

# Health Consultation

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Exposure Investigation Report

MEREDITH WILLIAM C CO. INC.  
EAST POINT, GEORGIA

EPA FACILITY ID: GAD003323805

AUGUST 23, 2007

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

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HEALTH CONSULTATION

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Prepared by:

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Public Health Service  
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## Executive Summary

The William C. Meredith Wood Treatment facility (“Meredith”) is located in East Point, Fulton County, Georgia. The wood processing at Meredith involves the dipping of timber into a low heat treatment reservoir and the subsequent cyclical drying of that timber in the open air. The facility uses either creosote or pentachlorophenol on a rotational basis. In July 2003, the Agency for Toxic Substances and Disease Registry (ATSDR) received a petition from a resident requesting a public health evaluation of Meredith. The primary complaints in the request were the obnoxious odor, respiratory irritation and asthma exacerbations. ATSDR and the Georgia Division of Public Health (GDPH) conducted an Exposure Investigation (EI) that collected air samples for creosote and pentachlorophenol from October 2003 to March 2004. Sampling results showed that airborne levels of creosote near Meredith were below levels known to cause a public health hazard. However, the pentachlorophenol air levels in the communities surrounding Meredith posed an indeterminate public health hazard due to uncertainty of the population’s internal dose. In the fall of 2004, we started a second EI to fill that data gap with an added biologic component. The air sampling was followed by urine sampling to determine pentachlorophenol levels in the urine of residents at risk of exposure. We also looked for a possible correlation between the pentachlorophenol levels in air and in urine.

**The results:** Pentachlorophenol was detected in the ambient air of the community and in the urine of residents.

**The conclusions:** Pentachlorophenol levels in air and urine in East Point are higher than elsewhere in the U.S., including in another community near a wood treatment plant. (Stone, 2006).

Although *long term exposure* to the highest concentration of pentachlorophenol in the air may slightly increase the risk of cancer, the levels measured in the urine suggest that health effects are unlikely.

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## **Objectives and Rationale**

The purpose of this second EI was to establish if the pentachlorophenol levels in urine of residents surrounding the Meredith facility-within a one mile radius- were elevated. We did this by comparing urine pentachlorophenol levels of the Meredith community, with that of the general population as defined by CDC's Second and Third National Report on Human Exposure to Environmental Chemicals, 2005. This EI is the second prepared in response to a petition request from a community member to ATSDR in the summer of 2003, regarding environmental odor complaints and respiratory irritation. The first EI found elevated pentachlorophenol levels in the air.

Results of this EI, without personal identifiers, will be shared with community residents, governmental and industrial stakeholders.

## **Background**

The Meredith wood treatment plant is located in East Point, Fulton County, Georgia on 640 acres of deeded land. Meredith processing involves the dipping of timber into a low heat reservoir and the subsequent drying of that timber in the open air.

The facility uses either creosote or pentachlorophenol as wood preservative on a rotational basis. The plant usually operates twenty-four hours a day, seven days per week. Outdoors drying of the treated wood poles is done in a cyclical manner in batches.

In July 2003, when ATSDR received a petition from a resident requesting a public health evaluation of Meredith, the primary complaints in the request were the obnoxious odor, respiratory irritation and asthma exacerbations. ATSDR and the GDPH collected air samples for creosote and pentachlorophenol from October 2003 to March 2004. These air samples were collected at various public locations to reflect community exposure. Sampling results showed that the levels of airborne creosote near Meredith were below levels known to cause a public health hazard. However, the pentachlorophenol air levels in the communities surrounding Meredith posed an indeterminate public health hazard due to uncertainty of the population's internal dose. In the fall of 2004, we started a second EI in an attempt to fill that data gap with an added biologic component. The biologic component of the second EI measured pentachlorophenol levels in the urine of residents at risk of exposure. Air sampling for pentachlorophenol also took place at this time. The purpose of this EI was to establish if the urine pentachlorophenol levels of residents surrounding the Meredith facility are elevated. We did this by comparing urine pentachlorophenol levels of the Meredith community, with that of the general population as defined by CDC's Second and Third National Report on Human Exposure to Environmental Chemicals, 2005.

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**The Chemical Pentachlorophenol:** Pentachlorophenol is an organochlorine pesticide and it is absorbed by the systemic circulation when it is inhaled. Chronic inhalation exposure to *high levels* of pentachlorophenol may result in inflammation of the upper respiratory tract and bronchitis. The International Agency for Research on Cancer (IARC) has determined that pentachlorophenol is possibly carcinogenic to humans, and EPA has classified pentachlorophenol as a probable human carcinogen (B2).

The majority of pentachlorophenol is excreted through the urine and does not accumulate within the body to a significant degree. Impurities found in pentachlorophenol formulations include small amounts of chlorinated dioxin congeners. Chlorinated dibenzodioxins and chlorinated dibenzofurans consist of approximately 210 different compounds with different levels of chlorination. Pentachlorophenol typically contains the higher chlorinated dioxins, which tend to have less toxicity compared with other dioxin congeners. Human epidemiology studies that evaluated the health impact of exposure to pentachlorophenol<sup>1</sup> are not conclusive because of inadequate exposure information and simultaneous exposures to other chemicals.

**Environmental Odors:** Some evidence suggests that people can become symptomatic from exposure to odors. Several mechanisms have been postulated for the symptoms including a natural aversion to certain odors, additional anxiety to someone already experiencing stress, a conditioning effect whereby nontoxic odors become associated with substances that are harmful, and aggravation of existing medical conditions, such as bronchial asthma. Odor-related aversive conditioning may occur when a person experiences low-level odor exposure after an initial traumatic exposure. A common response is hyperventilation with fast heart rate, dizziness, nausea, sweating, and anxiety (Shusterman, 1991). Stress-related health effects may be associated with the degree to which an individual believes an odor is causing risk. The symptoms-causing odor thresholds of some contaminants may be *below* levels thought to be hazardous, thus defying classic toxicological explanation. After exposure to noxious environmental odors, these processes may occur in some individuals and not in others. Smokers and the elderly may be less aware of odors with the added risk of prolonged exposure. In general, women are more sensitive to odors than men are.

Health effects from *low-level, chronic exposures* to some contaminants, carries a certain degree of uncertainty when compared with the known health effects of *occupational or acute high level exposure*.

## Exposure Investigation Design

This Exposure Investigation was triggered by a request from a community member from East Point complaining about environmental odors and health effects.

We did air sampling followed by urine pentachlorophenol screening around residences within a one mile radius from the plant. Air samples were taken in locations close to residential yards of

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<sup>1</sup> Studies to determine Hematologic effects (Klemmer, 1980); upper respiratory, dermal and ocular effects (Klemmer, 1980 and Baader, 1951); hepatic effects (Hryhorzcuk, 1998, Cheng, 1993); endocrine and reproductive effects (Gerhard, 1991, 1998, 1999); Neurologic effects (Peper, 1999); developmental effects (Dimich-Ward, 1996); cancer effects (Fingerhut, 1984; Greene, 1978; Roberts, 1983).



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recruited volunteers, and we looked for correlation between pentachlorophenol levels in air and in urine samples. A spot urine sample was collected before bedtime, as this time was more convenient for families. This collection time also was better for people working outside their house and allowed for added pentachlorophenol exposure time after they got home.

There are 4 neighborhoods within the East Point area. Each community has different socio-economic status, ethnic background and personality. A total of 18 air sampling devices were distributed within the site among the 4 neighborhoods. We included the yards of some recruited community members, plus some public areas for most people in that neighborhood. The number of air samples in each community varied according to wind direction -the more often a neighborhood was downwind of Meredith's odors, the more often samples were collected there.

On the air sampling day, urine collection kits were provided to all participants with instructions on how to collect and store the urine samples until they could be picked up by ATSDR staff. The air samples were collected the day prior to the collection of the urine samples.

### **Target Population**

The primary focuses of this EI were residents of the East Point community adjacent to Meredith within a one-mile radius. The potentially affected population was estimated to be approximately 2,000 people.

### **Environmental Sampling**

#### ***Data Collection/Sampling Procedures***

Pentachlorophenol was collected with adsorbent tubes consistent with OSHA method number 39 for the determination of pentachlorophenol in air and subsequently analyzed by high performance liquid chromatography/ultraviolet detection. A sample of ambient air was drawn by a pump into two daisy-chained tubes connected with flexible tubing and containing adsorbent granules of XAD-7 (glass tubes A and B). The samples were collected at a rate of 0.2 L/min over an eight-hour period. After the sample was collected another tube (glass tube C) was opened on one end and attached to the end of tube A that was previously open to the environment. Tube B was then capped at the open end. Samples were shipped following chain of custody and storage procedures. There were no known interferences with this sampling method.

