

# Health Consultation

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DEWEY LOEFFEL LANDFILL

NASSAU, RENSSELAER COUNTY, NEW YORK

EPA FACILITY ID: NYD000512335

MAY 15, 2003

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Agency for Toxic Substances and Disease Registry  
Division of Health Assessment and Consultation  
Atlanta, Georgia 30333

## **Health Consultation: A Note of Explanation**

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

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

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# HEALTH CONSULTATION

DEWEY LOEFFEL LANDFILL

NASSAU, RENSSELAER COUNTY, NEW YORK

EPA FACILITY ID: NYD000512335

Prepared by:

New York State Department of Health  
Under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry

## **Background and Statement of Issues**

### ***Statement of Issues***

Citizens who reside near and on Nassau Lake (Rensselaer County, New York) and near the Dewey Loeffel Landfill are concerned about their exposure to contaminants in their drinking water and to exposures to soils, sediment, air and surface water contaminated with polychlorinated biphenyls (PCBs). The Agency for Toxic Substances and Disease Registry (ATSDR) has received requests from Rensselaer County and from Senator Schumer to perform a health study in relation to these exposures.

ATSDR is responsible for evaluating human exposures to chemicals released into the environment, evaluating the public health implications of such exposures, making recommendations to protect public health, and determining the need for further public health actions, which may include a health study. The purpose of this health consultation is to evaluate the exposures to the community from the above pathways and to determine the need for additional public health actions.

### ***Background***

Nassau Lake is a man-made 172-acre impoundment of the Valatie Kill Creek. The area surrounding the lake is populated and the lake is used for recreational purposes by the residents. In the late 1970s, fish and sediment in the lake were found to be contaminated with PCBs from the Dewey Loeffel Landfill site which is about 2.5 miles from the lake (NYSDOH Files, 2003).

The Dewey Loeffel Landfill site is a hazardous waste landfill that operated from 1952 until around 1970, prior to regulations governing such activities. Operations ceased in the early 1970s and the site was covered with local soil and graded. In the late 1970s, after the Hazardous Waste Program in New York State was initiated, the New York State Department of Environmental Conservation (NYSDEC), along with the New York State Department of Health (NYSDOH) and the Rensselaer County Health Department (RCHD), investigated the site and the potentially affected area, including Nassau Lake. This effort resulted in a 1980 agreement between the State and the responsible parties to further investigate and remediate the site. A clay barrier wall, a cap and a leachate collection system within the barrier wall to control the level of leachate within the cell was completed in 1984. Since that time, a hydrogeologic investigation confirmed that groundwater is affected in the area south of the site which was previously thought to be outside of the drainage area. General Electric has provided filters on three wells to the south of the site and one well to the north. A Proposed Remedial Action Plan to enhance the operation of the containment system is pending approval and implementation. In addition, because of elevated levels of PCBs, primarily Aroclor-1260, found in certain species of fish, a fish consumption advisory was issued in 1980. This advisory was revised in 1988 to include all fish species (NYSDOH Site Files, 2003).

## Community Health Concerns

Between 1978 and 1980, preliminary investigations of the Dewey Loeffel site were done by the NYSDEC, NYSDOH, and the RCHD. In 1980, the General Electric Corporation (GE) hired a consultant to do a more extensive investigation of the site and to design the remedy (see above).

Throughout this process, there were numerous public informational meetings conducted by the Town of Nassau, the Nassau Lakes Association, or the State. After the on-site remediation was complete, there was little public interaction until 1988 when further environmental sampling was performed and the state initiated a lawsuit requiring GE to investigate off-site contamination.

From 1988 to the present, considerable community involvement has occurred regarding the site. The NYSDOH and NYSDEC have had extensive interaction with the community regarding their concerns over potential environmental contamination and specific health issues. During this fourteen year period, numerous meetings were held with the Nassau Lake Association, the Citizens Environmental Coalition (CEC), the Rensselaer County Legislature, the Town of Nassau Toxic Waste Committee, the citizen's group UNCAGED (United Neighbors Concerned about General Electric and the Dewey Loeffel Landfill), and the general public.

Most recently, the NYSDOH has been working closely with a group of stakeholders (including representatives from the Towns of Nassau and Schodack, CEC, Nassau Lake Association, and UNCAGED) to address ongoing concerns about the PCB contamination of Nassau Lake. Regular stakeholder meetings have been held since the Summer of 2001 and the group's main objectives have included:

- 1) creating a summary of residential well water sampling results to increase the public's understanding of the data;
- 2) having a cancer incidence study conducted for the area;
- 3) forming a fish advisory workgroup to educate the public about the dangers of consuming PCB-contaminated fish from Nassau Lake; and,
- 4) designing an exposure study (health study) to investigate serum PCB levels among Nassau Lake residents.

The NYSDOH have undertaken several initiatives to inform the public regarding the Nassau Lake fish advisory (see Public Health Action Plan for more details). Although consumption of fish from the lake may still be occurring, it is generally believed that persons who live around Nassau Lake are well aware of the fishing advisory and risks of consuming fish from the lake. Some of the citizens living around the lake (about 150-200 persons) are mainly concerned about their exposures to PCBs from contaminated soils, sediment, water, and air (Personal Communication, Site Manager, NYSDOH). Concern has also been expressed regarding exposures to children.

## Discussion

### *Contaminants of Concern and Exposure Pathways*

**Nassau Lake.** The primary contaminants of concern in sediment and surface water from the Nassau Lake and in soils adjacent to lake are PCBs. The levels of PCBs in sediment range from less than 0.08 ppm to 9 ppm. The average PCB level in these samples of the lake's sediment is 2.3 ppm. The average for the sediment in the northern end of the lake is higher (3.1 ppm) than for the southern end (1.6 ppm). Soils have been sampled from five properties along the lake that are flood-prone. The levels of PCBs ranged from less than 0.018 ppm to 2.2 ppm. The highest average in any one property was 1.4 ppm. For the other properties, PCB levels averaged 0.23 ppm, 0.05 ppm, and 0.04 ppm and non-detect. The PCB levels in the sediment from the lake are fairly consistent throughout the lake and the soil levels are, for the most part, lower. With one exception, PCBs have not been detected in water from Nassau Lake. The one sample taken on November 18, 1993, during heavy runoff, contained 0.053 ppb or parts per billion (NYSDOH 2000). Based on these results, it is possible that persons who reside along the lake may be exposed to PCBs through incidental ingestion of sediment while wading, swimming or playing near the shoreline or in the lake. Therefore, the public health implications of exposure to PCBs via these routes will be further discussed in the public health implications section below.

**Air Around Nassau Lake.** General Electric Corporation sampled air around Nassau Lake at three locations on the shore during the summer of 1997. No PCBs were found in any of the samples at a detection limit 0.004  $\mu\text{g}/\text{m}^3$  or micrograms per cubic meter (NYSDOH 2000). Based on these results, it does not appear that residents around the lake are being exposed to appreciable levels of PCBs from the lake by breathing air. Given the relatively low levels of PCBs in the surface water and sediment and the physical and chemical properties of PCBs, appreciable levels of PCBs in air from the lake would not be expected. Because no data or information are available to indicate that persons who reside around the lake are exposed to PCBs in the air, no further evaluation of this pathway will be performed.

**Drinking Water Around the Nassau Lake and Dewey Loeffel Landfill.** Several private wells near the Dewey Loeffel Landfill site have been contaminated with various site-related volatile organic contaminants (VOCs). No samples of private well water has ever detected contamination by PCBs. Monitoring by the NYSDOH around the landfill began in the late 1970's. Since the late 1990's, GE has performed routine monitoring of wells suspected to be in or near the plume of groundwater contamination. Depending on the location of the private well and the potential for the well to become contaminated, the monitoring frequency ranges from quarterly to yearly. A review of the monitoring data from the late 1970's to present indicates that private well numbers 1, 2, 24, and 25 were contaminated by site-related VOCs above ATSDR health comparison or screening values. However, it is believed that exposure to VOCs occurred only to persons who consumed water from wells 24 and 25. Persons who used well 1 are reported to have gotten their water from a nearby spring and did not use the well water. Well 2 was not in use when it was found to be contaminated because the house was vacant—a new

uncontaminated well was subsequently drilled before the house was occupied (Personal Communication, NYSDOH Site Manager). All contaminated wells still in use have a carbon filtration treatment system installed. For private wells 24 and 25, the first time contamination was found was during December 1992 and January 1993. Both wells were previously tested in July and August of 1988 and were found to be free of site-related contaminants. Therefore, the longest, worst-case, duration of exposure to these well users was about four years. Also, well 24 was actually two wells that were drilled at two depths and were combined to serve a house and an apartment on the same property. Persons who consumed water from well 25 may have been exposed to TCE at about 25 micrograms per liter or  $\mu\text{g/L}$  (the level detected in July 1988 before a treatment system was installed). For the users of well 24, they may have been exposed to about 86  $\mu\text{g/L}$  (the average level detected during the December 1992 and January 1993 sampling events). Because it is believed that persons who consumed water from wells 24 and 25 were exposed to TCE above health comparison values, the public health implications of exposures to TCE will be further discussed below.

