GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[x] ORIGINAL [ ] REVISION NO. _____

Project No. A-3497 GTRI/~~GIT~~ DATE 3/30/83

Project Director: Kenneth A. Smith, Jr. ~~School~~/Lab EDL/SHD

Sponsor: CNA Insurance Companies

Type Agreement: Research Project Agreement No. A-3497

Award Period: From 3/22/83 To 4/5/83 (Performance) 4/5/83 (Reports)

Sponsor Amount: Total Estimated: $ 1,250 Funded: $ 1,250 (Advance payment)

Cost Sharing Amount: $ _____ Cost Sharing No: _____

Title: Evaluation of Pesticide Contamination at the Beeson Residence

ADMINISTRATIVE DATA

OCA Contact Faith G. Costello

1) Sponsor Technical Contact:

2) Sponsor Admin/Contractual Matters:

John P. Biddar, Jr.
Senior Claim Representative
CNA Insurance Companies
P.O. Box 3200
Atlanta, GA 30302

PH: (404) 491-0233

Defense Priority Rating: _____ Military Security Classification: _____

(or) Company/Industrial Proprietary: _____

RESTRICTIONS

See Attached NA Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with NA

COMMENTS:

COPIES TO:

Research Administrative Network	Research Security Services	Research Communications (2)
Research Property Management	Reports Coordinator (OCA)	Project File
Accounting	GTRI	Other Smith
Procurement/EES Supply Services	Library	Other _____

FORM OCA 4:781 (Rev 982)

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

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SPONSORED PROJECT TERMINATION SHEET

Date 4/15/83

Project Title: Evaluation of Pesticide Contamination at the Beeson Residence

Project No: A-3497

Project Director: Kenneth A. Smith, Jr.

Sponsor: CNA Insurance Company

Effective Termination Date: 4/5/83

Clearance of Accounting Charges: 4/5/83

Grant/Contract Closeout Actions Remaining:

- [x] Final Invoice ~~and Closing Documents~~
- [ ] Final Fiscal Report
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other _____

Assigned to: EDL (~~School~~/Laboratory)

COPIES TO:

Administrative Coordinator	Research Security Services	EES Public Relations (2)
Research Property Management	Reports Coordinator (OCA)	Computer Input
Accounting	Legal Services (OCA)	Project File
Procurement/EES Supply Services	Library	Other Smith

ENGINEERING EXPERIMENT STATION
Georgia Institute of Technology
A Unit of the University System of Georgia
Atlanta, Georgia 30332

April 1, 1983

Mr. John P. Biddar, Jr.
Senior Claim Representative
CNA Insurance Companies
Post Office Box 3200
Atlanta, Georgia 30302

Dear Mr. Biddar:

On March 7, 1983, air and wipe samples for aldrin were taken at the residence of Mr. Roy Beeson, 2961 West Roxboro Road, N.E., Atlanta, Georgia 30324. Aldrin was the active termiticide agent in a formulation which on January 11, 1983, was accidentally sprayed into the basement workshop and storage areas of the house.

The air sampling procedure followed the NIOSH recommended method (P & CAM S275) by drawing a known volume of air through a glass fiber filter (Gelman Type A) housed in a 37 mm PVC cassette. The sampling train also included a midget impinger containing 15 milliliters (ml) of isooctane. As the isooctane evaporated to below 10 ml fresh isooctane was added to the 15 ml level. At the end of the sampling period the filter cassettes were recapped and the caps were taped to prevent them from falling out. The isooctane solution was transferred to a glass vial and capped with a teflon-lined cap to seal the vial. The cap was taped shut to prevent accidental opening.

Analysis for aldrin was performed in the laboratory by desorbing aldrin from the glass fiber filter in the isooctane sample medium. An aliquot of the solution was injected into a gas chromatograph (for separation of components) equipped with an electron capture detector. Aldrin was quantified by comparison of peak area of the sample to peak areas of known standards.

