

Muskegon Lake Area of Concern

Target for Delisting the Restrictions on Drinking Water Consumption or Taste and Odor Problems Beneficial Use Impairment

December 18, 2008

Introduction

The Muskegon Lake Area of Concern has a history of serious groundwater problems associated with abandoned and improperly plugged oil exploration wells, PA 307 / 201 sites, and National Priority List (NPL) Superfund sites. The specific volume of contaminated groundwater in the Muskegon Lake area is unknown.

In 1993, Muskegon County had 81 known sites of groundwater contamination (MDNR Environmental Response Division, PA 307, April 1992 for FY 1993). According to the 1994 Muskegon Lake Remedial Action Plan (RAP), Muskegon County continued to have the greatest number of contaminated groundwater sites of the 83 counties in the State of Michigan. The 1987 Muskegon Lake RAP indicates that contaminated groundwater is a secondary major source of pollution to the AOC, also noting that there were no documented cases of contaminated groundwater adversely affecting beneficial uses of Muskegon Lake. The 1987 RAP states that “Improperly constructed oil and gas wells, brine evaporation pits and abandoned oil wells have contributed to the migration of oil brine solutions into fresh water aquifers, contaminating these aquifers with chlorides, sodium, calcium, magnesium, bromide and sulfate. High chloride concentrations have been found in the aquifer under the City of North Muskegon, which are attributed to the numerous oil wells in the area. Intense oil exploration activities in Muskegon County occurred from the 1920’s until the late 1960’s, primarily north and northeast of the Muskegon Lake-Bear Lake area. Some of the earlier wells were poorly constructed and many abandoned uncapped, resulting in chloride and crude oil contaminated aquifers from seepage from brine evaporation pits and abandoned wells.

Although significant degradation and remaining threats to groundwater from historic causes were documented, the 1987 RAP did not consider “Restrictions on Drinking Water Consumption” as an impaired use of the Muskegon Lake AOC.

The 1994 RAP notes that “although there is considerable documentation of contaminated groundwater affecting tributaries to Muskegon Lake, there is less about such degradation to the lake itself. The whole AOC is susceptible to groundwater contamination because its sandy, porous soils do not protect aquifers from the infiltration of contaminants. Groundwater is known to be contaminated at many sites and is suspected to be slowly moving toward the lake.” The 1994 RAP mapped approximately fifty (50) P.A. 307 and two Superfund Sites within the entire AOC watershed, with fifteen sites adjacent to Muskegon Lake and tributaries. In addition, the 1994 RAP notes that “There are many other sites in the Muskegon Lake AOC where contamination of groundwater potentially is occurring, e.g., old landfills, underground storage tank locations, abandoned oil wells that remain to be identified and assessed.”

Within the AOC’s north side, where the majority of the population depends primarily on groundwater for drinking water supply, there are 2 Superfund Sites, 16 P.A. 307 sites and the Laketon, Dalton and Muskegon Township Oil Fields.

During the Muskegon Lake 2002 RAP update, the Muskegon Lake Public Advisory Council acknowledged that the AOC had a significant and historically impaired groundwater/drinking water supply on the north side. Because the area was highly residential, and lacked an alternate public drinking water supply, this led to the designation of this BUI in 2002 (Muskegon Lake Community Action Plan / RAP Update, 2002).

Available Guidance

The Michigan Department of Environmental Quality has established the following restoration criteria for the Restrictions on Drinking Water Consumption or Taste and Odor Problems Beneficial Use Impairment (BUI):

“This BUI will be considered restored when monitoring data for 2 years indicate:

- public water supplies meet the current and most stringent human health standards, objectives, or guidelines (at the point of distribution into the water system) for levels of disease-causing organisms, hazardous or toxic chemicals, or radioactive substances; and
- treatment needed to make raw water potable and palatable does not exceed standard treatment methods.”

The Michigan Department of Environmental Quality has provided guidance for establishing BUI restoration criteria (Guidance for Delisting Michigan’s Great Lakes Areas of Concern, January 2006):

“The State’s restoration criteria are applied to all BUIs except where locally developed criteria are approved. The PACs have the ability to establish restoration criteria that are functionally equivalent to the statewide criteria. Any locally developed criteria must be submitted to Chief of the MDEQ Water Bureau for approval. The PACs are expected to demonstrate how any locally developed criteria are equivalent to the statewide criteria. Approval is based on meeting or exceeding the State’s criteria. State assessments required for each BUI are integrated into the criteria. Local targets that require assessment beyond what is required for the statewide criteria (e.g., more frequent, different parameters, etc.) are the responsibility of the local PAC, including reporting results to the MDEQ. The MDEQ assists as resources allow.”

