Health Consultation

DEWEY LOEFFEL LANDFILL

TOWN OF NASSAU, RENSSELAER COUNTY, NEW YORK

EPA FACILITY ID: NYD000512335

Prepared by:
New York State Department of Health

NOVEMBER 1, 2013

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 or ATSDR's Cooperative Agreement Partner which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO
or
Visit our Home Page at: http://www.atsdr.cdc.gov

HEALTH CONSULTATION

DEWEY LOEFFEL LANDFILL

TOWN OF NASSAU, RENSSELAER COUNTY, NEW YORK

EPA FACILITY ID: NYD000512335

Prepared By:

New York State Department of Health
Center for Environmental Health
Under Cooperative Agreement with the
U. S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

SUMMARY

INTRODUCTION

The New York State Department of Health (DOH) and the Agency for Toxic Substances and Disease Registry (ATSDR) want to provide the community around the Dewey Loeffel Landfill site with the best information possible about whether and how people might contact contaminants from the site, and any potential health risks that could result from such contact.

This health consultation (HC) fulfills a congressional mandate that requires public health assessments be conducted for each site proposed by the United States Environmental Protection Agency (EPA) to the National Priorities List (NPL).

The ATSDR released a health consultation on the Dewey Loeffel Landfill in May of 2003. This health consultation updates information on human exposure pathways identified in the 2003 health consultation. It also evaluates soil vapor intrusion, an additional exposure pathway.

CONCLUSION 1

The DOH and ATSDR conclude that drinking and using water from private wells near the Dewey Loeffel Landfill site is not expected to harm people's health.

BASIS FOR DECISION

This is because possible exposure to volatile organic contaminants in private wells is being minimized by use and maintenance of treatment systems. The treated water meets state and federal drinking water standards for public water supplies.

CONCLUSION 2

The DOH and ATSDR conclude that data are sufficient within one-half mile south of the site to indicate that soil vapor intrusion is not occurring in the homes in this direction. The DOH and ATSDR cannot conclude whether soil vapor intrusion could occur to the north, east, and west of this site.

BASIS FOR DECISION

Recent shallow groundwater sampling data indicate that there are no site-related contaminants in this media to the south and, therefore, soil vapor intrusion is unlikely. However, there are insufficient data to evaluate the soil vapor intrusion pathway of contaminant migration to the north, east, and west of the site.

CONCLUSION 3

The DOH and ATSDR conclude that eating fish from Nassau Lake and other affected waters could harm people's health if people do not follow the DOH fish consumption advisories for these waters.

BASIS FOR DECISION

This is because elevated levels of polychlorinated biphenyls (PCBs) are present in certain species of fish in three water bodies affected by contamination from the landfill: the Valatie Kill, Nassau Lake, and Kinderhook Lake.

CONCLUSION 4

Exposures to PCBs in soils and sediments in the lake and along the shoreline of the lake, outdoor air, and in surface water are likely to be low and are not expected to harm people's health.

BASIS FOR DECISION

DOH estimated exposures based on the levels of PCBs detected in lake sediments as well as soils on lake properties that were prone to flooding, assuming a child is exposed by ingestion and by the absorption of PCBs through the skin. The estimated exposures were about 500 times lower than exposures that have caused adverse health effects in animals. These evaluations suggested that exposures to PCBs in Nassau Lake sediments and soil are likely to be low and people are unlikely to have health effects from such exposures. PCBs were not detected in air at Nassau Lake, and also were not detected in surface water except for one sample during heavy runoff. The level of PCBs in this one sample was below the state drinking water standard. Therefore, exposures to PCBs through inhalation or while swimming are unlikely to be harmful.

RECOMMENDATIONS

New York State Department of Environmental Conservation (DEC) or EPA should continue to oversee monitoring and maintenance of the existing potable water treatment systems to prevent exposure to site-related contaminants in drinking water from private wells. Monitoring should continue at a frequency sufficient to prevent breakthrough of contaminants into the drinking water.

DEC or EPA should delineate and evaluate the potential for future exposure to site-related contaminants in the soil vapor in areas where previous evaluations have not been made (north, east, and west of the site).

Anglers and others should follow the DOH's health advisory for consumption of fish in Nassau Lake and the other affected water bodies. These fish consumption advisories are for the Valatie Kill, Nassau Lake, and Kinderhook Lake.

The fish consumption health advisory is as follows:

Women under 50 years of age and children under 15 years of age should not eat any fish from the Valatie Kill from County Route 18 downstream to Nassau Lake or between Nassau Lake and Kinderhook Lake, and from Nassau and Kinderhook Lakes.

Women over 50 years old and men over 15 years old should follow the waterbody specific advice below:

- "Don't Eat" any fish species taken from the Valatie Kill between County Route 18 and Nassau Lake. "Don't Eat" any fish species taken from Nassau Lake.
- "Eat up to one meal per month" for American eel, bluegill and redbreasted sunfish from the Valatie Kill between Nassau Lake and Kinderhook Lake. All other fish eat up to 4 meals per month.
- "Eat up to one meal per month" for American eel taken from Kinderhook Lake. All other fish eat up to 4 meals per month.

Additional information related to the DOH fish advisory can be obtained at: http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/regional/hudson_valley_and_capital_district.htm)

NEXT STEPS

1. The DEC or EPA will continue to oversee monitoring and maintenance of potable water treatment systems to prevent exposure to site-related contaminants in drinking water. DOH will continue to review these sampling results and make recommendations if further action is needed.
2. DEC or EPA will evaluate the potential for exposure to site-related contaminants in the soil vapor media north, east, and west of the site. DOH will review the results of this work and make recommendations if further public health actions are needed.
3. The DOH will continue to support, re-evaluate as needed, and encourage people to adhere to the DOH health advisory for consumption of fish in Nassau Lake and the other affected water bodies. DOH will continue to make fish consumption advisory signs available to organizations wishing to post signs for these water bodies.

FOR MORE INFORMATION

If you have questions about the environmental investigation of the Dewey Loeffel Landfill, please contact the EPA at 212-637-3030. More information about the site can also be found at http://www.epa.gov/region02/superfund/npl/dewey/. If you have questions about this health consultation, please contact Mr. Christopher Doroski of the DOH at 518-402-7860 or 1-800-458-1158.

BACKGROUND AND STATEMENT OF ISSUES

Statement of Issues

The ATSDR and DOH are 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. The ATSDR released a health consultation in May of 2003 (ATSDR, 2003) based, in part, on an evaluation that the DOH completed for Rensselaer County Environmental Management Council in 2000 regarding health concerns from exposure to PCBs in residential soils and in Nassau Lake (DOH, 2000).

Since the final release of the 2003 Dewey Loeffel Health Consultation, additional environmental sampling has produced data for off-site groundwater and private well water. This health consultation updates information on previously identified exposure pathways and identifies soil vapor intrusion as an additional exposure pathway that needs to be evaluated for the site. Additionally, this update is required because the EPA nominated the site to the NPL in March of 2010 and added it the NPL on March 10, 2011 (EPA, 2011a).

Background

Nassau Lake is a 172-acre impoundment of the Valatie Kill Creek (see Appendix A, Map 1). Although the properties that surround the lake are all privately owned, the lake is used for recreation by the public, as well as 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 upstream from the lake (DOH, 2003). The levels of PCBs in Nassau Lake sediments range from less than 0.08 milligrams per kilograms (mg/kg) to 9 mg/kg. The average PCB concentration in the lake's sediment is 0.86 mg/kg.

The Dewey Loeffel Landfill 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 New York State Inactive Hazardous Waste Site Registry was established, the DEC, along with the DOH and the Rensselaer County Health Department (RCHD), initially 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. In 1984, a clay barrier wall, a cap, and a leachate collection system within the barrier wall to control the level of leachate within the cell were completed. Since then, an investigation confirmed that groundwater is contaminated by volatile organic compounds in the area south of the site. Under DEC oversight, the General Electric Company (GE) provided carbon filters on private drinking water wells to the south and to the north of the site (see Appendix A, Map 2).

In 1980, because of elevated levels of PCBs (primarily Aroclor 1260), found in certain species of fish, DOH first issued fish consumption advisories for three water bodies affected by contamination from the landfill: the Valatie Kill, Nassau Lake, and Kinderhook Lake (DOH, 2011). Women under 50 years of age and children under 15 years of age should not eat any fish from the Valatie Kill from County Route 18 downstream to Nassau Lake or between Nassau Lake and Kinderhook Lake, and Nassau and Kinderhook Lakes. All others should follow the water body specific advice below.

- "Don't Eat" any fish species taken from the Valatie Kill between County Route 18 and Nassau Lake. "Don't Eat" any fish species taken from Nassau Lake.
- "Eat up to one meal per month" for American eel, bluegill and redbreasted sunfish from the Valatie Kill between Nassau Lake and Kinderhook Lake. All other fish eat up to 4 meals per month.
- "Eat up to one meal per month" for American eel taken from Kinderhook Lake. All other fish eat up to 4 meals per month.

