EXHIBIT 90

HUFF POST COMMUNITY KINDNESS Sponsored by StateFarm

300 Plumbers Poured Into Flint, Michigan, To Install Water Filters For Free

"We certainly can help correct the damage that has been done!"

02/02/2016 03:46 pm ET

170 K

Elyse Wanshel
Trends Writer, The Huffington Post

ThinkProgress
@thinkprogress
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300 Union Plumbers Spent The Weekend Installing Water Filters For Flint Residents For Free thkpr.gs/3744770

6:30 PM - 1 Feb 2016

314 302

Everyone wants to see the city of Flint swim rather than sink — including plumbers.

More than 300 union plumbers from all over Michigan flooded Flint to install free filters for residents, this past weekend.

According to ABC12, not all the faucets in Flint can fit a filter, which each resident of the city desperately needs in order to get rid of lead in their drinking water. Some of the faucets are older and oddly shaped, making the installation of a filter nearly impossible.

Local plumbers with United Association Local 370 in Flint have been going door-to-door making sure that faucets are filter ready since October, reports Michigan

Radio. And last weekend, they got a boost from hundreds of union volunteers.

Upon the small army of plumbers' arrival on Saturday, they got a moving welcome from Local 370 official Harold Harrington.

Susan Maylone
@SusanMaylone

Follow

The MI Building & Construction Trades Council
400 union plumbers & pipe fitters stepping up to help Flint. Local 370

4:00 PM - 31 Jan 2016

41 41

"We did not cause this American tragedy in Flint," Harrington told the crowd. "But we certainly can help correct the damage that has been done!"

On Saturday alone, plumbers replaced faucets and filters in 800 homes. Plumbing Manufacturers International donated the faucets, which cost about $100 a pop according to ABC12, which is a price tag many residents of Flint cannot afford.

The problem with Flint's drinking water occurred several months ago when the Michigan city switched its water system from the Flint River and failed to use corrosion controls. The result was lead in the drinking water, which if consumed can lead to a laundry list of severe health risks.

Viva la causa!
@70torinoman

Follow

Flint water comes in three flavors. Corrosive brown, lead white, iron rust red. #FlintWaterCrisis (actual pipes)

5:25 PM - 24 Jan 2016

75 29

Some residents noticed something fishy in the drinking water right away.

“I was buying the water before we even realized they said all the lead was in it,” Berdie Johnson, a Flint resident, told Radio Michigan, “because the water was brown. Looked like Kool-Aid!”

The Economist
@TheEconomist

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A city where 40% live below the poverty line is suffering from brown, lead-poisoned water econ.st/1S9FPuO

7:17 PM - 24 Jan 2016

296 175

Since Gov. Rick Snyder admitted that he let residents down, tons of everyday folks and celebrities alike have donated money and sent water bottles to Flint, including Jimmy Fallon, Cher and Pearl Jam.

To make a donation, head to The United Way of Genesee County’s website.

UA Local 370 Plumbers Install Water Filters for Flint Resi...

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Here Are All The People Coming Toget...

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EXHIBIT 91

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2-85-111

INAL REPORT

600285111

Management of Point-of-Use Drinking Water Treatment Systems

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NATIONAL SANITATION FOUNDATION
ASSESSMENT SERVICES

PROPERTY OF THE
OFFICE OF SUPERFUND

MANAGEMENT OF POINT-OF-USE DRINKING WATER TREATMENT SYSTEMS

by

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Cooperative Agreement No. R809248010

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FOREWORD

The U.S. Environmental Protection Agency is charged by Congress with protecting the Nation's land, air, and water systems. Under a mandate of national environmental laws, the agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. The Clean Water Act, the Safe Drinking Water Act, and the Toxics Substances Control Act are three of the major congressional laws that provide the framework for restoring and maintaining the integrity of our Nation's water, for preserving and enhancing the water we drink, and for protecting the environment from toxic substances. These laws direct the EPA to perform research to define our environmental problems, measure the impacts, and search for solutions.

The Water Engineering Research Laboratory is that component of EPA's Research and Development program concerned with preventing, treating, and managing municipal wastewater discharges; establishing practices to control and remove contaminants from drinking water and to prevent its deterioration during storage and distribution; and assessing the nature and controllability of releases of toxic substances to the air, water, and land from manufacturing processes and subsequent product uses. This publication is one of the products of that research and provides a vital communication link between the researcher and the user community.

Treatment of drinking water at the point-of-use (POU) is under consideration as an approach to comply with the National Primary Drinking Water Regulations (NPDWRs). To effectively administer, maintain, amd monitor a system of POU drinking water treatment devices, an entity responsible for managing the system is required. This document addresses many of the issues a small community would encounter when considering such an approach to drinking water treatment.

Francis T. Mayo, Director
Water Engineering Research Laboratory

ABSTRACT

When public and/or non-public drinking water supplies become contaminated, it is often difficult to find an efficient, cost effective method for treating the water. Many small communities often lack the financial resources and technical expertise to solve such a problem.

One alternative solution which has been receiving more attention in recent years is treatment of contaminated water at the home, or point-of-use. While point-of-use treatment may present an efficient, cost effective solution to drinking water contamination, there may also be potential problems caused by this approach with the loss of control assumed for central treatment systems. When point-of-use treatment is the selected alternative, a sound program for management of point-of-use drinking water treatment systems is necessary to assure that all homes receive the desired quality of drinking water.

This document discusses steps which small communities should consider to implement proper installation and ongoing monitoring and maintenance of point-of-use treatment devices to assure public health and compliance with applicable regulations. Assuming that a water quality district is to be formed, the text outlines issues requiring consideration in management of point-of-use drinking water treatment systems.

This document was submitted in partial fulfillment of Contract No. R809248010 by the National Sanitation Foundation under the sponsorship of the U. S. Environmental Protection Agency.

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SECTION 1.

OVERVIEW

The Safe Drinking Water Act (PL 93-523) was passed in 1974 to ensure the public health of drinking water consumers throughout the United States by providing national water quality guidelines. Pursuant to the Act, the National Interim Primary Drinking Water Regulations (NIPDWRs) were established in 1975. The regulations apply to public water systems, which are defined in the Act as "systems of piped water intended for human consumption, regularly serving at least 25 people or having at least 15 service connections." This definition applies to both publically and privately owned water systems. "Regular" service is defined as service provided at least 60 days per year (1).

Both community and non-community water systems are considered public water supplies. A community system is one which serves at least 25 year-round residents or has at least 15 service connections supplying water to year-round residents. Non-community systems have at least 15 service connections or serve water to a daily average of at least 25 people, but generally serve transient populations. Examples of non-community systems include hotels, motels, restaurants, campgrounds, and some schools, churches, and factories.

The NIPDWRs established maximum contaminant levels (MCLs) for drinking water constituents having known health effects. The current MCLs include some organic and inorganic chemicals, radionuclides, and microbiological contaminants. The U.S. Environmental Protection Agency (EPA) is currently in the process of revising the NIPDWRs in efforts to establish National Revised Primary Drinking Water Regulations, under the requirements of the Safe Drinking Water Act. During the revision of the NIPDWRs, several groups of contaminants will be considered, including volatile synthetic organic chemicals (VOCs), synthetic organic chemicals (SOCs), inorganic chemicals (IOCs), microbiological contaminants, radionuclides, disinfection by-products, and other SOCs, IOCs, and pesticides not considered previously (2).

The Safe Drinking Water Act affects approximately 60,000 community water systems, 92 percent of which serve populations of 2500 or less (3). Many of these small systems are not in compliance with the MCLs, and face severe economic constraints associated with treatment of contaminated water supplies. The unit costs of constructing and operating small central treatment systems are very high. Compounding this problem is a lack of qualified personnel to operate small central plants.

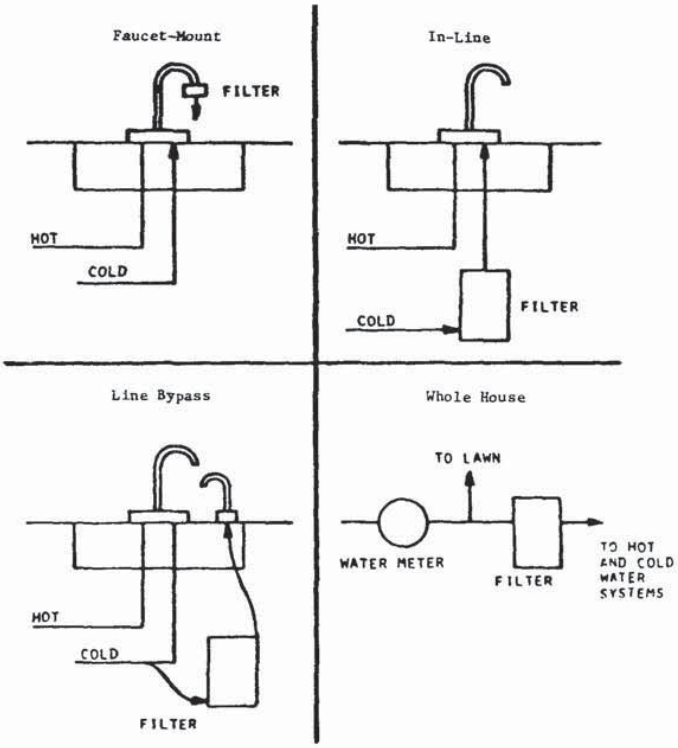
Alternatives to treatment include developing a new well or surface water source, connection to a neighboring public water supply, purchasing bottled

water for drinking and cooking, or hauling water from a nearby source. Constructing an alternate well or surface source, if possible, may be too costly. Small communities often draw their water from wells in the immediate vicinity, and access to a neighboring water supply of better quality may not be available. Bottled water may not be readily available (4). In many cases, treatment may be the only alternative.

