Focus on Western states dealer contaminant concerns and the technologies they use to treat them.

Water Quality Products *conducted a survey of its Western region dealers to find out more about their businesses and concerns. As a reader, you may be contacted in the future to participate in one of these surveys. We hope at that time you will take a couple of minutes to participate in helping shape the future of* WQP.

Although each one is unique, many dealerships face many of the same concerns from arsenic to chromium and from marketing to sales. These issues can be found worldwide. Dealers continue looking to associations, industry leaders and manufacturers/distributors for further advancements and knowledge. Fifty-six percent of respondents said that they turn to Western regional and state associations for unity on these issues and that these organizations were important to their business.

Although many of our dealer's concerns are common nationwide, there were some that were quite prevalent in the Western region. Arsenic was the number-one concern water treatment dealers were faced with. Many public water systems are not in compliance with EPA's most recent MCL of 10 ppb for arsenic because it will not be in effect until 2006. In the meantime, dealers may find more consumers turning to alternative water treatments to help bring down arsenic levels in their drinking water. Chromium 6, chlorine and iron/manganese also were mentioned as top contaminants dealers face.

Top 6 Contaminant Concerns in the Western Region

1. Arsenic
2. Chromium 6
3. Chlorine
4. Nitrates
5. Iron & Manganese
6. High total dissolved solids

Top 7 Selling Products for Dealers in the Western Region

1. Filters/Cartridges
2. RO Systems
3. Softeners
4. Conditioners
5. Chlorine
6. UV
7. DI water systems

In addition, the concerns regarding SB 1006, which was passed in California, and related issues continue to unfold in various other parts of the country. Although a ban on softeners can be made only upon meeting specific criteria, this issue has the attention of the entire water treatment industry.

Another emerging issue is mold. The Arizona Water Quality Association reports that mold is becoming a large issue in the West, and concerns that insurance companies are not covering such claims continue to demand serious discussions. The mold article below will serve as a briefing to inform you of the issue. More information can be found at www.wqa.org and through your specific insurance company.

How are dealers treating these contaminants for their customers? Filters remained the top product to solve many high contaminant levels with reverse osmosis, softeners and ozone closing in. Ultraviolet, chlorine and DI water systems also made the list.

The following articles were all based on issues of concern, comments, top selling products and questions that came straight from *WQP*'s dealer survey. WQP

Let us know what your top issues and business concerns are. Drop an e-mail to wqpeditor@sgcmail.com

Image courtesy of freestockphotos.com.

ARSENIC

Provided By Arizona Water Quality Association

Arsenic occurs naturally in the environment as a heavy metal in two different forms, arsenite (arsenic III) and arsenate (arsenic V). Arsenic is released into water supplies from erosion of rocks and soil. The distribution of arsenic in soil, groundwater and surface water has extensively been investigated during the past two decades. Long-term exposure to arsenic is proven to result in health effects such as cancer, cardiovascular disease, diabetes and reproductive problems. Nationally, about 3,000 (or 5.5 percent) of the nation's 54,000 community water systems and 1,100 (or 5.5 percent) of the 20,000 non-transient non-community water systems will need to take measures to lower arsenic in their drinking water. Of the affected systems, 97 percent serve fewer than 10,000 people. While high concentrations of arsenic are found mostly in the Western region of the United States, parts of the Midwest and New England show levels of arsenic that exceed the newly approved U.S. Environmental Protection Agency (EPA) standard of 10 parts per billion (ppb). The Western states have more systems with arsenic levels greater than 10 ppb as compared to the national average. Some systems in parts of the Midwest and New England have current arsenic levels that are greater than 10 ppb, but most systems

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MOLD

Provided By Arizona Water Quality Association

The following are program notes of the insurance panel presented at the Arizona Water Quality Association October 2002 program, reprinted with permission from the AZWQA.