Additional information related to the DOH fish advisory can be obtained at: http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/regional/hudson_valley_and_capital_district.htm.

Between 1978 and 1980, preliminary investigations of the Dewey Loeffel Landfill site were done by the DEC, DOH, and the RCHD. Since 1980, GE and an environmental consulting firm under contract with GE have done more extensive investigation of the on-site and off-site areas. More information on these investigations can be found at: http://www.epa.gov/region02/superfund/npl/dewey/.

Community Health Concerns

Public informational meetings have been held by the Town of Nassau, the Nassau Lake Improvement Association, and the State during the time when these site investigations were being conducted. In 1988, further environmental sampling was performed and the State initiated a lawsuit, the resolution of which ultimately required GE to investigate off-site contamination.

From 1988 to the present, the community has been actively involved in site-related issues. The DOH and DEC have had extensive interaction with the community regarding their concerns over potential environmental contamination and specific health concerns. During this 23-year period, meetings were held with the Nassau Lake Association, the Citizens Environmental Coalition (CEC), the Rensselaer County Legislature, the Town of Schodack, the Town of Nassau supervisors and boards, the Town of Nassau Toxic Waste Committee, the citizen's group UNCAGED (United Neighbors Concerned about GE and the Dewey Loeffel Landfill), and the general public. The DOH worked closely with the stakeholders (including representatives from the Towns of Nassau and Schodack, CEC, Nassau Lake Association, and UNCAGED) to address concerns about the landfill-related PCB contamination of Nassau Lake and volatile organic compound contamination in private drinking water wells.

DOH invited the public to review a draft of this health consultation during the public comment period, which ran from January 27, 2012 to April 29, 2012. A summary of the public comments we received, and our responses, can be found in Appendix D - Dewey Loeffel Landfill Health Consultation, Summary of Response to Public Comments.

Nassau Lake Fish

The DOH undertook several initiatives to inform the public about the Nassau Lake fish advisory. DOH and local community groups made a variety of outreach and education efforts to make sure that people who live around Nassau Lake are aware of the fish advisory and the risks of eating fish taken from the lake. The DOH distributed fish advisory information and signage to property owners and posted them in public access areas around the lake. Additional regional outreach and education efforts were made to anglers who may travel to these water bodies to fish. Long-term monitoring, including annual fish sampling, is required by the 2002 Record of Decision for the Dewey Loeffel Landfill site (DEC, 2002).

Private Drinking Water Wells

No sample of private well water has contained detectable PCB contamination. Citizens living downgradient of the landfill are concerned about volatile organic compounds contaminating the drinking water from their private wells. Five private homeowner wells (referred to as wells A through E in this health consultation) were found to be contaminated with volatile organic compounds from the Dewey Loeffel landfill. All but one of those wells are still in use and, since discovery of contamination, have had water treatment systems installed and maintained on a periodic schedule by GE's consultant, under DEC and DOH oversight (for more details, see ATSDR, 2003).

Recent Site Visit

In August of 2010, DOH inspected and sampled the system that treats Wells B and C after receiving an odor complaint from the homeowner. Laboratory results of the sampling confirmed the integrity of the treatment system and no site-related contaminants were present in the finished drinking water.

DISCUSSION

A. Environmental Contamination and Exposure Pathways

Media of Concern and Exposure Pathways

Exposure pathways are summarized in Appendix B, Table 1. Environmental media samples have been analyzed over the years of investigation for inorganic compounds including metals, and for volatile and semi-volatile organic compounds. PCBs and

volatile organic compounds have been identified as the on-going contaminants of concern.

Nassau Lake Soils, Sediments, Outdoor Air and Surface Water

The DOH (2000) evaluated potential exposures to PCBs in Nassau Lake sediments and soil. DOH estimated exposures based on the levels of PCBs detected in lake sediments as well as soils on lake properties that were prone to flooding, assuming a child is exposed by ingestion and absorption of PCBs through the skin. The estimated exposures were about 500 times lower than exposures that have caused adverse health effects in animals. DOH (2000) also reviewed several studies that measured PCB levels in serum from people who lived near sites having soil or sediments containing PCBs at levels generally higher than those detected at Nassau Lake. PCB levels in the people's serum were not above those of the general population unless they had eaten PCB-contaminated fish. These evaluations (DOH, 2000) suggested that exposures to PCBs in Nassau Lake sediments and soil are likely to be small and people are unlikely to have health effects from such exposures. However, the DOH could not rule out that people exposed though these pathways may have some, although difficult to detect, increases in PCB body burdens (DOH, 2000).

Outdoor air samples taken at three Nassau Lake locations during the summer of 1997 showed no detectable levels of PCBs (detection limit 4 nanograms per cubic meter). Surface water samples taken at multiple Nassau Lake locations on 10 separate occasions from 1992 to 1993 showed no detections of PCBs, with the exception of one sample taken during heavy runoff. The PCB level in this sample (0.053 micrograms per liter (mcg/L)) was 10 times lower than the state drinking water standard for PCBs in public water systems (0.5 mcg/L). Therefore, exposures to PCBs through inhalation or while swimming are unlikely to be harmful.

Private Drinking Water Wells

In 2003, ATSDR evaluated exposure to site-related volatile organic compound contaminants found in private drinking water wells (for more details, see ATSDR, 2003). No sample of private well water has contained detectable PCB contamination. Trichloroethene (TCE) was the only site-related contaminant that was found in two private wells known to be used for drinking water at levels above ATSDR health screening values. The estimated exposures indicate that persons who used water from the two wells for up to four years would have a low increased risk of experiencing adverse health effects[1]. Residents were notified at the time the contamination was discovered. Wells B and C were first found to be contaminated in 1992, after being found to have no site-related contamination in 1988. No one is believed to have consumed contaminated water from the other private wells before treatment was installed.

Five private wells near the Dewey Loeffel Landfill site (including the two mentioned above) were still contaminated with site-related volatile organic compounds in 2010. These volatile organic compounds include TCE, 1,1-dichloroethene, *cis*-1,2-dichloroethene, 1,2-dichloroethane, tetrachloroethene, methylene chloride, chlorobenzene, benzene and toluene.

The DOH drinking water standard (DOH, 2004) for these chemicals is 5 mcg/L. The five contaminated residential wells have consistently shown site-related contaminants and their break down products at concentrations above New York State public drinking water standards (see Table 1). Wells B and C are located on the same property. However, Well B is the only well that provides potable drinking water to two separate occupied dwellings on that property. Although Well C is currently used for monitoring, the potential exists for it to be reactivated and used as a potable source.

[1] Since the public release of this document, EPA developed and released new guidance on assessing TCE cancer risks that takes into account potential increased vulnerability in early life stages (EPA, 2011b). EPA also revised its estimate of TCE cancer potency and its TCE noncancer reference dose (EPA, 2011b). Using the new guidance and cancer potency factor does not change the original characterization of the TCE cancer risk ("low") in the 2003 ATSDR Public Health Consultation. If the revised reference dose is used to evaluate the noncancer risks, the highest reported TCE water concentrations in Wells 24 and 25 (86 mcg/L) could result in past exposures that exceed the reference dose and are 1) similar to the EPA's calculated TCE exposure level that corresponds roughly to a 1% increased risk for fetal heart malformations in rats, and 2) just below EPA's calculated effect level for immune toxicity in mice. This evaluation using the revised reference dose does not change the original conclusion in the 2003 ATSDR Health Consultation, that these exposures needed to be eliminated or minimized to levels below health concern, and that the potable water treatment systems be monitored and maintained. The TCE new guidance and toxicity values can be found at http://www.epa.gov/iris/subst/0199.htm.

Table 1. Site-related Chemicals Detected in Samples Collected from Private Wells from 2004-2010. Water Samples were taken from a sample tap that takes water before it enters the Water Treatment System.
(All values in micrograms per liter).

Chemical	Well A	Well B	Well C*	Well D	Well E
1,1 - dichloroethene	ND**	ND - 13	ND - 3.4	ND - 4.5	ND - 1.8
1,2 - dichloroethane	ND - 0.5	ND - 52	2.0 - 11	ND - 9.5	ND - 0.8
benzene	ND - 4.5	ND - 195	11 - 68	1.6 - 60	ND - 13
chlorobenzene	ND	ND - 15	1.1 - 9.7	ND - 8.6	ND - 25
cis-1,2 - dichloroethene	0.6 - 1.8	ND - 114	4.1 - 36	ND - 43	ND - 1.1
methylene chloride	ND - 0.8	ND – 2.4	ND – 3.7	ND - 32	ND -1.7
tetrachloroethene	ND	ND - 4.6	ND - 2.1	ND - 3.1	ND
trichloroethene	0.5 - 57	26 - 1450	250 - 1100	ND - 1300	ND - 35

* Well C is only used for monitoring, not for drinking.
** ND - chemical not detected in sample. Detection limits generally 0.5 micrograms per liter.

