

# Keeping the Pressure On

Hydrogeological consulting firm designs Cycle Stop Valve controlled pump systems to meet the difficult demands for a concrete manufacturing plant.

By Mike Price

Not to steal a line from one of those cheesy infomercials on television, but the slogan for a Cycle Stop Valve could be, “Set it, and forget it.”

That’s what Low’s Ready Mix Inc., a state-of-the-art and newly constructed concrete manufacturing plant in Caldwell, Idaho, recently found out.

No easy project, Low’s Ready Mix required instantaneous flow rates of water at a maximum 900 gallons of water per minute when filling concrete mixers and minimum flows down to 9 gpm to run the business office when it is not batching concrete. If that wasn’t difficult enough, the plant required that this wide range of Low’s be delivered at a constant pressure.

Hmm. What to do?

Brad Herrick, project manager for Low’s, did what anyone else would. He asked an expert. Herrick consulted with Hydro Logic Inc., a hydrogeological consulting firm in Boise, Idaho.

And the answer?

“We went with Cycle Stop Valves because we had such a wide range of flow rates. It is difficult to get a variable-frequency drive that will cover such a wide range,” says Ed Squires, president of Hydro Logic, who began using CSVs five years ago.

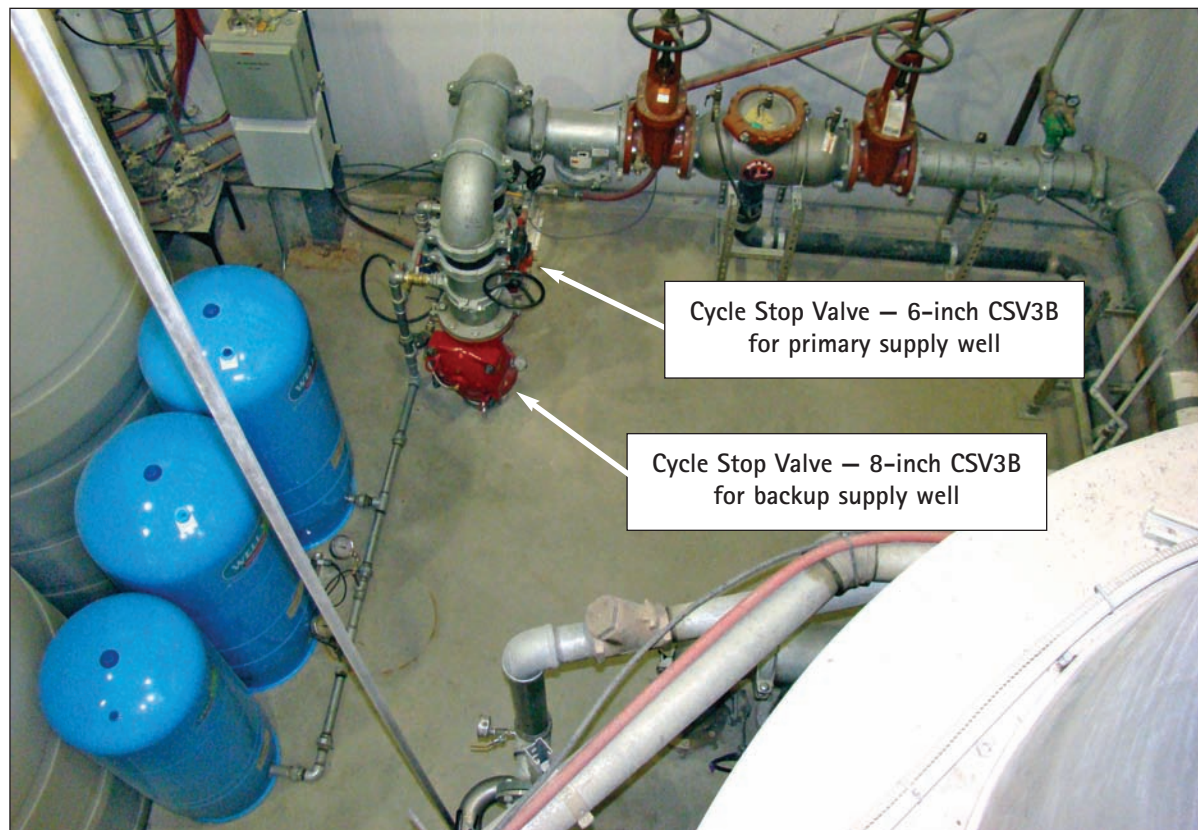
“The CSV operates throughout the necessary flow rates. Another reason we specified CSVs is because the concrete plant has rapidly shutting valves that are nearly instantaneous. In this new plant, the water shutoff valves slap shut, a situation that can lead to water hammer. The CSVs can react more quickly than a VFD, which can help eliminate water hammer.”

