

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROSPECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #1, Seam #4

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
EDMONTON - ALBERTA - CANADA

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Dated: October 6, 1969

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

00 265

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SGURRY RAINBOW OIL LTD.  
Adit #1, Seam #4

SUMMARY.

The data presented in this report refers to coal from Seam #4.

The analysis and the washability indicates that this coal is of the low volatile bituminous rank with a relatively high ash content (25.14%) and low sulphur content (0.33%). See Table 1 for general information.

INTRODUCTION.

This report is the first one of a series providing

- a. Washability data of size fractions.
- b. Performance evaluation data for cleaning coking coal from the Elk River prospect at various levels of efficiency.
- c. Residual moisture contents on size fractions.
- d. F.S.I. determinations on size and specific gravity fractions.

The objective of this and following reports is to provide analytical data about the coal and to provide basic engineering data for the design of facilities for preparing this coal to market specifications.

This report is of a preliminary character in that it deals with one adit sample only. Subsequent adit samples now being analysed will most likely have different composition and cleaning characteristics.

After all borehole and adit samples have been analysed a final study can be made as to mining, blending (if required) and cleaning.

Allowance should be made with regard to the contamination with some foreign material from roof and floor strata that is unavoidably produced along with the coal.

The cleaning characteristics of the coal are based on the error curve, a parameter for cleaning efficiency that is largely independent of the gravimetric composition of the coal (ash distribution) and can be used for comparing coal cleaning systems whose probable error values are known.

In the last section of this report examples of this method for predicting coal cleaning results are presented for the coarse coal fraction (2" x 28 mesh) and the fines fraction (28 x 100 mesh) when using equipment operating with a probable error of 0.10 for this coal.

Methods of coal cleaning can be directly compared for a range of cut points and the yield losses of each cleaning system can be properly balanced against the cost of cleaning.

WASHABILITY CHARACTERISTICS.

The overall weight and ash distribution of the raw coal, crushed to minus 2", is shown on Table 3. Ash contents were done for each individual size - gravity fraction and these values are shown in brackets. Sulphur analyses were done on size fractions only in view of the low sulphur level. (See table 2.)

The minus 100 mesh fraction constitutes a minor part of the coal only (2.22% by weight). The weights and ash contents of this size fraction were found not by direct analyses, but by calculation from the other size gravity fractions.

From the master table, washability data have been derived for the 2" x 20 mesh and 20 x 100 mesh fractions. This information is presented on Tables 5 and 6, respectively. Washability curves for these two main size fractions are presented on Figures 1 and 3.

Table 4 shows the volatile matter in weight percent against size and specific gravity fractions.

Table 7 shows the free swelling indexes for all size and specific gravity fractions.

PERFORMANCE EVALUATION.

The washability curves of both size fractions of the raw coal indicates that the cleaning of this coal is encumbered by intergrown ash. Yield of recovery at an ash content of 8.75% is therefore depressed.

The 2" x 20 mesh fraction constitutes the major part of the mine run (88.14% of the total, see Table 3). Figure 2 illustrates that with 25.71% ash on raw, the actual yield at 8.75% ash in the clean coal can be expected to range from 48% to 63% depending on the efficiency of the coal cleaning equipment. Performance Evaluation (P.E.) curves, relating yield and ash contents of coal and reject, are shown for separation efficiencies corresponding with probable error values ranging from 0.06 to 0.12

The 20 x 100 mesh fraction constitutes 9.64% by weight of the mine run. Figure 4 shows the P.E. curves for probable error values ranging from 0.08 to 0.14. An example illustrates the actual yield that can be expected at these efficiencies when cleaning the coal to 8.75% ash.

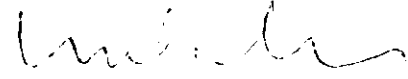
It is noted that the "yield error" can be found in each case by subtracting the expected actual yield from the corresponding theoretical yield read on the "theoretical curve" at the point vertically above it.

Similarly the "ash error" can be read directly from the P.E. graph along a horizontal line corresponding with the actual yield that is being considered. The ash error is the difference between the theoretical ash (intersect with "theoretical" curve) and the actual ash (intersect with the selected P.E. curve).

Respectfully submitted,

CYCLONE ENGINEERING SALES LTD.

Per: \_\_\_\_\_



P.D.J. Vinkenborg, P. Eng.  
General Manager



T A B L E 1. SEAM #4.

SCURRY RAINBOW OIL LTD.

Classification by Rank.

Ash:	25.14%
Volatile Matter:	15.47 %
Residual Moisture:	0.67%
Fixed Carbon:	58.72%
Sulphur:	0.33%
B.T.U./lb.	11,684
Rank:	Low volatile bituminous

T A B L E 2. SEAM #4.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2" x 1"	24.83	0.31	11,010	0.64
1" x 1/2"	20.52	0.32	11,010	0.69
1/2" x 1/4"	17.35	0.32	11,110	0.65
1/4" x 8 m.	18.32	0.33	11,100	0.67
8 x 20 m.	7.12	0.36	11,360	0.71
20 x 100 m.	9.64	0.40	12,090	0.74
- 100 m.	2.22	0.42	12,690	0.64
Total	100.00	0.33	11,684	0.67

TABLE 3. SEAM #4.

SCURRY RAINBOW OIL LTD.

Weight and Ash Distribution vs. Size and Specific Gravity.

(Figures in Brackets show the Ash Content of Individual Fractions)

Size \ Sp.Gr.	Sp.Gr.							Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2" x 1"	6.92 (4.65)	5.47 (7.70)	3.87 (12.23)	2.34 (20.80)	0.99 (34.06)	0.94 (46.06)	4.30 (80.07)	24.83 (23.82)
1" x 1/2"	6.96 (4.61)	3.07 (7.85)	2.67 (12.32)	1.85 (20.43)	0.81 (32.57)	0.75 (43.57)	4.41 (80.01)	20.52 (26.25)
1/2" x 1/4"	5.73 (4.26)	2.38 (7.59)	2.38 (12.14)	1.54 (19.99)	0.84 (31.94)	1.12 (45.63)	3.36 (78.36)	17.35 (25.55)
1/4" x 8 m.	6.35 (3.79)	2.02 (8.81)	1.64 (12.74)	1.58 (18.55)	0.89 (31.50)	1.90 (45.89)	3.94 (76.40)	18.32 (27.74)
8 x 20 m.	2.50 (3.10)	0.79 (7.69)	0.70 (13.28)	0.58 (21.53)	0.37 (31.65)	0.77 (43.29)	1.41 (73.83)	7.12 (25.94)
20 x 100 m.	4.15 (2.91)	1.25 (8.34)	0.70 (13.51)	0.69 (26.90)	0.50 (32.71)	0.82 (41.86)	1.53 (72.33)	9.64 (21.97)
Total	32.67 (4.06)	14.98 (7.91)	11.96 (12.43)	8.58 (20.70)	4.40 (32.50)	6.30 (44.72)	18.95 (77.90)	97.78 (25.34)
- 100 m.	This fraction forms 2.22% of the total sample and has an ash content of 16.21%, thus giving a total sample ash value of 25.14%.							

T A B L E 4. SEAM #4.

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in Brackets give Volatile Matter.)

Size \ Sp.Gr.	Sp.Gr.							Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2" x 1"	6.92 (17.17)	54.7 (16.52)	3.87 (16.00)	2.34 (16.15)	0.99 (14.64)	0.94 (14.37)	4.30 (10.55)	24.83 (15.39)
1" x 1/2"	6.96 (17.13)	3.07 (16.08)	2.67 (15.80)	1.85 (15.74)	0.81 (14.69)	0.75 (13.76)	4.41 (9.92)	20.52 (14.90)
1/2" x 1/4"	5.73 (18.27)	2.38 (16.92)	2.38 (15.90)	1.54 (15.40)	0.84 (14.49)	1.12 (12.86)	3.36 (9.69)	17.35 (15.31)
1/4" x 8m	6.35 (18.84)	2.02 (17.34)	1.64 (16.80)	1.58 (15.73)	0.89 (15.03)	1.90 (13.33)	3.94 (9.60)	18.32 (15.47)
8 x 20 m.	2.50 (18.09)	0.79 (17.48)	0.70 (16.46)	0.58 (16.14)	0.37 (15.01)	0.77 (14.17)	1.41 (9.41)	7.12 (15.40)
20 x 100 m.	4.15 (19.34)	1.25 (17.61)	0.70 (16.59)	0.69 (15.52)	0.50 (15.19)	0.82 (14.37)	1.53 (10.91)	9.64 (16.66)
Total	32.61 (18.02)	14.98 (16.74)	11.96 (16.10)	8.58 (15.79)	4.40 (14.79)	6.30 (13.69)	18.95 (9.99)	97.78 (15.41)
- 100 m.	This fraction forms 2.22% of the total sample and has a volatile matter content of 18.05%, thus giving a total sample volatile matter content of 15.47%.							

T A B L E 5. SEAM #4.

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	32.29	4.23	32.29	4.23	100.00	25.71	7.6
1.30 - 1.35	15.58	7.88	47.87	5.42	67.71	35.96	3.0
1.35 - 1.40	12.78	12.37	60.65	6.88	52.13	44.35	1.7
1.40 - 1.50	8.95	20.16	69.60	3.59	39.35	54.74	1.5
1.50 - 1.60	4.42	32.48	74.02	10.02	30.40	64.92	1.2
1.60 - 1.80	6.22	45.18	80.24	12.74	25.98	70.44	1
+ 1.80	19.76	78.39	100.00	25.71	19.76	78.39	N.A.
Total	100.00	25.71					

T A B L E 6. SEAM #4.

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	43.05	2.91	43.05	2.91	100.00	21.98	10
1.30 - 1.35	12.97	8.34	56.02	4.18	56.95	36.39	5.2
1.35 - 1.40	7.26	13.51	63.23	5.24	43.98	44.66	2.8
1.40 - 1.50	7.16	26.90	70.44	7.44	36.72	50.82	1.8
1.50 - 1.60	5.19	32.71	75.63	9.17	29.56	56.61	1.2
1.60 - 1.80	8.50	41.86	84.13	12.47	24.37	61.70	1
+ 1.80	15.87	72.33	100.00	21.98	15.87	72.33	N.A.
Total	100.00	21.98					

T A B L E 7. SEAM #4.

SCURRY RAINBOW OIL LTD.

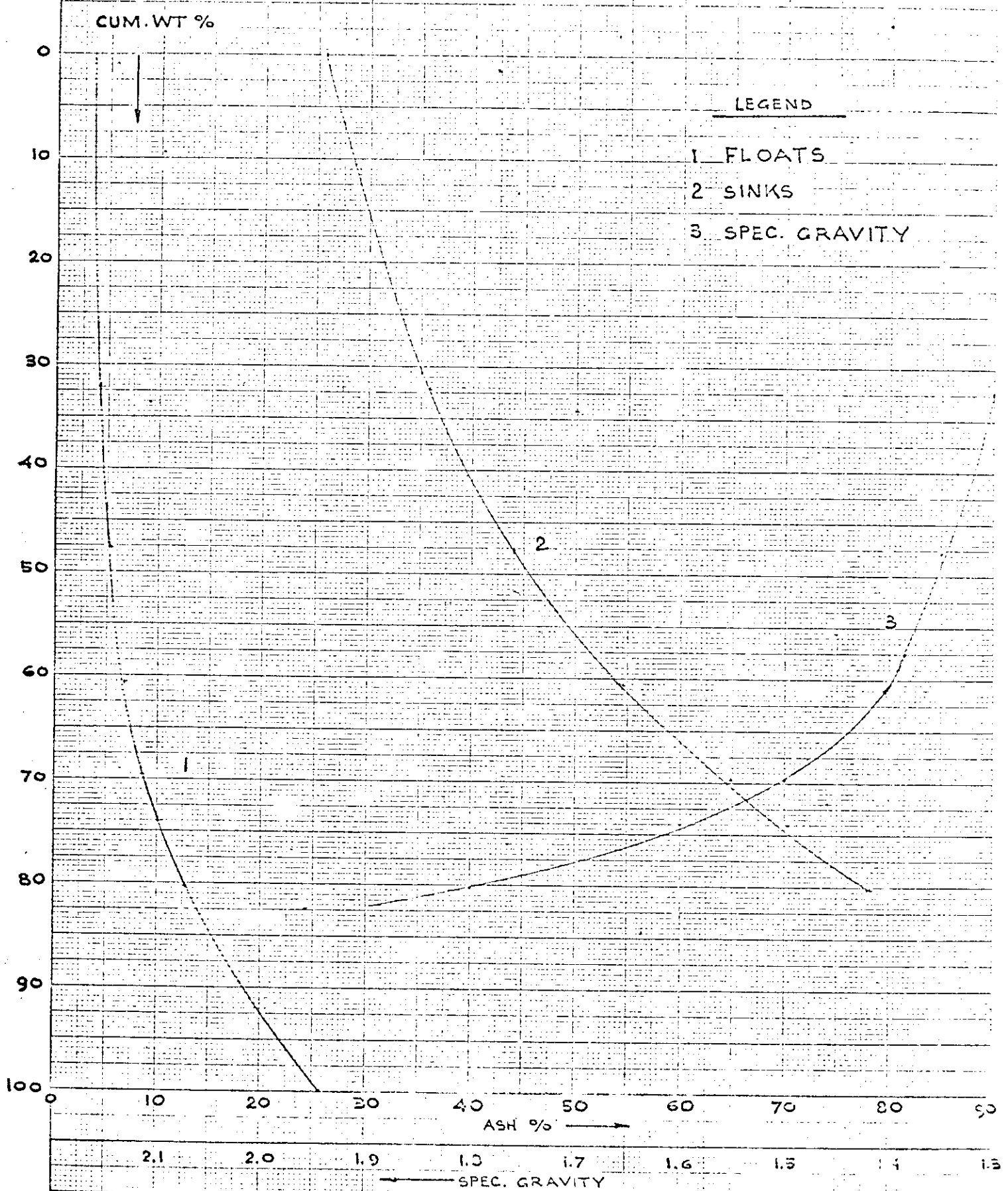
Free Swelling Index

Size Sp.Gr.	2" x 1"	1" x 1/2"	1/2" x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	5½, 5½, 6	5½, 6, 6	8½, 8½, 9	10, 10, 10	8½, 8½, 9	10, 10, 10
1.30 - 1.35	1½, 2, 2	2, 2, 2½	4, 4, 4	5, 5½, 5½	5, 5½, 5½	5, 5, 5½
1.35 - 1.40	1½, 1½, 1½	1½, 1½, 1½	1½, 1½, 1½	2½, 2½, 2½	3, 3, 3	2½, 3, 3
1.40 - 1.50	1½, 1½, 1½	1½, 1½, 1½	1½, 1½, 1½	1½, 1½, 1½	2, 2, 2	1½, 2, 2
1.50 - 1.60	1, 1, 1	1, 1, 1	1½, 1½, 1½	1, 1½, 1	1½, 2½, 1½	1, 1, 1½
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: F.S.I. on - 100 mesh fraction is 8, 8, 8.

# FIG. 1 SCURRY RAINBOW - SEAM NO. 4

## WASHABILITY CURVES OF 2in x 20m.

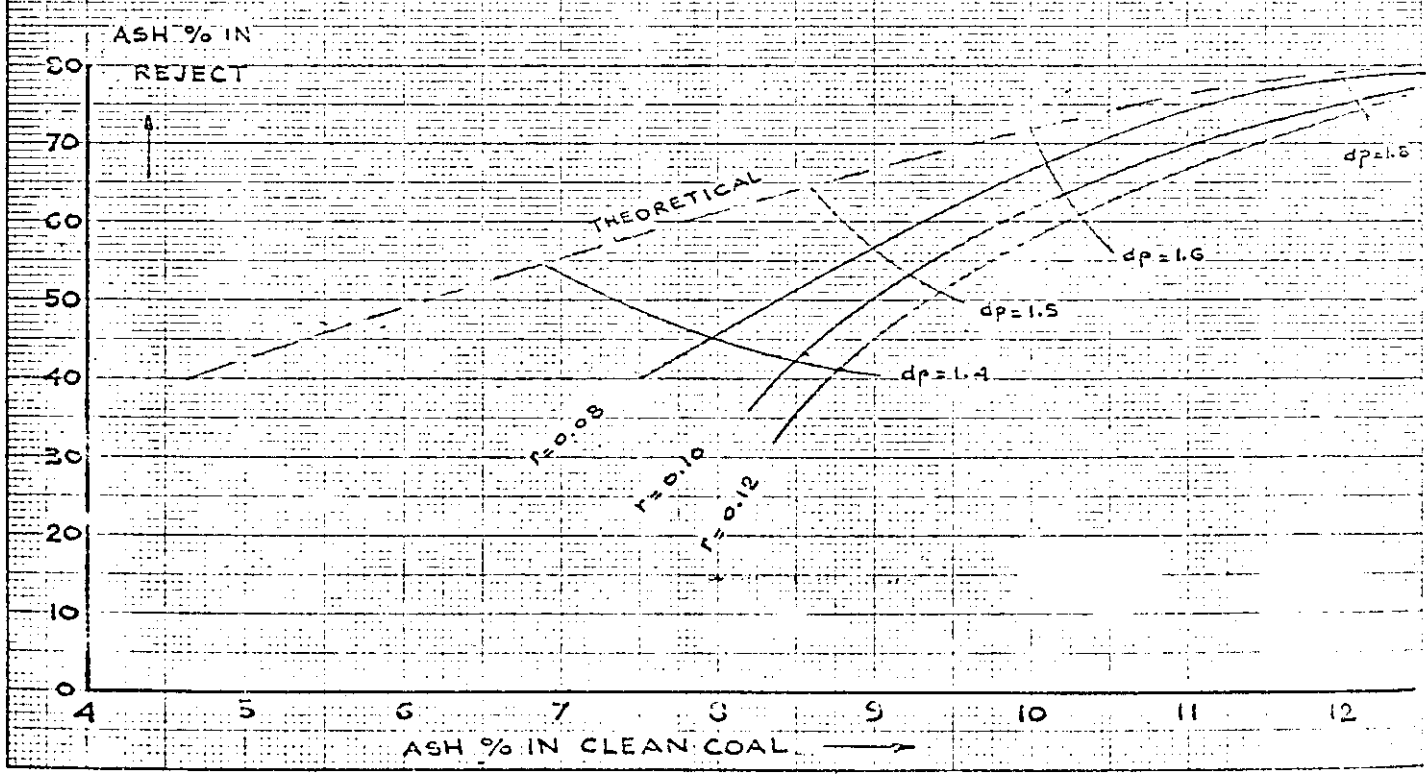
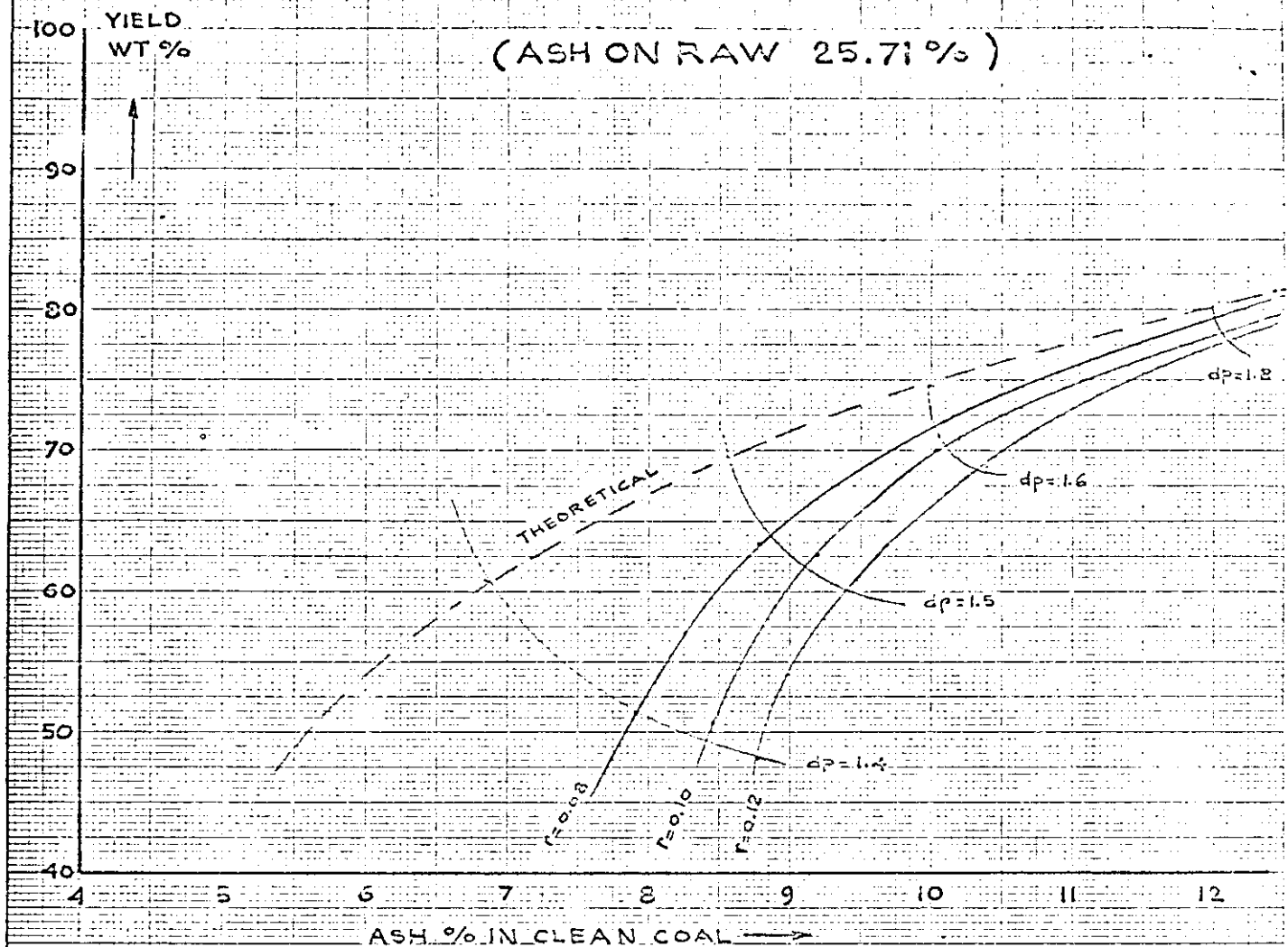


KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

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FIG. 2 SCURRY RAINBOW - SEAM NO. 4  
 PERFORMANCE EVALUATION CURVES FOR 2" x 20 m.  
 (ASH ON RAW 25.71%)



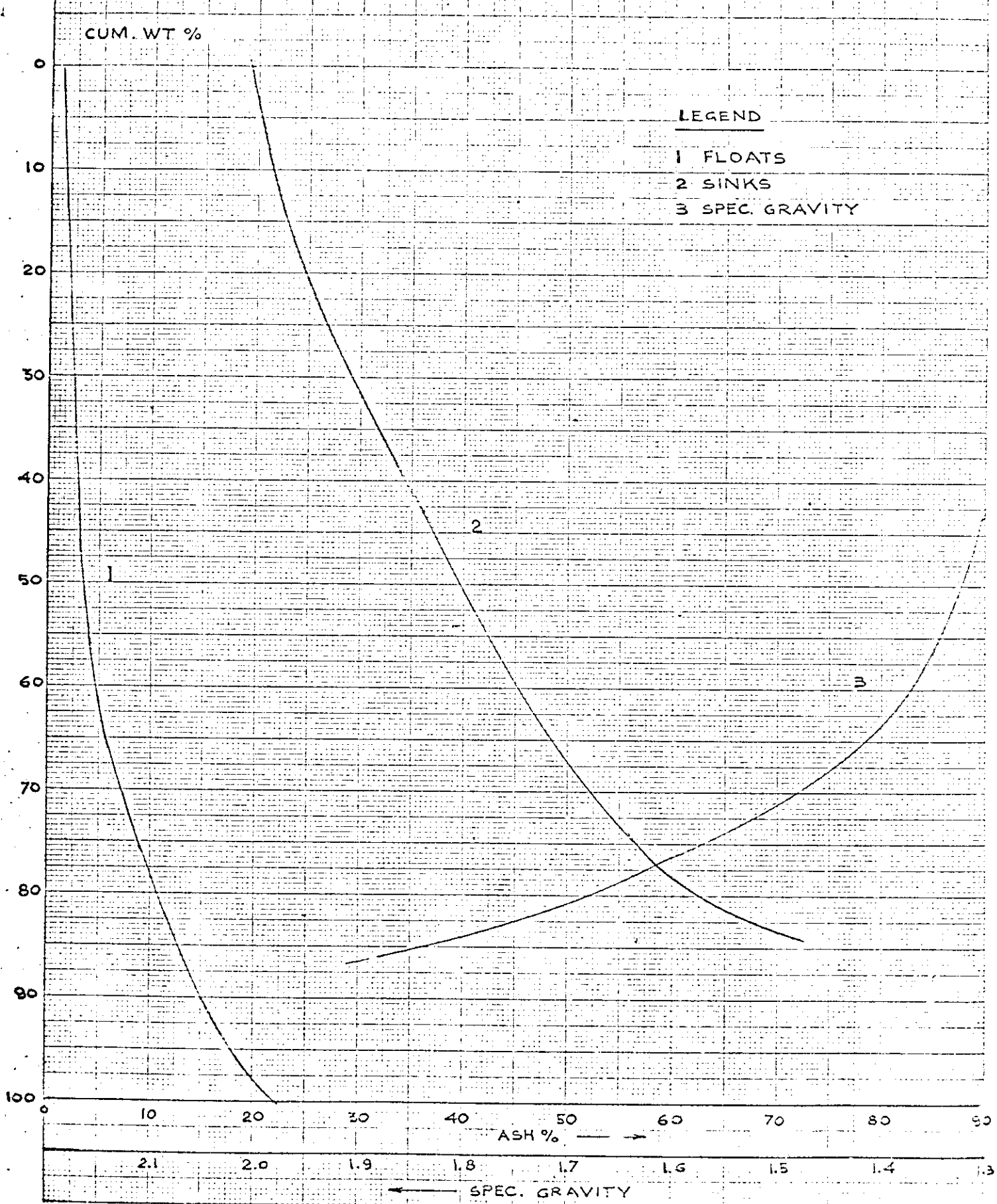
46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

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# FIG. 3 SCURRY RAINBOW - SEAM NO. 4

## WASHABILITY CURVES OF 20 x 100 m.



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

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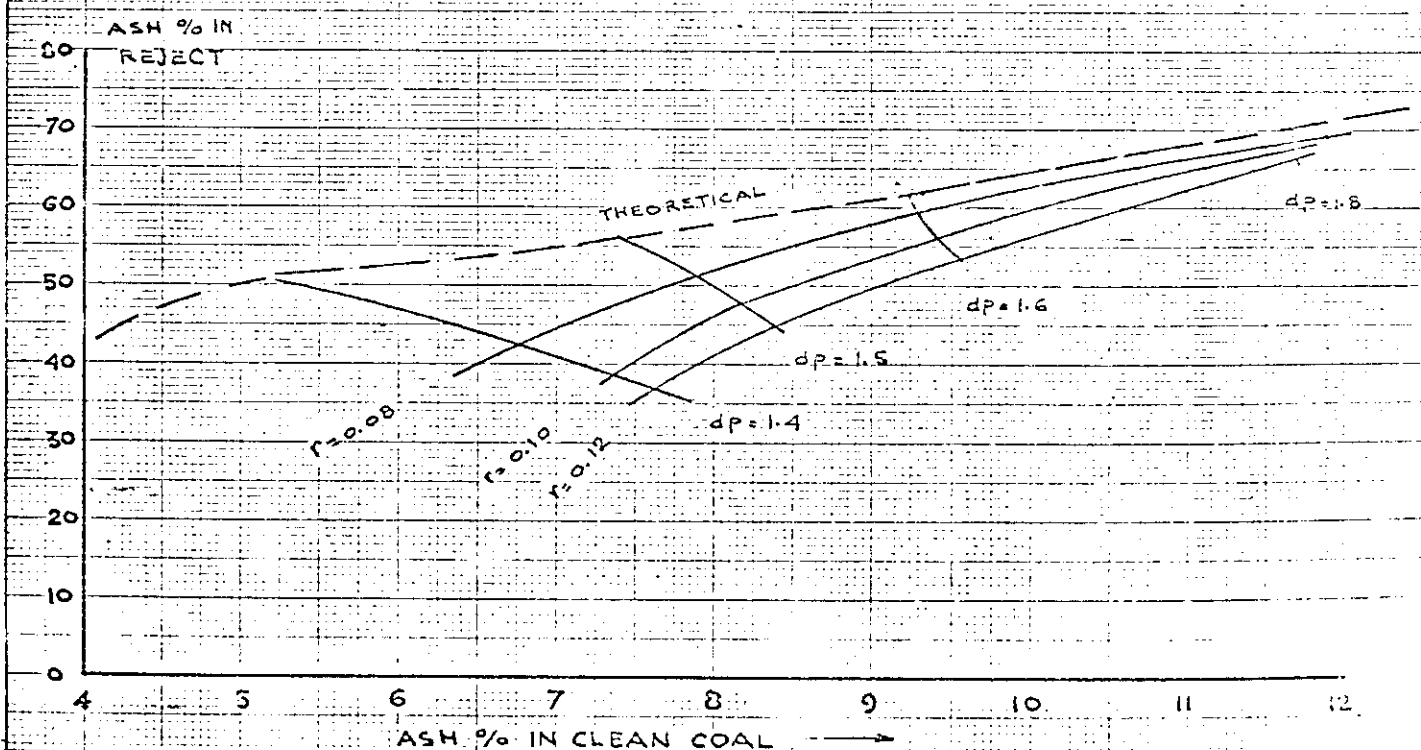
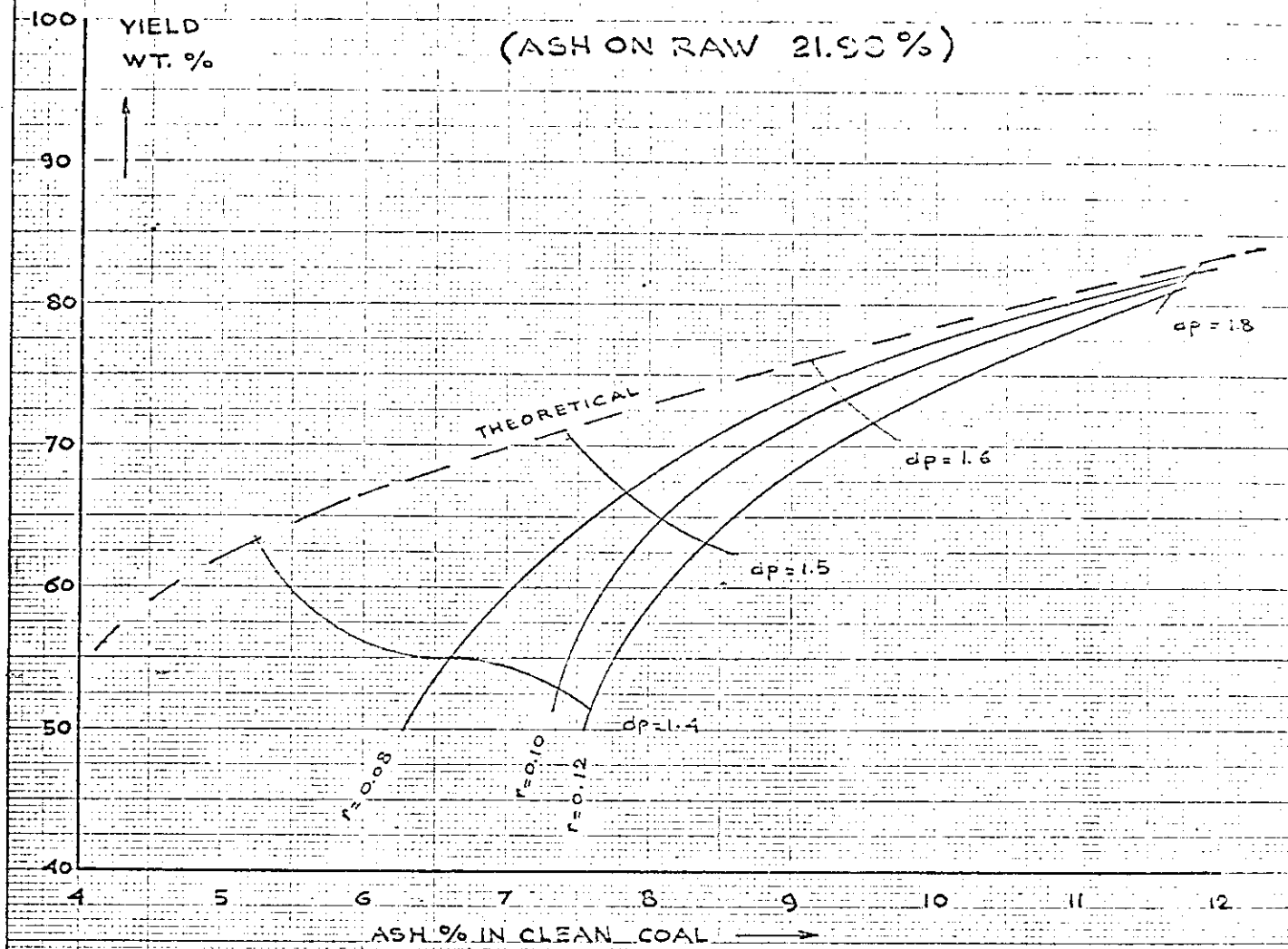
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# FIG. 4 SCURRY RAINBOW - SEAM NO. 4

PERFORMANCE EVALUATION CURVES FOR 20 x 100 m

(ASH ON RAW 21.93%)



KEUFFEL & ESSER CO.  
 MADE IN U.S.A.  
 46 1512  
 10 X 10 TO THE CENTIMETER  
 16 X 25 CM.

G. LAMAN  
OCT. 8/69

CYCLONE ENGINEERING SALES LTD  
EDMONTON ALBERTA CANADA

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROSPECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #2, Seam #7

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
EDMONTON - ALBERTA - CANADA

Report No.: RI-69.07.a  
Job No.: S1 - 58  
Dated: October 21, 1969

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SUMMARY

The data presented in this report refers to coal from Seam #7.

The analysis and the washability indicates that this coal is of low volatile bituminous rank with a moderate ash content of 14.46% and an acceptable sulphur content (0.59%).

The ash distribution over the various specific gravity fractions indicate that cleaning by heavy medium circuits may be required if an ash content of 8% in the clean coal is specified.

It is noted that the F.S.I. values of the 2" x 1" and 1" x 1/2" fractions of the floats at 1.3 and 1.35 were found much lower than those of the fine size fractions.

This is a very unusual phenomenon and for this reason we have contacted the Department of Energy, Mines & Resources for petrographic analysis and coke oven test. A copy of our letter to the Department is enclosed in this report for your information. We also have been in touch with the Alberta Research Council. As soon as any additional information is available we will forward this to you as an addendum to this report.

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October 20, 1969

Dr. J. Visman, Head  
Dept. of Energy, Mines & Resources  
P.O. Box Sub 11  
University of Alberta  
Edmonton 7, Alberta

Dear Dr. Visman:

We are forwarding two samples to you for the purpose of having a coking test performed on them in Ottawa. The samples are from Scurry Rainbow Seams #7 and #8.2.1. They are both floats at 1.30 of the size fraction 2" x 1". The liquid used for float sink was a solution of zinc chloride.

Contrary to our usual experience (we always get an F.S.I. of about 8 for floats at 1.30) these two samples are giving very low F.S.I. of 2 to 3.

Futhermore the free swelling index for floats at 1.30 of all size fractions below 1/4" is very much as expected.

There seems to be something wrong only with the two top size fractions of 2" x 1" and 1" x 1/2".

An actual 20 lb. coke oven test will help us provide Scurry Rainbow with more definite information on coking characteristics than is possible at the present moment.

Thank you.

Very truly yours,

CYCLONE ENGINEERING SALES LTD.

Per: 

R. S. Sehgal  
Head of Laboratory

RSS:sw

T A B L E 1. SEAM #7.

SCURRY RAINBOW OIL LTD.

Classification by Rank.

Ash:	14.46%
Volatile Matter:	17.85%
Residual Moisture:	0.44%
Fixed Carbon:	67.25%
Sulphur:	0.59%
B.T.U./lb.	12,860
Rank:	Low volatile bituminous

T A B L E 2. SEAM #7.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2" x 1"	16.41	0.64	13,030	0.44
1" x 1/2"	22.74	0.58	12,820	0.43
1/2" x 1/4"	19.44	0.57	12,400	0.44
1/4" x 8 m.	17.75	0.57	12,750	0.41
8 x 20 m.	9.76	0.60	12,930	0.47
20 x 100 m.	11.24	0.62	13,360	0.48
- 100 m.	2.66	0.65	13,740	0.45
Total	100.00	0.59	12,860	0.44

T A B L E 3. SEAM #7.

SCURRY RAINBOW OIL LTD.

Weight and Ash Distribution vs. Size and Specific Gravity.  
(Figures in Brackets show the Ash content of individual fractions)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2" x 1"	7.24 (4.76)	3.52 (8.24)	1.31 (12.90)	2.32 (21.35)	1.37 (30.84)	0.36 (38.69)	0.29 (72.51)	16.41 (12.62)
1 x 1/2"	9.28 (5.05)	4.09 (8.47)	2.36 (12.42)	3.61 (21.41)	1.89 (32.95)	0.70 (39.90)	0.81 (76.36)	22.74 (14.95)
1/2 x 1/4"	6.51 (4.23)	3.66 (9.10)	2.44 (12.46)	3.66 (20.38)	1.54 (32.10)	0.94 (41.75)	0.69 (74.83)	19.44 (15.75)
1/4" x 8 m.	7.66 (4.38)	1.77 (8.66)	2.93 (13.17)	2.27 (22.13)	1.43 (31.08)	0.85 (42.29)	0.84 (71.83)	17.75 (15.68)
8 x 20 m.	5.09 (4.40)	0.74 (8.60)	1.33 (14.21)	0.91 (21.52)	0.66 (30.67)	0.54 (40.54)	0.49 (68.68)	9.76 (14.65)
20 x 100 m.	6.35 (3.30)	1.24 (9.63)	0.83 (13.85)	0.91 (19.97)	0.90 (30.56)	0.59 (38.35)	0.42 (75.98)	11.24 (12.86)
Total	42.14 (4.40)	15.02 (8.69)	11.20 (13.00)	13.68 (21.15)	7.79 (31.59)	3.98 (40.59)	3.54 (73.57)	97.34 (14.57)
- 100 m.	This fractions forms 2.66% of the total sample and has an ash content of 10.46%, thus giving a total sample ash value of 14.46%.							