Delisting Target

The proposed delisting target addresses drinking water from public surface water and also private groundwater wells. The proposed delisting target is:

The groundwater portion of this BUI will be considered ready for removal when existing monitoring data indicates:

- 1) For areas where it is known that groundwater exceeds potable water criteria, an alternate supply source (public or private) of potable drinking water must be available; and
- 2) For sites where a MDEQ or EPA remediation plan has been approved, plume migration from these sites must be controlled, with the effectiveness confirmed by annual monitoring reports; and
- 3) For MDEQ permitted oil exploration wells in the abandoned oil fields listed in the 1987 Muskegon Lake RAP, Geological Survey Division well plugging records must indicate that progress has been made to plug priority wells in areas that continue to depend on groundwater for drinking water; or
- 4) Townships have adopted policies that prevent drinking from known contaminated aquifers or all known contaminated groundwater/drinking water supplies, not served by public water supply, meet potable water criteria.

Known sites of groundwater contamination that have historically, and may continue to pose a significant human health threat from drinking water in the north side of the AOC are:

- Ott Story Cordova Superfund / NPL Site
- Duell & Gardener Landfill Superfund / NPL Site
- Michigan PA 307 / 201 Groundwater Contamination Sites
- Laketon Township Oil Fields
- Muskegon Township Oil Fields
- Dalton Township Oil Fields

The surface water component of this BUI will be considered restored when monitoring data for 2 years indicate:

- 1) Public water supplies meet the current and most stringent human health standards, objectives, or guidelines (at the point of distribution into the water system) for levels of disease-causing organisms, hazardous or toxic chemicals, or radioactive substances; and
- 2) Treatment needed to make raw water potable and palatable does not exceed standard treatment methods.”

Functional Equivalence

The proposed targets for the Muskegon Lake AOC are functionally equivalent and exceed the MDEQ restoration criteria.

Restoration Activities and Programs for Monitoring and Assessing Restoration Success

Background:

The majority of the Muskegon Lake AOC's north side population is not served by a public drinking water supply within Laketon, Dalton and Muskegon Townships. Public water expansion has occurred since 1987 and more is planned. However, private groundwater wells continue to provide the primary source of drinking water on the AOC's north side, with the exception of the City of North Muskegon, which was connected to the City of Muskegon's public drinking water supply to serve their population due to oil well contamination in the early 1950's.

Located within Laketon Township and the Green Creek watershed, the Green Ridge Subdivision is an area long known for groundwater contamination from the historic Laketon Oil Field. A 2006 MDEQ state revolving fund grant to Muskegon County will connect residents to a planned extension of the public water supply in 2009.

Located within the Bear Creek / Bear Lake watershed, are the Laketon, Dalton and Muskegon Township Oil Fields and the Ott Story Cordova and the Duell Gardener National Priority List (NPL) sites of soil and groundwater contamination. Groundwater treatment is underway at the Ott Story Cordova NPL site in Dalton Township. The status of the Duell Gardener cleanup is unknown at this time.

During the 1990's, as part of the Ott/Story Cordova and the Duell and Gardener Landfill Superfund/NPL Remedial Investigations, Community Health Assessments were performed by the Agency for Toxic Substance Disease Registry (ATSDR). As a result, bottled water was provided to residents who would otherwise depend on the contaminated aquifer.

Currently, the expansion of public drinking water is planned to serve portions of the Muskegon Lake AOC's north side, although significant areas of groundwater resources continue to be utilized for drinking water. Because groundwater supply is the major drinking water source within the north side of the Muskegon Lake AOC, the Muskegon Lake Watershed Partnership (formerly the Muskegon Lake Public Advisory Council) voted to adopt a target for delisting the Restrictions on Drinking Water Consumption BUI that is more restrictive than the State of Michigan criteria. The target acknowledges that the expansion of public drinking water supply and the protection of critical groundwater resources are both important actions needed to remove the BUI.

1) Monitoring for NPL-related BUI Removal

- The MLWP will work in partnership with state and federal Superfund site managers to perform a data review of NPL site progress for groundwater-related operable units. The MLWP will develop a report summarizing five successive years of monitoring data and whether or not it indicates that the NPL cleanup standards for groundwater have been met and that local groundwater drinking water supplies are not being affected. The report will be submitted MDEQ as part of the BUI-removal process. The data review will be done annually until the report indicates that the BUI removal criteria have been met.

Funding

- Funding for the data review and preparation of the annual report will be by submitting grant requests to the MDEQ, EPA or other sources for support of local public advisory council work to monitor, restore and remove BUIs.

