

**CONFIDENTIAL**ECONOMICSCoal Reserves

Considering the very early stage of exploration of the coalfield, it is not possible to accurately calculate coal reserves, and particularly, it is not possible to determine the tonnages of recoverable clean coal. Furthermore, coal seam correlations have not been established and it is not possible to project coal occurrences from place to place throughout the coalfield.

Coal Quality

Many coal seams have been sampled from surface outcrops and in widely spaced diamond drill holes. These analyses were discussed in foregoing sections of this report and are further summarized in Tables 1, 2, 3 and 4.

Surface Samples. - Coal analyses of surface samples taken from various localities throughout the coalfield may be summarized as follows (all seams are 3.0 feet or more in thickness):

1. The ash content of clean coal, floated at specific gravity 1.58, ranges from 5.19 to 10.81 percent.
2. The yield at the above gravity fractions varies from 6.4 to 83.9 percent (Heavy media at S.G. = 1.58 is too low for this semi-anthracite coal).
3. The volatile matter ranges from 1.80 to 18.68 percent.
4. The total sulfur varies from 0.32 to 0.81 percent with 69 percent of the samples containing less than 0.60 percent sulfur.
5. The calorific value of the cleaned coal ranges from 12,800 to 14,683 Btu.
6. Fixed carbon varies from 66.76 to 88.64 percent.

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ANALYSES OF DIAMOND DRILL CORE SAMPLES  
GROUNDHOG COALFIELD

D. D. R. Number	Sample Interval (ft.)	Sample Width	Crushed Size	Washability Test		Inherent Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Btu	Sulfur %	
				S.G.	Sink %							Float %
1	148.8-154.5	5.7'	1/2" x 0"		Raw coal analyses		0.46	52.81	5.91	40.82	6,298	.53
1	210.5-212.3	1.8'	1/2" x 0"		" "	0.64	35.90	4.82	58.64	9,255	.52	
1	347.5-355.0	7.5'	1/2" x 0"		" "	0.47	34.66	5.95	58.92	9,204	.34	
1	359.0-361.5	2.5'	1/2" x 0"		" "	0.58	22.90	5.28	71.24	11,418	1.23	
1	468.5-472.0	3.5'	1/2" x 0"		" "	0.43	32.93	6.61	60.03	9,560	1.87	
1	474.0-477.8	3.8'	1/2" x 0"		" "	0.52	56.20	9.36	33.92	5,395	2.19	
1	517.0-522.0	5.0'	1/2" x 0"		" "	0.44	25.28	5.01	ND	10,700	.54	
2	194.6-200.8	6.2'	1/2" x 0"		" "	0.49	36.88	4.21	58.42	8,966	.43	
2	243.0-244.9	1.9'	1/2" x 0"		" "	0.39	35.33	6.32	57.96	9,567	2.35	
2	245.6-248.5	2.9'	1/2" x 0"		" "	0.73	64.75	4.02	30.50	3,949	.24	
2	257.0-258.2	1.2'	1/2" x 0"		" "	0.48	47.62	3.02	48.88	7,344	.28	
2	263.5-265.6	2.1'	1/2" x 0"		" "	0.23	26.47	5.61	67.79	10,872	1.07	
2	336.2-340.7	4.5'	1/2" x 0"		" "	0.63	74.84	4.74	19.79	24	.34	
2	391.8-395.3	3.5'	1/2" x 0"		" "	0.55	57.66	4.89	36.90	5,398	2.45	
2	524.7-527.3	2.6'	1/2" x 0"		" "	0.29	24.52	3.69	71.50	11,405	2.24	
2	551.0-554.0	3.0'	1/2" x 0"		" "	0.22	37.84	6.25	55.69	9,018	2.16	
3	53.5-60.0	6.5'	1/2" x 0"	1.65	82.4	17.6	0.61	13.20	5.43	80.76	12,995	1.04
3	71.2-76.0	4.8'	1/2" x 0"	1.65	58.1	41.9	0.61	13.31	4.89	81.19	13,418	.83
3	116.0-117.5	1.5'	1/2" x 0"	1.65	48.8	51.2	0.86	20.79	6.60	71.75	11,403	.45
3	291.7-293.0	1.3'	1/2" x 0"	1.65	86.1	13.9	0.63	15.99	5.70	77.68	12,489	1.80
3	295.5-297.3	1.8'	1/2" x 0"	1.65	82.6	17.4	0.81	17.95	6.47	74.77	12,092	.62
3	308.0-309.3	1.3'	1/2" x 0"	1.65	68.8	31.2	0.42	11.80	4.94	82.84	13,303	.77
3	347.0-351.5	4.5'	1/2" x 0"	1.65	65.8	34.2	0.48	14.42	5.07	80.03	12,773	1.23
3	379.3-380.9	1.6'	1/2" x 0"	1.65	65.2	34.8	0.47	14.99	5.02	79.52	12,641	.49
3	383.3-387.8	4.5'	1/2" x 0"	1.65	74.3	25.7	0.41	10.90	4.35	84.34	13,406	.79
3	478.0-480.6	2.6'	1/2" x 0"	1.65	31.9	68.1	0.77	10.78	5.06	83.39	13,869	1.81
3	484.2-486.0	1.8'	1/2" x 0"	1.65	61.4	38.6	0.50	13.45	4.90	81.15	12,883	2.32
3	495.3-498.9	3.6'	1/2" x 0"	1.65	47.9	52.1	0.57	13.57	4.96	80.90	12,858	.92
4	98.2-100.2	2.0'	1/2" x 0"	1.65	39.4	60.6	0.71	10.25	5.84	83.20	13,373	.39
4	134.0-135.6	1.6'	1/2" x 0"	1.65	19.4	80.6	0.67	5.30	5.49	88.54	14,396	.78
4	237.3-239.3	2.0'	1/2" x 0"	1.65	30.6	69.4	0.63	6.63	5.62	87.12	14,147	1.31
4	240.9-242.1	1.2'	1/2" x 0"	1.65	77.3	22.7	0.50	12.26	5.63	81.61	13,323	2.70
4	259.7-263.8	4.1'	1/2" x 0"	1.65	50.7	49.3	0.50	9.58	5.96	83.96	13,723	.59
4	443.3-444.9	1.6'	1/2" x 0"	1.65	54.5	45.5	0.76	7.59	5.04	86.61	14,047	.62
4	448.2-450.0	1.8'	1/2" x 0"	1.65	52.3	47.7	0.81	8.93	5.58	84.68	14,321	.35
5	183.0-186.8	3.8'	1/2" x 0"	1.65	64.4	35.6	0.90	11.07	4.77	83.26	13,473	.31
5	206.1-209.5	3.4'	1/2" x 0"	1.65	62.2	37.8	0.84	11.28	5.06	82.82	13,448	.45
5	212.5-214.3	1.8'	1/2" x 0"	1.65	80.2	19.8	0.52	10.30	5.22	83.96	13,698	.70
5	215.0-217.5	2.5'	1/2" x 0"	1.65	82.4	17.6	0.85	11.38	4.74	83.03	13,473	.56
5	291.0-292.2	1.2'	1/2" x 0"	1.65	79.2	20.8	0.52	8.84	5.28	85.36	13,972	.70
5	362.0-366.0	4.0'	1/2" x 0"	1.65	90.5	9.5	0.58	4.50	4.50	90.42	14,596	.38
5	429.5-435.5	6.0'	1/2" x 0"	1.65	83.4	16.6	0.55	7.74	4.78	86.93	14,022	.74
5	527.0-533.6	6.6'	1/2" x 0"	1.65	73.0	27.0	0.74	8.57	4.53	86.16	13,847	.51
6	45.0-47.0	2.0'	1/2" x 0"	1.65	51.0	49.0	0.78	12.03	7.08	80.11	13,273	.42
6	154.5-156.8	2.3'	1/2" x 0"	1.65	55.4	44.6	0.65	6.37	8.05	84.93	14,296	1.00
6	215.8-217.1	1.3'	1/2" x 0"	1.65	45.8	54.2	0.71	11.53	9.04	78.72	12,949	.90
6	278.5-282.6	5.1'	1/2" x 0"	1.65	58.4	41.6	0.53	12.96	8.37	78.14	12,899	.75
6	355.6-340.9	5.3'	1/2" x 0"	1.65	40.9	59.1	0.24	10.32	7.40	82.09	13,648	.85

ANALYSES OF SURFACE SAMPLES OF COAL  
GROUNDHOG COALFIELD

Field Description	Sample Width	S.G.	Sink %	Float %	Inherent Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Btu	Sulfur %
L. 988, Trail Creek	5.2'	1.58	83.9	16.1	2.19	5.88	7.45	84.48	13,348	0.40
Trail Creek at B.C.A.C. cabin	2.7'	1.58	81.6	18.4	1.79	6.20	4.31	87.70	13,822	0.57
L. 988, Trail Cr., Evan's dump No. 3	Grab	1.58	80.3	19.7	1.29	6.58	6.34	85.79	13,322	0.52
L. 988, Trail Cr., Evan's dump No. 2	Grab	1.58	91.7	8.3	1.86	4.59	5.39	88.16	14,346	0.67
Trail Cr., Evan's dump No. 1	0.9'	1.58	97.2	2.8	1.67	3.22	4.86	90.25	14,471	0.52
L. 135, Abraham Cr. prospect	2.0'	1.58	13.9	86.1	2.54	4.96	11.08	81.42	13,149	0.40
Augustine Cr., sheared, graphitic	Grab	1.58	100.0	0.0	ND	ND	ND	ND	ND	ND
Duke Creek, 200 ft, east of mouth of creek	1.4'	1.58	97.9	2.1	1.39	3.54	3.87	91.20	13,847	0.85
L.136, Evan's No.14, near mouth of Trail Cr.	Grab	1.58	89.3	10.7	2.39	8.46	7.32	81.83	13,772	0.52
Head of Duke Cr., upper seam	1.5'	1.58	50.2	49.8	2.03	11.80	9.59	76.58	12,101	0.38
Head of Duke Cr., lower seam	1.0'	1.58	48.3	51.7	2.38	12.08	11.99	73.55	11,826	1.01
C.L.816, 30 ft. above creek, west side	1.1'	1.58	46.5	53.5	3.82	6.39	14.98	74.81	12,500	0.43
C.L.822, about 5300 ft. elev. Good coal. Dave Cr.	4.1'	1.58	16.1	83.9	1.32	5.19	11.45	82.04	13,174	0.50
Lower Discovery Cr. Good hard, clean coal	Grab	1.58	6.3	93.7	4.04	3.92	7.81	84.23	14,097	0.50
Davis Cr. at Skeena River	3.5'	1.58	93.6	6.4	1.52	5.59	4.25	88.64	13,872	0.64
Head of Jackson Cr., elev. 5810 ft.	3.5'	1.58	45.5	54.5	3.68	7.10	8.62	80.60	12,924	0.52
Little Cr., elev. 4100 ft.	2.0'	1.58	85.3	14.7	3.88	5.49	7.29	83.34	13,224	0.47
Discovery Cr., elev. 3800 ft. Float only	Grab	1.58	8.2	91.8	1.94	5.33	5.47	87.26	14,147	0.46
Telfer Cr.	Grab	1.58	76.5	23.5	1.63	8.22	7.37	82.78	13,972	0.58
Telfer Cr., elev. 3550 ft. dump sample	Grab	1.58	48.1	51.9	ND	6.36	6.78	84.62	13,772	0.53
Langlois Cr., elev. 3750 ft. Many occurrences	Grab	1.58	68.7	31.3	1.10	8.55	6.12	84.23	13,473	0.49
Langlois Cr., elev. 3750 ft., along creek	Grab	1.58	50.0	50.0	1.21	10.06	7.54	81.19	14,321	0.52
Discovery Cr., elev. 4470 ft., Upper Discovery Cr. seam	5.5'	1.58	15.1	84.9	1.64	5.25	8.82	84.29	14,047	0.32
Devil's Claw Mtn., elev. 5735 ft.	Grab	1.58	4.3	95.7	1.59	5.58	11.24	81.59	14,346	0.41
Lonesome Cr., Moss Mtn., dump sample, faulted	Grab	1.58	99.8	0.2	ND	ND	ND	ND	ND	ND
Langlois Cr., elev. 3550 ft.	Grab	1.58	68.1	31.9	ND	6.7	6.96	85.63	14,047	0.66
Langlois Cr., elev. 3650 ft.	Grab	1.58	71.1	28.9	ND	7.58	7.22	84.24	13,822	0.64
Langlois Cr., elev. 3725 ft.	Grab	1.58	55.1	44.9	ND	8.63	5.28	84.58	13,922	0.94
Moss Mt., elev. 5030 ft., dump	Grab	1.58	100.0	0.0	ND	ND	ND	ND	ND	ND
Beirnes Cr. - Currier Cr. pass. Some "peacock" coal	4.0'	1.58	60.9	39.1	ND	8.25	5.18	84.81	13,847	0.58
Beirnes Cr. - Currier Cr. pass, elev. 4775 ft.	Grab	1.58	23.7	76.3	ND	4.62	6.60	84.46	13,797	0.49