#### ***Laboratory Analytic Procedures.***

### **Biologic Sampling**

#### ***Data Collection/Sampling Procedures***

##### ***Urine Collection***

Participants were solicited among the 4 communities within a one-mile radius of Meredith. The residents were requested to participate in pentachlorophenol urine sampling, excluding the employees of the facility, and children less than 6 years of age. The age limitation was set in

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order to have an age group comparable to that in the CDC's Second and Third National Report on Human Exposure to Environmental Chemicals.

A spot urine sample from each individual rather than a first morning void was obtained for the following reasons:

1. It was easier and more convenient for the community members and thus helped compliance.
2. CDC's Second and Third National Report on Human Exposure to Environmental Chemicals background values are based on spot urine samples.

Each participant was asked to sign the consent/assent forms (see appendix). Each participant received an acid-washed specimen container and was instructed to collect a spot urine sample. Participants were instructed to place the filled container in a zip-lock bag and refrigerate until ATSDR staff returned to collect the samples. These instructions were also written in plain language and given to them.

### ***Chemical Analysis Procedures***

A total of 34 samples were analyzed by the National Center for Environmental Health (NCEH)/CDC laboratory in Atlanta, GA. following the protocol described in the Journal of Analytical Toxicology, Vol. 19, September, 1995: "Determination of Pesticide Metabolites in Human Urine Using an Isotope Dilution Technique and Tandem Mass Spectrometry", by Robert H. Hill Jr., DB Shealy, SL Head et al. Two samples were from ATSDR staff (for health and safety monitoring) and are not considered in the analysis. Two samples were collected from the same individual in the community. The two results from this individual were identical; only one of his samples was considered in the analysis. Therefore the number of samples in the data analysis is 31.

### **Data Analysis Procedures**

The pentachlorophenol levels of thirty one urine samples were compared to the CDC's Second and Third National Report on Human Exposure to Environmental Chemicals, 2005 which defines geometric mean and selected percentiles of urine concentration ( $\mu\text{g/L}$  for pentachlorophenol) for the U.S. population aged 6 years and older. Values above the 95<sup>th</sup> percentile for age and gender were considered elevated.

The air samples are reported individually by sector and distance from the facility and by the correlation with people's urine pentachlorophenol level.

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## **Agency Roles**

ATSDR staff visited the site and surrounding area and conducted the environmental and biologic Exposure Investigation.

ATSDR staff also took the urine samples to NCEH laboratories to be analyzed.

ATSDR staff wrote this report of the investigation findings.

## **Records Management**

The key linking the individual name to the sample ID codes, and the results of the individual samples are kept confidential, with the information being kept in locked cabinets at ATSDR and in a password-protected computer file. Written reports do not identify participants by name or address. The coded results will be shared only with other federal, state and local public health and environmental agencies, as authorized by the written consent of the participants.

## **Results**

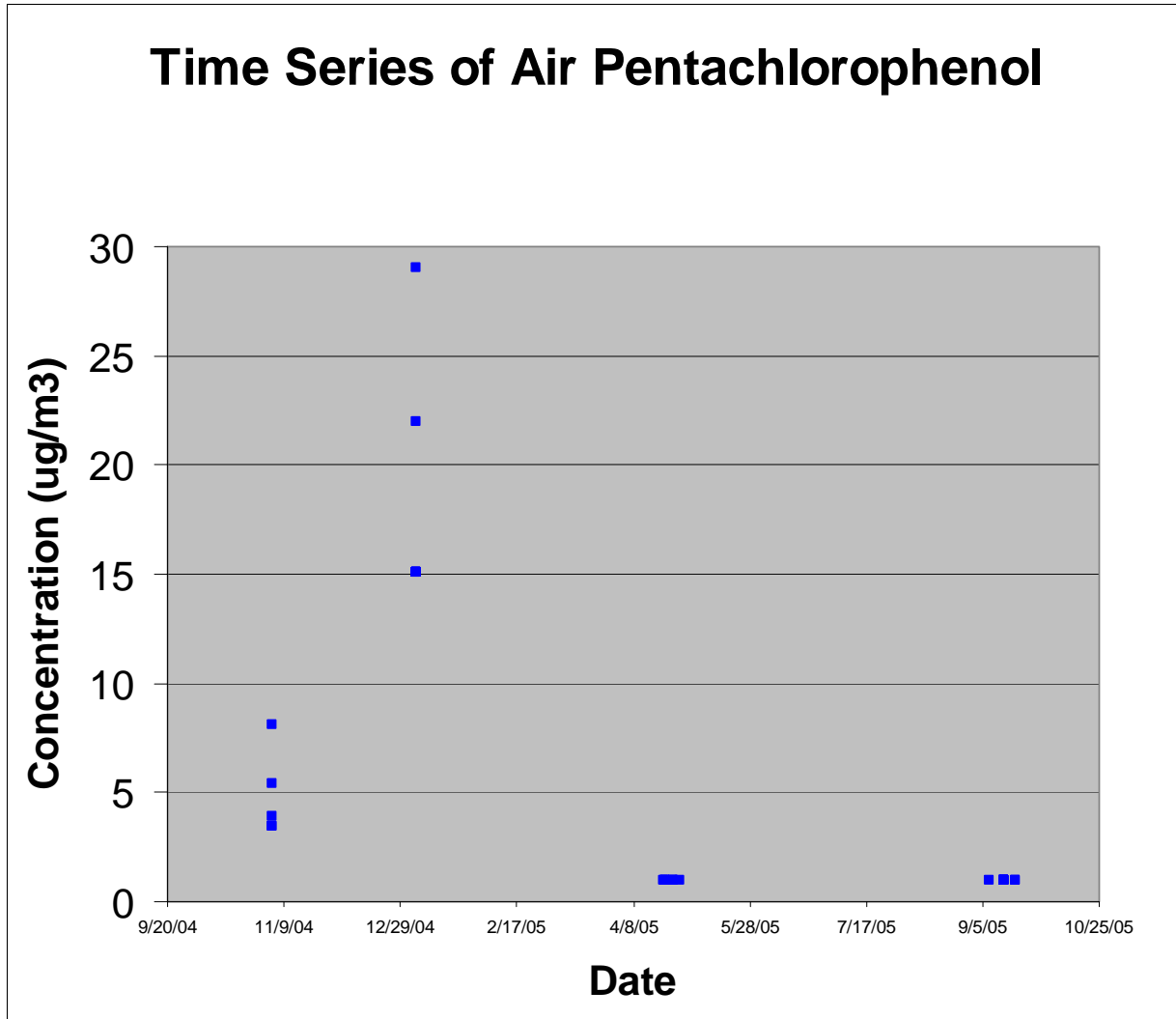
Pentachlorophenol was found in the ambient air of the community in East Point and in the urine of residents. The highest urine pentachlorophenol level found among community volunteers has not been associated with health effects (ATSDR 2001).

## **Environmental Sampling Results**

### **Air results**

In East Point, pentachlorophenol was detected in 36% of the air samples, the concentrations ranged from non detectable levels (ND) to 29  $\mu\text{g}/\text{m}^3$ . Three or four samples were collected each time ATSDR staff visited the community in response to obnoxious environmental odors. The pentachlorophenol measured in the air during this EI is depicted on Figure 1.

Figure 1: Pentachlorophenol Measurements Made in the East Point Air



Background environmental levels of pentachlorophenol in the US are not well documented; however, pentachlorophenol is rarely detected in the environment currently. In 1980, the EPA estimated the atmospheric levels of pentachlorophenol to be 0.00015-0.136  $\mu\text{g}/\text{m}^3$  in the US. A later Canadian study reported pentachlorophenol levels ranging from 0.00043-0.00368  $\mu\text{g}/\text{m}^3$  [Cessna et al. 1997]. In East Point, the levels were 15 – 30  $\mu\text{g}/\text{m}^3$  at the fence line. Residential levels ranged from less than 1.3 to 8.1  $\mu\text{g}/\text{m}^3$  for eight to ten hours. These values are similar to those from the previous East Point exposure investigation [Zarus, 2004].

Airborne pentachlorophenol concentrations measured inside pentachlorophenol treated log homes ranged from 0.2 -0.38  $\mu\text{g}/\text{m}^3$  [CDC 1980]. Airborne pentachlorophenol concentrations ranged from 0.3-50  $\mu\text{g}/\text{m}^3$  at several production, application, or pressure wood treatment operations [Wyllie et al. 1975, Zober et al. 1981]. In another report, airborne pentachlorophenol concentrations ranged from 3-69  $\mu\text{g}/\text{m}^3$  at seven pentachlorophenol dipping plants and 11 pentachlorophenol spray plants [Arnsenault, 1976].

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## Biological Sampling Results

### Urine results

Thirty eight percent (38%) of the East Point participants had detectable levels of pentachlorophenol in their urine; whereas, less than 20% of the general population had detectable levels of pentachlorophenol in their urine [NCEH 2005].

