

Just in the Nick of Time: Cla-Val Blending Valve Provides a Cost Effective Way to Meet the New Arsenic Rule Requirements for Drinking Water

New EPA Arsenic Rule Presents a Tall Order for Public Water System Operators

After more than 10 years of scientific and political debate, beginning on January 23, 2006, the EPA will put into effect a new rule that requires all US public water systems to deliver drinking water with less than 10 ppb (part per billion) of arsenic. This new compliance standard is a five-fold reduction from the existing level of 50 ppb.

The rule sprang from numerous health studies that indicate people who are exposed to high concentrations of arsenic over time exhibit a higher occurrence of respiratory, cardiovascular and skin diseases as well as increased cancer risks, including cancer of the lungs, bladder and skin.

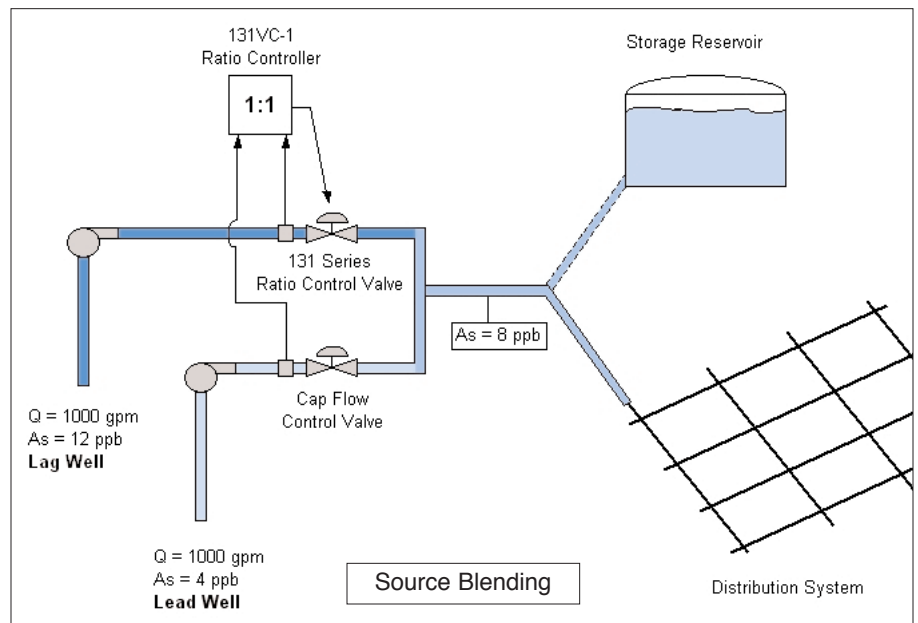
Arsenic contamination occurs naturally, coming from the earth's crust where it is introduced into groundwater through dissolution of minerals and ores and erosion from rocks. In some instances, industrial effluents contribute arsenic to water supplies. Elevated arsenic levels are particularly prevalent in the Western United States.

Compliance Options

Approximately 4,000 communities in the United States are faced with employing additional strategies to comply with the new arsenic content standard. In a best-case scenario, if a community has available water sources that are below 10 ppb, they may decide to simply abandon the sources that are over 10 ppb. If that is not an option, they may choose to pursue a variety of treatment or non-treatment alternatives.

The High Cost of Treatment

Available treatment technologies include filtration, co-precipitation and the use of arsenic absorbent media that can lower arsenic concentrations to acceptable levels. Unfortunately, most of these treatment options are quite costly and the desired results may be difficult to achieve by the January 2006 deadline. In fact, according to the latest EPA Arsenic Treatment Technology Handbook, installation of an arsenic treatment system for wells producing 2 to 3 million gallons per day can cost as much as \$1 million. Moreover, annual operations and maintenance costs for such systems are estimated to be more than \$100,000.



Cost Effective "Non-Treatment"

Fortunately, there are other alternatives to attain acceptable arsenic levels that are not only more cost effective but can also be more quickly implemented. Success has been achieved using an approach called *source blending*. Utilizing this approach (pictured above), water with elevated arsenic content is blended with another water source with an arsenic level well below the limits set forth in the EPA standard to achieve acceptable levels.

In this scenario, a combination of Cla-Val automatic control valves are installed on each drinking water system well line to control a blend ratio to maintain arsenic levels below the prescribed EPA limit.