TABLE 2 CONTINUED  
 ANALYSES OF SURFACE SAMPLES OF COAL  
 GROUNDHOG COALFIELD

Field Description	Sample Width	S.G.	Sink %	Float %	Inherent Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Btu	Sulfur %
Northwest cor. C.L.815, elev. 5285 ft.	1.0'	1.58	57.3	42.7	ND	5.50	11.55	79.20	13,248	0.50
Northwest cor. C.L.815, elev. 5300 ft.	1.0'	1.58	30.1	69.9	ND	5.04	6.82	84.46	13,947	0.49
Northwest cor. C.L.815	3.0'	1.58	46.6	53.4	ND	8.64	5.81	83.48	13,673	0.81
Beirnes Cr. - Currier Cr. pass	Grab	1.60	6.7	93.3	2.59	6.44	6.87	84.10	13,997	0.46
SW $\frac{1}{2}$ SW $\frac{1}{2}$ C.L.820, elev. 5300 ft.	Grab	1.60	7.5	92.5	3.28	5.79	5.96	84.97	14,122	0.38
N. side Beirnes Cr., opposite Geoffry Cr.	2.6'	1.58	47.7	52.3	2.19	9.42	10.58	77.81	13,074	0.66
N. side Beirnes Cr., opposite Geoffry Cr.	2.5'	1.58	41.7	58.3	1.37	6.73	15.98	82.69	13,199	0.44
N. side Beirnes Cr., opposite Geoffry Cr.	1.9'	1.58	36.1	63.9	2.01	11.88	9.53	76.58	12,550	0.29
N. side Beirnes Cr., opposite Geoffry Cr.	6.5'	1.58	51.5	48.5	1.41	8.28	10.63	79.69	13,523	0.67
S. side Davis Cr., near Skeena River	4.0'	1.58	87.4	12.6	1.92	5.66	5.33	87.09	13,648	0.75
N. side Davis Cr., near Skeena River	2.4'	1.58	91.0	9.0	1.41	4.24	5.34	89.01	14,346	0.58
E. side Jackson Cr., elev. 2990 ft.	8.3'	1.58	95.8	4.2	2.12	6.33	11.61	79.94	10,304	0.46
E. side Jackson Cr., elev. 3180 ft.	1.4'	1.58	60.8	39.2	1.80	7.17	8.72	82.31	13,723	0.49
Ridge east side Anthracite Cr.	3.3'	1.58	70.7	29.3	3.75	10.81	18.68	66.76	12,800	0.48
Ridge east side Anthracite Cr.	5.2'	1.58	31.1	68.9	1.02	9.52	15.29	74.17	13,797	0.38
Mt. Alex	1.6'	1.58	16.6	83.4	1.49	8.42	13.29	76.80	13,398	0.45
Upper part Scott seam, Beirnes Cr.	3.8'	1.58	86.6	13.4	1.21	8.34	4.87	85.58	13,772	0.47
Lower part Scott seam, Beirnes Cr.	5.9'	1.58	65.1	34.9	1.43	9.60	1.80	87.17	13,747	0.52
Garneau seam, north side Beirnes Cr.	2.7'	1.58	73.1	26.9	1.16	8.88	2.56	87.40	13,997	0.44

TABLE 3  
ANALYSES OF COMPOSITES FROM WASHABILITY TESTS  
WHICH WERE MADE ON DIAMOND DRILL CORE SAMPLES

Remarks	D.D.H. Number	Sample Interval	Sample Width (ft.)	Crushed Size	Specific Gravity Fraction Assayed	Float %	Ash %	Volatile Matter %	Fixed Carbon %	Btu	Sulfur %
Scott seam	1	148.8-154.5	5.7'	3/8" x 0	1.75 Composite	28.0	15.24	6.62	78.14	12,143	0.47
Ross seam, Top part	1	347.5-355.0	7.5'	3/8" x 0	1.75 Composite	58.1	10.99	5.66	83.35	12,894	0.46
Ross seam, Bottom part	1	359.0-361.5	2.5'	3/8" x 0	1.75 Composite	75.1	11.11	6.41	82.48	13,109	0.84
Beirnes No.5 seam, bottom part	1	474.0-477.8	3.8'	3/8" x 0	1.70 Composite	28.0	15.73	6.90	77.37	12,266	0.52
Beirnes No.6 seam	1	517.0-522.0	5.0'	3/8" x 0	1.70 Composite	66.7	13.05	6.88	80.07	12,614	0.60
Upper Discovery Creek seam	2	194.6-200.8	6.2'	3/8" x 0	1.75 Composite	58.3	9.43	5.70	84.87	13,522	0.43
Composite of 2 intersections	2	243.0-244.9									
	2	245.6-248.5	4.8'	3/8" x 0	1.70 Composite	18.8	10.28	6.27	83.45	13,155	1.15
	2	336.2-340.7	4.5'	3/8" x 0	1.70 Composite	4.7	12.49	7.25	80.26	12,909	0.69
Lower Discovery Creek seam	3	53.5- 60.0	6.5'	3/8" x 0	1.75 Composite	23.7	17.09	7.58	75.33	11,966	0.97
	3	71.2- 76.0	4.8'	3/8" x 0	1.75 Composite	38.9	13.08	6.21	80.71	12,645	0.77
	5	183.0-185.9	2.9'	3/8" x 0	1.75 Composite	36.1	14.01	5.72	80.27	12,293	0.49
	5	206.1-209.5									
	5	212.5-214.3									
Composite of 3 intersections	5	215.0-217.5	7.7'	3/8" x 0	1.75 Composite	28.0	15.85	6.30	77.85	12,075	0.69
Abraham Creek seam	6	278.5-283.6	5.1'	3/8" x 0	1.75 Composite	55.7	19.76	9.45	70.79	11,746	0.74
	6	335.6-340.9	5.3'	3/8" x 0	1.75 Composite	69.7	12.53	6.90	80.57	12,947	0.88

on back.

TABLE 4

Attitude of Coal Seams and Proximate Analyses of Coal in Groundhog Coalfield  
as Recorded by All Workers in the Coalfield Since 1904.  
These Sample Locations are Shown on Plate III.

Map Loc. No.	Report Page No.	Sample Location, Sampler	Date of Sample	Strike	Dip	Sample Width	Float		Inherent Moisture %	Ash %	Vol. Matter %	Fixed Carbon %	Btu	Sulfur %
							S.G.	Yield %						
1		S. Fk. Anthony Cr., G. S. Malloch	1911	N. 76 E.	17 S.E.	6.1 ft.	Raw coal anal.		4.09	41.14	8.48	46.29		
2		McEvoy Ridge, G.S. Malloch	1911			Spec.	" " "		2.23	19.65	13.73	64.39		
3		Augustine Cr., G. W. Evans	1911	N. 52 W.	10 N.E.	1.7	" " "		3.75	27.10	6.47	62.68	10,290	0.86
4		Brewer Creek, G. W. Evans	1911	N. 68 W.	39 S.W.	3.8	" " "		4.52	20.80	4.75	69.93	11,900	2.31
5	67	Lower Trail Cr., top bench W. W. Leach	1904	N. 47 W.	17 N.E.	4.5	" " "		4.71	20.75	7.03	67.51		
6	67	Lower Trail Cr., bottom bench, W. W. Leach	1904	N. 47 W.	17 N.E.	3.6	" " "		3.40	28.75	8.08	59.77		
7	67	Lower Trail Cr., J. McEvoy	1911	N. 47 W.	17 N.E.	6.7	" " "		1.39	29.84	5.75	63.02	10,541	1.08
8	67	Lower Trail Cr., J.F. Walter	1904	N. 47 W.	17 N.E.	6.7	" " "		1.57	37.37	7.49	53.57		
9	67	Lower Trail Cr., G. S. Malloch	1911	N. 47 W.	17 N.E.	6.5	" " "		1.36	42.41	7.17	49.04		
10	67	Lower Trail Cr., W. F. Robertson	1912	N. 47 W.	17 N.E.	6.8	" " "		2.5	48.8	6.1	42.6		
11	67	Trail Cr., W.F. Robertson	1912	N. 5 W.	14 N.E.	Spec.	" " "		2.3	21.5	5.1	71.1		
12	67	Trail Cr., W.F. Robertson	1912	N. 5 W.	14 N.E.	3.8	" " "		2.7	38.3	5.6	53.4		
13	69	Little Cr., G. W. Evans	1911	N. 15 W.	25 N.E.	2.3	" " "		4.42	30.04	6.58	58.96	9,930	1.61
14	69	Little Cr., Jackson No. 1, G. W. Evans	1911	N. 15 W.	25 N.E.	2.3	" " "		4.01	25.20	13.08	57.71	9,600	2.42
15		Jackson Cr., Jackson No. 2, G. W. Evans	1911	N. 40 W.	74 S.W.	4.0	" " "		2.45	29.73	3.86	63.96	10,280	1.93
16	68	Jackson Cr., Jackson No. 4, G. W. Evans	1911	N. 56 W.	20 N.E.	2.7	" " "		2.71	23.78	6.09	67.42	12,650	3.05
17	68	Jackson Cr., Jackson No.3, G. W. Evans	1911	N. 45 W.	35 S.E.	4.4	" " "		2.97	25.84	5.59	65.60	11,520	1.90
18		Mt. Jackson, G.S. Malloch	1911	N.R.	N.R.	3.3	" " "		10.16	20.32	23.73	45.79		
19		Mt. Jackson, G.S. Malloch	1911	N. 53 W.	40 S.W.	6.2	" " "		10.52	26.52	22.15	40.81		
20		Lower Jackson Cr., W. W. Leach	1904	N.R.	N.R.	7.0	" " "		6.42	22.80	9.83	60.95		
21		Skeena River below Duke Cr., W. W. Leach	1904	N. 64 W.	27 N.E.	3.5	" " "		3.66	35.22	7.30	53.82		
22		Abraham Cr., J. F. Walter	1904	N.R.	N.R.	6.0	" " "		2.48	27.90	5.20	64.42		
23	57	Abraham Cr., J. McEvoy	1911	N.R.	N.R.	6.0	" " "		1.17	16.58	6.05	76.20	12,215	0.72
24	57	Abraham Cr., G.S. Malloch	1911	N. 54 E.	16½ N.	5.6	" " "		1.04	22.68	8.39	67.89		
25	57	Abraham Cr., W.F. Robertson	1912	N. 90 E.	8 N.	5.9	" " "		2.5	27.1	8.1	62.3		
26		Abraham Cr., G.W. Evans	1911	N.R.	N.R.	5.9	" " "		3.0	24.4	6.6	66.0		
27	57	Abraham Cr., D.M. Jenkins	1970	N. 90 E.	15 N.	2.0	1.58		2.54	4.96	11.08	81.42	13,149	0.40
28		Discovery Creek., lower tunnel, J. McEvoy	1911	N. 68 E.	9 N.E.	5.3	Raw coal anal.		2.39	11.17	7.90	78.54		0.99

TABLE 4 (continued)

Attitude of Coal Seams and Proximate Analyses of Coal in Groundhog Coalfield  
as Recorded by All Workers in the Coalfield Since 1904.  
These Sample Locations are Shown on Plate III

Map Loc. No.	Report Page No.	Sample Location, Sampler	Date of Sample	Strike	Dip	Sample Width	Float		Inherent Moisture %	Ash %	Vol. Matter %	Fixed Carbon %	Btu	Sulfur %
							S.G.	Yield %						
29	50	Discovery Cr., lower tunnel, J. F. Walter	1904	N. 68 E.	9 N.E.	5.6 ft.	Raw coal anal.		3.83	27.66	6.37	62.14		
30	50	Discovery Cr., lower tunnel, Chas. Fergie	1904	N. 68 E.	9 N.E.	1.6	" " "		4.12	5.85	7.43	82.60	12,775	0.46
31	50	Discovery Cr., lower tunnel, Chas. Fergie	1904	N. 68 E.	9 N.E.	3.8	" " "		3.95	4.05	8.00	84.00	12,995	0.49
32	50	Discovery Cr., lower tunnel, J. McEvoy	1911	N. 68 E.	9 N.E.	6.1	" " "		2.62	5.93	6.96	84.49	13,814	0.57
33	50	Discovery Cr., lower tunnel, G. S. Malloch	1911	N. 68 E.	9 N.E.	5.5	" " "		2.88	10.64	7.64	78.84		
34		Discovery Cr., lower tunnel, J. McEvoy	1911	N. 68 E.	9 N.E.	Spec.	" " "		2.80	7.90	3.70	85.6		
35	52	Discovery Cr., lower dump W. D. Tompson	1970			Grab	1.58		3.92	7.81	84.23	14,097		0.50
36	52	Lower Discovery Cr., drill core, W. D. Tompson	1970	Core	Core	6.5	1.65	17.6	0.61	13.20	5.43	80.76	11,966	0.97
37	53	Lower Discovery Cr., drill core, W. D. Tompson	1970	Core	Core	6.5	1.75	23.7		17.09	7.58	75.33	11,966	0.97
38	54	Discovery Cr., upper tunnel, W. W. Leach	1904	N. 22 W.	16 N.E.	5.8	Raw coal anal.		5.75	11.65	7.34	75.26		
39	54	Discovery Cr., upper tunnel, W. W. Leach	1904	N. 22 W.	16 N.E.	5.8	" " "		1.45	15.81	7.51	75.23		
40	54	Discovery Cr., upper tunnel, J. F. Walter	1904	N. 22 W.	16 N.E.	5.4	" " "		4.45	7.55	8.75	79.25		
41	54	Discovery Cr., upper tunnel, J. McEvoy	1911	N. 22 W.	16 N.E.	5.4	" " "		1.17	8.92	6.54	83.37	13,328	0.74
42	55	Discovery Cr., upper tunnel, W. D. Tompson	1970	N. 10 W.	15 E.	5.5	1.58		1.64	5.25	8.82	84.29	14,047	0.32
43	55	Discovery Cr., upper tunnel, W. D. Tompson	1970	N. 10 W.	15 E.	5.5	1.75			4.91	6.20	88.89	14,012	0.45
44	55	Upper Discovery Cr., drill core, W. D. Tompson	1970	Core	Core	6.2	Raw coal anal.		0.49	36.88	4.21	58.42	8,966	0.43
45	57	Upper Discovery Cr., drill core, W. D. Tompson	1970	Core	Core	6.2	1.75	58.3		9.43	5.70	84.87	13,552	0.43
46	49	Lower Davis Cr., J. McEvoy	1911	N.R.	21 S.	4.7	Raw coal anal.		1.40	21.86	6.06	70.68	11,788	1.60
47	49	Lower Davis Cr., G. S. Malloch	1911	N.R.	21 S.	4.7	" " "		1.57	25.36	7.55	65.52		
48	49	Upper Davis Cr., J. McEvoy	1911	N. 70 W.	N.E.		" " "		4.72	12.61	10.65	72.02		0.65
49		Skeena River, G.S. Malloch	1911	N.R.	N.R.	Spec.	" " "		3.24	20.17	7.67	68.92		
50	48	No. 1, Anthracite Cr., R. C. Campbell-Johnson	1911	N.R.	N.R.	4.9	" " "			14.73	13.51	71.76		0.16

TABLE 4 (continued)

Attitude of Coal Seams and Proximate Analyses of Coal in Groundhog Coalfield  
as Recorded by All Workers in the Coalfield Since 1904.

