NOTICE

CERTAIN DATA CONTAINED IN THIS DOCUMENT MAY BE DIFFICULT TO READ IN MICROFICHE PRODUCTS.

[redacted]

- 1 -

RECORD

HW--17986-RD

DE92 011862

1. R. H. Beaton
2. R. B. Richards
3. A. R. Maguire
4. V. R. Cooper
5. F. W. Woodfield
6. G C. Oberg
7. E. F. Warren
8. R. E. Smith
9. J. T. Stringer
10. M. K. Harmon
11. J. G. Bradley
12. E. Doud
13. W. S. Figg
14. E. T. Merrill
15-18. (Extra)

COPY 1 OF [redacted]

[redacted]

Classification Cancelled And Changed To
DECLASSIFIED
By Authority of CA Bauman
2-13-92 CG-PR-2
by DD Bush 2-24-92
Verified By H Burstive, 2-24-92

June 2, 1950

TO: F. W. Woodfield

FROM: E. T. Merrill & W. S. Figg

EXHIBITS USED IN CHEMICAL DEVELOPMENT SECTION SEMINAR ON DEENTRAINMENT

Attached for your reference are copies of exhibits presented at the Chemical Development Section Seminar on June 2, 1950.

[redacted]

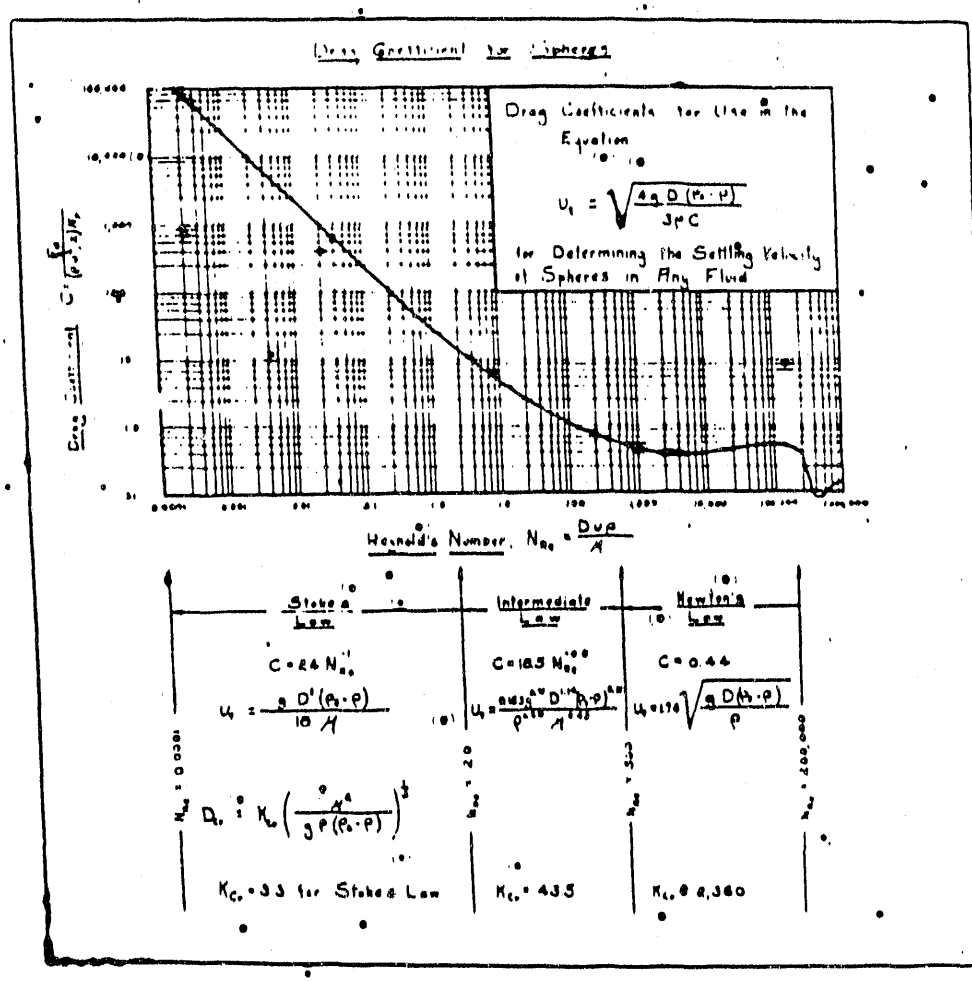
RECEIVED
JUN 1 1950
300 AREA
CLASSIFIED FILES

