

## OFFICE MEMORANDUM

TO : J. E. Dummer, H-1 Group Leader  
DATE: May 27, 1976  
THRU : A. M. Valentine, H-1 Alt. Group Leader  
FROM : D. G. Vasilik, Ldr., HPAL  
SUBJECT : DEPTH OF BURIAL CORRECTION FACTOR FOR HV-70 FILTER MEDIA  
USED FOR EFFLUENT AIR SAMPLING OF HEPA FILTERED PLUTONIUM STACKS  
SYMBOL : H-1-DGV-18-76  
MAIL STOP: 692

The determination of airborne plutonium levels in HEPA filtered stack effluent air streams is dependent on the sampling filter medium, collection efficiency, the sampling rate, the collection time, the analysis technique, etc. HV-70 filter paper is presently used at the LASL and the sampling rate is, in general, 2 cfm. The collection time for all HEPA filtered plutonium stacks is 168 hours. Except for depth of burial and loading effects for the HV-70 filter medium, the analysis techniques are very well understood. For the HEPA filtered plutonium stacks, loading effects are insignificant. However, the effect of deposition of various particle sizes within the filter medium on the alpha counting efficiency may be significant and should not be ignored.

Alpha analysis is conducted at the LASL Health Physics Analysis Laboratories (HPAL) with gas-flow proportional counting systems (Beckman Wide-Beta Instruments). Detector efficiencies are determined with standard reference sources. However, the alpha counting efficiency has not been corrected to date for depth of burial effects.

The literature has been searched for a depth of burial correction factor appropriate to this alpha analysis technique. In Table I, the results of this study are presented. It has been determined that a good number of experimental studies have been conducted to determine depth of burial correction factors. A good number of these experiments were found to be appropriate to our sampling and analysis methods. It is recommended that H-1 adopt the value of  $37.6 \pm 2.8$  as the percent alpha radiation lost by the effect of the deposition of airborne contaminants within the filter medium for HEPA filtered plutonium stacks. This number represents the average and associated 1 $\sigma$  standard deviation of the data presented in Table I.



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Table 1

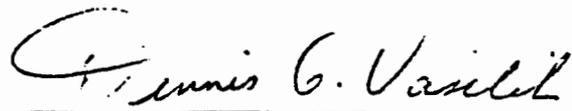
Depth of Burial Correction Factors Determined From Separate Experiments Reported in the Literature for HV-70 Filter Media in the Sampling Rate Range of 2 - 10 cfm

<u>Experiment</u>	<u>Sampling Flow Rate (cfm)</u>	<u>Percent Alpha Lost by Penetration</u>	<u>Particle Size(s)-u</u>	<u>Ref.</u>
1	10	37	0.3	1
2	8	40	0.3	1
3	4	33	0.3	1
4	2	39	0.3	1
5	2	39	0.27-0.3	2

With your concurrence, this correction factor will be incorporated in the appropriate alpha analyses results.

References

1. G. M. Angleton and R. F. Barker, "Determination of the Alpha Counting Efficiency of Some Filter Papers," AECU - 2853 (1954).
2. Y. Yoshida, K. Kitano, M. Murata and S. Moriyasu, "Comparison of Performance Characteristics of Some Filters Using Thoron Daughters As Radioactive Aerosol," Proceedings of International Radiation Protection Association Symposium, Rome, Italy, Sept. 1966, Part 2, Edited by W. S. Snyder, et al, Pergamon Press, New York NY.

  
 Dennis G. Vasilik

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General

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Document Title Memo: Depth of Burial Correction Factor For HV-70 Filter Media used for effluent air sampling of Hepa-filtered plutonium stacks.

Author(s)	Organization(s)	Keyword(s)
D G Vasilik	H-1	atmosphere effluent radionuclide uncertainty

Document Abstract

Memo states no correction made for burial prior to this date and recommends 37.6% loss for factor based on literature reported values.

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ESTIMATED

Analysts's Comments on Document's Relevance to Dose Reconstruction

All pre 1976 asserted releases from HEPA filtered stacks are low (in error) by a factor of 1.6 at LASL.

Project(s)

Analyst

Joe Shonka

Review Date

09/02/1999

CDC Category

1

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