

TR3-166-172

R. 325 R. 327 R. 328 R. 329

## CORNWALL COAL COMPANY

## SINK-FLOAT BENEFICIATION TESTS.

**Investigation.**

Four coal samples were received from the Cornwall Coal Co. for sink-float beneficiation tests as received and at two sizes, plus and minus  $1\frac{1}{4}$ -inch, to determine grades and recoveries obtainable at separating densities of 1.4, 1.5, 1.6, 1.7 and 1.8. Heavy liquids of these densities were used for the investigation and, for convenience, the separations were actually made at +2 inch,  $-2+1\frac{1}{4}$  inch,  $-1\frac{1}{4}+\frac{3}{4}$  inch, and  $-\frac{3}{4}$  inch +10 mesh B.S., for subsequent assembly into the required sizes. As separate analyses were made for the +2 inch and  $-2$  inch  $+1\frac{1}{4}$  inch fractions in the case of R. 325, and as the Sp.G. 1.8 rejects at these two sizes were further investigated by crushing and re-separation, additional information is available if required. The minus 10 mesh fractions were not beneficiated.

All results, with the exception of the sizing analysis, are expressed on a moisture free basis.

No responsibility is taken for the results shown in this report except in so far as they apply to the samples tested.

**Samples.**

R. 325 Cornwall No. 1 Seam, hand crushed to 4 inch size;	306 lbs.
R. 327 Cornwall No. 2 Seam, total production;	228 lbs.
R. 328 Duncan Colliery, total production;	382 lbs.
R. 329 Cornwall No. 2 Seam, top section, 4 feet 6 inches;	468 lbs.

**Sizings.**

	R. 325	Percent Weight		R. 329
		R. 327	R. 328	
+ 2 inch	49.3	15.1	Nil	17.9
+ $1\frac{1}{4}$ inch	19.9	17.9	2.4	32.4
+ $\frac{3}{4}$ inch	19.9	29.7	55.8	27.7
+10 mesh B.S.	9.5	30.9	35.9	18.7
-10 mesh B.S.	1.4	6.4	5.9	3.3

**Proximate Analyses.**

	Percent			
	R. 325	R. 327	R. 328	R. 329
V.C.M.	24.9	27.8	26.1	23.0
F.C.	42.6	48.4	51.0	39.1
Ash	29.4	22.3	22.0	31.9
S.	0.35	0.36	0.33	0.22
Calorific Value				
B.Th.U's.	9,620	10,790	11,030	8,900

Details of the sink-float tests at specific gravities from 1.4 to 1.8 in 0.1 steps are shown in the tables. However, to give a simplified summary the following table shows the results of beneficiation at a Sp.G. of 1.8 and includes the small quantities of untreated minus 10 mesh coal. This tabulation shows the ash content and B.Th.U's. of untreated coals, and the ash content and B.Th.U's. of the beneficiated coal together with the percentage of ash rejected and the percentage of coal recovered which is expressed as the percentage recovery of B.Th.U's. The most notable feature of the tests is that whereas the loss of weight by treatment may be as high as 20 percent at Sp.G. 1.8 the actual loss of coal may be as little as 2 percent.

**No Beneficiation**

	R. 325	R. 327	R. 328	R. 329
Ash, percent	29.4	22.3	22.0	31.9
B.Th.U's.	9,620	10,790	11,030	8,900

**Float at Sp.G. 1.8**

Weight, percent	81.7	95.2	96.5	82.6
Ash, percent	17.8	20.0	20.1	24.8
B.Th.U's.	11,640	11,190	11,360	10,340
Ash percent recovered	49.4	85.1	88.1	64.1
B.Th.U's. percent recovered	98.9	98.8	99.4	95.9

**Reject**

Weight percent	18.3	4.8	3.5	17.4
Ash, percent	81.3	68.9	74.5	65.9
Ash, percent rejected	50.6?	14.9	11.9	35.9
B.Th.U's., percent rejected	1.1	1.2	0.6	4.1

Treatment of sample R. 329 at a density of 1.6 is indicated to produce a 20 percent ash coal.