These Sample Locations are Shown on Plate III

Map Loc. No.	Report Page No.	Sample Location, Sampler	Date of Sample	Strike	Dip	Sample Width	Float		Inherent Moisture %	Ash %	Vol. Matter %	Fixed Carbon %	Btu	Sulfur %
							S.G.	Yield %						
51	48	No. 2 Anthracite Cr., G. F. Monckton	1911	N. 23 W.	45 S.W.	3.0 ft.								
52	48	No. 3 Anthracite Cr., R.C. Campbell-Johnston	1911	N. 23 W.	45 S.W.	3.0 ft.								
53	48	No. 3 Anthracite Cr., G. S. Malloch	1911	N. 88 W.	21 S.	5.9				19.86	6.78	73.36		0.12
54	39	Benoit seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N. 88 W.	21 S.	3.9				6.15	6.98	86.74		0.13
55	39	Benoit seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N. 55 W.	30 N.E.	6.3			6.09	14.69	13.70	65.52		
56	40	Scott seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N. 55 W.	30 N.E.	6.3			3.0	15.0	6.6	74.6		0.8
57	40	Scott seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N.R.	N.R.				4.5	10.0	4.6	80.1		0.8
58	40	Scott seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N.R.	N.R.					19.19	9.72	71.07		0.02
59	40	Scott seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N.R.	N.R.				3.5	10.00	4.6	81.10		0.8
60	40	Scott seam, Beirnes Cr., R.C. Campbell-Johnston	1911	N.R.	N.R.					13.13	11.17	75.66		0.04
61	41	Scott seam, Beirnes Cr., W. D. Tompson	1911	N.R.	N.R.				4.5	13.0	4.5	77.0	12,323	1.0
62	41	Scott seam, Beirnes Cr., W. D. Tompson	1970	N. 65 W.	29 N.E.	3.8			4.5	10.0	6.5	78.0	12,843	1.0
63	41	Scott seam, Drill core, W. D. Tompson	1970	N. 65 W.	29 N.E.	5.9	1.58		1.21	8.34	4.87	85.58	13,772	0.47
64	41	Scott seam, Drill core, W. D. Tompson	1970	Core	Core	5.7	1.58		1.43	9.60	1.80	87.17	13,747	0.52
65	42	Garneau seam, Beirnes Cr., R.C. Campbell-Johnston	1970	Core	Core	5.7	Raw coal anal.		0.46	52.81	5.91	40.82	6,298	0.53
66	43	Garneau seam, Beirnes Cr., W. D. Tompson	1911	N.R.	N.R.	3.0	1.75 28.0			15.24	6.62	78.14	12,143	0.47
67	43	Garneau seam, Drill core, W. D. Tompson	1970	N. 55 W.	29 N.E.	2.7	Raw coal anal.		4.00	8.50	4.00	82.50	13,455	1.00
68	43	Ross seam, Beirnes Cr., R.C. Campbell-Johnston	1970	Core	Core	1.8	1.58		1.16	8.88	2.56	87.40	13,997	0.44
69	44	Ross seam, top part, W. D. Tompson	1911	N.R.	N.R.		Raw coal anal.		0.64	35.90	4.82	58.64	9,255	0.52
70	44	Ross seam, top part, W. D. Tompson	1970	Core	Core	7.2	" " "			8.96	9.33	80.94		0.77
			1970	Core	Core	7.2	" " "		0.47	34.66	5.95	58.92	9,204	0.34
							1.75 58.1			10.99	5.66	83.35	12,894	0.46



TABLE 4 (continued)

Attitude of Coal Seams and Proximate Analyses of Coal in Groundhog Coalfield  
as Recorded by All Workers in the Coalfield Since 1904.  
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Map Loc. No.	Report Page No.	Sample Location, Sampler	Date of Sample	Strike	Dip	Sample Width	Float		Inherent Moisture %	Ash %	Vol. Matter %	Fixed Carbon %	Btu	Sulfur %
							S.G.	Yield %						
71	44	Ross seam, bottom part, W. D. Tompson	1970	Core	Core	2.3 ft.		Raw coal anal.	0.58	22.90	5.28	71.24	11,418	1.23
72	44	Ross seam, bottom part, W. D. Tompson	1970	Core	Core	2.3	1.75	75.1		11.11	6.41	82.48	13,109	0.84
73	46	Beirnes No. 5, top part, W. D. Tompson	1970	Core	Core	3.5		Raw coal anal.	0.43	32.93	6.61	60.03	9,560	1.87
74	46	Beirnes No. 5, bottom part, W. D. Tompson	1970	Core	Core	3.8	"	" "	0.52	57.20	9.36	33.92	5,395	2.19
75	46	Beirnes No. 5, top part, W. D. Tompson	1970	Core	Core	3.5	1.70		No	assay	data			
76	46	Beirnes No. 5, bottom part, W. D. Tompson	1970	Core	Core	3.8	1.70	28.0		15.73	6.90	77.37	12,266	0.52
77	47	Beirnes No. 6, Beirnes Cr. W. D. Tompson	1970	Core	Core	4.4		Raw coal anal.	0.44	25.28	5.01	N.D.	10,700	0.54
78	47	Beirnes No. 6, Beirnes Cr. W. D. Tompson	1970	Core	Core	4.4	1.70	66.7		13.05	6.88	80.08	12,614	0.60
79	45	Pelletier seam, Beirnes Cr. R.C. Campbell-Johnston	1911	N. 55 W.	82 N.E.			Raw coal anal.		24.91	8.42	64.93		1.74
80	45	Pelletier seam, Beirnes Cr. R.C. Campbell-Johnston	1911	N. 55 W.	82 N.E.			" " "	4.00	20.00	4.00	71.00	11,340	1.00
81	45	Pelletier seam, Beirnes Cr. R.C. Campbell-Johnston	1911	N. 55 W.	82 N.E.			" " "	4.00	28.00	7.00	60.00	10,374	1.00
82	45	Pelletier seam, Beirnes Cr. R.C. Campbell-Johnston	1911	N. 55 W.	82 N.E.			" " "	4.50	7.50	3.50	83.50		1.00
83	48	Beirnes Cr., opposite Geoffrey Cr., W.D. Tompson	1970			2.6	1.58		2.19	9.42	10.58	77.81	13,074	0.66
84	48	Beirnes Cr., opposite Geoffrey Cr., W.D. Tompson	1970			2.5	1.58		1.37	6.73	15.98	82.69	13,199	0.44
85	48	Beirnes Cr., opposite Geoffrey Cr., W.D. Tompson	1970			1.9	1.58		2.01	11.88	9.53	76.58	12,550	0.29
86	48	Beirnes Cr., opposite Geoffrey Cr., W.D. Tompson	1970			6.5	1.58		1.41	8.28	10.63	79.69	13,523	0.67
87	60	Telfer Cr., seam "A", G. W. Evans	1911	N. 75 W.	65 N.E.	4.7		Raw coal anal.	3.55	21.75	4.02	70.68	11,980	0.99
88	63	Telfer Cr., seam "A" (?), W. D. Tompson	1970	Core	Core	6.6	1.65	27.0	0.74	8.57	4.53	86.16	13,847	0.51
89	63	Telfer Cr., No. 1 (?), W. D. Tompson	1970	Core	Core	6.0	1.65	16.6	0.55	7.74	4.78	86.93	14,022	0.74
90	60	Telfer Cr., No. 2, G. W. Evans	1911	N. 22 W.	25 N.E.	5.1		Raw coal anal.	3.75	34.36	5.74	56.15	9,600	1.57
91	63	Telfer Cr., No. 2 (?), W. D. Tompson	1970	Core	Core	1.2	1.65	20.8	0.52	8.84	5.28	85.36	13,972	0.70

TABLE 4 (continued)

Attitude of Coal Seams and Proximate Analyses of Coal in Groundhog Coalfield  
as Recorded by All Workers in the Coalfield Since 1904  
These Sample Locations are Shown on Plate III

Map Loc. No.	Report Page No.	Sample Location, Sampler	Date of Sample	Strike	Dip	Sample Width	Float		Inherent Moisture %	Ash %	Vol. Matter %	Fixed Carbon %	Btu	Sulfur %
							S.G.	Yield %						
92	60	Telfer Cr., No. 3, G. W. Evans	1911	N. 9 E.	29 N.E.	3.3 ft.		Raw coal anal.	4.50	41.52	6.25	47.73	7,800	0.99
93	63	Telfer Cr., No. 3 (?), W. D. Tompson	1970	Core	Core	7.7	1.65	+19 Avg.	0.76	10.82	4.99	83.15	13,514	0.54
94	62	Telfer Cr., No. 4, G. W. Evans	1911	N. 30 W.	30 N.E.	5.0		Raw coal anal.	3.77	34.21	4.27	57.75	9,580	0.60
95	63	Telfer Cr., No. 4 (?), W. D. Tompson	1970	Core	Core	3.8	1.65	35.6	0.90	11.07	4.77	83.26	13,473	0.31
96	63	Telfer Cr., No. 7, G. W. Evans	1911	N. 90 E.	17 N.	3.5		Raw coal anal.	5.95	34.06	13.32	46.67	9,360	0.44
97	59	Langlois Cr., elev. 3550, W. D. Tompson	1970		Float sample		1.58			6.7	6.96	85.63	14,074	0.66
98	59	Langlois Cr., elev. 3650, W. D. Tompson	1970	"	"		1.58			7.58	7.22	84.24	13,822	0.64
99	59	Langlois Cr., elev. 3725, W. D. Tompson	1970	"	"		1.58			8.63	5.28	84.58	13,922	0.94
100	59	Langlois Cr., elev. 3750, W. D. Tompson	1970	"	"		1.58		1.10	8.55	6.12	84.23	13,473	0.49
101	59	Langlois Cr., elev. 3750, W. D. Tompson	1970	"	"		1.58		1.21	10.06	7.54	81.19	14,321	0.52
102	65	Duke Cr. at Skeena Rv., D. M. Jenkins	1970	N.R.	N.R.	1.3	1.58		1.39	3.54	3.87	91.20	13,847	0.85
103	65	Duke Cr., elev. 4650, upper, D. M. Jenkins	1970	N.R.	N.R.	1.5	1.58		2.03	11.80	9.59	76.58	12,101	0.38
104	65	Duke Cr., elev. 4650, lower, D. M. Jenkins	1970	N.R.	N.R.	1.0	1.58		2.38	12.08	11.99	73.55	11,826	1.01
105	70	Dave Cr., No. 3, D. M. Jenkins	1970	N. 44 W.	55 S.W.	6.0	1.58		1.32	5.19	11.45	82.04	13,174	0.50
106	70	Beirnes Cr. - Currier Cr. pass, W. D. Tompson	1970	N. 80 E.	7 N.	4.0	1.58			8.25	5.18	84.81	13,847	0.58
107	71	Beirnes Cr. - Currier Cr. pass, W. D. Tompson	1970		Float sample		1.58			4.62	6.60	84.46	13,797	0.49
108	68	Jackson Cr., elev. 2990, D. M. Jenkins	1970	N. 5 E.	30 S.E.	8.3	1.58		2.12	63.33	11.61	79.94	10,304	0.46
109	57	Abraham Cr. seam, W. D. Tompson	1970	Core	Core	5.1	1.75	55.7		19.76	9.45	70.79	11,746	0.74
110		Table Mtn., J. M. Black	1968	N.R.	N.R.	N.R.	N.R.	N.R.	4	35.4	6.2	54.4	N.R.	N.R.
111		Table Mtn., J. M. Black	1968	N.R.	N.R.	N.R.	N.R.	N.R.	4	50.0	8.0	38.0	N.R.	N.R.
112		Table Mtn., J. M. Black	1968	N.R.	N.R.	N.R.	N.R.	N.R.	6	50.0	7.0	7.0	N.R.	N.R.

N.D. Not determined

N.R. Not recorded

Spec. Specimen

The average quality of coal from surface samples taken throughout the coalfield may be summarized as follows:

Yield at S.G. = 1.58	42.8 %
Ash	7.8
Volatile matter	8.6
Fixed carbon	83.0
Sulfur	0.6
Btu	13,631

Drill Core Samples. - Diamond drill core samples are all from Target Areas "C" and "D" (see pp. 39 to 58). All intersections of coal seams which have thicknesses greater than 3.0 feet are summarized as follows:

1. The ash content of the clean coal floated at specific gravities 1.65 to 1.75, ranges from 4.5 to 19.7 percent.
2. The yield at the above gravity fractions varies from 4.7 to 66.7 percent.
3. Inherent moisture content is from 0.24 to 0.90 percent.
4. Volatile matter ranges from 4.89 to 9.45 percent.
5. Total sulfur varies from 0.38 to 1.23 percent.
6. Calorific value ranges from 11,746 to 14,596 Btu.
7. Fixed carbon is from 70.79 to 90.42 percent.

The average quality of coal from diamond drill core samples in Target Areas "C" and "D" may be summarized as follows:

Yield at S.G. 1.65 to 1.75	34.8 %
Ash	11.9
Moisture	.5
Volatile matter	5.8
Fixed carbon	81.8
Btu	13,102
Sulfur	.70

Estimate of Costs

It may be assumed that coal production from the Groundhog coalfield would be from open pit and underground mining operations.

However until details of the geology of the coal seams are known it is not possible to determine how the seams may be mined or what the mining costs would be.

It is estimated that approximately 1.5 million tons of coal per year will be required for a thermal power generating station. Cost of a wash plant to process that volume of coal is on the order of \$14,000,000. Cost of a heavy media plant to process 1.5 million tons of coal per year is about \$60,000,000.

It is estimated that in underground mining by room and pillar techniques, about 60 percent of the coal will be extracted and that up to half of the remaining pillars may be recovered from retreat.

In producing from an open pit mine about 75 to 80 percent of the coal will be recovered. Strip ratios up to 10 yards of overburden per ton of coal are probably acceptable.

It is anticipated that the yield from heavy media separation would be about 50 percent at a specific gravity somewhere between 1.60 and 1.70.

In other British Columbia coal mining operations costs are approximately as follows:

Underground mining	\$20.00 per ton
Coal washing	3.00 per ton
Open pit mining, Costs vary widely, up to	12.00 per ton
Reclamation	1.00 - 2.00 per ton

Since its' discovery the principal deterrant to production from the Groundhog coalfield, has been a lack of adequate transportation. The arrival of B.C. Railway at the Groundhog relieves many of these problems. Specifi-

cally, rail transportation of mining equipment and ancillary supplies and equipment to the coalfield will be available in 1977.