DECLASSIFIED

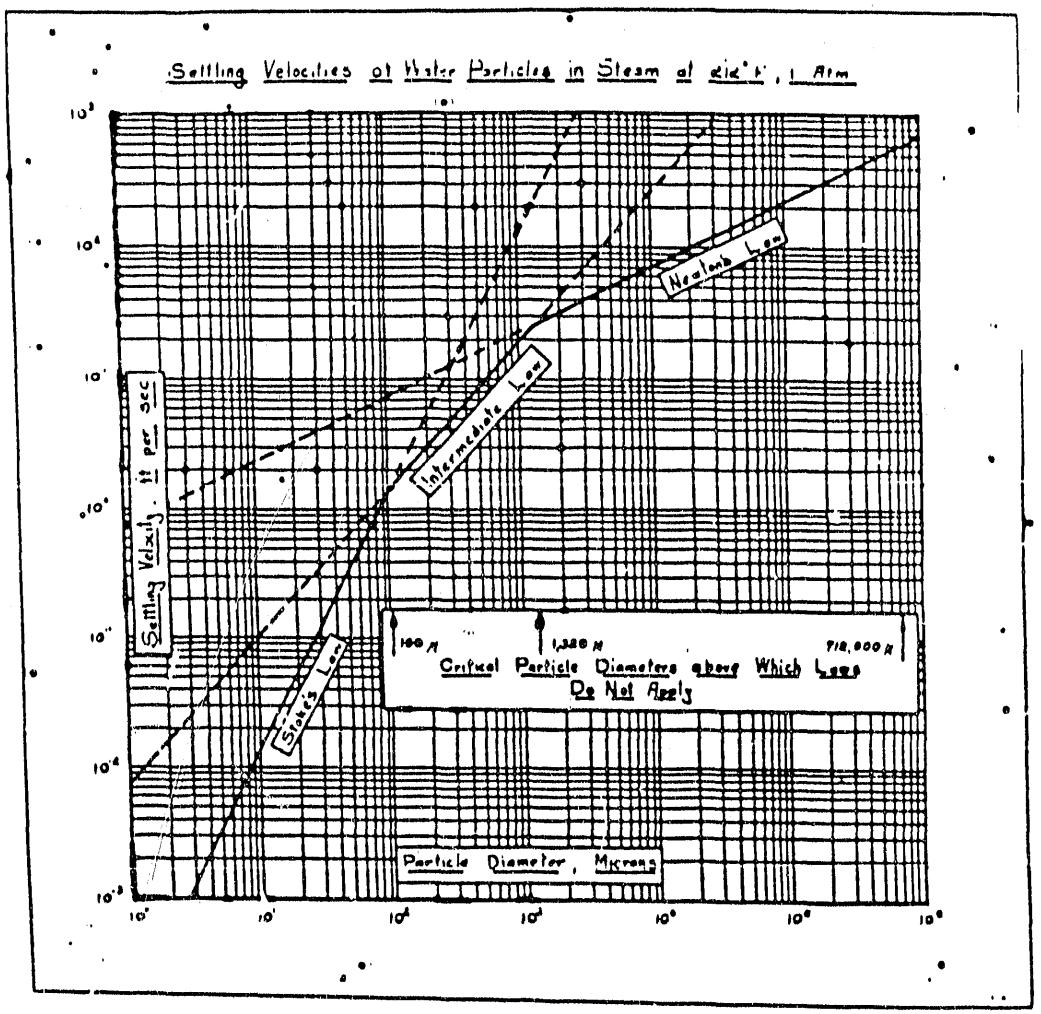
MASTER

[redacted]

