

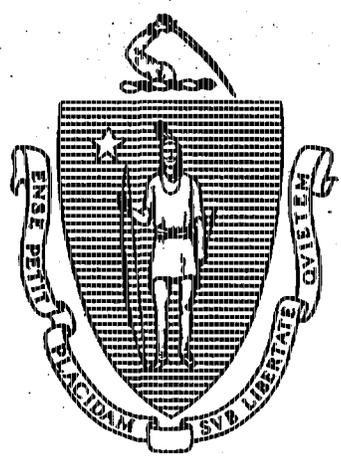


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**REPORT OF
ATTORNEY GENERAL SCOTT HARSHBARGER**

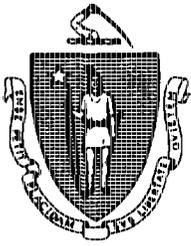
Relative to the Workshop Held on February 5, 1998
Regarding Health Concerns Relating to
PCB Contamination in Pittsfield and
Southern Berkshire County



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March 1998



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March 5, 1998

Dear Interested Party:



Last October, I met with residents who live at or near PCB-contaminated property in Pittsfield. At this meeting, people told gripping stories about their health concerns. One man reported that he was scared to hug his newborn grandchild; another spoke movingly about having cancerous growths cut out of him by the age of thirty-seven. People voiced their common perception that the residents of the Lakewood area were experiencing a highly elevated incidence of cancer, although many raised other health problems as well.

Because I am not a trained scientist or health care professional, it was not possible for me to evaluate the powerful anecdotal evidence that people presented to determine what level of concern is warranted. At the same time, I feel strongly that the people deserve answers to their questions, to the extent possible. I therefore instructed my staff to do what they could to serve as a catalyst to ensure that appropriate answers were provided.

My office obtained copies of the three major health studies that have been undertaken and distributed them to a select group of outside experts, agency representatives, and concerned citizens in the Greater Pittsfield area. On February 5, 1998, we convened an all-day workshop for this group to examine these issues. The purpose of the workshop was to review the past studies, to discuss what additional information would be useful to address residents' concerns, and to brainstorm about ways that we might obtain such information. Attached is a report summarizing the day's discussions.

I believe the workshop was a success because it helped develop a shared understanding of the issues and it advanced the debate on how best to proceed. I want to extend my heartfelt thanks to all of the day's participants, including to the outside experts who generously donated their expertise, to the Lakewood residents and Housatonic River Initiative representatives who gave a day of their busy lives to participate, and to the agency personnel who despite their otherwise full schedules spent the day helping to make the workshop a success. Special appreciation goes to Elaine Krueger and Bob Knorr of the state Department of Public Health who presented the recent blood study and who accepted the group's comments with equanimity.

Sincerely

Scott Harshbarger

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Introduction.

This report summarizes discussions that took place at a workshop that was held on February 5, 1998, to discuss health concerns relating to PCB contamination in Pittsfield and southern Berkshire County. This workshop was convened by Attorney General Scott Harshbarger as a follow-up to a meeting that he held with Pittsfield residents in October of 1997. Participants included a select group of outside experts, agency representatives, and concerned citizens in the Greater Pittsfield area. The workshop was held in Springfield so that people from both Boston and Pittsfield could attend. Despite sleet and freezing rain, 23 people participated. A list of these participants is included in Appendix A.

Part I of this report will review background issues discussed at the workshop, focusing on the issues of greatest concern and on the problems inherent in trying to use epidemiological studies to prove adverse health impacts from chemical exposures. Part II will detail the discussions of the three health studies that had been done to date, pointing out how the studies have been misconstrued. Part III will lay out specific action steps discussed, focusing especially on what can be accomplished with relatively limited public and private resources. In summarizing the discussions, we have tried to avoid technical jargon where possible in order to make the report accessible to the lay public. We hope that this report helps advance the debate on these critically important issues.

