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ARMY ENVIRONMENTAL HYGIENE AGENCY ABERDEEN PROVING GR--ETC F/G 6/20
INVESTIGATION OF POSSIBLE PESTICIDE RESIDUES AND TOXIC EFFECTS --ETC(U)
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**UNITED STATES ARMY
ENVIRONMENTAL HYGIENE
AGENCY**

ABERDEEN PROVING GROUND, MD 21010

PESTICIDE SPECIAL INVESTIGATIONS NO. 44-0976-78
INVESTIGATION OF POSSIBLE PESTICIDE RESIDUES AND
TOXIC EFFECTS ASSOCIATED WITH SLEEPING BAG COMPONENTS
JUNE 1978

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Feathers/down used for filling sleeping bags were submitted for pesticide residue determination and skin irritation studies. DDT and DDT metabolites were the only pesticides found. The range was 10.13-1187.12 parts per million (DDTR). A control sample contained 2.95 parts per million DDTR. The levels found are below the recommended treatment levels for this product. No irritation was found as the result of primary skin irritation studies.		

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DEPARTMENT OF THE ARMY
 U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
 ABERDEEN PROVING GROUND, MARYLAND 21010

Mr. Olds/cw/584-3015

28 AUG 1978

HSE-RP/WP

SUBJECT: Pesticide Special Investigations No. 44-0976-78, Investigation of Possible Pesticide Residues and Toxic Effects Associated with Sleeping Bag Components, June 1978

HQDA (DASG-PSP-E)
 WASH DC 20310

A summary of the pertinent findings and recommendations of the inclosed report follows.

a. Findings.

(1) Only DDT and DDT metabolites (DDTR) were found in the down/feather samples. The range of the DDTR is 10.13-1187.12 parts per million (ppm). These levels are below recommended treatment levels for effective protection against moth damage.

(2) DDT was also found in a control feather/down pillow (DDTR - 2.95 ppm) obtained from the supply system.

(3) No irritation was found as the result of primary skin irritation studies.

b. Recommendations. The test results do not provide a basis for the discontinuation of use of the treated feathers/down and there are no reasons to anticipate any untoward dermatologic response.

FOR THE COMMANDER:

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DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010

HSE-RP/WP

PESTICIDE SPECIAL INVESTIGATIONS NO. 44-0976-78
INVESTIGATION OF POSSIBLE PESTICIDE RESIDUES AND
TOXIC EFFECTS ASSOCIATED WITH SLEEPING BAG COMPONENTS
JUNE 1978

1. AUTHORITY.

- a. AR 40-5, Health and Environment, 25 September 1974.
- b. AR 200-1, Environmental Protection and Enhancement, 20 January 1978.

2. REFERENCES.

- a. Letter, DASG-PSP-E, Office of The Surgeon General, 4 May 1978, subject: Sleeping Bag - MIL-S-43880A.
- b. Military Specification MIL-M-3985 B(GL), 25 January 1968, subject: Mothproofing Concentrate, For Textiles and Feathers.
- c. DF, HSE-LT, this Agency, 1 June 1978, subject: Primary Skin Irritation (Study No. 44-0976-78).
- d. USAEHA Pesticide Monitoring Annual Report No. 44-0100-78, Department of the Army Pesticide Monitoring Program Evaluation of Environmental Samples Collected in Calendar Year 1975.

3. PURPOSE. To evaluate four feather/down samples for the presence of pesticide contaminants and to determine if the material has any toxicological effect on the exposed individuals.

4. GENERAL.

a. Background. On 13 February 1978 a Defense Logistics Agency (DLA) contractor for filling sleeping bags reported finding a label in feather and down bales which stated:

Packing and material contain DDT. Avoid skin contact and breathing of dusts. Disposal by open burning or open dumping on land or water is to be avoided.

WARNING: TOXIC HAZARD

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The contractor has complained (reference 2a) of contamination with pesticides (DDT, DDD, dieldrin) and skin rashes. The four samples received for analysis and their corresponding US Army Environmental Hygiene Agency (USAEHA) sample number are listed below:

<u>USAEHA Number</u>	<u>Sample Description</u>
SP-2412	Sample No. 1, DDT Content, Lot Unidentified, CO. 11
SP-2413	DLA 100-76-C-1986 Paramount Feather Company Brooklyn, NY 1211 Ship 2, Lot 2, Bag 2 (3?)
SP-2414	DLA 100-76-C-1986, Atlas Feather Corp. Brooklyn, NY 11222 Ship 5, Lot 5, Bag 1 (Atlas Ship 2, Lot 2, Bag 3)
SP-2415	Feathers and Down, Waterfowl, Chemically Modified 50-50 Blend Paramount Feather Corporation DLA 100-76-C-1986, Lot 6

b. Sample Preparation and Extraction.

(1) Sample preparation consisted of weighing two 10 g subsamples for each sample into a one-quart wide mouth jar. A control sample was obtained by requisitioning a feather pillow from the supply system. The history of the control pillow is unknown. A glassware/reagent blank was carried through the extraction/analysis procedure.

