

Health Consultation

Drinking Water Investigation

KIWANIS LAKE SUBDIVISION

NEWBURY TOWNSHIP, GEAUGA COUNTY, OHIO

SEPTEMBER 30, 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

Drinking Water Investigation

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NEWBURY TOWNSHIP, GEAUGA COUNTY, OHIO

Prepared by:

Ohio Department of Health
Health Assessment Section
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

STATEMENT OF ISSUES

On November 21, 2002, the Health Assessment Section (HAS) of the Ohio Department of Health (ODH) received a call from Robert Fioritto, a Newbury Township trustee, regarding a concern of some citizens that there were an abnormal number of cases of cancer in a small rural subdivision in Geauga County known as Kiwanis Lake. Mr. Fioritto relayed that the residents of Kiwanis Lake are fearful that the drinking water source they are currently using may be contaminated and may be the source of the suspected increase in cancer cases. Residents appear to be concerned that a local liquid waste hauling facility, Manfredi Motor Transit, or possibly other industrial sources in the area may have contaminated their drinking water supply.

As a result of the concerns that the groundwater may be contaminated, the ODH and the Ohio Environmental Protection Agency (Ohio EPA) sampled approximately twenty-five (25) residential wells in the community to determine if the local groundwater aquifer was contaminated and could potentially be causing adverse health effects in the residents of Kiwanis Lake. The Community Health Assessment Section of the ODH is currently working with an epidemiologist from the Geauga County Health Department to review cancer incidence data from the Ohio Cancer Incidence Surveillance System to determine if the rate of cancer in the Kiwanis Lake Community is elevated above what would be expected for the community. This health consultation documents the results of the residential well sampling. A report detailing the results of the cancer assessment is currently being completed and will be released separately from this report.

BACKGROUND

Community Concerns

Residents in the Kiwanis Lake area have expressed concern that past actions from industrial facilities in the area have contaminated local groundwater. Residents have alleged that inactivity by the United States Environmental Protection Agency (U.S. EPA), the Ohio EPA, and the ODH has allowed environmental pollution to occur and put area resident's health at risk. Local residents took it upon themselves to survey homes in the community and develop a list of residents that have been diagnosed with or died from cancer while living in the Kiwanis Lake area. Based on the survey, it was stated that 125 out of the 151 homes in the community have had someone diagnosed with cancer over the past 20-25 years. After learning of the suspected elevated rate of cancer in their community, several residents began to question whether their health is being impacted by some form of environmental pollution. The actual number of cancer cases in the community has not yet been confirmed.

In addition to receiving concerns from area citizens, the ODH also received letters from several other entities expressing concern over the perceived high rate of cancer in the Kiwanis Lake area. ODH has received and responded to letters from State Representative Dale Miller from the 19th House District; Greg Coleridge of the American Friends Service Committee, a Quaker social

action committee; and from the Rev. Werner Lange, Pastor of the Auburn Community Church.

Review of Background Information

To follow up on concerns of potential releases of hazardous chemicals to the environment in the Kiwanis Lake area, HAS reviewed 12 years of Ohio EPA site activity files and an Ohio EPA list of identified hazardous waste sites (former Master Sites List) in Ohio. Ohio EPA had identified 12 sites in Geauga County, of which seven are listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database of federal hazardous waste sites. The Kiwanis Lake Subdivision is not located on any list of known releases of hazardous substances to the environment. Two of the listed CERCLIS sites were located in Newbury Township. One, Manfredi Motor Transit, is located in close proximity to the Kiwanis Lake Subdivision.

Manfredi Motor Transit is a trucking company that specializes in transporting liquid materials, both hazardous and non-hazardous, in tanker trucks. In the 1970's, Manfredi routinely washed out the tanker trucks on site and ran this wash water through a multi-phased treatment system that resulted in the wash water being stored in a number of on-site lagoons. According to conversations with Ohio EPA, possible chemicals that may have been disposed of in the lagoon would likely include solvents, waste oils, and possibly some metals. As a result of periodic overflows and spills of the treated wash water from the lagoons causing adverse impacts on local streams and surface waters, Ohio EPA investigated the facility and oversaw the draining and closing of these waste water lagoons. Since the closure of the lagoons in 1978, waste waters have been stored in tankers or above-ground storage tanks at the site and then transported off-site for treatment and disposal. Groundwater in the vicinity of the waste lagoons was not sampled and only a limited number of residential wells in the area were sampled during the closing of the lagoons. Following a review of the site hydrogeology and information collected from Ohio EPA on past activities at Manfredi Motor Transit, HAS felt there was a possibility that groundwater in the vicinity of the facility, including the downgradient Kiwanis Lake area, could have been impacted by site-related chemicals.