I. Background Issues.

A. The difficulty of uncovering health effects through epidemiological studies:

One thing that came out of the workshop was a greater appreciation among the lay participants of the difficulties of undertaking epidemiological studies. For example, the experts in attendance explained why it is so difficult to design such studies, and why they take so much time and money to perform. The lay participants also gained a greater appreciation for why epidemiological studies so seldom demonstrate adverse health effects even when such effects are strongly suspected. There are many reasons for this, including the following:

- limitations on resources available to do the necessary data collection and analysis;
- the inherent difficulties of obtaining the necessary data even if unlimited time and money were available (e.g., little historical information on worker exposures, the invasiveness of medical procedures such as tissue biopsies, problems presented by multiple exposures, etc.);
- the difficulties of applying the rigors of scientific proof to complicated, uncontrolled "real world" situations;

- imprecise exposure data commonly resulting in a “bias toward the null hypothesis”; and
- the fact that epidemiologists are trained to be “critical of everything,” coupled with the fact that, because there is no such thing as a “perfect study,” they have ample leeway for their critical dispositions.

In light of the fact that epidemiological studies are notoriously “insensitive,” one outside expert noted after the workshop that he is most often quoted for his only-half-in-jest comment that a “health catastrophe” should be defined as “a health effect so powerful even an epidemiological study can detect it.”

Epidemiological studies are done for many reasons. These include seeking to advance our knowledge of health risks generally. They also include seeking to aid populations placed at special risk through, for example, helping potentially injured parties and medical professionals better address particular health risks they are facing, and securing “the truth” for its own sake (be it “good news” or “bad news”). The problems listed above obviously limit our ability to make use of epidemiological studies to serve their intended purposes. There is another impact as well, however. Because the public does not generally understand the difficulty of proving that exposure to particular chemicals causes adverse human health impacts, this often means that inconclusive epidemiological studies are taken to mean that no problem exists even when it well may.

One hotly debated issue at the workshop was whether public health officials are institutionally biased against uncovering major health problems. One outside expert made this assertion, mainly based on his view of the pressures that such officials face given that agencies do not have the resources to address any major health problems that they uncovered. Agency representatives strongly denied feeling such pressures.

B. The relationship between health studies and decision making regarding clean up standards:

On one point, everyone who attended the workshop was of a single mind: in light of the inherent difficulty of proving human health effects through epidemiological studies, agency officials should use ultra-conservative assumptions in setting risk-based clean up standards. One attendee pointed out that from this perspective, the governmental response to the contamination at Wells G and H in Woburn can be viewed as a success story. State and federal regulators shut down the wells upon learning of the contamination, notwithstanding the fact that most experts at the time doubted that a cancer link could be proven and the fact that such a link was not shown until many years later.

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C. What health impacts do people care most about?

For understandable reasons, most of the health fears to date have focused on cancer risks. Cancer simultaneously presents significant opportunities and obstacles for epidemiological research. On one hand, cancer incidence data are now readily available (through the state cancer registry) and generally considered reliable (given standardized laboratory procedures to diagnose malignancies). This is one of the reasons cancer is relatively well-studied, even though other health effects may hold greater significance. One outside expert attending the workshop analogized this situation to "the drunk who searched for his keys under the streetlight: he knows he didn't leave them there, but it was the only place he could look."

On the other hand, cancer presents a great challenge to researchers because, except for a small number of "sentinel cancers," it has many different possible causes. In addition, the fact that cancer is so prevalent in society (approximately one out of three people statistically is expected to develop cancer) presents major proof hurdles.

People's focus on cancer risks has obscured the fact that there are many other significant health risks potentially posed by PCBs. Studies have found associations between exposure to PCBs and at least the following serious conditions:

- non-malignant liver damage;
- chloracne and other skin problems;
- adverse reproductive effects;
- a variety of endocrine disorders; and
- infant and child development issues.

Moreover, researchers both at the workshop and elsewhere have emphasized how little is known about environmental health risks in general and exposure to PCBs in particular. One outside expert explained that this is why doing only a pure "exposure driven" study (i.e., one that examined a target group for known PCB-related health risks) would be shortsighted. In his words, "such a study might well miss the most interesting stuff." In addition to the problems listed above, residents expressed concerns regarding a variety of other health issues. For example, some residents noted their perception that Berkshire County was experiencing a raft of cases of multiple sclerosis. The researchers in attendance emphasized that an epidemiological study of multiple sclerosis would be extraordinarily difficult to carry out in light of difficulties of diagnosis and inaccessibility of incidence data.