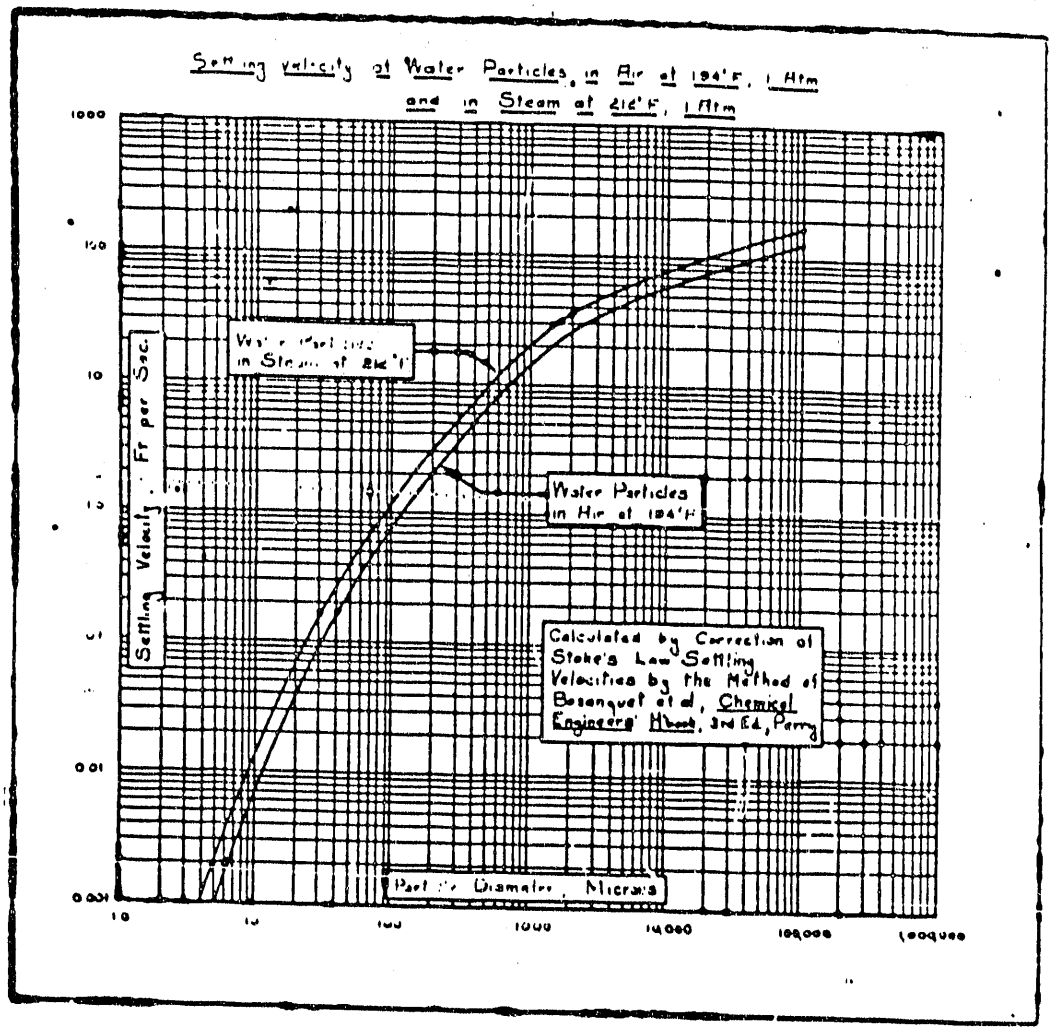
DISTRIBUTION RESTRICTED TO U.S. ONLY



DECLASSIFIED



DECLASSIFIED



DECLASSIFIED

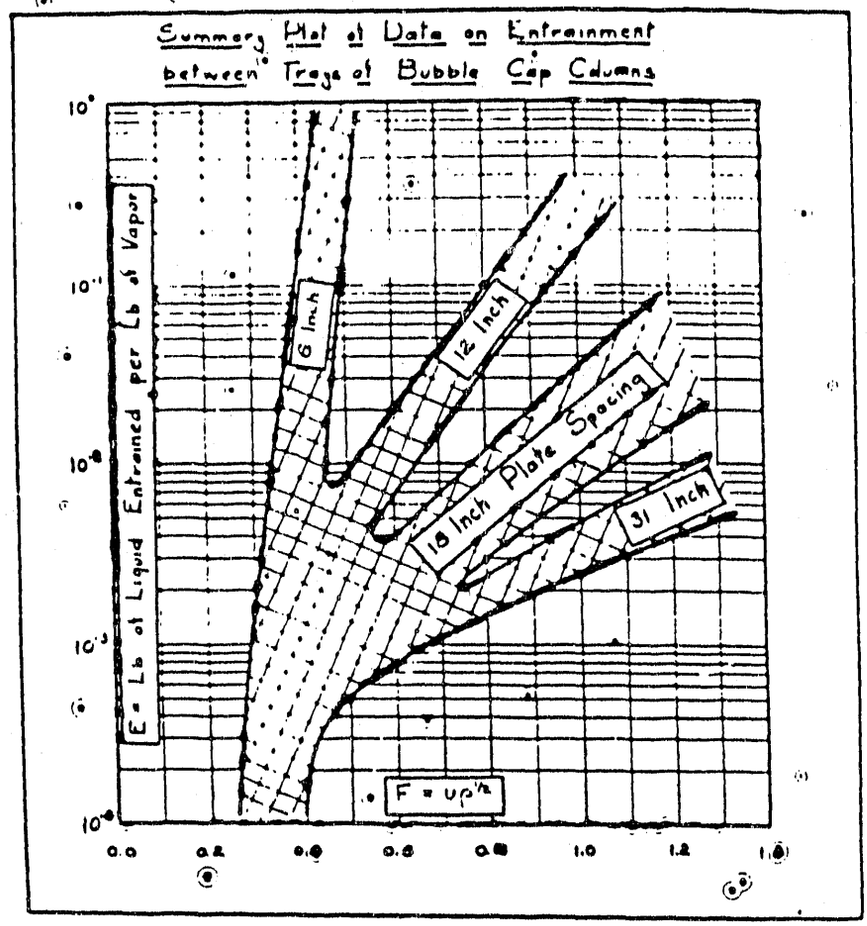
Derivation of "F" Factor

$$U = \sqrt{\frac{4gD(\rho_s - \rho)}{3\rho C}}$$

$$U = \sqrt{\frac{4gD(\rho_s - \rho)}{3C}} \sqrt{\frac{1}{\rho}} = \frac{F}{\rho^{1/2}}$$