2) Monitoring for Abandoned Oil Field-related BUI Removal

According to the MDEQ Geological Survey Division and Muskegon County Health Department, 14 wells were proposed for plugging (*1987 Muskegon Lake RAP*). Existing data will be gathered to demonstrate the status of progress on properly plugging abandoned oil wells, and analysis of how current and future public water supply addresses the groundwater/drinking water concern will be carried out under the leadership of the MLWP, in partnership with the Muskegon County Health Department, MDEQ Geological Survey Division and the West Michigan Shoreline Regional Development Commission (WMSRDC).

- ***Notes on Laketon Township Oil Field public water supply availability:***
The MDEQ awarded a grant to Muskegon County for Laketon Township to extend public water supply to the Green Ridge Subdivision, a known area of drinking water / groundwater contamination within the Laketon Township Oil Field area. Once construction is completed, public water supply will serve a portion of the impacted groundwater/drinking water area within the abandoned oil field in Laketon Township.
- ***Notes on Dalton Township Oil Field public water supply availability:***
Some public water supply is planned to serve portions of Dalton Township in the future.
- ***Notes on Muskegon Township public water supply availability:***
Some public water supply has been provided in Muskegon Township and more is planned.

Funding

With guidance from the MDEQ Geological Survey Division, the Muskegon County Health Department and the MLWP will develop a funding proposal to complete a baseline data summary that will be used to track and assess progress being made to properly plug historic oil wells, and to compare and contrast the locations of the oil wells with the proposed expansion of public water supplies.

3) Monitoring for Public Drinking Water Supplies-related BUI Removal

- The MLWP will work in partnership with the City of Muskegon to review water quality reports from the municipal water filtration plant. The only public water supply that serves a portion of the Muskegon Lake AOC is from Lake Michigan surface water. There is no history of water quality problems, and it is expected that reports will indicate that this is not a cause of the drinking water BUI. Reports will be reviewed to determine the status over the past 3 years. A summary report will be submitted MDEQ as part of the BUI-removal process. If findings indicate problems, the data review will be done annually until the report indicates that the BUI removal criteria have been met.

Funding

- Funding for the data review and preparation of the annual report will be by submitting grant requests to the MDEQ, EPA or other sources for support of local public advisory council work to monitor, restore and remove BUIs.

BUI Removal

The MLWP will submit a report and request for formal delisting of the Restrictions on Drinking Water Consumption or Taste and Odor Problems BUI to the MDEQ. The report will summarize the results of the available monitoring data, as described under the NPL Superfund, Abandoned Oil and Gas Exploration Fields and Public Water Supply categories above. The report will demonstrate that the delisting targets were achieved.

Additional Notes on Public Drinking Water Supplies:

Public water supply from the City of Muskegon's Lake Michigan filtration plant has historically been available to the south side of the Muskegon Lake AOC

- A new Muskegon County Northside Public Water Supply was established in 2006 through the efforts of townships located within the AOC's north-side and will help guide future expansion efforts.
- In 2006, the Muskegon County Long Range Infrastructure Plan identified the extension of this supply to serve certain areas of the north side.
- Also in 2006, the Michigan Department of Environmental Quality announced that a grant to extend public water supply to the Green Ridge Subdivision would be awarded to Laketon Township.

Additional Notes on Groundwater Ordinances, Wellhead Protection and Cleanup Efforts:

Communities have improved the public health threat through site cleanups and the extension of public water supply into known contaminated groundwater areas. However, the threat has not been eliminated.

- Individuals have the right and the responsibility to sample private wells. Changes in water quality are the Muskegon County Health Department's (MCHD) only indication that something is wrong. People need to report sample results to MCHD.
- There are no wellhead protection programs within the Muskegon Lake AOC watershed.

- The only community with a groundwater protection ordinance within the Muskegon Lake AOC is the City of Muskegon.
- Muskegon County has initiated efforts to reduce sources of groundwater contamination through the solid waste management plan, which includes a household hazardous waste collection program. In addition, the Muskegon County Wastewater Management System proactively works with the state and potentially responsible parties to accelerate the cleanup of contaminated groundwater through the NPDES program.
- The Muskegon County Health Department does not sample every private well. Individuals have the right and responsibility to sample private wells and to report the results to the MCDH. Changes in water quality are the MCDH's only indication that something is wrong with groundwater.

The Oil and Gas Wells and Municipal Water Services map (below) indicates where the major concentrations of improperly plugged oil wells exist and where public water supply exists and where future water supply is planned.