As stated at the Arizona Water Quality Association meeting in October 2002 by Sean Gillespie, claims manager at Allied Insurance, mold is becoming the "new asbestos" to insurance companies. More and more, mold is resulting in damage claims.

There are some things you can do to mitigate mold damage, starting with response time. If you respond within 24 hours of mold inception, you have the best chance of limiting damage, since it usually takes 24 to 48 hours for the mold growth to accelerate.

Mold needs three things to grow.

- The right temperature.
- Moisture
- A food source such as sheet rock, baseboard or ceiling tiles.

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POINT-OF-USE REVERS

By Tony Pagliaro, Nimbus Water Systems

As the residential point-of-use (POU) reverse osmosis (RO) industry approaches its 35th anniversary, it is time for a reality check on the industry's progress to date as well as a look ahead to new technologies or improvements that the industry may introduce for POU RO systems in 2003.

A Snapshot of 2002

Despite the red-hot market for new homes in the United States, POU RO sales in 2002 appear, at best flat and, at worst, down by 11 percent or a total of 181,000 in 2002 versus 204,000 in 2001, according to the November 2002 Water Quality Association's (WQA's) *Reverse Osmosis Drinking Water Shipments in the United States* report. These numbers are reported by 15 of the largest U.S. makers of POU systems for sale only in the U.S. market. Keep in mind these numbers do not include those systems made by POU assemblers or those who engage in the assembly/direct sell to consumers and do not include all of the suppliers in the retail, or

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ARSENIC

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have arsenic levels that range from 2 to 10 ppb of arsenic.

Treatment Options

During the EPA initial review of treatment options for arsenic removal, ion exchange, activated alumina, reverse osmosis, enhanced coagulation/filtration and oxidation/filtration were identified as best available technologies (BAT). These technologies, along with other industry emerging technologies, can be divided into three categories: sorption treatment processes, membrane treatment processes and precipitation/filtration processes.

Through **ion exchange** (IX), arsenic is removed by continuously passing water under pressure through column(s) packed with exchange resin. As a low-cost treatment option when used under specific operating criteria, IX has problems operating effectively with the presence of high levels of sulfate (SO_4^{-2}) and total dissolved solids (TDS) in process water.

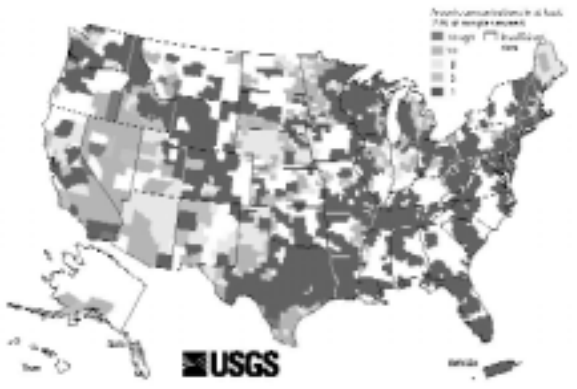
Activated alumina (AA) is a porous, granular material with properties similar to IX and commonly used for the removal of silica, natural organic matter and fluoride. To remove arsenic using this process, water under pressure is continuously passed through one or more beds of AA media. AA is pH sensitive and its selectivity requires As III to be preoxidized, converting it to As V before treatment. Currently, modified AA media are emerging to provide drinking water systems with media that has greater overall adsorption capacities, arsenic selectivity and operational flexibility than traditional AA.

R**everse osmosis** (RO), is an attractive treatment process because it can address various water quality problems through a simple and easy-to-use operation. RO is a pressure-driven membrane separation process that removes dissolved solutes and greater than 90 percent of arsenic from water. The RO treatment process is relatively insensitive to pH and has water recovery rates ranging from 60 to 80 percent.