### CONCLUSIONS

Coal-bearing rocks occur throughout an area of more than 100 square miles in the Groundhog coalfield. Geological mapping shows that an area of about 58 square miles contains coal seams in which structural disturbance is thought to be minimal. The coal beds are folded and faulted, but certain areas exist where thick coal seams are relatively undisturbed. Coal seam thicknesses are from 2.5 feet to 11 feet. It is not known how many coal seams occur, but there are probably more than 10.

Coal exploration Target Areas are identified as areas "A", "B", "C" and "D" and are assigned a priority due to their geographical locations, geological setting and available coal quality data.

The average coal quality of all coal seams greater than 3.0 feet in thickness, from both surface sampling and from diamond drill intersections, is summarized as follows:

Average yield at various specific gravities from 1.58 to 1.75	38.8 %
Ash	9.8
Volatile matter	7.2
Moisture	.5
Fixed carbon	82.4
Sulfur	<u>.6</u>
Total	100.5
Btu	13,366

The coal is a high quality thermal coal, suitable for thermal power generating stations.

It is not possible to correlate coal seams due to insufficient geological information and lack of drill data. Thus it is not possible to estimate coal reserves.

Exploration Target Areas "B", "C" and "D" cover 35 square miles of low lying ground along Skeena River. These areas offer the greatest possibility for the discovery of coal seams of economic potential.

#### RECOMMENDATIONS

It is recommended that an aggressive exploration program be conducted in order to complete the evaluation of the economic potential of the coalfield. A three year program is proposed:

##### First Year

1. Detailed geological mapping, stratigraphic studies and paleontological studies should be conducted throughout the four target areas so that coal seam correlation may be established.
2. Make several openings in coal seams to aid in coal seam correlations. This would also provide an opportunity to acquire samples of coal for washability tests and other analyses (these near-surface samples would be subject to oxidation and contamination by ground water movement through the coal seams).
3. Select two primary targets for diamond drilling during the second year.

##### Second Year

1. Diamond drilling should be conducted in each of two primary target areas. Each should be drilled for a total of 10,000 feet, recovering HQ core.
2. Establish coal seam correlations.
3. Estimate coal reserves.
4. Make preliminary assessment of probable mining methods.
5. Conduct washability tests on coal samples from drill core.
6. Establish estimates of recoverable coal in various coal seams throughout part of the coalfield.

7. Identify principal target area for further exploration. This target area should possess the greatest potential for development of 50 million tons of clean coal.

Third Year

1. An intensive diamond drilling program of 30,000 feet should be directed toward outling coal reserves in the principal target area.
2. Several exploration adits should be driven in order to test underground mining conditions.
3. Large coal samples from underground will be required for washability tests and pilot plant tests.

Estimated Cost of the Exploration Program

It was shown on page 77 that the estimated cost of conducting the three-year exploration project will be \$2,958,000.

First Year		
Geology, engineering, prospecting, and coal testing	\$ 184,000	
Camp operation, various travel costs and communications	49,000	
Fixed wing aircraft charter, helicopter contract, rail and highway travel	98,000	
Administration	<u>17,000</u>	\$ 348,000
Second Year		
Diamond drilling, 20,000 feet	330,000	
All other costs	<u>280,000</u>	610,000
Third Year		
Diamond drilling, 30,000 feet	500,000	
Underground testing	1,000,000	
All other costs	<u>500,000</u>	2,000,000
Total		\$2,958,000

BIBLIOGRAPHY

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CERTIFICATE

I, Willard D. Tompson of Smithers, British Columbia,  
do hereby certify:

1. That I am a consulting geologist, residing at  
Van Gaalen Road, Smithers, British Columbia
2. That I have practised my profession for more  
than 18 years
3. That I prospected and explored in the Groundhog  
coalfield from June to October, 1969
3. That I managed an exploration program in the  
Groundhog coalfield during 1970 and was actively  
engaged in geological field work during the  
period June 1, 1970 and October 15, 1970.

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Willard D. Tompson  
March 25, 1977

APPENDIX II

WASHABILITY TESTS, WASHABILITY  
CURVES AND PROXIMATE ANALYSES  
OF COMPOSITE FLOAT SAMPLES

**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 728-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29606  
Composite 1.75 Float = 98.8% of  
crushed to 16M x 0

Report No. 67-0478

PROXIMATE ANALYSIS

	<u>DRY BASIS</u>
% Ash	4.91
% Volatile	6.20
% Fixed Carbon	88.89
	<u>100.00</u>
Btu	14012
% Sulfur	0.45
FREE SWELLING INDEX	0

Outcrop sample, Upper Discovery Creek seam, 5.5 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.
  
R. A. Houser,  
District Manager

RAH/rh



Sample No. 29606, Sample  
crushed to 16M x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0276 - 67-0285

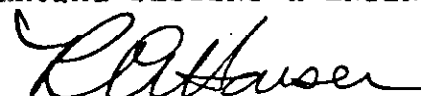
FLOAT & SINK ANALYSIS

November 30, 1970

SPECIFIC GRAVITY		CUMULATIVE RECOVERY						CUMULATIVE REJECT		
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	0.7	2.47	0.44	0.7	2.47	0.44	100.0	5.85	0.45
1.40	1.50	48.1	3.21	0.47	48.8	3.20	0.47	99.3	5.87	0.45
1.50	1.60	44.7	6.35	0.44	93.5	4.71	0.46	51.2	8.37	0.43
1.60	1.65	3.7	13.39	0.39	97.2	5.04	0.45	6.5	22.29	0.34
1.65	1.70	1.0	19.08	0.35	98.2	5.18	0.45	2.8	34.05	0.28
1.70	1.75	0.6	21.95	0.32	98.8	5.28	0.45	1.8	42.37	0.24
1.75	1.80	0.3	26.30	0.29	99.1	5.34	0.45	1.2	52.58	0.20
1.80	1.90	0.3	32.26	0.26	99.4	5.43	0.45	0.9	61.34	0.16
1.90	2.00	0.1	42.00	0.25	99.5	5.46	0.45	0.6	75.88	0.12
2.00		0.5	82.65	0.09	100.0	5.85	0.45	0.5	82.65	0.09

Outcrop, Upper Discovery Creek seam, 5.5 ft.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/ch

Job Quintana Minerals Corp.  
 Lab. No. 67-0276 - 67-0285  
 Mine Sample No. 29606  
 Size Cr. to 16M x 0  
 Raw Coal Ash 5.85%  
 Raw Coal Sul. 0.45%

**Commercial Testing & Engineering Co.**

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

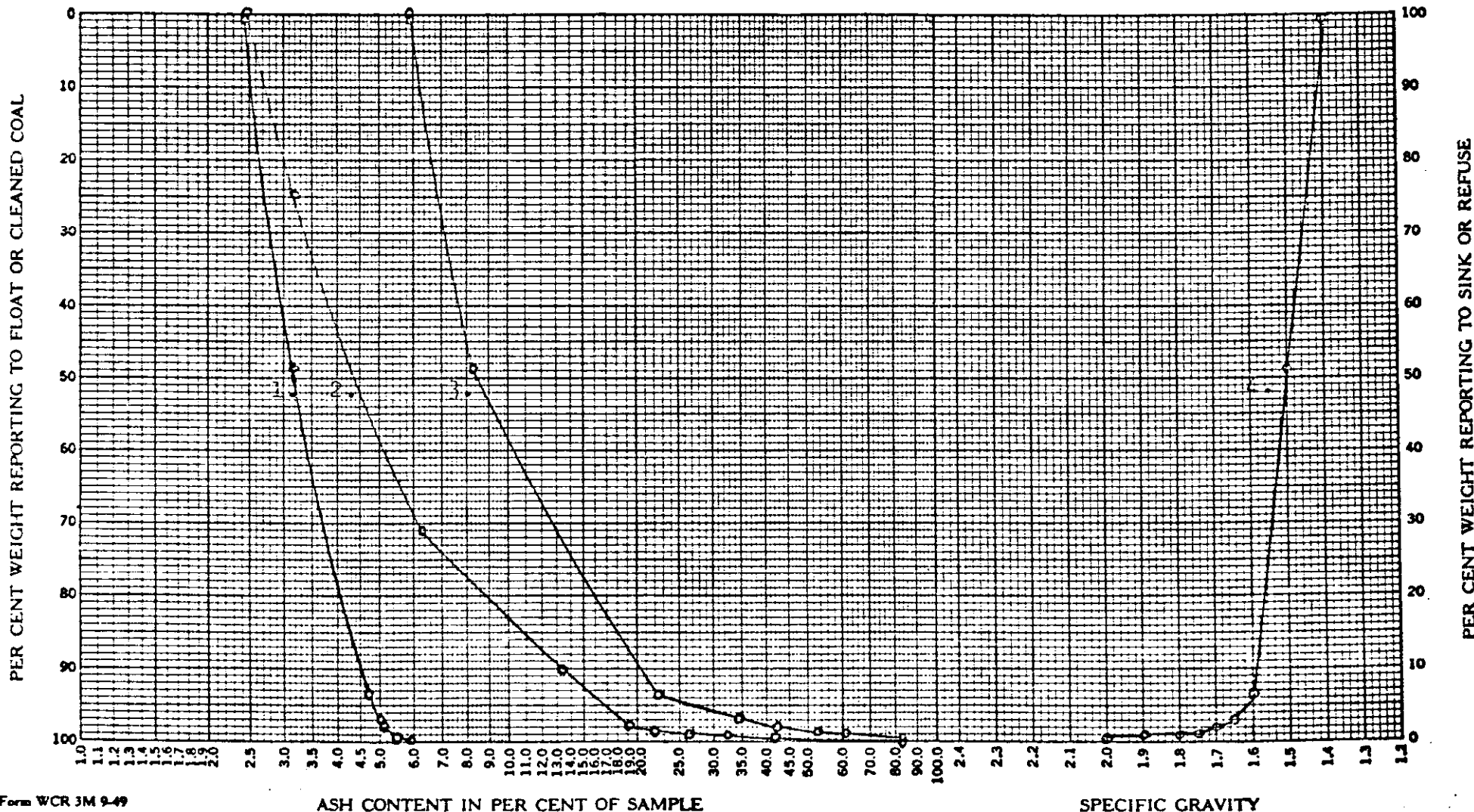
Charleston, W. Va.

Terre Haute, Ind.

**CURVE LEGEND**

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effect

**WASHABILITY CURVES**



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.

## Sample identification:

Sample No. 29676  
Composite 1.75 Float = 28.0% of  
sample crushed to 3/8" Rd. x 0

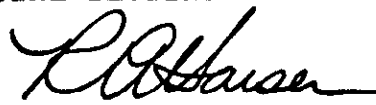
Report No. 67-0477

PROXIMATE ANALYSIS

	<u>DRY BASIS</u>
% Ash	15.24
% Volatile	6.62
% Fixed Carbon	<u>78.14</u>
	100.00
Btu	12143
% Sulfur	0.47

FREE SWELLING INDEX 0

DDH No. 1. 148.8-154.5 feet, 5.7 feet thick. Scott seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.
  
R. A. Houser,  
District Manager

RAH/rh





Sample No. 29676, Core  
sample crushed to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0432 - 67-0437 &  
67-0461 - 67-0464

FLOAT & SINK ANALYSIS

December 31, 1970

SPECIFIC GRAVITY		CUMULATIVE RECOVERY						CUMULATIVE REJECT		
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	0.5	4.34	0.34	0.5	4.34	0.34	100.0	49.95	0.57
1.40	1.50	8.6	5.47	0.47	9.1	5.41	0.46	99.5	50.18	0.57
1.50	1.60	7.8	13.18	0.45	16.9	9.00	0.46	90.9	54.41	0.58
1.60	1.65	4.2	20.24	0.42	21.1	11.23	0.45	83.1	58.28	0.59
1.65	1.70	3.2	24.82	0.47	24.3	13.02	0.45	78.9	60.31	0.60
1.70	1.75	3.7	27.70	0.43	28.0	14.96	0.45	75.7	61.81	0.60
1.75	1.80	0.9	30.16	0.41	28.9	15.44	0.45	72.0	63.56	0.61
1.80	1.90	7.7	34.31	0.41	36.6	19.41	0.44	71.1	63.98	0.62
1.90	2.00	12.0	43.38	0.47	48.6	25.33	0.45	63.4	67.59	0.64
2.00		51.4	73.24	0.68	100.0	49.95	0.57	51.4	73.24	0.68

DDH No.1, 148.8 - 154.5, 5.7 ft. Scott seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.