Urinary pentachlorophenol concentrations in East Point ranged from ND to 6.66 µg/L. In the general population pentachlorophenol ranged from ND to 325.19 µg/L. Five percent (5%) of the general population has more than 1.94 µg/L of pentachlorophenol in their urine, while sixteen (16%) of the participants in East Point have more than 1.94 µg/L

## Discussion

Over time, pentachlorophenol levels in air and urine have decreased dramatically in the US due to a joint effort by the EPA and CDC. As a result of numerous investigations of people living in pentachlorophenol-treated log homes, CDC recommended that pentachlorophenol not be used for log homes. EPA then promulgated a policy restricting pentachlorophenol from being used in log home construction. EPA also restricted the sale and use of pentachlorophenol pesticides and the commercial uses are required to be handled by trained applicators. As use has dropped, so have exposures.

### Air:

The data collected during this exposure investigation are unique as there has not been any substantial study of airborne pentachlorophenol exposures since the 1980's. Scientists seldom study pentachlorophenol in the atmosphere. Currently when pentachlorophenol is studied, it is seldom detected or is detected at low levels.

During this EI, the highest pentachlorophenol measurement of 29 µg/m<sup>3</sup> was collected near the plant fenceline. The highest pentachlorophenol level measured near a residence was 8.1 µg/m<sup>3</sup>. During the previous ATSDR investigation 30 µg/m<sup>3</sup> was measured in the sample collected near the fenceline and 7.9 µg/m<sup>3</sup> was measured near a residence.

Air concentrations of pentachlorophenol throughout both EIs were variable despite a designed attempt to collect samples at those sites where exposures were expected to be highest based on increased odors, wind direction, and the evidence of newly placed pentachlorophenol treated logs on the open ground of the facility.

Airborne pentachlorophenol was studied inside log homes during the 1980s. In those studies, CDC found that low levels (as low as 0.2-0.38 µg/m<sup>3</sup>) were associated with elevated urine levels of pentachlorophenol. Although the health effects data collected were subjective and limited, they recommended stopping the use of pentachlorophenol in log homes as a prudent public health practice. Since the restriction of pentachlorophenol, airborne studies have been limited to

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the workplace. However, workplace pentachlorophenol studies focus on exposure near the point of application and seldom study pentachlorophenol levels elsewhere.

The previous EI was the first to find pentachlorophenol in the air around a community [Zarus 2004]. Levels reported during this (2004-2005) follow-up investigation were consistent with those found previously. Although only low levels of pentachlorophenol were detected in samples collected after January of 2005, we are unable to determine if this represents a permanent decline in pentachlorophenol in the area or if we missed the exposure window for pentachlorophenol (e.g., in winter time) in the air. Even with the longest reported atmospheric half-life of about 66 hours [Bunce and Nakai 1989], it is possible that our air samples were collected after the emissions from the logs have ceased and pentachlorophenol was degraded. In the Atlanta summer, the half-life could be as short as 6 hours, making it very difficult to detect elevated levels.

While it is possible that we did not capture the maximum levels, the sampling strategy was designed to have a high bias (being down wind) and therefore the variability of the values of those samples indicates that exposures are not continuous. Individual intermittent exposures were expected to be short in duration. This fact has positive health implications, since the elimination rate of pentachlorophenol from the body is rapid, the short exposure periods give people time to recover from any peak exposure.

The data are insufficient to correlate the pentachlorophenol in the air with the pentachlorophenol in the urine. Sometimes it took several days to collect 10 urine samples following an air sampling event. Pentachlorophenol has a short half-life in the air but in the human body its elimination rate varies widely among individuals. With so few urine samples collected at varying time periods after each air event, our limited data were insufficient for a meaningful statistical analysis. (See Appendix for data)

## Urine

Urine is considered the best means to track pentachlorophenol exposures because pentachlorophenol is eliminated quickly from the body, and urine samples are easy to collect. Additionally, NCEH has conducted several studies of pentachlorophenol in urine in the general population over the years, which allows them to analyze trends. These trends allow us to track the decline in pentachlorophenol use.

As a result of the reduction in pentachlorophenol use over the last 20 years, pentachlorophenol decreased from detection in over 71.6% to less than 20% of the population. The steady decline is documented in the National Health and Nutrition Survey (NHANES) referenced below.

<b>Year sampled</b>	<b>Detection</b>	<b>Reference</b>
1976-1980	71.6%	NHANES II [Kutz et al., 1992]
1988-1994	64%	NHANES III [Hill et al., 1995]
1999-2000	<20%	NHANES 00 [NCEH 2005]
2001-2002	<20%	NHANES 02 [NCEH 2005]

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By combining the data from the last two surveys, we find that pentachlorophenol is detected in less than 15.8% of the population [CDC's Second and Third National Report on Human Exposure to Environmental Chemicals, July 2005]. The urine samples from East Point residents, however, showed a much higher detection frequency.

We cannot compare the general population's group average (mean) because most of the general population is below detectable levels. However, we can compare percentile groups.

If the thirty one (31) East Point participants had pentachlorophenol exposures like the general population nationwide, we would have expected 5 people to have measurable levels. There were 12 individuals in East Point with measurable levels. The table below includes the measurements of these 12 participants and compares them with the general population.

**Table 1: Pentachlorophenol Concentrations in Urine of Several East Point Participants**

Pentachlorophenol level in urine ( $\mu\text{g/L}$ )	Percentile of East Point	Percentile of US	Percentile Difference
0.55	65	85	20
0.58	68	86	18
0.63	71	86	15
0.74	74	87	13
0.90	77	88	11
1.66	81	94	13
1.75	84	94	10
2.44	88	96	8
2.73	91	97	6
3.68	94	98	4
3.70	97	98	1
6.66	99+	99	0

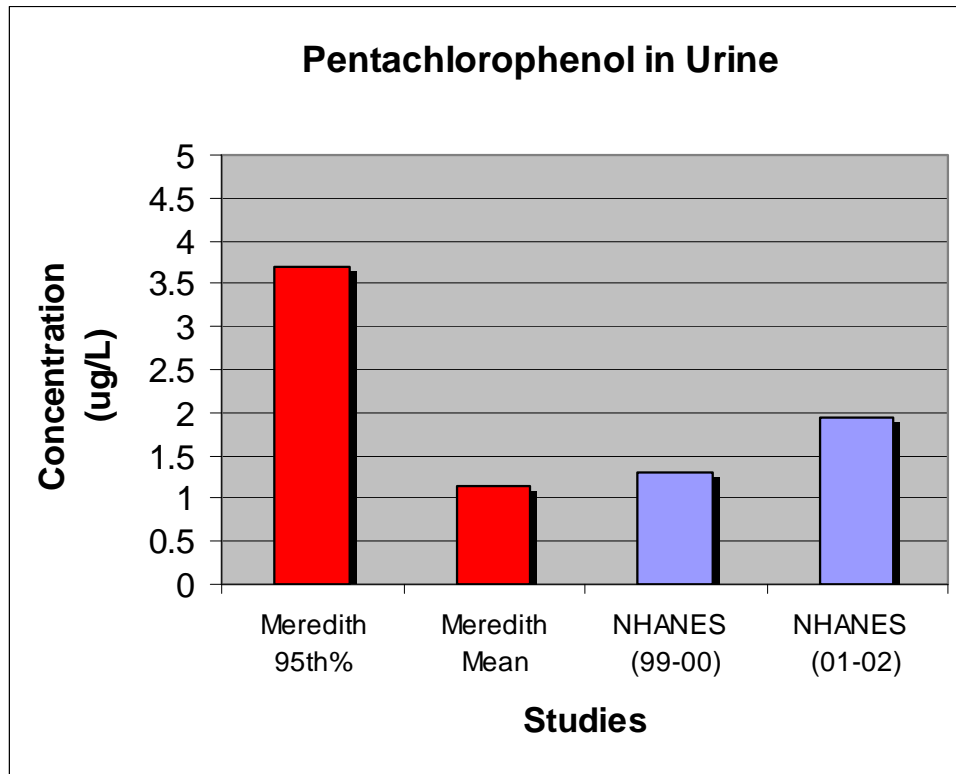
The first column is the amount of pentachlorophenol measured in the urine; the second column is the percentile of the measurements below this concentration in the East Point participants; the third column is the percentile of the measurements below this concentration in the general population; and the fourth column is the difference between the two percentile groups. This last column indicates that these East Point participants have higher exposure than the general population.

Additionally, there were three (3) East Point participants with pentachlorophenol levels at or higher than 98% of the general population; there are four (4) participants with pentachlorophenol levels higher than the maximum levels for the 95% of the general population for 1999 through 2000 and for 2001 and 2002. And there were seven (7) participants with pentachlorophenol levels higher than the 93% of the general population.

