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FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS

March 2008

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A NEW WAY TO PINPOINT LEAKS  
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STORM: ADVANCES IN PERMEABLE  
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SEWER: PUMPING INNOVATION  
FOR A SOUTH CAROLINA AGENCY  
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2008 EXPO  
SHOW  
ISSUE

PAGE 18

# CLAMPING DOWN ON LOSSES

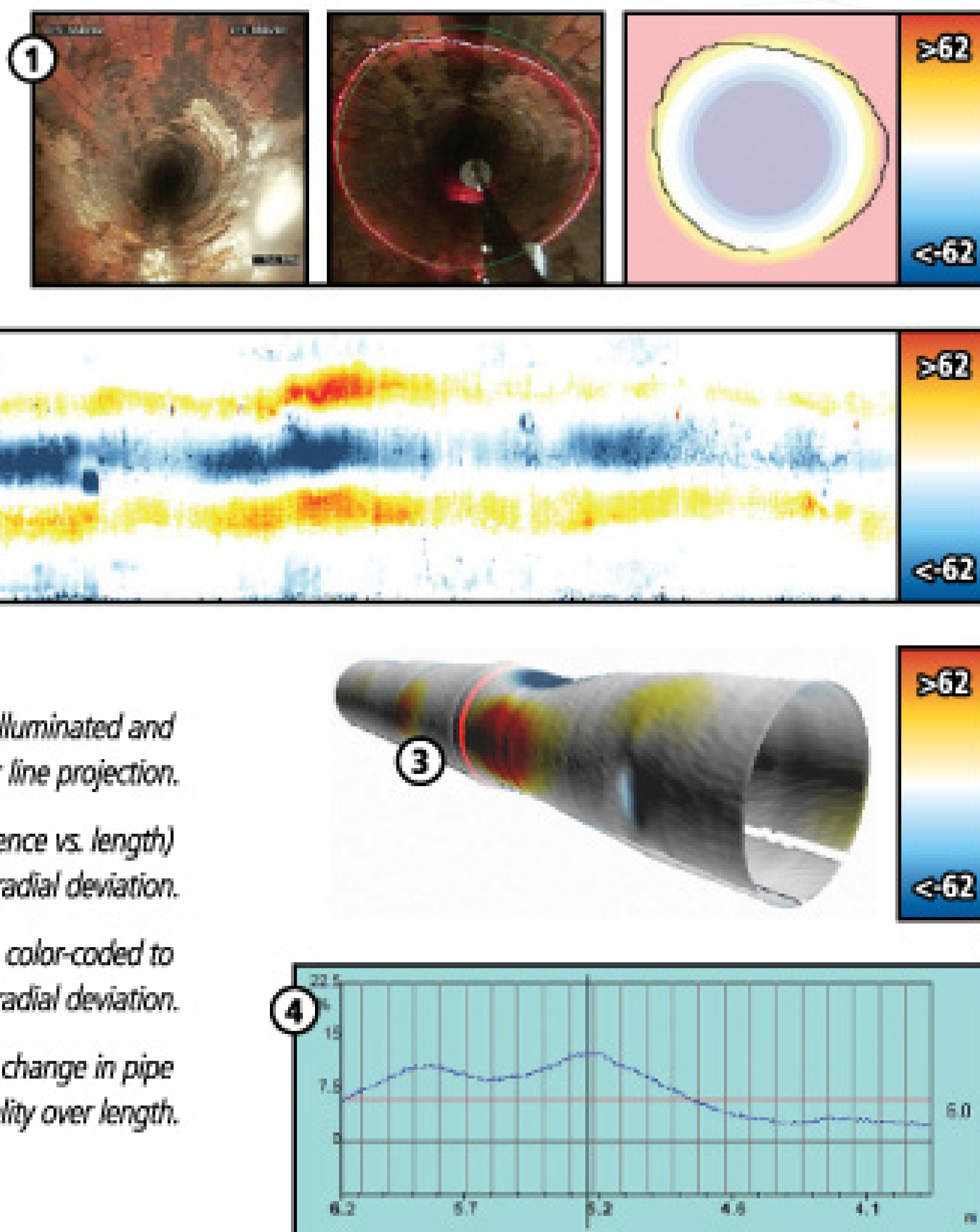
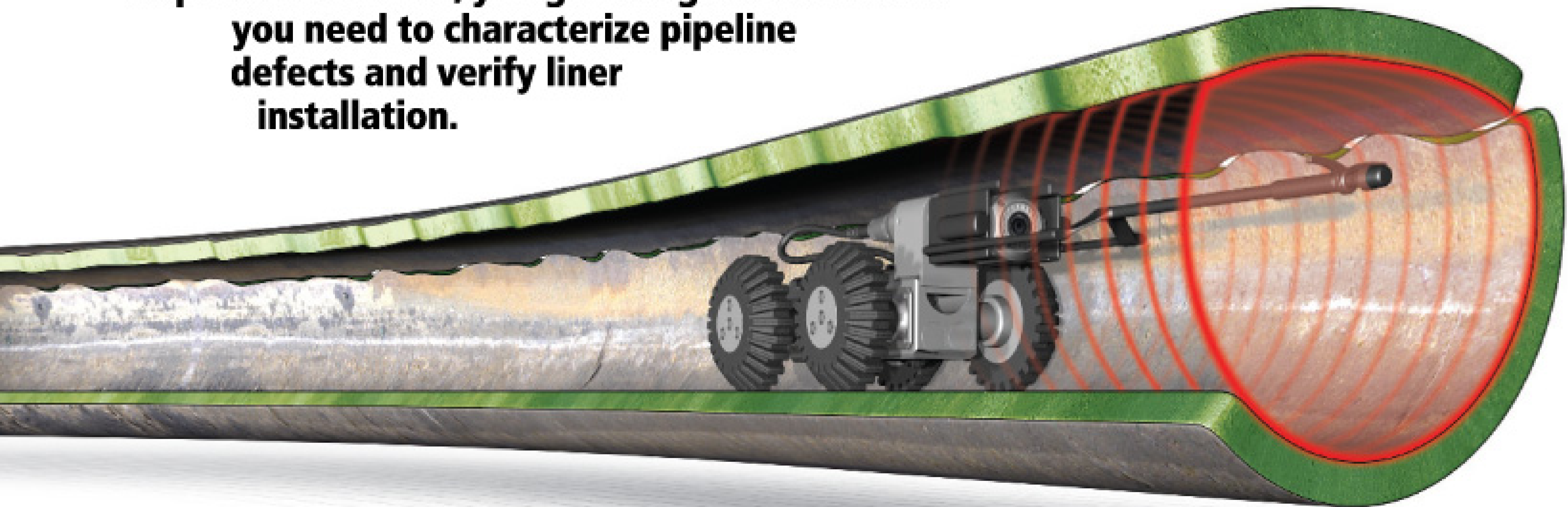
Iowa City gets tough on leaks  
and optimizes system capacity



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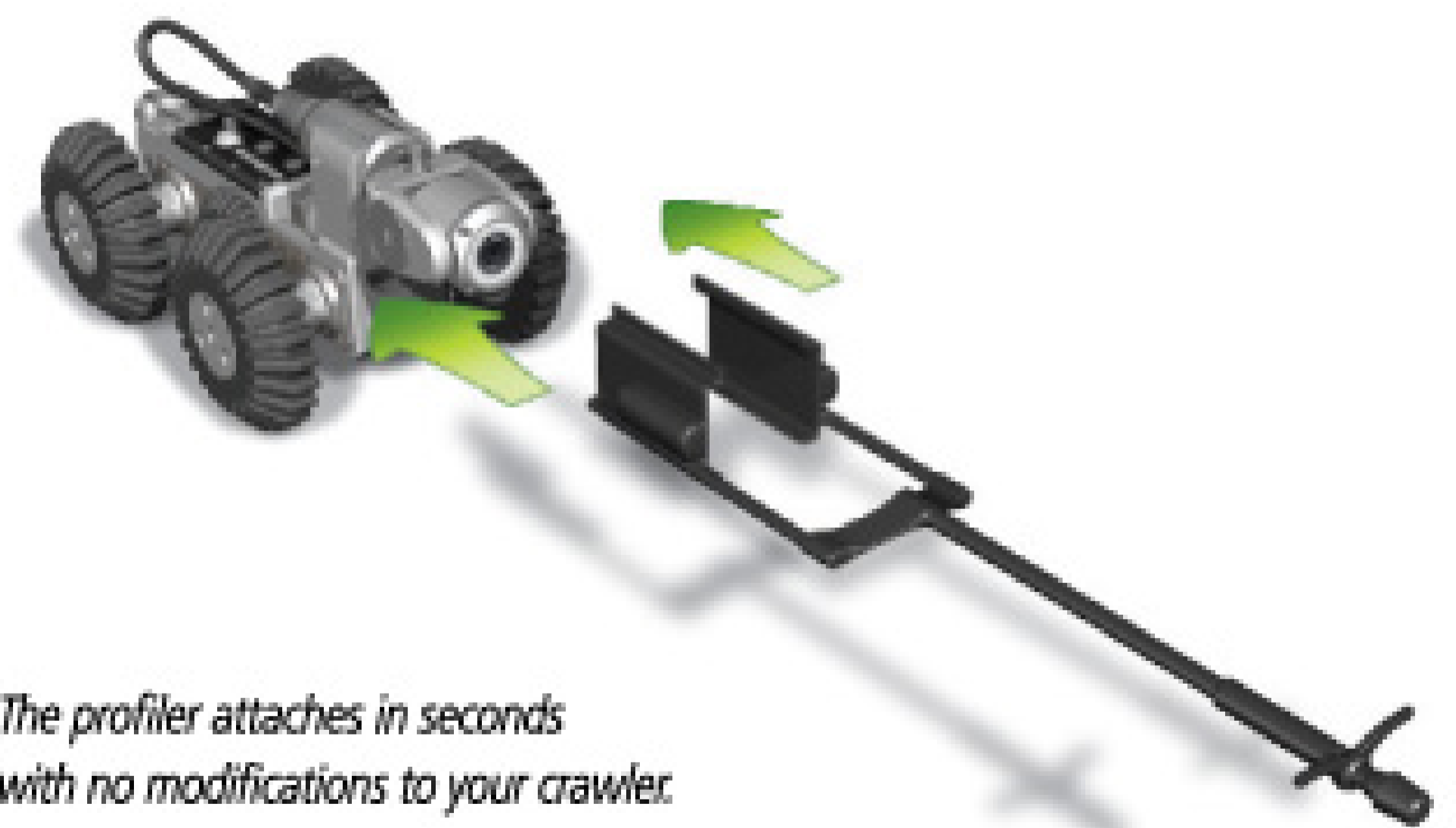
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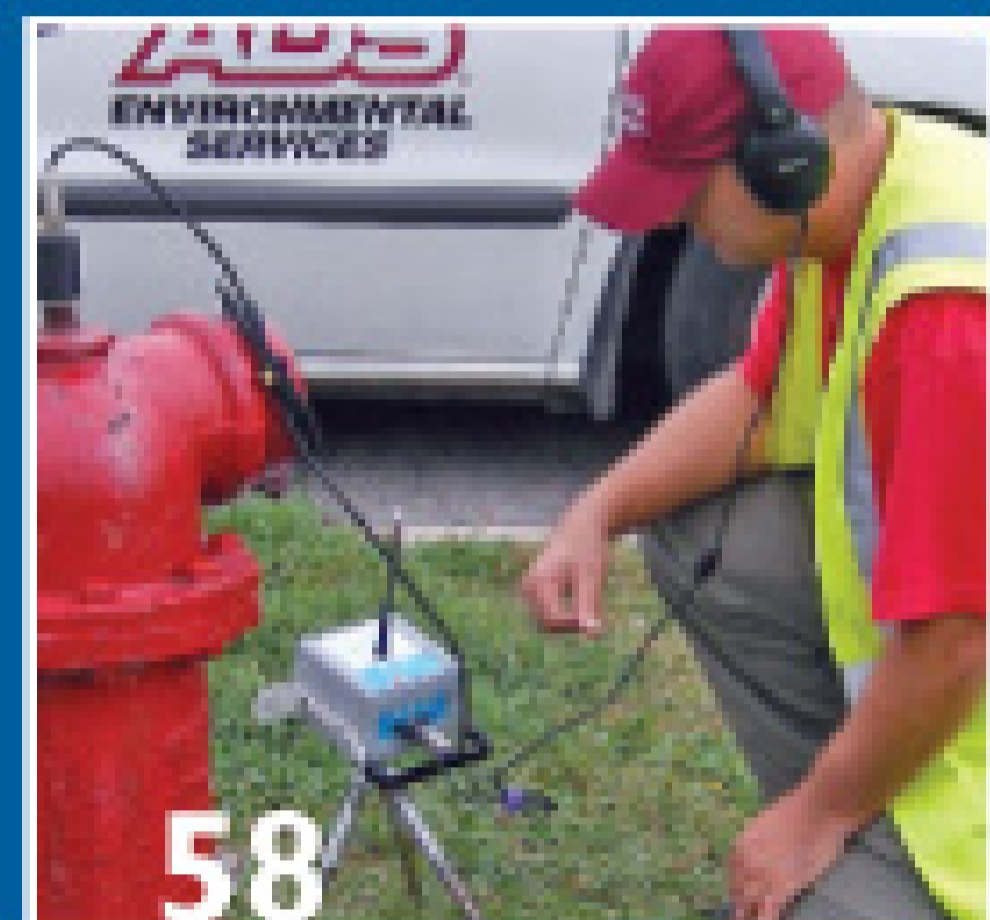
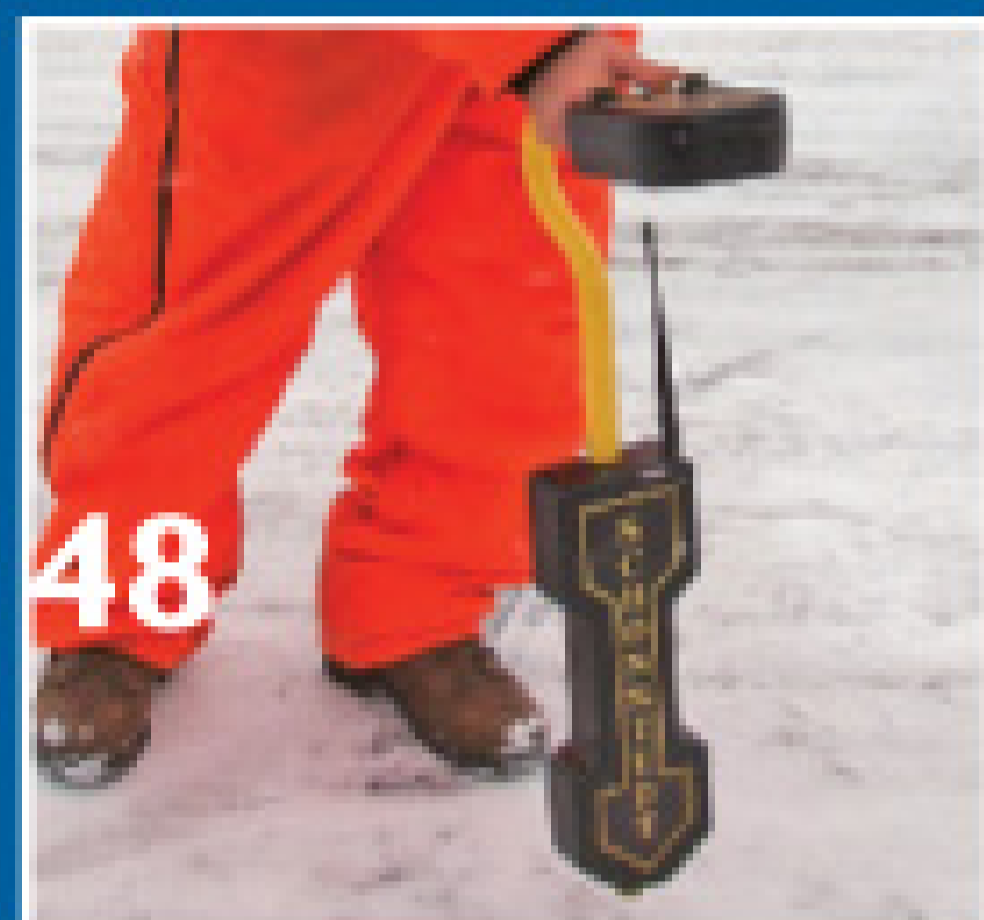
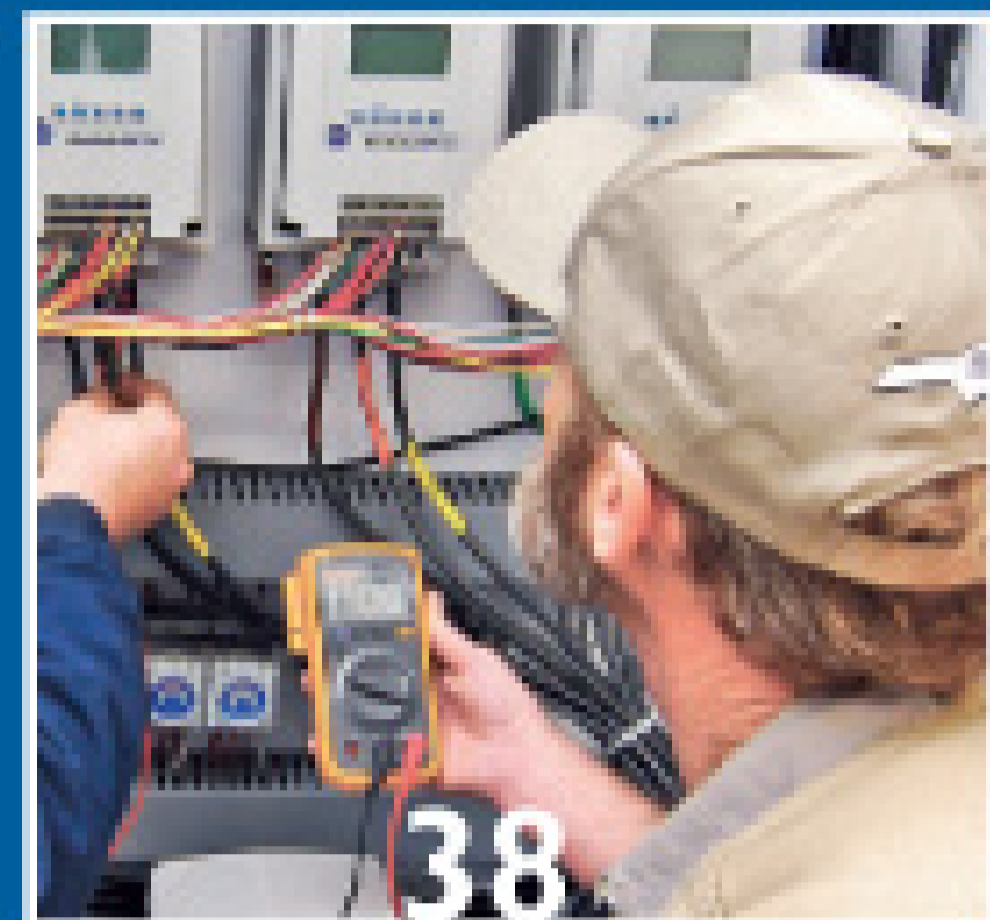
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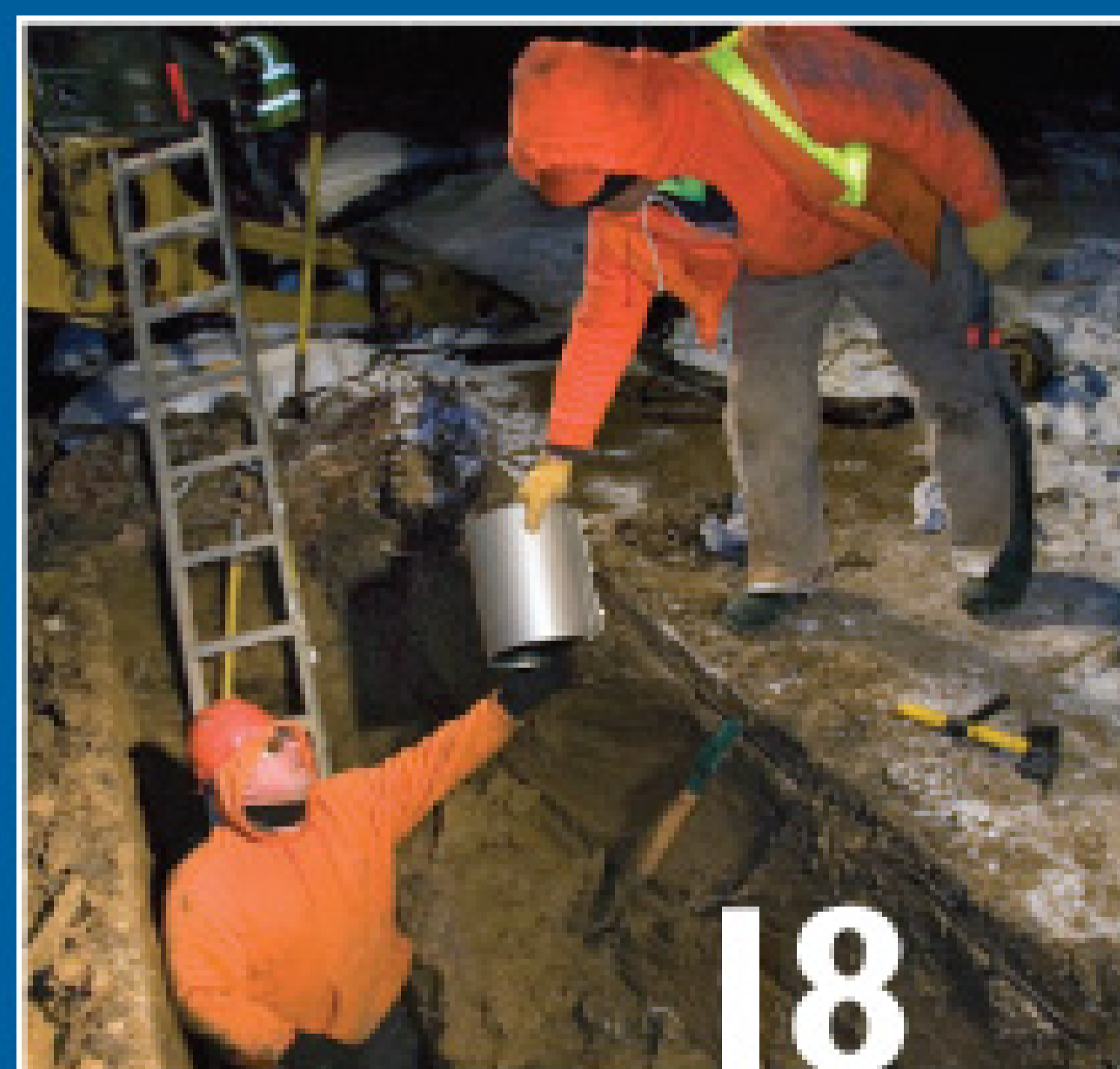
# INSIDE:

2008 PUMPER & CLEANER  
ENVIRONMENTAL EXPO SHOW ISSUE



## COVER:

In near-zero temperatures, Iowa City workers Brian Bailey (in ditch) and Desmond McCalla repair a cracked 6-inch cast iron water main, using a rubber-line stainless steel compression sleeve. (A shoring box was on site but not needed because the ditch was shallow.) The city has been aggressive to stop system losses and enhance conservation. (Photo by Mark Tade)



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– Scottie Dayton

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– Jim Force

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– Barry Harms, P.E.

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– Ted J. Rulseh

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– Ken Wysocky

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A new location marks the growth of NASSCO as a leading source of training and education for the industry.