R. A. Houser,  
District Manager

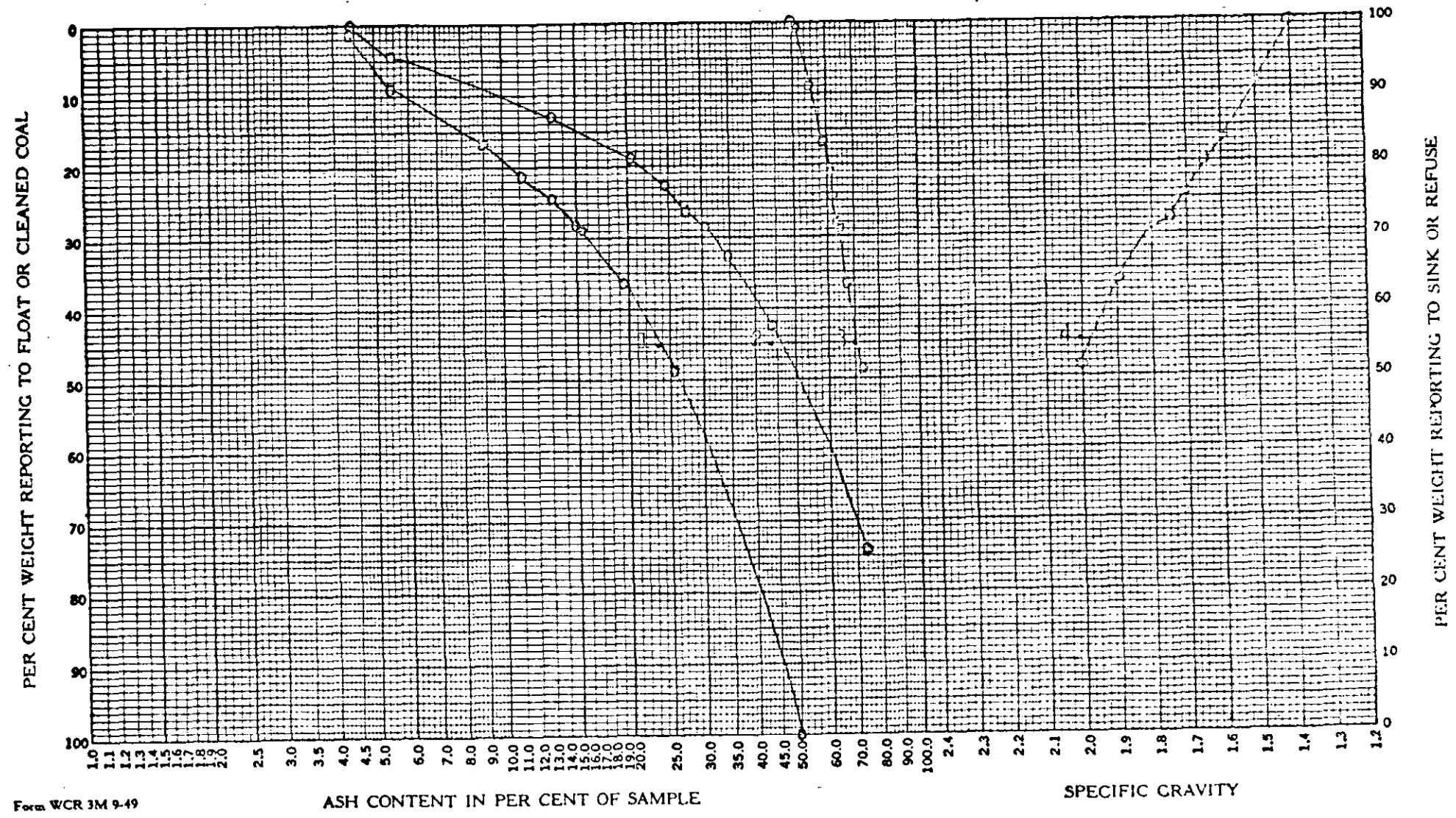
RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 67-0432-0437 & 0461-0464  
 Mine Sample No. 29676  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 49.95%  
 Raw Coal Sul. 0.57%

**Commercial Testing & Engineering Co.**  
 CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.  
 Charleston, W. Va.      Terre Haute, Ind.

- CURVE LEGEND**
- 1 Cumulative Coal-Ash
  - 2 Coal Characteristic
  - 3 Cumulative Refuse-Ash
  - 4 Yield-Specific Gravity
  - 5 Separation Effected

**WASHABILITY CURVES**



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.

Sample identification:

Sample No. 29678

Composite 1.75 Float = 58.1% of  
sample crushed to 3/8" Rd. x 0

Report No. 67-0480

PROXIMATE ANALYSISDRY BASIS

% Ash	10.99
% Volatile	5.66
% Fixed Carbon	83.35
	<u>100.00</u>
Btu	12894
% Sulfur	0.46

FREE SWELLING INDEX 0

DDH No. 1. 347.5-355.0, 7.5 feet thick. Ross seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



Sample No. 29678, Core  
crushed to 3/8" x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0438 - 0443 &  
67-0486 - 67-0489


FLOAT & SINK ANALYSIS

January 11, 1971

SPECIFIC GRAVITY		CUMULATIVE RECOVERY						CUMULATIVE REJECT		
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	1.3	4.42	0.44	1.3	4.42	0.44	100.0	32.78	0.40
1.40	1.50	28.4	5.04	0.48	29.7	5.01	0.48	98.7	33.15	0.40
1.50	1.60	14.1	11.30	0.45	43.8	7.04	0.47	70.3	44.51	0.36
1.60	1.65	6.6	19.34	0.43	50.4	8.65	0.46	56.2	52.84	0.34
1.65	1.70	3.2	23.21	0.39	53.6	9.52	0.46	49.6	57.30	0.33
1.70	1.75	4.5	27.51	0.37	58.1	10.91	0.45	46.4	59.65	0.33
1.75	1.80	1.0	30.33	0.36	59.1	11.24	0.45	41.9	63.11	0.32
1.80	1.90	8.1	34.05	0.33	67.2	13.99	0.44	40.9	63.91	0.32
1.90	2.00	5.6	45.05	0.27	72.8	16.38	0.42	32.8	71.28	0.32
2.00		27.2	76.68	0.33	100.0	32.78	0.40	27.2	76.68	0.33

DDH No. 1. 347.5-355.0, 7.5 feet. Ross seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 67-0438-0443 & 0486-0489  
 Mine Sample No. 29678  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 32.78%  
 Raw Coal Sul. 0.40%

**Commercial Testing & Engineering Co.**

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

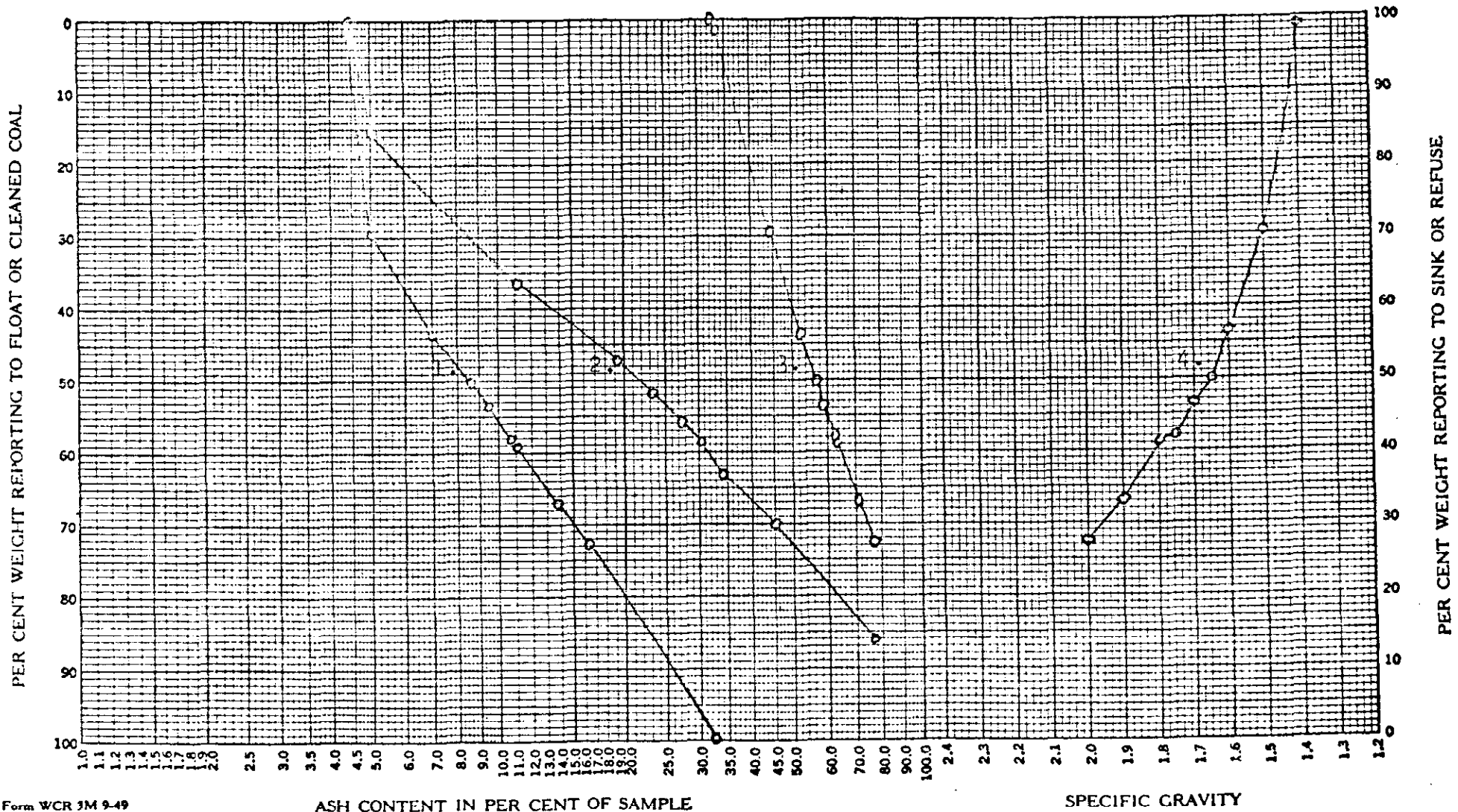
Charleston, W. Va.

Terre Haute, Ind.

**CURVE LEGEND**

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

**WASHABILITY CURVES**



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.

## Sample identification:

Sample No. 29679

Composite 1.75 Float = 75.1% of sample  
crushed to 3/8" Rd. x 0

Report No. 67-0475

PROXIMATE ANALYSIS

	<u>Dry basis</u>
% Ash	11.11
% Volatile	6.41
% Fixed Carbon	<u>82.48</u>
	100.00
Btu	13109
% Sulfur	0.84

FREE SWELLING INDEX 0

DDH No. 1. 359.0-361.5 feet, 2.5 feet thick.  
Bottom part of Ross seam.Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



QUINTANA MINERALS CORPORATION

Sample No. 29679, Core  
sample crushed to 3/8" Rd. x 0

Vancouver, B. C.

Lab. Nos. 67-0444 - 67-0449 &  
67-0465 - 67-0468


FLOAT & SINK ANALYSIS

December 31, 1970

SPECIFIC GRAVITY		CUMULATIVE RECOVERY			CUMULATIVE REJECT					
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	4.4	5.13	0.28	4.4	5.13	0.28	100.0	23.12	1.06
1.40	1.50	26.0	6.15	0.60	30.4	6.00	0.55	95.6	23.95	1.09
1.50	1.60	34.3	11.19	0.94	64.7	8.75	0.76	69.6	30.60	1.28
1.60	1.65	6.0	24.20	1.04	70.7	10.06	0.78	35.3	49.45	1.60
1.65	1.70	2.1	26.12	1.55	72.8	10.53	0.80	29.3	54.62	1.72
1.70	1.75	2.3	29.53	1.06	75.1	11.11	0.81	27.2	56.82	1.75
1.75	1.80	0.9	32.64	2.19	76.0	11.36	0.83	24.9	59.34	1.80
1.80	1.90	3.4	36.91	1.18	79.4	12.46	0.84	24.0	60.34	1.78
1.90	2.00	3.8	45.48	1.26	83.2	13.97	0.86	20.6	64.21	1.88
2.00		16.8	68.45	2.02	100.0	23.12	1.06	16.8	68.45	2.02

DDH No.1, 359.0 - 361.5, 2.5 ft.  
Bottom part of Ross seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 67-0444-0449 & 0465-0468  
 Mine Sample No. 29679  
 Size Cr. to 3/8" rd.  
 Raw Coal Ash 23.12%  
 Raw Coal Sul. 1.06%

**Commercial Testing & Engineering Co.**

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS

CHICAGO, ILL.

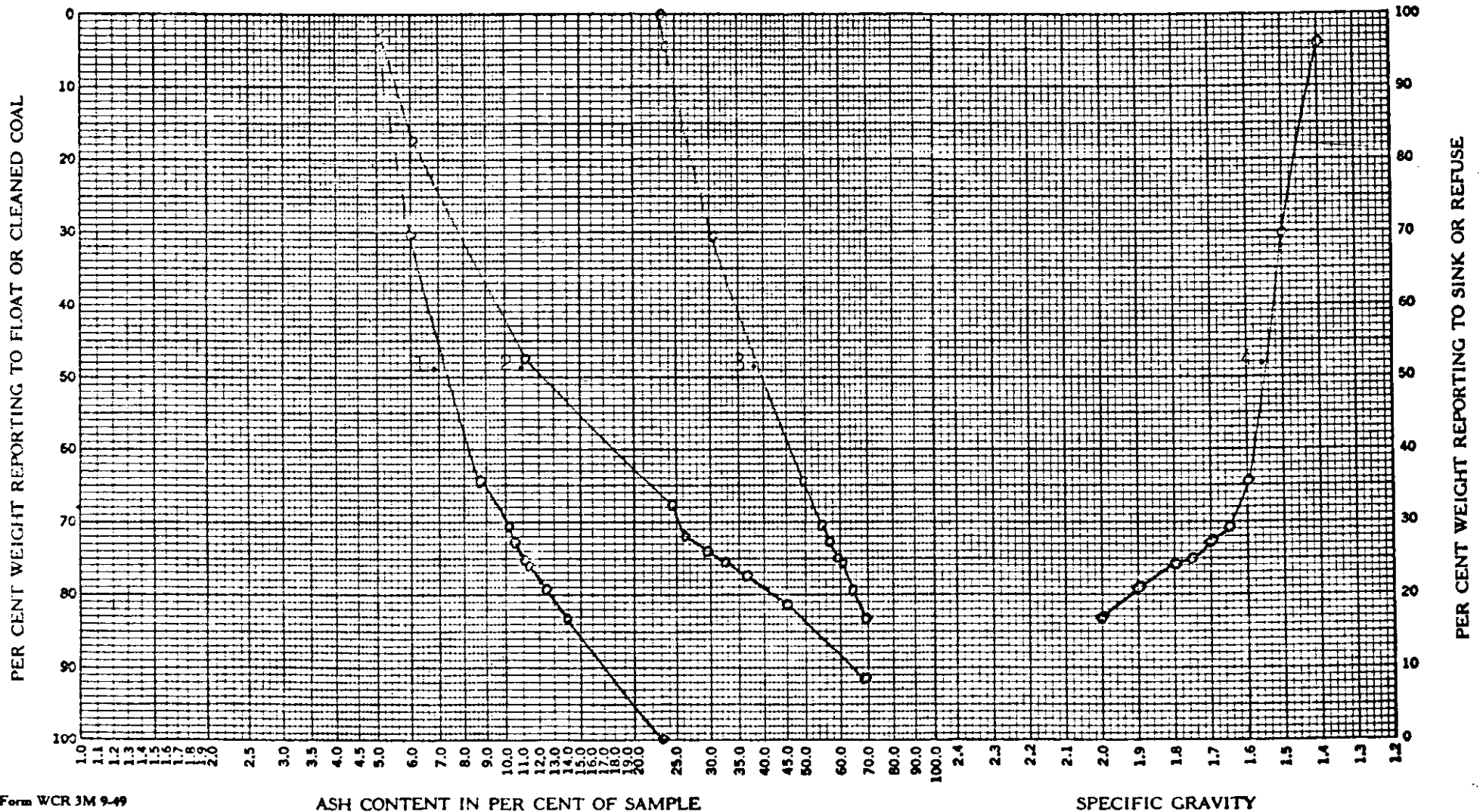
Charleston, W. Va.

