·6	0·6	0·5	0·5	0·5	0·6	0·6	0·6
Nitrogen %	1·1	1·1	1·1	1·2	1·2	1·2	0·9	1·0	1·0
Oxygen %	6·4	6·4	5·5	5·5	5·2	4·4	8·3	6·5	5·8
Calorific value:— Calories per gram, gross	6850	6850	6930	7360	7380	7460	6620	6750	6810
B. Th. U. per lb. gross	12330	12330	12470	13240	13290	13430	11910	12150	12250
Fuel ratio		2·15			2·10			2·05	
Carbon-hydrogen ratio	14·9	14·9	15·3	15·5	15·6	15·9	15·5	16·2	16·6
Coking properties	Fair sized lump of good coke.			Good solid coke, not much swollen.			Small lump of fair coke.		
Hoffmann potash test	....	....	....	....	....	....	....	....	....
Location in mine	No. 1 or shaft seam.			No. 1 or shaft seam, main gangway south.			No. 1 or shaft seam.		
Kind of sample	Mine.			Mine.			Commercial—car load.		
Quality of coal	....			....			Run-of-mine.		
Taken by	A. N. Scott, provincial mine inspector.			F. Aspinall, provincial mine inspector.			F. Aspinall.		
Date of sampling	April, 1914.			November, 1914.			Nov. 1914. Lab. sample April 21, 1915.		
Remarks	....			....			....		

ALBERTA COAL FIELDS

Crowsnest Pass Area

Description	Hillcrest Collieries, Ltd., Hillcrest Sec. 18, Tp. 7, R. 3										
Sample No	M 32			M 232	M 2032		884			1465	
Moisture condition (see note p. 2)	R	AD	D	D	R	D	R	AD	D	R	D
Loss on air-drying....%	1·7	.....	.....	....	.....	.....	1·0	.....	.....	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	3·0	1·3	....	....	1·0	.....	1·9	0·9	.....	0·9	....
Ash....%	14·8	15·1	15·3	9·8	13·4	13·5	14·0	14·1	14·3	9·2	9·2
Volatile matter....%	28·5	28·9	29·3	29·8	29·7	30·0	25·2	25·5	25·7	30·5	30·8
Fixed carbon....%	53·7	54·7	55·4	60·4	55·9	56·5	58·9	59·5	60·0	59·4	60·0
Ultimate analysis:— Carbon....%	68·3	69·5	70·4	77·0	....	....	72·1	72·9	73·5	....	....
Hydrogen....%	4·4	4·3	4·2	4·7	....	....	4·5	4·5	4·4	....	....
Ash....%	14·8	15·1	15·3	9·8	....	....	14·0	14·1	14·3	....	....
Sulphur....%	0·6	0·6	0·6	0·5	0·8	0·8	0·6	0·6	0·6	0·6	0·7
Nitrogen....%	1·0	1·0	1·0	1·1	....	....	1·1	1·1	1·1	....	....
Oxygen....%	10·9	9·5	8·5	6·9	....	....	7·7	6·8	6·1	....	....
Calorific value:— Calories per gram, gross	6710	6830	6920	7450	7060	7130	7120	7200	7260	....	....
B.Th.U. per lb., gross	12080	12290	12450	13410	12700	12830	12820	12950	13070	....	....
Fuel ratio		1·90		2·00	1·90			2·35		1·95	
Carbon-hydrogen ratio	15·5	16·2	16·7	16·4	....	....	15·9	16·3	16·7	....	....
Coking properties	....	....	....	....	....	....	Good coke			Coke swollen, but fairly strong.	
Location in mine	.....			.....	.....		No. 1 seam			.....	
Kind of sample	Commercial — 10 tons.			.....	Mine		Commercial — 30 tons.			.....	
Quality of coal	Run-of-mine			Washed coal from M32, yield 82%	Run-of-mine		.....			Blacksmith coal.	
Taken by	T. Denis, Mines Braneh.			.....	E. Stansfield.		Provincial Inspector of Mines.			Mine authorities.	
Date of sampling	May 4, 1908			.....	July 29, 1909		Dec. 15, 1915. Lab. sample Nov. 22, 1916.			January, 1919.	
Remarks	.....			.....	.....		.....			.....	

ALBERTA COAL FIELDS

Crowsnest Pass Area

Description	West Canadian Collieries, Ltd., Blairmore Bellevue Colliery, Bellevue. Sec. 29, Tp. 7, R. 3														
Sample No	M 33			M 233	M 2033		322			549		
Moisture condition (see note p. 2)	R	AD	D	D	R	D	R	AD	D	R	AD	D
Loss on air-drying....%	0·7	.....	....	....	....	....	0·0	....	....	1·8	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	0·9	0·2	....	....	1·2	....	1·3	1·3	....	2·7	0·9	....
Ash....%	15·3	15·4	15·5	12·7	13·9	14·1	17·0	17·0	17·2	18·8	19·1	19·3
Volatile matter....%	27·4	27·6	27·6	28·4	26·4	26·7	20·8	20·8	21·0	25·5	26·0	26·2
Fixed carbon....%	56·4	56·8	56·9	58·9	58·5	59·2	60·9	60·9	61·8	53·0	54·0	54·5
Ultimate analysis:— Carbon....%	70·8	71·3	71·5	75·1	....	....	71·7	71·7	72·6	67·9	69·2	69·8
Hydrogen....%	4·4	4·4	4·3	4·4	....	....	4·1	4·1	4·0	4·5	4·4	4·3
Ash....%	15·3	15·4	15·5	12·7	....	....	17·0	17·0	17·2	18·8	19·1	19·3
Sulphur....%	0·8	0·8	0·8	0·5	0·9	0·9	0·3	0·3	0·3	0·5	0·6	0·6
Nitrogen....%	1·0	1·0	1·0	1·1	...	....	1·0	1·0	1·1	1·0	1·0	1·0
Oxygen....%	7·7	7·1	6·9	6·2	....	....	5·9	5·9	4·8	7·3	5·7	5·0
Calorific value:— Calories per gram, gross.	6820	6870	6880	7210	6910	7000	6710	6710	6790	6550	6670	6730
B. Th. U. per lb., gross..	12280	12370	12390	12980	12440	12590	12070	12070	12230	11790	12010	12110
Fuel ratio	2·05			2·05	2·20		2·95			2·10		
Carbon-hydrogen ratio	16·1	16·4	16·5	17·0	....	....	17·4	17·4	18·0	15·1	15·9	16·2
Coking properties							Poor coke			Poor coke		
Hoffmann potash test	....	....	....	....	....	....	....	....	....	....	....	....
Location in mine	No. 1 seam			.....	No. 1 seam...		No. 1 seam			No. 1 seam.		
Kind of sample	Commercial — 10 tons.			.....	Mine		Mine			Commercial — 35 tons.		
Quality of coal	Run-of-mine			Washed coal from M33, yield 86%	Run-of-mine..		.....			Run-of-mine.		
Taken by	T. Denis, Mines Branch.			.....	E. Stansfield..		A. N. Scott, provincial mine inspector.			F. Aspinall, provincial mine inspector.		
Date of sampling	May 5, 1908			.....	July 29, 1909..		January, 1914			November, 1914. Lab. sample—April 12, 1915.		
Remarks	.....			.....	.....		.....			.....		

ALBERTA COAL FIELDS

Crowsnest Pass Area

Description	West Canadian Collieries, Ltd., Blairmore Lille colliery, Lille. Sec. 8, Tp. 8, R. 3.					Leitch Collieries, Ltd., Passburg Sec. 15, Tp. 7, R. 3								
Sample No.	M 28			M 2028		M 48			M 2048		305		
Moisture condition (see note p. 2)	R	AD	D	R	D	R	AD	D	R	D	R	AD	D
Loss on air-drying....%	0·9	....	....	....	....	0·9	....	....	....	....	0·1	....	....
Results obtained by	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	1·7	0·8	....	1·5	....	1·9	1·0	....	1·1	....	1·1	1·0	....
Ash....%	16·1	16·3	16·4	15·5	15·8	17·6	17·7	17·9	17·9	18·1	20·3	20·3	20·5
Volatile matter....%	24·6	24·8	25·0	24·9	25·3	26·5	26·7	27·0	28·4	28·7	25·8	25·8	26·1
Fixed carbon....%	57·6	58·1	58·6	58·1	58·9	54·0	54·6	55·1	52·6	53·2	52·8	52·9	53·4
Ultimate analysis:— Carbon....%	70·0	70·6	71·2	....	....	68·6	69·3	70·0	....	....	66·5	66·6	67·3
Hydrogen....%	4·4	4·3	4·2	....	....	4·6	4·5	4·4	....	....	4·4	4·4	4·3
Ash....%	16·1	16·3	16·4	....	....	17·6	17·7	17·9	....	....	20·3	20·3	20·5
Sulphur....%	0·5	0·5	0·5	0·6	0·6	0·6	0·6	0·6	1·4	1·4	1·7	1·7	1·7
Nitrogen....%	0·9	0·9	0·9	....	....	1·0	1·0	1·0	....	....	0·9	0·9	0·9
Oxygen....%	8·1	7·4	6·8	....	....	7·6	6·9	6·1	....	....	6·2	6·1	5·3
Calorific value:— Calories per gram, gross	6810	6870	6930	6910	7010	6670	6730	6800	6710	6790	6480	6490	6560
B. Th. U. per lb., gross	12260	12370	12470	12430	12620	12000	12120	12240	12090	12220	11670	11680	11800
Fuel ratio	2·35			2·30		2·05			1·85		2·05		
Carbon-hydrogen ratio	16·0	16·4	16·8	....	....	15·0	15·4	15·8	....	....	15·1	15·1	15·5
Coking properties	....	....	....	....	....	....	....	....	....	....	Small lump of very fair coke		
Hoffmann potash test	....	....	....	....	....	....	....	....	....	....	....	....	....
Location in mine	No. 1 seam			No. 1 seam		No. 1 or Byron seam.			No. 1 or Byron seam.		No. 1 seam, main gangway.		
Kind of sample	Commercial — 1 ton.			Mine		Commercial — 5 tons.			Mine		Mine.		
Quality of coal	Run-of-mine			Run-of-mine		Run-of-mine			Lumps of slate removed by hand - picking.		.....		
Taken by	T. Denis, Mines Branch.			E. Stansfield.		T. Denis, Mines Branch.			E. Stansfield.		A. N. Scott, provincial mine inspector.		
Date of sampling	May 6, 1908			July 30, 1909		July 18, 1908			July 29, 1909		November, 1913.		
Remarks													

ALBERTA COAL FIELDS

Canmore Banff Area

Description	Canmore Coal Co., Ltd., No. 2 mine, Canmore Sec. 29, Tp. 24, R. 10											
Sample No.	370			371			303			718		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	1·4	....	....	3·5	....	....	0·0	....	....	1·0	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	2·1	0·7	....	4·4	0·9	....	0·9	0·9	....	1·9	0·9	....
Ash....%	7·2	7·3	7·4	15·4	16·0	16·1	5·4	5·4	5·4	6·2	6·3	6·4
Volatile matter....%	15·6	15·8	15·9	13·3	13·8	13·9	14·0	14·0	14·1	9·8	9·9	10·0
Fixed carbon....%	75·1	76·2	76·7	66·9	69·3	70·0	79·7	79·7	80·5	82·1	82·9	83·6
Ultimate analysis:— Carbon....%	....	....	....	....	....	....	85·2	85·2	86·0	82·8	83·6	84·3
Hydrogen....%	....	....	....	....	....	....	4·2	4·2	4·1	4·2	4·2	4·1
Ash....%	....	....	....	....	....	....	5·4	5·4	5·4	6·2	6·3	6·4
Sulphur....%	....	....	....	....	....	....	0·9	0·9	0·9	0·7	0·7	0·8
Nitrogen....%	....	....	....	....	....	....	1·3	1·3	1·3	1·6	1·6	1·6
Oxygen....%	....	....	....	....	....	....	3·0	3·0	2·3	4·5	3·6	2·8
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	8040	8040	8120	7930	8010	8080
B. Th. U. per lb., gross	....	....	....	....	....	....	14470	14470	14610	14280	14420	14560
Fuel ratio	4·80			5·05			5·70			8·35		
Carbon-hydrogen ratio	....	....	....	....	....	....	20·5	20·5	21·0	19·5	20·0	20·5
Coking properties	....	....	....	....	....	....	Very slight tendency to agglomerate			Forms agglomerate.		
Hoffmann potash test	....	....	....	....	....	....	....	....	....	12		
Location in mine	Carey seam			Sedlock seam, basin slope.			Carey seam			Stewart seam, main gangway.		
Kind of sample	....			....			Mine			Mine.		
Quality of coal	....			....			Includes two 3-inch bands of dirty coal.			Run-of-mine.		
Taken by	Mine authorities.			Mine authorities.			F. Aspinall, provincial mine inspector.			J. A. Richards, provincial mine inspector.		
Date of sampling	Spring of 1914			1914			November, 1913.			December 4, 1915.		
Remarks	....			....			....			....		

ALBERTA COAL FIELDS

Canmore-Banff Area

Description	Canmore Coal Co., Ltd., Canmore No. 1 or old mine Sec. 29, Tp. 24, R. 10				The Georgetown Collieries, Ltd., Canmore Secs. 1 and 6, Tp. 25, R's 10 and 11					
Sample No.	M 25			M 225	301			354		
Moisture condition (see note p. 2)	R	AD	D	D	R	AD	D	R	AD	D
Loss on air-drying, %	0·3	....	....	....	0·0	....	....	2·1	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc
Proximate analysis:—										
Moisture, %	1·2	0·9	....	....	0·8	0·8	....	2·9	0·9	....
Ash, %	12·1	12·2	12·3	5·9	9·6	9·6	9·7	12·3	12·5	12·6
Volatile matter, %	17·0	17·0	17·2	16·2	16·8	16·8	16·9	13·1	13·4	13·5
Fixed carbon, %	69·7	69·9	70·5	77·9	72·8	72·8	73·4	71·7	73·2	73·9
Ultimate analysis:—										
Carbon, %	73·7	74·0	74·6	85·2	80·4	80·4	81·1	76·2	77·9	78·5
Hydrogen, %	3·9	3·9	3·8	4·1	4·2	4·2	4·1	4·2	4·1	4·0
Ash, %	12·1	12·2	12·3	5·9	9·6	9·6	9·7	12·3	12·5	12·6
Sulphur, %	0·8	0·8	0·8	0·7	1·8	1·8	1·8	0·8	0·8	0·8
Nitrogen, %	1·6	1·6	1·6	1·7	1·5	1·5	1·5	1·2	1·2	1·2
Oxygen, %	7·9	7·5	6·9	2·4	2·5	2·5	1·8	5·3	3·5	2·9
Calorific value:—										
Calories per gram, gross	7250	7270	7340	8000	7570	7570	7640	7180	7330	7390
B. Th. U. per lb., gross	13050	13090	13210	14400	13640	13640	13750	12920	13190	13300
Fuel ratio		4·10		4·80		4·35			5·45	
Carbon-hydrogen ratio	19·0	19·1	19·6	20·8	19·3	19·3	19·7	18·1	19·2	19·6
Coking properties	....	....	....	....	Agglomerates slightly			Barely agglomerates		
Hoffmann potash test	....	....	....	....	9–10			....	....	....
Location in mine	....			....	No. 3 seam.			No. 3 seam.		
Kind of sample	Commercial — 10 tons.			....	Mine			Commercial — 20 tons.		
Quality of coal	Lumps hand-picked, and then remixed with slack			Washed coal from M 25, yield 82%	....			....		
Taken by	T. Denis, Mines Branch.			....	Provincial mine inspector.			F. Aspinall, provincial mine inspector.		
Date of sampling	April 22, 1908.			....	November, 1913.			November, 1913. Lab. sample Mar. 25, 1914.		
Remarks	Operated by H. W. McNeil Co., Ltd. at time of sampling.			....	....			....		

ALBERTA COAL FIELDS

Canmore-Banff Area

Description	Canadian Pacific Railway Company, Natural Resources Department, Calgary Bankhead colliery, Bankhead Sec. 19, Tp. 26, R. 11											
Sample No.	M 23			M 23 SP			M 23 M	M 223 M	M 24		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	D	D	R	AD	D
Loss on air-drying....%	0·5	....	....	0·6	....	....	....	....	1·8	....	....
Results obtained by	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Anal.	Anal.	Calc.	Calc.	Anal.
Proximate analysis:—											
Moisture....%	0·9	0·5	....	1·1	0·5	....	....	....	2·7	0·9	....
Ash....%	12·1	12·1	12·2	15·7	15·8	15·9	14·1	8·9	13·9	14·1	14·3
Volatile matter....%	11·7	11·7	11·8	12·5	12·6	12·6	12 6	12·5	16·6	17·0	17·1
Fixed carbon....%	75·3	75·7	76·0	70·7	71·1	71·5	73·3	78·6	66·8	68·0	68·6
Ultimate analysis:—											
Carbon....%	78·7	79·1	79·4	75·2	75·6	76·0	76·6	81·8	74·2	75·6	76·3
Hydrogen....%	3·6	3·6	3·6	3·7	3·7	3·7	3·6	3·8	3·9	3·8	3·7
Ash....%	12·1	12·1	12·2	15·7	15·8	15·9	14·1	8·9	13·9	14·1	14·3
Sulphur....%	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6	0·6
Nitrogen....%	1·0	1·0	1·0	0·9	0·9	0·9	1·0	1·1	1·0	1·0	1·0
Oxygen....%	4·0	3·6	3·2	3·9	3·4	2·9	4·1	3·8	6·4	4·9	4·1
Calorific value:—											
Calories per gram, gross...	7330	7360	7400	6970	7010	7040	7270	7760	7080	7210	7280
B. Th. U. per lb., gross....	13190	13250	13310	12540	12610	12670	13080	13970	12740	12970	13100
Fuel ratio....		6·45			5·65		5·80	6·30		4·00	
Carbon-hydrogen ratio....	21·7	22·0	22·3	20·1	20·5	20·8	21·3	21·5	19·1	20·2	20·7
Coking properties....	Non-coking			Non-coking			Non-coking	Non-coking	Non-coking		
Hoffmann potash test....	....	....	....	....	....	....	....	....	....	....	....
Location in mine....	....			....			....	....			
Kind of sample....	Commercial — 5 tons.			Commercial — 5 tons.			....	....	Commercial — 5 tons.		
Quality of coal....	Pea size ¾ to 7/16-inch, over slater and picker.			Buckwheat size 7/16 to 5/16-inch, over slater.			Mixture of M 23 and M 23 SP.	Washed coal from M 23 M yield 84%.	Coal dust briquetted with about 10% coal tar.		
Taken by....	T. Denis, Mines Branch.			T. Denis....			....	....	T. Denis.		
Date of sampling....	April 21, 1908....			April 21, 1908....			....	....	April 20, 1908.		
Remarks....	....			....			....	....	....		

ALBERTA COAL FIELDS

Canmore-Banff Area

Description	Canadian Pacific Railway, Natural Resources Department, Calgary Bankhead colliery, Bankhead Sec. 19, Tp. 26, R. 11								
Sample No.	772			774			902		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	0·0	....	....	0·1	....	....	0·6	..	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	0·6	0·6	....	0·6	0·5	....	1·1	0·5	....
Ash....%	13·6	13·6	13·7	9·7	9·7	9·8	18·4	18·5	18·6
Volatile matter....%	8·8	8·8	8·9	8·2	8·2	8·2	10·0	10·0	10·1
Fixed carbon....%	77·0	77·0	77·4	81·5	81·6	82·0	70·5	71·0	71·3
Ultimate analysis:— Carbon....%	78·2	78·2	78·7	82·2	82·3	82·7	72·7	73·1	73·5
Hydrogen....%	3·5	3·5	3·4	3·7	3·7	3·6	3·3	3·3	3·2
Ash....%	13·6	13·6	13·7	9·7	9·7	9·8	18·4	18·5	18·6
Sulphur....%	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5
Nitrogen....%	1·1	1·1	1·1	0·9	0·9	1·0	1·0	1·0	1·0
Oxygen....%	3·1	3·1	2·6	3·0	2·9	2·4	4·1	3·6	3·2
Calorific value:— Calories per gram, gross....	7160	7160	7200	7640	7650	7690	6770	6810	6840
B. Th. U. per lb., gross....	12890	12890	12970	13750	13769	13830	12180	12250	12310
Fuel ratio....		8·70			9·95			7·10	
Carbon-hydrogen ratio....	22·6	22·6	23·0	22·4	22·4	22·8	21·7	22·1	22·5
Coking properties....	Non-coking			Non-coking			Non-coking		
Hoffmann potash test....	9			10			....		
Location in mine....	No. 0000 seam, B level gangway.			No. 2 seam, C level gangway.			....		
Kind of sample....	Mine....			Mine....			Commercial—20 tons.		
Quality of coal....	Bone coal left in sample, which was probably of lower grade than coal shipped from mine.			Run-of-mine....			Pea coal.		
Taken by....	F. Aspinall, provincial mine inspector.			F. Aspinall....			Provincial mine inspector.		
Date of sampling....	July 7, 1916....			July 12, 1916....			May, 1916. Lab. sample November 29, 1916.		
Remarks....	....			....			....		

