

Arsenic Treatment

Full-scale arsenic treatment delivers clean water to New River Elementary School in Arizona

In early 2004, AdEdge was pre-qualified and invited to participate in an arsenic pilot study of commercial adsorption-based treatment technologies with Damon S. Williams & Associates (DSWA). As an outcome of the successful piloting and preliminary work with the engineer, AdEdge was chosen by Centennial Contractors to perform full-scale arsenic treatment using its granular ferric oxide adsorption technology at the New River Elementary School site in New River, Ariz., 15 miles north of Phoenix.

By Greg Gilles

AdEdge worked with the contractor, DSWA, and Maricopa County to furnish and commission a 30 gpm treatment system to reduce arsenic in the main well serving the school. Raw water arsenic concentrations range historically from 35-50 ppb, up to five times above the new arsenic maximum contaminant level. This system was AdEdge's third installation for a public drinking water system in the state utilizing the granular ferric oxide technology and first for the Deer Valley Unified School District. Prior to piloting, a complete water profile was obtained by DSWA on the source water to assess the water chemistry and predict performance. Table 1 lists some of the more important water quality parameters for the site.

TABLE 1

Total Arsenic	35-50 ppb	As
As(III)	< 0.005 mg/L	As
Alkalinity	150-160 mg/L	CaCO ₃
Calcium	140-150 mg/L	Ca
Total Hardness	290-310 mg/L	CaCO ₃
Phosphate	0.05-0.1 mg/L	P
Sulfate	150-160 mg/L	SO ₄
Iron	0.05-0.1 mg/L	Fe
Manganese	< 0.05 mg/L	Mn

System Description

The AdEdge system was installed in an outdoor location near the well head. The Adsorption Package Unit or APU-30, designed for up to 30 gpm maximum flow, is a skid-mounted, integrated system that utilizes the Bayoxide E/AD33 granular ferric oxide adsorption media as the means for reducing arsenic. The small footprint system features a twin vessel configuration with automatic controls, series flow configuration and a backwash holding tank for periodic backwash water.

For disinfection purposes, sodium hypochlorite is injected at two points prior to entering the distribution system. The adsorption system itself requires no chemicals, regeneration, and does not generate liquid or hazardous waste.

Media, when spent, is discarded as a non-hazardous solid waste. It is designed for minimal operator attention and maintenance. Visual instrumentation is provided on a stainless steel control panel to measure critical operating parameters. Total gallons and flow rate for each vessel is measured continuously.

Performance

The system was placed into operation in July, 2004. Average flow from the well is 25 gpm, treating an estimated 15,000 gal. per day. Several samples have been taken to date of both the influent and effluent from designated sample ports following startup of the system. Effluent samples indicate more than 98% removal of arsenic from 40 ppb to below 2 ppb. AdEdge has a two-year agreement with Centennial to provide follow-on services as required. *wqp*

About the Author

Greg Gilles is vice president and principal for AdEdge Technologies, Inc., Atlanta, Ga. With 20 years of engineering and applied technology expertise, Gilles leads AdEdge's municipal and commercial water treatment products group providing new business development, designing new technology applications, conducting training, and providing field and start-up services in support of its packaged treatment systems. Gilles is also the expert of *Water Quality Products* Arsenic Zone at www.wqpmag.com. He can be reached at 678.835.0052, or by e-mail at greg@adedgetechnologies.com.

Quick Facts

Location:

New River Elementary School site in New River, Ariz.

Problem:

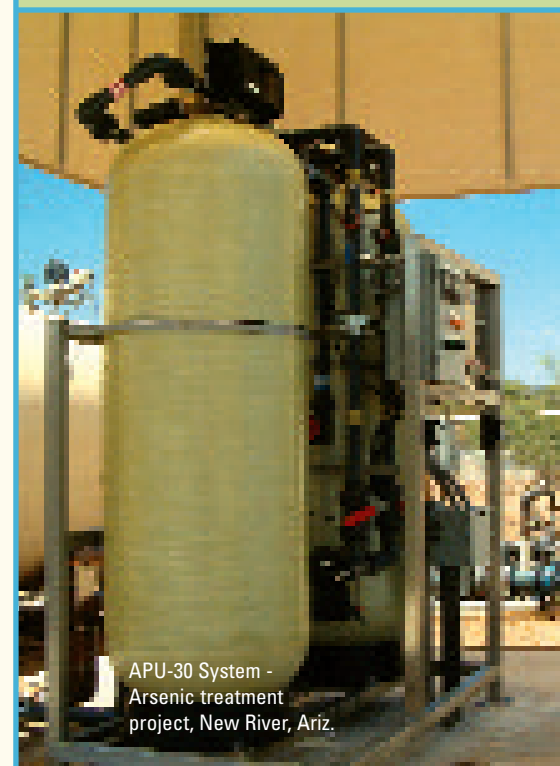
Raw water arsenic concentration range from 35-50 ppb, up to five times above the new arsenic maximum contaminant level.

Solution:

Adsorption Package Unit – APU-30, designed for up to 30 gpm maximum flow, is a skid-mounted, integrated system that utilizes Bay oxide E/AD33 granular ferric oxide adsorption media.

Results:

Effluent samples indicating more than 90% removal of arsenic from 40 ppb to below 2 ppb.



APU-30 System - Arsenic treatment project, New River, Ariz.

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