### ***Public Health Implications***

**Current and Past Exposures to PCBs from Nassau Lake Sediment and Soils.** At the request of the the Rensselaer County Environmental Management Council, the NYSDOH performed a health evaluation of exposure to PCBs in sediment from the Nassau Lake and from residential soils along the lake (NYSDOH 2000). This evaluation and the accompanying letter to the Rensselaer County is provided in Attachment A. The NYSDOH evaluated exposures using two methods. One method was to evaluate the estimated exposures to PCBs in relation to health effects shown in animal or human studies. The other method was to compare studies that have evaluated people's PCB blood serum levels in relation to potential exposures to contaminated soils and sediments. ATSDR reviewed the report by the NYSDOH and believe the conclusions to be accurate and in accordance with generally accepted assessment practices (ATSDR 2002). The NYSDOH concluded that both methods of evaluation suggest that exposure to PCBs in soil or sediment at Nassau Lake is likely to be small and people are unlikely to experience any detectable health effects that can be associated with these exposures. However, the NYSDOH could not rule out that people exposed may have some, although difficult to detect, increases in PCB body burdens (NYSDOH 2000). ATSDR concurs with these findings (ATSDR 2002).

**Past Exposure to TCE in Private Wells.** Studies of workers exposed to trichloroethene and other chemicals show an association between exposure to high levels of trichloroethene and increased risks of certain forms of cancer, including kidney, liver and non-Hodgkin's lymphoma. It is unlikely that chance is responsible for these associations; however, the role of other factors in causing these cancers, including exposures to other potential cancer-causing chemicals, is not fully known. Thus, these data suggest, but do not prove, that trichloroethene causes cancer in humans. Other studies show that people living in communities with drinking water supplies contaminated by mixtures of chemicals, including trichloroethene, have higher risks of certain types of cancer (e.g., non-Hodgkin's lymphoma) than do people living in communities with uncontaminated drinking water. These studies are weaker than those of workers largely because

we do not know for certain whether the people who got cancer actually drank the contaminated water for long periods of time before they got cancer. Trichloroethene causes cancer in laboratory animals given large oral doses or exposed to high levels in air over their lifetimes (ATSDR, 1997). The animal cancers caused by trichloroethene include liver, kidney, testes, lymphoma, and lung cancer. Chemicals that may cause cancer in workers and cause cancer in laboratory animals may cause cancer in humans who are exposed to lower levels over long periods of time.

Based on the results of studies in animals and limited sampling of private residential water supply wells, people drinking water (from wells 24 and 25) containing trichloroethene at levels from 25  $\mu\text{g/L}$  to as levels as high as 86  $\mu\text{g/L}$  for a maximum of four years, are estimated to have a low increased risk of developing cancer (i.e., the increased risk is between one-in-one million and one-in-ten thousand).

Trichloroethene also produces non-cancer effects, primarily to the liver and kidneys. Although the risks of noncarcinogenic effects from past exposures in drinking water are not completely understood, the existing data suggest that they could be low for people exposed to levels of trichloroethene ranging from 25 to 86  $\mu\text{g/L}$ .

Although the likelihood of an adverse health effect because of past exposures to person who used wells 24 and 25 for potable purposes is low, ATSDR concurs that these exposures needed to be eliminated or minimized to below levels of health concern.

### ***ATSDR Child Health Considerations***

The ATSDR Child Health Initiative emphasizes examining child health issues in all of the agency activities, including evaluating child-focused concerns through its mandated public health assessment activities. The ATSDR consider children when evaluating exposure pathways and potential health effects from environmental contaminants. We recognize that children are of special concern because of their greater potential for exposure from play and other behavior patterns. Children sometimes differ from adults in their susceptibility to the effects of hazardous chemicals, but whether there is a difference depends on the chemical. Children may be more or less susceptible than adults to health effects from a chemical and the relationship may change with developmental age.

As indicated above, ATSDR reviewed and concurs with NYSDOH's evaluation methods and conclusions regarding potential health effects of exposure to PCB contamination of sediment and soils around Nassau Lake. The NYSDOH did consider PCB exposure to children in their evaluation (NYSDOH 2000). Therefore, exposure to children and any potential increased sensitivity to PCB exposures was taken into account when evaluating the health risks associated with the site.

The potential for trichloroethene to cause adverse effects in the offspring of humans and/or laboratory animals has been assessed in several studies. Studies of children born to women who were exposed to trichloroethene in drinking water during pregnancy provide limited evidence that an association may exist between oral trichloroethene exposure and adverse developmental effects (e.g., neural tube and oral cleft defects, low birth weight) as well as childhood leukemia (ATSDR, 1997). In each of these studies, the mothers were exposed to chemicals other than trichloroethene, and the overall data are not strong enough to conclude that the effects are caused by trichloroethene and not by some other factor or factors. When pregnant animals are exposed by ingestion and/or inhalation to large amounts of trichloroethene, adverse effects on the normal development of the offspring are observed (ATSDR, 1997). In most, but not all of these studies, the high amounts of trichloroethene also caused adverse health effects on the parent animal. The estimated levels of exposure to trichloroethene in drinking water were compared to the exposure levels in the animal studies in which adverse health effects were observed, and were found to be lower. Thus, the possibility that children may have increased sensitivity to trichloroethene was taken into account when evaluating the potential health risks associated with the site.

### ***Health Outcome Data***

ATSDR has not independently performed an evaluation of health outcome data for the geographic areas around Nassau Lake and the Dewey Loeffel Landfill. However, the NYSDOH has performed a cancer incidence evaluation of persons who reside in geographic areas (zip codes) that include or are adjacent to Nassau Lake and the site (See Attachment B). The evaluation by the NYSDOH concluded that the overall number of cancers in the study area during the 10-year study period (1989-1998) was not elevated above the number of cancers that would have been expected based on New York State rates, excluding New York City. This conclusion was also true for individual cancers except for lung cancer in females who lived within zip code 12062 (East Nassau) for which there was a statistically significant excess. The NYSDOH also reports that cancer of the lung and bronchus is one of the most common cancers among New Yorkers, with smoking being the most common cause. Among females in zip code 12062 who developed cancer of the lung and bronchus between 1989 and 1998, for whom smoking status could be ascertained, all were identified as either current or former smokers at the time of diagnosis. Given the relatively small number of women in this zip code who developed lung cancer, this proportion is within the range of the approximately 90% of females diagnosed with lung cancer between 1989 and 1998 in New York State, exclusive of New York City, who were current or former smokers at the time of diagnosis (NYSDOH 2002).

ATSDR has reviewed the NYSDOH report and concurs with the NYSDOH's evaluation methods and findings concerning cancer incidence within the geographic areas (zip codes) which include or are adjacent to Nassau Lake and the site.

