MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER BUREAU

REPORT ON BOTTLED WATER ALTERNATIVE PROJECT FOR ELEVATED ARSENIC IN EXISTING NONCOMMUNITY WATER SUPPLIES

MICHIGAN SAFE DRINKING WATER ACT
1976 PA 399, AS AMENDED

August 1, 2006

Overview of Project

The United States Environmental Protection Agency established a new drinking water quality standard for arsenic in Noncommunity Water Supplies (NCWS) effective January 23, 2006. Preliminary estimates indicated there were approximately 300 nontransient noncommunity water systems (NTNCWS) in Michigan with arsenic levels exceeding or close to exceeding the new 10 micrograms per liter standard. Most of the systems could not obtain an alternate source meeting the standard, so treatment would be necessary. Point of entry treatment was not likely to be feasible for many systems due to costs and operational considerations. Point of use treatment (POU) would need to be looked at in many cases as affordable, yet still technically challenging for systems and operators. Bottled water as an alternative to arsenic treatment was a project conceived out of necessity to determine if it could be at least as protective of public health, and operationally less challenging for systems/operators. An affirmative project outcome should result in improved compliance and less technical and enforcement resources expended than would be the case for more complex treatment options.

Project Description

Drinking water standards for acute contaminants are based on the potential to cause illness after a single exposure. Drinking water standards for nonacute or chronic contaminants are based on repeated long-term, low-level exposure. Arsenic in Michigan groundwater exhibits nonacute or chronic effects, and the drinking water standard is based on long-term exposure. The project was initiated based on the belief that under prescribed conditions, bottled drinking water could be an effective means to protect public health from nonacute contaminants, such as arsenic at certain NTNCWS.

When any contaminant exceeds a drinking water standard, steps must be taken to obtain a permanent supply (or alter the existing supply) to meet the standards. Permanently eliminating the contaminant from the drinking water source is the most reliable public health solution. Bottled water is not a permanent solution for acute contaminants because the potential for a single exposure (such as drinking from a

bathroom sink posted “not for drinking”) exists as long as the public has access to the water that exceeds the standard. However, an incidental, single exposure to a contaminant at nonacute levels is not a significant public health concern. Therefore, bottled water may be a viable public health option for nonacute contaminants, such as arsenic, at existing NCWS in the event a permanent supply meeting the standard cannot be obtained.

The Michigan Department of Environmental Quality (MDEQ) requires monitoring of the on-site supply for coliform and nitrate (acute contaminants) and non-acute contaminants sufficient to demonstrate they are reliably and consistently at or below all standards other than arsenic and/or the source has not been impacted by other contaminants. The MDEQ may require monitoring of the on-site bottled water quality also. Participants in this project were required to enter into a consent agreement (sample attached) stipulating operating conditions including monthly operation reports documenting water purchase/use and daily dispenser checks.

Conditions/Operational Requirements

The first consent agreements were executed in June of 2004 with the bulk of contracts signed in late 2005. To participate in the project existing NTNCWS were required to sign and comply with a consent agreement and:

a. Have evaluated source replacement or connection to an approved public water system and found those permanent solutions to be not feasible. The MDEQ or its agent must concur with this assessment.

b. Have an on-site source that complies with applicable construction, monitoring, and drinking water standards for acute contaminants.

c. Provide bottled drinking water from an approved source and make it readily available on a continuous basis. The level of arsenic in the bottled water must be at or less than .002 milligrams per liter. Maintain records of purchases, water quality results, and availability of bottled water to consumers and consumer comments. Submit monthly operation reports.

d. Disconnect water fountains or other drinking water dispensing fixtures from the on-site source.

e. Permanently post all sinks and other outlets with an appropriate notice indicating “Not for drinking, exceeds arsenic standard.”

f. Continue all required monitoring for arsenic and other contaminants unless notified in writing.

The classification of an NCWS (and the associated annual water supply fee) shall not change because the supply is participating in this Project and providing bottled water in addition to the piped water available for household purposes. The use of bottled water does not change the requirements to produce monitoring results, and comply with all

other applicable requirements in the Safe Drinking Water Act, 1976 PA 399, as amended (SDWA). The MDEQ may rescind the authorization to use bottled water to meet the arsenic standard if a source meeting the standard becomes available or the supply does not comply with the conditions of participation.

Bottled Water Project Compliance Summary

One of the primary issues raised throughout this project is the ability to verify that bottled water is being provided and consumers are notified not to drink from taps with elevated arsenic. This concern has been addressed in exactly the same way it is handled with point-of-use treatment or for that matter any treatment to comply with drinking water standards. That includes on-site inspections of the facility by the regulatory agency, employment of a certified operator, and monthly reporting from the facility to the agency. Failure to provide the bottled water is grounds for termination of the agreement. The failure to submit required reports is addressed in the same manner as other reporting violations including a reminder/warning, informal conference, civil fines, or termination of the agreement if the problem persists.