$$F = U\rho^{1/2}$$

DECLASSIFIED



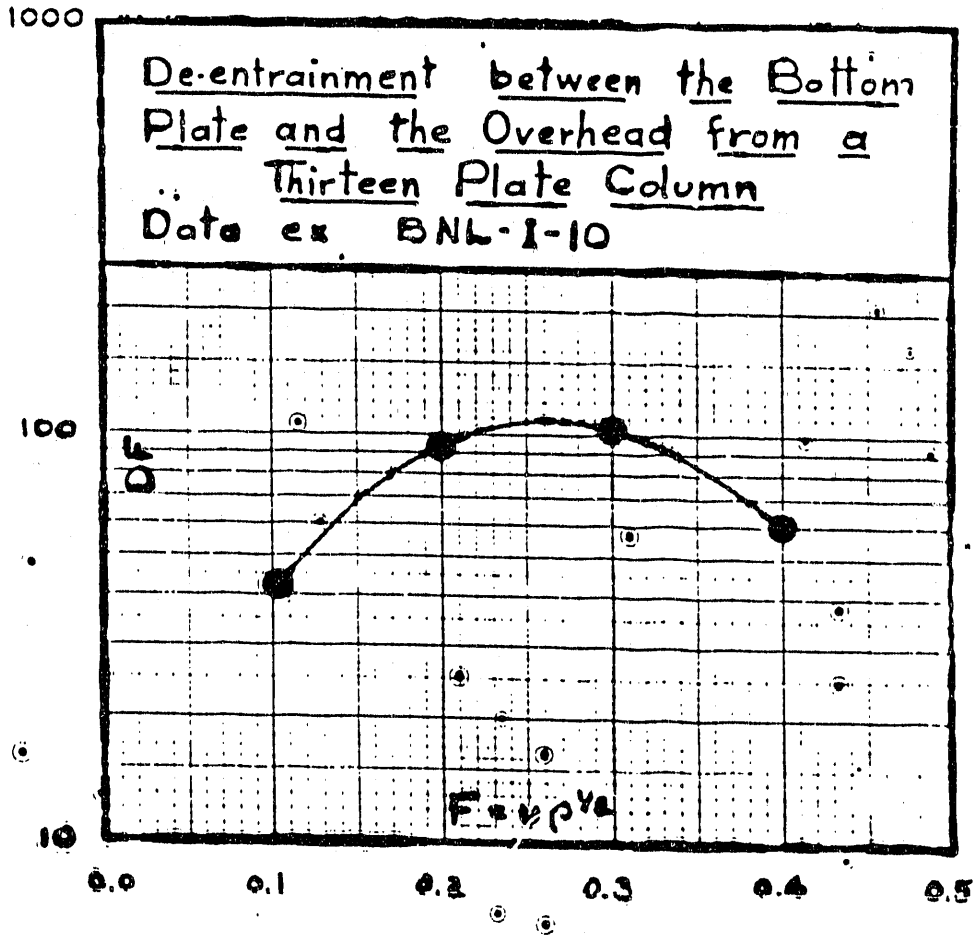
References:

1. Holbrook and Baker, Trans. Am. Inst. Chem. Engrs. 30, 520 (1934

2. Strang, Trans. Inst. Chem. Engrs. (London) 12, 169 (1934).

DECLASSIFIED

[redacted]

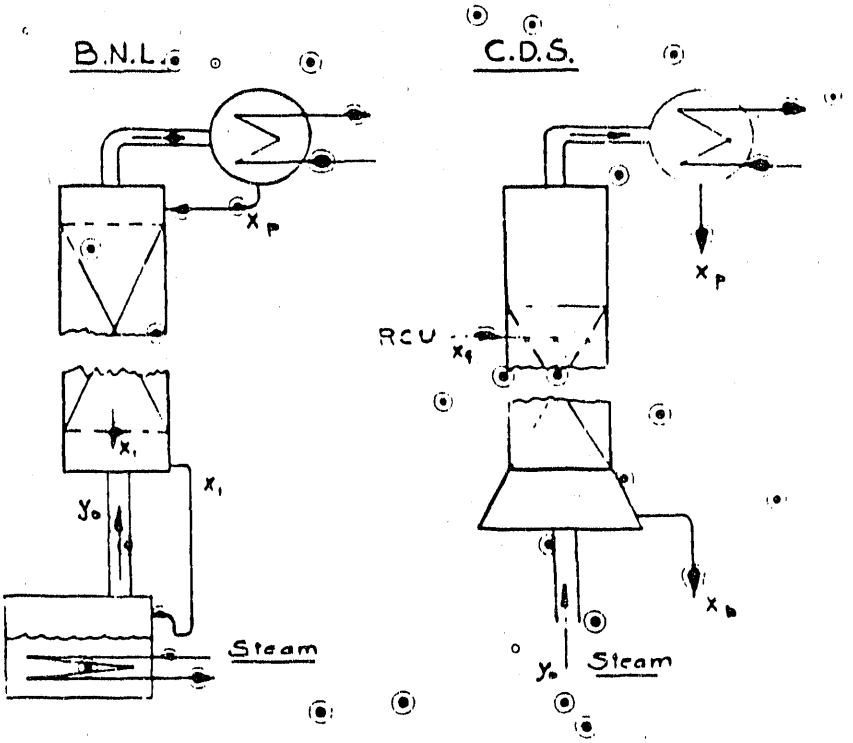


[redacted]