## Conclusions

1. Citizens who reside on or near Nassau Lake (Rensselaer County, New York) and near the Dewey Loeffel Landfill are concerned about their exposure to contaminants in their drinking water and to exposures to soils, sediment, air and surface water potentially contaminated with polychlorinated biphenyls (PCBs). The Agency for Toxic Substances and Disease Registry (ATSDR) has received requests from Rensselaer County and from Senator Schumer to perform a health study in relation to these exposures. The purpose of this health consultation is to evaluate the exposures to the community from the above pathways and to determine the need for additional public health actions.
2. ATSDR has reviewed NYSDOH's evaluation of exposures to PCBs from soils, sediment, surface water and air and concur with their approach and findings. Specifically, ATSDR concurs that potential consumption of surface water from Nassau Lake and breathing of air around the lake is not likely to result in any appreciable PCB exposures. Moreover, exposures to soils and sediments in and along the shoreline of the lake, including swimming, are likely to be small and not likely to result in any adverse health effects. Therefore, ATSDR concludes that exposure to PCBs through these pathways pose a no apparent public health hazard. ATSDR uses this hazard category to define an exposure situation where there is reason to believe exposure may have occurred but where adverse health effects are not expected from the exposure.
3. Even though efforts have been made to inform the public of the hazards of consuming fish from Nassau Lake, exposures to PCBs in fish may still be occurring, primarily to those who do not live on or near the lake but to others who may come from out of the area to fish. Depending on the amount of fish consumed, some persons may still be exposed to PCBs at levels of health concern. Continued efforts to educate the public on the hazards of consuming fish from the lake are needed.
4. ATSDR has performed an evaluation of exposure to site-related contaminants found in private drinking water wells. Trichloroethene or TCE, in wells 24 and 25, was the only site-related contaminant that was found at levels above ATSDR health screening values. Further evaluation of the estimated exposures indicate that persons who used water from these wells for up to four years would have a low increased risk of experiencing an adverse health effect. Although the likelihood of an adverse health effect because of past exposures to person who used wells 24 and 25 for potable purposes is low, ATSDR concurs that these exposures needed to be eliminated or minimized to below levels of health concern.
5. ATSDR has reviewed NYSDOH's evaluation of cancer incidence among residents of the geographic areas (zip codes) that include or are adjacent to Nassau Lake and the site and concurs with the evaluation methods and findings. Based on the evaluation methods, the NYSDOH

concluded that the overall number of cancers diagnosed among residents of the study area during the period 1989-1998 was not elevated above the number of cancers that would have been expected. NYSDOH's conclusion was also true for individual cancers except for lung cancer among females who lived within zip code 12062 (East Nassau) for which there was a statistically significant excess. According to the NYSDOH evaluation, cancer of the lung and bronchus is one most common cancers in the state, with smoking being the most common cause. Of these residents for whom NYSDOH could ascertain smoking status, all were identified as either current or former smokers at the time of diagnosis.

6. Based on the available data and information, the ATSDR have evaluated the soil, sediment, surface water, air, and drinking water exposure pathways related to the Dewey Loeffel Landfill and the most current scientific literature related to the potential health effects of exposure to PCBs and TCE to determine the need for follow-up health studies or investigations. ATSDR does not believe that a health study or investigation is indicated because:

- □ Exposures to PCBs in soil, sediment, surface water, and air, by residents who live on or near Nassau Lake, are not likely to result in an adverse health effect and any increase of PCBs in blood would likely be small and difficult to detect.
- □ Past exposures to TCE, by users of wells 24 and 25, may have resulted in a low increased risk of cancer and non-cancer effects to a small population and these exposures ceased about 10 years ago.

## **Recommendations**

1. Private wells that may potentially become contaminated by the plume of groundwater contamination from the Dewey Loeffel Landfill should continue to be monitored in accordance with the current plan based on a well's potential to become contaminated.
2. Routine fish sampling from the Nassau Lake and updating of the fish advisory, as necessary, should continue. Moreover, efforts should continue to educate the public of the hazards of consuming fish from the lake.
3. NYS DOH should offer enrollment in the VOC Exposure Registry to residents of households served by wells 24 and 25 from 1988 through 1992. NYS DOH's VOC Exposure Registry provides for long-term follow-up on the health status of persons with documented exposures to VOCs at selected sites in New York State. The exposure registry is a resource for research that may help us learn whether exposures to VOCs are related to health effects.

## Public Health Action Plan

### *Actions Taken:*

The NYSDOH conducted an evaluation of cancer incidence for cancers diagnosed during the period 1989 through 1998 among residents of zip codes 12123 (including 12063) and 12062.

In March 2002, the NYSDOH, by working with a sub-committee of the Dewey Loeffel stakeholders group, completed an outreach and education plan for the Nassau Lake fish advisory.

The main purpose of the plan was to raise awareness about the fish advisory for Nassau Lake and the Valatie Kill up to County Route 18. The group wanted the plan to be broad and comprehensive, with the understanding that funds/resources might not be available for the entire plan. To date, several actions have been taken, as follows:

- Three times (in 2001, 2002, and 2003) flyers were printed and inserted in the *The Advertiser* that reaches more than 3,300 homes in the Nassau Lake area. These flyers covered information about the scope of the advisory area and a reminder that no fish should be eaten from Nassau Lake. A winter flyer insert was targeted to ice fishers.
- Two-hundred signs were produced for posting along the Lake. Two versions of the sign were generated, one with and one without the term “PCBs”. This was done because some of the committee members wanted stronger language and because some were concerned about the impact on property values.
- Metal posts were ordered.
- Permission cards were generated and used for property owners to sign.
- The NYSDOH have and will continue to make available the signs and posts for the residents to use. To date, only a small percentage (10 percent) of signs and posts have been distributed to the residents.

### *Actions Planned:*

The NYS DOH is currently gathering contact information to offer VOC Exposure Registry enrollment to residents near the Dewey-Loeffel site who consumed water from Wells 24 and 25 from 1988 through 1992. Enrollment in the registry involves completing a survey about possible exposures to VOCs, the health status of each member of the household, and other factors related to health, such as smoking. Residents who enroll in the Registry will be re-contacted approximately every two to three years to update address information and monitor changes in health status. People who are enrolled in the Registry will be kept informed of any research results that come from the Registry data. Data gathered for the registry will be kept confidential.

## **References**

ATSDR (Agency for Toxic Substances and Disease Registry) 1997. Toxicological Profile for Trichloroethylene (Update). U.S. Department of Health and Human Services, U.S. Public Health Service, ATSDR, Atlanta, Georgia.

ATSDR 2002. Personal Communication between Gregory Ulirsch and Dr. Ken Orloff, Exposure Investigations and Health Consultation Branch, Division of Health Assessment and Consultation, ATSDR, November 20, 2002. Subject: Review of NYSDOH's Nassau Lake Assessment and Health Risk Information.

ATSDR 2003. Personal Communication between Gregory Ulirsch and John Sheehan, New York State Department of Health, February 28, 2003.

NYSDOH (New York State Department of Health) 2000. Letter from Dr. Nancy Kim, NYSDOH to the Rensselaer County Environmental Management Council (Mr. Ken Dufty), March 24, 2000. Subject: Nassau Lake Exposure Assessment and Health Risk Information Report.

NYSDOH 2002. Cancer Incidence Among Residents of Zip Codes 12123 (including 12063) and 12062, Rensselaer County, New York 1989-1998, June 2002.

NYSDOH 2003. NYSDOH Dewey Loeffel Site Files.

## **Preparers of Report**

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## **APPENDIX A**

### **NYSDOH'S NASSAU LAKE EXPOSURE ASSESSMENT AND HEALTH RISK INFORMATION**



# STATE OF NEW YORK DEPARTMENT OF HEALTH

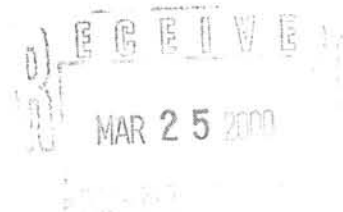
Flanigan Square, 547 River Street, Troy, New York 12180-2216

Antonia C. Novello, M.D., M.P.H.  
*Commissioner*

Dennis P. Whalen  
*Executive Deputy Commissioner*

March 24, 2000

Mr. Ken Dufty  
Executive Director  
Rensselaer County  
Environmental Management Council  
Rensselaer County Office Building  
Troy, New York 12180



Dear Mr. Dufty:

Commissioner Novello asked me to respond to your December 1, 1999, letter about recreational use of Nassau Lake. Your letter states your concerns about possible exposures and health risks to people who may be exposed to PCBs at Nassau Lake. People may take in PCBs if they are exposed to low levels in sediment or soil. However, we do not believe that the possible exposures or any associated health risks at Nassau Lake are at levels to warrant a recommendation that people should be prevented from recreational contact with the lake sediment or shoreline soil (see enclosure for basis). Much larger exposures to PCBs are possible if people eat fish from the lake. Thus, we continue to recommend that no one eat any fish from the lake.

