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OPERATION HURRICANE GROUP REPORTS

(Part 41)

The Decontamination of Radioactive Clothing.

I. Preliminary Survey

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Summary

A description of the method used in determining the level of activity is followed by a table of summarised results.

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1. Introduction

A few months after Operation Hurricane a selection of active protective clothing was made available at AWRE, Aldermaston for investigation into means of decontamination. The clothing as received was contained in conventional dust bins packed in P.V.C. bags, numbering about twenty. No further information or identification as to the contents of each individual bin was available.

A preliminary survey of the bins was made in order to estimate the levels of activity likely to be encountered. In no case did the dosage exceed 5 mR./hr. at the surface of the bin. The bins were stored in A10 active storage bay.

2. Procedure

For the survey, bins, were moved as required to Lab.1, A1.1. Two adjacent fume cupboards were available for the survey; these were separated by a vertically sliding glass door. The floors of the fume cupboard were covered with polythene film and the dust bin under examination placed in the left-hand cupboard. The outer P.V.C. bag was cut away with a pair of scissors and the lid removed.

Articles of clothing were either packed loose inside the bins, or in the case of more active clothing, in bituminous paper bags. The articles were removed singly by hand, sorted, labelled, monitored, repacked in polythene bags and returned to a fresh dust bin.

2.1.1 Labelling

A code letter was assigned to each type of garment.

viz.	A	Combination Suit
	B	Hats
	C	Socks
	D	Sweat Rags
	E	Vests
	F	Pants
	G	Boots
	H	Gloves, rubber
	I	Gloves, cotton
	J	Gas Masks
	K	Puttees, wool
	L	Towels
	M	Haversacks

A prefix H (Hurricane) was assigned, thus, for example H A 8 signifies Combination Suit No.8, and H G 10, Boot No.10 respectively.

2.1.2 Tags

Each garment to be monitored was tagged with a small aluminium rectangle ($\frac{3}{4}$ in. \times $\frac{1}{2}$ in. \times 0.01 in.) bearing the code letter and number of the garment. The letters were applied by letter-punch and the tags secured by one or two staples, using a conventional office stapling machine.

2.2.1 Monitoring

For the purpose of recording results, each garment was divided into areas, and figures for each area were recorded. Large garments were rolled up and a figure for the bundle also recorded. In the case of smaller garments a single figure was recorded. Large garments such as the combination suits were divided into some seventeen areas, e.g. collar, shoulder left, sleeve left, cuff left, shoulder right etc.: each area being assigned a number so that samples from any area would be readily identified. Thus sample H A 7/6 would be from the back of combination suit No. 7.

2.2.2 Monitor

A type 1021 monitor with a $\beta\gamma$ probe (used with window open) was used in the routine survey, the probe being held about an inch from the fabric. This instrument has a top limit of 2000 c./s. which was exceeded in only a few cases. The normal background level was 2 - 3 c./s.. Tolerance is given by Health Physics Branch at 10 c./s. on this type of monitor.

3. Results

3.1 Numerical Results

The detailed lists have been summarised in the attached table. A large number of boots and combination suits were at background level and were not therefore tagged. The table refers only to tagged clothing. The results given refer to the general level of activity over the whole suit.

Hot spots (about twice the average) were found on the cuffs and lower legs of combination suits, and on the underside and toes of boots. Rubber gloves tended to be high, as were the tops of socks. Sweat rags, hats and underclothes were all of low activity. Gas masks were generally low.

Little activity was found in the dust bins, although several bitumen paper bags came within the 150-500 c./s. range.

3.2 Time Interval and Dose Rates at Time of Use

The survey was carried out approximately five months after

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3.2 Time Interval and Dose Rates at Time of Use

The survey was carried out approximately five months after the explosion.

Assuming a $t^{-1.2}$ law for the decay of fission product activity, one would obtain a decay factor of 10^5 , 10^3 and 10^2 between one hour, one day and one week respectively, and the actual date of monitoring.

It will be seen that several of the suits were at a very high level of activity, and indeed γ dosages of 0.5 R./hr. at one week would be expected from single suits.

With respect to β dosages, it is known that on suit No. 20, which was cut up for laboratory investigation, discs of about 10 sq. cm. area gave counts of the order of 1,000 - 20,000 c./m. on an end window counter of approximately 7 per cent efficiency,

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Hurricane Clothing Survey

CLOTHING	Bkgnd - 15 c./s.	15 - 50 c./s.	50 - 150 c./s.	150 - 500 c./s.	500 - 2000 c./s.	>2000 c./s.	TOTAL
Combination Suits	* 14						
Hats		9	12	16			73
Socks	8	2	8	1		6	19
Sweat Rags		6	9	6			22
Vests	14	4	10	2			30
Pants		6	4				10
Boots		6	5				11
Gloves Rubber	3	21	18	14	30	15	101
Gloves Cotton		8	8	7	11	1	35
Gas Masks		1		2	2		5
Puttees		2	7	1			10
Towel							2
Haversacks		1	3	1			2
							1
							5

* Plus an unknown number, probably ~ 40 at background.
 To this figure about 30 untagged boots at background must be added.