– Irv Gemora

COMING IN APRIL 2008

#### Special Issue: Pipe Lining

- ◆ Sewer: CIPP lining and slip lining in Wausau, Wis.
- ◆ Storm: Protecting the critical Buzzards Bay watershed
- ◆ Water: Pipe cleaning and lining in Clayton County, Ga.
- ◆ Human Side: The value of humor in the workplace

MARCH 2008

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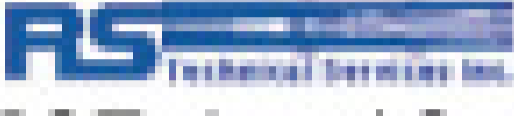
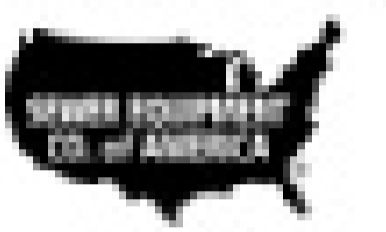


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## MUNICIPAL SEWER & WATER

FOR SANITARY, STORM AND  
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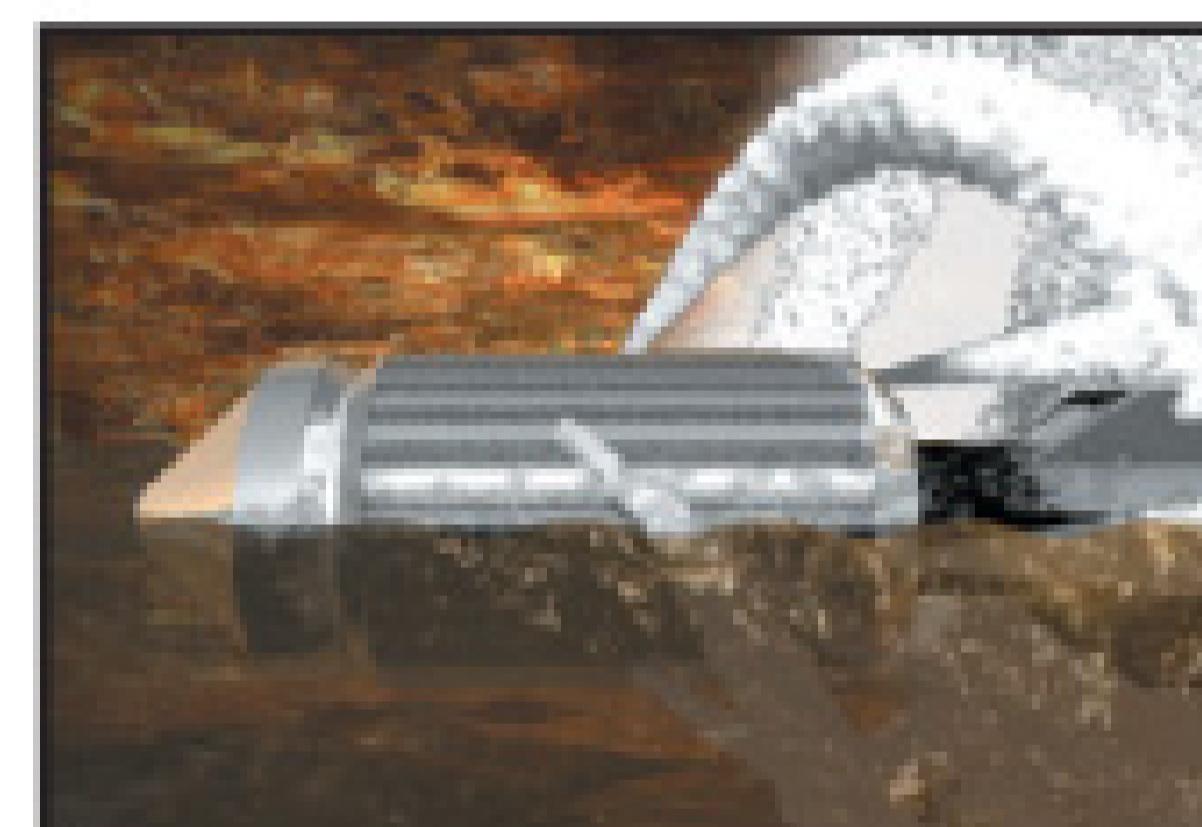
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# NEVER FEAR

Many public agencies hesitate to get out and talk to their publics — failing to realize that the most harmful thing they can do is keep quiet

**F**or companies in the private sector, public relations is an accepted and essential function. A business may have a public relations representative or, if large enough, an entire department. A firm may also have outside public relations counsel. Customers don't question that — it's part of doing business.

And yet, in municipal agencies, public relations is often considered suspect. News media have been known to criticize initiatives to communicate about major projects — school building referendums, infrastructure rehabilitation programs, wastewater treatment plant construction — as exercises in propaganda or image polishing. It's unfair, and yet it keeps some public entities from getting out and telling their story.

Another reason some public officials shrink from talking to their citizens is that they fear confrontation. Sometimes, when faced with paying for a major project, citizens respond first by getting angry. Meeting with angry people in public forums can be intimidating. One can only guess at how many worthwhile projects have been scrubbed or delayed because of failure to communicate well, or to communicate at all.

## Asking the question

In Wisconsin, where I live, school districts and municipalities face state-imposed limits on annual tax levy increases. If they want to exceed the limit in a given year, they have to pass a referendum. School districts in particular struggle with the limits. Many reach the point where they must either cut programs or raise more revenue.

At that point, some go to referendum. Others don't try — they want to avoid the back-

**As long as a public entity is behaving responsibly, it has nothing to fear from people who are angry. Because if they're angry, at least they are interested. And it's not a long stretch to turn that interest into understanding, or even outright support. A time of public unrest can be a valuable teaching moment.**

lash that goes with raising taxes. The success rate for referendums seems to range from about one-third to one-half. You can guess the success rate where no referendum is even put forward. The irony is that when public entities forgo important projects in the name of keeping taxes

down, they often do a disservice — shirking their responsibility and in the long run hurting the people they were trying to keep happy.

As long as a public entity is behaving responsibly, it has nothing to fear from people who are angry. Because if they're angry, at least they are interested. And it's not a long stretch to turn that interest into understanding, or even



## FROM THE EDITOR

Ted J. Rulseh

outright support. A time of public unrest can be a valuable teaching moment.

## Out of the bunker

Communicating well depends in part on believing that most people are reasonable. That holds true even in this era of anti-tax fever. If it were not true, how would so many worthy but expensive projects go forward?

Just as consumers will pay top dollar for products and services they trust to deliver excellent value, taxpayers will support initiatives they perceive as being in their own or their families' best interests.

The key to communicating about public projects is to do so openly and honestly. Here, public agencies are held to higher standards. You can't get by with the kind of slick advertising that's used to sell toothpaste or hamburgers. And you can't peddle half-truths and distortions the way political campaigns do. That is as it should be.

Instead, lay out the facts — pros and cons alike. Expect tough questions, and be ready to give straight answers. Explain clearly why your project deserves support — and don't be shy about it. Your confidence and conviction can help carry the day.

When we want the public's blessing, we have to ask. The public has the right to say no. But we do the public a disservice if we fail to raise the question. Always remember what Abraham Lincoln said: "Public sentiment is everything. With public sentiment, nothing can fail. Without it, nothing can succeed." ♦

Comments on this column or about any article in this publication may be directed to editor Ted J. Rulseh, 800/257-7222; editor@mswmag.com.

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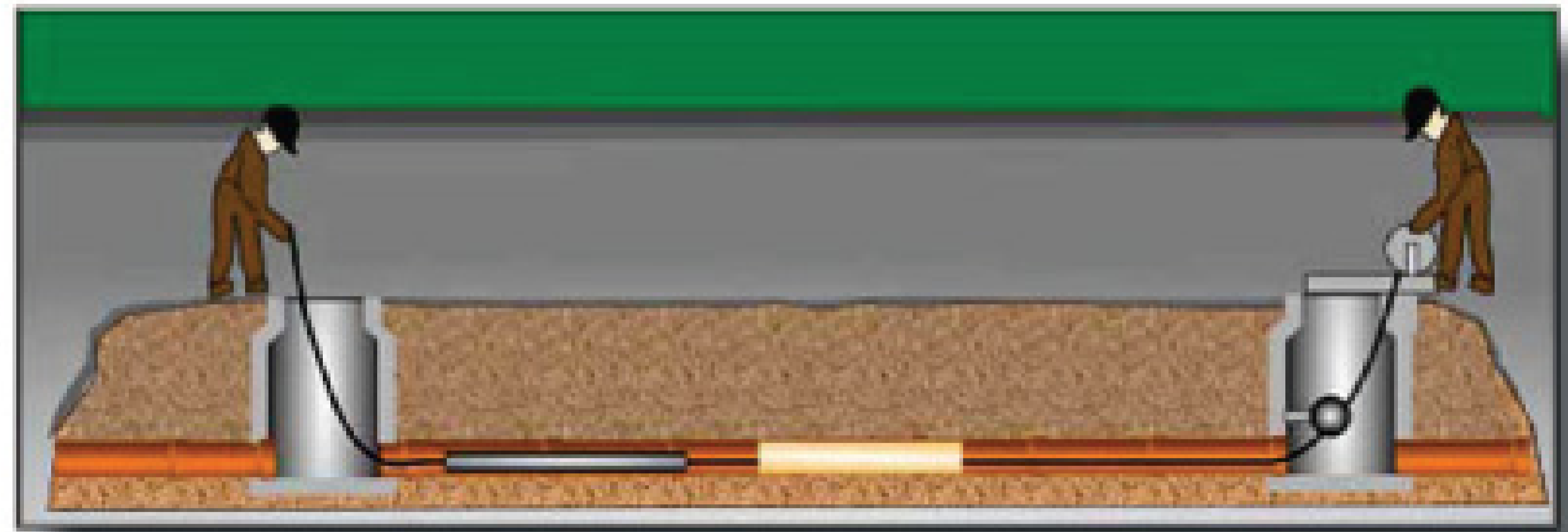
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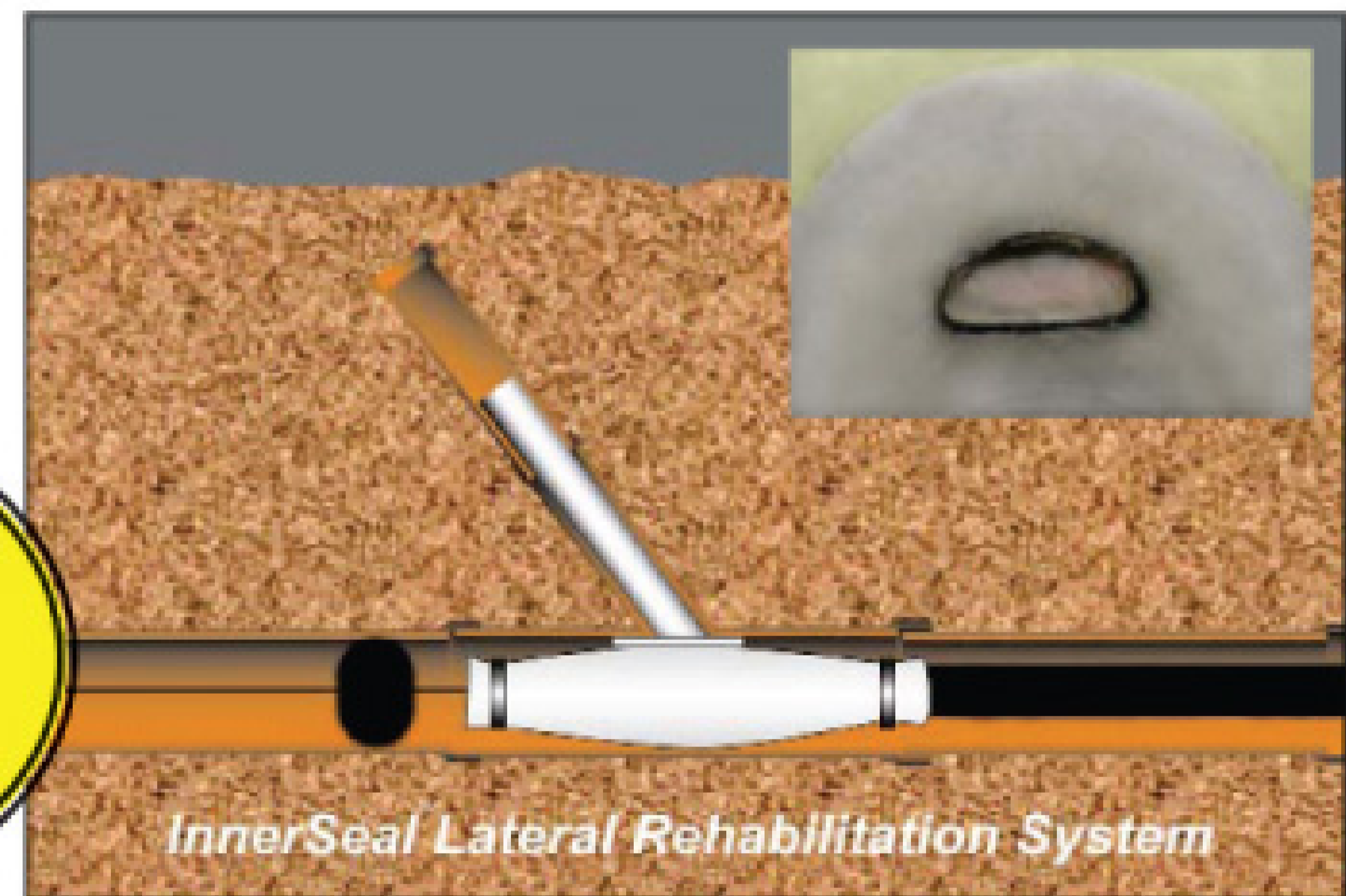
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 6,044,867; 6,068,725; 6,146,491; 6,337,114; 6,520,719; and  
 6,899,832 and Patent Application No. SN 11/135,792.





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We have been waiting for over a year to be able to say that. For the thousands of industry professionals who have made it to this year's show you probably already know how hospitable and welcoming Louisville is. As you spend time walking the exhibit floor, gaining knowledge in the seminars, enjoying the entertainment or exploring the many diverse venues Louisville has to offer, you will understand why we are excited to welcome you to this year's show.

The shows are always an exceptional value. This year there is more of everything. More exhibits in a much larger exhibit hall is making it easier for the industry's top manufacturers, dealers and suppliers to show you what they have to offer. The number of educational programs has been increased, offering you more opportunities to learn and take knowledge back home to help you grow your businesses. There is also more entertainment than ever before, and with a line up that includes Jeff Foxworthy, Big & Rich, Cowboy Troy and John Corbett, it's hard to imagine anyone not having a great time.

The best of the industry is here and that includes you. All of us at COLE Publishing want you to enjoy the show, enjoy Louisville and enjoy yourselves.

**Bob Kendall**  
Co-founder  
COLE Publishing



## Schedule of Events

### WEDNESDAY

**February 27, 2008**

- Education Day
- 56 Educational Sessions (Exhibit Halls Closed)
- Industry Appreciation Lounge open (COLE Pub)

### THURSDAY

**February 28, 2008**

- Certified Onsite Installer Course
- Exhibits Open: 9 a.m. - 5 p.m.
- Educational Seminars: 8 a.m. - 12 p.m.
- Industry Appreciation Party  
5 p.m. • Cash Bar
- Jeff Foxworthy - 7 p.m. • Cash Bar



### FRIDAY

**February 29, 2008**

- Exhibits Open: 9 a.m. - 5 p.m.
- Educational Seminars: 8 a.m. - 12 p.m.
- Industry Appreciation Lounge open (COLE Pub)

### SATURDAY

**March 1, 2008**

- Exhibits Open: 9 a.m. - 3 p.m.
- Industry Appreciation Lounge open
- Saturday Evening Jam  
5 p.m. - John Corbett  
7 p.m. - Big & Rich w/Cowboy Troy

*(Show times are approximate)*



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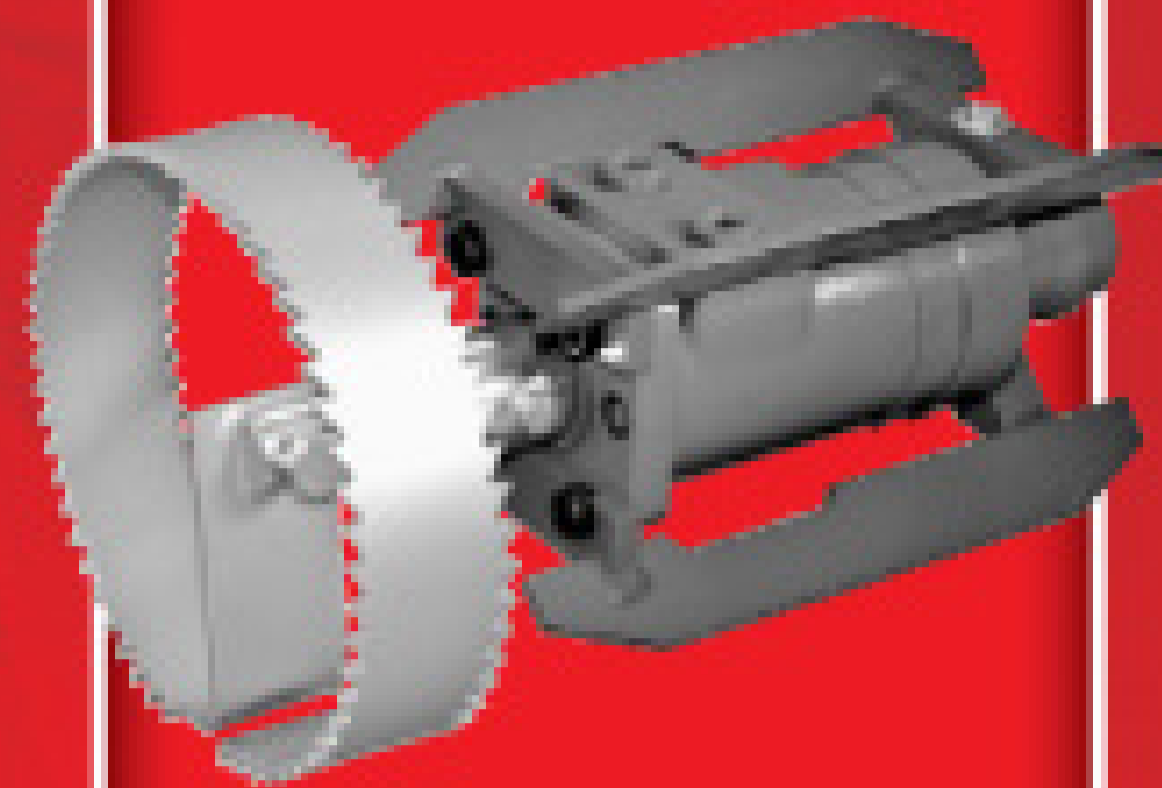
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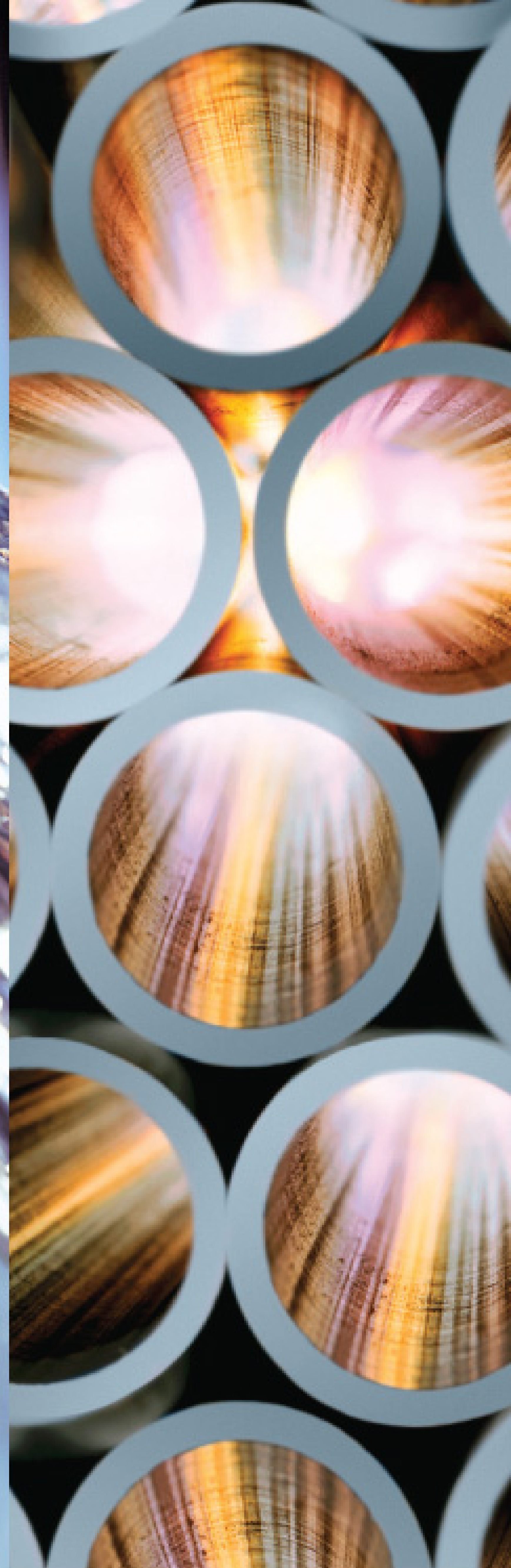
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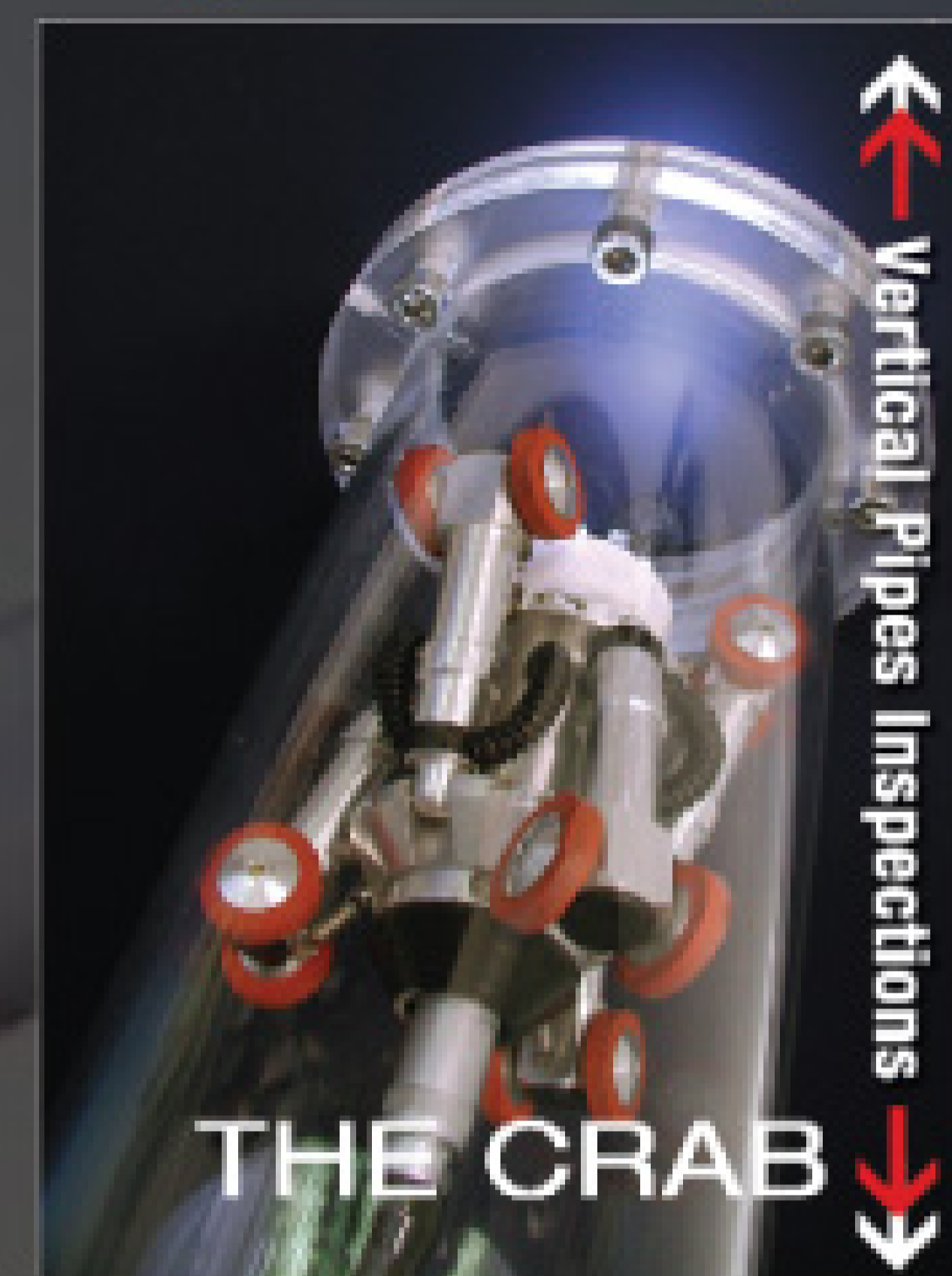
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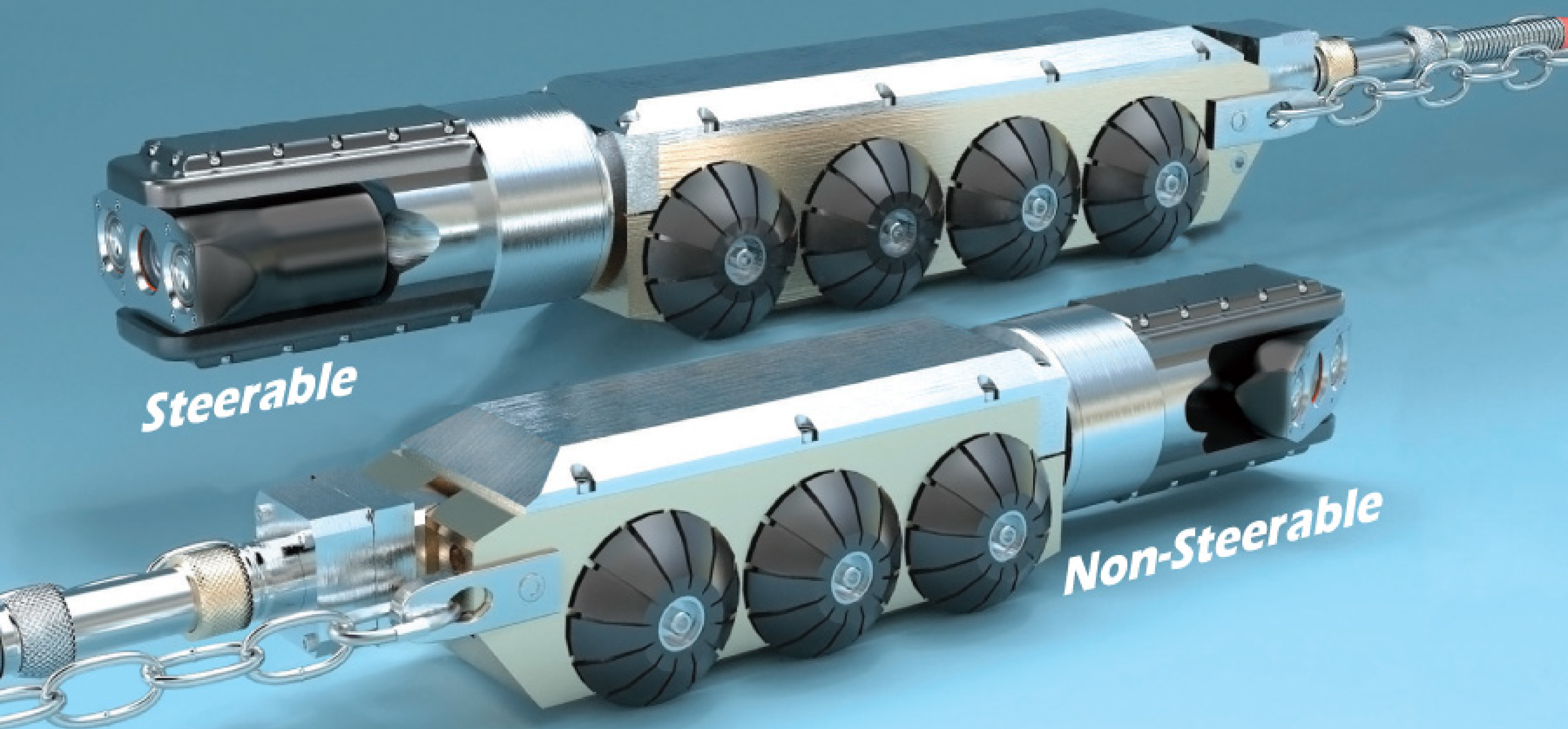


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# CLAMPING DOWN ON LOSSES

Leak detection initiatives in Iowa City help the Water Division minimize non-revenue water and scale down a new treatment plant

By *Scottie Dayton*



Iowa City water distribution workers Desmond McCalla (left) and Mike Sansen assemble a cut-in valve for repairing broken 6-inch water mains. With subzero temperatures forecast, the crew was preparing for main breaks. (Photo by Mark Tade)

**A** 100-year decision changed the course of the Water Division in Iowa City, Iowa.

The original water treatment plant, built in 1882 and upgraded twice, was nearing the end of its life. In 1990, the city began researching a new water purification facility.

