

Bill Frazier

AirBurst Technology LLC and Frazier Well Services LLC

Water Well Journal interviews a groundwater professional every month. Since this month's issue focuses on well rehabilitation, we decided to speak with Bill Frazier, president of AirBurst® Technology LLC and Frazier Well Services LLC in Muskego, Wisconsin, which is 20 miles southwest of Milwaukee. AirBurst Technology is a patented water well rehabilitation process that stimulates selected zones in a water well. A small volume of high pressure inert gas is used to generate high intensity "pressure-pulses" in the well. The pulses create high frequency acoustic waves that break up and remove mineral scales and bio-films from the borehole wall or well screen.



Bill Frazier, president of AirBurst Technology and Frazier Well Services

Frazier contracts and licenses the use of AirBurst Technology, as well as manufacturing equipment associated with it, throughout the world.

Before incorporating AirBurst Technology LLC in 1995, Frazier was an engineering consultant, well and pump salesman and engineer, and a well and pump contractor. He served on the membership committee and was a founding board member for Wisconsin's section of Water For People that provided a potable water source, pumping equipment, and storage reservoir for three villages in Guatemala.



Mike Price is the associate editor of Water Well Journal. He can be reached at mprice@ngwa.org.

Water Well Journal: What is the state of the water well rehabilitation industry today?

Bill Frazier: New well rehabilitation technology has provided creative and successful methods for curing the age-old ailment of diminished well capacity. Today, wells can be restored with environmentally responsible procedures that achieve positive results more quickly, efficiently, and safely than in the past. Nationally, engineering consultants are specifying new technology procedures for their customers as they can offer benefits that may not have been attainable previously. Technology has opened up possibilities for rehabilitation of wells formerly not accessible to conventional methods. It has been very rewarding to see the acceptance of the new technologies by municipalities and industries, as well as farmers and even homeowners, who without production increases from their wells faced true hardships. It's important for our industry to focus and refocus on the value of well rehabilitation for our customers and for our businesses.

What does the future look like? Well rehabilitation is becoming increasingly important as energy costs soar and well drilling regulations and restrictions increase. The owners and operators of wells desperately need to be educated by our industry contractors and consultants about the rewards for restoring capacity to their wells. They must be advised of the consequences for allowing the well production to fall below the levels where it is no longer economical to or feasible to implement rehabilitation procedures.

Education of our industry professionals is the future. Engineers, municipalities, industries, farmers, and homeowners all look to us for solutions to their problems. We must be up to the challenge and can only do so by com-

A before and after photo of a well screen that was rehabilitated with AirBurst Technology.



mitting our resources to continuing education on both local and national levels. Many states have implemented mandatory continuing education programs for drillers and pump installers to maintain or renew their professional licenses. All states should have a continuing education requirement; it would be to the benefit of every contractor and ultimately every customer. Our professionals must be well informed.

WWJ: What kind of general advice do you give water well contractors who are looking to rehabilitate a customer's well?

Bill: The need for well rehabilitation is constantly increasing and there is a market for the service. The first thing a contractor should do is homework on the ABCs of the potential project. Interview the customer and gather as much information about the well that may be available. Research the geology of the area.

Try to locate construction logs from regulatory agencies, or if it's a repeat customer, which is our favorite type, in-house records can be reviewed.

Many times a service call is for a failed pump, whether municipal, industrial, farm, or residential. When the pump is pulled, look for signs of excessive drawdown of the water level during pumping. This is usually indicated by discoloration of the pump discharge piping, which is caused by exposure of the pipe to air, thereby oxidizing the water which remains on the pipe. If the discoloration change is near the pump, this is an indicator that the well production has declined and the pumping water level is critically low. Hopefully, for municipal and industrial applications, the customer has current records that indicate water levels, but the same colorization also applies to larger pump piping.

Based upon field observations and records, the customer can be given meaningful information about what needs to be done and how the contractor proposes to accomplish the task. Many customers are more likely to have the contractor use a method of rehabilitation that is environmentally responsible and does not disrupt their well site or yard.

The opportunity for well rehabilitation is present in many of the wells that the contractor services. He or she must have the ability to recognize the situation and turn it into additional business, which in the end benefits all. Usually, two choices are available to the customer: lower the pump, a temporary solution, or restore the well capacity. The decision to pursue the long-term benefit to the customer can translate into additional work and higher profits for the contractor if the customer chose rehabilitation.

What are the advantages of rehabilitating a well over drilling a new one? The benefits are numerous. Cost is always the biggest factor. Replacing is not just drilling another borehole, it's lateral relocation, piping relocation, electrical relocation, abandoning the old well, disruption and restoration of the site, permits, availability of a regulation-complying location, potential for water quality changes, etc.

Rehabilitation procedures vary significantly with well size and type of

customer. Residential wells are usually the easiest to rehabilitate as production rates of 5 to 20 gpm are normally adequate for most residences. Many tried and proven procedures can be effective, but new technology may be more efficient and may have longer-lasting results. Effectiveness of the rehabilitation process is paramount, but perception by the customer of what has been received for what has been paid is also important. Implementation of a higher tech process even with higher cost and with excellent results will set the progressive contractor apart from others. Word of mouth from neighbor to neighbor or customer to customer is invaluable.

