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Research Department, Mound Laboratory

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**PLUTONIUM-238 AS SUBSTITUTE FOR
POLONIUM-210 IN SQUAB CELLS**

MOUND LABORATORY, MOUND, MISSOURI

Central File No. 62-12-154

Dr. G. R. Grove

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Investigation of the feasibility of substituting plutonium-238 as an alpha source for polonium-210 was requested by G. R. Grove on December 5, 1962, and discussed by the following people on December 6, 1962:

- F. D. Lonadier
- J. A. Grasso
- F. M. Huddleston
- R. W. MacFaddin
- R. E. Vallee

MOUND DECLASSIFICATION REVIEW	
1ST REVIEW DATE: 9/9/98	DETERMINATION CANCELLED
AUTHORITY: SAC, SAC, SAC	1. CLASSIFICATION RETAINED
NAME: Frank Lonadier	2. CLASSIFICATION CHANGED TO
2ND REVIEW DATE: 1/2/99	3. CONTAINS NO DOE CLASSIFIED INFO
AUTHORITY: SAC	4. COORDINATE WITH
NAME: Bob Patay	5. CLASSIFICATION CANCELLED
	6. CLASSIFIED INFO BRACKETED
	7. OTHER SPECIFIC

Joe Grasso and Fred Huddleston furnished (for discussion purposes) drawings of the Cell, Cell components, and needed partial specifications pertaining to the finished Cell. Frank Lonadier and Richard MacFaddin furnished technical "knowhow" in the handling of plutonium-238 and in the availability of facilities. The result of the meeting was that the substitution seemed feasible. However, additional information is needed. The major unknown is the neutron background which will be present in the plutonium-238 due to internal conversion or due to impurities. Other factors which need to be evaluated are:

1. Parameters needed to deposit plutonium-238 in the correct amount (about 100 mg) and with the proper distribution. Past experience at Mound Laboratory indicates that this problem can be evaluated in a reasonable time.
2. Compatibility of the plutonium-238 metal with the nickel coat presently used on the item. At the temperature involved, these materials should be compatible. Integrity of the nickel coat however must be checked.

Approved for Release by NSA on 09-08-2013 pursuant to E.O. 13526

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In order to provide a reliable answer to the problem the above factors will be determined experimentally. Initial experiments will be to vapor deposit plutonium-238 metal onto a nickel coated substrate (to be furnished by the Production Department). Size and shape of this collector will be identical to the present Mound item but iron or steel will be substituted for the beryllium. This will allow determination of the neutron contribution of the plutonium-238 metal. The effect of the plutonium-238 metal on the nickel coat can also be determined in these initial experiments.

If a sufficiently low neutron background is obtained in the initial experiments, additional pieces will be fabricated using nickel coated beryllium pieces which can be assembled to produce "live" items.

Existing equipment will be utilized to accomplish the experimental work. The vacuum vapor deposition system in room R-145 will be reactivated. Necessary renovation involves removal, fabrication, and replacement of one hood front; replacement of a cracked glass bell jar; and fabrication and replacement of a damaged base plate.

Persons directly responsible for the work to be performed in R-145 are Frank Lonadier and Richard MacFaddin.

With the excellent cooperation being received from the Engineering, Production and Development Departments, Frank Lonadier feels that the renovation will be accomplished by December 15, 1962, and that experimental work can be started the following week.

R. Vallee
Richard E. Vallee

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