T A B L E 4. SEAM #7.

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in brackets give Volatile Matter)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2" x 1"	7.24 (18.01)	3.52 (16.71)	1.31 (16.91)	2.32 (16.69)	1.37 (16.59)	0.36 (15.47)	0.29 (14.71)	16.41 (17.22)
1" x 1/2"	9.28 (18.20)	4.09 (16.70)	2.36 (17.30)	3.61 (17.00)	1.89 (16.42)	0.70 (15.66)	0.81 (14.46)	22.74 (17.28)
1/2" x 1/4"	6.51 (18.92)	3.66 (16.70)	2.44 (17.22)	3.66 (16.70)	1.54 (16.04)	0.94 (15.38)	0.69 (14.01)	19.44 (17.29)
1/4" x 8 M.	7.66 (19.45)	1.77 (18.55)	2.93 (17.46)	2.27 (17.02)	1.43 (16.64)	0.85 (16.20)	0.84 (13.34)	17.75 (18.05)
8 x 20 m.	5.09 (20.50)	0.74 (19.44)	1.33 (17.93)	0.91 (17.44)	0.66 (17.38)	0.54 (16.84)	0.49 (13.28)	9.76 (19.00)
20 x 100 m.	6.35 (20.88)	1.24 (19.08)	0.83 (18.16)	0.91 (18.04)	0.90 (17.36)	0.59 (17.42)	0.42 (14.80)	11.24 (19.56)
Total	42.14 (19.18)	1.502 (17.25)	11.20 (17.41)	13.68 (16.96)	7.79 (16.60)	3.98 (16.11)	3.54 (14.00)	97.34 (17.84)
- 100 m.	This fraction forms 2.66% of the total sample and has a volatile matter content of 18.39%, thus giving a total sample volatile matter content of 17.85%.							



T A B L E 5. SEAM #7.

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	41.56	4.61	41.56	4.61	100.00	14.81	5.6
1.30 - 1.35	16.01	8.61	57.57	5.72	58.44	22.06	1.5
1.35-1.40	12.04	12.93	69.61	6.97	42.43	27.13	1.7
1.40 - 1.50	14.83	21.24	84.44	9.48	30.39	32.76	1.3
1.50 - 1.60	8.00	31.73	92.44	11.90	15.56	43.73	1.1
1.60 - 1.80	3.94	40.99	96.38	12.61	7.56	56.44	1.1
+ 1.80	3.62	73.25	100.00	14.81	3.62	73.25	0.1
Total	100.00	14.81					

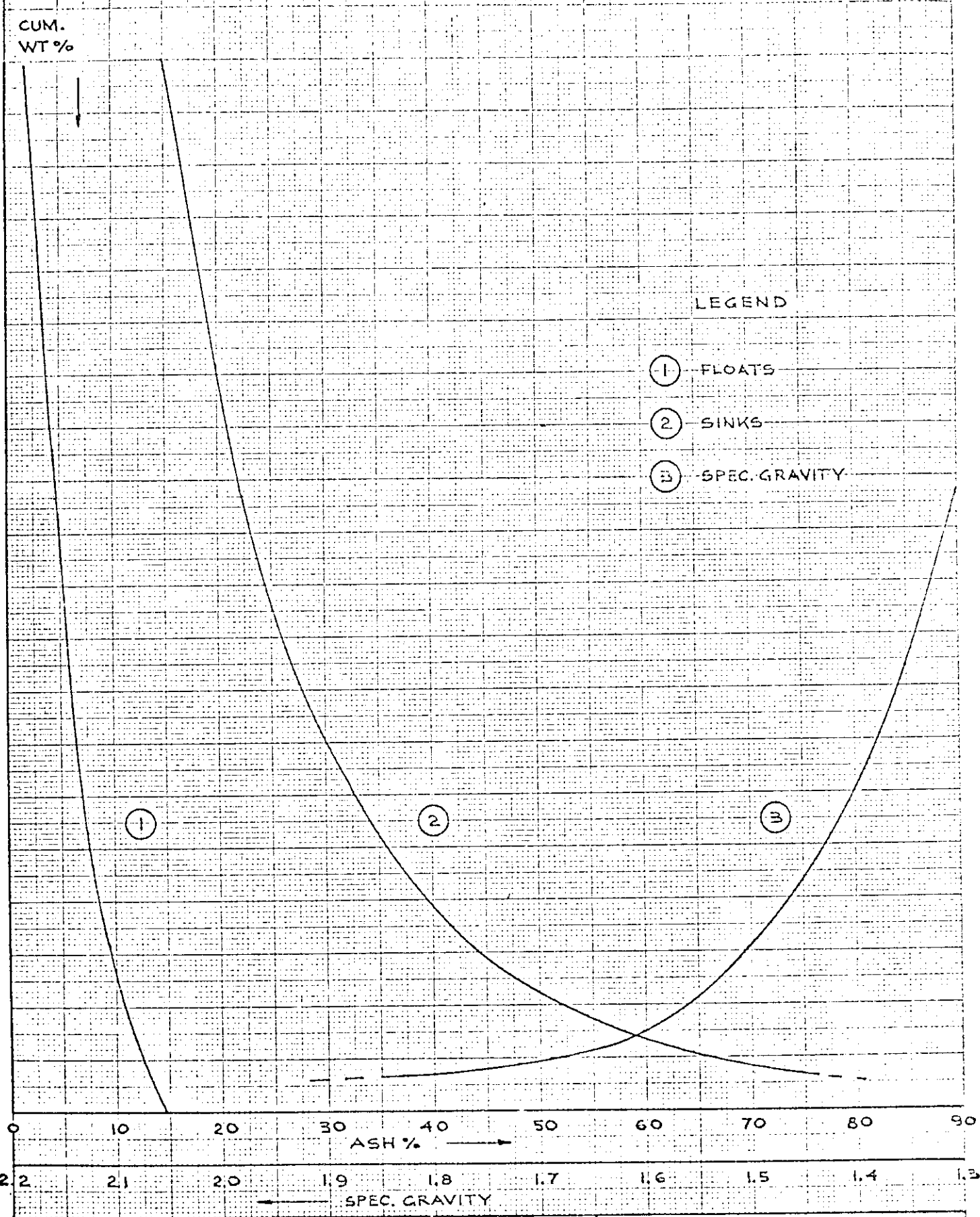
T A B L E 6. SEAM #7.

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	56.49	3.30	56.49	3.30	100.00	12.87	9.4
1.30 - 1.35	11.03	9.63	67.52	4.33	43.51	25.29	4.9
1.35 - 1.40	7.38	13.85	74.90	5.27	32.48	30.61	2.2
1.40 - 1.50	8.10	19.97	83.00	6.71	25.10	35.54	1.5
1.50 - 1.60	8.01	30.56	91.01	8.81	17.00	42.96	1
1.60 - 1.80	5.25	38.35	96.26	10.42	8.99	54.00	1
+ 1.80	3.74	75.98	100.00	12.87	3.74	75.98	1.5
Total	100.00	12.87					

# FIG. 1 SCURRY RAINBOW SEAM No. 7

## WASHABILITY CURVES FOR 2" x 20 m.



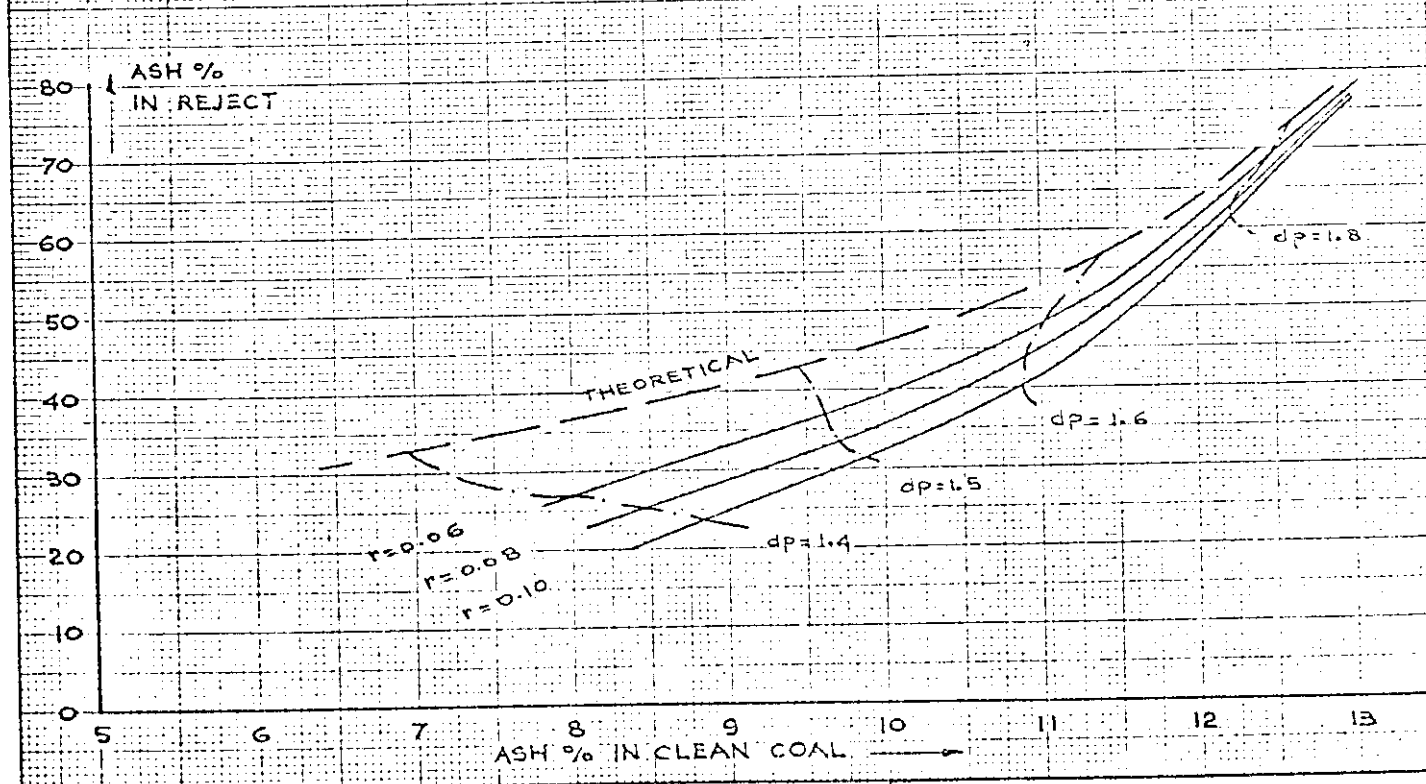
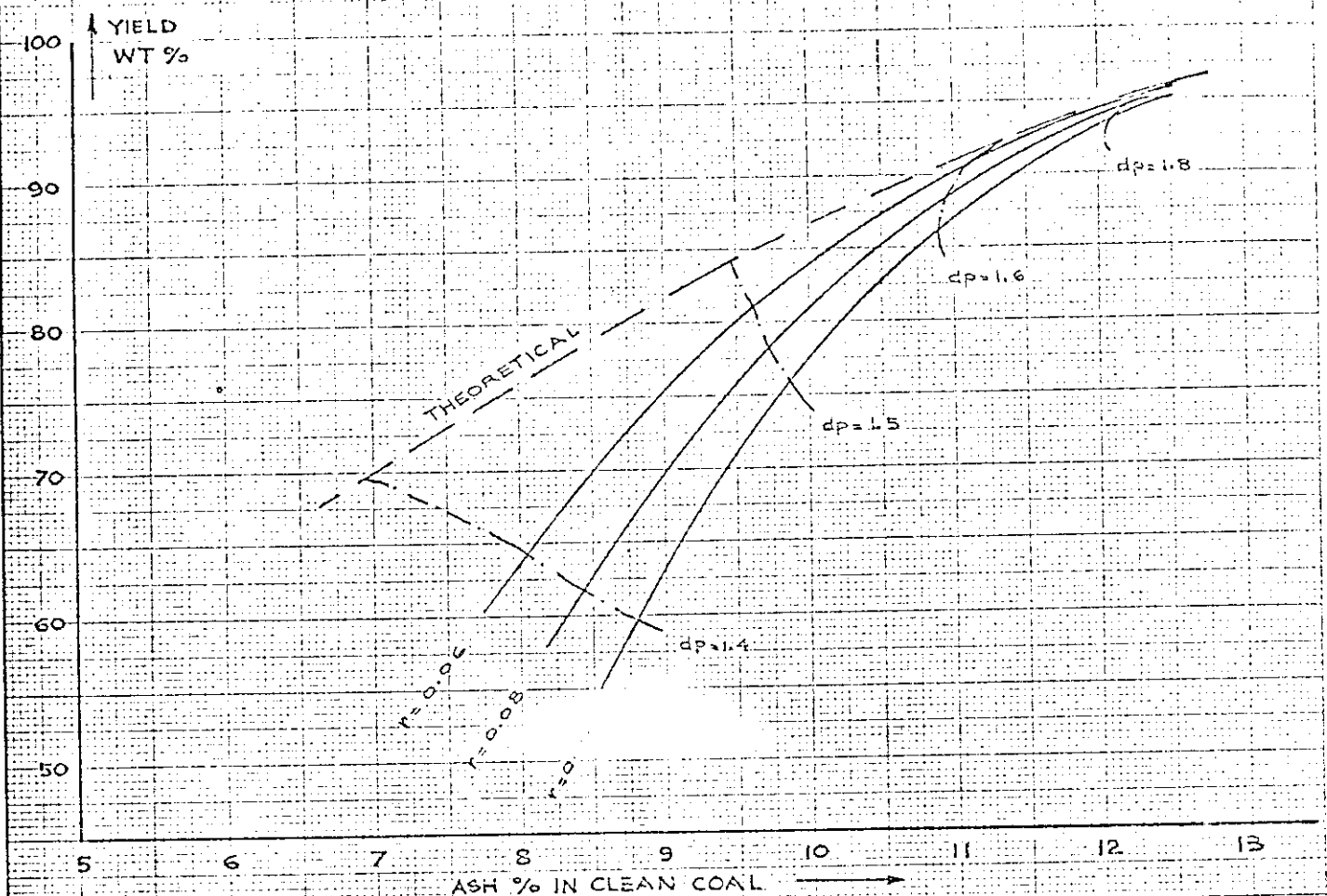
KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

OCT. 21 / '69 LAMAN

CYCLONE ENGINEERING SALES LTD  
 EDMONTON ALBERTA CANADA

# FIG. 2 SCURRY RAINBOW SEAM No. 7

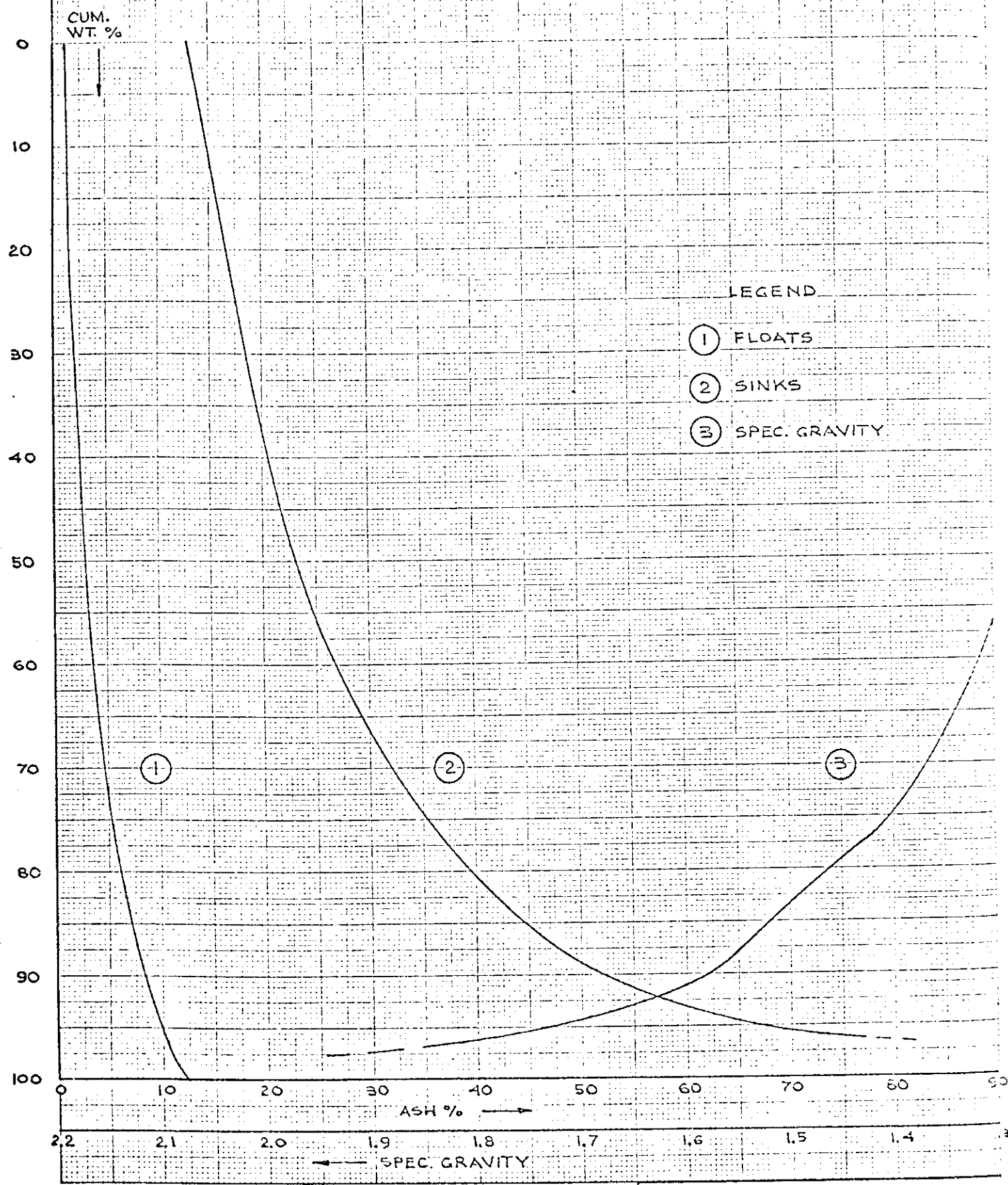
PERFORMANCE EVALUATION CURVES FOR 2" x 20 m.  
(ASH ON RAW 14.81 %)



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

# FIG. 3 SCURRY RAINBOW SEAM No. 7

WASHABILITY CURVES FOR 20 m. x 100 m.



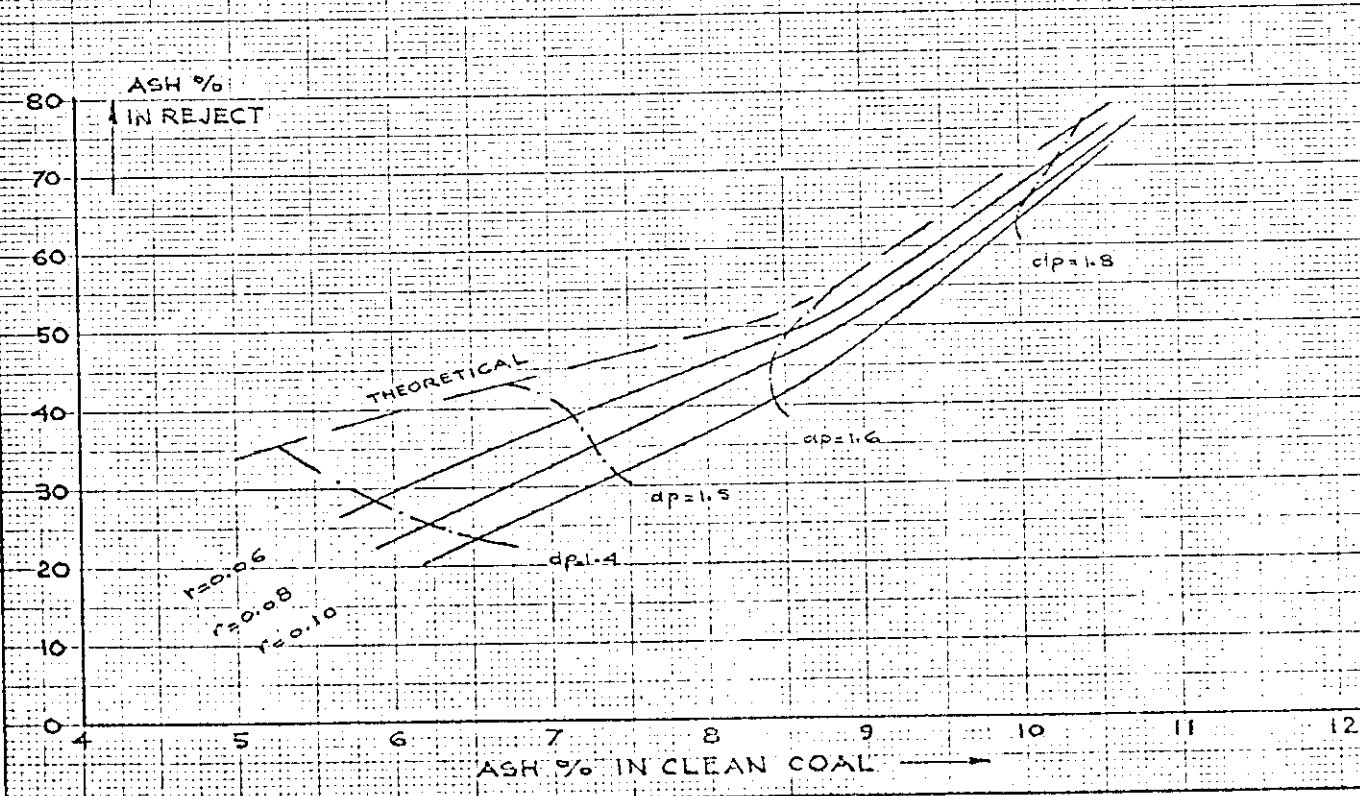
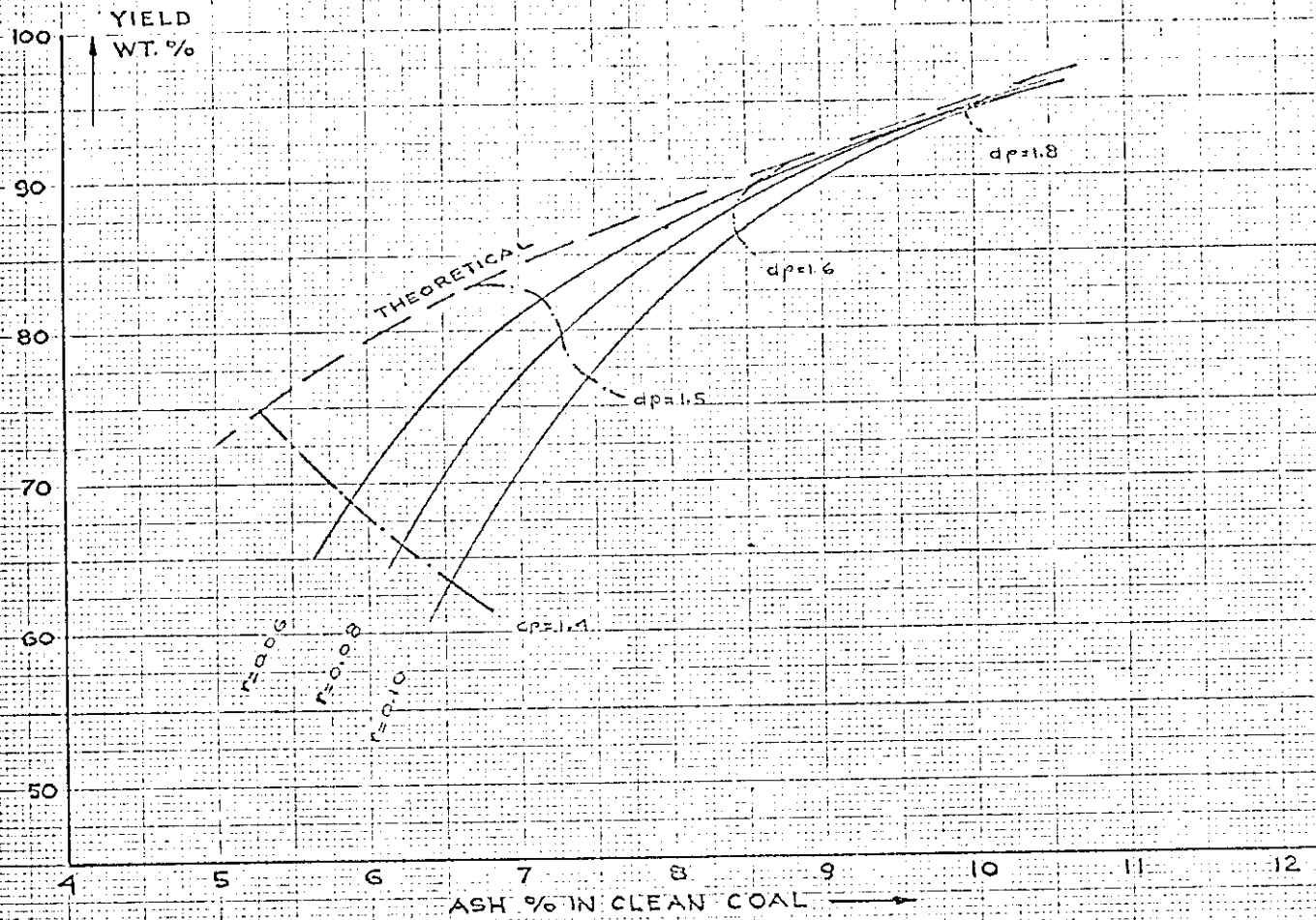
KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
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# FIG. 4 SCURRY RAINBOW SEAM No. 7

PERFORMANCE EVALUATION CURVES FOR 20m.x100m.  
(ASH ON RAW 12.87%)



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
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CYCLONE ENGINEERING SALES LTD.  
EDMONTON ALBERTA CANADA

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #3, Seam #8.2.1

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
EDMONTON - ALBERTA - CANADA

Report No.: RI-69.07.b  
Job No.: S1 - 58  
Dated: October 24, 1969

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1. Washability Curves on 2" x 20 mesh.
2. Performance Evaluation Curves on 2" x 20 mesh.
3. Washability Curves on 20 x 100 mesh.
4. Performance Evaluation Curves on 20 x 100 mesh.

SUMMARY

The data presented in this report refers to coal from Seam #8.2.1.

The coal from this adit is of low volatile bituminous rank with an ash content (16.90%) somewhat higher than in Seam #7 but still considerably lower than in Seam #4.

Sulphur content is 0.40% which is acceptable.

The F.S.I. values shown the same phenomenon in the coarse floats (2" x 1/2" fraction) and we will come back on this in an addendum after additional information is received.



T A B L E 1. SEAM #8.2.1.

SCURRY RAINBOW OILLTD.

Classification by Rank.

Ash:	16.90%
Volatile Matter:	17.86%
Residual Moisture:	0.42%
Fixed Carbon:	64.82%
Sulphur:	0.43%
B.T.U./lb.	12,430
Rank:	Low volatile bituminous

T A B L E 2. SEAM #8.2.1.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	17.21	0.37	12,030	0.35
1 x 1/2"	21.88	0.36	11,790	0.42
1/2 x 1/4"	17.91	0.35	11,480	0.34
1/4" x 8 m.	18.81	0.38	12,600	0.60
8 x 20 m.	8.68	0.43	13,450	0.43
20 x 100 m.	12.10	0.45	13,840	0.36
- 100 m.	3.41	0.46	14,020	0.41
Total	100.00	0.40	12,430	0.42

T A B L E 3. SEAM # 8.2.1.

SCURRY RAINBOW OIL LTD.

Weight&Ash Distribution vs. Size and Specific Gravity.  
(Figures in brackets show the Ash content of individual fractions)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2" x 1"	7.62 (5.18)	2.77 (7.44)	1.49 (12.03)	1.35 (18.56)	1.29 (30.90)	1.01 (42.03)	1.68 (80.52)	17.21 (18.63)
1 x 1/2"	7.34 (4.75)	3.44 (7.98)	3.03 (12.29)	2.57 (20.64)	1.86 (30.72)	1.05 (38.09)	2.59 (78.31)	21.88 (20.68)
1/2 x 1/4"	6.05 (5.03)	2.42 (7.66)	2.72 (11.33)	2.42 (19.58)	1.33 (29.87)	0.97 (41.62)	2.00 (77.20)	17.91 (20.19)
1/4" x 8 m.	6.33 (2.80)	4.23 (7.48)	2.37 (12.91)	1.91 (23.01)	1.19 (32.21)	0.98 (45.23)	1.80 (76.01)	18.81 (18.25)
8 x 20 m.	4.61 (2.15)	1.41 (7.44)	0.74 (12.66)	0.83 (19.83)	0.32 (30.27)	0.28 (42.81)	0.49 (73.30)	8.68 (11.96)
20 x 100 m.	7.60 (1.84)	1.64 (6.39)	0.89 (11.36)	0.73 (18.22)	0.40 (26.26)	0.30 (40.66)	0.54 (70.46)	12.10 (8.97)
Total	39.55 (3.70)	15.91 (7.49)	11.24 (12.10)	9.81 (20.30)	6.39 (30.55)	4.59 (41.68)	9.10 (77.28)	96.59 (17.50)
- 100 m.	This fraction forms 3.41% of the total sample and has an ash content of 8.97%, thus giving a total sample ash value of 16.90%.							

T A B L E 4. S E A M # 8.2.1.

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in brackets give Volatile Matter)

Size	Sp.Gr.							Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	7.62 (18.09)	2.77 (18.05)	1.49 (17.89)	1.35 (16.87)	1.29 (15.99)	1.01 (14.45)	1.68 (9.97)	17.21 (16.80)
1 x 1/2"	7.34 (19.42)	3.44 (18.22)	3.03 (17.70)	2.57 (16.78)	1.86 (15.86)	1.05 (15.28)	2.59 (10.62)	21.88 (17.13)
1/2 x 1/4"	6.05 (18.06)	2.42 (18.72)	2.72 (17.96)	2.42 (17.66)	1.33 (16.52)	0.97 (15.06)	2.00 (11.34)	17.91 (17.05)
1/4" x 8 m.	6.33 (20.78)	4.23 (18.32)	2.37 (17.70)	1.91 (16.84)	1.19 (16.36)	0.98 (15.22)	1.80 (12.22)	18.81 (18.05)
8 x 20 m.	4.61 (21.63)	1.41 (18.61)	0.74 (17.57)	0.83 (17.35)	0.32 (16.51)	0.28 (15.69)	0.49 (12.43)	8.68 (19.48)
20 x 100 m.	7.60 (21.82)	1.64 (19.20)	0.89 (17.88)	0.73 (17.64)	0.40 (17.00)	0.30 (16.38)	0.54 (13.24)	12.10 (20.24)
Total	39.55 (19.89)	15.91 (18.42)	11.24 (17.79)	9.81 (17.13)	6.39 (16.22)	4.59 (15.13)	9.10 (11.22)	96.59 (17.83)
- 100 m.	This fraction forms 3.41% of the total sample and has a volatile matter content of 18.78%, thus giving a total sample volatile matter content of 17.86%.							

T A B L E 5. SEAM #8.2.1.

SCURRY RAINBOW OIL LTD.  
Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	37.82	4.14	37.82	4.14	100.00	18.75	4.8
1.30 - 1.35	16.89	7.62	54.71	5.21	62.18	27.64	2.3
1.35 - 1.40	12.24	12.17	66.95	6.49	45.29	35.10	1.5
1.40 - 1.50	10.75	20.74	77.70	8.46	33.05	43.60	1.3
1.50 - 1.60	7.09	30.84	84.79	10.33	22.30	54.62	1.2
1.60 - 1.80	5.08	41.75	89.87	12.11	15.21	65.70	1
+ 1.80	10.13	77.71	100.00	18.75	10.13	77.71	0.03
Total	100.00	18.75					

T A B L E 6. SEAM #8.2.1.

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	62.81	1.84	62.81	1.84	100.00	8.98	10
1.30 - 1.35	13.55	6.39	76.36	2.64	37.19	21.03	3.3
1.35 - 1.40	7.36	11.36	83.72	3.41	23.64	29.42	1.7
1.40 - 1.50	6.03	18.22	89.75	4.41	16.28	37.58	1.3
1.50 - 1.60	3.31	26.26	93.06	5.19	10.25	48.98	1.2
1.60 - 1.80	2.48	40.66	95.54	6.11	6.94	59.81	1
+ 1.80	4.46	70.46	100.00	8.98	4.46	70.46	0.5
Total	100.00	8.98					

T A B L E 7. SEAM # 8.2.1.

SCURRY RAINBOW OIL LTD.

FREE SWELLING INDEX

Sp. Gr. \ Size	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	2, 2, 2	3½, 3½, 3½	1, 1, 1½	9½, 9½, 9½	10, 10, 10	10, 10, 10
1.30 - 1.35	2, 2, 2	2, 2½, 2½	2, 2, 1½	2½, 2½, 3	2½, 2½, 2½	3, 3½, 3½
1.35 - 1.40	1, 1½, 1½	2, 2, 1½	1, 1½, 1½	1½, 1½, 1½	1½, 1½, 1½	1½, 1½, 2
1.40 - 1.50	1, 1, 1½	1½, 1½, 1	1½, 1½, 1	1, 1½, 1½	1, 1, 1½	1, 1½, 1½
1.50 - 1.60	1, 1, 1½	1, 1, 1½	1½, 1, 1	1, 1, 1½	1, 1, 1	1, 1, 1½
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	N.A.	N.A.	N.A.	½, ½, ½	½, ½, ½	½, ½, ½

NOTE: F.S.I. on - 100 mesh fraction is 9, 9, 9.

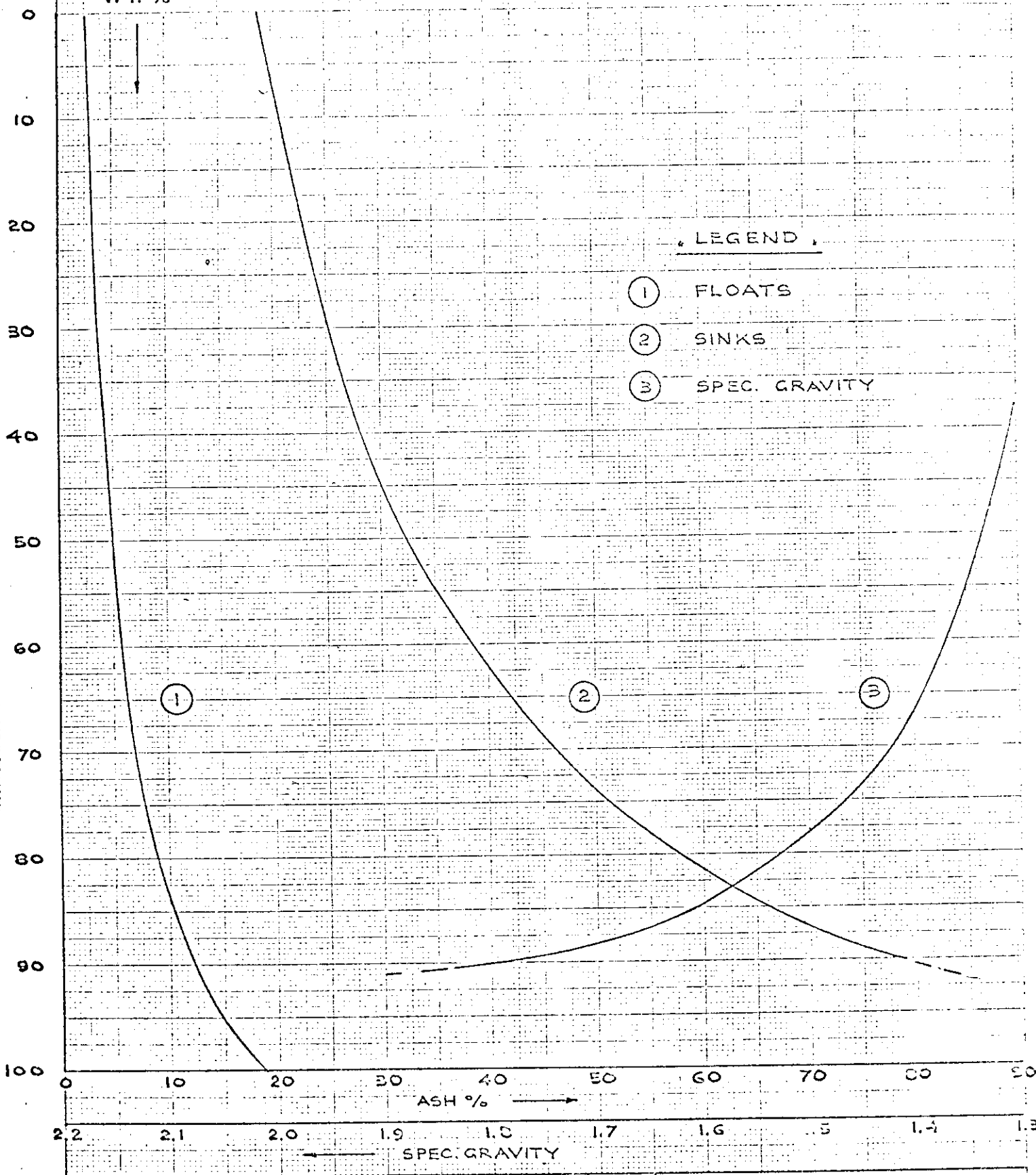
9

FIG. 1 SCURRY RAINBOW BEAM No. 0.2.1  
 WASHABILITY CURVES FOR 2" x 20m.