Enhanced coagulation/filtration, both conventional and pressurized methods, can be used to remove inorganic arsenic from water. During the treatment process, arsenic is adsorbed onto an aluminum, ferric hydroxide, ferric sulfate or ferric chloride precipitate depending on application-specific parameters. The economics and efficiency of this treatment system rely on coagulant type and dosage, mixing frequency and pH levels. If optimized, this treatment process can effectively remove greater than 90 percent of arsenic from water.

Oxidation/filtration is a pressurized granular-media filtration process that uses manganese-oxide media because of its adsorptive and catalytic qualities. Under optimized conditions, this process and be a cost-effective treatment option that yields an efficiency rate between 80 and 95 percent.

Figure 1. **Arsenic Occurrence in the United States**



Courtesy of USGS.

Granular ferric oxide/hydroxide media is an arsenic treatment technology not initially included in the EPA's evaluation of treatment processes. This adsorption process can be applied in fixed-bed pressure column(s) similar to those for AA. Granular ferric oxide/hydroxide media is not as pH sensitive as AA, can treat larger bed volumes and has higher surface areas. Although this adsorption process has not

been designated as a BAT by the EPA, evaluation of the technology is underway.

Area of Concern

The EPA estimates that approximately 97 percent of community water systems serving fewer than 10,000 people will be impacted by the 10 ppb maximum contaminant level. This poses a problem, considering most small water systems have small customer bases, few community assets and little income. Funding to comply with the arsenic standard is available through the EPA's drinking water state revolving fund (DWSRF). Capital projects that include new technology and upgrading systems are eligible under the DWSRF. However, as one might imagine, if a public water system applies for funding closer to the compliance date of January 2006, the surge in applications coming in at that time will impede the process to effectively meet all systems' needs.

THE EPA ESTIMATES THAT APPROXIMATELY 97 PERCENT OF

Nonetheless, all systems will be required to comply with the new standard, and consolidating or restructuring the water systems or using point-of-use (POU) devices might be the most cost-effective options for these small water systems.

Under the final EPA ruling, POU devices are approved as small system compliance technologies (SSCT). SSCTs must be owned, controlled and maintained by the public water system or by an agency under contract with the water system (i.e., responsibility to operate and maintain these systems cannot be passed along to the customer). While small system use of POU devices will result in lower capital and treatment costs. Administrative and monitoring costs will be higher. The EPA notes that previous studies show this to be an economically viable treatment alternative for systems treating 50 to 250 people. Adsorption (AA or granular ferric oxide/hydroxide) and RO probably are the industry's two most recognized treatment technologies for POU arsenic removal. These technologies should be applied based on performance and cost for effective arsenic removal.

An arsenic removal system that reduces arsenic levels to below 3 ppb across a complete range of small drinking water systems up to 450 gpm.

What Dealers Should Know

Cost-effective and commercially proven arsenic removal technologies currently are available to treat arsenic contamination. Individuals not willing to wait for their water system's compliance with the arsenic standard currently are looking for treatment systems to use in their homes. POU and even point-of-entry (POE) treatment systems are an attractive solution for these individuals. A water treatment dealer can address theses concerns by offering POU and POE systems for installation. The process should begin with a basic understanding of arsenic contamination and the element's chemistry, a complete water quality analysis of the application-specific water and the knowledge of available technologies. When combined, water treatment dealers then can present individual customers with the appropriate treatment option for arsenic removal. WQP

About the Author
Rich Dennis is the separations products manager for Severn Trent Services, Fort Washington, Pa. He has more than 29 years of experience in the water and wastewater treatment industry, and he holds a BS in chemical engineering from Lehigh University. He can be reached at rdennis@severntrentservices.com; 813-886-9331; fax 813-886-0651.

Table 1.
New York City's Mold Guidelines.

Level		
1	10 sq. ft. or less	Area can be cleaned and does not need to be contained.
2	10–30 sq. ft.	Area needs to be quarantined.
3	30–100 sq. ft.	Need to bring in an outside firm to handle job.
4	100 sq ft or more	Major situation requiring outside help.

