MASTER

Westinghouse WANL TME 007

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Date February 1, 1962

From L. O. Ricks

Subject Radiation Levels of
Reactor Components
After Shutdown

Attached is a tabulation of the maximum radiation levels expected at the surface of various reactor components after three equally spaced 20-minute full-power runs in 30 days, followed by a decay period of 24 hours. The table contains the values for both the NERVA and Phebus engines that were marked on the engine disassembly sequence drawing (W Dwg 699J784) on 12/4/61. These radiation levels were requested by Vitro Corporation and are to be used to determine the shield requirements for the E-MAD building.

The radiation levels are presented for gamma emitters only, since the shield required for these will be more than adequate for the beta and alpha particles. Since several grades of a given material are being considered for use in the reactor, the activity is based on the maximum concentration of the constituent or impurity occurring in any of the grades.

L. O. Ricks

LOR/mb
Enclosure

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SPECIAL REREVIEW FINAL DETERMINATION	Reviewers	Class.	Date
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PHOEBUS 4000 MW

NERVA 1140 MW

Operating Time - 3 - 20 Minutes in 30 Days; 24 Hours Decay

COMPONENT	MATERIAL	SURFACE DOSE AT 24 hr.	
		R/hr	
		PHOEBUS	NERVA
Reflector	Beryllium	6×10^3	1.6×10^3
	Steel	3×10^4	8×10^3
	Carbon	7×10^3	2×10^3
Shield	Lithium Hydride + Stainless Steel	3×10^4	8×10^3
Vessel	Aluminum	4×10^4	1×10^4
Core Support	Aluminum	12×10^4	3×10^4
Nozzle	Stainless Steel	2×10^5	5×10^4
	Inconel - x	3.4×10^4	1×10^4
Control Drums	Alt B ₄ C	3×10^4	8×10^3
Drum Drives	Stainless Steel	2×10^5	5×10^4
	Titanium	4×10^3	4×10^2
Core	Uranium + Carbon	3.7×10^6	1×10^6