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Furthermore, it should be noted that none of the urine samples collected after September 5, 2005 had measurable levels of pentachlorophenol and this coincided with no pentachlorophenol levels detected in the air (see appendix).

**Figure 3: Comparison of Meredith with the 95th percentile of the General Population**



**Meredith 95th percentile** = the calculated urine measurement that corresponds with the 95% highest measurement.  
**Meredith Mean** = the average of all the pentachlorophenol measured in the East Point Participant's urine.  
**NHANES (99-00)** = the 95th percentile of the general population collected in 1999 and 2000.  
**NHANES (01-02)** = the 95th percentile of the general population collected in 2001 and 2002.

The conclusion of this comparison is that while not all of the East Point participants meet our definition of an unusually exposed group, an exposed sub-population may exist. There are confounders that do not allow us to determine if residents who spend 24-hrs/day at home in East Point are an unusually exposed sub-population. After examining the results of several individuals who both lived close to the facility and had no pentachlorophenol detected in their urine, we also learned that they have only lived in the area for a short time. This is significant because the metabolism and elimination rate of pentachlorophenol is different for people who have been exposed to a few events (acute exposure) compared with those exposed continuously over long periods of time (chronic exposure).

The elimination half-life of pentachlorophenol in the urine varies according to study and is dependent on whether the exposure is acute or chronic. [Braun 1977, Reigner 1991, Yaun 1994]. The range of half-lives in people is about 27-36 hours [Braun 1979].

Inhaled pentachlorophenol was readily absorbed at rate of 88-76%, when human subjects were exposed for less than one hour at low air concentrations at 0.23 -0.43 ng/m<sup>3</sup>. The



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pentachlorophenol in human bodies was evenly distributed among liver, kidney, brain, spleen, and body fat. The inhaled pentachlorophenol was found in human urine both in unchanged form and its degradation products. The elimination of inhaled pentachlorophenol from exposed humans was biphasic. In acutely exposed human subjects, the inhaled pentachlorophenol eliminated from urine had a half-life of 10 hours. However, in wood-treatment workers chronically exposed to pentachlorophenol, the urinary half-life of elimination was 19-20 days. (ATSDR, 2001). Therefore, in those chronically exposed, urine pentachlorophenol may be found even after the pentachlorophenol in air disappeared.

Therefore, since we know that the air concentrations were variable, and that people's elimination rates vary, the urine measurements do not necessarily represent the peak values. This makes the East Point levels less biased toward peak levels and more appropriately compared to the random samples of the general population.

### **Public Health Implications of Pentachlorophenol Exposure**

While the pentachlorophenol air levels pose a slight cancer risk, the pentachlorophenol urine levels found in the volunteer community members are below the levels associated with non-cancerous health effects (ATSDR 2001).

Neither ATSDR nor the EPA has developed health-based toxicity values for inhalation exposure to pentachlorophenol in air. However, EPA has developed an RfD of  $3 \times 10^{-2}$  mg/kg/day for oral exposures to pentachlorophenol. The average concentration of pentachlorophenol in air from residential yards in Meredith was less than  $3 \mu\text{g}/\text{m}^3$ . If an 11 kg child inhaled  $9.15 \text{ m}^3$  of air per day (EPA 1997), this would be equivalent to a daily dose of  $2.5 \mu\text{g}/\text{kg}/\text{day}$ . This dose is less than the RfD of  $30 \mu\text{g}/\text{kg}/\text{day}$ , so no adverse, non-cancer health effects would be expected.

In addition, the EPA has developed a cancer slope factor of  $1.2 \times 10^{-1}$  (mg/kg/day) for oral ingestion of pentachlorophenol. Applying this slope factor to an adult resident living near Meredith (70 Kg) who inhaled  $16 \text{ m}^3$  of air per day for 30 years would equate to an increased cancer risk level of  $3.5 \times 10^{-5}$  his risk level would not result in an observable increased risk of cancer in the community and does not pose a public health hazard.

There are no studies on intermittent inhalation exposures to pentachlorophenol at low levels. The limited *human* exposure data, in addition to the above health guidelines, also suggest that there is little or no risk of cancer from inhalation of pentachlorophenol, and the *animal* data suggest a very low risk of cancer.

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The last statement above is based on the following:

- 1) The highest urine concentrations of pentachlorophenol measured in an East Point resident volunteer was 6.66 µg/L.
- 2) Based on occupational studies of exposure to pentachlorophenol, a no effect level for pentachlorophenol on kidney function was estimated to be between 590 and 950 µg/L of free creatinine, which corresponds to a total pentachlorophenol concentration of about 2.4 to 4 mg/L [Begley 1977].
- 3) The pentachlorophenol log home studies consisted of *continuous* inhalation of pentachlorophenol at levels near those measured in Meredith with little or no health effects observed (no renal, hepatic, or enzyme induction effects) and urine measurements ranged 4.9-269 µg/L. Although, the observed health effects were limited to dermatitis only, the populations were not large enough to determine if there was an increased risk of cancer [Hosenfeld 1986].
- 4) There are no studies that reported an association of *low level* pentachlorophenol inhalation and cancer in humans, despite a long history of worker and residential exposures to pentachlorophenol [ATSDR 2001].
- 5) There are *occupational* studies that suggest that *high level* exposures to pentachlorophenol treated wood are associated with non-Hodgkin's lymphoma [Hertzman 1997, Hardel 1994]
- 6) Ingestion of fish and water with *high levels* of pentachlorophenol was associated with non-Hodgkin's lymphoma [Lampi 1992]
- 7) There are several animal studies that associate ingestion of *high doses* of pentachlorophenol and cancer in animals [ATSDR 2001]

## Limitations

This EI is limited to the study of pentachlorophenol exposure of volunteer community members living within one mile of the Meredith site.

The small number of participants in this EI may not be representative of the community at highest risk for exposure. Seventy four percent of the recruited volunteers worked outside of their homes, and they were away from the area an average of 10 hours each day except on weekends.

The individual exposures may vary depending on the amount of time spent in or near their home. Additionally, each person eliminates pentachlorophenol at different rates. In one case we observed *similar* urine measurements between spouses despite spending different times at home; in another case, we observed *different* urine measurements between spouses despite having spent the same time at home. The one person with the highest level of pentachlorophenol in urine lived

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in her house many years and stayed home most of the time. Their next-door neighbors, with no detectable levels of pentachlorophenol in their urine, moved there recently and lived closer to Meredith but worked outside their home.

We may have overestimated the extent of exposure down wind by following the smell of pentachlorophenol in the air, as odor detection may not be accurate to assess human exposure to airborne pollutants: the exposed group may be smaller. Some people can smell chemicals 500-1000 times better than others. Age, stress, certain health conditions and fertility status influences an individual's ability to detect odors on a given day (Lundström, 2006).

On days that the air pentachlorophenol levels were elevated and the urine pentachlorophenol levels were not, we may have missed the window of exposure by collecting the urine the day *after* the air samples were collected. The elimination rate of pentachlorophenol is variable; available studies found differences in elimination rates [Braun 1977, Braun 1979, Reigner 1991, and Yaun 1994].

**Sources of Pentachlorophenol:** Most of the general population is exposed to small amounts of pentachlorophenol in their food.(ATSDR 2001). Very little is attributed to inhalation. The *total* exposure of pentachlorophenol in the East Point participants is uncertain. Pentachlorophenol levels were generally higher in the individuals who lived farther from Meredith which would suggest that they may not have an unusual body burden due to air exposures. However, other evidence suggests that Meredith contributed to the exposures:

- 1) One ATSDR staff member had higher urine levels of pentachlorophenol after going to East Point several days in a row than when he stayed away.
- 2) The levels of pentachlorophenol in the air and in the urine both dropped as the investigation progressed.
- 3) The pentachlorophenol levels measured in air would produce measurable body burdens: An air concentration of 1  $\mu\text{g}/\text{m}^3$  (the average observed) would yield a dose of about 20  $\mu\text{g}/\text{day}$ ; if it all was excreted in the urine in one day, it would result in an urine concentration of about 10  $\mu\text{g}/\text{L}$  of pentachlorophenol.<sup>2</sup> If the pentachlorophenol was excreted over a period of 3 days, we would estimate an average urine concentration of 3  $\mu\text{g}/\text{L}$  (near the level observed in a few of the participants)

## Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children could be at greater risk than are adults from certain kinds of exposure to hazardous substances. Since only one East Point resident volunteer was less than 18 years of age, we do not have the appropriate data to support specific conclusions for East Point children. However, there are several studies which provide general childhood exposure data that can be applied to East Point.

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2 Assuming: An inhalation rate of 20  $\text{m}^3$  /day and an elimination rate of 2 L/day.