Squires oversaw the installation of an 8-inch CSV3B for the main water supply well on a 75 hp pump when the Low’s plant opened in 2006. After a year of monitoring the plant’s actual water usage patterns, Squires designed Low’s second (backup) well with two submersible pumps. In this second well, flows are regulated by a 6-inch CSV3B. This valve controls the output for both a 3 hp and 75 hp pump. Both wells are independently functional, but the second well with two pumps now serves as the primary well because of its dual pump capability.

The CSV causes the amp draw of the 3 hp to vary from 4.6 amps to 2.5 amps, and the 75 hp to vary from 107 amps to 58 amps. This varies the amp draw of the system from 2.5 amps to 107 amps, depending on the amount of flow being used at the time. Many people do not realize that the power consumption of a pump when controlled with a valve is very similar to the power consumption of a VFD controlled pump. The two-pump setup using the CSV for control delivers even more energy efficiency and versatility.



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An aerial shot of Low’s Ready Mix Inc., a concrete manufacturing plant, in Caldwell, Idaho. Low’s can batch 180 cubic yards an hour.

“The CSV really showed its versatility by regulating a multiple pumping system through a single valve,” Squires says, “and the manufacturer’s technical support is beyond compare.”

Another feature of a CSV that is helpful to Low’s Ready Mix is the part about setting and forgetting it. The valve’s discharge pressure setting is adjustable, allowing it to fit the user’s needs. At the plant, both CSV3B’s have a discharge pressure of 72 psi to 74 psi, with the pressure switch shutoff at 95 psi.

“We find that once the valve is set, it remains set. That is one of the attributes of these valves,” Squires says. “They’re very maintenance-free, and if you do need to adjust them or work on them, all you need is a crescent wrench. That appeals to a lot of our clients because most operators like things that are simple.

“Low’s main focus is making concrete, so they want a water system that you set and forget. The CSV, to a large degree, has provided that kind of system for them.”

No service has been needed for Low’s CSV, Squires says. He noted the valve’s durability by recalling another CSV story.

Squires had recommended a CSV for a greenhouse irrigation well on the outskirts of Boise. The CSV was installed by one of the client’s employees and reported it to be “working fine.” Five years later, Squires and his staff were working on a geothermal project for the same client and happened to go by the

greenhouse well that had been equipped with the CSV. However, no CSV was apparent at the well, which was located in an open field. Nearby, after looking under a makeshift cover, Squires found the CSV that had been simply buried in the dirt outside the wellhead.

“It was still clicking away,” Squires says with a laugh. “The valve had been working that way since installation. Now we wouldn’t recommend that, mind you, but talk about ‘set it and forget it.’”

As for the Low’s project, the only hiccup came not because of the valve, but rather fist-sized chunks of concrete that had gotten into the water lines during installation. Despite the debris, the valve still worked, but not as smooth as Squires and his staff thought it should. After checking everything else, Squires opened up the valve and observed the concrete chunks had been “beating around” in the valve.

Although there was damage to the epoxy lined waterways, after the debris was removed, Squires says “the valve still worked. However, CSV loaned Low’s another valve to use while they repaired the epoxy lining in the damaged valve.”

Low’s 3 hp pump will function over flow rates of 5 to 35 gpm. Once it exceeds that range, the 3 hp pump kicks off and the 75 hp pump turns on to meet the increased demand. Low’s can batch 180 cubic yards an hour on a busy day, dispatching 15 trucks an hour. Not only that, but the CSV also accommodates fire-flow requirements of 1100 gpm.