Based on population projections, gallons per capita expectations, and growth, the plant's projected capacity and size kept increasing, as did the cost. The city council charged the utility to look at the effect of proposed rate increases and the potential to reduce non-revenue water, believing it would be possible to downsize the plant through leak prevention and conservation.

Ed Moreno, division superintendent, and staff, picked up the gauntlet. Leak detection became their battle cry, backed by an innovative water conservation education program. Minimizing accountable and non-accountable water losses enabled

the city to optimize its investment, while providing consumers with a high quality product.

The results speak for themselves. In 1992, the Water Division provided 6.7 million gpd to 18,400 accounts. In 2007, it had 24,000 customers, yet they used only 5.6 million gpd. The new plant's water capacity of 16.7 million gpd is enough to meet Iowa City's growing needs far into the 21st century.

**“Before 1998, we knew we had a leak when water surfaced. We’d bring in a leak detection group only if we couldn’t find the source. Things were going on in those pipes that we knew nothing about.”**

**Ed Moreno**

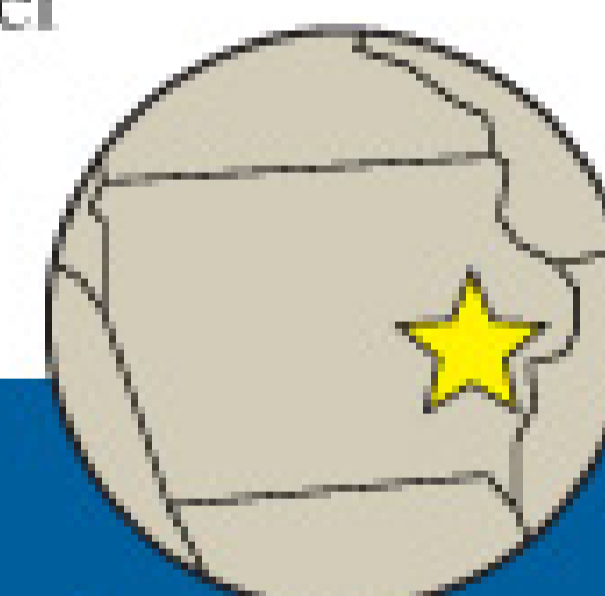
## Vintage years

Iowa City is home to the University of Iowa. More than 85 percent of the Water Division's 24,000 accounts are residential, encompassing the city proper and a town inside the city called University Heights. The university has its own water treatment plant, distribution system, and wastewater collection system. The utility's 25-square-mile service area has 2- to 30-inch cast iron, ductile iron, and PVC water mains.

Early cast-iron pipes had thick walls. “They remain very hearty,” says Moreno. “Cast-iron pipes made during World War II and into the 1950s, when materials were scarce, are troublemakers.” Iowa City migrated to ductile pipe in the early 1970s.

Leaks aren't due just to inferior metal. The area has pockets of corrosive soils that attack the brittle, unwrapped pipes. Freezing and thawing buckle the ground, creating circumferential breaks.

“Before 1998, we knew we had a leak when water surfaced,” says



**PROFILE:**  
Iowa City, Iowa,  
Water Division

**FOUNDED:**  
1882

**CUSTOMERS:**  
24,000

**AREA SERVED:**  
25 square miles

**EMPLOYEES:**  
32

**INFRASTRUCTURE:**  
254 miles of distribution mains

**ANNUAL BUDGET:**  
\$600,000 to \$800,000  
(pipe repairs only)

**WEB SITE:**  
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Contract staff from Tschiggfrie Excavating assembled valve packages above ground, then lifted them into place to be connected to the Certa-Lok C900/RJ pipe on a water main replacement project. (Photos courtesy Iowa City Water Division)



Iowa City water distribution staff members prepare a CertainTeed C900/RJ water main to be pulled into a bore pit on a main replacement project.

Moreno. "We'd bring in a leak detection group only if we couldn't find the source. Things were going on in those pipes that we knew nothing about. The council's charge changed everything."

Moreno first consulted with larger communities that had their own leak detection equipment. He also called the sales representative of the leak detection equipment used by the city's contractor. "The salesman couldn't make it work," says Moreno. "It became apparent that if you didn't use the equipment every day to keep up your skills, proficiency suffered."

In 1998, Iowa City signed a three-year contract with Westrum Leak Detection of Stratford, Iowa, and has negotiated extensions ever since. Westrum inspected the entire service area. The Water Division then fixed the leaks identified in the city.

After that, the city, except downtown, was divided into three areas and put on a three-year rotation. "Our program, which is now preventive maintenance, focuses on one area plus downtown every year," says Moreno. "Westrum finds the smaller leaks that are all over and sends an annual report."

### Earning their keep

The report identifies leaks in mains, abandoned lines, service lines, hydrants, and valves. Initially, leaks averaged 9 million gallons a year, while the leak detection service cost the city \$7,000. "The justification for this program was apparent in the beginning," says Moreno. "Our average payback period was a little more than seven months. Recouping all the leaks really added up."

Water mains were mapped as they were surveyed, digitized, and entered in the utility's AutoCad program. "We're working on databases for asset management," says Moreno. "Our next goal is to step more firmly into geographic information systems (GIS). We've done a pilot project, but haven't gone



Carol Sweeting, water public information education coordinator, teaches a customer how to read a water meter after he experienced an extremely high water use.

## TELLING THE STORY

To raise money to replace its aging water treatment plant, the city council in Iowa City increased water rates repeatedly and substantially over 10 years, and charged the Water Division to develop a residential water conservation program.

A public information-education coordinator position was created, then filled by Carol Sweeting. "Our biggest challenge was determining how we could make consumers more aware of their water consumption," she says.

Sweeting helped develop a home leak identification program, and talked to organizations about the importance of water, the construction of the new facility, and the role they had in using water wisely. She started a TV show videotaped in homes, showing residents how to find and fix leaks. Experts explained how water softeners worked, enabling homeowners to check that theirs functioned properly.

When the new plant opened in April 2003, the Water Division anticipated providing 12 million gpd to customers. Four years later, through consumer conservation and water main replacement, it pumped 5.6 million gpd to 24,000 accounts.

full-fledged into GIS yet."

Westrum surveys the mains in late August, using fast spectral correlation to locate leaks. Sound waves, transmitted from two opposite points in the pipe, spike on the computer monitor when anomalies are present. The operator then evaluates what is causing the spikes and identifies their locations.

"When we dig, we find the leaks exactly where Westrum says they are," says Moreno. "The company has nearly a 100 percent accuracy rating with us."

Once a leak — usually a circumferential break — is located, Water Division crews excavate using open cut or trenchless technology, clean the pipe, and put a stainless steel band around the break to repair it. If an undetected

leak presents itself as water bubbling up and excavation doesn't reveal the source, the men pothole using an HXX Prodigy hydroexcavator from Vector Manufacturing.

### Directional boring

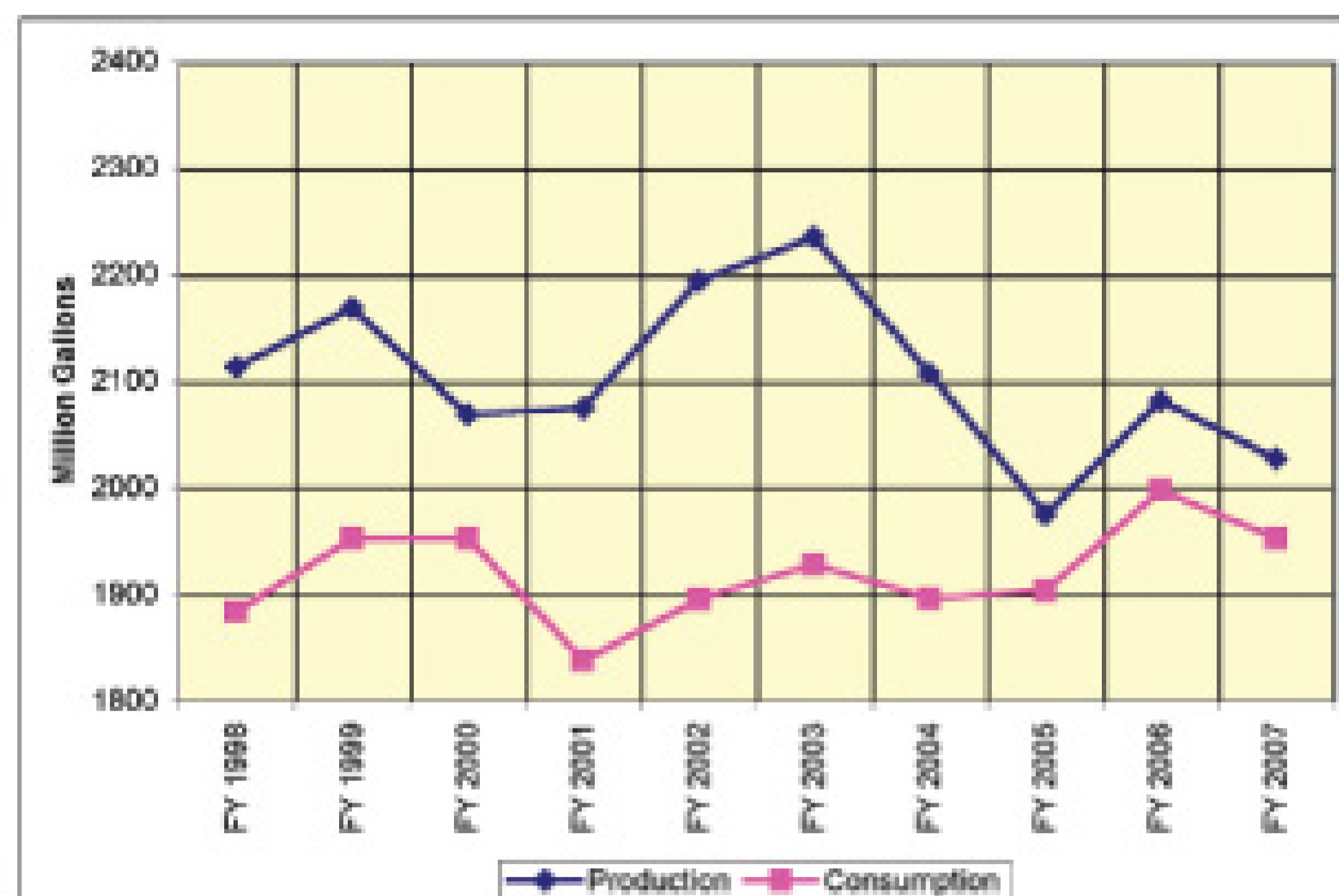
The utility is moving toward more directional boring, too. "At first, we directional bored in areas with only a few service lines, but now the majority of our projects use it so we don't dig up entire neighborhoods," says Moreno. "The technology enables us to accomplish more and to serve our customers better."

Moreno is proud of the pipe replacement work accomplished in the last 10 years, and of the budget allotted for it. In 2007, the city spent more than \$800,000 on

**“The justification for this program was apparent in the beginning. Our average payback period was a little more than seven months. Recouping all the leaks really added up.”**

**Ed Moreno**

**A graph shows how the Iowa City leak detection program, over time, has narrowed the gap between water produced and water consumed.**



replacement, a considerable amount for a small utility.

The city has contracted Central Iowa Water Association in Newton and, more recently, Gaylord Construction Inc. in Fort Madison, Iowa, to do its directional boring. Water Division crews prepare the sites. “We use Certa-Lok C900/RJ, a restrained joint PVC pipe from CertainTeed Corp., and can replace several hundred feet a day,” says Moreno. Gaylord uses the Ditch Witch JT2720 drilling rig.

After the pipe is pulled, it is pressure and bacterial tested. Then Moreno’s team connects the service lines and does the restoration work. “We replace the main to the stop box with copper pipe,” says Moreno. “When necessary, we use our pneumatic percussion boring tool from Pow-R Mole to cross beneath streets.”

### Catastrophic failure

In 2007, the utility began a valve exercising program, and Moreno anticipates inspecting all valves within five years. However, the need for such a program was emphasized 20 years ago during the division’s most challenging repair.

Crews were trying to locate a 20-inch water main beneath a brick street alongside the old plant. During the exploration, the backhoe hit the pipe (stamped with the date 1890), releasing high-pressure water that shot bricks skyward and eroded a massive hole on its journey to the Iowa River.

“The plant went down immediately, activating the pump stations,” says Moreno. Iowa City is unique in that its 6 million gallons of emergency water are stored below ground in pre-stressed con-



**Left, a water main replacement project placed Certa-Lok C900/RJ pipe with a combination of Mueller gate valves on ductile iron. Below, pipe is stacked and ready to be pulled into the pit on a main replacement.**



crete tanks with pump stations.

Unable to isolate the main because the valving was inoperable, Moreno watched stored water levels drop slowly until they were no longer maintainable. “This was in winter, so demand was lower,” he says. “We opened some interconnections with the university’s water plant and maintained low-pressure service throughout the city. However, we issued a boil order as a precaution.”

The main was eventually isolated. Finding ductile iron pipe to fit the oversized damaged section took 30 some hours. The utility installed many new valves in later projects to isolate the line. “The emergency showed the importance of having a valve exercising program,” says Moreno. “Those things have to work.” From 1998 to 2007, Westrum found only two leaking valves.

### Tracking losses

Besides monthly meter readings, the Water Division assists homeowners in monitoring leaks through its billing system, which punches out abnormal usages. “If normal usage goes up or down by half, we verify it, then leave a notice suggesting that homeowners look for leaking toilets, faucets, or open outside spigots,” says Moreno. If they can’t find the leak, customer service is dispatched to help.

A university town has numerous apartments. Iowa City meters most of them individually. “It’s another tool we use to identify leaks,” says Moreno.

Accurate water usage depends on accurate meters. The old plant had insertion prop meters that were calibrated every two years. “They still weren’t as accurate as the mag meters in the new plant,” says Moreno. “We feel pretty good about the accuracy of our metering now.”

In addition, the utility has a meter change-out program tied

the utility to reduce its per capita usage. Moreno believes raising water rates was a key component. “That forced customers to really look at their usage,” he says. “Once the rate structure began increasing, the City Council requested that we offer citizens a conservation program, which was heavily promoted.”

The new plant’s purification process helps residents conserve water, too. Seventy percent own water softeners, but the water they receive now has only 7 grains of hardness instead of 20-plus grains. “That caused a significant change in water usage because people no longer dumped 50 gallons every time the softener recycled,” says Moreno.

Thanks to Moreno and his staff, and the cooperation of city residents, Iowa City is on course for an ample supply of high-quality water for many years to come. ♦

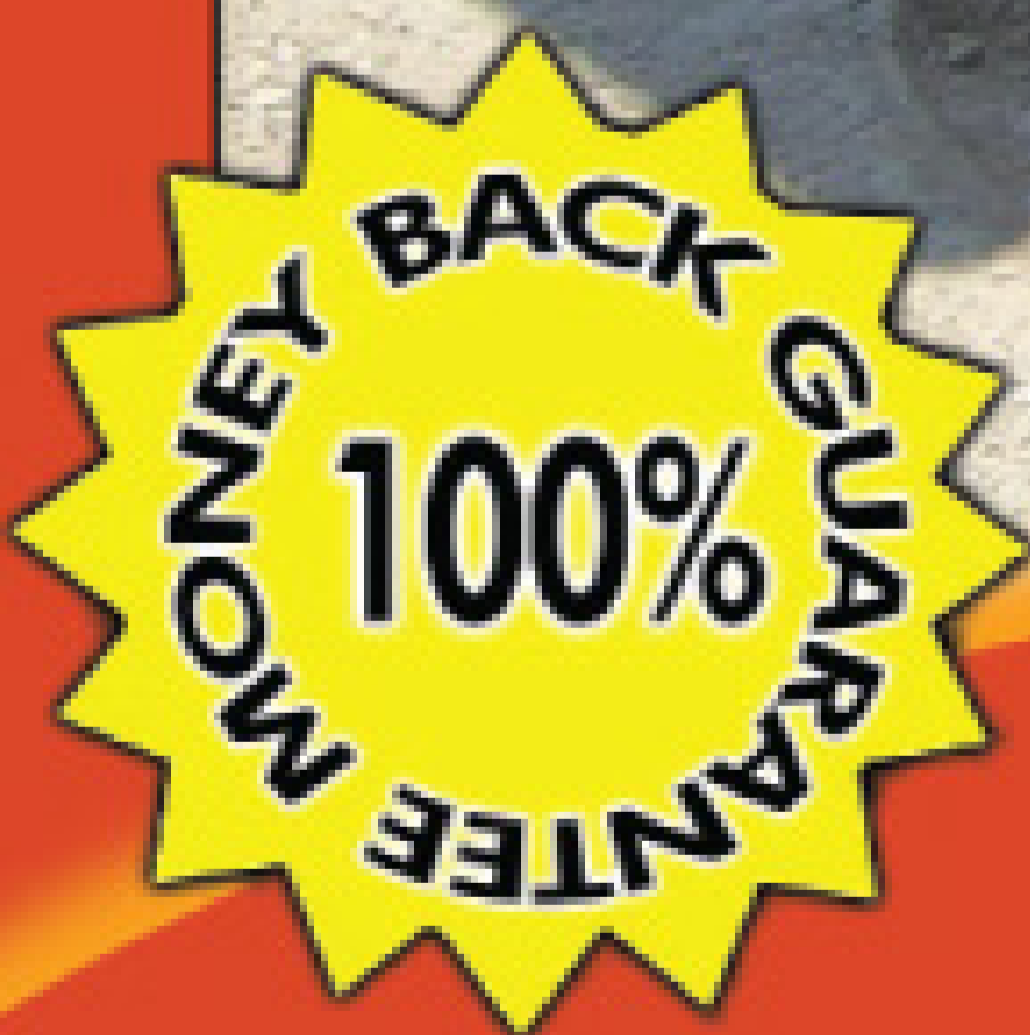
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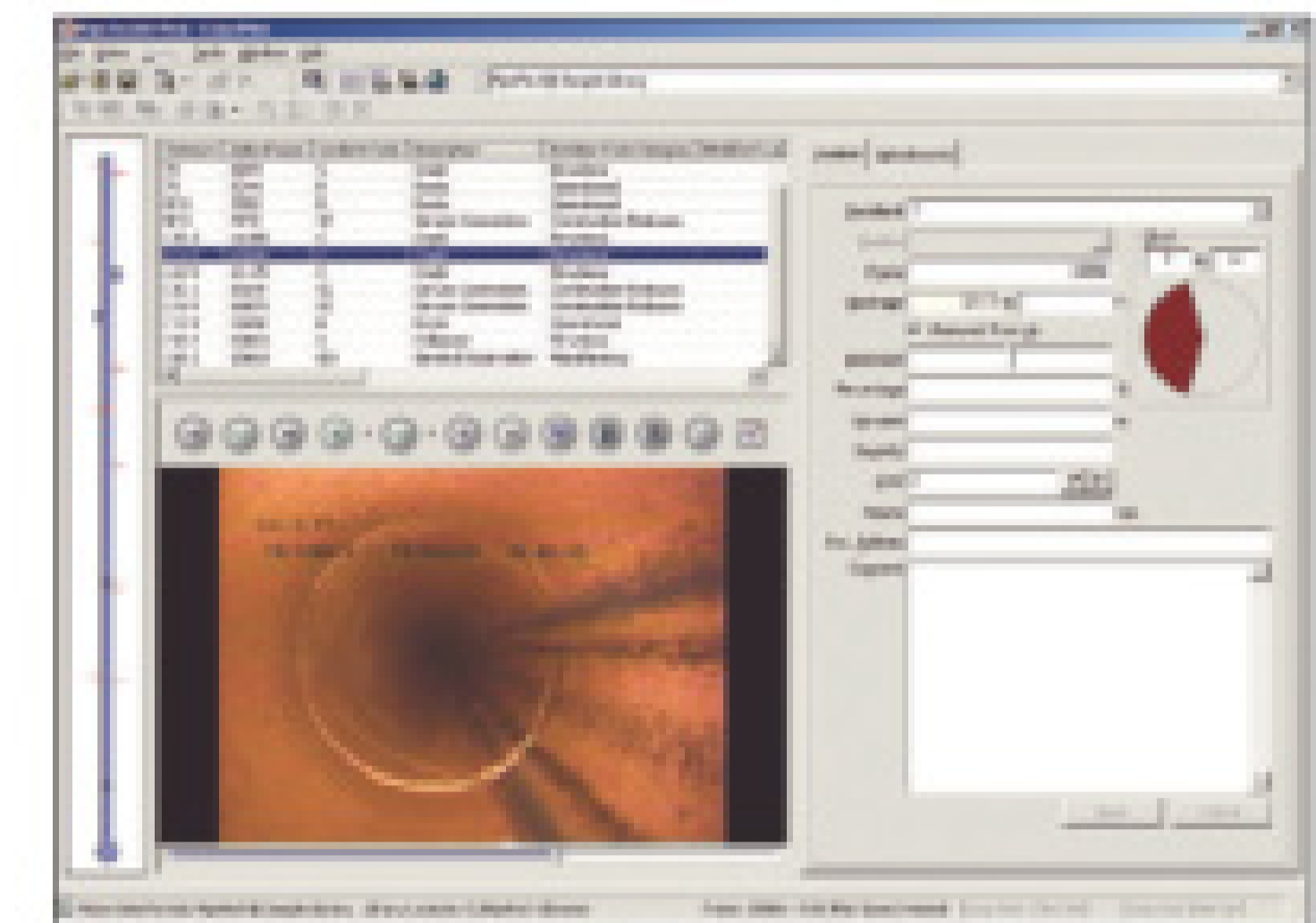
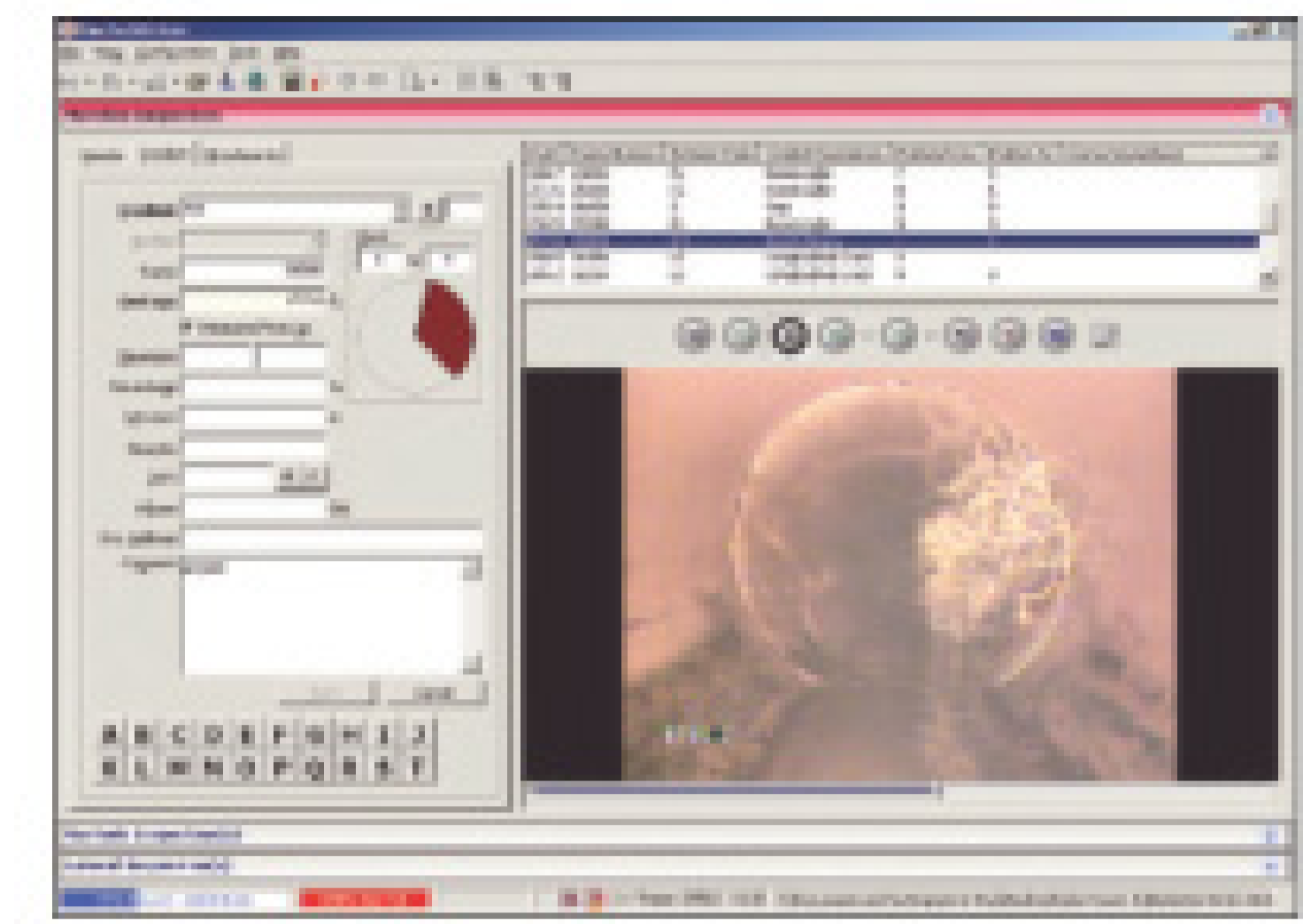