CUM.  
WT. %

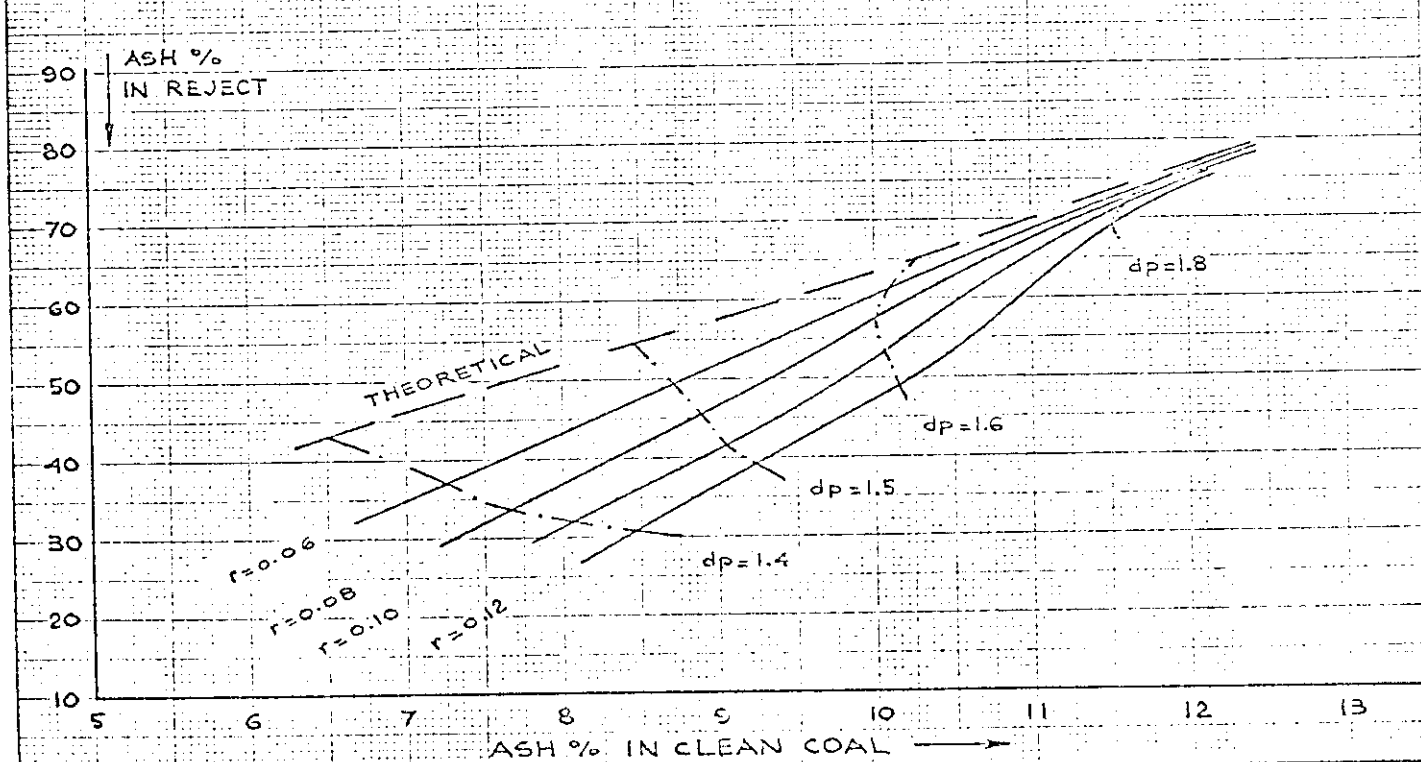
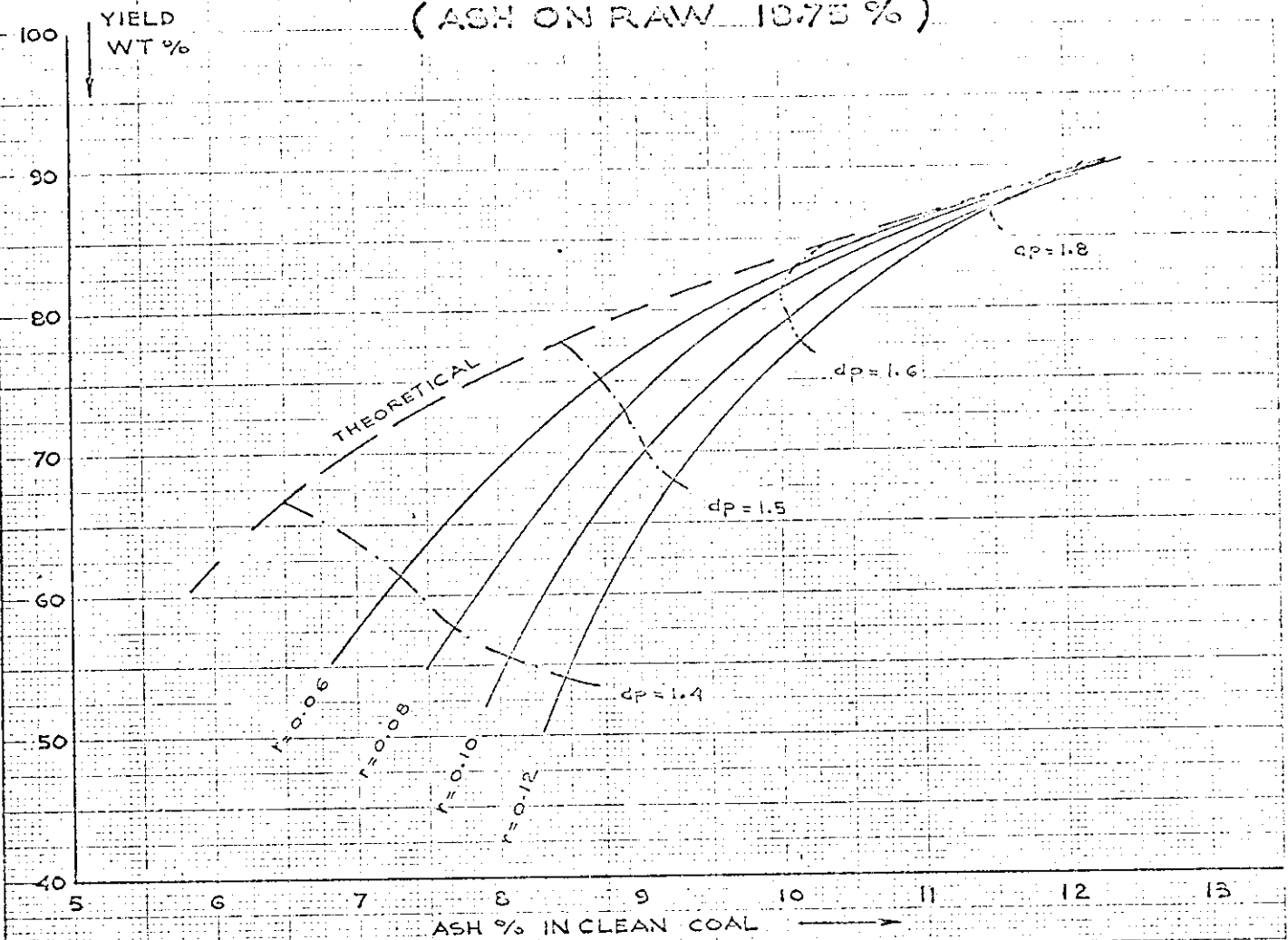
LEGEND

- ① FLOATS
- ② SINKS
- ③ SPEC. GRAVITY



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A. •  
 KEUFFEL & ESSER CO.

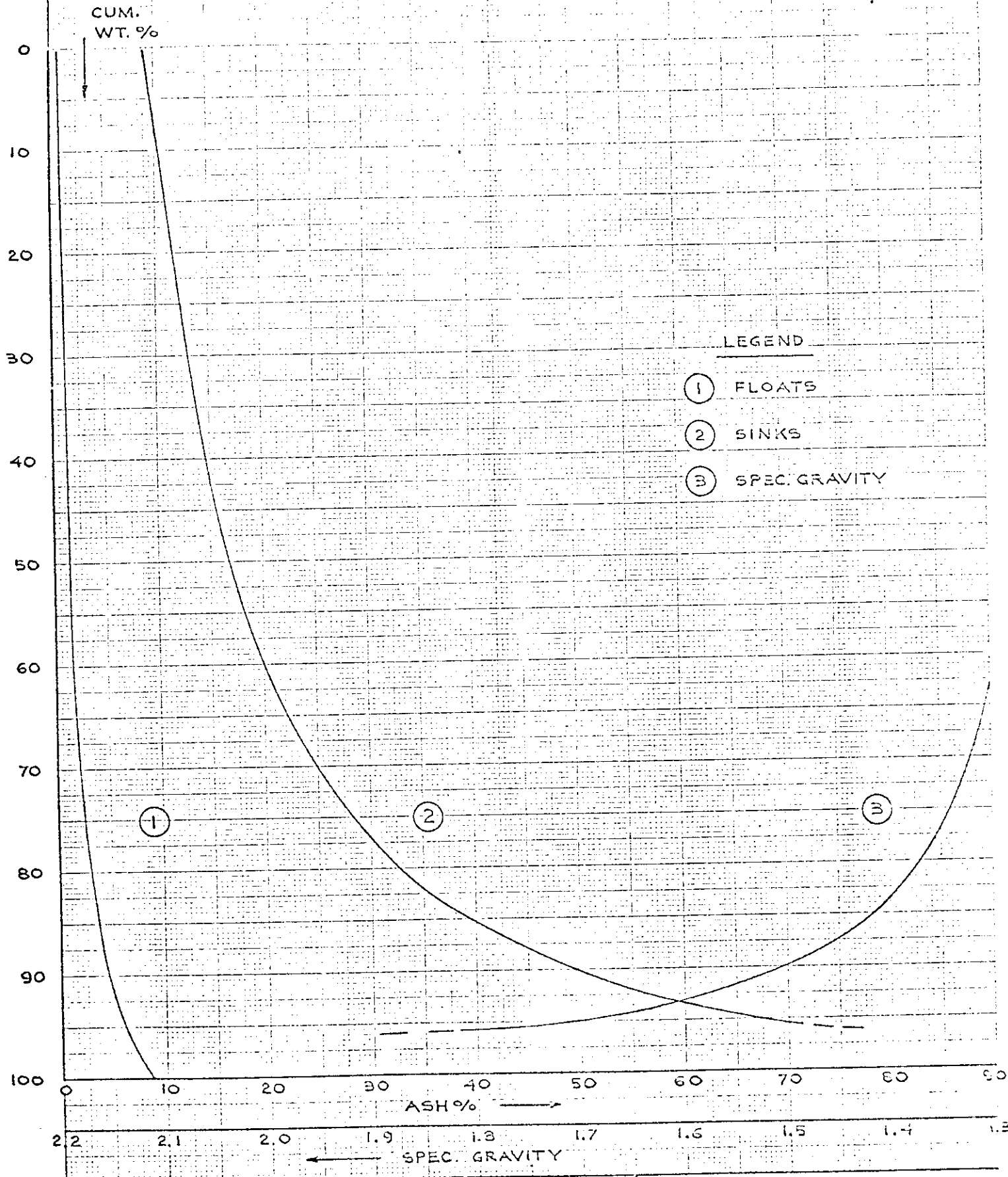
**FIG. 2 SCURRY RAINBOW SEAM No. G.2.1**  
**PERFORMANCE EVALUATION CURVES FOR 2" X 20m.**  
**(ASH ON RAW 18.75 %)**



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

# FIG. 2 SCURRY RAINBOW SEAM No. 0.2.1

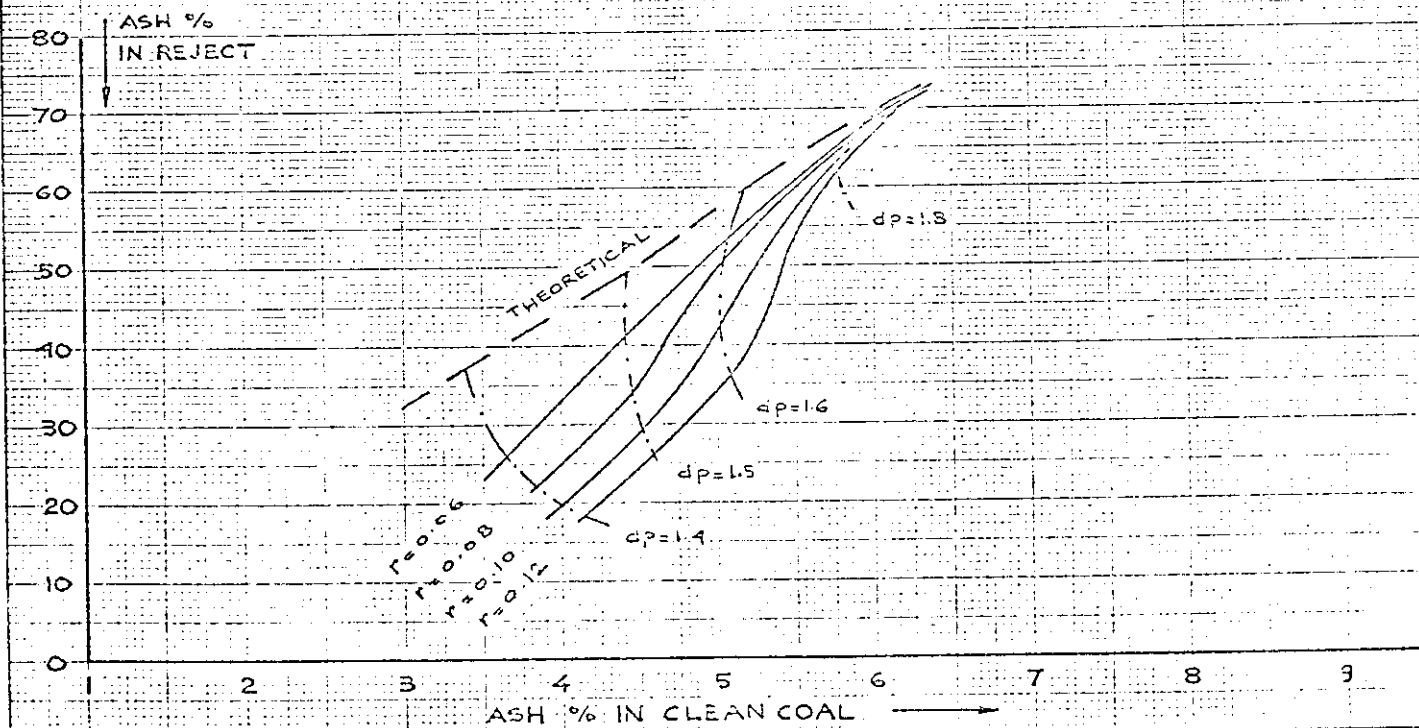
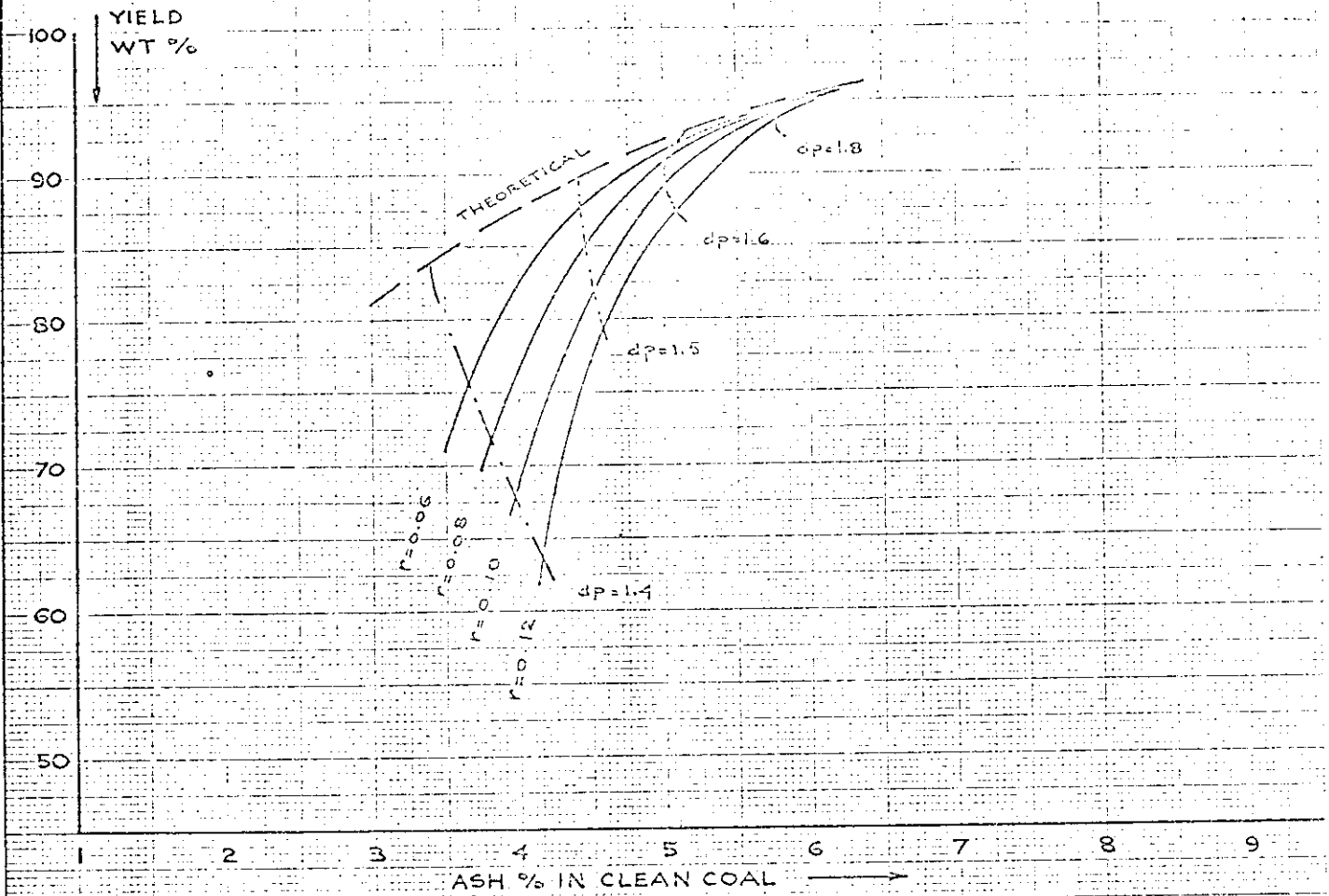
## WASHABILITY CURVES FOR 20m. x 100m.



KEUFFEL & ESSER CO. 10 X 10 TO THE CENTIMETER 46 1512 MADE IN U.S.A.



**FIG. 4 SCURRY HANDBLOW BEAM No. C.0.1**  
**PERFORMANCE EVALUATION CURVES FOR 20x100m.**  
**(ASH ON RAW 0.00 %)**



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #4, Seam #8.2.2

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
EDMONTON - ALBERTA - CANADA

Report No.: RI-69.07.c

Job No.: S1 - 58

Dated: November 6, 1969

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### FIGURES

1.	Washability Curves on 2" x 20 mesh.
2.	Performance Evaluation Curves on 2" x 20 mesh.
3.	Washability Curves on 20 x 100 mesh.
4.	Performance Evaluation Curves on 20 x 100 mesh.

SUMMARY

The data presented in this report refers to coal from Seam #8.2.2.

The coal from this adit is of low volatile bituminous rank with relatively low ash (11.34%) and sulphur (0.41%) contents.

Free swelling indexes are excellent.

Washing characteristics make this coal easy to clean at a required ash content of 8.75%.

SCURRY RAINBOW OIL LTD.

T A B L E 1. SEAM #8.2.2.

Classification by Rank.

Ash:	11.34%
Volatile Matter:	19.34%
Residual Moisture:	0.51%
Fixed Carbon:	68.81%
Sulphur:	0.41%
B.T.U./lb.:	13,530
Rank:	Low volatile bituminous

T A B L E 2. SEAM # 8.2.2.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M.%
2 x 1"	21.94	0.41	13,930	0.51
1 x 1/2"	20.17	0.42	13,740	0.53
1/2 x 1/4"	15.52	0.41	13,270	0.55
1/4" x 8 m.	17.96	0.38	13,180	0.45
8 x 20 m.	8.23	0.42	13,380	0.44
20 x 100 m.	11.88	0.44	13,390	0.53
~ 100 m.	4.30	0.43	13,580	0.50
Total	100.00	0.41	13,530	0.51

T A B L E 3. SEAM #8.2.2

SCURRY RAINBOW OIL LTD.

Weight & Ash Distribution vs. Size and Specific Gravity.

(Figures in brackets show the Ash content of individual fractions.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	5.30 (3.64)	11.53 (6.40)	3.16 (11.70)	1.04 (18.92)	0.23 (30.32)	0.29 (40.93)	0.39 (71.93)	21.94 (8.96)
1 x 1/2"	6.97 (3.37)	7.12 (6.16)	3.56 (10.91)	1.22 (18.57)	0.31 (29.12)	0.29 (39.55)	0.70 (77.14)	20.17 (10.08)
1/2 x 1/4"	5.10 (3.07)	5.03 (6.50)	2.50 (11.66)	1.19 (18.80)	0.34 (25.58)	0.31 (43.45)	1.05 (74.80)	15.52 (12.92)
1/4" x 8 m.	7.39 (2.30)	5.60 (7.60)	1.40 (14.24)	1.36 (21.73)	0.43 (32.02)	0.52 (44.16)	1.26 (71.88)	17.96 (13.15)
8 x 20 m.	5.51 (3.54)	0.74 (10.93)	0.37 (15.07)	0.41 (22.28)	0.22 (32.35)	0.33 (44.26)	0.65 (66.37)	8.23 (13.02)
20 x 100 m.	7.95 (2.29)	0.93 (9.55)	0.71 (12.99)	0.55 (20.58)	0.27 (31.14)	0.43 (42.66)	1.04 (65.80)	11.88 (12.02)
Total	38.22 (2.96)	30.95 (6.78)	11.70 (11.94)	5.77 (19.88)	1.80 (29.98)	2.17 (42.72)	5.09 (71.26)	95.70 (11.35)
- 100 m.	This fraction forms 4.30% of the total sample and has an ash content of 11.06%, thus giving a total sample ash value of 11.34%.							

- 3 -

T A B L E 4. SEAM #8.2.2

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in brackets give Volatile Matter.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	5.30 (19.95)	11.53 (18.41)	3.16 (17.45)	1.04 (16.81)	0.23 (16.01)	0.29 (15.13)	0.39 (11.67)	21.94 (18.37)
1 x 1/2"	6.97 (21.65)	7.12 (19.69)	3.56 (18.79)	1.22 (18.25)	0.31 (17.09)	0.29 (15.15)	0.70 (11.37)	20.17 (19.72)
1/2 x 1/4"	5.10 (21.95)	5.03 (19.81)	2.50 (18.85)	1.19 (18.37)	0.34 (17.91)	0.31 (14.79)	1.05 (11.83)	15.52 (19.56)
1/4 x 8 m.	7.39 (21.85)	5.60 (18.49)	1.40 (18.71)	1.36 (18.31)	0.43 (17.75)	0.52 (15.71)	1.26 (11.81)	17.96 (19.30)
8 x 20 m.	5.51 (21.00)	0.74 (19.08)	0.37 (18.94)	0.41 (19.08)	0.22 (17.72)	0.33 (16.10)	0.65 (12.20)	8.23 (19.65)
20 x 100 m.	7.95 (21.27)	0.93 (19.14)	0.71 (18.69)	0.55 (18.91)	0.27 (17.77)	0.43 (16.29)	1.04 (12.65)	11.88 (19.82)
Total	38.22 (21.32)	30.95 (18.98)	11.70 (18.42)	5.77 (18.15)	1.80 (17.44)	2.17 (15.59)	5.09 (11.96)	95.70 (19.31)
- 100 m.	This fraction forms 4.30% of the total sample and has a volatile matter content of 19.96%, thus giving a total sample volatile matter content of 19.34%.							

- 4 -

T A B L E 5. SEAM #8.2.2

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	36.11	3.14	36.11	3.14	100.00	11.27	9.3
1.30 - 1.35	35.81	6.70	71.92	4.91	63.89	15.86	3.2
1.35 - 1.40	13.11	11.87	85.03	5.99	28.08	27.54	2.0
1.40 - 1.50	6.23	19.81	91.26	6.93	14.97	41.27	1.9
1.50 - 1.60	1.83	29.78	93.09	7.38	8.74	56.57	1.5
1.60 - 1.80	2.08	42.75	95.17	8.15	6.91	63.66	1
+ 1.80	4.83	72.67	100.00	11.27	4.83	72.67	0.3
Total	100.00	11.27					

T A B L E 6. SEAM #8.2.2

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	66.92	2.29	66.92	2.29	100.00	12.02	9.5
1.30 - 1.35	7.83	9.55	74.75	3.05	33.08	31.70	5.5
1.35 - 1.40	5.98	12.99	80.73	3.79	25.25	38.57	4.5
1.40 - 1.50	4.63	20.58	85.36	4.70	19.27	46.51	4
1.50 - 1.60	2.27	31.14	87.63	5.38	14.64	54.70	2
1.60 - 1.80	3.62	42.66	91.25	6.86	12.37	59.03	1
+ 1.80	8.75	65.80	100.00	12.02	8.75	65.80	0.5
Total	100.00	12.02					



T A B L E 7. SEAM #7.

SCURRY RAINBOW OIL LTD.

FREE SWELLING INDEX

Sp.Gr. \ Size	2" x 1"	1" x 1/2"	1/2" x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	3, 3, 3½	3½, 3½, 4	5½, 6, 6	7½, 8, 8	8½, 9, 9	9, 9½, 9½
1.30 - 1.35	1, 1, 1	1, 1, 1	½, ½, ½	4, 4, 4	5, 5, 5½	4½, 5, 5,
1.35 - 1.40	1, 1½, 1½	1½, 1½, 1½	1½, 1½, 1½	2, 2, 2	2, 2, 2½	2, 2, 2½
1.40 - 1.50	1½, 1½, 1½	1, 1½, 1½	1, 1, 1½	1, 1½, 1½	1, 1, 1½	1½, 1½, 1½
1.50 - 1.60	1, 1, 1	1, 1, 1½	1, 1, 1½	1, 1, 1½	1, 1, 1	1, 1, 1
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1½	1, 1, 1½	1, 1, 1	1, 1, 1
+ 1.80	N.A.	N.A.	N.A.	N.A.	½, ½, ½	½, ½, ½

NOTE: F.S.I. on - 100 mesh fraction is 8, 8, 8.

1  
9  
1

T A B L E 7. SEAM #8.2.2

SCURRY RAINBOW OIL LTD.

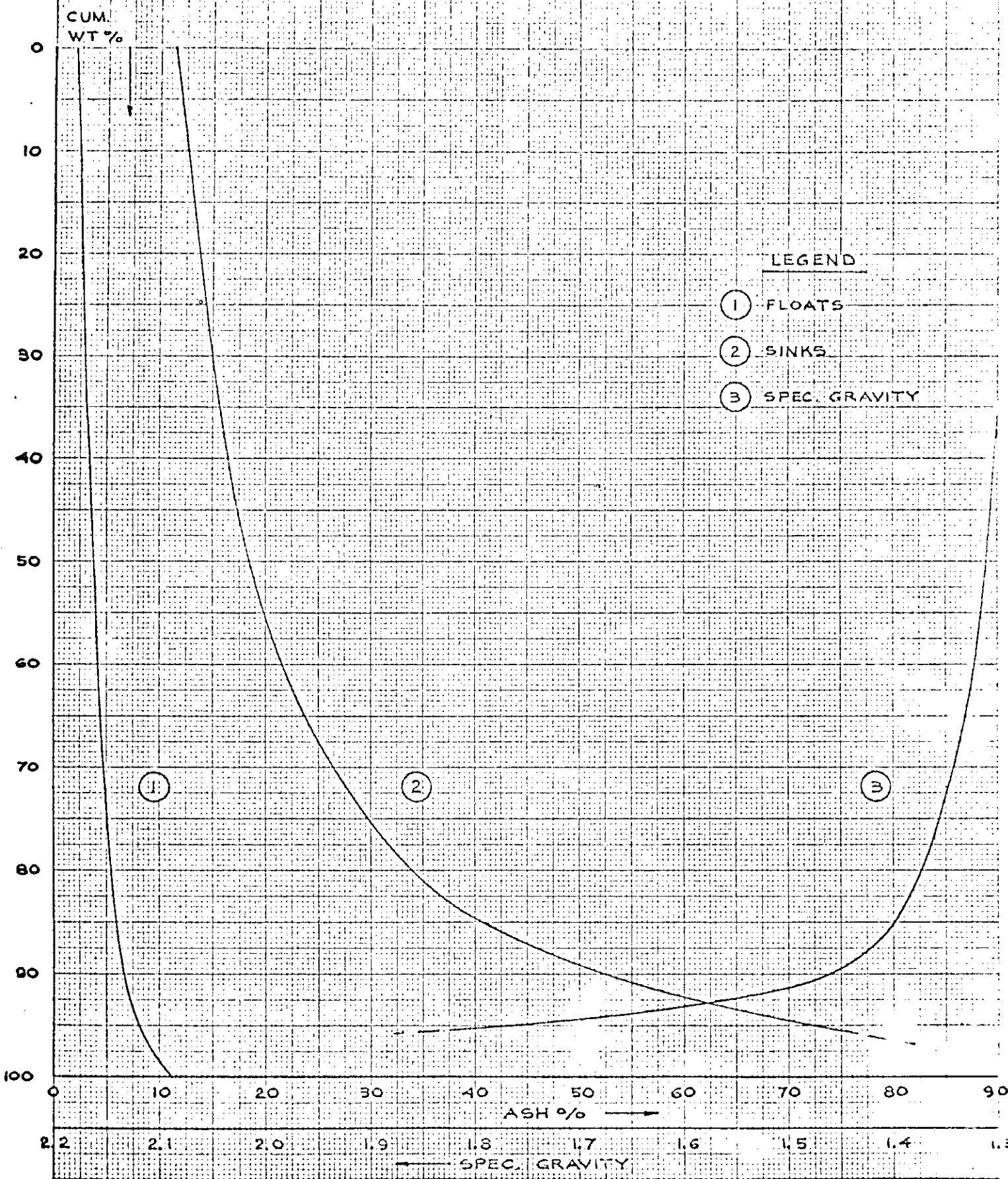
Free Swelling Index

Sp.Gr. \ Size	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	9, 9, 9	9,9,9	9½, 9½, 9½	9½, 9½, 9½	9½, 9½, 9½	9½, 9½, 9½
1.30 - 1.35	3, 3, 3	3,3, 3	3, 3, 3	4, 4, 4	4, 4½, 4½	5½, 5½, 5½
1.35 - 1.40	2, 2, 2	1½, 1½, 1½	1½, 1½, 1½	3½, 3½, 3½	4, 4, 4	4½, 4½, 4½
1.40 - 1.50	1½, 1½, 1½	1, 1, 1	1, 1, 1½	3, 3, 3½	3½, 3½, 4	4, 4, 4
1.50 - 1.60	1½, 1½, 1	1, 1, 1	1½, 1½, 1½	2, 2, 2	1½, 1½, 1½	2, 2, 2,
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	½, ½, ½	N.A.	N.A.	½, ½, ½	½, ½, ½	½, ½, ½

NOTE: F.S.I. on - 100 mesh fraction is 9, 9, 9.

FIG. 1 SCURRY RAINBOW SEAM No. 3.2.2

WASHABILITY CURVES FOR 2" x 20 m.



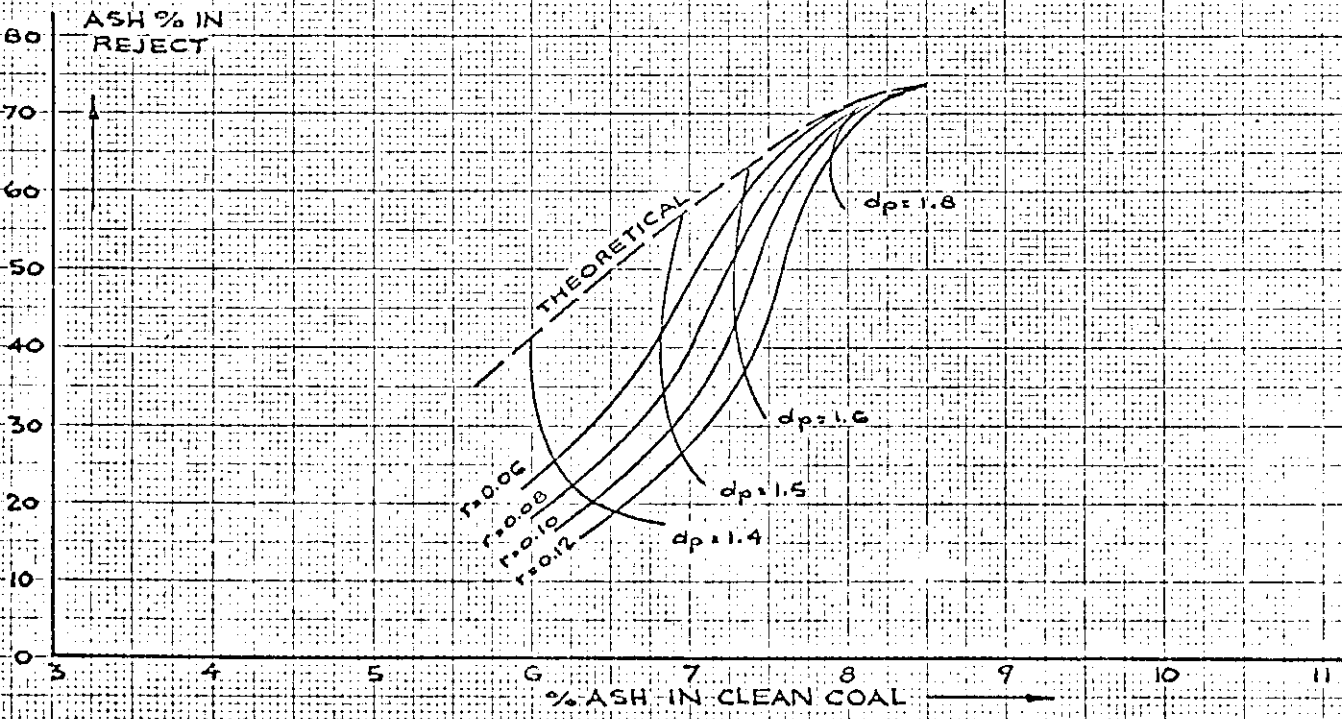
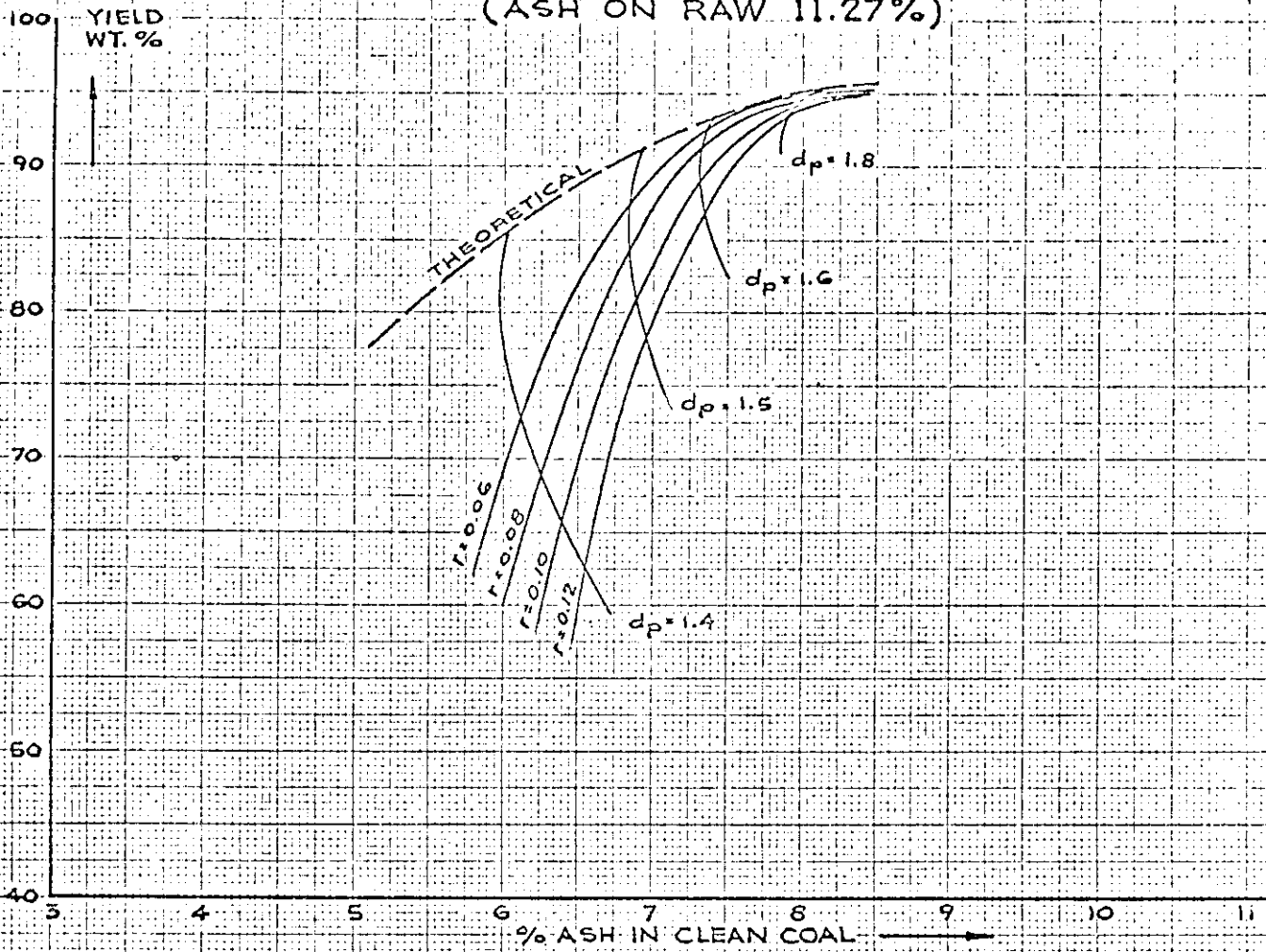
KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A. •  
 KEUFFEL & ESSER CO.