HAS staff reviewed aerial photographs and topographic and hydrogeologic maps of the area as well as examined well logs for private wells in the vicinity of Manfredi Motor Transit (ODNR Well Logs). This information suggests that most of the Kiwanis Lake subdivision obtains its water from numerous private wells that tap groundwater from a buried valley sand and gravel aquifer, with most wells drilled to 50 to 100 feet below ground surface. Kiwanis Lake and the surrounding subdivision occupy a low-lying, swampy northwest-southeast trending valley situated between bedrock highs to the south along Route 87 (Kinsman Road) and to the north along Pekin Road (Figure 1). The Manfredi facility is located on a hill, within 100 yards of the southern edge of the Kiwanis Lake subdivision. Groundwater in the area of the Manfredi facility is expected to flow in a northeastern direction towards Kiwanis Lake. Assuming the waste water lagoons were unlined, it is possible that chemicals in the lagoons could have percolated down to the same sand and gravel aquifer used by Kiwanis Lake residents and could have potentially impacted residential wells. As stated above, Ohio EPA sampled a limited number (three or four)

of residential wells in 1978, and no chemicals of concern were detected.

Ohio EPA is currently working with Manfredi Motor Transit to address concerns that a waste hauling tanker is buried on site. Currently it is unknown whether the buried tanker contains any liquid waste or whether the tanker has caused any adverse impacts to the environment.

DISCUSSION

Residential Well Sampling

After reviewing the local hydrogeology and the available site information regarding the Manfredi Motor Transit facility, HAS staff contacted ODH Private Water Systems staff with regard to the possibility of sampling a number of community and residential wells in the area of the Kiwanis Lake subdivision to determine if drinking water supplies had been contaminated. ODH staff worked with the Geauga County Health Department and the Ohio EPA to develop a sampling plan for the area. The plan was to sample a representative number of homes throughout the community whose wells were located at various depths and in different aquifers. To complete this task, HAS and Ohio EPA staff reviewed Ohio Department of Natural Resources well logs for homes in and adjacent to the community and chose 25 wells to be sampled. The actual number of wells sampled was 24 due to the inability to gain access to raw water that had not been treated in one of the schools. These included wells that obtained their water from the three different aquifer systems that underlie the subdivision.

Residential well sampling was conducted on January 14, 2003 by the Geauga County Health Department and the Ohio Department of Health. Samples were collected from twenty-one residential wells, the Newbury High School Well, the main well at Manfredi Motor Transit, and a well servicing the community center for the Kiwanis Lake subdivision. The well samples were analyzed for 55 volatile organic compounds, 53 semi-volatile organic compounds, 26 inorganic compounds (metals/nonmetals), and 26 pesticide/herbicides. Samples were collected from each well in a location nearest to the well that had not undergone any form of treatment so that each sample was representative of what was in the raw water in the well. The water was allowed to run for 15 minutes to clear the distribution system and to allow a sample to be collected from water that had just entered the well from the aquifer.

Analytical results indicated that there were no detections of volatile organic compounds, semi-volatile organic compounds, or pesticide/herbicides in any of the samples collected. Levels of inorganic compounds were not detected at levels of health concern with the exception of arsenic. Seven residential wells contained arsenic at levels that exceeded the new U.S. EPA maximum contaminant limit (MCL) of 10 parts per billion (ppb) recently established for public drinking water supplies. MCLs are not enforceable for private water systems; however, ODH uses these levels as guidance values when making recommendations on water quality. ODH mailed the drinking water results to each property owner along with an explanation of the health implications of the results.

Additional groundwater samples were collected on February 6, 2003 by the Newbury Township Trustees. Samples were collected from 21 residential wells located in the Kiwanis Lake subdivision and in the surrounding area north and east of the subdivision and analyzed for benzene, toluene, ethyl benzene, xylenes, and hexavalent chromium. None of the above chemicals were detected in any of the 21 wells sampled.

Arsenic Detections and Toxicity

The arsenic levels in the seven wells that exceeded the MCL (10 ppb) ranged from 13 ppb to 26 ppb. There is no information to suggest that arsenic in the residential wells is a result of contamination originating from the Manfredi Motor Transit facility or any other industrial source. It is much more likely that the arsenic is naturally occurring. Most of the residents in the Kiwanis Lake subdivision obtain their drinking water from a buried valley sand and gravel aquifer (ODNR well logs). It is common in Ohio for arsenic to be present in groundwater at levels above 10 ppb (Ohio EPA, 2000). The relationship between arsenic and groundwater is generally thought to be based on the depth of the aquifer and the type of soils present in the aquifer. It is believed that the highest levels of arsenic in groundwater tend to increase with depth, under reducing conditions in sand and gravel aquifers similar to what is present in the area of Kiwanis Lake (Ohio EPA, 2000). Data from the Ohio EPA's Groundwater Quality 2000 305(B) report and a United States Geological Survey fact sheet on Arsenic in groundwater in the United States (2000) indicate that the groundwater in northeastern Ohio is likely to contain arsenic at levels above the MCL of 10 ppb. After reviewing the location and depths of the wells that contained arsenic in the Kiwanis Lake subdivision, no geographic or geologic pattern in arsenic distribution is evident.

