

GENERAL INFORMATION

Conversion Factors

$$\begin{aligned} \text{Lb. MSCF} \times 16.91 &= \text{G/NCM} \\ \text{G/NCM} \times 0.05914 &= \text{Lb./MSCF} \end{aligned}$$

Definitions

$$\% \text{ C}_3 \text{ Selectivity} = \frac{\text{Total C}_3 + (\text{incl. W.S.Oxy.})}{\text{Total C}_1^+} \times 100$$

$$\text{W.S.Oxy Selectivity} = \frac{\text{W.S.Oxy.}}{\text{Total C}_1^+} \times 100$$

$$\text{Gravelocity} = \text{SCFH/lb. of Catalyst}$$

Brownsville Design Data

	<u>Lb./MSCF</u>	<u>G/NCM</u>	<u>Gal./MSCF</u>
C ₁ C ₂	2.05	34.6	
CO ₂	6.01	101.6	
H ₂ O	11.00	186.0	
C ₃ C ₆	2.66	44.9	0.54
<i>Rec. Oil</i>	6.02	101.8	0.94
W.S.Oxy.	0.94	15.8	0.11
Total C ₃ ⁺	9.62	162.5	1.59

$$\text{C}_3^+ \text{ Selectivity} = 82.4\% \quad \text{W.S.Oxy. Selectivity} = 8.1\%$$

Bbl./Day

Gasoline	6079
Gas Oil	947
Fuel Oil	198
W.S.Oxy.	<u>631</u>
	7855

COMPARISON OF METHODS
FOR EXPRESSING OXYGENATE YIELDS

(Values in grams/NCM)

<u>Sample</u>	<u>Method I</u>	<u>Method II</u>	<u>Method III</u>	
I	6.7	8.1	8.4	
II	8.2	11.0	10.3	
III	9.8	11.4	12.3	
IV	27.2	31.0	34.0	
V	21.5	23.7	26.9	
VI	16.2	19.8	20.2	
VII	19.4	24.2	24.2	33.1 Refractive Index
A	11.0	16.7	13.7	13.4)
B	17.8	24.3	22.3	21.5) Montebello