(2) Extraction of the feathers was accomplished by adding 500 ml hexane/acetone (3:1) to the 10 g sample in the one-quart jars. The jars were shaken for 2 hours on a reciprocal shaker and then allowed to stand for 1 hour. The solvent mixture and feathers were placed on a Buckner funnel and vacuumed until no further solvent was removed from the feathers. The extract was then measured for determination of definitive volume and definitive sample weight. The extract was concentrated to approximately 5 ml on a Kuderna-Danish apparatus. The extract was then placed on a Florisil®

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column and 6 percent and 15 percent eluates were collected. These extracts were concentrated to 5 ml on a Kuderna-Danish apparatus for gas-liquid chromatography determination.

c. Pesticide Determination. Pesticide determination was made by gas-liquid chromatography using an electron capture detector. The 15 percent Florisil extracts were screened on the flame photometric detector. The columns and temperatures are the same as those reported in reference d. The screening for compounds listed in Appendix A was in addition to DDT and its metabolites. The lower limits of detectability for each of the compounds are also listed.

5. RESULTS AND DISCUSSION.

a. The results of the analyses are listed in Appendix B. No pesticides other than DDT and DDT metabolites were found. Comparing the means of the replicates, the range of DDTR [(DDE + DDD) x 1.114 + DDT] is 10.13 - 1187.12 parts per million (ppm). These values are lower than expected based upon recommended effective treatment levels for feathers and down as specified in reference b. The Military Specification states that the feather products will contain approximately 0.5 percent DDT by weight (5000 ppm). It also states that:

The effective range for protection against moth damage has been determined to be 0.2 to 0.7 percent DDT based on the weight of the fabric, feathers or feather products.

b. The presence of DDT in the control feathers obtained from the supply system suggests that DDT has been used for many years in the treatment of feather and down products. This would also suggest that many of the feather and down products in the military supply system have been treated with DDT and contain residues of DDT and DDT metabolites.

c. Primary skin irritation studies were conducted on the four samples (reference 2c) employing the standard USAEHA Toxicology Division protocol. No irritation was found. Additionally, cursory examination of the samples by light microscopy revealed no distinct difference between the control and sample feathers.

6. CONCLUSIONS.

a. DDT was found in the four samples submitted and the control feathers at levels below the levels recommended for protection against moth damage.

b. No irritation was found as the result of primary skin irritation studies and no difference was observed between the samples and the control under microscopic examination.

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7. RECOMMENDATION. The data presently available do not provide a basis for discontinuation of use of the treated feathers/down for the intended purpose. Based on the test results from our laboratory, there are no reasons to anticipate any untoward dermatologic responses.

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APPENDIX A

LISTING OF PESTICIDES/PESTICIDE METABOLITES ANALYZED FOR

Pesticides/Pesticide Metabolites	Limits of Detectability (ppm)
α -BHC	0.002
β -BHC	0.01
aldrin	0.01
chlordane (tech)	0.05
o,p'-DDE	0.02
p,p'-DDE	0.01
o,p'-DDD	0.02
p,p'-DDD	0.01
o,p'-DDT	0.02
p,p'-DDT	0.02
dieldrin	0.01
endrin	0.02
heptachlor	0.003
heptachlor epoxide	0.01
lindane	0.003
methoxychlor	0.06
mirex	0.02
toxaphene	0.63
chlorpyrifos	0.01
diazinon	0.04
methyl parathion	0.02
parathion	0.02
cis-chlordane	0.01
trans-chlordane	0.01
oxychlordane	0.01

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APPENDIX B

RESULTS OF ANALYSIS OF FEATHER/DOWN SAMPLES (ppm)

	REP No. 1	REP No. 2	\bar{x}
SP-2412			
o,p'-DDE	.06	.01	.03
p,p'-DDE	.83	.84	.83
o,p'-DDD	-	.03	.02
p,p'-DDD	.54	.19	.37
o,p'-DDT	2.11	2.04	2.08
p,p'-DDT	7.24	6.08	6.66
DDTR	10.94	9.31	10.13
SP-2413			
o,p'-DDE	1.25	.63	.94
p,p'-DDE	22.15	14.39	18.27
o,p'-DDD	.51	.40	.45
p,p'-DDD	25.38	4.98	15.18
o,p'-DDT	14.44	33.50	23.97
p,p'-DDT	251.93	191.64	190.62
DDTR	321.28	247.87	284.26
SP-2414			
o,p'-DDE	3.52	3.13	3.32
p,p'-DDE	28.16	37.47	32.82
o,p'-DDD	2.02	1.23	1.62
p,p'-DDD	11.39	48.16	29.78
o,p'-DDT	213.18	113.73	163.46
p,p'-DDT	875.39	1021.46	948.42
DDTR	1138.80	1235.44	1187.12
SP-2415			
o,p'-DDE	.55	.30	.42
p,p'-DDE	2.80	4.00	3.40
o,p'-DDD	.25	.26	.25
p,p'-DDD	2.82	1.54	2.18
o,p'-DDT	13.15	19.23	16.19
p,p'-DDT	42.35	51.76	47.06
DDTR	62.65	77.78	70.21
CONTROL			
o,p'-DDE	.27		
p,p'-DDE	.46		
o,p'-DDD	-		
o,p'-DDD	-		
o,p'-DDT	.62		
p,p'-DDT	1.52		
DDTR	2.95		