ALBERTA COAL FIELDS

Brazeau Area

Description	Brazeau Collieries, Ltd., Nordegg Sec. 22, Tp. 40, R. 15												
Sample No.	469			537			574			858		859	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	D	R	D
Loss on air-drying....%	1·0	....	....	1·8	....	....	0·3	....	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	1·8	0·9	....	2·1	0·4	....	0·8	0·5	....	0·8	....	0·6	....
Ash....%	11·9	12·0	12·1	10·5	10·6	10·7	2·7	2·7	2·7	14·5	14·6	11·6	11·7
Volatile matter....%	16·3	16·5	16·6	16·8	17·1	17·1	17·0	17·9	18·0	15·1	15·2	14·6	14·7
Fixed carbon....%	70·0	70·6	71·3	70·6	71·9	72·2	78·6	78·9	79·3	69·6	70·2	73·2	73·6
Ultimate analysis:— Carbon....%	77·9	78·7	79·4	78·7	80·1	80·4	....	....	....	76·1	76·7	79·7	80·1
Hydrogen....%	4·3	4·2	4·1	4·2	4·1	4·0	....	....	....	3·9	3·8	4·1	4·0
Ash....%	11·9	12·0	12·1	....	....	....	....	....	....	14·5	14·6	11·6	11·7
Sulphur....%	0·4	0·4	0·4	....	....	....	....	....	....	0·5	0·5	0·4	0·4
Nitrogen....%	1·1	1·1	1·1	....	....	....	....	....	....	1·1	1·1	1·1	1·2
Oxygen....%	4·4	3·6	2·9	....	....	....	....	....	....	3·9	3·3	3·1	2·6
Calorific value:— Calories per gram, gross...	7420	7490	7560	....	....	....	....	....	....	7280	7340	7600	7640
B. Th. U. per lb., gross....	13350	13480	13620	....	....	....	....	....	....	13110	13210	13690	13760
Fuel ratio	4·30			4·20			4·40			4·60		5·00	
Carbon-hydrogen ratio	18·2	18·7	19·2	18·8	19·7	20·0	....	....	....	19·6	20·0	19·7	20·0
Coking properties	Poor coke			Small lump of fair coke			Swells considerably forming good coke			Poor coke		Poor coke	
Hoffmann potash test	....			11			10			....		....	
Location in mine	No. 2 mine, No. 2 seam, main entry.			No. 2 seam			No. 2 seam			No. 2 seam, 4200 feet from entry.		No. 2 seam, centre of workings.	
Kind of sample	Mine			Mine			Mine			Mine		Mine.	
Quality of coal	....			....			....			....		....	
Taken by	J. A. Richards, provincial mine inspector.			Fire ranger, Board of Railway Commissioners.			Fire ranger			J. S. Stewart, Geological Survey.		J. S. Stewart.	
Date of sampling	December, 1914...			February, 1915....			May, 1915.....			Summer of 1916.		1916.	
Remarks	....			....			....			....		....	

ALBERTA COAL FIELDS

Brazeau Area

Description	Brazeau Collieries, Ltd., Nordegg Sec. 22, Tp. 40, R. 15										
Sample No.	538			575			719			860	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	D
Loss on air-drying, %	1·6	....	....	0·1	....	....	0·0	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture, %	2·1	0·5	....	0·7	0·6	....	0·7	0·7	....	0·6	....
Ash, %	12·3	12·5	12·6	34·9	34·9	35·2	13·1	13·1	13·2	16·9	17·0
Volatile matter, %	16·5	16·8	16·8	14·7	14·7	14·8	12·6	12·6	12·7	14·6	14·7
Fixed carbon, %	69·1	70·2	70·6	49·7	49·8	50·0	73·6	73·6	74·1	67·9	68·3
Ultimate analysis:— Carbon, %	77·0	78·2	78·6	....	....	....	77·7	77·7	78·3	74·4	74·8
Hydrogen, %	4·3	4·2	4·2	....	....	....	4·1	4·1	4·0	3·9	3·9
Ash, %	12·3	12·5	12·6	....	....	....	13·1	13·1	13·2	16·9	17·0
Sulphur, %	....	....	....	....	....	....	0·5	0·5	0·5	0·5	0·5
Nitrogen, %	....	....	....	....	....	....	1·1	1·1	1·1	1·2	1·2
Oxygen, %	....	....	....	....	....	....	3·5	3·5	2·9	3·1	2·6
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	7430	7430	7480	7100	7140
B. Th. U. per lb., gross	....	....	....	....	....	....	13370	13370	13460	12790	12860
Fuel ratio	4·20			3·40			5·85			4·65	
Carbon-hydrogen ratio	17·9	18·7	18·9	....	....	....	19·0	19·0	19·4	19·1	19·4
Coking properties	Small lump of fair coke			Poor coke			Poor coke			Poor coke	
Hoffmann potash test	10-11			9			8-9			....	
Location in mine	No. 3 seam			No. 3 seam			No. 3 mine, No. 3 seam, main gangway.			No. 3 seam, 2000 ft. from entry.	
Kind of sample	Mine			Mine			Mine			Mine.	
Quality of coal	....			....			Average of 14-ft. seam.			....	
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger			J. A. Richards, provincial mine inspector.			J. S. Stewart, Geological Survey.	
Date of sampling	February, 1915.			May, 1915.			December 9, 1915.			Summer of 1916.	
Remarks	....			....			....			....	

ALBERTA COAL FIELDS

Brazeau Area

Description	Brazeau Collieries, Ltd., Nordegg See. 22, Tp. 40, R. 15							British Collieries (Brazeau), Ltd., Ed. Brown & Co., agents, Winnipeg, Man. Tp. 44, R. 20			
Sample No.	534			560		561		293		294	
Moisture condition (see note p. 2)	R	AD	D	R	D	R	D	R	D	R	D
Loss on air-drying....%	0·1	....	....	0·0	....	0·0	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	0·6	0·4	....	0·8	....	0·7	....	0·8	....	0·9	....
Ash....%	3·5	3·5	3·6	18·3	18·4	17·3	17·5	13·5	13·6	12·6	12·7
Volatile matter....%	18·2	18·2	18·3	16·7	16·9	17·1	17·2	22·4	22·6	23·2	23·3
Fixed carbon....%	77·7	77·9	78·1	64·2	64·7	64·9	65·3	63·3	63·8	63·3	64·0
Ultimate analysis:— Carbon....%	87·0	87·1	87·5	....	....	....	....	....	....	....	....
Hydrogen....%	4·4	4·4	4·4	....	....	....	....	....	....	....	....
Ash....%	3·5	3·5	3·6	....	....	....	....	....	....	....	....
Sulphur....%	....	....	....	....	....	....	....	0·2	0·2	0·1	0·1
Nitrogen....%	....	....	....	....	....	....	....	....	....	....	....
Oxygen....%	....	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	....	7310	7360	7370	7440
B. Th. U. per lb. gross	....	....	....	....	....	....	....	13150	13260	13270	13390
Fuel ratio	4·25			3·85		3·80		2·85		2·75	
Carbon-hydrogen ratio	19·7	19·7	19·9	....	....	....	....	....	....	....	....
Coking properties	Swells considerably forming good coke			Poor coke		Poor coke		Poor coke		Fair coke	
Hoffmann potash test	10			9		10		....		....	
Location in mine	.....			.....		.....		Lower portion of 20-foot seam.		Top 12 feet in 20-foot seam	
Kind of sample	Mine			Commercial		Commercial		.....		.....	
Quality of coal	.....			From tipple		From tipple		.....		.....	
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger		Fire ranger		L. V. Rice		L. V. Rice.	
Date of sampling	February, 1915			Feb. 18, 1915.		Feb. 18, 1915.		1913		1913.	
Remarks	.....			.....		.....		.....		.....	

32066—3½

ALBERTA COAL FIELDS

Mountain Park Area

Description	Mountain Park Coal Co., Ltd., Mountain Park Sec. 33, Tp. 45, R. 23									
Sample No.	1352		1466		434			546		
Moisture condition (see note, p. 2)	R	D	R	D	R	AD	D	R	AD	D
Loss on air-drying....%	....	....	....	....	0·2	....	....	1·4	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	1·5	....	1·0	....	0·8	0·7	....	3·2	1·9	....
Ash....%	15·3	15·6	13·1	13·3	12·0	12·0	12·1	4·3	4·3	4·4
Volatile matter....%	26·5	26·9	27·3	27·5	28·7	28·7	28·9	30·5	30·9	31·5
Fixed carbon....%	56·7	57·5	58·6	59·2	58·5	58·6	59·0	62·0	62·9	64·1
Ultimate analysis:— Carbon....%	....	....	....	....	76·3	76·4	76·9	81·2	82·3	83·8
Hydrogen....%	....	....	....	....	4·9	4·8	4·8	5·4	5·3	5·2
Ash....%	....	....	....	....	12·0	12·0	12·1	4·3	4·3	4·4
Sulphur....%	0·3	0·3	0·3	0·3	0·3	0·3	0·3	0·4	0·4	0·4
Nitrogen....%	....	....	....	....	....	....	....	1·3	1·3	1·4
Oxygen....%	....	....	....	....	....	....	....	7·4	6·4	4·8
Calorific value:— Calories per gram, gross..	7090	7200	....	....	....	....	....	7900	8000	8150
B. Th. U. per lb., gross..	12760	12960	....	....	....	....	....	14210	14400	14680
Fuel ratio	2·15		2·15		2·05			2·05		
Carbon-hydrogen ratio	....	....	....	....	15·7	15·8	16·0	15·0	15·5	16·1
Coking properties	Small lump of good coke		Coke swollen but fairly strong		Fair coke			Good coke, considerably swollen		
Location in mine	....		....		No. 1 seam			No. 1 seam.		
Kind of sample	Commercial		....		Mine			Mine.		
Quality of coal	....		Blacksmith coal		....			....		
Taken by	....		Mine authorities		Fire ranger, Board of Railway Commissioners.			E. D. Black, provincial mine inspector.		
Date of sampling	Summer of 1918		December, 1918		November, 1914			February 16, 1915.		
Remarks	From G.T.P. fuel agent.		....		....			....		

ALBERTA COAL FIELDS

Mountain Park Area

Description	Mountain Park Coal Co., Ltd., Mountain Park Sec. 33, Tp. 45, R. 23								
Sample No.	866		885			435		
Moisture condition (see note p. 2)	R	D	R	AD	D	R	AD	D
Loss on air-drying....%	....	....	1·5	....	....	0·4	....	....
Results obtained by	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	0·9	....	2·2	0·7	....	1·2	0·8	....
Ash....%	5·4	5·4	13·7	13·9	14·0	8·0	8·0	8·1
Volatile matter....%	29·9	30·2	24·1	24·4	24·6	28·2	28·3	28·6
Fixed carbon....%	63·8	64·4	60·0	61·0	61·4	62·6	62·9	63·3
Ultimate analysis:— Carbon....%	81·4	82·1	72·8	73·9	74·4	78·9	79·2	79·9
Hydrogen....%	5·1	5·0	4·6	4·5	4·5	4·8	4·8	4·8
Ash....%	5·4	5·4	13·7	13·9	14·0	8·0	8·0	8·1
Sulphur....%	0·4	0·5	0·4	0·4	0·4	....	....	....
Nitrogen....%	1·4	1·4	1·1	1·1	1·1	....	....	....
Oxygen....%	6·3	5·6	7·4	6·2	5·6	....	....	....
Calorific value:— Calories per gram, gross	7950	8020	7100	7210	7260	7680	7720	7780
B. Tb. U. per lb., gross	14310	14440	12780	12970	13070	13830	13890	14010
Fuel ratio	2·15		2·50			2·20		
Carbon-hydrogen ratio	16·0	16·4	15·7	16·3	16·6	16·3	16·5	16·8
Coking properties	Fair coke, swollen and friable		Fair, somewbat friable, coke			Fair coke		
Location in mine	No. 1 seam, 1000 ft. from entry.		Nos. 1 and 3 seams			No. 3 seam.		
Kind of sample	Mine		Commercial—25 tons			Mine.		
Quality of coal	....		Run-of-mine			....		
Taken by	J. S. Stewart, Geological Survey.		Provincial mine inspector.			Fire ranger, Board of Railway Commissioners.		
Date of sampling	Summer of 1916.		April, 1916. Lab. sample November 24, 1916.			November, 1914.		
Remarks	....		....			....		

ALBERTA COAL FIELDS

Mountain Park Area

Description	Mountain Park Coal Co., Ltd., Mountain Park Sec. 33, Tp. 45, R. 23								Cadomin Coal Co., Ltd., Cadomin Sec. 31, Tp. 46, R. 23	
Sample No.	868		869		867		870		1354	
Moisture condition (see note, p. 2)	R	D	R	D	R	D	R	D	R	D
Loss on air-drying....%	....	....	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	0·5	....	0·7	....	0·7	....	1·3	....	1·3	....
Ash....%	23·6	23·8	22·8	23·0	15·2	15·3	17·5	17·7	12·4	12·6
Volatile matter....%	25·1	25·2	23·0	23·2	25·2	25·4	24·3	24·6	25·0	25·3
Fixed carbon....%	50·8	51·0	53·5	53·8	58·9	59·3	56·9	57·7	61·3	62·1
Ultimate analysis:— Carbon....%	64·9	65·2	66·1	66·5	73·0	73·6	69·0	69·9	....	....
Hydrogen....%	4·2	4·1	4·1	4·0	4·4	4·3	4·3	4·2	....	....
Ash....%	23·6	23·8	22·8	23·0	15·2	15·3	17·5	17·7	....	....
Sulphur....%	0·3	0·3	0·4	0·4	0·4	0·4	0·4	0·4	0·2	0·3
Nitrogen....%	0·9	0·9	1·0	1·0	0·9	0·9	1·5	1·5	....	....
Oxygen....%	6·1	5·7	5·6	5·1	6·1	5·5	7·3	6·3	....	....
Calorific value:— Calories per gram, gross.	6270	6300	6400	6440	7090	7140	6670	6760	7400	7500
B. Th. U. per lb., gross..	11290	11350	11520	11600	12760	12860	12010	12170	13320	13500
Fuel ratio	2·00		2·30		2·35		2·35		2·45	
Carbon-hydrogen ratio	15·6	15·8	16·3	16·6	16·7	17·0	15·9	16·5	....	....
Coking properties	Fair coke, somewhat swollen		Poor coke		Fair coke		Poor coke		Small lump of fair coke	
Location in mine	No. 3 seam, middle portion.		No. 3 seam, lower portion.		No. 2 (prospect) seam, 150 ft. from entry.		No. 5 seam, 50 ft. from entry.		....	
Kind of sample	Mine		Mine		Mine		Mine		Commercial.	
Quality of coal	....		....		....		....		....	
Taken by	J. S. Stewart, Geological Survey.		J. S. Stewart		J. S. Stewart		J. S. Stewart.		....	
Date of sampling	Summer of 1916.		1916		1916		1916		Summer of 1918.	
Remarks	Samples taken 400 ft. from bottom of slope.				....		....		From G.T.P. fuel agent.	

ALBERTA COAL FIELDS

Jasper Park Area

Description	Jasper Park Collieries, Ltd., Pocohontas				Jasper Park Collieries, Ltd., Miette mine, Pocohontas Sec. 18, Tp. 49, R. 28			The Blue Diamond Coal Co., Ltd., Brulé Mines Sec. 15, Tp. 50, R. 27	
Sample No	602		1355		487			603	
Moisture condition (see note, p. 2)	R	D	R	D	R	AD	D	R	D
Loss on air-drying %	....	....	....	....	1·8	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture %	0·8	....	1·0	....	2·3	0·5	....	0·7	....
Ash %	5·8	5·8	16·4	16·6	21·4	21·8	21·9	15·8	15·9
Volatile matter %	17·8	17·9	17·2	17·4	18·5	18·8	18·9	20·5	20·6
Fixed carbon %	75·6	76·3	65·4	66·0	57·8	58·9	59·2	63·0	63·5
Ultimate analysis:— Carbon %	....	....	....	....	66·8	68·1	68·4	....	....
Hydrogen %	....	....	....	....	4·0	3·9	3·8	....	....
Ash %	....	....	....	....	21·4	21·8	21·9	....	....
Sulphur %	....	....	0·6	0·6	0·8	0·8	0·8	....	....
Nitrogen %	....	....	....	....	1·1	1·1	1·1	....	....
Oxygen %	....	....	....	....	5·9	4·3	4·0	....	....
Calorific value:— Calories per gram, gross	....	....	7060	7130	6430	6550	6580	....	....
B. Th. U. per lb., gross	....	....	12710	12840	11580	11790	11840	....	....
Fuel ratio	4·25		3·80			3·10		3·10	
Carbon-hydrogen ratio	....	....	....	....	16·7	17·6	17·8	....	....
Coking properties	Small lump of fair coke		Poor coke		Small lump of good coke			Small lump of poor coke	
Hoffmann potash test	11		....	....	....	....	....	11	
Location in mine	No. 1 seam		.....		.....			.....	
Kind of sample	Mine		Commercial		Commercial—30 tons			Mine.	
Quality of coal	.....		.....		.....			.....	
Taken by	Fire ranger, Board of Railway Commissioners.		.....		Provincial mine inspector.			Fire ranger.	
Date of sampling	July, 1915		Summer of 1918.		December, 1914. Lab. sample February 1, 1915.			July, 1915.	
Remarks	.....		From G. T. P. fuel ageat.		.....			Operated by Mackenzie and Mann at time of sampling.	

ALBERTA COAL FIELDS

Jasper Park Area

Description	The Blue Diamond Coal Co., Ltd., Brulé Mines Sec. 15, Tp. 50, R. 27									Bartholemew claim Near Brulé Lake Sec. 17, Tp. 50, R. 28	
Sample No.	1219			1220			1221			889	
Moisture condition (see note p. 2).	R	AD	D	R	AD	D	R	AD	D	R	D
Loss on air-drying.....%	0·0	....	....	0·0	....	....	0·0	....	....	....	....
Results obtained by	Anal.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture.....%	0·5	0·5	....	0·9	0·9	....	0·5	0·5	....	2·2	....
Ash.....%	11·2	11·2	11·3	16·5	16·5	16·6	13·5	13·5	13·6	18·7	19·1
Volatile matter.....%	21·3	21·3	21·4	16·9	16·9	17·1	18·6	18·6	18·7	15·3	15·6
Fixed carbon.....%	67·0	67·0	67·3	65·7	65·7	66·3	67·4	67·4	67·7	63·8	65·3
Ultimate analysis:—											
Carbon.....%	79·3	79·3	79·7	74·2	74·2	74·9	77·3	77·3	77·7	....	....
Hydrogen.....%	4·3	4·3	4·3	4·0	4·0	3·9	4·2	4·2	4·1	....	....
Ash.....%	....	....	....	....	....	....	....	....	....	....	....
Sulphur.....%	....	....	....	....	....	....	....	....	....	....	....
Nitrogen.....%	....	....	....	....	....	....	....	....	....	....	....
Oxygen.....%	....	....	....	....	....	....	....	....	....	....	....
Calorific value:—											
Calories per gram, gross.....	....	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross.....	....	....	....	....	....	....	....	....	....	....	....
Fuel ratio.....	3·15			3·90			3·60			4·15	
Carbon-hydrogen ratio.....	18·3	18·3	18·5	18·7	18·7	19·2	18·6	18·6	18·9	....	....
Coking properties.....	Very swollen, rather friable coke			Small lump of fair coke			Good coke			Non-coking	
Hoffmann potash test.....	....			....			....			....	
Location in mine.....	No. 2 north seam.			No. 4 south seam.			.....			.....	
Kind of sample.....	Mine.....			Mine.....			Commercial.....			Prospect.	
Quality of coal.....	.....			.....			Coal from tipple..			.....	
Taken by.....	Fire ranger, Board of Railway Commissioners.			Fire ranger.....			Fire ranger.....			John MacVicar, Geological Survey, Ottawa.	
Date of sampling.....	November, 1917..			November, 1917..			November, 1917..			Summer of 1916.	
Remarks.....	.....			.....			.....			.....	

