Source Water Protection
Selected References

City of Holland – Holland Board of Public Works
Ottawa and Allegan Counties, Michigan

SECTION 11 Selected References

MDEQ leaking underground storage tank (LUST) sites;

MDEQ registered underground storage tank (UST) sites;

MDEQ Environmental Cleanup Site Information System (ECSI) sites;

MDEQ Source Information System (for water discharge permit sites including National Pollutant Discharge Elimination System (NPDES) permits, Water Pollution Control Facility (WPCF) permits, stormwater discharge permits, and on-site sewage (septic) system permits);

MDEQ Underground Injection Control (UIC) database;

MDEQ Active Solid Waste Disposal Permits list;

Michigan Department of Transportation (MDOT) - Hazardous Materials database;

State Fire Marshall registry of above-ground fuel storage tank sites;

State Fire Marshall Hazardous Material Handlers and Hazardous Material Incidents (HAZMAT) sites;

U.S. EPA Envirofacts database;

U.S. EPA Resource Conservation Recovery Act (RCRA) generators or notifiers list;

U.S. EPA RCRA Treatment, Storage, and Disposal Facility (TSDF) Permits list;

U.S. EPA National Priorities List (NPL);

U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) List;

Macatawa River Watershed Hydrologic Study (1,800 KB)

Lake Macatawa Watershed Project: michigan.gov/documents/deq/ess-nps-fs-macatawa

Overview " Macatawa Area Coordinating Council: www.the-macc.org/watershed/overview

Research " Macatawa Area Coordinating Council: www.the-macc.org/watershed/research

Lake Macatawa - Wikipedia, the free encyclopedia: wikipedia.org/wiki/Lake_Macatawa

Michigan Department of Environmental Quality Surface Water

Holland Board of Public Works | Electric | Dredge Site

Quarterly

Lake Macatawa... Holland MI Nature

Lake Michigan LaMP 2004

NOAA Great Lakes Environmental Research Laboratory (GLERL) - 4840 S. State Rd. Ann Arbor, MI 48105 (734) 741-2283

www.lowergrandriver.org - Lower Grand Watershed Interactive Tool (WIT) - AWRI

Grand River Watershed is the largest watershed with one common river in the State

DEQ - Macatawa Watershed

Chapter 2. Environmental Conditions

glc.org/tributary/models/documents/**Grand**Fact_000.pdf – Grand River Fact Sheet

The Nature Conservancy, accessed online at: http://nature.org/

U.S. Census, 2000 accessed online at http://quickfacts.census.gov/

Macatawa Real time flow monitoring: http://wdr.water.usgs.gov/wy2009/pdfs/04108800.2009.pdf

Appendix A

Source Water Assessment Report for City of Holland Water Supply

Source Water Assessment Report for the City of Holland Water Supply November 2003

Holland Board of Public Works Water Treatment Plant
Holland, Michigan

Prepared for:
City of Holland Water Supply, WSSN 2790

Prepared by:
U.S. Geological Survey, Water Resources Division, Michigan District
Michigan Department of Environmental Quality, Water Division

Michigan Source Water Assessment Report 46

Executive Summary

The purpose of the Source Water Assessment is to analyze the sensitivity and determine susceptibility of a community's source of drinking water to potential sources of contamination.

Sensitivity is determined from the natural setting of the source water (raw water to the water treatment plant), and indicates natural protection afforded the source water. Using procedures established in the Great Lakes Protocol, Michigan Source Water Assessment Program, the offshore intakes for the Holland Water Treatment Plant have a moderate degree of sensitivity to potential contaminants. When the effects of winds, lake currents, and the possible influence of the Macatawa and Pigeon Rivers are considered, the Holland intake is categorized as moderately sensitive.

Susceptibility identifies factors within the community's source water area that may pose a risk to the water supply. The susceptibility determination provides information with respect to listed facilities and land areas within the source water area that should be given greater priority and oversight in implementing a source water protection program. The source water area for the Holland intake includes 364 potential contaminant sources, at least one of which discharge directly to Lake Michigan, plus urban and agricultural runoff from the Macatawa river watershed. The potential contaminant sources, in combination with the moderately sensitive intake, indicate that the Holland source water has moderately high susceptibility to potential contamination.

The Holland source water is categorized with moderately high susceptibility, given land uses and potential contaminant sources within the source water area. However, it is noted that historically Holland Board of Public Works Water Treatment Plant has effectively treated this source water to meet drinking water standards. The city of Holland has instituted pollution prevention programs, but should be cognizant of additional potential threats to its source of drinking water that are identified in this report. This report explains the background and basis for these determinations.

Using this Assessment

Clean, safe drinking water is fundamental to the viability of any community. Protecting the drinking water **source** is a wise and relatively inexpensive investment in your community's future. The overall intent of this assessment is to provide background information for your community to use in developing a local source water protection program. The assessment benefits your community by providing the following:

- ***A basis for focusing limited resources within the community to protect the drinking water source(s).*** The assessment provides your community with information regarding activities within the **source water area** (**SWA**) that directly affect your water supply. It is within this SWA that a spill or improper use of **potential contaminants** may cause these contaminants to migrate toward the water **intake**. By examining where the source waters are most susceptible to contaminants, and where potential contaminants are located, the assessment clearly illustrates the potential risks that should be addressed.
- ***A basis for informed decision-making regarding land use within the community.*** The assessment provides your community with a significant amount of information regarding where your drinking water comes from (the source) and what the risks are to the quality of that source. Knowing where the resource is allows your community planning authorities to make informed decisions regarding proposed land uses within the SWA that are compatible with both your drinking water resource and the vision of growth embraced by your community.

- ***A basis for dealing with future regulations.***
  The assessment has been designed to functionally meet proposed requirements for surface-water supplies. Information needed to address regulatory needs and requirements has been collected and made available to your community through this report.

This source water assessment also provides the basis for a locally developed, voluntary source water protection program. Communities interested in voluntarily developing source water protection programs should contact the Michigan Department of Environmental Quality (MDEQ) or visit the Department web page at http://www.deq.state.mi.us.

Introduction

In 1996, Congress amended the **Safe Drinking Water Act** and provided resources for state agencies to conduct source water assessments by identifying SWAs, analyzing the **sensitivity** of the source to natural conditions, conducting contaminant source inventories, and determining the **susceptibility** of the source to potential contamination. Delineations, sensitivity analyses, contaminant inventories, and susceptibility determinations comprise a "source water assessment." Assessments will be completed for every public water supply source in Michigan. To support this effort, the MDEQ Water Division established a partnership with the U.S. Geological Survey (USGS) to develop a method for conducting source water assessments for surface water supplies (Sweat and others, 2000; Sweat and others, *in p*ress)**.**

The requirements for public water supplies in Michigan to meet United States Environmental Protection Agency (USEPA) **maximum contaminant levels (MCLs)** provide some degree of assurance of safe drinking water; however, all systems are vulnerable to potential contamination. One of the best ways to ensure safe drinking water is to develop a local program designed to protect the source of drinking water against potential contamination. Not only does this add a margin of safety, but it also raises the awareness of consumers and/or the community of the risks of drinking water contamination. It is expected that source water assessment results will provide a basis for developing a source water protection program.

Background

The city of Holland is located in Ottawa County, about 5 miles (mi) east of Lake Michigan (fig. 1). Besides serving city residents, the water supply also provides water to the city of Zeeland, plus Laketown, Park, Zeeland and a small portion of Holland townships and also portions of Allegan County. The Holland water supply is operated by the Holland Board of Public Works and was originally a ground-water supply. In 1954, construction was begun on a surface water intake and the water treatment plant (WTP) which went on line in 1957 with a capacity of 14 million gallons per day (MGD). The intake structure consists of an upturned, funnel-shaped crib, approximately 22.5 ft in diameter in 34 feet of water. A single 42-inch diameter, reinforced concrete cylinder intake pipe located 4,475 feet (ft) offshore provides untreated Lake Michigan water to a wet well located on shore in the low service pump building. An emergency hatch is located on the 42-inch intake pipe, approximately 2,400 ft from shore. The intake has a design capacity of 42 million gallons per day (MGD). Chlorine is fed at the point where the intake pipe joins the funnel to control zebra mussels. The intake is inspected annually and cleaned every 3 years.

Holland WTP Low Service Pump Station

The 42-inch raw water, reinforced concrete pipe enters a chamber in the wet well. Two deteriorated joints in this raw water line have been repaired in recent years. The low service pump building is located in Tunnel Park, on the shore of Lake Michigan, about a quarter mile west of the WTP. Five low-service pumps deliver raw water from the wet well to the WTP.

With the 1998 expansion, the WTP rated capacity was increased from 28 MGD to 38.5 MGD. The WTP employs conventional water treatment utilizing chlorine for disinfection, alum for coagulation along with the processes of flocculation, sedimentation and filtration. Fluoride is added for dental health, polymers are used to improve coagulation and activated carbon is available for controlling taste and orders.

The WTP has two ground level reservoirs on site with a total capacity of 4.5 million gallons (MG). There are 4 reservoirs located throughout the distribution system with 11.5 MG of storage capacity. Total system storage capacity is 16 MG, which is about 50 percent of the maximum day demand. The Holland WTP serves approximately 48,245 people (Greiner, 1996). The Holland WTP records show that water use between 1991 and 1995 averaged 10.5 MGD with a maximum daily demand of 27.6 MGD during this period. Water quality and meteorological conditions are also monitored.

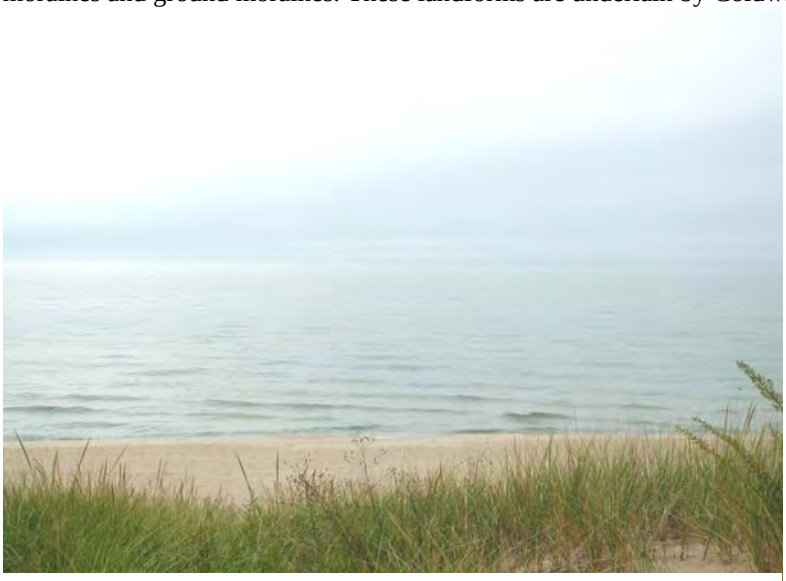
Water treatment plants are periodically inspected to identify construction, maintenance, and operational or source defects that could make them vulnerable to contamination, particularly from contaminants that are microbial in nature, such as fecal coliforms. Water suppliers are provided a sanitary survey report that notes any deficiencies in the system, and the State may direct the system to make necessary corrections. The sanitary survey is an important part of a safe drinking water program. The most recent sanitary survey of the Holland WTP was completed in June 1996.

Climate

The Holland source water area is located in the West-Central Lower Peninsula hydrologic province (Rheaume, 1991). The region experiences temperate summers with moderate winters. The Roosevelt Park weather station in Muskegon reports long-term average annual precipitation for the period 1894-1999 was 32.56 in, with about 31 percent of that as snowfall between November and March. Average annual precipitation from 1995-1999 was 28.08 in (NOAA, 1999). Annual average runoff for the Holland SWA, extrapolated from Miller and Twenter (1986, fig. 1) is 12 inches to 15 inches, with the higher runoff values closest to Lake Michigan.

Source Water Area Geology and Hydrology

The study area for evaluating the extent of the Holland WTP SWA includes portions of the Macatawa and Pigeon river watersheds, in addition to Lake Michigan (fig. 1). The SWA consists of lakebed sand, outwash deposits, and moraines and ground moraines. These landforms are underlain by Coldwater Shale and Marshall Sandstone (Martin, 1955; Milstein, 1987). Soils in the Holland SWA are primarily from the Grattan complex. They include sands, sandy peat, loamy sands, sandy loams, loam, muck, and loamy fine sands (U.S. Department of Agriculture, 1987; BASINS, 1998).



Lake Michigan – Source Water for Holland WTP

Soil permeability is based on the calculated time of travel, in inches per hour (in/hr), for water to move vertically through a saturated soil zone. Soil thickness and permeability values are available in soil survey reports published by the National Cooperative Soil Survey and U.S. Department of Agriculture (1987). Permeability ranges from less than 0.06 in/hr, rated as very slow, to more than 20 in/hr, rated as very rapid.

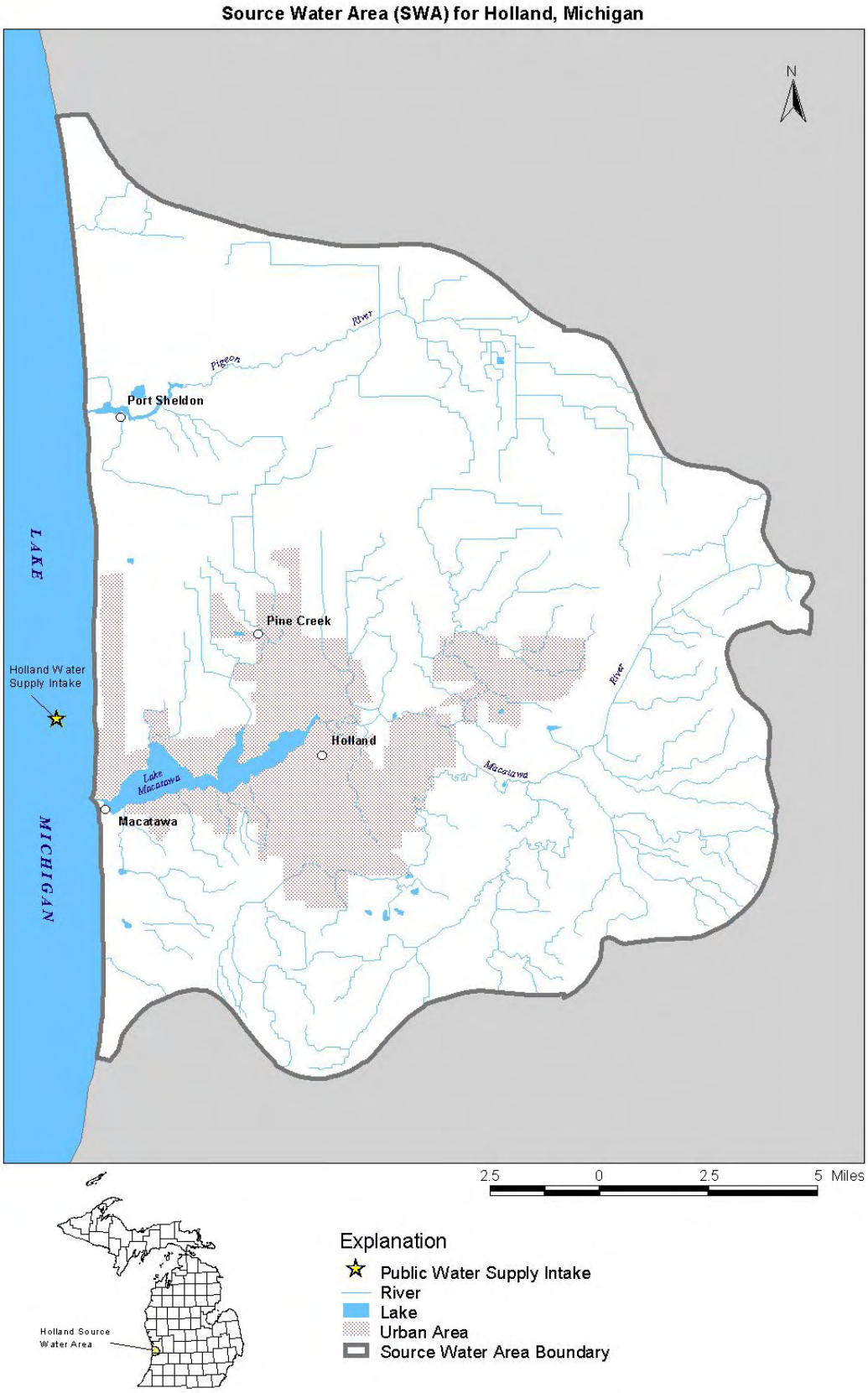


Figure 1. Source Water Area (SWA) for the evaluation of the Holland water Supply, Holland, Michigan.

Very slowly permeable soils significantly reduce the movement of water through the soil zone and, as a result, allow greater time for natural degradation of contaminants. However, such soils also provide for rapid overland transport of contaminants directly to receiving waters, which in turn may affect the water supply intake. In contrast, very rapidly permeable soils allow for rapid infiltration and passage through the soil zone from the surface. Such soils potentially allow rapid transport of contaminants with minimal contact-time available for contaminant breakdown. Erosion and transport of soils by surface waters can cause an increase in turbidity.

Mean, area-weighted, depth-integrated permeabilities for the Holland SWA range from 0.2 to as much as 20 in/hr. The mean permeability is 5.5 in/hr (Schneider and Erickson, undated, series of 5 maps; BASINS, 1998;). Soils are generally moderately to rapidly permeable throughout the SWA (fig. 2; U.S. Department of Agriculture, 1987; BASINS, 1998), with some small areas of moderate permeability in the east-central quarter of the SWA. Soils with rapid permeability are close to the Macatawa and Pigeon rivers and Lake Michigan (Lusch and others, 1992; BASINS, 1998). The Holland SWA contains an area of about 250 square miles (mi^2) and is directly connected to Lake Michigan. most significant tributaries to Lake Michigan from the SWA are the Macatawa and Pigeon rivers, with drainage areas of about 66 mi^2 and 155 mi^2, respectively. Only one gauge has been operated in the SWA by the USGS (Blumer and others, 2001, p. xii). Annual mean discharge at the Macatawa River near Zeeland gauging station was 71.0 cubic feet per second (cfs) between 1961 and 2000, and ranged from 1.2 to 5,540 cfs. In the Grand River watershed, north of the SWA, 10 gauges are currently in operation, and in the Kalamazoo River watershed, south of the SWA, 13 gauges are currently in operation.

Under ambient conditions, currents in Lake Michigan are, typically, from the south-southwest and pass over the Holland WTP intakes. Water from the Macatawa River (about 2 miles south of the intakes) flows north from its mouth, and may influence water quality and chemistry at the intake. Water from the Kalamazoo River (about 9 miles south of the intakes) also flows north from its mouth, and may influence water quality and chemistry at the intake as well. In addition, sustained strong winds from the west often affect lake currents, causing increases in near shore turbidity, and, possibly, increases in coliform concentrations. Sustained winds from the northwest through northeast can occasionally cause the flow of the Pigeon River (7 miles north of the intakes) and possibly the Grand River (about 18 miles north of the intakes), to pass over the intakes, causing changes in water quality and chemistry at the intake.