NOV. 5 / 69 LAMAN

CYCLONE ENGINEERING SALES LTD  
 EDMONTON ALBERTA CANADA

# FIG. 2 SCURRY RAINBOW - SEAM NO. 3.2.2.

PERFORMANCE EVALUATION CURVES FOR 2" x 20m  
(ASH ON RAW 11.27%)



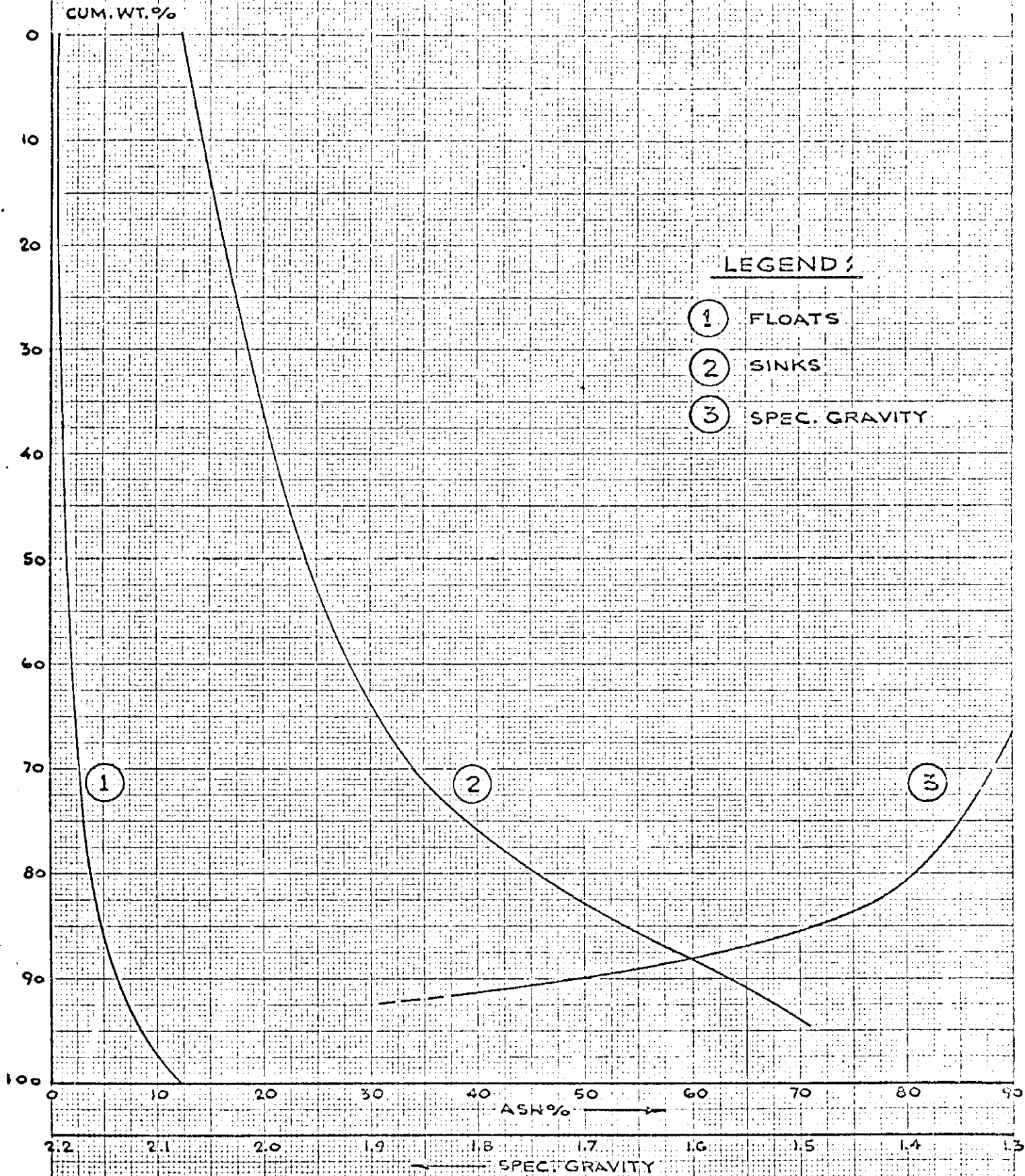
NOV. 5./69 H.SCH.

CYCLONE ENGINEERING SALES LTD  
EDMONTON ALBERTA CANADA

K&E 10 X 10 TO THE CENTIMETER 46 1512  
MADE IN U.S.A. •  
KEUFFEL & ESSER CO.

# FIG. 3 SCURRY RAINBOW - SEAM No. 8.2.2.

WASHABILITY CURVES FOR 20m x 100m



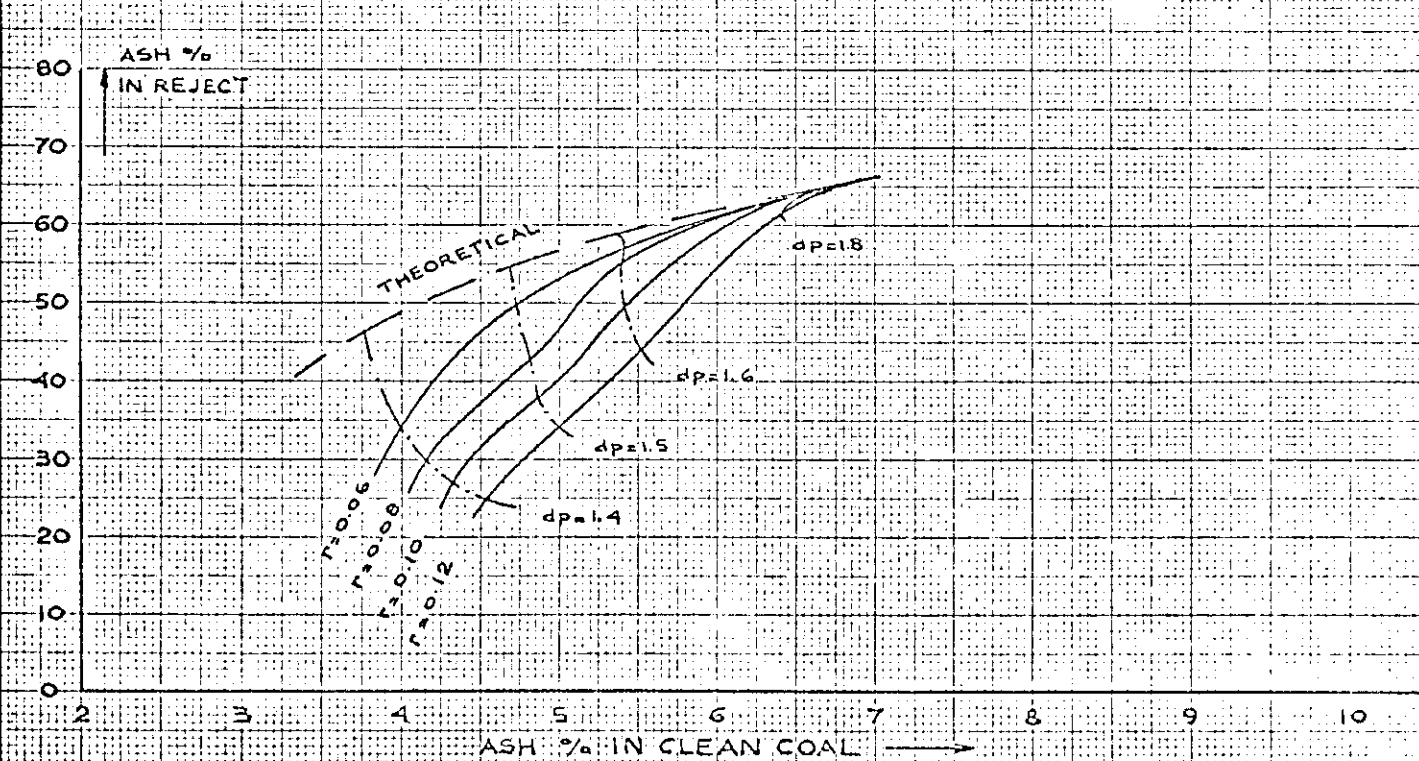
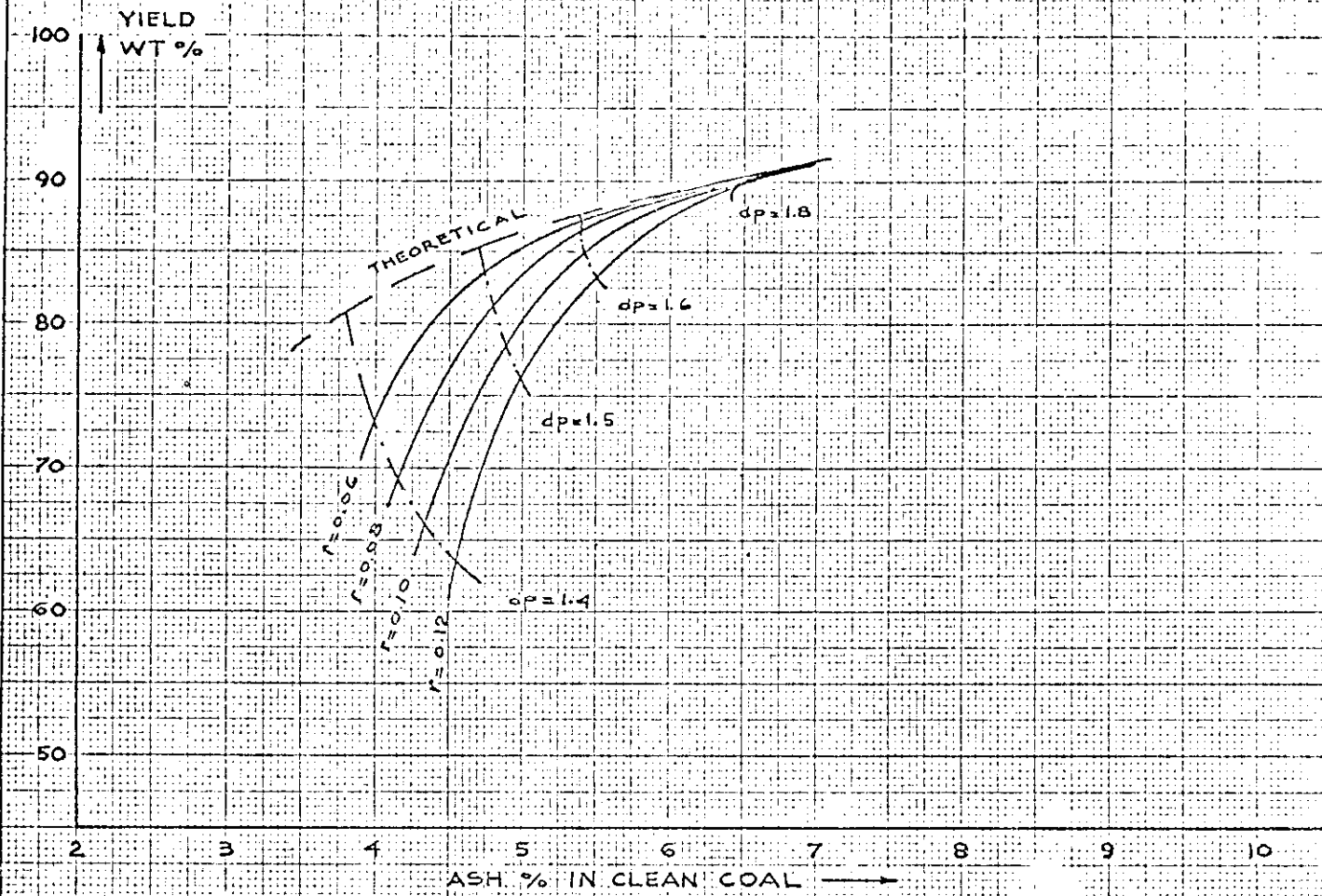
NOV. 5, /69 H.SCH.

CYCLONE ENGINEERING SALES LTD.  
EDMONTON ALBERTA CANADA

KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

# FIG. 4 SCURRY RAINBOW SEAM No. 8.2.2

PERFORMANCE EVALUATION CURVES FOR 20m x 100m.  
(ASH ON RAW 12.02 %)



KEUFE 10 X 10 TO THE CENTIMETER 46 1512  
 16 X 25 CM. MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #5. Seam #9.2

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
Edmonton - Alberta - Canada

Report No.: RI-69.07.d  
Job No.: S1-58  
Dated: November 18, 1969

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SUMMARY

The data presented in this report refers to coal from Seam #9.2.

The coal from this adit is of low volatile bituminous rank with relatively low ash (13.66%) and sulphur (0.42%), with excellent free swelling indexes.

Washing characteristics make this coal easy to clean at a required ash content of 8.75%.

SCURRY RAINBOW OIL LTD.

T A B L E 1. SEAM #9.2

Classification by Rank.

Ash:	13.66%
Volatile Matter:	19.27%
Residual Moisture:	0.68%
Fixed Carbon:	66.39%
Sulphur:	0.42%
B.T.U./lb.:	12,940
Rank:	Low volatile bituminous

T A B L E 2. SEAM #9.2.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	36.62	0.44	13,030	0.71
1 x 1/2"	23.47	0.41	12,350	0.68
1/2 x 1/4"	11.72	0.45	12,040	0.63
1/4" x 8m.	13.62	0.39	13,380	0.65
8 x 20 m.	5.43	0.35	13,910	0.62
20 x 100 m.	7.41	0.42	14,060	0.72
- 100 m.	1.73	0.51	13,960	0.60
Total	100.00	0.42	12,940	0.68

T A B L E 3. SEAM #9.2

SCURRY RAINBOW OIL LTD.

Weight & Ash Distribution vs. Size and Specific Gravity.

(Figures in brackets show the Ash content of individual fractions.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	6.54 (2.91)	17.87 (6.11)	3.29 (11.16)	3.05 (18.97)	1.61 (27.73)	1.55 (41.49)	2.71 (70.18)	36.62 (14.25)
1 x 1/2"	4.75 (2.69)	8.78 (6.00)	2.82 (12.01)	2.88 (20.03)	1.21 (29.37)	0.96 (44.33)	2.07 (69.89)	23.47 (16.18)
1/2 x 1/4"	2.82 (2.51)	3.70 (5.89)	1.29 (11.63)	1.31 (19.12)	0.83 (25.69)	0.65 (42.67)	1.12 (73.72)	11.72 (17.11)
1/4" x 8 m.	6.46 (1.53)	2.60 (5.47)	1.47 (10.51)	1.40 (18.23)	0.48 (28.28)	0.41 (41.68)	0.80 (71.31)	13.62 (11.21)
8 x 20 m.	3.49 (1.36)	0.71 (5.94)	0.39 (10.76)	0.38 (18.38)	0.15 (28.24)	0.11 (40.75)	0.20 (70.62)	5.43 (7.91)
20 x 100 m.	4.70 (1.16)	1.02 (4.94)	0.57 (9.74)	0.53 (16.74)	0.20 (26.42)	0.15 (39.27)	0.24 (71.39)	7.41 (7.18)
Total	28.76 (2.05)	34.68 (5.97)	9.83 (11.27)	9.55 (19.05)	4.48 (27.81)	3.83 (42.31)	7.14 (70.83)	98.27 (13.74)
- 100 m.	This fraction forms 1.73% of the total sample and has an ash content of 9.25%, thus giving a total sample ash value of 13.66%.							

1  
3  
1

T A B L E 4. SEAM #9.2

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in brackets give Volatile Matter)

Sp.Gr. Size								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	6.54 (20.29)	17.87 (19.33)	3.29 (18.63)	3.05 (17.91)	1.61 (17.55)	1.55 (16.79)	2.71 (15.63)	36.62 (18.86)
1 x 1/2"	4.75 (20.44)	8.78 (19.34)	2.82 (18.50)	2.88 (17.60)	1.21 (17.26)	0.96 (16.42)	2.07 (14.22)	23.47 (18.57)
1/2 x 1/4"	2.82 (21.43)	3.70 (19.13)	1.29 (18.45)	1.31 (17.91)	0.83 (17.59)	0.65 (16.25)	1.12 (14.25)	11.72 (18.73)
1/4" x 8 m.	6.46 (22.13)	2.60 (19.75)	1.47 (18.55)	1.40 (17.97)	0.48 (17.45)	0.41 (17.33)	0.80 (14.19)	13.62 (20.08)
8 x 20 m.	3.49 (22.42)	0.71 (19.72)	0.39 (18.56)	0.38 (18.16)	0.15 (17.64)	0.11 (17.16)	0.20 (14.46)	5.43 (20.96)
20 x 100 m.	4.70 (22.86)	1.02 (19.90)	0.57 (19.12)	0.53 (18.34)	0.20 (17.80)	0.15 (17.08)	0.24 (15.34)	7.41 (21.34)
Total	28.76 (21.51)	34.68 (19.36)	9.83 (18.58)	9.55 (17.85)	4.48 (17.48)	3.83 (16.68)	7.14 (14.80)	98.27 (19.24)
- 100 m.	This fractions forms 1.73% of the total sample and has a volatile matter content of 21.00%, thus giving a total sample volatile matter content of 19.27%.							

T A B L E 5. SEAM #9.2

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	26.48	2.22	26.48	2.22	100.00	14.28	8.2
1.30 - 1.35	37.05	6.00	63.53	4.42	73.52	18.62	2.3
1.35 - 1.40	10.19	11.36	73.72	5.38	36.47	31.45	1.6
1.40 - 1.50	9.93	19.19	83.65	7.02	26.28	39.24	1.1
1.50 - 1.60	4.71	27.88	88.36	8.13	16.35	51.42	1.1
1.60 - 1.80	4.05	42.44	92.41	9.63	11.64	60.94	1.1
+ 1.80	7.59	70.81	100.00	14.28	7.59	70.81	0.5
Total	100.00	14.28					

T A B L E 6. SEAM #9.2

SCURRY RAINBOW OIL LTD.

Washability Data - 20 x 100 mes.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	63.43	2.05	63.43	2.05	100.00	8.25	10
1.30 - 1.35	13.77	5.97	77.20	2.75	36.57	19.01	3.6
1.35 - 1.40	7.69	11.27	84.89	3.52	22.80	26.88	1
1.40 - 1.50	7.15	19.05	92.04	4.73	15.11	34.83	1
1.50 - 1.60	2.70	27.81	94.74	5.39	7.96	49.00	1
1.60 - 1.80	2.02	42.31	96.76	6.16	5.26	59.88	1
+ 1.80	3.24	70.83	100.00	8.25	3.24	70.83	0
Total	100.00	8.25					

T A B L E 7. SEAM #9.2

SCURRY RAINBOW OIL LTD.

Free Swelling Index.

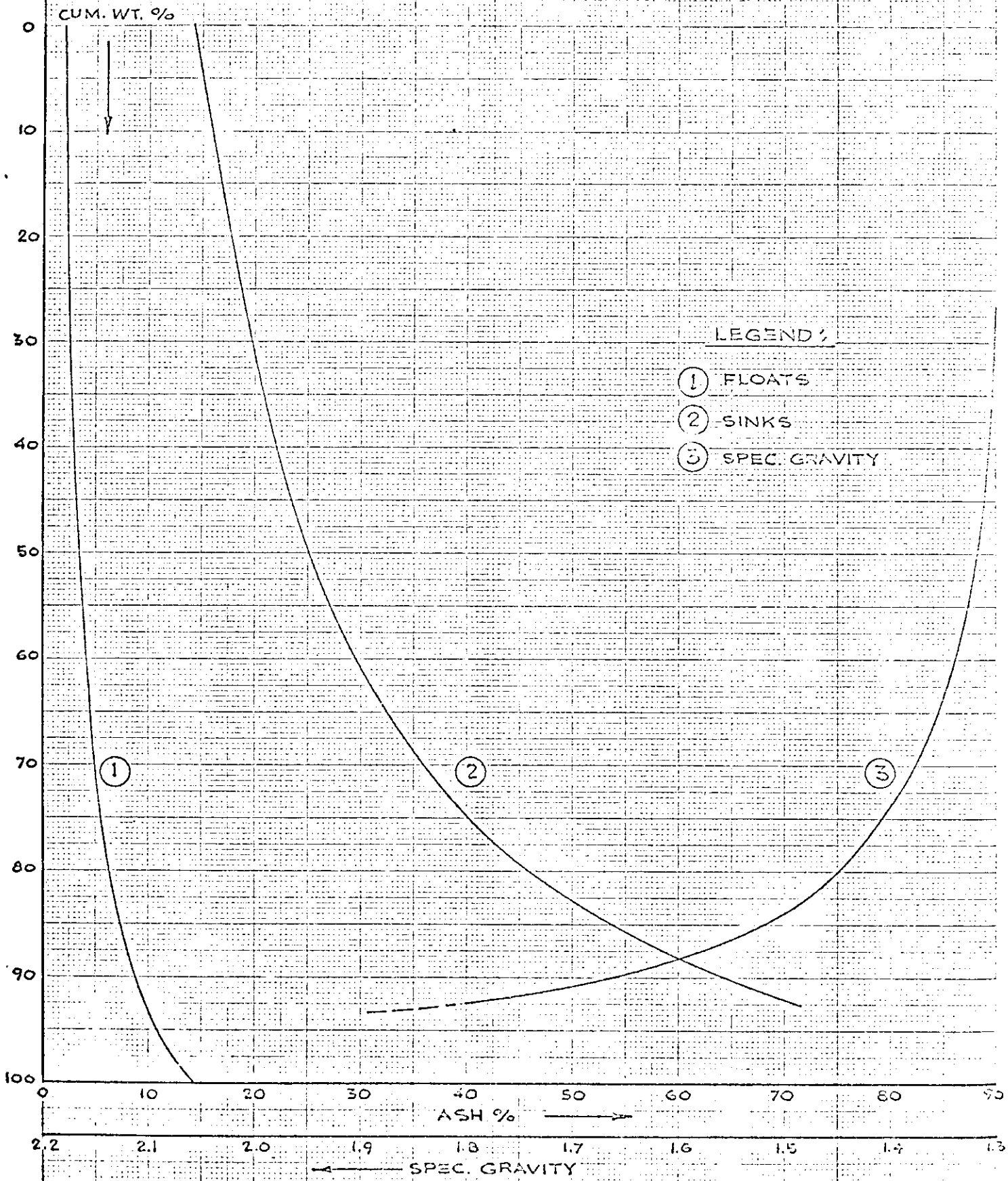
Sp. Gr. \ Size	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	6, 6½, 6½	6½, 6½, 7	8, 8, 8½	10, 10, 10	10, 10, 10	10, 10, 10
1.30 - 1.35	2, 2½, 2½	2, 2, 2½	2, 2, 2½	2½, 2½, 3	2½, 3, 3	4, 3½, 3½
1.35 - 1.40	2, 2, 1½	1½, 1½, 1½	1, 1, 1½	1½, 1½, 1½	1, 1, 1	1, 1, 1
1.40 - 1.50	1, 1, 1	1, 1, 1½	1, 1, 1	1, 1, 1½	1, 1, 1	1, 1, 1
1.50 - 1.60	1, 1, 1½	1, 1, 1½	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
1.60 - 1.80	1, 1½, 1½	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	½, ½, ½	½, ½, ½	½, ½, ½	½, ½, ½	N.A.	N.A.

NOTE: F.S.I. on - 100 mesh fraction is 7½, 7½, 8

16

FIG. 1 SCURRY RAINBOW - SEAM NO. 9.2.

WASHABILITY CURVES FOR 2" x 20m



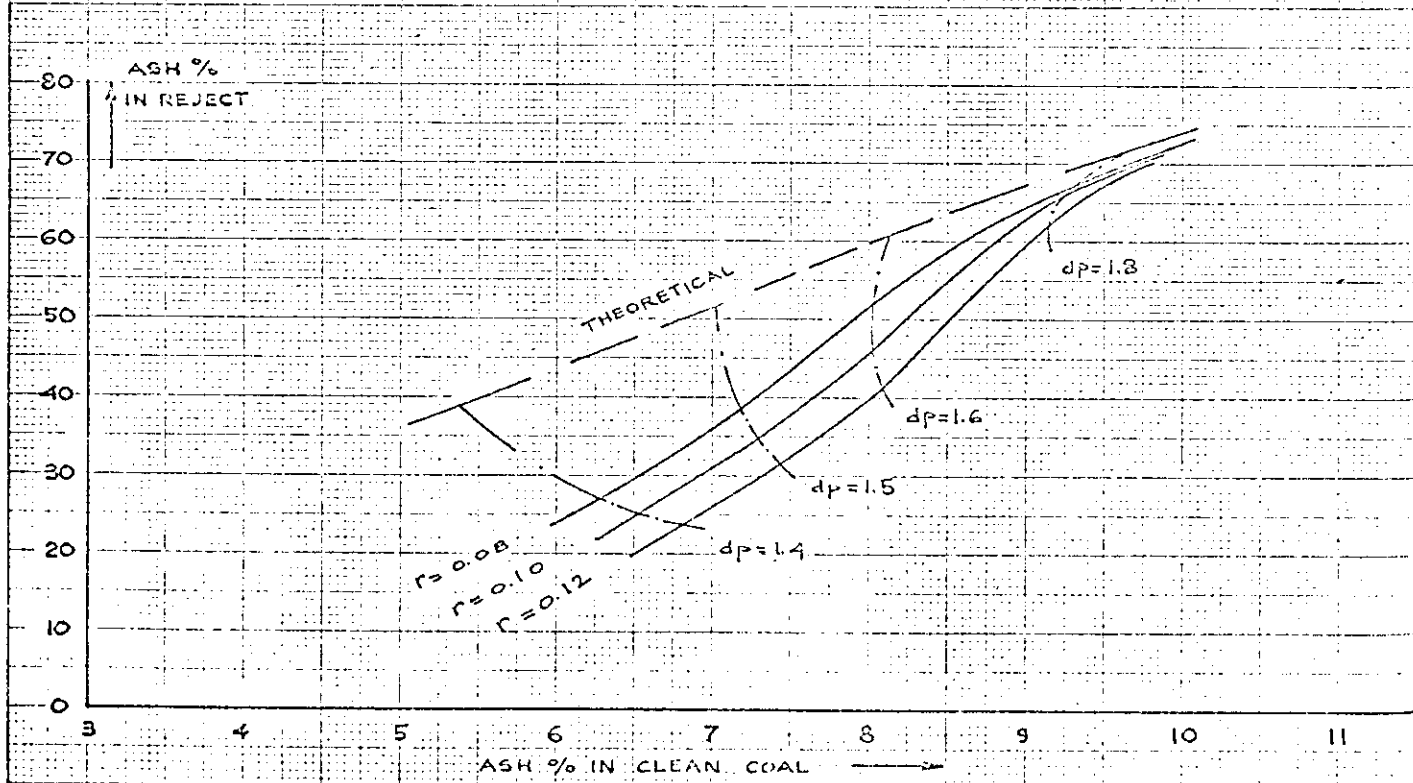
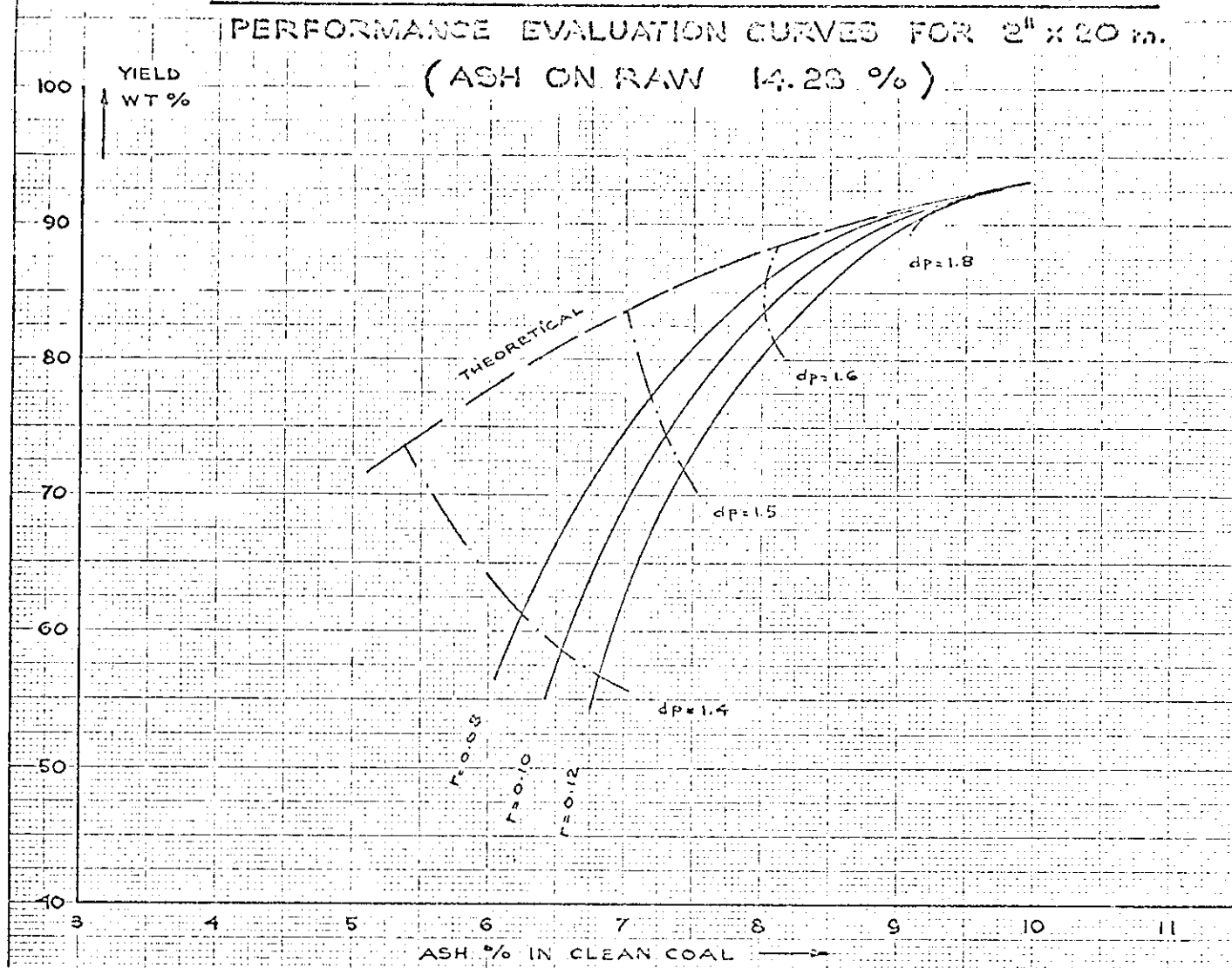
LEGEND:

- ① FLOATS
- ② SINKS
- ③ SPEC. GRAVITY

KEUFFEL & ESSER CO.  
 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.

# FIG. 2 SCURRY RAINBOW SEAM No. 9.2

PERFORMANCE EVALUATION CURVES FOR 2" x 20" m.  
(ASH ON RAW 14.23 %)

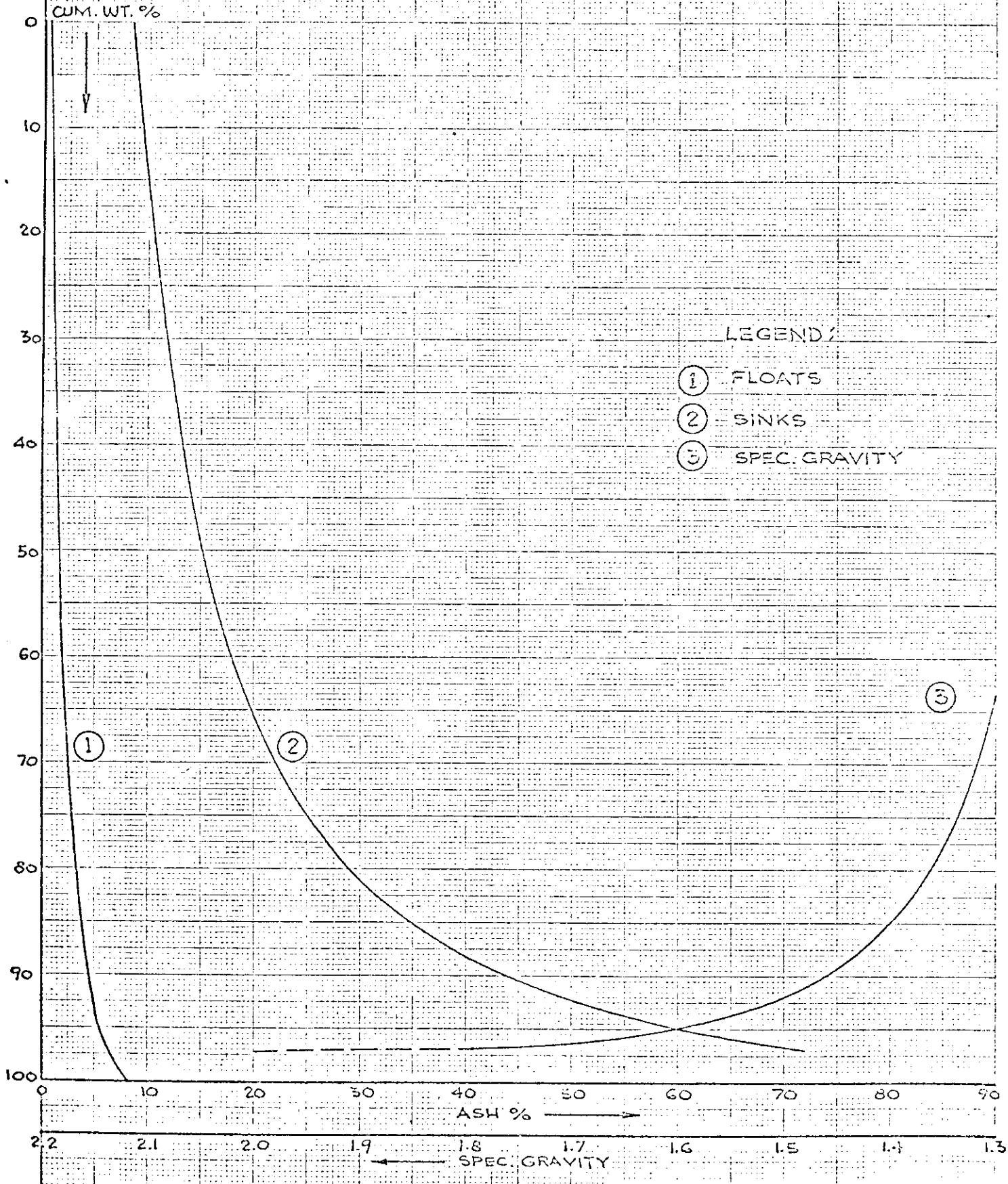


KEUFFEL & ESSER CO.  
 MADE IN U.S.A.  
 46 1512  
 10 X 10 TO THE CENTIMETER  
 10 X 25 CM.



FIG. 3 SCURRY RAINBOW- SEAM NO. 9.2.

WASHABILITY CURVES FOR 20 m x 100 m



LEGEND:

- ① FLOATS
- ② SINKS
- ③ SPEC. GRAVITY

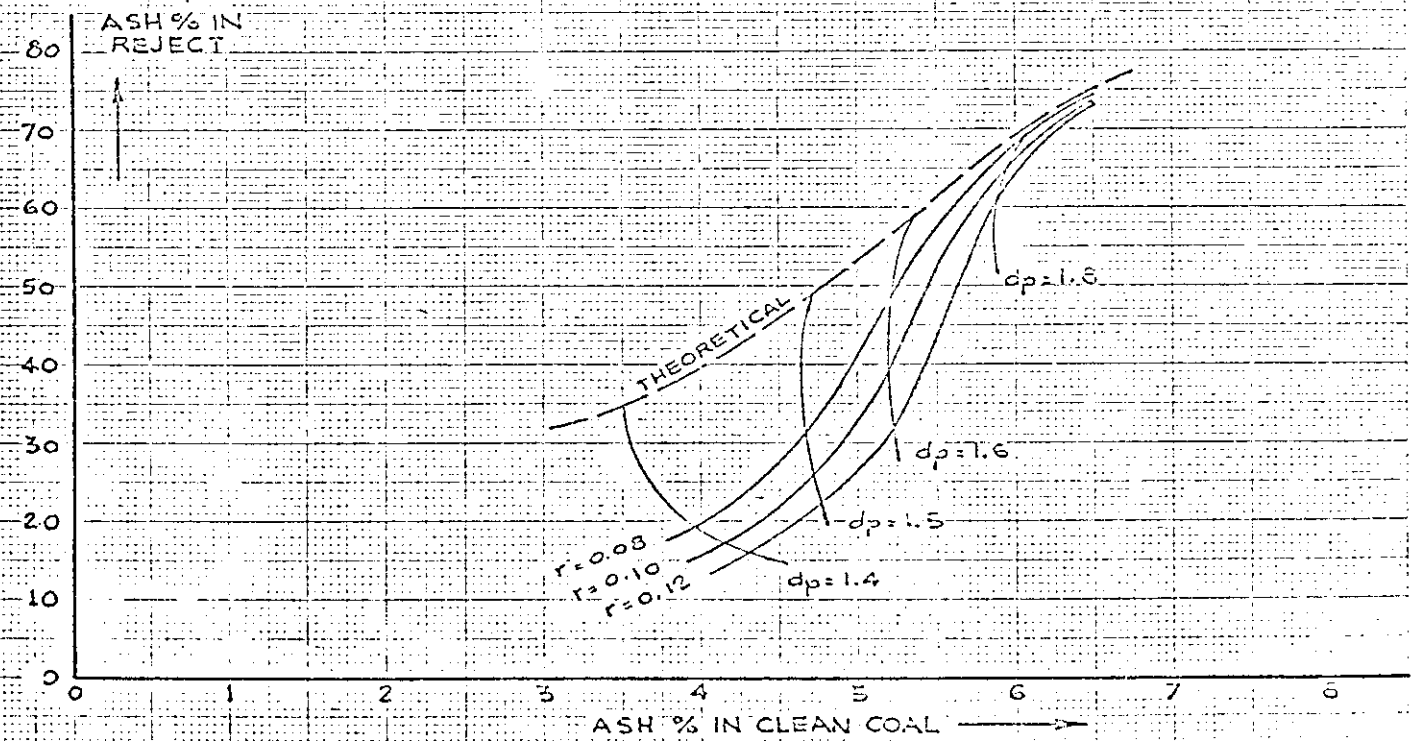
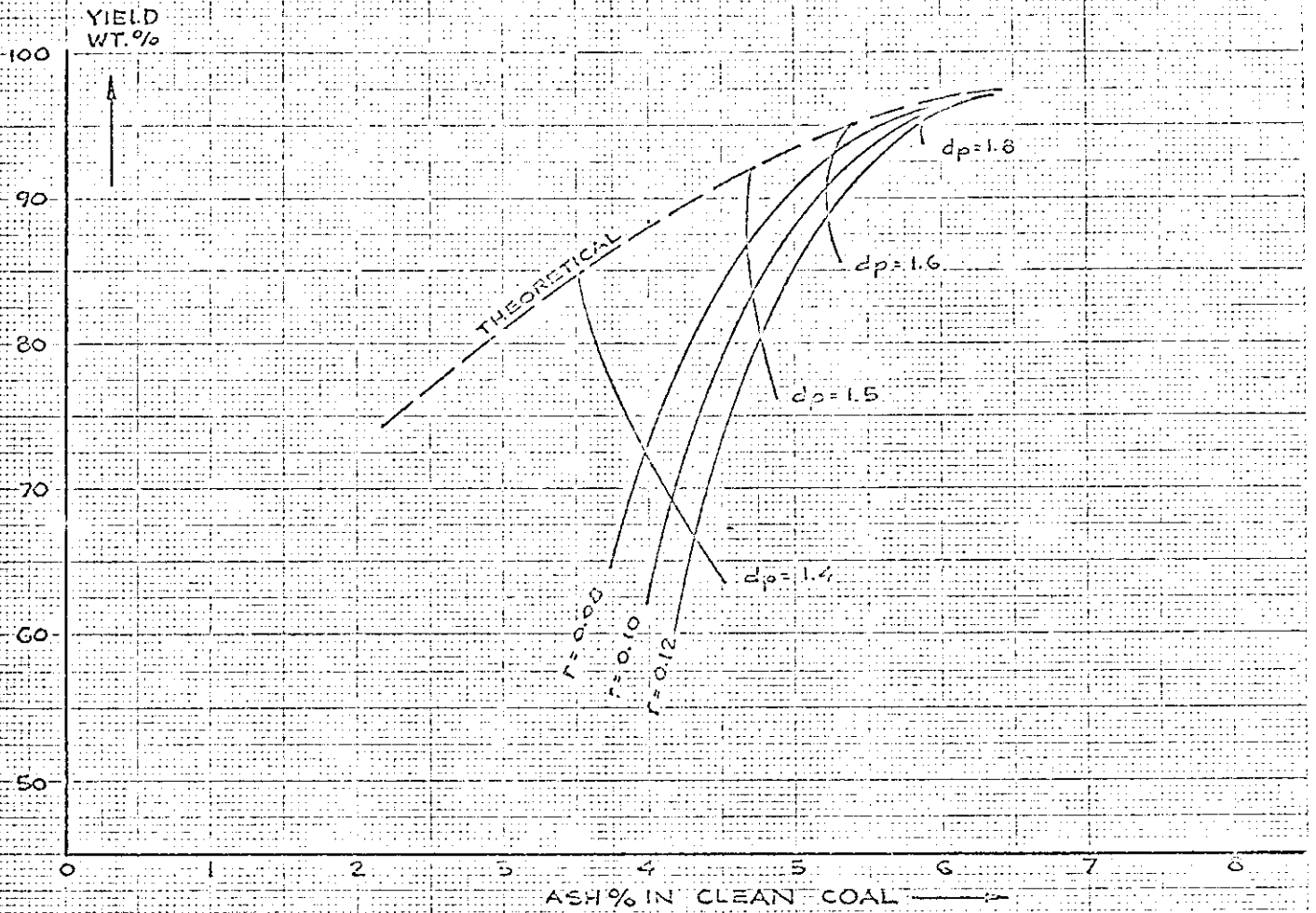
KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

NOV. 17./69 H. SCH.