One method of evaluating exposures and health risks is to use information about PCB levels in the sediment, soil, water, and air around Nassau Lake and information about how people may be exposed to these media. This method (see enclosure and figure) suggests that PCB exposures (except for eating fish) at Nassau Lake are likely to be small and unlikely to cause detectable health effects.

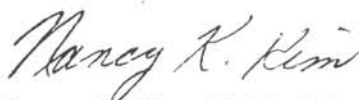
Another way of evaluating possible exposures, and by inference health risks, from PCBs at Nassau Lake is to review studies of people who could have been exposed to PCBs in situations similar to those at Nassau Lake. Studies that measured both PCB levels in people's blood serum and PCB levels in sediment or soil are particularly useful. People in these studies were compared with people not similarly exposed to see if PCBs from the sediment or soil got into their bodies. These studies (see enclosure, particularly Tables 1 and 2) did not consistently detect elevated serum PCB levels. The PCB levels in soil and sediment in these studies were generally higher than levels near

Nassau Lake. Thus, these findings suggest that it may be difficult to detect an increase in PCB serum levels due to exposure to PCBs from Nassau Lake sediment and soil.

Both methods of evaluation suggest that exposure to PCBs in soil or sediment at Nassau Lake is likely to be small and people are unlikely to experience any detectable health effects that can be associated with the exposures. However, we can not rule out that people may have some, although difficult to detect, increase in PCB body burdens.

For some time we have been evaluating possible exposures to PCBs from the sediment and soil around Nassau Lake. Our current analysis incorporates much of the new information gathered since we began our evaluation, and we will continue to update our analysis as new information becomes available. Consistent with past statements, our evaluations and the environmental data do not warrant a recommendation that people be prevented from using the lake for recreational purposes. However, if people want to minimize their potential exposure to PCBs in soil, we have suggestions for them to consider. Examples of some possible steps to take are rinsing off mud after contact with sediment or soil that may have low levels of PCBs or rinsing off children's toys that may have sediment or soil on them. We continue to remind everyone that no one should eat any fish from the lake. If you have any comments or additional data you would like us to consider, please feel free to contact me.

Sincerely,



Nancy K. Kim, Ph.D., Director  
Division of Environmental Health Assessment

Enclosures

cc: Ms. Denise Ayers, RCHD  
Dr. Anders Carlson, NYS DOH  
Dr. David Carpenter, UA-School of Public Health  
Mr. Roy Champagne, RCHD  
Dr. James Cogliano, USEPA  
Mr. Walt Demick, NYS DEC  
Ms. Cynthia Engel, Legislator, Environmental Health Committee  
Dr. Edward Horn, NYS DOH  
Hon. Neil Kelleher, Legislative Chairman  
Mr. William Knight, Nassau Toxic Committee  
Mr. Dave Monroe, NYS DOL  
Ms. Ann Rabe, CEC  
Hon. Carol Sanford, Nassau Town Supervisor  
Mr. Tom Tobia, Nassau Lake Association  
Mr. Ronald Tramontano, NYS DOH  
Hon. Henry Zwack, Rensselaer County Executive

## **NASSAU LAKE EXPOSURE ASSESSMENT AND HEALTH RISK INFORMATION**

This exposure assessment identifies completed exposure pathways associated with Nassau Lake. An exposure pathway is the process by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) environmental media and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population. Environmental media and transport mechanisms "carry" contaminants from the source to points where people are or may be exposed. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, dermal absorption). The receptor population is the person or people who are, or may be, exposed.

### **1. Estimating Possible PCB Exposures at Nassau Lake**

#### Exposure Routes

People could be exposed to PCBs around Nassau Lake in several ways. People could eat PCB-contaminated fish. People, especially children, might incidentally ingest sediment or soil containing PCBs through hand-to-mouth contact. PCBs could be absorbed through skin that is in contact with PCB-containing sediment or soil while wading or playing. PCBs from the sediment or soil could possibly evaporate into the air and people could breathe them in as a vapor. If the sediment or soil becomes airborne, people could possibly breathe in small particles containing PCBs. If PCBs were in the water, people could take in some PCBs by swallowing some lake water during playing or swimming or absorbing some PCBs through the skin. Although all of these exposures could occur in theory, some are more likely than others.

#### Exposures from Sediment and Soil

Samples of the sediment and soil at Nassau Lake have been analyzed for PCBs. The levels of PCBs in sediment range from less than 0.08 parts per million (ppm) to 9 ppm. The average PCB level in these samples of the lake's sediment is 2.3 ppm. The average for the sediment in the northern end of the lake is higher (3.1 ppm) than for the southern end (1.6 ppm). Soil samples were taken from five properties, at flood-prone areas at the edge of the lake, and the PCB levels ranged from less than 0.018 ppm to 2.2 ppm. The highest average in any one property was 1.4 ppm. For the other properties, PCB levels averaged 0.23 ppm, 0.05 ppm, 0.04 ppm and non-detect. The PCB levels in the sediment are fairly consistent throughout the lake and the soil levels are, for the most part, lower. We've used the average sediment level of 3 ppm to evaluate exposures and risks. Using this value is likely to overestimate, rather than underestimate, exposures and risks.

People can be exposed to PCBs in contaminated sediment or soil by incidentally eating some soil or sediment or by absorbing PCBs through the skin. We estimated the

average daily amount of PCBs that a six-year-old child would take into the body if he or she were exposed to sediment or soil containing 3 ppm of PCBs. Using procedures outlined by the U. S. Environmental Protection Agency (EPA) and the exposure assumptions shown in Table 3, the amounts would be about 0.008 micrograms of PCBs per kilogram of body weight (mcg/kg) through incidental ingestion and 0.003 mcg/kg through the skin. We also evaluated the health risks associated with these amounts. These intakes are about 500 times less than those that have caused health effects in animals (see figure).

One factor that is important in this evaluation is that the amount of soil-bound PCBs absorbed through the skin and into the body is relatively low, particularly compared to absorption after ingestion. Studies in animals and humans consistently show that about 90% or more of ingested PCBs (not bound to soil) are absorbed into the body (ATSDR, 1998). A study with rats suggests that the percent absorption of soil-bound PCBs when ingested is 70 - 90% (Fries et al., 1989). In contrast, an estimate of the percent absorption of soil-bound PCBs (as Aroclor 1242 or Aroclor 1254) applied to monkey skin is about 14% (Wester et al., 1993).

#### Exposures from Air

People could breathe in PCBs that evaporate into the air or that are on small airborne sediment or soil particles. General Electric (GE) measured air for PCBs at Nassau Lake at three locations on the shore during the summer of 1997. By taking the samples in the summer, GE increased the likelihood of finding PCBs in the air. No PCBs were detected in the air (detection limit of 0.004 micrograms per cubic meter of air). These results are not surprising because PCBs, especially the Aroclor 1260 at Nassau Lake, do not readily evaporate. Also, we would not expect people to breathe in many small soil particles because the sediment/soil is likely to be damp and small particles are not likely to be produced. Given these data and conditions at Nassau Lake, inhalation exposure is unlikely to be important.

#### Exposures from Water

With one exception, PCBs have not been detected in the water at Nassau Lake. The detection limit for PCBs was 0.022 micrograms per liter (mcg/L). One sample of lake water taken on November 18, 1993, during heavy runoff contained 0.053 mcg/L. This is below the drinking water standard of 0.5 mcg/L. Given these data, we believe that exposure to PCBs while swimming in the water is unlikely to be important.

#### Uncertainties

This assessment evaluates data to determine the potential for PCBs to cause health effects in people living at Nassau Lake. Uncertainties are inherent in any exposure or risk assessment. In this assessment, uncertainties are associated with the data on PCB levels in sediment, soil, air and water; some of the assumptions used to estimate exposure; the toxicological data on PCBs; and the human exposure studies. In

preparing this assessment, we used what we consider to be the best available scientific data and likely overestimated, rather than underestimated, exposures.