ALBERTA COAL FIELDS

—	Pincher Creek Area	High River Area					
Description	The Breckenridge & Lund Coal Co., Ltd., Lundbreck Sec. 26, Tp. 7, R. 2.	From H. A. Ford's holdings, Cat creek, Highwood valley Tp. 17, R. 6 W. 5 Mer.					
Sample No.	M 47	1606	1607	1608	1609	1610	1611
Moisture condition (see note p. 2)	R AD D	R D	R D	R D	R D	R D	R D
Loss on air-drying, %	1·2	....	....	....	....	....	....
Results obtained by	Calc Calc Anal.	Anal. Calc.	Anal. Calc.	Anal. Calc.	Anal. Calc.	Anal. Calc.	Anal. Calc.
Proximate analysis:— Moisture, %	4·9 3·8	0·6	0·9	0·5	0·6	0·6	0·7 ....
Ash, %	28·2 28·6 29·7	23·6 23·7	8·1 8·2	8·7 8·7	7·6 7·6	23·9 24·0	6·8 6·9
Volatile matter, %	28·6 28·9 30·1	14·3 14·4	16·0 16·1	15·1 15·2	16·0 16·1	16·2 16·3	18·8 18·9
Fixed carbon, %	38·3 38·7 40·2	61·5 61·9	75·0 75·7	75·7 76·1	75·8 76·3	59·3 59·7	73·7 74·2
Ultimate analysis:— Carbon, %	52·1 52·7 54·8	....	....	....	....	....	....
Hydrogen, %	4·4 4·3 4·1	....	....	....	....	....	....
Ash, %	28·2 28·6 29·7	....	....	....	....	....	....
Sulphur, %	1·2 1·2 1·2	0·6 0·6	0·6 0·6	0·5 0·5	0·5 0·5	0·3 0·3	0·7 0·7
Nitrogen, %	1·4 1·4 1·5	....	....	....	....	....	....
Oxygen, %	12·7 11·8 8·7	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	5180 5240 5450	6450 6490	7840 7910	7860 7900	7940 7990	6320 6350	7980 8040
B. Th. U. per lb., gross	9330 9440 9810	11620 11690	14110 14230	14150 14210	14300 14380	11370 11440	14370 14470
Fuel ratio	1·35	4·30	4·70	5·00	4·75	3·65	3·95
Carbon-hydrogen ratio	11·8 12·1 13·4	....	....	....	....	....	....
Coking properties	....	Poor coke	Agglomerates	Fair coke	Agglomerates	Poor coke	Good coke, not much swollen.
Location in mine	.....	Across supper 7 ft. of 14-ft. seam.	.....	17-ft. seam.	Bottom 22-ft. coal, underlying 2 ft. shale, and top 16 ft. coal.	10-ft. seam.	7-ft. seam.
Kind of sample	Commercial—2 tons.	All prospect					
Quality of coal	Run-of-mine						
Taken by	T. Denis, Mines Branch.	B. Rose, Geological Survey					
Date of sampling	July 21, 1908	Summer of 1919					
Remarks	.....	Samples numbered from east to west along Cat creek					

ALBERTA COAL FIELDS

Saunders Creek Area

Description	Sample said to be from 10-ft. seam near Saunders cache, close to survey line of C.N.R. west of Rocky Mountain House		Saunders Creek Coal Co., Ltd., Saunders Tp. 40, R. 12				
Sample No.	106		720			861	
Moisture condition (see note, p. 2)	R	D	R	AD	D	R	D
Loss on air-drying, %	....	....	2·5	....	....	....	....
Results obtained by	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—							
Moisture, %	7·1	....	10·8	8·4	....	4·8	....
Ash, %	6·7	7·2	6·4	6·6	7·2	6·3	6·7
Volatile matter, %	....	....	27·0	27·7	30·3	33·1	34·7
Fixed carbon, %	....	....	55·8	57·3	62·5	55·8	58·6
Ultimate analysis:—							
Carbon, %	68·2	73·4	65·7	67·4	73·7	70·4	74·0
Hydrogen, %	5·3	4·8	5·2	5·1	4·5	4·9	4·5
Ash, %	6·7	7·2	6·4	6·6	7·2	6·3	6·7
Sulphur, %	0·7	0·8	0·3	0·3	0·3	0·3	0·3
Nitrogen, %	....	....	1·0	1·0	1·1	1·2	1·2
Oxygen, %	....	....	21·4	19·6	13·2	16·9	13·3
Calorific value:—							
Calories per gram, gross	....	....	6190	6350	6940	6630	6960
B. Th. U. per lb., gross	....	....	11150	11430	12490	11930	12530
Fuel ratio	....	....		2·05		1·70	
Carbon-hydrogen ratio	12·9	15·3	12·6	13·4	16·4	14·6	16·4
Coking properties	....	....		Non-coking		Non-coking	
Hoffmann potash test	....	....		4		....	....
Location in mine			Lower seam			Lower seam, 650 ft from entry.	
Kind of sample			Mine			Mine.	
Quality of coal							
Taken by	Private individual		J. A. Richards, provincial mine inspector.			J. S. Stewart, Geological Survey.	
Date of sampling	1911		December 11, 1915			Summer of 1916.	
Remarks							

ALBERTA COAL FIELDS

Yellowhead Pass Area

Description	North American Collieries, Ltd., Edmonton Pacific Pass Colliery, Lovettville Sec. 3, Tp. 47, R. 19														
Sample No.	671		864		433			558			862				
Moisture condition (see note p. 2)	R	D	R	D	R	AD	D	R	AD	D	R	D			
Loss on air-drying, %	....	....	....	....	0·5	....	....	1·8	....	....	....	....			
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.			
Proximate analysis:—															
Moisture, %	6·5	....	8·1	....	4·9	4·4	....	9·2	7·5	....	4·4	....			
Ash, %	4·8	5·1	7·8	8·5	12·5	12·6	13·2	7·5	7·6	8·3	10·3	10·7			
Volatile matter, %	34·4	36·8	38·0	41·4	34·0	34·2	35·7	29·7	30·3	32·7	31·4	32·9			
Fixed carbon, %	54·3	58·1	46·1	50·1	48·6	48·8	51·1	53·6	54·6	59·0	53·9	56·4			
Ultimate analysis:—															
Carbon, %	....	....	59·4	64·6	65·5	65·8	68·9	66·4	67·6	73·1	67·3	70·4			
Hydrogen, %	....	....	4·2	3·6	4·7	4·6	4·3	5·4	5·3	4·8	4·5	4·2			
Ash, %	....	....	7·8	8·5	....	....	....	7·5	7·6	8·3	10·3	10·7			
Sulphur, %	....	....	0·2	0·2	....	....	....	0·2	0·2	0·2	0·1	0·1			
Nitrogen, %	....	....	0·9	1·0	....	....	....	1·0	1·0	1·1	1·0	1·1			
Oxygen, %	....	....	27·5	22·1	....	....	....	19·5	18·3	12·5	16·8	13·5			
Calorific value:—															
Calories per gram, gross	....	....	5330	5790	....	....	....	6260	6380	6900	6340	6620			
B. Th. U. per lb., gross	....	....	9590	10430	....	....	....	11280	11480	12420	11410	11930			
Fuel ratio	1·60		1·20		1·45			1·80			1·70				
Carbon-hydrogen ratio	....	....	14·2	18·2	14·0	14·2	15·9	12·4	12·9	15·3	14·9	16·6			
Coking properties	Non-coking		Non-coking		Non-coking			Non-coking			Non-coking				
Hoffmann potash test	....	....	....	....	6-7			4-3			....	....			
Location in mine	Val d'Orc seam.		Prospect seam practically at surface.		Silkstone or upper seam.			Silkstone or upper seam, No. 2 west level.			Silkstone or upper seam, 600 ft. from entry.				
Kind of sample	Mine		Mine		Mine			Mine			Mine				
Quality of coal	....		....		....			Clay and sulpbur bands omitted.			....				
Taken by	Fire ranger, Board of Railway Commissioners.		J. S. Stewart, Geological Survey.		Fire ranger			Provincial mine inspector at Edson.			J. S. Stewart.				
Date of sampling	November, 1915.		Summer of 1916.		November, 1914.			March 29, 1915.			1916.				
Remarks	Operated by Canadian Coal & Coke Co., Ltd., at time of sampling.														

ALBERTA COAL FIELDS

Yellowhead Pass Area

Description	North American Collieries, Ltd., Edmonton Pacific Pass Colliery, Lovettville Sec. 3, Tp. 47, R. 19							Brookdale Collieries Ltd., Lovettville Sec. 6, Tp. 47, R. 19			Blackstone Coal, Ltd., Lovettville Sec. 19, Tp. 47, R. 19		
Sample No.	432			863		1353		1712			1711		
Moisture condition (see note, p. 2)	R	AD	D	R	D	R	D	R	AD	D	R	AD	D
Loss on air-drying....%	0·8	....	....	....	....	....	....	0·0	....	....	0·0	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Anal.	Calc.	Anal.	Anal.	Calc.
Proximate analysis:— Moisture....%	5·5	4·8	....	4·4	....	7·7	....	8·9	8·9	....	5·7	5·7	....
Ash....%	9·3	9·4	9·9	16·1	16·9	17·3	18·7	11·5	11·5	12·7	24·4	24·4	25·8
Volatile matter....%	34·9	35·2	36·9	32·6	34·1	29·4	31·9	31·2	31·2	34·2	32·0	32·0	34·0
Fixed carbon....%	50·3	50·6	53·2	46·9	49·0	45·6	49·4	48·4	48·4	53·1	37·9	37·9	40·2
Ultimate analysis:— Carbon....%	68·1	68·6	72·1	62·9	65·7	....	....	63·0	63·0	69·1	52·1	52·1	55·2
Hydrogen....%	4·8	4·7	4·4	4·5	4·2	....	....	4·9	4·9	4·3	4·0	4·0	3·6
Ash....%	9·3	9·4	9·9	16·1	16·9	....	....	11·5	11·5	12·7	24·4	24·4	25·8
Sulphur....%	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2
Nitrogen....%	....	....	....	0·9	1·0	....	....	0·9	0·9	0·9	0·7	0·7	0·7
Oxygen....%	....	....	....	15·4	12·0	.....		19·5	19·5	12·8	18·6	18·6	14·5
Calorific value:— Calories per gram, gross...	6470	6520	6850	5920	6180	5640	6100	5980	5980	6570	4780	4780	5070
B. Th. U. per lb., gross....	11650	11740	12330	10650	11130	10150	10990	10770	10770	11820	8600	8600	9120
Fuel ratio	1·45			1·45		1·55		1·55			1·20		
Carbon-hydrogen ratio	14·3	14·5	16·4	14·1	15·8	....	....	12·9	12·9	16·2	13·0	13·0	15·5
Coking properties	Barely agglomerates			Non-coking		Non-coking		Non-coking			Shows tendency to agglomerate		
Hoffmann potash test	6–7			....		....		....			....		
Location in mine	Myaheer or lower seam.			Mynheer or lower seam, 900 ft. from entry.		.....		.....			.....		
Kind of sample	Mine.			Mine.		Commercial		Mine.			Mine.		
Quality of coal	.....			.....		.....		.....			.....		
Taken by	Fire ranger, Board of Railway Commissioners.			J. S. Stewart Geological Survey.		.....		Fire ranger.			Fire ranger.		
Date of sampling	November, 1914.			Summer of 1916.		Summer of 1918.		June, 1920.			June, 1920.		
Remarks	Operated by Canadian Coal & Coke Co. Ltd., at time of sampling.			From G.T.P. fuel agent.		.....		.....			.....		

ALBERTA COAL FIELDS

Yellowhead Pass Area

Description	Oliphant Collieries, Ltd., Coalspur No. 2, Rocky Hard mine, Basing Sec. 35, Tp. 47, R. 20								
Sample No.	1834			1502			1577		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	0·8	....	....	0·4	....	....	0·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture....%	7·0	6·3	....	7·3	6·9	....	6·1	5·9	....
Ash....%	17·1	17·3	18·4	8·9	8·9	9·6	14·4	14·4	15·3
Volatile matter....%	32·1	32·3	34·5	....	....	....	30·9	31·0	33·0
Fixed carbon....%	43·8	44·1	47·1	....	....	....	48·6	48·7	51·7
Ultimate analysis:—									
Carbon....%	58·8	59·2	63·2	66·5	66·8	71·8	62·6	62·7	66·7
Hydrogen....%	4·7	4·6	4·2	4·8	4·7	4·3	4·3	4·3	3·8
Ash....%	17·1	17·3	18·4	8·9	8·9	9·6	14·4	14·4	15·3
Sulphur....%	0·3	0·3	0·4	....	....	....	....	....	....
Nitrogen....%	0·8	0·8	0·8	....	....	....	....	....	....
Oxygen....%	18·3	17·8	13·0	....	....	....	....	....	....
Calorific value:—									
Calories per gram, gross	5520	5560	5940	....	....	....	....	....	....
B. Th. U. per lb., gross	9940	10010	10660	....	....	....	....	....	....
Fuel ratio		1·30		....	....	....		1·55	
Carbon-hydrogen ratio	12·6	12·8	15·1	14·0	14·1	16·9	14·6	14·7	17·4
Coking properties	Non-coking			....	....	....	Barely agglomerates.		
Location in mine									
Kind of sample	Mine								
Quality of coal									
Taken by	Fire ranger, Board of Railway Commissioners.			Fire ranger			Fire ranger.		
Date of sampling	Summer of 1921			March, 1919			September, 1919.		
Remarks									

ALBERTA COAL FIELDS

Yellowhead Pass Area

Description	The Oliphant Collieries, Ltd., Coalspur Sec. 23, Tp. 48, R. 25													
Sample No.	927			928			877		937		878		938	
Moisture condition (see note, p. 2.)	R	AD	D	R	AD	D	R	D	R	D	R	D	R	D
Loss on air-drying....%	0·1	....	....	0·7	....	....	....	....	....	....	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture.....%	3·4	3·3	....	4·1	3·4	....	6·1	...	3·5	....	5·4	...	3·2	....
Ash.....%	7·9	8·0	8·2	8·0	8·1	8·4	6·6	7·0	12·0	12·5	6·2	6·5	8·7	9·0
Volatile matter..%	....	....	....	....	....	....	35·1	37·4	36·4	37·7	36·2	38·3	37·1	38·3
Fixed carbon.....%	....	....	....	....	....	....	52·2	55·6	48·1	49·8	52·2	55·2	51·0	52·7
Ultimate analysis:— Carbon.....%	70·3	70·4	72·3	68·3	69·3	71·8	....	....	....	....	....	....	....	....
Hydrogen.....%	4·9	4·9	4·6	5·0	4·9	4·7	....	....	....	....	....	....	....	....
Ash.....%	7·9	8·0	8·2	8·0	8·1	8·4	....	....	....	....	....	....	....	....
Sulphur.....%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Nitrogen.....%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Oxygen.....%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Fuel ratio.....	....	....	....	....	....	....	1·50		1·30		1·45		1·40	
Carbon-hydrogen ratio..	14·4	14·5	15·7	13·8	14·0	15·2	....	....	....	....	....	....	....	....
Coking properties.....	....	....	....	....	....	....	Non-coking		Non-coking		Non-coking		Non-coking	
Hoffmann potash test...	....	....	....	....	....	....	4		4–5		4		5–4	
Location in mine.....	.....			.....			No. 1 seam.		No. 1 seam, 350 ft. from entry.		No. 2 seam.		No. 2 seam, 650 ft. from entry.	
Kind of sample.....	Commercial.....			Commercial.....			Mine.....		Mine.....		Mine.....		Mine.	
Quality of coal.....	.....			.....			.....		.....		.....		.....	
Taken by.....	Fire Ranger, Board of Railway Commissioners.						Fire ranger.		Fire ranger.		Fire ranger.		Fire ranger.	
Date of sampling.....	January, 1917.....			January, 1917.....			Oct., 1916...		1917.....		Oct., 1916...		1917.	
Remarks.....	.....			.....			.....		.....		.....		.....	

ALBERTA COAL FIELDS

Yellowhead Pass Area

Description	Yellowhead Coal Co., Ltd., Coalspur Sec. 6, Tp. 48, R. 21											
Sample No.	314			315			316			431		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	2·4	....	....	1·1	....	....	2·2	....	....	1·1	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	6·6	4·2	....	4·9	3·9	....	6·0	3·8	....	5·1	4·0	....
Ash....%	9·9	10·2	10·6	12·7	12·8	13·3	12·2	12·5	13·0	8·2	8·3	8·7
Volatile matter....%	36·1	37·0	38·6	36·7	37·1	38·6	35·4	36·3	37·7	37·3	37·8	39·3
Fixed carbon....%	47·4	48·6	50·8	45·7	46·2	48·1	46·4	47·4	49·3	49·4	49·9	52·0
Ultimate analysis:— Carbon....%	65·0	66·7	69·6	64·7	65·4	68·1	64·3	65·7	68·3	68·4	69·2	72·1
Hydrogen....%	4·8	4·6	4·3	5·1	5·0	4·8	4·9	4·8	4·6	4·9	4·8	4·5
Ash....%	9·9	10·2	10·6	12·7	12·8	13·3	12·2	12·5	13·0	8·2	8·3	8·7
Sulphur....%	0·2	0·2	0·2	0·1	0·1	0·1	0·1	0·1	0·1	0·2	0·2	0·2
Nitrogen....%	....	....	....	....	....	....	....	....	....	....	....	....
Oxygen....%	....	....	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross..	6260	6420	6700	6230	6300	6560	6170	6310	6560	6470	6550	6820
B. Th. U. per lb., gross..	11270	11550	12060	11220	11340	11800	11110	11360	11800	11650	11790	12280
Fuel ratio	1·30			1·25			1·30			1·30		
Carbon-hydrogen ratio	13·6	14·5	16·0	12·7	13·1	14·2	13·1	13·7	14·9	14·0	14·4	15·9
Coking properties	Barely agglomerates			Barely agglomerates			Barely agglomerates			Barely agglomerates		
Hoffmann potash test	4–5			4–5			4–5			4–5		
Location in mine	....			....			....			....		
Kind of sample	Mine.			Mine.			Mine.			Mine.		
Quality of coal	....			....			....			....		
Taken by	Fire ranger, Board of Railway Commissioners.									Fire ranger.		
Date of sampling	December, 1913.			December, 1913.			December, 1913.			November, 1914.		
Remarks	....			Sample received in a broken bottle, and therefore partially dried.			....			....		

ALBERTA COAL FIELDS

Yellowhead Pass Area

Description	Yellowhead Coal Co., Ltd., Coalspur Sec. 6, Tp. 48, R. 21					Yellowhead Coal Co., Ltd., No. 5 mine, Coalspur Sec. 6, Tp. 48, R. 21					
Sample No	489			865		985			986		
Moisture condition (see note p. 2)	R	AD	D	R	D	R	AD	D	R	AD	D
Loss on air-drying %	2·2	....	....	....	....	0·3	....	....	0·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture %	5·9	3·8	....	3·7	....	4·8	4·5	....	5·5	5·0	....
Ash %	10·9	11·1	11·6	11·4	11·9	9·6	9·6	10·1	8·0	8·1	8·5
Volatile matter %	35·2	36·0	37·4	33·2	34·5	36·8	37·0	38·7	34·7	34·9	36·7
Fixed carbon %	48·0	49·1	51·0	51·7	53·6	48·8	48·9	51·2	51·8	52·0	54·8
Ultimate analysis:—											
Carbon %	64·5	65·9	68·5	67·8	70·4	66·9	67·2	70·3	67·9	68·3	71·9
Hydrogen %	4·7	4·5	4·3	4·4	4·2	4·8	4·8	4·5	4·8	4·8	4·4
Ash %	10·9	11·1	11·6	11·4	11·9	9·6	9·6	10·1	8·0	8·1	8·5
Sulphur %	0·2	0·2	0·2	0·2	0·2	....	....	....	....	....	....
Nitrogen %	0·7	0·7	0·7	0·9	0·9	....	....	....	....	....	....
Oxygen %	19·0	17·6	14·7	15·3	12·4	....	....	....	....	....	....
Calorific value:—											
Calories per gram, gross	6070	6210	6460	6330	6570	....	....	....	....	....	....
B. Th. U. per lb., gross	10930	11180	11620	11400	11830	....	....	....	....	....	....
Fuel ratio	1·35			1·55		1·30			1·50		
Carbon-hydrogen ratio	13·7	14·5	16·1	15·4	16·9	14·0	14·1	15·8	14·1	14·3	16·2
Coking properties	Slight tendency to agglomerate			Non-coking		Non-coking			Non-coking		
Hoffmann potash test	....			....		4–5			5–4		
Location in mine	....			Prospect seam near surface.		No. 1 seam, 500 ft. from entry.			No. 2 seam, 500 ft. from entry.		
Kind of sample	Commercial — 30 tons.			Mine		Mine			Mine		
Quality of coal	Screened coal			....		....			....		
Taken by	Provincial mine inspector.			J. S. Stewart, Geological Survey.		Fire ranger, Board of Railway Commissioners.					
Date of sampling	Feb., 1914, Lab. sample Feb. 2, 1915.			Summer of 1916.		1917			1917.		
Remarks	....			....		....			....		