CYCLONE ENGINEERING SALES LTD.  
 EDMONTON ALBERTA CANADA

# FIG. 4 SCURRY RAINBOW - SEAM NO. 9.2.

PERFORMANCE EVALUATION CURVES FOR 20m x 100m  
(ASH ON RAW 8.25%)



RZ 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #6. Seam #8.1.1

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
Edmonton - Alberta - Canada

Report No.: RI-69.07.e  
Job No.: S1 - 58  
Dated: November 26, 1969

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3. Washability Curves on 20 x 100 mesh.	
4. Performance Evaluation on 20 x 100 mesh.	

SUMMARY

The data presented in this report refers to coal from Seam #8.1.1.

The Analysis and the washability data indicate that this coal is of low volatile bituminous rank with a moderate ash content of 15.75% and a low sulphur content (0.36%).

The ash distribution over the various specific gravity fractions indicate that this coal is a difficult coal and cleaning by heavy medium circuit may be required if an ash content of 8% in the clean coal is specified.

It is noted that coking properties are excellent and therefore cleaning to a higher ash content of clean coal and blending with low swell, low ash coal should be considered.

SCURRY RAINBOW OIL LTD.

T A B L E 1. SEAM #8.1.1

Classification by Rank.

Ash:	15.75%
Volatile Matter:	18.89%
Residual Moisture:	0.60%
Fixed Carbon:	64.76%
Sulphur:	0.36%
B.T.U./lb.:	12,820
Rank:	Low volatile bituminous

T A B L E 2. SEAM #8.1.1

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	17.22	0.40	12,990	0.63
1 x 1/2"	19.71	0.33	12,510	0.62
1/2 x 1/4"	18.74	0.32	11,850	0.59
1/4" x 8 m.	12.21	0.36	12,610	0.52
8 x 20 m.	14.81	0.36	13,330	0.58
20 x 100 m.	13.77	0.38	13,700	0.61
- 100 m.	3.54	0.46	13,920	0.63
Total	100.00	0.36	12,820	0.60

T A B L E 3. SEAM #8.1.1

SCURRY RAINBOW OIL LTD.

Weight & Ash Distribution vs. Size and Specific Gravity.  
(Figures in brackets show the Ash content of individual fractions.)

Sp.Gr. Size	1.30	1.50	1.40	1.50	1.60	1.80	Total	
2 x 1"	1.00 (3.13)	7.30 (6.73)	3.83 (11.54)	2.19 (17.29)	0.88 (26.49)	1.16 (39.83)	0.86 (68.17)	17.22 (15.24)
1 x 1/2"	1.35 (3.31)	7.55 (7.87)	3.66 (12.05)	2.55 (18.61)	1.37 (28.52)	1.73 (45.59)	1.50 (70.63)	19.71 (19.24)
1/2 x 1/4"	1.93 (2.90)	6.56 (6.89)	3.05 (12.14)	2.70 (18.82)	0.75 (29.34)	2.85 (41.95)	1.40 (75.35)	18.74 (19.46)
1/4" x 8 m.	2.42 (2.32)	3.51 (6.16)	2.24 (11.63)	1.49 (19.11)	0.60 (28.70)	0.85 (42.62)	1.10 (68.70)	12.21 (17.26)
8 x 20 m.	6.08 (2.31)	3.08 (6.66)	1.88 (10.88)	1.40 (17.90)	0.55 (19.17)	0.78 (42.55)	1.04 (67.18)	14.81 (13.07)
20 x 100 m.	5.71 (1.36)	3.89 (3.88)	1.46 (9.09)	1.02 (16.28)	0.39 (26.89)	0.51 (41.08)	0.79 (63.31)	13.77 (9.74)
Total	18.49 (2.19)	31.89 (6.61)	16.12 (11.48)	11.35 (18.17)	4.54 (27.01)	7.38 (42.55)	6.69 (69.58)	96.46 (16.01)
- 100 mesh	This fraction forms 3.54% of the total sample and has an ash content of 8.75%, thus giving a total sample ash value of 15.75%.							

T A B L E 4. SEAM #8.1.1

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.  
(Figures in brackets give Volatile Matter.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	1.00 (20.54)	7.30 (18.96)	3.83 (18.36)	2.19 (18.42)	0.88 (18.14)	1.16 (17.12)	0.86 (15.32)	17.22 (18.50)
1 x 1/2"	1.35 (21.00)	7.55 (18.48)	3.66 (18.32)	2.55 (17.92)	1.37 (17.16)	1.73 (15.26)	1.50 (12.72)	19.71 (17.73)
1/2 x 1/4"	1.93 (21.50)	6.56 (19.40)	3.05 (18.32)	2.70 (18.12)	0.75 (17.30)	2.35 (15.84)	1.40 (12.54)	18.74 (18.21)
1/4" x 8 m.	2.42 (22.50)	3.51 (19.68)	2.24 (18.84)	1.49 (17.96)	0.60 (17.88)	0.85 (16.82)	1.10 (13.72)	12.21 (19.05)
8 x 20 m.	6.08 (22.02)	3.08 (19.28)	1.88 (18.64)	1.40 (18.36)	0.55 (17.50)	0.78 (16.50)	1.04 (13.80)	14.81 (19.63)
20 x 100 m.	5.71 (22.40)	3.89 (21.90)	1.46 (19.12)	1.02 (18.38)	0.39 (18.28)	0.51 (17.24)	0.79 (15.58)	13.77 (20.91)
Total	18.49 (21.99)	31.89 (19.40)	16.12 (18.51)	11.35 (18.16)	4.54 (17.60)	7.38 (16.18)	6.69 (13.68)	96.46 (18.87)
- 100 m.	This fraction forms 3.54% to the total sample and has a volatile matter content of 19.57%, thus giving a total sample volatile matter content of 18.89%.							

- 4 -



T A B L E 5. SEAM #8.1.1

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	15.46	2.57	15.46	2.57	100.00	17.06	8.1
1.30 - 1.35	33.86	7.00	49.32	5.61	84.54	19.71	2.5
1.35 - 1.40	17.73	11.72	67.05	7.23	50.68	28.20	1.3
1.40 - 1.50	12.49	18.36	79.54	8.97	32.95	37.07	1.1
1.50 - 1.60	5.02	27.02	84.56	10.05	20.46	48.50	1.0
1.60 - 1.80	8.31	42.66	92.87	12.96	15.44	55.48	1.0
+ 1.80	7.13	70.42	100.00	17.06	7.13	70.42	0.5
Total	100.00	17.06					

T A B L E 6. SEAM #8.1.1

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	41.47	1.36	41.47	1.36	100.00	9.74	9.7
1.30 - 1.35	28.25	3.88	69.72	2.38	58.53	15.68	8.5
1.35 - 1.40	10.60	9.09	80.32	3.27	30.28	26.70	1.7
1.40 - 1.50	7.41	16.28	87.73	4.37	19.68	36.18	1.0
1.50 - 1.60	2.83	26.89	90.56	5.07	12.27	48.20	1.0
1.60 - 1.80	3.70	41.08	94.26	6.48	9.44	54.59	1.0
+ 1.80	5.74	63.30	100.00	9.74	5.74	63.30	0.5
Total	100.00	9.74					

T A B L E 7. SEAM #8.1.1

SCURRY RAINBOW OIL LTD.

Free Swelling Index.

Size Sp.Gr.	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	8½, 8½, 8½	8½, 8½, 9	9, 9, 9½	9½, 9½, 9½	9½, 9½, 10	9½, 9½, 10
1.30 - 1.35	1½, 1½, 1½	1½, 1½, 2	3, 3, 3½	3½, 3½, 4	3½, 4, 4	8½, 8½, 8½
1.35 - 1.40	1, 1, 1½	1, 1½, 1½	1½, 1½, 1½	1, 1½, 1½	1, 1, 1	1½, 1½, 2
1.40 - 1.50	1, 1, 1	1, 1, 1	1, 1, 1½	1, 1½, 1½	1, 1, 1	1, 1, 1
1.50 - 1.60	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	N.A.	½, ½, ½	½, ½, ½	½, ½, ½	½, ½, ½	½, ½, ½

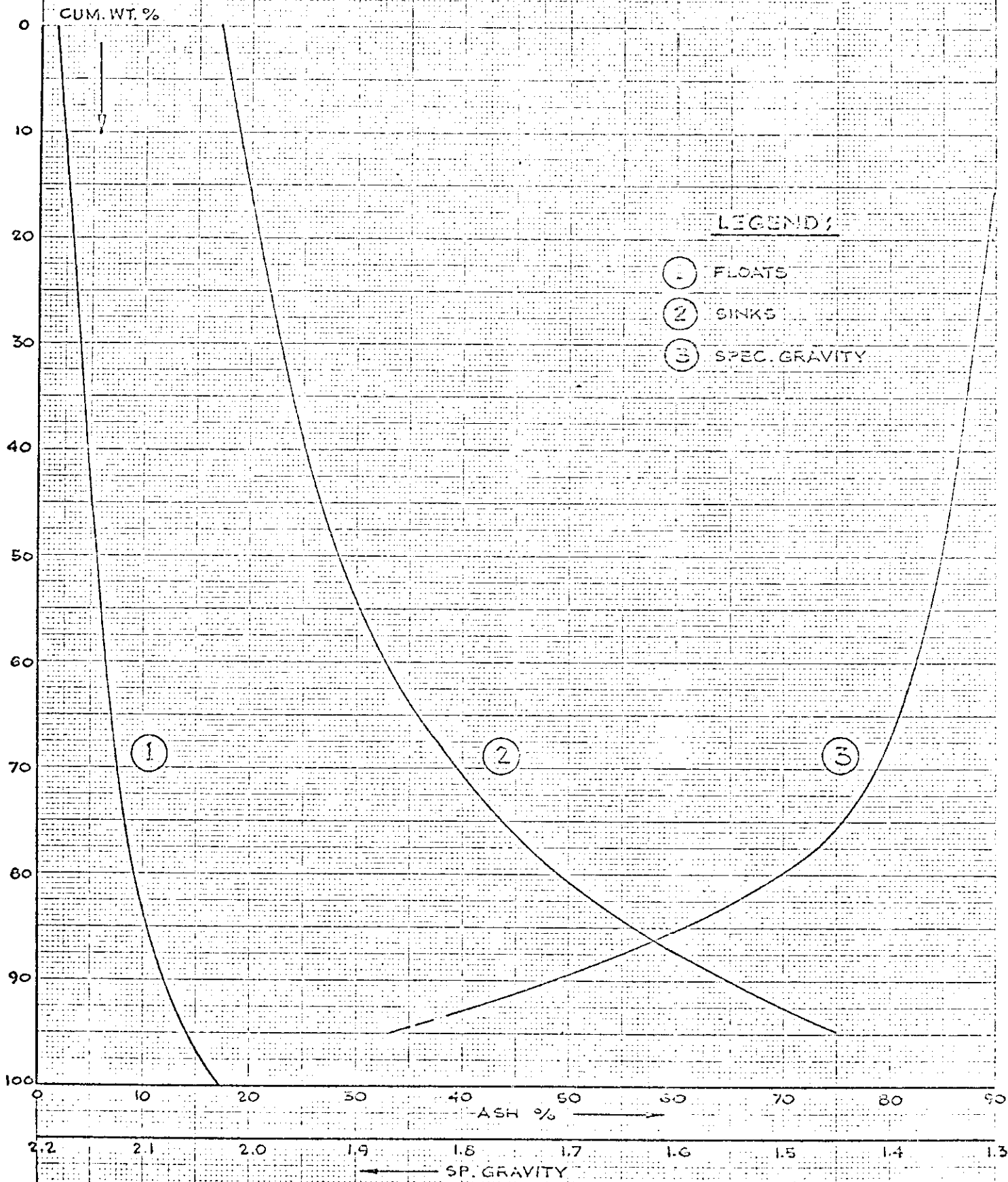
NOTE: F.S.I. on - 100 mesh fraction is 8, 8, 8½

1  
6  
1

FIG. 1

SCURRY RAINBOW - SEAM # 3.1.1.

WASHABILITY CURVES FOR 2" x 20 m



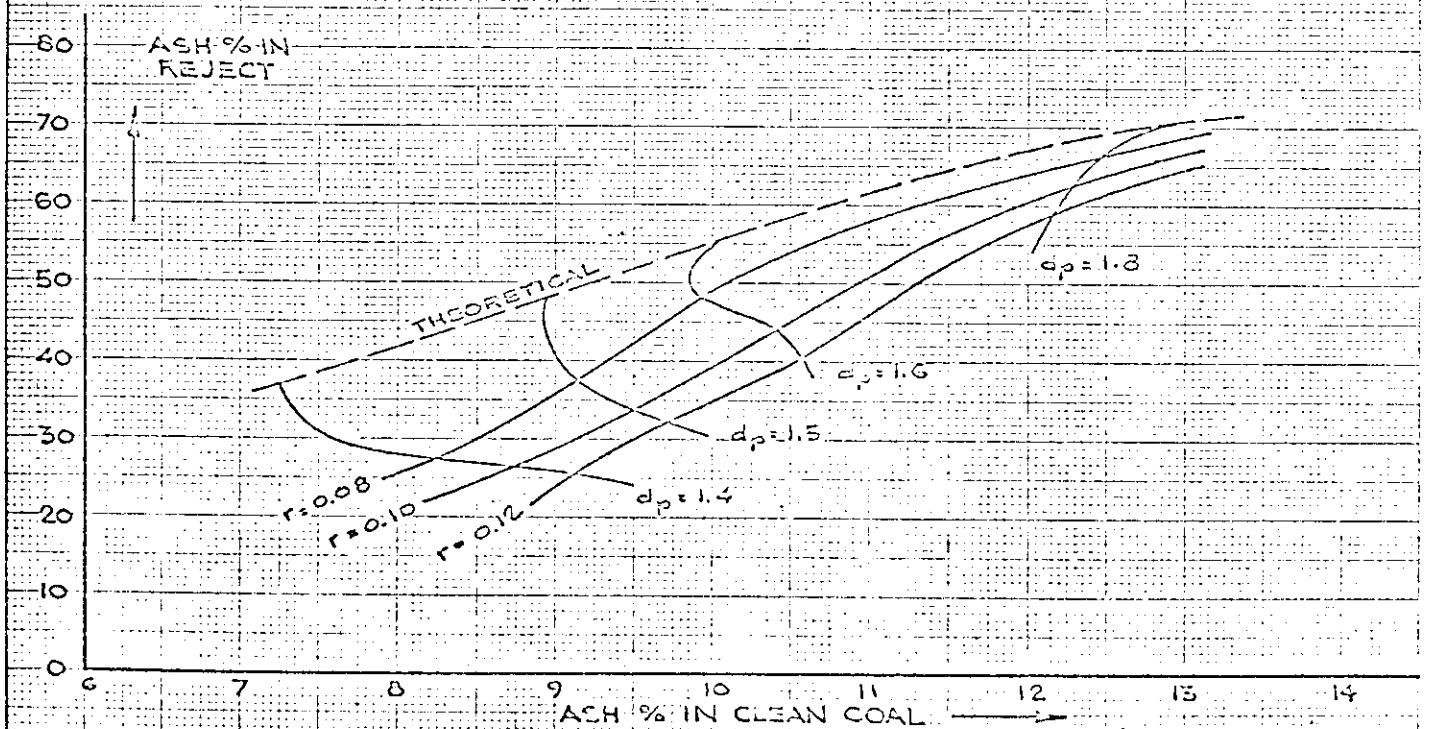
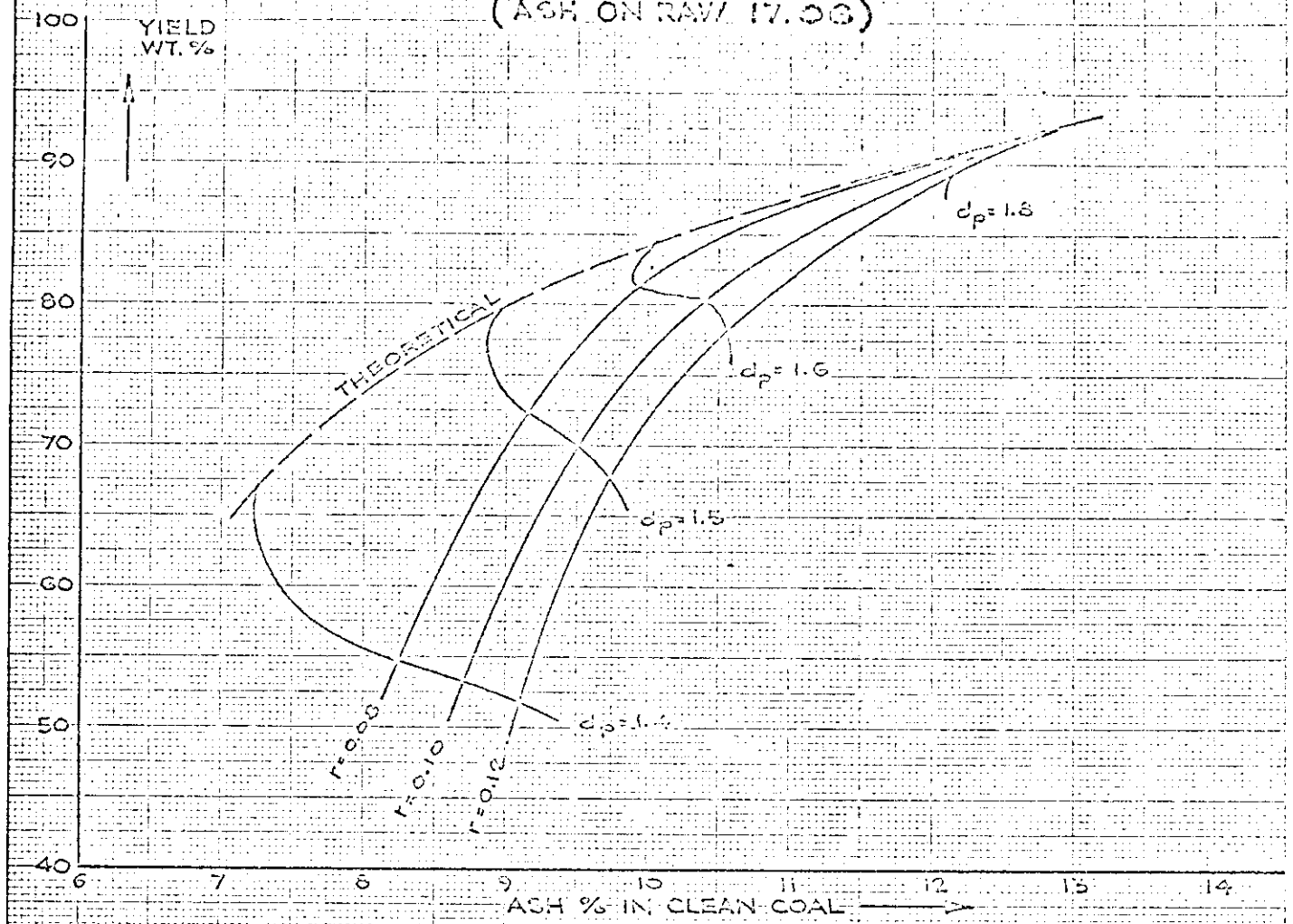
KE 10 X 10 TO THE CENTIMETER 46 1512  
MADE IN U.S.A.  
KEUFFEL & ESSER CO.

NOV. 25. /69 H. SCH.

CYCLONE ENGINEERING SALES LTD.  
EDMONTON ALBERTA CANADA

# FIG. 2 SCURRY RAINBOW - SEAM # 3.1.1.

PERFORMANCE EVALUATION CURVES FOR 2" x 20m  
(ASH ON RAW 17.06)



NOV. 26/69 H. SCH.

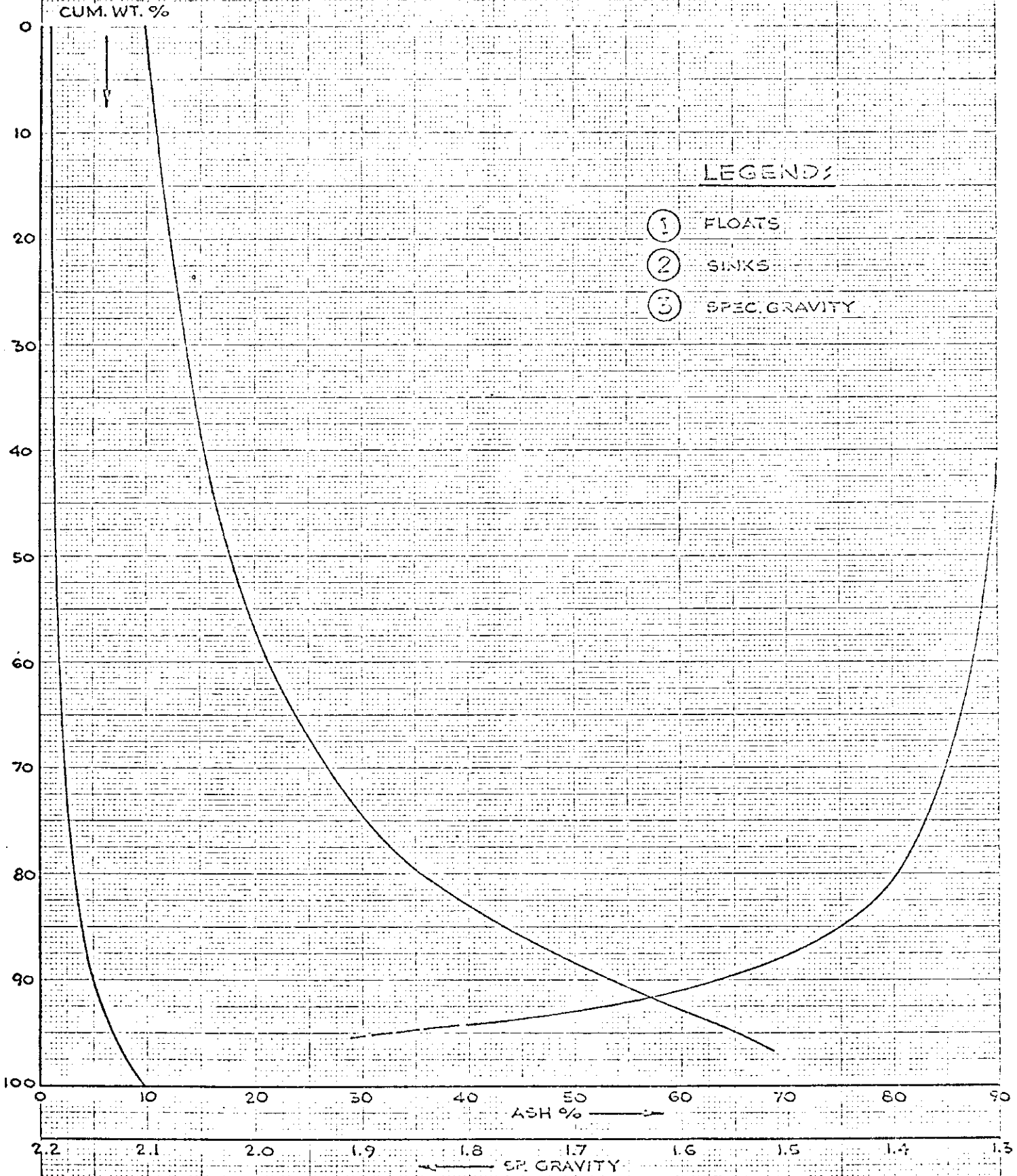
CYCLONE ENGINEERING SALES LTD.  
EDMONTON ALBERTA CANADA

KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

FIG. 3

SCURRY RAINBOW - SEAM # 0.1.1.

WASHABILITY CURVES FOR 20m x 100m



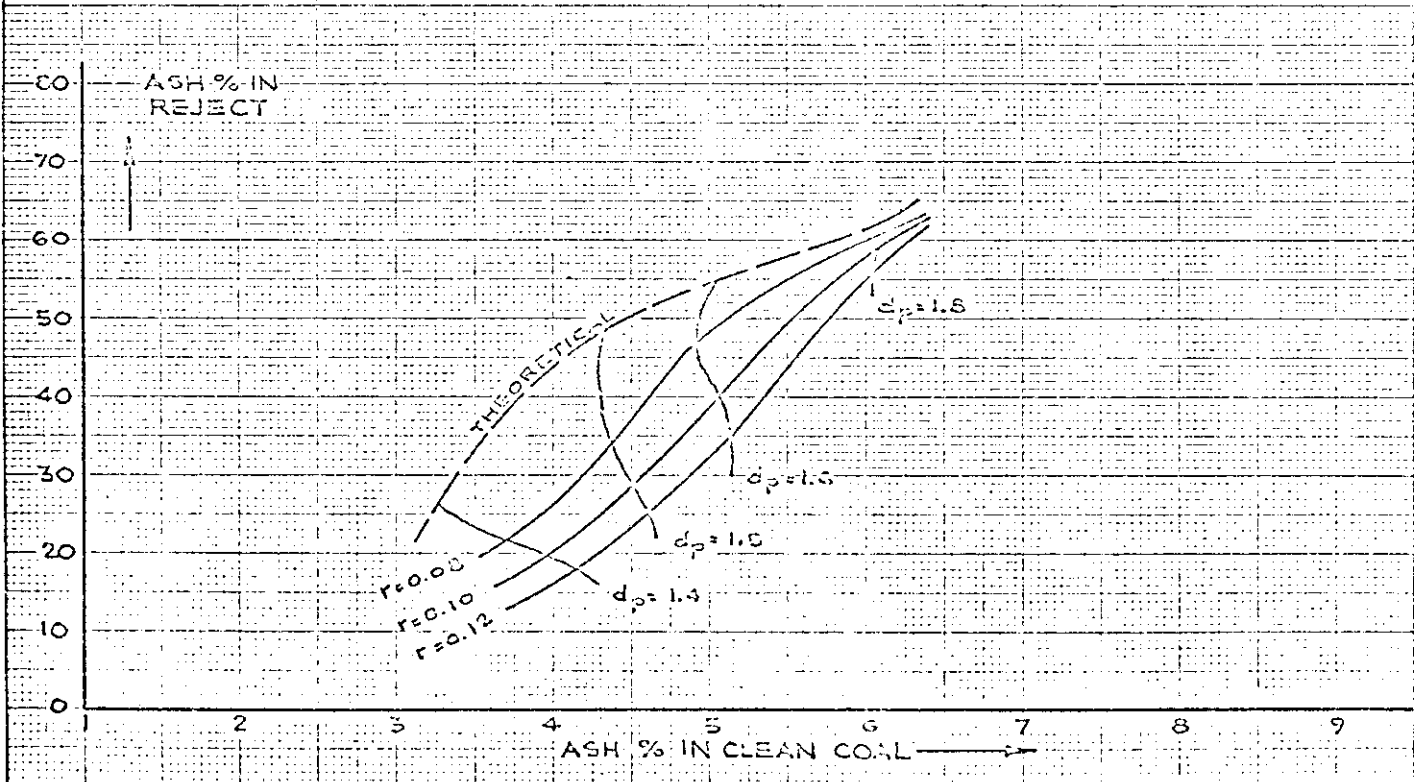
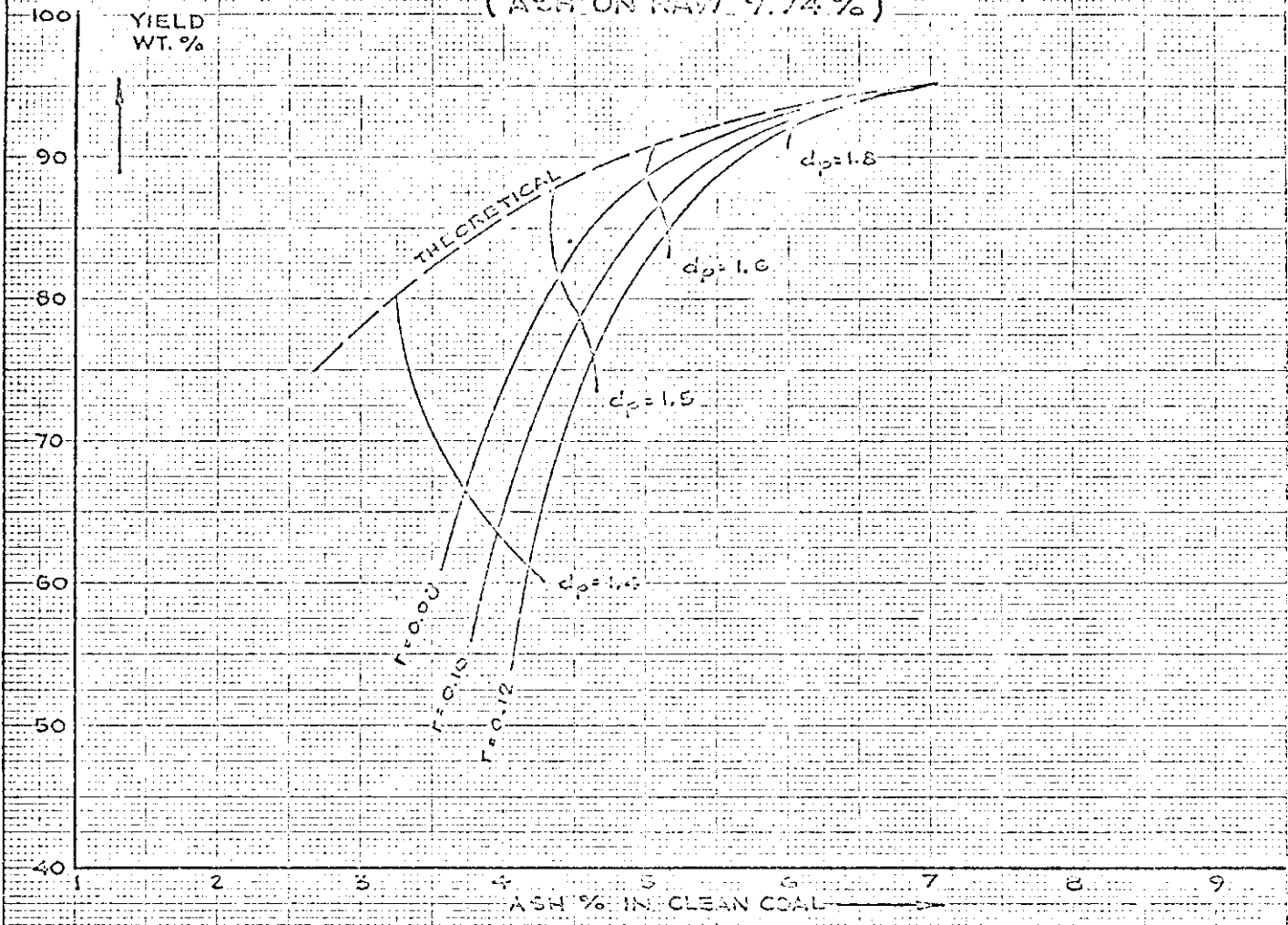
KEUFFEL & ESSER CO. 10 X 10 TO THE CENTIMETER 46 1512 MADE IN U.S.A.

NOV. 25./69 M. SCH.

CYCLONE ENGINEERING SALES LTD EDMONTON ALBERTA CANADA

**FIG. 4 SCURRY RAINBOW - SEAM # 0.1.1.**

PERFORMANCE EVALUATION CURVES FOR 20m x 100m  
(ASH ON RAW 9.74%)



KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A. • KEUFFEL & ESSER CO.

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #7. Seam #8.1.2

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
EDMONTON - ALBERTA - CANADA

Report No.: RI-69.07.f  
Job No.: S1 - 58  
Dated: December 5, 1969

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1. Washability Curves on 2" x 20 mesh.
2. Performance Evaluation Curves on 2" x 20 mesh.
3. Washability Curves on 20 x 100 mesh.
4. Performance Evaluation Curveys on 20 x 100 mesh.



SUMMARY

The data presented in this report refers to coal from Seam #8.1.2.

The analysis and the washability data indicate that this coal is of low volatile bituminous rank with a low ash content of 11.91% and a low sulphur content (0.36%).

Washing characteristics make this coal easy to clean at a required ash content of 8.75%.

It is noted that coking properties are very good.

SCURRY RAINBOW OIL LTD.

T A B L E 1. SEAM #8.1.2.

Classification by Rank.

Ash:	11.91%
Volatile Matter:	18.94%
Residual Moisture:	0.68%
Fixed Carbon:	68.47%
Sulphur:	0.37%
B.T.U./lb.:	13,240
Rank:	Low volatile bituminous

T A B L E 2. SEAM # 8.1.2.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	22.78	0.36	12,830	0.61
1 x 1/2"	20.64	0.34	12,890	0.65
1/2 x 1/4"	16.55	0.36	13,120	0.68
1/4" x 8 m	12.74	0.36	13,160	0.78
8 x 20 m.	12.85	0.40	13,800	0.70
20 x 100 m.	11.72	0.41	14,130	0.71
- 100 m.	2.72	0.44	14,110	0.75
Total	100.00	0.37	13,240	0.68

T A B L E 3. SEAM #8.1.2.

SCURRY RAINBOW OIL LTD.

Weight and Ash Distribution vs. Size and Specific Gravity.  
(Figures in brackets show the Ash content of individual fractions.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	2.14 (2.66)	10.70 (5.24)	4.03 (11.14)	2.32 (19.16)	1.03 (28.34)	1.21 (32.95)	1.35 (51.22)	22.78 (12.70)
1 x 1/2"	2.48 (2.34)	8.40 (5.36)	3.92 (11.48)	2.40 (18.35)	1.03 (27.95)	1.17 (45.02)	1.24 (60.51)	20.64 (14.35)
1/2 x 1/4"	2.41 (2.43)	6.36 (5.16)	3.14 (10.88)	2.02 (18.19)	0.78 (28.68)	1.03 (32.35)	0.81 (71.06)	16.55 (13.46)
1/4" x 8 m.	3.61 (1.95)	4.00 (5.34)	2.01 (10.56)	1.45 (18.10)	0.58 (28.64)	0.48 (41.39)	0.61 (66.26)	12.74 (11.99)
8 x 20 m.	6.03 (1.66)	2.84 (5.68)	1.50 (10.40)	1.16 (17.64)	0.46 (27.40)	0.36 (39.89)	0.50 (65.77)	12.85 (9.49)
20 x 100 m.	6.32 (1.17)	2.16 (4.44)	1.31 (8.39)	0.92 (15.54)	0.34 (25.55)	0.26 (37.84)	0.41 (65.74)	11.72 (7.48)
Total	22.99 (1.81)	34.46 (5.25)	15.91 (10.80)	10.27 (18.13)	4.22 (28.02)	4.51 (37.67)	4.92 (61.38)	97.28 (12.03)
- 100 mesh	This fraction forms 2.72% of the total sample and has an ash content of 7.49%, thus giving a total sample ash value of 11.91%.							

T A B L E 4. SEAM #8.1.2

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.  
(Figures in brackets give Volatile Matter)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	2.14 (20.95)	1.070 (19.95)	4.03 (18.19)	2.32 (17.35)	1.03 (15.77)	1.21 (15.35)	1.35 (13.55)	22.78 (18.65)
1 x 1/2"	2.48 (21.35)	8.40 (19.07)	3.92 (18.45)	2.40 (17.09)	1.03 (16.09)	1.17 (14.69)	1.24 (13.79)	20.64 (18.28)
1/2 x 1/4"	2.41 (21.48)	6.36 (19.22)	3.14 (18.50)	2.02 (17.24)	0.78 (16.14)	1.03 (15.54)	0.81 (13.90)	16.55 (18.53)
1/4" x 8 m.	3.61 (22.00)	4.00 (19.03)	2.01 (17.75)	1.45 (17.18)	0.58 (16.26)	0.48 (15.50)	0.61 (13.68)	12.74 (18.94)
8 x 20 m.	6.03 (21.60)	2.84 (19.34)	1.50 (18.02)	1.16 (17.40)	0.46 (16.38)	0.36 (16.24)	0.50 (13.88)	12.85 (19.66)
20 x 100 m.	6.32 (21.79)	2.16 (20.03)	1.31 (18.75)	0.92 (17.97)	0.34 (16.85)	0.26 (16.87)	0.41 (14.33)	11.72 (20.31)
Total	22.99 (21.61)	34.46 (19.44)	15.91 (18.28)	10.27 (17.30)	4.22 (16.13)	4.51 (15.39)	4.92 (13.78)	97.28 (18.91)
- 100 mesh	This fraction forms 2.72% of the total sample and has a volatile matter content of 19.87%, thus giving a total sample volatile matter content of 18.94%.							