History of Raw Water Quality at the Source

Public water supplies are required to routinely monitor raw water quality for selected parameters to optimize treatment, and to monitor treated water quality for a list of contaminants that is determined by MDEQ and the Safe Drinking Water Act. A detection of any contaminant may indicate that a pathway exists for contaminants to reach the intake. It is important to realize that the results from a given sample only provide information regarding the water quality at the time the sample was collected. Water quality can change with time for a number of reasons. The fact that a water sample does not contain contaminants is no guarantee that contamination will not occur in the future. Conversely, the detection of a contaminant in the past does not indicate that it will occur in the future.

Raw water quality WTP records for the period of January 2002 through September 2002 revealed average monthly turbidites ranging from 0.88 to 8.68 nephelometric turbidity units (NTU) with monthly maximums from 2.4 to 25 NTU. Raw water pH ranged from 7.84 to 8.60 units while chlorides remained consistent at 8 to 12 mg/l. Raw water hardness ranged from 136 to 170 mg/l as CaCO3 while alkalinity varied from 105 to 145 mg/l as CaCO3. Total coliform counts ranged from not detected to 60 counts per 100 ml in the raw water using the membrane filter procedure.

Treated water analyses are reported annually by the Holland Board of Public Works to the water supply customers in the Consumer Confidence Report (CCR). The CCR for 2002 reported a maximum nitrate concentration of 0.7 mg/l and distribution system trihalomethanes averaging 0.034 mg/l. The CCR also reported no crypotosporidium protozoa were detected in monthly raw water samples for the year.

An analysis of wind direction, water and air temperature, precipitation, discharge from the Pigeon Rver, and source water chemistry indicates that there may be an indirect correlation between wind direction and turbidity, and perhaps wind direction and total coliform bacteria. Regression analysis of these data may indicate that when the wind is from the north-northwest through north-northeast (330-30°) for more than 24 to 36 hours, there is a

quantifiable increase in turbidity of the source water after 3 to 4 days, and possibly an increase in total coliforms after 2 to 3 days.

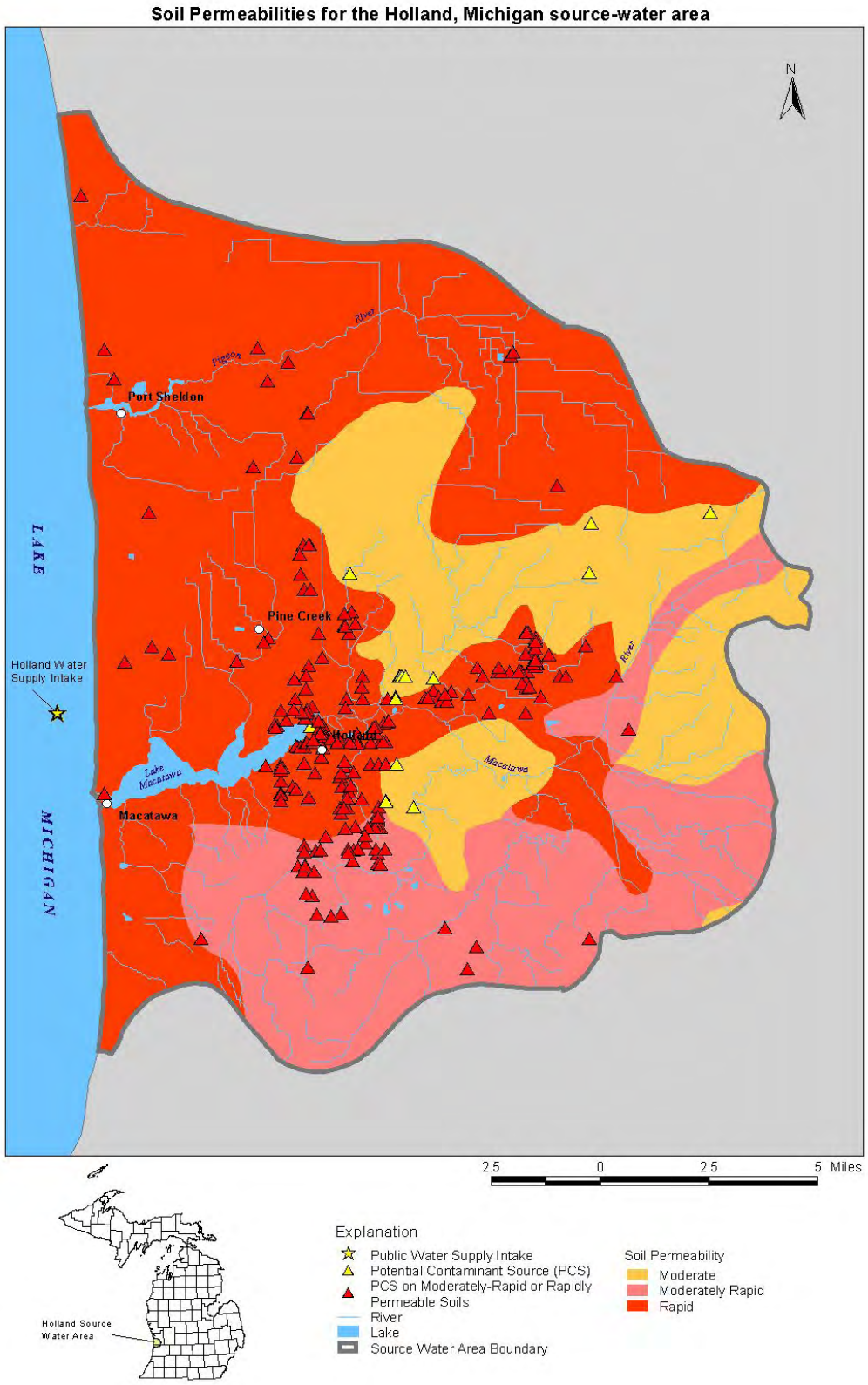


Figure 2. Source water (SWA) permeability map for the Holland water supply, Holland, Michigan.

This occurs because these sustained winds shift the circulation pattern in the Lake near the intake, and may cause water from the Pigeon river to pass over the intake.

Similarly, data indicate that sustained winds from the south through southwest (180-225°) can cause in increase in turbidity. These changes are most likely associated with changes to circulation patterns in Lake Michigan, which can cause sediments near the intake to be suspended in the water column due to wave action, and, are possibly associated with increased flow of the Macatawa River, and possibly the Kalamazoo River, over the intake. While not regulated, esthetic parameters such as taste and odors associated with algae blooms are also a source water concern for the Holland WTP.

Thermal inversions in Lake Michigan can also cause treatment problems for the plant. Thermal inversions are typically associated with heating of the surface of the lake in spring, and cooling of the surface of the lake in the fall or early winter. Both events cause density differences in the lake that cause the water to turnover and mix, often stirring up bottom sediments and detritus. These materials enter the WTP through the intake and may cause treatment difficulties. In addition, rapidly fluctuating lake temperatures and very cold water can upset the treatment process at the plant.

Source Water Assessment Methodology

Technical guidelines for completing source water assessments are contained in the Michigan **Source Water Assessment Program**, Assessment Protocol for Great Lakes Sources (Protocol) (MDEQ, 1999, Appendix L). In general, an assessment is a process for evaluating a drinking water supply and the potential for its treated water to exceed an MCL due to raw water contamination. A source water assessment considers the SWA, potential sources of contamination within the SWA, conditions of the water supply intake, and susceptibility to contaminants in order to identify potential risks to drinking water quality. Although the Protocol provides the minimum requirements and instructions on how to conduct an assessment, each water supply is unique with respect to how the process is carried out, due to local conditions and information. Sweat and others (2000, *in p*ress) have developed and documented the methodology used in the preparation of this assessment.

Delineating Source Water Areas

Delineation of the SWA is accomplished by using **geographic information system** (GIS) software to map the watershed(s) that have the potential to affect source water at the intake. Using information from the water supply, a **critical assessment zone** (CAZ) is defined for the intake (MDEQ, 1999, Appendix L). A buffer is then created along any shoreline intersected by the CAZ, and from the edge of the CAZ to the mouth of any river(s) that might influence the intake. Finally, the buffer is extended along the shoreline of any river(s) that might influence the intake, from the mouth of the river to its headwaters. The area defined by the CAZ, river and shoreline buffers is termed the **susceptible area.** The susceptible area within the SWA defines locations where a water supply should focus its management strategies and resources to benefit the drinking water resources.

Using the Great Lakes Protocol and the Holland water supply information:

- The CAZ for Holland intake #1 is calculated as:

  4,475 (the length of the intake in ft.) x 34 (the depth of the intake in ft.) = 152,150 (unitless)
  This results in rating the intake as moderately sensitive, with a CAZ of 1,000 ft (MDEQ, 1999, Appendix L; fig. 3).
- The CAZ does not intersect the shoreline and there is no shoreline susceptible area.

Contaminant Source Inventory

Past, current, and potential future sources of contaminants were inventoried to identify several categories of potential sources of contaminants including microorganisms (bacteria, oocysts, and viruses), inorganic compounds (nitrates and metals), organic compounds (solvents, petroleum compounds, pesticides), and disinfection by-product precursors (trihalomethanes, haloacetic acids).

- It is important to remember that sites and areas identified by this process are only **potential contaminant sources** (PCS) to the drinking water. Environmental contamination is not likely to occur

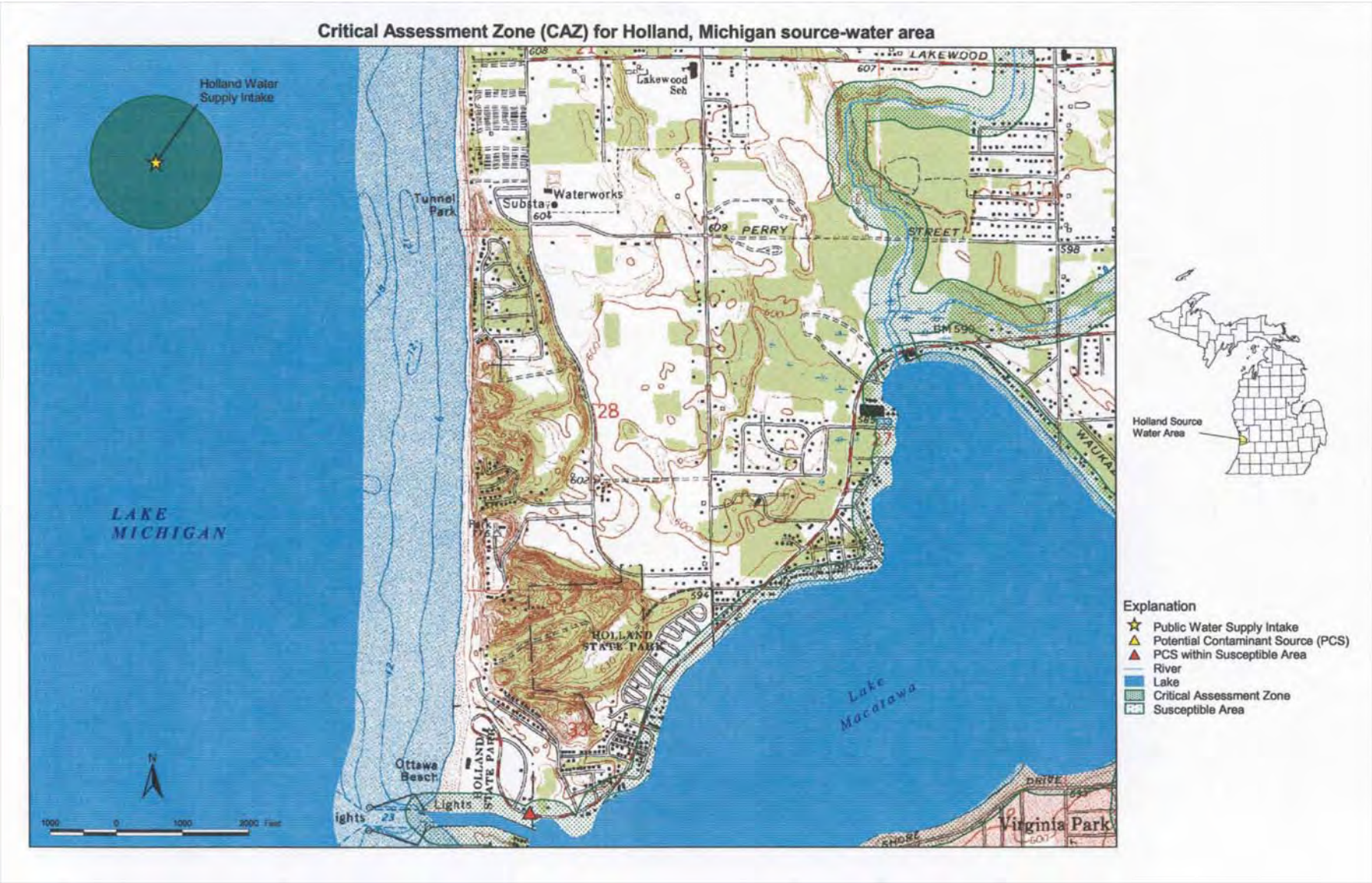


Figure 3. Critical assessment zone (CAZ) for the Holland water supply, Holland, Michigan.

when potential contaminants are particular types of land uses and risks associated with those land uses. Assumptions are discussed further in the results portion of this report.

The process for completing the inventory included several steps, which are summarized as follows:

1. Reviewed readily available land use maps and historical/current aerial photographs.
3. Plotted relevant information from applicable state and federal regulatory databases including the following lists:
    - MDEQ leaking underground storage tank (LUST) sites;
    - MDEQ registered underground storage tank (UST) sites;
    - MDEQ Environmental Cleanup Site Information System (ECSI) sites;
    - MDEQ Source Information System (for water discharge permit sites including National Pollutant Discharge Elimination System (NPDES) permits, Water Pollution Control Facility (WPCF) permits, storm water discharge permits, and on-site sewage (septic) system permits);MDEQ Underground Injection Control (UIC) database;
    - MDEQ Active Solid Waste Disposal Permits list;
    - Michigan Department of Transportation (MDOT) - Hazardous Materials database;
    - State Fire Marshall registry of above-ground fuel storage tank sites;
    - State Fire Marshall Hazardous Material Handlers and Hazardous Material Incidents (HAZMAT) sites; U.S. EPA BASINS software, version 2.01.
    - U.S. EPA Envirofacts database;
    - U.S. EPA Resource Conservation Recovery Act (RCRA) generators or notifiers list;
    - U.S. EPA RCRA Treatment, Storage, and Disposal Facility (TSDF) Permits list;
    - U.S. EPA National Priorities List (NPL);
    - U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) List;
    - U.S. EPA RCRA Corrective Action Activity List (CORRACTS);
    - U.S. Department of Transportation (DOT) Hazardous Materials Information Reporting System (HMIRS);
    - U.S. EPA Toxic Chemical Release Inventory System (TRIS); and
    - U.S. EPA Oil Pollution Act of 1990 Spill Response Atlas.
4. Met with public water supply and community officials on October 2, 2002 to identify potential sources not listed elsewhere in databases or on maps and completed a preliminary inventory form to be used in completing the SWA base map. Subsequent contacts by email and telephone on numerous occasions to request additional data, clarify data, and discuss results.
5. Land use and/or ownership (for example, residential/municipal; commercial/industrial; agricultural/forest; and other land uses) was mapped and evaluated in relation to PCS, soil characteristics, and proximity to the intakes.
6. Conducted an informal field inventory to locate additional PCS.
6. Completed final inventory form of PCS and plotted locations of PCS on the base map.

The purpose of the inventory is three fold: first, to provide information on the location of PCS, especially those within the susceptible area; second, to provide an effective means of educating the public about PCS; and third, to provide a reliable basis for developing a management plan to reduce potential contaminant risks to the Holland water supply.

The inventory process attempts to identify potential point-source contaminants within the SWA. It does not include an attempt to identify specific potential contamination problems at specific sites, such as facilities that do not safely store potentially hazardous materials. However, assumptions were made about particular types of land use. For example, it is assumed that rural residences associated with farming operations have specific potential contamination sources such as fuel storage, chemical storage and mixing areas, and machinery repair shops. It should also be noted that although the inventory depicts existing agricultural uses (crops grown), these are likely to undergo continual change due to normal crop rotation practices. What is irrigated farmland now may be non-irrigated farmland next year, or vice versa.

The results of the inventory were analyzed in terms of current, past, and future land uses and their relationship to the susceptible area and the supply intake. In general, land uses and PCS that are closest to the supply intake pose the

greatest threat to a safe drinking water supply. Inventory results are summarized in tables 1 and 2 and are shown on figure 4.

Many PCS are readily identifiable because they have a single discharge point, and often a permit is required for these discharges. Dredging in Lake Macatawa, Pigeon Lake and the mouth of the Kalamazoo and Grand rivers is also a point source concern for the Holland SWA. Dredging activities could potentially release contaminated sediments into the water column and could have an adverse affect on water quality. In general, Lake Macatawa and Pigeon Lake act as sinks for contaminants in water from the Macatawa and Pigeon rivers, respectively. With a residence time of days, most suspended contaminants settle out in the lakes and only dissolved contaminants are transported to Lake Michigan. The large estuaries at the mouths of the Kalamazoo and Grand rivers serve a similar purpose.

Table 1. Potential contaminant sources in the Holland source-water area, Michigan.

Type of potential contaminant source	Number of potential contaminant sources	Number of potential contaminant sources with permitted discharges to Lake Michigan
Hazardous or Solid Waste Site	223	0
Industrial Facilities Discharge Site	42	0
National Priority List Sites	2	0
Permit Compliance System	40	1
Toxic Release Inventory	57	0

Table 2. Potential-contaminant source-inventory results, Holland source-water area, Michigan

Site Name	ID Number	Reason for Permit	Reason for Listing as Potential Contaminant Source
CPCO J H CAMPBELL POWER PLNT	MI0001422	Waste Water, Dust, and Process Water	Permit Compliance System

Other PCS have diffused, poorly defined discharge locations. These are known as non-point discharges because they occur over large areas and may not be quantifiable by readily accepted methods. These non-point source discharges are difficult to identify and control, and consequently to quantify, yet they are a major source of water pollution (Carpenter and others, 1998). Non-point sources also include atmospheric deposition over water and land, and include urban, rural, and agricultural runoff from areas such as lawns, golf courses, farm fields, pastures, parking lots, and roadways. Runoff from these areas can contain many types of pollutants including sediments, metals, organic and inorganic chemicals, viral and bacterial pathogens, pharmaceuticals, and animal wastes.