## **2. PCB Levels in People Living Near PCB-Contaminated Sediment or Soil**

Many studies have measured PCB levels in the blood serum of people potentially exposed to PCBs. Some studies were of people who were exposed because of specific activities, such as their occupation. Other studies looked at people living near contaminated areas. The studies show that certain types of activities increase PCB levels in serum above serum PCB levels in the general population. These activities include working with PCBs, eating contaminated food (e.g., fish), playing with contaminated electrical parts, living on a farm with contaminated silos, or living with someone who was exposed at work (ATSDR, 1998). A few studies examined PCB levels in serum of people who lived near sites with sediment or soil containing PCBs (see Tables 1 and 2). The soil or sediment PCB levels at these sites are, for the most part, much higher than the PCB levels at Nassau Lake. At all sites, the PCB levels in the people's serum were not above levels in the general population, except for those people who engaged in the activities listed previously (e.g., eating PCB-contaminated fish). At one site (Housatonic River Area in Table 2), serum PCBs levels in people engaged in activities associated with soil/sediment exposure (yard work, gardening, canoeing) were similar to those of people who did not engage in such activities.

These studies have limitations and cannot be considered definitive. Only a small number of people were in the studies and only two studies included children (Yaffe and Reeder, 1989, and one study in Stehr-Green et al., 1988).

**Table 1. Summary of Biomonitoring Data on Populations Living Near PCB-Contaminated Sites (Adapted from Stehr-Green et al., 1988).**

Site	Maximum On-Site Soil (ppm)	Maximum Off-Site Soil (ppm)	Blood Serum PCB Levels in People with Highest Exposure Potential*		
			Number of People	Geometric mean (ppb)**	Percent Below 20 ppb**
<i>Sites with No Evidence of Increased Human Serum PCB Levels***</i>					
Sebastian, AR	no data	133,000	20	5.8	100
Wayne, GA	3,436	149	4	5.1	100
Norfolk, MA	220,000	3	89	4.1	100
Ashtabula, OH	no data	0.1	57	4.1	100
Allegheny PA	32,000	1,106	9	2.7	100
Chester, PA	36,000	6,400	22	5.3	95
Pickens, SC	no data	130	27	2.6	96
Marion, WV	22,226	205	24	5.0	96
Monroe, IN (3 sites)#	333,000	3,500	51	9.0#	90#
<i>Sites with Evidence of Increased Human Serum PCB Levels</i>					
New Bedford (Newport) MA##	99,000	no data	42	13##	79##

\* People with the greatest reported frequency and duration of activities that might lead to contact with contaminated areas; data for non-workers only except for Sebastian, Pickens, and Marion.

\*\* At the time of the studies, most people without occupational exposure had serum PCB levels in the low ppb range with median levels between 5 - 7 ppb and 95% of the levels were below 20 ppb (5% were 20 ppb or above).

\*\*\* Sites where ATSDR (Stehr-Green et al., 1988) did not find a statistically significant increased proportion of non-occupationally exposed people with serum PCB levels substantially above background levels (i.e., the proportion of people with serum PCB levels 20 ppb or above was not significantly different from the expected proportion of 5%).

# ATSDR (Stehr-Green et al., 1986) could not trace elevated levels in people to any specific environmental (non-occupational) route of exposure (including contact with contaminated soil/sediments) with the possible exception of people who reportedly salvaged metal from discarded electrical equipment; 10% of the people had levels 20 ppb or above which is not significantly ( $p = 0.12$ ) different from the proportion expected (5%); ATSDR recommended additional studies to find out sources of exposure.

## People who ate large amounts of locally-caught seafood had higher PCB levels than people who did not eat seafood. Thus, the primary source of environmental exposure was determined to be the consumption of contaminated seafood (Telles, 1982; see Table 2 for follow-up study); 21% of the people had levels 20 ppb or above which is significantly ( $p < 0.05$ ) different from the expected proportion of 5%).

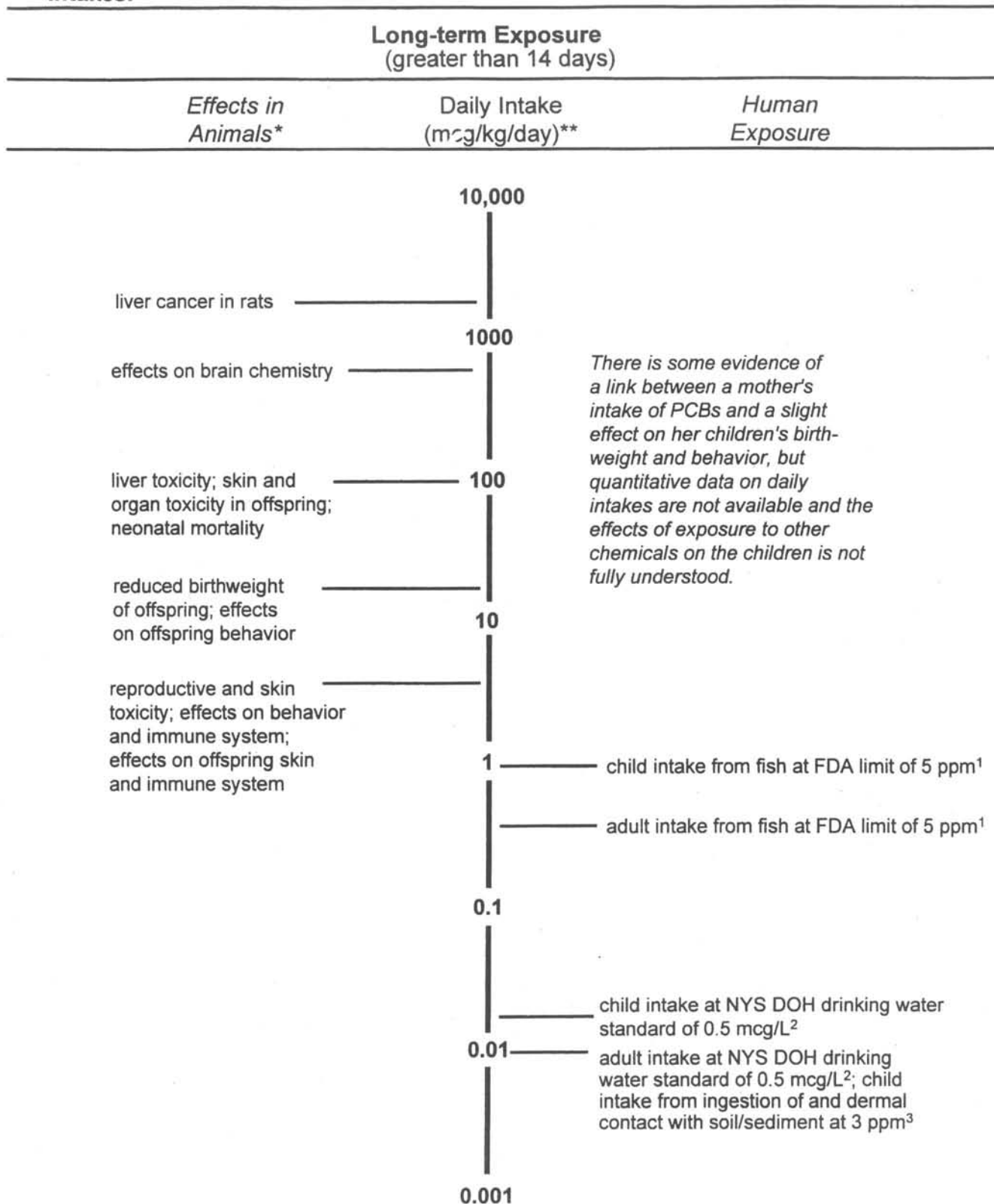
**Table 2. Conclusions Regarding Human Blood Serum PCB Levels in Populations Living Near PCB-Contaminated Sites in Massachusetts and Canada.**