T A B L E 5. SEAM #8.1.2

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	19.48	2.06	19.48	2.06	100.00	12.66	9.2
1.30 - 1.35	37.75	5.31	57.23	4.20	80.52	15.23	3.2
1.35 - 1.40	17.06	11.02	74.29	5.77	42.77	23.98	1.5
1.40 - 1.50	10.93	18.39	85.22	7.39	25.71	32.59	1.3
1.50 - 1.60	4.54	28.24	89.76	8.44	14.78	43.08	1
1.60 - 1.80	4.97	37.67	94.73	9.93	10.24	49.67	1
+ 1.80	5.27	60.98	100.00	12.66	5.27	60.98	0.8
Total	100.00	12.66					

T A B L E 6. SEAM #8.1.2

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	53.92	1.81	53.92	1.81	100.00	9.37	10
1.30 - 1.35	18.43	5.25	72.35	2.69	46.08	16.05	5
1.35 - 1.40	11.18	10.80	83.53	3.77	27.65	23.25	2.3
1.40 - 1.50	7.85	18.13	91.38	5.01	16.47	31.70	1
1.50 - 1.60	2.90	28.02	94.28	5.71	8.62	44.05	1
1.60 - 1.80	2.22	37.67	96.50	6.45	5.72	52.18	1
+ 1.80	3.50	61.38	100.00	8.37	3.50	61.38	0.5
Total	100.00	8.37					

T A B L E 7. SEAM #8.1.2

SCURRY RAINBOW OIL LTD.

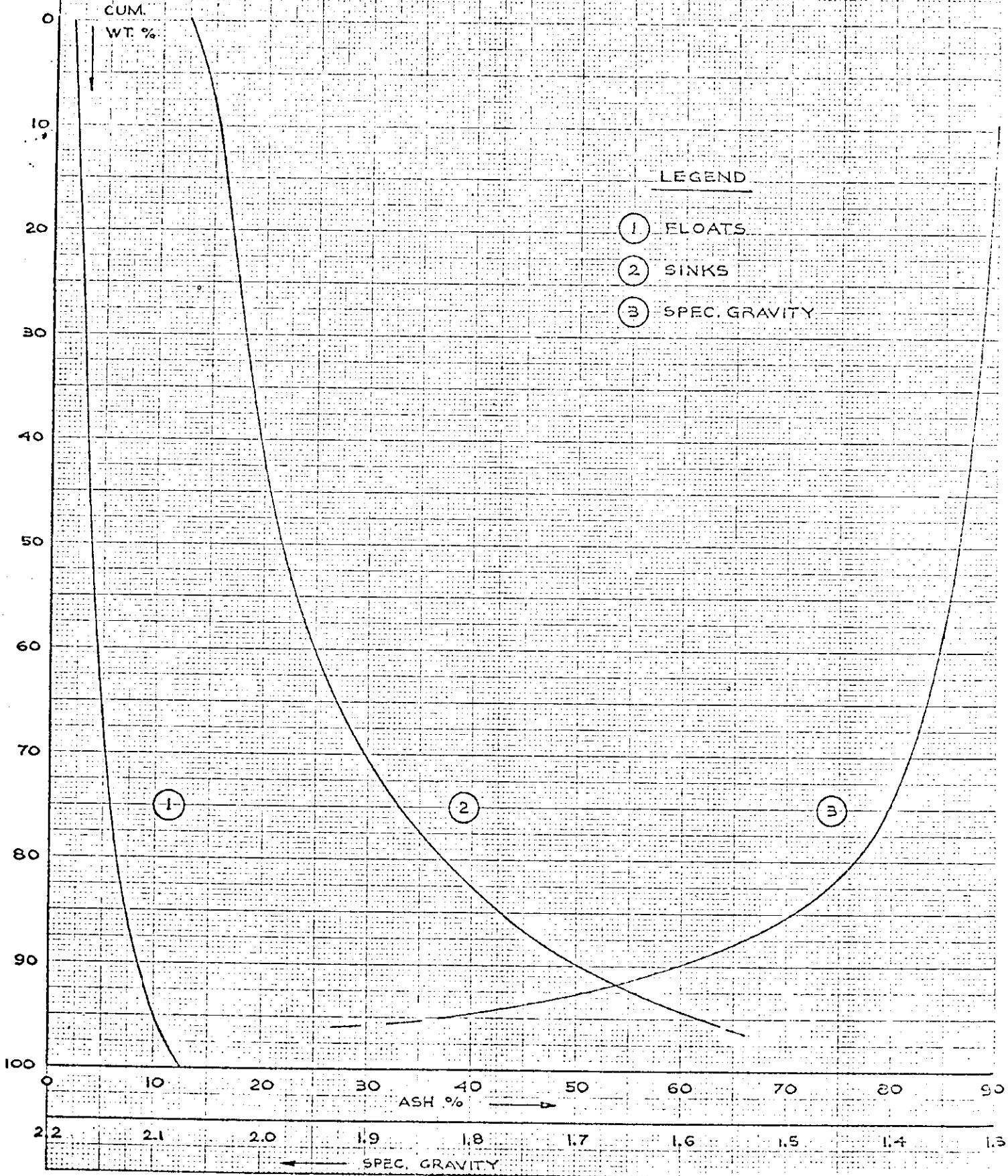
Free Swelling Index

Sp. Gr. \ Size	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	8½, 8½, 8½	9, 9, 9	9, 9, 9	9½, 9½, 9½	9, 9½, 9½,	10, 10, 10
1.30 - 1.35	3, 3, 3	3, 3, 3	4, 4½, 4½	3, 3, 3	2½, 2½, 2½	5, 5, 5
1.35 - 1.40	1, 1, 1	1½, 1½, 1½	1½, 1½, 2	1½, 1½, 2	1½, 1½, 1½	2, 2½, 2½
1.40 - 1.50	1, 1, 1	1½, 1½, 1½	1½, 1½, 1½	1, 1, 1	1, 1, 1½	1, 1, 1
1.50 - 1.60	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	1, 1, 1	1, 1, 1	½, ½, ½	½, ½, ½	½, ½, ½	½, ½, ½

NOTE: F.S.I. on - 100 mesh fraction is 7, 7, 7,

FIG. 1

SCURRY RAINBOW SEAM<sup>TM</sup> S.1.2  
WASHABILITY CURVES FOR 2" x 20 m.

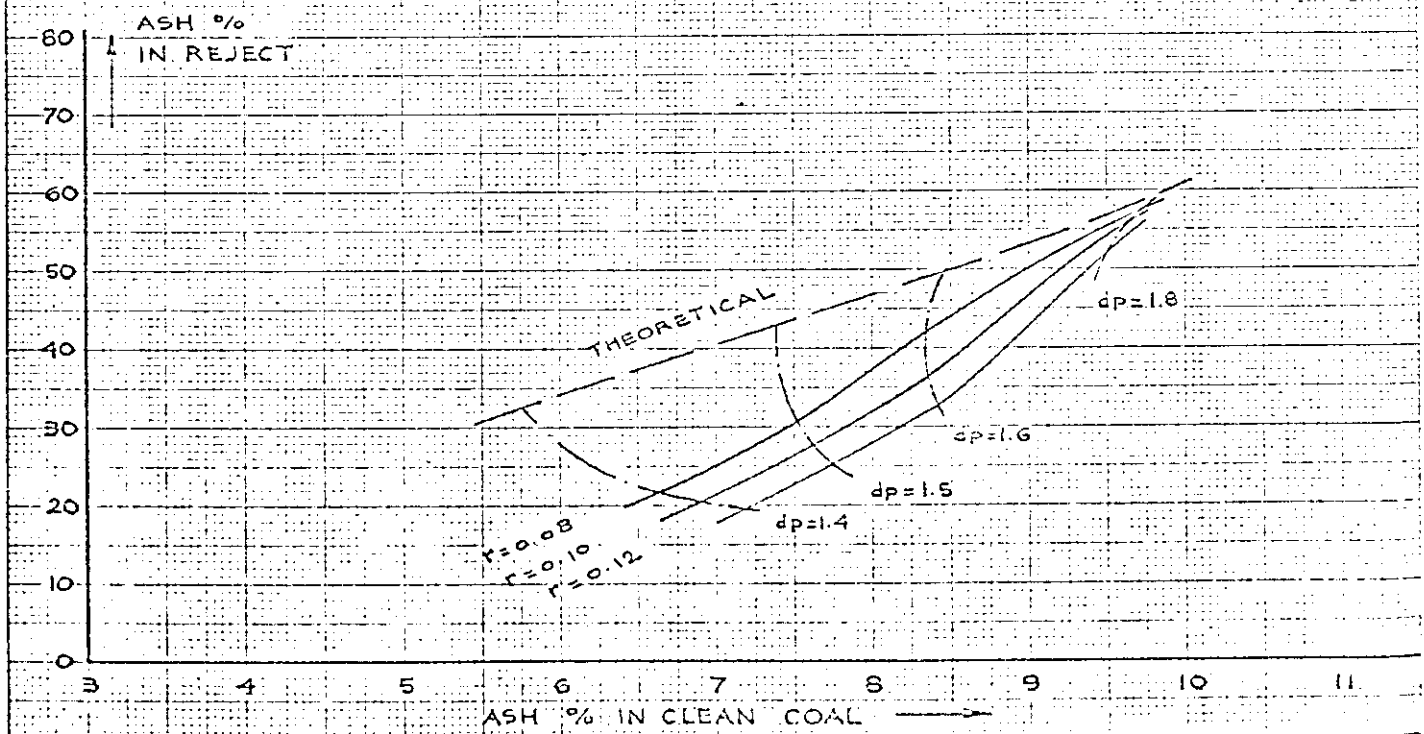
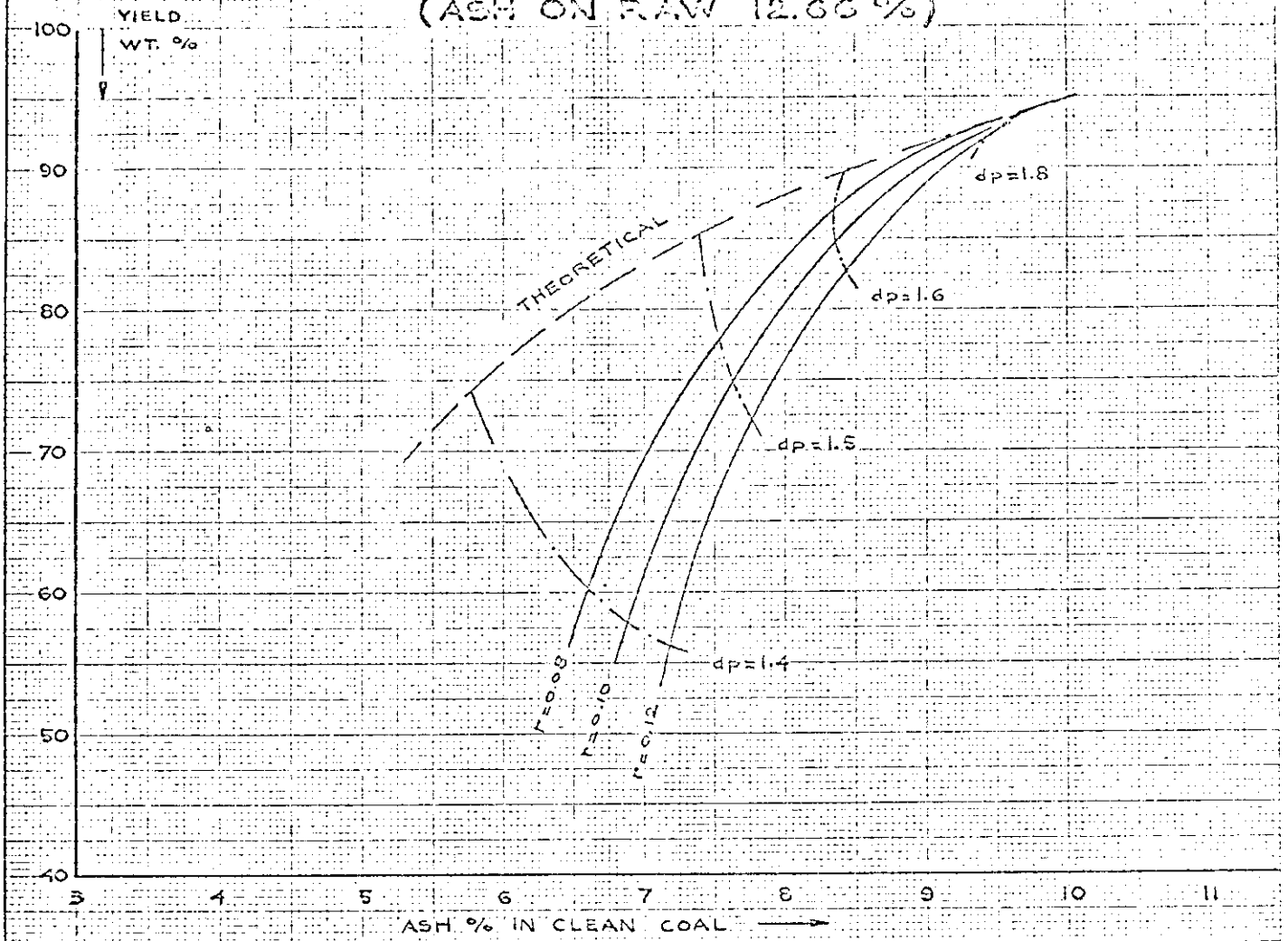


KE 10 X 10 TO THE CENTIMETER 46 1512  
MADE IN U.S.A.  
KEUFFEL & ESSER CO.

FIG. 2

SCURRY HANBOW BEAM<sup>®</sup> 0.1.2

PERFORMANCE EVALUATION CURVES FOR 2" x 20 m.  
(ASH ON RAW 12.66%)

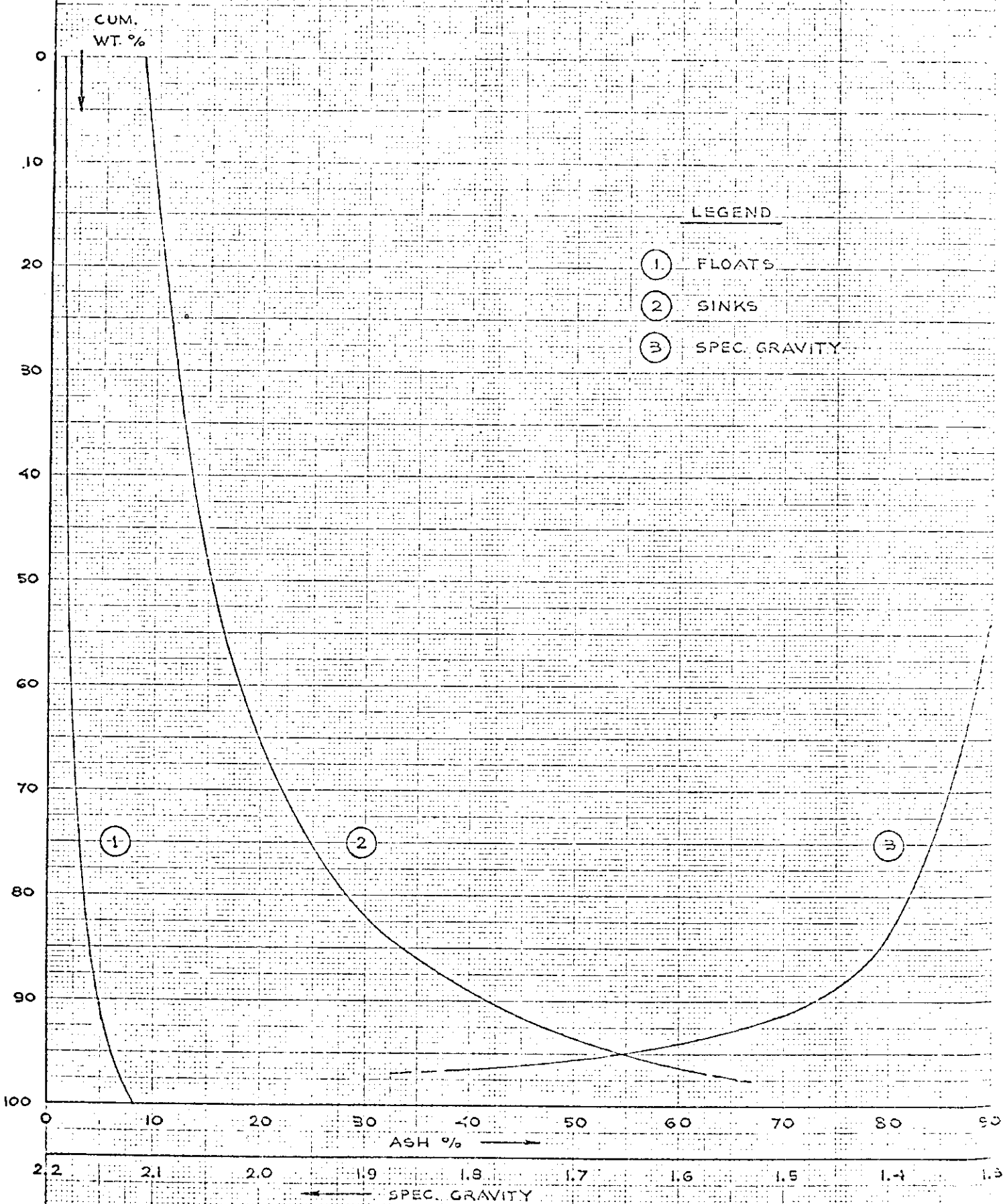


10 X 10 TO THE CENTIMETER 45 1512  
MADE IN U.S.A.  
KEUFFEL & ESSER CO.



# FIG. 3 SCURRY RAINBOW SEAM 0.1.2

## WASHABILITY CURVES FOR 20m X 100m



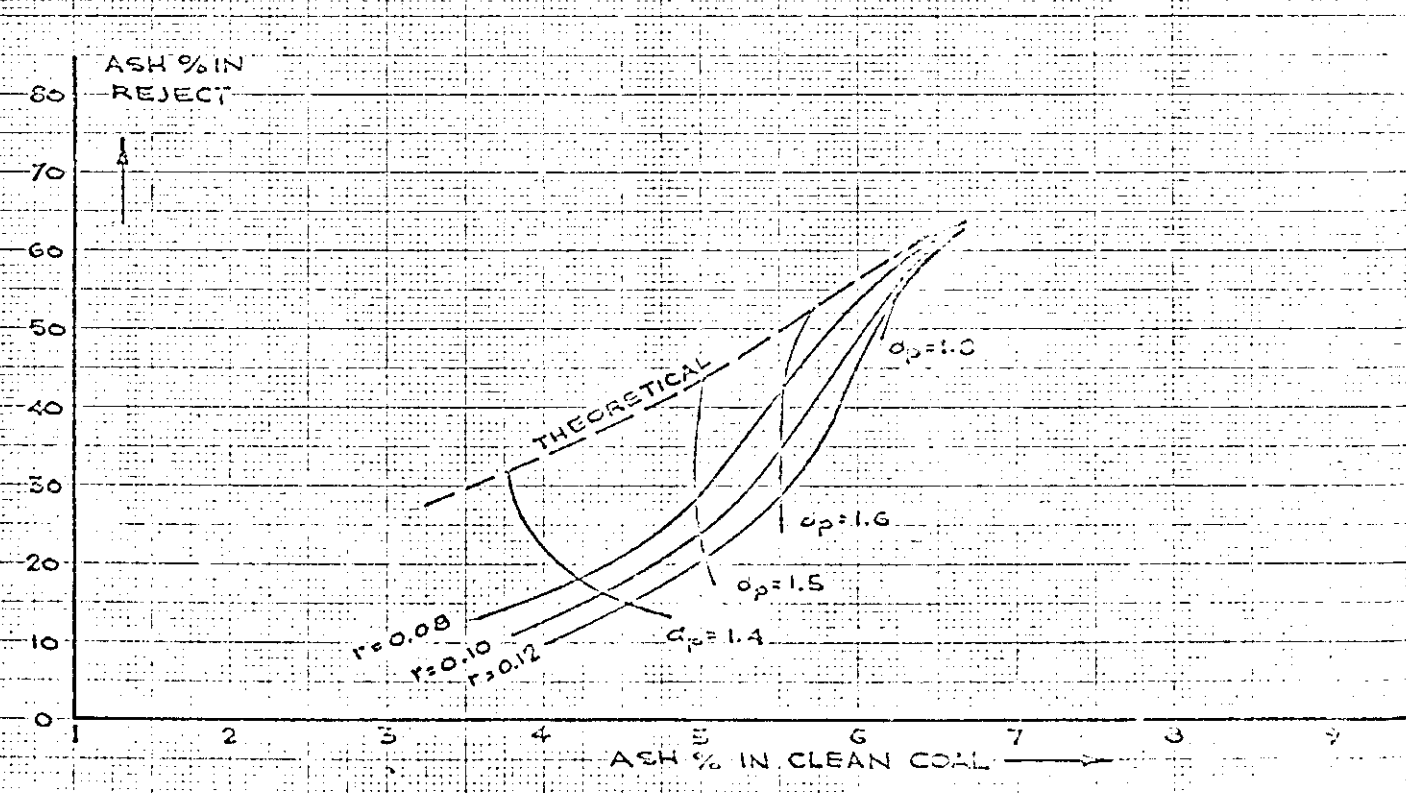
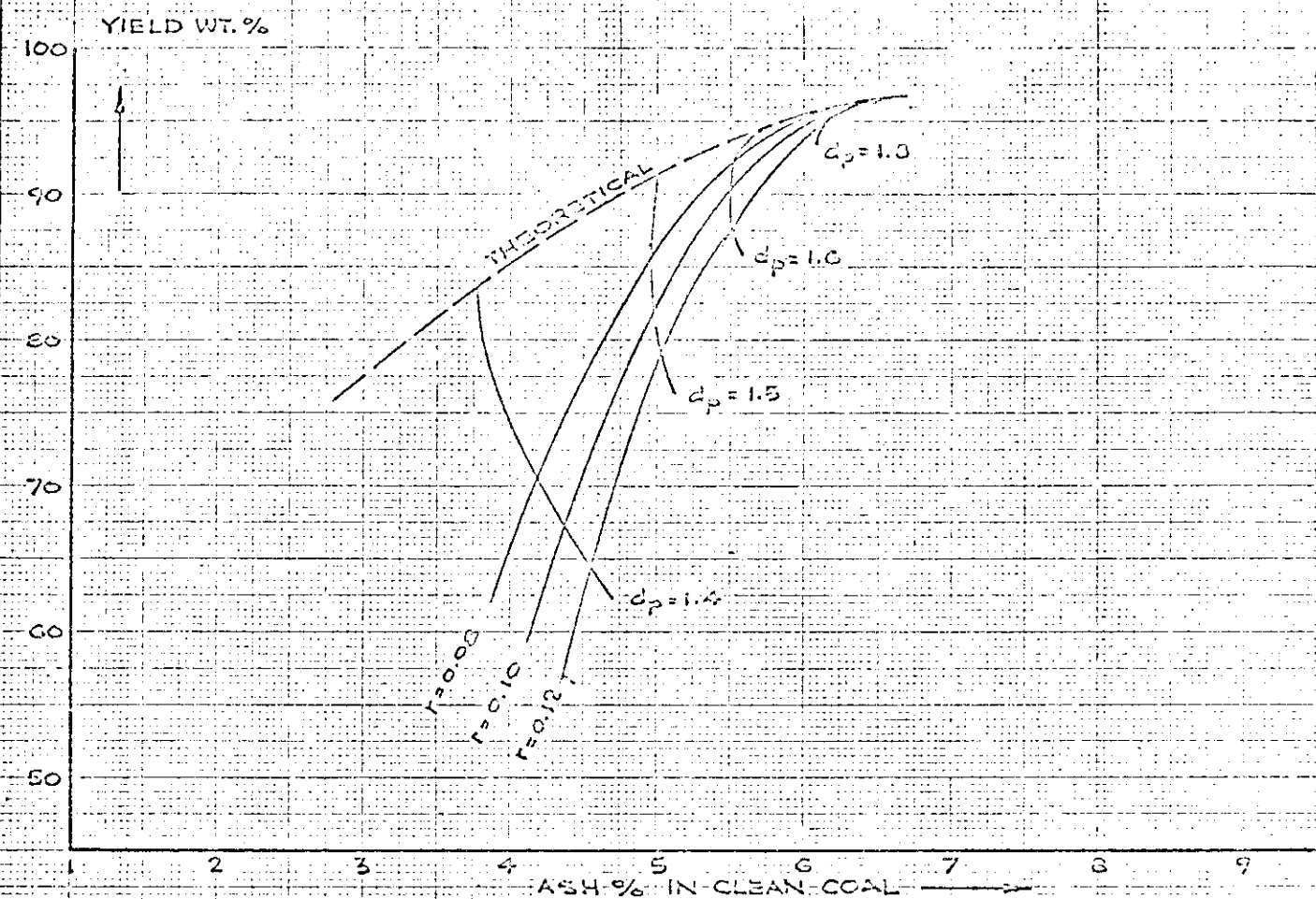
KE 10 X 10 TO THE CENTIMETER 46 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

DEC 4 / '69 LAMAN

CYCLONE ENGINEERING SALES LTD  
 EDMONTON ALBERTA CANADA

FIG. 4 SCURRY RAINBOW BEAM® 2.1.1.

PERFORMANCE EVALUATION CURVES FOR 20max100m  
(ASH ON RAW 3.37%)



DEC. 4. / 69 H. SCH

CYCLONE ENGINEERING & CONSULTANTS LTD.  
EDMONTON ALBERTA CANADA

10 X 10 TO THE CENTIMETER 46 1512  
10 X 25 CM. MADE IN U.S.A.  
KEUFFEL & ESSER CO.

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #8. SEAM #9.1

SUBMITTED BY  
CYCLONE ENGINEERING SALES LTD.  
Edmonton - Alberta - Canada

Report No.: RI-69.07.g

Job No.: S1-58

Dated: December 17, 1969

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SUMMARY

The data presented in this report refers to coal from Seam #9.1.

The analysis and washability data indicate that this coal is of low bituminous rank with a moderate ash content of 14.90% and low sulphur content (0.44%).

Washing characteristics of this coal show that yield losses, when cleaned to an ash content of 8.75%, are relatively small. The coking characteristics are good.

SCURRY RAINBOW OIL LTD.

T A B L E 1. SEAM #9.1

Classification by Rank.

Ash:	14.90%
Volatile Matter:	19.41%
Residual Moisture:	0.64%
Fixed Carbon:	65.05%
Sulphur:	0.44%
B.T.U./lb.:	12,670
Rank:	Low volatile bituminous

T A B L E 2. SEAM #9.1

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	33.63	0.44	12,250	0.62
1 x 1/2"	22.87	0.42	12,410	0.65
1/2 x 1/4"	12.40	0.42	12,130	0.61
1/4" x 8 m.	10.04	0.42	12,820	0.71
8 x 20 m.	10.14	0.46	13,910	0.69
20 x 100 m.	8.62	0.49	14,090	0.59
- 100 m.	2.30	0.52	12,810	0.72
Total	100.00	0.44	12,670	0.64

T A B L E 3. SEAM #9.1

SCURRY RAINBOW OIL LTD.

Weight & Ash Distribution vs. Size and Specific Gravity.  
(Figures in brackets show the Ash content of individual fractions.)

Size \ Sp.Gr.	Sp.Gr.							Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	3.37 (3.17)	16.94 (6.29)	5.25 (10.81)	3.11 (20.53)	1.59 (27.57)	1.38 (47.40)	1.99 (72.61)	33.63 (14.61)
1 x 1/2"	3.17 (3.23)	9.39 (6.40)	3.06 (12.03)	2.81 (20.25)	1.02 (30.12)	1.38 (45.62)	2.04 (72.54)	22.87 (17.74)
1/2 x 1/4"	2.39 (2.83)	3.56 (6.56)	1.72 (11.97)	1.87 (21.93)	0.54 (29.79)	0.74 (45.01)	1.48 (74.54)	12.40 (20.33)
1/4" x 8 m.	3.73 (1.98)	2.27 (6.01)	1.24 (11.34)	1.21 (18.20)	0.49 (29.02)	0.38 (41.21)	0.77 (71.92)	10.04 (4.03)
8 x 20 m.	6.05 (1.72)	1.37 (6.39)	0.90 (11.18)	0.82 (13.35)	0.29 (27.55)	0.25 (41.10)	0.46 (70.70)	10.14 (9.37)
20 x 100 m.	5.14 (1.40)	1.17 (5.72)	0.77 (9.72)	0.69 (15.96)	0.25 (29.34)	0.21 (39.24)	0.39 (68.46)	8.62 (8.66)
Total	23.85 (2.20)	34.80 (6.31)	12.94 (11.27)	10.51 (19.97)	4.13 (28.75)	4.34 (45.12)	7.13 (72.56)	97.70 (14.94)
- 100 mesh	This fraction forms 2.30% of the total sample and has an ash content of 13.24%, thus giving a total sample ash value of 14.96%.							

T A B L E 4. SEAM #9.1

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity

(Figures in brackets give Volatile Matter.)

Sp.Gr. Size	1.30	1.35	1.40	1.50	1.60	1.80	Total	
2 x 1"	3.37 (20.74)	16.94 (19.40)	5.25 (18.78)	3.11 (17.94)	1.59 (18.10)	1.38 (16.74)	1.99 (16.46)	33.63 (18.95)
1 x 1/2"	3.17 (20.99)	9.39 (19.35)	3.06 (19.13)	2.81 (17.93)	1.02 (17.79)	1.38 (16.85)	2.04 (14.21)	22.87 (18.69)
1/2 x 1/4"	2.39 (20.95)	3.66 (19.33)	1.72 (18.61)	1.87 (17.91)	0.54 (17.85)	0.74 (16.49)	1.48 (14.05)	12.40 (18.46)
1/4" x 8 m.	3.73 (22.57)	2.27 (19.43)	1.24 (18.59)	1.21 (17.79)	0.44 (17.91)	0.38 (17.25)	0.77 (14.37)	10.04 (19.75)
8 x 20 m.	6.05 (23.03)	1.37 (19.61)	0.90 (18.89)	0.82 (18.35)	0.29 (18.03)	0.25 (17.59)	0.46 (14.99)	10.14 (21.18)
20 x 100 m.	5.14 (23.05)	1.17 (19.69)	0.77 (19.19)	0.69 (18.63)	0.25 (18.71)	0.21 (17.75)	0.39 (17.49)	8.62 (21.38)
Total	23.85 (22.15)	34.80 (19.39)	1.294 (18.35)	10.51 (17.99)	4.13 (18.00)	4.34 (16.87)	7.13 (15.05)	97.70 (19.35)
- 100 mesh	This fraction forms 2.30% of the total sample and has a volatile matter content of 22.08%, thus giving a total sample volatile matter content of 19.41%.							



T A B L E 5. SEAM #9.1

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
-1.30	21.00	2.63	21.00	2.43	100.00	15.56	8.1
1.30-1.35	37.75	6.34	58.75	4.94	79.00	19.05	2.5
1.35-1.40	13.66	11.37	72.41	6.15	41.25	30.68	2.0
1.40 - 1.50	11.02	20.26	83.43	8.02	27.59	40.24	1.3
1.50-1.60	4.36	28.71	87.79	9.05	16.57	53.53	1.1
1.60-1.80	4.64	45.43	92.43	10.87	12.21	62.40	1
+1.80	7.57	72.80	100.00	15.56	7.57	72.80	1
Total	100.00	15.56					

T A B L E 6. SEAM #9.1

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
-1.30	59.63	2.20	59.63	2.20	100.00	9.99	10
1.30-1.35	13.57	6.31	73.20	2.96	40.37	21.49	4
1.35-1.40	8.93	11.27	82.13	3.87	26.80	29.13	2
1.40-1.50	8.01	19.97	90.14	5.30	17.87	38.13	1.3
1.50-1.60	2.90	28.75	93.04	6.03	9.86	52.88	1
1.60-1.80	2.44	45.12	95.48	7.03	6.96	62.94	1
+1.80	4.52	72.56	100.00	9.99	4.52	72.56	0.5
Total	100.00	9.99					

T A B L E 7. SEAM #9.1

SCURRY RAINBOW OIL LTD.

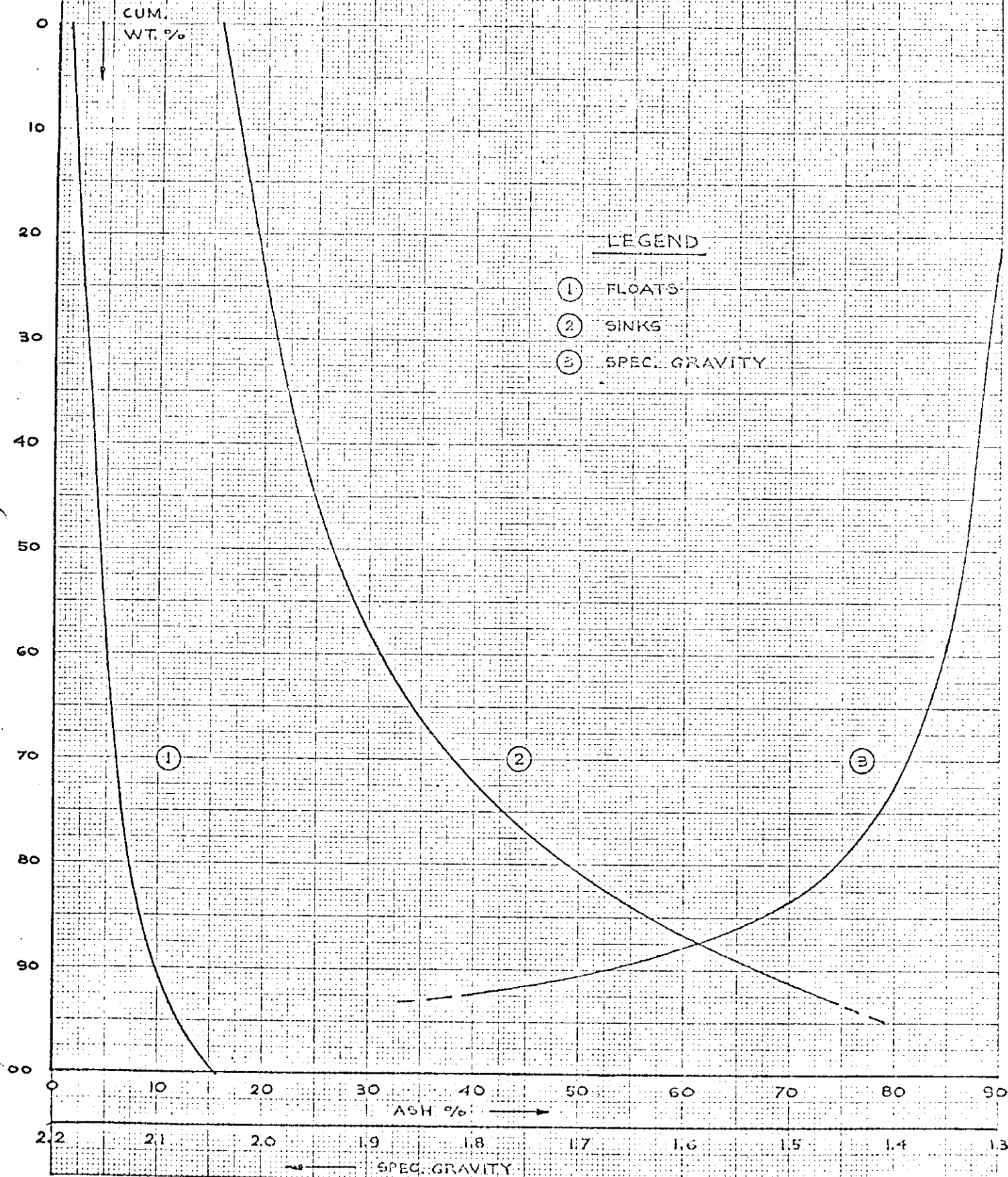
Free Swelling Index.

Sp.Gr. \ Size	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	6, 6, 6	6, 6, 6	7, 7, 7½	9, 9, 9½	10, 10, 10	10, 10, 10
1.30 - 1.35	2, 2½, 2½	2½, 2½, 2½	2½, 2½, 2½	3, 3, 3	3, 3, 3½	4, 4, 4,
1.35 - 1.40	2, 2, 2	2, 2, 2	1½, 1½, 2	2, 2, 2	2, 2, 2	2, 2, 2
1.40 - 1.50	1, 1½, 1½	1½, 1½, 1	1½, 1½, 1	1, 1, 1½	1, 1, 1½	1, 1½, 1½
1.50 - 1.60	1, 1, 1½	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
1.60 - 1.80	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	½, ½, ½	½, ½, ½	½, ½, ½	½, ½, ½	N.A.	½, ½, ½

NOTE: F.S.I. on - 100 mesh fraction is 6½, 7, 7.