Transportation also represents a non-point source of contamination. Trucking, railroads, and shipping all transport potential contaminants through the SWA. An accident causing a spill could lead to potential contaminants entering a storm sewer, or in the case of shipping, directly discharge to Lake Michigan, possibly near the water intake. Non-point sources of concern to the Holland water supply are primarily from agriculture and livestock in the Holland SWA; from industrial, commercial, and residential sources in surrounding communities; and from the transport of fuel, coal, salt, and cement on Lake Michigan.

The Michigan Department of Agriculture ands the MDEQ are in the process of identifying concentrated animal feedlots (greater than 1000 animal units) in the Holland SWA. At least one animal feedlot operation has a documented discharge to these watersheds. The U.S. Environmental Protection Agency (USEPA) has identified two

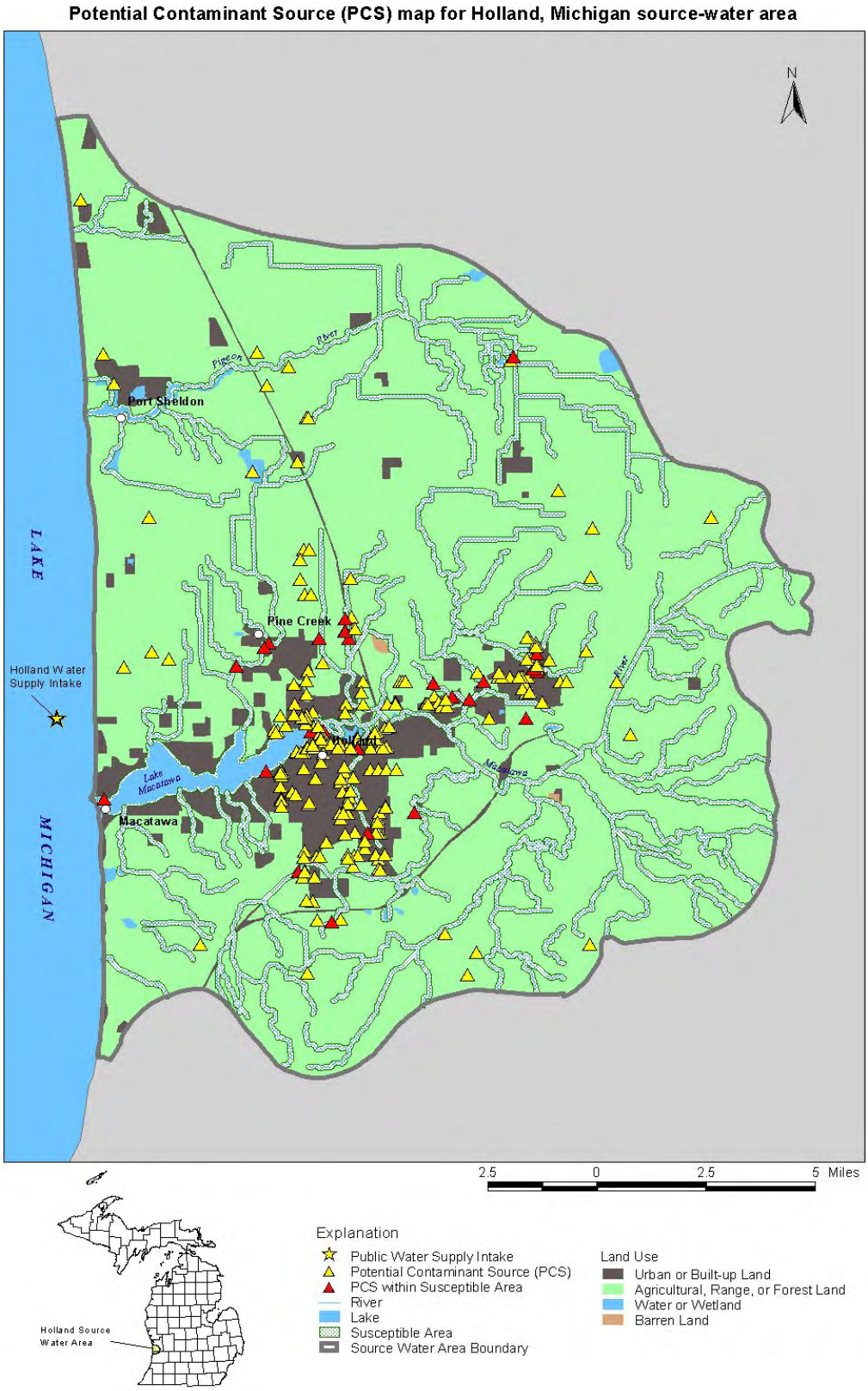


Figure 4. Contaminant Source Inventory for the Holland water supply, Holland, Michigan.

impaired water bodies in the Holland SWA on its Clean Water Act 303(d) list. The parameters of concern listed for the river and its tributaries are polychlorinated biphenyl's (PCBs), chlordane, threatened and poor fish and macro-invertebrate communities, nutrient enrichment, and algae (MDEQ, 2001).

The Kalamazoo and Muskegon rivers have been identified as minor contributors of *trans*-Nonachlor to Lake Michigan, while the Grand River is listed as a major contributor of *trans*-Nonachlor (USEPA, 2001). The Grand River is a significant contributor of mercury to Lake Michigan, and the Kalamazoo and Muskegon rivers contribute minor amounts of mercury. The Kalamazoo, Muskegon, and Grand Rivers were identified as minor contributors of PCBs. Results for atrazine have not yet been released.

In general, PCS within the susceptible area pose greater risks than those outside the susceptible area. The presence of PCS within the SWA indicates potential sources of chemicals that could, if improperly managed or released, affect the water quality at the intake. A small quantity of these chemicals, in some cases a gallon or less, can significantly affect the supply. Also of concern is the location and distribution of these sources with respect to highly permeable soils. Overlaying the PCS locations and the soil permeability map for the Holland SWA indicates that 339 of the located PCS are located on or very near to areas with moderate to rapidly permeable soils (fig. 2).

The SWA consists of primarily agricultural, forested, and urban land (fig. 4). The results of the PCS inventory performed for the Holland water supply are shown on figure 4 and are summarized as a function of PCS locations within the SWA relative to land use. Inventory results indicate that there are 364 PCS within the SWA, at least one of which discharge directly to Lake Michigan (tables 1, 2).

Sensitivity Analysis

Sensitivity is the natural ability of a SWA to provide protection against the contamination of the water supply intake, and includes physical attributes of lakes, rivers, and soils. The sensitivity analysis requires consideration of several different variables related to the natural environment, for example:

- Water quality history of the source.
- Distribution of moderately to highly permeable soils.
- Amount of available water from precipitation or runoff.
- Potential for runoff to affect the intake.
- Nature of the intake, including: depth, distance from shore, age, and materials used.
- Surface water flow patterns in vicinity of intake.

To perform this analysis, USGS, MDEQ, and the operator of the Holland WTP collected, researched, and analyzed information from the WTP, monthly operator reports, sanitary surveys, soil maps, published reports, and historical

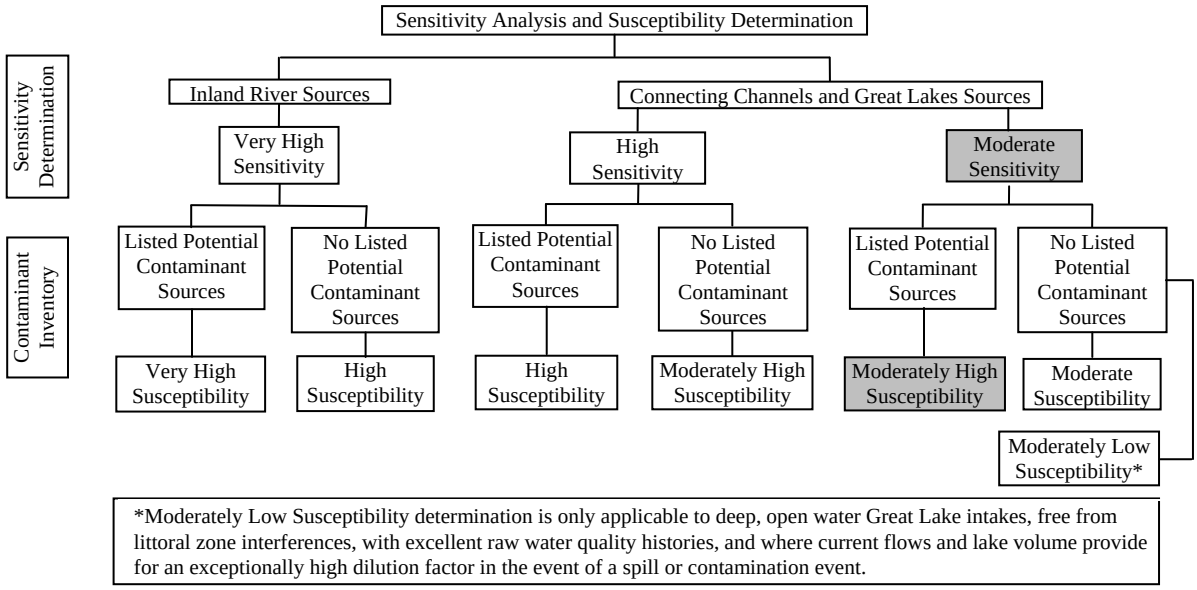


Figure 5. Surface-water source sensitivity analyses and susceptibility determination, Holland WTP, Michigan.

plant operation and raw water quality data. The Michigan SWAP has three categories of sensitivity for surface water sources ranging from moderately sensitive to very highly sensitive. Analysis of this information, using guidelines provided in Brogren (1999) and Sweat and others (2000, 2002), indicates that the Holland intake is moderately sensitive (fig. 5). This means that the natural environment offers some limited protection against contamination of the water supply intake.

Susceptibility Determination

Susceptibility is the relative potential for contamination to reach the public water supply intake used for drinking water purposes. Whereas the sensitivity of a water supply is the natural ability of the area to protect the intake against contamination, the susceptibility determination also takes into account other factors that will affect whether a contaminant reaches the intake. Whether or not a particular drinking water source becomes contaminated depends on three factors:

(1) The distribution of PCS;
(2) The source water area; and
(3) The natural protection, or sensitivity, of the source.

In conducting a susceptibility determination, the part of the SWA that yields water to the water supply-system intake is identified by establishment of the susceptible area within the source water area. PCS within the susceptible area are then located. Based on the distribution of PCS within the susceptible area, the type of PCS, and the nature of the chemicals they use or store, PCS are analyzed for the risk they may represent to the water supply intake. Along with the presence and distribution of PCS, the sensitivity analysis is then used to determine the susceptibility of the water supply (fig. 5). This leads to a determination of whether the drinking water source is moderately susceptible, highly susceptible, or very highly susceptible to contamination (Sweat and others, *in press*). It is important to understand that a system can have low sensitivity relative to some conditions (for example, intake construction and location), and high susceptibility because of other conditions (for example, the type of PCS). In Michigan, surface water sources of drinking water range from moderately low to very-high susceptibility.

When a public water supply is determined to have a moderate, high, or very high susceptibility because of a particular condition or set of conditions, there is a significant risk of contamination of the drinking water source because of that condition or set of conditions. Although the susceptibility determination does not predict when or if contamination will actually occur, it does recognize conditions that are highly favorable for contamination of the supply. In the event of a contaminant release to soils or surface water within the susceptible area, it is very likely that contamination at the intake would occur without completion of remedial actions.

If a public water supply's drinking water source is determined to be highly susceptible, it is recommended that the system identify the condition(s) that lead to the high susceptibility. Immediate steps should be taken to protect the source, and action should be considered to remedy the condition (for example, repairing or replacing faulty intake construction, working directly with facility operators to implement sound management practices, etc.).

All water supplies, regardless of their susceptibility, should consider identified factors that could lead to higher susceptibility in the future, and should prepare a strategy to protect the water supply source. Raising public awareness through signs and other education programs, encouraging proper intake construction and the use of best management practices in existing facilities are good ways of ensuring that a surface water source maintains its moderate susceptibility rating.

The Holland WTP intake is located far enough from shore and in deep enough water that the CAZ is 1,000 ft (figs. 3, 4). The Holland WTP intake is considered to have moderately high susceptibility (fig. 5).

Summary and Recommendations

The actual susceptibility of the drinking water source of a water supply depends on a number of contributing factors, some of which are only slightly related. Sensitivity is determined from the natural setting of the source and identifies the natural protection afforded to the source water. Susceptibility is determined by identifying those factors within the community's source water area that may pose a risk to the source water. The susceptibility

determination provides information with respect to facilities within the SWA or land areas within the SWA that should be given greater priority and oversight in the implementation of a drinking water protection program.

Sensitivity Analysis: Based on criteria adopted in the Great Lakes Protocol of the Michigan Source Water Assessment Program, the offshore intake for the Holland Water Treatment Plant has a moderate degree of sensitivity to potential contaminants. When considering off shore winds and influences from the Macatawa, Pigeon, Kalamazoo, and Grand rivers, the Holland intake is categorized as moderately sensitive.

Susceptibility Determination: The SWA for the Holland intake includes 364 listed potential contaminant sources, plus agricultural, urban, and industrial runoff from the Holland SWA. However, the intake is far enough from shore that the susceptible area likely doesn't influence them. The moderately sensitive intake for the Holland WTP has a moderately high susceptibility determination (fig. 5).

Effective Treatment: While it has been determined the Holland source water has moderately high susceptibility to potential contamination, it is also noted the City of Holland Water Treatment Plant has, historically, effectively treated this source water to meet drinking water standards with minimal complaints from the public. This assessment provides the City with a basis to institute a source water protection program as another tool to assure the continued safety of its water supply.

The results of this assessment and the recommendations based on these results are summarized as follows:

- ***Intake* -** The Holland Water Supply was originally constructed in 1938 as a ground-water system. The current surface-water intake was installed in 1954, and draws water 4,475 ft from shore, under about 34 ft of water (1935 datum), making it a moderately sensitive intake.
- ***Soils* –** Using a mean, area-weighted, depth-integrated permeability estimation, the soil and subsoil material in the SWA range from 0.2 in/hr to as much as 20 in/hr. The mean permeability is 5.5 in/hr (Schneider and Erickson, undated, series of 5 maps; BASINS, 1998). Over half of the soils in the Holland SWA are rapidly permeable. There are 339 PCS located on these soils. These factors combine to make the SWA, and thus the intake, moderately sensitive. The community should take steps to evaluate current and future land use in areas of highly permeable soils, particularly those occurring within the susceptible area. Those PCS that have been identified either on or in close proximity to these soils should be informed of the sensitive nature of the area and encouraged to adopt best management practices designed to minimize the risk of a ground release. Residential areas that have been developed on these soils should be targeted for educational programs identifying steps that residents can take to protect the water supply.
- ***Historical Contaminant Detections* -** There have been no detections of synthetic or volatile organic contaminants in the systems raw water. Inorganic contaminants are typically at lake background levels. Nitrate concentrations are routinely below the detection limit. Positive coliform bacteria detections have occurred often associated with snowmelt, spring runoff, and discharge from the Muskegon and Grand Rivers above median flow. The periodic presence of coliform bacteria before chlorination at the intake is indicative of a relationship between runoff and soil conditions, causing the occasional presence of bacteria at detectable levels in the source water. These factors indicate that the SWA, and thus the intake, is moderately susceptible.
- ***Sanitary Survey* -** The most recent sanitary survey (Greiner, 1996) revealed only minor defects. Those requiring repair either have been corrected or are scheduled for repair. It is important that the water supply continue to follow good management practices.
- ***Potential Contaminant Sources* -** A review of the PCS inventory and the moderately and highly permeable soil distribution indicates that the Holland SWA has 339 PCS located on rapidly permeable soils. However, Lake Macatawa and Pigeon Lake provide significant buffers between the Macatawa and Pigeon rivers, respectively, and Lake Michigan, acting as a settling basin for many contaminants transported in the river. Likewise, estuaries at the mouths of the Kalamazoo and Grand rivers provide similar functions. It is recommended that the community focus initially on PCS that are located on rapidly permeable soils and nearest any water bodies, as they pose the greatest potential threat to the water supply. These facilities should be made aware of free technical assistance that is available through MDEQ's pollution prevention programs. Through chemical inventory, waste reduction, and by increasing awareness of best management

practices, the risk these facilities pose to source waters can be reduced. The PCS inventory indicates that the source has moderately high susceptibility.

- ***Source Water Assessment -*** The Holland source water assessment of moderately high susceptibility is based on these site-specific parameters:
  1. Definition of a Critical Assessment Zone around the intake for a source with moderate sensitivity;
  2. Definition of a SWA for the Macatawa and Pigeon rivers and the shoreline near the intake;
  3. Wind and current patterns in Lake Michigan near the Holland WTP intakes and their effects on source water quality; and
  4. Listed and nonlisted potential contaminant sources.
- ***Source Water Protection*** – Most cities have initiated source water protection activities with Industrial Pretreatment Programs incorporating management plans, chemical containment, and spill response, spill response training, plus catch basin and street cleaning programs.

The Holland Board of Public Works and/or the community should assemble a team to assist in the development and implementation of a source water protection program that uses this assessment to further protect the Holland source water area.

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Glossary

Critical Assessment Zone (CAZ) – the area from the intake structure to the shoreline and inland, including a triangular water surface and a land area encompassed by an arc from the endpoint of the shoreline distance on either side of the on shore intake pipe location

Geographic Information System (GIS) – a system to capture, store, update, manipulate, analyze, and display all forms of geographically referenced information

Impaired water bodies – As defined by USEPA and Clean Water Act 303(d) list

Intake – the point at which source (raw) water is drawn into a pipe to be delivered to a water treatment plant

Lignins – an amorphous, cellulose-like, organic substance that acts as a binder for the cellulose fibers in wood and adds strength and stiffness to cell walls

Maximum Contaminant Level (MCL) – the maximum permissible level of a contaminant in water that is delivered to any user of a public water system

Potential Contaminant Sources (PCS) – listed and non-listed agricultural sites, businesses, and industries that have the potential to cause contaminants to be introduced into source water

Sensitivity – a measure of the physical attributes of the source area and how readily they protect the intake from contaminants

Source – the water body from which a water supplier gets its water

Source Water Area (SWA) – the land and water area upstream of an intake that has the potential to directly influence the quality of the water at the intake

Source Water Assessment Program (SWAP)– in Michigan, the process defined by the state Department of Environmental Quality to complete assessments of all the state's public water supplies

Susceptibility – the Susceptibility identifies factors that may pose a risk within the community's source water area

Susceptible Area – the area defined by the critical assessment zone and a buffer on either side of any drainages that contribute water to an intake

Synthetic Organic Contaminants (SOC) – Manmade organic chemical compounds such as pesticides, etc.

