

Project Profile

Uranium Treatment System Middletown Springs Elementary School Vermont



Background

The Middletown Springs Elementary School in Vermont is located in an area of the U.S. very susceptible to the formation of naturally-occurring uranium. Due to the high levels of uranium detected in the well water serving the School, it was placed on a "Do-not-Drink Advisory". AdEdge was contacted by Otter Creek Engineering in June 2009 to assist the School in providing a packaged treatment system for uranium removal that complied with the Vermont Department of Health's drinking water regulations. The School's flow rate requirement of 15 gpm produced a uranium concentration in the influent water of about 22 parts per billion (ppb), exceeding the MCL for uranium of 20 ppb as allowed by the Vermont Department of Health. AdEdge Technologies worked in conjunction with Otter Creek Engineering and SVE Associates to provide a uranium-treatment solution for the School that satisfied the Department of Health's drinking water regulations.



Treatment System

After careful consideration, it was concluded that the regenerative AD92 IX ion exchange approach was the preferred and most cost-effective option for this site. The AdEdge AD92 system provided for the School was packaged into twin 14-inch vessels with a design flow of 15 gpm in a parallel configuration. The system was controlled during normal operation and backwash using Fleck 2750 valves with NT3200 NXT programmers, which are top-mounted automated valve assemblies. The system was furnished complete with a regeneration/brine system to regenerate the IX resin periodically on demand. A sodium chloride (brine) solution was used to regenerate the anion resin and remove the uranium from the resin into the brine solution replacing the chloride and bicarbonate ions onto the media bed. The brine module is a separate system composed of a 24"x48" polyethylene brine tank with valves, flow restrictors and rotometers which work during the automatic cycle operation, service, backwash, brining, slow rinse and fast rinse cycles.

Parameters		
pH	7.80	assumed
Total As	no data	mg/L As
As(III)	no data	mg/L (if known)
Sulfides	0.33	mg/L
Hardness	174	mg/L @ CaCO ₃
Alkalinity	163.0	mg/L @ CaCO ₃
Silica	7.1	mg/L SiO ₂
Phosphate	<0.3	mg/L P ₀₄
Bicarbonate	no data	mg/L HCO ₃
Iron	0.100	mg/L Fe
Manganese	0.022	mg/L Mn

The treatment train included also a softener and a particulate filter (provided by others) to remove turbidity prior to entering the Uranium Treatment System. Chlorine, provided by others, is injected into the water after it enters the AD92 system. Treated water flows into a 3,500 gallon pre-cast concrete water storage tank, which is pressurized via two booster pumps to the hydro-pneumatic tanks and the distribution system. Although the site presented a challenge providing access to the treatment equipment room, AdEdge accommodated the AD92 system's footprint by making it fit within the geometric constraints.

Performance

The complete system was packaged and delivered for site installation in August of 2009 and was placed into full operation in early September of that same year. On September 25th, 2009 samples of the treated water were taken to perform follow-up on the functioning of the system. The system was treating about 1,200 gallons per day and the water samples showed no presence of uranium; the gross alpha was found to be 1.25 pCi/L. The Middletown Springs Elementary School was taken off from the "Do-not-Drink Advisory", and the students and staff are enjoying cleaner water thanks to the success of the AdEdge AD92 treatment system.

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