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**Pentachlorophenol-Specific Child Health Considerations:** Children are not just small adults. Children breathe more air relative to their body weight than adults. Children's exposure to the same air concentrations of pentachlorophenol in the environment is higher per pound of body weight than for adults [Cline 1979; CDC 1980]; children may be more susceptible to pentachlorophenol exposures [Chapman 1965; McConnachie 1991; Mehmood 1996; Leeder and Kearns 1997]; pentachlorophenol may cross the placenta and enter into the developing fetus [Larsen 1975]; and pentachlorophenol is a developmental toxicant at high doses [Schwetz 1978, Argus 1993b, Bernard 2001b, Argus 1997, Bernard 2001c, Beard 1999b, Courtney 1976, Larsen 1975, Welsch 1987, Schwetz 1974].

## **Conclusions**

- Airborne pentachlorophenol levels in East Point community are higher than in other US localities, including another community near a wood treatment plant.
- Pentachlorophenol measured in the urine of some East Point residents was elevated, but the link between the urine exposure level and the air level is uncertain.
- Pentachlorophenol measured in the air and urine of resident volunteers in East Point does not pose an acute or intermediate public health hazard.
- Pentachlorophenol urine levels found in the volunteer community members are below the levels associated with non-cancer adverse health effects.
- Long-term exposure to the highest measured concentrations of pentachlorophenol in air may pose a slight increase in the risk of cancer. The cancer risk is not zero.

## **Recommendations**

- Since there are increased community concerns of upper respiratory tract irritation, asthma exacerbation, and obnoxious odors, the prudent public health measure is to reduce area pentachlorophenol levels. (e.g. installing a pressure treated containment vessel).
- Because communities include sensitive subpopulations, such as children (see Childhood Health Initiative), and the data on pentachlorophenol exposures to children are limited in the available literature, we recommend that exposures in this neighborhood should be reduced.
- Provide Community Health Education related to wood-preserving materials and how to reduce pentachlorophenol exposure.

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## **Public Health Action Plan**

To present the EI results to participating community members of East Point; explain the data and answer their questions.

To provide the local EPA with a copy of the Meredith EI including the recommendations for reducing area pentachlorophenol level exposure.

To educate the Meredith community about ways of reducing their pentachlorophenol exposure.

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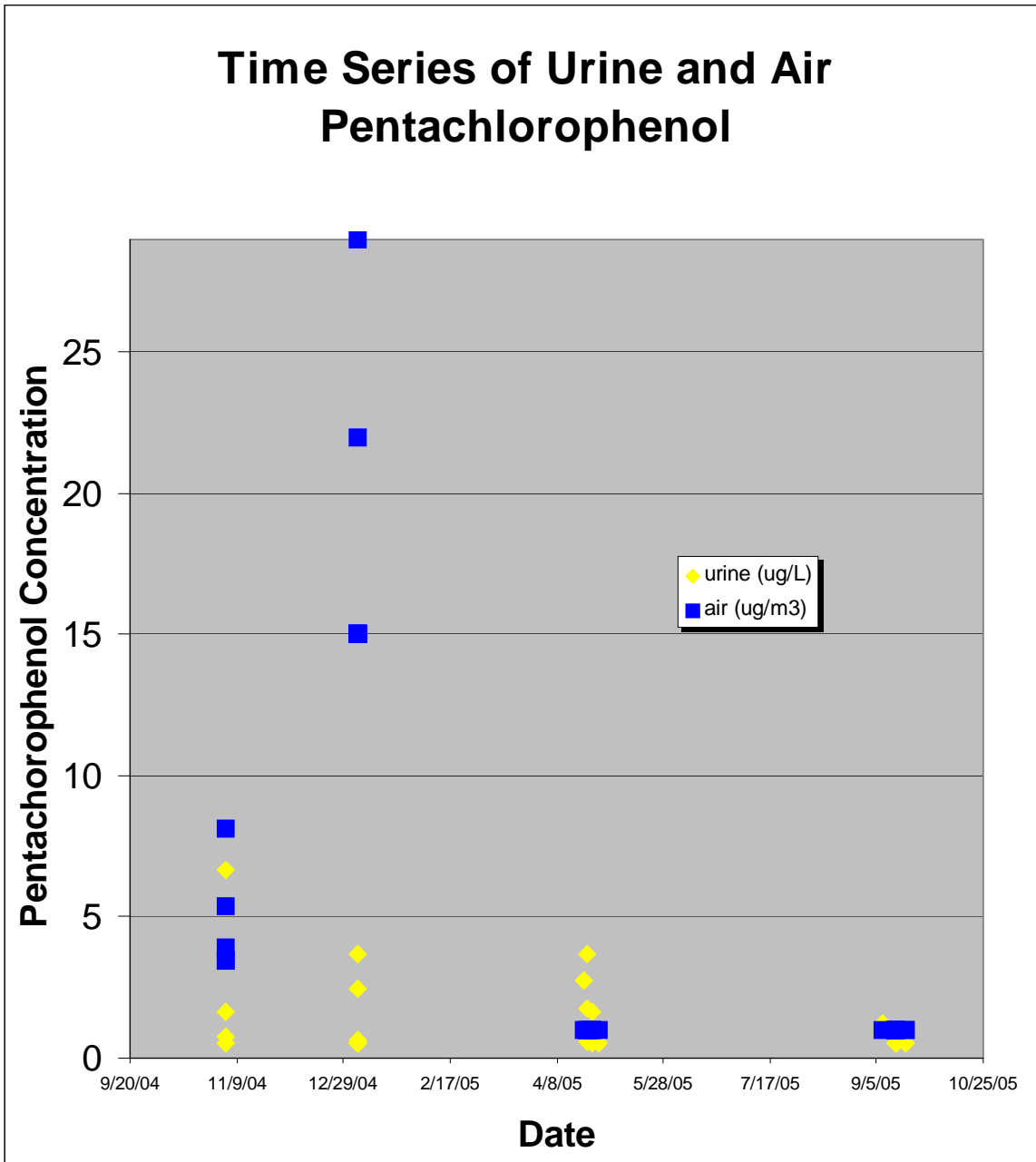
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**Appendixes:**

**A. - The association between air levels and personal exposure to pentachlorophenol**

While it appears that the pentachlorophenol in the air may contribute to the elevated levels in some of the East Point participants, there are discrepancies in the results. While the measurements of both are higher than normal, inconsistencies in the trend of each set of data were noted. For example, the figure below suggests that the pentachlorophenol in the air and in the urine of residents is declining. The air concentrations in two batches of winter samples were significantly higher than that in the following two batches of summer samples.



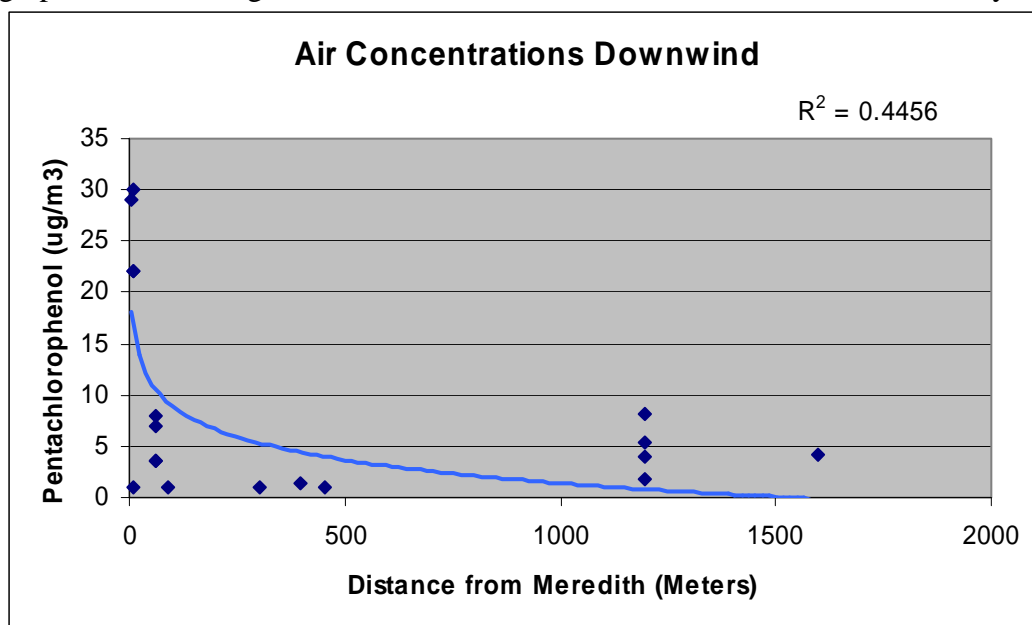
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While the highest air levels were measured during the winter (as with the previous EI), this trend was not as apparent in the urine samples.