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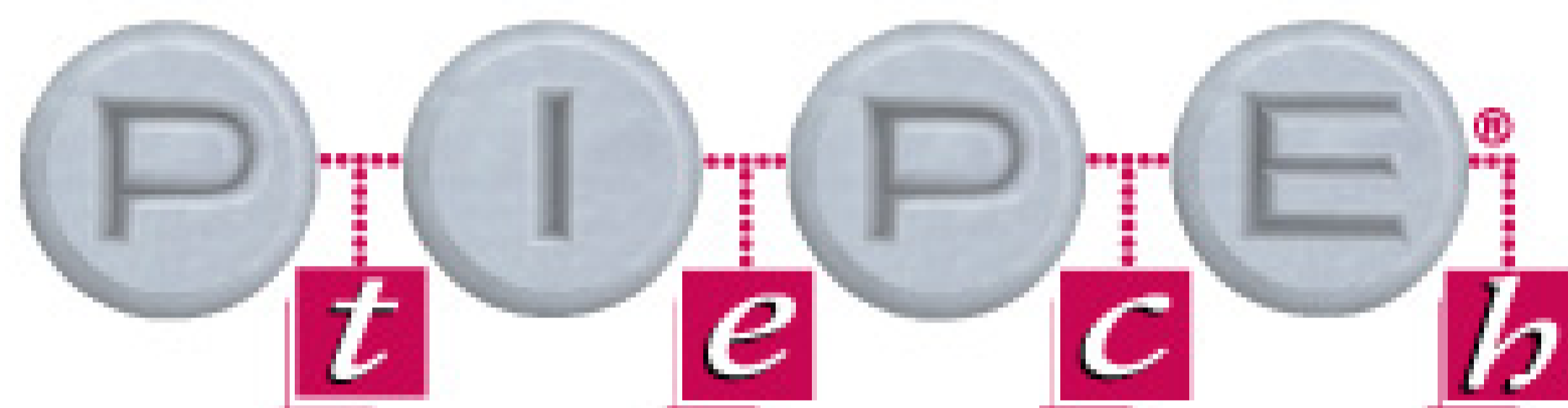
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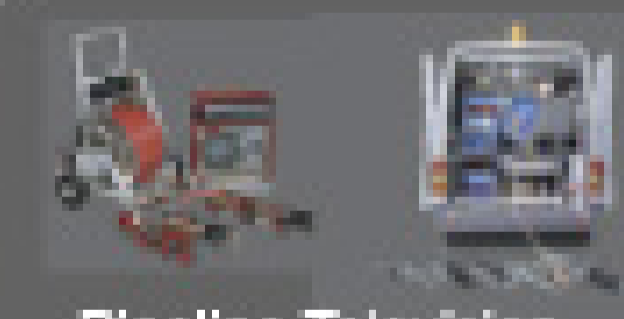
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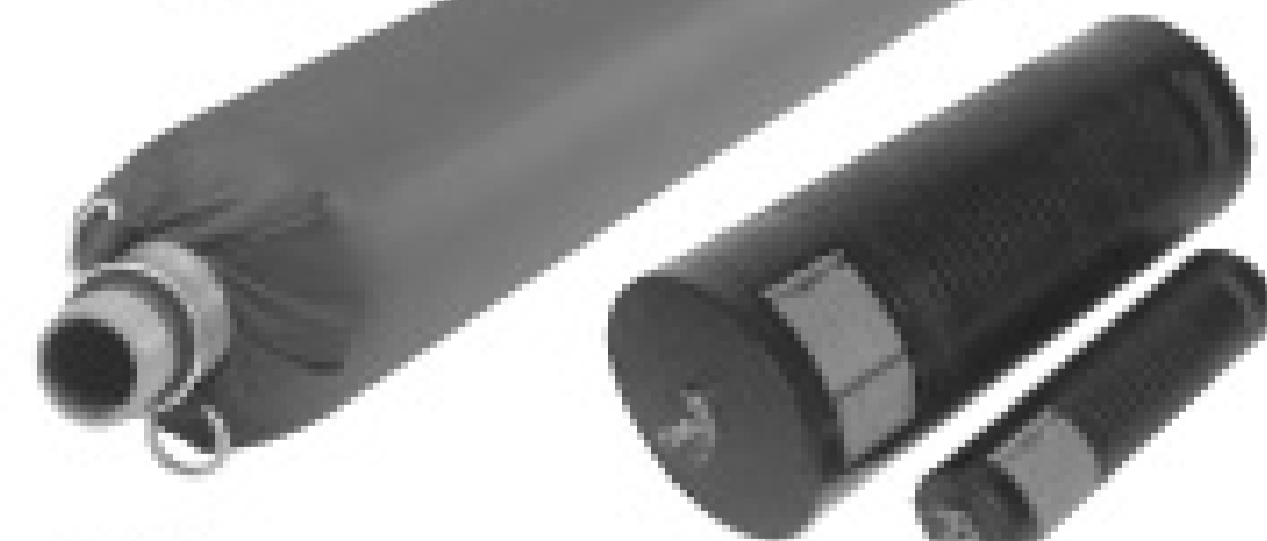
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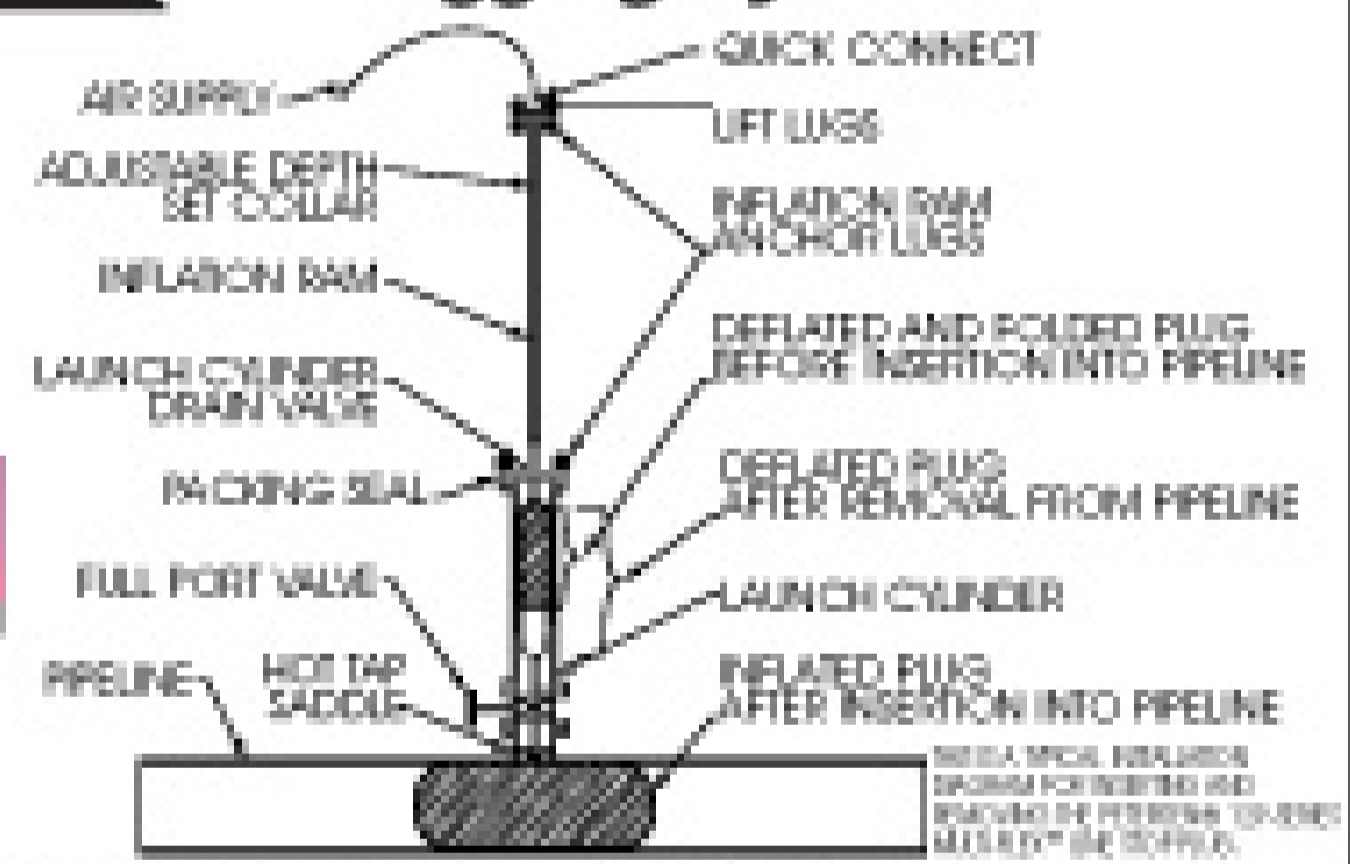


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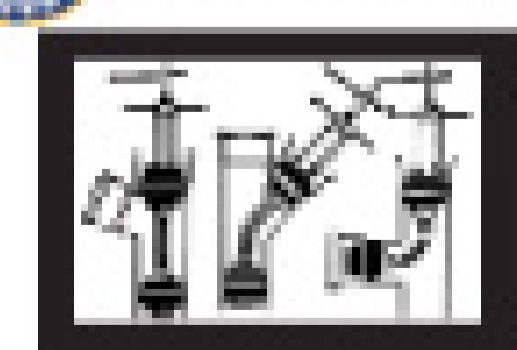
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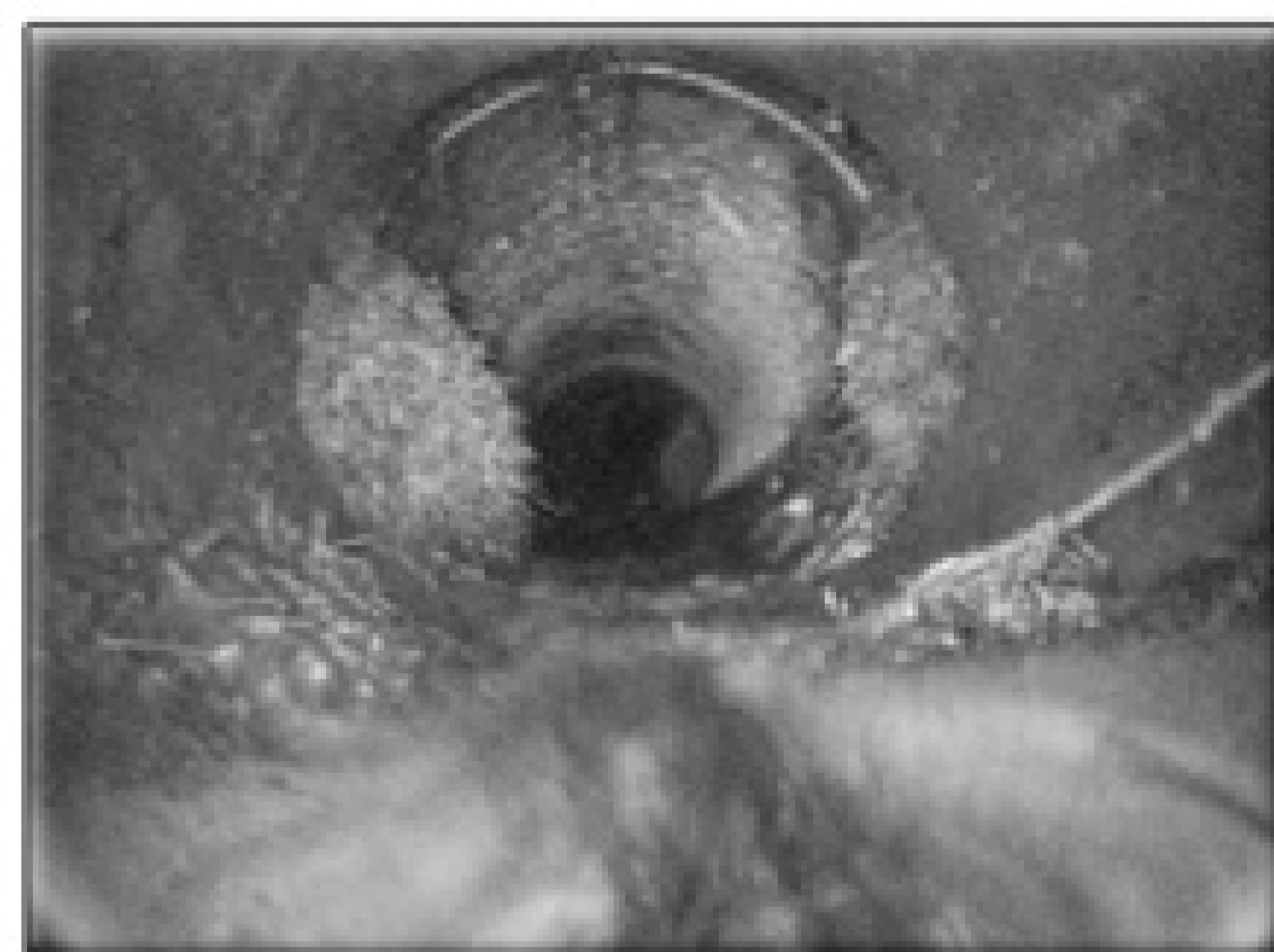


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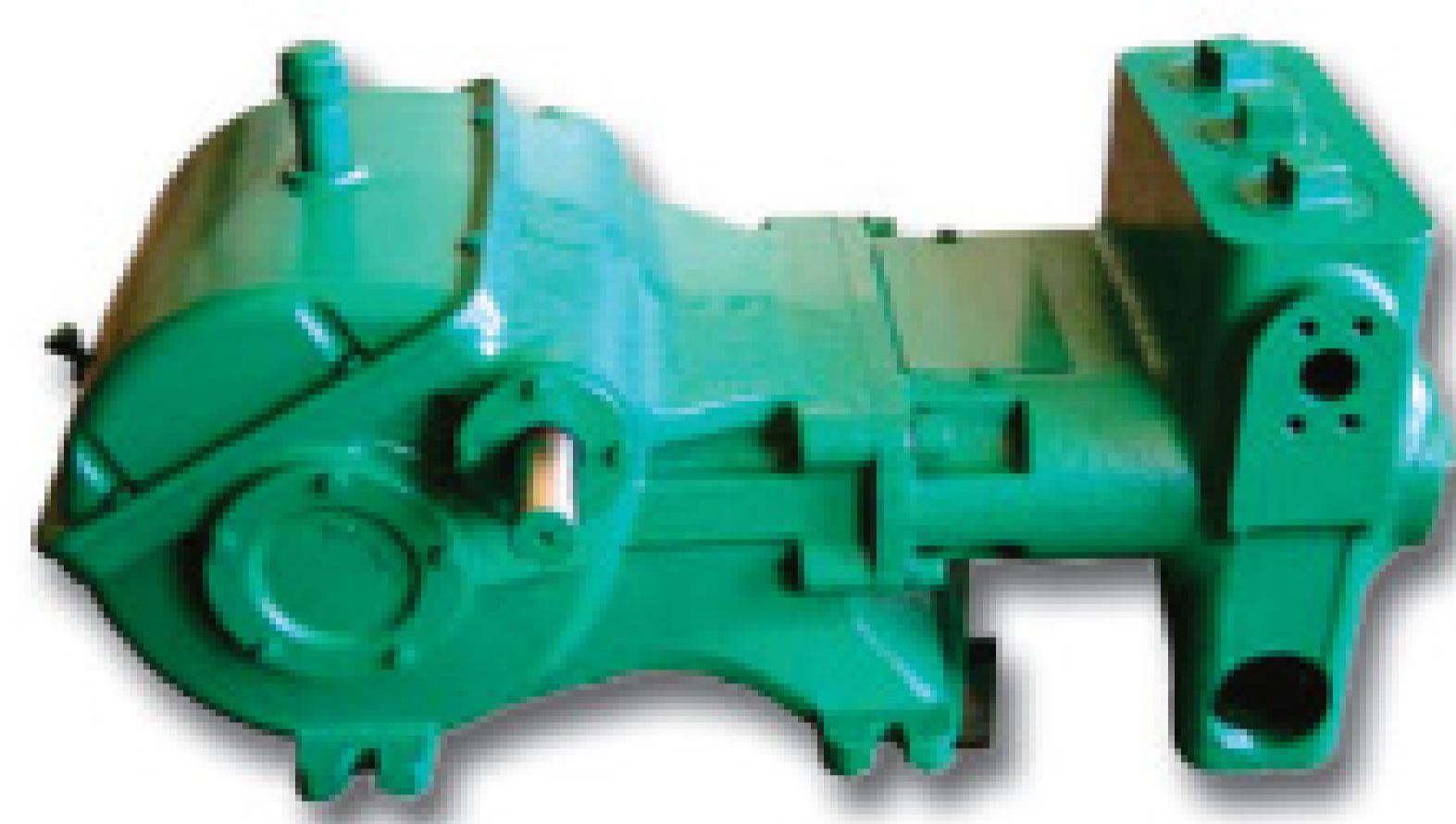
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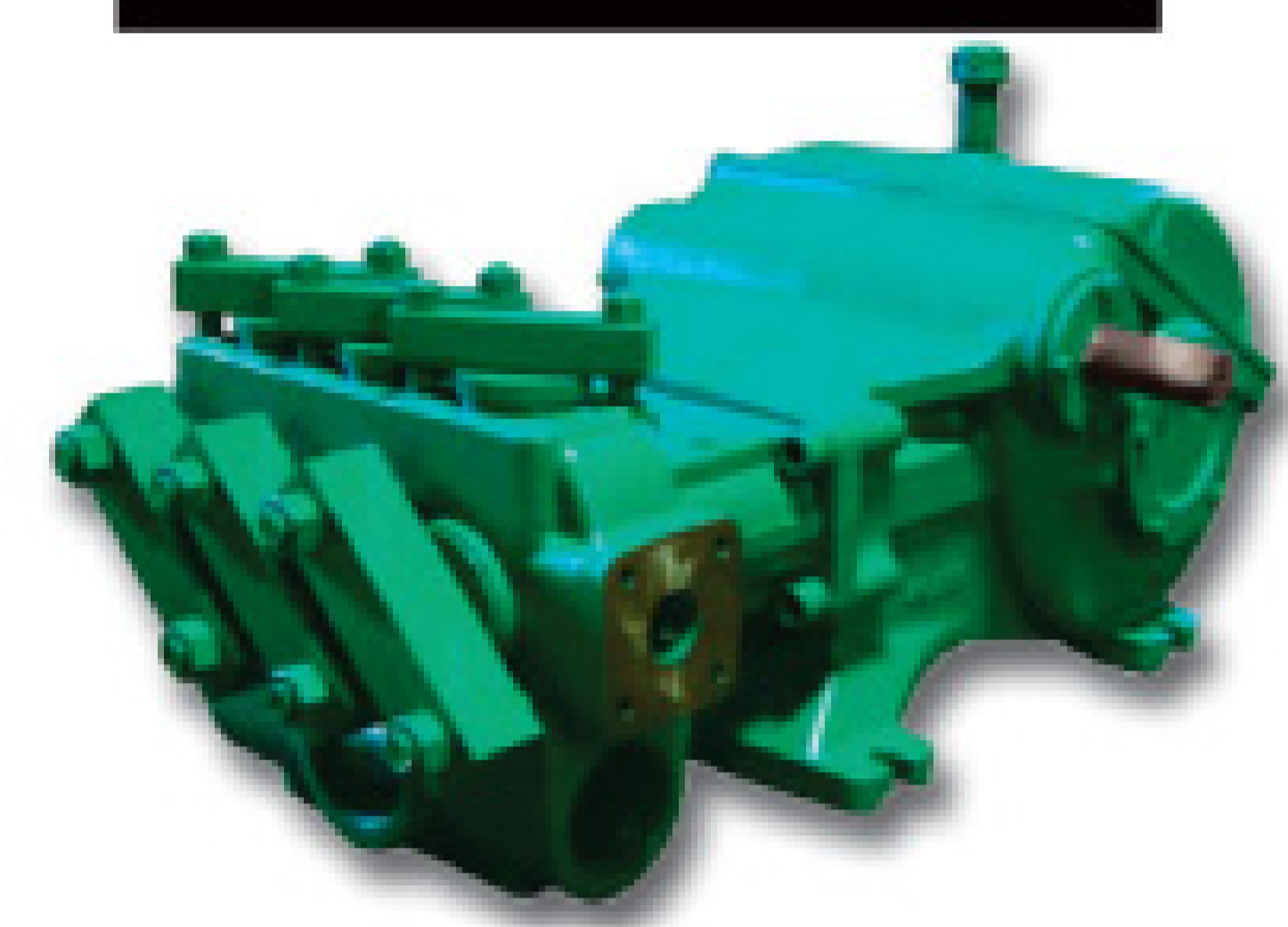
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# SOAKING UP SOLUTIONS

Permeable pavement surfaces begin living up to their promise as cost-effective tools to reduce runoff and cut stormwater pollution

By Jim Force

**S**ometimes, the best solution to a problem is to turn the problem into the solution.

That may be the case with stormwater runoff from hard surfaces like parking lots, streets, sidewalks and alleys.

Permeable “hardscapes” allow rainwater to soak into the ground instead of running off into sewer systems and polluting receiving streams. They actually serve as a stormwater management system.

Introduced in Europe, permeable surfaces are gaining ground in North America, propelled by

stormwater regulations and public concerns that continued paving with impervious materials is not sound environmental policy. The approach also dovetails with other municipal low-impact development strategies and practices.

## Reaching all levels

“We’ve been working with permeable projects for several years,” says Donna DeNinno, marketing director for Uni-Group U.S.A., maker of the Eco-Stone family of interlocking concrete pavers, headquartered in Palm Beach Gardens, Fla. “Now we’re seeing interest all

the way to the residential level. People are actually coming to us.”