SAMPLE RESULTS

Four air samples and six "wipe" samples were taken at various locations within the house. During sampling the house was kept "closed-up"; that is, all windows and doors were kept closed. The furnace was turned on to simulate the expected "normal" air movement throughout the house in summer and winter months. The sample results included in this report refer only to the levels found for aldrin. It is known that aldrin degrades into dieldrin, another pesticide with very similar toxic effects. Qualitative results from the air samples indicate that trace amounts of heptachlor are also present.

The highest concentration of aldrin (10.6 ug/M^3) was found in the basement workshop area (see Table 1). This area was identified as the site of a major spill of the pesticide formulation. Although the floor had been cleaned (by unspecified methods) ambient levels remained high. The apparent source of aldrin was the volatilization of aldrin residues which had penetrated into unprotected wood surfaces, or remained on the concrete floor and concrete block wall.

A second sampler was placed in the doorway between the furnace room and the basement storage area. The sampler was placed in this location to determine the levels of aldrin which would be transported to other areas of the house. Over a 236 minute period the ambient level of aldrin was 3.9 ug/M^3.

Two air samples were taken upstairs, one in the living room and one in the northwest corner bedroom. The ambient aldrin levels in both areas were similar (1.7 ug/M^3 in the bedroom and 1.3 ug/M^3 in the living room). The presence of aldrin in these areas is probably due to diffusion of aldrin from the basement area, and also transport from the basement area via the furnace blower.

Wipe samples of surfaces throughout the residence were taken by wetting Whatman 41 filters with isooctane and lightly rubbing the surfaces. Positive results of the wipe sampling can be interpreted only as a qualitative determination of the presence of aldrin. Quantification of the results is meaningless. Negative results can be interpreted only as stating that the levels of aldrin are less than the minimum detection limit of 0.1 micrograms.

The wipe sample results (see Table 2) indicate that the items which were directly contaminated by the spill remain contaminated as evidenced by the presence of aldrin on tools, the unfinished chairs, and the cabinets. In fact, the contamination appears to have been spread by inappropriate clean-up methods. The basement door leading to the patio and its frame, and the floor in the basement den show evidence of contamination. One sample taken on the living room carpet upstairs showed no evidence of aldrin contamination.

No information is available to determine the time it would take to reduce levels to less than 1 ug/M^3 by natural processes. In soil, 75-80% of aldrin is lost in 1-2 years. Dieldrin, one of the decay products of aldrin has a half-life in soil of 2-4 years. The mechanisms of loss include volatilization, photodegradation, and microbial action. Extrapolation of these data to a basement area of a home is unsure. The expected major loss of aldrin and dieldrin is by volatilization.

Information is not available to compare the observed aldrin levels to the aldrin levels in homes treated with aldrin-containing formulations where no spills occurred.

DISCUSSION

The interpretation of the observed pesticide levels in the Beesons' home is heavily dependent upon some recent data published by the National Research Council (NRC). The NRC is administered jointly by the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine. The

NRC's Committee on Toxicology published "An Assessment of the Health Risks of Seven Pesticides Used For Termite Control" in August 1982 in which they made recommendations on the control of exposure to aldrin. At that time the Committee suggested interim guidelines for airborne aldrin/dieldrin and heptachlor of 1 ug/m^3 and 2 ug/m^3 respectively for exposures not exceeding three years. It is their expectation that within this three year interim period, new exposure data will be developed that will enable the agency to make a more definitive statement concerning exposure to these pesticides at very low concentrations.

The NRC study candidly points out that data for chronic exposure (as opposed to the single acute exposure) is sparse and there is no information available on effects of long term exposure at low airborne concentrations. Aldrin has produced hepatocellular carcinomas in mice, however, and there is data that suggests that aldrin is a more potent carcinogen than chlordane. Because aldrin and dieldrin are less volatile than chlordane, the possibility of their becoming an airborne hazard is somewhat less, however, they will tend to be more persistent.