ALBERTA COAL FIELDS

Lethbridge-McGrath Area

Description	North American Collieries, Ltd., Edmonton Lethbridge Mine, Coalhurst Sec. 21, Tp. 9, R. 22						C. P. Ry., Nat. Resources Dept., Calgary					
							Galt No. 3 mine, Lethbridge. Sec. 6, Tp. 9, R. 21			Galt No. 6 mine, Lethbridge. Sec. 18, Tp. 9, R. 21		
Sample No.	321			722			M 44			306		
Moisture condition (see note p. 2).	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying.....%	0·1	....	....	1·5	....	....	0·5	....	....	1·0	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture.....%	8·9	8·8	....	10·7	9·3	....	8·4	7·9	....	9·8	8·9	....
Ash.....%	9·7	9·7	10·7	13·1	13·3	14·7	10·1	10·1	11·0	9·6	9·7	10·7
Volatile matter.....%	33·6	33·6	36·8	27·4	27·8	30·7	34·3	34·5	37·5	33·4	33·7	37·0
Fixed carbon.....%	47·8	47·9	52·5	48·8	49·6	54·6	47·2	47·5	51·5	47·2	47·7	52·3
Ultimate analysis:—												
Carbon.....%	63·3	63·4	69·5	58·1	59·0	65·0	60·9	61·3	66·5	62·9	63·5	69·7
Hydrogen.....%	5·4	5·4	4·8	5·2	5·1	4·5	5·4	5·4	4·9	5·5	5·5	4·9
Ash.....%	9·7	9·7	10·7	13·1	13·3	14·7	10·1	10·1	11·0	9·6	9·7	10·7
Sulphur.....%	0·6	0·6	0·6	0·5	0·5	0·6	0·7	0·7	0·8	0·5	0·5	0·6
Nitrogen.....%	1·6	1·6	1·8	1·4	1·4	1·6	1·6	1·6	1·7	1·5	1·5	1·7
Oxygen.....%	19·4	19·3	12·6	21·7	20·7	13·6	21·3	20·9	15·1	20·0	19·3	12·4
Calorific value:—												
Calories per gram, gross.....	6050	6060	6640	5520	5610	6180	5960	6000	6510	6040	6100	6700
B. Th. U. per lb., gross.....	10890	10900	11950	9940	10090	11130	10730	10790	11710	10880	10980	12030
Fuel ratio.....	1·40			1·80			1·35			1·40		
Carbon-hydrogen ratio.....	11·7	11·8	14·4	11·1	11·5	14·4	11·2	11·3	13·5	11·4	11·6	14·2
Coking properties.....	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test.....	3			3–2			....			3–2		
Location in mine.....	No. 1 seam.....			No. 1 seam, south-west section.			.....			.....		
Kind of sample.....	Mine.....			Mine.....			Commercial—3 tons			Mine.		
Quality of coal.....	.....			.....			Over ¾-inch screen and picking table.			.....		
Taken by.....	S. A. Jones, provincial mine inspector.			W. Shaw, provincial mine inspector.			T. Denis, Mines Branch.			A. N. Scott and S. A. Jones, provincial mine inspectors.		
Date of sampling.....	January, 1914.....			December 22, 1915			July 22, 1908.....			December, 1913.		
Remarks.....	Operated by the Canadian Coal & Coke Co., Ltd., at time of sampling.						Operated by Alberta Railway & Irrigation Co., at time of sampling.			.....		

ALBERTA COAL FIELDS

Description	Lethbridge-McGrath Area — Chinook Coal Co., Ltd., Commerce, Sec. 12, Tp. 10, R. 22									Carmangay (Aldersyde) Area — Ellis Bros. No. 1 mine, Champion, Sec. 8, Tp. 16, R. 23		
Sample No	304			697			721			717		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying, %	0·0	....	....	3·3	....	....	0·8	....	....	2·9	....	....
Results obtained by	Anal.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture, %	9·6	9·6	....	9·4	6·3	....	8·7	8·0	....	12·8	10·2	....
Ash, %	9·8	9·8	19·8	14·9	15·4	16·4	11·2	11·3	12·2	6·8	7·0	7·8
Volatile matter, %	32·8	32·8	36·3	30·9	32·0	34·1	28·0	28·2	30·7	31·7	32·7	36·4
Fixed carbon, %	47·8	47·8	52·9	44·8	46·3	49·5	52·1	52·5	57·1	48·7	50·1	55·8
Ultimate analysis:—												
Carbon, %	62·7	62·7	69·3	57·8	59·8	63·8	62·1	62·5	68·0	60·7	62·5	69·6
Hydrogen, %	5·3	5·3	4·6	5·2	5·0	4·5	5·3	5·3	4·7	5·5	5·4	4·7
Ash, %	9·8	9·8	10·8	14·9	15·4	16·4	11·2	11·3	12·2	6·8	7·0	7·8
Sulphur, %	0·5	0·5	0·5	0·7	0·7	0·8	0·6	0·6	0·7	0·5	0·5	0·6
Nitrogen, %	1·5	1·5	1·7	1·4	1·4	1·6	1·6	1·6	1·8	1·2	1·2	1·4
Oxygen, %	20·2	20·2	13·1	20·0	17·7	12·9	19·2	18·7	12·6	25·3	23·4	15·9
Calorific value:—												
Calories per gram, gross	5910	5910	6540	5590	5780	6170	5950	5990	6520	5750	5920	6600
B. Th. U. per lb., gross	10640	10640	11760	10060	10400	11100	10710	10790	11730	10350	10660	11870
Fuel ratio		1·45			1·45			1·85			1·55	
Carbon-hydrogen ratio	11·9	11·9	15·0	11·2	12·1	14·1	11·7	11·9	14·4	11·0	11·7	14·9
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test	2-3			....			3			2		
Location in mine	No. 1 seam			No. 1 seam			No. 1 seam, south-west main entry			No. 1 seam, main entry.		
Kind of sample	Mine			Commercial — 20 tons.			Mine			Mine.		
Quality of coal	....			Lump			....			Inferior coal not taken.		
Taken by	S. A. Jones, provincial mine inspector.			F. Aspinall, provincial mine inspector.			W. Shaw, provincial mine inspector.			J. A. Richards, provincial mine inspector.		
Date of sampling	November, 1913.			October, 1915. Lab. sample Mar. 6, 1916.			Dec. 21, 1915			November 4, 1915.		
Remarks	....			....			....			....		

ALBERTA COAL FIELDS

Drumheller Area

Description	Rosedale Coal Co., Ltd., Rosedale Sec. 28, Tp. 28, R. 19											
Sample No	259		348			665			691			
Moisture condition (see note p. 2).	R	D	R	AD	D	R	AD	D	R	AD	D	
Loss on air-drying....%	....	....	7·2	....	....	5·1	....	....	4·7	....	....	
Results obtained by	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	
Proximate analysis:— Moisture....%	16·5	....	15·3	8·8	....	18·3	13·9	....	18·8	14·8	....	
Ash....%	6·5	7·8	7·6	8·2	9·0	4·9	5·1	6·0	7·9	8·3	9·3	
Volatile matter....%	33·6	40·2	32·1	34·6	37·9	32·1	33·8	39·3	28·4	20·8	34·9	
Fixed carbon....%	43·4	52·0	45·0	48·4	53·1	44·7	47·2	54·7	44·9	47·1	55·3	
Ultimate analysis:— Carbon....%	57·3	68·6	56·9	61·2	67·2	57·9	61·0	70·9	54·7	57·4	67·4	
Hydrogen....%	5·8	4·7	5·6	5·2	4·6	5·7	5·4	4·5	5·6	5·3	4·3	
Ash....%	6·5	7·8	7·6	8·2	9·0	4·9	5·1	6·0	7·9	8·3	9·8	
Sulphur....%	0·4	0·5	0·6	0·6	0·6	0·4	0·5	0·5	0·5	0·5	0·5	
Nitrogen....%	1·3	1·6	....	....	....	1·3	1·4	1·6	1·4	1·5	1·7	
Oxygen....%	28·7	16·8	....	....	....	29·8	26·6	16·5	29·9	27·0	16·3	
Calorific value:— Calories per gram, gross	5360	6420	5340	5750	6300	5570	5870	6820	5200	5460	6410	
B. Th. U. per lb., gross	9650	11560	9600	10350	11340	10030	10570	12270	9370	9830	11540	
Fuel ratio	1·30		1·40			1·40			1·60			
Carbon-hydrogen ratio	9·9	14·6	10·2	11·9	14·7	10·1	11·3	15·7	9·8	10·8	15·6	
Coking properties	Non-coking		Non-coking			Non-coking			Non-coking			
Hoffmann potash test	....		....			....			....			
Location in mine	.....		.....			No. 2 seam			No. 2 seam.			
Kind of sample	Commercial—15 tons.		Commercial—15 tons.			Mine			Commercial—30 tons.			
Quality of coal	.....		.....			Run-of-mine			Run-of-mine.			
Taken by	Provincial mine inspector.		Provincial mine inspector.			F. Aspinall, provincial mine inspector.			Provincial mine inspector.			
Date of sampling	1913		1913			October, 22, 1915			October, 1915.			
Remarks	Lab. sample July 10, 1913. Both lab. samples taken from same commercial sample.		Lab. sample March 18, 1914.			.....			Lab. sample Feb. 7, 1916.			

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ALBERTA COAL FIELDS

Drumheller Area

Description	Elgin Coal Co., Ltd., Drumheller Sec. 2, Tp. 29, R. 20			The Drumheller Land Co., Ltd., Drumheller Sec. 2, Tp. 29, R. 20					
Sample No.	1805			319			473		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying, %	1·3	....	....	3·2	....	....	8·7	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture, %	18·5	17·4	....	19·2	16·5	....	18·9	11·2	....
Ash, %	3·7	3·8	4·6	6·4	6·6	7·9	14·8	16·2	18·3
Volatile matter, %	31·0	31·4	38·0	30·3	31·3	37·5	28·3	31·0	34·9
Fixed carbon, %	46·8	47·4	57·4	44·1	45·6	54·6	38·0	41·6	46·8
Ultimate analysis:—									
Carbon, %	....	....	....	56·4	58·3	69·8	49·2	53·8	60·6
Hydrogen, %	....	....	....	5·8	5·6	4·5	5·5	4·9	4·1
Ash, %	....	....	....	6·4	6·6	7·9	14·8	16·2	18·3
Sulphur, %	0·4	0·4	0·5	0·4	0·4	0·5	0·4	0·4	0·5
Nitrogen, %	....	....	....	1·2	1·3	1·5	1·0	1·1	1·3
Oxygen, %	....	....	....	29·8	27·8	15·8	29·1	23·6	15·2
Calorific value:—									
Calories per gram, gross	5600	5630	6370	5240	5410	6490	4630	5070	5710
B. Th. U. per lb., gross	10090	10220	12370	9440	9750	11680	8330	9120	10270
Fuel ratio		1·50			1·45			1·35	
Carbon-hydrogen ratio	....	....	....	9·8	10·5	15·6	9·0	11·0	14·7
Coking properties	Non-coking			Non-coking			Non-coking		
Location in mine	....			Lower seam			....		
Kind of sample	....			Mine			Commercial—car load.		
Quality of coal	....			....			Slack.		
Taken by	Mine authorities			J. T. Stirling, provincial chief mine inspector.			F. Aspinall, provincial mine inspector.		
Date of sampling	Summer of 1921			November, 1913			May, 1914. Lab. sample, Jan. 7, 1915.		
Remarks	....			....			....		

ALBERTA COAL FIELDS

Drumheller Area

Description	The Drumheller Land Co., Ltd., Drumheller Sec. 2, Tp. 29, R. 20									Alberta Block Coal Co., Ltd., Drumheller Sec. 3, Tp. 29, R. 20		
Sample No.	1770			1771			1772			531		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying, %	6·5	....	....	8·2	....	....	8·2	....	....	5·6	....	....
Results obtainsd by	Calc.	Anal.	Calo.	Calc.	Anal.	Calo.	Calc.	Anal.	Calc.	Calc.	Anal.	Calo.
Proximate analysis:— Moisture, %	14·2	8·1	....	18·7	11·4	....	18·1	10·8	....	16·5	11·6	....
Ash, %	8·3	8·9	9·7	6·0	6·6	7·4	6·2	6·7	7·5	2·9	3·1	3·5
Volatile matter, %	31·4	33·6	36·6	29·6	32·2	36·3	29·3	31·9	35·8	33·2	35·1	39·7
Fixed carbon, %	46·1	49·4	53·7	45·7	49·8	56·3	46·4	50·6	56·7	47·4	50·2	56·8
Ultimate analysis:— Carbon, %	....	....	....	....	....	....	....	....	....	....	....	....
Hydrogen, %	....	....	....	....	....	....	....	....	....	....	....	....
Ash, %	....	....	....	....	....	....	....	.....		....	....	....
Sulphur, %	0·4	0·4	0·4	0·5	0·5	0·5	0·4	0·4	0·5	....	....	....
Nitrogen, %	....	....	....	....	....	....	....	....	....	....	....	....
Oxygen, %	....	....	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	5690	6000	9530	5390	5870	6630	5380	5860	6570	....	....	....
B. Th. U. per lb., gross	10090	10800	11750	9700	10570	11930	9680	10540	11820	....	....	....
Fuel ratio	1·45			1·55			1·60			1·45		
Carbon-hydrogen ratio	....			....			....			....		
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Location in mine	From lower 6 ft. seam. Face of main entry No. 1, 1,000 ft. from bottom of hoisting slope.			Face of No. 3 room off No. 1 main entry, 960 ft. from bottom of hoisting slope.			Face of No. 2 entry, 1050 ft. from bottom of hoisting slope.			.....		
Kind of sample	Mine			Mine			Mine			.....		
Quality of coal	.....			.....			.....			.....		
Taken by	Duncan McDonnld, provincial mine inspector									Mine authorities.		
Date of sampling	February 9, 1921									January, 1915.		
Remarks	.....									.....		

ALBERTA COAL FIELDS

Drumheller Area

Description	Newcastle Coal Co. Ltd., Drumheller Sec. 9, Tp. 29, R. 20			Midland Collieries, Ltd., Drumheller Sec. 9, Tp. 29, R. 20						Hy-Grade Coal Co. Drumheller Sec. 11, Tp. 29, R. 20		
Sample No.	491			650			881			1600		
Moisture condition (see note p. 2).	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	5·9	....	....	5·8	....	....	4·3	....	....	3·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	10·5	11·4	....	18·6	13·7	....	16·2	12·5	....	10·2	10·5	....
Ash....%	7·6	8·1	9·1	5·8	6·1	7·1	7·9	8·2	9·4	4·3	4·5	5·4
Volatile matter....%	32·1	34·1	38·5	30·1	32·0	37·0	30·3	31·6	36·1	29·8	30·8	36·8
Fixed carbon....%	43·8	46·4	52·4	45·5	48·2	55·9	45·6	47·7	54·5	46·7	48·2	57·8
Ultimate analysis:— Carbon....%	56·3	59·8	67·5	57·3	60·8	70·4	57·3	59·9	68·4	58·5	60·5	72·4
Hydrogen....%	5·0	5·2	4·5	5·7	5·4	4·4	5·5	5·2	4·4	5·7	5·5	4·4
Ash....%	7·6	8·1	9·1	5·8	6·1	7·1	7·9	8·2	9·4	4·3	4·5	5·4
Sulphur....%	0·4	0·4	0·5	0·4	0·4	0·4	0·4	0·5	0·5	0·4	0·4	0·5
Nitrogen....%	1·2	1·2	1·4	1·2	1·3	1·5	1·3	1·3	1·5	1·2	1·2	1·5
Oxygen....%	28·9	25·3	17·0	29·6	26·0	16·2	27·6	24·9	15·8	29·9	27·9	15·8
Calorific value:— Calories per gram, gross..	5330	5660	6390	5490	5830	6750	5380	5620	6420	5510	5700	6330
B. Th. U. per lb. gross...	9590	10190	11500	9890	10490	12150	9680	10120	11560	9920	10260	12290
Fuel ratio	1·35			1·50			1·50			1·55		
Carbon-hydrogen ratio	10·1	11·4	15·1	10·1	11·4	15·9	10·4	11·4	15·5	10·2	10·9	16·4
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test	....			....			....			2–1		
Location in mine	Newcastle seam			No. 3 seam			No. 4 seam			Newcastle seam. Face of No. 5 room off No. 2 east entry, 400 ft. from bottom of hoisting slope.		
Kind of sample	Commercial—20 tons.			Mine			Commercial—30 tons.			Mine.		
Quality of coal	Run-of-mine			Bone and clay left out to correspond with regular practice at mine.			Run-of-mine			....		
Taken by	F. Aspinall, provincial mine inspector			F. Aspinall			Provincial mine inspector.			Duncan McDonald, provincial mine inspector.		
Date of sampling	October 15, 1914. Lab. sample, Feb. 4, 1915.			October 21, 1915			Sept. 1915. Lab. sample, Nov. 17, 1916.			May 22, 1910.		
Remarks	....			....			....			....		

ALBERTA COAL FIELDS

Big Valley—Trochu—Three Hills—Carbon Area

Description	From holdings of R. J. Christy on Knee Hill creek Sec. 11, Tp. 29, R. 22			Chas. S. Wilson's mine, Twining Sec. 14, Tp. 31, R. 24			Geo. Watson's mine, Three Hills Sec. 22, Tp. 31, R. 24			Ellis Coal Co. Ltd., Three Hills Sec. 36, Tp. 31, R. 24		
Sample No.	1731			961			957			936		
Moisture condition (see note, p. 2).	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	6·1	....	....	0·9	....	....	2·3	....	....	3·3	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	15·1	9·6	....	15·1	14·3	....	15·7	13·8	....	17·3	14·5	....
Ash....%	11·2	11·9	13·1	8·3	8·4	9·8	5·9	6·1	7·0	7·9	8·2	9·5
Volatile matter....%	28·6	30·4	33·7	28·3	28·5	33·3	30·9	31·5	36·6	28·3	29·3	34·3
Fixed carbon....%	45·1	48·1	53·2	48·3	48·8	56·9	47·5	48·6	56·4	46·5	48·0	56·2
Ultimate analysis:— Carbon....%	....	....	....	58·0	58·5	68·3	59·6	60·9	70·7	57·1	59·0	69·0
Hydrogen....%	....	....	....	5·4	5·3	4·3	5·7	5·6	4·7	5·4	5·2	4·2
Ash....%	....	....	....	8·3	8·4	9·8	5·9	6·1	7·0	7·9	8·2	9·5
Sulphur....%	0·3	0·4	0·4	0·6	0·6	0·7	1·8	1·8	2·1	0·4	0·4	0·5
Nitrogen....%	....	....	....	0·9	0·9	1·1	1·0	1·0	1·2	0·9	0·9	1·1
Oxygen....%	....	....	....	26·8	26·3	15·8	26·0	24·6	14·3	28·3	26·3	15·7
Calorific value:— Calories per gram, gross..	5260	5600	6190	5440	5490	6410	5650	5780	6700	5340	5520	6460
B. Th. U. per lb., gross...	9470	10080	11150	9800	9890	11540	10170	10410	12070	9610	9940	11630
Fuel ratio	1·60			1·70			1·55			1·65		
Carbon-hydrogen ratio	....	....	....	10·8	11·0	15·7	10·5	11·0	15·2	10·5	11·3	16·4
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test	....			2			2			2		
Location in mine	No. 2, 6 ft. seam, 416 ft. below trail level.			No. 1 seam, 350 ft. in No. 1 entry.			No. 1 seam, 300 ft. in east entry.			No. 1 seam, west entry, 600 ft. from shaft bottom.		
Kind of sample	Prospect			Mine			Mine			Mine.		
Quality of coal	....			Run-of-mine			Run-of-mine			Run-of-mine.		
Taken by	R. J. Christy			Duncan McDonald, provincial mine inspector.								
Date of sampling	January 11, 1921			January 19, 1917			January 19, 1917			January 18, 1917.		
Remarks	Sample from drill-hole, sent in by Duncan McDonald, provincial mine inspector.			Sample received in broken bottle, and therefore partially dried.			....			....		