How Source Blending Works

The preceding diagram illustrates a typical setup where the lead well is the better water source than the lag well. In order to maintain an acceptable arsenic level to below 10 ppb, the blend ratio should be one to one. This means that if the lead well produces less than 1000 gpm, the lag well must track this change and automatically throttle the Cla-Val 131 Series Electronic Ratio Control Valve to the same flow as the lead well. Flow meters on each line provide the feedback to an electronic valve controller, which modulates the Ratio Control Valve. A cap flow control valve serves to limit the well maximum output and control startup surges.

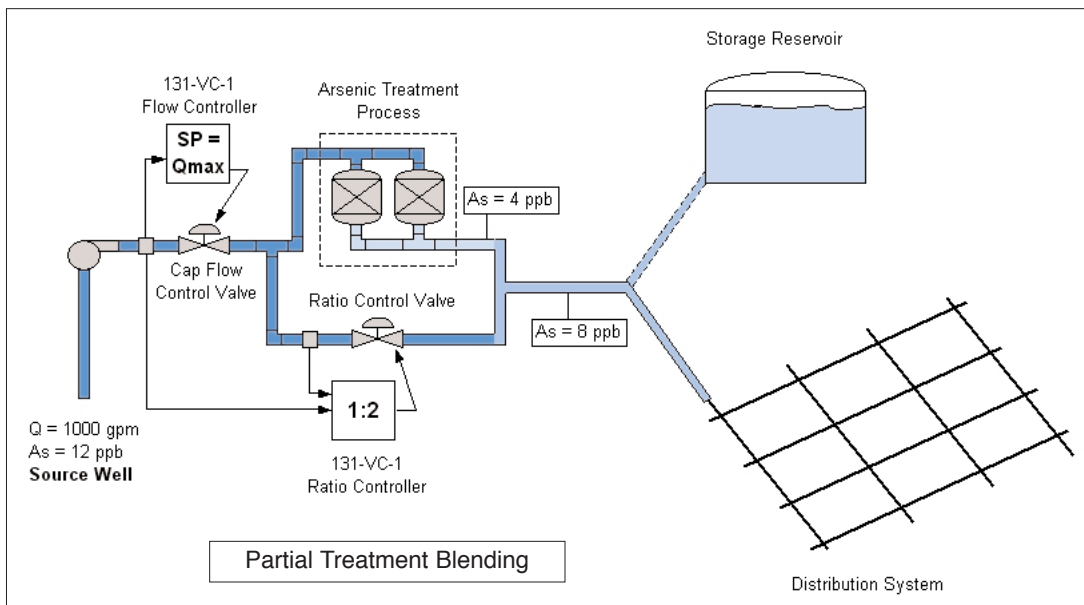
Partial Treatment Blending

If the community does not have water sources that are below the limit, then they must treat at least part of the water to remove arsenic. It has already been established that treating *all* of the water is quite costly. Moreover, in some instances, it may not even be necessary.

In an alternative approach, called *partial treatment blending* or "*sidestream treatment*", only a portion of the water source is treated to remove most of the arsenic and remixed with water with higher arsenic content to meet the prescribed EPA levels.

When employing the partial treatment blending approach, a Cla-Val 131 Series Electronic Ratio Control valve is used to proportionally *split the flow* so that one portion is treated to remove arsenic and the remaining raw water is remixed after the treatment process to provide water for the distribution system that meets regulatory requirements. If the treatment process removal rate changes with time, the ratio factor may need to be adjusted periodically. Monitoring raw and treatment arsenic levels will determine the split ratio. In this application, a cap flow control valve serves to limit the well maximum output and control startup surges.

Other variations of this strategy include *source blending in combination with partial treatment blending*. Regardless of the method selected, the objective is to minimize treatment costs while limiting arsenic to an acceptable level by the January 2006 deadline.



For additional information regarding blending ratios, contact Cla-Val Technical Marketing at 949.722.4800 or info@cla-val.com

Additional and Backup Functions

In addition to ratio control, the control valve may need to perform additional control functions such as upstream pressure, downstream pressure, and check valve. There should also be contingency planning for power failure and loss of either flow meter signal to protect the pump, piping system, and against high levels of arsenic in the distribution system. The good news is that careful planning can result in *a safe and cost effective solution* that meets the EPA requirement -- just in the nick of time.