If treatment is selected as a solution to a drinking water contamination problem, it may occur at a central plant or at the point-of-use (POU). Treatment is provided at residences or businesses using POU technology. POU treatment is currently used to control a wide spectrum of contaminants. A common application of this technology is for improving aesthetic water quality (i.e. to control taste, odor, and color). Another common application is to reduce levels of organic chemicals, including pesticides. POU technologies are also currently used to control turbidity, fluoride, iron, radium, cysts, chlorine, arsenic, nitrate, ammonia, and microorganisms. The alternative of decentralized treatment is under consideration by the EPA as a Generally Available Technology (GAT) to meet the requirements of the National Primary Drinking Water Regulations (2).

POU treatment approaches include batch process units, faucet-mounted devices, in-line devices, line-bypass devices, and whole-house treatment. A batch process device treats one batch of water at a time, is not connected to the water supply, and may rest on the kitchen countertop. Faucet-mounted devices are attached directly to the faucet or placed on the countertop with tubing connections to the faucet. In-line devices are installed between the cold water supply and the kitchen faucet, and generally treat the entire kitchen cold water supply. With the line-bypass approach, the cold water line is tapped to provide influent to a treatment device, which may be installed under the kitchen sink; a separate drinking water tap is provided. Line-bypass devices are designed to treat only water intended for consumption. Whole-house treatment has been proposed for contaminant removal (5) where potential health risks associated with skin contact and inhalation exist (6). With such a system, all water entering the home is treated. Simplified schematics of POU treatment approaches appear in Figure 1.

A sound program for management of POU treatment systems is necessary to assure that a desired level of treatment is provided to all sites, that prescribed monitoring and maintenance is carried out, and that the system is in compliance with applicable regulations. This may be accomplished through formation of water quality districts, generally created by an ordinance or resolution of local/state governing bodies. These districts may resemble existing districts used for water, sewage, or solid waste disposal. A water quality district should be an independent corporate body, with powers exercised by a board of directors, which would assume responsibility for the fiscal and operational aspects of POU treatment applications within its area of jurisdiction.



Furnished by P. Regunathan, Everpure Corporation, Westmont, IL.

Figure 1. Approaches to point-of-use treatment.

For POU treatment to be considered as a means of compliance with regulations, regulatory agencies will most likely require the establishment of a clearly defined body to assume responsibility for the system. Also, formation of an officially sanctioned district may open avenues for funding not otherwise available.

A generalized process diagram for water quality district formation is presented in Figure 2. The developmental phase begins with identification of the particular water quality problem(s) encountered and evaluation of possible alternatives. Assuming that POU treatment is selected as a solution, cost estimates for equipment, installation, monitoring, and maintenance need to be developed. Access to homes for equipment monitoring and maintenance must be granted by homeowners, and scheduling and logistics need consideration.

The approval process may begin with a public hearing, where the issues, alternatives, and concerns of the public are addressed. If property owners wish to form a water quality district, a petition to officially establish the district may need to be submitted to the local health department and/or regulatory agency. If approved, the district may require technical assistance for selection, procurement, and installation of equipment; obtaining sources of funding; and setting up monitoring and maintenance procedures. A pilot study on the effectiveness of treatment equipment may be desired.

This document presents an overview of the key topics to consider when implementing a water quality district for treatment of contaminated water supplies at the point-of-use. These topics include:

- Institutional considerations;
- Advantages and disadvantages of POU treatment;
- Types of contamination problems;
- Available sources of information;
- Estimating treatment costs and financing;
- Equipment selection and installation;
- Equipment maintenance and monitoring;
- Disposal of waste materials; and
- Public relations and education.

The appendices include names and addresses of agencies and organizations to consult for technical, regulatory, and economic guidance.

Steps for District Formulation	Phase
. Identify problem	DEVELOPMENT
. Consult regulatory agencies	
. Water testing	
. Make preliminary plans and maps	
. Estimate costs	
. Hold public hearing	APPROVAL
. Property owner petition	
. District formed by resolution of county/state supervisors	
. Directors appointed	
. Agreement with town board and property owners for cost recovery	
. Obtain funding	OPERATION
. Pilot demonstration	
. Select equipment	
. Equipment Installation	
. Authorize payments	
. Monitoring and Maintenance	
. Feedback and Education	

Figure 2. Water quality district formation chronology.

SECTION 2.

INSTITUTIONAL CONSIDERATIONS

A key issue to the effectiveness of POU treatment on a group or community level is the development of a workable water quality district management program which is acceptable to regulatory authorities. The district would be established by the municipality as a legal entity to obtain funding, incur costs, and assume responsibilty for the treatment systems. A comprehensive management plan, including provisions for equipment monitoring and maintenance, will maximize the rate of acceptance of POU treatment plans by regulatory agencies.

If a water quality district is formed to achieve compliance with drinking water regulations, POU devices should be installed at each site serviced by the public water supply to assure that water used for drinking and cooking is in compliance with the regulations. Also, right of access to treatment devices must be granted at each site serviced by the supply so that prescribed maintenance and monitoring can be carried out.

Several options are available for a water quality district to administer the use and maintenance of POU treatment equipment. A board of directors may be appointed, elected, or be composed of community volunteers. It may serve the district well to have a representative from local government on the board, such as a treasurer or clerk. A three-member water board allows division of tasks into the following categories:

- Treatment works (equipment installation, monitoring, and maintenance);
- Financing (rate setting, budget, levy or assessment, financial assistance); and
- Administration (billing, correspondence, agency coordination, public relations, education).

Some possible approaches to equipment ownership and maintenance include the following:

- Municipality or district owns and operates the POU treatment equipment;
- Municipality or district owns the equipment and contracts maintenance to private enterprise;
- District leases equipment to municipality;

- Equipment is privately owned; or

- Equipment is owned by the water purveyor, which would be subject to regulation by a public utility commission.

Overview of State POU Policies

Because regulatory responsibility for drinking water quality is generally under the jurisdiction of at least one state agency and one local unit of government, it is often difficult to characterize a state as having a particular overall policy on POU treatment. In order to collect information concerning current state regulations, policies, and attitudes regarding POU treatment, a questionnaire was sent to 73 members of the Conference of State Sanitary Engineers (CSSE), representing all 50 states and three U.S. possessions. CSSE members were asked whether they regarded POU treatment as a feasible option, whether a policy existed in their respective states, what agencies had authority governing POU treatment, what contaminants were currently being removed with POU technology, and what criteria would be included in a state policy, were it developed. Responses were received from 32 states and two U.S. possessions; a summary appears in Table 1.

Of the respondents, 47 percent believed POU treatment to be a feasible option, 35 percent did not consider POU to be feasible, and 18 percent said that POU treatment should be used only as a last resort, interim measure, or in a very limited capacity. Three respondents stated that POU treatment was feasible only with adequate institutional control and responsibility for operation and maintenance of treatment devices. Of the states which did not consider POU treatment a feasible option, three did not recommend POU treatment on public water supplies, and one responded that POU was not to be used for compliance with drinking water regulations. Most concerns focused on potential problems with operation, monitoring, and maintenance of treatment devices. Because of limited experience with such systems, additional supportive research and experience are necessary before some jurisdictions will consider developing a POU policy.

Nine states responding have an existing policy regarding use of POU treatment, and four states plan to develop or revise a policy. Nineteen respondents believed that such a policy was needed, including 12 states which currently have no policy. Present policies range from those authorities that basically do not allow POU treatment, or do so with considerable limitations, to those who take a cautious but open approach. Some existing state policies on POU treatment include:

- Application of plumbing codes providing for proper installation;

- Application of food and drug laws providing for truth in labeling of devices used for disease prevention (although this has not been directly implemented for POU devices, the state policy would include them);

TABLE 1. CSSE SURVEY SUMMARY

Question	Responses (number in parentheses)		
Number of states and possessions responding:	States (32)	Possessions (2)	
Do you believe POU treatment to be a feasible option?	Yes (16)	No (12)	Last Resort(6)
Who in your state has or will have authority to permmit installation of POU treatment equipment?	State (27)	Local (6)	Local Only (1)
Can POU treatment be used in your state?	Conventionally (14)	Experimentally (23)	
POU treatment systems are currently used for:	Tastes & Odor (17) Color (5) Softening (4) Fluoride (4) Radium (1) Radon (1) Chlorine (1) Ultraviolet disinfection (1) Unknown (5)	Organics (10) Pesticides (5) Turbidity/ Particulates (6) Iron (2) Ammonia (1) Arsenic (1) Cysts (1) Nitrate (1)	
Criteria regarding POU treatment systems does/would include:	Monitoring (12) Maintenance (11) Efficacy (10) Capacity (9) Size (9) Whole-house vs. tap (9) Depends on contaminants (2) Registration of devices (1) Approval of engineering plans (1) Manufacturer's specifications (1) Notification to potential house buyer (1)		

- Compliance of equipment to state public water supply construction standards;

- Use restricted to treatment for aesthetic purposes (taste, odor, or color);

- Use restricted to situations where treatment beyond drinking water quality is desired (food processing, dialysis water, pharmaceutical applications);

- Use restricted to private wells; and

- For use on a public water supply, state health department must first review and approve plans (two responses).