Standard - F.B. + RT

METHODS OF CALCULATING OXYGENATE YIELDS

Method I

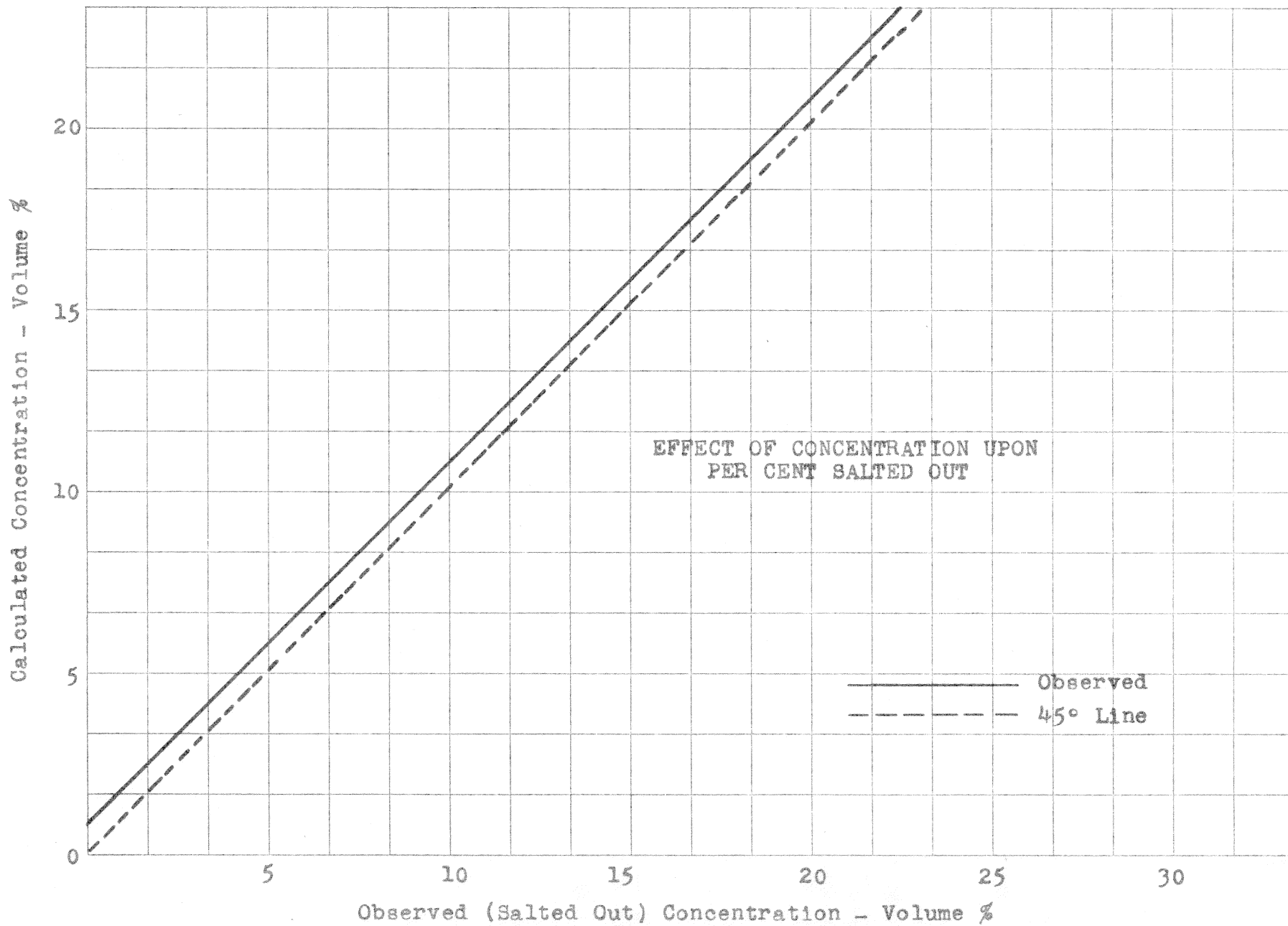
Assumed weighted density for ethanol-propanol mixture 0.80
 Vol. salted out/100 cc. solution x 0.80 = Wt. % Total Oxygenates
 Wt. % Oxygenates x Grams NCM Water Produced = Grams NCM
 Oxygenates