Bob Lisi of LHB Inc. in Duluth, Minn., observes, “The trend is borderline revolutionary in the construction industry. Current pavement design relies on preventing moisture from penetrating the pavement. Porous pavements flip this design practice and readily accommodate moisture in the base materials. My guess is that porous pavements will become mainstream technology across the United States in the next 10 years.”

And Bruce Chatten, executive director of the Washington Aggre-

gates and Concrete Association (WACA), says the trend line is “almost exploding” in the Northwest. “It started slowly — trails and sidewalks, but now we are seeing residential streets, parking lots, and residential driveways,” he says.

“Permeable concrete provides the ability to maximize the use of the site, provides a two-stage infiltration filter over the whole site,

Washington Aggregates and Concrete Association



Permeable concrete pavement allows stormwater to pass directly through.



A growing bank of data provides information on attributes of permeable pavement, such as ease of installation and durability.

# PROJECT SKETCHES

Cities and counties across the nation are putting permeable pavements to work in a variety of applications. Here are a few examples of successful projects.

## Residential Subdivision

Completed in April, the 20-home Stratford Place in Sultan, Wash., has 20-foot-wide roads and 4-foot wide sidewalks. It is the first plat in the state to use pervious concrete for stormwater management on its entire paved surface (32,000 square feet).

The system consists of 8 inches of pervious concrete over an 8-inch coarse gravel retention layer. In essence, no stormwater leaves the site.

The system directs rainwater from roads to the recharge area under the concrete. It mimics natural infiltration and directly recharges groundwater. It also mitigates first-flush potential by reducing pollutant loading.

The pervious surface approach at Stratford Place is economical when all factors are considered. The approach eliminated catch basins, embeds and piping infrastructure, detention vaults and lids, interior plat curbing, asphalt, and future city-county maintenance of the stormwater system.

Including the value of and tax revenue from additional housing plats that traditional stormwater management structures would have required, overall project savings amounted to \$264,000.

Washington Aggregates and Concrete Association



**Pervious concrete streets and driveways on Stratford Place in Sultan, Wash.**

## Church Parking Lot

At White Bear Unitarian Universalist Church in Mahtomedi, Minn., workers recently finished a 14,000-square-foot parking lot using porous asphalt.

LHB Inc.



**A rooftop view of porous asphalt placement. Soil behind the curb lines is stabilized with erosion control blanketing.**

The subgrade is protected from compaction to maintain the soils' infiltration potential.

Bob Lisi of the project design firm LHB Inc. says excavation and site preparation took about one week, plus one day for placement of the porous asphalt. To achieve uniform compaction, contractors usually place standard asphalt in two or three layers. But porous asphalt can be placed in one layer, since compaction is not as crucial due to the desired high voids content of the finished product.

## Green Alleyways

The City of Vancouver, B.C., sought ways to reduce stormwater runoff from its maze of alleyways, which provide access to garages and for trash and garbage pickup. The city developed a Country Lanes concept making these alleyways

greener, more rural, and in conformance to the city's emphasis on environmental sustainability. Property owners helped with planning and remain engaged by maintaining the lanes.

Instead of edge-to-edge asphalt, two narrow strips of material provide a smooth driving surface. A plastic grid, covered with topsoil and grass, lies between the strips. This "structural grass" can support vehicles and prevents the grass roots from compaction and rutting. The road base is a mixture of aggregate for stability and a sand/soil blend that allows for drainage and grass growth. Interlocking block provides additional support at driveway connections and in heavy truck traffic areas.

Three demonstration lanes used three different materials for the driving strips as test cases. "In the first two lanes we constructed, the driving strips were non-permeable concrete," explains Carl Matricardi, engineering project coordinator for the city's Street Design Branch. "The third lane we constructed was property line to property line using the structural grass product, and the driving strips were permeable gravel."

Matricardi believes lanes of the first two types will always cost a premium over edge-to-edge asphalt lanes, because they have more construction steps and require more detailed or hand work. On the other hand, he believes edge-to-edge structural grass with gravel lanes will be equal to or below conventional asphalt lanes once crews become more familiar with installation.

City of Vancouver Engineering Services



**At Farmers Country Lane, designers used interlocking paver blocks for support where driveways entered alleys, or in areas with heavy utility truck traffic.**

## Arboretum Visitor Center

The Morton Arboretum in Lisle, Ill., is a 1,700-plus acre site northwest of Chicago. In the late 1990s, the arboretum made plans to expand its visitor center and parking lot and decided on a green approach using a permeable surface parking lot and bio-swale medians.

The 5-acre lot is next to Meadow Lake, which was about to be renovated under a grant. The construction of an asphalt parking lot beside the lake and in the floodplain of the DuPage River, did not strike project designers as appropriate.

They chose the Uni Ecoloc system of interlocking permeable concrete pavers, supplied by Uni manufacturer Unilock. The pavers are 3 1/8 inches thick. One-inch-square openings between pavers allow rainwater to pass through to the base course and sub-base below. Drainage void areas represent 12-18 percent of surface per square foot, facilitating infiltration into the base reservoir.

The ability of the pavers to provide year-round service, support heavy vehicles like buses, and provide a favorable lifecycle cost analysis over other types of surfaces also led to the decision to use the pavers. The arboretum received a matching grant from the Illinois EPA to help fund the project.

UNI-GROUP U.S.A.



**A permeable parking lot surface supports a "green" approach at Morton Arboretum.**

and filters pollutants and recharges the groundwater supply. It is almost a structural soil.”

But while earth-friendly, how difficult are permeable (also called pervious or porous) surfaces to install and maintain? Do they hold up? Are they a feasible retrofit? And how much do they cost compared to traditional surfaces? Answers are still forming, since permeable surfaces are still not widespread. But a growing number of installations are providing new and useful information.

### Some differences

Generally, installers can use standard construction techniques and equipment to put down permeable surfaces, but contractors need to make unique modifications to prepare the site, install the base materials, and place the actual surface. According to LHB’s Lisi, “The main challenge is getting contractors up to speed on proper construction techniques to

**The Westmoreland Permeable Pavement Pilot Project in Portland, Ore., was a joint effort of the Portland Office of Transportation, Bureau of Environmental Services, and the city Water Bureau.**

ing a leaking water connection or main beneath the city’s green Country Lanes would cost more than on a conventional alley or lane.

“In Country Lanes, the cost for a cut would be significantly more because the cross section of the surface treatment is so much more diverse than regular pavement,” he says. “Over time, costs for maintenance will decline as everyone becomes more familiar with construction methods and procedures. Keep in mind that these types of projects are different than what we are use to, so there is a learning curve for everyone involved.”

And what about winter? Owners remove snow the same way as on traditional pavements, although applying sand for traction tends to plug the surface

**“Permeable concrete provides the ability to maximize the use of the site, provides a two-stage infiltration filter over the whole site, and filters pollutants and recharges the groundwater supply. It is almost a structural soil.”**

**Bruce Chattin**

**Washington Aggregates and Concrete Association (WACA)**

avoid problems due to improper installation methods.

“Porous pavement needs to be understood as a system, not just as a new type of pavement surface. The system is unique in that it temporarily accommodates stormwater in the base materials — quite the reverse from traditional pavement design.”

Likewise, traditional maintenance procedures apply to the new surfaces. Sweeping, blowing, and pressure washing work fine. Proper landscaping and curbing can control runoff of silts and fines. “Any site should have a Best Management Practice program on how to monitor and maintain any pervious surface,” says Chattin of WACA.

In Vancouver, B.C., Carl Matricardi, engineering project coordinator for the city’s Street Design Branch, notes that replac-

ing pores. Icing on porous pavements is less likely, since the water seeps into the base layer before it freezes. Porous pavements may be less prone to freeze-thaw cracking because the base layers are stronger. In fact, current research shows that freeze-thaw conditions do not negatively affect long-term pervious concrete pavements.

Actually, minor pavement cracking does not compromise the function of a porous pavement. “Cracks are another conduit for drainage into the base layers that are designed to accommodate the water,” says Lisi.

### Loadings and retrofits

Permeable surfaces may not be suitable for all applications, and heavy industrial loadings may warrant stronger materials. “Sometimes, as in heavy truck-use areas,



ICPI and UNI-Group U.S.A.

traditional concrete can be a better long-term choice and will make more sense for the owner,” says Chattin. A mix of pervious concrete with traditional parking lot surfaces still allows a site to store stormwater in the base layer.

In the Country Lanes project, designers used interlocking paver blocks for support where driveways entered alleys, or in areas with heavy utility truck traffic.

So far, little information on retrofitting exists. Lisi suggests that porous asphalt can be pulled up and new porous material installed over the original base, if the system still functions and the bituminous is all that needs replacing. Paver stones and permeable concrete can also be replaced as necessary.

For replacing an impervious surface with pervious, the best approach might be to strategically place porous pavement where it will best capture storm runoff before discharging water from the site. This would be more cost effective than removing the entire existing surface.

### The cost question

In general, permeable surfaces cost more, mainly because of the larger quantity of base materials. But that may change as the technology becomes more prevalent and if owners take total project costs into account. Compared to a traditional pavement with stormwater infrastructure (catch basins, piping, and land dedicated to treatment ponds and rain gardens),

## THE MATERIALS

Here are descriptions of the major types of permeable paving materials used for stormwater runoff reduction. The information comes from the Interlocking Concrete Pavement Institute.

**Pervious concrete** is made with carefully controlled amounts of water and cementitious materials to create a paste that forms a thick coating around aggregate particles. Unlike conventional concrete, the mixture contains little or no sand, creating a substantial void content of 15 to 25 percent.

**Porous asphalt** (also called open-graded asphalt) contains no fine aggregate particles. The spaces between the larger aggregate particles provide voids that allow water to collect within and drain through the pavement.

**Permeable interlocking concrete pavement** is comprised of a layer of durable concrete pavers separated by joints filled with small stones.

porous pavement can be very cost effective.

“Pervious concrete is better evaluated based on the value it brings to a development or project,” says Chattin. “It almost will save a developer substantially over

expensive and expansive detention vaults, plus it puts land otherwise used for retention ponds back into development, yielding more taxable parcels for a city."

Lisi believes stormwater fees charged to landowners should figure in the equation. "The fees are typically based on the amount of impervious surfacing contributing runoff," he says. "If a landowner can receive a reduced utility fee for utilizing a porous pavement system, the annual savings will eventually pay for the porous system."

**"Over time, costs for maintenance will decline as everyone becomes more familiar with construction methods and procedures. Keep in mind that these types of projects are different than what we are use to, so there is a learning curve for everyone involved."**

**Carl Matricardi**

City of Vancouver, B.C.

Lisi also expects unit prices to decrease as demand for permeable surfaces meets reasonable bulk production levels for suppliers. That could well happen, as the pavement industries have developed nationwide design and installation guidelines, which are being modified by state agencies and industry representatives to adapt to regional climates and material resources.

As applications expand, and as specifiers and contractors become more educated and certified in the technology and grow comfortable with it, the application of permeable surfaces should increase. "Contractors need to understand the type and differences between pervious and impervious surfaces, and specifications should require

trained or certified contractors," Chaitin says.

However, porous pavement should not be a license to pave with abandon. "Vegetation has ecological value beyond what any pavement can provide," says Lisi. "First, reduce paving to that which is necessary. Then look for ways to integrate paving and vegetation into the site."

More information about permeable pavements is available from:

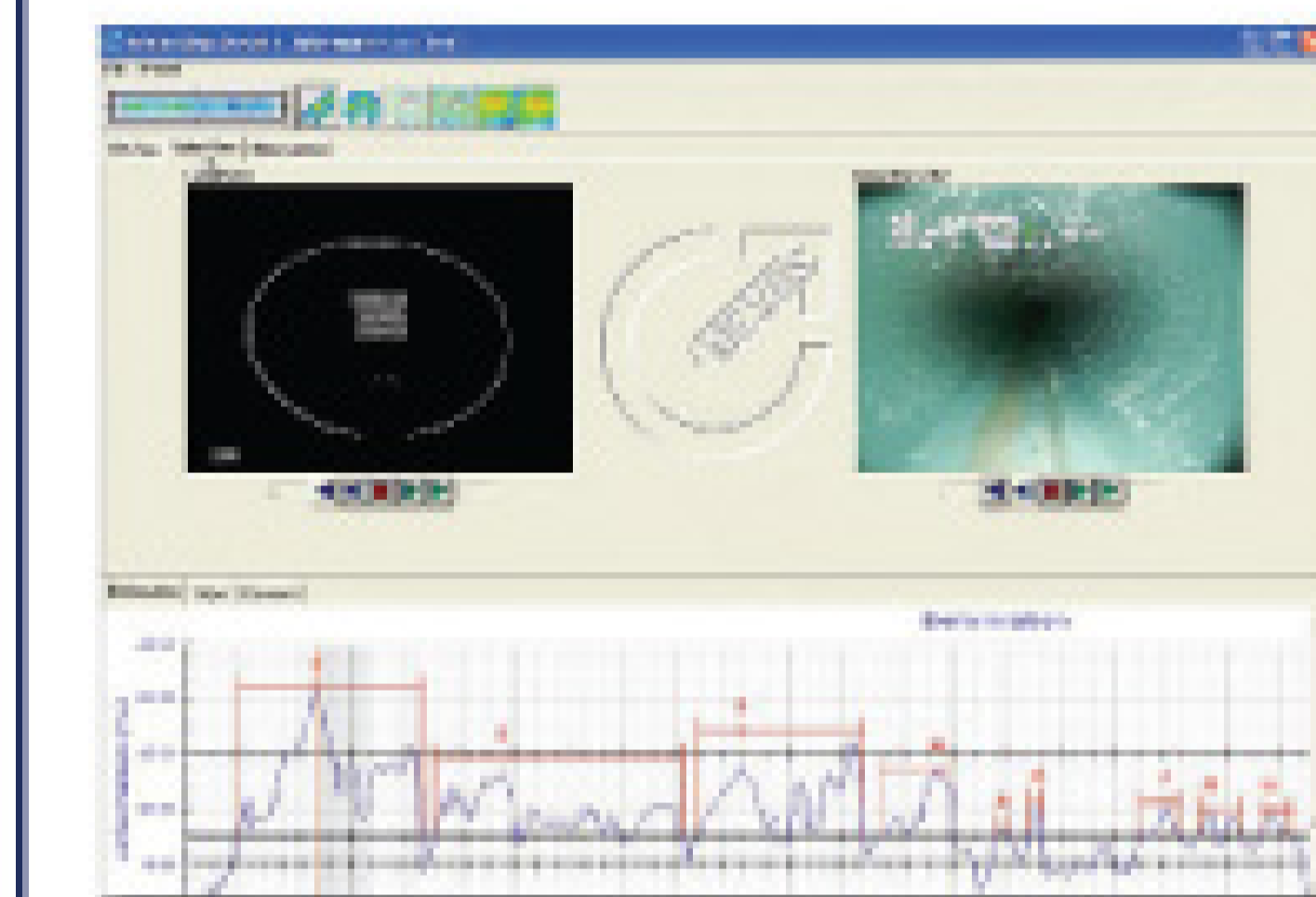
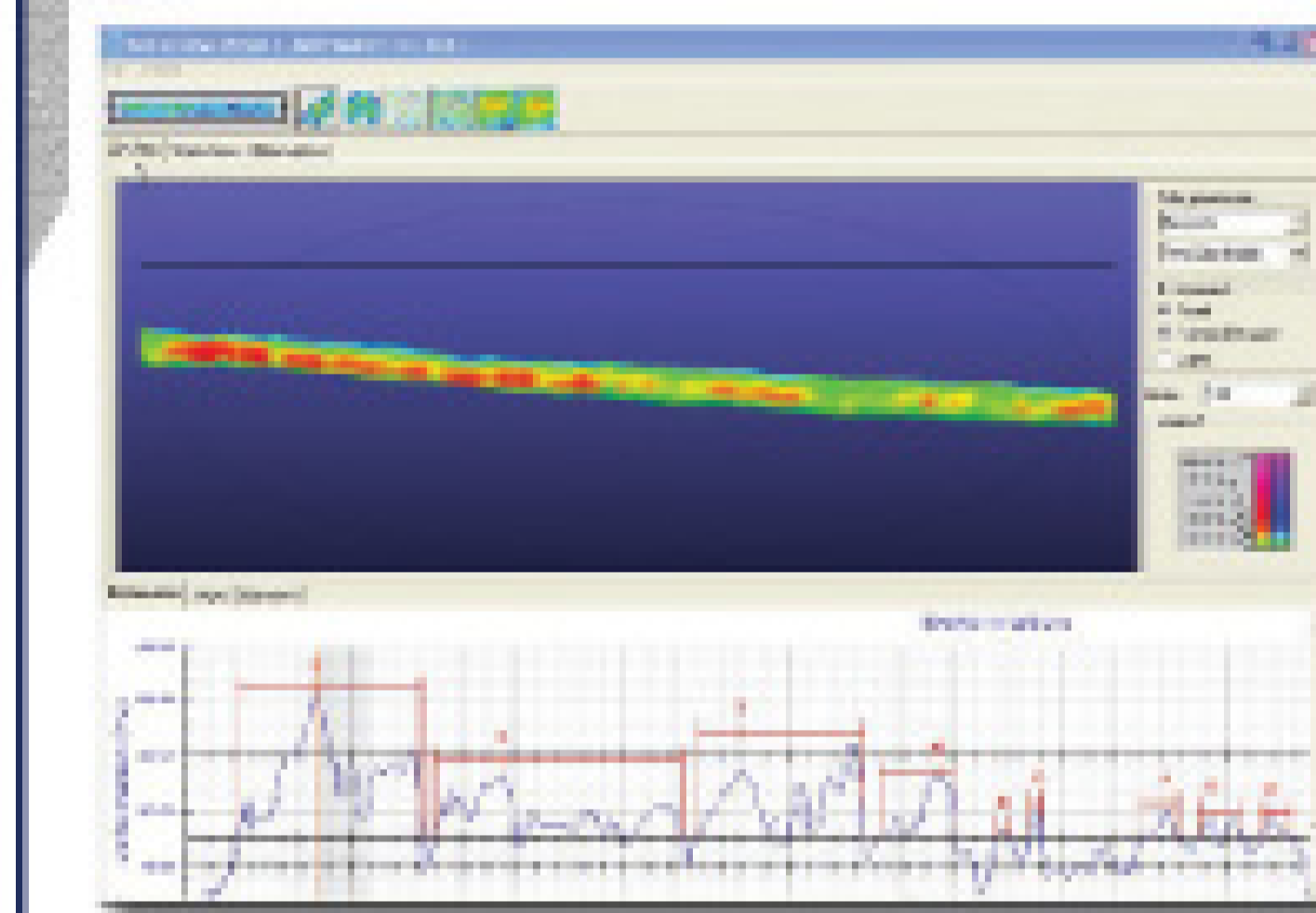
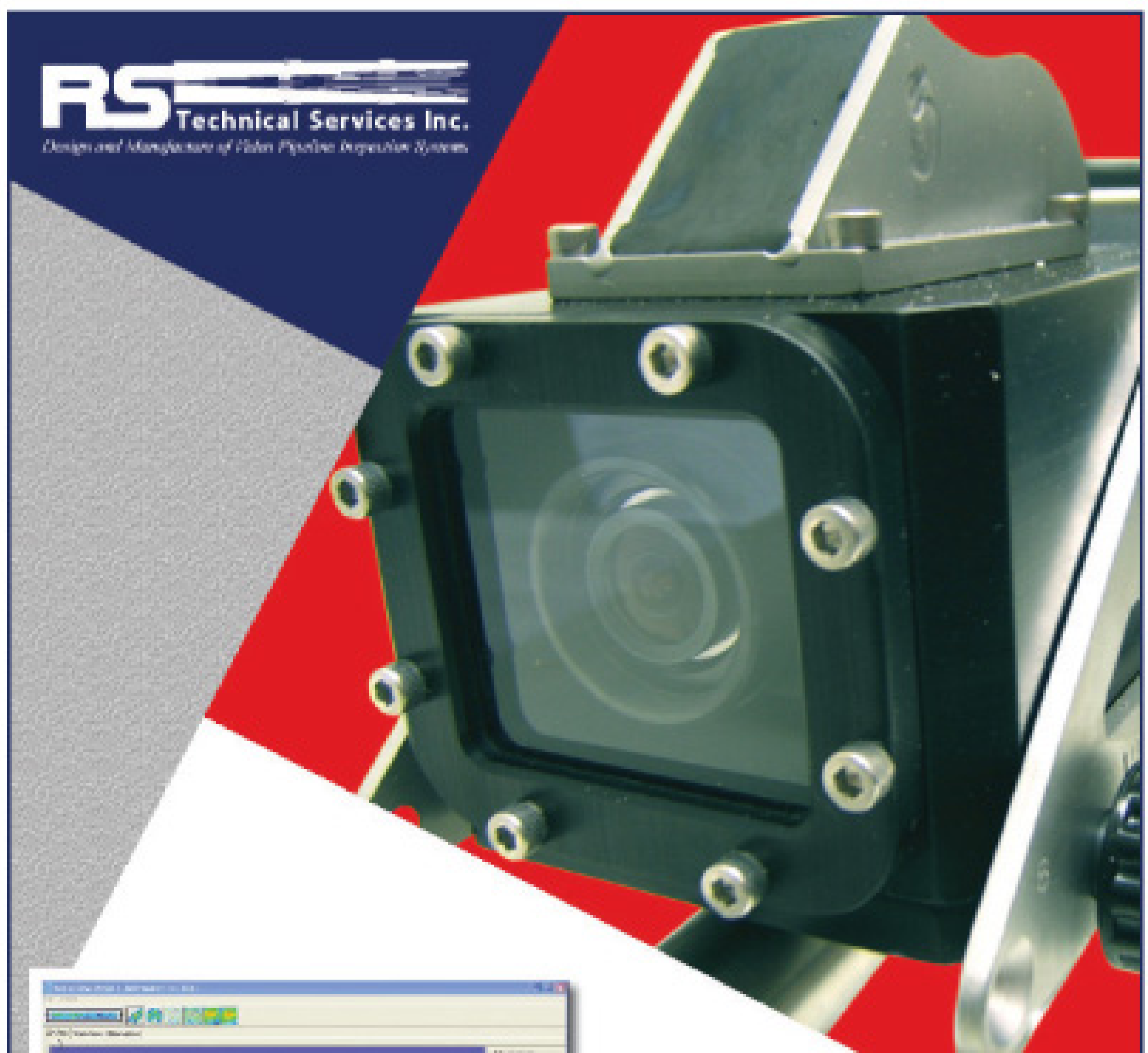
- Washington Aggregates and Concrete Association ([www.washingtonconcrete.org](http://www.washingtonconcrete.org)).