Five respondents stated that POU treatment equipment was to be used at the individual's discretion, and that equipment use could not be regulated. One state reported an informal and unwritten policy which leaves the choice to individual homeowners. Two respondents commented on the need to develop either a federal policy or a national approval mechanism to assure proper use of POU treatment equipment and to provide a standardized approach throughout the country.

None of the states from which responses were received have statutes placing a general prohibition on the use of POU treatment. In fact, there is no legal precedent for preventing an individual from using a POU device, providing there is no demonstrated adverse impact on the community. However, appropriate regulatory authorities are required to exercise discretion when considering use of these devices on public water supplies, or when individual wells are proven to be contaminated. For the most part, each potential application of POU technology is reviewed individually.

Statutory responsibility for drinking water quality was divided among those agencies responsible for public health and for environmental protection. Permitting of POU treatment systems in 27 states is accomplished, at least partially, through state agencies. While local agencies can establish policy and adopt regulations in six states, only one respondent reported that this authority rested exclusively with local agencies. In addition, there may be involvement by agencies enforcing plumbing codes, particularly with respect to installation of treatment devices.

The majority of respondents believed POU treatment should be used only when a traditional treatment system is not feasible or cannot provide drinking water of satisfactory quality. Fourteen states did report, however, that POU devices were being used by individuals on either private wells or public water supplies. This may be partially attributed to the inability of a regulatory agency to control private use. Experimental use of POU technology was reported in 23 states, six of which limited use to experimental applications only.

Current applications of POU technology include taste, odor, and/or color removal (22 responses); organics removal, including pesticides (15 responses);

reduction of turbidity and/or particulates (6 responses); fluoride reduction (4 responses); softening (4 responses); and iron removal (2 responses). One response was recieved for each of the following contaminants: ammonia, radium, radon, arsenic, cysts, chlorine, nitrate, and bacteria (ultraviolet light). Five states responded that applications were unknown because use was confined to either private wells or individual homes.

Criteria for POU treatment systems were virtually non-existent in the states responding. Of the authorities providing information, none reported established state criteria. However, 12 states reported that a provision for monitoring the units would be included in a state policy, if one is developed. The need for establishing a monitoring program is based on the general feeling that a homeowner may not have sufficient expertise to inspect the unit for proper performance, and may not replace system components when needed. Consequently, 11 respondents also felt some provision should be made for maintenance of treatment devices.

Other frequently mentioned criteria were treatment efficacy (10 responses), capacity of treatment devices (9 responses), and size of equipment (9 responses). These criteria could be met by manufacturers through performance data, conditions for use, and equipment specifications provided via sales literature. In addition, nine respondents stated that whole-house treatment versus single tap treatment was a criterion to consider for proper application of POU technology. Other criteria (1 response each) included implementing truth in advertising and/or labeling laws, registration of POU devices, approval of engineering plans, and a provision for notifying potential house purchasers that a POU device was installed in a residence. Two respondents mentioned that criteria would depend on the contaminant being removed and the conditions for use.

New York State Policy

One state which has developed POU policy and criteria is New York. An act to amend county and town law to include provisions for the creation and implementation of water quality districts has been approved in the State of New York (7). Although the legislation deals exclusively with POU treatment on private wells, the act covers the institutional considerations that a public water system would need to address in establishing a water quality district, and serves as a good example of a mechanism for forming a district.

The act authorizes counties and towns to create special districts, or water quality treatment districts. The districts may be formed by a resolution of the county board of supervisors upon petition, following a public hearing. The petition may be executed by one or more owners of taxable real property in the proposed district. A copy of the petition is sent to the state health department. Before the public hearing, maps and plans showing the location of the benefitted properties and estimated costs for improvements must be submitted to and approved by the state health department.

The purpose of the district is to procure and install POU treatment devices, assist agencies in finding sources of contamination, implement remedial measures to reduce contamination, conduct public meetings, issue annual

reports, and assure maintenance of treatment devices and protection of the public. The district may be composed of either contiguous or noncontiguous parcels of property.

The town or county board of supervisors may establish or appoint a supervisory board or officer for the district. The officers are required to develop estimates for costs of monitoring, testing, and operation of treatment devices; to estimate anticipated revenues and expenditures; and to determine the amount each parcel of property is to be charged. An agreement between the town board and property owners is to be reached before procurement and installation of treatment devices. The district may authorize annual installments, subject to existing tax laws covering collection and enforcement of payments. Property owners must grant a right of access to the district for sample collection, monitoring, and maintenance of treatment devices.

Summary

In summary, institutional issues which should be considered when establishing a water quality district include:

- Determining whether the purpose of the district is for compliance with drinking water regulations or for reduction of non-regulated and/or secondary contaminants;

- Establishing a legal entity to obtain funding, incur costs, and assume responsibility for POU treatment systems;

- Granting the right of access to all sites serviced by the water supply; and

- Including clearly defined provisions for equipment ownership, installation, monitoring, and maintenance.

SECTION 3.

POINT-OF-USE AND CENTRAL TREATMENT COMPARISON

Treatment Costs

Central treatment is cost effective as long as the capital and operating costs can be spread over a large number of customers. As community size decreases, per capita capital and operating costs for central treatment systems increase at an accelerated rate. Economies of scale often prevent the construction of central treatment plants for contaminant removal for small water systems.

As an example, the relationship between monthly customer cost and average daily flow for small communities using central activated alumina treatment (for reduction of fluoride) is depicted in Figure 3 (8). As average daily flow decreases, the monthly customer costs increase dramatically. POU treatment would become more cost effective at low total daily flows. Because no capital intensive treatment facility is required, costs for POU treatment may be significantly lower than costs for central treatment in small communities.

When a public water supply has an existing central treatment and distribution system, treatment alternatives may include upgrading the treatment plant or installing POU devices in residences and businesses. When no central treatment and distribution system exists, as with a group of private wells, POU treatment provides a substantial cost advantage. However, monitoring and maintenance would be more costly for a system of private wells because of variable water quality.

Operations

Many small central systems have unlicensed plant operators, who may only be available on a part time basis. Small water systems typically cannot afford the services of full time, experienced plant operators. This inability to retain qualified full time personnel may compound problems associated with central treatment on a small scale; the tight control of finished water quality associated with central systems may not be realized.

A major concern of regulatory agencies with POU treatment is the loss of control in monitoring treatment effectiveness and assuring routine maintenance. POU treatment presents logistical difficulties in regular sampling of all operating units, while homeowners are generally not trained in operation and maintenance of treatment devices. If replacement parts such as media cartridges are not replaced prior to exhaustion, the device will no longer provide treatment, or, in extreme cases, the contaminant level in the

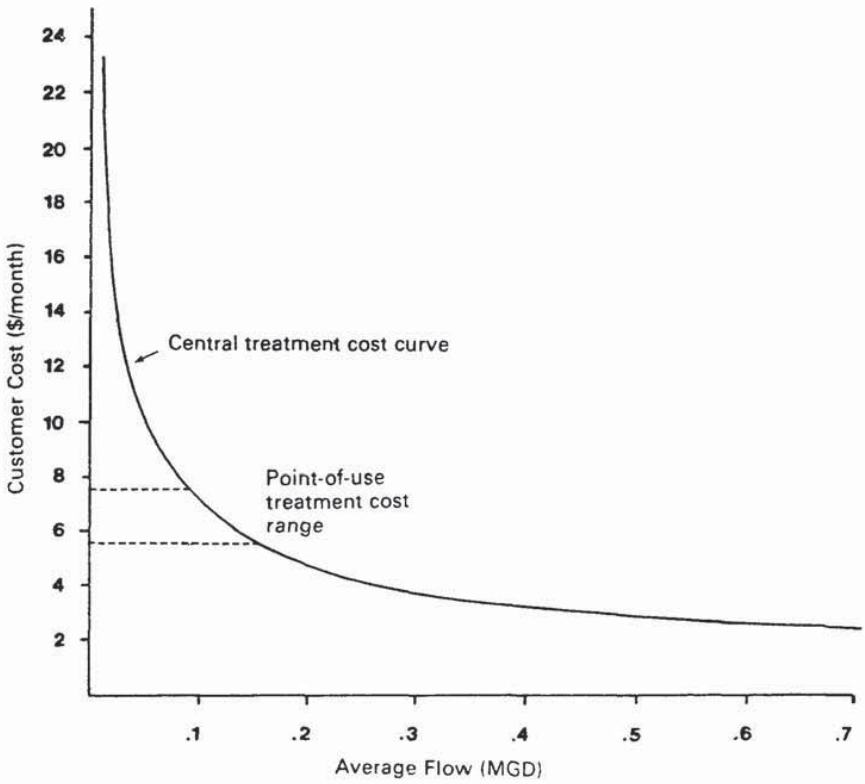


Figure 3. Central and POU treatment costs for activated alumina.

postdevice water may actually increase as contaminants leach from the media into the water. A sound program for POU treatment device monitoring and maintenance is essential to deal with the more complex logistics of POU treatment.

Poor source water quality may significantly degrade POU treatment efficiency, and pretreatment may not be possible or economical. For example, fluoride sorption on activated alumina from water with high alkalinity cannot be optimized with POU treatment. At high alkalinity, the rate of hydroxide ion displacement by fluoride is depressed and in such a case, the activated alumina will have a reduced fluoride reduction capacity. Full knowledge of source water quality is required to consider and size treatment techniques.