Tannins – naturally occurring phenolic compounds that precipitate proteins, alkaloids, and glucosides from solution that has a yellowish appearance

Volatile Organic Contaminants (VOC) – Unnatural, volatile organic chemical compounds such as gasoline components, solvents, degreasers, etc.

Appendix B

Emergency Response
Plans, Procedures & Contacts

The purpose of this section is to provide copies of Holland's emergency response documents that addresses response to events or threats that may impact the source water supply. To this effect, this section includes the following documents:

(a) Emergency Intake Operation
(b) Emergency Interconnect Operation
(c) Emergency Sampling Kit SOP
(d) Frazil Ice Monitoring Log
(e) Frazil Ice Operating Procedures
(f) Low Service Pump SOP for Low Lake Level
(g) Low Service Security Alarm SOP
(h) List of Populations at Risk
(i) Priority Phone List
(j) Communications and Public Notifications Procedures
(k) Security Threat Phone Checklist
(l) Security Threat Response Plan
(m) Tier 1 Templates
(n) Water Plant Supply Contamination Procedures
(o) Water Use Reduction Plan
(p) WTP Shut Down Checklist
(q) WTP Start Up Checklist
(r) Zebra Muscle Control
(s) WTP Pollution Incident Prevention Plan

Emergency Intake Operation

The Holland Water Treatment Plant is rated at 38.5 million gallons per day. Lower than average Lake Michigan water levels have an impact on the Water Treatment Plant's ability to provide its maximum capacity. Additionally, a major failure of the primary intake structure could substantially limit the Water Treatment Plant's ability to treat water.

An emergency access riser is located at approximately 2,000 feet from the shore and has been fitted with an 8" spool piece and blank flange. Additionally, operational procedures have been developed for pump operation during low lake water conditions.

If lake levels fall below 577 feet divers are mobilized and will remove the blank flange from the spool piece. When the valve is opened, the intake capacity is increased by approximately 4.5 mgd.

If there is a failure in the primary intake structure, divers would be mobilized and open the emergency riser.

WYOMING/HOLLAND WATER INTERCONNECT

There are three interconnections between the Holland Water Distribution System and the Holland Township Water Distribution System (City of Wyoming). The interconnects should not be opened if the City of Holland's water supply is contaminated.

In an emergency, the Incident Commander is responsible for requesting the opening of the interconnects. The actual contacting of Holland Township may be delegated, but the IC is the only person who may authorize the opening of the interconnects.

In the event of a failure in the Holland distribution system or the Holland Township distribution system that could be alleviated through temporarily opening the three interconnection valves, the following steps should be followed prior to opening the interconnection valves:

a. Failure in the Holland system:
   - i A representative of the Holland BPW will contact Holland Township and ask permission to use water coming through their system.
   - ii A representative of the Holland BPW will contact the Wyoming Water Treatment Plant and ask permission to use water.

b. Failure in the Holland Township system:
   - i Holland Township must contact the Holland BPW and ask for permission to use water. The Holland BPW will then notify the Water Treatment Plant that permission has been granted to use water.

c. Interconnect Locations:
   - i. At Douglas Ave. (Ottawa Beach Rd.) approximately 1000 feet west of 140th Ave. in Holland Township. Size: 8"
   - ii. At Douglas Ave. (Ottawa Beach Rd.) and 140th Ave. in Holland Township. Size: 12"
   - iii. At Douglas Ave. (Ottawa Beach Rd.) and Madison St. in Holland Township. Size: 12"

d. City of Zeeland/Holland Township Interconnects

The City of Zeeland has interconnects with Holland Township that can supply water from the City of Wyoming. If we have a water supply shortage or disruption, the City of Zeeland should be requested to close the interconnects with the Holland BPW and open the Holland Township interconnects

EMERGENCY SAMPLING KIT SOP

The following procedure is to help sample for a suspected or known contamination in the raw or finished water.

Determine, if possible, what type of contamination has occurred.

Chemical/Agent: _____

Volume of Agent: _____Gallons/Liters___

Source of Spill/Contaminant: _____

Date: _____Time: _____

Contacted by: _____

Please answer the following questions about the water being sampled:

Clear: Yes___ No___ Milky: Yes___ No___ Oily:Yes___ No___

Color Yes___ No___Describe**:** (Yellow, Blue, etc.) _____

Odor Yes___ No___ Describe**:** (Musty, Chemical, etc._____

Suspended Particles:Yes___ No___ Describe**:** _____

Additional Observations:_____

_____

1. Notify Plant Superintendent and the Director of Water and Wastewater Services:

Water Treatment Plant Superintendent	Jim Van De Wege	Home Cell Office	616.396.4233 616.566.6055 616.355.1698
Water Treatment Plant Operations Supervisor	Steve Teunis	Home Office Pager	616.846.7016 616.355.1697 616.713.0285
Operations Director	Dave Koster	Home Cell Office	616.399.1516 616.218.7887 616.355.1562

2. The Plant Superintendent is responsible for contacting the Water/Wastewater Services Superintendent.

Water/Wastewater Services Superintendent	Dan Sorek	Cell/Home Office	616.218.2940 616.355.1644
Water/Wastewater Services Supervisor	Dave Cyrus	Home Office Cell	616.392.7442 616.355.1646 616.218.3439

3. The Superintendent of the Water Treatment Plant, Water/Wastewater Services Superintendent and Director of Operations will evaluate the situation and decide whether or not to take samples for later analysis. They will also determine the need to contact additional personnel and/or Law enforcement personnel.

4. The Emergency Sampling Kit contains the following:
    - Safety Goggles
    - Rubber gloves
    - Disposable lab coat
    - Trash bags
    - Sample Paperwork for all bottles
    - Pen and Permanent Marker
    - The following sample bottles are included:
        - Chemical analysis. (Sampling Unit 32)
        - Radionuclides (One Gallon Collapsible Container)
        - Cyanide Analysis (Sampling Unit 36CNa)
        - Total Metals (Sampling Unit 36ME)
        - Microbiological (Sampling Unit 30)
        - Methods 525.1 Organics (Sampling Unit 36NV)
        - VOC method 524.2 (Sampling Unit 36VO)
        - Complete Minerals (Sampling Unit 33)

5. Determine the site where to collect the samples.
6. If the contaminant is unknown or is toxic in nature, utilize personal protective equipment (PPE) included in the kit.
7. Label all bottles with the appropriate information.
8. Pack all sample in the sampling kit container along with “blue ice”.
9. Carefully remove all PPE and place in one of the trash bags provided in the kit.
10. Make sure to de-contaminate by thoroughly washing hands or if necessary showering.
11. Take note of any environmental conditions (smells, spills, color, etc.), which may be part of the contamination.
12. Immediately deliver samples to the Water Treatment Plant.

Frazil Ice Monitoring Log

Date/Time	Low Service Flow	Wetwell Level	Water Temperature	Air Temperature	Wind Speed/ Direction

Frazzle Ice Operating Procedures

Formation Conditions

Management and operators need to be alert to the possible formation of frazil ice whenever the following conditions are present:

- Lack of ice cover over the intakes
- Water temperatures near 32 degrees
- Cold clear nights (generally under 20 degrees)
- Wind is considered an essential requirement to promote surface cooling and promote downward movement of the super- cooled water to the intake. February 16, 2003 winds of 15 mph from the NE had fallen to only 8 mph before dawn when plugging of our intake occurred.

Instructions

1. If conditions highly conducive to ice formation are anticipated (especially all the above and nighttime temperatures of 10 degrees or less), all reservoirs should be full between the hours of 8:00 PM and 8:00 AM.
    a. SCADA trending of the wetwell level may be helpful.

2. Notify management immediately if frazil ice restriction is observed.

3. **Shut the intake down** at the first certain indication of ice accumulation (**falling wet well levels)**, ice may be visible at the low lift. Ice forms on the forward side of bar screens and causes noticeable restriction only when fairly well advanced when bridging and total blockage looms.

4. **Screens** should be cleaned, if possible. If heavily weighted with ice it may be advisable to only pull them upward, but not out of the water.

History

The worst known incident occurred on February 16, 2003, when intakes at Palisades Nuclear, St. Joseph, Benton Harbor, South Haven, Holland, and Grand Rapids all experienced plugging. All conditions listed above were present at the time.

LOW SERVICE PUMP OPERATION∗
Low Lake Level Operation

Due to the abnormally low lake levels, please follow the procedure below when treating 28 mgd or larger volumes of water.

- ❑ Start number 4 low service pump.
  Number 4 or number 2 may be started first.
  Number 4 or 2 or both may already be running

Note: You will be starting one pump in each wetwell.

- ❑ Start number 2 low service pump and ramp up to 100%.
  Number 4 or number 2 may be started first.
  Number 4 or 2 or both may already be running

- ❑ Monitor wetwell level.
  Low service pumps will cutoff at 6.5 feet.
  If pumps do cutoff you will have to reset the Low Water Cutoff at the low service building.

- ❑ Allow flow and wetwell to stabilize.

- ❑ Start number 3 low service pump and ramp up to 70%.

- ❑ Allow flow and wetwell to stabilize.

- ❑ Continue to ramp up number 3 low service pump in 5% increments until a flow of approximately 36-mgd is reached.

- ❑ Continue to monitor wetwell level until it stabilizes.

Low Service Security Alarm

If during the course of your shift the low lift security alarm is activated:

1. If an electrical storm is in progress you may disregard as an electrical storm will set off the alarm.

2. Make a visual inspection from the monitor on the operator's desk.

3. If at this time you still believe the threat to be real, call Ottawa County Sheriff, (911), and report a possible break in.

4. Notify Operation Supervisors or Superintendent.

POPULATIONS AT RISK

Listed below are customers who house/serve clients that have compromised immune systems and/or are at higher risk in the case of contaminated water.

Appledorn Living Center 727 Apple Avenue	Main Switchboard		616.392.4650
Black River Public School 491 Columbia Avenue	Main Swithcboard Cruf@blackriver.spfs.mi.us		616.355.0055
Fountain View 340 West 40th Street	Main Switchboard fvhol@leisure-living.com		616.39400302
Freedom Village 145 Columbia Avenue	Main Switchboard		616.820.7400
Good Shepard Home 280 W. 40th Street	Main Switchboard gsh@resthaven.org	(Resthaven Patrons, Inc.)	616.392.7161
Haven Park Christian Nursing Home, Zeeland, MI	Main Switchboard		616.772.4641
Heartland of Holland 493 West 32nd Street	Main Switchboard		616.396.1438
Heritage Nursing & Rehab Community, Zeeland, MI	Main Switchboard		616.772.9191
Holland Hospital 602 Michigan Avenue	Emergency Administrator On-Call	Pager	616.713.0867
Holland Christian School 956 Ottawa Avenue	Administrative Offices info@hollandchristian.org		616.820.2805
Holland Public School 372 S. River Avenue	Main Switchboard jsullivan@hollandpublicschools.org	Business	616.494.2000
Renal Advantage Inc. **2 Locations** 2 Royal Park Drive, Zeeland 655 Hastings Ave, Holland	Judy Dykstra judydykstra@renaladvantage.com	Dialysis Lab sensitive to chlorine levels	616.748.0522 616.748.0881 fax
Resthaven Care Center 280 W. 40th Street	Main Switchboard		616.393.7161
Resthaven Retirement 49 E. 32nd Street	Main Switchboard		616.392.4805
Royal Atrium Inn Zeeland, MI	Main Switchboard		616.772.1248
Vanderbilt Charter Academy 301 W 16th Street	Main Switchboard		616.820.5050
Warm Friend 5 E. 8th Street	Main Switchboard warmfriend@resthaven.org		616.392.3131
Zeeland Community Hospital	Main Switchboard		616.772.4644

Revised 04.14.2010

PRIORITY PHONE LIST

Water Treatment Plant

Water Treatment Plant	Main Line		616.355.1589
	Emergency		616.399.9400
	Plant Fax		616.355.1559
Maintenance Supervisor	Mike Grenier	Home	616.392.9006
Maintenance I	Dave Broene	Home	616.355.0489
Lead Maintenance	Ross DeVries	Home	616.772.1835
Industrial Electrician	Rick DenBleyker	Home Cell Office	269.751.4074 616.566.2968 616.355.1260
Operator	§ Dan Jenkins	Home	269.568.1751
Operator	§ Mike Helder	Home	616.772.5538
Operator	§ Ed Balko	Home	616.786.2252
Operator	§ Dave Yskes	Home	616.786.4594
Operator	§ Joe Ortquist	Home	231.750.3015
Utility	Tommy Bouatic	Home	616.786.3582

§ Certified to operate the water treatment plant

BPW

General Manager	Loren Howard	Home Cell Office	616.335.2690 616.405.7209 616.355.1572
Operations Director	Dave Koster	Home Nextel Office	616.399.1516 616.218.7887 616.355.1201
Water Treatment Plant Superintendent	Jim Van De Wege	Home Cell Office	616.396.4233 616.566.6055 616.355.1698
Water Treatment Plant Operations Supervisor	Steve Teunis	Home Office Pager	616.846.7016 616.355.1697 616.713.0285
Utility Services Director	John Van Uffelen	Home Cell Office	616.396.8498 616.218.2772 616.355.1642
Water/Wastewater Maintenance Supervisor	Mike Grenier	Home Cell Office	616.392.9006 616.566.2968 616.355.1263
Water/Wastewater Services Superintendent	Dan Sorek	Cell Office	616.218.2940 616.355.1644
Communications Specialist	Andree Keneau	Home Cell Office	616.786.0033 616.834.1451 616.355.1576
Environmental & Regulatory Specialist	Judy Visscher	Home Cell Office	616.396.6261 616.405.0213 616.355.1210
Safety Specialist	Paul Hascher	Home Cell Office	616.791.8157 616.218.5167 616.355.1573

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These individuals/organizations shall also be notified, depending on the emergency

Holland City Interim Fire Chief (City Emergency Coordinator)	Chris Tinney	Office Cell After hours	616.355.1023 616.836.5408 911
Holland City Manager	Soren Wolff	Home Cell Office	616.335.2332 616.836.6573 616.355.1312
Holland Hospital Emergency Administrator On-Call		Pager	616.713.0867
Ottawa County Health Dept. Medical Director	Paul Heidel	Home Cell Office	616.847.2568 616.638.7524 616.494.5548
Ottawa County Public Health Emergency Preparedness Coordinator	Jennifer Sorek	Home Cell Office	616.298.4024 616.886.8205 616.393.5655
Ottawa County Health Officer	Lisa Stefanovsky	Home Cell Office	616.399.2473 616.638.7649 616.393.5781
Allegan County Health Dept. Emergency Preparedness Coordinator	Don Haneckow	Cell Office	269.998.2246 269.686.4580
Ottawa County Sheriffs Department			911
Allegan County Sheriffs Department			911
Holland City Police Department			911
MDNRE District Engineer	Luke Dehtiar	Office	616.356.0027
City of Wyoming Water Treatment Plant	Jerry Caron		616.399.6511 ext 102
City of Zeeland Water Supervisor	Chuck Van Der Kolk	Home Cell PowerPlant (24hr) Office	616.772.3250 616.550.3050 616.772.2001 616.772.6212
National Response Center (to notify pre-determined federal response agencies)	National Response Center	24 hr emergency	800.424.8802
Ottawa County Emergency Response Director	Bill Smith	Office Cell Home	616.738.4050 616.638.7760 616.335.5083
Allegan County Emergency Response Dir.	Central Dispatch	Office	269.673.3899

Water & Wastewater Services

Water/Wastewater Engineering Specialist	Joe Eastman	Cell Office	616.836.0803 616.355.1518
Scheduler	Marsha Wentzel	Home Cell Office	616.896.7530 616.836.5490 616.355.1643
Water/Wastewater Engineering Supervisor	Adam Pietrzyk	Cell Office	616.928.7255 616.355.1564
Service & Maintenance Supervisor	David Cyrus	Home Office Cell	616.392.7442 616.355.1646 616.218.3439
Engineering Field Technician	Scott DeFeyter	Home Office Cell	269.990.1179 616.355.1638 616.218.1402
Engineering Field Technician	John Schroeder	Home Office Cell	616.688.5102 616.355.1652 616.218.9965
Engineering Field Technician	Doug Lake	Office Cell	616.355.1504 616.836.3712
Lead Service & Maintenance	Matt Johnson	Home	616.283.8280
Lead Service & Maintenance	Marty Trevino	Home Cell Office	616.335.3451 616.886.7504 616.218.1781
Lead Service & Maintenance	Brian Sybesma	Home Cell	616.335.9679 616.836.5491
Service & Maintenance II	Bill Wynes	Home	616.394.9064
Service & Maintenance II	Ron Harrison	Home	616.355.0011
Service & Maintenance II	Scott Klingenberg	Home Cell	269.751.8330 616.218.3696
Service & Maintenance II	Rocky Clay	Home Cell	616.931.5242 616.218.2979
Service & Maintenance I	JR Flores	Home Cell	616.499.9245 616.748.6240
Service & Maintenance I	Greg Salinas	Cell	616.990.3393

Additional Contacts

Service Center	Main Extension		616.355.1500
	FAX		616.355.1550
Wastewater Treatment Plant Superintendent	Dave VerHoef	Home Office Cell	616.796.0336 616.355.1253 616.566.0198
Network Engineer	George Miller	Cell Office Home	616.293.2160 616.355.1631 616.662.0338
Network Specialist	Pete Cavanaugh	Cell Office	616.836.5331 616.355.1624
Line Crew Supervisor	Greg Fishnick	Home Cell Office	616.738.8748 616.866.9518 616.355.1621

Additional Emergency Phone Numbers

Spill Response & Clean Up	Young's Environmental	24 hr pager	800-496-8647
U.S. Coast Guard, Officer in Charge	Mark Rose	Office Pager	399-9330 616-283-5526
Chemical Spills	National Response Center	24 hr emergency	800-424-8802
Pollution Emergency	Michigan DNRE	24 hr emergency	800-292-4706
Spyglass contact	Bill Dryfout	Cell Home	616-403-7790 399-2434

Revised 04.14.2010

MUNICIPAL OFFICIALS

Fillmore Township Supervisor	Keith Potter	Office	269.751.7655
Holland City Mayor	Kurt Dykstra	Office Home	616.355.1314 616.355.6563
Holland City Engineer	Brian White	Office Cell	616.298.2448 616.218.5786
Holland City Environmental Health	Cindy Osman	Office Cell	616.355.1337 616.836.6567
Holland Township Supervisor	Don Komejan	Office	616.396.2345
Laketown Township Supervisor	Al Meshkin	Office Cell	616.335.3050 616.836.5017
Park Township Supervisor	Jerry Felix	Office	616.399.4520
Zeeland City Mayor	Les Hoogland	Office Home	616.772.6400 616.772.4156