- Interlocking Concrete Pavement Institute ([www.icpi.org](http://www.icpi.org)).
- Uni-Group, Eco-Stone pavers ([www.uni-groupusa.org](http://www.uni-groupusa.org)).
- Vancouver Country Lanes ([www.city.vancouver.bc.ca/engsvcs/streets](http://www.city.vancouver.bc.ca/engsvcs/streets)).
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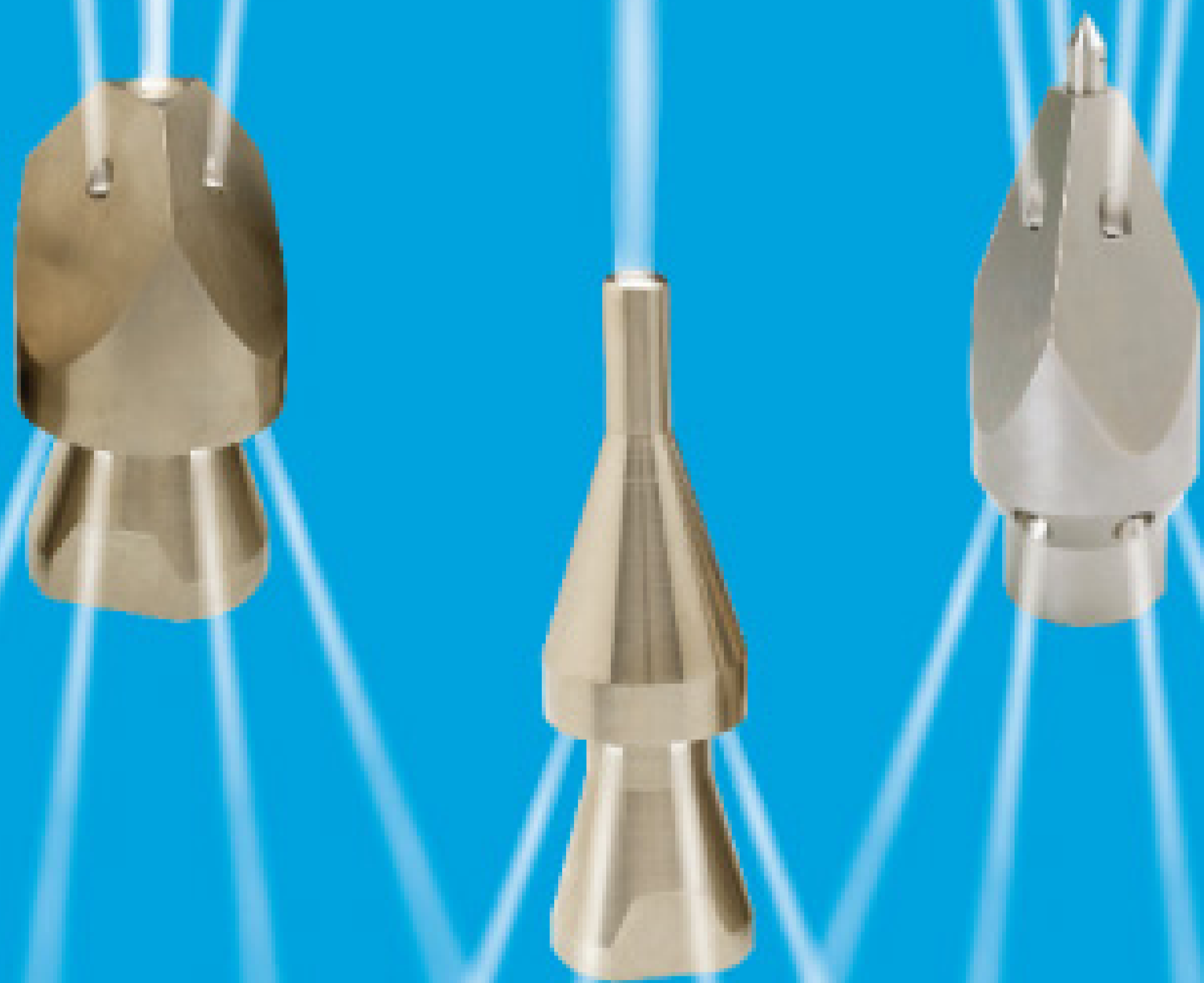
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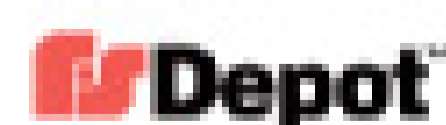
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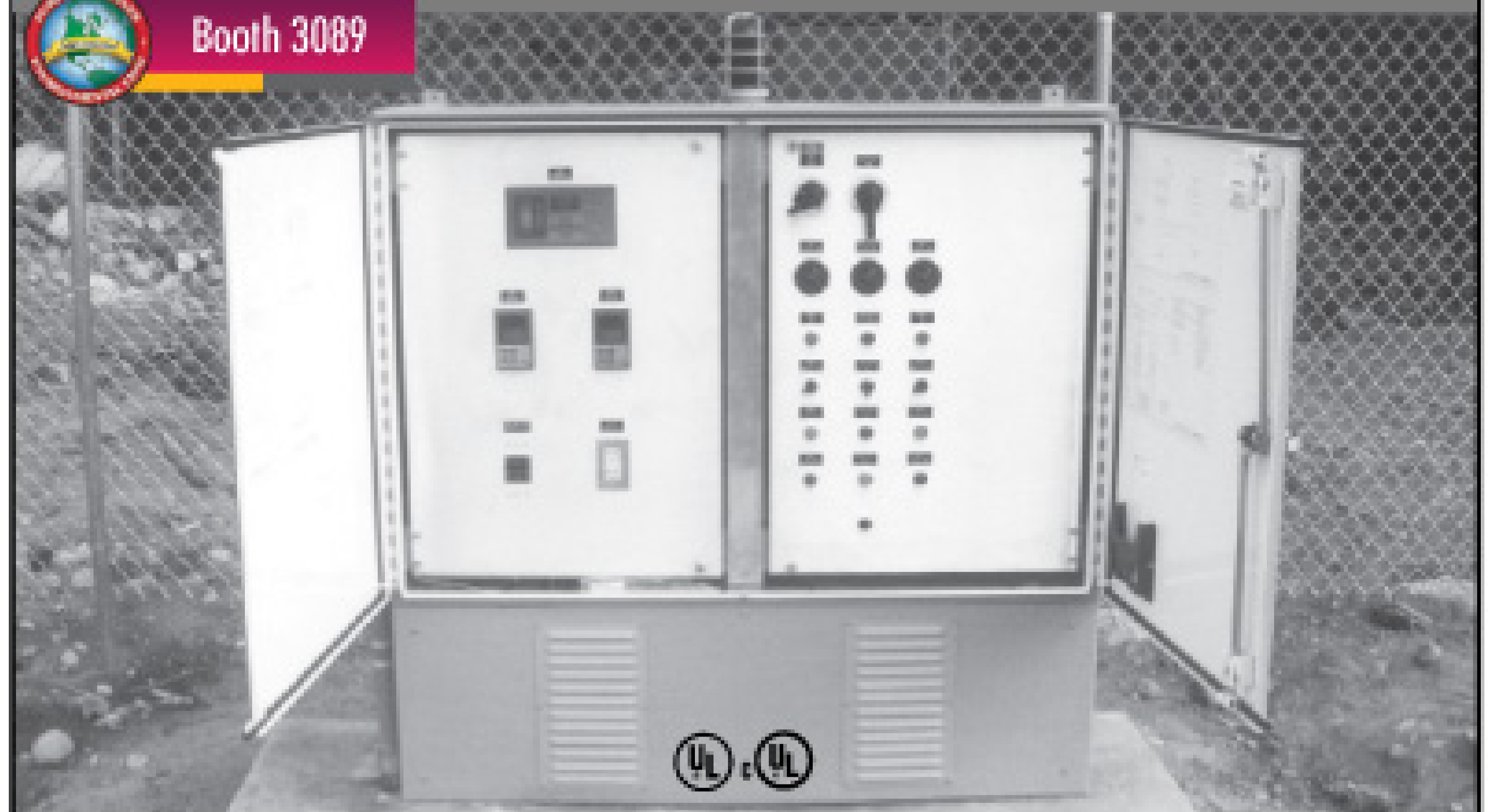
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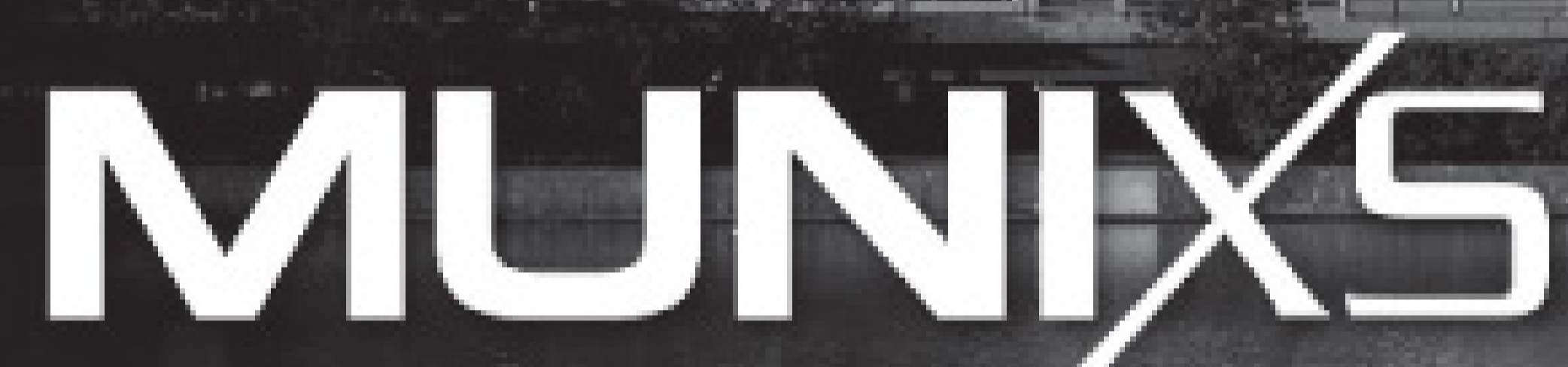


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Scott Tate (left) and Rick "J.B." Bryant, team electricians, check output from reduced-voltage solid-state starters in the WCRSA system. (Photos courtesy Gorman-Rupp Co.)

FOCUS: SEWER

# PRESSURE RELIEF

The Western Carolina Regional Sewer Authority deploys innovative pumping technology to replace an old pump station and build capacity for growth

By Barry Harms, P.E.

**F**or more than eight decades, the Western Carolina Regional Sewer Authority has protected the public health and provided infrastructure to support economic growth in South Carolina, even as state and federal environmental regulations grew tighter.

A population surge over the past 15 to 20 years challenged the authority with rebuilding the Tubbs Mountain Road No.1 pump station, one of the oldest in the

wastewater network. Installed in the 1960s, the pump station was operating at maximum duty cycle and showing telltale signs of aging.

In the end, rather than rebuild the old pump station, the authority decided to build one that uses the latest in high-head, high-efficiency pump technology. The newly configured pump station delivers more capacity in a smaller footprint. Besides fulfilling the authority's immediate needs, it provides capacity to accommodate growth.

## Facing constraints

Celebrating 80 years of environmental stewardship, WCRSA aims to be a world-class organization and to have zero violations, while enhancing the caliber of life in its service area with high quality wastewater treatment services.

Founded in 1925 and based in Greenville in northwestern South Carolina, the authority is a special purpose district, serving more than 400,000 customers in Greenville County and parts of Anderson, Spartanburg and Laurens counties.

Some 300 miles of major sewer trunk lines serve a 296-square-mile area. WCRSA maintains those lines and operates nine major wastewater treatment facilities.

As a participant in the U.S. EPA Capacity Management, Operation and Maintenance (CMOM) program, the authority's in-house Inflow and Infiltration Abatement Program identified Tubbs Mountain Road No.1 pump station as its leading offender for sanitary sewer overflows (SSO) during rain events exceeding 1.5 inches in 24 hours.

The pump station serves two sub-basins through 10-inch gravity trunk sewers and one sub-basin through an additional pump station with a 6-inch force main.

The authority made a commitment to correct the station's problems within two years, while operating the site during rebuilding to minimize community inconvenience. "This process is very difficult — and can be very expensive," says Tony Walton, collection system manager.

Trent Bowles, pump station supervisor, noted that space was a critical issue. "We're in a developed area, so we had a very small footprint within which to work," he says. "The site was already very compact, and the redesign imposed even tighter restrictions."

### Change of plans

Rogers & Callcott, the Greenville-based engineering firm charged with addressing the challenge,

**"We're in a developed area, so we had a very small footprint within which to work. The site was already very compact, and the redesign imposed even tighter restrictions."**

Trent Bowles

originally drafted the new design to incorporate two 7- by 10-foot Gorman-Rupp pump stations, but that larger footprint didn't use space in the most effi-



**PROFILE:**  
Western Carolina  
Regional Sewer  
Authority, Greenville, S.C.

**FOUNDED:**  
1925

**CUSTOMERS:**  
400,000

**SERVICE AREA:**  
296 square miles

**INFRASTRUCTURE:**  
300 miles of trunk sewer lines

**ANNUAL BUDGET:**  
\$18 million

**WEB SITE:**  
www.wcrsa.org



**A Gorman Rupp Ultra V pump (first stage).**

cient manner. Reducing that footprint required a creative solution.

Rogers & Callcott found that in addition to aging, the Tubbs Mountain Road No.1 station was capacity-limited by the facilities that received its discharge. Therefore, rather than build a force

main to the original discharge point, the engineers decided to reroute the 10-inch ductile iron pipe to a remote destination about two miles away, where the flow could discharge into a 20-mile-long gravity trunk sewer feeding the 29 mgd Mauldin Road wastewater treatment plant.

"The day that decision was made was a big day in western South Carolina, says Bowles. "This new pump station has removed a load from a regional pump station, and that is an additional benefit to the sewer authority."

Proceeding with the plan, the team determined that the pump station needed a yield of 800 gpm based on current wastewater flow, projected growth, and projected infiltration and inflow. Calculations showed that a total of 160 feet of dynamic head had to be overcome in the force main, plus the friction loss created at 800 gpm.

Because the required volume and pressure would push a single pump to the extreme, the original



**Above, a set of pumps showing the inspection covers on both Ultra V units. Left, a full view of a complete set of Ultra V pumps from the belt drive side.**

## GOING FOR THE GREASE

In January 2007, the Western Carolina Regional Sewer Authority launched a FOG public awareness campaign to educate the community on the environmental problems created by pouring fats, oils and grease into the sewer system.

The authority offers customers a Grease Be Gone can with a liner and tips on the proper disposal of grease. A coloring book featuring mascot Freshwater Freddie as a superhero stamping out grease educates children and their families on the hazards of pouring FOG down the drain. The program also includes an eye-catching brochure.

The materials were distributed to about 5,000 people at various schools in the Greenville County School District and at the Roper Mountain Science Center on the second Saturday of every month.

In addition, Freshwater Freddie launched a blog on the authority's web site at [www.wcrsa.org](http://www.wcrsa.org) to address grease disposal, wastewater treatment, and other environmental issues.



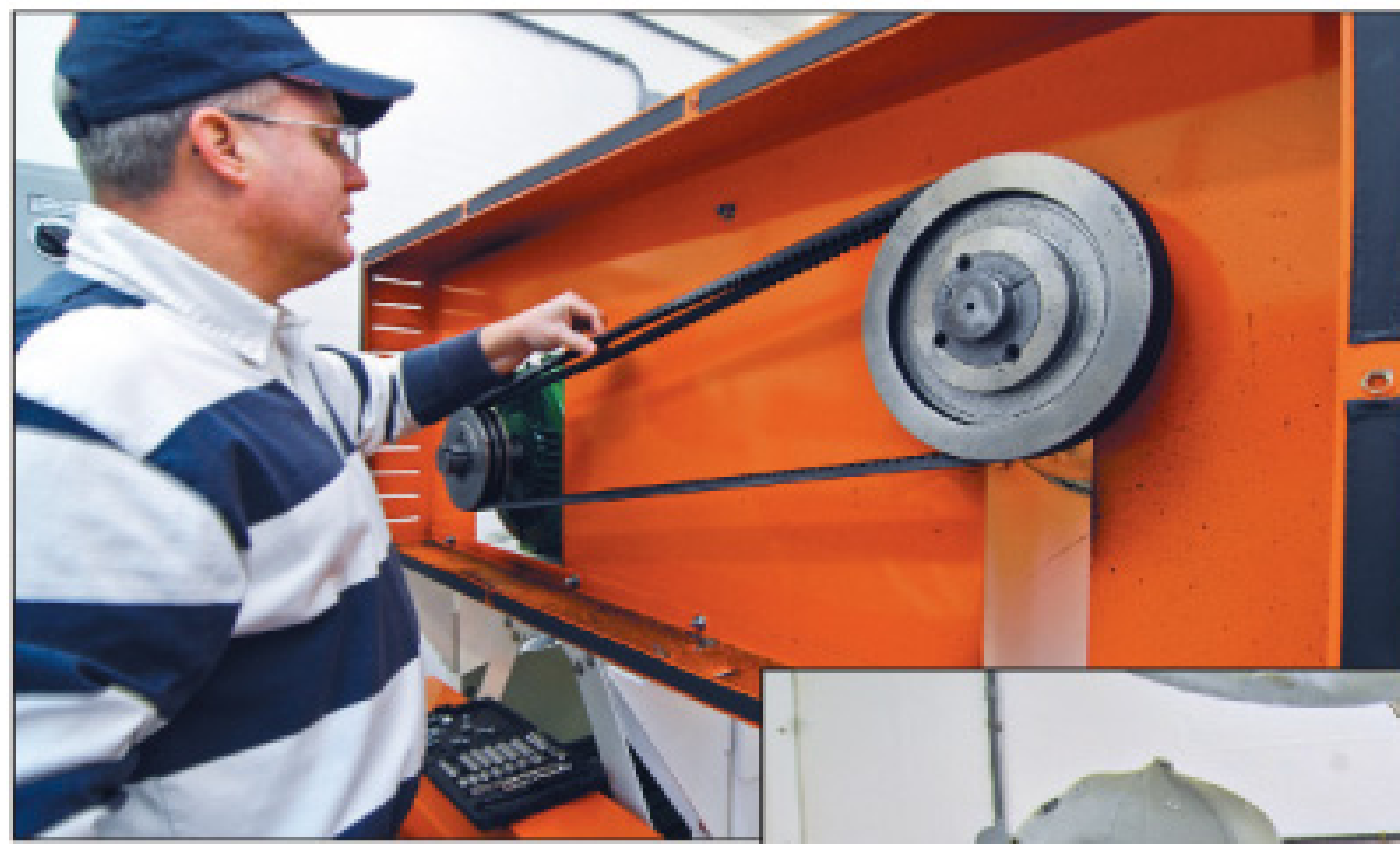
plan incorporated two T-series pumps. They would split the horsepower, enabling them to operate at a more efficient point on the pump curve and achieve the required head.

### Next generation

However, while planning, the engineers learned of a new pumping technology that could maximize the station's efficiency and performance, delivering up to 30 percent more capacity than the team previously expected. They chose an Ultra V Series pump, a new-generation solids-handling, self-priming centrifugal trash pump manufactured by the Gorman-Rupp Co.

The V6 can reach 1,950 gpm or 325 feet of head. Its 8-inch suction/6-inch discharge handles 3-inch solids. The pump is capable of 60 percent increased pressure and 40 percent increased flow over self-priming trash pumps of the same size, while substantially increasing overall pumping efficiency.

By using the V Series, WCRSA still has two pumps in effect, but



**Trent Bowles, pump station supervisor, checks belt tension and condition for wear.**

keep the station functioning for 20 to 40 years.

### System monitoring

The application incorporates a custom level controller, integrating air-release valve technology. WCRSA uses a level control system integrated with the pump's control panel. To communicate that data, WCRSA relies on a RACO dialer, used on all the authority's pump stations for data monitoring.



**John Schafer (left) and Scott Tate take gauge readings with a mobile gauge set.**

**“To integrate the new technology required a quick redirect and redesign, but we went to work, modifying drawings to accommodate the change in technology.”**

**Tony Walton**

each has a higher efficiency range and therefore uses less horsepower. Besides allowing more expansion capabilities for the same dollar, they also reduced the size requirements for the onsite generator.

Also key in the decision process was the ability to reduce the pump footprint, freeing space to enable the equipment to be positioned for safer, more comfortable routine maintenance, such as cleaning of the wet well.

“To integrate the new technology required a quick redirect and redesign, but we went to work, modifying drawings to accommodate the change in technology,” recalls Walton. The pump installed by WCRSA was the first of its kind in the state. The design allows more room to install equipment and do the work needed to

“We also have an internal polling system,” adds Walton. “We use land lines at our facilities, and we poll the stations twice an hour to ensure communications. If we don't receive a signal, then we know we're experiencing a disruption on the system, and someone is dispatched instantly to rectify the failure.”

To WCRSA, the ability to monitor the pump stations is extremely important, as that allows the engineering team to focus on the repairs and line work associated with the pump stations and collection system.

With the new system, authority staff can diagnose problems whenever they occur simply by using gauge readings. WCRSA provides all personnel with ongoing courses on the basics of centrifugal pumps,

operation and maintenance, safety, and troubleshooting, enabling them to diagnose problems before they become acute.

Maintenance is a top priority. The pump station has one supervisor and three teams of an electrician and a mechanic. They are responsible for inspection, operation, and repair of 21 pump stations on each of three routes.

### Added insurance

In all, the authority uses pumps from nine manufacturers throughout its collection system and 63 pump stations. To help ensure that any repairs are streamlined, WCRSA stocks critical spare parts. “Due to the inventory of parts available within 24-hours, our staff can quickly rectify any problem with simple maintenance in the field,” says Walton.

More than half the pump stations use Gorman-Rupp pumps. “By having that amount of experience with the Gorman-Rupp pumps and pump stations, we ben-

efit from our familiarity with the technology and the company, and troubleshooting and service are easier,” Walton says.

Diligent maintenance helps ensure that WCRSA provides reliable, cost-effective service to its customer. And the creative design of the replacement pump station will help the authority accommodate growth cost-effectively for years to come. ♦

### About the Author

Barry Harms, P.E., is a sales engineer with Tencarva Machinery Co., a regional pump and compressor distributor in Greensboro, N.C.

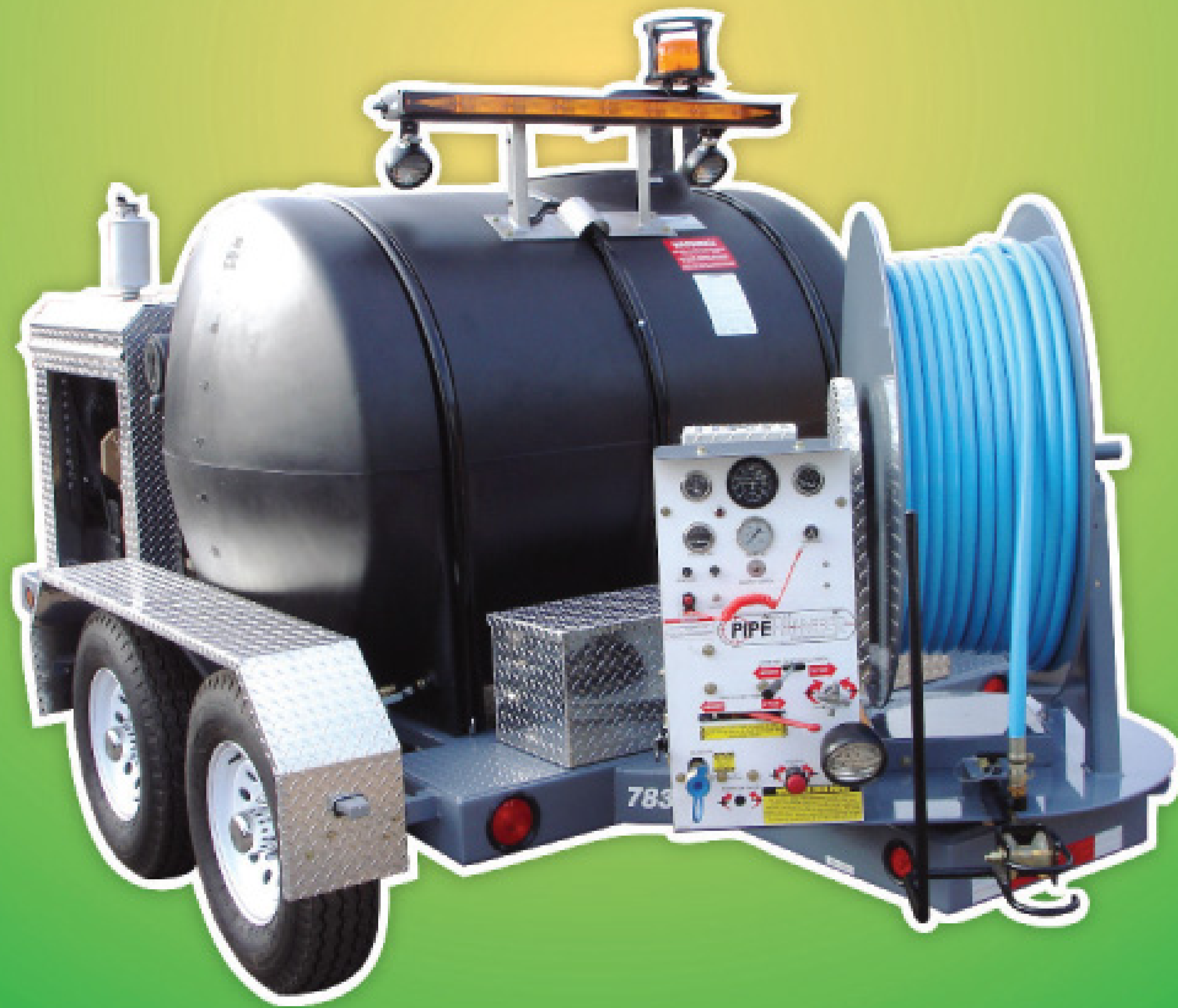
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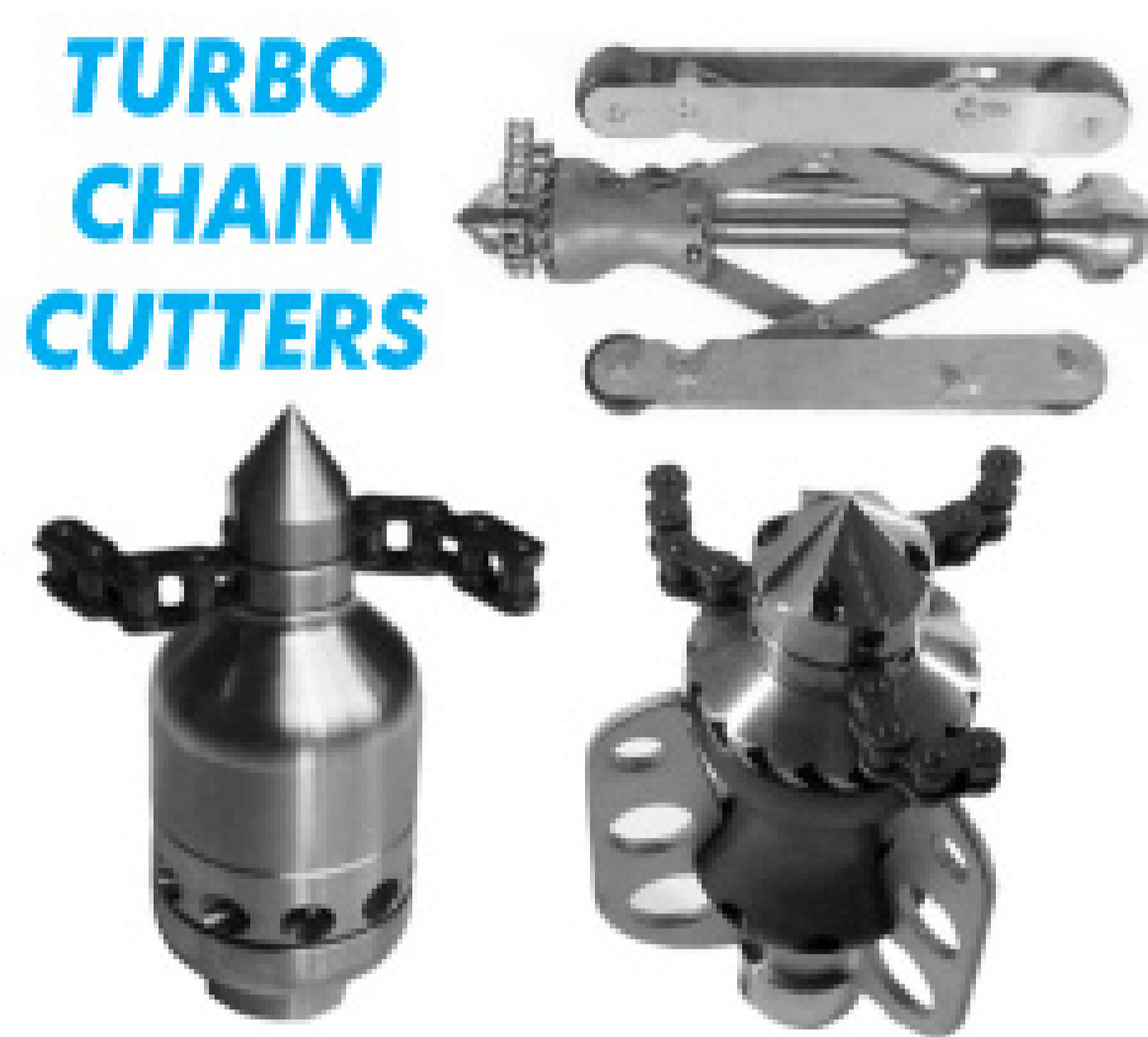
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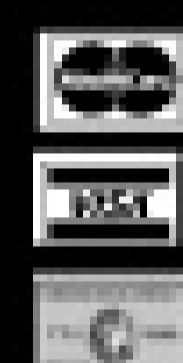
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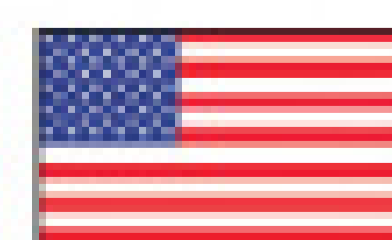
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# THE BIG BANG

Louisville residents still remember the Friday the 13th sewer explosion in 1981 that destroyed some 13 miles of lines and left 38-foot-deep craters

By *Scottie Dayton*

**A**t 5:16 a.m. on Friday, Feb. 13, 1981, an explosion in downtown Louisville, Ky., hurled a passenger car into a railroad overpass structure and dropped it into a crater. At the same time, officers in a police helicopter saw a series of explosions begin at the railroad underpass on Hill Street (three miles northwest of the Kentucky Exposition Center site) and continue along the streets of Old Louisville.