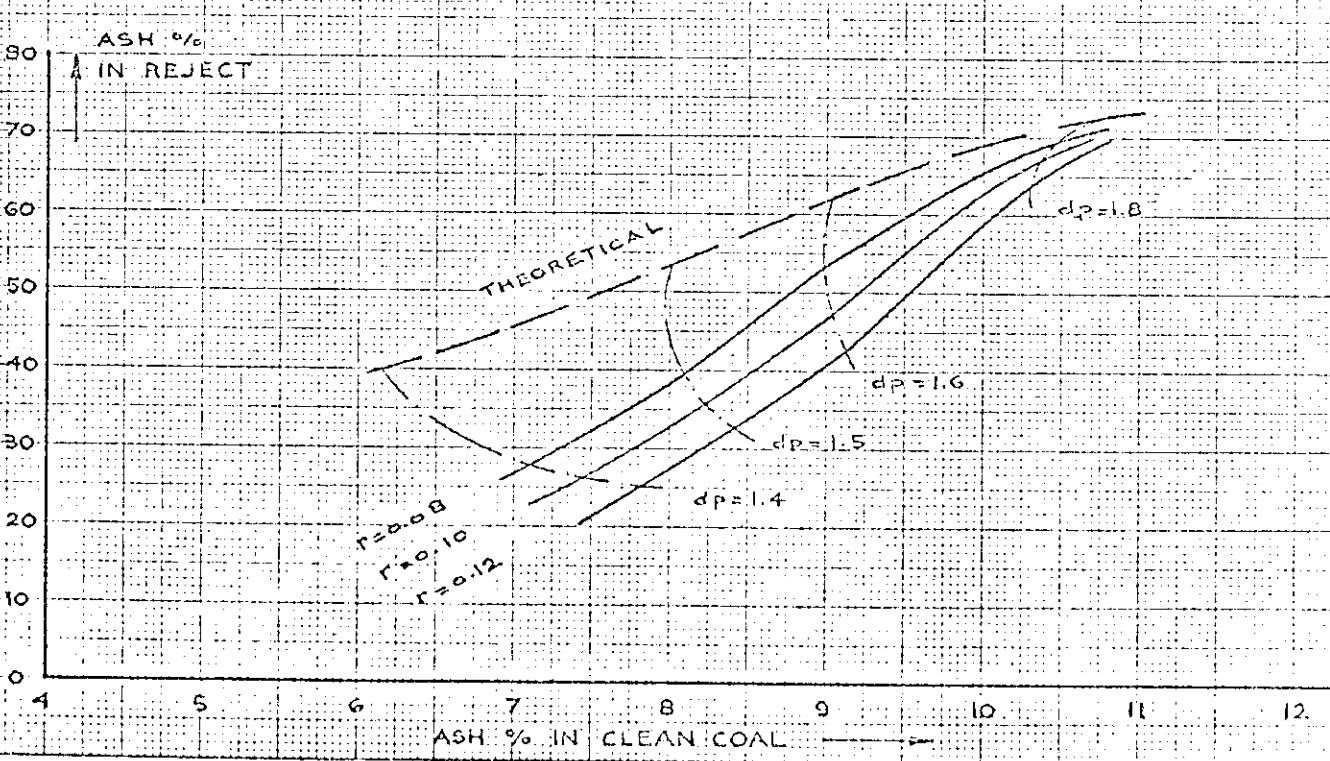
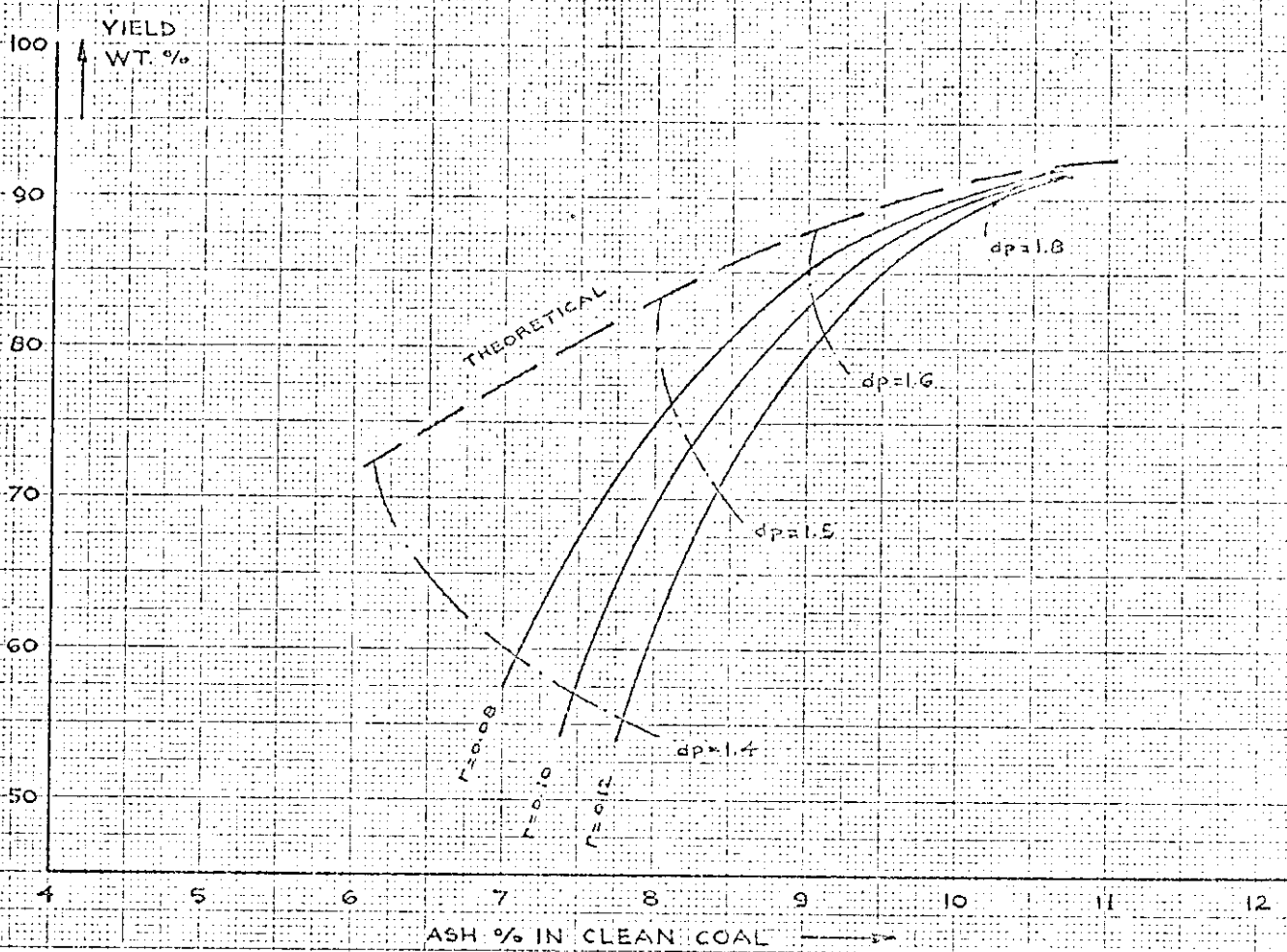
FIG. 1 SCURRY RAINBOW SEAM No. 9.1

WASHABILITY CURVES FOR 12" x 20" M.



KE 10 X 10 TO THE CENTIMETER 45 1512  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.

**FIG. 2 SCURRY RAINBOW SEAM No. 9.1**  
**PERFORMANCE EVALUATION CURVES FOR 2" X 20" (ASH ON RAW 15.56%)**

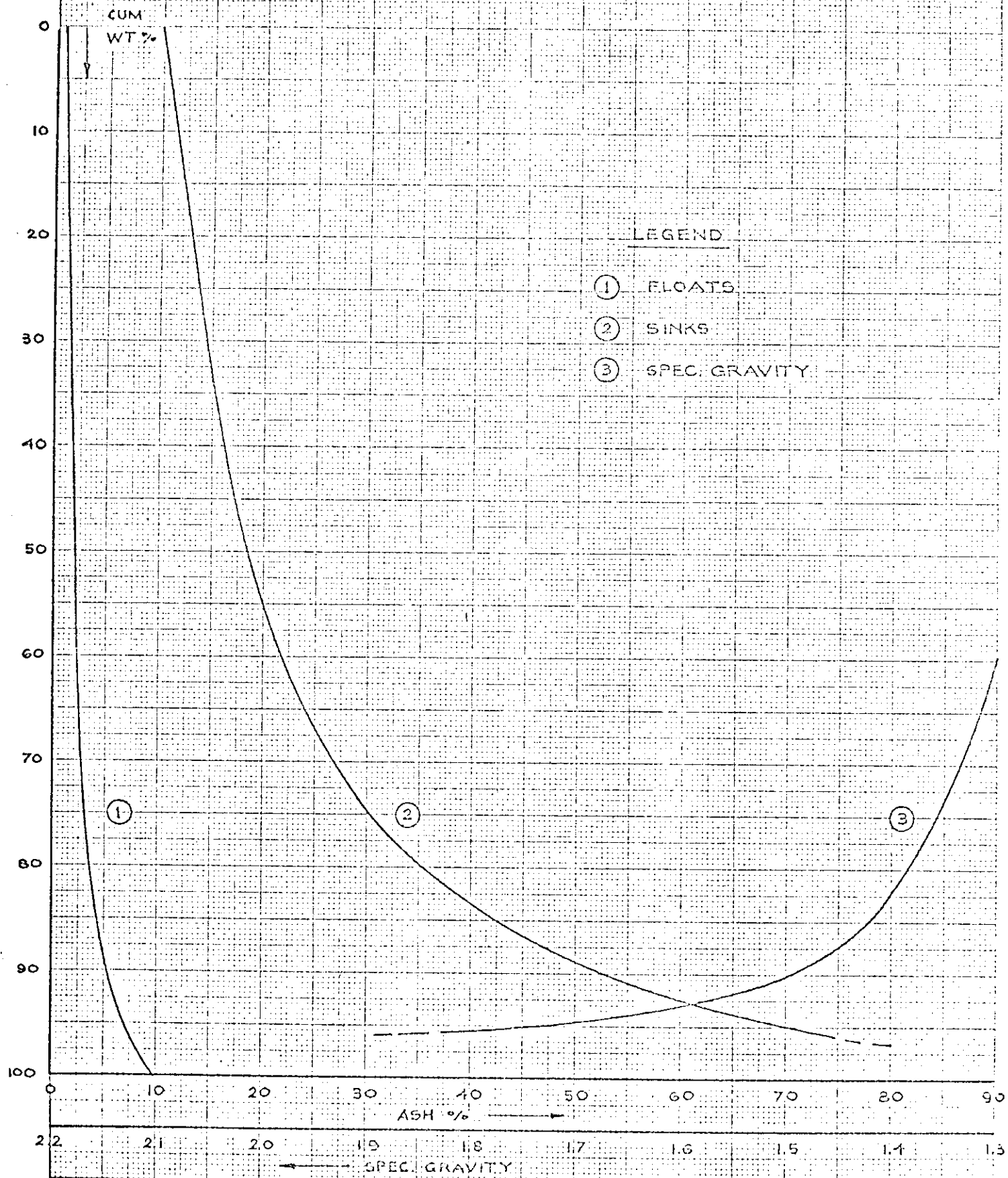


KEUFFEL & ESSER CO.  
 16 X 25 CM.  
 10 X 10 TO THE CENTIMETER  
 46 1512  
 MADE IN U.S.A.

FIG. 2

SCURRY RAINBOW BEAM No. 9.1

WASHABILITY CURVES FOR 20m. x 100m.



10 X 10 TO THE CENTIMETER 46 1512  
16 X 25 CM.  
KEUFFEL & ESSER CO.

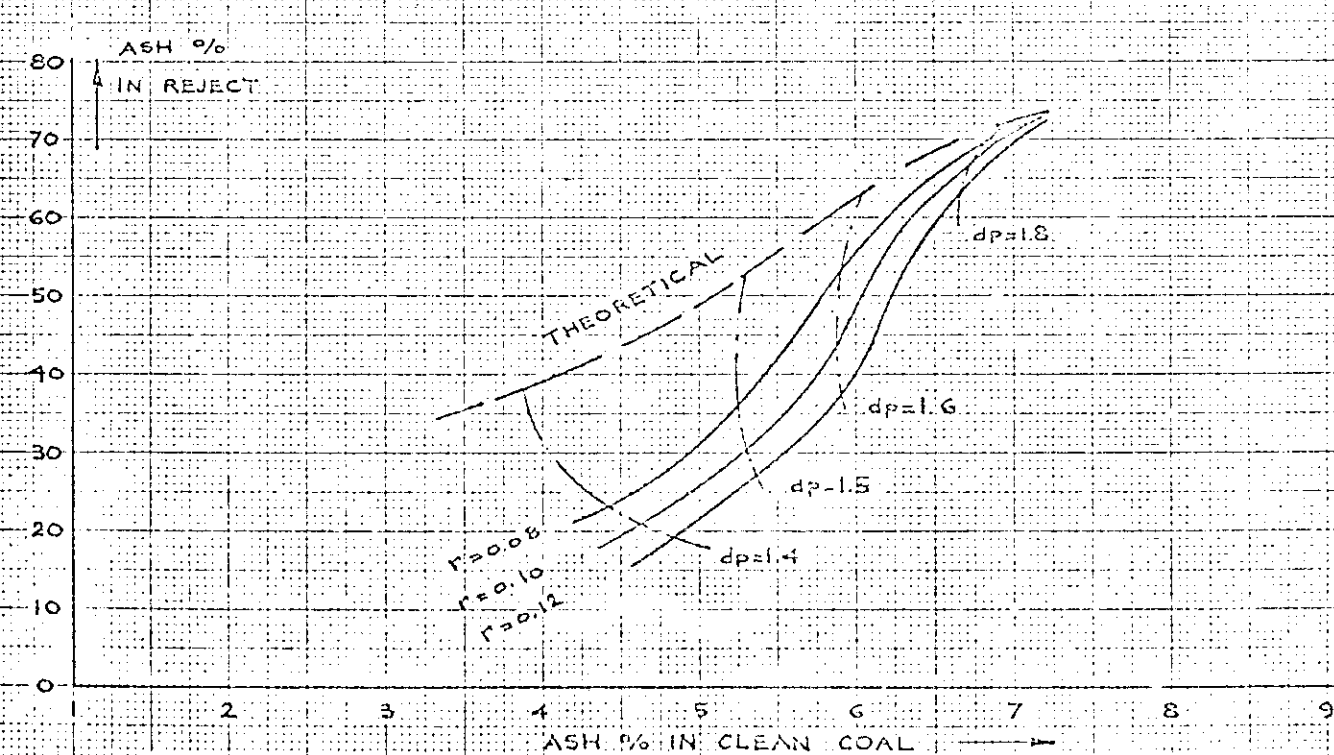
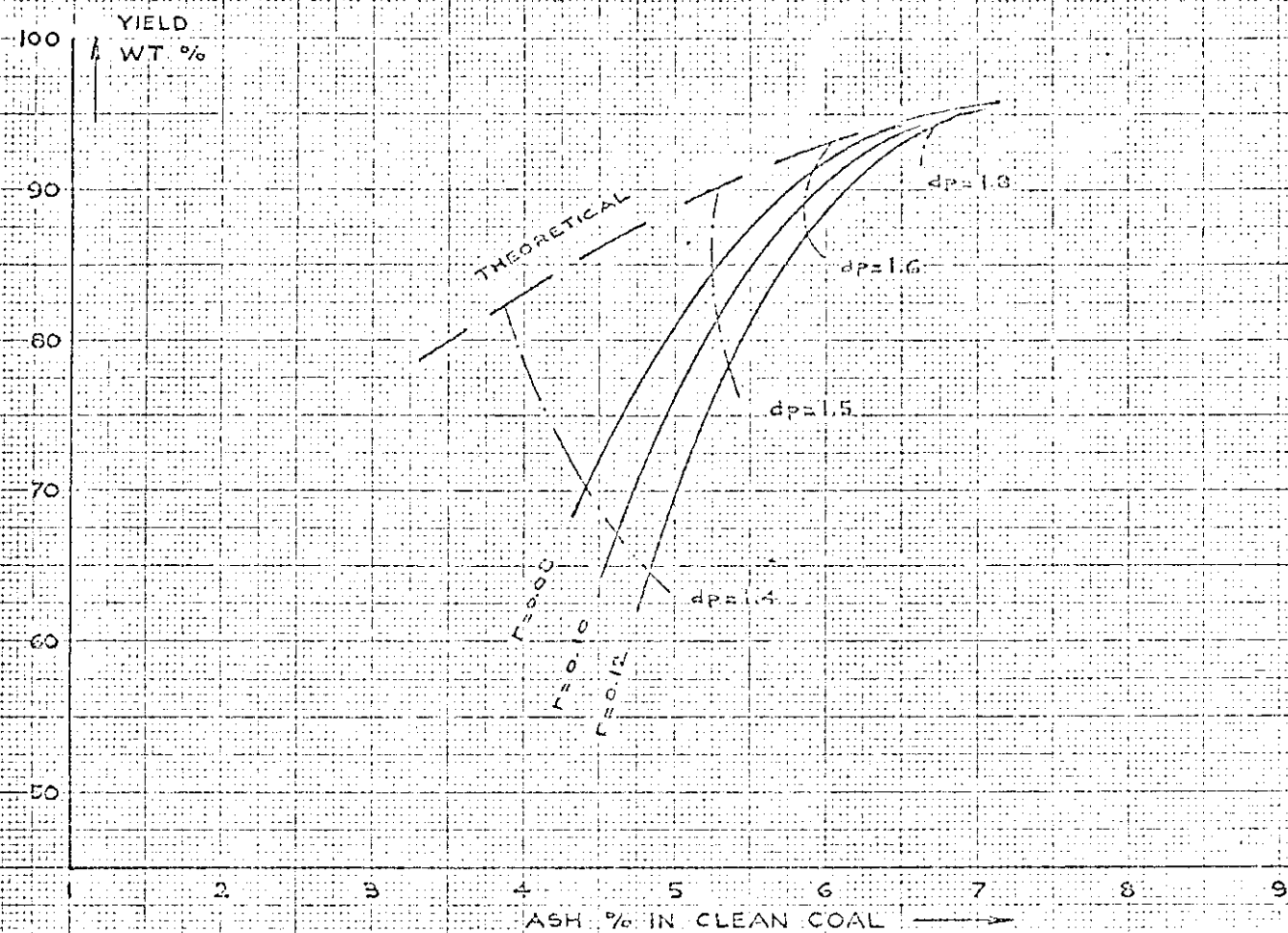
DEC. 17/69

CYCLONE ENGINEERING SALES LTD.  
EDMONTON ALBERTA CANADA

FIG. 4

SECURITY RAINBOW (SEAM No. 91)

PERFORMANCE EVALUATION CURVES FOR 20m X 100m.  
(ASH ON RAW = 5.93%)



KE 10 X 10 TO THE CENTIMETER 46 1512  
MADE IN U.S.A.  
KEUFFEL & ESSER CO.

REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #9. SEAM #H-1

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
Edmonton - Alberta - Canada

Report No.: RI-69.07.h

Job No.: S1-58

Dated: December 19, 1969

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RESUME

The data presented in this report refers to coal from Seam #H-1.

The analysis and the washability data indicate that this coal is of medium volatile bituminous rank with a low ash content of 10.50%.

The ash distribution over the various specific gravity fractions indicate that this coal is an "easy" coal and can be cleaned to a low ash content of 7% with little yield loss.

It is noted that the coking properties are excellent.

Sulphur content, however, is extremely high (2.13%) and large pyrite crystals are immediately discovered on visual inspection.

If this coal will be mined together with coal from low sulphur seams, or, if the amount of reserves, represented by this adit, is large and is to be incorporated in total reserves, than sulphur reduction will be required.

T A B L E 1. SEAM #H-1

SCURRY RAINBOW OIL LTD.

Classification by Rank.

Ash:	10.50%
Volatile Matter:	22.91%
Residual Moisture:	0.67%
Fixed Carbon:	65.92%
Sulphur:	2.13%
B.T.U./lb.:	13,440
Rank:	Medium volatile bituminous

T A B L E 2. SEAM #H-1

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	14.63	6.78	11,360	0.69
1 x 1/2"	18.26	1.56	13,430	0.65
1/2 x 1/4"	17.69	1.55	13,270	0.64
1/4" x 8 m.	16.30	1.24	13,900	0.68
8 x 20 m.	16.32	1.13	14,240	0.70
20 x 100 m.	13.70	1.11	14,270	0.63
- 100 m.	3.10	1.13	13,960	0.72
Total	100.00	2.13	13,440	0.67

T A B L E 3. SEAM #H-1

SCURRY RAINBOW OIL LTD.

Weight & Ash Distribution vs. Size and Specific Gravity.

(Figures in brackets show the Ash content of individual fractions.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	3.52 (3.32)	4.62 (6.56)	2.56 (10.76)	0.92 (18.63)	0.17 (30.89)	0.12 (45.20)	2.72 (65.76)	14.63 (18.88)
1 x 1/2"	6.38 (3.15)	5.26 (6.79)	3.21 (11.88)	1.44 (18.57)	0.36 (23.54)	0.22 (31.16)	1.39 (60.38)	18.26 (12.04)
1/2 x 1/4"	7.76 (3.27)	4.66 (6.25)	2.39 (12.28)	1.39 (19.78)	0.44 (29.53)	0.25 (44.24)	0.80 (66.71)	17.69 (10.67)
1/4" x 8 m.	8.93 (2.40)	3.64 (7.80)	1.70 (12.49)	1.04 (20.23)	0.34 (28.84)	0.18 (39.00)	0.47 (65.56)	16.30 (8.57)
8 x 20 m.	11.10 (2.23)	2.41 (7.95)	1.21 (12.80)	0.79 (19.48)	0.27 (28.97)	0.17 (42.63)	0.37 (66.00)	16.32 (7.00)
20 x 100 m.	9.89 (1.64)	1.63 (6.61)	0.81 (11.00)	0.62 (17.66)	0.22 (27.73)	0.17 (39.60)	0.36 (67.83)	13.70 (6.13)
Total	47.58 (2.51)	22.22 (6.90)	11.88 (11.84)	6.20 (19.15)	1.80 (28.02)	1.11 (39.94)	6.11 (64.78)	96.90 (10.55)
- 100 mesh	This fraction forms 3.10% of the total sample and has an ash content of 9.05%, thus giving a total sample ash value of 10.50%.							

T A B L E 4. SEAM #H-1

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in brackets give Volatile Matter.)

Size \ Sp.Gr.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
2 x 1"	3.52 (24.79)	4.62 (20.47)	2.56 (19.61)	0.92 (19.23)	0.17 (18.89)	0.12 (18.93)	2.72 (20.65)	14.63 (21.28)
1 x 1/2"	6.38 (24.59)	5.26 (21.61)	3.21 (19.91)	1.44 (19.45)	0.36 (18.99)	0.22 (19.55)	1.39 (19.45)	18.26 (21.94)
1/2 x 1/4"	7.76 (25.18)	4.66 (23.24)	2.39 (20.22)	1.39 (19.88)	0.44 (18.94)	0.25 (18.16)	0.80 (19.40)	17.69 (23.06)
1/4" x 8 m.	8.93 (25.70)	3.64 (22.10)	1.70 (20.42)	1.04 (19.84)	0.34 (18.98)	0.18 (18.96)	0.47 (17.44)	16.30 (23.51)
8 x 20 m.	11.10 (25.00)	2.41 (22.54)	1.21 (21.14)	0.79 (20.04)	0.27 (19.26)	0.17 (18.32)	0.37 (16.32)	16.32 (23.74)
20 x 100 m.	9.89 (25.05)	1.63 (22.77)	0.81 (21.29)	0.62 (20.87)	0.22 (19.77)	0.17 (19.05)	0.36 (15.65)	13.70 (23.96)
Total	47.58 (25.10)	22.22 (21.98)	11.88 (20.19)	6.20 (19.79)	1.80 (19.10)	1.11 (18.80)	6.11 (19.41)	96.90 (22.90)
- 100 mesh	This fraction forms 3.10% of the total sample and has a volatile matter content of 23.04%, thusgiving a total sample volatile matter content of 22.91%.							

T A B L E 5. SEAM #H-1

SCURRY RAINBOW OIL LTD.

Washability Data - 2" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
-1.30	45.30	2.74	45.30	2.74	100.00	11.28	9.9
1.30-1.35	24.75	6.93	70.05	4.22	54.70	18.36	6.2
1.35-1.40	13.30	11.90	83.35	5.45	29.95	27.81	2.3
1.40 - 1.50	6.71	19.32	90.06	6.48	16.65	40.51	2.2
1.50-1.60	1.90	28.07	91.96	6.93	9.94	54.82	1.2
1.60-1.80	1.13	40.01	93.09	7.33	8.04	61.14	1.5
+1.80	6.91	64.59	100.00	11.28	6.91	64.59	0.1
Total	100.00	11.28					

T A B L E 6. SEAM #H-1

Washability Data - 20 x 100 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
-1.30	72.19	1.64	72.19	1.64	100.00	6.14	9.8
1.30-1.35	11.90	6.61	84.09	2.34	27.81	17.82	8.8
1.35 - 1.40	5.91	11.00	90.00	2.91	15.91	26.21	3.2
1.40-1.50	4.52	17.66	94.52	3.62	10.00	35.20	2
1.50-1.60	1.61	27.73	96.13	4.02	5.48	49.66	1
1.60 - 1.80	1.24	39.60	97.37	4.47	3.87	58.78	1
+1.80	2.63	67.83	100.00	6.14	2.63	67.83	0.5
Total	100.00	6.14					

T A B L E 7. SEAM #H-1

SCURRY RAINBOW OIL LTD.

Free Swelling Index.

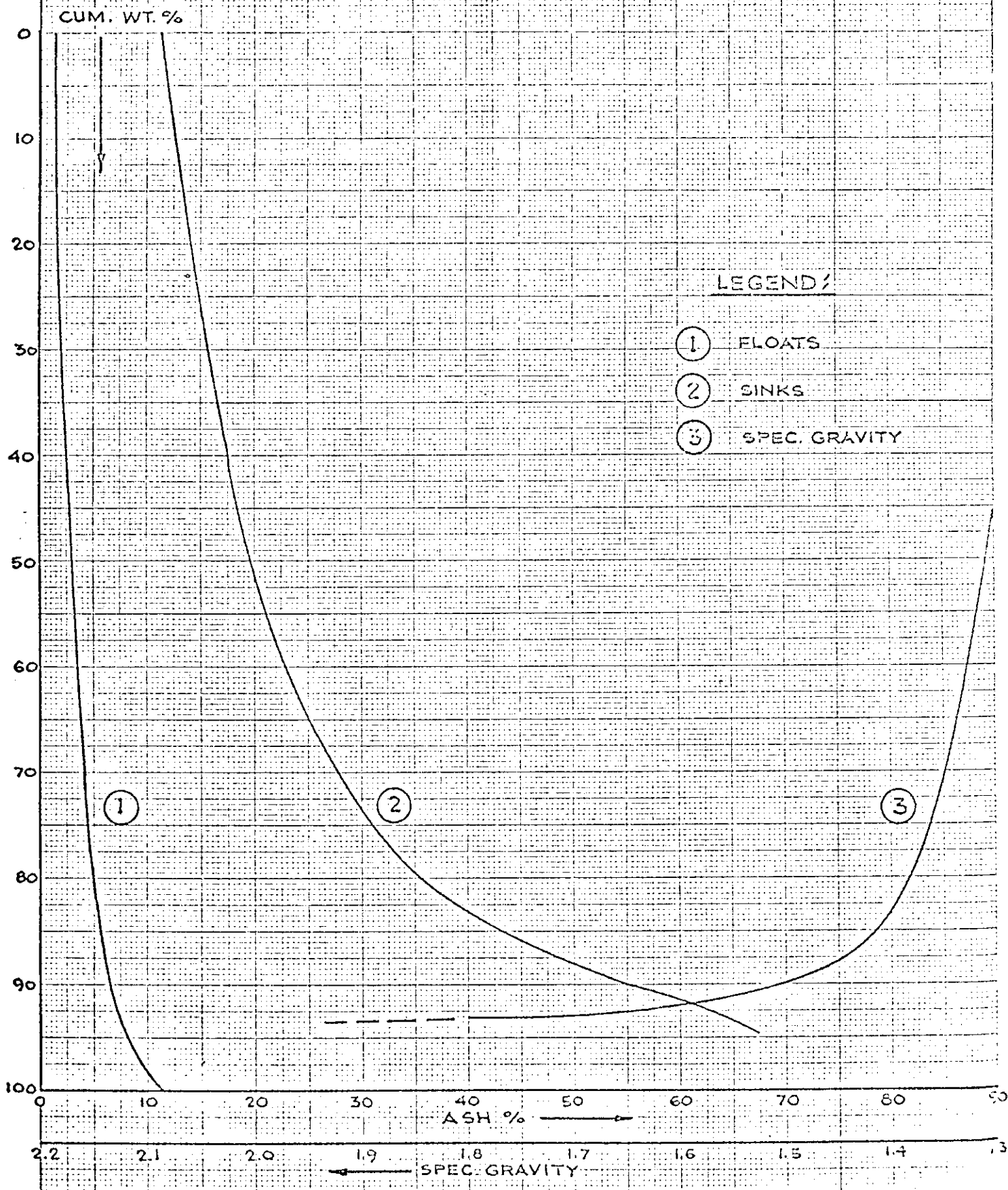
Size Sp.Gr.	2 x 1"	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	9½, 10, 10	10, 10, 10	9½, 10, 10	10, 10, 10	10, 10, 10	9½, 10, 10
1.30 - 1.35	2½, 3, 3	4½, 4½, 5	8½, 9, 9	8, 8, 8½	7½, 7½, 8	8½, 9, 9
1.35 - 1.40	1½, 1½, 1½	2, 2½, 2½	2, 2, 2	3, 3, 3½	3½, 3½, 3½	3, 3, 3½
1.40 - 1.50	2, 2, 2	1½, 1½, 2	2½, 2½, 2½	2½, 2½, 3	2, 2½, 2½	2, 2, 2
1.50 - 1.60	1½, 1½, 1½	1, 1, 1	1, 1, 1½	1½, 1½, 1½	1, 1, 1	1, 1, 1
1.60 - 1.80	2½, 2½, 2½	2½, 2½, 2½	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	N.A.	N.A.	½, ½, ½	½, ½, ½	½, ½, ½	½, ½, ½

NOTE: F.S.I. on - 100 mesh fraction is 9, 9, 9.

FIG. 1

SCURRY RAINBOW-SEAM #H-1

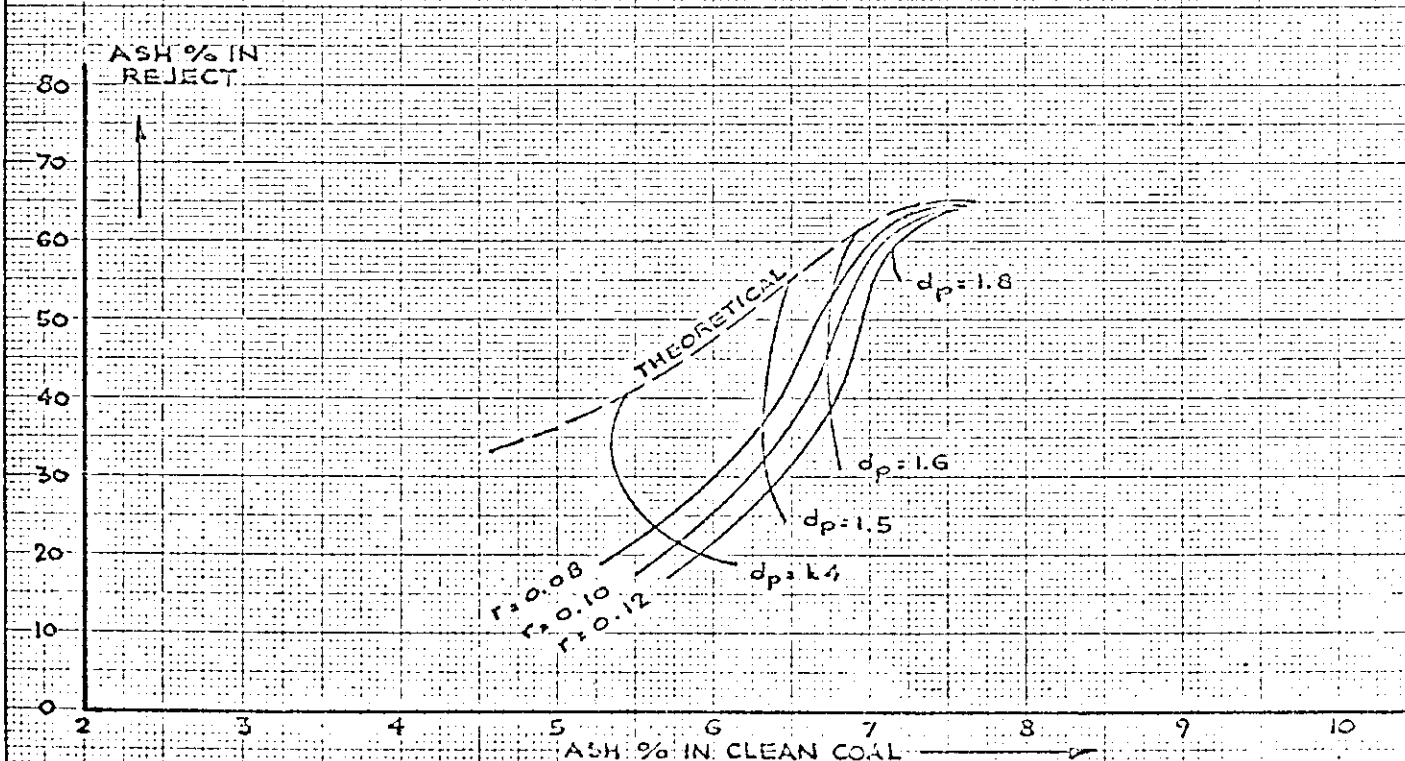
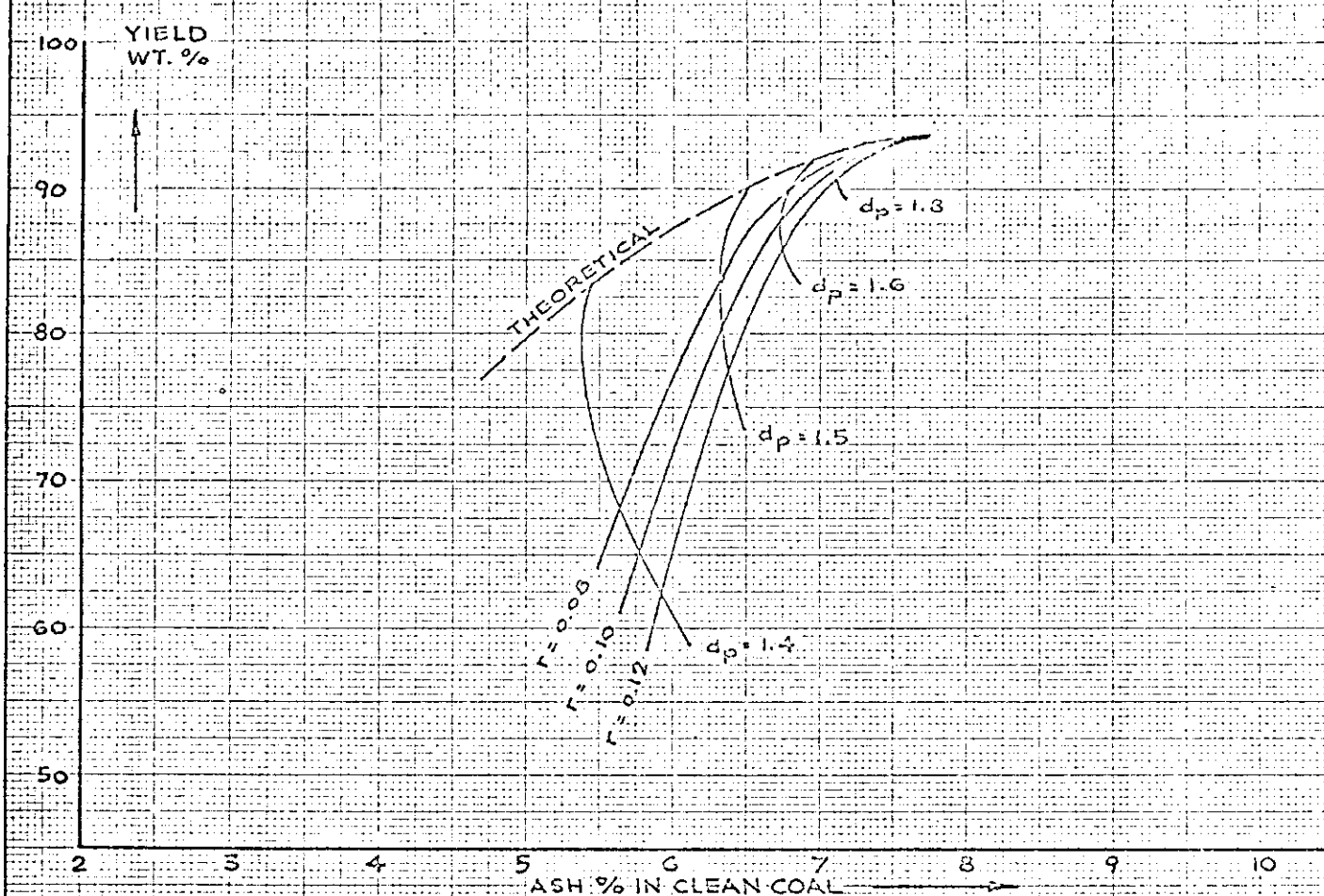
WASHABILITY CURVES FOR 2 INCH x 20 MESH



10 X 10 TO THE CENTIMETER 46 1512  
18 X 25 CM. KEUFFEL & ESSER CO.  
MADE IN U.S.A.

# FIG. 2 SCURRY RAINBOW - SEAM # H-1

PERFORMANCE EVALUATION CURVES FOR 2" x 20 m  
(ASH ON RAW 11.28%)



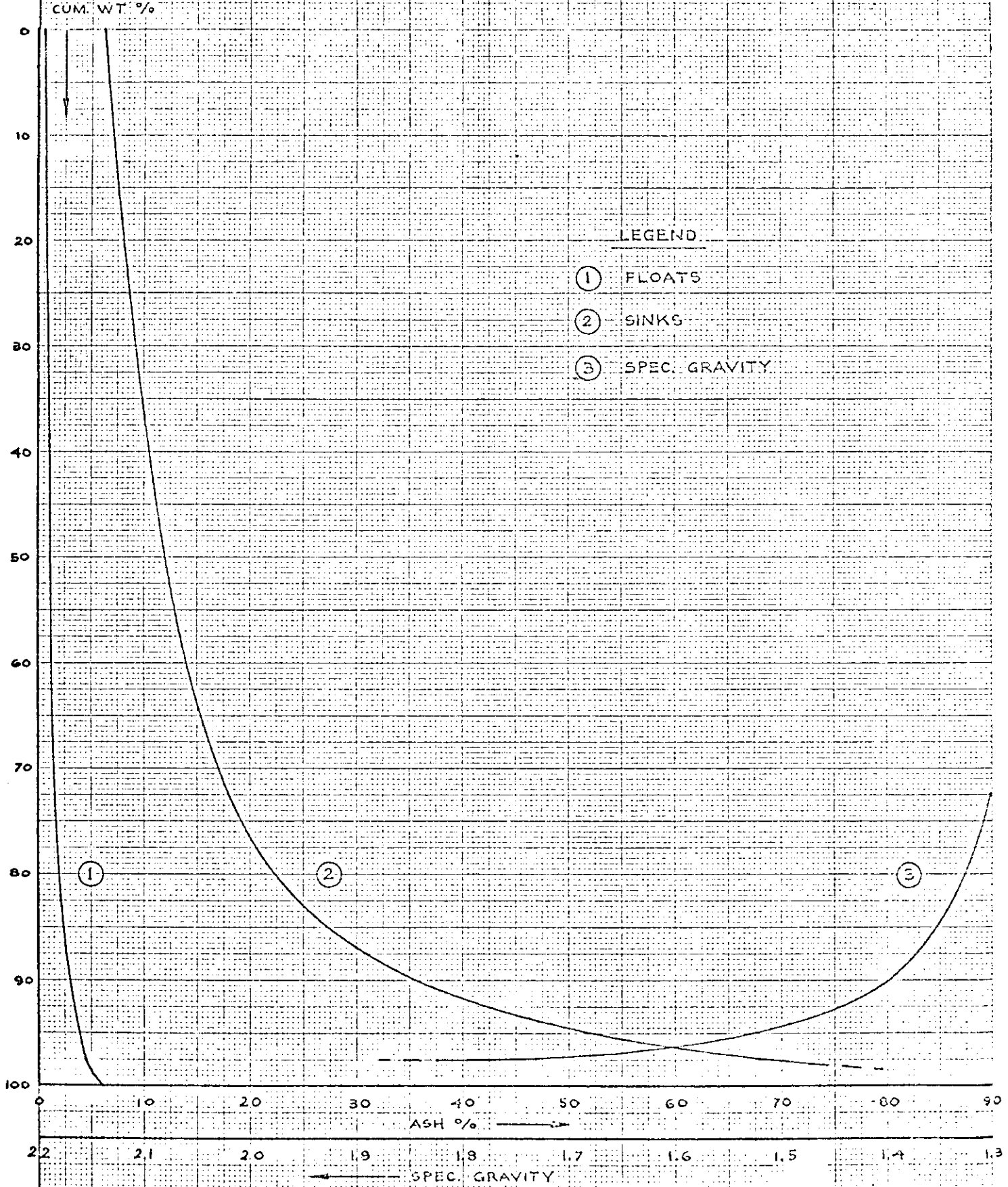
KE 10 X 10 TO THE CENTIMETER 45 IN. 12  
 MADE IN U.S.A.  
 KEUFFEL & ESSER CO.



