

# Health Consultation

Abandoned Dredge Pond

NORTH HOLLYWOOD DUMP

MEMPHIS, SHELBY COUNTY, TENNESSEE

EPA FACILITY ID: TND980558894

SEPTEMBER 24, 2002

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES**

**Public Health Service**

Agency for Toxic Substances and Disease Registry

Division of Health Assessment and Consultation

Atlanta, Georgia 30333

## **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.

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HEALTH CONSULTATION

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Prepared by

Tennessee Department of Health  
under a cooperative agreement with  
Agency for Toxic Substances and Disease Registry

## **BACKGROUND AND STATEMENT OF ISSUES**

In the 1930s, North Hollywood Dump (NHD) was started by the city of Memphis as a municipal dump. In the late 1940s, Hayden Chemical Company disposed of wastes generated by the production of sodium hypochloride in NHD. Velsicol Chemical Company bought Hayden and continued disposal in NHD. NHD was also used for the disposal of other Memphis-area industrial wastes (EPA 2002a).

In 1980, the U.S. Environmental Protection Agency (EPA) discovered pesticides and heavy metals in surface soil, groundwater, and pond sediments at NHD (EPA 2002a). With an estimated 10,000 people living within 3 miles of NHD and a high level of community concern, Tennessee recommended NHD as its highest priority hazardous waste site.

In 1980, EPA took emergency action to slow the movement of contaminants from NHD. EPA installed a chain-link fence barrier and began an on-site waste monitoring program. In 1981, some of the surface contamination was removed. In 1990, EPA issued a Record of Decision (ROD) for the site.

During 1996-1997, the North Hollywood Dump Steering Committee and EPA reached agreement on cleanup and monitoring of the Abandoned Dredge Pond (ADP) just southeast of NHD. The 35-acre, 70-foot deep, and naturally beautiful pond (Figure 1) contained fish that were known to have bioaccumulated pesticides. It was feared that people would catch and eat contaminated fish. To determine the extent of clean up needed, grid sampling of the pond substrate was performed. It was determined that the eastern and western parts of the pond were contaminated with pesticides while the central, shallow portion of the pond was not contaminated. The remediation procedure lowered the water level before dredging the eastern and western sediments. The sediment from the center of the pond was used to fill in the dredged areas. In addition, the fish were killed, the pond was restocked, and a fish consumption warning was posted (Conestoga-Rovers & Associates 1997; EPA 2002a).

The 1997 report (Long-Term Monitoring and Maintenance Plan - North Hollywood Dump, Memphis, Tennessee [Conestoga-Rovers & Associates 1997]) that followed the initial remedial activities set monitoring of pesticide levels in fish at 2-year intervals. During each monitoring phase, fish from the ADP were to be compared to fish from the nearby Wolf River. Although the Wolf River already had a posted consumption warning, fish from the river were used to represent the background contaminant level.

The 2001 (Table 1) fish surveys showed pesticide levels higher than the 1992 pre-remediation levels.

In July 2002, Richard Campbell from EPA asked the Tennessee Department of Health (TDH) to provide a health consultation to answer to the question, "Is there a health risk associated with

eating fish from the ADP at NHD?” He provided background information, reports with data sets, and photos detailing fish sampling and people fishing in the pond (Figures 2 and 3).

On August 15, 2002, Don Hudgins from the city of Memphis escorted Jim Morrison, Tennessee Department of Environment and Conservation (TDEC) Division of Superfund; Benjamin Moore, Agency for Toxic Substances and Disease Registry (ATSDR); and David Borowski, TDH, to the Abandoned Dredge Pond at the NHD site. ADP was investigated from many possible access points. Visible evidence of recent fishing included monofilament line, bait containers, and lure packaging. A small boat was beached on the shoreline. Three people were seen fishing near a makeshift boat ramp, built from pea gravel and asphalt, on the south side of ADP (Figures 4 and 5).

## **DISCUSSION**

### **Public Use of ADP**

During the August 15 visit to ADP, interviews with people fishing near the makeshift boat ramp helped clarify whether the public could be exposed to the pesticides. The first man encountered had a fishing pole and bait. He already found a sinker, and was looking for discarded hooks and line. He was new to the neighborhood and knew little about ADP, except that a friend told him it was good for fishing.

Also during the August 15 visit, a couple drove their pickup truck to ADP. The truck was loaded with cane fishing poles, buckets, a tackle box, and a cooler. The couple had lived in the area some 30 years. They knew about fish advisories from a letter they received. The woman mentioned that they did not catch any of the fish mentioned in the letter anyway, so she was not concerned about a health risk. She mentioned people from Arkansas who fished in ADP from their boat. While we interviewed the couple, they put a fish into their cooler.