## R. 325.

Total Coal Treatment	Coal Product						Reject					
	Analyses			Distribution			Analyses		Distribution			
% Wgt.	% Ash	B.Th.U's.	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.				
No Beneficiation	100.0	29.4	9620	100.0	100.0	....	....	....	....			
Float at Sp.G. 1.8	80.3	17.5	11690	47.8	97.6	18.3	81.3	50.6	1.1			
Float at Sp.G. 1.7	79.3	17.1	11750	46.2	97.0	19.3	79.7	52.2	1.7			
Float at Sp.G. 1.6	77.9	16.6	11820	44.2	95.9	20.7	77.1	54.2	2.8			
Float at Sp.G. 1.5	70.5	15.0	12100	36.0	88.8	28.1	65.4	62.4	9.9			
Float at Sp.G. 1.4	52.4	12.0	12560	21.4	68.5	46.2	49.0	77.0	30.2			
Untreated—10 mesh fraction.	1.4	33.8	8840	1.6	1.3	....	....	....	....			
+14" Fraction												
	Analyses						Distribution		Analyses		Distribution	
	% Wgt.	% Ash	B.Th.U's.	% V.C.M.	% F.C.	% S	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.
No Beneficiation	68.9	28.0	9810	25.6	43.6	.36	65.7	70.3	....	....	....	....
Float at Sp.G. 1.8	57.2	17.3	11730	30.6	52.1	.43	33.7	69.8	11.7	80.4	32.0	0.5
Float at Sp.G. 1.7	56.7	17.0	11780	30.7	52.3	.43	32.9	69.5	12.2	79.1	32.8	0.8
Float at Sp.G. 1.6	56.2	16.8	11810	30.8	52.4	.43	32.2	69.1	12.7	77.6	33.5	1.2
Float at Sp.G. 1.5	51.7	15.4	12040	31.2	53.3	.44	27.2	64.8	17.2	65.9	38.5	5.5
Float at Sp.G. 1.4	38.1	12.4	12500	32.3	55.3	.47	16.1	49.6	30.8	47.3	49.6	20.7
-14" +10 mesh Fraction.												
No Beneficiation	29.7	32.4	9200	23.2	40.7	.32	32.7	28.4	....	....	....	....
Float at Sp.G. 1.8	23.1	17.9	11570	29.8	52.3	.42	14.1	27.8	6.6	83.0	18.6	0.6
Float at Sp.G. 1.7	22.6	17.2	11690	30.0	52.8	.40	13.3	27.5	7.1	80.6	19.4	0.9
Float at Sp.G. 1.6	21.7	16.2	11850	30.3	53.5	.41	12.0	26.8	8.0	76.3	20.7	1.6
Float at Sp.G. 1.5	18.8	13.7	12260	31.2	55.1	.42	8.8	24.0	10.9	64.6	23.9	4.4
Float at Sp.G. 1.4	14.3	10.8	12710	32.3	56.9	.43	5.3	18.9	15.4	52.4	27.4	9.5

Test Results at Sp.G. 1.8 on Sizes Coarser than 14".

+2" Fraction

	Analyses					Distribution				Analyses		Distribution	
	% Wgt.	% Ash	B.Th.U's.	% V.C.M.	% F.C.	% S	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.	
No Beneficiation	49.4	27.5	9890	25.5	44.2	.36	46.2	50.8	.....	.....	.....	.....	
Float at Sp.G. 1.8	41.4	17.5	11710	30.2	52.3	.43	24.7	50.4	8.0	79.1	21.5	0.4	
-2" +14" Fraction													
No Beneficiation	19.5	29.4	9610	25.9	42.0	.35	19.5	19.5	.....	.....	.....	.....	
Float Sp.G. 1.8	15.8	16.8	11780	31.7	51.5	.43	9.0	19.4	3.7	83.2	10.5	0.1	

R. 327.

Total Coal Treatment	Coal Product					Reject		Distribution	
	% Wgt.	Analyses % Ash	B.Th.U's.	% Ash	Distribution % B.Th.U's.	Analyses % Wgt.	% Ash	% Ash	% B.Th.U's.
No Beneficiation	100.0	22.3	10790	100.0	100.0	.....	.....	.....	.....
Float at Sp.G. 1.8	88.9	19.6	11260	77.9	92.8	4.8	68.9	14.9	1.2
Float at Sp.G. 1.7	85.7	18.6	11450	71.2	91.0	8.0	60.4	21.6	3.0
Float at Sp.G. 1.6	80.7	17.3	11670	62.5	87.3	13.0	52.2	30.3	6.7
Float at Sp.G. 1.5	71.7	15.5	11970	49.9	79.5	22.0	43.7	42.9	14.5
Float at Sp.G. 1.4	46.7	12.2	12520	25.6	54.1	47.0	32.0	67.2	39.9
Untreated -10 mesh fraction	6.3	25.5	10250	7.2	6.0	.....	.....	.....	.....