Action

- **Eliminate water source.** Shut off the water source causing the problem.
- **Remove excess water.** Use towels or a vacuum to dry the affected area.
- **Lower humidity.** Humidity should be brought under 60 percent. Use dehumidifier or large fans to dry area.

Tips For Mold Issues

A "Hold Harmless" agreement is a legal contract that provides that one party, the "Promisor," will be responsible for all damages and liability including legal fees incurred in defending against a claim, the other party (the "Promisee") incurs, resulting from something the Promisor does or fails to do. Another name commonly used for a Hold Harmless Agreement is "Indemnity Agreement," because the Promisor "indemnifies" the Promisee for any liability or claims made against the Promisee. A Hold Harmless Agreement usually is used where the Promisor's actions could lead to a claim or liability to the Promisee.[1]

Hold Harmless agreements may protect you only in some states. Here are some suggestions from Federated Insurance that were previously published in *Connection*, the Plumbing Heating Cooling Contractors National Association's newsletter.

- Consult your business attorney for specific information and contract wording in your state.
- Wording must clearly indicate your customer's intention to contract away mold-related claims even if they are due to your negligence.
- Even if the correct wording is used, it probably will not apply to bodily injury claims or wanton and willful conduct.
- Enforcement of the hold harmless agreement may result in significant legal expense.

Other questions and answers regarding mold issues are listed in the article located at www.phccweb.org.

1 Legaldocs.com. "Hold Harmless Agreement Questionnaire."

MOLD

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Molds can cause everything from severe allergic reactions to lung disease, cancer, neurological disorders and sometimes even death.

If you don't see any evidence of mold, there probably is not any.

If there is evidence, obviously you need to shut off the water source causing the problem and remove excess water with towels or a vacuum and dry the affected area. Limit contact with wood furniture or fibrous material. If you cannot move the wood furniture, place it on a block or aluminum foil. Pull back the carpet and remove the pad, if possible. If the damage covers a larger area such as several rooms you should consider calling in an outside service firm that has the heavy-duty equipment to tackle the problem.

"Should you or an employee improperly install water equipment or should your equipment fail, you can be liable for a mold claim if the customer's home is not properly cleared of water," reports John Larkin, president of the Pure Water Insurance.[1] (Visit www.wqa.org for the full article.)

If you do see mold evidence, deal with it as quickly as possible. There is no set guideline on when you need to call in a professional service firm when dealing with mold damage. However, New York City does have a guideline that tends to be followed by the mold and remediation companies and others. The guideline sets out four levels of mold and it is recommended that an outside firm be brought in if you reach level three. (See Table 1.)

Remember, mold insurance coverage is available, but it is expensive. Most coverage does not include mold and some carriers have permission from certain states to exclude mold from policies. Be sure to check with your insurance representative for questions on your coverage as well as any advice for taking care of what could be a costly claim later on. *WQP*

References

1 Larkin, John. "The Single Most Important Article You May Read This Year," www.wqa.org, 2002.

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"big box," marketplaces. Taking these twists into consideration, we could safely add 100,000 to the 2002 number to date and have a total U.S. unit sales volume of 280,000, which means that this year's sales equal just about 1 percent of the total population of the United States. Another way to look at this is that homebuilders are reporting that 990K new homes were built this year versus the 280,000 POU RO units sold—a total of approximately 28.8 percent market share—if every POU RO sold was sold through the new home market exclusively. That number—29 percent—sounds much better than the 11 percent loss WQA reported. Too bad this number is not useable since a significant share of the RO units sold in 2002 have continued to be sold into existing homes or as replacements.