Study	Environmental Contamination	Study Conclusion																		
Housatonic River Area PCB Exposure Assessment (MDPH, 1997)	<p><b>Sediment</b> (108 samples; 0-0.5 inches in depth; over 4 miles of the most heavily contaminated river areas): Five areas (means) = 20, 20, 30, 15, 3.1 ppm</p> <p><b>Soil</b> (987 samples; all depths, floodplain soil sampling of same river areas as above): Five areas (means) = 12, 22, 22, 2.4, 0.5 ppm</p>	Serum levels of individuals with highest potential for exposure to PCBs from daily activities in and around area were generally within the background range for non-occupationally exposed US populations; occupational exposures increased significantly serum levels; other activities (including eating fish, gardening, other yard work, canoeing) did not increase significantly serum levels																		
Greater New Bedford PCB Health Effects (MDPH, 1987; Miller et al., 1991)	Hot-spot sediment contamination levels were >200,000 ppm. Mean seafood levels = 131 ppm. Eels were as high as 730 ppm, and lobsters were as high as 68 ppm	The proportion of elevated serum PCBs in the sample of residents was found to be typical of non-occupationally exposed urban populations in the US; eating locally-caught seafood increased serum levels																		
Norwood Public Exposure Assessment Program (MDPH, 1991)	Initial surface soil samples (before remediation) were as high as 110,000 – 220,000 ppm. Off-site soil samples near 3 residences were 0.1 ppm, 0.1 ppm, and 1.6 ppm	Serum levels found in the Norwood population were well within the normal range of the typical non-occupationally exposed US population																		
Soil Contamination in Toronto (Yaffe and Reeder, 1989); study area within 500 meters of a plant that had used PCBs	<table> <tr> <th>Soil Levels</th><th>Study Area</th><th>Control Area</th></tr> <tr> <td>No. samples</td><td>23</td><td>20</td></tr> <tr> <td>No. &lt; 0.1 ppm</td><td>7</td><td>15</td></tr> <tr> <td>No. &gt; 0.25 ppm</td><td>5</td><td>2</td></tr> <tr> <td>Max</td><td>2.7 ppm</td><td>0.35 ppm</td></tr> <tr> <td>GM*</td><td>0.19 ppm</td><td>0.12 ppm</td></tr> </table> <p>*geometric means significantly (p &lt; 0.2) different</p>	Soil Levels	Study Area	Control Area	No. samples	23	20	No. < 0.1 ppm	7	15	No. > 0.25 ppm	5	2	Max	2.7 ppm	0.35 ppm	GM*	0.19 ppm	0.12 ppm	30 children from study area and 21 children from uncontaminated area similar in age and sex distribution and similar in exposure potentials (including via breastmilk, fish consumption, soil contact, and parental occupation) showed similar serum levels of PCBs, and all levels were comparable to those of other children with no known PCB exposure except the American diet
Soil Levels	Study Area	Control Area																		
No. samples	23	20																		
No. < 0.1 ppm	7	15																		
No. > 0.25 ppm	5	2																		
Max	2.7 ppm	0.35 ppm																		
GM*	0.19 ppm	0.12 ppm																		

**Table 3. Assumptions for Estimating Exposure to PCBs in Nassau Lake Soil and Sediment.**

Parameter	Value
<i>Dermal Exposure Assumptions</i>	
Exposure frequency	5 days per week; 4 months per year (mid-May through mid-September)
Area of exposed skin	lower legs, feet, forearms and hands (2841 square centimeters)
Soil-to-skin adherence factor	0.2 milligrams of soil or sediment per square centimeter of skin
Fraction of PCBs dermally absorbed from soil/sediment	0.14 (14 percent)
Average body weight of 6-year old child	22.6 kilograms
<i>Ingestion Exposure Assumptions</i>	
Exposure frequency for ingestion of outdoor soil/sediment	5 days per week; 4 months per year (mid-May through mid-September)
Exposure frequency for ingestion of outdoor soil/sediment tracked indoors	365 days per year
Amount of outdoor soil/sediment ingested	80 milligrams per day
Amount of indoor soil/sediment ingested	40 milligrams per day
Fraction of PCBs absorbed from ingested soil/sediment	1 (100 percent)
Average body weight of 6-year old child	22.6 kilograms

# Comparison of PCB Intakes Causing Heath Effects in Animals to Estimated PCB Human Intakes.



\* These effects are listed at the lowest level at which they were first observed. They may also be seen at higher levels.

\*\*Micrograms of PCBs per kilogram body weight per day (mcg/kg/day).

<sup>1</sup> PPM is parts per million. Intake based on 70-kg adult eating 0.5 pound of fish per month and 22.6-kg child eating 0.3 pound of fish per month. The PCB concentration in fish (5 ppm) is based on data for largemouth bass collected from Nassau Lake in 1997.

<sup>2</sup> Intake based on 70-kg adult drinking 2 liters of water per day and 22.6-kg child drinking 1 liter of water per day at 0.5 micrograms PCBs per liter of water (0.5 mcg/L).

<sup>3</sup> See Table 3 for exposure assumptions.

## References

- ATSDR (Agency for Toxic Substances and Disease Registry). 1998. Toxicological Profile for Polychlorinated Biphenyls (Update). Draft for Public Comment. Research Triangle Park, NC: U.S. Public Health Service, ATSDR, U.S. Department of Health and Human Services.
- Fries, G.F., G.S. Marrow, and C.J. Somich. 1989. Oral bioavailability of aged polychlorinated biphenyl residues contained in soil. *Bull. Environ. Contam. Toxicol.* 43:683-690.
- MDPH (Massachusetts Department of Public Health). 1991. Norwood PCB Public Exposure Assessment Program (PEAP). Final Report. Boston, MA: Division of Environmental Health Assessment, MDPH.
- MDPH (Massachusetts Department of Public Health). 1987. Final Report of the Greater New Bedford PCB Health Effects Study 1984 - 1987. Boston, MA: MDPH.
- MDPH (Massachusetts Department of Public Health). 1997. Housatonic River Area PCB Exposure Assessment Study. Final Report. Boston, MA: Environmental Toxicology Unit, Bureau of Environmental Health Assessment, MDPH.
- Miller, D.T., K. Condon, S. Kutzner, D.L. Phillips, E. Krueger, R. Timperi, V.W. Burse, J. Cutler, and D.M. Gute. 1991. Human exposure to polychlorinated biphenyls in Greater New Bedford, Massachusetts: A prevalence study. *Arch. Environ. Contam. Toxicol.* 20:410-416.
- Stehr-Green, P.A., D. Ross, J. Liddle, E. Welty, and G. Steele. 1986. A pilot study of serum polychlorinated biphenyl levels in persons at high risk of exposure in residential and occupational environments. *Arch. Environ. Health.* 41:240-244.
- Stehr-Green, P.A., V.W. Burse, and E.W. Welty. 1988. Human exposure to polychlorinated biphenyls at toxic waste sites: Investigations in the United States. *Arch. Environ. Health.* 43:420-424.
- Telles, N.C. 1982. The New Bedford Study - Preliminary findings. Boston, MA: Massachusetts Department of Public Health, Environmental Health Assessment (as cited in Stehr-Green et al., 1988).
- Yaffe, B.A., and B.A. Reeder. 1989. An epidemiologic assessment of exposure of children to polychlorinated biphenyls (PCBs) in a Toronto community. *Can. J. Public Health.* 80:325-329.
- Wester, R.C., H.I. Maibach, L. Sedik, J. Melendres, and M. Wade. 1993. Percutaneous absorption of PCBs from soil: *in vivo* rhesus monkey, *in vitro* human skin, and binding to powdered human stratum corneum. *J. Toxicol. Environ. Health.* 39:375-382.

## **APPENDIX B**

### **NYSDOH'S CANCER INCIDENCE REPORT**



New York State Department of Health  
Center for Community Health

June 2002

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BUREAU OF ENVIRONMENTAL  
EXPOSURE INVESTIGATION

**Cancer Incidence Among Residents  
of ZIP Codes 12123 (including 12063) and 12062,  
Rensselaer County, New York 1989-1998**

**Highlights**

In February 2001, the Community Exposure Research Section of the Bureau of Environmental and Occupational Epidemiology in the Center for Environmental Health of the New York State Department of Health requested that the Cancer Surveillance Program of the Bureau of Chronic Disease Epidemiology and Surveillance in the Center for Community Health conduct an investigation of the incidence of cancer in areas surrounding the Dewey Loeffel landfill and Nassau Lake in the Town of Nassau, Rensselaer County. The request was specifically for an investigation of ZIP Code 12123 (Nassau)(including point ZIP Code 12063 (East Schodack), which has residential post office boxes but no associated mail delivery area) and ZIP Code 12062 (East Nassau). It was agreed that the investigation would cover the most recent 10-year time period for which data from the New York State Cancer Registry were complete, 1989-1998.