Current Exposure to Site-related Contaminants in Private Wells

Since 1992, all private potable water wells with contaminants from the Dewey Loeffel Site have had water treatment systems installed and maintained on a periodic basis by GE's consultant under the oversight of DEC and DOH. The treatment systems are placed so that they treat the water before it is distributed to the household. To ensure the effectiveness of the water treatment systems, post treatment water samples are collected and submitted for laboratory analysis periodically. Sampling is conducted quarterly. Filters are replaced as needed. No chemical detections of volatile organic compounds above laboratory method detection limits have been reported to date in the post treatment water samples.

Groundwater Investigation and Sampling

A groundwater investigation and sampling program has been undertaken by GE since the release of the 2003 ATSDR Health Consultation. This includes further delineation of the extent of site-related contaminants in the shallow and deep groundwater aquifers and the sampling of private wells. No additional private wells beyond Wells A through E were found to be affected. More information about the groundwater investigations can be found at http://www.epa.gov/region02/superfund/npl/dewey/.

Soil Vapor Evaluation

Volatile organic compounds in groundwater or soil may move into the air spaces within the soil (called soil vapor). This vapor may migrate into overlying buildings and affect indoor air quality (DOH, 2006). This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. In May and December of 2010, shallow groundwater samples were collected at two homes one-half mile south of the site. The absence of site-related chemicals in

the shallow groundwater indicates that soil vapor intrusion is not likely to occur at these locations, although the deeper aquifer, from which the private wells take water, is contaminated. However, the lack of site-related chemicals in the shallow groundwater south of the site does not preclude the need to further evaluate the potential for soil vapor intrusion in other areas. A separate shallow groundwater/soil vapor media investigation is needed in the other directions from the landfill before conclusions about the possibility of completed and potential future exposure pathways via soil vapor intrusion can be made.

B. Public Health Implications – Adult and Children's Health Concerns

In the 2003 Health Consultation, ATSDR performed an evaluation of exposure to site-related contaminants found in private drinking water wells. The evaluation concluded that persons who used water from these wells would have a low increased risk for adverse health effects in part because of the limited duration of exposure to VOCs from 1988 when wells first contained contamination (no site-related contamination found previously), to 1992 when the chemicals were first discovered and addressed (for more details, see ATSDR, 2003) [2].

Based on the available data, additional exposure to site-related contaminants has not occurred since water treatment systems were provided to affected households. No new data have been presented to the DOH or ATSDR that would require a further evaluation of public health implications from exposure to site-related contaminants.

The DOH and ATSDR consider children when evaluating all exposure pathways and potential health effects from environmental contaminants. Exposure of children and any potential increased sensitivity to PCB and TCE exposures was taken into account when evaluating the health risks associated with the site (DOH, 2000).

C. Health Outcome Data Evaluation

ATSDR (ATSDR, 2003) reviewed DOH'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 agreed with the evaluation methods and findings. Based on the evaluation methods, the DOH 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. DOH'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 DOH evaluation, cancer of the lung and bronchus is one of the most common cancers in the state, with smoking being the most common cause. Of the residents with lung cancer for whom DOH could ascertain smoking status, all were identified as either current or former smokers at the time of diagnosis.

[2] See footnote 1.

In addition, the ATSDR 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 did not believe that any follow-up health study or investigation was indicated (ATSDR, 2003).

No further health study or investigation has been done in this area and there are no new environmental data or public health findings that indicate that further work is warranted at this time.

CONCLUSIONS

The DOH and ATSDR conclude that drinking and using water from private wells near the Dewey Loeffel Landfill site is not expected to harm people's health because exposures are being mitigated by the use and maintenance of treatment systems (see Appendix C).

The DOH and ATSDR conclude that data are sufficient within one-half mile south of the site to indicate that soil vapor intrusion is not occurring in this direction. Recent shallow groundwater sampling data indicate that there are no site-related contaminants in this media and, therefore, soil vapor intrusion in this direction is unlikely. The DOH and ATSDR cannot conclude whether soil vapor intrusion could occur to the north, east, and west of this site.

The DOH and ATSDR conclude that eating fish from Nassau Lake and other affected waters could harm people's health if people do not follow the DOH fish consumption advisories for these waters.

Exposures to PCBs in soils and sediments in and along the shoreline of the lake, outdoor air, and surface water are likely to be low and are not expected to harm people's health.

RECOMMENDATIONS

The existing potable water treatment systems should continue to be maintained and monitored to prevent exposure to site-related contaminants in drinking water from private wells.

Assess the potential for exposure to site-related contaminants in the soil vapor in areas north, east, and west of the site.

The public should follow the DOH's health advisory for consumption of fish in Nassau Lake and the other affected water bodies. The fish consumption health advisory is as follows:

Women under 50 years of age and children under 15 years of age should not eat any fish from the Valatie Kill from County Route 18 downstream to Nassau Lake or between Nassau Lake and Kinderhook Lake, and Nassau and Kinderhook Lakes.

Women over 50 years old and men over 15 years old should follow the waterbody specific advice below:

•"Don't Eat" any fish species taken from the Valatie Kill from County Route 18 downstream to Nassau Lake and Nassau Lake itself.
•"Eat up to one meal per month" for American eel, bluegill and redbreasted sunfish from the Valatie Kill from Nassau Lake to Kinderhook Lake
•"Eat up to one meal per month" for American eel taken from Kinderhook Lake.
•The general health advisory of "eat up to four one-half pound fish meals per month" applies to other fish species in the Valatie Kill from Nassau Lake to Kinderhook Lake and in Kinderhook Lake.

DOH should update the advisory as needed to inform people about the risks of exposure to contaminants in fish taken from the affected water bodies and consumed.

PUBLIC HEALTH ACTION PLAN

DEC or EPA will continue to oversee monitoring and maintenance of potable water treatment systems to minimize exposure to site-related contaminants in drinking water. DOH will continue to review these results and make recommendations if further action is needed.

DEC or EPA will delineate and evaluate the potential for future exposure to site-related contaminants in the soil vapor media north, east, and west of the site. DOH will review the results of this work and make recommendations if further public health actions are needed.

The DOH will continue to support, re-evaluate as needed, and encourage people to adhere to the DOH health advisory for consumption of fish in Nassau Lake and the other affected water bodies. DOH will continue to make fish consumption advisory signs available to organizations wishing to post signs for these water bodies.

The DOH will continue to work with the DEC and EPA on the investigation and additional remedial actions at the Dewey Loeffel Landfill and make public health recommendations to the environmental agencies as needed.

REFERENCES

ATSDR (Agency for Toxic Substances and Disease Registry). 2003. Health Consultation for the Dewey Loeffel Landfill, Nassau, Rensselaer County, New York. EPA Facility ID: NYD000512335. May 15.

DEC (New York State Department of Environmental Conservation). 2002. Declaration Statement – Record of Decision. Dewey Loeffel Inactive Hazardous Waste Disposal Site. Operable Unit 3. Towns of Nassau and Schodack, Rensselaer County, New York. Site No. 44 2006. January.

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

DOH (New York State Department of Health). 2003. Miscellaneous site files stored at the Center for Environmental Health in Albany, NY.

DOH (New York State Department of Health). 2004. Public Water Systems, Part 5, Subpart 5-1, Statutory Authority: Public Health Law Section 225. Available on-line at http://www.health.ny.gov/environmental/water/drinking/regulations/

DOH (New York State Department of Health). 2006a. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Available on-line at: http://www.health.ny.gov/environmental/investigations/soil_gas/svi_guidance/.

DOH (New York State Department of Health). 2011. Chemicals in Sportfish and Game. 2011-2012 Health Advisories. Available on-line at: http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/.

EPA (United States Environmental Protection Agency). 2011a. Region 2 Superfund. Dewey Loeffel Landfill, Rensselaer County, NY. Additional Documents. Available on-line at: http://www.epa.gov/region02/superfund/npl/dewey/docs.html.

EPA (United States Environmental Protection Agency). 2011b. Integrated Risk Information System. Trichloroethylene (CASRN 79-01-6). Washington, DC: Office of Research and Development, National Center for Environmental Assessment. Accessed (September 4, 2013) on line at: http://www.epa.gov/iris/subst/0199.htm.

Town of Nassau. 2011. Dewey Loeffel Landfill Cleanup. Available on-line at: http://townofnassau.org/content/Generic/View/17.

REPORT PREPARATION

This Health Consultation for the Dewey Loeffel Landfill site was prepared by the New York State Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented. ATSDR's approval of this document has been captured in an electronic database.