D. What "exposure pathways" do people care most about?

PCBs can be ingested, inhaled, or absorbed through the skin. Studies of workers have focused mainly on skin contact in light of stories that workers most heavily exposed to PCBs effectively "bathed" in pyranol, the oily fluid that contained the PCBs. Studies of residents have focused mainly on ingestion, mostly through eating fish. Some workshop attendees expressed their view that more attention should be paid to skin contact by residents in light of the fact that PCB-contaminated soils have been buried throughout the community and in light of a new study referred to by an agency representative that reportedly found that skin contact may result in higher "uptake" than previously thought. In addition, some attendees expressed puzzlement as to why the breathing pathway had not been examined more, given the fact that a PCB incinerator operated at the GE site for many years.

E. What chemical exposures do people care most about?

Not surprisingly, most public attention has focused on the PCB contamination itself. In addition, there may be other chemicals of potential concern, even in the residential setting. For example, the pyranol in which the PCBs were contained also contained trichlorobenzene. (An agency representative noted that trichlorobenzene had not all volatilized into the air but is still being found in the environment.) In the workplace setting, there were many substances that are of potential concern. Indeed, a report prepared for GE by Dr. David Wegman (discussed further below) itself found associations between elevated cancer deaths and various substances to which GE workers had been exposed, including: resins, solvents, machining fluids, and benzene. Finally, obviously dioxins and dibenzofurans potentially raise significant health concerns for both workers and residents. These substances can result from incomplete combustion of PCBs, and, according to the report prepared by Dr. Wegman, dibenzofurans are found in trace amounts in pyranol. It is at least worth considering whether future studies should examine the health effects of these other chemicals in addition to, or instead of, those of PCBs.

II. *What We Have Learned from the Three Major Studies.*

A. Wegman Worker Study:

In the late 1970s, a state study (described as preliminary) found an excess of mortality from leukemia and cancer of the large intestine among people who had been employed at the GE facility. In the 1980s, General Electric commissioned a follow-up study under the direction of the eminent epidemiologist, Dr. David Wegman. This was a "case control study of cancer mortality risk" among GE workers. In lay terms, the study looked at a population of GE workers who had died of cancer over a 15-year period and asked what was different about their exposure compared to those GE workers who died of some other cause. The report of the study is dated January 24, 1990.

One of the most interesting points to come out at the meeting was that notwithstanding the fact that the Wegman study has achieved an almost mythological significance in GE's efforts to downplay the health risks, few people had had the opportunity to actually read the study. In fact, virtually all of the participants in the workshop -- most of whom have been intimately involved in GE-Pittsfield issues for years -- saw the report for the first time when it was distributed to them in preparation for the workshop.

The candid nature of Dr. Wegman's conclusions may help explain why GE has not itself distributed the report more widely. First, the study did find associations between increased cancer risks and worker exposure to various substances other than pyranol. Second, even though the Wegman study did not find an association between worker exposure to pyranol and excess cancer mortality risk, it listed numerous problems that seriously undercut the value of such a finding. Most of these problems involved questionable data on which the study had to rely, including, for example:

- incomplete company records;
- the difficulty of determining "real" cause of death;
- inclusion only of cancers that resulted in death; and
- very limited data on historical workplace exposures.

At several points, Dr. Wegman noted that these problems limited the statistical value of the study, known as "power." In fact, in discussing the limited historical workplace exposure data available to him, Dr. Wegman himself concluded:

There is a high probability, therefore, that even if elevated cancer risks exist in this environment they might not be found.

A Case-Control Study of Cancer Mortality at the General Electric Pittsfield Facility, Vol. I, p. 6.

Given the thoroughness of Dr. Wegman's analysis of the obstacles to his study, the outside experts had little to add. They all spoke highly of Dr. Wegman and complimented the state-of-the-art methods he used. They emphasized, however, that ultimately the study's findings were limited by its input. In light of the kinds of problems that Dr. Wegman identified even with the considerable resources otherwise available to him, many participants expressed great skepticism at further formal worker health studies.