Take a look at another familiar kitchen appliance: refrigerators. According to *Appliance Magazine*, total 2002 sales year to date (YTD) on Sept. 20, 2002, stood at 9.3 million versus 8.7 million in 2001 for an increase of 6.80 percent. Have you ever wondered why the refrigerator makers appeared to rapidly add filters to their product lines once one manufacturer did just that? Using just half of the YTD September 2002 numbers (4.65 million refrigerator units sold) those replacement filter sales, based on an average retail selling price per unit of $30, would yield $139.5 million dollars in replacement filter sales in just six months and a total of $279 million if the filters are exchanged at the semiannual rate as recommended by the refrigerator makers. These sales numbers represent only a small part of the potential revenue that these filters can generate. The offering of filtered water has become a standard feature for most refrigerator manufacturers for approximately three years, and now they are on at least 85 percent of the brands offered in the United States. Further, no refrigerator maker charges substantially more for these systems, but rather has invested in increasing the sophistication level of the filter monitoring operations, which of course leads to consumers becoming more mindful of when filter changes are required as well as insuring the recurring revenue for the refrigerator and filter maker. Is there something wrong here? Absolutely not. It is the perfect example of a "win-win" approach to water quality improvement—the consumer gets better tasting water at little or no additional up front cost, the refrigerator maker generates a revenue stream and, even more importantly, maintainS close ties to its customer base for the potentially beneficial marketing programs that target other home appliance improvements and/or programs.

How does POU compare to point-of-entry (POE)? Again, referring to the WQA, RO unit shipments are down 11.4 percent in 2002, while, according to *Appliance Magazine's* September 2002 shipment numbers, residential water softener sales were up for the year with a total of 738,000 units shipped versus 690,000 in 2001, for an overall improvement of 6.90 percent increase for 2002. It prompts the question, why are POU RO sales decreasing while water softener sales increase, especially since the notion that drinking water is accepted universally as a requirement for good health? While the answer may vary region to region, the bottom line is that while consumers may understand all of the various POU technologies such as filtration, adsorption, distillation or reverse osmosis they simply are *not* buying RO devices. Perhaps the answer is simpler than we can believe: Consumers remain baffled by the myriad of choices and price points the industry offers and choose to bypass POU RO because they cannot see or understand the value of POU RO ownership.

REVERSE OSMOSIS TECHNOLOGY IS SHOWING INNOVATION. WITH NEW PRODUCTS ON THE

Looking Ahead

So what can we expect in 2003? The answer appears to be technology. Right now the POU RO industry appears to be embracing new approaches to how the next generation of home RO systems

will look, operate and be maintained as a method to stimulate stale sales numbers. Here is a roundup of the products vying for "Most Interesting in 2003." Their technologies are considered the most likely to be presented by POU RO manufacturers at the March 2003 WQA Convention and Trade Show in Las Vegas. (See "WQA PreShow," page 18.)

Lower- and zero-discharge systems. The basic design of a POU RO has been prefilter, membrane product water to storage tank, and then from tank through postfilter and out of the faucet. This system also uses hydraulic feed water shut-off valve, which will stop the system from processing any water when the storage tank is full. This design remains as the most commonly used configuration even today—unchanged for three decades. Recognized as simple, efficient and time-proven, this design has some limitations. The latest twist on this design premise is low- or no-waste POU RO systems.

While low- and no-waste systems have been available for quite a while in some form or another for commercial applications, bringing this concept into the home market has never reached the level as the "traditional" POU RO. In the '70s, Layton Manufacturing had such a system that installed "split-stream" style in the feed water, and the effluent from the membrane was "flushed away" into the home's general use water. The newer version incorporates a pump so that the membrane rinse water from the device is discharged into the hot water distribution piping at one pound per square inch greater than the hot water piping pressure. The manufacturer also makes retrofit kits available, according to the information on the IAPMO website. While the advantages of such a closed-loop system in more arid regions are self-explanatory, a consideration for use of such a system would be that the concentration of organic compounds contained in the membrane effluent water must not exceed the U.S. Environmental Protection Agency (EPA) drinking water requirements. This would translate to a problem if you have POU RO on an application where a contaminant such as nitrate when discharged from the membrane effluent flow exceeds the maximum contaminant level (MCL) as set by EPA.