Method II

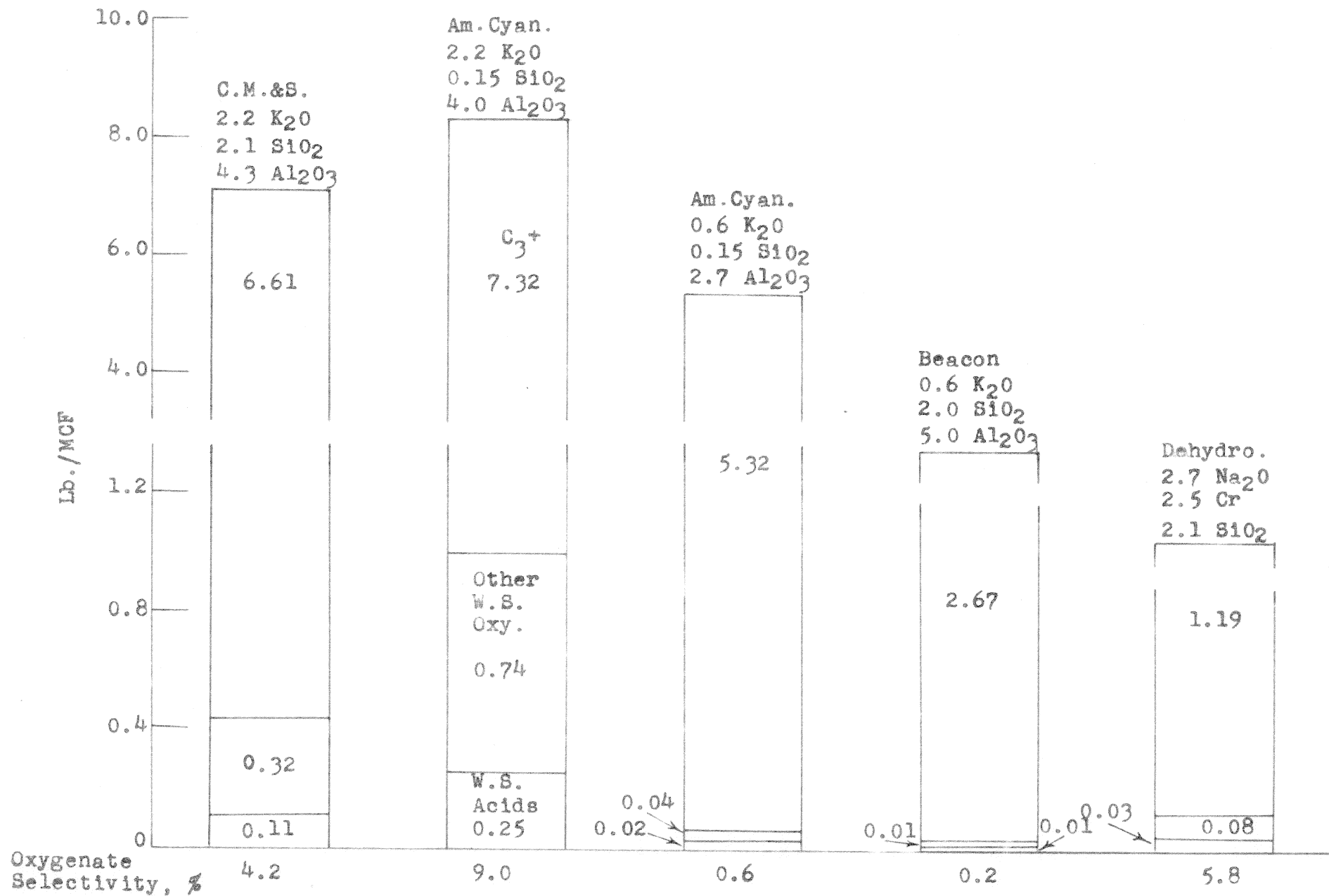
Assume (1) Avg. Density of Water Phase 0.995 g./cc.
 (2) Avg. Density of Oxygenates 0.85
 (3) 16% water in Salted-out Oxygenates
 Vol. of oxygenates salted out/100 cc. soln. x $\frac{0.850}{0.995}$ x 0.84 =
 Wt. % Oxygenates
 (Vol. % salted out x 0.72 + Wt. % acidity as acetic acid) x
 Grams/NCM Water Produced = Wt. of Oxygenates/NCM