Terre Haute, Ind.

**CURVE LEGEND**

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

**WASHABILITY CURVES**





**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

March 30, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORP.  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29681Report Nos. 67-0814  
67-0815PROXIMATE ANALYSIS1.70 Float = 28.0% of sample  
crushed to 3/8" x 0Dry basis

% Ash	15.73
% Volatile	6.90
% Fixed Carbon	<u>77.37</u>
	100.00
Btu	12266
% Sulfur	0.52

1.70 Sink = 72.0% of sample  
crushed to 3/8" x 0

% Ash	57.55
% Ash, Raw Coal	45.84

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

March 30, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORP.  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29682Report Nos. 67-0816  
67-0817PROXIMATE ANALYSIS1.70 Float = 66.7% of sample  
crushed to 3/8" x 0Dry basis

% Ash	13.05
% Volatile	6.88
% Fixed Carbon	<u>80.07</u>
	100.00
Btu	12614
% Sulfur	0.60

1.70 Sink = 33.3% of sample  
crushed to 3/8" x 0

% Ash	54.91
% Ash, Raw Coal	26.99

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.**Sample identification:**Sample No. 29683  
Composite 1.75 Float = 58.3% of  
sample crushed to 3/8" x 0

Report No. 67-0479

PROXIMATE ANALYSISDRY BASIS

% Ash	9.43
% Volatile	5.70
% Fixed Carbon	84.87
	<u>100.00</u>
Btu	13552
% Sulfur	0.43

FREE SWELLING INDEX 0

DDH No. 2. 194.6-200.8 feet,  
6.2 feet thick. Upper Discovery  
Creek seam intersected in drill  
hole 1300 feet down dip from  
outcrop.Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



Sample No. 29683, Core  
sample crushed to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0286 - 67-0295

FLOAT & SINK ANALYSIS

November 30, 1970

SPECIFIC GRAVITY		CUMULATIVE RECOVERY						CUMULATIVE REJECT		
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	1.3	1.51	0.48	1.3	1.51	0.48	100.0	35.51	0.33
1.40	1.50	25.6	3.41	0.46	26.9	3.32	0.46	98.7	35.96	0.33
1.50	1.60	21.1	9.15	0.45	48.0	5.88	0.46	73.1	47.35	0.28
1.60	1.65	5.5	22.21	0.39	53.5	7.56	0.45	52.0	62.86	0.21
1.65	1.70	2.3	29.84	0.35	55.8	8.48	0.45	46.5	67.66	0.19
1.70	1.75	2.5	32.61	0.35	58.3	9.51	0.44	44.2	69.63	0.18
1.75	1.80	1.9	33.91	0.37	60.2	10.28	0.44	41.7	71.85	0.17
1.80	1.90	3.2	38.26	0.41	63.4	11.70	0.44	39.8	73.66	0.17
1.90	2.00	4.1	47.18	0.41	67.5	13.85	0.44	36.6	76.76	0.14
2.00		32.5	80.49	0.11	100.0	35.51	0.33	32.5	80.49	0.11

DDH No.2, 194.6 - 200.8, 6.2 ft. Upper  
Discovery Creek seam. - intersected in  
drill hole 1300 feet down dip from outcrop.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.



R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 67-0286 - 67-0295  
 Mine Sample No. 29683  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 35.51%  
 Raw Coal Sul. 0.33%

## Commercial Testing & Engineering Co.

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

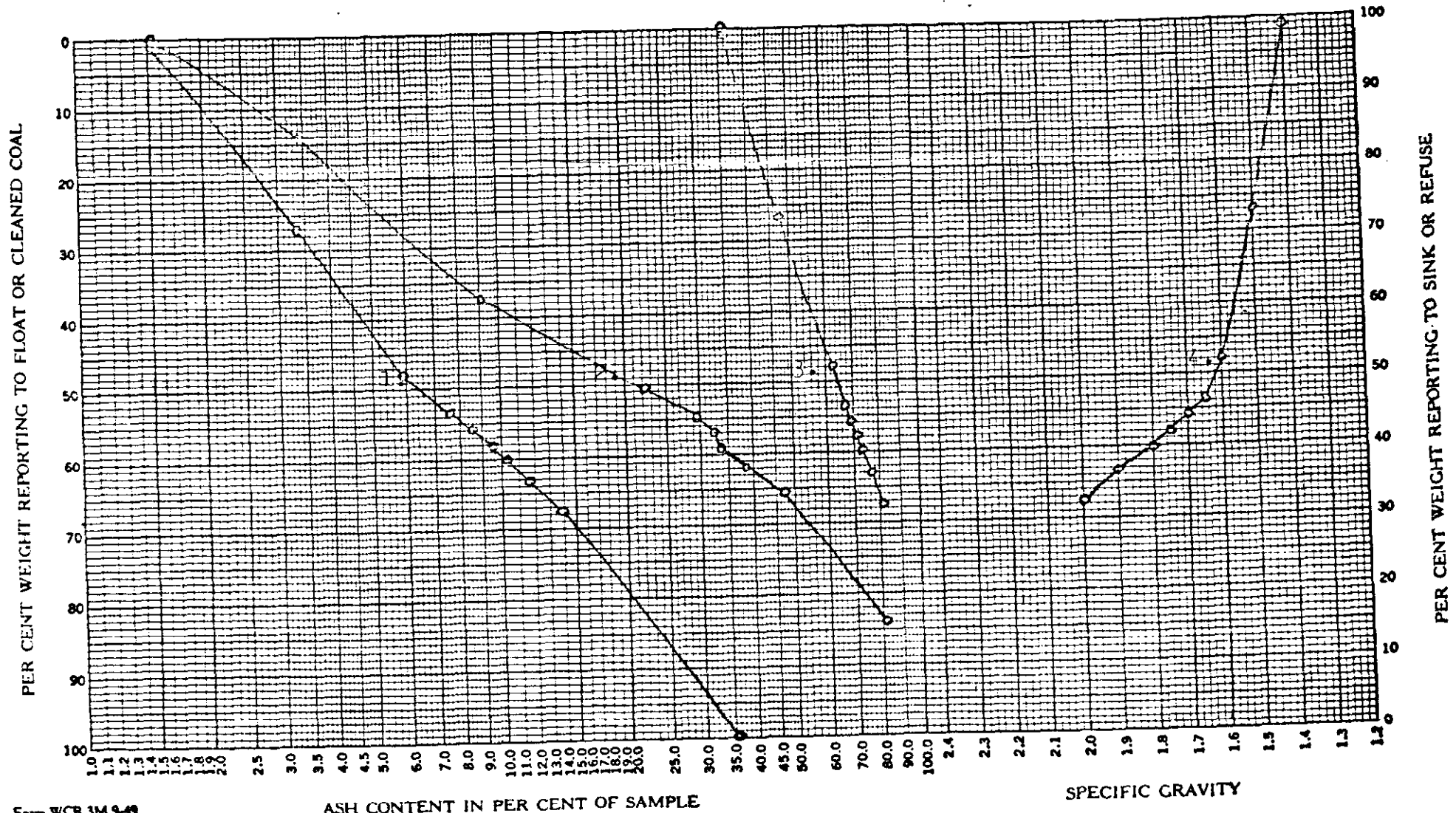
Charleston, W. Va.

Terre Haute, Ind.

### CURVE LEGEND

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

### WASHABILITY CURVES



Form WCR 3M 9-49

ASH CONTENT IN PER CENT OF SAMPLE

SPECIFIC GRAVITY

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**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 - AREA CODE 312 726-8434

March 30, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORP.  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Composite samples 29684 & 29685Report Nos. 67-0818  
67-0819PROXIMATE ANALYSIS1.70 Float = 18.8% of sample  
crushed to 3/8" x 0

	<u>Dry basis</u>
% Ash	10.28
% Volatile	6.27
% Fixed Carbon	<u>83.45</u>
	100.00
Btu	13155
% Sulfur	1.15

1.70 Sink = 81.2% of sample  
crushed to 3/8" x 0

% Ash	62.36
% Ash, Raw Coal	52.57

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

March 30, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORP.  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29688Report Nos. 67-0820  
67-0821PROXIMATE ANALYSIS1.70 Float = 4.7% of sample  
crushed to 3/8" x 0Dry basis

% Ash	12.49
% Volatile	7.25
% Fixed Carbon	80.26
	<u>100.00</u>

Btu	12909
% Sulfur	0.69

1.70 Sink = 95.3% of sample  
crushed to 3/8" x 0

% Ash	78.05
% Ash, Raw Coal	74.97

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.

## Sample identification:

Sample No. 29692

Composite 1.75 Float = 23.7% of  
sample crushed to 3/8" Rd. x 0

Report No. 67-0476

PROXIMATE ANALYSISDRY BASIS

% Ash	17.09
% Volatile	7.58
% Fixed Carbon	<u>75.33</u>
	100.00
Btu	11966
% Sulfur	0.97

## FREE SWELLING INDEX

0

DDH No. 3. 53.5-60.0, 6.5 feet thick.

Lower Discovery Creek seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh





Sample No. 29692, Core  
sample crushed to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0414 - 67-0423

FLOAT & SINK ANALYSIS

December 31, 1970

SPECIFIC GRAVITY		CUMULATIVE RECOVERY						CUMULATIVE REJECT		
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	0.3	4.54	0.58	0.3	4.54	0.58	100.0	54.55	1.26
1.40	1.50	7.2	4.62	0.87	7.5	4.62	0.86	99.7	54.70	1.27
1.50	1.60	7.1	12.97	1.26	14.6	8.68	1.05	92.5	58.60	1.30
1.60	1.65	4.0	24.84	0.92	18.6	12.15	1.02	85.4	62.40	1.30
1.65	1.70	2.8	33.52	0.85	21.4	14.95	1.00	81.4	64.24	1.32
1.70	1.75	2.3	37.50	0.76	23.7	17.14	0.98	78.6	65.34	1.34
1.75	1.80	3.7	39.44	0.56	27.4	20.15	0.92	76.3	66.18	1.35
1.80	1.90	6.0	41.07	0.52	33.4	23.91	0.85	72.6	67.54	1.39
1.90	2.00	8.9	48.61	0.52	42.3	29.11	0.78	66.6	69.92	1.47
2.00		57.7	73.21	1.62	100.0	54.55	1.26	57.7	73.21	1.62

DDH No. 3, 53.5 - 60.0, 6.5 ft. Lower  
Discovery Creek seam.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 57-0414 - 57-0423  
 Mine Sample No. 29692  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 54.55%  
 Raw Coal Sul. 1.26%

### Commercial Testing & Engineering Co.

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

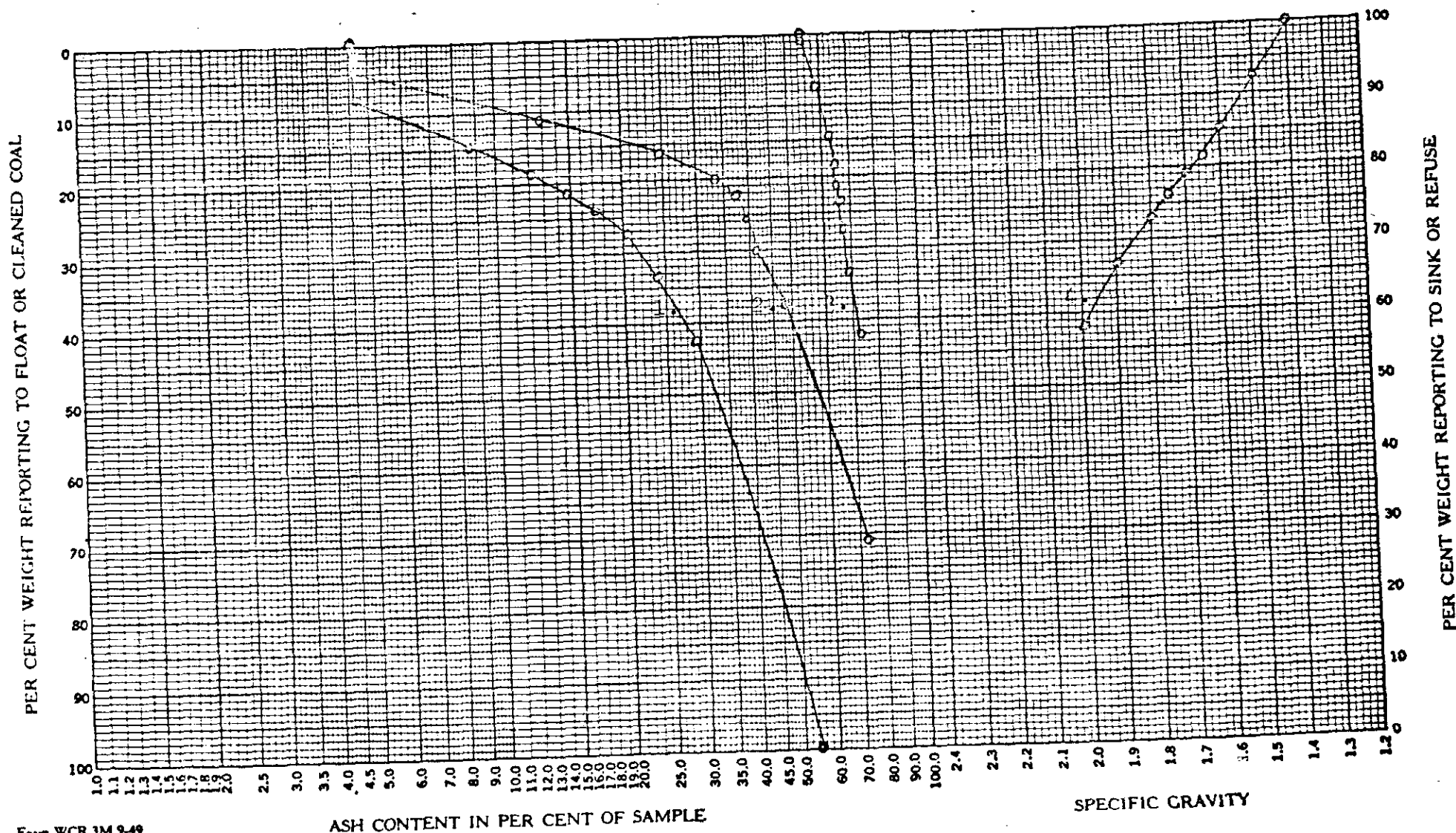
Charleston, W. Va.

