APPENDIX G

MODEL DEVELOPMENT

I) Correlations for Wake Volume Ratio, K_o

$$K_o = \exp(a_{12} + b_{12}\, U_l) \qquad Ul_1 < U_l < Ul_2$$

$$K_o = \exp(a_{23} + b_{23}\, U_l) \qquad Ul_2 \leq U_l \leq Ul_3$$

Run	211	212	423
Fluid	Kerosene	Kerosene	Mineral Oil
Temperature, °F	80	71	175
% Fines	17.8	0	0
Ul_1, Ft/Sec	0.0001	0.0001	0.0001
Ul_2, "	0.5000	0.5000	0.1496
Ul_3, "	0.5001	0.5001	0.5000
a_{12}, Sec/Ft	-0.03074	0.5441	0.13995
b_{12}, "	8.55736	0.0	6.56681
a_{23}, "	--	--	1.28003
b_{23}, "	--	--	-1.05323

II) Correlation of Bubble Terminal Velocity

Define $\Delta = U_g - U_l$.

$$Ut_B = a_{12} + b_{12}\,\Delta \qquad \Delta_1 \leq \Delta \leq \Delta_2$$

$$= a_{23} + b_{23}\,\Delta \qquad \Delta_2 \leq \Delta \leq \Delta_3$$

$$= a_{34} + b_{34}\,\Delta \qquad \Delta_3 \leq \Delta \leq \Delta_4$$

Run	211	212	423
Fluid	Kerosene	Kerosene	Mineral Oil
Temperature, °F	80	71	175
% Fines	17.8	0	0
Δ_1, Ft/Sec	-99	-99	-99
Δ_2, "	-0.0476	-0.02190	-0.04280
Δ_3, "	0.1254	100	0.00534
Δ_4, "	100	--	100
a_{12}	0.259	0.24652	0.10885
b_{12}	0	-1.45387	-2.54940
a_{23}	0.6005	0.26270	0.27151
b_{23}	7.1713	-0.71516	1.25074
a_{34}	1.50	--	0.25183
b_{34}	0	--	4.93799

III) Correlation of X_k Relative Solids Holdup in Wake

$$X_k = 1 - \frac{1}{(a + b\ U_{tB})} \qquad \text{if } U_l \geq U_l^*$$

$$X_k = 1 - 0.877\ \frac{U_t}{\frac{U_g}{\epsilon_g} - \frac{U_l}{\epsilon_l}} \qquad \text{using predicted } \epsilon_g, \epsilon_l; \text{ if } U_l \leq U_l^*$$

Run	211	212	423
Fluid	Kerosene	Kerosene	Mineral Oil
Temperature, °F	80	71	175
% Fines	17.8	0	0
U_l^*, Ft/Sec	0.135	100	0.095
a	0.5038	--	0.36174
b, Sec/Ft	2.582	--	2.83710

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