+14" Fraction

	Analyses					Distribution			Analyses		Distribution	
	% Wgt.	% Ash	B.Th.U's.	% V.C.M.	% F.C.	% S	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.
No Beneficiation	32.6	20.1	11200	29.1	50.6	.37	29.4	33.9	.....	.....	.....	.....
Float at Sp.G. 1.8	32.3	19.6	11290	29.3	51.1	.36	28.3	33.8	0.3	78.8	1.1	0.1
Float at Sp.G. 1.7	31.7	19.0	11390	29.5	51.5	.38	27.0	33.5	0.9	59.7	2.4	0.4
Float at Sp.G. 1.6	30.6	18.3	11520	29.7	52.0	.39	25.1	32.7	2.0	48.0	4.3	1.2
Float at Sp.G. 1.5	28.3	17.0	11740	30.1	52.9	.39	21.6	30.8	4.3	40.7	7.8	3.1
Float at Sp.G. 1.4	17.7	13.7	12280	31.0	55.3	.42	10.9	20.1	14.9	27.8	18.5	13.8

## -14" +10 mesh Fraction

	Analyses					Distribution			Analyses		Distribution	
	% Wgt.	% Ash	B.Th.U's.	% V.C.M.	% F.C.	% S	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.
No Beneficiation	61.1	23.2	10630	27.1	47.5	.35	63.4	60.1	.....	.....	.....	.....
Float at Sp.G. 1.8	56.6	19.6	11250	29.2	51.2	.38	49.6	59.0	4.5	68.3	13.8	1.1
Float at Sp.G. 1.7	54.0	18.3	11480	29.5	53.5	.39	37.4	54.6	11.0	53.0	26.0	5.5
Float at Sp.G. 1.6	50.1	16.7	11760	29.9	53.5	.39	37.4	54.6	11.0	53.0	26.0	5.5
Float at Sp.G. 1.5	43.4	14.6	12120	30.5	55.0	.41	28.3	48.7	17.7	44.4	35.1	11.4
Float at Sp.G. 1.4	29.0	11.3	12660	31.7	57.1	.45	14.7	34.0	32.1	34.0	48.7	26.1

## R. 328.

Total Coal Treatment	Coal Product					Distribution		Analyses		Distribution	
	% Wgt.	% Ash	B.Th.U's.	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.		
No Beneficiation	100.0	22.0	11030	100.0	100.0	.....	.....	.....	.....	.....	
Float at Sp.G. 1.8	90.5	19.7	11420	81.1	93.7	3.5	74.5	11.9	0.6		
Float at Sp.G. 1.7	88.8	19.1	11530	77.0	92.8	5.2	67.3	16.0	1.5		
Float at Sp.G. 1.6	85.8	18.2	11680	71.0	90.8	8.2	58.8	22.0	3.5		
Float at Sp.G. 1.5	77.6	16.6	11950	58.5	84.0	16.4	46.2	34.5	10.3		
Float at Sp.G. 1.4	54.2	13.6	12450	33.5	61.2	39.8	32.9	59.5	33.1		
Untreated -10 mesh Fraction.	6.0	25.8	10460	7.0	5.7	.....	.....	.....	.....		

## -14" +10 mesh Fraction

	Analyses					Distribution			Analyses		Distribution	
	% Wgt.	% Ash	B.Th.U's.	% V.C.M.	% F.C.	% S	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.
No Beneficiation	94.0	21.8	11070	26.1	51.2	.39	93.0	94.3	.....	.....	.....	.....
Float at Sp.G. 1.8	90.5	19.7	11420	27.1	53.2	.40	81.1	93.7	3.5	74.5	11.9	0.6
Float at Sp.G. 1.7	88.8	19.1	11530	27.2	53.7	.40	77.0	92.8	5.2	67.3	16.0	1.5
Float at Sp.G. 1.6	85.8	18.2	11680	27.4	54.4	.39	71.0	90.8	8.2	58.8	22.0	3.5
Float at Sp.G. 1.5	77.6	16.6	11950	27.7	55.7	.42	58.5	84.0	16.4	46.2	34.5	10.3
Float at Sp.G. 1.4	54.2	13.6	12450	28.7	57.7	.43	33.5	61.2	39.8	32.9	59.5	33.1