DECLASSIFIED

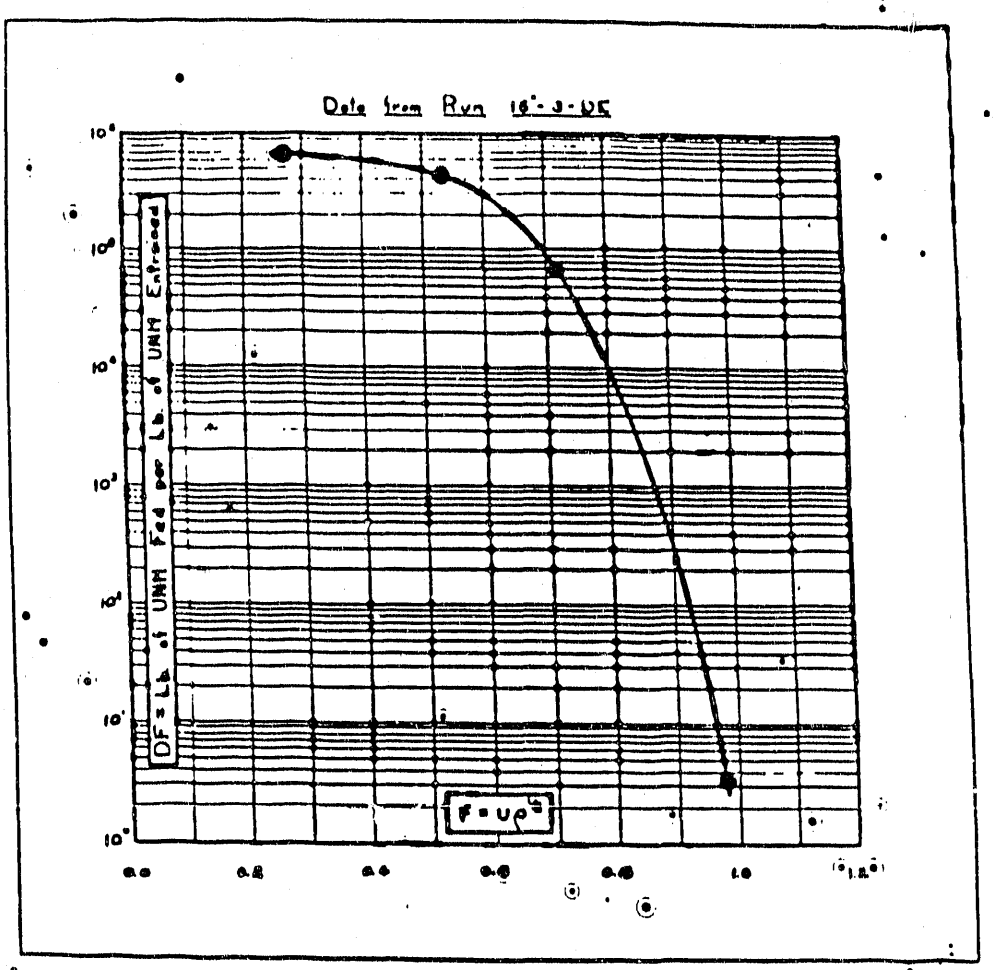
[redacted]

Flow Diagrams of Brookhaven Nat. Lab. and Chem. Dev. Sect. Deentrainment Study Equipment



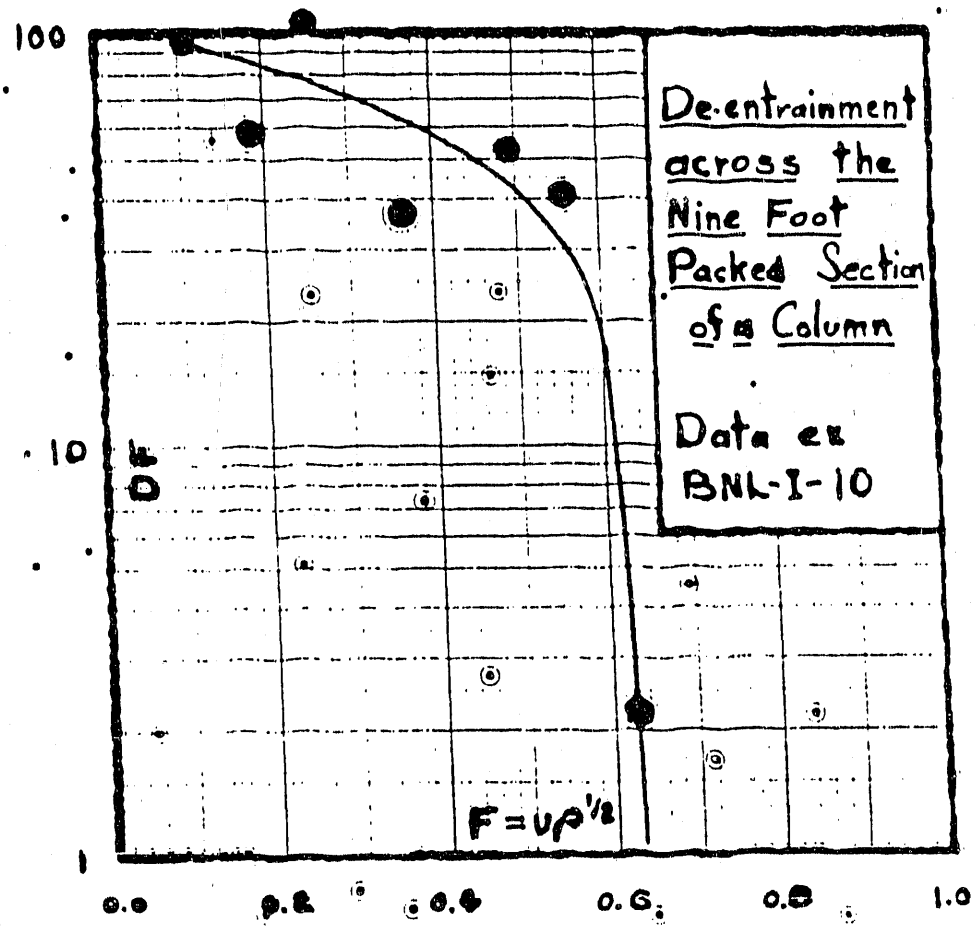
[redacted]