ALBERTA COAL FIELDS

Big Valley—Trochu—Three Hills—Carbon Area

Description	William Halbert's mine, Trochu Sec. 12, Tp. 33, R. 23			Halbert Bros.' (R. & D.) mine, Trochu Sec. 14, Tp. 33, R. 23			Ole Thompson's mine, Lousana Sec. 12, Tp. 36, R. 22						Calgary Collieries, Ltd., Ardley Sec. 29, Tp. 38, R. 23		
Sample No.....	984			983			807			971			814		
Moisture condition (see note, p. 2).	R	AD	D	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying.....%	2·4	....	....	2·6	....	....	2·9	....	....	3·0	....	....	2·0	....	....
Results obtained by.....	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis Moisture.....%	17·3	15·3	....	17·6	15·4	....	18·2	15·7	....	17·9	15·3	....	17·1	15·4	....
Ash.....%	8·4	8·6	10·1	8·3	8·5	10·1	7·8	8·0	9·5	15·6	16·1	19·0	8·4	8·6	10·1
Volatile matter.%	27·2	27·9	33·0	27·4	28·1	33·2	28·3	29·2	34·6	27·3	28·2	33·3	32·3	32·9	38·9
Fixed carbon..%	47·1	48·2	56·9	46·7	48·0	56·7	45·7	47·1	55·9	39·2	40·4	47·7	42·2	43·1	51·0
Ultimate analysis: Carbon.....%	57·0	58·4	68·9	56·7	58·2	68·8	55·4	57·0	67·7	49·9	51·5	60·8	55·9	57·0	67·4
Hydrogen.....%	5·4	5·2	4·1	5·4	5·2	4·1	5·3	5·2	4·0	5·3	5·2	4·0	5·6	5·5	4·5
Ash.....%	8·4	8·6	10·1	8·3	8·5	10·1	7·8	8·0	9·5	15·6	16·1	19·0	8·4	8·6	10·1
Sulphur.....%	0·3	0·3	0·4	0·4	0·4	0·5	0·2	0·2	0·3	0·4	0·4	0·5	0·4	0·4	0·4
Nitrogen.....%	0·9	0·9	1·1	0·9	1·0	1·1	0·9	0·9	1·1	0·9	0·9	1·1	1·0	1·1	1·3
Oxygen.....%	28·0	26·6	15·4	28·3	26·7	15·4	30·4	28·7	17·4	27·9	25·9	14·6	28·7	27·4	16·3
Calorific value:— Calories per gram, gross....	5320	5450	6430	5280	5420	6410	5120	5270	6260	4710	4850	5730	5290	5400	6380
B. Th. U. per lb. gross.....	9570	9810	11580	9500	9750	11530	9210	9490	11270	8470	8740	10320	9530	9720	11490
Fuel ratio.....	1·75			1·70			1·60			1·45			1·30		
Carbon-hydrogen ratio.....	10·6	11·2	16·6	10·6	11·2	16·8	10·4	11·0	16·8	9·4	10·0	15·0	9·9	10·3	15·0
Coking properties..	Non-coking			Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test.....	2—1			2—1			1			2—1			2		
Location in mine..	Jewel Mine. No. 1 seam, 120 ft. in No. 2 entry.			No. 1 seam, 130 ft. in No. 1 entry.			.....			250 ft. in main entry.			Red Deer seam.		
Kind of sample....	Mine.....			Mine.....			Mine.....			Mine.....			Mine.		
Quality of coal....	.....			.....			Run-of-mine.....			Run-of-mine.....			.....		
Taken by.....	Duncan McDonald, provincial mine inspector.....														
Date of sampling..	March 8, 1917.....			March 8, 1917.....			August 2, 1916.....			March 7, 1917.....			August 1, 1916.		
Remarks.....	.....			.....			.....			.....			.....		

ALBERTA COAL FIELDS

Pembina-Wabamun Area

Description	Security Coal Mines, Wabamun Sec. 14, Tp. 53, R. 4						Lakeside Coals, Ltd., Wabamun Sec. 9, Tp. 53, R. 4					
Sample No	193			194			872		875			
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	D	R	AD	D	
Loss on air-drying....%	2·5	....	....	1·0	....	....	....	....	5·4	....	....	
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	
Proximate analysis:—												
Moisture....%	18·9	16·8	....	14·6	13·8	....	6·7	....	24·1	19·7	....	
Ash....%	5·6	5·7	6·9	5·6	5·7	6·6	11·7	12·5	6·1	6·5	8·1	
Volatile matter....%	31·6	32·4	38·9	33·3	33·6	39·0	34·8	37·3	27·7	29·3	36·5	
Fixed carbon....%	43·9	45·1	54·2	46·5	46·9	54·4	46·8	50·2	42·1	44·5	55·4	
Ultimate analysis:—												
Carbon....%	54·7	56·0	67·4	58·3	58·9	68·3	58·9	63·1	52·0	55·0	68·5	
Hydrogen....%	5·3	5·2	4·0	5·1	5·1	4·1	4·4	3·9	5·8	5·5	4·0	
Ash....%	5·6	5·7	6·9	5·6	5·7	6·6	11·7	12·5	6·1	6·5	8·1	
Sulphur....%	0·2	0·2	0·3	0·2	0·2	0·2	0·1	0·1	0·1	0·1	0·2	
Nitrogen....%	0·7	0·7	0·8	0·7	0·7	0·9	0·7	0·8	0·7	0·7	0·9	
Oxygen....%	33·5	32·2	20·6	30·1	29·4	19·9	24·2	19·6	35·3	32·2	18·3	
Calorific value:—												
Calories per gram, gross	4960	5080	6110	5250	5300	6150	5360	5750	4690	4950	6170	
B. Th. U. per lb., gross	8930	9150	11000	9450	9550	11080	9650	10340	8440	8920	11110	
Fuel ratio	1·40			1·40			1·35		1·50			
Carbon-hydrogen ratio	10·3	10·8	17·0	11·4	11·6	16·7	13·4	16·2	9·1	10·1	17·0	
Coking properties	Non-coking			Non-coking			Non-coking		Non-coking			
Hoffmann potash test	....			....			....		1–2			
Location in mine	....			....			No. 1 or upper seam.		No. 1 or upper seam.			
Kind of sample	Mine.			Mine.			Mine.		Mine.			
Quality of coal	Average of mine.			Average of mine.			....		....			
Taken by	J. G. S. Hudson, Mines Branch, Ottawa.			J. G. S. Hudson.			J. S. Stewart, Geological Survey.		J. T. Stirling, provincial chief mine inspector.			
Date of sampling	August 22, 1912.			August 22, 1912.			Summer of 1916.		October 28, 1916.			
Remarks	....			....			Operated by Island Lake Coal Co at time of sampling.					

ALBERTA COAL FIELDS

Pembina Wabamun Area

Description	Gainford Collieries, Ltd., Gainford Sec. 14, Tp. 53, R. 6							
Sample No	186			187			260	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	D
Loss on air-drying, %	1·3	....	....	4·8	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—								
Moisture, %	9·9	8·7	....	19·9	15·8	....	17·0	....
Ash, %	6·0	6·1	6·7	5·8	6·1	7·3	8·4	10·1
Volatile matter, %	34·8	35·3	38·7	30·0	31·5	37·4	30·8	37·1
Fixed carbon, %	49·3	49·9	54·6	44·3	46·6	55·3	43·8	52·8
Ultimate analysis:—								
Carbon, %	60·9	61·7	67·6	54·9	57·6	68·4	53·8	64·8
Hydrogen, %	5·0	4·9	4·3	5·8	5·5	4·4	5·0	3·8
Ash, %	6·0	6·1	6·7	5·8	6·1	7·3	8·4	10·1
Sulphur, %	0·2	0·2	0·2	0·2	0·2	0·2	0·6	0·7
Nitrogen, %	0·9	0·9	1·0	0·7	0·7	0·9	1·6	1·9
Oxygen, %	27·0	26·2	20·2	32·6	20·9	18·8	30·6	18·7
Calorific value:—								
Calories per gram, gross	5680	5750	6300	5130	5390	6400	5020	6050
B. Th. U. per lb., gross	10220	10350	11340	9230	9700	11510	9040	10890
Fuel ratio		1·40			1·50		1·40	
Carbon-hydrogen ratio	12·2	12·5	15·6	9·5	10·5	15·5	10·8	17·1
Coking properties	Non-coking			Non-coking			Non-coking	
Hoffmann potash test		....			....			....
Location in mine								
Kind of sample	Mine			Mine			Commercial—carload.	
Quality of coal	Average of seam			Average of seam				
Taken by	J. G. S. Hudson, Mines Branch.			J. G. S. Hudson			Provincial mine inspector.	
Date of sampliag	August 10, 1912			August 10, 1912			Lab. sample July 9, 1913.	
Remarks								

ALBERTA COAL FIELDS

Pembina-Wabamun Area

Description	North American Collieries, Ltd., Edmonton Pembina Mine, Evanshurgh Sec. 30, Tp. 53, R. 7										
Sample No.	357			369			302			871	
Moisture condition (see note p. 2).	R	AD	D	R	AD	D	R	AD	D	R	D
Loss on air-drying.....%	6·2	....	....	4·1	....	....	3·3	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture.....%	17·0	11·5	....	18·2	14·7	....	18·9	16·1	....	5·7	....
Ash.....%	9·7	10·4	11·7	10·3	10·7	12·6	10·1	10·5	12·5	11·1	11·8
Volatile matter.....%	29·5	31·5	35·7	27·6	28·8	33·7	27·1	28·0	33·4	32·4	34·3
Fixed carbon.....%	43·8	46·6	52·6	43·9	45·8	53·7	43·9	45·4	54·1	50·8	53·9
Ultimate analysis:— Carbon.....%	54·4	58·0	65·6	53·9	56·2	65·9	55·1	57·0	67·9	61·9	65·7
Hydrogen.....%	5·7	5·4	4·6	5·5	5·3	4·3	5·5	5·3	4·1	4·3	3·9
Ash.....%	9·7	10·4	11·7	10·3	10·7	12·6	10·1	10·5	12·5	11·1	11·8
Sulphur.....%	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·2	0·2
Nitrogen.....%	....	....	....	....	....	....	0·7	0·8	0·9	1·0	1·0
Oxygen.....%	....	....	....	....	....	....	28·4	26·2	14·3	21·5	17·4
Calorific value:— Calories per gram, gross.....	4990	5320	6010	4960	5170	6060	4930	5100	6080	5720	6060
B. Th. U. per lb., gross.....	8980	9580	10830	8930	9310	10910	8870	9180	10940	10300	10920
Fuel ratio.....		1·50			1·60			1·60			1·55
Carbon-hydrogen ratio.....	9·5	10·8	14·3	9·7	10·6	15·4	10·1	10·8	16·4	14·4	16·9
Coking properties.....	Non-coking			Non-coking			Non-coking			Non-coking	
Hoffmann potash test.....	....			....			1			....	
Location in mine.....	.....			.....			Lower or No. 2 seam			Lower or No. 2 seam.	
Kind of sample.....	Commercial—30 tons.			Commercial—30 tons.			Mine.....			Mine.	
Quality of coal.....	.....			.....			.....			.....	
Taken by.....	Provincial mine inspector.			Provincial mine inspector.			J. T. Stirling, provincial chief mine inspector.			J. S. Stewart, Geological Survey.	
Date of sampling.....	March, 1914.....			March, 1914.....			November, 1913....			Summer of 1916	
Remarks.....	Lab. sample March 27, 1914. Both lab. samples taken from same commercial sample. Operated by Pembina Coal Co., Ltd., at time of sampling.			Lab. sample April 27, 1914.						Operated by Pembina Coal Operators, Ltd., at time of sampling.	

ALBERTA COAL FIELDS

Taber-Bow Island Area

Description	Canada West Coal Co., Ltd., Taber Sec. 31, Tp. 9, R. 16						
Sample No.	M 43			M EX 12	366		
Moisture condition (see note p. 2)	R	AD	D	D	R	AD	D
Loss on air-drying, %	1·5	....	....	....	0·8	....	....
Results obtained by	Calc.	Calc.	Anal.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—							
Moisture, %	13·0	11·7	....	....	13·0	12·2	....
Ash, %	12·3	12·4	14·1	23·6	10·8	10·9	12·4
Volatile matter, %	31·3	31·8	36·0	33·8	30·9	31·2	35·5
Fixed carbon, %	43·4	44·1	49·9	42·6	45·3	45·7	52·1
Ultimate analysis:—							
Carbon, %	56·1	56·9	64·5	....	58·9	59·4	67·7
Hydrogen, %	5·6	5·5	4·7	....	5·4	5·4	4·6
Ash, %	12·3	12·4	14·1	....	10·8	10·9	12·4
Sulphur, %	1·2	1·3	1·4	1·4	0·9	0·9	1·0
Nitrogen, %	1·3	1·4	1·6	....	1·4	1·4	1·6
Oxygen, %	23·5	22·5	13·7	....	22·6	22·0	12·7
Calorific value:—							
Calories per gram, gross	5330	5420	6130	5220	5460	5510	6280
B. Th. U. per lb., gross	9600	9750	11040	9400	9830	9920	11300
Fuel ratio		1·40		1·25		1·45	
Carbon-hydrogen ratio	10·1	10·4	13·6	....	10·8	11·0	14·8
Coking properties	Non-coking			....	Non-coking		
Hoffmann potash test		....		....		....	
Location in mine	....			....	....		
Kind of sample	Commercial—5 tons			Mine	Mine.		
Quality of coal	Over ¾-inch shaking screen.			Slack	....		
Taken by	T. Denis, Mines Branch.			T. Denis	S. A. Jones, provincial mine inspector.		
Date of sampling	July 23, 1908			July 23, 1908	April, 1914.		
Remarks	....			....	....		

ALBERTA COAL FIELDS

Taber-Bow Island Area

Description	Regal Coal Co., Ltd., Eureka mine, Taber Sec. 8, Tp. 10, R. 16			Superior Coal Co., Ltd., Taber Sec. 18, Tp. 10, R. 16			Rock Springs Coal & Brick Co., Ltd., Elcan Sec. 3, Tp. 10, R. 17		
Sample No.		406			408			407	
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying, %	1·2	....	....	2·6	....	....	0·5	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture, %	15·0	14·0	....	14·9	12·7	....	12·8	12·4	....
Ash, %	7·3	7·4	8·7	6·9	7·0	8·1	11·2	11·2	12·8
Volatile matter, %	31·4	31·8	36·9	31·8	32·6	37·3	30·0	30·2	34·4
Fixed carbon, %	46·3	46·8	54·4	46·4	47·7	54·6	46·0	46·2	52·8
Ultimate analysis:—									
Carbon, %	59·7	60·5	70·3	59·3	60·8	69·7	56·4	56·7	64·7
Hydrogen, %	5·8	5·8	4·9	6·0	5·8	5·1	5·4	5·4	4·6
Ash, %	7·3	7·4	8·7	6·9	7·0	8·1	11·2	11·2	12·8
Sulphur, %	1·2	1·2	1·4	1·3	1·3	1·5	1·1	1·1	1·2
Nitrogen, %	1·4	1·5	1·7	1·5	1·6	1·8	1·3	1·3	1·4
Oxygen, %	24·6	23·6	13·0	25·0	23·5	13·8	24·6	24·3	15·3
Calorific value:—									
Calories per gram, gross	5610	5680	6600	5580	5730	6560	5330	5350	6110
B. Th. U. per lb., gross	10100	10220	11880	10050	10320	11810	9580	9630	10990
Fuel ratio		1·45			1·45			1·55	
Carbon-hydrogen ratio	10·3	10·5	14·4	9·9	10·4	13·8	10·5	10·6	14·2
Coking properties		Non-coking			Non-coking			Non-coking	
Hoffmann potash test		1–2			....			1–2	
Location in mine	....								
Kind of sample	Mine samples								
Quality of coal	....								
Taken by	S. A. Jones, provincial mine inspector								
Date of sampling	October, 1914								
Remarks	....								

ALBERTA COAL FIELDS

Hanna Area

Description	Luck & Sinclair mine, Parr Sec. 18, Tp. 29, R. 14			W. J. Anderson's mine, Sheerness Sec. 12, Tp. 29, R. 13			Sam. Wadsworth's mine, Hanna Sec. 19, Tp. 29, R. 14		
Sample No.		916			944			820	
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying, %	3·3	....	....	6·1	....	....	4·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture, %	23·8	21·2	....	24·9	20·0	....	24·1	20·8	....
Ash, %	9·1	9·4	12·0	4·4	4·7	5·9	5·6	5·8	7·3
Volatile matter, %	28·3	29·2	37·1	27·5	29·3	36·6	29·7	31·0	39·2
Fixed carbon, %	38·8	40·2	50·9	43·2	46·0	57·5	40·6	42·4	53·5
Ultimate analysis:— Carbon, %	48·7	50·3	63·9	52·5	55·9	69·8	51·7	53·9	68·2
Hydrogen, %	5·9	5·7	4·2	6·0	5·7	4·3	6·0	5·8	4·3
Ash, %	9·1	9·4	12·0	4·4	4·7	5·9	5·6	5·8	7·3
Sulphur, %	0·4	0·5	0·6	0·3	0·3	0·4	0·4	0·4	0·5
Nitrogen, %	1·0	1·1	1·4	1·0	1·1	1·4	1·0	1·1	1·4
Oxygen, %	34·9	33·0	17·9	35·8	32·3	18·2	35·3	33·0	18·3
Calorific value:— Calories per gram, gross	4530	4690	5950	4870	5190	6490	4850	5060	6400
B. Th. U. per lb., gross	8160	8440	10710	8770	9340	11680	8730	9120	11510
Fuel ratio		1·35			1·55			1·35	
Carbon-hydrogen ratio	8·3	8·9	15·3	8·7	9·9	16·3	8·6	9·4	15·7
Coking properties	Non-coking			Non-coking			Non-coking		
Hoffmann potash test		1			1			1	
Location in mine	No. 1 seam, No. 1 south entry.			No. 1 seam, south entry, 200 ft. from slope bottom.			Black Diamond Mine. No. 1 seam, main entry.		
Kind of sample	Mine			Mine			Mine.		
Quality of coal	Run-of-mine								
Taken by	Duncan McDonald, provincial mine inspector								
Date of sampling	December 1, 1916			December 13, 1916			August 24, 1916.		
Remarks									

ALBERTA COAL FIELDS

Lacombe Area

Description	McCormack Mine Co., Castor Sec. 34, Tp. 37, R. 14					Coal said to be from Coalbeck Collieries, Castor					
Sample No.	876			992		323		324		325	
Moisture condition (see note p. 2).	R	AD	D	R	D	R	D	R	D	R	D
Loss on air-drying.....%	7·0	....	....	....	....	....	..	....	....	....	....
Results obtained by	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—											
Moisture.....%	28·1	22·7	....	14·5	....	15·5	....	18·8	....	17·5	....
Ash.....%	7·6	8·2	10·6	8·3	9·7	5·5	6·4	4·3	5·3	4·4	5·3
Volatile matter.....%	28·6	30·7	39·7	33·6	39·3	37·0	43·8	35·2	43·3	34·4	41·7
Fixed carbon.....%	35·7	38·4	49·7	43·6	51·0	42·0	49·8	41·7	51·4	43·7	53·0
Ultimate analysis:—											
Carbon.....%	46·0	49·4	63·9	....	....	....	....	....	....	....	....
Hydrogen.....%	6·1	5·7	4·1	....	....	....	....	....	....	....	....
Ash.....%	7·6	8·2	10·6	....	....	....	....	....	....	....	....
Sulphur.....%	0·4	0·5	0·6	....	....	....	....	....	....	....	....
Nitrogen.....%	0·9	1·0	1·3	....	....	....	....	....	....	....	....
Oxygen.....%	30·0	35·2	19·5	....	....	....	....	....	....	....	....
Calorific value:—											
Calories per gram, gross.....	4250	4570	5900	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross.....	7640	8220	10630	....	....	....	....	....	....	....	....
Fuel ratio.....	1·25			1·30		1·15		1·20		1·25	
Carbon-hydrogen ratio.....	7·5	8·6	15·4	....	....	....	....	....	....	....	....
Coking properties.....	Non-coking			Non-coking		....		....		....	
Hoffmann potash test.....	1			....		.. ..		....		....	
Location in mine.....	No. 1 seam, No. 2 south entry.			.....		No. 1 entry..		No. 4 entry..		No. 5 entry.	
Kind of sample.....	Mine.....			.....		.....		.....		.....	
Quality of coal.....	Run-of-mine.....			.....		.....		.....		.....	
Taken by.....	Duncan McDonald, provincial mine inspector.			Mine authorities.		Private individual.		Private individual.		Private individual	
Date of sampling.....	September 9, 1916...			April, 1917....		January, 1914.		1914.....		1914.	
Remarks.....	.....			.....		Samples apparently from the Coalbeck Colliery, now operated by the National Coal Co., Sec. 3, Tp. 38, R. 14.					