Authors – NYS DOH, Center for Environmental Health

Christopher Doroski
Public Health Specialist
Bureau of Environmental Exposure Investigation

Don Miles
Public Health Specialist
Bureau of Environmental Exposure Investigation

ATSDR Reviewers

Gregory V. Ulirsch
Technical Project Officer
Division of Community Health Investigations (DCHI)

Richard Gillig
Branch Chief
DCHI

Carole Hossom for Lynn Wilder
Assistant Director for Science
DCHI

Tina Forester
Acting Director
DCHI

Appendix A. Maps

Figure 1. Overall Map of the area surrounding the Dewey Loeffel Landfill including Nassua Lake and the Valatie kill.

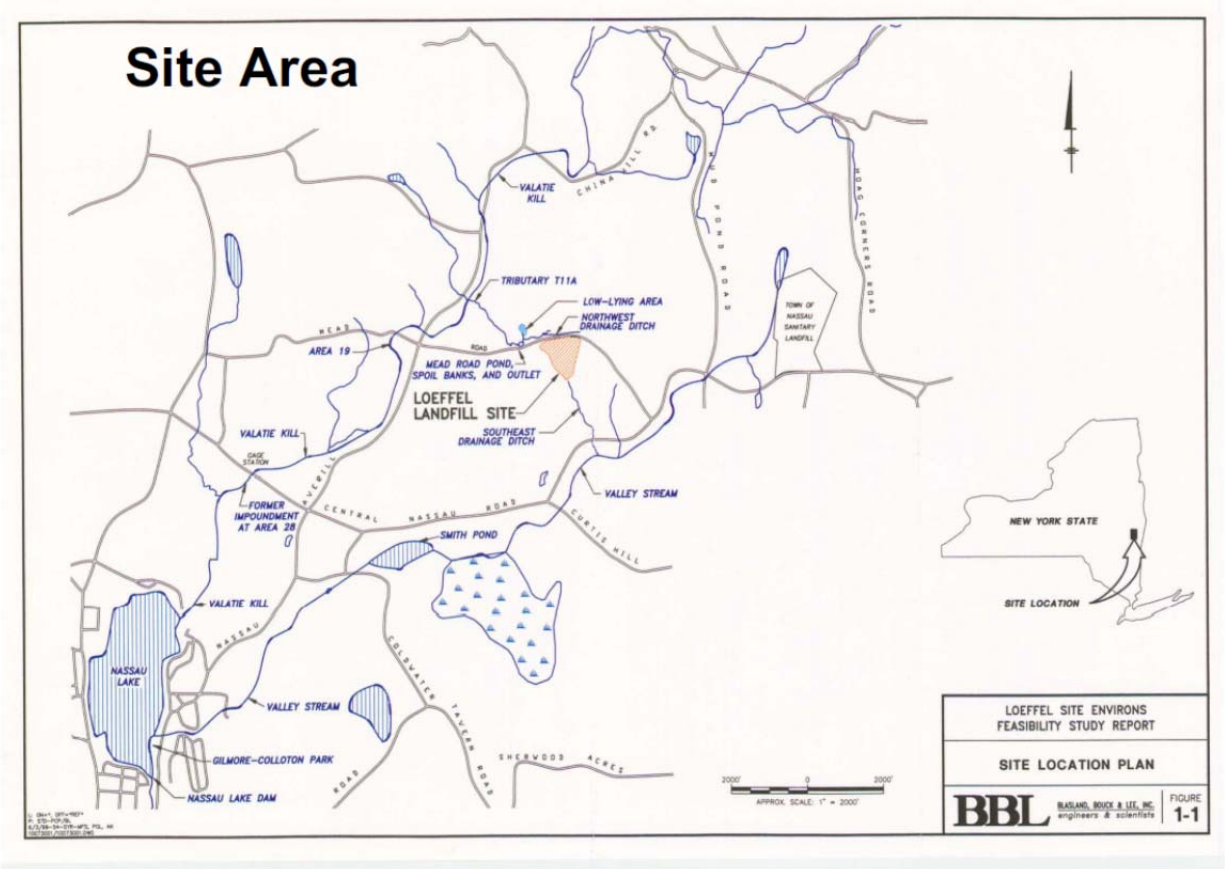
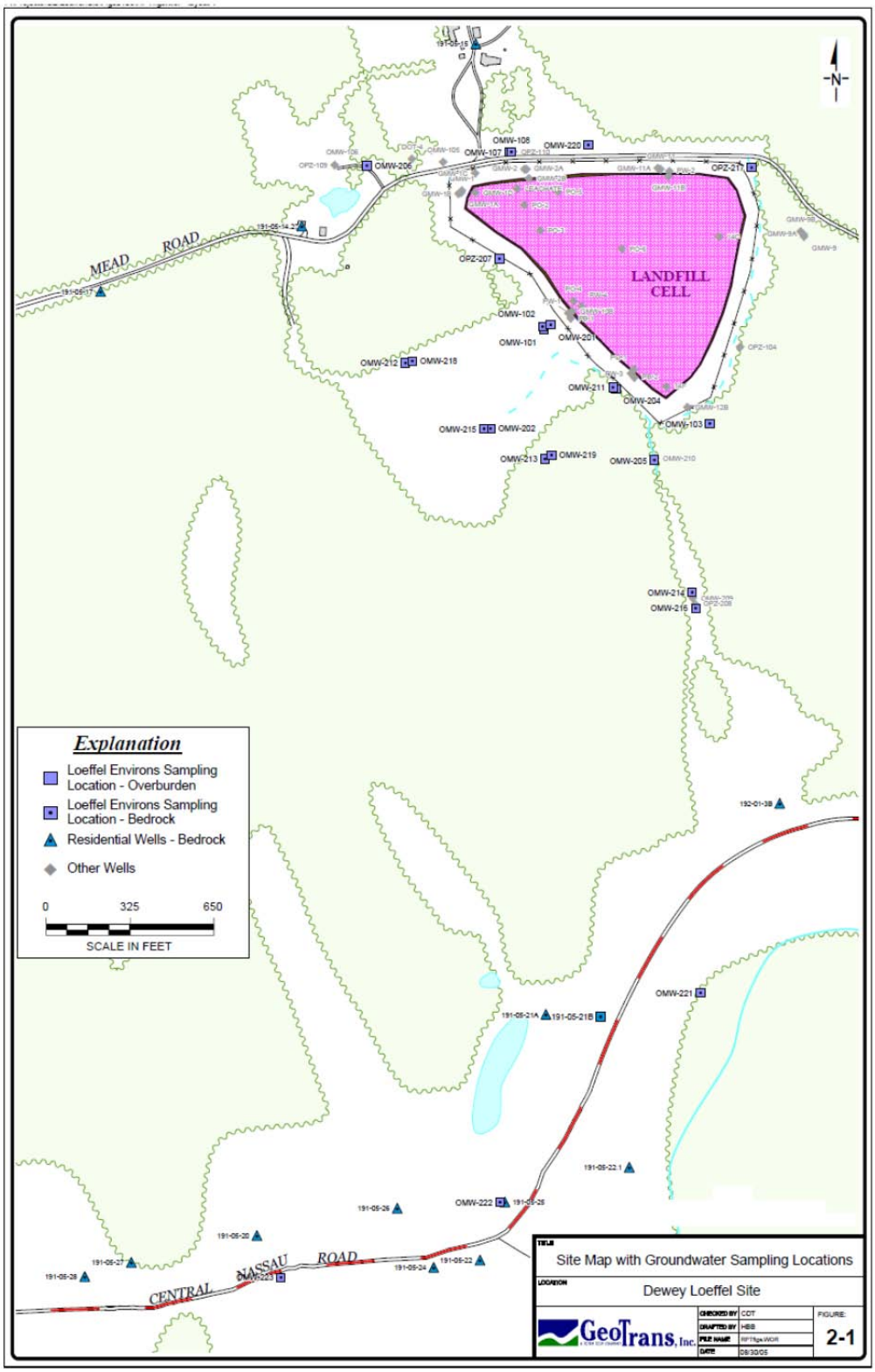


Figure 2. Map of the Dewey Loeffel Landfill and the nearby residential homes with private wells.



APPENDIX B
Table

Table 1. Exposure Pathways Summary Table for Dewey-Loeffel Landfill Site.