Also available this year are the "non-pressurized" storage tank systems. These units will have an atmospheric tank or, in some cases, a bag that operates in conjunction with a delivery pump. Such systems offer high quality water, faster storage tank refill times and lower overall recovery rates by reducing the back pressure on the membrane caused by using a pressurized storage tank. Several companies have systems in production or soon will have systems available. Expect to see some creative packaging with these units as they can be arranged around or in box, taking up less space and allowing for some non-traditional installation locations as well as fewer external connections. In addition, these units can offer a solution to the problem of feed water pressure to the multiple locations and/or those applications where the POU RO must supply a product water at a minimum inlet pressure to another water-using appliance such an icemaker.

On-demand. No, not a way to enjoy first-run movies at home, but RO systems that "process water" only when the consumer pushes down on the faucet or when there is demand for the product such as to refill an ice machine. Among the first commercially viable versions of these types of units came from the Swedish company Electrolux. These on-demand systems feature a small commercial-sized element, which is pressurized by a positive displacement pump. These

About the Author
Tony Pagliaro is vice president of sales and marketing for Nimbus Water Systems, in San Marcos, Calif. He can be reached by e-mail at tony@nimbuswater.com. To learn more about POU RO, refer to *A Practical Application Manual for Residential, Point-of-Use Reverse Osmosis Systems* by Robert Slovak, which is available from the Water Quality Association (publication E48) at www.wqa.org.

systems have proven that this type of technology rapidly can produce high quantities and maintain high-quality water while operating at a reduced time sequence, thus saving time and water.

Other OEMs offered units utilizing versions of this technology at the 2002 WQA Show in New Orleans, but at least one manufacturer has plans to unveil an on-demand system without a pump. Such a system would provide sufficient product water flow to meet the needs of the average consumer while "operating," or processing tap water into RO permeate, only as long as the source demands. The primary advantages of such an on-demand system operating at line pressure would be the dual reduction of both cost because a pump is not required as well as energy consumption from not having to run a high-pressure booster pump and motor while still offering drinking water to several locations within a home. Still to be determined is the flow and pressure such systems would deliver at the faucet.

Proprietary product models will continue to grow. This unit features special connection on the replacement filters and membrane elements that only the original equipment manufacturer's (OEM's) replacements will fit. These types of units are not new, having been available since the mid-1980s. It has become clear that such units offer the user and seller distinct advantages. The consumer will have access to easy-to-change and reliable filters that he may choose to service on his own. This concept of controllable replacement is important. Right now, systems with standard component filters can be fitted with any number of replacement cartridges including those not recommended by the OEM. OEMs have concerns that systems that use these standard components place the OEM at risk if the end user uses inferior or unreliable cartridges. Another emerging trend is labor. Having easy-to-use, "no-brainer" filter exchanges increases the available labor pool by opening the door for less technical personnel. Finally, there is no denying that the revenue stream from a dedicated filter base is very desirable for the dealer and the OEMs. It is said that rarely, if ever, has a propriety system maker gone out of business or turned its back on those loyal system users.

Membrane element selection options will grow. While we see the flux, or gallon per day process capacities, of standard residential membrane elements grow to completely unbelievable ranges (up to 150 gallons per day), expect to see the availability of "designer total dissolved solids (TDS) rejection" elements. These elements can be designed with selective TDS rejection and provide a customer's desired overall TDS rejection quality to match the feed water quality needs of a specialty application.

Challenges in 2003

With RO membrane element pricing at an all time low, why has the industry seemingly run out of steam? There are no easy answers. The industry must look at the facts and then determine for itself—What is the future here? But one thing is clear: while the industry can and does rise to the technological challenges of POU RO improvement, it has failed to reach the consumer with a succinct and clear message about the value of RO POU drinking water systems. WQP