

## ARSENIC IN DRINKING WATER COMPLIANCE SUCCESS STORIES

# Michigan: Arsenic in Schools

### Case Study Contact Information

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More than 100 schools in Michigan have their own groundwater supply and some of these supplies have arsenic levels greater than 10 ppb. These schools found cost effective, easy-to-implement solutions to their arsenic problems.

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### Lessons Learned

Schools that have installed water treatment systems for arsenic removal often select systems that are easy to operate; that require no chemical addition or minimal chemical handling; that do not produce a waste stream; and systems that do not require a lot of floor space. Some schools find the cost of treatment systems to be prohibitive so have sought alternative approaches such as connecting to a public water system or an existing well; or developing a new well.

### Background

The Michigan DEQ reports that about 115 Michigan schools have their own water systems and typically use a groundwater supply. These systems are regulated as non-transient, non-community water systems. A number of these schools have measured arsenic in the drinking water at levels greater than 10 ppb.

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## Schools Using Treatment Alternatives

Table 1 highlights the compliance approach for several schools that selected treatment alternatives. Additional details are provided in the following paragraphs.

**Table 1**  
**Arsenic Rule Compliance for Michigan Schools Using a Treatment Approach**

School System	Population Served	Raw Water Arsenic Levels, ppb (sample date)	Compliance Approach
Lake Fenton Community Schools (West Shore Elementary, Torrey Hill Intermediate, Lake Fenton Middle School), Genesee County	3,700	18-25	Installed filtration system with iron adsorption media
Clarkston Elementary School, Oakland County	600	30-55	Installed package treatment system using granular ferric oxide adsorption technology
Faith Baptist School, Genesee County	400	29 (12/14/95)	Installed filtration system with iron adsorption media

At three Lake Fenton Community Schools, the school district has installed filtration systems with iron adsorption media to reduce arsenic to levels below 10 ppb. The total cost of the treatment systems was \$116,609 plus an estimated \$5,400 for maintenance over a 5-year period. The treatment systems were installed in July 2006 and placed into service October 5, 2006 after receiving a permit from the Genesee County Drain Commission. The Lake Fenton Board of Education evaluated treatment proposals from five different vendors and compared bid prices and expected operations and maintenance costs for the different proposals. They also considered drilling new wells and supplying bottled water to the affected schools.

Clarkston Elementary School in Oakland County, Michigan found arsenic levels in the range of 30 to 55 ppb in their water supply. In response, a treatment system was installed in May 2003 and has been successful in reducing arsenic levels to < 3 ppb, [Clarkson School Project Profile \(PDF\)](#) (1 pp, 124K, [About PDF](#)). The 40 gpm treatment system uses a granular ferric oxide adsorption technology. Because the school had limited space available to install the water treatment equipment, they selected a package treatment system with a small footprint. The treatment system includes a water conditioner pretreatment step to remove hardness and iron. No chemicals are added to the water, and no liquid waste is generated by the treatment process. The media is expected to last about two years, and can then be disposed of as a non-hazardous solid waste.

## Schools Using Non-Treatment Alternatives

Some schools find the cost of treatment systems to be prohibitive so they have sought alternative approaches to complying with the Arsenic Rule. These alternatives include connection to a public water system or an existing well; or developing a new well. Since these alternatives can take time to implement, several schools are providing bottled water as an interim measure. Table 2 summarizes the compliance approach for schools using non-treatment approaches. Additional details are provided in the following paragraphs.

**Table 2**  
**Arsenic Rule Compliance for Michigan Schools Using Non-Treatment Alternatives**

<b>School System</b>	<b>Population Served</b>	<b>Raw Water Arsenic Levels, ppb (sample date)</b>	<b>Compliance Approach</b>
Palo Community School	194	18	Using bottled water as interim solution; planning to drill new well.
Pittsford Area Elementary School	396	13 (5/2/95)	Installed new wells. To address elevated arsenic levels in new wells, treatment equipment was installed including softening and filtration with iron adsorption media.
Countryside Christian School, Ithaca, Gratiot County	80	13	Installed new well.

The Palo Community School in Ionia County has been using bottled water for drinking and cooking since January 2006 while they continue to evaluate and implement a long-term solution. Alternatives that were considered include connection to an existing private well in the community that has arsenic and nitrate levels below the regulatory limits, and installing a treatment system at the school's existing well. Bottled water is not considered a long-term option due to the high costs. The school has decided to drill a new well.

At Pittsford Area Elementary School, the two existing wells had arsenic levels in the range of 13 to 18 ppb. The school district installed two new wells to replace the existing wells but the new wells also contained arsenic at levels greater than 10 ppb. In response, the school district installed water softening and filtration with iron adsorption media for the two new wells. The treatment system was selected based on interviews with treatment system vendors and a comparison of bids. Sampling has demonstrated that arsenic concentrations in the finished water are below detection levels. The school district spent a total of \$80,000 to comply with the Arsenic Rule.