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

District Supervisor	Dave Timm	Office	616.356.0277
Emergency (24 hr.)	Lansing		800.292.4706

LAW ENFORCEMENT AND FIRE DEPARTMENTS

For emergencies call 911, for non-emergencies see below

Allegan County Sheriff's Department	Sheriff Blaine Koops	Office	269.673.0510
Holland Police Department	Interim Police Chief Matt Messer	Office	616.355.1100
Ottawa County Sheriff's Department	Sheriff Gary Roezma	Office	616.738.4000
Ottawa County Sheriff's Reserve Deputy	Lt. Bill DeWitt	Office	616.738.4043
DuHadway & Kendall Security	Keith Hewitt, Acct Mgr		800.535.0646 616.656.0123
Holland City Fire		Office	616.355.1020
Holland Township Fire	Fire Chief Jim Kohsel	Office	616.395.0196
Park Township Fire	Fire Chief Scott Gamby	Office Cell	616.399.7388 616.218.2407
Graafschap Fire	Fire Chief Cal Haverdink	Office	616.396.4060

OTHER UTILITIES

Zeeland BPW	After Hours		616.772.2001
	Lloyd Van Slooten (unlisted)	Home Cell	616.688.5503 616.886.8061
	Greg Sheldon	Home Cell	616.688.5598 616.886.8062
Zeeland Water Dept	Chuck Van Der Kolk	Office	616.772.6212
Park Township Maintenance	Tim Steggerda	Home Cell	616.399.1845 616.566.4952
Grand Rapid Water Treatment		Office	616.842.7427
Consumers Power Co		Office (unlisted)	800.805.8185
	Todd Duncan	Office Cell	616.530.4388 616.240.5863

Revised 04.14.2010

NEWS MEDIA

Local Print			
Grand Rapids Press – Lakeshore edition 209 E. 8th St., Holland 49423 (Daily and weekends)	Rick Martinez, Suburban editor Nancy Crawley, Business editor		616.222.5532 616.222.5452
Holland Sentinel 54 W. 8th Street, Holland 49423 (Daily and weekends)	Jim Hayden, News Editor Andrea Goodell, Newsroom Pamela Fisher, Editor	Main News Editor	616.392.2311 616.645.4274 616.939.6710 616.546.4275 616.546.4265
Zeeland Record 16 S. Elm St., Zeeland 49464 (Weekly, published on Thursday)	Kurt VanKoevening, Editor	Office Fax	616.772.2131 616.772.9771
Local Radio			
EZ 105.7 WOOD FM 77 Monroe Center, Suite 1000 Grand Rapids 49503 1300 AM WOOD Radio		News Fax	616.459.1919 616.732.3330 616.459.1919
WTHS 89.9 FM Hope College			616.395.7878
WGHN Radio, 92.1 1 South Harbor, Grand Haven 49417	Walt Zerlaut News Editor	Office Fax	616.842.8110 616.842.4350
WHTC-AM 1450 87 Central Ave. Holland, MI 49423	Kevin Oswald, Station Manager; Red Kingman, News Director	Office Fax	616.392.3121 616.392.8066
WJQ-FM	Les Lanser, Brad Lanser, General Manager Jack Moeleker, News Director	Office Fax	616.394.1260 616.394.9008
WGNB 89.3 FM	Moody Bible Inst., Zeeland		616.772.7300
WGVU FM 88.5 Grand Valley State University Allendale, MI	http://www.wgvu.org		616.771.6666
WVYN 92.7	Gary Stevens, News Director		616.392.3121
WJQ-FM 1260AM &99.3AM	Les Lanser		616.394.1260
WVYN-92.7 FM			616.396.0927
Television Stations			
Macatawa Area Community Television 160 E. 19th St., Holland 49423	Aron Dieter, Programming Manager Barb Pyle, Executive Director	Office Fax	616.392.7832 616.392.1060
WOOD TV (NBC) Channel 8 120 College Ave., SE, GR 49503 www.woodtv.com	Ken Koeker	News room News Tips Phone Fax Unlisted	616.771.9663 616.771.9663 616.456.8888 616.456.5755 616.459.2522
WWMT-TV (CBS) Channel 3 590 W. Maple, Kalamazoo 49008 News Tips	Early morning news at 6 & 7am Cathy Younker, News Director Missy Broderick, Assign. Editor Liz Klynstra, Night Assign Desk	Office Fax Hotline	800.875.3333 269.388.8228 269.388.9968
WXMI - FOX 17 TV 3117 Plaza Dr., NE, GR 49525	Tim Dyke, news director	Office Fax	616.364.8722 616.364.6018
WZZM – Channel 13 645 Three Mile Grand Rapids, MI 49544	News Director newsdirector@wzzm13.com Tyler Lecceadone, Assign Desk	Office Fax News Tips	616.785.1313 616.785.1301 616.559.1300

CONTRACTORS

Excavators			
Bruce's Underground	Bruce Vander Kolk	Holland Cell	616.875.2036 616.437.7653
My-Con,Inc.	Hudsonville Kevin Hager	Office Home Cell	616.896.9049 616.735.0742 269.506.7789
Connan	Zeeland Wade Slagh	Office Mobile	616.772.5454 616.836.1772
K & R	Office Randy Workman	Grand Rapids Home	616.949.0800 616.698.8027
City of Holland	Nick King Street Superintendent	Holland Cell	616.928.2437 616.836.6568
Welders			
IXL			616.392.9803
Quality Concrete	Len Ten Harmsel	Office Home	616.772.1030 616.396.5330
Genzink Steel	Don Genzink	Office Home	616.392.1437 616.396.4247
Electricians			
Parkway Electric		Office	616.392.2788
Windemuller Electric		Office (24 hr)	800.333.3641
SCADA Repair			
Impact Point	Bill Achterhof	Office Cell	616.772.0900 616.836.2287
Windemuller Electric		Office (24 hr)	800.333.3641
Reimink Plumbing	Randy Glass	Office Cell	616.392.9647 616.836.3827
Unema Plbg.	Office Nick Unema	Office Home Cell	616.392.3664 616.396.9620 616.292.4724
Mechanical			
Franklin Holwerda	Bob Holt	Office	616.538.3231
Applied Mechanical	Rich Wackerle	Office	616.669.4800
Motor Repair			
Rapa Electric	Jim Hagenow	Office Cell	616.673.3157 616.299.2988
Holland Electric Motors			616.392.1115
Richland Machine & Pump		Office	616.629.4344
Intake Repair			
Sea Brex Marine	Allen Sebrechts	Office	269.429.6100
King Co			616.399.1784
Luedtke Engineering Co, Inc. (Installed Original Intake)	Curt Luedtke	Frankfort, MI	231.352.9631
Motors			
Universal Electric Prod. Co. Inc.		Office	517.546.9961
L. H. Flaherty Co. Inc,			616.245.9266
General Electric Water & Process Technology		Customer Care	866.439.2837
Computers			
Computers & More			616.396.5222
Eagle Computer Technology			616.392.7422

Suppliers

Pump Repair/Parts			
Peerless-Midwest,Inc.	Lynn Anderson	Office Home	616.527.0050 616.260.1007
Richland Machine & Pump Co.	Tom Ruckstaetter	Office	269.629.4344
Raymer Co.	Marne	Office	800.441.4943
Dubric	Comstock Park Greg Pott	Office GR Office	800.848.0022 616.340.3394
Pumps Repair/Parts (Chemical Metering)			
Matoon & Lee	Frank Comer	Office After Hours	616.455.6421 248.778.5666
Suppliers Auxiliary Power Units			
Coffman Electric Co steadypower.com	Office	Office & On-Call	888.331.5344 616.452.8708
Wolverine Power Systems		Office & On-Call	800.485.8068
Zeeland BPW	For use of generator		616.772.6212
Chemical			
Alexander Chemical		Customer Service	800.348.8827
General Chemical	New Jersey –Keith Buckey	Customer Service	800.585.6844
K.A. Steel Chemicals, Inc.	Illinois	Office & On-Call	800.677.8335
General Alum Chemical Col	Muskegon/Maine	Customer Service	800.266.5155
Rowell	Illinois	Office	630.920.8833
S.F. Polydyne		Office	888.848.7659
Webb Chemical	Office	Office	231.733.2181
Van Walters & Rogers (Univar)	Grand Rapids	Office	616.698.7330
Electrical			
Smith Instrument(J.O. Galloup)		Office	800.968.1195
		Local Number	616.245.1195
Kendall Electric	Bud Gould	Office	616.396.4625
All Phase Electric Supply Co.		Office	616.931.9931
Pumps			
Peerless Pumps			317.925.9661
Demag Delaval (DeLaval Turbine)			609.890.5000
HydroDynamics		Office & On-Call	248.623.4700
Water Main Repair Parts and Fittings			
ETNA Supply Co		Holland	616.396.1717
East Jordon Iron Works		Grand Rapids	616.538.2040
J. O. Galloup		Holland & On-Call	616.392.4030
Vander Lind & Son		Grand Rapids	616.247.0307
Large Portable Heating Units			
Pennington Brothers, Inc.	Ken Smith (Twin Lake)	Office	231.828.4555
SCADA Parts & Repair			
Smith Instrument		Office	800.968.1195
Parkway Electric		Office	616.392.2788
Windemuller Electric		Office	800.333.3641

COMMUNICATIONS & PUBLIC NOTIFICATIONS

COMMUNICATIONS

a. In an emergency response outlined in this procedure, the person assuming the role of Incident Commander will initially oversee all communications with the public, news media, and HBPW personnel concerning the emergency.

b. If the emergency is minor in scope and nature, the need for communications may also be minor and handled solely by the Incident Commander.

c. If the emergency is more significant, then the Incident Commander shall request the Director of Sales and Marketing to fill the role of "Public Information Officer" as outlined in HBPW Incident Command System (found in Section G General BPW Procedures).

PUBLIC NOTIFICATIONS

If the water supply is contaminated, the EPA has specific regulations regarding the notification of the public about the contamination. Outlined below are those requirements that shall be fulfilled by the Incident Commander.

a. Tier 1 – Acute Contaminants
   i. Immediate Notice, Within 24 Hours. The clock for notification starts when the HBPW learns of the violation. Notices must be provided to persons served (not just billing customers).
   ii. Violations requiring public notice:
      (1) Fecal coliform or E. coli violations; failure to test for fecal coliform after initial total coliform sample tests positive.
      (2) Nitrate/Nitrite, or total nitrate and nitrite MCL violation; failure to take confirmation sample
      (3) Exceedance of nitrate MCL by NCWS
      (4) Chlorine maximum residual distribution level (MRDL) violation in distribution system; failure to take samples in distribution system when required
      (5) Turbidity Over 1 NTU
      (6) Turbidity Treatment Technique – if filtration has broken down could be in violation.
      (7) Waterborne Disease Outbreak or other waterborne emergency – Primacy agency will make the determination.
      (8) Other violations or situations determined by Primacy Agency.

b. Tier 2 – Chronic Contaminants
   i. Notice As Soon As Possible, Within 30 Days
   ii. Repeat notice every three months until violation is resolved. Notice via mail or direct delivery. Must use additional delivery methods reasonably calculated to reach other consumers not notified by the first method.
   iii. All other MCL, MRDL and treatment technique violations, except where Tier 1 notice is required.
   iv. Monitoring and testing procedure violations when primacy agency says so – if consecutive violations.

c. Tier 3 – Ministerial Omissions
   i. Within One Year
   ii. Notice within 12 months; repeated annually for unresolved violations. Notice via mail or direct delivery. Must use additional delivery methods reasonably calculated to reach other consumers not notified by the first method.
   iii. Other monitoring or testing procedure violations, unless primacy agency elevates to Tier 2
   iv. Failure to use correct testing procedures
   v. Unregulated contaminant monitoring results – required to monitor something that is not regulated.
   vi. Exceedance of SMCL for fluoride, availability of unregulated contaminant monitoring results.

d. Multilingual Requirements
   i. All non-speaking English populations that represent 10% of the population served, must receive the notification/information in the appropriate language(s) on the importance of the notice or on how to get assistance or a translated copy of the information being given.
   ii. Full translation is not required, however Tier 1 violations and important phrases of other Tier violations need to be translated.

e. Format of the notices
   i. Must be conspicuously displayed.
   ii. Do not use overly technical language.
   iii. No small print.
   iv. No formatting that defeats purpose.
   v. No language that nullifies purpose.

f. Contents of the Notice
   i. Unless otherwise specified in the regulations, each notice must contain:
   ii. A description of the violation or situation, including contaminant levels, if applicable
   iii. When the violation or situation occurred
   iv. Any potential adverse health effects
   v. The population at risk
   vi. Whether alternative water supplies should be used
   vii. What actions consumers should take
   viii. What the system is doing to correct the violation or situation
   ix. When the water system expects to return to compliance or resolve the situation. (How long will it last.)
   x. The name, business address, and phone number of the Holland Board of Public Works
   xi. A statement encouraging distribution of the notice to others.

g. Who Must Be Notified
   i. Persons served by our system, to include multiple family units; businesses/employees
   ii. Whole service area
   iii. Notice to portion of service area only with written permission from primacy agency.
   iv. Consecutive Systems. Not to individual customers of that system, but to system operators within the same timeline as our own customers.

h. Templates/Sample Language
   i. For Monitoring:
   "We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards. During (period) we (did not monitor or test/did not complete all monitoring or testing) for (contaminant/s/) and therefore cannot be sure of the quality of the drinking water during that time."

   ii. Pertaining to distribution of information:
   "Please share this information with all the people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail."

   iii. Response to inquiries re: recent security measures:
   "Our Water Treatment Plant conducts over 50,000 tests encompassing more than 200 contaminants on an annual basis. Throughout the years, the HBPW has consistently maintained a system, which has never violated a maximum contaminant level or any other water quality standard.

   "We have maintained for some time, contingency plans to address a number of crisis situations. Since September 11th, the HBPW has conducted an assessment of those plans, and updated them to more closely address acts of terrorism. Further, the HBPW has tightened its security of all of our facilities, and has been in communication with the appropriate agencies regarding testing our water supply for specific agents and the frequency of those tests.

   "We have stepped up our testing procedures. We have instituted a process for random sampling of such biological agents. We have indicators that would tell us of a possibility of a problem. We are working collaboratively with other area water utilities; and we will continue to evaluate additional testing.

   "The HBPW is committed to safeguarding our water supply and has taken a number of steps to protect our resources and our customers."

   iv. If asked about individual home monitoring techniques for biological contaminants:
   "Most tests are too highly developed to be performed by a lay-person. The most suitable test available for a lay person would be chlorine residual testing. The HBPW currently performs those tests as well."

   v. Standard Health Effects Language

vi. Foreign Language Translation

vii. Automatic Telephone Messaging

viii. Instructions for handling telephone calls

ix. BPW personnel assigned to responding to telephone calls

Security Threat - Phone Check List*

If you receive a threatening phone call, try to keep the caller on the line to obtain as much information as possible. Record as much of this information as possible, including:

1. What kind of threat is posed?

Contamination _____ Physical Damage _____ Violence ____ Bomb_____

2. What is the exact wording of the threat?

_____

_____

_____

_____

3. Where? _____

4. When? _____

5. Why? _____

6. By whom? _____

7. What is your (caller's) name? _____

8. What is your (caller's) affiliation, if any? _____

9. What is your (caller's) address/phone #? _____

10. Is the caller __male __female __well spoken __illiterate __foul __irrational __incoherent

11. Is the caller's voice __calm __ angry __slow __rapid __soft __loud __laughing __crying

__Normal __slurred __nasal __clear __lisping __stuttering __deep __high

__Cracking __excited __young __old

__Familiar - who did it sound like_____

__Accented - what nationality, region _____

12. Is the connection clear? (Could it have been a wireless or cell phone?)

13. Are there background noises? __street noises - what kind?_____

__Machinery - what type?_____

__Voices - describe_____

__Children - describe_____

__Animals- what kind_____

__Computer keyboard/office

__Motors - describe_____

__Music - what kind _____

__Other_____

Name of person receiving call_____ Date _____Time_____

Notified supervisor _____phone:_____

Other _____ phone: _____

_____

SECURITY THREAT RESPONSE

A. Notification and Warning
   i. Notification of a security threat against this site may be received by telephone, mail, or message at any time.
   ii. Telephone threats may be received at the WTP, Service Center, or over public telephones located on the property.
   iii. When a security threat is received, the Superintendent or Plant Operator will contact the Ottawa County Sheriffs Department.
   iv. Each lead employee will be contacted and instructed to inform their employees.
   v. Other essential BPW staff should be informed, including:
      (1) General Manager
      (2) Marketing & Communications Specialist
      (3) Safety Specialist

B. General Response
   i. Personnel receiving a telephone security threat will use the Security Threat Call Checklist found in this section. Personnel should strive to obtain as many details as possible about the caller and the threat. An accurate analysis of the telephone threat can provide police with many valuable clues. The caller could reveal personal characteristics and may unwittingly provide a clue to his location by background noises. They may intentionally or unintentionally provide accurate information on the type of threat. If possible, another staff member should be listening in on the phone call.
   ii. If a letter threat is received, it should be preserved for the police investigator. To preserve fingerprints, it should not be handled once the letter is opened.
   iii. The Superintendent, in cooperation with police and fire officials at the scene, shall determine the necessity of searching and/or evacuating the site.
   iv. The Superintendent or Supervisor will brief employees on the situation as soon as possible and inform them of the actions to be taken.

   v. If the decision is made to evacuate the building, all personnel should report to the assembly area identified in the facility layout. Supervisors will ensure all personnel have taken the appropriate actions and will conduct a roll call of their personnel (the location of field personnel must be confirmed). The results of the roll call shall be reported to the Superintendent.
   vi. Access to the facilities and grounds are restricted to essential personnel. The Superintendent will authorized reentry into the site after being cleared to do so by police and fire officials at the scene.
   vii. In conjunction with the Police and BPW Communications Specialist, prepare a statement to be released to the news media.

If the decision is made to search without evacuation, all available personnel will make a prompt and thorough visual inspection of their work areas. Any suspicious objects or packages found should be reported immediately to the Superintendent. The object or package should not be touched or moved!