Because levels of arsenic were detected above MCLs in seven residential wells and to provide the most conservative message possible, the Ohio Department of Health recommended that those residents with arsenic levels above 10 ppb seek an alternate source of drinking water or treat their water prior to the tap. Residents were mailed information on the health effects of arsenic and were provided with information on treatment systems that were available to remove the arsenic from their well water. HAS staff, along with a representative of the Private Water Systems Group of ODH, attended a public meeting on March 28, 2003, and explained the results of the sampling event. During the meeting, staff answered questions relating to health effects from exposure to arsenic and available methods to remove arsenic from drinking water.

Even though arsenic was detected above the current MCL of 10 ppb, current scientific data do not indicate that anyone will develop adverse health effects from drinking water with arsenic levels ranging from 13 to 26 ppb. The primary adverse health effect linked to long-term exposure to arsenic in drinking water is the development of select cancers, especially skin cancer. Generally skin cancer caused by exposure to arsenic is preceded by small pre-cancerous lesions on the palms, heels, and torso. Several epidemiological studies conducted in Taiwan indicate a dramatic increase in skin cancer in populations with elevated levels of arsenic in their drinking water (Tseng W-P, 1977). However, arsenic levels in this study ranged from several hundred ppb to over 1,000 ppb, which is much higher than anything detected in the Kiwanis Lake wells.

Epidemiological studies conducted in the United States have not detected an increased frequency of skin cancer in populations consuming water containing arsenic at levels around 100 to 200 ppb (Goldsmith et al., 1972; Harrington et al., 1978; Morton et al., 1976; Southwick et al., 1981). In addition to skin cancer, there is growing evidence that ingestion of arsenic may increase the risk of a number of internal cancers including bladder, kidney, and lung (ATSDR 2000). Most of the evidence for this comes from epidemiological studies conducted in Taiwan and Chile where the populations were exposed to arsenic in drinking water in excess of several hundred parts per billion (ATSDR, 2000). A number of studies are available documenting the ability of arsenic to cause cancer in humans; however it appears that the exposures are generally at levels exceeding several hundred parts per billion often for decades. While it is generally accepted that there is no safe exposure threshold for chemicals that cause cancer, a cursory review of available studies indicate that there may in fact be a dose response relationship between levels of arsenic in drinking water and the development of cancer in people drinking the water.

CHILDREN'S HEALTH CONSIDERATIONS

HAS and ATSDR understand that children are often at a greater risk of developing illness due to exposure to hazardous chemicals due to their smaller stature and developing body systems. Children are likely to breathe in more air and consume more food and water per body weight than are adults. Children are also likely to spend more time outside and have more opportunity to come into contact with environmental pollutants. To be protective of the health of children, HAS has reviewed all data from this groundwater sampling as if children were the primary population being exposed.

CONCLUSIONS

Analytical results from the sampling of drinking water wells in and adjacent to the Kiwanis Lake subdivision indicate that the drinking water in the area currently poses "no apparent public health threat" to the residents and businesses. Seven of the wells sampled currently have what appears to be naturally occurring arsenic levels above the U.S. EPA MCL of 10 ppb established for public water supplies. Based on a review of available scientific data, it appears that it is unlikely that residents consuming water with arsenic levels in the concentrations detected would develop any adverse health effects. However, because of general concern about environmental contamination and to provide the most conservative message, HAS recommended that those seven residents seek an alternate source of drinking water or treat their well water to remove the arsenic. The Ohio Department of Health provided information to residents on health effects of arsenic exposure and information on how to remove arsenic from their drinking water.

RECOMMENDATIONS

- To provide the most conservative message, HAS recommends that residents with arsenic levels above the MCL of 10 ppb reduce their exposure to arsenic in their drinking water. Residents were provided with information on available treatments systems designed to remove arsenic from water supplies. It is unknown whether any residents have followed up on this recommendation. HAS will follow-up with the local health department to determine if residents have any additional concerns about their drinking water.
- Residents who have concerns about arsenic should seek to have their well tested for arsenic to determine if their well water exceeds the MCL. Residents can contact their local health department for information on how to sample their wells for arsenic. The ODH does not have intentions of sampling additional wells because the arsenic detected is believed to be naturally occurring.

PUBLIC HEALTH ACTION PLAN

HAS will continue to provide assistance to the Geauga County Health Department and the citizens of Geauga County in addressing concerns about environmental contamination and reviewing environmental data to ensure that their drinking water supply is safe.