ALBERTA COAL FIELDS

Lacombe Area

Description	Coal said to be from Coalbeck Collieries, Castor				From J. B. Remillard, Castor Sec. 33, Tp. 37, R. 14			Frank Mehiltz' mine, Halkirk Sec. 18, Tp. 39, R. 15			Armour Gray's mine, Gadsby Sec. 28, Tp. 39, R. 16		
Sample No.	326		327		1832			760			958		
Moisture condition (see note p. 2)	R	D	R	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	....	....	....	....	4·1	....	....	3·9	....	....	8·0	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	17·8	....	17·6	....	24·8	21·5	....	27·0	25·0	....	25·8	19·3	....
Ash....%	6·2	7·6	5·3	6·4	9·0	9·4	12·0	5·0	5·2	7·0	7·9	8·6	10·6
Volatile matter....%	35·3	42·0	34·8	42·2	31·2	32·5	41·4	26·7	27·8	37·0	26·8	29·1	36·1
Fixed carbon....%	40·7	49·5	42·3	51·4	35·0	36·6	46·6	40·4	42·0	56·0	39·5	43·0	53·3
Ultimate analysis:— Carbon....%	....	....	....	....	....	....	....	48·8	50·8	67·6	48·7	53·0	65·6
Hydrogen....%	....	....	....	....	....	....	....	6·2	6·0	4·2	6·0	5·5	4·2
Ash....%	....	....	....	....	....	....	....	5·0	5·2	7·0	7·9	8·6	10·6
Sulphur....%	....	....	....	....	0·5	0·5	0·7	0·7	0·7	0·9	0·4	0·4	0·5
Nitrogen....%	....	....	....	....	....	....	....	1·0	1·0	1·4	0·9	1·0	1·3
Oxygen....%	....	....	....	....	....	....	....	38·3	36·3	18·9	36·1	31·5	17·8
Calorific value:— Calories per gram, gross	....	....	....	....	4370	4560	5810	4560	4740	6320	4530	4920	6100
B. Th. U. per lb., gross	....	....	....	....	7870	8210	10450	8200	8540	11370	8150	8860	10970
Fuel ratio	1·15		1·20		1·10			1·50			1·50		
Carbon-hydrogen ratio	....	....	....	....	....	....	....	7·9	8·5	15·9	8·1	9·0	15·7
Coking properties	....	....	....	....	Non-coking			Non-coking			Non-coking		
Hoffmann potash test	....		....		....			1			1		
Location in mine	No. 6 entry.		No. 7 entry.		.....			Main entry			No. 1 seam, 200 ft. in No. 1 entry.		
Kind of sample	.....		.....		.....			Mine			Mine.		
Quality of coal	.....		.....		.....			Normal output of mine.			Run-of-mine.		
Taken by	Private individual.		Private individual.		.....			F. Aspinall, provincial inspector of mines.			Duncan McDonald, provincial mine inspector.		
Date of sampling	January, 1914.		1914.		1921.			May 3, 1916			February 15, 1917.		
Remarks	Samples apparently from the Coalbeck Colliery, now operated by the National Coal Co., Sec. 3, Tp. 38, R. 14.				.....			.....			.....		

ALBERTA COAL FIELDS

Camrose—Battle River Area

Description	Colfax Coal Mining Company Bish or Le Gear mine, Hastings Coulée Sec. 36, Tp. 40, R. 16			J. B. Turney's mine, Hastings Coulée Sec. 36, Tp. 40, R. 16		
Sample No.	758			744		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D
Loss on air-drying....%	3·1	....	....	5·1	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	25·4	23·0	....	25·3	21·3	....
Ash....%	5·8	6·0	7·8	5·1	5·4	6·9
Volatile matter....%	27·8	28·7	37·3	28·1	29·6	37·6
Fixed carbon....%	41·0	42·3	54·9	41·5	43·7	55·5
Ultimate analysis:— Carbon....%	50·4	52·0	67·5	51·3	54·1	68·7
Hydrogen....%	6·0	5·9	4·3	6·4	6·1	4·8
Ash....%	5·8	6·0	7·8	5·1	5·4	6·9
Sulphur....%	0·4	0·4	0·6	0·4	0·4	0·5
Nitrogen....%	1·1	1·1	1·4	1·1	1·2	1·5
Oxygen....%	36·3	34·6	18·4	35·7	32·8	17·6
Calorific value:— Calories per gram, gross	4720	4870	6330	4830	5090	6460
B. Th. U. per lb., gross	8500	8770	11390	8690	9160	11630
Fuel ratio		1·45			1·50	
Carbon-hydrogen ratio	8·4	8·9	15·8	8·0	8·8	14·4
Coking properties	Non-coking			Non-coking		
Hoffmann potash test	1			2		
Location in mine	Main entry			Main entry.		
Kind of sample	Mine			Mine.		
Quality of coal	Impurities left out of sample, which was a little better than normal output.			Bands and parting left out of sample, which was a little better than normal output.		
Taken by	F. Aspinall, provincial mine inspector					
Date of sampling	May 5, 1916					
Remarks						

ALBERTA COAL FIELDS

Tofield Area

Description	Tofield Coal Co., Ltd., Tofield Sec. 26, Tp. 50, R. 19								
Sample No.	180			181			182		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	8·7	....	....	5·4	....	....	11·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	23·2	15·9	....	16·5	11·7	....	26·3	17·0	....
Ash....%	5·1	5·6	6·6	6·5	6·9	7·8	5·0	5·6	6·8
Volatile matter....%	31·3	34·3	40·8	34·7	36·7	41·5	30·4	34·2	41·2
Fixed carbon....%	40·4	44·2	52·6	42·3	44·7	50·7	38·3	43·2	52·0
Ultimate analysis:— Carbon....%	53·3	58·4	69·4	55·6	58·8	66·6	49·6	55·9	67·3
Hydrogen....%	6·3	5·8	4·8	5·4	5·1	4·3	6·1	5·4	4·3
Ash....%	5·1	5·6	6·6	6·5	6·9	7·8	5·0	5·6	6·8
Sulphur....%	0·5	0·5	0·6	0·5	0·5	0·6	0·5	0·6	0·7
Nitrogen....%	1·0	1·1	1·3	1·1	1·1	1·3	1·0	1·1	1·4
Oxygen....%	33·8	28·6	17·3	30·9	27·6	19·4	37·8	31·4	19·5
Calorific value:— Calories per gram, gross	4970	5440	6480	5120	5410	6130	4770	5370	6470
B. Th. U. per lb., gross	8950	9800	11660	9220	9740	11040	8580	9660	11640
Fuel ratio		1·30			1·20			1·25	
Carbon-hydrogen ratio	8·5	10·1	14·5	10·2	11·5	15·5	8·2	10·3	15·8
Coking properties	Non-coking			Non-coking			Non-coking		
Hoffmann potash test	1			....			....		
Location in mine	....			....			....		
Kind of sample	Mine			Mine			Mine.		
Quality of coal	Full height of seam			Full height of seam			Top 4 ft. of seam.		
Taken by	J. G. S. Hudson, Mines Branch								
Date of sampling	August 7, 1912.								
Remarks	....								

ALBERTA COAL FIELDS

Tofield Area.

Description	Tofield Coal Co., Ltd., Tofield Sec. 26, Tp. 50, R. 19								The Dobell Coal Co. Ltd., Tofield S.W. ¼ Sec. 35, Tp. 50, R. 19		
Sample No	183			184			232		185		
Moisture condition (see note p. 2).	R	AD	D	R	AD	D	R	D	R	AD	D
Loss on air-drying.....%	12·7	....	....	9·6	....	....	....	....	7·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture.....%	27·4	16·8	....	21·1	12·7	....	25·0	....	22·2	15·8	....
Ash.....%	6·3	7·2	8·7	10·8	11·9	13·7	8·5	11·3	6·2	6·7	7·9
Volatile matter.....%	28·2	32·4	38·9	30·0	33·2	38·0	29·8	39·7	29·9	32·4	38·5
Fixed carbon.....%	38·1	43·6	52·4	38·1	42·2	48·3	36·7	49·0	41·7	45·1	53·6
Ultimate analysis:— Carbon.....%	48·5	55·6	66·8	47·9	52·9	60·7	50·4	67·2	52·3	56·6	67·2
Hydrogen.....%	6·2	5·5	4·3	5·5	4·9	4·0	6·6	5·1	5·7	5·3	4·1
Ash.....%	6·3	7·2	8·7	10·8	11·9	13·7	8·5	11·3	6·2	6·7	7·9
Sulphur.....%	0·4	0·4	0·5	0·6	0·6	0·7	0·3	0·4	0·4	0·5	0·6
Nitrogen.....%	1·0	1·1	1·3	0·9	1·0	1·1	0·9	1·2	1·0	1·1	1·3
Oxygen.....%	37·6	30·2	18·4	34·3	28·7	19·8	33·3	14·8	34·4	29·8	18·9
Calorific value:— Calories per gram, gross.....	4520	5180	6230	4540	5020	5750	4440	5920	4860	5260	6240
B. Th. U. per lb., gross.....	8140	9330	11210	8170	9030	10350	7990	10660	8740	9460	11230
Fuel ratio.....	1·35			1·25			1·25		1·40		
Carbon-hydrogen ratio.....	7·8	10·1	15·4	8·7	10·8	15·1	7·6	13·2	9·2	10·7	16·2
Coking properties.....	Non-coking			Non-coking			Non-coking		Non-coking		
Hoffmann potash test.....	....			....			....		....		
Location in mine.....	.....			.....			.....		Water well.		
Kind of sample.....	Mine.....			Mine.....			Commercial—20 tons.		Mine.		
Quality of coal.....	Lower 4 ft. of seam.			Slack, exposed to atmosphere for two years.			.....		.....		
Taken by.....	J. G. S. Hudson, Mines Branch.			J. G. S. Hudson....			Provincial mine inspector.		J. G. S. Hudson.		
Date of sampling.....	August 7, 1912.....			August 7, 1912.....			January, 1913... Lab. sample, June 12, 1913.		August 7, 1912.		
Remarks.....	.....			.....			.....		.....		

ALBERTA COAL FIELDS

Edmonton–Clover Bar Area

Description	The Bush Mine Coal Co., Beverly River lot 42, Secs. 6 and 7, Tp. 53, R. 23			Humberstone Coal Co., Beverly Sec. 7, Tp. 53, R. 23			The Great West Coal Co., Ltd., Edmonton Mine at Clover Bar. Secs. 5–8, Tp. 53, R. 23			The Clover Bar Coal Co., Ltd., Clover Bar Sec. 18, Tp. 53, R. 23		
Sample No.	680			681			470			679		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	7·2	....	....	5·8	....	....	2·7	....	....	9·6	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	23·2	17·2	....	23·6	18·0	....	25·4	23·3	....	25·5	17·6	....
Ash....%	5·7	6·2	7·5	8·8	9·3	11·5	5·7	5·9	7·7	7·3	8·0	9·7
Volatile matter....%	26·5	28·6	34·5	25·1	26·6	32·8	27·1	27·9	36·3	25·1	27·8	33·8
Fixed carbon....%	44·6	48·0	58·0	42·5	45·2	55·7	41·8	42·9	56·0	42·1	46·6	56·5
Ultimate analysis:— Carbon....%	52·5	56·6	68·4	49·9	53·0	65·3	51·9	53·4	69·6	49·9	55·2	67·0
Hydrogen....%	5·9	5·5	4·3	5·9	5·6	4·3	6·2	6·1	4·5	6·0	5·4	4·2
Ash....%	5·7	6·2	7·5	8·8	9·3	11·5	5·7	5·9	7·7	7·3	8·0	9·7
Sulphur....%	0·3	0·3	0·4	0·4	0·4	0·5	0·3	0·3	0·4	0·3	0·4	0·5
Nitrogen....%	1·1	1·1	1·4	1·0	1·0	1·3	1·1	1·1	1·5	1·0	1·1	1·3
Oxygen....%	34·5	30·3	18·0	34·0	30·7	17·1	34·8	33·2	16·3	35·5	29·9	17·3
Calorific value:— Calories per gram, gross..	4840	5210	6300	4600	4880	6020	4740	4880	6360	4580	5070	6150
B. Th. U. per lb., gross..	8710	9380	11330	8270	8780	10830	8540	8780	11450	8250	9130	11080
Fuel ratio	1·70			1·70			1·55			1·65		
Carbon-hydrogen ratio	8·9	10·3	15·8	8·4	9·4	15·1	8·4	8·8	15·4	8·4	10·2	16·0
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test	1			1			....			2		
Location in mine	800 ft. in main entry.			Main entry, No. 2 opening.			Northwest entry....			No. 1 seam, No. 3 north entry.		
Kind of sample	Mine.			Mine.			Mine.			Mine.		
Quality of coal	....			....			1 foot of bone coal and clay at top of seam not included.			....		
Taken by	S. A. Jones, provincial mine inspector.			S. A. Jones.			E. D. Black, provincial mine inspector.			S. A. Jones.		
Date of sampling	December 3, 1915.			December 2, 1915.			November 26, 1914.			December 1, 1915.		
Remarks	....			....			....			....		

ALBERTA COAL FIELDS

Edmonton-Clover Bar Area

Description	Strathcona Coal Co., Strathcona River lot No. 9, Edmonton Settlement			Parkdale Coal Co., Edmonton River lot No. 22, Edmonton Settlement			The McPeak Coal Co., City Mine, Edmonton River lot No. 26, Edmonton Settlement Sec. 10, Tp. 53, R. 24					
Sample No.	M 46			M 42			M 45			678		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying, %	5·8	....	....	4·6	....	....	4·9	....	....	8·4	....	....
Results obtained by	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—												
Moisture, %	22·9	18·2	....	22·7	18·9	....	23·7	19·8	....	26·2	19·4	....
Ash, %	8·8	9·3	11·4	8·4	8·8	10·9	6·2	6·5	8·1	8·1	8·9	11·0
Volatile matter, %	31·6	33·6	41·0	29·2	30·6	37·8	32·0	33·7	42·0	24·2	26·4	32·8
Fixed carbon, %	36·7	38·9	47·6	39·7	41·7	51·3	38·1	40·0	49·9	41·5	45·3	56·2
Ultimate analysis:—												
Carbon, %	48·5	51·5	62·9	50·5	52·9	65·3	50·1	52·7	65·6	48·9	53·3	66·2
Hydrogen, %	6·0	5·7	4·5	6·1	5·9	4·6	6·0	5·8	4·5	5·9	5·5	4·1
Ash, %	8·8	9·3	11·4	8·4	8·8	10·9	6·2	6·5	8·1	8·1	8·9	11·0
Sulphur, %	0·3	0·3	0·4	0·3	0·3	0·4	0·3	0·3	0·4	0·3	0·3	0·4
Nitrogen, %	1·0	1·1	1·3	1·0	1·0	1·2	1·0	1·0	1·3	1·0	1·1	1·3
Oxygen, %	35·4	32·1	19·5	33·7	31·1	17·6	36·4	33·7	20·1	35·8	30·9	17·0
Calorific value:—												
Calories per gram, gross	4590	4880	5060	4680	4910	6060	4820	5060	6310	4470	4880	6050
B. Th. U. per lb., gross	8270	8780	10730	8430	8840	10900	8670	9120	11360	8040	8780	10890
Fuel ratio	1·15			1·35			1·20			1·70		
Carbon-hydrogen ratio	8·0	9·0	13·9	8·3	9·0	14·1	8·3	9·1	14·7	8·2	9·7	16·2
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test	....			....			....			2		
Location in mine	....			....			....			Main entry, 75 feet from slope bottom.		
Kind of sample	Commercial—2 tons			Commercial—2 tons			Commercial—2 tons			Mine.		
Quality of coal	Over 1½-inch bar screen.			Over 1½-inch bar screen.			Over 1½-inch bar screen.			....		
Taken by	T. Denis, Mines Branch.			T. Denis			T. Denis			S. A. Jones, provincial mine inspector.		
Date of sampling	July 16, 1908			July, 1908			July, 1908			December 3, 1915.		
Remarks	....			....			Operated by Edmonton Standard Coal Co., Ltd., at time of sampling.					

ALBERTA COAL FIELDS

Edmonton-Clover Bar Area

Description	Twin City Coal Co., Ltd., Edmonton River lot 17, Tp. 53, R. 24											
Sample No.	175			176			177			178		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	7·5	....	....	9·1	....	....	10·6	....	....	9·9	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	20·8	14·4	....	23·1	15·4	....	24·5	15·6	....	23·8	15·4	....
Ash....%	24·5	26·5	30·9	6·2	6·9	8·1	12·2	13·6	16·2	6·0	6·7	7·9
Volatile matter....%	24·1	26·1	30·5	30·3	33·3	39·4	26·8	30·0	35·5	29·2	32·4	38·3
Fixed carbon....%	30·6	33·0	38·6	40·4	44·4	52·5	36·5	40·8	48·3	41·0	45·5	53·8
Ultimate analysis:— Carbon....%	39·5	42·8	50·0	52·3	57·6	68·1	46·1	51·5	61·0	52·1	57·8	68·3
Hydrogen....%	5·0	4·5	3·4	6·1	5·6	4·6	5·7	5·1	4·0	5·9	5·3	4·2
Ash....%	24·5	26·5	30·9	6·2	6·9	8·1	12·2	13·6	16·2	6·0	6·7	7·9
Sulphur....%	0·2	0·3	0·3	0·3	0·4	0·4	0·3	0·4	0·4	0·3	0·3	0·4
Nitrogen....%	0·8	0·8	1·0	1·1	1·2	1·4	1·0	1·1	1·3	1·0	1·1	1·3
Oxygen....%	30·0	25·1	14·4	34·0	28·3	17·4	34·7	28·3	17·1	34·7	28·8	17·9
Calorific value:— Calories per gram, gross..	3630	3920	4580	4870	5360	6340	4260	4760	5640	4820	5350	6320
B. Th. U. per lb., gross...	6530	7060	8250	8770	9650	11410	7660	8570	10160	8670	9630	11380
Fuel ratio		1·25			1·35			1·35			1·40	
Carbon-hydrogen ratio	7·9	9·5	14·8	8·5	10·2	14·8	8·0	10·1	15·4	8·9	11·0	16·2
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test	....			....			....			....		
Location in mine	Mining machine cutting.			No. 1 north level....			3rd east level....			Main east level.		
Kind of sample	Mine.			Mine.			Mine.			Mine.		
Quality of coal	....			Full section of seam.			Full section of seam.			Full section of seam.		
Taken by	J. G. S. Hudson, Mines Branch											
Date of sampling	July 31, 1912											
Remarks	....											