Pathway	Pathway Exposure Pathway Elements				Pathway Classification
	Environmental Medium	Route of Exposure	Location	Exposed Population	
Goundwater	Private Residential Wells	Ingestion, Inhalation	Residences	Adults and Children	Past - Completed for Several Homes to the South, Present & Future - Mitigated and Monitored
Soil Vapor Intrusion	Indoor Air	Inhalation	Residences	Adults and Children	Past & Current - Eliminated to the South Future- Data Gap to the East, West and North
Fish Consumption	Fish	Ingestion	Valatie Kill, Nassau Lake, Kinderhook Lake	Anglers, Adults and Children	Past, Present and Future Completed, but Mitigated with Fish Advisory
Ambient Air	Outdoor Air	Inhalation	Near Nassau Lake	Adults and Children	Past, Present and Future - Eliminated
Surface water, sediments and soils	Surface water, sediments and soils	Dermal, Ingestion	Nassau Lake and Shoreline	Adults and Children	Past, Present & Future - Eliminated

APPENDIX C

Conclusion Categories and Hazard Statements

Conclusion Categories and Hazard Statements

ATSDR has five distinct descriptive conclusion categories that convey the overall public health conclusion about a site or release, or some specific pathway by which the public may encounter site-related contamination. These defined categories help ensure a consistent approach in drawing conclusions across sites and assist the public health agencies in determining the type of follow-up actions that might be warranted. The conclusions are based on the information available to the author(s) at the time they are written.

1. Short-term Exposure, Acute Hazard "ATSDR concludes that...could harm people's health."

This category is used for sites where short-term exposures (e.g. < 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid public health intervention.

2. Long-term Exposure, Chronic Hazard "ATSDR concludes that...could harm people's health."

This category is used for sites that pose a public health hazard due to the existence of long-term exposures (e.g. > 1 yr) to hazardous substance or conditions that could result in adverse health effects.

3. Lack of Data or Information "ATSDR cannot currently conclude whether...could harm people's health."

This category is used for sites in which data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels to support a public health decision.

4. Exposure, No Harm Expected "ATSDR concludes that ... is not expected to harm people's health."

This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.

5. No Exposure, No Harm Expected "ATSDR concludes that ...will not harm people's health."

This category is used for sites that, because of the absence of exposure, are not expected to cause any adverse health effects.

APPENDIX D

Summary of Response to Public Comments

Dewey Loeffel Landfill
Health Consultation
Summary of Response to Public Comments

This summary was prepared to address comments and questions on the public comment draft of the Dewey Loeffel Landfill Site Health Consultation. The public was invited to review the draft during the public comment period, which ran from January 27, 2012 to April 29, 2012. Some statements were reworded for clarity and brevity. If you have any questions about the summary, please contact the DOH's project manager, Christopher Doroski, at (518) 402-7860.

Comment 1: The Dewey Loeffel Health Consultation Report is only for the south side of the Landfill.

Response: The Health Consultation is written to include all areas affected by the landfill. The groundwater plume from the landfill flows south. Therefore, much of the investigation and remedial work has been concentrated in that direction.

Comment 2: Conclusion Section: Your conclusions are based on 25% of the area that makes the landfill.

Response: The conclusions section discusses what is known about contamination related to the site. That is, all of the private wells, the fish, soil, sediments outdoor air, and surface water. Also, we know about the potential for soil vapor intrusion within one-half mile south of the site. However, unknown is the potential for exposure to site-related contaminants in the soil vapor in areas north, east, and west of the site.

Comment 3: Summary Section: You have not addressed the shale bedrock and how much liquid is leaching through it.

Response: The remedial investigation of the on- and off-site areas evaluated the shallow and deep groundwater aquifers, as well as the hydraulic gradients for each aquifer. The amount of contamination that has leached into the bedrock cannot be definitively calculated because bedrock wells cannot be placed to intercept all of the fractures containing site-related contaminants of concern. The EPA project manager, Ben Conetta, may be contacted at 212-637-3030. More information about the site can also be found at http://www.epa.gov/region02/superfund/npl/dewey/.

Comment 4: Recommendations Section: The sediment at the bottom of Nassau Lake should be checked if you are going to recommend that swimming be allowed in the lake.

Response: The DOH reviews new data that are collected, including data from Nassau Lake. If new data indicate that we should change our recommendations, we will do so and let the public know. The EPA is planning to conduct a remedial investigation that will evaluate sediments. For more information, please contact the EPA Project Manager, Ben Conetta, at 212-637-3030 or go to EPA's website at: **http://www.epa.gov/region02/superfund/npl/dewey**

Comment 5: Additional areas for investigation are stated as needed in the report but no schedule or work plan is included.

Response: The exact schedule or work plan is determined by EPA, not DOH. For more information on this, please contact the EPA Project Manager, Ben Conetta, at 212-637-3030 or go to EPA's website at: **http://www.epa.gov/region02/superfund/npl/dewey.**

Comment 6: I disagree with DOH's conclusions about the need for further soil vapor intrusion work. The extent of groundwater contamination at the Site is well documented based on the semi-annual groundwater monitoring program conducted since 1998 plus at least 10 and up to 43 sampling events at 14 residential wells. The monitoring and residential wells are located to the north, east, and west of the site. Evaluations of the potential for soil vapor intrusion have been completed by GE at two properties located south (i.e., downgradient) of the Dewey Loeffel Landfill, as documented in letter reports prepared by Tetra Tech GEO (formerly GeoTrans, Inc.) dated May 24 and December 3, 2010. The properties were selected based on the presence of VOCs in the bedrock supply wells at these two locations. Overburden monitoring wells were installed and groundwater samples were collected to evaluate the potential for vapor intrusion in structures located on these properties. There were no site-related VOCs detected in the shallow groundwater samples, and therefore no potential for vapor intrusion exists at these two properties.

In addition to the completed evaluations, GE planned to install overburden monitoring wells and collect samples from a third property located downgradient of the Site and, at DEC's request, a fourth property located north (i.e., upgradient) of the Dewey Loeffel Landfill. However, GE was not able to obtain access from the property owner to complete these evaluations. GE remains willing to perform this work if access is provided.

The planned evaluations of soil vapor, together with the data from the previous evaluation, are sufficient to determine the potential for vapor intrusion near the Site. These investigations encompass properties within the known groundwater plume. Further, the residential wells at other properties near the Site are sampled on a regular basis (semi-annually, annually or biennially, depending on location) and no site-related VOCs have been detected in the groundwater at these locations. The planned evaluations, combined with data collected from the prior evaluation and the existing

groundwater monitoring and residential well network, are sufficient to determine the extent of site-related groundwater contamination. Evaluation of the potential for soil vapor intrusion for structures on other properties is not necessary or warranted.

Response: The DOH will evaluate data from properties that previously refused access and areas identified in this health consultation for soil vapor intrusion if the sampling is conducted. However, to date, the DOH does not have enough data to conclusively determine whether actions are needed to reduce the potential for exposure from soil vapor intrusion in those areas.

Comment 7: Conclusion 2 in the report states that there is no soil vapor intrusion in existing homes within one-half mile of the site. The basis for this statement, while acknowledging that deep ground water is contaminated, is that no VOCs were found in only two samples taken from shallow groundwater around two homes. This is no proof at all. VOCs, by their very nature, migrate through soils, and if they are in deep ground water will work their way up to the surface. The fact that two samples from shallow ground water showed no VOCs proves nothing, since the concern is not the shallow groundwater but rather the levels in air. Of additional concern is that the plume of TCE and other VOCs is still moving. Extensive retesting of vapor intrusion and TCE well water contamination is needed for more accurate results.

Response: The DOH evaluated available environmental contaminant data in this document. Based on our understanding of soil vapor intrusion, "The DOH and ATSDR conclude that data are sufficient within one-half mile south of the site to indicate that soil vapor intrusion is not occurring in this direction. Recent shallow groundwater sampling data indicate that there are no site-related contaminants in this medium and, therefore, soil vapor intrusion in this direction is unlikely." However, we recommend that EPA "Assess the potential for exposure to site-related contaminants in the soil vapor in areas north, east, and west of the site." Should additional environmental data indicate otherwise, we will revisit our conclusions and recommendations.

Comment 8: In this 2012 Health Consultation Report, it appears that much of the information used for this report was taken from the 2003 Health Consultation Report. It would seem that after twelve years, the 2003 Report would be considered outdated for any current considerations and that it should also be noted also, that the one sample (page 3) for air and surface waters taken during heavy runoff was actually taken in 1993. ("PCBs were not detected in air at Nassau Lake, and also were not detected in surface water except for one sample during heavy runoff….The PCB 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." In addition, of the twelve references used for this 2012 Report, only three are current. All of the other references are from six to fifteen years old. Although some

older information is valuable, more current studies and testing are needed for accurate, up-to-date health assessments as noted earlier in our comments.

Response: The landfill area, tributaries, and Nassau Lake have undergone remediation since the 2003 Health Consultation was released. However, the remedial activities were not able to recover all of the contamination and did leave behind some residual site-related contaminants of concern that people have the potential to be exposed to. DOH reviewed all data relevant to site-related exposure pathways and discussed these data in this report.

