DECLASSIFIED

HW-66775
Page 1

DISTRIBUTION

1. RR Bloomstrand
2. HG Spencer
3. CF Poor
4. WS Nechoda
5. R Nilson
6. CE Bowers
7. *Hand Copy*
8. *Bar Filed*

This document classified by

R Nilson

This document consists of
2 pages,

WFO 1 OF 1. SWCT. MA

September 13, 1960

E-N LOAD CONVERSION RATIOS

The conversion ratios listed below were extracted and extrapolated from various sources, not including separations data on the small-scale test (PT-IP-255) of "black" mint recently irradiated. The values are therefore only best estimates, and should be used for preliminary optimization purposes only, not for accountability. (Actually, these values are considered to be as accurate as present accountability values, and might well be adequate for small-scale use.) Basic sources of data were: 1) for striped loadings: HW-58911, "Final Report, PT-IP-2-A, Enriched Uranium Conversion and Stability Test," L. W. Lang. These data were approximately corrected for the change to I&E geometry and the change from "grey" to "black" mint. 2) HW-58102 Rev., "Fringe Isotope Production," W. L. Bunch. These data were corrected for the change from "grey" to "black" mint, and further corrected for a discrepancy between predicted and observed T₂ production recently disclosed by SRO extractions. (1)

C. F. Poor indicates that furnished with these data he will undertake to correct the conversion ratio sub-routine in the optimization program; J. D. Orton has volunteered occasional consulting services.

BEST COPY AVAILABLE

(1) Personal communication with G. B. Kuklinski.

Classified by [redacted] and Changed To

DECLASSIFIED

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

By Authority of *CG-PR-2*
WA Snyder, 1-26-94.
By *Curri Mally, 4-20-94.*
Verified By *DK Hanson, 4-20-94*

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DECLASSIFIED

EW-66775

Page 2

CENTRAL ZONE CONVERSION EQUATIONS

A. Striped E-N, (I&E Black Mint & OIIE)

1) Cosine Flux Distribution

$$\text{Equivalent Pu buildup (gms/ton)} = .833 M_{25}^{-1.3825} M \times 10^{-4} \bullet .197 M$$

$$25 \text{ Burnout (gms/ton)} = 1.177 M_{25}^{-1.1168} M \times 10^{-4}$$

2) 15% Depeaked Flux Distribution

$$\text{Equivalent Pu buildup (gms/ton)} = .833 M_{25}^{-1.3142} M \times 10^{-4} \bullet .197 M$$

$$25 \text{ Burnout (gms/ton)} = 1.177 M_{25}^{-1.0616} M \times 10^{-4}$$

3) Upstream Peaked Flux Distribution

$$\text{Equivalent Pu buildup (gms/ton)} = .833 M_{25}^{-1.3310} M \times 10^{-4} + .197 M$$

$$25 \text{ Burnout (gms/ton)} = 1.177 M_{25}^{-1.0752} M \times 10^{-4}$$

B. Spiked Mint Columns

$$\text{Equivalent Pu buildup (grams)} = 1.64 M_{25} M_{adj}$$

Where M_{adj} = MWD generated in adjacent column or segment of same length as the mint column (MWD/Column)

FRINGE ZONE CONVERSION EQUATIONS

A. I&E E Columns, (43 Pieces of OIIE)

1) Cosine Flux Distribution

$$\text{Pu buildup (gms/ton)} = .833 M_{25}^{-1.3825} M \times 10^{-4}$$

$$25 \text{ burnout (gms/ton)} = 1.177 M_{25}^{-1.1168} M \times 10^{-4}$$

* Includes T_2 as equivalent Plutonium.

DECLASSIFIED

HW-66775
Page 3

2) 15% Dopeaked Flux Distribution

$$\text{Pu buildup (gms/ton)} = 0.833 M_{\text{e}}^{-1.3142} M \times 10^{-4}$$

$$25 \text{ burnout (gms/ton)} = 1.177 M_{\text{e}}^{-1.0616} M \times 10^{-4}$$

3) Upstream Peaked Flux Distribution

$$\text{Pu buildup (gms/ton)} = 0.833 M_{\text{e}}^{-1.3310} M \times 10^{-4}$$

$$25 \text{ burnout (gms/ton)} = 1.177 M_{\text{e}}^{-1.0752} M \times 10^{-4}$$

B. Mint Blanket Columns (Full Length Solid Black Mint Columns)

$$\text{Equivalent Pu buildup** (grams)} = 1.25 M_{\text{adj}}$$

Where M_{adj} = MWD generated in adjacent full-length supporting E columns (MWD/column)

C. 34 Pu I&E E Columns

1) Cosine Flux Distribution

$$\text{Pu buildup (gms/ton)} = 0.833 M_{\text{e}}^{-1.2775} M \times 10^{-4}$$

$$25 \text{ burnout (gms/ton)} = 1.177 M_{\text{e}}^{-1.0321} M \times 10^{-4}$$

W. S. Nechodom

W. S. Nechodom
Reactor Physics Unit
Process & Reactor Development Subsection
Research & Engineering Section
IRRADIATION PROCESSING DEPARTMENT

WBN:kmm

** T_2 production expressed in grams of Plutonium