Terre Haute, Ind.

#### CURVE LEGEND

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effect

WASHABILITY CURVES



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29693  
Composite 1.75 Float = 38.9% of  
sample crushed to 3/8" Rd. x 0


Report No. 67-0484

PROXIMATE ANALYSISDRY BASIS

% Ash	13.08
% Volatile	6.21
% Fixed Carbon	<u>80.71</u>
	100.00
Btu	12645
% Sulfur	0.77

FREE SWELLING INDEX 0

DDH No. 3. 71.2-76.0 feet, 4.8 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.
  
R. A. Houser,  
District Manager

RAH/rh



Sample No. 29693, Core  
sample crushed to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION

Vancouver, B. C.

Lab. Nos. 67-0404 - 67-0413


FLOAT & SINK ANALYSIS

December 31, 1970

SPECIFIC GRAVITY		CUMULATIVE RECOVERY						CUMULATIVE REJECT		
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	0.5	4.32	0.46	0.5	4.32	0.46	100.0	52.02	2.72
1.40	1.50	17.5	4.38	0.60	18.0	4.38	0.60	99.5	52.26	2.73
1.50	1.60	10.4	13.73	0.74	28.4	7.80	0.65	82.0	62.48	3.18
1.60	1.65	4.3	23.33	0.80	32.7	9.84	0.67	71.6	69.56	3.54
1.65	1.70	4.5	28.75	1.25	37.2	12.13	0.74	67.3	72.51	3.71
1.70	1.75	1.7	34.00	1.45	38.9	13.09	0.77	62.8	75.65	3.89
1.75	1.80	2.2	35.94	1.53	41.1	14.31	0.81	61.1	76.81	3.96
1.80	1.90	2.8	38.71	1.98	43.9	15.87	0.89	58.9	78.34	4.05
1.90	2.00	3.8	46.91	2.11	47.7	18.34	0.98	56.1	80.31	4.15
2.00		52.3	82.74	4.30	100.0	52.02	2.72	52.3	82.74	4.30

DDH No.3, 71.2 - 76.0, 4.8 ft.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 67-0404 - 67-0413  
 Mine Sample No. 29693  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 52.02%  
 Raw Coal Sul. 2.72%

**Commercial Testing & Engineering Co.**  
 CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

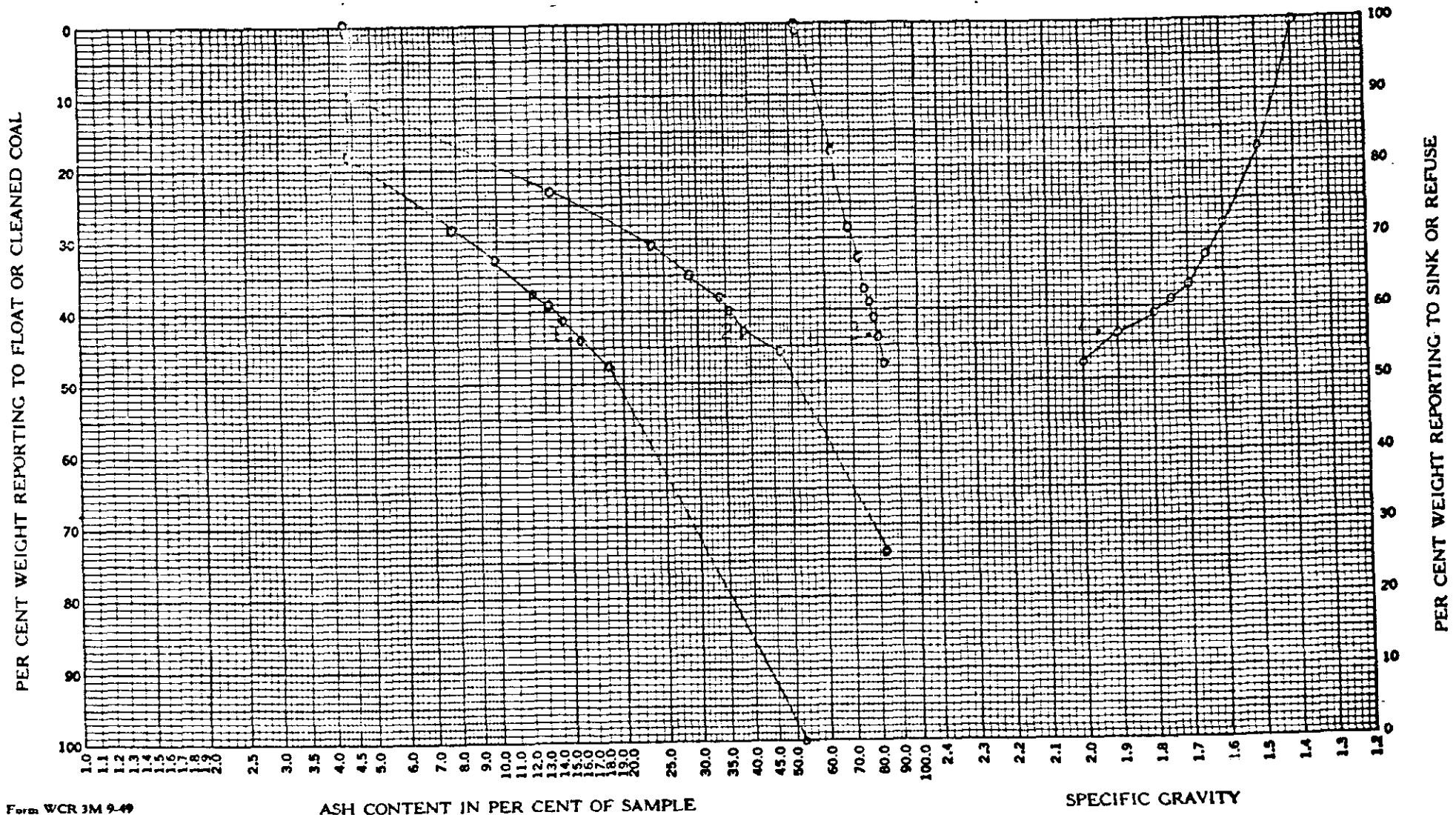
Charleston, W. Va.

Terre Haute, Ind.

**CURVE LEGEND**

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

**WASHABILITY CURVES**



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 220 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-6434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29711  
Composite 1.75 Float = 36.1% of  
sample crushed to 3/8" Rd. x 0

Report No. 67-0481

PROXIMATE ANALYSIS

	<u>DRY BASIS</u>
% Ash	14.01
% Volatile	5.72
% Fixed Carbon	80.27
	<u>100.00</u>
Btu	12293
% Sulfur	0.49

FREE SWELLING INDEX 0

DDH No. 5. 183.0-185.9, 2.9 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manger

RAH/rh



QUINTANA MINERALS CORPORATION

Sample No. 29711, Core  
crushed to 3/8" Rd. x 0

Vancouver, B. C.

Lab. Nos. 67-0450 - 67-0454 &  
67-0494 - 67-0498


FLOAT & SINK ANALYSIS

January 11, 1971

SPECIFIC GRAVITY		CUMULATIVE RECOVERY			CUMULATIVE REJECT					
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	0.5	4.37	0.43	0.5	4.37	0.43	100.0	42.85	0.39
1.40	1.50	10.3	4.88	0.50	10.8	4.86	0.50	99.5	43.04	0.39
1.50	1.60	12.9	12.57	0.47	23.7	9.05	0.48	89.2	47.44	0.37
1.60	1.65	6.8	22.14	0.41	30.5	11.97	0.47	76.3	53.34	0.36
1.65	1.70	5.2	25.34	0.38	35.7	13.92	0.45	69.5	56.39	0.35
1.70	1.75	0.4	27.10	0.40	36.1	14.07	0.45	64.3	58.91	0.35
1.75	1.80	2.4	28.59	0.37	38.5	14.97	0.44	63.9	59.10	0.35
1.80	1.90	14.0	34.08	0.35	52.5	20.07	0.42	61.5	60.30	0.35
1.90	2.00	10.2	44.66	0.30	62.7	24.07	0.40	47.5	68.02	0.35
2.00		37.3	74.41	0.36	100.0	42.85	0.39	37.3	74.41	0.36

DDH No. 5. 183.0-185.9, 2.9 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 07-0450-0454 & 0494-0498  
 Mine Sample No. 29711  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 42.85%  
 Raw Coal Sul. 0.39%

### Commercial Testing & Engineering Co.

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

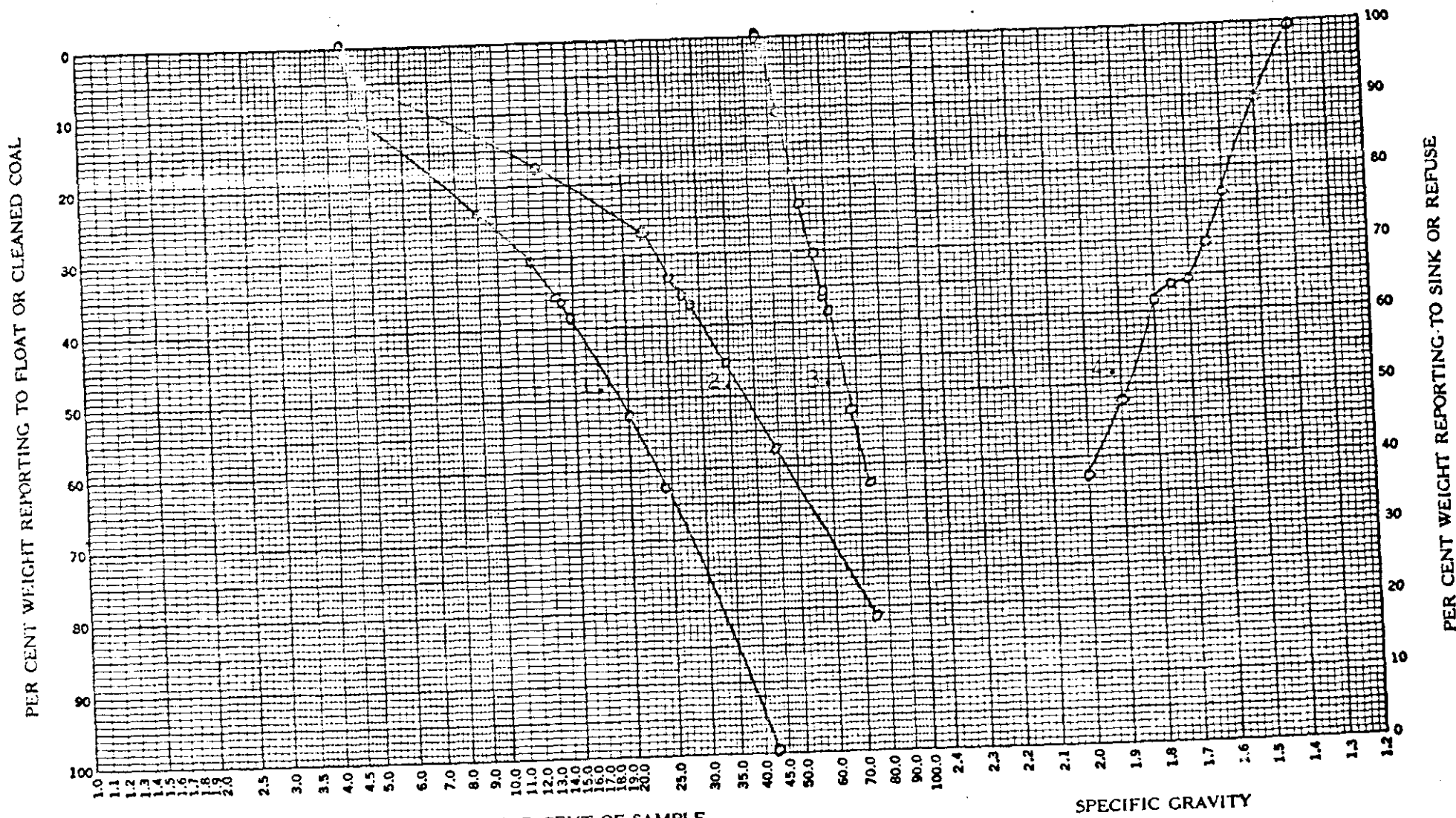
Charleston, W. Va.

Terre Haute, Ind.

#### CURVE LEGEND

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

#### WASHABILITY CURVES





**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971



P. O. Box 8596  
Vancouver 5, B. C.

QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.

Sample identification:  
Sample No. 29712 - 29713 - 29714  
Composite 1.75 Float = 28.0% of  
samples crushed to 3/8" Rd. x 0

Report No. 67-0482

PROXIMATE ANALYSIS

DRY BASIS

% Ash	15.85
% Volatile	6.30
% Fixed Carbon	<u>77.85</u>
	100.00
Btu	12075
% Sulfur	0.69

FREE SWELLING INDEX 0

DDH No. 5. Three seams, 206.1-209.5, 212.5-214.3, and 215.0-217.5.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

*R. A. Houser*  
R. A. Houser,  
District Manager

RAH/rh



Composite of Sample Nos.  
29712, 29713, 29714, crushed  
to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0455 - 67-0460 &  
67-0490 - 67-0493

FLOAT & SINK ANALYSIS

January 11, 1971

Specific Gravity		% Wt.	% Ash	% Sul.	CUMULATIVE RECOVERY			CUMULATIVE REJECT		
Sink	Float				% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	1.8	4.16	0.48	1.8	4.16	0.48	100.0	45.93	1.00
1.40	1.50	6.9	4.81	0.52	8.7	4.68	0.51	98.2	46.70	1.01
1.50	1.60	8.0	12.47	0.63	16.7	8.41	0.57	91.3	49.86	1.05
1.60	1.65	4.9	22.34	0.73	21.6	11.57	0.61	83.3	53.46	1.09
1.65	1.70	3.0	23.63	0.93	24.6	13.04	0.64	78.4	55.40	1.11
1.70	1.75	3.4	29.36	0.82	28.0	15.02	0.67	75.4	56.67	1.12
1.75	1.80	3.3	32.23	0.80	31.3	16.84	0.68	72.0	57.95	1.13
1.80	1.90	7.4	36.18	0.79	38.7	20.54	0.70	68.7	59.19	1.15
1.90	2.00	10.3	44.38	0.82	49.0	25.55	0.73	61.3	61.97	1.19
2.00		51.0	65.52	1.27	100.0	45.93	1.00	51.0	65.52	1.27

DDH No. 5. Three seams, 206.1-209.5,  
212.5-214.3, and 215-217.5.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.