POU treatment may provide a drinking water of overall quality superior to that achievable with central treatment. An example is removal of trihalomethanes, which may be reduced to a lower level than economically feasible with central treatment (9). Another advantage to treatment at the point-of-use is that contaminants from the distribution system, such as disinfection and corrosion by-products, may be controlled.

Another operational consideration with POU treatment is the susceptability of media beds to microbial growth (10-13). Standard plate count organisms have been detected in POU treated water samples in higher numbers than in corresponding untreated water samples for treatment devices employing activated carbon, activated alumina, and reverse osmosis (8,13). It has not been established that the increased microbial densities in POU treated water will cause health problems.

Bacterial colonization of media beds is not unique to POU treatment systems. Central treatment systems, however, normally provide disinfection after treatment. Disinfection after POU treatment may be provided by ultraviolet light, ozone, or halogen compounds, but such post-disinfection will increase the costs and complexity of POU treatment.

Flexibility of Treatment

When treatment is desired for a specific segment of a population, POU may present a cost effective, viable alternative. For example, infants are adversely affected by nitrate levels which do not affect other members of a household (14). In areas of high nitrate levels, households without infants may not require treatment. Treatment focused on need is an important advantage of the POU treatment alternative.

Some organic chemical compounds (e.g. benzene) may be equally or more dangerous when inhaled or absorbed through the skin than when ingested (6). For these types of compounds, whole-house treatment should be considered.

POU treatment may also provide a good emergency response technique for temporary problems such as a Giardiasis outbreak or transient chemical contamination of a water supply. It can also be used to treat water to drinking water quality on a temporary basis while more permanent solutions are being investigated, planned, and implemented.

Summary

To summarize, treatment for a drinking water contamination problem may be provided at a central plant or at the point-of-use. Central treatment has the following associated advantages and disadvantages when compared to POU treatment:

Advantages of Central Treatment:

- Positive control of water quality through operation, maintenance, monitoring, and regulatory oversight;
- All water is treated to drinking water standards;
- For large communities, economies of scale for both capital and operating costs; and
- Flexibility of operation - ability to extend treatment cycles by blending water from more than one reactor.

Disadvantages of Central Treatment:

- Capital and operating costs may be prohibitive for small communities;
- Lack of trained plant operators and high operator turnover rates, especially for small systems; and
- Significantly more water will be treated to drinking water quality than may be needed for drinking and cooking.

POU treatment has the following associated advantages and disadvantages when compared to central treatment:

Advantages of POU Treatment:

- Only water intended for consumption may need to be treated;
- Costs per customer may be significantly lower for small communities;
- Provides a means for private well owners to treat their water to assure continual supply;
- Treatment may be focused on need;
- Some forms of treatment may provide greater contaminant reduction than with central treatment.

Disadvantages of POU Treatment:

- Greater complexity associated with control of treatment, monitoring, routine maintenance, and regulatory oversight;

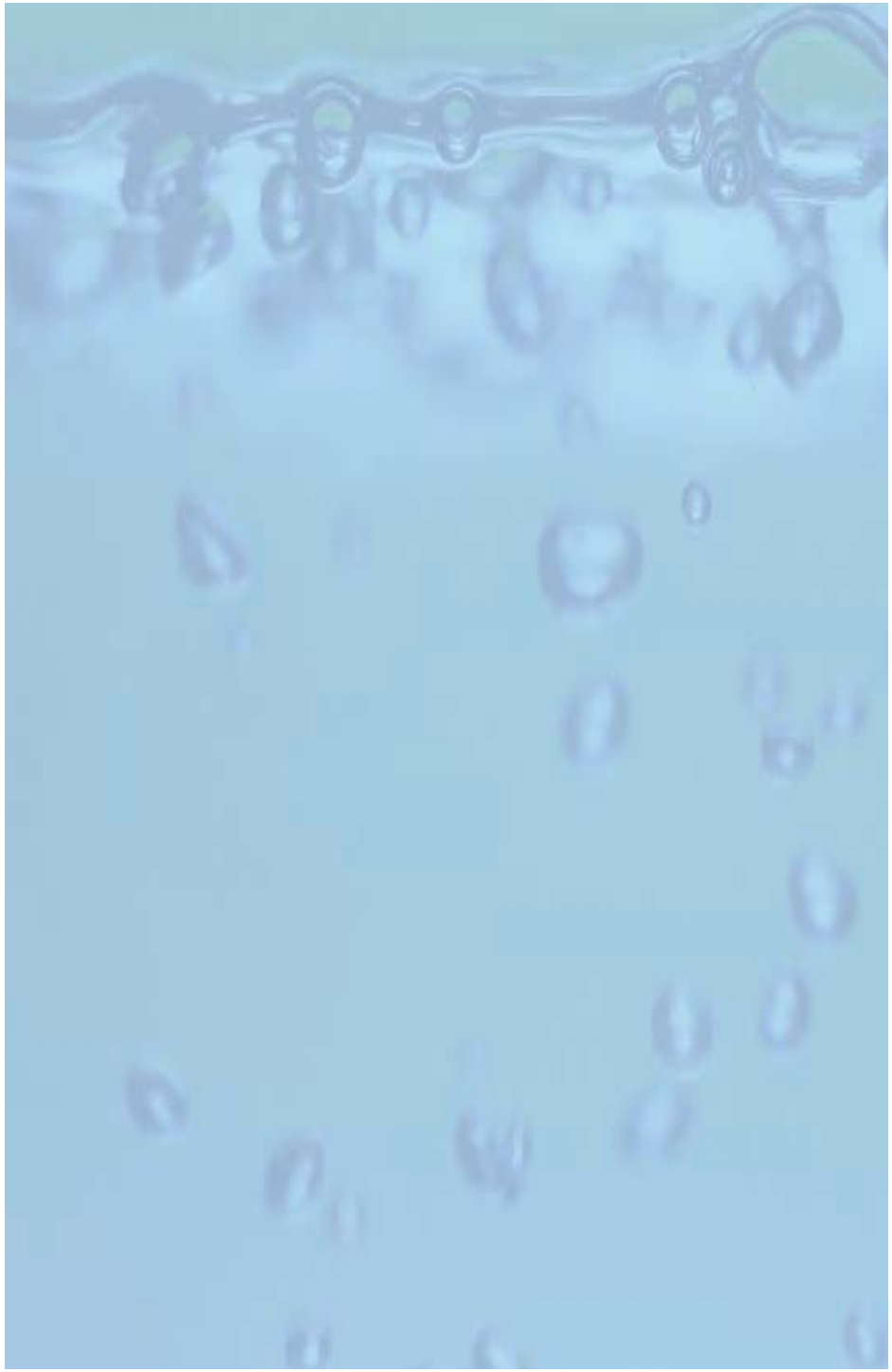
- Life and efficiency of treatment units are dependent on source water quality;

- Monitoring costs will be higher than with central treatment; and

- Media beds may be susceptible to microbial growth.

EXHIBIT 92

WATER HEALTH
SERIES
Filtration Facts
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY



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Point of use devices pg.5

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Certification pg.7

Contact information pg.8

EPA registration of water filters *(Sidebar)* pg.8

Advice for people with severely compromised immune systems

Some people may wish to take special precautions with the water they drink. In particular, people with immune systems that are weakened by AIDS, chemotherapy or transplant medications are more vulnerable to microbial contaminants in drinking water such as *Cryptosporidium*.

Cryptosporidium is a microscopic parasite that lives in the intestine of infected animals and humans. It passes in the stool in its dormant oocyst form. The oocyst is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine-based disinfectants. It occurs mainly in surface water sources, such as lakes, streams and rivers. In healthy adults, *Cryptosporidium* can cause illness, but for people with weakened immune systems, it can cause severe illness and even death.

Those who wish to take extra measures to avoid waterborne cryptosporidiosis can bring their drinking water to a boil for a full minute. ***Boiling water is the most effective way of killing Cryptosporidium.*** As an alternative to boiling water, people may take the following measures:

Use a point-of-use filter

Consider using point-of-use (personal use, end-of-tap, under sink) filters that remove particles one micrometer or less in diameter. Filters that use reverse osmosis, those labeled as "absolute one micron filters," or those labeled as certified by an American National Standards Institute (ANSI) - accredited organization to ANSI/NSF Standard 53 for "Cyst Removal" provide the greatest assurance of removing *Cryptosporidium*. As with all filters, follow the manufacturer's instructions for filter use and replacement.

Use bottled water

Check the label or call the bottler to find out how bottled water is treated. The following bottled water treatments protect against *Cryptosporidium*: reverse osmosis, distillation, ultraviolet light, or filtration with an absolute one micron filter. Bottled waters derived from protected well and spring water sources are less likely to be contaminated by *Cryptosporidium* than those containing untreated municipal drinking water from less protected sources such as rivers and lakes.

Those who choose to take these precautions should remember that they can be exposed to waterborne pathogens through water used for brushing teeth, making ice cubes, and washing fruits and vegetables – not just through water they drink.

Home Water Treatment Facts

Americans spend billions of dollars each year on home water treatment units. According to the Water Quality Association, more than four out of 10 Americans use a home water treatment unit. These units range from simple pitchers costing less than $20 to sophisticated reverse osmosis units costing hundreds of dollars.

Some people use a home water treatment unit to improve the taste of their tap water. Others treat their water because of health concerns. While EPA does not endorse specific units, the Agency does set and enforce national standards for the tap water provided by public water systems.

Drinking water can reasonably be expected to contain at least small amounts of some contaminants. As long as those contaminants are at levels no higher than EPA standards, the water is considered safe to drink for healthy people. People with severely weakened immune systems or other specific health conditions, or those concerned about specific contaminants present in local drinking water, may wish to further treat their water at home or purchase high quality bottled water.