DECLASSIFIED



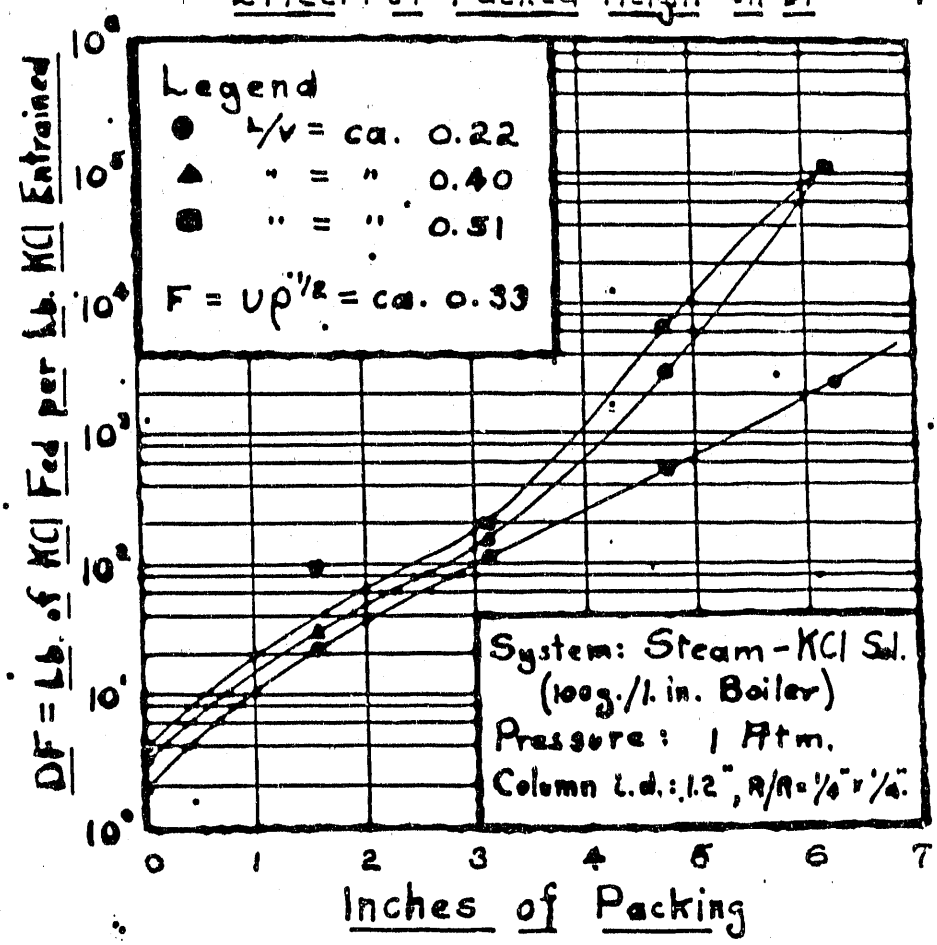
DECLASSIFIED

[redacted]



DECLASSIFIED

Effect of Packed Height on DF

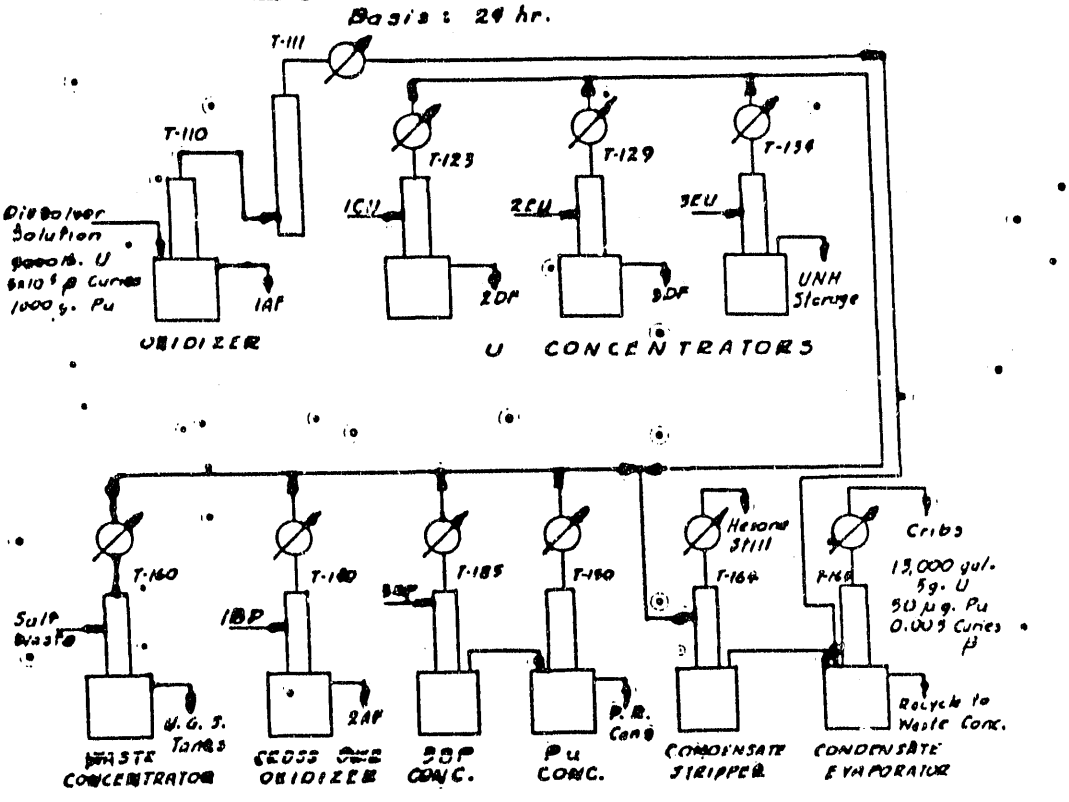


Reference: Chi-Chuan Shen, Production of Purer Distilled Water, J. Chinese Pharm. Assoc., 2, 293-312 (1940).