Tier 1 Templates

Tier 1 notices must be issued for the following violations or situations:

- Total coliform MCL violations where fecal coliform or *E. coli* are present, or failure to test for fecal coliform or *E. coli* when any repeat sample tests positive for coliform (some times referred to as an acute violation of the Total Coliform Rule);
- Nitrate, nitrite, or total nitrate and nitrite MCL violations, or failure to take a confirmation sample for nitrate or nitrite within 24 hours after learning that an initial sample exceeded the MCL;
- Exceedance of the nitrate MCL by non-community water systems that have been granted permission by the primacy agency to continue to exceed the MCL of 10 mg/l, although they must not exceed 20 mg/l;
- Chlorine dioxide MRDL violations when one or more of the samples taken in the distribution system exceeded the MRDL on the day after a chlorine dioxide measurement taken at the entrance to the distribution system exceeded the MRDL, or when required samples are not taken in the distribution system;
- Turbidity MCL violations of 5 NTU or more, if elevated to Tier 1 by the primacy agency, or if consultation does not occur within 24 hours of the violation (see Chapter 6);
- Treatment technique violations resulting from a single exceedance of turbidity limits, if elevated to Tier 1 by the primacy agency, or if consultation does not occur within 24 hours of the violation (see Chapter 6);
- The occurrence of a waterborne disease outbreak or other waterborne emergency such as a treatment failure, chemical spill or overfeed, sewage spill, or natural disaster; and
- Other violations or situations which could cause serious health effects, as determined by your primacy agency.

The pages that follow contain templates for these Tier 1 violations or situations, as listed below. Along with each template are instructions, including the required method of delivery and suggestions for completing individual sections of the notice. These instructions are designed to supplement Chapter 5, so you may see much of the information repeated here.

Mandatory language on health effects, which must be included as written with blanks filled in, is presented in italics (141.205(d)).

You must also include the following italicized language in all notices, where applicable (141.205(d)). Use of this language does not relieve you of your obligation to take steps reasonably calculated to notify all persons served:

> *Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.*

Instructions for Fecal Coliform or *E. Coli* NoticeBTemplate 1-2

Template on Reverse

Since exceeding the fecal coliform or *E. coli* maximum contaminant level is a Tier 1 violation, you must provide public notice to persons served as soon as practical but within 24 hours after you learn of the violation (141.202(b)). During this time, you must also contact your primacy agency. You should also coordinate with your local health department. You may also have to modify the template if you also have high nitrate levels or other coliform MCL violations. You must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

X Radio
X Television
X Hand or direct delivery
X Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served.

The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio or TV notice. If you do, you must still include all required elements and leave the health effects language in italics unchanged. This language is mandatory (141.205(d)). See Chapter 8 for a notice designed for posting. If you post or hand deliver, print your notice on letterhead, if you have it.

Population Served

Make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with fecal coliform or *E. coli* violations. Use one or more of the following actions, if appropriate, or develop your own:

X We are chlorinating and flushing the water system.
X We are switching to an alternate drinking water source.
X We are increasing sampling for coliform bacteria to determine the source of the contamination.
X We are repairing the wellhead seal.
X We are repairing the storage tank.
X We are restricting water intake from the river/lake/reservoir to prevent additional bacteria from entering the water system and restricting water use to emergencies.

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met all the public notice requirements to your primacy agency within ten days from the time you issue the notice (141.31(d)).

It is recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of contamination so they can use bottled water.

It is a good idea to issue a problem corrected notice when the violation is resolved. See Template 1-6.

DRINKING WATER WARNING

[System] water is contaminated with [fecal coliform] or [*E. coli*]

BOIL YOUR WATER BEFORE USING

Fecal coliform [or *E. coli*] bacteria were found in the water supply on [date]. These bacteria can make you sick, and are a particular concern for people with weakened immune systems.

What should I do?

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.

The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care providers.

What happened? What is being done?
Bacterial contamination can occur when increased run-off enters the drinking water source (for example, following heavy rains). It can also happen due to a break in the distribution system (pipes) or a failure in the water treatment process.

[Describe corrective action.] We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem within [estimated time frame].

For more information, please contact [name of contact] at [phone number] or [mailing address]. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people

in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system].
State Water System ID#: _____. Date distributed:

Instructions for Spanish Fecal Coliform or *E. Coli* NoticeBTemplate 1-2A

Template on Reverse

The template on reverse is a Spanish translation of Template 1-2 for fecal coliform or *E. coli*. All the instructions of Template 1-2 apply. If you modify the English template, you should modify this template accordingly. Schools or universities may be able to provide low cost translations. See page 12 for suggestions on multilingual notices.

AVISO SOBRE SU AGUA POTABLE

El Agua del Sistema [system name] esta contaminado con [bacterias coliformes fecales] [*E. coli*]

HIERVAN EL AGUA ANTES DE USARLA

Bacterias coliformes fecales (o *E. coli*) fueron encontradas en su servicio de agua el dia [date of violation in Spanish (day-month-year)]. Estas bacterias pueden enfermarle, y son especialmente peligrosas para personas con las defensas bajas o sistemas imunológicos débiles.

)Que debo hacer?

X **NO BEBA EL AGUA SIN ANTES HERVIRLA**. Hierva toda el agua, déjela hervir por un minuto, y déjela reposar antes de usarla, o utilize agua embotellada. Agua hervida o embotellada debe ser usada para beber, hacer hielo, lavarse los dientes, lavar los platos y para preparar la comida hasta próximo aviso. Hierviendo morta a bacteria y otros organismos en el agua.

X *Coliformes fecales o E. coli son bacterias cuya presencia indica que el agua esta contaminada con desechos humanos o de animales. Microbios de esos desechos pueden causar diarrhea, cólicos, nausea, dolores de cabeza u otros síntomas. Pueden representar un peligro para la salud de bebés, niños y niñas de corta edad y personas con sistemas immunológicos en alto riesgo.*

X Los síntomas descritos arriba no ocurren solamente debido a los microbios. También pueden ser causados por otros motivos. Si usted siente estos síntomas y estos persisten, usted puede optar por hacer una consulta con su médico. Personas en situaciones de alto riesgo deben consultar con sus proveedores de servicios médicos.

)Qué pasó?)Qué se está haciéndo al respecto?

Contaminación bacteriana puede ocurrir cuando exceso de aguas rebasan sus cauces y entran a las fuentes de agua potable (por ejemplo, luego de una lluvia fuerte). También pueden ocurrir cuando se rompe un sistema de recolección de aguas negras, o cuando hay una falla en el tratamiento de agua.

[Describe corrective action in Spanish] Le informaremos cuando las pruebas demuestren que no hay bacterias y que usted ya no necesita hervir su agua. Anticipamos que resolveremos el problema el [date of expected resolution in Spanish day-month-year].

Para mayor información, por favor póngase en contacto con [contact name] al [phone number] o escribiendo a [mailing address].

Por favor comparta esta información con otros que pueden tomar de esta agua, colocando este aviso en lugares visibles, o remitiéndolo por correo, o entregandolo manualmente. Es de particular interés distribuir este aviso ampliamente si usted lo recibe representando un negocio, un hospital u hogar de infantes u hogar de ancianos o comunidad residencial.

Este aviso ha sido enviado a usted por [system]. Numero de Identificación : _____. Fecha de distribución:

Instructions for Waterborne Disease Outbreak NoticeBTemplate 1-3

Template on Reverse

Since a waterborne disease outbreak is a Tier 1 situation, you must provide public notice to persons served as soon as practical but within 24 hours after you learn of the situation (141.202(b)). You must also contact your primacy agency during this time. You should coordinate with your local health department as well. **You must issue a public notice if you are experiencing a waterborne emergency other than a waterborne disease outbreak, such as one caused by flooding or treatment failure. In such cases, you may be able to modify this template to apply to your situation.** Check with your primacy agency for more direction. More information on waterborne disease outbreaks and emergencies is available from the Centers for Disease Control and Prevention (www.cdc.gov/health/diseases.htm, 1 (800) 311-3435). For a waterborne disease outbreak or other emergency, you must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

X Radio
X Television
X Hand or direct delivery
X Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served. If you post or hand deliver, print your notice on letterhead, if available. The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio, TV notice, or posting.

Describing the Outbreak

If known, list any organisms detected, the number of affected people, any water treatment problems contributing to the waterborne disease outbreak, and any sources of contamination, such as flooding.

Potential Health Effects

No mandatory health effects language exists for waterborne disease outbreaks. You may wish to use the sentence below, if appropriate, or contact your primacy agency or health department. These symptoms are common to many diseases caused by microscopic organisms:

X Symptoms may include nausea, cramps, diarrhea, jaundice, and associated headaches and fatigue.

Population at Risk

Some people who contract waterborne diseases can be affected more severely than others, as described on the reverse page. The specific language on the reverse is not mandatory, but you must provide information on the population at risk. In addition, make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe the corrective actions you are taking. Listed below are some steps commonly taken by water systems with waterborne disease outbreaks. Use one or more of the following actions, if appropriate, or develop your own:

X We are repairing our filtration system.
X We are increasing sampling for disease-causing organisms.

Make sure to send a copy of each type of notice and a statement certifying that you=ve met all public notification requirements to your primacy agency within ten days after issuing the notice (141.31(d)). It is a good idea to issue a Aproblem corrected@ notice when the waterborne disease outbreak is under control. See Template 1-6.

It is recommended that you notify health professionals in the area of the outbreak. People may call their doctors with questions about how the situation may affect their health, and the doctors should have the information they need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of contamination so they can use bottled water.

DRINKING WATER WARNING

BOIL YOUR WATER BEFORE USING

Disease-causing organisms have entered [system=s] water supply.

These organisms are causing illness in people served by [system]. We learned of a waterborne disease outbreak from [agency] on [date].

What should I do?

$ **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice. Boiling kills bacteria and other organisms in the water.

$ [Describe symptoms of the waterborne disease.] If you experience one or more of these symptoms and they persist, contact your doctor. People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers.

What happened? What is being done?

[Describe the outbreak, corrective action, and when the outbreak might end.]

We will inform you when you no longer need to boil your water.

For more information, please contact [name of contact] at [phone number] or [mailing address]. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]. State Water System ID#: _____. Date distributed:

Instructions for Notice for Turbidity Single Exceedance as Tier 1BTemplate 1-4

Template on Reverse

If your primacy agency has designated this turbidity single exceedance as a Tier 1 violation (141.202(a)), you must provide public notice to persons served within 24 hours after it has been designated Tier 1 (141.202(b)). Turbidity violations are Tier 2 by default, but may frequently be elevated to Tier 1 by your primacy agency. In addition, violations are automatically elevated if you are unable to consult with your primacy agency within 24 hours. **In such cases, you must issue a notice within the next 24 hours.** You may elevate the violation to Tier 1 yourself as well. You should also coordinate with your local health department. One or both agencies should tell you whether to instruct consumers to boil water. You must use one or more of the following methods to deliver the notice to consumers (141.202(c)):

X Radio
X Television
X Hand or direct delivery
X Posting in conspicuous locations

You may need to use additional methods (e.g., newspaper, delivery of multiple copies to hospitals, clinics, or apartment buildings), since notice must be provided in a manner reasonably calculated to reach all persons served. If you post or hand deliver, print your notice on letterhead, if you have it.

The notice on the reverse is appropriate for hand delivery or a newspaper notice. However, you may wish to modify it before using it for a radio or TV notice or posting. If you modify the notice, you must leave the health effects language in italics unchanged. This language is mandatory (141.205(d)).

Population Served

Make sure it is clear who is served by your water system--you may need to list the areas you serve.

Corrective Action

In your notice, describe corrective actions you are taking. Listed below are some steps commonly taken by water systems with turbidity single exceedance. Use one or more of the following actions, if appropriate, or develop your own:

X We are adding chemicals that reduce turbidity.
X We are sampling both untreated and treated water for the presence of coliform bacteria.
X We are monitoring chlorine levels and will adjust them as needed to compensate for filtration problems.
X We are inspecting and cleaning the filters.

Source of the Problem

If you know why the turbidity is high, explain it in your notice. For instance, unusual conditions, such as heavy rains and flooding, can overburden the water plant, and treated water may therefore not meet the standards. In addition, run-off from parts of the watershed could contain increased concentrations of sediment and animal waste.

After Issuing the Notice

Send a copy of each type of notice and a certification that you have met public notice requirements to your primacy agency within ten days after you issue the notice (141.31(d)). It is a good idea to issue a Aproblem corrected@ notice when the violation is resolved. See Template 1-6.

It recommended that you notify health professionals in the area of the violation. People may call their doctors with questions about how the violation may affect their health, and the doctors should have the information they

need to respond appropriately. In addition, health professionals, including dentists, use tap water during their procedures and need to know of potential microbiological contamination so they can use bottled water.

DRINKING WATER WARNING

[system] has high turbidity levels

BOIL YOUR WATER BEFORE USING

We routinely monitor your water for turbidity (cloudiness). This tells us whether we are effectively filtering the water supply. A water sample taken [date] showed turbidity levels of [number] turbidity units. This is above the standard of [standard] turbidity units. Because of these high levels of turbidity, there is an increased chance that the water may contain disease-causing organisms.

What should I do?

$ **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, and food preparation until further notice.

$ *Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease causing organisms. These organisms include bacteria, viruses, and parasites, which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.* People with severely compromised immune systems, infants, and some elderly may be at increased risk. These people should seek advice about drinking water from their health care providers.

$ The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.

What happened? What is being done?

[Describe reason for the high turbidity, corrective action, and when the system expects to return to compliance.]

We will inform you when turbidity returns to appropriate levels and when you no longer need to boil your water.

For more information, please contact [name of contact] at [phone number] or [mailing address]. General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1(800) 426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]. State Water System ID#: _____. Date distributed:

DRINKING WATER PROBLEM CORRECTED

Customers of [system] were notified on [date] of a problem with our drinking water and were advised to [describe recommended action]. We are pleased to report that the problem has been corrected and that it is no longer necessary to [describe recommended action]. We apologize for any inconvenience and thank you for your patience.

[Add further details here when appropriate.]

As always, you may contact [contact name] at [phone number] or [mailing address] with any comments or questions.

> *Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.*

This notice is being sent to you by [system]. State Water System ID#: _____. Date distributed:

WATER STORAGE TIPS TO ASSIST IN EMERGENCY PREPAREDNESS*

While many individuals rush to purchase bottled or distilled water during times of crises, another viable option for securing a supply of safe water is the storage of tap water for future use. Following are easy-to-implement guidelines to ensure that tap water remains potable while in storage:

Store at least one gallon of water per person, per day in a cool, dark place.

The average individual must drink at least two quarts of water every day. Children, nursing mothers, the elderly and people in warmer climates need more. Additional water should be reserved for personal hygiene and food preparation. The U.S. Department of Homeland Security encourages individuals to store enough water to last a minimum of three days - bearing in mind that water is needed for drinking as well as for personal hygiene. Water should be collected on days when it appears free of sediment or color. On certain days, particularly after a hard rain or heavy snowmelt, some tap water may have a brownish color and contain sediment.

Choose appropriate containers for water storage; disinfect before use.

Clear food-grade plastic containers, such as soft drink bottles, are ideal. Other options include fiberglass or enamel-lined metal containers. Never use a container that has previously held toxic substances. Containers for water should be rinsed with a diluted chlorine bleach solution (one part bleach to ten parts water) before use.

If necessary, treat water with a chlorine bleach solution prior to storage to prevent buildup of harmful bacteria or pathogens. Replace water every six months.

If your water is treated commercially by a water utility, it is not necessary to treat water before storing it. If you have a well or public water that has not been treated, disinfect the water prior to storage using liquid household bleach containing 5.25 percent sodium hypochlorite. Do not use scented or color-safe bleaches or bleaches containing soaps. The American Red Cross and the U.S. Federal Emergency Management Agency recommend the following procedure for treating water for storage:

· Add six drops (1/8 teaspoon) of unscented bleach per gallon of water.
· Stir and let stand for 30 minutes.
· If the water does not taste and smell of chlorine after 30 minutes, add another dose of 1/8 teaspoon and let stand another 15 minutes.
· Seal the containers and label with contents and date of preparation.

Identify additional sources of water.

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* Revised: 04/04

In addition to stored water, other sources include melted ice cubes, water drained from the water heater faucet (if the water heater has not been damaged), water dipped from the flush

Water Plant Supply Contamination Procedures

Lake Supply (1)

1. Shut down Low Service Pumps/Chemical feed/Filters.
2. Collect samples.
3. Wait until pollutant has passed.

Wet wells (2)

1. Shut down Low Service Pumps/Chemical feed/Filters.
2. Isolate one basin.
3. Open drain on the isolated basin.
4. Pump water from the wet well to the isolated basin.
5. Drain the basin to the reclaim.

Rapid Mix (2)

1. Shut down Low Service Pumps/Chemical feed/Filters.
2. Open drains on the rapid mix.
3. Drain to the reclaim.
4. Dilute and pump to the lagoons.

Basins (4)

Only One Basin Contaminated:

1. Shut down Low Service Pumps/Chemical feed/Filters.
2. Isolate and drain to reclaim.
3. Dilute and pump to lagoon.
4. Disinfect w/sodium hypochlorite

All Basins Contaminated:

1. Shut down Low Service Pumps/Chemical feed/Filters.
2. Isolate one basin and drain that basin to the reclaim.
3. Disinfect w/sodium hypochlorite
4. Refill the basin and begin limited treatment with one basin.

Secondary Rapid Mix (2)

1. Isolate and drain to the reclaim.
2. Dilute and pump to the lagoon.

Filters (10)

1. Isolate and backwash.
2. Decontaminate.

Clearwells (2)
1. Isolate and drain to the reclaim.
2. Dilute and pump to the lagoon.

Plant Reservoirs (2)
1. Isolate, drain, and flush.
2. Decontaminate.

Structural

Failure of Intake Crib (1)
1. Open riser on 42” intake line (Divers).

Failure of 42” Intake Line (1)
1. Open 42” at any point on pipe (Divers).

Loss of Low Service (1)
1. Open interconnects with Holland Township & Zeeland.

Power Loss
1. During a loss of primary power feed, switch to secondary feed.
2. During a loss of both primary and secondary feed, operate the gas engines.
3. During a loss of primary, secondary, and gas feed, use the truck mounted generator.

Loss of Building (1)
1. Close the transmission valves at the plant or 168th and Perry.
2. Open the interconnects with Holland Township & Douglas.
3. Open interconnects with Holland Township & Zeeland.

