

Health Consultation

MONTROSE CHEMICAL CORPORATION
(HOUSE DUST)

TORRANCE, LOS ANGELES COUNTY, CALIFORNIA

CERCLIS NO. CAD008242711

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service

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Office of Regional Operations
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Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

HEALTH CONSULTATION

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(House Dust)

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Prepared by:

The California Department of Health Services
Under Cooperative Agreement with
The Agency For Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

The Montrose site is located in the city of Torrance, California. The Del Amo site, another hazardous waste site, is located directly west of the Montrose site in the city of Los Angeles, California. From 1947 to 1982, Montrose manufactured, formulated, and ground the insecticide DDT (dichlorodiphenyltrichloroethane) at its 13-acre facility.

In 1984, the United States Environmental Protection Agency (USEPA) placed the Montrose site on the National Priorities List (NPL) of hazardous wastes sites because of potential contamination to the soil, groundwater, and air due to the migration of DDT (all isomers of DDT and its degradation products DDD and DDE) and other chemicals off-site via surface water runoff into drainage ditches and canals, discharges to the sanitary sewer system, airborne dispersion, and percolation to groundwater.

During a soil investigation conducted in September 1993, USEPA discovered a DDT fill area beneath several homes (i.e., between 1039 and 1055) located on West 204th Street. Because of this, USEPA offered voluntary relocation assistance to approximately 30 households. Since then, USEPA has conducted additional soil sampling investigations in order to determine the extent of DDT contaminated fill. During August and September 1994, USEPA conducted an extensive investigation at West 204th Street which included sampling of the subsurface soil, indoor air, tap water, and household dust. The dust sampling method used to analyze the samples was able to qualitatively indicate that DDT was present or in most of the samples. A quantitative analytical approach would have been able to provide information concerning the levels of DDT in the dust samples. The importance of obtaining quantitative data would allow us to better understand past exposures to DDT that may have occurred from living in those homes.

Therefore, in 1995, the Agency for Toxic Substances and Disease Registry (ATSDR) and the Environmental Health Investigations Branch (EHIB) of the California Department of Health Services (CDHS) requested that the USEPA conduct an household dust sampling investigation. This document presents the evaluation conducted by CDHS of the household dust sampling data.

DISCUSSION

A. Summary of the Household Dust Investigation

Initially, CDHS/ATSDR recommended that three samples should be collected in all "relocated" homes. Due to the financial constraints, USEPA agreed to collect three samples in seven of the relocated homes for a total of 21 samples. However, members from the Del Amo Action Committee (DAAC) recommended that USEPA collect samples from all relocated homes. Thus, due to the concerns voiced by the (DAAC), USEPA decided to collect one carpet dust sample in each of the relocated homes located along West 204th

Street. Samples were collected in twenty homes. Access to two homes was denied; thus, carpet dust samples could not be collected.

The household dust sampling investigation was conducted in May 22-24, 1995, in order to obtain quantitative levels of DDT, breakdown products of DDT (i.e., DDD and DDE), and benzene hexachloride (in its four forms: alpha-, beta-, delta-, and gamma-benzene hexachloride) in the twenty homes along West 204th Street. The purpose of USEPA's obtaining these data was to assist the physicians in their evaluation of community members living in the vicinity of the Del Amo site for environmental exposures. Furthermore, these data may enable the physicians to better correlate adverse clinical findings with past exposures to DDT.

The field team consisted of two environmental engineers and one environmental technologist from CH₂M Hill, one of USEPA's contractors, and one industrial hygienist from CDHS/ATSDR. The sampling protocol, Standard Practice for Collection of Floor Dust for Chemical Analysis: D5438-94 by the American Society for Testing Materials (ASTM), was used as a guideline for the investigation. The carpet dust samples were collected by a High Volume Small Surface Sampler (HVS3) which was developed by USEPA and manufactured by Cascade Stack Sampling Systems (CS3).

The field team attempted to collect carpet dust samples in locations where people were most likely to be exposed, in essence, locations where they spend the majority of the time. Without a personal survey/questionnaire and because several of the residents have removed their furniture out of their homes, it was difficult to assess where people spent the majority of their time (e.g., sampling in front of a television set would have been a good location to choose because people, especially young children, have a tendency to spend hours in front of television sets). Furthermore, because of the extremely small size of several homes, the sampling locations were based on the available surface area.