R. 329.

Total Coal Treatment	% Wgt.	Coal Product				Analyses				Distribution	
		Analyses % Ash	B.Th.U's.	% Ash	Distribution % B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.		
No Beneficiation	100.0	31.9	8900	100.0	100.0	...	...	35.9	4.1		
Float at Sp.G. 1.8	79.3	24.6	10380	61.1	92.4	17.4	65.9	45.5	8.5		
Float at Sp.G. 1.7	72.9	22.6	10750	51.5	88.0	23.8	61.0	55.2	14.9		
Float at Sp.G. 1.6	65.3	20.4	11130	41.8	81.6	31.4	56.1	65.4	25.9		
Float at Sp.G. 1.5	54.7	18.4	11490	31.6	70.6	42.0	49.7	84.6	58.4		
Float at Sp.G. 1.4	27.7	14.3	12250	12.4	38.1	69.0	39.2	...	...		
Untreated -10 mesh Fraction.	3.3	29.1	9380	3.0	3.5	...	...	...	...		

+14" Fraction

	Analyses		Distribution			Analyses		Distribution				
	% Wgt.	% Ash	B.Th.U's.	% V.C.M.	% F.C.	% S	% Ash	% B.Th.U's.	% Wgt.	% Ash	% Ash	% B.Th.U's.
No Beneficiation	49.6	31.3	9010	23.7	39.2	.22	48.5	50.3	...	...	...	...
Float at Sp.G. 1.8	41.8	25.4	10240	28.1	46.5	.26	33.2	48.1	7.8	62.7	15.3	2.2
Float at Sp.G. 1.7	37.9	23.1	10660	28.3	48.6	.28	27.4	45.4	11.7	57.7	21.1	4.9
Float at Sp.G. 1.6	33.8	20.9	11050	28.9	50.3	.31	22.1	42.0	15.8	53.5	26.4	8.3
Float at Sp.G. 1.5	27.8	18.7	11450	29.2	52.0	.32	16.3	35.8	21.8	47.2	32.2	14.5
Float at Sp.G. 1.4	13.6	14.3	12240	29.9	55.8	.36	6.1	18.7	36.0	37.7	42.4	31.6

-14" +10 mesh Fraction.

No Beneficiation	47.1	32.8	8750	21.8	38.9	.22	48.5	46.2	...	...	...	...
Float at Sp.G. 1.8	37.5	23.7	10530	27.4	48.9	.27	27.9	44.3	9.6	68.5	20.6	1.9
Float at Sp.G. 1.7	35.0	22.0	10850	27.6	50.4	.28	24.1	42.6	12.1	64.2	24.4	3.6
Float at Sp.G. 1.6	31.5	20.0	11210	28.0	52.1	.30	19.7	39.6	15.6	58.8	28.8	6.6
Float at Sp.G. 1.5	26.9	18.1	11540	28.4	53.5	.31	15.3	34.8	20.2	52.4	33.2	11.4
Float at Cp.G. 1.4	14.1	14.2	12260	29.4	56.4	.34	6.3	19.4	33.0	40.8	42.2	26.8

# R. 325, R. 327, R. 328, and R. 329

## CORNWALL COAL COMPANY

### APPENDIX.

Tabulations showing individual floats at various densities from which the published cumulative figures were derived.

	Individual		Cumulative	
	Wgt. %	Ash %	Wgt. %	Ash %
<b>R. 325</b>				
Float 1.4	52.4	12.0	52.4	12.0
Float 1.5	18.1	23.6	70.5	15.0
Float 1.6	7.4	32.5	77.9	16.6
Float 1.7	1.4	41.6	79.3	17.1
Float 1.8	1.0	49.2	80.3	17.5
<b>R. 327</b>				
Float 1.4	46.7	12.2	46.7	12.2
Float 1.5	25.0	21.7	71.7	15.5
Float 1.6	9.0	31.4	80.7	17.3
Float 1.7	5.0	39.0	85.7	18.6
Float 1.8	3.2	47.7	88.9	19.6
<b>R. 328</b>				
Float 1.4	54.2	13.6	54.2	13.6
Float 1.5	23.4	23.5	77.6	16.6
Float 1.6	8.2	33.6	85.8	18.2
Float 1.7	3.0	44.0	88.8	19.1
Float 1.8	1.7	52.6	90.5	19.7
<b>R. 329</b>				
Float 1.4	27.7	14.3	27.7	14.3
Float 1.5	27.0	22.7	54.7	18.4
Float 1.6	10.6	30.8	65.3	20.4
Float 1.7	7.6	40.8	72.9	22.6
Float 1.8	6.4	47.8	79.3	24.6