R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 07-0455-0460 & 0490-0493  
 Mine Comp. 29712, 29713, 29714  
 Size Cr. to 3/8" rd.  
 Raw Coal Ash 45.93%  
 Raw Coal Sul. 1.00%

## Commercial Testing & Engineering Co.

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

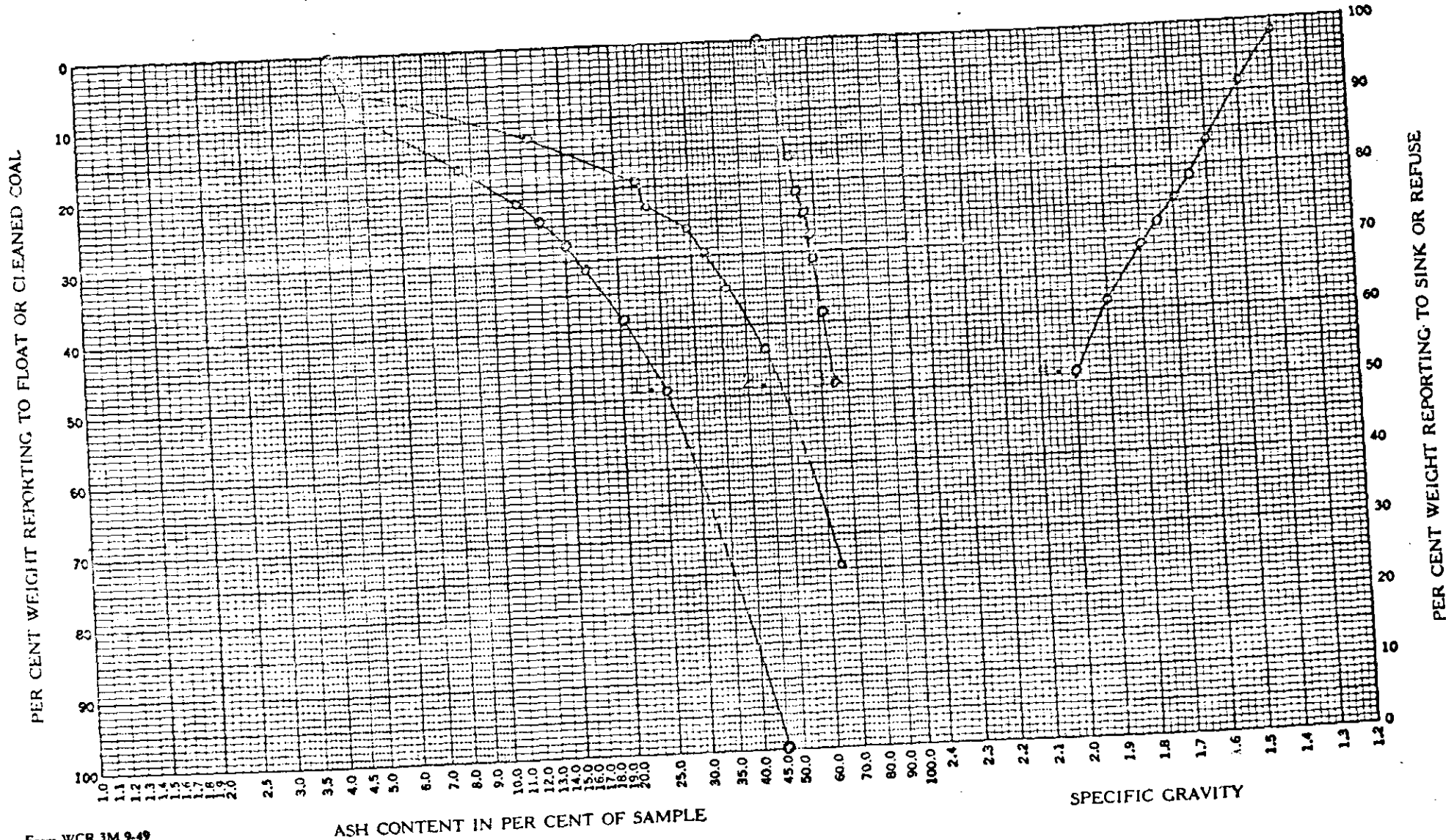
Charleston, W. Va.

Terre Haute, Ind.

### CURVE LEGEND

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

### WASHABILITY CURVES



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29722  
Composite 1.75 Float = 55.7% of  
sample crushed to 3/8" Rd. x 0

Report No. 67-0485

PROXIMATE ANALYSIS

	<u>DRY BASIS</u>
% Ash	19.76
% Volatile	9.45
% Fixed Carbon	70.79
	<u>100.00</u>
Btu	11746
% Sulfur	0.74

FREE SWELLING INDEX 0

DDH No. 6. 278.5-283.6, 5.1 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



Sample No. 29722, Core  
crushed to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION

Vancouver, B. C.

Lab. Nos. 67-0499 - 67-0508

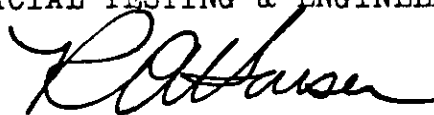
FLOAT & SINK ANALYSIS

January 11, 1971

SPECIFIC GRAVITY		CUMULATIVE RECOVERY			CUMULATIVE REJECT					
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	2.6	5.43	0.37	2.6	5.43	0.37	100.0	38.92	1.31
1.40	1.50	11.8	5.85	0.62	14.4	5.77	0.57	97.4	39.81	1.33
1.50	1.60	7.6	15.96	0.64	22.0	9.29	0.60	85.6	44.49	1.43
1.60	1.65	26.5	26.39	0.80	48.5	18.63	0.71	78.0	47.27	1.51
1.65	1.70	2.4	28.16	0.84	50.9	19.08	0.71	51.5	58.01	1.87
1.70	1.75	4.8	30.77	0.99	55.7	20.09	0.74	49.1	59.47	1.92
1.75	1.80	0.6	31.36	1.16	56.3	20.21	0.74	44.3	62.58	2.02
1.80	1.90	11.2	37.33	1.30	67.5	23.05	0.84	43.7	63.01	2.04
1.90	2.00	7.0	49.65	1.92	74.5	25.55	0.94	32.5	71.86	2.29
2.00		25.5	77.96	2.39	100.0	38.92	1.31	25.5	77.96	2.39

DDH No. 6. 278.5-283.6, 5.1 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.



R. A. Houser,  
District Manager

RAH/rh

Job Quintana Minerals Corp.  
 Lab. No. 67-0499 - 67-0508  
 Mine Sample No. 29722  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 38.92%  
 Raw Coal Sul. 1.31%

## Commercial Testing & Engineering Co.

CONSULTING FUEL ENGINEERS  
AND CHEMISTS

CHICAGO, ILL.

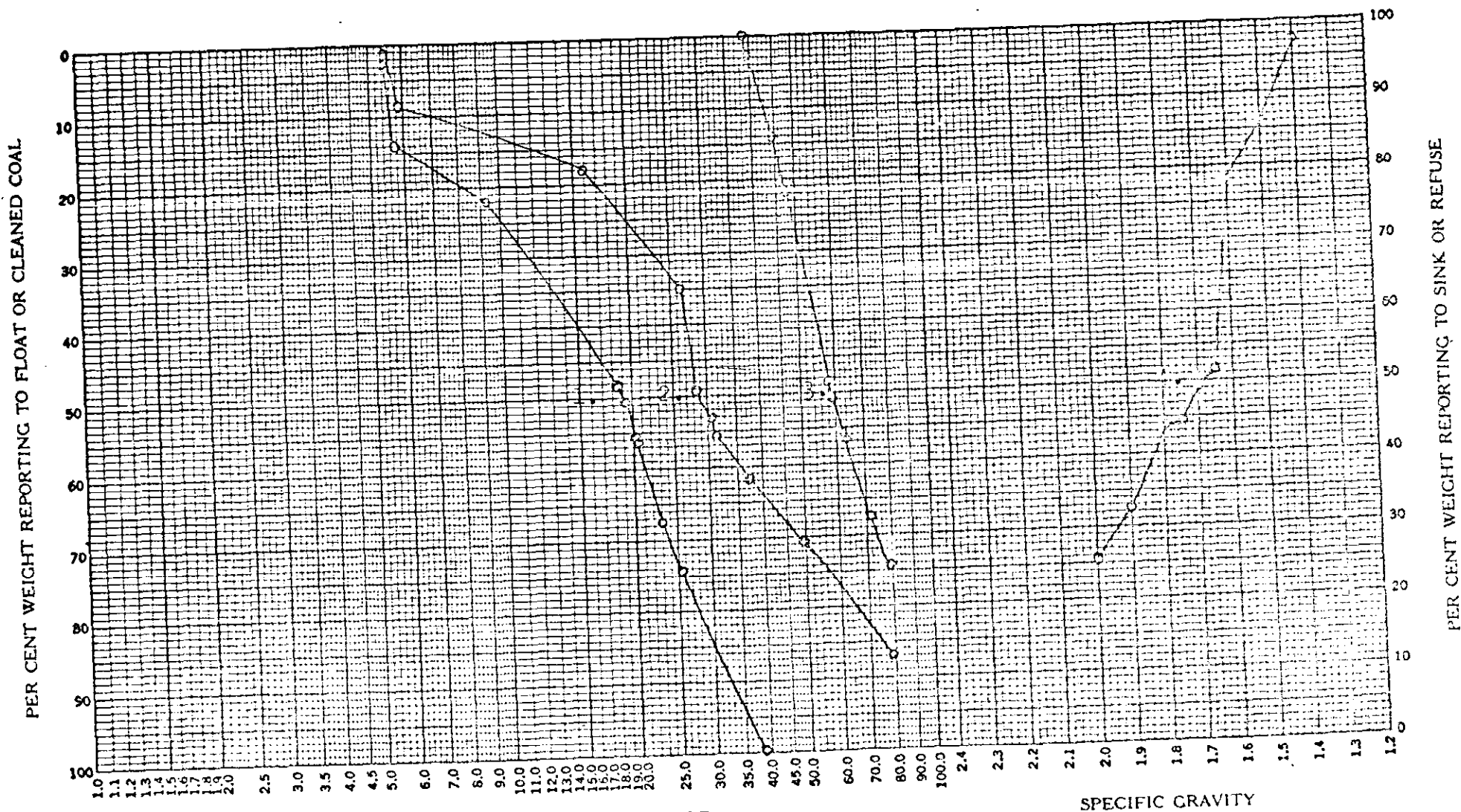
Charleston, W. Va.

Terre Haute, Ind.

### CURVE LEGEND

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effected

### WASHABILITY CURVES



**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 728-8434

January 11, 1971

P. O. Box 8596  
Vancouver 5, B. C.QUINTANA MINERALS CORPORATION  
2 Bentall Centre  
Vancouver, B. C.Sample identification:  
Sample No. 29723  
Composite 1.75 Float = 69.7% of  
sample crushed to 3/8" x 0

Report No. 67-0483

PROXIMATE ANALYSIS

	<u>DRY BASIS</u>
% Ash	12.53
% Volatile	6.90
% Fixed Carbon	80.57
	<u>100.00</u>
Btu	12947
% Sulfur	0.88
FREE SWELLING INDEX	0

DDH No. 6. 335.6-340.9, 5.3 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser,  
District Manager

RAH/rh



Sample No. 29723, Core  
crushed to 3/8" Rd. x 0

QUINTANA MINERALS CORPORATION  
Vancouver, B. C.

Lab. Nos. 67-0509 - 67-0518

FLOAT & SINK ANALYSIS

January 11, 1971

SPECIFIC GRAVITY		CUMULATIVE RECOVERY			CUMULATIVE REJECT					
Sink	Float	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.	% Wt.	% Ash	% Sul.
	1.40	1.4	2.28	0.52	1.4	2.28	0.52	100.0	29.22	2.22
1.40	1.50	33.6	6.31	0.68	35.0	6.15	0.67	98.6	29.61	2.24
1.50	1.60	18.1	13.54	0.95	53.1	8.67	0.77	65.0	41.65	3.05
1.60	1.65	11.1	23.82	1.28	64.2	11.29	0.86	46.9	52.50	3.86
1.65	1.70	2.2	24.56	1.79	66.4	11.73	0.89	35.8	61.39	4.66
1.70	1.75	3.3	31.46	1.55	69.7	12.66	0.92	33.6	63.80	4.85
1.75	1.80	0.5	33.93	2.56	70.2	12.81	0.93	30.3	67.32	5.20
1.80	1.90	5.7	37.08	2.07	75.9	14.64	1.02	29.8	67.88	5.25
1.90	2.00	3.6	50.91	3.16	79.5	16.28	1.11	24.1	75.17	6.00
2.00		20.5	79.43	6.50	100.0	29.22	2.22	20.5	79.43	6.50

DDH No. 6. 335.6-340.9, 5.3 feet thick.

Respectfully submitted,  
COMMERCIAL TESTING & ENGINEERING CO.

  
R. A. Houser,  
District Manager

RAH/rh



Job Quintana Minerals Corp.  
 Lab. No. 67-0509 - 67-0518  
 Mine Sample No. 29723  
 Size Cr. to 3/8" Rd.  
 Raw Coal Ash 29.22%  
 Raw Coal Sul. 2.22%

### Commercial Testing & Engineering Co.

CONSULTING FUEL ENGINEERS  
 AND CHEMISTS  
 CHICAGO, ILL.

Charleston, W. Va.

Terre Haute, Ind.

#### CURVE LEGEND

- 1 Cumulative Coal-Ash
- 2 Coal Characteristic
- 3 Cumulative Refuse-Ash
- 4 Yield-Specific Gravity
- 5 Separation Effect

#### WASHABILITY CURVES