The majority of the samples were collected in the living room area. However, in a few of the homes, carpet dust samples were collected in other areas (e.g., hallways, bedrooms, entire home, etc.) because of one or more of the following reasons: lack of carpet in the living room, lack of sampling area in the living room due to furniture and/or other household items, and/or absence of a living room. In two homes, the owners specifically requested that the field team collect carpet dust samples in specific locations: a child's room because of an air vent that may be carrying DDT contaminated air/dust; and a bedroom where a person was experiencing respiratory problems. A few homes were extremely small; therefore, more than one area had to be sampled in order to collect adequate amounts of sample. Thus, CDHS/ATSDR initial recommendation to collect three samples per home would not have been feasible in the smaller homes because of the lack of surface area; however, it would have been possible in the larger homes.

The carpet dust samples were analyzed for DDT, breakdown products of DDT (i.e., DDD and DDE), and benzene hexachloride (in its four forms: alpha-, beta-, delta-, and gamma-

benzene hexachloride). The level of benzene hexachloride (all four forms) in all the samples analyzed were non-detect (i.e., below 1 ppm). The levels of DDT and its breakdown products (i.e., DDD and DDE) in all the samples were below the health comparison level of 26 ppm. The levels of DDT and its breakdown products in twelve homes were non-detect (i.e., below 1 ppm). However, DDT was detected in low levels, ranging from 1 ppm to 8 ppm, in the remaining seven homes.

The seven homes were located either directly above the DDT fill area or in the vicinity of the DDT fill area. One of the homes is located directly above the DDT fill area. Two of the homes are located a few homes east of the DDT fill area; whereas, the remaining four homes are located on the western border of the DDT fill area. Furthermore, in September 1993, a sampling investigation conducted by USEPA's contractor, Dames & Moore, found elevated DDT levels, which ranged from 29 ppm to 111 ppm, in the subsurface soil (more than 3 inches in depth) in the DDT fill area. According to research conducted on house dust, "....80% of household dust is assumed to be identical in contaminant content to outdoor soil...." (4-6). Thus, the elevated DDT levels in the subsurface soil may have contributed to the low levels of DDT detected in the household dust samples in the seven homes.

B. Health Impact to Low Levels of DDT in Household Dust

CDHS estimated the DDT inhalation and dermal doses. The summation of the inhalation and dermal doses (or the resultant additive doses) were compared to non-cancer health comparison values and were also used to estimate cancer risk. The additive doses were used instead of individual doses (inhalation doses or dermal doses) because these doses "summed-up" the total exposure through both the inhalation and dermal routes.

Non-cancer Risk: Minimal Risk Levels (MRLs), which are developed by ATSDR, are estimates of daily exposure of a human being to chemicals that are likely to be without an appreciable risk of non-carcinogenic effects over a specific duration of exposure (viz., acute: less than 14 days; intermediate: greater than 14 days, but less than 1 year; and chronic: greater than 1 year). The MRLs are based on non-toxic exposure levels in animals extrapolated to human being using a 1,000-fold safety factor.

The additive doses were based on exposure to five levels of DDT concentrations (i.e., 1 ppm, 2 ppm, 5 ppm, 6 ppm, and 8 ppm) detected in the homes. The length of exposures to DDT used in the calculations were nine and thirty years. The additive doses for the inhalation and dermal routes were below ATSDR's acute, intermediate, and chronic MRLs (0.0005 mg/kg/day) with the exception of the doses calculated for a pica-child. Non-cancer effects are not expected to occur from past exposure to DDT. Although the pica-child's dose was higher than the MRL, we do not expect non-cancer effects because the MRL was calculated using a 1000-fold safety factor. In other words, in the research studies conducted with DDT, adverse non-cancer effects were detected at 0.5 mg/kg/day; thus, the highest dose a pica-child may be exposed to, 0.003 mg/kg/day, is well below this level. The results are

summarized in Table 1.

Table 1. DDT Exposure and Total Dose

DDT (ppm)	Total Dose (mg/kg/day)			MRLs (mg/kg/day)
	Adult	Child	Pica-Child*	
1	0.000009	0.00003	0.0003	0.0005
2	0.00002	0.00005	0.0007	0.0005
5	0.00005	0.0001	0.0017	0.0005
6	0.00006	0.0002	0.002	0.0005
8	0.00008	0.0002	0.003	0.0005

*Pica-Child = A pica child is defined as a child that has an abnormal appetite for non-food items, such as, soil.

Cancer-Risk: Our chance of getting cancer in our lifetime, known as our "background cancer risk," is about one-in-four. When we say there is a one-in-a-million extra cancer risk from a given exposure to a cancer-causing chemical, we mean that each individual exposed to that chemical at that level over his or her lifetime has a one-in-a-million chance above the background risk of getting cancer from that particular exposure. In order to take into account the uncertainties in the science, the risk numbers used are plausible upper limits of the actual risk. In actuality, the extra risk is probably somewhat lower than one-in-a-million, and, in fact, may be zero. That is important to remember in reading this document. The terms "low increased risk" or "very low increased risk" are qualitative interpretations of risk numbers that ATSDR uses. In reality, the increased risk at those levels may actually be zero. Because of individual sensitivities and our lack of knowledge of how possible carcinogens work on the body, we cannot say without doubt there is no increased risk from a low-level exposure.