### B. - Air Concentration Downwind

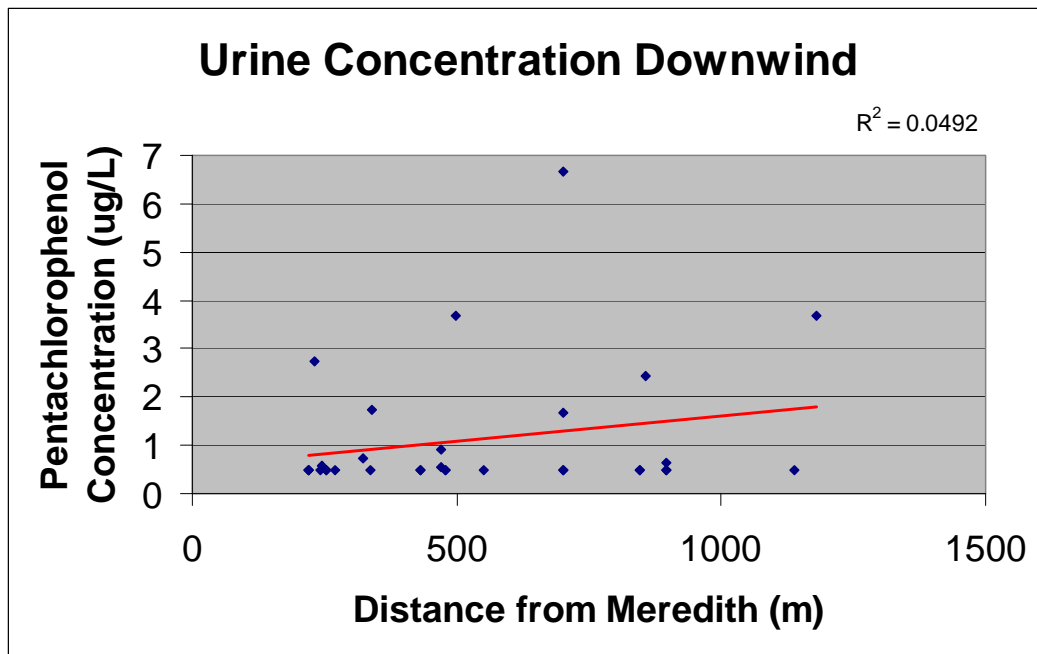
Because the purpose of the EI was to determine a reasonable worst case assessment of exposure, the data was not collected in a manner to determine average fate and transport. This is evident when reviewing the association of air concentration with distance or urine concentration of pentachlorophenol with distance. In contrast with this EI, a study designed to determine the decrease of concentration downwind, would be designed to collect several samples during the same day.

Although the EI was not designed to determine the decrease of concentration down wind, one was observed (as with the previous EI). Air levels at the fence line were usually above 20 ug/m<sup>3</sup> and those downwind were usually below 5 ug/m<sup>3</sup>. A best fit logarithmic line is placed on the graph below relating air concentrations and distance from the Meredith facility.



### C. - Urine Concentration Downwind

Urine sampling followed each set of air sampling. Like the air, it was collected throughout the year and some samples were collected one day after the air exposures and some collected were two or three days after exposure. Urine concentration of pentachlorophenol did not correlate with distance from the facility. The following should be noted when reviewing biological data: there is human variability in pentachlorophenol metabolism and excretion; less pentachlorophenol is eliminated as time from the exposure increases; air levels varied; people spent different times in the area.



Two possible explanations for these differing trends include: 1) that Meredith’s air emissions do not contribute significantly to the general pentachlorophenol exposures in East Point; 2) that the body’s elimination rate for pentachlorophenol is too variable (from person to person or over time within one person) to be assessed with a single urine sample from each participant.

**D.-The coefficient of determination** describes how well the regression line describes the data. For both of these plots the coefficient of determination is below 0.5 which indicates an extremely weak correlation. Since we know that air levels should decrease at a predictable rate, the weak correlation indicates that not enough samples were collected to understand the specific complexities associated with the air emissions from Meredith.

We expect that the same weak correlation is true for the urine samples. This assumption is supported by the measurements within a few households where one member was elevated and others were not, despite both (or more) having spent time together in the same household.

Although there are discrepancies that make correlations between the data problematic, there are sufficient data to conclude that there are no severe prolonged exposures. Both sets of exposure data (air and urine) indicate that exposures are not as high as worker exposures or as frequent as residents who live in pentachlorophenol treated wood homes.

**E.-Pentachlorophenol: Geometric mean and percentiles of urine concentrations (in µg/L) for the US Population (aged 6-59 years) and Meredith Population (11-82)**

	Survey Years	Geo-mean	50th	75th	90th	95th	Sample size
<b>Total, age 6 and older</b>	99-00	NC	<LOD	<LOD	<b>0.36</b> (<LOD-.930)	<b>1.3</b> (.480-2.10)	1994
	01-02	NC	<LOD	<LOD	<b>1.23</b> (.590-1.76)	<b>1.94</b> (1.58-2.53)	2527
	Meredith 05	NC	<LOD	<b>1.06</b> (.9-1.22)	<b>2.61</b> (2.44-2.73)	<b>3.69</b> (3.68-3.70)	34
<b>Age Group</b>							
20-59 years	99-00	NC	<LOD	<LOD	<LOD	<b>1.1</b> (.250-1.70)	831
	01-02	NC	<LOD	<LOD	<b>1.01</b> (<LOD-1.3)	<b>1.86</b> (1.45-2.53)	1125
20-80 years	Meredith 05	NC	<LOD	<b>1.14</b> (.9-1.22)	<b>2.64</b> (2.44-2.73)	<b>3.69</b> (3.68-3.70)	33
<b>Gender</b>							
Males	99-00	NC	<LOD	<LOD	<b>0.63</b> (>LOD-1.30)	<b>1.4</b> (.400-2.20)	973
	01-02	NC	<LOD	<LOD	<b>1.31</b> (.680-1.80)	<b>1.94</b> (1.47-3.09)	1190
	Meredith 05	NC	<LOD	<b>0.69</b> (.55-.74)	<b>1.66</b> (1.62-1.75)	<b>2.04</b> (1.75-3.68)	17
Females	99-00	NC	<LOD	<LOD	<LOD	<b>0.86</b> (.280-2.00)	1021
	01-02	NC	<LOD	<LOD	<b>1.1</b> (<LOD-1.78)	<b>1.92</b> (1.54-2.42)	1337
	Meredith 05	NC	<LOD	<b>1.47</b> (.90-1.66)	<b>3.02</b> (2.73-3.70)	<b>4.14</b> (3.70-6.66)	17
<b>Race</b>							
Non-Hispanic Blacks	99-00	NC	<LOD	<LOD	<b>0.97</b> (<LOD-2.50)	<b>1.64</b> (.860-2.10)	521
	01-02	NC	<LOD	<LOD	<b>1.73</b> (1.25-2.29)	<b>2.75</b> (2.02-3.67)	695
	Meredith 05	NC	<LOD	<b>1.66</b> (.74-1.75)	<b>2.73</b> (1.75-6.66)	<b>4.69</b> (1.75-6.66)	8
Non-Hispanic Whites	99-00	NC	<LOD	<LOD	<b>0.35</b> (<LOD-1.10)	<b>1.3</b> (<LOD-2.30)	603
	01-02	NC	<LOD	<LOD	<b>1.16</b> (<LOD-1.76)	<b>1.91</b> (1.48-2.42)	951
	Meredith 05	NC	<LOD	<b>0.77</b> (.63-.90)	<b>2.55</b> (2.44-2.73)	<b>3.39</b> (2.73-3.68)	26

## **Protocol**

### **Background**

The William C. Meredith Wood Treatment facility is located in East Point, Fulton County, Georgia on 640 acres of deeded land. Meredith processing involves the dipping of timber into a low heat treatment reservoir and the subsequent drying of that timber in the open air. In the past, the facility used creosote and pentachlorophenol (Pentachlorophenol) on a rotational basis, but in March of 2004, because of odor complaints within the surrounding communities, changed to Pentachlorophenol exclusively. Most days, the plant works twenty-four hours a day, seven days per week. Drying of the treated wood poles, also takes place 24/7. In July 2003, the Agency for Toxic Substances and Disease Registry (ATSDR) received a petition from a resident requesting a public health evaluation of the Meredith Wood Treatment facility, primarily because of odor complaints and respiratory irritation. ATSDR and the Georgia Division of Public Health (GDPH) collected air samples for creosote and Pentachlorophenol from October 2003 to March 2004. These air samples were collected at various public locations to reflect community exposure. Sampling results showed that airborne levels of creosote near Meredith were below levels known to cause a public health hazard. However, the Pentachlorophenol levels in the communities surrounding the Meredith facility pose an indeterminate public health hazard due to uncertainty of the population's internal dose. This exposure investigation (EI) will measure Pentachlorophenol levels in the urine of residents at risk of exposure. Air sampling for Pentachlorophenol will also take place at this time. The purpose of this EI will be to establish if the urine Pentachlorophenol levels of residents surrounding the Meredith facility are elevated. We will do this by comparing urine Pentachlorophenol levels of the Meredith community, with that of the general population as defined by CDC's Second and Third National Report on Human Exposure to Environmental Chemicals.