WATER SUPPY CONTAMINATION PROCEDURE

This procedure details the response that the Incident Commander (as designated in section B) ensures are taken for threats of contamination, multiple customer complaints, and hospital/health department reports.

a. Notification of Key Personnel
   Theses personnel shall be contacted immediately when contamination of the system has occurred or is threatened.

   i. WTP Superintendent
   ii. WTP Operations Supervisor
   iii. W/WW Services Superintendent
   iv. W/WW Services Supervisor
   v. Operations Director
   vi. Communications Specialist
   vii. Environmental & Safety Specialist
   viii. General Manager
   ix. MDNRE District Engineer
   x. Holland Police Department
   xi. Ottawa and Allegan County Health Department
   xii. Holland Fire Chief (City Emergency Coordinator)
   xiii. Critical customers
   xiv. Wholesale customers

b. Initial Response
   The designated Incident Commander needs to ensure that the following steps are taken by the Water Department. This is the recommended sequence of steps, but may vary depending on the situation.

   i. Evaluate the need for shutting down the Water Treatment Plant and isolating the Pumping Stations. If the Water Treatment Plant is not shut down, increase the chlorine residual of water leaving the plant.
   ii. Isolate area of contamination in the distribution system, if possible. Use GIS to evaluate the contamination “foot print".

c. Threatening call or letter
   i. Contact 911 and request either Holland Police Department or Ottawa County Sheriff's Department, depending on jurisdiction of where the threat was received. Request that the 911 dispatcher not broadcast the request over the police radio frequency.
   ii. Instruct both WTP and Water Crew personnel to test and sample water in the distribution system as instructed in the water sampling kits.
   iii. The grounds and facilities of both the WTP and distribution system shall be checked by personnel for suspicious situations, i.e. unlocked gates, tampered equipment.

iv. Contact both Ottawa and Allegan County Health Departments to review threat and possible related hospital admissions. Request the Health Department to share the information only "as-needed" and not with the news media.

v. ***If the threat is discredited and the sampling results are normal***
   (1) No public notice is to be issued.
   (2) An investigation shall be conducted with appropriate law enforcement agencies.

vi. If the threat cannot be discredited and the sampling results are normal:
   (1) Issue a public notice
   (2) Coordinate with law enforcement
   (3) Be as detailed as possible
   (4) Indicate that threat is being investigated
   (5) Give instructions about using water
   (6) Contact the General Manager and activate the HBPW "Emergency Operations Center".

vii. If the threat is discredited and sampling results are not normal:
   (1) Follow Public Notice requirements for issuing notices if applicable.
   (2) If the chlorine results are low, begin flushing of affected areas.

viii. If the threat cannot be discredited and sampling results are not normal:
   (1) Issue "No Drinking or Contact" public notice
   (2) Contact General Manager and activate the HBPW "Emergency Operation Center".
   (3) Secure WTP and distribution facilities with security personnel.

d. Multiple Customer Complaints

i. The Water/Wastewater Scheduler is the designated position to receive customer complaints from the Customer Service Department. The Scheduler will inform the WTP and the following personnel:
   (1) Water/Wastewater Services Supervisor
   (2) Water/Wastewater Services Superintendent
   (3) Water/Wastewater Director

ii. W/Ww Services crew will be dispatched to the site of complaints.

iii. Personnel from both the WTP and distribution shall obtain samples and test water.

iv. The management group will review test results and other pertinent information and determine next step.
   (1) Milky colored water - check for air and flush.
   (2) Brown (rusty) - flush.
   (3) Colored water (not rusty) - test and flush.
   (4) Low Chlorine residual or abnormal pH is with no apparent cause - sample and then flush.
   (5) If at a dead end, then conduct sampling upstream.
v. If additional technical assistance is needed, contact MIDEQ for assistance in evaluating complaints.
vi. If any suspicious circumstances become known, contact 911 and request either Holland Police Department or Ottawa County. Sheriff's Department to investigate suspicious circumstance.
vii. Determine need for public notification.

e. Hospital/health department
Either the county health department or local hospital may contact the HBPW about a possible link between multiple illnesses and water-borne causes.

i. The person receiving the phone call shall obtain the following information and forward it to the Water Plant and Water/Wastewater Services Superintendents:
   (1) Name and phone number of contact
   (2) Potential water-borne cause
   (3) Possible locations and times of illnesses
   (4) Number of people affected
   (5) Any other pertinent information
ii. The Water Plant shall review recent test results for any abnormal test results and contact the MIDEQ for advice.
iii. If areas in the distribution systems are potential sources, the W/Ww Services Superintendent will dispatch personnel to grab samples and test for pH and chlorine residual.
iv. The management group will review sampling and other pertinent information and determine next step.
   (1) Milky colored water - check for air and flush.
   (2) Brown (rusty) – flush.
   (3) Colored water (not rusty) - test and flush.
   (4) Low Chlorine residue or pH is abnormal with no apparent cause - sample and then flush.
   (5) If at a dead end, then conduct back sampling.
v. If additional technical assistance is needed, contact MIDEQ for assistance in evaluating complaints.
vi. If any suspicious circumstances become known, contact 911 and request either Holland Police Department or Ottawa County Sheriff's Department to report suspicious circumstance.
vii. Determine need for public notification.

f. Early Monitoring

The water supply system has a continuous monitoring system for various parameters. The location and types of monitors are listed below and shall be used in evaluating the contamination. Additionally, in the event of contamination, the monitors should be reevaluated for accuracy with portable chlorine analyzers.

i. Water Treatment Plant - pH, temperature, turbidity, and chlorine residual.
ii. Southside Pump Station – chlorine residual.
iii. Waverly Pump Station – chlorine residual.

g. Investigation

After the contamination has been resolved, an investigation will be conducted into the cause and spread. Additionally, a briefing shall be conducted to review the response to the contamination.

h. Customer Disinfection Instructions

i. Boiling Water for Drinking
   (1) If water is cloudy, allow water to run until water appears clear.
   (2) Bring water to a rolling boil. Boil for 5 minutes.
   (3) Water may taste flat or different than normal, but if cooled, the taste will improve with time.

ii. Chlorinating Water for Drinking
   (1) If water is cloudy, allow water to run until water appears clear.
   (2) Add three drops of any common liquid laundry bleach, such as Clorox (active ingredient of chlorine at 5.25%) to each gallon of clear water.
   (3) Mix and let stand for a minimum of 30 minutes before use.

Water Use Reduction Plan

A. Introduction

The following Water Use Reduction Plan is to be implemented during times of water shortage or severe drought.

B. Policy

The policy consists of five stages, which may be implemented at any level, depending on the severity of the situation. Restrictions may be increased or decreased at any time as conditions warrant. Decisions regarding the stage to be implemented will be made based on the judgment of the Holland Board of Public Works staff.

i. Public Awareness
Customers will be informed of the possibility of restricted water use and asked to restrict their use of water voluntarily.

ii. Odd-Even Lawn Sprinkling
All customers whose addresses end in an odd number will be exempted from sprinkling restrictions only on odd numbered dates. Customers with even-number addresses will be exempted from sprinkling restrictions only on even numbered dates.

iii. Odd-Even Sprinkling-Midnight to Noon
Same as above, except all permitted sprinkling activity must occur between the hours of midnight and noon. All sprinkling, regardless of address, will be prohibited from noon to midnight.

iv. Total Ban on Sprinkling.

v. Total Ban on Sprinkling and Non-essential Use of Water.
Examples:
(1) Non-commercial car washes.
(2) Hosing drives and walks.

If it is determined water use restrictions are necessary, the limitation or prohibition shall take effect immediately.

C. Procedure

The following procedure was developed for the implementation of the Water Use Reduction Plan. It is assumed that there is a reasonable amount of time to give proper notice. In a critical situation, the media should be called immediately. Notification of the media should then be followed up with the notification procedures outlined below.

The Water Plant Superintendent will consider the imposition of water use restrictions when the plant has run at over 80% of existing capacity for two days. If the Superintendent feels some water restriction is necessary this procedure will be followed:

i. The Superintendent of the water plant will notify the Water/Wastewater Director and inform him of the need to initiate the Water Use Reduction Plan, the reason as to why the policy needs to be implemented and the suggested stage to be placed into effect.

ii. If the Water/Wastewater Director agrees, he will notify the General Manager of the HBPW of the need to initiate the Water Use Reduction Plan and the suggested water reduction stage needed.

iii. If the General Manager agrees, he will notify the Board of Public Works' Communications Specialist, the Mayor of Holland, and the City Manager of Holland that it is necessary to implement the Water Use Reduction Plan. He will explain what caused the problem, the water reduction stage needed at this time, and the level of the emergency.

iv. The Operations Director will notify contact persons at the City of Zeeland and Park Township. The Director will inform the contact person of the need to implement the Water Use Reduction Plan, what created the need to implement the policy, the stage needed at this time, and the estimated duration of the restriction. The Director will also ask if their communities wish to be included in the notice. If so, the Water/Wastewater Director will notify the Communications Specialist of their desire to be included in all public notification.

v. The Communications Specialist will notify necessary news media, the Holland Board of Public Works Customer Services staff, and any other affected HBPW staff, and will activate the telephone message system.

vi. The Superintendent of the Water Plant will contact the Michigan Department of Environmental Quality and inform them about the measures being taken.

vii. Customers will be notified of the lifting of restrictions in the same manner that notification was made at the time restrictions were imposed.

WTP Plant Shut Down
Check List

It is the responsibility of the operating Operator to complete checklist items.

- ☐ Place all chemical feed pumps, at the SCADA computer, in the auto position.
- ☐ Stop all low service pumps in operation at SCADA computer.
- ☐ Shut down all chemical feed pumps in operation at the SCADA computer.
- ☐ Shut all chemical feed pump suction side valves.
- ☐ Manually shut off alum feeder at the feeder.
- ☐ When in operation, shut down phosphate feed pump.
- ☐ Shut the outlet valve on all chemical day tanks.
  - ☐ Sodium Hypochlorite (Second floor, chemical feed room)
  - ☐ Fluoride (Second floor, chemical feed room)
  - ☐ Alum (Third Floor)
  - ☐ Phosphate (Third floor)
- ☐ Shut down all sampling pumps.
- ☐ * Shut down all filters in operation at the filter console. *
- ☐ Disable all transfer pumps if necessary.
- ☐ Visibly verify that all check list items have been completed.

*** In most cases, one (1) filter may remain on to filter any additional influent flows.**

WTP Plant Start Up
Check List

It is the responsibility of the operating Operator to complete checklist items.

- ☐ Open the outlet valve on all chemical day tanks.
  - ☐ Sodium Hypochlorite
  - ☐ Fluoride
  - ☐ Alum
  - ☐ Phosphate
- ☐ Open suction side valves on all chemical feeders.
- ☐ Start sodium hypochlorite and fluoride pumps from SCADA.
- ☐ Start alum feeder at the feeder.
- ☐ Start a low service pump from SCADA computer.
- ☐ When in operation, start phosphate feed system.
- ☐ Start all sampling pumps
- ☐ Enable transfer pumps if necessary.
- ☐ Turn on filters.
- ☐ Visibly verify that all check list items have been completed.
- ☐ Ten minutes after start up check mix chlorine residual.

Zebra Mussel Control
Chemical Feed Line

In November 1990, the Holland Water Treatment Plant hired Sea Brex Marine Inc for a penetration dive of our 4,775 feet of 42” raw water intake line and related structures. The raw water intake line from Lake Michigan supplies the Water Treatment Plant with the water it treats for the City of Holland. The purpose of the dive was two fold. First, a routine inspection of the intake and related structures, and second, check for Zebra mussel infestation.

A small population of Zebra Mussels was found with the major concentrations found in the first 700 feet from the shoreline. None were found in the intake crib structure or the first 1,000 feet from the crib.

After an extensive study, it was decided to install a 2-inch chemical feed line inside the 42-inch raw water line to eradicate the mussel population. The line would be used to feed sodium hypochloite. The installation of the 4,775 feet of 2-inch PVC chemical feed line was completed in the spring of 1991.

During the warm water months sodium hypochlorite is applied any time lake water is being drawn into the plant. Should the plant lose electrical power or shut down the raw water pumps, the chlorine feed is shut down automatically. No sodium hypochlorite is released into the lake.

Zebra Mussels are removed from the exterior and interior of the intake crib structure each spring prior to summer demands.

In early summer of 1999 plant operators noted a sudden 15 million-gallon per day reduction in plant intake capacity. Divers were immediately called in to determine the cause of the reduction in capacity. The divers found that the 2-inch chemical feed line had broken loose, corkscrewed, and partially restricted the 42-inch intake pipe. Cost to remove the 4,800 feet of 2” pipe was $9,000. We were unable to use the Zebra mussel control system during the summer mussel attachment is most active. Repairs could not commence due to heavy pumpage.

Pollution Incident Prevention Plan

Holland Water Treatment Plant

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I. General Information for Holland Water Treatment Plant

Location:	46 N. Lakeshore Dr. Holland, MI 49422 (616) 355-1589 (616) 399-9410 (616) 399-9400
Mailing address:	625 Hastings Ave Holland, MI 49423
Superintendent:	Jim Van De Wege Holland Board of Public Works 625 Hastings Ave. Holland, MI 49423
Plant Owner:	City of Holland 270 South River Ave. Holland, MI 49423
Spill Coordinators:	Steve Teunis Pager: (616) 713-0285 Home: (616) 846-7016 Jim Van De Wege Cell: (616) 566-6055 Home: (616) 396-4233

II. Facility Description

The Holland Water Filtration Plant, a 38.5 million-gallon a day plant is located on Lake Michigan, seven miles northwest of the City of Holland, directly across from Tunnel Park.

The plant obtains its water from Lake Michigan. A 42-inch intake line delivers water by gravity to a low-lift station located on the shoreline. From there, the water is pumped through two 30-inch pipes to the treatment plant located to the east and across the street from the low-lift station.

The water from the low-lift station enters the treatment plant at the northwest corner and flows through two parshall flumes at which point the water is metered. The water flows from the parshall flumes into the rapid mix where the chemicals are added. Sodium Hypochlorite for disinfection, fluoride for dental health care, and Alumer for coagulation, are added. The water is mixed in the rapid mix and flows out of the treatment plant, by gravity, to the settling basins located on the north side of the plant.
The water enters one of four underground settling basins at the north end of the basin. As it enters the basin, the water is gently mixed by means of two sets of large paddle wheels or flocculators. This mixing action causes suspended particles to coagulate or attach to each other and form larger particles, which are readily settled out. This settled material is flushed out with fire hoses once a year into two lagoons located behind the plant. The clear water is drawn off at the south end of the basins and flows, by gravity, back into the plant.

The water entering the plant from the basins then flows onto one of ten rapid sand filters. The filters are layered with larger stone on the bottom, used as a support medium, and progressively smaller stone in the next layers, sands, and finally anthracite coal, as the top layer. The filters are periodically backwashed or cleaned by reversing the flow through the filter and the water discarded into lagoons. The water flows through filters and into two clearwells located directly

below the filters where it is pumped to ground level storage reservoirs.

An additional process involves the treatment for zebra mussels. A two-inch chemical feed line is installed in the 42-inch water intake line and attached to the intake structure. The chemical feed line supplies a chlorine solution to the intake for preventing zebra mussel buildup.

The plant is operated 24 hours a day, 365 days a year by a staff of 7 state certified operators and support staff. The EPA and the Michigan State Department of Environmental Quality approve of all treatment processes.

Spill Response-if unable to handle internally, call 911. After there has been emergency stabilization of the spill, call Young's to handle final clean-up

Contractor
Young's Environmental Cleanup
4990 West River Dr NE
Comstock Park, MI 49321
(800) 496-8647

III. Material Stored - for specific chemical information, see MSDS's in Appendix B

A. Alumer (Aluminum Sulfate/Polymer Blend): 3rd floor chemical storage room

Tank No:	**A1**
Construction:	Steel
Capacity:	2,000 gallons
Radius:	72 inches
Shell thickness :	250 inches
Heads thickness:	.312 inches
Corrosion barrier:	black rubber
Max. Temperature:	650 degrees F
Max. Pressure:	50 psi
Date of Fabrication:	1966
Manufacturer:	Niles Steel Tank Co.
Serial No.:	23064

Tank No:	**A2**
Construction:	Steel
Capacity:	2,000 gallons
Radius:	72 inches
Shell thickness:	.250 inches
Heads thickness:	.312 inches
Corrosion barrier:	black rubber
Max. Temperature:	650 degrees F
Max. Pressure:	50 psi
Date of Fabrication:	1966
Manufacturer:	Niles Steel Tank Co.
Serial No.:	23065

Tank No:	**A3**
Construction:	Steel
Capacity:	2,000 gallons
Radius:	72 inches
Shell thickness:	.250 inches

Heads thickness:	.312 inches
Corrosion barrier:	black rubber
Max. Temperature:	650 degrees F
Max. Pressure:	50 psi
Date of Fabrication:	1966
Manufacturer:	Niles Steel Tank Co.
Serial No.:	23063

Tank No:	**CST-03**
Construction :	Reinforced fiberglass
Capacity:	2594 gallons
Serial No:	20383
Corrosion barrier veil:	Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130 800-253-4252
B.T.T. model:	C-CFV-7-2594
Date of Fabrication:	9/97

Tank No:	**CST-04**
Construction :	Reinforced fiberglass
Capacity:	2594 gallons
Serial No:	20383
Corrosion barrier veil:	Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130 800-253-4252
B.T.T. model:	C-CFV-7-2594
Date of Fabrication:	9/97

B. Sodium Hypochlorite: 3rd floor chemical storage room

Tank No:	**CST-05**
Construction :	Reinforced fiberglass
Capacity:	5423 gallons
Serial No:	20386
Corrosion barrier veil:	Double Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130
B.T.T. model:	C-CPV-11.5-5423
Date of Fabrication:	9/97

Tank No: **CST-06**

Construction:	Reinforced fiberglass
Capacity:	5423 gallons
Serial No:	20383
Corrosion barrier veil:	Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130
B.T.T. model:	C-CFV-7-2594
Date of Fabrication:	9/97

Tank No:	**CST-07**
Construction:	Reinforced fiberglass
Capacity:	5423 gallons
Serial No:	20383
Corrosion barrier veil:	Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130
B.T.T. model:	C-CFV-7-2594
Date of Fabrication:	9/97

C. Hydrofluorosilicic Acid: 1st floor

Tank No:	**CST-01**
Construction:	Reinforced fiberglass
Capacity:	4159 gallons
Serial No:	20388-2
Corrosion barrier veil:	Double Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130
B.T.T. model:	C-CFV-9-4159
Date of Fabrication:	9/97

Tank No:	**CST-02**
Construction:	Reinforced fiberglass
Capacity:	4159 gallons
Serial No:	20388-2
Corrosion barrier veil:	Double Nexus
Corrosion barrier resin:	Derakane 411-45
Structural layer resin:	Derakane 411-45
Manufacturer:	Belding Tank Technologies Belding, MI Phone 616-794-1130
B.T.T. model:	C-CFV-9-4159
Date of Fabrication:	9/97

IV. Containment

Each of the three bulk chemicals stored and handled at the WTP have their own containment areas. The Sodium Hypochlorite and Alumer are located on the third floor and have poured concrete walls for containment. The hydroflousilicic acid is located on the 1st floor and is a combination of poured concrete and cement block for containment. Containment for all areas are coated with a fiberglass reinforced resin. Dimensions are listed below.

All containment areas have floor drains that lead to the reclaim wells. Any spilled material would be drained to the reclaim wells and then diluted or neutralized.

Chemical	Height	Area	Capacity
Alumer (Aluminum Sulfate/Polymer Blend)	1.5 ft	1104 cu. ft.	8,252 gallons
Sodium Hypochlorite	2.67 ft	2294 cu. ft.	17,155 gallons
Hydroflousilicic acid	4.0 ft	1380 cu. ft.	10,322 gallons

Each tank is monitored by ultrasonic level indicators with high level audible alarms at the tanks and at the chemical loading docks. The indicators are also monitored by the plant SCADA system.