In order to calculate the increased lifetime cancer risk, we assumed that adults were exposed to DDT for a 9- or a 30-year period. According to our calculations, there is no apparent increased cancer risk to an exposure to DDT at levels below 2 ppm for a period of 9 years. As for exposure to DDT at levels between 5 to 8 ppm for a period of 9 years, the increased cancer risk is very low. Exposure to DDT levels below 6 ppm for a 30-year period results in a very low increased cancer risk. As for exposure to DDT at 8 ppm for 30 year, the increased cancer risk is low. The results are summarized in Table 2.

Table 2. DDT Exposure and Cancer Risk

Total Cancer Risk					
DDT (ppm)	9 Year Period	Qualitative Interpretation	DDT (ppm)	30 Year Period	Qualitative Interpretation
1	1 in 2,500,000	No Apparent Increased Risk	1	1 in 730,000	Very Low Increased Risk
2	1 in 1,250,000		2	1 in 350,000	
5	1 in 450,000	Very Low Increased Risk	5	1 in 630,000	
6	1 in 400,000		6	1 in 125,000	
8	1 in 300,000		8	1 in 92,000	Low Increased Risk

CONCLUSIONS

Based on the household dust data reviewed and the information provided, the levels of DDT and benzene hexachloride (BHC) do not appear to pose non-cancer health concerns.

Specifically, the level of benzene hexachloride (all four forms) in all the samples analyzed were non-detect (i.e., below 1 ppm). The levels of DDT and its breakdown products in twelve homes were non-detect (i.e., below 1 ppm). However, DDT was detected in low levels, ranging from 1 ppm to 8 ppm, in the remaining seven homes. The additive doses calculated using the levels (viz., ranging from 1 to 8 ppm) of DDT detected in the household dust were all below ATSDR health comparison level for non-cancer effects.

For a 9-year exposure to DDT (levels below 2 ppm), there is no apparent increased cancer risk; however, for levels between 5 to 8 ppm, the increase cancer risk is very low. For a 30-year exposure to DDT (levels below 6 ppm), there is a very low increased cancer risk. At 8 ppm, the increase cancer risk is low.

RECOMMENDATIONS

Since USEPA plans to remove the DDT contaminated soil, the levels of DDT should significantly decrease in the area. Furthermore, USEPA plans to clean all the "relocated" homes. However, it is not possible to entirely eliminate household dust; therefore, general housekeeping is extremely important if there are young children, especially infants, living in the homes.

Additional recommendations are as follow:

- CDHS should determine if the community would find a workshop and/or fact sheet covering general housekeeping techniques (viz., methods to "control" and "minimize" the level of interior household dust) helpful.
- CDHS should determine if the community would find a workshop covering the basic concepts of toxicology and risk assessment helpful. It is important that the community members gain a basic understanding of the complex variables involved in conducting a risk assessment (e.g., exposure pathways, health comparison levels, safety factors, qualitative vs. quantitative sampling methods, etc.)
- EPA should consider additional environmental sampling to support the clinic's activities as needed.

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DOCUMENTS REVIEWED

- 1) USEPA Preliminary Pesticide Organic Analysis Data Sheets for the Household Dust Sampling Investigation May 26, 1995.
- 2) California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Dust Control in the Home.
- 3) Agency for Toxic Substances and Disease Registry. Toxicological Profile for 4,4'-DDT, 4,4'-DDE, 4,4'-DDD (Update), TP-93/05, May 1994.
- 4) Hawley, JK. Assessment of Health Risk from Exposure to Contaminated Soil. Risk Analysis, Vol. 5(4):289-302, 1985.

- 5) Fergusson, JE et al. The Elemental Composition and Sources of House Dust and Street Dust, *The Science of the Total Environment*, 50:217-221, 1986.
- 6) Fergusson, JE and Kim, ND. Trace Elements in Street and House Dusts: Sources and Speciation, *The Science of the Total Environment*, 100:125-150, 1991.

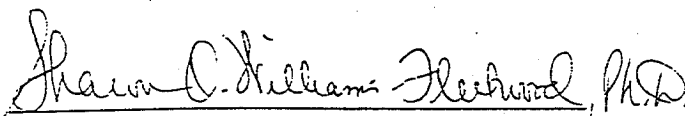
CERTIFICATION

The Montrose House Dust Health Consultation has been prepared by the California Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.


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The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.


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