Comment 9: It is unacceptable for residents living near the Dewey Loeffel Superfund site to be subjected to any elevated risk of disease because of the failure of General Electric and New York State to protect them from toxic exposures. It is essential that the contamination coming from the Dewey Loeffel site be stopped and removed. The slurry wall at the site is near to the end of its effective life, and as it deteriorates, additional contamination will migrate from the landfill into the ground water. The capped landfill continues to pose a direct threat to the health of nearby residents. Ultimately, to remove this threat, we need the treatment and complete removal of contaminants from the site. Contaminated sediments in all of the affected bodies of water must be dredged and removed. In the interim, a public water supply hookup is needed for the impacted residences and an aggressive publicity campaign on eating no fish from the impacted waterways.

Response: General Electric, under the continued oversight of the DEC, DOH and EPA has investigated and identified site-related contaminants of concern that have migrated from the former Dewey Loeffel Landfill. Additionally, extensive efforts have been made to identify and address the human exposure pathways in private drinking water, soil, surface water, and sediments. The final remedial decisions about contamination in the landfill and affected bodies of water will be made by the EPA, in consultation with the State, other stakeholders and the public. Total removal of contamination is unlikely to be feasible.

Comment 10: The actions proposed do not serve to adequately protect the public health of residents and visitors.

Response: The DEC, DOH, EPA and the responsible party have identified and implemented measures to prevent the exposures to chemicals in drinking water, soil, sediments, surface waters, and fish. Although additional evaluation of the soil vapor intrusion pathway is needed to determine the extent of potential exposures to site-related contaminants of concern near the landfill, other exposure pathways have been addressed. Staff from the DEC, DOH and EPA will continue to work closely with community members to address concerns about the landfill and exposure to contamination that has migrated off site.

Comment 11: Public Health Action Plan Section: How long will it take before remediation takes place? How long will we have to sit on a toxic landfill before it is cleaned up?

Response: Exactly how long remediation will take to complete is not known. For more information on this, please contact the EPA Project Manager, Ben Conetta, at 212-637-3030 or go to EPA's website at: **http://www.epa.gov/region02/superfund/npl/dewey/**

Comment 12: The fish survey does not address the increased PCBs above Nassau Lake.

Response: The Remedial Investigation determined that PCBs are a contaminant of concern in Nassau Lake and Tributary T-111A, which is above (upstream) of Nassau Lake. The existing DOH fish advisory includes Nassau Lake and its associated tributaries.

Comment 13: Pages 4, 6 &12 – The fish consumption recommendations can be confusing to some people. It should clearly state that "No one should eat any fish from Nassau Lake or from the Valatie Kill from County Route 18 to Nassau Lake"; other water bodies, fish types and age limitations should then follow. For the additional restrictions when referring to the Valatie Kill it should state "from (below) Nassau Lake to Kinderhook."

Response: There are many ways to communicate fish consumption advisories and we appreciate the suggestions. Currently, on the DOH website (http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/regional/hudson_valley_and_capital_district.htm), the fish consumption advisory is presented below:

Women under 50 years and children under 15 years

Don't eat fish from the waters[1] listed below.

For waters not listed below--eat up to four meals a month of any fish.

Men over 15 years and women over 50 years

Follow advice for eating fish from waters[1] listed below

- "Don't Eat" any fish species taken from the Valatie Kill between County Route 18 and Nassau Lake. "Don't Eat" any fish species taken from Nassau Lake.
- "Eat up to one meal per month" for American eel, bluegill and redbreasted sunfish from the Valatie Kill between Nassau Lake and Kinderhook Lake. All other fish eat up to 4 meals per month.
- "Eat up to one meal per month" for American eel taken from Kinderhook Lake. All other fish eat up to 4 meals per month.

Comment 14: Nassau Lake Fish – This statement is misleading and implies that the January 2002 Record of Decision (ROD) issued by the DEC for Operable Unit 3 required annual fish monitoring for an indefinite period. The ROD states, "{s}ince the remedy results in untreated hazardous waste constituents remaining in Operable Unit 3 of the Dewey Loeffel site, a long term monitoring program will be continued." One element of the monitoring program is "annual biota sampling" in T11A, in the Valatie Kill, and in Nassau Lake, along with reference locations."

The November 2011 Biological Monitoring Data Summary Report submitted to DEC includes a detailed re-evaluation of the fish consumption advisories using the most recent (2009 to 2011) fish tissue data. The re-evaluation indicates that the current fish advisories could be relaxed for many species in Nassau Lake and the Valatie Kill upstream of Nassau Lake, and that for several species the advisories would reflect the general state-wide advisory of one meal per week. Therefore, the annual monitoring program has met the stated objective in the January 2002 ROD, and it is appropriate that the program be re-evaluated as to whether it needs to be continued on an annual basis.

Response: The statement in the document has been re-worded based on this comment. No decisions about changing the monitoring or fish advisory have been made at this time.

Comment 15: Conclusion 3 acknowledges that consumption of fish from Valatie Kill, Nassau Lake and Kinderhook Lake poses threats to human health. However, the recommendation for limited fish consumption is given only to women over 50 years of age and men over the age of 15."

Response: Not correct. Per the current DOH fish advisory (see table in response to comment 13, above), women under 50 years and children under 15 years of ages are advised to not eat any fish from the Valatie Kill, Nassau Lake or Kinderhook Lake. All others (women over 50 and men over 15 years of age) are advised to limit their consumption according to the waterbody and fish species taken.

Comment 16 There are many reports (Haase et al., 2009; Schantz et al.), including some coming from the Department of Health (Fitzgerald et al. undated) that demonstrate decreased memory function in adults in relation to their exposure to PCBs. PCBs and many VOCs are either known or probable human carcinogens. Moreover, warning people not to consume fish from the affected waterways does not resolve the problem. Many anglers do not have access to the warning and many are forced by economic circumstances to consume fish that may not be healthy. We strongly recommend that the advisory be truly health protective and say that no one eat fish from these waters until the contaminants are removed.

Response: In developing the fish consumption advisories, the DOH considers the balance between the benefits and risks of eating fish with chemical contaminants while recognizing the differences in risk among people by age and gender - potential health risks may be greater for women of childbearing age, infants and young children versus the general population. See response to Comment 15.

Comment 17: There needs to be much wider publicity of the advisory, not just relying only on the DEC Regulations Fishing Booklet that is given out with licenses. Signs need to be placed at frequent sites along all these bodies of water, and information needs to be provided to all members of the community every spring stating emphatically that fish and other forms of wildlife from these bodies of water are not safe to eat.

Response: In the past, the DOH worked closely with the Nassau Lake community to develop site-specific fish advisory outreach materials. Signs about fish consumption warnings for Nassau Lake were specifically made and printed by DOH at the request of community members. As property owner permission is required to post signs on private lands, this outreach approach has had limited success, both at Nassau Lake and at other waterbodies of concern throughout the state. In addition, flyers were developed specific to Nassau Lake with a map and distributed. Another was prepared just for ice fishing. The local town clerk orders these materials on an annual basis for distribution in the community.

More recently, the DOH has expanded the types of outreach materials available (easy reading, more graphics) and modes of distribution (identifying and working with community based partners) in an effort to target fish advisory outreach populations to at risk populations. The DOH would welcome new opportunities to partner with concerned residents in the Nassau Lake community to enhance fish advisory outreach efforts in this area.

Comment 18: In addition, we request an investigation on consumable wildlife that use these waterways.

Response: The DOH provides statewide advice about eating waterfowl and snapping turtle because studies have shown that these game species can accumulate PCBs and other persistent chemicals. This protective advice (listed below) instructs people who eat waterfowl and snapping turtle how to reduce their exposures to these contaminants. Based on the available information, the DOH advice should be adequate to address potential human exposures to PCBs (and other chemical contaminants) in these species.

Advice on Contaminants in Game

DOH also issues advisories about eating certain game. The primary contaminants of concern in waterfowl are PCBs, mirex, chlordane and DDT; and PCBs are the main concern in snapping turtles.

- ***Snapping Turtles*** - Snapping turtles retain contaminants in their fat, liver, eggs and, to a lesser extent, muscle. If you choose to consume snapping turtles, you can reduce your exposure by carefully trimming away all fat and discarding the fat, liver and eggs prior to cooking the meat or preparing soup. Women of childbearing age, infants and children under the age of 15 should AVOID EATING snapping turtles or soups made with their meat. (Contaminant - PCBs)
- ***Wild Waterfowl*** - Mergansers are the most heavily contaminated waterfowl species and should NOT BE EATEN. EAT NO MORE THAN TWO MEALS PER MONTH of other wild waterfowl; you should skin them and remove all fat before cooking, and discard stuffing after cooking. Wood ducks and Canada geese are less contaminated than other wild waterfowl species and diving ducks are more contaminated than dabbler ducks. (Contaminants - PCBs, mirex, chlordane, DDT)

Comment 19: Background and Statements of Issues Section: You did not state what contaminated the private drinking wells. Your emphasis is always on the PCBs, not the other chemicals. The Discussion Section does not explain the well contaminants.