B. DPH Bladder Cancer Study:

The Wegman study examined cancer mortality (i.e., deaths caused by cancer) as opposed to the incidence of cancer, whether or not it was the cause of death. This was presumably because at the time the Wegman study was begun, there was no systematic way of tracking information regarding the incidence of cancer in Massachusetts. This changed with the creation of the state cancer registry in 1982. Routine analysis of the first four years of cancer registry data (1982-1985) uncovered an excess incidence of bladder cancer among males in the city of Pittsfield. The state Department of Public Health analyzed the data available through the registry, including looking at possible "confounding" impacts of smoking, and found:

There is a notable, statistically significant excess of bladder cancer among GE workers as a whole (SMOR=202; 95% CI=135-302) and among the sub-population of smokers (SMOR=217; 95% CI=136-346). [SMOR stands for "standardized morbidity odds ratio" and CI stands for "confidence interval."]

Relying on currently available cancer registry information, this study was styled a "preliminary investigation." It recommended follow-up investigation to obtain "more detailed exposure information."

Workshop attendees who spearheaded the bladder cancer study described to the others what follow-up occurred. DPH made various efforts to uncover whether GE had utilized various known or suspected bladder carcinogens in Pittsfield, including extensive interviews of bladder cancer victims. Although it initially denied such use, GE apparently admitted some use of the chemical known as "MBOCA" -- a known bladder carcinogen -- after an employee produced a "material safety data sheet" for that chemical. Beyond this, however, follow-up efforts hit something of a standstill. In short, with the Wegman study then still ongoing and with DPH researchers encountering problems of obtaining necessary data from GE, further follow-up by DPH was shelved. While DPH urged GE to conduct follow-up on its own, it was not known by any of the attendees whether any such follow-up was done.

C. DPH Blood Study:

In 1995, the DPH began a study that looked at PCB blood levels in Pittsfield area residents. Beginning with a random selection of households that resided within one-half mile of the Housatonic River (adjusted to have balanced representation from Pittsfield and "South County" residents), DPH selected a target population of 120 individuals whom the agency concluded were the most likely to have been exposed to PCBs. The selection relied heavily on assumptions regarding PCB exposure that grew out of a DPH study of PCB exposures in New Bedford. Of the 120 selected individuals, 69 individuals (including 35 from Pittsfield) agreed to have their blood tested. DPH also sampled the blood of 79 self-selecting volunteers.

DPH issued a report of its findings in September of 1997. The report demonstrated through actual blood sampling that the amount of PCBs found in people's blood was associated not only with age (given that PCBs accumulate in the body over time) but with fish consumption and with opportunities for occupational exposure. The report also called for a continuation of strict remedial measures in order to protect the public health, noting in fact that the blood levels found may have been lower than otherwise because of regulatory actions such as the now-longstanding ban on eating fish caught in the Housatonic River. The most noted and controversial conclusion of the DPH report, however, was that:

The serum PCB levels found among participants with the highest risk of exposure to PCBs in this study were generally within the background range reported for the non-occupationally exposed population in the U.S.

Housatonic River Area PCB Exposure Assessment Study, Final Report, p. 31. This finding, listed first among the report's conclusions, has been read by GE and many others as concluding that PCBs do not pose a major health threat.

The assembled group spent over two hours discussing the DPH study in a frank and open atmosphere. Attendees raised the following concerns regarding the study's primary conclusion:

- **sample size:** Some expressed concern about the sample size used. For example, in the selected target population, only 35 people from Pittsfield had their blood sampled. Although these people by definition lived within one-half mile of the Housatonic River, they otherwise were presumably distributed throughout Pittsfield. Therefore, it is likely that only a small number of them actually came from the Lakewood area where people have voiced the strongest health concerns. Read in this light, the blood level results obtained through the study may not be as comforting. When questioned about such issues, DPH personnel stated that they did not have the resources available to produce the statistical "power" they would have liked.