Before purchasing a home water treatment unit, consider local water quality, cost and maintenance of the unit, product performance, and certifications to make sure that the unit will meet your needs.

Local water quality

Begin by learning as much as possible about your tap water. If you haven't already received it, contact your local water supplier and ask for the annual water quality report (sometimes called a consumer confidence report). This report lists the levels of contaminants that have been detected in the water and shows how these levels compare with EPA's drinking water standards.

Some contaminant levels remain constant throughout the year, while others vary according to season, weather, or from house to house. For example, lead typically occurs when it leaches from the lead pipes and solder that are in some homes. If you are concerned about a contaminant whose level may vary, consider getting your water tested (use a certified laboratory for the most reliable results). Use this information to help decide on a home water treatment unit.

If your water comes from a household well, EPA recommends annual water testing for nitrates and coliform bacteria. In addition, check with your health department or local water systems that use ground water for information on contaminants of concern in your area.

Armed with this specific information, you can determine your purpose in buying a home water treatment unit: to remove specific contaminants; to take extra precautions because a household member has a compromised immune system; to improve the taste of the water, or some combination of these concerns.

Improve taste

If you object to the chlorine taste of your tap water, try placing the water in an uncovered pitcher in the refrigerator overnight. This will reduce the chlorine taste. Most tap water is treated with chlorine to kill disease-causing microbes. Water systems use chlorine because it is an effective disinfectant for viruses and bacteria, and because it continues to disinfect water as it travels through pipes.

Reduce lead

If you have tested your water and know that it has high levels of lead, or if your home has lead pipes, flush the cold water tap by running it until it becomes cold if the water hasn't been used for several hours. Lead accumulates after extended contact with lead pipes. You may use this flushed water to water plants and do other household chores.

Cost and Maintenance

Prices vary depending on type (pitcher, faucet filter, etc.), where and how the unit is installed, and what contaminants it removes. Prices can range from $20 for a simple pitcher to hundreds of dollars for a reverse osmosis unit.

All units require some maintenance, and it is important to follow the manufacturer's recommendations for replacements. For example, activated carbon filters are designed to filter a certain amount of water; after that, the filters become clogged and ineffective. Check the schedule and cost for replacement filters.

Performance

The following information briefly describes how different types of home water treatment units work. ***For details, read information that accompanies the product and look for independent certification of manufacturers' claims.***

Different units remove different contaminants or classes of contaminants from the water. Sophisticated units may use multiple technologies to remove several types of contaminants and to provide backup protection in case one treatment fails.

A water treatment device can either be free-standing, attached to a tap, plumbed in with a dedicated faucet (also called a point-of-use device) connected to a refrigerator's water and ice dispensing system; or centrally attached to treat all water entering a house (a point-of-entry device).

For most contaminants, a point-of-use device is effective for treating only the water that is consumed. However, some contaminants, such as radon, disinfection byproducts, and some organic chemicals, easily turn

Kill microbes

If you have a contaminated private well, have special health needs (see left side of page 2), or in an emergency situation such as a flood, boil water for one minute to kill microbes (or three minutes at altitudes greater than one mile) and place in a clean, covered container.

into gases and may pose a risk when inhaled, such as when showering. A point-of-entry device can reduce concentrations of these contaminants and others that cause aesthetic problems such as scaling, staining, or odor.

Point-of-Use Devices:

Filter pitchers: *Water filtration pitchers are an affordable and commonly used free-standing home water treatment device. Most water pitchers use granular-activated carbon and resins to bond with and trap contaminants. These filters are effective at improving the taste of water, and many will also reduce lead and other contaminants.*

Specific contaminants removed vary by model and depend on the pore size and other factors. An activated carbon filter, by itself, is not designed to remove all disease-causing organisms. Carbon filters have a specified shelf life and should be replaced regularly according to the manufacturer's instructions.

How filters work

A water filter is composed of a screen with many microscopic holes. The smaller the holes, the more contaminants the filter can remove. Filter holes are measured in microns. (The period at the end of this sentence is 500 microns.) When considering filter size, look for an absolute (the largest hole), not a nominal (the average hole), rating. EPA and CDC recommend an absolute one micron filter (or one labeled for cyst removal) to remove Cryptosporidium.

Some contaminants and their size in microns:

Giardia lamblia - 8 to 12 microns

Cryptosporidium parvum - 4 to 6 microns

Bacteria *(such as E. coli* and *salmonella)* - 0.2 to 4 microns

Viruses - 0.004 to 0.1 microns (Generally, only a few filters, such as ultrafilters and reverse osmosis, have holes small enough to assure removal of all viruses. However, viruses can be killed using a disinfectant).

Filters that attach to a faucet or are installed under the sink for a drinking water third faucet: *These filters generally use the same technologies as their pour-through pitcher counterparts. Some filters use fabrics, fiber, or ceramic screening to physically remove contaminants. The most common types use a molded block of activated carbon. These filters are effective at improving the taste of tap water, and some will also reduce lead, protozoan cysts, and many other contaminants. Like filter pitchers, shelf lives and specific contaminants removed vary so read the label and instructions carefully.*

Distillers: *Distillers heat water to the boiling point, and then collect the water vapor as it condenses, killing disease-causing microbes and leaving most chemical contaminants behind. Contaminants that easily turn into gases, such as gasoline components or radon, may remain in the water unless the system is specifically designed to remove them. Distilled water may taste flat to some people because the water's natural minerals and dissolved oxygen often have been removed.*

Reverse Osmosis Units: *Reverse osmosis units force water through a semi-permeable membrane under pressure, leaving contaminants behind. Reverse osmosis units use approximately three times as much water as they treat, but they are effective in eliminating all disease-causing organisms and most chemical contaminants.*

Point-of-Entry Devices:

Adsorptive media: *Liquids, solids, dissolved or suspended matter adhere to the surface of, or in the pores of, a solid material. Carbon filters use this technology.*

Aerators: *Aerators force water to travel over air jets. Contaminants that easily turn into gases, such as gasoline components and radon, are removed. Other contaminants are not. The water may be additionally filtered after it passes through this system to remove additional contaminants.*

Removing specific contaminants

Giardia and Cryptosporidium - distillation, reverse osmosis, absolute one micron filters, ultraviolet light, and filters certified for cyst removal.

Bacteria and viruses - distillation, reverse osmosis, ultraviolet light, and disinfection.

Arsenic - adsorptive media

Disinfection byproducts - point-of-entry adsorptive media systems distillation, aeration, carbon filtration and reverse osmosis.

Lead - distillation, reverse osmosis and some carbon filters.

Nitrates - distillation, reverse osmosis or ion exchange.

Pesticides - some carbon filters.

Radium - ion exchange, distillation or reverse osmosis.

Radon - activated carbon filter and aeration.

Water Softeners: *Water softeners use a cation exchange resin, regenerated with sodium chloride or potassium chloride, to reduce the amount of hardness (calcium, magnesium) in the water. The hardness ions in the water are replaced with sodium or potassium ions. Ion exchange water softeners simultaneously remove radium and barium while removing water hardness.*

Certification

Make sure that the unit you intend to purchase can address your concerns. There are three different certifications to look for on the label. These organizations can also assist you in selecting a device that meets your needs. If a home water treatment unit isn't certified by one of these organizations, contact the manufacturer directly and ask for proof of the manufacturer's claims.

Three organizations are accredited by the American National standards Institute (ANSI), and they each certify units using ANSI/NSF standards. Each ANSI/NSF standard requires verification of contaminant reduction performance claims, an evaluation of the unit, including its materials and structural integrity, and a review of the product labels and sales literature. Each certifies that home water treatment units perform to meet or exceed ANSI/NSF and EPA drinking water standards. ANSI/NSF standards are issued in two different sets, one for health concerns (such as removal of specific contaminants) and one for aesthetic concerns (such as improving taste or appearance of water). Certification from these organizations will be tied to one or both of these specific standards.

NSF International: *The NSF Water treatment Device Certification Program requires extensive product testing and unannounced audits of production facilities. The goal of this program is to provide assurance to consumers that the water treatment devices they are purchasing meet the design, material, and performance requirements of national standards.*

EPA registration of water filters

Some units have an EPA registration number and an EPA establishment number. EPA registration (unlike that of NSF, WQA, or UL) is not intended to guide consumers in selecting a water treatment device, and is not an endorsement of the product. EPA registers any product that contains an antimicrobial (germ-killing) or bacteriostatic (slowing or inhibiting growth of germs) agent. EPA registers these products because consumers cannot independently verify whether the germ-related claims they make are true.

For most units, an EPA registration number means that the filter uses a bacteriostatic agent to slow the growth of microbes within the filter, the unit does not pose a human health threat, and EPA has verified all bacteriostatic claims on the label. Registration is not an endorsement of the filter or its performance. The most commonly used bacteriostatic agent is silver.