Response: The private wells were contaminated by the Dewey Loeffel Landfill site. The site-related volatile organic compounds (VOCs), including trichloroethene, 1,1-dichloroethene, *cis*-1,2-dichloroethene, 1,2-dichloroethane, tetrachloroethene, methylene chloride, chlorobenzene, benzene and toluene, move more easily in

groundwater than PCBs and reached the private wells. Currently, no one is drinking water with these contaminants because, since 1992, all private potable water wells with contaminants from the Dewey Loeffel Site have had water treatment systems installed and maintained on a periodic basis by General Electric's consultant under the oversight of DEC and DOH. Contamination of private drinking water wells is discussed in subsections of the major headings "Background and Statement of Issues" (page 7), and "Discussion" (page 8).

Comment 20: In "Recommendations": The first sentence should read "The existing potable water treatment systems should continue to be maintained and monitored to prevent exposure to site-related contaminants in drinking water from private wells."

Response: Agreed; change made.

Comment 21: Private Drinking Water Wells – Text and tables referring to the history of private well contamination are inaccurate, and the written comment makes suggested changes in several places in the document.

Response: We have revised the document to address the information provided in the comment.

Comment 22: Conclusion 1 in the report states that the DOH and ATSDR conclude that drinking and using water from private wells will not harm human health. This statement is false. The well waters have been documented as being contaminated by VOCs from site leachate, and nine specific VOCs are mentioned. The list includes known and probable human carcinogens. There is no basis to assert that these carcinogens will not affect person's health. In addition, the presence of these carcinogens in drinking well water is not because of any action taken by the residents, but is rather the responsibility of those who have contaminated the ground water. One can argue about how great the increased risk of cancer and other diseases is that will result from these past exposures, but the only acceptable elevated risk is zero. Risks come not only from drinking the contaminated water in the past – before the wells were filtered - but also from *bathing* and having other contact. Now, of course, homeowners have well filters, but this is not a permanent solution, and chemicals can break through the filter. Though the "treated water meets State and Federal drinking water standards for public water supplies," this is only a temporary solution, and should not be considered a permanent repair. In addition, the contaminated groundwater plume continues to move. The report recommendation should be that the only long-term solution is to connect these homes to the nearest municipal water supply.

Response: The 2003 Health Consultation (ATSDR, 2003) indicates that the contamination of private wells was a concern. ATSDR stated that "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."

In this health consultation, the conclusions about whether or not health effects are expected from the VOCs in private wells apply to current conditions, in which the levels in the wells are mitigated through the use of carbon filters prior to consumption. The DOH understands that carbon filters on private water supplies is not a permanent solution. However, in the interim, a well-maintained and monitored filter system effectively reduces exposures to VOCs in the groundwater.

The DOH also recognizes that exposure to VOCs in drinking water wells is possible by ingestion, and also by dermal contact and inhalation from water uses such as showering, bathing and cooking. The DOH considered these pathways in its evaluation of risk by assuming that exposure to VOCs in water through the inhalation and dermal routes was the same as exposure through the ingestion route.

Finally, reducing environmental health risks to zero is not practical, and for this reason EPA and other health agencies have made decisions about what range of cancer risks may be acceptable. Cancer risks of one-in-one million or less are usually considered insignificant and not a public health concern, while cancer risks above one-in-ten thousand usually result in measures to reduce exposure. When cancer risk estimates are between one in one million and one-in-ten thousand, a risk management decision must be made on a case by case basis that considers many scientific, technical, legal, and social factors. Historically, the EPA has stated a clear preference for managing environmental health risks at the more protective end of the cancer risk range (i.e., closer to one-in-one million).

Comment 23: In relation to exposure estimates on the private drinking water wells, the report indicates, "The estimated exposures indicate that persons who used water from two wells for up to four years would have a low increased risk of experiencing an adverse health effect." Has there been an evaluation to determine what happens beyond four years, or how long the people using these wells have been at this residence? Wells B & C referenced in the report would indicate that no one was using potable water from these wells from 1988 to 1992, but there is no indication that statement has been confirmed. The statement "No one is believed to have consumed contaminated water from the other private wells before treatment was installed" could only be true if no one was occupying this residence during these years. We request detailed information to justify this claim.

Response: The information cited comes from the 2003 Health Consultation (ATSDR, 2003), which attributes the information to "personal communication DOH project manager." The DOH project manager at that time was personally involved and knowledgeable about the private well sampling conducted at the time. Nevertheless, as a result of the private well sampling program, actions were taken to eliminate the exposure to contaminants in private drinking water wells.

Comment 24: Page 11 - The 2003 ATSDR report is referred to and relied upon for the evaluation of cancer risks using ZIP codes and cancer data from 1989-1998. A total of 281 cancers were reported. This approach was apparently used due to the ease of obtaining information. There are a very limited number of persons living near the landfill and an estimated 150-200 persons living around Nassau Lake according to the 2003 report. The 2010 census numbers for the population of ZIP codes 12123 and 12062 reports 6900 persons.

The use of a large sampling area and population for a very limited affected area can mask the results of the impacted area. The limited number of homes in close proximity of the affected areas should be individually checked for incidences of past and present cancer and other illnesses to evaluate potential impacts. All cancer data which post-dates the landfill should be used along with the most recent data, since cancers can take years to develop and be identified.

Response: As the comment states, the 2003 ATSDR report is referred to for an evaluation of risks for cancer and other health outcomes. However, this risk evaluation is not based on the ZIP -Code level review of cancer incidence. Rather, as stated in the "Public Health Implications" section (Section B, p. 10), the risk evaluation uses information about the specifics of potential exposures to site-related contaminants. The exposure details are considered along with the best available information from the scientific literature. The evaluation's conclusions, as stated on page 10, are that persons who used water in the past from the impacted private drinking water wells, from 1988 to 1992, before the chemicals were first discovered and addressed, would have a low increased risk for adverse health effects.

The "Health Outcome Data Evaluation" is the next section of the report (Section C, p. 10). The ZIP-Code level cancer review's conclusions are described here, but they are not the basis for conclusions about health risks and site-related exposures. The ZIP-Code level review was done in response to a request from the community. Cancer studies need to define study area boundaries using Census boundaries so that the area's population by age groups can be estimated. Blocks, block groups, and census tracts, which are usually much smaller than ZIP Codes, are sometimes used to define study boundaries for study populations with unusual exposures. However, the 2003 ATSDR report concluded that additional follow-up health studies were not warranted for the area. For more information on the NYS DOH process for responding to concerns about cancer incidence, see the information sheet, "How NYS Department of Health Responds to Cancer Concerns."

http://www.health.ny.gov/statistics/cancer/environmental_facilities/mapping/about/concerned_about_cancer_in_your_community.htm.

When health outcomes are looked at for a very small number of people (such as the persons living near the landfill and around Nassau Lake as the comment suggests), we have difficulties in interpreting the results of the study because there is no comparison population. We can simply count the number of cancer cases observed, but don't know how many cases we should expect to see. This is why cancer incidence studies are conducted using some type of census boundary (ZIP Code, block group) so that we can calculate the number of cancer cases we would expect to occur given the population living in the study area. We then compare this expected number to the number of cancer cases we actually observe to determine if there are more, less, or about the same number of cancer cases as we would expect to see in the study area.

Recently the NYS Cancer Registry published cancer data at the census block group level for the years 2005 to 2009. The census block groups are much smaller than the ZIP Code. This is a different time period from the original ZIP Code incidence study that looked at cancer data from 1989-1998 in ZIP Codes 12123 and 12062. Currently, expected numbers are not available, so these data are somewhat difficult to interpret.

The cancer registry publishes the counts for the 23 types of cancer by block group and clusters for 6 types of cancer at:
https://apps.nyhealth.gov/statistics/cancer/environmental_facilities/mapping/map/

We looked to see if the Cancer Registry data showed any cancer clusters in any part of this area on the cancer mapping web application. There are no clusters shown for bladder, breast, lung, colorectal, brain or thyroid cancer in the area of the Dewey Loeffel Landfill or Nassau Lake.

The census block group 08/3052601/2 is just south of the Dewey Loeffel Landfill and contains the eastern portion of Nassau Lake. This block group is the larger of the two and is located in ZIP Code 12062.

2010 Population: Male 1001, Female 967
Total cancer (2005-2009): 72

The majority of Nassau Lake is located in census block group 08/3052502/3. This block group is located in ZIP Code 12123 and excludes the more populated Village of Nassau.