Method III

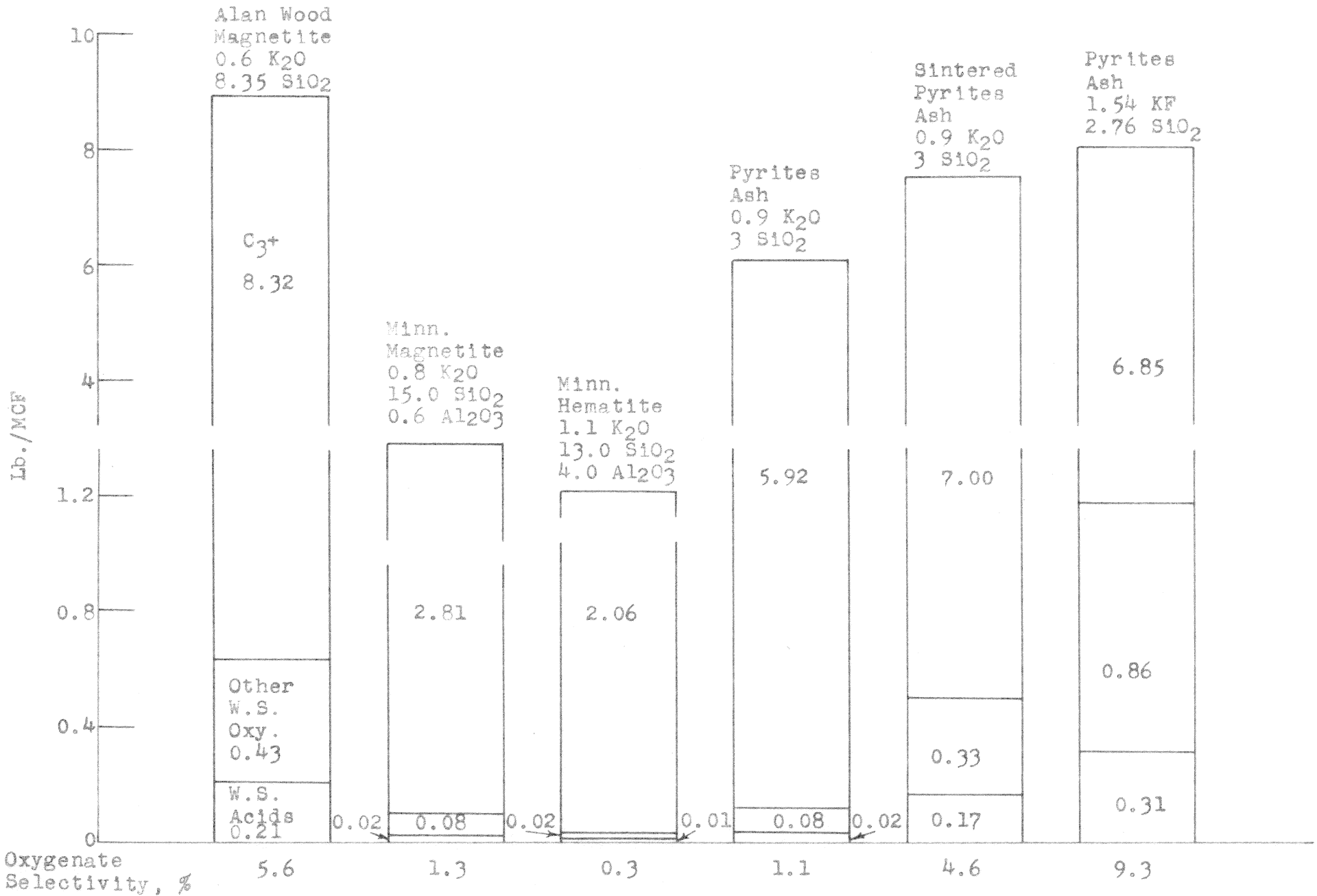
Vol. % salted out = Wt. % Total Oxygenates