The cause was the ignition of highly volatile hexane from a Ralston Purina soybean processing plant that escaped into the city sewer system. The explosion demolished more than 13 miles of lines in a 3-square-mile area, leaving 38-foot-deep craters where manholes had been and collapsing several blocks of Hill Street into the space that had been the 7.5- to 12-foot concrete sewer line.

Students at the University of Louisville saw their bathrooms blow apart. Shockwaves knocked people off their feet. As fumes

built up downstream in the sewer line, police evacuated several schools and an oil refinery. At 3:45 p.m., the "Friday the 13th monster" gasped its final breath, popping a manhole cover at Second Street and Burnett Avenue.

No serious injuries occurred, but 2 1/2 to 3 feet of sewage continued to flow in the invert, causing health officials to evacuate 107 residents from their homes. Chimneys on 43 buildings collapsed and stairways fell, but building foundations were mostly undamaged. On Monday morning, schools opened and a traffic flow plan funneled commuters into the downtown area.

## Not typical tofu

The cause of the explosions was the overflow of a containment basin of hexane, a solvent used at the Ralston Purina plant, southeast of the university campus. Company officials informed the city of the problem on Thursday, Feb. 12. They temporarily shut down the facility to reduce flow.

The volume of the floating chemical, however, eventually

depressed the water beneath it and rushed into the sewer main through the basin outlet. A city inspector is said to have found no explosive readings at the site Thursday night.

Experts theorize that fumes rising from a manhole on Hill Street became trapped in the underpass area and were touched off by a passing car. The two women in the car sustained moderate injuries. Water flowing from broken water mains washed away underground supports, creating more craters.

**Experts theorize that fumes rising from a manhole on Hill Street became trapped in the underpass area and were touched off by a passing car.**

The explosions prompted the City of Louisville and Jefferson County to adopt the community's first hazardous materials ordinance, charging the Metropolitan Sewer District (MSD) with regulating the storage and disposal of such materials.

## Massive cleanup

The destroyed section of Hill Street became an open trench as

**Historic photos show wreckage from the sewer blast, caused by hexane that leaked into the sewer system from a grain processing plant.**



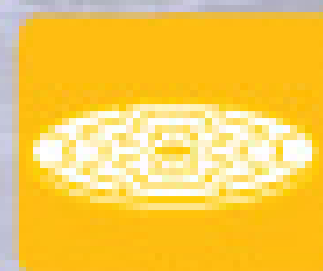
**A 1981 magazine featured the Louisville sewer gas explosion on its cover.**

crews cleared away the debris and prepared to replace the sewer line. The stench from the trench, which remained open all summer, was so bad that the MSD used huge blocks of restroom deodorant to mask the odor. It did not work.

Bud Schardein of MSD disaster and emergency services says the explosion is one reason the agency still closely monitors explosive gases and limits their concentrations in sewer lines. It took 20 months to restore the sewer lines and several more to repair the streets. Ralston Purina pleaded guilty to four counts of violating federal environmental laws, and paid a fine of \$62,500.

In February 1984, the company agreed to pay MSD more than \$18 million in damages, and more than \$8.9 million to 16,000 plaintiffs and government agencies. Ralston Purina admitted that it released hexane into the sewers, but denied negligence. ♦





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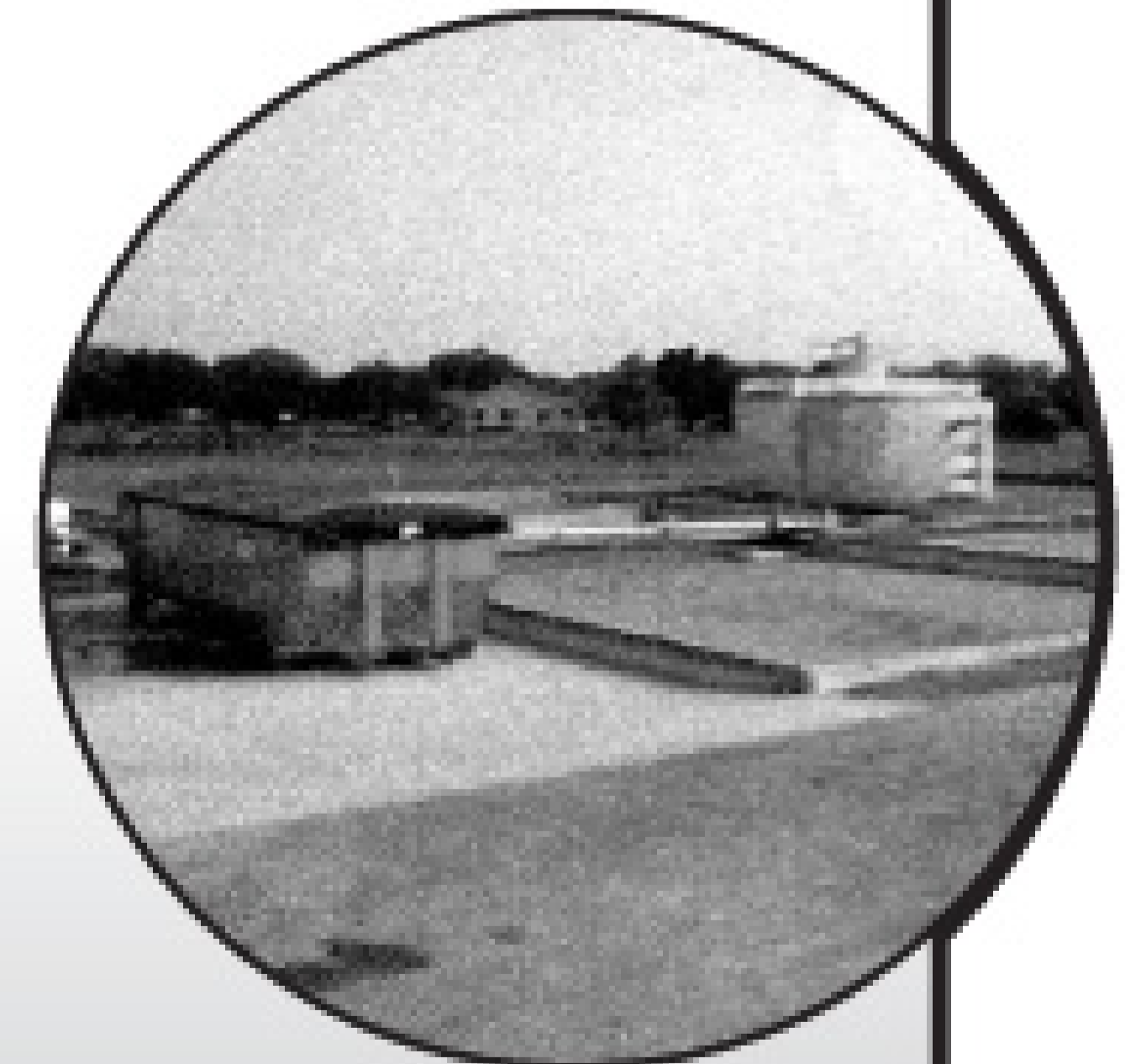
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# THREE WAYS TO LOCATE

The TraceMaster II locator from Schonstedt Instrument Co. offers simple controls and three modes for detecting underground utilities

By Erik Gunn

**P**ipe location systems use a variety of technologies to detect underground utilities.

The objective always is to make locating as easy as possible for technicians while also ensuring high accuracy.

The TraceMaster II system from Schonstedt Instrument Co. can be used in any of three modes to allow operators to map sewer

and water pipes and other buried infrastructure. When it is possible to send a probe into the target line, the system is used with a sonde that sends a 512 Hz signal to the handheld receiver. The sonde is typically used in sewer lines of any composition, including clay, concrete or plastic.

In locating water lines, the system can be used in the conductive or inductive mode. Both modes require the pipe being located to be metal. In the conductive method, a transmitter is clipped to an above-ground metal object, such as a fire hydrant, and to a ground stake perpendicular to the water line direction. The transmitter sends a signal through the line, which the receiver picks up.

If a metallic connection to the line being located is not accessible, the operator can use the inductive method, sending a signal from the transmitter into the ground and determining the pipe's location by the way the signal bounces back to the receiver.

Racine (Wis.) Wastewater Utility employees received a demonstration of the TraceMaster II on Jan. 21, 2008, at the utility's offices at 2310 Center St. Demonstrators were James Bach, national sales manager, and Scott Rauen, regional sales manager, for Schonstedt. Utility

## TECHNOLOGY TEST DRIVE

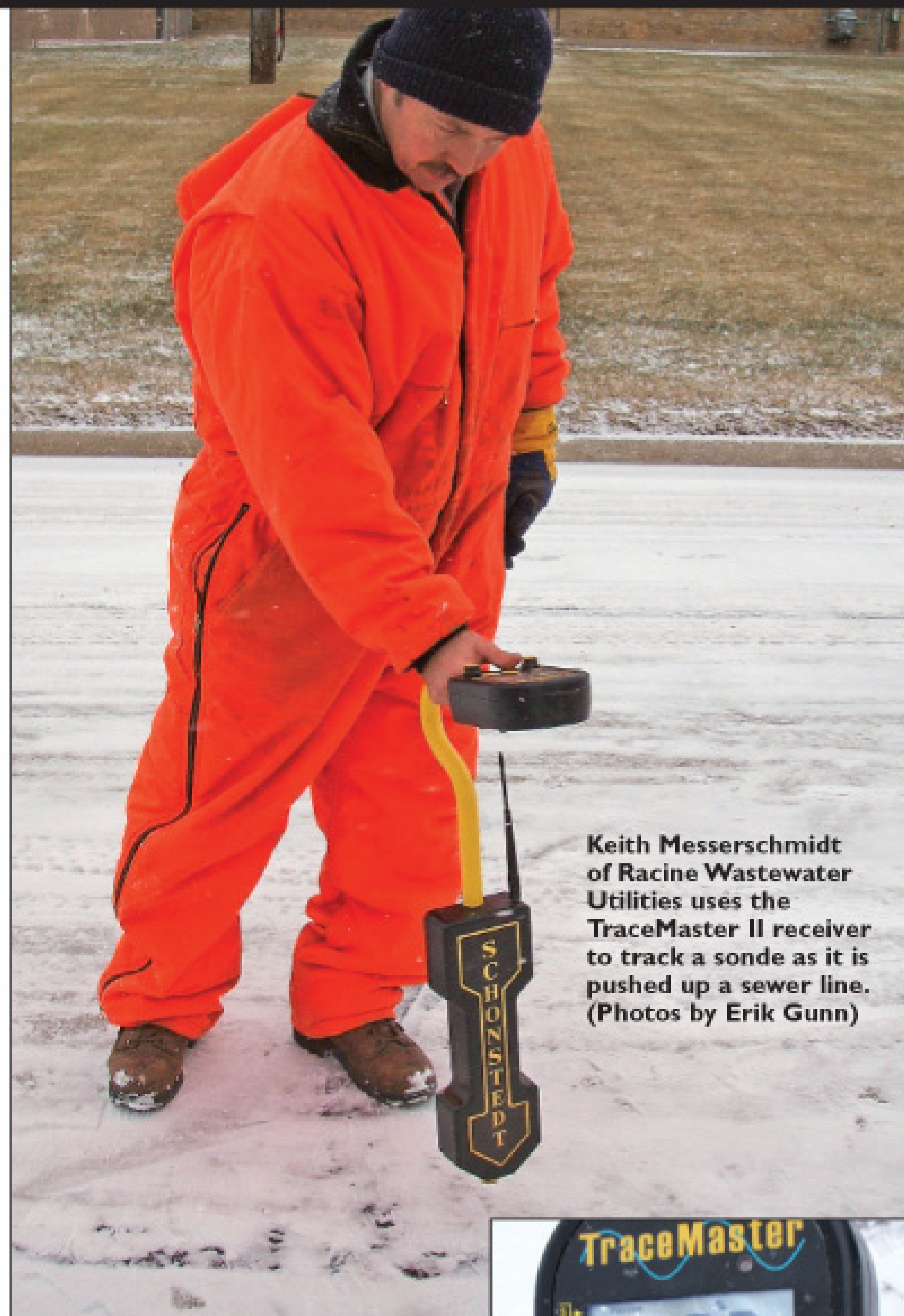
**EQUIPMENT:**  
TraceMaster II utility locating system

**MANUFACTURER:**  
Schonstedt Instrument Co.,  
Kearneysville, W.V.

**LOCATION OF DEMO:**  
Racine, Wis.

**DEMONSTRATED BY:**  
James Bach, national sales manager, and Scott Rauen, regional sales manager,  
Schonstedt

**LIST PRICE:**  
\$3,395 for receiver and transmitter; \$515 for optional sonde.



Keith Messerschmidt of Racine Wastewater Utilities uses the TraceMaster II receiver to track a sonde as it is pushed up a sewer line. (Photos by Erik Gunn)



At right, the digital readout on TraceMaster II shows two arrows are pointing toward each other with a vertical bar between. This indicates that the receiver is directly over the water pipe carrying the signal from the transmitter.



A sonde accompanies the TraceMaster II unit for locating sewer pipes.

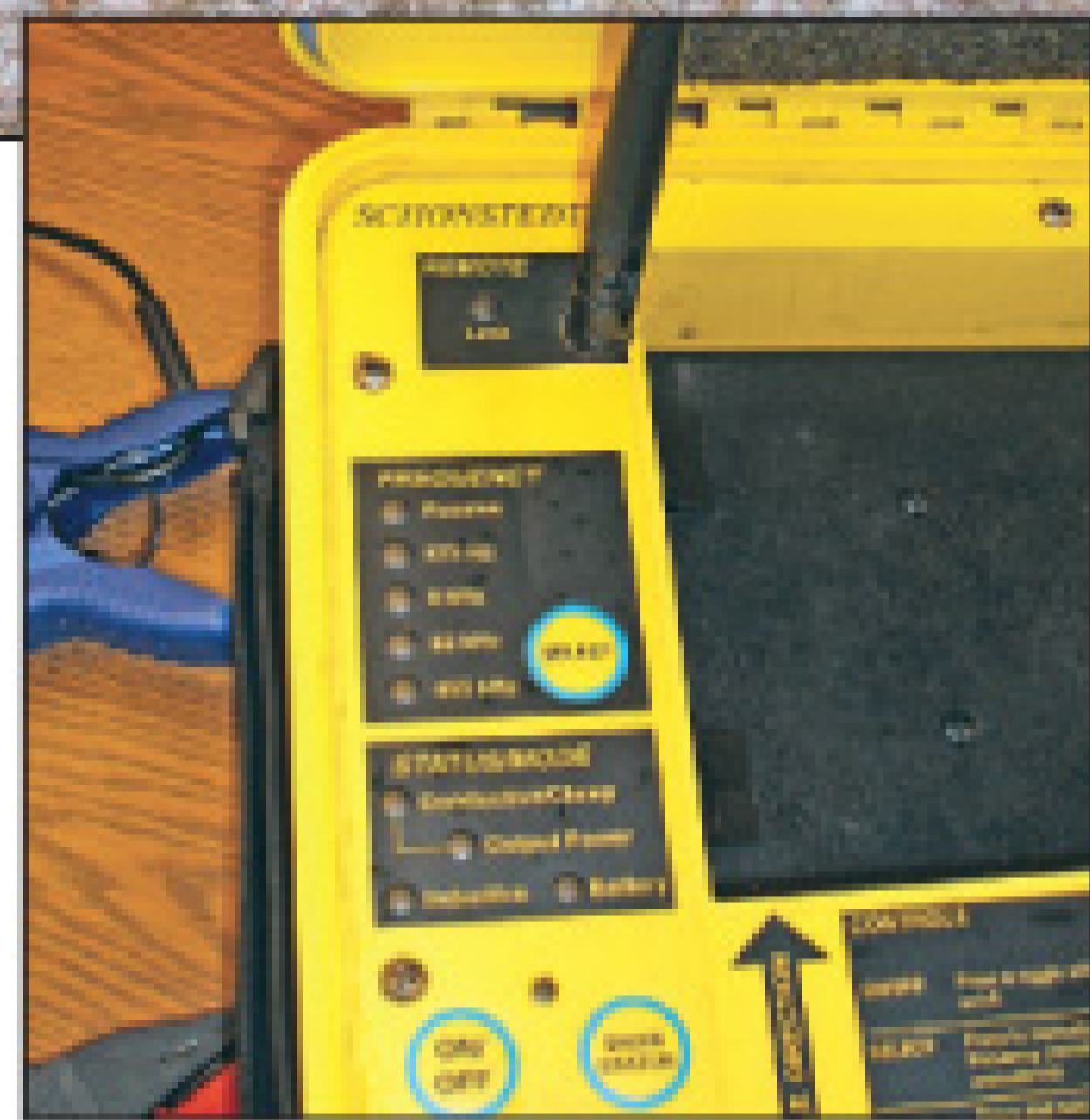


The inspection crew used duct tape to attach the sonde to a camera cable. The sonde is more typically attached to a sewer-cleaning cable.





Above, when not used with a sonde, the locator detects metal pipelines by receiving a signal sent into the line. Conductive clamps from a transmitter unit are attached to a fire hydrant to impart the signal. At right, the antenna on the transmitter that receives a control signal from the receiver unit. The receiver operator can use a remote radio signal to change the transmitter signal frequency.



employees Keith Messerschmidt and Owen van Swol took part.

### Walk-around

The principal components of the TraceMaster II are the receiver and transmitter. The yellow-and-black handheld receiver is about 30 inches long and weighs less than 4 pounds. It has an LCD digital readout and control panel at the top and a sensor assembly at the base.

The operator holds the receiver like a cane, but keeps it slightly above the ground, the sensor assembly pointing down and the LCD/control panel held horizontally. The screen indicates the strength of the signal, and arrows show the target's location relative to the receiver. It can also display a calculation for the depth of the utility detected.

The device includes four controls: two one-handed knobs and two membrane buttons. At the left of the control array is a knob that

controls the strength of the signal (or gain) coming to the receiver. To its right is a button to change the transmitter frequency when the unit is in the conductive or inductive mode. To the right of that is a second button, which when pushed displays the calculated depth of the target.

On the far right of the panel is the second knob, which controls the volume of the sound that indicates the proximity of the target. Icons displaying the battery charge level in the receiver and the transmitter also appear on the screen.

The transmitter includes a radio link antenna that allows it to communicate with the receiver so that the operator can change the frequency that the transmitter emits using a control on the receiver. The transmitter is contained in a high-impact yellow plastic case IP65 under an international standard, signifying that it is dustproof and waterproof. The case can store

the sonde and the conductive clips and ground stake for using the device in the conductive mode.

The TM 50910 sonde, an accessory available with the TraceMaster II unit, emits a standard 512 Hz signal. The transmitter uses eight D batteries, and the receiver eight AA batteries.

### Operation

Bach, Rauen, Messerschmidt and van Swol met on a cold morning outside the Wastewater Utility offices under an overcast sky with light snow. While the weather was not ideal, Bach said that the near-zero temperatures would not interfere with the locator.

For the first demonstration, Bach used duct tape to attach the sonde to a pushrod sewer camera supplied by the utility. Typically the sonde would be attached to a sewer rod, but the Racine crew could not use their rod because it is shielded by a plastic tube that the sonde could not pass through.

Messerschmidt and van Swol lowered the camera cable, sonde attached, into the sewer and guided

percentage number in any lateral pass indicated the precise location of the sonde in the pipe.

A crew on assignment in the field would likely mark the path with spray paint to give road crews planning a street repair guidance about the pipe's location.

After observing Bach, Messerschmidt took the receiver and repeated his actions, following the trail of the pipe as the receiver picked up the sonde signal.

Bach and Rauen then demonstrated the device in the conductive mode on a nearby water line. They used conduction clamps to attach the transmitter to a fire hydrant, then shoved a metal grounding rod into the nearby soil and attached it with a cable to the transmitter.

When turned on, the transmitter sent a signal through the metal hydrant and into the metal water line. Walking with the receiver away from the hydrant, Bach determined the path of the line. In this mode, Bach demonstrated how the LCD readout displayed the location and depth of the target line.

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**The TraceMaster II system from Schonstedt Instrument Co. can be used in any of three modes to allow operators to map sewer and water pipes and other buried infrastructure.**

---

it into the pipe. As they pushed the sonde in farther, Bach walked with the TraceMaster II receiver down the middle of the street, slowly moving the unit from side to side. The receiver emitted a high-pitched beeping, an electronic peak sound to signify when it was closest to the sonde. Bach adjusted the gain rheostat to diminish or boost receiver sensitivity.

Walking about 15 feet, Bach showed how the unit could be used from the street to map the path of the sewer pipe. As he adjusted the gain, the LCD displayed the strength of the signal from the sonde as a percentage. At any given point, the percentage shifted as Bach moved the receiver laterally. The peak

As Bach slowly waved the receiver back and forth in increments of about 6 inches to 1 foot, the unit emitted an electronic tone. As with the sonde method, the unit gave a reading for the signal received in terms of percentage, which could be adjusted using the gain control.

In addition to observing when the signal percentage peaked, the screen displayed an arrow pointing right or left, indicating in which direction the operator should move to directly locate the water line. When both arrows became visible at once, pointing at each other, a vertical line appeared between them, and the tone turned into a rapid beeping, indicating

that the water line was directly beneath the unit.

Bach also pressed the depth button, which activated a display on the LCD screen showing the depth of the line — 5 feet, 9 inches at the point detected. Using a thumb to press the frequency button on the receiver control panel, Bach changed the frequency of the signal sent by the transmitter.