Perhaps the best evidence for use of ADP for fishing came from the Heard Avenue homeowner living closest to the makeshift boat ramp. The homeowner stated that people have fished in ADP for many years. Fish in ADP include bass, crappie, catfish, shad, gar, carp, sunfish, and brim. The homeowner said that the area is full of parked cars on weekends when people come to fish. He stated that it was common for four boats to launch into ADP on a Saturday. Two of his stories helped to solidify evidence of public exposure pathways to the pesticides in ADP fish. One story was about a 6-year-old boy who caught a 5-pound bass; the other was about a man who caught 40 crappie in 1 day.

### **Pesticide Contaminants**

Chlordane, a manufactured chemical used as a pesticide in the United States from 1948 to 1988, is the contaminant of concern in the fish from ADP. Chlordane was also known by the trade names Octachlor and Velsicol 1068. Chlordane is not a single chemical, but rather a mixture of

related chemicals. It is a thick, clear liquid that does not dissolve in water. Chlordane was usually applied as an emulsion and used in agriculture, lawn-and-garden, and termite control applications. Chlordane was used to treat field crops and as a solid treatment to kill termites. The EPA phased out the use of chlordane as concerns of accumulation in body fat, persistence in the environment, danger to wildlife, and cancer risk grew (ATSDR 1994).

Chlordene and heptachlor epoxide, both degradation products of chlordane, and endrin were also measured in ADP fish (Table 1) (Environmental Resources Management 2002).

Chlordane is of considerable concern to human health. Reasons for this concern include its potential for inducing adverse health effects, its presence in breast milk, its persistence in adipose tissue in the human body, and its persistence in all environmental media.

Chlordane residues stored in fat in the human body are probably innocuous. It is possible that toxicity might occur when stores of body fat are mobilized in response to stress or dieting. Toxicity might also occur in nursing mothers, who mobilize substantial amounts of body fat to maintain lactation. No examples of mobilization were found in available literature.

The effects observed in humans or animals exposed to chlordane do not appear to be route dependent, probably because absorption occurs readily by any route of exposure (ATSDR 1994). It seems reasonable, therefore, that the effects of human exposure would be similar in people whether exposure occurs at hazardous waste sites or in their homes.

Neurologic signs have been consistently found in animal poisoning, which firmly establishes chlordane as a neurotoxicant. Longer term exposure of humans to lower levels of chlordane caused neurologic signs, including grand-mal seizures and altered electroencephalograms (EEGs), but levels of exposure were not quantified. The occurrence of jaundice in persons living in chlordane-treated homes and the alteration of serum enzyme levels in persons working as pesticide applicators suggest that the liver is an important target organ in humans. Available data suggest that hematologic effects might occur in unusually sensitive persons exposed to low levels of chlordane in environmental media near waste sites.

Genotoxicity studies in microorganisms or mammalian systems were mostly negative, meaning that chlordane does not alter DNA (ATSDR 1994). Yet, EPA (2002c) considered the data in laboratory animals sufficient to classify chlordane in Group B2 – as a probable human carcinogen.

### **Pesticide Concentrations**

The 2001 data show that the amounts of chlordane, chlordene, endrin, and heptachlor epoxide have increased in the restocked fish since the 1999 sampling (Table 1). In fact, pesticide levels in 2001 were higher than the 1992 concentrations that were the reason for the initial cleanup. The increase of pesticide levels in fish tissue was the reason for this health consultation.

It is important to note the 1999 and 2001 chemical concentrations were measured in actual fish fillets. Normally, chemical concentrations are higher in fish viscera than in a meaty fish fillet. In these instances, the chemical concentrations were measured directly from the desirable portions of the fish. In addition, a study using blue fish demonstrated that cooking did not significantly change chlordane concentrations (ATSDR 1994). Therefore, no argument can be made that cleaning or cooking techniques will reduce chlordane concentration.

### **Chemical Intake Assumptions**

Ingestion rates of chemicals in contaminated fish tissues were calculated using intake equations outlined by EPA (1989). Standard values of 70-kilogram (kg) adult body weight and 70-year life span were incorporated. Based on a modest 8-ounce fish meal per 2 months which is equivalent to 3.73 g of contaminated fish per 1 day was used as the intake. Reference dose (RfD), slope factor, and minimum risk level (MRL) values were taken from Health Guidelines Comparison Values (ATSDR 2002). Table 2 shows the chemical ingestion rates calculated using a standard ingestion equation.

The upper 95% confidence interval of chemical concentrations in the average of all fish was used for all calculations rather than predicting the trophic level of fish that would be caught and consumed. This generalization is valid because popular game fish such as bass, bluegill, crappie, and catfish span all trophic levels.