DECLASSIFIED

Figure 1

REDOX LIQUID WASTE SYSTEM

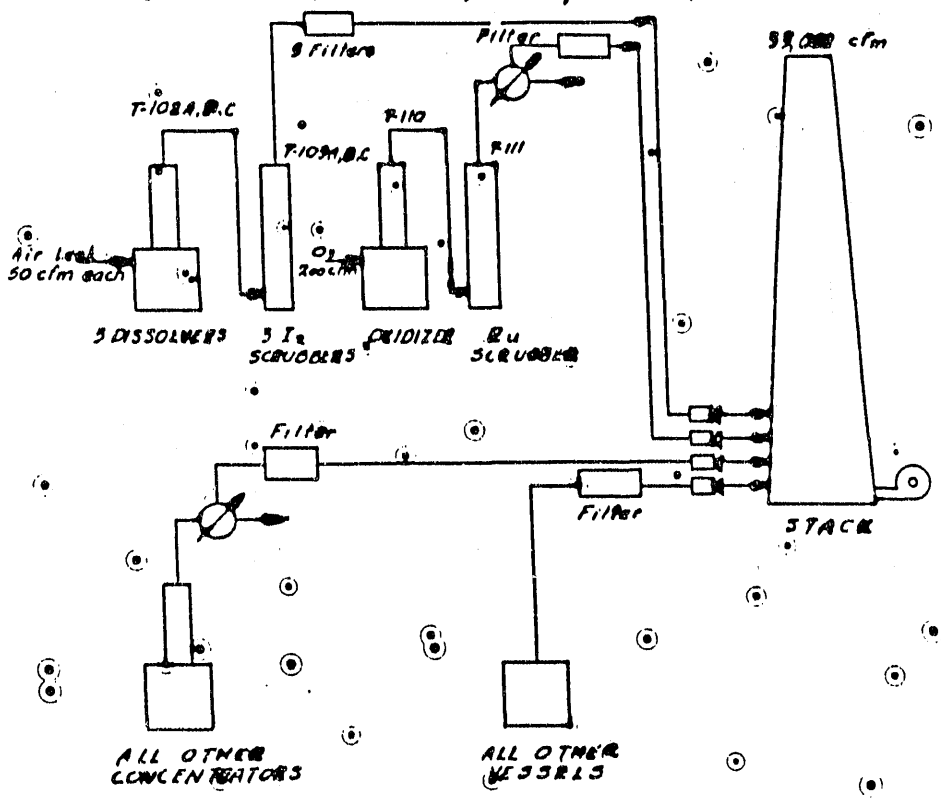


DECLASSIFIED

Figure 2

REDOX GASEOUS WASTE SYSTEM

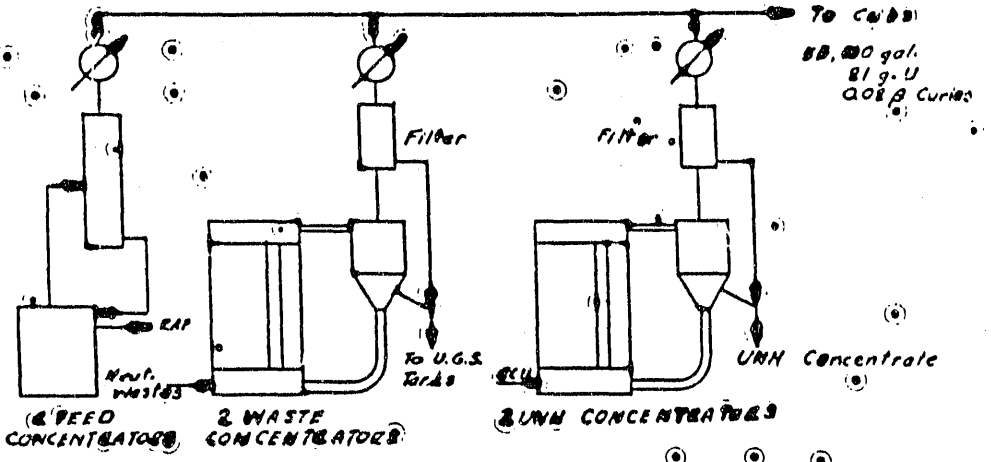
Basis: 24 hr., 5000 lb. U, 5×10^5 curies, 1000 g. Pu



DECLASSIFIED

Figure 3
WASTE METAL RECOVERY PLANT
LIQUID WASTE SYSTEM

Basis: 24 hr., 5 Tons U, 5×10^6 β Curies



DECLASSIFIED

TABLE I

EXISTING LIQUID TOLERANCES

Activity	Cribbing Tolerance	D.F.* Required	Drinking Tolerance	D.F.* Required	Proposed Tolerance
U			100 µg/l.	5×10^5	
Pu	5 µg./l.	10^4	0.001 µg/l	2×10^7	0.000,04 µg./l.
Sr	50 curies/l.	2×10^6	0.1 curies/l.	10^8	
I	50 curies/l.	10^5			

*Note: This D.F. is defined as the activity in the IAF (feed) processed per day divided by the activity in the cribbed waste per day.

