MEMORANDUM FOR THE RECORD 9 September 1969

SUBJECT: Cross-calibration of NASA ^{60}Co Source

1. The results of the NASA-SAM 12 curie ^{60}Co cross-calibration have been analyzed and indicate very close correlation.

2. Two Victoreen R-chambers, calibrated at NBS, were used for this experiment. The 2.5 R-chamber, serial number 3849B, and the 100 R-chamber, serial number 3849A, were read on the Model 570, serial number 768, R-chamber reader. The Victoreen Radicon II, Model 555, serial number 234, was used to monitor the beam. Appropriate temperature and pressure corrections (1.00 for 762 mm and 22.5 °C) and the NBS probe correction factor for ^{60}Co were applied. For the NASA R-chambers, Victoreen calibration factors were used. Three source distances were used and several measurements made at each source.

3. It was noted that a difference of approximately 5% was involved in comparing NASA and SAM corrected R-chamber readings. The NBS probe calibration was made with the stem of the R-chambers exposed and it is the impression of the undersigned that Victoreen calibrations are obtained for a stem shielded configuration. Beginning with the second reading of position 169, the stems of the R-chambers were shielded which resulted in a 3% decrease in the NASA R-chamber readings. This factor was used to correct all readings in which the stem was exposed to obtain stem effect corrected R-chambers. All data in the attached table are stem effect corrected.

4. The readings were converted to dose rate information, and comparisons made by taking the ratio of NASA to SAM chamber readings. A previous NASA calibration taken on 7 May 1969 was corrected for decay to 15 Aug 1969 and these values were also compared by taking the ratio of the NASA calibration to the SAM R-chamber readings.

5. All data agreed within ±4%. The accuracy of Victoreen R-chambers is stated to be ±5%, thus making all measurements within the rated accuracy of the instruments.

6. The agreement between NASA and SAM instruments is quite good as has been the case with our cross-calibration of proton measurements results. These results help in assuring us that the Rad measured in space is the same Rad we are measuring in the laboratory.

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Table

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2.5 R-CHAMBER

POSITION NUMBER	NASA CALIBRATION TAKEN 5-7-69 CORRECTED TO 8-15-69 (R/HR)	RAD II (R/HR)	SAM R-CHAMBER (R/HR)	NASA R-CHAMBER (R/HR)	NASA R-CHAMBER / SAM R-CHAMBER	NASA CALIBRATION / SAM R-CHAMBER
120 (21.2")	53.4	54.4	54.3	55.3	1.02	.98
		54.4	54.3	55.3	1.02	.98
		54.8	54.7	55.7	1.02	.98
		55.6	55.1*	55.3*	1.003	.97
169 (26.1")	36.8	38.1	37.8	38.0	1.005	.97
		38.3	38.1	38.3	1.005	.97
		38.1	38.0	38.0	1.000	.97
290 (38.2")	18.0	18.4	18.7	18.8	1.007	.96
		18.1	18.5	18.4	.995	.97
120 (21.2")	53.4	54.8	55.3	56.6	1.02	.97
		54.4	55.3	56.6	1.02	.97
		56.0	55.3	56.6	1.02	.97

100 R-CHAMBER

120 (21.2")	53.4	51.8	51.5	49.5	.96	1.04

*NASA PROBE READ ON SAM READER
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