"This is just working out great now because when we need 5 to 600 gpm for a minute or two, the 75 hp clicks on and satisfies that demand, and when that's over and it's slow, and we need to just use 10 to 15 gpm, the 3 hp until we have a big demand again," Herrick says. "We've got a unique situation here. I think we've got the best of both worlds now."

Cycle Stop Valves Inc. of Lubbock, Texas, received its first of five patents in 1999. Cycle Stop Valves are pump-control valves that essentially make variable-flow pumps out of any constant-speed pumps. The CSV attaches to the discharge plumbing and automatically regulates the pump's output to match the amount of water required by the user. They give large pumps small-flow capabilities without the need for huge pressure tanks, water towers, or complicated electronic devices.

Cycle Stop Valves come in a variety of sizes and models from 1 to 12 inches. They can handle flow rates of 1 gpm to 5000 gpm, with pressure adjustments ranging from 4 psi to 500 psi.

"It's very non-labor-intensive," Squires says. "When it comes to VFDs, most water system operators defer to hired consultants owing to the technical difficulties of the computerized systems, programming, and software learning curves. Don't get me wrong, I'm not trying to knock VFDs, because we have a lot of VFD applications and clients who use them.

"What I am saying is that I don't subscribe to the general misconception that VFDs solve all problems and work in all situations because they do not. There's a place for both of these systems and there are many good applications suitable to using Cycle Stop Valves where they actually work better than VFDs, and generally speaking, simple is better."

If only everything in life were that simple. [WWWJ](#)

## CSV Does the Job at New Soft Drink Plant

Another recent project that Hydro Logic Inc., a hydrogeological consulting firm in Boise, Idaho, completed using a Cycle Stop Valve was a water supply system for a state-of-the-art \$31 million soft drink manufacturing plant that opened in Nampa, Idaho, in 2007.

A producer of soft drinks and bottled water, the water supply plant for Nagel Beverage Co. Inc. can provide water for a multitude of uses, at a constant pressure. The range of flow rates required varies from 5 gallons per minute to a maximum of 530 gpm and is regulated by just one CSV.

"It is quite a versatile and clever fixture that can deliver 5 gpm to 500 gpm at a constant pressure while protecting the pump motor from cycling, which shortens pump motor life more than any other operational circumstance," says Ed Squires, president of Hydro Logic.

Nagel Beverage uses two separate water treatment systems: a nanofiltration system and a reverse osmosis system. The initial setup required the CSV to provide the correct pressures for the reverse osmosis system. The nanofiltration system requires 400 gpm and the reverse osmosis system 130 gpm. The discharge pressure of Nagel Beverage's 6-inch CSV3B is 62 psi on a 30 hp pump, with the pressure switch shutoff at 80 psi.

"It's sort of a batch-and-run operation," says Larry Wheeler, Nagel Beverage's project manager. "We start out with a rather slow but steady flow in the 80 to 120 gpm range but, when everything gets rocking-and-rolling, it'll jump up over 500 gpm. The nanofiltration system is designed for future growth here, and the CSV will allow for this expansion when

it comes. We have had no problems with the CSV, and coming out of the pump, that's the first thing that we go through."

Squires considered using a variable-frequency drive unit in this application, but he says its complexity was an issue.

"VFDs have many, many applications," Squires says, "but they are relatively technical and, like other computerized equipment, there are glitches. Also, without an across-the-line electrical bypass and a separate control panel, if the VFD has a problem, you don't have any water. With the CSV, this is one less potential weakness in the system. Given the wide range of flow requirements for this project, we felt the CSV was the best fit. It is quiet and takes up very little space.

Vance Miller, president of Nagel Beverage, admits he was somewhat skeptical of Squires' recommendation to use a CSV at first. Looking back, Miller says, "I cannot envision a system that could work better than the CSV."

Because high quality ground water is its lifeblood, Nagel Beverage had Squires design and supervise the drilling, construction, and development of its supply well and the discharge well head plumbing. The CSV regulates all of Nagel Beverage's varied water demands, including wash-down, recycling, commercial, and domestic uses.

"This sort of thing doesn't get a whole lot of headlines in the company. We deal with issues. This is a non-issue," Wheeler says. "I just wish everything was made that way. We're living in an age where it seems like everything is designed with either no quality control or with planned obsolescence in mind. This is just a simple piece of equipment that functions day in and day out without any adjustments or maintenance."