ALBERTA COAL FIELDS

Edmonton-Clover Bar Area

Description	Twin City Coal Co., Ltd., Edmonton River Lot 17, Tp. 53, R. 24								
Sample No.	179			274			352		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	10·1	....	....	1·8	....	....	6·4	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	23·5	15·0	....	18·1	16·6	....	15·9	10·1	....
Ash....%	3·8	4·2	4·9	7·3	7·4	8·9	13·5	14·5	16·1
Volatile matter....%	30·0	33·3	39·2	33·3	33·9	40·6	29·8	31·8	35·4
Fixed carbon....%	42·7	47·5	55·9	41·3	42·1	50·5	40·8	43·6	48·5
Ultimate analysis:— Carbon....%	55·0	61·2	71·9	54·1	55·1	66·1	51·3	54·8	61·0
Hydrogen....%	6·3	5·7	4·8	5·9	5·8	4·7	5·4	5·0	4·3
Ash....%	3·8	4·2	4·9	7·3	7·4	8·9	13·5	14·5	16·1
Sulphur....%	0·3	0·3	0·4	0·4	0·4	0·5	0·3	0·3	0·3
Nitrogen....%	1·0	1·2	1·4	1·1	1·1	1·3	....	....	....
Oxygen....%	33·6	27·4	16·6	31·2	30·2	18·5	....	....	....
Calorific value:— Calories per gram, gross	5140	5710	6720	5090	5180	6210	4740	5060	5639
B. Th. U. per lb., gross	9250	10290	12100	9160	9320	11180	8530	9120	10140
Fuel ratio		1·40			1·25			1·35	
Carbon-hydrogen ratio	8·8	10·7	15·1	9·2	9·5	14·0	9·5	11·0	14·1
Coking properties	Non-coking			Non-coking			Non-coking		
Hoffmann potash test		....			....			....	
Location in mine	6th south entry			....			....		
Kind of sample	Mine			Commercial—20 tons			Commercial—20 tons.		
Quality of coal	Full section of seam			....			....		
Taken by	J. G. S. Hudson, Mines Branch.			Provincial mine inspector.			Provincial mine inspector.		
Date of sampling	July 31, 1912			August, 1913. Lab. sample Sept. 6, 1913			August, 1913. Lab. sample Mar. 23, 1914.		
Remarks	....			Both lab. samples taken from same commercial sample.					

ALBERTA COAL FIELDS

Cardiff-Namao Area

Description	Kelly Coal Co., Ltd., Namao Sec. 8, Tp. 55, R. 24			The Alberta Coal Mining Co., Ltd., Cardiff Sec. 23, Tp. 55, R. 25			Gervais or Banner mine, operated by Blain & Gilliland, Cardiff Sec. 24, Tp. 55, R. 25		
Sample No.		360			682			683	
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	4·6	....	....	6·3	....	....	5·2	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	25·7	22·1	....	24·1	19·0	....	24·0	19·9	....
Ash....%	4·8	5·1	6·5	7·7	8·2	10·1	6·5	6·9	8·6
Volatile matter....%	28·4	29·7	38·2	27·1	28·9	35·7	26·8	28·3	35·3
Fixed carbon....%	41·1	43·1	55·3	41·1	43·9	54·2	42·7	44·9	56·1
Ultimate analysis:— Carbon....%	52·1	54·6	70·2	49·9	53·2	65·7	50·5	53·3	66·5
Hydrogen....%	6·2	6·0	4·5	6·1	5·8	4·5	6·1	5·8	4·5
Ash....%	4·8	5·1	6·5	7·7	8·2	10·1	6·5	6·9	8·6
Sulphur....%	0·3	0·3	0·4	0·2	0·2	0·3	0·3	0·3	0·3
Nitrogen....%	1·1	1·1	1·4	0·9	1·0	1·2	1·0	1·0	1·3
Oxygen....%	35·5	32·9	17·0	35·2	31·6	18·2	35·6	32·7	18·8
Calorific value:— Calories per gram, gross	4800	5030	6450	4580	4880	6030	4660	4910	6130
B. Th. U. per lb., gross	8630	9050	11620	8240	8790	10850	8390	8840	11040
Fuel ratio		1·45			1·50			1·60	
Carbon-hydrogen ratio	8·4	9·2	15·7	8·2	9·3	14·7	8·3	9·2	14·9
Coking properties	Non-coking			Non-coking			Non-coking		
Hoffmann potash test	....			1–2			1		
Location in mine	New drift			No. 1 or top seam, No. 1 main entry.			No. 1 or top seam, north-east section.		
Kind of sample	Mine			Mine			Mine.		
Quality of coal	....			....			....		
Taken by	Mr. Heathcote, provincial mine inspector.			S. A. Jones, provincial mine inspector.			S. A. Jones.		
Date of sampling	March, 1914			December 6, 1915			December 7, 1915.		
Remarks	Operated by Duthie, Wilcox & Gwilliam at time of sampling.			....			Operated by Capital Coal Co., Ltd., at time of sampling.		

ALBERTA COAL FIELDS

Cardiff-Namao Area

Description	Cardiff Collieries, Ltd., Cardiff Secs. 13, 24, 25, Tp. 55, R. 25											
Sample No.	188			189			190			191		
Moisture condition (see note, p. 2)	R	AD	D	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	9·6	....	....	10·6	....	....	11·3	....	....	4·7	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	26·1	18·2	....	24·8	15·8	....	27·4	18·1	....	26·2	22·5	....
Ash....%	4·8	5·3	6·5	6·3	7·0	8·4	3·4	3·8	4·6	6·0	6·3	8·1
Volatile matter....%	28·9	31·9	39·0	29·6	33·2	39·4	29·0	32·7	40·0	30·0	31·6	40·7
Fixed carbon....%	40·2	44·6	54·5	30·3	44·0	52·2	40·2	45·4	55·4	37·8	39·6	51·2
Ultimate analysis:— Carbon....%	50·2	55·6	67·9	50·2	56·2	66·8	50·6	57·0	69·6	49·9	52·3	67·6
Hydrogen....%	6·1	5·6	4·3	6·0	5·4	4·3	6·4	5·7	4·5	6·5	6·2	4·8
Ash....%	4·8	5·3	6·5	6·3	7·0	8·4	3·4	3·8	4·6	6·0	6·3	8·1
Sulphur....%	0·2	0·2	0·3	0·2	0·3	0·3	0·2	0·2	0·3	0·2	0·2	0·3
Nitrogen....%	0·8	0·9	1·1	1·0	1·1	1·3	0·9	1·0	1·2	0·9	1·0	1·2
Oxygen....%	37·9	32·4	19·9	36·3	30·0	18·9	38·5	32·3	19·8	36·5	34·0	18·0
Calorific value:— Calories per gram, gross..	4700	5200	6360	4650	5200	6180	4600	5190	6330	4650	4880	6310
B. Th. U. per lb., gross..	8460	9360	11440	8370	9360	11130	8280	9340	11400	8370	8790	11350
Fuel ratio		1·40			1·30			1·40			1·25	
Carbon-hydrogen ratio	8·2	10·0	15·8	8·3	10·4	15·4	8·0	9·9	15·4	7·7	8·4	14·1
Coking properties	Non-coking			Non-coking			Non-coking			Non-coking		
Hoffmann potash test		....			....			....			....	
Location in mine	Main southwest entry.			Butt of southwest entry.			Northeast entry....			Northwest entry.		
Kind of sample	Mine.			Mine.			Mine.			Mine.		
Quality of coal										Full height of seam.		
Taken by	J. G. S. Hudson, Mines Branch.											
Date of sampling	August 14, 1912.											
Remarks												

ALBERTA COAL FIELDS

Cardiff-Namao Area

Description	Cardiff Collieries, Ltd., Cardiff Secs. 13, 24, 25, Tp. 55, R. 25								
Sample No.	192			273			350		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	0·9	....	....	0·9	....	....	14·7	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	13·6	12·8	....	20·0	19·3	....	21·2	7·6	....
Ash....%	5·8	5·9	6·7	8·0	8·1	10·0	7·6	8·9	9·6
Volatile matter....%	35·4	35·7	41·0	31·6	31·9	39·5	32·1	37·6	40·7
Fixed carbon....%	45·2	45·6	52·3	40·4	40·7	50·5	39·1	45·9	49·7
Ultimate analysis:— Carbon....%	57·7	58·2	66·8	52·1	52·6	65·2	51·5	60·4	65·4
Hydrogen....%	5·6	5·6	4·7	6·4	6·3	5·1	6·1	5·2	4·7
Ash....%	5·8	5·9	6·7	8·0	8·1	10·0	7·6	8·9	9·6
Sulphur....%	0·2	0·2	0·3	0·2	0·2	0·3	0·2	0·2	0·2
Nitrogen....%	1·1	1·1	1·2	1·1	1·1	1·4	....	....	....
Oxygen....%	29·6	29·0	20·3	32·2	31·7	18·0	....	....	....
Calorific value:— Calories per gram, gross	5300	5340	6130	4870	4920	6100	4760	5580	6040
B. Th. U. per lb., gross	9540	9620	11030	8770	8850	10970	8570	10050	10870
Fuel ratio		1·30			1·30			1·20	
Carbon-hydrogen ratio	10·3	10·5	14·1	8·1	8·4	12·8	8·5	11·6	13·8
Coking properties	Non-coking			Non-coking			Non-coking		
Hoffmann potash test		....			....			....	
Location in mine	....			....			....		
Kind of sample	Mine			Commercial—25 tons			Commercial—25 tons.		
Quality of coal	Exposed to atmosphere for 7 months.			....			....		
Taken by	J. G. S. Hudson, Mines Branch.			Provincial mine inspector.			Provincial mine inspector.		
Date of sampling	August 14, 1912			August, 1913. Lab. sample Aug. 29, 1913.			August, 1913. Lab. sample March 20, 1914.		
Remarks	....			Both lab. samples taken from same commercial sample.					

ALBERTA COAL FIELDS

Peace River Area

Description	From a 5-ft. seam 5 miles down Peace river from Peace River Crossing		Prospect tunnel, South Heart river Near Peace River Crossing				Outcrop on bank of Heart river near its junction with the Peace river, Sec. 28, Tp. 83, R. 21 W. 5 Mer.	
Sample No.	1002		1157		1158		846	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D
Loss on air-drying....%	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:—								
Moisture....%	16·0	....	14·2	....	7·9	....	7·6	....
Ash....%	18·6	22·1	13·9	16·2	58·2	63·2	51·9	56·2
Volatile matter....%	27·4	32·6	28·9	33·7	15·1	16·4	15·3	16·6
Fixed carbon....%	38·0	45·3	43·0	50·1	18·8	20·4	25·2	27·2
Ultimate analysis:—								
Carbon....%	....	....	....	....	....	....	....	....
Hydrogen....%	....	....	....	....	....	....	....	....
Ash....%	....	....	....	....	....	....	....	....
Sulphur....%	....	....	....	....	....	....	....	....
Nitrogen....%	....	....	....	....	....	....	....	....
Oxygen....%	....	....	....	....	....	....	....	....
Calorific value:—								
Calories per gram, gross	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....
Fuel ratio	1·40		1·50		1·25		1·65	
Carbon-hydrogen ratio	....	....	....	....	....	....	....	....
Coking properties	Non-coking		Non-coking		Non-coking		Non-coking	
Hoffmann potash test	....		....		....		....	
Location in mine	.....		Top coal		Bottom coal		.....	
Kind of sample	.....		Prospect		Prospect		.....	
Quality of coal	Does not include 3-inch seam of carbonised shale		.....		.....		.....	
Taken by	Private individual at Grande Prairie.		F. H. McLearn, Geological Survey.		F. H. McLearn		.....	
Date of sampling	1917		Summer of 1917		1917		1916.	
Remarks	.....		.....		.....		.....	

ALBERTA COAL FIELDS

Peace River Area

Description	Errington claim, Hay river				From seams on Little Berland river, 2½ miles above mouth of south branch				MacConnachie claim, Hay river
	From Sec. 24, Tp. 52, R. 4 W. 6 Mer.		From Sec. 27, Tp. 52, R. 4 W. 6 Mer.		Sec. 35, Tp. 53, R. 3 W. 6 Mer.				Sec. 2, Tp. 53, R. 5 W. 6 Mer.
Sample No.	890		891		1618		1619		892
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D	R D
Loss on air-drying, %	....		....		....		....		....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal. Calc.
Proximate analysis:— Moisture, %	1·1	....	2·0	....	0·9	....	1·1	....	1·9 ....
Ash, %	16·3	16·5	16·6	17·1	6·6	6·7	8·3	8·4	13·1 13·4
Volatile matter, %	24·0	24·3	23·6	24·3	17·0	17·1	16·3	16·5	26·2 26·7
Fixed carbon, %	58·6	59·2	56·9	58·6	75·5	76·2	74·3	75·1	58·8 59·9
Ultimate analysis:— Carbon, %	....	....	....	....	....	....	....	....	....
Hydrogen, %	....	....	....	....	....	....	....	....	....
Ash, %	....	....	....	....	....	....	....	....	....
Sulphur, %	....	....	....	....	....	....	....	....	....
Nitrogen, %	....	....	....	....	....	....	....	....	....
Oxygen, %	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....	....
Fuel ratio	2·45		2·40		4·45		4·55		2·25
Carbon-hydrogen ratio	....	....	....	....	....	....	....	....	....
Coking properties	Small lump of dense, hard coke		Non-coking		Poor coke		Agglomerates		Non-coking
Location in mine	18-ft. seam								100-ft. seam.
Kind of sample	Prospect								
Taken by	J. MacVicar, Geological Survey.								
Date of sampling	Summer of 1916.				Summer of 1919.				Summer of 1916.

ALBERTA COAL FIELDS

Peace River Area

Description	From small creek entering north branch of Berland river, about 6 miles above Sunset creek Sec. 32, Tp. 53, R. 5 W. 6 Mer.									
Sample No.	1623		1624		1625		1626		1627	
Moisture condition (see note, p. 2)	R	D	R	D	R	D	R	D	R	D
Loss on air-drying, %	....	....	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture, %	1·2	....	3·2	....	5·0	....	4·7	....	3·5	....
Ash, %	5·1	5·1	16·2	16·7	22·1	23·2	15·1	15·8	11·0	11·4
Volatile matter, %	20·0	20·3	20·1	20·8	22·5	23·7	22·3	23·4	20·1	20·8
Fixed carbon, %	73·7	74·6	60·5	62·5	50·4	53·1	57·9	60·8	65·4	67·8
Ultimate analysis:— Carbon, %	.....	....	....	....	....	....	....	....	....	....
Hydrogen, %	....	....	....	....	....	....	....	....	....	....
Ash, %	....	....	....	....	....	....	....	....	....	....
Sulphur, %	....	....	....	....	....	....	....	....	....	....
Nitrogen, %	....	....	....	....	....	....	....	....	....	....
Oxygen, %	....	....	....	....	....	....	....	....	....	....
Calorific value.— Calories per gram, gross	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb., gross	....	....	....	....	....	....	....	....	....	....
Fuel ratio	3·70		3·00		2·25		2·60		3·25	
Carbon-hydrogen ratio	....		....		....		....		....	
Coking properties	Very poor coke		Very poor coke		Agglomerates		Agglomerates		Agglomerates	
Location in mine	.....									
Kind of sample	Prospect									
Taken by	J. MacVicar, Geological Survey									
Date of sampling	Summer of 1919									

ALBERTA COAL FIELDS

Peace River Area

Description	From Moon creek, 7 miles from mouth Sec. 6, Tp. 54, R. 3 W. 6 Mer.				From Big Berland river, 1 mile below mouth of Adam's creek Sec. 15, Tp. 54, R. 4 W. 6 Mer.		Claim of A. Joachim on Smoky river Sec. 24, Tp. 56, R. 9 W. 6 Mer.		Abbot claim between 15th base line and Grand Cache lake Sec. 4, Tp. 57, R. 7 W. 6 Mer.	
Sample No.	1620		1621		1622		896		893	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D	R	D
Loss on air-drying....%	....	....	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	6·5	....	1·3	....	7·0	....	1·3	....	1·1	....
Ash....%	37·9	40·5	49·2	49·8	48·6	52·2	2·5	2·6	5·3	5·3
Volatile matter....%	24·2	25·9	10·5	10·7	17·3	18·6	16·9	17·1	23·0	23·3
Fixed carbon....%	31·4	33·6	39·0	39·5	27·1	29·2	79·3	80·3	70·6	71·4
Ultimate analysis:— Carbon....%	....	....	....	....	....	....	....	....	....	....
Hydrogen....%	....	....	....	....	....	....	....	....	....	....
Ash....%	....	....	....	....	....	....	....	....	....	....
Sulphur....%	....	....	....	....	....	....	....	....	....	....
Nitrogen....%	....	....	....	....	....	....	....	....	....	....
Oxygen....%	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross.	....	....	....	....	....	....	....	....	....	....
B. Th. U. per lb. gross,..	....	....	....	....	....	....	....	....	....	....
Fuel ratio	1·30		3·70		1·55		4·70		3·05	
Carbon-hydrogen ratio	....		....		....		....		....	
Coking properties	Non-coking		Non-coking		Non-coking		Non-coking		Forms good coke	
Location in mine	....									
Kind of sample	Prospect									
Taken by	J. MacVicar, Geological Survey									
Date of sampling	Summer of 1919						Summer of 1916			

ALBERTA COAL FIELDS

Peace River Area

Description	Isenberg claim on Smoky river		Moberly claim on Sheep creek		Campbell claim on Sheep creek		From exposures on Smoky and Muskeg rivers Tp. 57 and 58, R. 7 and 8 W. 6 Mer.					
	Sec. 15, Tp. 58, R. 8 W. 6 Mer.		Sec. 4, Tp. 58, R. 9 W. 6 Mer.		Sec. 9, Tp. 58, R. 9 W. 6 Mer.		From right limit Muskeg river near junction with Smoky river					
Sample No.	897		895		894		1564		1565		1566	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D	R	D	R	D
Loss on air-drying....%	....	....	....	....	....	....	....	....	....	....	....	....
Results obtained by....	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.
Proximate analysis:— Moisture....%	1·4	....	1·3	....	1·3	....	2·5	....	1·6	....	1·3	....
Ash....%	3·0	3·0	3·0	3·0	3·1	3·2	11·1	11·4	25·8	26·2	15·9	16·1
Volatile matter...%	19·5	19·8	17·0	17·2	17·4	17·6	17·3	17·8	18·9	19·2	19·7	20·0
Fixed carbon....%	76·1	77·2	78·7	79·8	78·2	79·2	69·1	70·8	53·7	54·6	63·1	63·9
Ultimate analysis:— Carbon....%	....	....	....	....	....	....	....	....	....	....	....	....
Hydrogen....%	....	....	....	....	....	....	....	....	....	....	....	....
Ash....%	....	....	....	....	....	....	....	....	....	....	....	....
Sulphur....%	....	....	....	....	....	....	0·5	0·5	0·4	0·4	0·3	0·4
Nitrogen....%	....	....	....	....	....	....	....	....	....	....	....	....
Oxygen....%	....	....	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	....	....	....	....	....	....	7600	7800	6120	6220	7110	7200
B. Th. U. per lb., gross	....	....	....	....	....	....	13690	14040	11020	11200	12790	12960
Fuel ratio	3·90		4·65		4·50		4·00		2·85		3·20	
Carbon-hydrogen ratio	....	....	....	....	....	....	....	....	....	....	....	....
Coking properties	Agglomerates slightly		Non-coking		Non-coking		Fair coke		Agglomerates		Agglomerates	
Location in mine	17-ft. seam											
Kind of sample	Prospect						Prospect					
Taken by	J. MacVicar, Geological Survey						O. S. Finnie, Mining Lands and Yukon Branch, Dept. of Interior.					
Date of sampling	Summer of 1916						Summer of 1919					