- the limited nature of the study's aims: As the DPH representatives explained, the blood study had relatively modest goals: to take an initial look at various pathways of exposure to PCBs and to examine correlations between these pathways and actual blood levels. In other words, as the official title of the study makes clear, this was a study of "exposure" to PCBs. While the level of PCBs in people's blood presumably correlates somehow with the degree of health risks presented, this relationship was not a subject of study here nor is it generally well understood. Strictly speaking, therefore, the blood study did not itself examine health risks at all. Somewhere between the original design of the study and the message that people heard when the report was announced, this point got lost. Citizens who attended the meeting expressed their frustration that DPH did not do more to clarify the limited nature of the study after it was announced;
- different congeners: The inability of the blood study to examine health risks is compounded by the fact that PCBs come in many different forms, known as congeners, that vary considerably in their toxicity. Workshop attendees stated that because of their high chlorine content, the congeners at issue in Pittsfield are more toxic than those generally confronted. The DPH blood tests were not "congener-specific," however, because such blood tests are technically quite challenging and presumably quite expensive;
- comparison to national background: The study ultimately compared its sample results against the range of PCBs in blood that would be expected in a randomly selected nationwide population among people who had not been occupationally exposed. The latter figure was taken from a report published by the Agency for Toxic Substances and Disease Registry, a federal health agency. While conceding that the ATSDR data might constitute the "best available evidence" of an expected national average, many people criticized the worth of that number. For example, average PCB blood levels are thought to be declining over time now that PCB manufacturing has been banned, PCB disposal has been regulated, and PCB-contaminated sites are being cleaned up. The ATSDR figure is based on data that is at least a decade old, and therefore it may well no longer be accurate. In addition, neither the ATSDR figure, nor the DPH results, were "congener-specific." Because the PCBs at issue in Pittsfield are of the relatively toxic variety, while the ATSDR figure is for all varieties (including the much more prevalent congeners of lesser toxicity), the comparison to the ATSDR figures may not be "apples to oranges," but it may be "apples to mixed fruit salad." Finally, one workshop attendee pointed out that the ATSDR figure may not be that useful for comparison purposes in light of the fact that, but for the contamination caused by GE, Southern Berkshire County is a rural, relatively pristine area where one would expect less opportunity for exposure to PCBs than on average nationally. In light of such problems, many workshop attendees questioned why the blood study did not include for comparison purposes a "control group" of people in

Berkshire County who had likely not been exposed to PCBs. The DPH response was again that the agency did not have the resources available to it to do what it would have liked.

- downplaying “adverse” findings: Some felt that DPH de-emphasized findings that did not fit neatly into its overall “background levels” conclusion. For example, the report emphasized that only 6% of the volunteer study had blood levels of over 20 parts per billion (as compared to an expected 5%), but failed to highlight that some of those readings were significantly higher than 20 ppb, including one of 114 ppb. In addition, although the report’s focus on non-occupational exposures is consistent with the study’s overall purpose, the fact that those volunteer participants with an opportunity for occupational exposure had blood levels of two to four times the expected national average for non-occupationally exposed population struck some as a significant finding that was downplayed.
- what do blood levels mean? Ironically, the chemical stability of PCBs -- one characteristic that made them useful as a product -- is one reason PCBs are thought to cause a health threat. PCBs are known to accumulate over time in fatty tissues within the body. Ideally, one would want to measure the PCB levels in such tissues. Measuring PCB content in fatty tissues involves invasive biopsies, however. Drawing blood is a much less invasive procedure. Moreover, having people fast before their blood is drawn releases some of the PCBs stored in fatty tissues back into the blood. For these reasons, blood sampling is typically used instead of tissue biopsies. But it is not entirely clear what PCB blood levels tell us. For example, how do PCB blood levels change over time and how constant is the relationship between PCB levels in blood compared to those in fatty tissues? The lack of answers to such questions may explain why some of the workshop participants sensed contradictory suggestions in the study: blood levels used as a surrogate for levels in fatty tissues vs. blood levels used as a measure of recent exposures. Finally, but most importantly, while blood levels may well correlate with the degree of health risk presented, the nature of this relationship is unknown. In other words, the amount of PCBs in blood says next to nothing about the particular level of risk presented.
- residential fill properties: According to the DPH representatives, the blood study generally assumed that the exposure factors shown to be of concern in the New Bedford study would be the ones of most concern in Pittsfield as well. This central assumption is subject to question, however, in light of the fact that the factual context of the Pittsfield problem is different in some respects from that of New Bedford Harbor. In Pittsfield, unlike New Bedford, for example, there are PCB wastes buried throughout the community. The blood study was undertaken prior to DPH’s learning about the large amounts of PCB-contaminated fill that were disposed of at schools and in residential areas, especially in the Lakewood area. In fact, additional fill sites are still being discovered and many more such sites are