FIG. 3

SCURRY RAINBOW SEAM<sup>3</sup> H.1

WASHABILITY CURVES FOR 20m. X 100m.

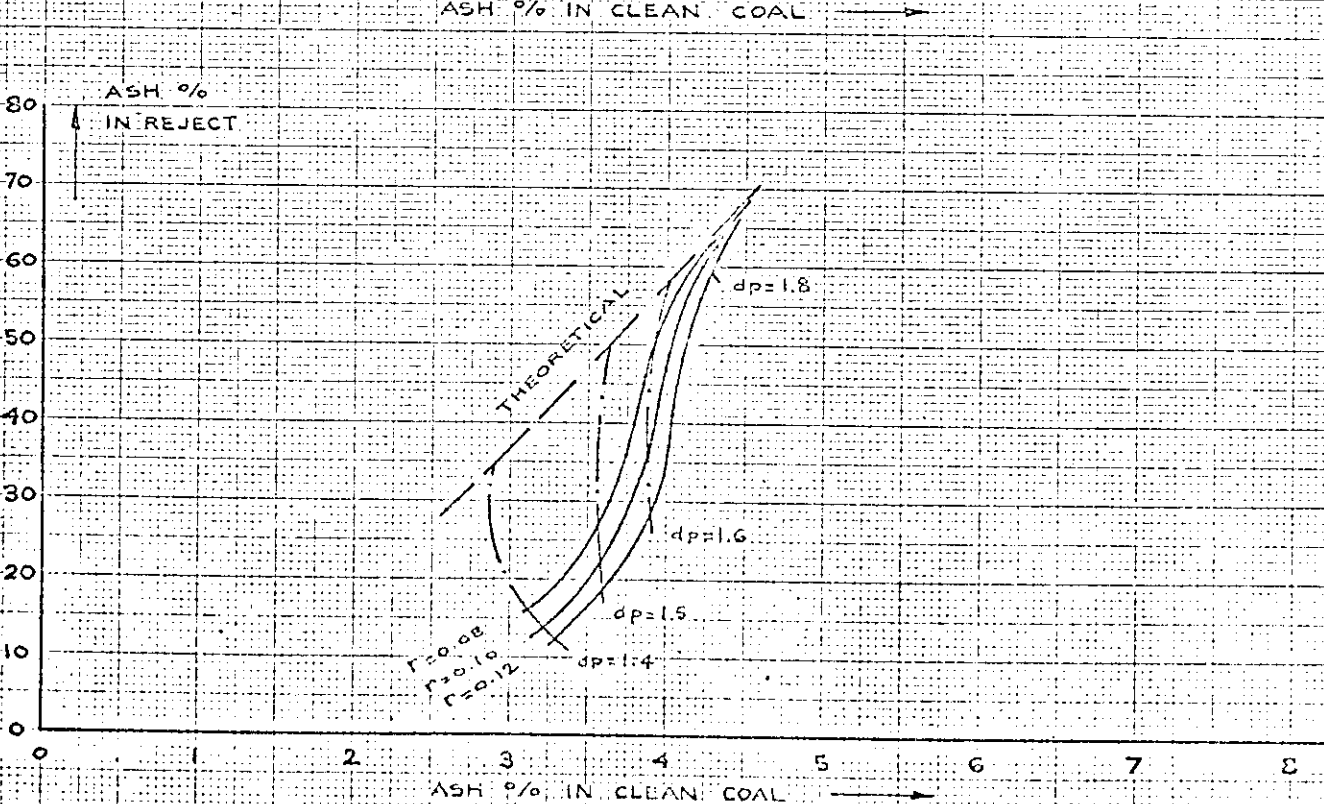
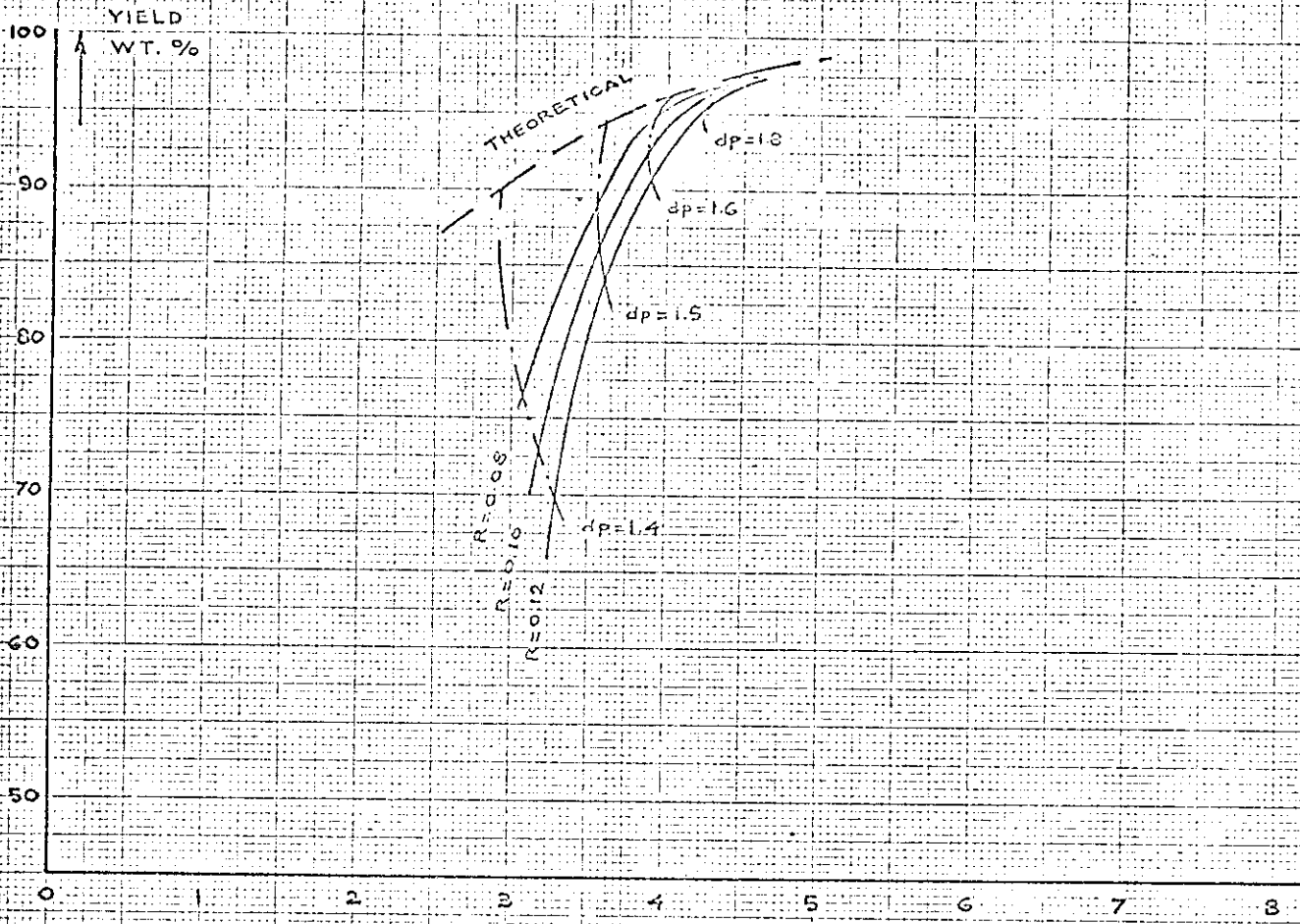


KE 10 X 10 TO THE CENTIMETER 46 1512  
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FIG. 4

SCURRY RAINBOW - SEAM H-1

PERFORMANCE EVALUATION CURVES FOR 20m. x 100m.  
(ASH ON RAW 6.14 %)



10 X 10 TO THE CENTIMETER 46 1512  
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REPORT ON  
CLEANING COKING COAL  
from the  
ELK RIVER PROJECT  
for  
SCURRY RAINBOW OIL LTD.  
Adit #10. SEAM #H-2.

Submitted by  
CYCLONE ENGINEERING SALES LTD.  
Edmonton - Alberta - Canada

Report No.: RI-69-07.i

Job No.: S1 - 58

Dated: December 24, 1969

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4. Performance Evaluation Curves on 20 x 100 mesh.	

SUMMARY

The data presented in this report refers to coal from Seam #H-2.

The sample did not contain sufficient material of the 2" x 1" fraction to qualify this fraction as representative. A total weight of 650 lbs. is the A.S.T.M. requirement.

The coal is of a medium volatile bituminous rank with a low ash content (11.83%) and a higher than normal sulphur content (0.99%).

Coking properties are very good and the washability shows that this coal is very easy to clean for ash.

This coal can be qualified as an excellent coal depending on the cleaning characteristics for sulphur reduction.

T A B L E 1. SEAM #H-2.

SCURRY RAINBOW OIL LTD.

Classification by Rank.

Ash:	11.83%
Volatile Matter:	23.73%
Residual Moisture:	0.67%
Fixed Carbon:	63.77%
Sulphur:	0.99%
B.T.U./lb.:	12,860
Rank:	Medium volatile bituminous

T A B L E 2. SEAM #H-2.

Size Analysis - Sulphur, B.T.U. and Residual Moisture.

Size	Weight %	Sulphur %	B.T.U./lb.	R.M. %
2 x 1"	6.23	1.62	13,680	0.71
1 x 1/2"	16.58	1.25	13,750	0.68
1/2 x 1/4"	14.68	0.86	13,070	0.73
1/4" x 8 m.	13.51	0.93	12,840	0.63
8 x 20 m.	17.35	0.95	12,280	0.67
20 x 100 m.	22.87	0.84	12,400	0.62
- 100 m.	8.78	0.87	12,650	0.69
Total	100.00	0.99	12,860	0.67

T A B L E 3. SEAM #H-2.

SCURRY RAINBOW OIL LTD.

Weight and Ash Distribution vs. Size and Specific Gravity.

(Figures in brackets show the Ash content of individual fractions.)

Size \ SP. GR.								Total
	1.30	1.35	1.40	1.50	1.60	1.80		
1 x 1/2"	11.76 (2.36)	2.96 (5.65)	0.59 (11.06)	0.30 (19.08)	0.27 (30.47)	0.07 (42.07)	0.63 (76.97)	16.58 (7.01)
1/2 x 1/4"	9.92 (2.92)	2.50 (5.99)	0.73 (12.53)	0.46 (18.03)	0.17 (29.02)	0.20 (48.29)	0.70 (76.62)	14.68 (8.82)
1/4" x 8 m.	7.99 (2.34)	2.01 (6.43)	1.16 (10.30)	0.70 (19.54)	0.29 (29.14)	0.22 (41.47)	1.05 (74.40)	13.51 (11.45)
8 x 20 m.	9.77 (2.21)	2.29 (7.10)	1.41 (11.38)	1.36 (20.44)	0.57 (29.14)	0.44 (41.91)	1.51 (74.01)	17.35 (13.17)
20 x 100 m.	8.40 (1.58)	4.72 (2.93)	3.30 (7.29)	1.83 (18.04)	0.97 (28.01)	0.83 (40.45)	2.82 (71.51)	22.87 (15.15)
Total	47.84 (2.30)	14.48 (5.15)	7.19 (9.42)	4.74 (19.04)	2.27 (28.80)	1.76 (41.89)	6.71 (73.57)	84.99 (11.47)
2" x 1"	This fraction forms 6.23% of the total sample and has an ash content of 10.31%.							
- 100 mesh	This fraction forms 8.78% of the total sample and has an ash content of 16.45%, thus giving a total sample ash value of 11.83%.							

T A B L E 4. SEAM #H-2.

SCURRY RAINBOW OIL LTD.

Weight % and Volatile Matter % vs. Size and Specific Gravity.

(Figures in brackets give Volatile Matter.)

Sp.Gr. Size	1.30	1.35	1.40	1.50	1.60	1.80	Total	
1 x 1/2"	11.76 (25.95)	2.96 (22.95)	0.59 (21.59)	0.30 (21.65)	0.27 (20.67)	0.07 (21.11)	0.63 (12.35)	16.58 (24.55)
1/2 x 1/4"	9.92 (24.98)	2.50 (21.84)	0.73 (21.64)	0.46 (21.40)	0.17 (21.04)	0.20 (16.60)	0.70 (11.78)	14.68 (23.37)
1/4" x 8 m.	7.99 (25.60)	2.01 (22.14)	1.16 (21.94)	0.70 (21.46)	0.29 (19.34)	0.22 (16.96)	1.05 (13.06)	13.51 (23.27)
8 x 20 m.	9.77 (26.40)	2.29 (22.16)	1.41 (21.90)	1.36 (21.50)	0.57 (19.96)	0.44 (18.06)	1.51 (14.92)	17.35 (23.66)
20 x 100 m.	8.40 (25.80)	4.72 (25.50)	3.30 (24.70)	1.83 (22.16)	0.97 (20.92)	0.83 (18.38)	2.82 (18.70)	22.87 (23.93)
Total	47.84 (25.75)	14.48 (23.35)	7.19 (23.14)	4.74 (21.74)	2.27 (20.45)	1.76 (17.99)	6.71 (15.64)	84.99 (23.79)
2" x 1"	This fraction forms 6.23% of the total sample and has an ash content of 24.65%.							
- 100 mesh	This fraction forms 8.78% of the total sample and has a volatile matter content of 22.49%, thus giving a total sample volatile matter value of 23.73%.							



T A B L E 5. SEAM #H-2.

SCURRY RAINBOW OIL LTD.

Washability Data - 1" x 20 mesh.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	63.49	2.46	63.49	2.46	100.00	10.13	10
1.30 - 1.35	15.71	6.24	79.20	3.21	36.51	23.46	5.8
1.35 - 1.40	6.26	11.23	85.46	3.80	20.80	36.47	4
1.40 - 1.50	4.69	19.67	90.15	4.62	14.54	47.34	4.5
1.50 - 1.60	2.09	29.40	92.24	5.18	9.85	60.52	2.5
1.60 - 1.80	1.50	43.19	93.74	5.79	7.76	68.90	1
+ 1.80	6.26	75.06	100.00	10.13	6.26	75.06	N.A.
Total	100.00	10.13					

T A B L E 6. SEAM #H-2.

Washability Data - 20 x 100 m.

Specific Gravity Fraction	Fractional		Cumulative				F.S.I.
	Wt. %	Ash %	Floats		Sinks		
			Wt. %	Ash %	Wt. %	Ash %	
- 1.30	36.73	1.58	36.73	1.58	100.00	15.26	10
1.30 - 1.35	20.64	2.93	57.37	2.07	63.27	23.20	10
1.35 - 1.40	14.43	8.00	71.80	3.26	42.63	33.01	8
1.40 - 1.50	8.00	18.04	79.80	4.74	28.20	45.80	5.17
1.50 - 1.60	4.24	28.01	84.04	5.91	20.20	56.80	2.5
1.60 - 1.80	3.63	40.45	87.67	7.34	15.96	64.45	1
+ 1.80	12.33	71.51	100.00	15.26	12.33	71.51	N.A.
Total	100.00	15.26					

T A B L E 7. SEAM #H-2.

SCURRY RAINBOW OIL LTD.

Free Swelling Index

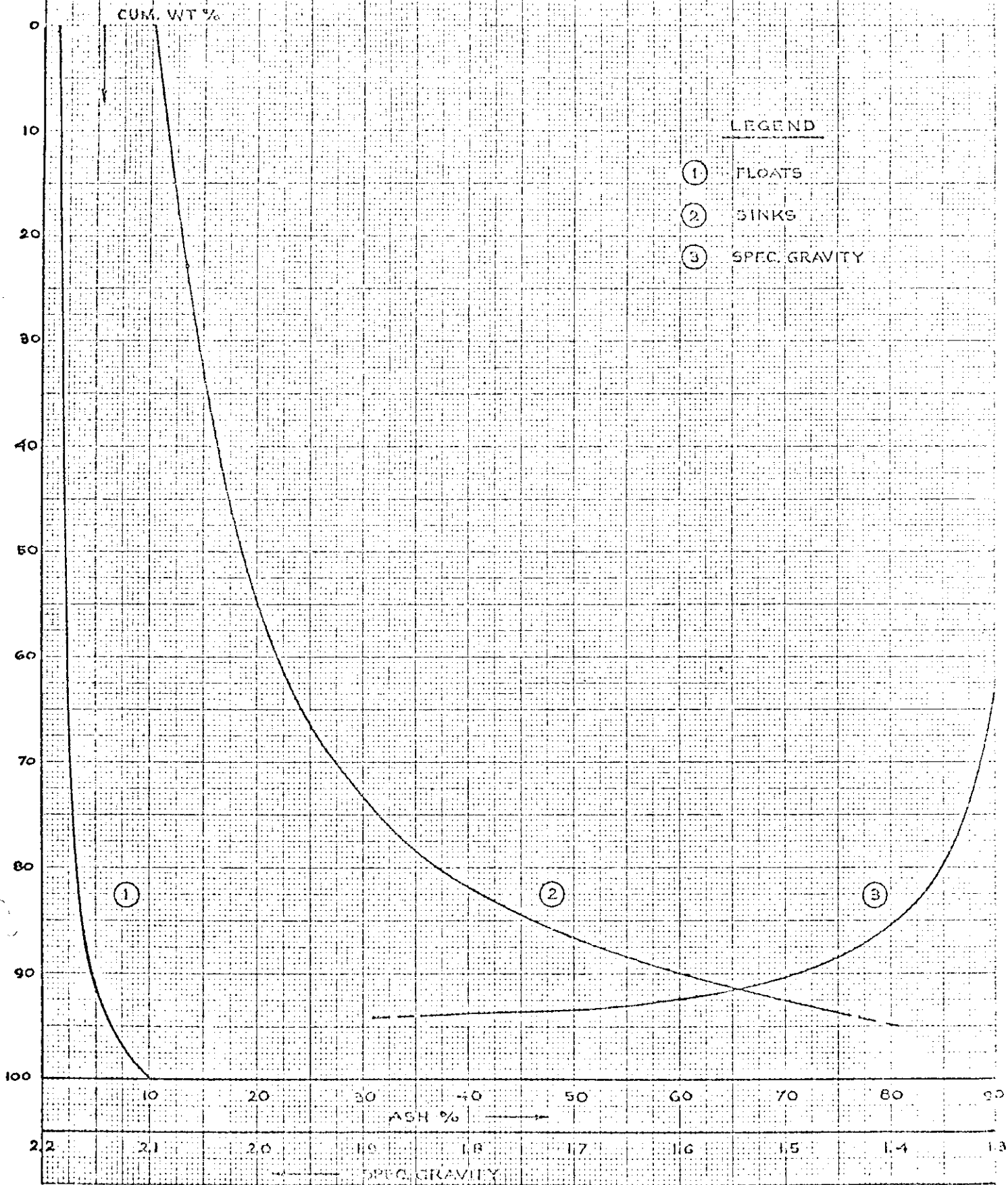
Sp.Gr. \ Size	1 x 1/2"	1/2 x 1/4"	1/4" x 8 m.	8 x 20 m.	20 x 100 m.
- 1.30	10, 10, 10	10, 10, 10	10, 10, 10	10, 10, 10	10, 10, 10
1.30 - 1.35	6½, 7, 7	3½, 3½, 4	4½, 5, 5	7½, 7½, 7½	10, 10, 10
1.35 - 1.40	6, 6, 6	3, 3, 3	3½, 3½, 3½	4, 4, 4	8, 8, 8
1.40 - 1.50	4, 4, 4½	5, 5, 5	4, 4, 4½	4½, 4½, 5	5, 5, 5½
1.50 - 1.60	3, 3½, 3½	2, 2, 2	1½, 1½, 1½	3, 2½, 2½	2½, 2½, 2½
1.60 - 1.80	1½, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1	1, 1, 1
+ 1.80	N.A.	N.A.	N.A.	N.A.	N.A.

NOTE: F.S.I. on: 2" x 1" is 9½, 9, 9½.

- 100 mesh is 8½, 8, 8.

# FIG. 1 SCURRY RAINBOW SEAM # H-2

## WASHABILITY CURVES FOR 1" x 20 in.



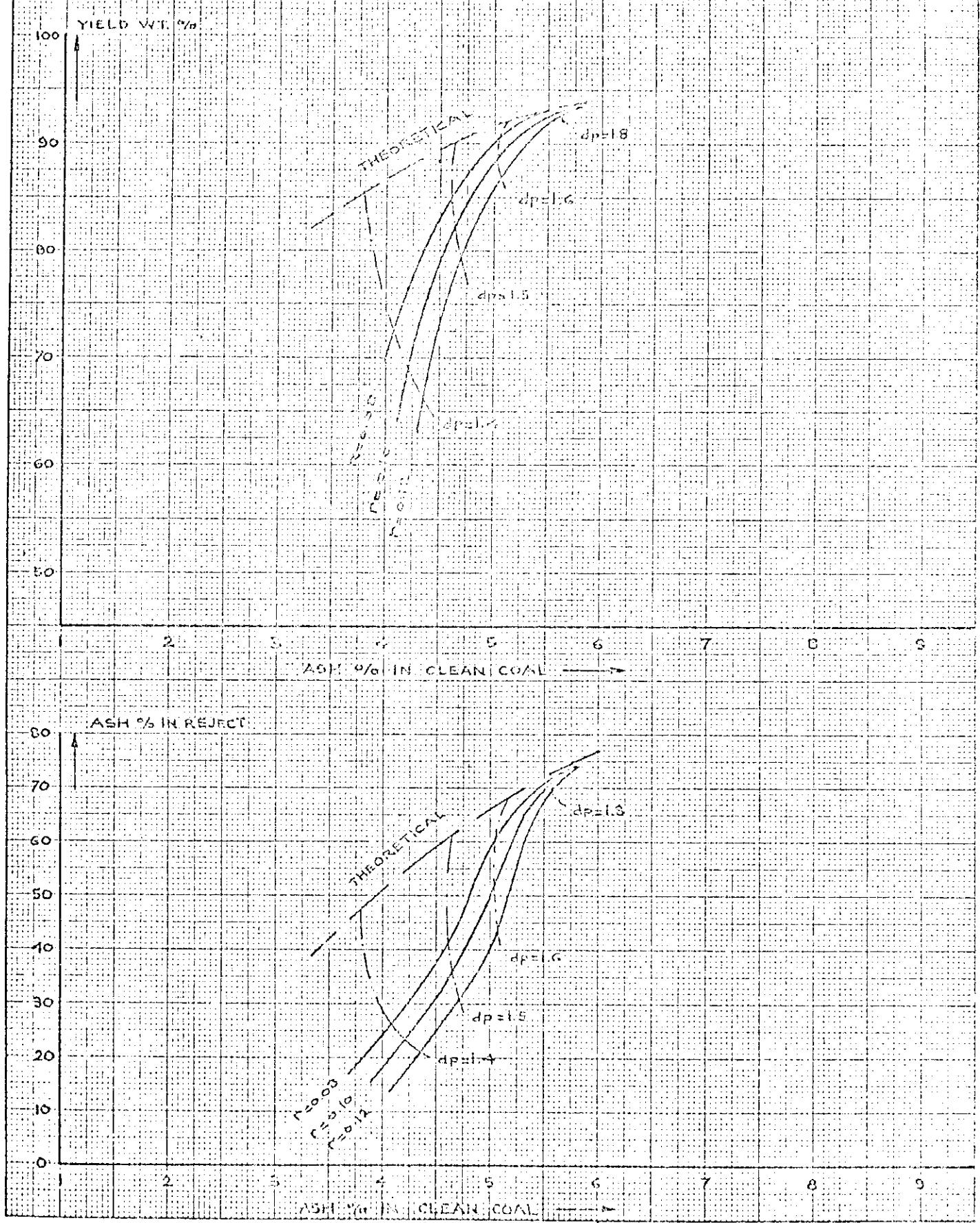
KE 10 X 10 TO THE CENTIMETER 46 1512  
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LAMAN

CYCLONE ENGINEERING GALLS LTD.  
 EDMONTON ALBERTA CANADA

# FIG. 2 SCURRY RAINBOW SEAM<sup>3</sup> H-2

PERFORMANCE EVALUATION CURVES FOR 1" x 20 m.  
(ASH ON RAW 10.13 %)



KE 10 X 10 TO THE CENTIMETER 46 1512  
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DEC. 23 /'69

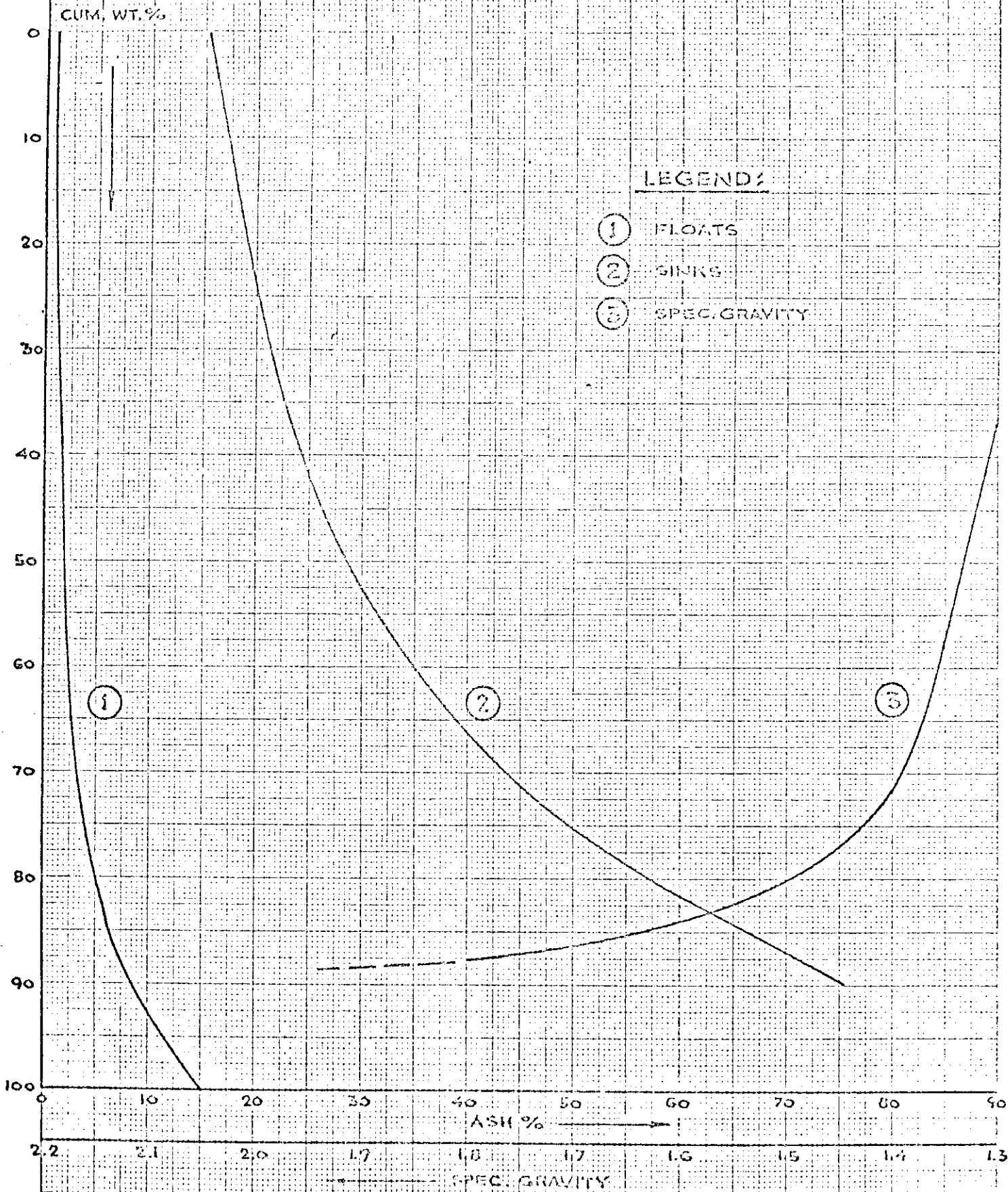
LAMAN

CYCLONE ENGINEERING SALES LTD.  
EDMONTON ALBERTA CANADA

FIG. 3

SCURRY RAINBOW - SEAM # H-2

WASHABILITY CURVES FOR 20 m x 100 m



LEGEND:

- (1) FLOATS
- (2) SINKS
- (3) SPEC. GRAVITY

KE 10 X 10 TO THE CENTIMETER 46 1512  
10 X 25 CM. MADE IN U.S.A.  
KEUFFEL & ESSER CO.

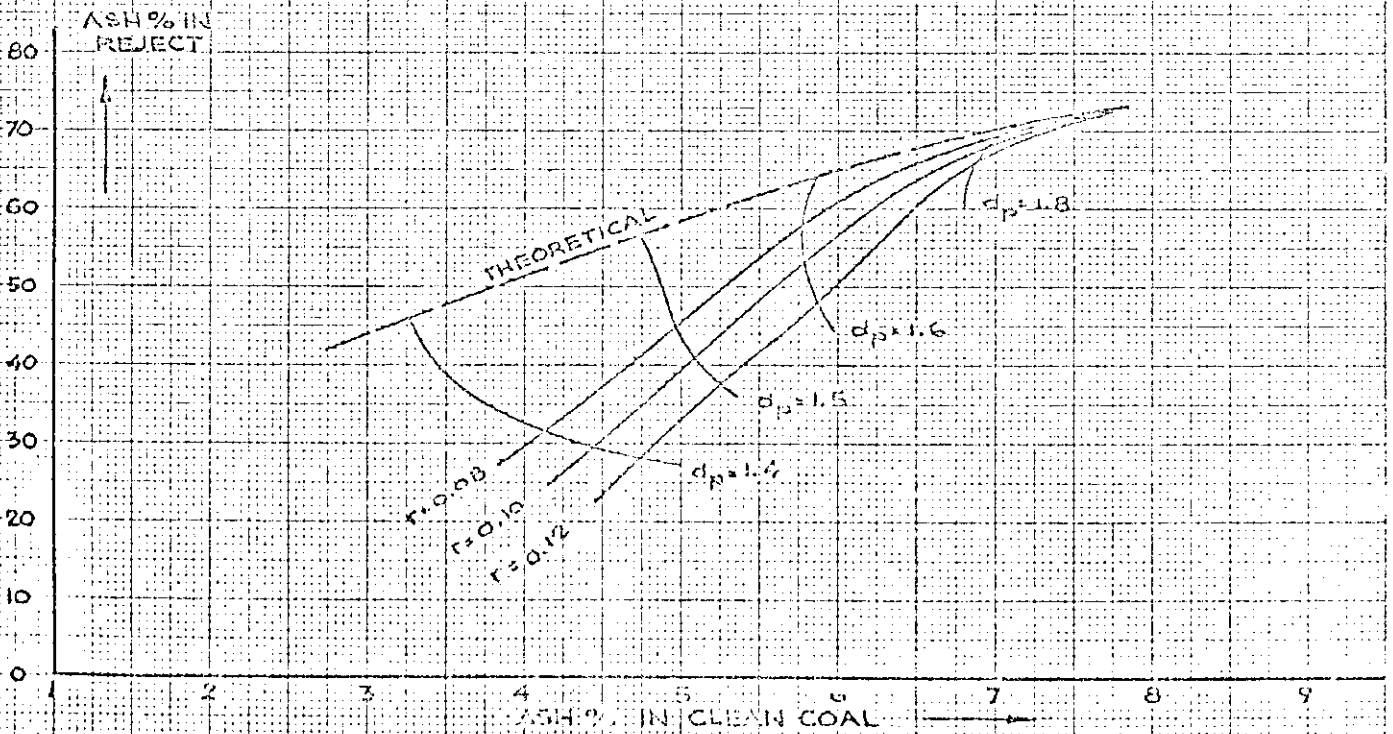
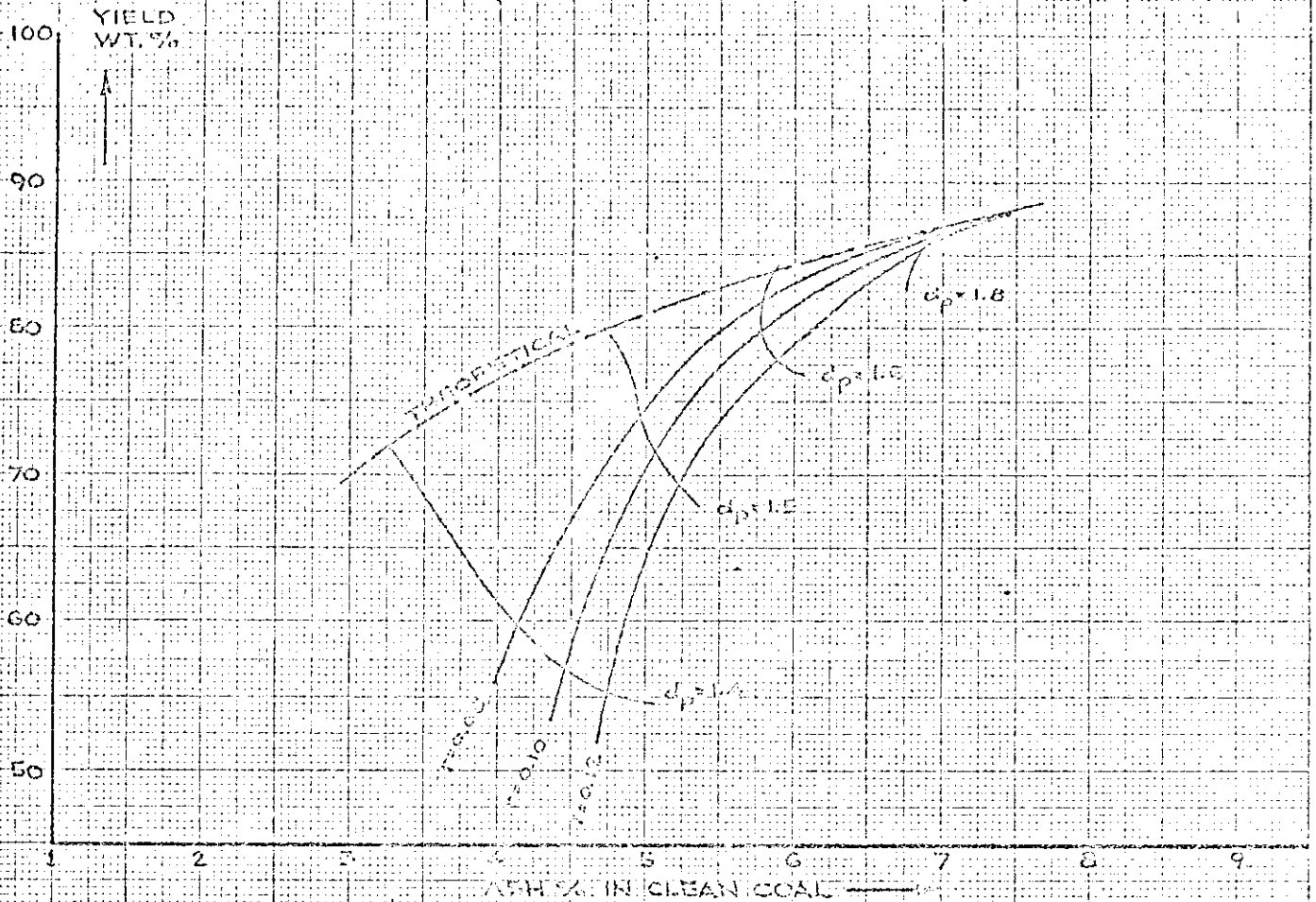
DEC. 23./69 H.SCH.

CYCLONE ENGINEERING SALLS LTD.  
EDMONTON ALBERTA CANADA

FIG. 4

SCURRY RAINBOW-SEAM # H-2

PERFORMANCE EVALUATION CURVES FOR 20m x 100m  
(ASH ON RAW 15.26%)



KE 10 X 10 TO THE CENTIMETER 46 1512  
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