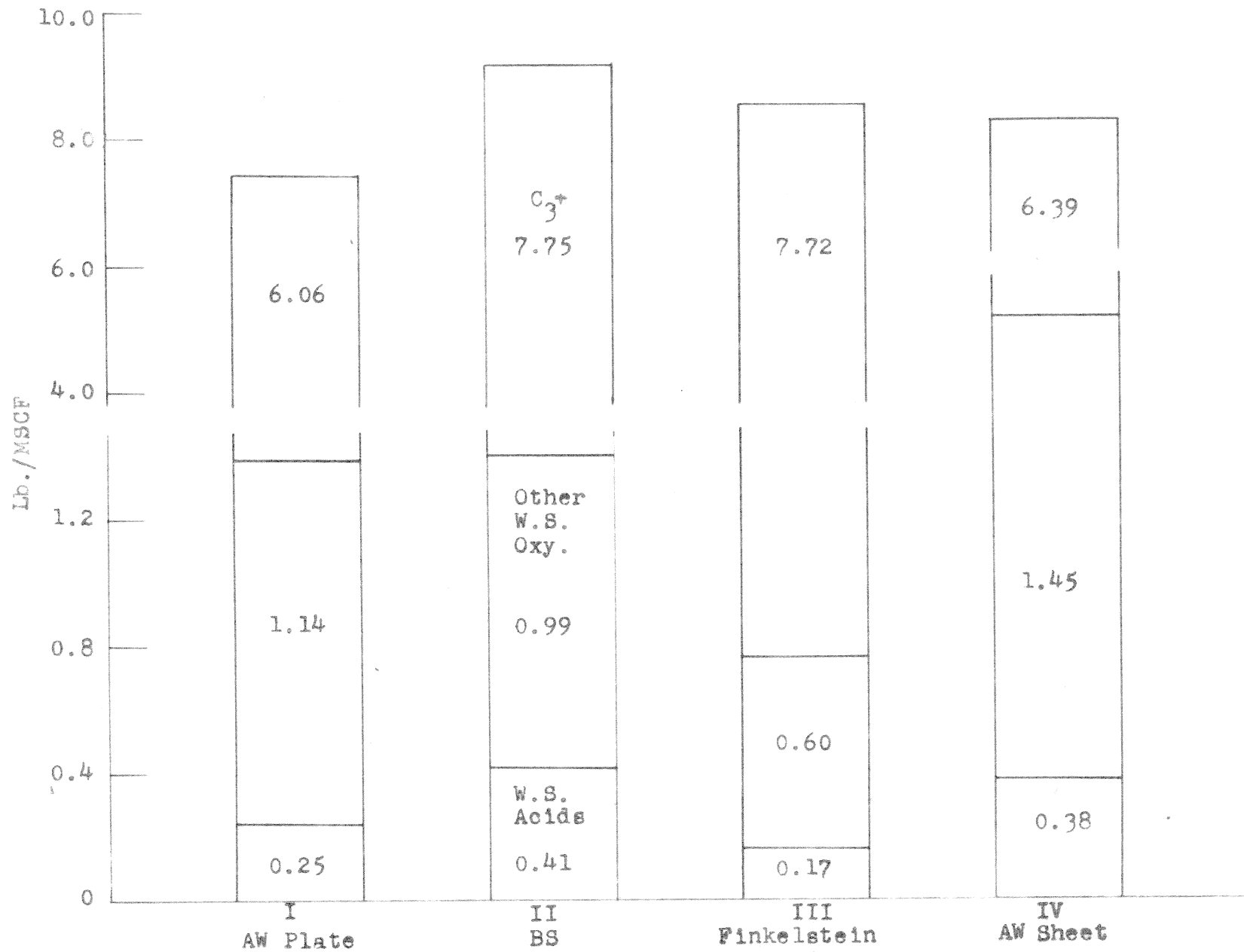
FUSED CATALYSTS
 650°F. - 200 psig - 2/1 H₂/CO - 2/1 RECYCLE



