CONFIDENTIAL
RESTRICTED DATA
Atomic Energy Act - 1954

WESTINGHOUSE ELECTRIC CORPORATION
ASTRONUCLEAR LABORATORY

P. O. Box 10864
Pittsburgh 36, Pennsylvania

March 16, 1962

Mr. V. R. Miller
NERVA Subcontract Manager
Aerojet-General Corporation
Azusa, California

Attention: Mr. A. H. Flagg
Mr. L. E. White
Mr. A. L. Nichols

Gentlemen:

MASTER

Transmitted herewith are five (5) copies of WANL-TME-028, Radiation Levels from Activated Engine Components, dated March 9, 1962.

These data were prepared in fulfillment of the agreement made between WANL, AGC, and Vitro Corporation during a meeting in Azusa, California on January 4, 1962.

The data should be reviewed by Aerojet-General and transmitted to Vitro Engineering Corporation.

NOTICE
This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes 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.

HFF/jm

Respectfully,

H. F. Faught
H. F. Faught
Program Manager
NERVA Nuclear Subsystem

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

WHEN SEPARATED FROM ENCLOSURES, HANDLE THIS

DOCUMENT AS Unclassified
(INSERT PROPER CLASSIFICATION)

CONFIDENTIAL
RESTRICTED DATA
Atomic Energy Act - 1954

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, makes 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.

~~CONFIDENTIAL~~
~~RESTRICTED DATA~~
~~Atomic Energy Act - 1954~~

Westinghouse
WANL-TME-028

Date March 9, 1962

From L. O. Ricks

Subject Radiation Levels from
Activated Engine Components

A tabulation has been made of the maximum radiation levels expected 5 feet from the surface of various Phoebus reactor components due to neutron activation. These data are to be used in determining the shielding requirements for the low level hot cells of the E-MAD Building and handling of various components.

The attached table presents the dose rates from three photon energy groups at 24 and 60 hours after shutdown. Emitters with photon energies less than 0.5 mev are omitted since their contribution to the shielded dose rates will be negligible. The radiation levels are based on the maximum concentration of each constituent found in the several materials and three 20 minute exposures to a Phoebus core operating at 4000 MW. Both fast and thermal neutron reactions were considered in determining the sources. It is expected that these values will be revised down when particular grades of materials are chosen.

L. O. Ricks

~~CONFIDENTIAL~~
~~RESTRICTED DATA~~
~~Atomic Energy Act - 1954~~

~~CONFIDENTIAL~~
~~RESTRICTED DATA~~
~~Atomic Energy Act - 1954~~

~~CONFIDENTIAL~~
~~RESTRICTED DATA~~
~~Atomic Energy Act - 1954~~

DOSE RATES AT 5 FEET
from
UNSHIELDED REACTOR COMPONENTS
(mr/hr)

(3 - 20 min. Phoebus runs at 4000 MW in 30 days)

Component/Material	24 hrs Decay				60 hours Decay			
	0.8	E_{γ} (mev) 1.3	2.0	Total	0.8	E_{γ} (mev) 1.3	2.0	Total
Reflector (C)	0.26×10^2	2.1×10^2	3.5×10^2	5.9×10^2	1.0	0.35×10^2	0.61×10^2	0.96×10^2
Reflector (Be)	2.0×10^3	1.5×10^4	3.8×10^4	5.6×10^4	$.39 \times 10^3$	3.4×10^3	6.8×10^3	1.1×10^4
Shield (SS+LiH)	2.1×10^5	2.9×10^4	1.9×10^5	4.3×10^5	9.1×10^3	2.8×10^4	1.0	3.7×10^4
Support Plate (Al)	2.1×10^5	4.7×10^5	8.6×10^5	1.5×10^6	1.5×10^1	0.86×10^5	1.8×10^5	2.2×10^5