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C. D. Lingerfelt

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James H. Keyes
Authorizing Official
Date: *10-27-10*

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~~SECRET~~

J. B. Dee

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July 31, 1957

H. C. Woodsum, E. S. Rost

cc. A. N. Carson
A. I. Chalfant
C. D. Lingenfelter
R. I. Strough

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THIS DOCUMENT CONTAINS *7* PAGES
NO. *4* OF *7* *A*

Fitt
Shield weights were calculated for a number of fast reactors having desirable engineering characteristics using the Shield Optimization code. On the basis of these calculations, a Design Fast Reactor was chosen. This reactor, henceforth known as the FWAR-9, has a 12.75 inch core O.R. with a 2 inch Ni reflector. The reactor-shield weight and weight components for a supersonic mission, 2 man crew compartment, are given in table 1. The present shield design uses U and LiH as shielding materials on the reactor and U and plastic on the crew compartment. No intermediate heat exchanger is used since hot Na is pumped directly to the engines. The dose from the activated Na is taken into account by putting more shielding on the crew compartment. No patch weights on the reactor have been added since it is estimated that little will be needed.

H. Woodsum
H. C. Woodsum

E. S. Rost
E. S. Rost

SPECIAL REVIEW		Reviewers	Class.	Date
FINAL DETERMINATION		KAW	U	3-13-82
Class: <i>U</i>		RCP	U	6-24-82

mrs

CLASSIFICATION CHANGED TO

DATE *5-9-61*

H. F. Carroll
Chief, Declassification Branch

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J. B. Dee

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Table 1

Design Criterion and Dimensions

Reactor Power	350 MW
Core O. R.	12.75 inches
Reflector Thickness	2.0 inches
Core Length/Radius Ratio	2
Volume % Na in core	55.5
Volume % VO_2 in core	15.7
Volume % SS in core	28.8
Shield I. R.	17.0 inches
Shield O. R.	35.6 inches
Design gamma dose to crew	1.1 r/hr.
Design neutron dose to crew	0.4 r/hr.
Maximum dose rate at 50 ft.	50,000 r _{eq} /hr.
Total Na activity	2.5×10^5 curies

Weights

Reactor Neutron Shield wt.	9070 lbs.
Reactor Gamma Shield wt.	4950 lbs.
Structure wt.	870 lbs.
Estimated Patch wt.	0
Total Reactor Shield wt.	<u>14,890 lbs.</u>
Reactor wt.	8,430 lbs.
Reactor Shield Assembly wt.	<u>23,320 lbs.</u>
Crew Compartment Shield wt.	20,050
Total Shield wt.	<u>34,940 lbs.</u>
Total Reactor and Shield wt.	<u>43,500 lbs.</u>

mf

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