PREPARED BY

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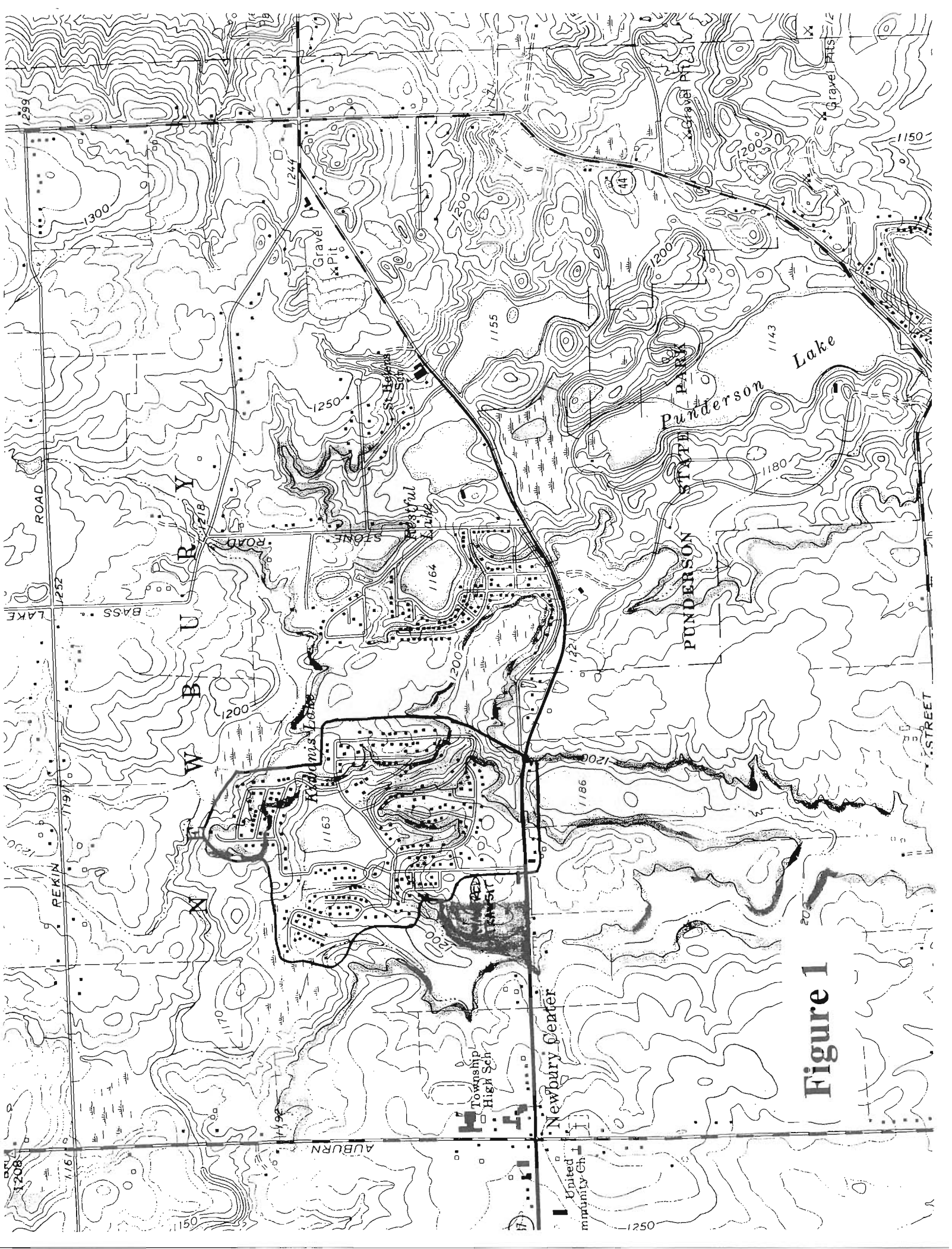
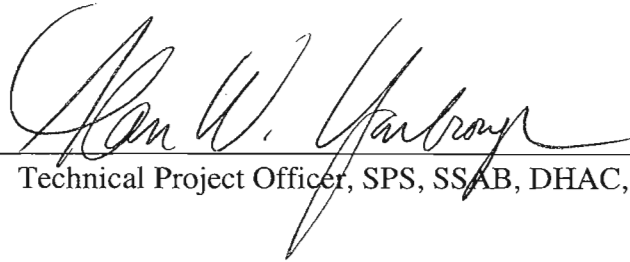


Figure 1

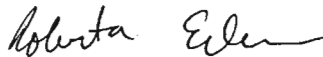
Certification

This Kiwanis Lake Subdivision Health Consultation was prepared by the Ohio Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.



Technical Project Officer, SPS, SSAB, DHAC, ATSDR

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



Chief, State Programs Section, SSAB, DHAC, ATSDR