expected to be found. Because DPH had no knowledge of these sites, it did not design its study around them. Given that the fill areas generally fall within one-half mile of the Housatonic, some number of residents at or near these properties may well have been included in the blood sampling of the targeted population. Nevertheless, for at least a couple of reasons, the blood study likely did not adequately address the exposure issues posed by the "residential fill" properties. First, the point system used to determine whose blood would be tested from the target group was set up based on the assumption that the river and floodplain posed the greatest opportunities for exposure. While activities that would have put people in contact with soils in their own yard (such as gardening) did count for points (including a doubling of the designated points if these activities were performed in Pittsfield or Lenox), their point value was still relatively low compared to other activities. For example, under the DPH scoring system, a resident who lived nowhere near the residential fill properties who ate freshwater fish from somewhere other than the Housatonic River could easily "outscore" (i.e., be assumed to be more at risk) a residential fill owner who gardened seven days a week. The likely undervaluing of the residential fill problem is underscored by a new study reported by one agency official that PCB uptake through skin contact may be greater than previously thought. Because the blood sampling of the target group was done only among those who -- based on the point system -- were assumed to be most at risk, it is quite possible that people who were exposed to PCBs through activities such as gardening never made it to the blood testing stage. In addition, the inclusion of people who may not have been at relatively great risk in the blood sampling could obviously "water down" the overall average of people who had been exposed.

- air pathway: Meeting attendees expressed concern that the blood study did not adequately examine the possibility of intake of PCBs through inhalation. In particular, residents expressed fear about possible impacts from the PCB incinerator that GE operated for many years, especially in light of the periodic "downdrafts" that they observed. Highly dangerous dioxins and dibenzofurans can be produced when PCBs are incinerated if a problem with the incinerator resulted in incomplete combustion. Agency personnel expressed their view that the incinerator at GE was well designed and that it was well run during the period they were actively monitoring it, although they could not vouch for operations in a prior period. DPH did not explain in its report or at the workshop why it did not factor the presence of the incinerator into its analysis. The potential skewing effect on DPH's findings is similar to that discussed above for the residential fill properties: the down-draft area appears to fall within the one-half mile study area, but because no points were assigned to living downwind of the incinerator, people who may have been exposed through this means may not have been included in the blood sampling, even though they perhaps should have been.

- testing of children: Both at the workshop and in other forums, residents have over and over stated that their biggest health concerns are for their children. Nevertheless, children were excluded from the blood sampling. The explanation for this seeming paradox appears to be that because the study was designed to focus on those who DPH expected to have the highest blood levels and because PCBs accumulate in the body over time and therefore generally increase with the age of the person tested, it did not make sense to test children. Some workshop attendees felt that the fact that one would not expect PCBs in children's blood is precisely why it might be useful to look there. While not finding appreciable levels in children may not say much, finding them would be significant.

In sum, two conclusions can be made regarding the blood study. First, it is clear that this study has been misperceived by the press and many members of the general public as addressing health effects issues that DPH never even purported to examine (many citizens who attended the workshop expressed anger at their view that DPH allowed these misinterpretations to lie uncontroverted) Second, many serious questions have been raised about the validity and significance of the central conclusion that the report did reach that blood levels in the people most at risk of exposure did not exceed national background levels.

III. What Next Steps Should We Take?

The last hour-and-a-half of the workshop was devoted to the question of what to do next. Particular attention was paid to how to conserve limited public and private resources, whether there are low resource ways of obtaining additional information that would better inform our thinking, and how better to coordinate various ongoing efforts.

Representatives from DPH briefly discussed two efforts it was conducting (in addition to some additional blood sampling). The first is a pilot study of whether there are correlations between the incidence of breast cancer in Berkshire County and blood levels of PCBs and DDE (a by-product of the pesticide DDT) in the cancer patients. DPH explained that this was a very preliminary, "quick and dirty" study aimed at determining whether to seek funding to conduct a fuller study. Many participants expressed concern that given the limited purpose of this pilot study and the fact that it was something of a "shot in the dark," inconclusive results could be misinterpreted as demonstrating that exposures to PCBs and DDE are not harmful.

DPH also stated that it was conducting a comprehensive health assessment of the GE-Pittsfield site pursuant to funding obtained through ATSDR. This assessment will gather and analyze existing health-related information; it will not otherwise collect new data.