Underwriters Laboratories: *Underwriters Laboratories, Inc., is an independent, accredited testing and certification organization that certifies home water treatment units which meet or exceed EPA and ANSI/NSF drinking water standards of contaminant reduction, aesthetic concerns, structural integrity, and materials safety.*

Water Quality Association: *The Water Quality Association is a trade organization that tests water treatment equipment, and awards its Gold Seal to systems that meet or exceed ANSI/NSF standards for contaminant reduction performance, structural integrity, and materials safety.*

For more information about water treatment units:

NSF International
P.O. Box 130140
Ann Arbor, MI 48113-0140
877-8-NSF-HELP; (877) 867-3435
www.nsf.org
info@nsf.org

Underwriter's Laboratories, Inc.
333 Pfingsten Road
Northbrook, IN 60062-2096
(877) 854-3577
www.UL.com/water
mail to: ***water@us.ul.com***

Water Quality Association
4151 Naperville Road
Lisle, IL 60632-3696
(630) 505-0160
www.wqa.org
info@mail.wqa.org

EPA also registers a type of water treatment device known as a purifier. A purifier must remove, kill, or inactivate all types of disease-causing organisms from the water, including viruses. Few water treatment devices can meet these criteria. These units typically work using a disinfectant within the filter to kill or inactivate microbes. Most purifiers are used by hikers or campers and are not generally needed in homes served by public water systems unless there is a water emergency.

EPA's Office of Pesticide Programs' Antimicrobial Division website provides additional information on EPA product registrations, ***www.epa.gov/oppad001***. You may also contact the Antimicrobial Hotline at 703-308-0127 (phone); 703-308-6467 (fax); or e-mail ***info_antimicrobial@epa.gov.***

For more information about tap water:

EPA's Safe Drinking Water Hotline
1 (800) 426-4791

www.epa.gov/safewater *- includes drinking water standards, state certification officers for water testing, and information for household well owners.*

www.epa.gov
September 2005
816-K-05-002

EXHIBIT 93

The Public Health and Safety Organization

Certified Product Listings for Lead Reduction

Special Supplement for the Flint Water Crisis

About this guide

In response to the Flint water crisis, there has been an unprecedented demand for information on home water filters certified to reduce the levels of lead in the municipal water serving residents and businesses in Flint, Michigan. NSF International has received many requests for information on which filters are certified for lead reduction and any limitations in the use of these filters.

NSF International has created this guide that lists all NSF-certified filters for lead reduction in drinking water. This guide also explains the NSF standards and the process by which NSF International verifies a filter's ability to reduce lead in drinking water.

About NSF International and Its Role Certifying Water Filters

Who is NSF International?

NSF International is an independent, not-for-profit organization that writes standards, and tests and certifies products for the food, water and consumer goods industries to minimize adverse health effects and protect the environment. Founded in 1944 at the University of Michigan School of Public Health (as the National Sanitation Foundation), NSF International is now an independent organization that is committed to protecting human health and safety. NSF International's standards and product certifications are relied on extensively by regulators, manufacturers, retailers, consumers and public health officials. Additionally, NSF International is a World Health Organization/Pan American Health Organization Collaborating Center on Food Safety, Water Quality and Indoor Environment.

How are NSF standards developed?

NSF International uses a consensus-based process to develop national standards which means

that regulators (including the U.S. EPA), consumers, academia and industry are involved in developing standards to ensure they are protective of public health. NSF International is accredited by the American National Standards Institute (ANSI) for standards development and product certification. NSF International drinking water certification programs are accredited by ANSI to ensure objectivity and transparency. Additionally, NSF standards receive public health ratification from its Council of Public Health Consultants which is comprised of representatives from government, academia and public health. NSF International has developed over 90 consensus national standards.

What are NSF's water filtration standards?

In the 1970s, NSF International led the development of the American National Standards for materials and products that treat or come in contact with drinking water, including water filters used in homes and businesses. NSF/ANSI Standard 53 for Drinking Water Treatment Units is the nationally recognized standard for evaluating and certifying drinking water treatment systems for the reduction of contaminants from drinking water. NSF/ANSI Standard 58 is the national recognized standard for Water Treatment Systems that use reverse osmosis technology. Water filters are tested and certified to NSF/ANSI 53 and 58 to ensure they reduce contaminants, including lead, per the requirements of the standards.

How does NSF test water filtration products?

Manufacturers voluntarily submit products to NSF International for independent testing and certification to NSF/ANSI Standard 53 and 58. NSF International performs a thorough product review and evaluation, and conducts rigorous product testing to verify that the product meets the requirements of the standard. This product testing and evaluation is carried out in NSF's ISO 17025-accredited laboratories located in Ann Arbor, Michigan. NSF certified water filters for lead reduction have been evaluated in a study using water that contains 150 parts per billion (ppb) of lead. This lead concentration is ten times higher than the U.S. EPA maximum allowable level in drinking water. The filters are challenged at this level of contaminated water for beyond the filter's claimed service life-cycle. Certification is only confirmed when the product has met all of the lead reduction and other requirements of the standard. NSF also audits the facilities in which the products are manufactured annually to ensure the product being manufactured meets the standard.

Filters Certified to Reduce Lead

Several different types of water filters have been certified by NSF for reducing lead in drinking water:

Filters Certified to NSF/ANSI Standard 53 Reduction Claims for Drinking Water Treatment Systems

- **Pour-through pitcher/carafe:** Water drips through a filter in a water pitcher using gravity.
- **Faucet mount:** Mounts on kitchen faucet. Uses diverter to direct water through a filter.
- **Counter-top connected to sink faucet:** Connects to existing sink faucet through a hose/tubing.
- **Plumbed-in to separate tap or to kitchen sink:** Installs under a sink; filtered water is usually dispensed through a separate faucet directly to the kitchen sink.

Filters Certified to NSF/ANSI Standard 58 Reduction Claims for Reverse Osmosis Drinking Water Treatment Systems

- **Reverse Osmosis (RO):** Connects to your plumbing under the sink and uses a membrane filter to reduce lead (also can reduce minerals/Total Dissolved Solids).

Look for the NSF mark to ensure the filter or cartridge you are buying is certified. It must say NSF/ANSI 53 or NSF/ANSI 58 to be sure it reduces lead.

How Filters Reduce Lead in Water

NSF International certified water filters reduce the amount of lead in drinking water:

- Water dispensers or filters attached to the faucet allows the water to flow through adsorption media which captures contaminants such as lead.
- Contaminants, such as lead, are trapped in the filter and remain inside the filter, reducing their presence in the finished drinking water.
- Filters must be replaced according to the manufacturer's recommended filter capacity so they can continue to reduce lead and other contaminants for which they are certified. NSF certified filters reduce the contaminants as shown on the product's box or manual.
- Many filters have meters or indicators that show when the filter needs to be replaced. Review the manufacturer’s specifications for details on filter change frequency and filter capacity.

Please keep in mind:

- Only qualified laboratory testing can reliably confirm the amount of lead in drinking water. Home test kits may not provide an accurate measurement of water quality.
- Minerals are present in all natural waters (sometimes referred to as Total Dissolved

Solids) and do not indicate the presence or absence of lead. The presence of Total Dissolved Solids (minerals) in filtered water does not mean the water filter is not working to reduce lead.

How to Properly Use NSF Certified Water Filters

Water filters need to be changed regularly in order to reduce lead and the other contaminants for which they are certified. Follow the manufacturer's instructions that come with your water treatment system and replace filter cartridges and other items as recommended using NSF certified filters.

Why filters must be changed

Many filtration systems use carbon, charcoal or a blend of filter media to help reduce impurities. These systems generally reduce contaminants in one of two ways:

- Some contaminants are filtered mechanically, meaning the particles are large enough to be trapped in the pores of the filter. Eventually, the pores of the filter become so clogged with debris that water is unable to move through the filter effectively.
- Other contaminants adhere or adsorb to the surface of the filter media. Over time, the surface area of the filter media becomes filled and no more contaminants can be adsorbed.

While the former is easy to spot (the flow rate of the water being produced by the system slows dramatically), it's not as easy to tell when the surface area of the filter media has become full and needs to be changed.

How often they need to be changed

The recommended filter change cycle varies from one product to the next. Home filtration systems usually have established "service cycles," however extra precaution should be take when tap water contains high levels of contaminants.

- Certification to NSF/ANSI 53 requires manufacturers to state the filter capacity, which is the volume of water that can pass through a filter before it must be changed.
- To ensure the filter continues to reduce contaminants, replace it when it has reached the manufacturer's recommended filter capacity. The filter capacity will be listed in the specifications on your product's owner's manual or on the product packaging. Many products also have a device that indicates when the filter must be changed.

Choosing the right replacement cartridge

Filter cartridges are not universal.

- While a non-certified cartridge may look similar in size and even appear to fit inside the housing of a water treatment system, even the smallest size difference could allow contaminated water to go around the cartridge rather than through it.
- Non-certified filter cartridges may not be of the same quality as the manufacturer's recommended replacement. This could result in the water not being filtered effectively or even the introduction of chemicals into the water from materials that were never verified to be acceptable for drinking water.

To ensure your water treatment system is performing effectively, use the proper replacement cartridge and change your filter at the recommended interval.

Contacts

The following resources may provide answers to your questions.

U.S. EPA Safe Drinking Water Hotline

- Website: www.epa.gov/your-drinking-water/safe-drinking-water-hotline
- Phone: 1 800.426.4791

State of Michigan Department of Environmental Quality

- Website: www.michigan.gov/deq
- Phone: 1 800.662.9278

Genesee County Health Department

- Website: www.gchd.us
- Phone: 1 810.257.3612

NSF International

- Website: www.nsf.org/info/leadfiltrationguide
- Email: info@nsf.org
- Phone: 1 800.673.8010

Certified Product Listings

EXHIBIT 94

Free Water Filters Available

Free Water Filters and Installation Information will be Available to Flint Residents at Flint Area MDHHS and GCCARD Locations Monday – Friday, 9:00am – 4:00pm

Residents currently receiving help from the Michigan Department of Health and Human Services can obtain a FREE Water Filter for their Home Kitchen Tap at the following MDHHS locations:

125 E. Union St., Flint
4809 Clio Road, Flint

All Other Residents can obtain a FREE Water Filter at the following GCCARD Locations:

2727 Lippincott, Flint
601 N. Saginaw, Flint

All City of Flint Residents Need to Bring Valid Identification and a Copy of Their Water Bill

For More Information on the Filters and Installation, Residents can call 211 Anytime, Any Day

EXHIBIT 95

U.S. Census Bureau

AMERICAN FactFinder

B16001

LANGUAGE SPOKEN AT HOME BY ABILITY TO SPEAK ENGLISH FOR THE POPULATION 5 YEARS AND OVER
Universe: Population 5 years and over
2010-2014 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Data and Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities and towns and estimates of housing units for states and counties.