V. Spill Procedure

A. Initial Response: Actions to be taken by person discovering release

1. Do not enter affected area. Survey the spill and obtain as much information as practical without placing yourself in a position where you become exposed to the chemical or the vapors.

2. Notify your supervisor of the spill and provide them with as much information as possible.

3. Notify other personnel in the immediate vicinity of the spill through the plant paging system.

4. If needed due to vapors, fire, etc., evacuate the affected area through the closest exit and assemble in the designated evacuation site. Note wind direction as you exit and account for all personnel. Begin notification of personnel listed on the "Priority Phone List".
   a) All employees are required to exit quickly and calmly through the nearest exit when an evacuation has been ordered. You may take possessions, which are in your immediate vicinity, but you may not detour from the evacuation to retrieve possessions. If you have guests or visitors in the Plant, it is YOUR RESPONSIBILITY to ensure that they safely exit the building. Assemble at the main gate on the west side of the plant grounds.

5. Continue to monitor and assess the situation until your supervisor arrives on scene.

6. Report all pertinent information to your supervisor, including any missing personnel.
   a) Report nature of emergency.
   b) Location of personnel.
   c) Any persons down or injured and the nature of the injury and location of injured person.
   d) Location
   e) Weather
   f) Potential for environmental damage.
   g) Available resources (Manpower, PPE, equipment)
   h) Potential for shutdown of operations

Hazardous Material Release – Liquid Fluoride*

Procedures to follow in the event of a bulk liquid fluoride tank, day tank, or chemical feed piping failure resulting in a release of liquid fluoride. A hazardous event will be indicated by an alarm on the SCADA, showing that a spill has occurred.

Bulk Tank Failure:

- Do not enter the fluoride storage room if a spill or leak has been detected or is suspected.
- Visually verify that a leak or spill has occurred through the window on west side of building.
- Call for help.
- Contact Operation Supervisor, Plant Superintendent, Director Water/Wastewater Services.
- Calculate the quantity of material spilled by utilizing SCADA trend screens or day tank volumes.

When Help Arrives:

- Report all pertinent information to responders
- Contact Ottawa County Emergency Response (should be done when 911 is called) 738-4050 and inform them of the situation.
- Record all information.
- Contact MDEQ if fluoride feed system is not operational for 24 hours.

Pipe Failure:

- Put on full-faced respirator with NIOSH approved multi-gas/vapor cartridge with P-100 Filter.
- Close valve on bulk or day tank that is supplying chemical to leaking pipe.
- Do not attempt to close a valve if doing so places you in a hazardous situation.
- Call for help
- Contact Plant Superintendent, Operation Supervisor and Lead Maintenance.
- Determine if it is major or minor leak.
    - A **Minor Release** (Incidental) is one that can be **eliminated** or controlled at the time of the release by employees in the immediate release area or by maintenance personnel.
    - The personnel in the immediate area shall isolate the spill without placing themselves in danger and contact maintenance personnel.
    - A **Major Release** (uncontrollable) requires a response by employees from outside the immediate release area or by other designated responders.
- Calculate the quantity of material spilled.

When Help Arrives:

- Report all pertinent information to responders
- Put on proper PPE: rubber boots, rubber rain suit, rubber gloves and full-faced respirator.
- Hose down the entire area of spill with water.

- Rinse down all tanks, piping and floor to nearest floor drain.
- Before leaving spill area, hose down boots, rain suit, and gloves.
- Repair piping.
- Contact MDEQ if fluoride feed system is not operational for 24 hours
- Record all information.

Hazardous Material Release - Liquid Sodium Hypochlorite

Procedures to follow in the event of a bulk sodium hypochlorite tank, day tank, or chemical feed piping failure resulting in a release of sodium hypochlorite. A hazardous event will be indicated by an alarm on the SCADA showing that a spill has occurred.

Bulk Tank Failure:

- Put on full-faced respirator with NIOSH approved multi-gas/vapor cartridge with P-100 Filter.
- Proceed to area of detected leak or spill.
- Bulk tanks located on third floor.
- Day tank located on second floor.
- Visually verify that a leak or spill has occurred.
- Call for help: contact Operation Supervisor, Plant Superintendent, and Director of Water/Wastewater Services.
- Calculate the quantity of material spilled by utilizing SCADA trend screens or day tank volumes.
- If reclaim is full, pump down to 18 feet and shut off pumps.
- If reclaim is empty, shut off pumps and fill to approximately 18 feet (11,260gal/ft).
- Opening the drain on one of the filters and leaving the influent open to that filter will fill the reclaim.

When Help Arrives:

- Report all pertinent information to responders.
- If reclaim is at 18 feet, open containment area drains. The sodium hypochlorite will drain to reclaim.
- Put on proper PPE: rubber boots, rubber rain suit, rubber gloves and full-faced respirator.
- Hose down the entire area of spill with water.
- Rinse down all tanks, piping and floor.
- Before leaving containment area, hose down boots, rain suit, and gloves.
- Close the drains.
- Turn on reclaim pump.
- Record all information.
- Responders will assist in determining the need to evacuate the area.

Pipe Failure:

- Put on full- faced respirator with NIOSH approved multi-gas/vapor cartridge with P-100 Filter.

- Close valve on bulk or day tank that is supplying chemical to leaking pipe.
- Do not attempt to close a valve if doing so places you in a hazardous situation.
- Call for help
    - Contact Plant Superintendent, Operation Supervisor and Lead Maintenance.
- Determine if it is major or minor leak.
    - A **Minor Release** (Incidental) is one that can be **eliminated** or controlled at the time of the release by employees in the immediate release area or by maintenance personnel. The personnel in the immediate area shall isolate the spill without placing themselves in danger and contact maintenance personnel.
    - A **Major Release** (uncontrollable) requires a response effort by employees from outside the immediate release area or by other designated responders.
- If treatment process is affected shut down plant.
- Calculate the quantity of material spilled.

When Help Arrives:

- Report all pertinent information to responders
- Put on proper PPE
    - Rubber boots, rubber rain suit, rubber gloves and full-faced respirator
- Hose down the entire area of spill with water.
- Rinse down all tanks, piping and floor to nearest floor drain.
- Before leaving spill area, hose down boots, rain suit, and gloves.
- Repair piping.
- Place plant back online as soon as repairs are complete.
- Record all information

Hazardous Material Release – Aluminum Sulfate

Procedures to follow in the event of a bulk aluminum sulfate tank, day tank, or chemical feed piping failure resulting in a release of aluminum sulfate. An event will be indicated by an alarm on the
SCADA showing that a spill has occurred

Bulk or Day Tank Failure:

- Put on full-faced respirator with NIOSH approved multi-gas/vapor cartridge with P-100 Filter.
- Proceed to area of detected leak or spill.
- Bulk tanks are located on the third floor.
- Day tank is located on the second floor.
- Visually verify that a leak or spill has occurred.
- Call for help.
    - Contact Operation Supervisor, Plant Superintendent, Operation Director.
- Calculate the quantity of material spilled by utilizing SCADA trend screens or day tank volumes.
- If reclaim is full, pump down 18 feet and shut off pumps.

- If reclaim is empty, shut off pumps and fill to approximately to 18 feet. (11, 260 gal/ft).
    - Opening the drain on one of the filters and leaving the influent open to that filter will fill the reclaim.

When Help Arrives:

- Report all pertinent information to responders
- If reclaim is at 18 feet, open containment area drains. The Alumer (Aluminum Sulfate/Polymer Blend) will drain to reclaim.
- Put on proper PPE:
    - Rubber boots, rubber rain suit, rubber gloves and full-faced respirator.
- Hose down the entire area of the spill with water.
- Rinse down all tanks, piping and floor.
- Before leaving the containment area, hose down boots, rain suit, and gloves
- Close the drains.
- Turn on reclaim pump.
- Continue to dilute product while pumping.
    - Opening the drain on one of the filters and leaving the influent open to that filter will fill the reclaim.
- Record all information.

Pipe Failure:

- Put on full-faced respirator with NIOSH approved multi-gas/vapor cartridge with P-100 Filter.
- Close valve on bulk or day tank that is supplying chemical to leaking pipe.
- Do not attempt to close a valve if doing so places you in a hazardous situation.
- Call for help
- Contact Plant Superintendent, Operation Supervisor and Lead Maintenance.
- Determine if it is major or minor leak.
    - A **Minor Release** (Incidental) is one that can be **eliminated** or controlled at the time of the release by employees in the immediate release area or by maintenance personnel.
    - The personnel in the immediate area shall isolate the spill without placing themselves in danger and contact maintenance personnel.
    - A **Major Release** (uncontrollable) requires a response by employees from outside the immediate release area or by other designated responders.
- If the treatment process is affected shut down plant.
- Calculate the quantity of material spilled.

When Help Arrives:

- Report all pertinent information to responders.
- Put on proper PPE: rubber boots, rubber rain suit, rubber gloves and full-faced respirator.
- Hose down the entire area of spill with water.
- Rinse down all tanks, piping and floor to nearest floor drain.

- Before leaving spill area, hose down boots, rain suit, and gloves.
- Repair piping.
- Place plant back online as soon as repairs are complete.
- Record all information.

SODIUM HYPOCHLORITE (BLEACH)

Delivery Procedures

Procedure for Delivery of Sodium Hypochlorite

1. When a Bulk chemical tank truck arrives outside the gate, notify the operator.
    a. **Do not fill day tanks during the off loading procedure**.
2. Bulk chemical tank truck unloading must be received outside the main gate.
3. Driver information is requested by purchasing and is to be sent to the Water Treatment Plant to the copier/fax machine located in the operations area. Phone Number 616-355-1559. The fax machine should be checked for the information prior to the delivered material arriving.
4. Before entry is allowed onto the premises, check the following from a faxed information sheet: date, carrier's name, driver's name, tractor number, trailer number, shipper's number, estimated time of delivery, seal numbers,

and a copy of the driver's license to operate a motor vehicle.

Note: Do not climb on to truck.

5. Check that the proper seal is still intact on all access ports and hatch to the chemical tank and that the seal has not been broken.
6. Once confirmation of the proper information is made and that all the correct seals are in place, the truck may be directed to the proper unloading site.
7. At the unloading site, the seals should be removed from the tank. Ask the truck driver to remove the seals (2) from the trailer.
8. Compare the seal number on the faxed information sheet with the seal removed from the top hatch and the seal removed from the discharge valve. If the numbers are different, do not continue unloading the tank truck. The shipper must be contacted to verify any discrepancy of numbers in order to confirm the integrity of the material.
9. Verify that the delivery is for the Holland Water Treatment Plant.
    a. Two plant personnel must verify delivery point.
    b. Two plant personnel must sign the manifest.
10. Verify that the delivery is sodium hypochlorite.
    a. Use certificate of analysis for verification.
    b. Must be verified by two plant personnel
    c. Two plant personnel must initial certificate of analysis.
11. Record level in tanks on third floor.
    a. Record tank level and tank number being filled on certificate of analysis.
12. Unlock fill point.
    a. Key in lock box in communication room.
13. Check for correct hookup of truck hose to plant delivery point.
    a. Are they connected to the connection labeled sodium hypochlorite?
    b. Two plant personnel must verify correct unloading point.
14. Supply driver with air for unloading by opening valve.
15. Allow driver to begin unloading of sodium hypochlorite.
    a. Open valve on the fill line inside the containment area.
    b. To avoid splashing or spraying in the event of component failure, stay clear of the hose and connections.
16. Using proper PPE, collect a sample of the sodium hypochlorite.
    a. Proper PPE includes rubber gloves and face shield.
    Use sample taps on building exterior.
    b. Transport sample to lab. Test sample for odor, specific gravity, and temperature and do a visual inspection for color, clarity and particulates.
17. Continue to monitor offloading area, fill lines and bulk tanks until the offloading process is complete.

a. Check all fill lines and connections throughout the unloading of bleach.
    b. Monitor tank levels.

18. Do not leave area until loading is complete.
19. Close valves on bulk tank after unloading is complete.
20. Record tank levels.
21. If a spill should occur at any time during the unloading of the sodium hypochlorite implement the Emergency Response Plan.

FLUORIDE (HYDROFLUOROSILICIC ACID)

Delivery Procedures

Procedure for Delivery of Liquid Fluoride

1. When a Bulk tank delivery arrives outside the gate, notify the operator.
    b. **Do not fill day tanks during the off loading procedure**.
2. Bulk chemical tank truck unloading must be received outside the main gate.
3. Driver information is requested by purchasing and is to be sent to the Water Treatment Plant Plant to the copier/fax

machine located in the operations area. Phone Number 616-355-1559. The fax machine should be checked for the information prior to the delivered material arriving.

4. Before entry is allowed onto the premises, check the following from a faxed information sheet: date, carrier's name, driver's name, tractor number, trailer number, shipper's number, estimated time of delivery, seal numbers, and a copy of the driver's license to operate a motor vehicle.
5. Check that the proper seal is still intact on all access ports to the chemical tank and that the seal has not been broken.

Note: Do not climb on to truck.

6. Once confirmation of the proper information is made and that all the correct seals are in place, the truck may be directed to the proper unloading site.
7. At the unloading site, the seals should be removed from the tank. Ask the truck driver to remove the seals (2) from the trailer.
8. Compare the seal number on the faxed information sheet with the seal removed from the top hatch and the seal removed from the discharge valve. If the numbers are different, do not continue unloading the tank truck. The shipper must be contacted to verify any discrepancy of numbers in order to confirm the integrity of the material.
9. Verify that the delivery is for the Holland Water Treatment Plant.
    a. Two plant personnel must verify delivery point.
    b. Two plant personnel must sign the manifest.
10. Verify that the delivery is liquid fluoride (Hydrofluorosilicic Acid).
    a. Use certificate of analysis for verification.
    b. Must be verified by two plant personnel
    c. Two plant personnel must initial certificate of analysis.
11. Record level in tanks on first floor.
    a. Two plant personnel must verify valves on bulk tanks are open so tanks equalize.
    b. Record tank levels and tank numbers being filled on certificate of analysis.
12. Unlock fill point.
    a. Key in lock box in communication room.
13. Check for correct hookup of truck hose to plant delivery point.
    a. Are they connected to the connection labeled fluoride?
    b. Two plant personnel must verify correct unloading point.
14. Allow driver to begin unloading of Hydrofluorosilicic Acid.
    a. Open valve on the fill line inside the containment area.
    b. To avoid splashing or spraying in the event of component failure, stay clear of the hose and connections.
15. Using proper PPE, collect a sample of the fluoride.
    a. Proper PPE includes rubber gloves and face shield.
    b. Use sample taps located inside fluoride room.
    c. Transport sample to lab. Test sample for odor, specific gravity, and temperature and do a visual inspection for color, clarity and particulates.
16. Continue to check for proper filling and unloading.
    a. Check all fill lines and connections throughout the unloading of fluoride.
    b. Monitor tank levels.
17. Continue to monitor offloading area, fill lines and bulk tanks until the offloading process is complete.
18. Close valves on bulk tanks after unloading is complete.
19. Record tank levels.
20. If a spill should occur at any time during the unloading of the fluoride implement the Emergency Response Plan.

Alumer (ALUMINUM SULFATE/Polymer Blend)

Delivery Procedures

Procedure for the Delivery of Liquid Alum

1. When a Bulk tank truck arrives outside the gate, notify the operator.
    a. **Do not fill day tanks during the off loading procedure**.
2. Bulk chemical tank truck unloading must be received outside the main gate.
3. Driver information is requested by purchasing and is to be sent to the Water Treatment Plant to the copier/fax machine located in the operations area. Phone number is 616-355-1559. The fax machine should be checked for the information prior to the arrival of the delivered material.
4. Before entry is allowed onto the premises, check the following from the faxed information sheet: date, carrier's name, driver's name, tractor number, trailer number, shipper's number, estimated time of delivery, seal numbers, and a copy of the driver's license to operate a motor vehicle.
5. Check that the proper seal is still intact on all access ports to the chemical tank and that the seal has not been broken.

Note: Do not climb on to truck.

6. Once confirmation of the proper information is made and that all the correct seals are in place, the truck may be directed to the proper unloading site.
7. At the unloading site the seals should be removed from the tank. Ask the truck driver to remove both seals from the trailer.
8. Compare the seal number on the faxed information sheet with theseal removed from the top hatch and the seal removed from the discharge valve. If the numbers are different, do not continue unloading the tank truck. The shipper must be contacted to verify any discrepancy of numbers in order to confirm the integrity of the material.
9. Verify that the delivery is for the Holland Water Treatment Plant.
    a. Two plant personnel must verify delivery point.
    b. Two plant personnel must sign the manifest.
10. Verify that the delivery is liquid alum (Aluminum Sulfate).
    a. Use certificate of analysis for verification.
    b. Must be verified by two plant personnel.
    c. Two plant personnel must initial certificate of analysis.
11. Record level in tanks on third floor.
    a. Two plant personnel must verify valves on bulk tanks are open so tanks equalize.
    b. Record tank levels and tank numbers being filled in on certificate of analysis.
    c. If filling tanks A1-A3, close the interconnect between A4 and A5
    d. If filling A4, A5 and A1, open the interconnect between A4 and A5.

12. Unlock fill point (Key in lock box in communication room.)
13. Check for correct hookup of truck hose to plant delivery point.
    a. Are they connected to the proper tanks to be filled (Red or Brown colored tanks).
    b. Are they hooked up to the connection labeled alum?
    c. Two plant personnel must verify correct unloading point.
14. Supply driver with air for unloading by opening valve.
15. Allow driver to begin unloading of alum.
    a. Open valve on wall behind door:
        1) If filing alum tanks A1, A2, or A3 (Red Tanks) open corresponding labeled valve.
        2) If filling alum tanks A4 and A5 open valve labeled A4 or A5.
    b. To avoid splashing or spraying in the event of component failure, stay clear of the hose and connections.
16. Using proper PPE, collect a sample of the aluminum sulfate.
    a. Proper PPE includes rubber gloves and face shield.
    b. Use sample taps on building exterior.
    c. Transport sample to lab. Test sample for odor, specific gravity, and temperature and do a visual inspection for color, clarity and particulates.
    d. Record all data
17. Continue to monitor offloading area, fill lines and bulk tanks until the offloading process is complete.
    a. Check all fill lines and connections throughout the unloading of alum.

b. Monitor tank levels.

18. Do not leave area until unloading is complete.
19. Close valves on bulk tanks after unloading is complete.
    a. Close valve on wall behind door if filling alum tanks #1, #2, or #3 (Red Tanks)
20. Record tank levels.
21. If a spill should occur at any time during the unloading of the alum, implement the Emergency Response Plan.