NATURAL ORES



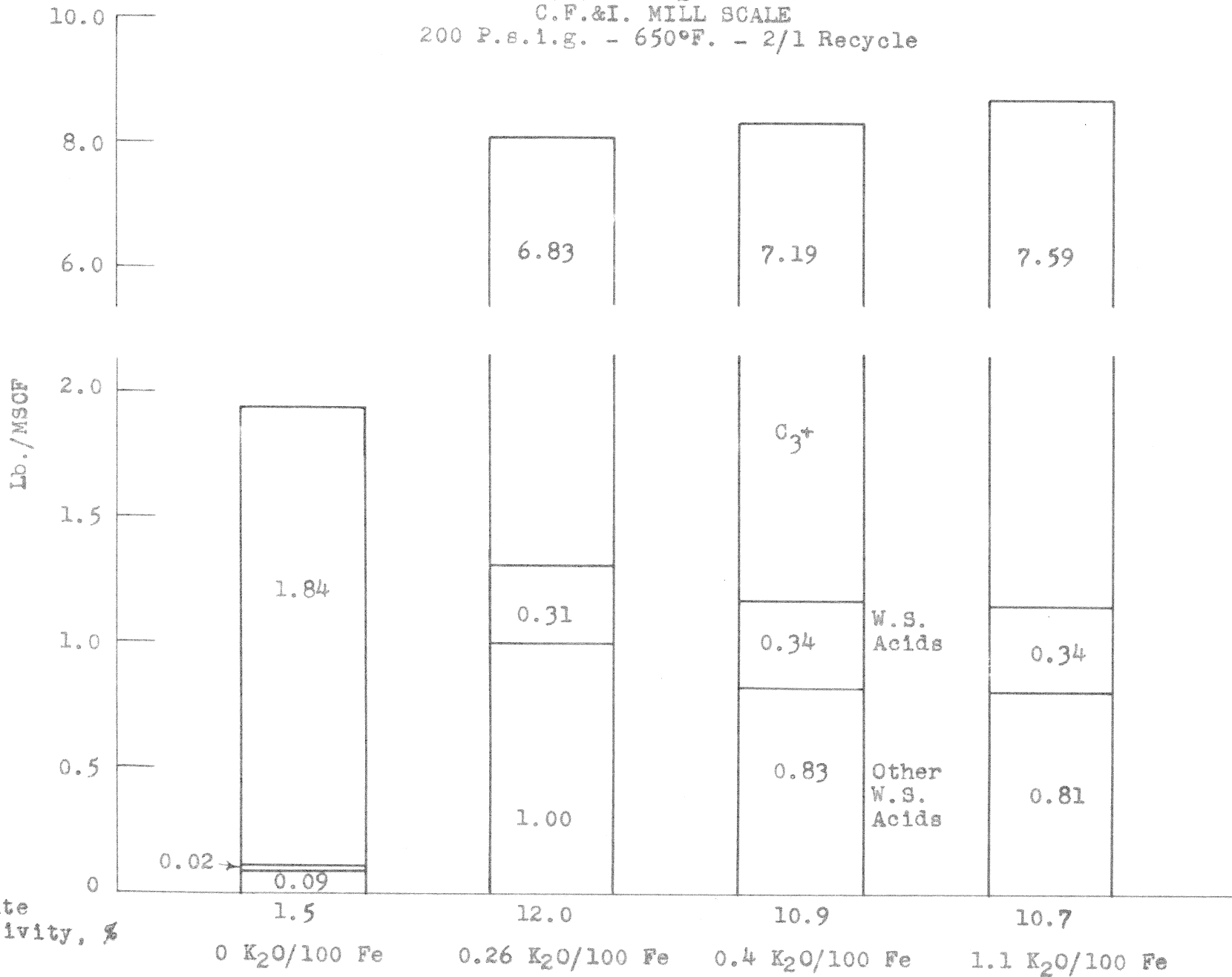
MILL SCALES WITH VARYING OXIDE CONTENTS



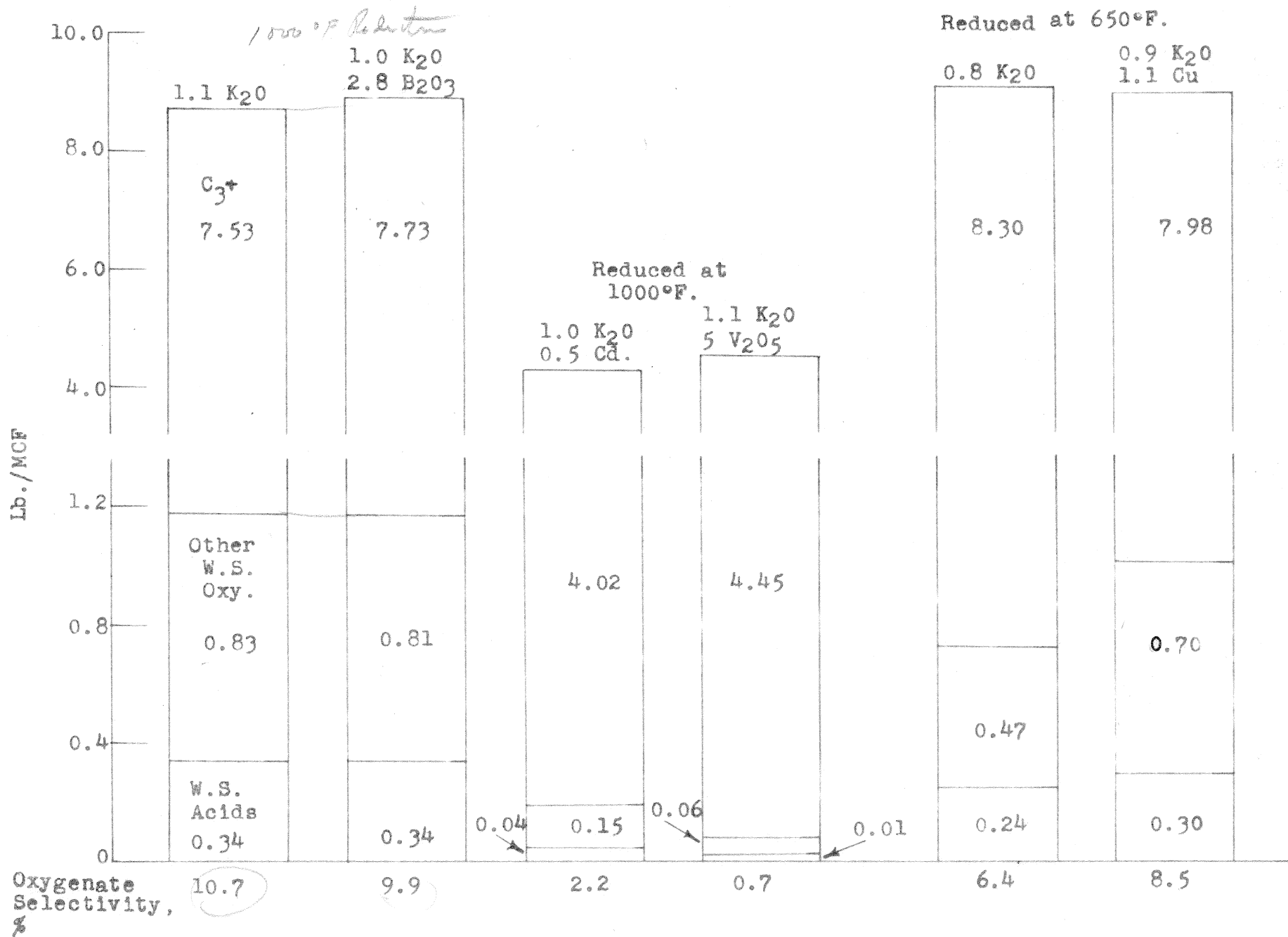
MILL SCALES WITH
VARYING OXIDE CONTENTS

<u>Source</u>	<u>I Alan Wood Plate</u>	<u>II Beth. Steel</u>	<u>III Finkel- stein Rail</u>	<u>IV Alan Wood Sheet</u>
FeO	75	65	60	40
Fe ₃ O ₄	20	30	30	50
Fe ₂ O ₃	5	5	10	10
K ₂ O	0.5	0.88	0.5	0.4
SiO ₂	1.5	0.3	5.5	0.4
Mn	2.3	0.6	1.1	0.4
% Oxy. in Total C ₃ ⁺	18.7	15.4	9.0	22.4
Oxy. Selectivity	14.1	12.2	6.9	17.0