DPH mentioned that it was considering undertaking a further worker study and that it was engaged in preliminary discussions with GE regarding access to worker records. The other participants to the workshop expressed skepticism about the value of such a study in light of the problems that the well-funded Wegman study and DPH's own bladder cancer study uncovered. Some recommended that rather than pursue such a formal study, DPH should investigate less formal ways to obtain worker exposure information through seeking to obtain and follow up on union rosters. One participant made reference to published reports that 62% of people who worked in Building 12 at the GE plant developed cancer and recommended that someone follow up on what data lay behind such reports.

Residents of the Lakewood area and members of the Housatonic River Initiative discussed their efforts to put together a health survey designed to uncover whether there was an elevated incidence of various health problems in the Lakewood area. The experts who attended the workshop pledged their assistance in reviewing the proposed survey questionnaire once it was drafted. Some of them were skeptical about such a survey being able to prove a link between PCB exposure and adverse problems observed, while at the same time noting that the Woburn study and initial smoking studies began in a similar citizen-driven manner. The residents in attendance at the workshop emphasized the value of conducting such a survey regardless of its "scientific" value in proving direct causal links.

Some of the attendees expressed their view that future studies should focus on children. One expressed his view that "trans-generational effects" (i.e., those effects passed down to a subsequent generation from exposures to a current one) should be

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studied. While expressing empathy for the concern regarding trans-generational effects, one outside expert pointed out the technical difficulty of doing so. As he put it, "we're having problems getting a handle on studying current health effects [because of the problems discussed above]; the problems would be even worse for studying effects across generations."

Much of the discussion focused on whether there was any readily available data that lay unplumbed. Some participants stated their view that DPH could and should do more to review currently available data from the cancer registry. For example, given the level of concern in the Lakewood area and given the fact that cancer registry data is available by census tract, some felt that DPH should immediately determine how closely the available census tracts "fit" the neighborhood, with follow-up analysis of the registry data as appropriate.

One participant mentioned that the Berkshire Medical Center had a repository of tissue samples from cancer patients that could theoretically be tested for PCB levels. While some of the outside experts were intrigued by this potential source of information, they also expressed great skepticism for two reasons. One is the fact that complicated legal issues may prevent access. The other is that the presence or absence of PCBs may not reveal anything useful. For example, there is no reason to believe that carcinogens would be concentrated in tissues taken from fast-growing tumors that they may have caused. One expert identified hospital discharge data as a potentially more promising source of information that may be reasonably accessible and that might be useful to study non-cancer related illnesses.

All participants emphasized the need for better coordination and increased opportunities for public input. With reference to its upcoming health assessment, DPH indicated that it would consider many of the workshop participants for membership on a DPH advisory committee.

Conclusion.

The people who live at or near PCB-contaminated property in the Greater Pittsfield area, and former GE workers who may have been exposed to PCBs and other potentially dangerous chemicals in the workplace, have serious concerns about the health impacts they face. These concerns involve cancer risks and many other issues as well. Trying to address these concerns through epidemiological studies is extremely challenging, because such studies are typically inconclusive. There is no better example of this than the Wegman study itself. Despite the expertise of the researchers, the state-of-the-art research methods used, and a budget reported to be \$700,000, the study ultimately concluded that, because of inherent limitations in the data available, "[t]here is a high probability, therefore, that even if elevated cancer risks exist in this environment they might not be found."

Without the resources available to Dr. Wegman, DPH sought to design a study that would assess the extent to which people in Pittsfield and southern Berkshire County had been exposed to the PCBs. Serious concerns have been raised regarding the validity and significance of the study's conclusion that the blood levels in the "participants with the highest risk of exposure to PCBs" generally fell within national background levels. In addition, the study did not assess the health risks presented by the blood levels found, and the study's conclusions have clearly been misperceived by many members of the public.

The health concerns held by many people, especially in the Lakewood area, have not sufficiently been addressed by the studies that have been done to date. While there are no easy answers to addressing these concerns, the workshop helped focus people's thinking on specific avenues to pursue. In the interim, everyone agreed that in order to protect the public health with an adequate margin of safety, clean up decisions should be made using ultra-conservative risk-based assumptions.

Appendix A: Workshop Attendees

Ann Marie Adams, Pittsfield

Mary Ballew, U.S. Environmental Protection Agency

Stephanie Carr, U.S. Environmental Protection Agency

Barbara Cianfarini, Pittsfield

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