### **Risk to the Public**

Using standard EPA assumptions for adults, the amount of chlordane ingested exceeds EPA and ATSDR thresholds (RfD and MRL, respectively) for non-cancer adverse health effects. EPA's National Guidance for Assessing Chemical Contamination Data for Use in Fish Advisories (EPA 2002b) advises no fish consumption for fish with chlordane concentrations greater than 9.4 parts per million (ppm, equivalent to mg/kg). Furthermore, the U.S. Food and Drug Administration (FDA) established that the levels of the chlordane and its breakdown products in fish should not be greater than 100 parts per billion (ppb, equivalent to ug/kg) (ATSDR 1994).

Evidence exists that the elderly, pregnant women, and children are populations that are unusually susceptible to the effects of chlordane. Factors including age, body weight, diet, genetic make-up, and habits such as smoking can enhance the adverse effects of chlordane (ATSDR 1994). In addition, individuals with declining organ function or developing organs are more vulnerable to toxic substances than are healthy adults.

### **ATSDR Child Health Initiative**

In 1996, ATSDR launched an initiative to place a special agency-wide emphasis on environmental hazards to children's health and to emphasize child health in all agency programs

and activities. The initiative was begun because of the special vulnerabilities children have when exposed to hazardous substances (ATSDR 1997, 1998).

Children are at greater risk than are adults from certain kinds of exposure to hazardous substances at sites with environmental contamination. Children engage in activities such as playing outdoors and in hand-to-mouth behaviors that increase their exposure to hazardous substances. Children are shorter than adults, which means they breathe dust, soil, and vapors close to the ground. Their lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. The developing body systems of children can sustain permanent damage if toxic exposures are high enough during critical growth stages.

Exposure pathways involving small children were evaluated during the development of this health consultation. In evaluating these data, careful attention was paid to ensure that the health of small children was protected. With regard to small children, eating fish caught from the pesticide contaminated ADP creates a situation in which the risk of adverse health effects will increase. This is especially true for children with low body weight, inconsistent diet, or nutritional deficiencies (ATSDR 1994). Interviews and Figure 2 provided evidence that children use ADP.

### **Physical Hazards**

Several physical hazardous are present along the ADP shoreline that could cause physical injury to adults and especially to children. Litter and illegal dumping are prevalent along the southern shoreline of ADP. Glass bottles, metal cans, plastic bags, and monofilament line are all present. Parked and junked cars (Figure 6) essentially create a parking lot where many people park to fish. This situation was witnessed during the August 15, 2002, site visit and described in interviews. Each person interviewed mentioned that children played near ADP.

## **CONCLUSIONS**

1. A public health hazard exists at the North Hollywood Dump Abandoned Dredge Pond, Shelby County, Memphis, Tennessee.
2. The attempt to remedy NHD ADP does not appear to have been successful. Pesticide concentrations in the fish were higher in 2001 than in 1992.
3. A completed exposure pathway exists for consumption of pesticide-contaminated fish from ADP.
4. ADP is easily accessible to the public.
5. On the basis of current data, the concentration of chlordane in fish exceeds EPA, ATSDR, and FDA guidelines; therefore, ADP fish are not safe for human consumption.

## **RECOMMENDATIONS**

1. Look at further ways to mitigate contamination in ADP.
2. Prevent access to ADP.
3. Publish new fish advisories written so that they are understood by the local community members and in the languages spoken by these community members.
4. Conduct community outreach to inform the local citizens of the ADP health hazard.

## **ACTIONS PLANNED**

1. The city of Memphis plans to post illustrated, universal “No Fishing” signs.
2. The Tennessee Department of Health Environmental Health Studies and Services will plan outreach to inform local community members of the ADP health hazard.

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**Table 1**  
**Chemical Concentrations in Abandoned Dredge Pond**  
**Total of All Fish 1992, 1999, 2001**  
 North Hollywood Dump Site  
 Memphis, Shelby County, Tennessee

<b>Chemical</b>	<b>1992 Upper 95% Confidence Interval Concentration [mg/kg]</b>	<b>1999 Upper 95% Confidence Interval Concentration [mg/kg]</b>	<b>2001 Upper 95% Confidence Interval Concentration [mg/kg]</b>
Chlordane	2.07	2.27	12.25
Chlordene	0.04	0.15	0.24
Endrin	0.07	0.04	0.19
Heptachlor Epoxide	0.14	0.04	0.20

**Table 2**  
**Chemical Concentrations in Abandoned Dredge Pond**  
**Total of All Fish 2001**  
 North Hollywood Dump Site  
 Memphis, Shelby County, Tennessee