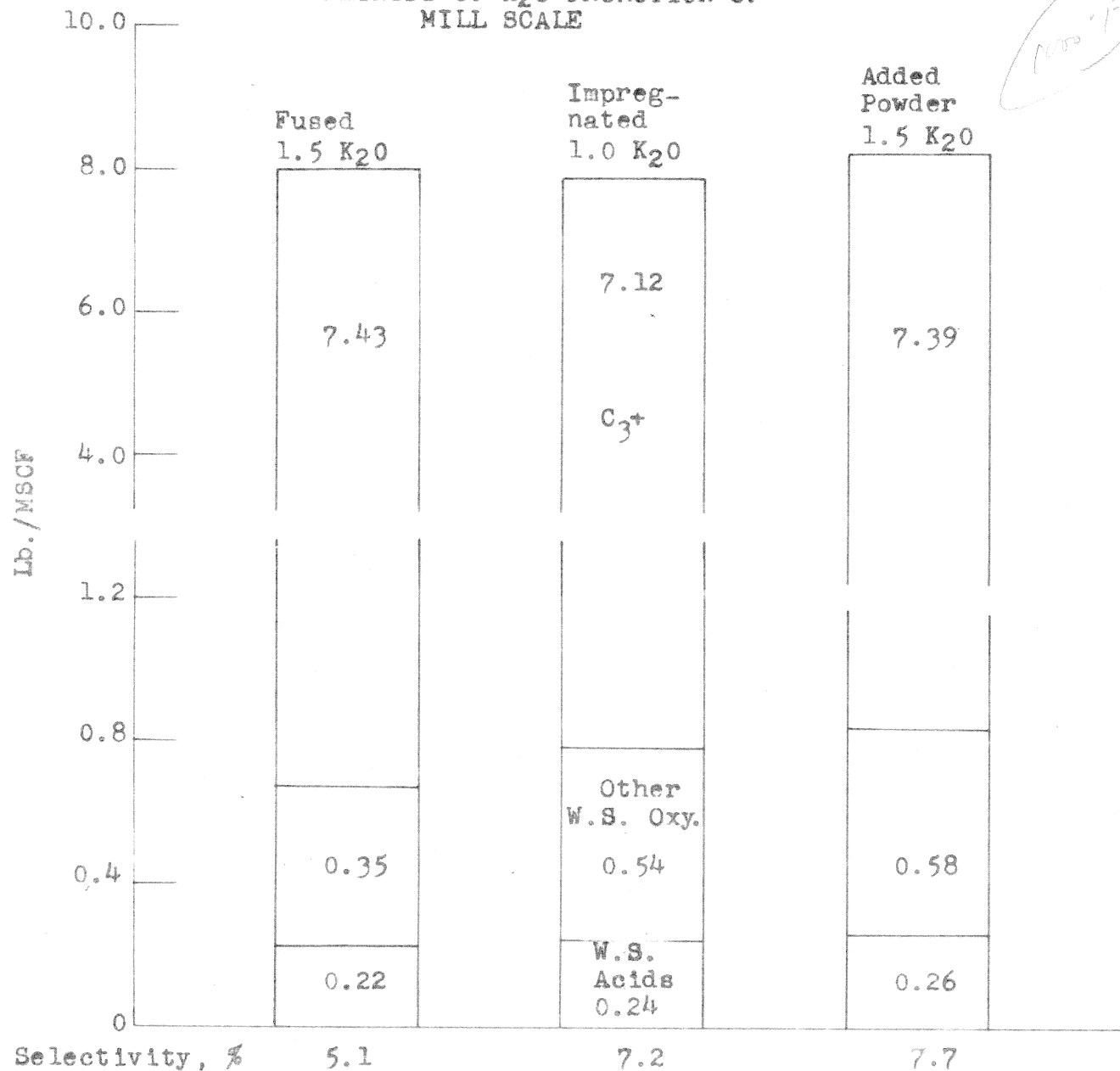
EFFECT OF K₂O CONTENT
 C.F.&I. MILL SCALE
 200 P.s.i.g. - 650°F. - 2/1 Recycle



PROMOTED C.F.&I. MILL SCALE



METHODS OF K₂O PROMOTION OF
MILL SCALE



EFFECT OF REDUCTION TEMPERATURE
UPON W.S. OXYGENATES