	Flint city, Michigan	
	Estimate	Margin of Error
Total:	92,728	+/-435
Speak only English	90,131	+/-557
Spanish or Spanish Creole:	1,398	+/-293
Speak English "very well"	987	+/-231
Speak English less than "very well"	411	+/-133
French (incl. Patois, Cajun):	228	+/-97
Speak English "very well"	205	+/-92
Speak English less than "very well"	23	+/-25
French Creole:	8	+/-12
Speak English "very well"	0	+/-23
Speak English less than "very well"	8	+/-12
Italian:	33	+/-32
Speak English "very well"	17	+/-16
Speak English less than "very well"	16	+/-23
Portuguese or Portuguese Creole:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
German:	130	+/-73
Speak English "very well"	124	+/-72
Speak English less than "very well"	6	+/-9
Yiddish:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Other West Germanic languages:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Scandinavian languages:	23	+/-26
Speak English "very well"	23	+/-26
Speak English less than "very well"	0	+/-23
Greek:	60	+/-52
Speak English "very well"	46	+/-47
Speak English less than "very well"	14	+/-23
Russian:	44	+/-59
Speak English "very well"	32	+/-41
Speak English less than "very well"	12	+/-18
Polish:	18	+/-24

	Flint city, Michigan	
	Estimate	Margin of Error
Speak English "very well"	13	+/-21
Speak English less than "very well"	5	+/-12
Serbo-Croatian:	5	+/-9
Speak English "very well"	1	+/-3
Speak English less than "very well"	4	+/-8
Other Slavic languages:	33	+/-34
Speak English "very well"	33	+/-34
Speak English less than "very well"	0	+/-23
Armenian:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Persian:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Gujarati:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Hindi:	10	+/-18
Speak English "very well"	10	+/-18
Speak English less than "very well"	0	+/-23
Urdu:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Other Indic languages:	12	+/-17
Speak English "very well"	12	+/-17
Speak English less than "very well"	0	+/-23
Other Indo-European languages:	18	+/-24
Speak English "very well"	18	+/-24
Speak English less than "very well"	0	+/-23
Chinese:	138	+/-125
Speak English "very well"	65	+/-72
Speak English less than "very well"	73	+/-69
Japanese:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Korean:	2	+/-4
Speak English "very well"	0	+/-23
Speak English less than "very well"	2	+/-4
Mon-Khmer, Cambodian:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Hmong:	86	+/-64
Speak English "very well"	62	+/-58
Speak English less than "very well"	24	+/-31
Thai:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Laotian:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Vietnamese:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Other Asian languages:	11	+/-17
Speak English "very well"	11	+/-17
Speak English less than "very well"	0	+/-23
Tagalog:	12	+/-20
Speak English "very well"	12	+/-20
Speak English less than "very well"	0	+/-23

	Flint city, Michigan	
	Estimate	Margin of Error
Other Pacific Island languages:	4	+/-6
Speak English "very well"	4	+/-6
Speak English less than "very well"	0	+/-23
Navajo:	0	+/-23
Speak English "very well"	0	+/-23
Speak English less than "very well"	0	+/-23
Other Native North American languages:	53	+/-47
Speak English "very well"	53	+/-47
Speak English less than "very well"	0	+/-23
Hungarian:	3	+/-6
Speak English "very well"	3	+/-6
Speak English less than "very well"	0	+/-23
Arabic:	92	+/-73
Speak English "very well"	34	+/-37
Speak English less than "very well"	58	+/-53
Hebrew:	84	+/-62
Speak English "very well"	84	+/-62
Speak English less than "very well"	0	+/-23
African languages:	42	+/-36
Speak English "very well"	42	+/-36
Speak English less than "very well"	0	+/-23
Other and unspecified languages:	50	+/-65
Speak English "very well"	50	+/-65
Speak English less than "very well"	0	+/-23

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

Methodological changes to data collection in 2013 may have affected language data for 2013. Users should be aware of these changes when using multi-year data containing data from 2013.

While the 2010-2014 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural population, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

EXHIBIT 96

Michigar

People take to streets to protest Flint water quality

By **William E. Ketchum III | wketchum@mlive.com**
Follow on Twitter
on February 14, 2015 at 5:33 PM, updated February 15, 2015 at 12:26 AM

FLINT, MI -- On a cold, windy Saturday in downtown Flint, more than 50 people took to the streets and demanded clean water in the city.

The group met at City Hall around 1 p.m. and marched up Saginaw Street to the Durant and back, holding picket signs while bundled up to combat the cold winds.

Bob Bowcock, founder of Integrated Resource Management and a longtime investigator with environmentalist Erin Brockovich, spoke to the group after comments by organizer Melissa Mays and Flint Councilmen Eric Mays and Wantwaz Davis.

"...A bottom line question for many people (is) why are we paying 100 percent more than we were a few years ago, for poorer water quality," Bowcock told the crowd before the march. "Your attendance on this very, very cold day is important. You're demonstrating leadership to everyone in this community that this water issue is a problem that can be solved with community action."

The march was followed by a meeting at Saints of God Church where Bowcock gave his evaluation of the water problem in Flint.

Bowcock said that since arriving in Flint on Thursday night, he has looked at the distribution system and water treatment plant, and met with Flint City Council leaders. He has suggested a "less is more" system of changes that focuses more treatment technologies for removing dirt and less on chemicals.

"Every time there's a water quality problem, they've overreacted with more chemicals. I think they need to evaluate their treatment technologies as they relate to removing the dirt," he said. "They can do that by changing out their filter media. ... By doing that, they're going to have the ability to improve the water quality so it won't cause the leeching it's causing out in the distribution system."

"You have a community going through economic change, and rather than collect the money for good and proper water utility service...they're doing an OK job in transition. But they need to spend the money they're collecting for water rates, on the water system," he said.

Bowcock said that city officials have been receptive to his feedback, and that he wants to address state issues of lime softening water--he said it makes water more corrosive, which hurts the distribution system. He said he heard that Veolia North America, another consultant organization that arrived in Flint this week, but would likely have similar feedback, but that they may advise to add ammonia to the water, which would bring them into compliance, but still form thousands of other chemicals.

He told meeting attendees that he plans to send an outline of his recommendations on Sunday, during his flight home.

Flint Mayor Dayne Walling on Friday declined comment on his conversation with Bowcock, while city spokesman Jason Lorenz said Bowcock was given a guided tour of the water plant and that Director of Public Works Director Howard Croft "answered all" of Bowcock's questions.

Bowcock said if the city were to start to implement his feedback immediately, changes would begin immediately and Flint could have good water quality by April or May.

"Now, we're going to see how the powers that be receive this. Not so much the mayor and the city council, but I want the mayor to hear this, because some council people and the mayor have went along to get along with the emergency manager," Mays said after the meeting. He also pitched to temporarily go back to the Detroit system for 30 to 60 days until while fixing the Flint issue.

"...We want the message sent loud and clear to the powers that be, which is the emergency manager and governor: you have your experts, we have ours. We want to see if we can get the job done, because the goal is safe, clean and affordable water."

Saturday's rally is the latest development in ongoing public backlash behind Flint's water quality. In April 2014, Flint stopped purchasing already-treated Lake Huron water from Detroit to switch to the Flint River. The decision was planned to save an estimated $5 million over two years while work was completed on the Karegnondi Water Authority pipeline to Lake Huron. The changeup marked the first time in 50 years that Flint is responsible for the day-to-day treatment of drinking water.

The city notified customers in January that it was in violation of the Safe Drinking water Act, because of high levels of total trihalomethanes (TTHM) in water samples collected in May, August and November 2014.

The city has said that water tests have improved, but residents have steadily filed complaints about the smell, taste and color of the water.

Gov. Rick Snyder awarded Flint $2 million--part of the state's $8-million Financially Distressed Cities, Villages, and Townships Grant Program--to find leaks in city water lines and to replace a wastewater incinerator. Mayor Dayne Walling has said that the city needs more money to fix the problem.

Flint resident Jessica Owens said that her water has had a "sewer" smell since and has been discolored as recently as this week. She doesn't believe city statements about the quality of water having improved, insisting that it's just an attempt at calming panic.

She said that if the water isn't fixed, that residents should stop paying their water bills.

"It's water. It's not like we're talking about something for leisure. We need it for human life," she said. "... Why are we being charged for poison? The minute we stop paying is the minute they will start to recognize that we won't stand for this."

Jackie Demberton is a big water drinker: she said she drinks about a gallon a day, along with coffee. She said she had seen discoloration in her water, and had avoided it before deciding to "bite the bullet." She said she began to experience bad heartburn, and she visited her doctor after receiving the letter from Flint about the water tests.