<b>Chemical</b>	<b>2001 Upper 95% Conf. Int. Conc. [mg/kg]</b>	<b>Intake (mg/kg-d)</b>	<b>EPA RfD (mg/kg-d)</b>	<b>EPA slope factor (mg/kg-d)<sup>-1</sup></b>	<b>ATSDR MRL (mg/kg-d)</b>	<b>Non Cancer Hazard</b>	<b>Excess Cancer Risk Quotient</b>
Chlordane	12.25	6.53x10 <sup>-4</sup>	5x10 <sup>-4</sup>	0.35	6x10 <sup>-4</sup>	1.31	1.87x10 <sup>-3</sup>
Chlordene	0.24	1.28x10 <sup>-5</sup>					
Endrin	0.19	1.01x10 <sup>-5</sup>	3x10 <sup>-4</sup>		2x10 <sup>-3</sup>	0.034	
Heptachlor Epoxide	0.20	1.07x10 <sup>-5</sup>	1.3x10 <sup>-5</sup>	4.5		0.82	2.4x10 <sup>-6</sup>

**Table 3.**  
**Monthly Fish Consumption Limits for Carcinogenic and Noncarcinogenic Health Endpoints for Chlordane (EPA 2002b)**

<b>Risk Based Consumption Limit<sup>a</sup></b>	<b>Noncancer Health Endpoints<sup>b</sup></b>	<b>Cancer Health Endpoints<sup>c</sup></b>
<b>Fish Meals / Month</b>	<b>Fish Tissue Concentrations</b>	<b>Fish Tissue Concentrations</b>
	<b>(ppm, wet weight)</b>	<b>(ppm, wet weight)</b>
Unrestricted (>16)	0 - 0.15	0 - 0.0084
16	>0.15 - 0.29	>0.0084 - 0.017
12	>0.29 - 0.39	>0.017 - 0.022
8	>0.39 - 0.59	>0.022 - 0.034
4	>0.59 - 1.2	>0.034 - 0.067
3	>1.2 - 1.6	>0.067 - 0.089
2	>1.6 - 2.3	>0.089 - 0.13
1	>2.3 - 4.7	>0.13 - 0.27
0.5	>4.7 - 9.4	>0.27 - 0.54
None (<0.5)	>9.4	>0.54

a The assumed meal size is 8 oz (0.227 kg). The ranges of chemical concentrations presented are conservative, e.g., the 12-meal-per-month levels represent the concentrations associated with 12 to 15.9 meals.

b Chronic, systemic effects.

c Cancer values represent tissue concentrations at a 1 in 100,000 risk level.

Notes:

- Consumption limits are based on an adult body weight of 70 kg, an RfD of  $5 \times 10^{-4}$  mg/kg-d, and a cancer slope factor (CSF) of  $0.35 \text{ (mg/kg-d)}^{-1}$
- None = No consumption recommended.
- In cases where >16 meals per month are consumed, refer to Equations 3-1 and 3-2, Section 3.2.1.2, for methods to determine safe consumption limits.
- The detection limit for chlordane is  $1 \times 10^{-3}$  mg/kg.
- Instructions for modifying the variables in this table are found in Section 3.3.
- Monthly limits are based on the total dose allowable over a 1-month period (based on the RfD). When the monthly limit is consumed in less than 1 month (e.g., in a few large meals), the daily dose may exceed the RfD (see Section 2.3).

## CERTIFICATION

This North Hollywood Dump Abandoned Dredge Pond Health Consultation was prepared by the Tennessee Department of Health 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 begun.

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Technical Project Officer, SPS, SSAB, DHAC, ATSDR

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

*Roberta Erlwein*

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Chief, State Program Section, SSAB, DHAC, ATSDR

*Electronic Document*

**Figure 1**

**Abandoned Dredge Pond - August 15, 2002**

**Looking West**

North Hollywood Dump, Memphis, Shelby County, Tennessee

*(Photo by David Borowski, TDH)*



**Figure 2**  
**Abandoned Dredge Pond**  
**Family Fishing at Makeshift Boat Ramp**  
North Hollywood Dump, Memphis, Shelby County, Tennessee  
*(Photo by Carolyn Robinson, EPA)*



**Figure 3**

**Abandoned Dredge Pond - August 15, 2002**

**Person Fishing**

North Hollywood Dump, Memphis, Shelby County, Tennessee

*(Photo by Carolyn Robinson, EPA)*



**Figure 4**

**Abandoned Dredge Pond - August 15, 2002**

**Makeshift Boat Ramp**

North Hollywood Dump, Memphis, Shelby County, Tennessee

*(Photo by David Borowski, TDH)*



**Figure 5**

**Abandoned Dredge Pond - August 15, 2002**

**People Fishing**

North Hollywood Dump, Memphis, Shelby County, Tennessee

*(Photo by David Borowski, TDH)*



**Figure 6**

**Abandoned Dredge Pond - August 15, 2002**

**Physical Hazard Junked Cars**

North Hollywood Dump, Memphis, Shelby County, Tennessee

*(Photo by David Borowski, TDH)*