Following are the results of the inspections conducted to date at facilities participating in the bottled water project and an analysis of compliance with the requirement to submit monthly operation reports.

100% (92/92) Inspections of active Systems.
98% (90/92) Systems maintaining bottled water, posting, and records.
78% (607/685) Submittal of monthly operation reports.

Compliance inspections are ongoing; all systems will be visited. Verification of the availability of approved bottled water, posting of untreated faucets, and facility bottled water record maintenance are evaluated during the site visits. To date, issues noted include a facility needing to provide an additional posting, and using commercially bottled water not currently on the MDEQs approved list. Failure to submit the monthly operation reports periodically is an issue with all reporting by NCWS, including water treatment for arsenic, and other contaminants, and not singularly an issue with this bottled water project. For example, problems experienced with operation of arsenic removal treatment by operators so far include elevated arsenic in the distribution systems because the chlorine injector was turned off and a case where the oxidant solution tank was emptied and not refilled. It is inherent in small noncommunity water systems that the more complex the treatment the more likely a failure will occur. The simplicity of the bottled water option is a very significant advantage in this respect.

Michigan's Arsenic Compliance Data

This information is included with this report to illustrate the role of the bottled water project in the overall effort to meet the new arsenic standard at NTNCWS. It was never intended or expected to be a universal solution for arsenic exceedances or to promote bottled water over a safe and adequate supply of piped water at each facility. The project was intended to determine if bottled water could be a viable alternative to arsenic removal treatment for some facilities under specified conditions. It is one

aspect of a larger effort to meet a complex and costly drinking water standard at typically very small facilities with very limited resources. Installing treatment, connecting to a municipal source, drilling a new well to meet the standard, and the bottled water project are all being used to reduce exposure to arsenic and protect public health.

Following is a summary of the arsenic compliance information from the 1,600 NTNCWS in Michigan and data regarding bottled water use and costs for bottled water project participants:

333 Initial total NTNCWS with potential for exceeding Arsenic maximum contaminant level (MCL)
41 Systems with alternate source (new well or municipal water) or no longer NTNCWS
128 Systems with running annual average below MCL
164 Systems actually exceeded MCL

Of those systems exceeding MCL:
92 Systems participating in bottled water project
70 Systems with permits to treat or consent agreement to treat or find alternate source
2 Candidates for further enforcement (failed to submit plans to comply)

Bottled Water Project
92 Current active participants/systems
8 Bottled water users that did not ultimately exceed MCL
10 Systems used bottled water until treatment installed
1 Dropped from project for failure to meet conditions

Bottled Water User Survey (response voluntary)
92 Systems surveyed
63% (58/92) Systems Responding
174 Average water use per system per month (gallons)
124 Average population served
53 Median population served
1.4 Average use per person per month (gallons)
$1.96 Average cost per person per month
100% Responses supporting continued use of bottled water

Conclusion

Most NCWS are very small with limited resources. Seventy-seven percent of Michigan's NCWS supplies serve 100 persons or less. Central treatment can be complex and require significant capital and operating expense. The water system operators at NCWS normally do not have the training or capability to successfully operate and maintain a central water treatment system. In addition, a poorly operated treatment system can concentrate contaminants in the drinking water and actually increase health risks.

POU systems may be less complex than central treatment, but can be expensive and still require proper maintenance and monitoring to assure protection of the user. The bottled water option approach is practical, more reliable, less complicated, and provides excellent, public health protection at these types of facilities. It also requires less capital outlay and can be implemented or discontinued, if necessary, in a much shorter time than the other corrective action solutions.

Federal Regulation does not currently allow the use of bottled water as a permanent solution to a violation of a drinking water standard. In 1998, Congress removed the provision that prevented the use of POU treatment devices to comply with an MCL. Thus, for the first time, Federal law allowed partial protection from drinking water exceeding a maximum contaminant level in a facility supplying water to the public. However, the prohibition of using bottled water to comply with an MCL was left in place. We have seen no convincing reasons documented as to why it is acceptable to connect a POU device to the water outlet in an NCWS, but it is not acceptable to shut off the outlet and replace it with an approved bottled water dispenser.

In summary, the use of bottled water can be a practical means of complying with the new arsenic standard at NTNCWS. It can be a viable compliance option at existing NCWS where a permanent supply meeting the standard cannot be obtained and treatment may not be practical. Bottled water has many advantages over arsenic treatment options in certain public water systems, and therefore, should be allowed for permanent use until a more reliable option is available.

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Bottled Water Report Addendum: 12/7/2006

The current number of active participants in the project is 83, down from 92 when the report was written in August of 2006. This change is due to systems connecting to municipal water, drilling new wells, installing treatment, or closing.

The compliance rate for submittal of monthly operation reports for 2006 is 84%. The 78% rate reflected in the August report was based all reports received / required since the inception of the Project. The compliance increase for 2006 reflects additional regulatory emphasis placed on reporting in that period.