2010 Population: Male 411, Female 381
Total cancer (2005-2009): 30

One last point is that cancer data are routinely collected and maintained by the Cancer Registry, but available data on most health outcomes other than cancer are lacking. This makes it difficult to study non-cancer outcomes.

Comment 25: We believe the health evaluation performed by DOH that is referred to in Section C is completely inadequate. As noted earlier, efforts were made to dilute any potential positive outcomes, by indicating that sampling only those directly affected would be too small of a sample size, instead including entire ZIP code areas, most of which have no direct exposure to the contamination. The report statement, "No further health study or investigation has been done in this area and there are no new environmental data or public health findings that indicate that further work is warranted at this time" is true. But, without any effort to collect public health findings, there will never be any new "public health findings." No effort has been made to evaluate multiple generations of the same families living within the affected area, nor has there been any work to evaluate those that had lived in the affected areas for a long period, but now have moved away. Additional health testing could easily be done for short-term exposure on people who may only spend time in the summer months on Nassau Lake, but this has also not happened. No work has been done to evaluate the serious health effects on domestic animals surrounding the lake, which would be easily accessible through local veterinary office records. Every effort by the community groups to have a substantive health study done for the contaminated area was brushed aside as being too expensive or inconclusive.

Response: In response to the community's heath concerns, DOH has conducted many public participation activities with residents of the Dewey Loeffel/Nassau Lake area, dating back to the 1980s. Various types of meetings have been held (public, stakeholder, Lake Association, legislative), educational materials produced (fact sheets, fish advisory materials), and public health activities conducted (environmental sampling, cancer incidence study, site visits, development of protocol for PCB Blood Study).

DOH is constrained by the availability of routinely collected health data. Cancer data are routinely collected and maintained by the NYS Cancer Registry, but available data on most health outcomes other than cancer are lacking. This makes it difficult to study non-cancer outcomes. Even Cancer Registry data has limitations. Cancer data only capture people who are living in NYS when diagnosed. Therefore, if a person lived on Nassau Lake for a long period, but then moved out of State before being diagnosed with cancer, their diagnosis would not be included in the NYS cancer data. Please see previous comment for a discussion about newly published cancer data for small areas like the Dewey Loeffel/Nassau Lake area. DOH focuses primarily on human health and does not routinely evaluate the health of domestic animals.

DOH worked closely with the Dewey Loeffel Landfill Site Stakeholders Group, holding monthly meetings over the course of a year. One of the priorities for the group was the development of a study protocol to look at PCB levels in people around Nassau Lake. A study like this, if conducted, would determine blood PCB levels among people living around Nassau Lake, but it wouldn't be a comprehensive health assessment and might not be responsive to residents' health concerns. This protocol was developed with the intention of seeking funding from an external source. Funding could not be secured.

ATSDR, in the 2003 Health Consultation (ATSDR, 2003), evaluated the merits of conducting a health study or investigation for the community around the Dewey Loeffel Landfill and affected waterbodies. The conclusion in the health consultation was:

> "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:
>
> 1. 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;
> 2. 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."

Comment 26: Conclusion 4 in the report states that PCB exposure from soils and sediment in and along the shoreline, outdoor air and surface water were small and not expected to impact human health. This conclusion, apparently based on one surface water sample taken in 1993, is totally without basis. In the first place, PCB exposure from soils, sediments and surface water has not been adequately studied. In addition, even if the exposures are "small" they may have significant adverse human health effects (Vandenberg et al., 2012). Low-dose effects have been demonstrated for diabetes (Lee et al., 2010) and blood pressures (Goncharov et al., 2011), and likely occur for a variety of other diseases. Linda Birnbaum, Director of the National Institute of Environmental Health Sciences, has described the assumption that low concentrations of chemicals do not have significant adverse effects as "antiquated," and has affirmed the conclusion from the above publications that low dose effects and non-monotonic dose response curves not only occur but should also be incorporated into risk assessments. These concerns apply to all individuals living near to the shorelines and particularly those who wade in or swim in the contaminated water bodies, such as the children at Nassau Camp. There should be investigations on how much PCB soil sediment is re-distributed by swimmers and motor boats who access the Valatie Kill and Nassau Lake for recreational use.

Response: The DOH conclusion concerning the health risks from PCB exposures was not, as stated in the comment, "based on one surface water sample." We also disagree that the conclusion is "totally without basis." The basis for the conclusion for the various media is as follows: For sediment and soil, we based our conclusion on an average sediment level of 3 parts per million (which, based on the sampling data is likely to overestimate an individual's exposure), and calculated oral and dermal exposures using assumptions which were chosen so that underestimation of the exposures would be unlikely. Since the estimated exposures were about 500 times lower than the those that

have caused health effects in animals, we concluded the exposures were unlikely to cause health effects. Surface water was sampled at multiple locations on ten separate occasions from 1992 to 1993. Most surface water samples showed no detections of PCBs. In the single sample in which PCBs were detected (taken during a heavy runoff event), the level was ten times lower than the standard for public drinking water systems. Based on this and that the PCBs were not detected any other surface water sample, we concluded that exposure to PCBs by ingesting surface water while swimming is unlikely to be important. For air, DOH concluded that inhalation exposure to PCBs is unlikely to be important based on air samples taken at three locations at Nassau Lake during the summer of 1997. None of the air samples detected PCBs. While we acknowledge that there are uncertainties in this and any risk assessment (as the comment implies), our conclusions are based on the best risk assessment tools currently available to us. Should site-specific data that indicate a need to revisit our conclusions and recommendations become available, we will do so.

Comment 27: On other issues, the "Nassau Lake Soils, Sediments, Outdoor Air and Surface Water" Appendix A (now Appendix B), Table 1 gives no details as to what soil samples were used, what time of the year the samples were taken, or how "DOH estimated exposure" to know that the "estimated exposures were about 500 times lower than exposures that have caused adverse health effects in animals." We request detailed information to justify this claim. For instance, does this or any section acknowledge the pathway through consumption of contaminated fish?

Response: The assumptions used by the DOH to estimate exposure to PCBs in Nassau Lake sediments and soil are provided in detail in Dr. Nancy Kim's letter to Rensselaer County Environmental Management Council (DOH, 2000), which was referenced in the health consultation. These are reproduced below:

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

Parameter	Value
Dermal Exposure Assumptions	
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 [cm^2])
Soil-to-skin adherence factor	0.2 milligrams of soil or sediment per square centimeter of skin (mg_{soil}/cm^2)
Fraction of PCBs dermally absorbed from soil/sediment	0.14 (14 percent)
Average body weight of 6-year old child	22.6 kilograms (kg)
Ingestion Exposure Assumptions	
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 (mg_{soil}/day)
Amount of indoor soil/sediment ingested	40 milligrams per day (mg_{soil}/day)
Fraction of PCBs absorbed from ingested soil/sediment	1 (100 percent)
Average body weight of 6-year old child	22.6 kilograms (kg)

The estimates of PCB dose (from an average soil or sediment value of 3 millligrams per kilogram of soil (mg/kg_{soil})) and margin of exposure were calculated as follows:

Dermal PCB Dose

3 mg/kg_{soil} x 5 days/7 days x 4 months/12 months x 2841 cm^2 x 0.2 mg_{soil}/cm^2 x 1/22.6 kg x 1 kg_{soil}/1E+6 mg_{soil} x 0.14 = 2.5E-6 mg/kg/day

Oral PCB Dose

Outdoor Soil/Sediment Ingestion Rate:

80 mg_{soil}/day x 5 days/7 days x 4 months/12 months = 19 mg_{soil}/day

Combined Outdoor Soil/Sediment and Indoor Soil/Sediment Rate:

19 mg_{soil}/day + 40 mg_{soil}/day = 59 mg_{soil}/day

Oral Soil/Sediment Dose:

3 mg/kg_{soil} x 59 mg_{soil}/day x 1 kg_{soil}/1E+6 mg_{soil} x 1/22.6 kg = 7.8E-6 mg/kg/day

Total Dermal and Oral PCB Dose

2.5E-6 mg/kg/day + 7.8E-6 mg/kg/day = 1.03E-5 mg/kg/day

Margin of Exposure (MOE):

MOE = Lowest Observed PCB Effect Level[3]/Estimated PCB Dose

MOE = 5E-3 mg/kg/day/1.03E-5 mg/kg/day = 485 = 500 (rounded to one significant figure)

Regarding the pathway of exposure through consumption of contaminated fish, we acknowledge that it is a complete exposure pathway of concern for people who catch and eat fish taken from Nassau Lake and other affected water bodies. DOH recommends that anglers follow the DOH's health advisory for consumption of fish for those waters.

[3] EPA (United States Environmental Protection Agency). 1994. Integrated Risk Information System. Aroclor 1254 (CASRN 11097-69-1). Available on-line at http://www.epa.gov/iris/subst/0389.htm.