The Cancer Surveillance Program has now completed this investigation. A summary of the methods used to conduct the investigation, a map of the area, and a table of the findings are attached. Comparisons between the observed, or actual, numbers of cancers diagnosed and the numbers expected were made for all cancers combined, and separately for fifteen cancers occurring in both males and females, two occurring in males only and four occurring in females only. In order to protect patient confidentiality, some related anatomic sites of cancer have been grouped and some others may not appear on the attached table due to small numbers of cases.

The attached table shows observed and expected numbers of incident cancer cases for males and females in the study area. The total number of males with cancer was statistically significantly less than the total number expected, with 143 cases observed and 174 expected. The total number of females with cancer was not statistically significantly different from the total number expected, with 138 cases actually observed and 159 expected. The small difference that was seen is consistent with the effects of random variation. No individual type of cancer in males showed a statistically significant difference from the number expected. When grouped, cancers of the blood and blood-forming system (lymphomas, multiple myeloma, and leukemias) showed a statistically significant deficit in males, with a total of seven cases observed and 16 cases expected. There was a statistically significant deficit of colorectal cancers in females, with nine cases diagnosed and 19 cases expected. No other type of cancer in females showed a statistically significant difference from the number expected.

Observed and expected numbers of incident cancer cases for males and females were also examined for each of the ZIP Codes separately. Due to small numbers of cases for most of the individual types of cancer, a table will not be presented for the individual ZIP Codes to protect patient confidentiality. In ZIP Code 12123 (Nassau), including 12063, the total number of males

with cancer was statistically significantly less than the total number expected (117 observed, 142 expected). The total number of females with cancer was not statistically significantly different from the total number expected (111 observed, 131 expected). No individual type of cancer in males showed a statistically significant difference from the number expected. In females, the numbers of cases of colorectal cancer and of lymphomas were both statistically significantly less than expected. No other type of cancer in females showed a statistically significant difference from the number expected. In ZIP Code 12062 (East Nassau) the total numbers of males with cancer (26 observed, 32 expected), and of females with cancer (27 observed, 29 expected), were not statistically significantly different from the total numbers expected. No individual type of cancer in males showed a statistically significant difference from the number expected. There was a statistically significant excess of female lung cancer, with nine cases observed and four expected. No other type of cancer in females showed a statistically significant difference from the number expected.

Cancer of the lung and bronchus is one of the most common cancers among New Yorkers, with smoking being the most common cause. Among females in ZIP Code 12062 who developed cancer of the lung or bronchus between 1989 and 1998, for whom smoking status could be ascertained, all were identified as either current or former smokers at the time of diagnosis. Given the relatively small number of women in this ZIP Code who developed lung cancer, this proportion is within the range of the approximately 90% of females diagnosed with lung cancer between 1989 and 1998 in New York State, exclusive of New York City, who were current or former smokers at the time of their diagnosis.

Also attached is background information on lung cancer along with information on cancer in general. Any questions regarding this investigation may be addressed to Ms. Aura Weinstein, Director, Cancer Surveillance Program at (518) 474-2354.

**New York State Department of Health  
Cancer Surveillance Program  
Methods for Cancer Incidence Studies of Small Areas**

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**Study Plan:**

Small area studies are designed to determine if the number of cancers occurring among residents of a particular area is unusual. To do this, the number of residents of the study area diagnosed with cancer is compared to the number expected, based on the cancer rates for New York State, excluding New York City.

**Identifying Cases (Observed):**

Residents of the study area who were diagnosed with cancer between 1994 and 1998 are identified from the New York State Cancer Registry. As required by New York State law, the Cancer Registry contains information on all individuals diagnosed with cancer in the State. The Registry receives this information from hospitals, death certificates and various other sources. Cancer Registry files are continuously updated and all of the information received is combined to provide a complete and accurate picture of a person's cancer diagnosis.

**Calculating Expected Cases (Expected):**

To determine if the number of residents diagnosed with cancer in the study area is unusual, we calculate the number of cancers that would be expected in the area. This calculation takes into account the number of residents in the area (population), including their age and sex. In this study, the expected number of cases was calculated by multiplying the cancer incidence rates, by age and sex, for New York State (excluding New York City) by the estimated population of the study area, by age and sex. The study area population for 1994 through 1998 was estimated using the U.S. Census and information from commercial vendors.

**Types of Cancer (Anatomic Sites) Studied:**

We examined the anatomic sites (location in the body) of cancer that the requestor was concerned about. The number of cases for some anatomic sites of cancer may not appear on the attached table in order to protect the privacy of individuals reported to the New York State Cancer Registry.

**Statistical Testing:**

We compared the actual number of cancers in the study area to the expected number of cancers. Sometimes a difference between the observed number of cancers and the expected number occurs due to chance. We used a statistical test to determine the probability that the actual number of cancers was larger or smaller than the number expected due only to chance. We considered this difference to be statistically significant if there was a low probability that the difference was due to chance (less than 5%).

## Study Limitations:

There are a number of things that should be kept in mind when looking at a study of this type. These include:

Effects of Chance (Multiple Comparisons): Approximately one out of every 20 statistical tests (5%) done in this type of study will be statistically significant due to chance alone. In this study, a large number of comparisons were made between expected and observed cancers for different anatomic sites for males and for females. When many statistical tests are done, the probability is high that at least one statistically significant difference may occur entirely by chance. It is not always possible to determine if a significant difference is due to chance alone.

Small Numbers of Cancer Cases (Statistical Power): In an area that has few cancer cases, it is difficult to detect an unusual difference between the number of cancers observed and the number expected. A large number of observed or expected cancers is required before we can be certain that what we observe is statistically different from what is expected. Our ability to detect this difference is called statistical power.

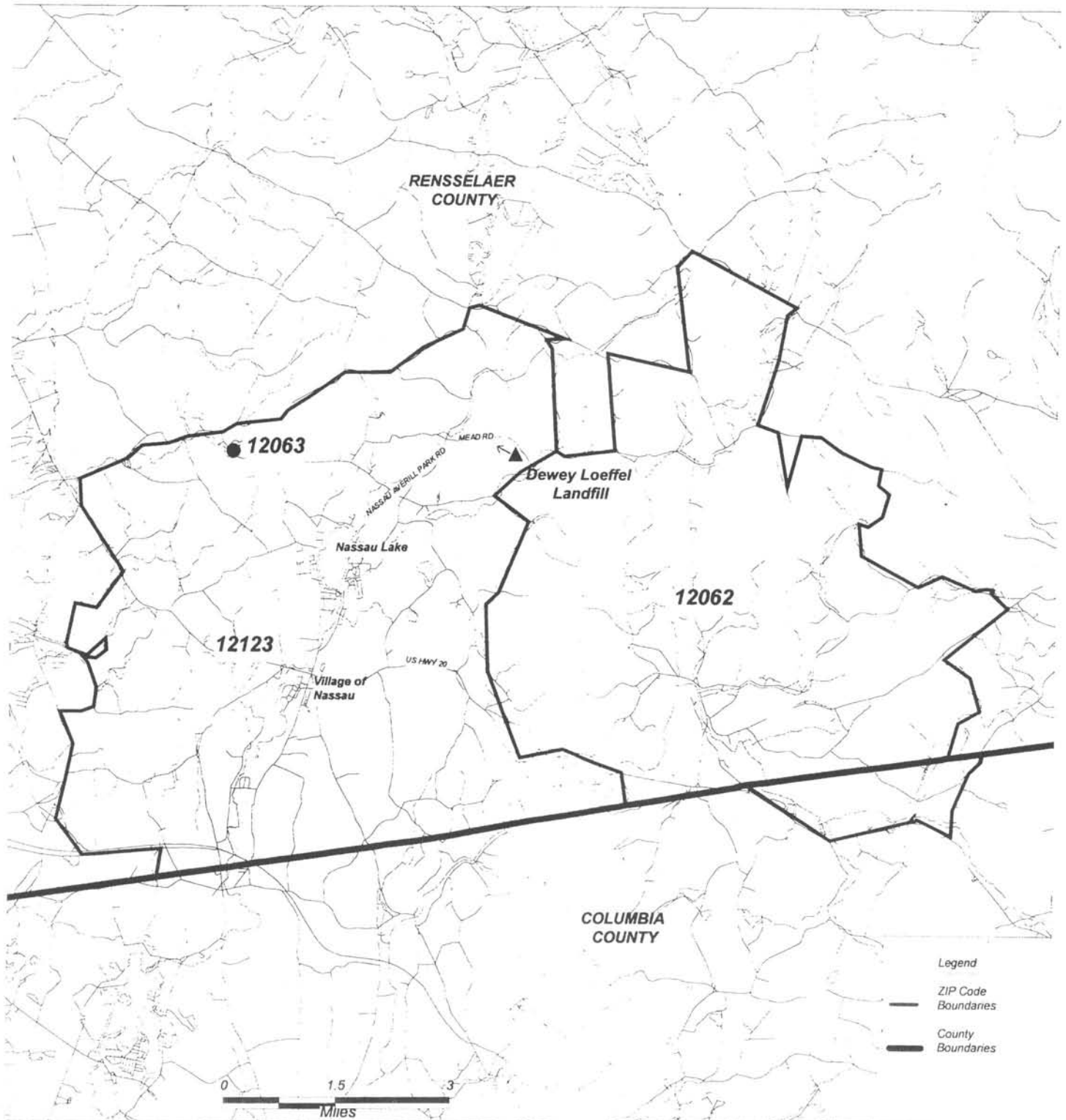
Migration (Residence): Migration is the movement of people in or out of the study area. For example, people who lived in the study area for a long time and move away shortly before they are diagnosed with cancer are not included in the study. People who lived elsewhere but moved into the study area shortly before their diagnosis are included in the study. Therefore, migration influences our ability to determine if living in the study area increases or decreases an individual's risk of getting cancer.