ALBERTA COAL FIELDS

Peace River Area

Description	From exposures on Smoky and Muskeg rivers Tp. 57 and 58, R. 7 and 8 W. 6 Mer.													
	From right limit Smoky river, 1 mile above mouth of Muskeg rivor				From left limit Smoky river, opposite to location of samples 1562—3								From Barnott claim, left limit Smoky river, 5 miles above location of samples 1562–70	
Sample No.	1562		1563		1567		1568		1569		1570		1571	
Moisture condition (see note p. 2)	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Loss on air-drying...%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Results obtained by	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc.	Anal.	Calc	Anal.	Calc
Proximate analysis:— Moisture...%	1·8	....	2·6	....	1·4	....	2·1	....	1·5	....	1·5	....	1·2	....
Ash...%	1·9	1·9	5·1	5·2	13·4	13·5	13·0	13·3	4·9	5·0	9·8	9·9	2·8	2·8
Volatile matter..%	20·8	21·2	21·1	21·6	17·8	18·1	18·3	18·7	19·6	19·8	21·2	21·6	14·6	14·8
Fixed carbon...%	75·5	76·9	71·2	73·2	67·4	68·4	66·6	68·0	74·0	75·2	67·5	68·5	81·4	82·4
Ultimate analysis:— Carbon...%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hydrogen...%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Ash...%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sulphur...%	0·5	0·6	0·3	0·4	0·3	0·3	0·3	0·4	0·4	0·4	0·6	0·6	0·6	0·6
Nitrogen...%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Oxygen...%	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Calorific value:— Calories per gram, gross	8280	8430	7760	7970	7240	7340	7080	7240	8120	8240	7570	7680	8240	8340
B. Th. U. per lb., gross	14900	15180	13960	14340	13040	13220	12750	13030	14610	14830	13630	13830	14830	15010
Fuel ratio	3·65		3·40		3·80		3·65		3·80		3·20		5·55	
Carbon-hydrogen ratio	....		....		....		....		....		....		....	
Coking properties	Very poor coke		Agglomerates		Agglomerates		Barely agglomerates		Poor coke		Poor coke		Agglomerates	
Location in mine	Lower seam		Upper seam		Lower tunnel.		9-ft. seam		9-ft. seam, middle tunnel.		Upper 4-ft. seam, upper tunnel.		7-ft. seam.	
Kind of sample	Prospect													
Taken by	O. S. Finnie, Mining Lands and Yukon Branch, Dept. of Interior													
Date of sampling	Summer of 1919													

ALBERTA COAL FIELDS

Peace River Area

Description	Brown's stripping pit, Red Willow creek, Halcourt Sec. 21, Tp. 70, R. 10 W. 6 Mer.			Ray's mine, Red Willow creek, Halcourt Sec. 25, Tp. 70, R. 11 W. 6 Mer.			Dunlop's mine, Spring creek, Grand Prairie Sec. 35, Tp. 70, R. 7 W. 6 Mer.		
Sample No.	874			833			832		
Moisture condition (see note p. 2)	R	AD	D	R	AD	D	R	AD	D
Loss on air-drying....%	1·6	....	....	1·8	....	....	3·3	....	....
Results obtained by	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.	Calc.	Anal.	Calc.
Proximate analysis:—									
Moisture....%	11·8	10·4	....	12·3	10·7	....	17·5	14·6	....
Ash....%	3·7	3·8	4·2	4·0	4·1	4·5	5·7	5·9	6·9
Volatile matter....%	31·5	32·0	35·7	31·2	31·7	35·6	30·0	31·0	36·3
Fixed carbon....%	53·0	53·8	60·1	52·5	53·5	59·9	46·8	48·5	56·8
Ultimate analysis:—									
Carbon....%	67·0	68·0	75·9	66·7	67·9	76·1	59·5	61·5	72·1
Hydrogen....%	5·7	5·6	4·9	5·7	5·6	4·9	5·8	5·6	4·7
Ash....%	3·7	3·8	4·2	4·0	4·1	4·5	5·7	5·9	6·9
Sulphur....%	0·3	0·3	0·4	0·4	0·4	0·5	0·4	0·4	0·4
Nitrogen....%	1·7	1·8	2·0	1·8	1·8	2·0	1·5	1·5	1·8
Oxygen....%	21·6	20·5	12·6	21·4	20·2	12·0	27·1	25·1	14·1
Calorific value:—									
Calories per gram, gross	6470	6570	7340	6500	6610	7410	5710	5910	6930
B. Th. U. per lb., gross	11650	11830	13210	11700	11910	13330	10290	10640	12470
Fuel ratio		1·70			1·70			1·55	
Carbon-hydrogen ratio	11·8	12·2	15·5	11·8	12·2	15·6	10·3	11·0	15·5
Coking properties	Non-coking			Non-coking			Non-coking		
Hoffmann potash test	4			5-4			3-2		
Location in mine	No. 1 seam			No. 1 seam			Entrance to drift.		
Kind of sample	Mine			Mine			Mine.		
Quality of coal	Bone coal left out of sample.						Bone coal left out of sample.		
Taken by	J. A. Richards, provincial mine inspector								
Date of sampling	September 20 to 23, 1916								
Remarks									

MISCELLANEOUS SAMPLES

ALBERTA NATURAL GAS

Sample No. 345

Natural gas from the Canadian Western Natural Gas, Light, Heat & Power Co., Calgary.

Analysis:—

Oxygen	0·2%
Methane	91·6%
Nitrogen	8·2%

Density:—

(Air=1)	0·595

Calorific Value: gross—per cu. ft. of dry gas, at 15·5° C. and 760 mm. of mercury—946 B. Th. U.

There is no evidence that the gas contains appreciable quantities of higher hydrocarbons, and it is therefore a "dry" gas.

Sample received from above named company on March 9, 1914.

Sample No. 815

Natural gas from the Pelican well, situated on Athabaska river 90 miles below Athabaska Landing.

Analysis:—

Carbon dioxide	1·0%
Oxygen	2·9%
Methane	83·5%
Nitrogen	12·6%

Calorific Value: gross—(calculated from results of analysis) per cu. ft. dry gas at 15·5° C. and 760 mm. mercury—850 B. Th. U.

Sample taken by F. H. McLearn of the Geological Survey during July, 1916.

Sample No. 825

Natural gas from a spring on Tar island in Peace river, 25 miles below Peace River Crossing.

Analysis:—

Carbon dioxide	1·8%
Oxygen	3·7%
Methane	77·2%
Nitrogen	17·3%

Density:—

(Air=1)	0·670

Calorific Value: gross—(calculated from results of analysis) per cu. ft. dry gas at 15·5° C. and 760 mm. mercury—785 B. Th. U.

Sample taken by Chas. Camsell of the Geological Survey, Sept. 18, 1916.

ALBERTA OIL

Sample No. 401

Crude oil from Dingman No. 1 well.

The oil is of a yellow colour, shows fluorescence and is practically free from any sediment. It possesses a strong unpleasant odour.

Specific Gravity:—
At 15·5° C..... 0·756

Distillation Test: Engler apparatus—intermittent method. First drop distils at 76° C.

Temperature	% by volume	Specific gravity	Colour of distillate
76°–100°	14·4	·702	Yellow.
100°–120°	28·3	·729	Orange.
120°–140°	19·3	·746	"
140°–160°	11·3	·760	Yellow.
160°–180°	7·0	·774	Pale yellow.
180°–200°	4·3		
200°–220°	3·4	·791	Almost colourless.
220°–250°	2·8		
Residue	0·6	·874	Dark brown.
Loss	2·6	.....	

Specific gravity calculated from above test.....0·752

Sulphur.....0·10%

Sample received from Calgary Petroleum Products Company, Oct. 30, 1914.

Sample No. 402

Gasoline from Dingman No. 1 well.

The gasoline is of a pale yellow colour, deposits a white sediment on standing, and has a strong, unpleasant odour.

Specific Gravity:—
At 15·5° C.....0·700

Distillation Test: Engler apparatus—intermittent method.
First drop distils at 53° C.

Temperature	% by volume	Specific gravity
53°- 70°	32·5	·670
70°- 80°	21·2	·690
80°- 90°	15·5	·707
90°-100°	11·1	·719
100°-120°	9·8	·737
120°-140°	3·4	·735
140°-160°	1·7	
160°-180°	0·7	·754
180°-200°	0·7	
Residue	1·8	·80 (approx).
Loss	1·6	

The various fractions are colourless, and the residue a dark brown liquid.

Specific gravity calculated from above test.....0·699

Sulphur.....0·11%

Sample received from Calgary Petroleum Products Company, Oct. 30, 1914.

Sample No. 530

Crude oil from a well on Sec. 18, Tp. 49, R. 24 W. of 4 Mer., at a depth of 800 ft.

The oil is very dark in colour.

Specific Gravity:—
At 15·5° C.....0·829

Distillation Test: Engler apparatus—intermittent method.
First drop distils at 128° C.

Temperature	% by volume	Specific gravity	Colour
128°–150°	1·0	0·718	Colourless.
150°–200°	24·8		
200°–250°	25·4	0·804	Yellow.
250°–300°	17·8	0·832	Orange-yellow.
Residue	30·0	.....	Black.
Loss	1·0	.....	

The tests show that the oil is a crude petroleum of normal composition, but give no indication of its original source.

Sample received from Hon. Frank Oliver, February 10, 1915.

Sample No. 924

Crude oil or tar from McMurray district.

The oil is almost black, and very viscous at ordinary temperatures.

Filtration and Distillation: continuous method.

Vegetable and earthy matter.....	13·7%	
Water.....	16·5%	
Up to 170° C. (770 mm. pressure).. ..	1·3%	Burning oils.
170°–250° (420 mm. pressure).....	3·7%	
Asphalt	64·8%	

The asphalt is soluble in carbon bisulphide, and flows slowly at ordinary temperatures.

Sample received from a private individual, January 18, 1917.

Sample No. 1156

Crude oil said to be from No. 1 well, Peace River Oil Co., on Peace river, N.E. ¼ Sec. 24, Tp. 85, R. 21 W. 5 Mer.

The oil is dark coloured and viscous, with an odour resembling that of kerosene.

Specific Gravity:—
At 15·5° C.....0·981

Distillation Tests:—

Temperature	Method "A"* Continuous	Method "B"* Intermittent
	% by volume	% by volume
Below 150° C.	0·1	2·0
150°–200° C.	1·7	4·8
200°–250° C.	3·6	5·3
250°–300° C.	10·7	56·2
300°–325° C.	....	5·2
Residue and loss	83·9	26·5

The above results, especially those by method "B," are distinctly affected by "cracking."*

Sample received from private individual, Nov. 8, 1917.

Sample No. 1293

Crude oil from No. 2 well, Peace River Oil Co., at a depth of 980 feet.

Specific Gravity:—
At 15·5° C. ..... 0·978

Distillation Tests:—

Temperature	Method "A"*		Method "B"*		Method "C"*	
	% by volume	Sp. Gr. at 15·5° C.	% by volume	Sp. Gr. at 15·5° C.	% by volume	Sp. Gr. at 15·5° C.
0°–150° C.	0·4	....	0·9	....	1·8	0·75
150°–200° C.	1·5	0·74	1·8	0·75	1·2	0·80
200°–250° C.	2·9	0·82	8·6	0·85	5·5	0·84
250°–300° C.	11·7	0·882	52·8	0·869	30·7	0·884
Residue	84·2	0·996	40·7	1·07	62·5	1·03
Gain	0·7	....	4·8	....	1·7	....
Specific gravity of crude oil calculated from above results	....	0·972	....	0·944	....	0·967

The above results, especially those by method "B," are distinctly affected by "cracking."*

Sample taken by F. H. McLearn, Geological Survey, Ottawa, October 13, 1917.

* See Appendix A.

Sample No. 1218

Crude petroleum from right bank of Peace river, 14 miles below town of Peace River, at a depth of 900 ft.

The oil is black and very viscous, with an odour resembling that of kerosene.

Specific Gravity:—
At 15·5° C.....0·987

Distillation Tests: continuous method (in 500 c.c. flask).

Temperature	% by volume	Nature of product
0°–100° C.	3·5	Water.
100°–150°	....	
150°–300°	10·4	Illuminating oils.
Residue	86·1	Lubricating oils, coke, etc.

A further distillation at temperatures above 300°, to obtain lubricating oils, gives a yield equivalent to 53% of the original weight of crude oil.

General Analysis:—

Paraffin wax	0·9%
Asphalt (insoluble in alcohol and ether)	8·4%
Sulphur	4·0%
Impurities (mineral matter)	1·5%

Sample collected by F. H. Kitto, Natural Resources Intelligence Branch, Department of the Interior, during the summer of 1917.

Sample No. 823

Crude petroleum from McArthur well on Peace river, 17 miles below Peace River Crossing.

The oil is dark and viscous, with an odour resembling that of kerosene.

Solubility: In benzene—Practically complete.
In gasoline—5% insoluble.
In alcohol-ether—Considerable insoluble matter.

Specific Gravity:—
At 15·5°.....0·984

Flash Point: (closed test)..... 59°C
Fire Point:.....127°C

Calorific Value: gross..... 9730 calories per gram.
.....17520 B. Th. U. per lb.

Preliminary Distillation: under reduced pressure.

—	% by volume	% by weight	Specific gravity
Oil distillate	73·9	67·7	0·902
Pitch residue	....	23·0	.....
Water and loss	....	9·3	.....

Fractional Distillation of above Oil Distillate—intermittent method.
First drop at 140°C. Sp. Gr.
140°–150° (gasoline), 2% by volume (1·5% crude oil).....0·642
150°–300° (illuminating oils, etc.), 32·5% by volume (24·0% crude oil) 0·834
Residue (lubricating oils, etc.), 65·5% by volume (48·4% crude oil).

Sample taken by Chas. Camsell of the Geological Survey, September 18, 1916.

OIL FROM NORTHWEST TERRITORIES

Sample No. 824

Crude petroleum from Pointe aux Esclaves, Great Slave lake.

The oil is dark and viscous, with an odour resembling that of kerosene.

Specific Gravity:—
At 15·5°C.....0·957

Calorific Value: gross.....10040 calories per gram.
.....18070 B. Th. U. per lb.
Sulphur.....1·0%

Preliminary Distillation: under reduced pressure.
Oil distillate (sp. gr. 0·888) 60% by weight and 64·5% by volume of crude oil.

Fractional Distillation of Oil Distillate: intermittent method.
First drop at 178°C.
178°–300°C. (illuminating oils, etc.), 23% by volume (14·9% crude oil) sp. gr. 0·835.
Residue (lubricating oils, etc.), 77% by volume (49·6% crude oil).

Sample collected by Chas. Camsell, of the Geological Survey in August, 1916.

Sample No. 1292

Crude oil from Windy point, Great Slave lake.

Specific Gravity:—
At 15·5°C.....0·949

Distillation Tests:—

Temperature	Method "A"*		Method "B"*	
	% by volume	Sp. Gr. at 15·5° C.	% by volume	Sp. Gr. at 15·5° C.
0°–150° C.	0·9	....	0·9	....
150°–200° C°	0·2	....	0·1	....
200°–250° C.	0·1	....	1·1	0·85
250°–300° C.	14·2	0·871	46·9	0·863
Residue	84·6	0·956	47·2	0·983
Loss	0·0	....	3·8	....
Specific gravity of crude oil calculated from above results	....	0·940	....	0·921

The above results, especially those by method "B," are distinctly affected by "cracking."*

Sample taken by A. E. Cameron, Geological Survey, Ottawa, during the summer of 1917.

Sample No. 1718

Crude petroleum from a 260-foot to 272-foot horizon in the first well drilled by the Imperial Oil Co., at Oil creek, 45 miles below Fort Norman.

The oil is opaque and dark olive green. It is completely soluble in petroleum ether.

Specific Gravity:—
At 15·5° C. 0·839

Calorific Value: gross.....10320 calories per gram.
.....18580 B. Th. U. per lb.

Sulphur.....0·2%

*See Appendix A.

Distillation Tests:—

Temperature	Method "A"[1]	Method "B"[1]		
	% by volume	% by volume	Sp. Gr. at 15·5° C.	Colour
60°–100° C.....	6·5	7·0	0·687	Colourless.
100°–150° C.....	12·0	14·0	0·735	Colourless.
150°–200° C.....	12·5	12·0	0·783	Colourless, slightly opalescent.
200°–250° C.....	10·5	11·0	0·816	Colourless, opalescent.
250°–300° C.....	10·5	10·0	0·837	Very faint yellow, opalescent.
300°–350° C.....	10·0	12·0*	0·861	Straw yellow, opalescent.
Residue.....	38·0	34·0	0·929	Dark brown, with olive green tinge.

* Probably some "cracking"[1] here.

Specific gravity calculated from above test.....0·837

Sample sent in by Deputy Minister of Mines.

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[1]. See Appendix A.

APPENDIX A

Distillation Tests of Crude Petroleum and its Products

Crude Petroleum. Many methods of distillation are in common use, the most important of these being as follows:—

A. The Ubbelohde continuous method. 100 c.c. of the oil is distilled at a uniform rate, from a distillation flask of approximately the same dimensions as the standard Engler flask, by the continuous application of heat; the various fractions being collected between specified temperatures.

B. The Engler intermittent method. 100 c.c. of the oil is distilled from a glass distillation flask of specified dimensions (about 150 c.c. capacity). When the thermometer indicates the maximum temperature for the first fraction, the source of heat is removed and the temperature allowed to fall at least 20°C.; the flask is then reheated to the maximum of the fraction. This process is repeated until practically no more distillate is obtained. The succeeding fractions are collected in like manner.

C. The Hempel continuous fractionation method. 100 c.c. of the oil is distilled from a flask with a fractionating column attached. The column is filled with beads, preferably aluminium, and the distillation is carried out at a uniform rate by continuous heating.

A crude oil, especially when it contains a notable amount of water, may give so much trouble with bumping and frothing that it is impossible to make a regular test on the original sample. It is then customary to make a preliminary distillation, preferably under reduced pressure at the higher temperatures, and redistil the distillate in the regular way. The results are not strictly comparable with those on original samples.

The following table[1] illustrates the discrepancies between the results obtained with two of the above methods:—

TABLE I.

Method	A. Continuous	B. Intermittent
To 150° C.....%	5·2	9·5
150°–300° C.....%	32·3	32·7
Above 300° C.....%	56·0	52·9

From theoretical reasons it is clear that wide discrepancies must occur between the results of the different methods and the actual composition

[1] Rittmann and Dean: The Analytical Distillation of Petroleum, U.S. Bureau of Mines, Bul. 125, p. 8.

of the mixture distilled. Method C normally gives the closest results, but is little used and has less claim than the others to be regarded as standard. Method B generally gives closer results than A, especially for the lower fractions, but is very slow. Method A gives more concordant results between duplicate tests. In some cases neither B nor C can be used on account of the low temperature at which "cracking" begins. "Cracking" is the name given to the decomposition by heat of hydrocarbon or other compounds into new bodies of lower molecular weight and lower boiling point. Rittmann and Dean[1] found that California, Oklahoma, and Pennsylvania crude petroleums do not begin to crack below 325°C., but some careful tests with samples 1156, 1292 and 1293 (see pages 69, 70, and 73) showed that considerable cracking occurred with these oils below 300°C. In these cases the divergence between the results of the different methods was very considerable.

Petroleum Products. The International Petroleum Congress in 1912 officially adopted the Ubbelohde continuous method, but many modifications are in common use. These vary in the rate of heating, position of thermometer bulb, employment of a still head, etc. Thus in Dean's modification[2] the distillation rate is 4–5 c.c. per minute, and the condenser is ice-jacketed. Some results taken from Lomax[3] illustrate the variations to be expected in the results on gasoline with the method employed.

TABLE II.

Method	1	2	3
Volatile below 100° C.....%	8·5	17·0	21·5
" 125° C.....%	58·0	64·5	64·0
" 150° C.....%	88·5	92·0	90·5
Total distillate.....%	98·5	98·5	97·5
Residue.....%	1·4	1·2	2·1
Loss.....%	0·1	0·3	0·4

Method 1: Redwood, continuous. Method 2: Engler, intermittent (slightly modified). Method 3: Lomax, fractionating, continuous.

Most samples of oil, whether crude or refined, examined in the Fuel Testing Laboratories at Ottawa, were distilled in an Engler apparatus, having a metal flask and condenser, either by the continuous or intermittent method as stated.

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[1] Rittmann and Dean. The Analytical Distillation of Petroleum, U.S. Bureau of Mines, Bul. 125, p. 14.

Motor Gasoline, by E. W. Dean, U.S. Bureau of Mines, Tech. Paper 166.

Testing and Standardization of Motor Fuels. The Petroleum World, Vol. XIV, No. 206, Nov., 1917.

APPENDIX B

Classification of the Products of Oil Distillation

The temperature intervals for the various fractions into which oils are separated by distillation are not very well defined, and vary in different localities and with different individuals. For this reason, most analyses of oils reported from the Fuel Testing Laboratories have not stated the nature of the products of distillation, but merely the temperatures at which they were distilled.

However, for purposes of comparison, the following table of distillation temperatures is appended, which, it should be distinctly understood, is approximate and applicable only to the analyses of oils tabulated in this bulletin.

Gasoline and light naphthas	Up to 175°C.
Kerosenes and illuminating oils	175°-300°C.
Lubricating oils and residue	Above 300°C.