A final point concerning the NRC report is that unlike other standards which are applied to the workplace, their recommendations are for residential situations. This takes into account that there may be persons such as very young children exposed who, in general, are more susceptible to "environmental insults". For this reason the Committee concluded that it could not determine a level of exposure to any of the commonly used termiticides below which there would be no biologic effects.

RECOMMENDATIONS

The NRC recommendation on airborne aldrin referred to above is not a legal requirement. There are no legal standards for exposure to a pesticide that are applicable to a residential setting. The National Institute for Occupational Safety and Health has recommended that 150 ug/m^3 be established as a limit for exposure in the work environment. The current OSHA Permissible Exposure Limit has been set at 250 ug/m^3 as an eight-hour, time-weighted average for workplace exposure. Workplace standards however are set for a largely healthly population and generally exclude the very young and the very old. In addition a worker's allowable exposure is predicated on a forty hour work week rather than the twenty four hour per day exposure associated with a residential situation. Based on these considerations, re-occupation of the Beesons' house at the present level of contamination is not advised. It is suggested that further "clean up" work be conducted to lower the potential hazard from exposure to this pesticide. Some suggestions which you might wish to consider are the following:

1. All surfaces which absorb water, such as exposed wood surfaces, and which were directly contaminated by the liquid pesticide formulation spill should be replaced.

2. Non-porous floor and wall surfaces which were contaminated by the pesticide formulation should be thoroughly cleaned using a "one-pass" method, whereby only uncontaminated cleaning solution is applied to the

surfaces. An example of this method is the commercial carpet cleaning process. This method should reduce the contamination present, without spreading the aldrin to other surfaces.

3. All contaminated objects and cleaning solutions should be disposed of in a manner consistent with EPA/RCRA guidelines.

4. It may be necessary to seal the contaminated surfaces after cleaning to reduce the ambient aldrin levels. Sealing can be accomplished by installing vinyl flooring. It is suggested that an epoxy adhesive would produce a better seal than an asphalt-based adhesive because aldrin is soluble in petroleum-based components. The use of asphalt adhesive could effectively reduce the resistance of the covering to migration of aldrin through the covering.

The above suggestions are by no means an exhaustive list of factors you should consider in your decision regarding further clean-up work. We have attempted to locate companies that might be able to perform such clean-up but to date we have been unsuccessful. In the event that you engage someone to accomplish this work we would be happy to assist them with any additional testing required.

Sincerely,

Paul J. Middendorf, CIH
Research Scientist I

PJM:sek

TABLE 1. AREA ALDRIN SAMPLES

GEORGIA INSTITUTE OF TECHNOLOGY
Engineering Experiment Station
Safety & Health Services

Report No._____

INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant Roy Beeson's Residence

2961 West Roxboro Road, N.E., Atlanta, Georgia

Materials DuPont P-2500 Constant Flow Samplers

Glass Fiber Filter - 15 ml Isooctane in Midget Impinger

Date	Sample Number	Description	Sampling Period		Sample Volume (Liters)	Sample Time (Min.)	Concentration	
			Start	Stop			Aldrin (ug/M^3)	
3/7/83	2817 and 2818	Furnace/Storage Area	11:12	3:08	236	236	3.9	
3/7/83	2819 and 2820	Northwest Corner Bedroom	11:06	3:04	238	238	1.7	
3/7/83	2821 and 2822	Basement Workshop Area	11:09	3:10	241	241	10.6	
3/7/83	2823 and 2824	Living Room	11:04	3:00	236	236	1.3	

TABLE 2

ROY BEESON'S RESIDENCE

WIPE SAMPLES FOR ALDRIN

DATE	SAMPLE NO.	DESCRIPTION	ALDRIN (ug)
3/7/83	2811	Unfinished chair	3.99
3/7/83	2812	4 Tools	16.08
3/7/83	2813	Basement/Patio Door	1.50
3/7/83	2814	Inside Basement Cabinets	0.41
3/7/83	2815	Basement Floor	7.10
3/7/83	2816	Living Room Carpet	< 0.1