Populations/ZIP Code areas: As indicated in the section labeled "Calculating Expected Cases", an estimated population of the study area is used to calculate the number of expected cases. The population is estimated based on information from the U.S. Census and data from commercial vendors, incorporating information on births, deaths and migration. We believe the population estimates to be reasonably accurate. However, because they are estimates and the actual number of residents in the study area may differ, the expected number of cases is also an estimated number.

In a few cases, ZIP Code populations were combined with those of adjacent ZIP codes because of changes in mail delivery patterns during the study period. Also, when a ZIP Code had no mail delivery area (e.g. post office boxes only), it was combined with an adjacent ZIP Code.

Interpretation: Studies such as the one done here cannot determine a cause-and-effect relationship. Cancer surveillance investigations can only tell us about the pattern of cancer in a particular study area. They cannot tell us that living in the study area increases or decreases a person's risk for getting cancer. Findings that are considered to be "statistically significant" may provide leads for further investigation of the cancer experience of a community.

**DEWEY LOEFFEL LANDFILL STUDY AREA  
ZIP CODES 12123 (INCLUDING 12063), AND 12062  
RENSSELAER COUNTY, NEW YORK**



**BUREAU OF CHRONIC DISEASE EPIDEMIOLOGY AND SURVEILLANCE  
NEW YORK STATE DEPARTMENT OF HEALTH**

Observed and Expected Numbers of Incident Cancer Cases,  
ZIP Codes 12123 (including 12063) and 12062,  
Rensselaer County, New York, 1989-1998  
New York State exclusive of New York City Standard 1989-1998

SITES (ICD-9) <sup>a</sup>	MALES		FEMALES	
	Observed <sup>b</sup>	Expected <sup>c</sup>	Observed <sup>b</sup>	Expected <sup>c</sup>
All Sites (140-208, 42.2, 233.7) <sup>d</sup>	143*	174	138	159
Colorectal (153-154.1, 159.0)	24	22	9*	19
<u>Other Digestive:</u> Esophagus (150) Stomach (151) Liver/Intrahepatic Bile Duct (155) Pancreas (157)	12	13	8	8
Lung / Bronchus (162.2-162.9)	26	30	24	21
Female Breast (174)			46	48
Corpus Uterus / Uterus NOS (179, 182)			8	10
Ovary (183.0)			7	7
Prostate (185)	39	45		
Urinary Bladder (188, 233.7 [in situ])	9	13	7	4
<u>Blood and Blood-forming System:</u> Lymphomas (200-202.2, 202.8-202.9) Multiple Myeloma (203.0, 203.8) Leukemias (204-208, 202.4, 203.1)	7*	16	6	12

<sup>a</sup>Classification of site is based on International Classification of Diseases, ninth revision.

<sup>b</sup>Data were obtained from the New York State Cancer Registry (database as of October 2001).

<sup>c</sup>Expected numbers are based on standard cancer incidence rates by age and sex for New York State, exclusive of New York City. Standard rates are applied to the total 1989-1998 study population (37,702 males and 37,964 females) to obtain expected numbers of cases.

<sup>d</sup>Includes observed and expected numbers of cases at sites of cancer not listed below.

\*Denotes a statistically significant difference from expected. The probability that this difference is due to chance is less than 5%.



### What is cancer?

Cancer is not a single disease, but more than 100 different diseases. It is characterized by the abnormal growth of cells in the body.

The body is made up of billions of cells. These cells reproduce by dividing. Through this process the body grows and repairs itself. Sometimes, a cell begins dividing abnormally and tumors form. Tumors may be *benign* or *malignant*. Malignant tumors (cancers) can spread to other tissues or organs nearby or to other parts of the body. This is called *metastasis*. Cancers grow at different speeds. Some may grow very quickly; others may grow slowly over a period of many years.

Some cancers are easily cured, others are more difficult to treat. This depends largely on the place in the body where the cancer cells grow, how large the tumor is when it is first found, and if it has spread. Doctors usually consider tumors that start in different parts of the body (not those that spread, but new tumors) to be different diseases. Generally, each type of cancer has its own risk factors, symptoms, outlook for cure, and methods of treatment.

### What causes cancer?

No one knows for sure why a normal cell becomes a cancer cell. Many causes of cancer have been identified. Sometimes there is a family history of cancer. Scientists agree that people can get cancer through repeated long-term contact with *carcinogens*. These include tobacco, sunlight, X-rays, and certain chemicals that may be found in the air, water, food, drugs and workplace. Our personal habits and lifestyle may contribute to most cancers. It is believed that about 30% of cancer deaths are due to tobacco. Some cancer risk may be related to diet.

### How soon after exposure to a carcinogen does the cancer appear?

Cancers develop slowly in people. They usually appear five to 40 years after exposure to a carcinogen. For example, cancer of the lung may not occur until 30 years after a person starts smoking. This long *latency* period is one of the reasons it is difficult to determine what causes cancer in humans.

### Who gets cancer?

Cancer is a very common disease. One in three people will be diagnosed with cancer at some time in their life. Eventually, cancer occurs in three out of every four families. In New York, nearly one in four deaths is due to cancer.

Cancer occurs at all ages, but most often in middle-aged and older people. The number of people diagnosed with cancer has increased over the past 40 years. Most of this is due to the increase in the population and because people are living longer.

The most common cancers diagnosed among men, besides skin, are prostate, lung and colon cancer. Among women, they are cancers of the breast, lung and colon.

#### Terms

**Benign Tumor** - An unusual growth of cells that is not cancer. It cannot spread to other parts of the body.

**Malignant Tumor** - A cancerous tumor. It has the ability to spread to other parts of the body.

**Metastasis** - Cancer that has spread to another part of the body.

**Carcinogen** - Something that causes cancer, also known as a cancer causing agent.

**Latency** - The time between exposure to a cancer causing agent and when a person develops cancer.

#### Tips for Lowering Cancer Risk

**Stop smoking or using tobacco of any kind.**

**Get regular health check-ups.**

**Eat high-fiber, vitamin rich foods each day (fruits, vegetables, whole grain bread and cereal).**

**Eat foods low in fat (fruits, vegetables, cereals, lean meat and low-fat dairy products).**

**Exercise regularly.**

**Drink alcoholic beverages only in moderation.**

**Avoid exposure to known cancer causing agents.**

**Avoid unnecessary X-rays.**

**Avoid too much sunlight; wear protective clothing and use sunscreen.**

**Discuss the risk of hormone replacement therapy with your health care provider.**

**Be aware of health and safety rules at work and follow them.**