NOTICE

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

DECLASSIFIED

DE91 001394

NUCLEONICS DEPARTMENT
GENERAL ELECTRIC
 HANFORD WORKS

- R. J. Schier
2. E. A. Eschbach
3. J. W. Underwood
4. B. F. Butler
5. R. F. Cell
6. 300 Area Files
7. 700 Area Files
8. Pink Copy
9. Yellow Copy

November 19, 1951

Classification Change (10/11/90)

*Declassified*By *RLO-L6-4*

R. J. Schier

*AE Dykeman 10/11/90**O. Cleaves 10/18/90*
PM Eick 10-18-90

This document consists of

3 Pages

Summary of Results to Date ofStatistical Investigation of Slug Failures

Most of the work to date has consisted in the gathering and assembly of pertinent data. Failures 1 through 75 have been tabulated and the 100 Area data punched on IBM cards. Copies of this tabulation are available; however, many individual items are missing. The following information has been listed for each failure:

1. Failure number
2. Tube number
3. Area
4. Charge date
5. Failure date
6. Time in reactor
7. Time reactor in operation during life of slug
8. Days since last startup
9. Total number of shutdowns during life of slug
10. Total number of scrams during life of slug
11. Total number of purges during life of slug
12. Type of failure
13. Shutdown time - hours
14. Orifice size
15. Tube exposure in MWD/ton
16. Slug exposure in MWD/slug — *should be MWD/t*
17. Tube power at failure in KW/tube
18. Normal tube power during life of slug in KW/tube
19. Slug power at failure in KW/slug
20. Normal slug power during life of slug in KW/slug
21. Local water temperature at failure
22. Normal local water temperature during life of slug
23. Location from front.

Another listing will be made in the near future consisting of pertinent 300 Area data relating to these failures.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Due to film deterioration,
 portions of this document
 may be illegible.

DECLASSIFIED

MAE

P/L 10-40

NUCLEONICS DEPARTMENT
GENERAL ELECTRIC
HARTFORD WORKS

Tentative correlation studies indicate the following:

<u>Variables</u>		<u>Correlation</u>	<u>Significance</u>
<u>Dependent</u>	<u>Independent</u>		
1. Normal slug power	Slug power at failure	+0.74	High
2. Normal local water temperature	Local water temperature at failure	+0.99	High
3. Number of failures	River water temperature (monthly average) and average power level for five piles	+0.91	High
4. Days since last startup	Total scrams	-0.16	None
5. Days since last startup	KW/slug at normal	+0.01	None
6. Days since last startup	Local water temperature at normal	-0.09	None
7. Total scrams	KW/slug at normal	+0.01	None
8. Total scrams	Local water temperature at normal	+0.11	None
9. KW/slug at normal	Local water temperature at normal	-0.001	None

The correlation in item # 3 above should be received with suspicion due to the coincidence of increasing power level and increasing river temperature over the period of study. A longer study is necessary and will be made.

Plots of failures on front face diagrams indicate some pattern in some piles, i.e., at D pile most failures have occurred in the lower left hand region of the front face (considering 2 dimensions only).

A plot of slug position in the pile (distance from front face) indicates an average position of approximately 37, with wide variation and no noticeable predominance of failures in the front or rear, all piles considered.

There is no significant difference between piles in the number of slug failures suffered, not considering actual time operated nor MW produced. These latter variables are under consideration.

Distributions were obtained of the KW/slug for all slugs at B, D, and F piles as of August 1949 and August 1951. Failures have occurred at B pile in a range of KW/slug values which, in 1949, included 30 % of all slugs; for D pile 43 %, and for F pile 28 %.

DECLASSIFIED

HW-22762

NUCLEONICS DEPARTMENT

GENERAL ELECTRIC

HANFORD WORKS

The distribution of slug powers at failure is somewhat smooth with an average of approximately 5.8 KW/slug and ranges from 2.75 to 8.25 KW/slug. The distribution of the normal slug power, which is an integrated function of each slug's history in the pile, is a more ragged distribution with an average of about 5.5 KW/slug and also ranges from 2.75 to 8.25 KW/slug.

Study of the relationships between all the above failures is being continued.

R. F. Cell

R. F. Cell
Statistics
Technical Services Unit

END

DATE FILMED

11 / 09 / 90