### **Objectives and Rationale**

To do urine Pentachlorophenol screening in community volunteers and Pentachlorophenol air sampling closer to recruited volunteers' home yards, looking for correlation. For the urine Pentachlorophenol level, a spot urine sample will be collected before bedtime, as this time seems more convenient for families. This collection time also will be better for people working outside their home, allowing the added Pentachlorophenol exposure time after they get home. The facility operates twenty-four hours per day seven days per week, assessment of chronic exposure can be done at any time of the day or night. Results of this EI will be shared with community residents, governmental and industrial stakeholders.

### **Target Population**

The primary focus of this EI is the residents of the East Point community adjacent to the Meredith Wood Treatment facility living within a 1 mile radius. The potentially affected population is estimated to be approximately 2,000 people.

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## **Agency Roles**

ATSDR (DHAC, EICB) will visit the site and surrounding area, and will write the protocol, consent/assent for this EI. We will also provide environmental health information to community members about the contaminant of concern, the Exposure Investigation process, and the environmental and biologic testing planned. We will also participate in the public meeting(s) to release the results from the previous EI that took place from October 2003 to March 2004. We will be recruiting for biologic testing for Pentachlorophenol in urine. We will obtain consent/assent for urine collection, and will provide instructions to collect and store the urine samples. The collected urine samples will be delivered in Atlanta to the laboratory at The National Center for Environmental Health (NCEH) for analysis. After sample collection and analytic evaluation is done, we will go back to the community with the interpretation of the results and what they mean for the community.

GDPH will help and support ATSDR on this effort.

## **Methods**

There are 4 neighborhoods within the East Point area. Each community has different socio-economic status, ethnic background and personality. A total of 18 air sampling devices will be distributed within the site among the 4 neighborhoods. We will include the yards of some recruited community members, plus an area common to most people in that neighborhood. The number of air samples in each community will vary according to the size of the population - the bigger the number of people in the community, the more air sampling devices we will place in that neighborhood.

On the air sampling day, urine collection kits will be provided to all participants with instructions on how to collect and store the urine until they can be picked up by ATSDR. The air samples will be collected the day prior to the collection of the urine.

## **Environmental Sampling**

### **Data collection/Sampling Procedures**

Pentachlorophenol will be collected using sorbent tubes consistent with OSHA method no. 39 for the determination of Pentachlorophenol in air and subsequently analyzed by high performance liquid chromatography/ultraviolet detection. A sample of ambient air will be drawn by a pump into 2 daisy-chained tubes connected with flexible tubing and containing adsorbent granules of XAD-7 (glass tubes A and B). The samples will be collected at a rate of 0.2 L/min. over an 8 hour period. After the sample is collected another tube (glass tube C) is opened on one end and attached to the end of tube A that was previously open to the environment. Tube B is then capped at the open end. Samples will be shipped following chain of custody and storage procedures to Data CHEM laboratories, Salt Lake City Utah. There are no known interferences with this sampling method.



## **Biological Sampling**

### **Data Collection/Sampling Procedure**

A total of 50 participants will be solicited among the 4 communities within a 1 mile radius of the Meredith facility. The request for participation will be for Pentachlorophenol urine sampling. Exclusions will include employees of the facility, and children below the age of 6. A spot urine sample from each individual rather than a first morning void will be obtained for the following reasons:

1. It will help with compliance, as it will be done at the community member's convenience
2. CDC's Second and Third National Report on Human Exposure to Environmental Chemicals background values are based on spot urine samples.

Each participant will be asked to sign the consent/assent forms (see appendix). Each participant will receive an acid-washed specimen container and will be instructed to collect a spot urine sample. Participants will be instructed to place the filled container in a zip-lock bag and refrigerate until ATSDR staff return to collect these samples.

### **Laboratory Analytic Procedures**

50 urine samples will be analyzed by the NCEH laboratory in Atlanta, following the protocol described in the Journal of Analytical Toxicology, Vol. 19, September 1995: "Determination of Pesticide Metabolites in Human Urine Using an Isotope Dilution Technique and Tandem Mass Spectrometry", by Robert H. Hill and Larry Needham et al.

### **Data Analysis Procedures**

The results of the 50 urine samples will be compared to CDC's Second and Third National Report on Human Exposure to Environmental Chemicals which defines selected percentiles of Pentachlorophenol urine concentration for the U.S. population age 6 years and older. Values above the 95th percentile for age and gender will be considered elevated.

The air samples will be reported individually by sector and distance from the facility and by the correlation with people's urine Pentachlorophenol level.

### **Quality Assurance**

ATSDR will use chain-of-custody forms to document sample collection, storage, shipment, and the description of requested analysis without personal identifiers. A copy of the forms will be taken along with the urine samples to the NCEH laboratory in Atlanta and ATSDR will maintain the original of the forms.

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## **Community Involvement**

ATSDR will solicit participants through a public availability meeting, door to door information and recruitment, and environmental health information via facts sheets. The use of local state officials and community leaders may also help encourage participation.

## **Risk/Benefit Information**

There are virtually no risks associated with this exposure investigation. The potential benefit is that participants will learn if they and/or their household members are being exposed to Pentachlorophenol levels above that of the US general population as indicated by increased Pentachlorophenol urine levels (>95percentile) of the Second and Third National Exposure Report on Human Exposure to Environmental Chemicals for age and gender.

## **Informed Consent Procedures**

Potential participants will be informed of the purpose of this exposure investigation and any benefits or risks should they choose to participate. It will be stressed that participation is strictly voluntary and that if they choose to participate, they may withdraw from the investigation at any time without penalty. They will also be informed that their participation, air sampling and urine analysis is free of charge to them.

## **Procedures for Notifying Participants of Individual and Overall Results**

ATSDR will evaluate the data to determine if Pentachlorophenol is present at levels that may have potential public health implications. If the data review indicates that a public health hazard exists, the participants will be notified as soon as we get that information. Individual urine pentachlorophenol levels and an explanation of their significance will be provided in writing to each participant upon completion of this investigation.

## **Assurance of Confidentiality**

Individual test results will not be made available to the public and confidentiality will be protected to the fullest extent possible by law. Individual test results may be released only to other federal, state, and local public health and environmental agencies. These agencies must also protect this confidential information. All records and computer files related to this EI will be locked and password protected, respectively.

## **Estimated Time Line**

### **Budget**

**Extramural budget includes \$10,500 for laboratory analysis.**

## **Meredith Site Adult Consent /Adolescent Assent Form.**

This form tells you about an Exposure Investigation (EI) taking place within one mile of the Meredith site in East Point, GA. We are doing this EI because testing the local air showed the chemical pentachlorophenol coming from the Meredith Wood Treatment facility. Pentachlorophenol is a chemical used to make wood last longer. Some community members asked the Agency for Toxic Substances and Disease Registry (ATSDR) and the Georgia Division of Public Health (GDPH) to find out if pentachlorophenol is getting inside their body. The results of this EI will compare your exposure to pentachlorophenol with exposures in the general US population. It will tell us if your exposure is higher by living close to the plant. This form will tell you how we are doing this investigation. We will also do a Creatinine level to help us interpret the results. We will test the area ambient air for levels of pentachlorophenol. Along with the free testing, we will also ask you some questions to help us understand your test results better.

We want to test 50 people for pentachlorophenol in their urine. We want you to participate because you live close to the Meredith plant. Before you decide to be part of this project please read the rest of this form. You can ask us any questions you have.

### **Here is what we will do:**

If you choose to be part of this EI, we will ask you to give us a urine sample and we may ask your permission to place an air sampling device in your yard for a few hours.

We think this will take about an hour.

We will collect the air sampling devices at the end of the day.

The next day we will collect the urine samples.

We will take the urine samples to a CDC lab in Atlanta to be tested for pentachlorophenol. The results will be compared to pentachlorophenol levels from people in the general population of the US. We will send the air samples to Data CHEM laboratories, Salt Lake City Utah.

### **Could I be hurt?**

Giving us some urine should not hurt.

### **Will I get something from this investigation?**

You will know the amount of pentachlorophenol you have in your urine. You will know also if the amount of pentachlorophenol in your urine is higher than in the US general population.

We will send everyone who was part of this EI a letter with the urine results in about 3 months. If we find high pentachlorophenol levels in your urine, we will tell you as soon as we know it.