Demberton said her doctor told her to stop drinking the water, and she has since begun to haul water from her son's home in Burton. She said since making the switch, the increased heartburn has gone away.

"I want to hear that they'll put us back on the Detroit system. I keep hearing that it's to save money, but you can't put a dollar amount on health," she said. "I don't know about you, but I grew up in Flint, and I know what that Flint River water is about."

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EXHIBIT 97

Michigar

Groups collect 26,000 signatures to end use of Flint River for water

By **Ron Fonger | rfonger1@mlive.com**
on August 31, 2015 at 10:02 AM, updated August 31, 2015 at 11:09 AM

FLINT, MI -- Three groups advocating the city end its use of the Flint River for drinking water are rallying today, Aug. 31, at City Hall and say they're delivering **26,000 petition signatures** to show the depth of their support.

Organizer Melissa Mays said Food & Water Watch, Water You Fighting For and the Coalition for Clean Water plan to hand deliver the petitions, which were collected online, to Mayor Dayne Walling and City Administrator Natasha Henderson at 10 a.m.

The petitions say in part, that "the Flint River clearly is not a safe, reliable source for the city's drinking water. It was as easy as pushing a button to disconnect from (the Detroit Water and Sewerage Department); it's time to push the button again, reconnecting Flint to DWSD and providing Flint residents with the clean, safe water they deserve.

"Please reconnect Flint to the Detroit Water and Sewerage Department immediately and make water safe and clean for all."

Flint has been in violation of the Safe Drinking Water Act since January because of high levels of total trihalomethanes (TTHM), a problem that arose after the city changed its drinking water source from Lake Huron to the Flint River.

FLINT WATER

Snyder's Flint water task force co-chair teases upcoming report

Gov. Snyder 75-point plan for Flint water crisis draws mixed reviews

Flint water crisis could mean two dozen layoffs if state fails to pay $1.1M

State unveils big plans for Flint recovery after water crisis

Plan to loan workers $15K for Flint houses so crazy it just might work

All Stories

Levels of TTHM, a byproduct of chlorinating river water, have dropped to allowable amounts in more recent tests, and the city has installed a new a $1.5 million granulated active-charcoal filter in an effort to purify river water.

City officials have said Flint water is safe, but have mailed residents, warning of potential health problems related to long-term exposure to high levels of TTHM.

The use of the Flint River for drinking water is expected to end next year when the new Karegnondi Water Authority pipeline is expected to be put into service.

The project is a joint venture involving the city and Genesee County.

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EXHIBIT 98

Michigar

Flint mayor accepts petitions but not call to end use of Flint River

By **Ron Fonger | rfonger1@mlive.com**
on August 31, 2015 at 2:14 PM

FLINT, MI -- Mayor Dayne Walling has accepted **petitions asking the city to end its use of the Flint River** for drinking water, but the mayor said today, Aug. 31, that he remains opposed to turning back to the city of Detroit for future water purchases.

"I have not supported going **back to Detroit**," Walling said after representatives of three groups handed in the petitions, which ask that Flint return to purchasing Lake Huron water from Detroit -- something that had happened for more than 50 years, until April 2014.

Walling said he would study the petitions, which include more than 26,000 online signatures; the results of lead testing that's being done by Virginia Tech University, and continue to push for improvements in the city's water treatment and distribution system, such as a $1.6 million granulated active-charcoal filter.

"I agree that water is a basic human right," Walling said in a prepared statement issued by the city. "Flint residents deserve water that is 100 percent safe, secure and affordable.

"The problems from 2014 are being addressed. We already pushed the button on the new carbon filters, and they are working."

FLINT WATER

Snyder's Flint water task force co-chair teases upcoming report

Gov. Snyder 75-point plan for Flint water crisis draws mixed reviews

Flint water crisis could mean two dozen layoffs if state fails to pay $1.1M

State unveils big plans for Flint recovery after water crisis

Plan to loan workers $15K for Flint houses so crazy it just might work

All Stories

While Flint has been in violation of the Safe Drinking Water Act since the start of 2015 because of high levels of total trihalomethanes, officials say that violation could be lifted in a matter of days because TTHM levels have sharply declined since summer 2014.

The improvements haven't satisfied water quality advocates, some of whom said they remain concerned about not just TTHM, but also levels of copper, lead, tin and iron.

"How long will this Walling administration continue to deny the citizens of Flint, Michigan, pure, clean, fresh water? How long?" asked the Rev. Allen Overton, a member of the Concerned Pastors for Social Action and chairman of the Coalition for Clean Water in Flint.

"How many more lies will this Walling administration continue to tell us? ... The best source of water for the city of Flint right now would be Detroit water. We're asking them to give us the best water they can give us," Overton said.

In addition to Overton, representatives of Food & Water Watch and Water You Fighting For spoke outside City Hall. Karen Weaver, who is challenging the mayor as he seeks re-election in November, said she would make the switch the groups are seeking.

"People don't believe assurances from city officials that treated river water is safe," Weaver said. "Nobody believes that."

The city's switch to the Flint River as its source of drinking water came in April 2014 and is expected to be temporary -- until the Karegnondi Water Authority pipeline to Lake Huron is completed in 2016.

City Administrator Natasha Henderson said in a written statement Monday that Flint officials are "doing everything possible to make the system more secure, efficient and affordable."

"Water from the treatment plant is significantly better now and comparable with Detroit's," Henderson's statement says.

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EXHIBIT 99

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

CONCERNED PASTORS FOR SOCIAL ACTION, et al.,

Plaintiffs,

v.

NICK A. KHOURI, et al.,

Defendants.
_____/

Case No. 16-10277

Hon. Mark A. Goldsmith

Mag. J. Stephanie Dawkins Davis

[PROPOSED] ORDER GRANTING
PRELIMINARY INJUNCTIVE RELIEF

Having reviewed Plaintiffs' filings and evidence in support of their Motion for Preliminary Injunction, and Defendants' filings and evidence in opposition thereto, and for good cause shown, it is hereby **ORDERED** that Plaintiffs' Motion for a Preliminary Injunction is **GRANTED**.

Defendants, their agents, and all persons in active concert or participation with Defendants under Fed. R. Civ. P. 65(d)(2)(B)-(C), are hereby **ENJOINED** to perform the following actions:

1. Defendants shall within seven days submit for Court review and approval a detailed plan for door-to-door delivery of bottled water to every household served by the Flint Water System. Within seven days of Defendants' submission, Plaintiffs may propose amendments to Defendants' proposed delivery

plan. Upon approval by the Court, Defendants shall promptly implement the delivery plan.

2. As an alternative to bottled water delivery, Defendants may, upon good cause shown and approval by the Court, distribute free point-of-use faucet water filters to some or all households served by the Flint Water System, through door-to-door delivery. Defendants may use this alternative only if Defendants arrange for professional installation of the home filters, conduct regular (at least monthly) maintenance of the home filters, and perform regular (at least monthly) monitoring to ensure that the home filters are effective at removing lead from drinking water to the minimum standards of the Lead and Copper Rule.

3. If Defendants plan to distribute home filters to some or all households served by the Flint Water System in lieu of or in addition to distributing bottled water as described in Paragraph 1 above, Defendants shall, within seven days of the date of entry of this Order, submit for Court review and approval a detailed plan for distribution, installation, maintenance, and monitoring of home filters that meets the requirements set forth in Paragraph 2. Within seven days of Defendants' submission, Plaintiffs may propose amendments to Defendants' proposed plan. Upon approval by the Court, Defendants shall promptly implement the plan.

4. Defendants shall provide Flint residents with adequate and up-to-date information about lead contamination in the drinking water by delivering written

notices to every household served by the Flint Water System. Defendants shall deliver these notices on a monthly basis. These notices shall state: (a) Unfiltered tap water from the Flint Water System is currently unsafe for drinking, cooking, brushing teeth, or preparing baby formula because it may contain high levels of lead; (b) Lead exposure can cause serious and permanent health harms, especially to infants and children; (c) Flint residents should use bottled water for these purposes until further notice; and (d) Flint residents should use faucet filters instead of bottled water only if the water filter has been professionally installed on a home faucet and is professionally maintained and monitored at least monthly. The notices must also provide a phone number, email address, and website that Flint residents can use to notify Defendants if they lack access to sufficient safe water and to arrange for a prompt bottled water delivery or faucet filter replacement, installation, or maintenance. The information in each notice shall be presented in multiple languages, including English, Spanish, Chinese, Arabic, and Hmong.

5. Defendants shall operate or fund operation of a telephone helpline and website to provide current, accurate information about lead contamination in the drinking water. All information presented on the helpline and website shall be available in multiple languages, including English, Spanish, Chinese, Arabic, and

Hmong. Defendants shall ensure that the helpline is adequately staffed to respond to Flint residents who need help accessing safe drinking water.

6. Defendants shall submit monthly status reports to the Court and Plaintiffs beginning one month after the date of the entry of this Order. Each report shall be filed on the Court's Case Management/Electronic Case Filing (CM/ECF) system and include a description of the actions Defendants have taken with respect to their obligations under this Order during the preceding month and a description of the actions Defendants intend to take with respect to their obligations under this Order during the following month. Each report must contain an accounting of the number and locations of households served by Defendants' water delivery or filter delivery, installation, maintenance, and monitoring efforts.

The preliminary injunctive relief granted today shall remain in effect until this Court determines that Defendants are in full compliance with the Lead and Copper Rule, or until this Court enters final judgment, whichever comes first.

SO ORDERED.

_____ _____

Date

Honorable Mark A. Goldsmith
United States District Judge