DECLASSIFIED

TABLE II

PROPOSED LIQUID TOLERANCES - BW-1549k

Activity	Pollution Tolerance	Cribbing Tolerance	DF Required
U			10^6
Pu	0.000,04 µg/l.	0.000,04 µg/l.	5×10^8
Sr	0.000,02 µ curies/l	0.000,02 µ curies/l	5×10^9
Cs	0.1 µ curies/l	0.1 µ curies/l.	2.5×10^5
Ce	0.0001 µ curies/l	1 µ curies/l.	1.5×10^5
Zr	" "	10^3 curies/l.	1
Ru^{106}	" "	0.2 µ curies/l.	5×10^6
Ru total	0.0002 µ curies/l	1 µ curies/l.	10^6
Others	0.0001 µ curies/l each	---	

Note: These tolerances are 100 fold lower than those agreed upon at the Chalk River conference.

DECLASSIFIED

TABLE III

EXISTING GASEOUS TOLERANCES

Activity	Breathing Tolerance	Total D.F.(1) Required	Process D.F.(2) Required
U	0.05 μg/l	4×10^6	40
Pu	2×10^{-8} μg/l	5×10^9	5×10^4
β	10^{-1} μcuries/l	3×10^{11}	3×10^6

Notes: 1. This D.F. is based on the activity of the feed per day divided by allowable activity in the off gas per day.

2. A dilution DF of 10^5 is assumed for the stack.

DECLASSIFIED

TABLE IV

REDOX DECONTAMINATION REQUIREMENTS

Hover	# of Total Condensate	D.F. Required	O/D[1]	E, Allowed
T-165 Cond. Evap.	93	4 x 10^2	0.04	1 x 10^{-4}
T-164 Cond. Stripper	3	10^3	1/3	3 x 10^{-2}
T-160 Waste Conc.	26	5 x 10^3 (2) 2.5 x 10^5	1.8	6 x 10^{-4} (2) 1 x 10^{-5}
T-123, 129, 134 U Conc.	12	3.3 x 10^3	1:6	3.4 x 10^{-3}
T-140 IRP Oxid.	1	2. x 10^5	0.3	5 x 10^{-6}
T-150, 185 TBP Conc.	4.3	4 x 10^5	0.18 2	0.12 6 x 10^{-5}
T-110 LAP Oxids	6	5 x 10^3 2.5 x 10^5	3	2 x 10^{-2} 2 x 10^{-6}

NOTES: 1. O/D is the ratio of the flow rate of liquid subject to entrainment to the flow rate of the distillate.

2. The upper number corresponds to present cribbing limits and the lower to drinking water tolerances.

DECLASSIFIED

TABLE V

REDOX DEENTRAINMENT TOWER DIMENSIONS

Tower		Diameter, In.	Deentrainment Section	Stripping Section	E Allowed
Dissolver	T-102	22	5 ft.	None	3×10^{-7}
Oxidizer	T-110	24	6.4	None	3×10^{-7}
ICU Conc.	T-123	22	5	5 ft.	3×10^{-3}
2EU Conc.	T-129	22	5	5	3×10^{-3}
3EU Conc.	T-134	22	5	5	3×10^{-3}
DRP Oxid.	T-140	20	5	5	5×10^{-4}
3BP Conc.	T-185	6	None	4	6×10^{-5}
Pu Conc.	T-150	8	4	None	6×10^{-5}
Waste Conc.	T-160	42	3.5	6 trays	1×10^{-3}
Cond. Str.	T-164	20	4	6	3×10^{-2}
Cond. Evap.	T-165	54	6 trays	None	1×10^{-4}

DECLASSIFIED

[redacted]

TABLE VI

THP PLANT DEENTRAINMENT REQUIREMENTS

Tower	Feed Concentrator	Waste Concentrator	UNH Concentrator
% of total condensate	18	30	52
D.F. Required	3×10^4 / 1.5×10^6 (1)	3×10^4 / 1.5×10^6	? / 2×10^5
O/D(2)	2	1.2	0.1
E Allowable	8×10^{-5} / 1.7×10^{-6} (3)	1×10^{-4} / 2×10^{-6} (4)	? / 7×10^{-7}
Tower Cross-section	4.5 x 8.5 ft.		
Deentrainment Section	7 plates at 10"	49" Cyclone	Followed by coarse filter.

NOTES:
1. The upper value is based on existing cribbing limits while the lower corresponds to the drinking water tolerances.
2. O/D is ratio of the flow rate of the liquid subject to entrainment to the flow rate of the distillate.
3. These E's contribute 20% of the tolerance.
4. These E's contribute 80% of the tolerance.

DECLASSIFIED

[redacted]

END

DATE
FILMED
6/03/92