If your yard air was tested, we will tell you what we find.

We will write an EI report that sums up what we find in your urine and the air sampled. We will give the report to the GDPH. If you want a copy of the report we will send you one.

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**What about my privacy?**

We will protect your privacy as much as the law allows. We will give you an ID number. This number, not your name, will go on all of your samples. We will not use your name in any reports we write about this EI. We will keep a record of your name, address, and ID number to send you the results of the tests. After that, we will destroy that information. The papers with your name on them (the consent, and the assent) will be kept in a locked file cabinet away from where we keep the tests results.

**Are there any costs?**

You do not have to pay to be in this EI. We will not pay you for being in this EI. If you discuss the results of this EI with your own doctor and he or she wants to do more test on you, you or your insurance will be responsible for the costs of those tests.

**What if I don't want to do this?**

You can choose to be in this EI or not. If you decide not to be in this EI nothing will happen to you. If you join this EI, you can change your mind later and drop out. Again nothing will happen to you if you do this. If you join this EI, you do not have to answer any questions you don't want to. You can also choose not to do some parts of the EI.

**How can I find out more?**

If you have questions you can ask anyone here right now. If you have questions later about this EI or think you have been harmed by this EI you can call Dr. L. Rosales-Guevara at ATSDR: 404-498-0499.

If you have questions about your rights as a person in this EI, please call the office of the CDC Deputy Associate Director for Science at 1-800-584-8814 and leave a message with your phone number saying that you are calling about ATSDR protocol No. 05 - 03. Someone will return your call.

**Consent Statement**

I have read this form or it has been read to me. I had a chance to ask questions about this investigation and my questions have been answered. I agree to be part of this EI. I have marked below the parts I will do.

Yes No Give ATSDR some urine for testing  
Yes No Let air samples to be collected from my yard by ATSDR.

\_\_\_\_\_  
Participant's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Participant's Printed Name

\_\_\_\_\_  
Address: zip

I have read the consent form to the person named above. He/she has asked questions about the investigation and had the questions answered.

\_\_\_\_\_  
Signature of person giving oral consent

## **Parental Consent Form for the Participation of Children and Adolescents Less than 18 years of Age in the Meredith site EI.**

This form tells you about an Exposure Investigation (EI) taking place within one mile of the Meredith site in East Point, GA. We are doing this EI because testing the local air showed the chemical pentachlorophenol coming from the Meredith Wood Treatment facility. Pentachlorophenol is a chemical used to make wood last longer. Some community members asked the Agency for Toxic Substances and Disease Registry (ATSDR) and the Georgia Division of Public Health (GDPH) to find out if pentachlorophenol is getting inside their body. The results of this EI will compare your child/ward's exposure to Pentachlorophenol with exposures in the general population. It will tell us if your child/ward's exposure to pentachlorophenol is higher by living close to the Meredith site. This form will tell you and your child/ward how we are doing this investigation. We are asking you to let your child/ward be part of this EI because he/she lives and go to school close to the Wood Treatment facility. Before you decide if your child/ward can be part of this project, please read the rest of this form. You and your child/ward can ask us any questions you have.

### **Here is what we will do**

We will ask your child/ward to give us a urine sample.

We think this will take about 5 minutes.

We will collect your child/ward's urine sample at the same time we collect the urine sample of the rest of your family.

We will send your child/ward's urine sample to the same CDC lab in Atlanta we send yours, to be tested for pentachlorophenol. The results will be compared to pentachlorophenol levels from people in the general population of the US.

### **Could your child/ward be hurt?**

Giving us some urine should not hurt.

### **Will your child/ward get something from this investigation?**

You and your child/ward will know his/her level of exposure to pentachlorophenol. You and your child/ward will know also if the amount of pentachlorophenol in his/her urine is higher than in the US general population.

We will send you a letter with your child/ward urine results in about 3 months. If we find high pentachlorophenol levels in your child/ward's urine, we will tell you as soon as we know it.

We will include your child/ward urine testing results in the EI report we write. We will give the report to the GDPH. If you want a copy of the report we will send you one.

### **What about my child/ward's privacy?**

We will protect your child/ward privacy as much as the law allows. We will give your child/ward an ID number. This number, not your child/ward's name, will go on all of the samples. We will not use your child/ward's name in any reports we write about this EI. We will

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keep a record of your child/ward's name, address, and ID number to send you the results of the tests. After that, we will destroy that information. The papers with your child/ward's name on them (the parental consent, and the assent) will be kept in a locked file cabinet away from where we keep the tests results.

**Are there any costs?**

You do not have to pay for your child/ward to be in this EI. We will not pay you for letting your child/ward being in this EI. If you discuss the results of this EI with your child/ward's own doctor and he or she wants to do more test on your child/ward, you or your insurance will be responsible for the costs of those tests.

**What if I don't want my child/ward to do this or, my child/ward doesn't want to do this?**

You can let your child/ward be in this EI or not. If you decide not to let your child/ward be in this EI or your child/ward does not want to be in this EI, nothing will happen to you or your child/ward. If you let your child/ward join this EI, you can change your mind later and take your child/ward out of the investigation. Again nothing will happen to you or your child/ward if you do not want your child/ward to do this or if your child/ward doesn't want to do this. If you let your child/ward join this EI, you or your child/ward doesn't have to answer any questions if you don't want to. Your child/ward can also choose not to do some parts of the EI.

**How can I find out more?**

If you have questions you can ask anyone here right now. If you have questions later about this EI or think your child/ward has been harmed by this EI you can call Dr. L. Rosales-Guevara at ATSDR: 404-498-0499.

If you have questions about your child/ward's rights as a person in this EI, please call the office of the CDC Deputy Associate Director for Science at 1-800-584-8814 and leave a message with your phone number saying that you are calling about ATSDR protocol No. 05 - 03. Someone will return your call.

**Consent Statement**

I have read this form or it has been read to me. I had a chance to ask questions about this EI and my questions have been answered. I allow my child/ward to be part of this EI and to give ATSDR some urine for testing.

\_\_\_\_\_  
Parent Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Parent Printed Name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Address zip

I have read the consent form to the person named above. He/she has asked questions about the Exposure Investigation and had the questions answered.

**Meredith site Children's Assent Form  
(7 to 12 years of age)**

**Read the statement below to children in the presence of their parent/guardian before collecting the children's urine:**

“Pentachlorophenol is a chemical that is put on wood to make the wood last longer. Sometimes pentachlorophenol can get inside your body. To find out if you have pentachlorophenol in your body we need a sample of your urine. It is safe to do this. You just have to “pee” in a cup. Your mother or father can help you do this. We will pick up the cup of urine later. Your mother, father, or guardian said it would be OK for you to do this”. But you don't have to if you don't want to. If you say it is OK, please write your name and your age in the space below. Do you have any questions? ”

Name of Child: \_\_\_\_\_

Signature of Child: \_\_\_\_\_ Age \_\_\_\_\_

Witness: \_\_\_\_\_  
(Print your Name) (Signature)

Date: \_\_\_\_\_

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**Questionnaire**

**ADULTS**

Today's date: \_\_\_\_\_

Name \_\_\_\_\_  
(Last) (First) (MI)

Address \_\_\_\_\_  
\_\_\_\_\_

Telephone number: \_\_\_\_\_  
(Home) (Work) (Cell)

1. Are you healthy? Yes \_\_\_\_\_, No \_\_\_\_\_, if no
2. What illness do you have? \_\_\_\_\_
3. If you take medications, list all medications \_\_\_\_\_  
\_\_\_\_\_
4. What type of work do you do? \_\_\_\_\_
5. If you have worked with pesticides, list pesticides used \_\_\_\_\_
6. How long ago? \_\_\_\_\_
7. How long have you lived in this house? \_\_\_\_\_
8. If you or anyone in your household has used or helped apply Kwell (Lindane) shampoo, state how long ago?

\_\_\_\_\_  
Name of person answering the question

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness



**CHILDREN**

1. Do you play near the Meredith site? Yes\_\_\_\_\_, No\_\_\_\_\_.
2. Do you play there after school? Yes\_\_\_\_\_, No\_\_\_\_\_.
3. Do you play near the Meredith site on the weekends? Yes\_\_\_\_\_, No\_\_\_\_\_.
4. Do you play by telephone poles? Yes\_\_\_\_\_, No\_\_\_\_\_.
5. Do you play by railroad tracks/ Yes\_\_\_\_\_, No\_\_\_\_\_.
6. Do you have asthma? Yes\_\_\_\_\_, No\_\_\_\_\_, If yes,
7. Does your asthma get worse when you play near the Meredith site? Yes\_\_\_\_\_,  
No\_\_\_\_\_.
8. Do you bite your nails? Yes\_\_\_\_\_, No\_\_\_\_\_.

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Name of person answering the questions

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Date

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Witness