It may be extremely cost prohibitive and impractical to drill a replacement well for municipal, industrial, irrigation, and other high-capacity applications. The infrastructure surrounding the well associated with the distribution system, electrical supply, and housing can make the task overwhelming; rehabilitation is often the true answer. Unfortunately, many high-capacity wells suffer from the saying "If it ain't broke, don't fix it." The problem with this scenario is that if you wait for it to break, fixing it may not be an option. Rehabilitating a high-capacity well when the production, in terms of gallons per minute per foot of drawdown, has diminished by only 20% will most always result in the production being restored to original levels and with minimal investments. Allowing wells to deteriorate beyond 20% before rehabilitation will increase costs on an exponential basis. The greater the production loss prior to rehabilitation, the less likely that full capacity restoration can be achieved.

WWJ: What are the most common questions you hear regarding well rehabilitation from water well contractors?

Bill: Will a process work in a PVC-cased or screened well? How long will the rehabilitation last? Is there any guarantee that the process will work? Will the rehabilitation work change the water quality? Will the process stop the well from developing and pumping sand? How much will rehabilitation cost versus drilling a new well?

WWJ: What industry trends do you see in the water well rehabilitation industry?

Bill: There are an increasing number of contractors interested in rehabilitating wells, but they may not know where to start, especially contractors that are primarily pump installers. These contractors—using new technology procedures and equipment—will be able to expand their business and develop a niche market. With reasonable assurances of success, the customer would much rather spend 50% of the drilling cost on rehabilitation, and the rehabilitator should be able to net more profit than drilling a new well.

WWJ: What type of advice do you give new professionals who are beginning to rehabilitate wells?

Bill: The first thing is to educate themselves on the very basics of well hydrology, an understanding of how and why a well produces water and why it stops producing water. This information is clearly and simply explained in either edition of the *Groundwater & Wells* books published by Johnson Screens.

The books also cover various proven methods for well rehabilitation, but may lack some of the latest technology that is available.

I also say to keep a clear objective to do what is best for the customer, given the time and financial constraints of the project. Always look at a pump repair project as a potential well rehabilitation project, as many times the pump failure is related to the ability of the well to produce water.

Consider using high-tech procedures to restore well capacity and keep that equipment looking new. Impressing the customer with a technical service and good results will give the contractor a competitive advantage, which all contractors need.

Finally, do not make guarantees that you may not be able to keep. There are certain geological formations that will not yield desired quantities of water, so know the geology in your area. It's not unreasonable to give the customer a partial credit if things do not turn out as both of you would have desired.

WWJ: AirBurst Technology is one of several ways to rehabilitate a well. Can you tell us the ideal scenarios of when to use the technology?

Bill: I think AirBurst Technology is always the best process that should be used and many times the only rehabilitation process that is required. However, chemical application in screened wells is sometimes desired or required, especially for control of nuisance bacteria. Getting the chemicals where they need to go to achieve the anticipated results can be a challenge. As we all know, the injected chemicals will follow the path of least resistance and that path is obviously not the area of the screen and formation that is plugged. AirBurst thoroughly cleans the screen, breaks up naturally occurring cementation of the gravel surrounding the well screen, and releases sand that may be trapped in the gravel. Chemical application after AirBursting will permit uniform flow of the chemical into the formation. AirBurst may also be used to agitate the chemicals and move them far out into the geological formation.

Open rock wells such as limestone, dolomite, sandstone, basalt, granite, and similar formations are easily and successfully restored when the proper amount of energy is used at the appropriate locations. After AirBursting, it's not uncommon for this type of well to yield flow rates greater than when the well was first drilled.

WWJ: What is the learning curve for water well contractors who decide to use AirBurst Technology?

Bill: The learning curve for a contractor that uses AirBurst is about one year or 10 to 15 wells. Screened or slotted casing wells of similar construction but in different areas respond in unique ways to given controlled stimulation. After a few wells are completed, the contractor can establish his or her own guidelines beyond that which is provided by the AirBurst manual.

WWJ: Can you tell us about any new technology you are working on or have already released?

Bill: If technology is truly to be considered as modern technology, it must continually undergo improvements.

Throughout the past 13 years, AirBurst has strived to improve the overall operation of the process and equipment. The most recent improvement involves precise control of our down-hole energy source, commonly known as an air gun. An electronic firing panel incorporates an electronic timer that sets the all-important interval between bursts as well as providing critical internal air gun controls. These features are especially significant in deep wells with hundreds of feet of screen or formation, which require thousands of bursts. The controls also minimize the amount of compressed air or inert gas that is used by metering only that amount of air or gas that is actually required.

WWJ: Lastly, what do you think are the critical issues facing the groundwater industry today?

Bill: The water industry of yesterday is quickly fading away along with the contractors that are not staying current with technology, regulations, education, expanding markets, and the new millennium in general. Our industry must take and maintain an environmentally responsible attitude for all aspects of drilling, well rehabilitation, and related construction.

It has been said that water is the new oil. The demand for water will be ever present long after the need for oil has been overcome by higher technology energy sources. This means that the water industry is here forever and cannot be replaced by technology, just enhanced by technology. Through education, our industry can keep pace with the times and demands of our society. Businesses that change with the times and meet those demands will be the success stories of future *Water Well Journal* articles. [WWJ](#)