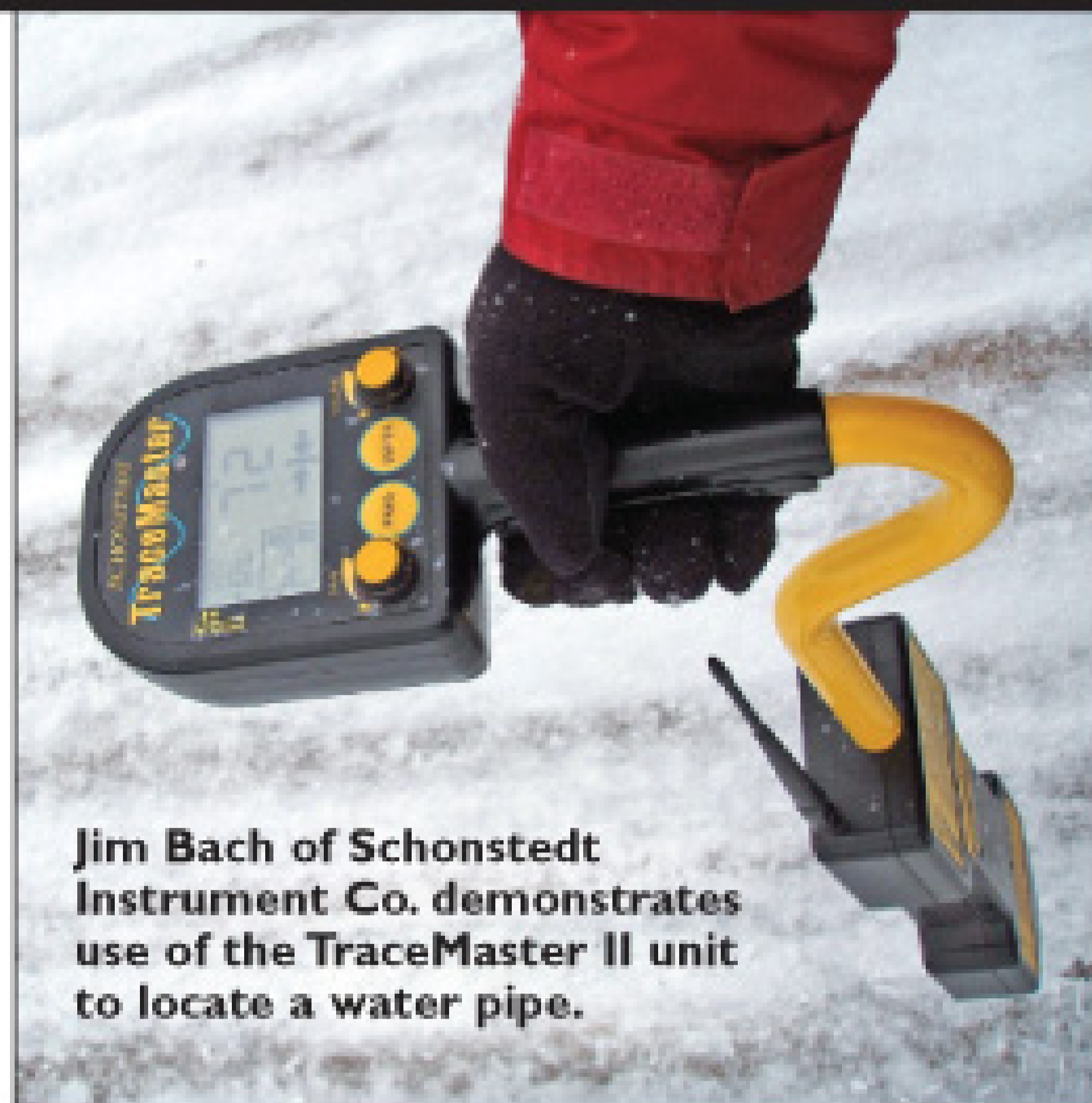
He concluded by briefly demonstrating and describing the inductive method of location, which is used in more remote situations where there is no external connection to the line being located.

The transmitter is placed above a known starting point for the line. That location might be derived from a plan or other documentation. The transmitter broadcasts a signal into the ground, where it is picked up by and travels along the metallic pipe. The receiver picks up the signal. Bach explained that the inductive method is less precise because variations in the ground conditions can distort the signal. However, it offers information not otherwise available if an area is not mapped.

#### Observer suggestions

Messerschmidt reported that the TraceMaster II was light and easy to carry. He noted that using a locator increases confidence. Without a detector, he said, finding an underground pipe is more labor intensive and involves more guesswork. Maps may or may not be up to date or accurate.

With a detector, "When you're within five feet of what you're looking for, you're not digging all over the place," he said. He found the device itself simple to use. With very few controls, it appeared easy to learn to operate. The sound emitted, although annoying, was clear and easy to interpret. The



Jim Bach of Schonstedt Instrument Co. demonstrates use of the TraceMaster II unit to locate a water pipe.

digital readouts on the LCD display were clear and intuitive.

#### Manufacturer comments

The unit offers a choice of four frequencies: 575 Hz, 8 kHz, 82 kHz, and 455 kHz. The lowest frequencies are for detecting smaller pipes, and the higher frequencies for larger ones. Bach noted that the ability to remotely change the transmitter frequency is a convenience, because the operator does not have to leave the path in the middle of the locate in order to make the adjustment at the transmitter.

Adjusting the gain during location allows the operator to boost the signal from the transmitter, which enables the operator to follow the line a greater distance during the location. "As you walk away from your hook-up point, the signal will die over the distance," Bach explained. By boosting the gain, the operator can compensate.

Bach said Schonstedt had worked to make the controls as user-friendly and easy to learn as possible. "There are no menus," he said. "There are two knobs and two buttons. With a more complex control system, there's a lot of training and a lot of learning curve." ♦

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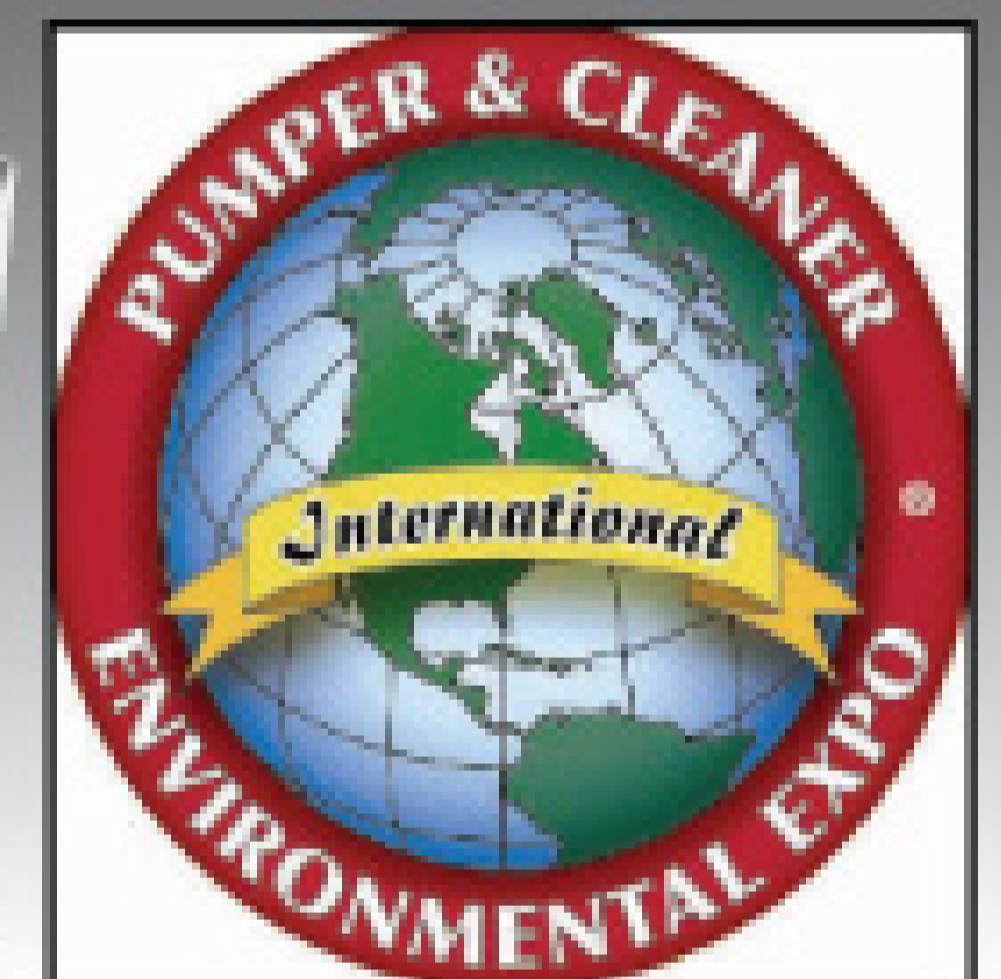


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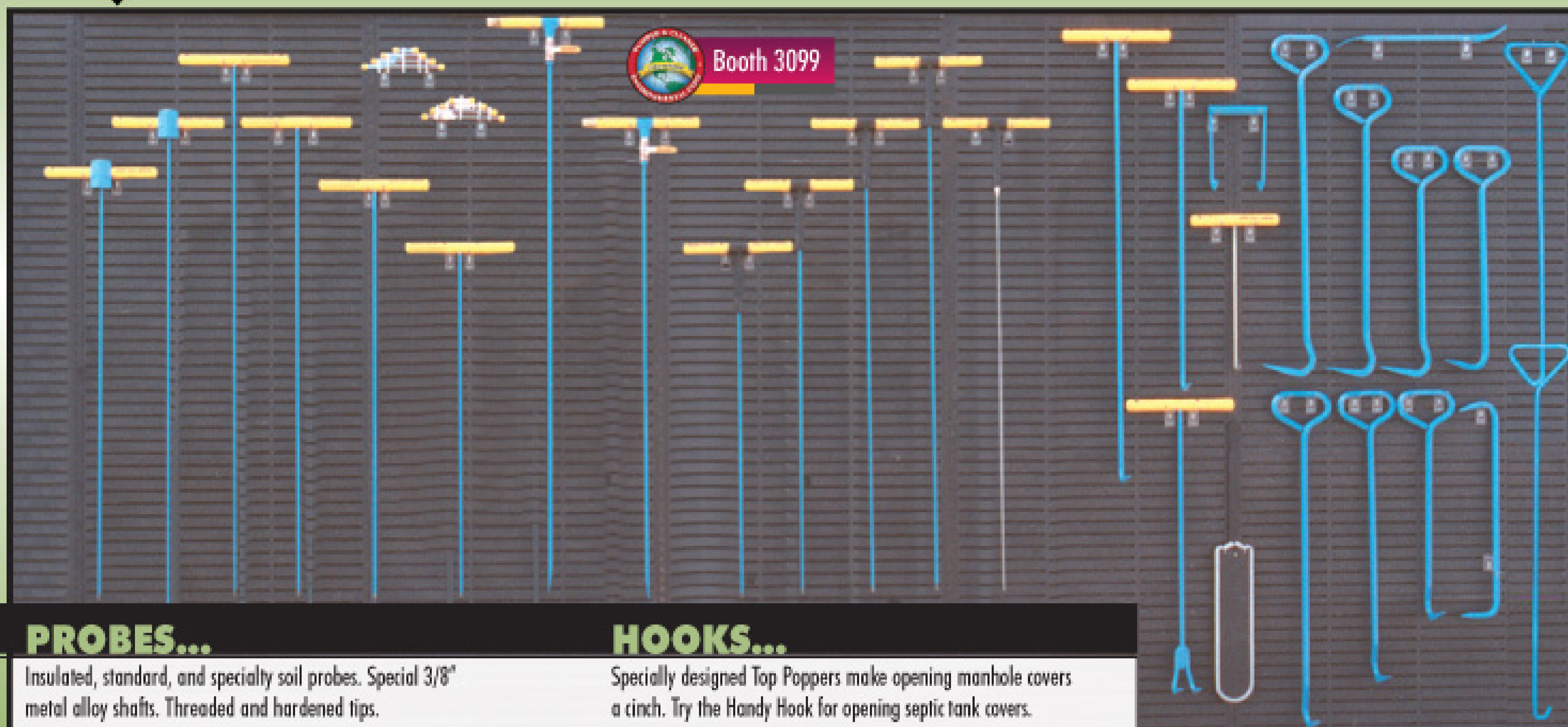
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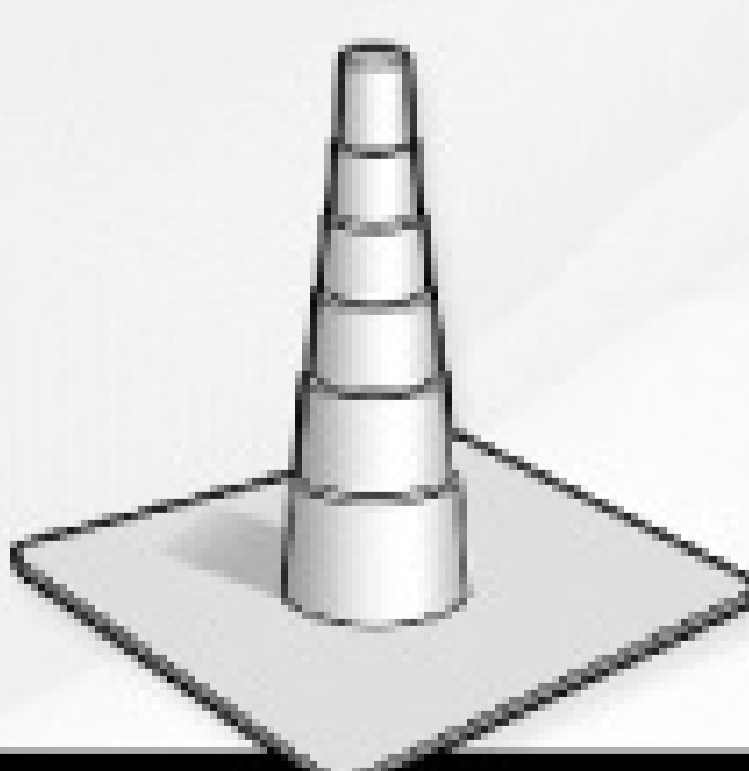


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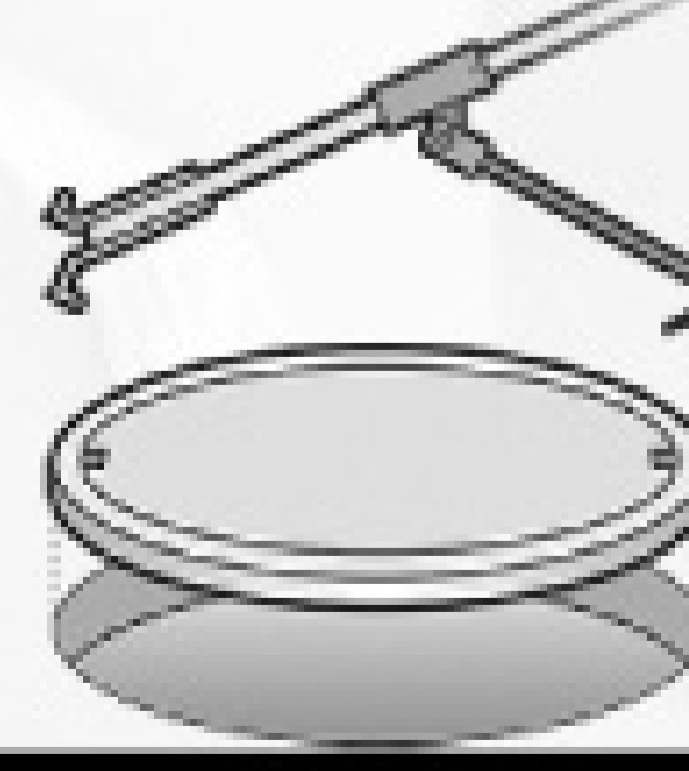
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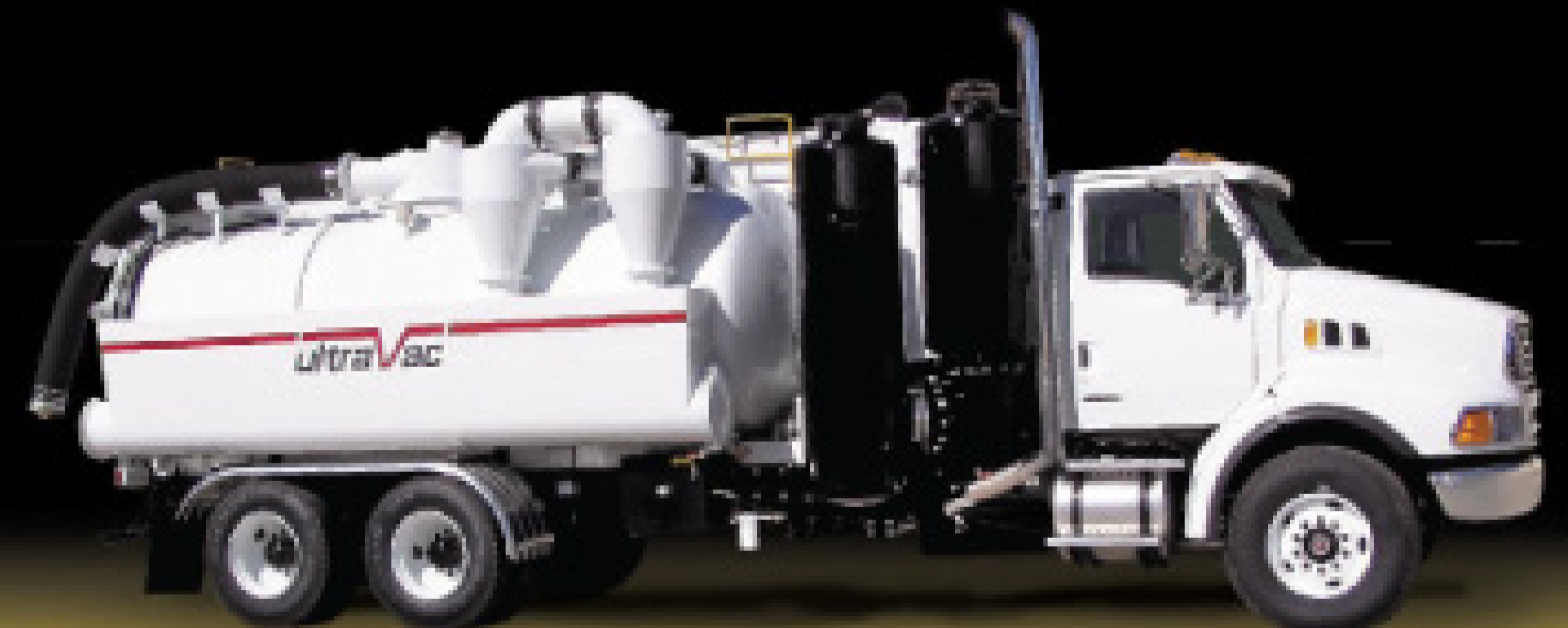
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A technician with ADS Environmental Services uses the large-pipe leak correlator.

# PINPOINT ACCURACY

A prototype of a large-diameter pipe leak correlator enables an Illinois utility to locate an elusive leak

By *Scottie Dayton*

Water entering the basement of a school in downtown Chicago, Ill., was the first clue the Chicago Water Department had that something was amiss. However, city crews were unable to locate the source of the leak.

The department called its service provider, Pitometer Group of ADS Environmental Services. ADS, the city's authorized service provider of the Echologics large pipe LeakFinderRT technology, saw an opportunity to test the new software in the field.

All previous achievements had involved induced known leaks. On the first attempt, and in a matter of hours, the leak correlator pinpointed the leak in a large-diameter main without an intensive setup or intrusive techniques.

### Multiple choices

The street where the school is located has two 8-inch iron water mains and one 36-inch prestressed concrete cylinder pipe. Working at night, Bill Doyle and Nicole Avalos, ADS leak detectors, correlated the 8-inch mains using a

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### MANUFACTURER:

Echologics Engineering Inc., Toronto, Ont.

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sensors are closely spaced. It also is more effective than the traditional function for small leaks or high background noise.

Basic hardware includes two accelerometers, two hydrophones, wireless transmitters, and a two-channel wireless receiver with headphones.

Doyle and Avalos installed hydrophones on a 1-inch pitot tap on the pipe's south end (Blue Station). At the north end, they chose a fully charged hydrant on a 12-inch leg (White Station). An out-of-bracket noise (probably a pump running) at first obscured any sounds. However, filtering the noise from the correlation enabled Doyle and Avalos to hear a leak in the main. They measured the distance between the two hydrophones, including the hydrant leg, using a measuring wheel. The length was 829 feet.

### X marks the spot

To measure the velocity of sound on the 36-inch pipe, Doyle and Avalos created a leak outside the bracketed area by opening a hydrant, then recorded the time delay and velocity of the sound. The velocity was 3,542 feet per sec-

ond. Entry of the pipe length and sound velocity into the calculation pinpointed a leak 408 feet north of the Blue Station.

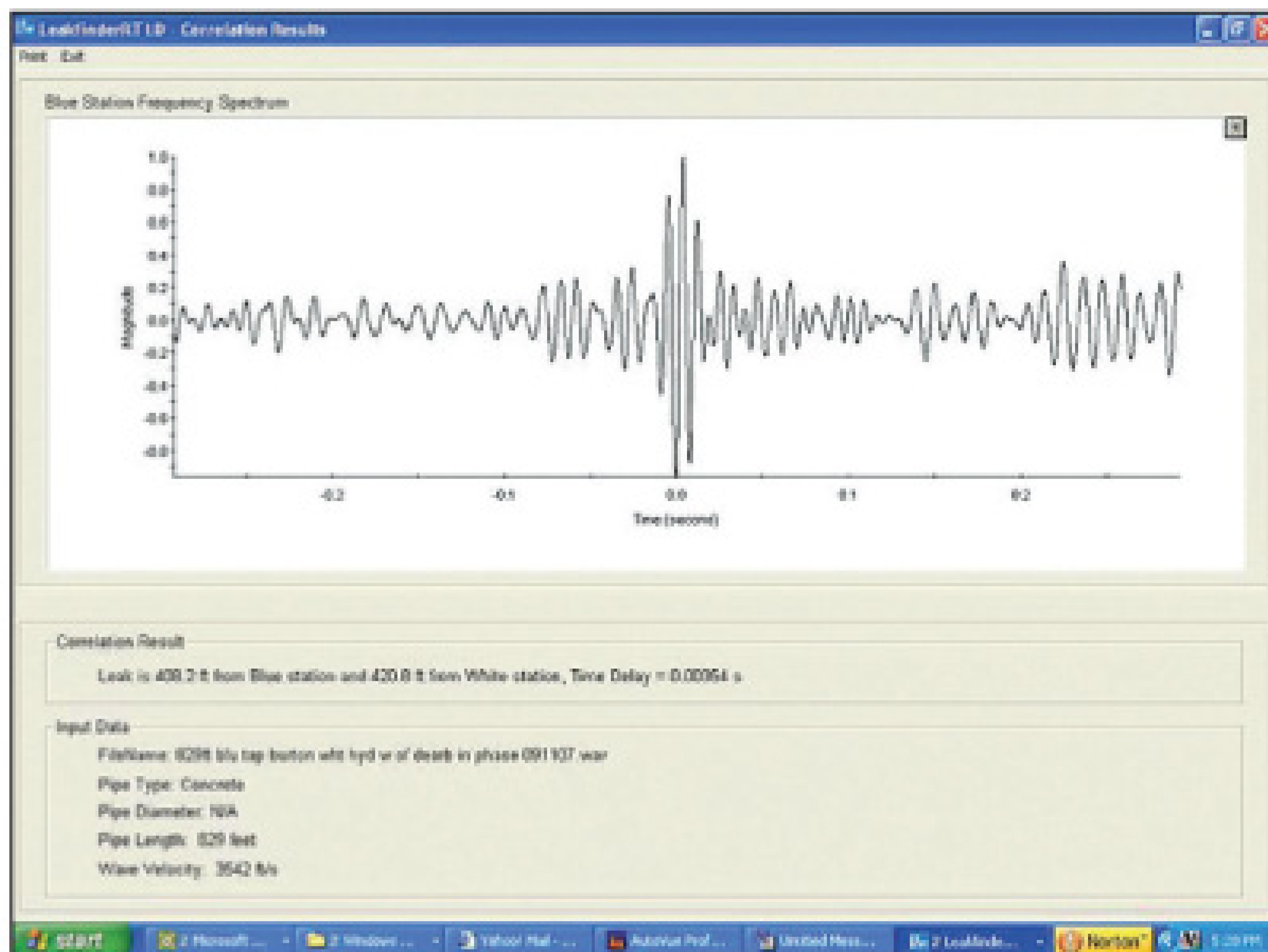
"We marked the measurement on the street with blue paint, but ground microphoning of the area was inconclusive," says Doyle. "The measurement fell directly over a known concrete-to-ductile-iron adapter in a repaired section of the concrete pipe." They reported the leak location measurement to the water department, which scheduled repairs for early one Saturday.

When a crew dug down to the adapter, they found a torn gasket exactly 408 feet from the Blue Station. The Chicago Water Department theorizes that it probably suffered a small tear during construction that gradually worsened over time. ■

### MORE INFO:

**114 ADS Environmental Services**  
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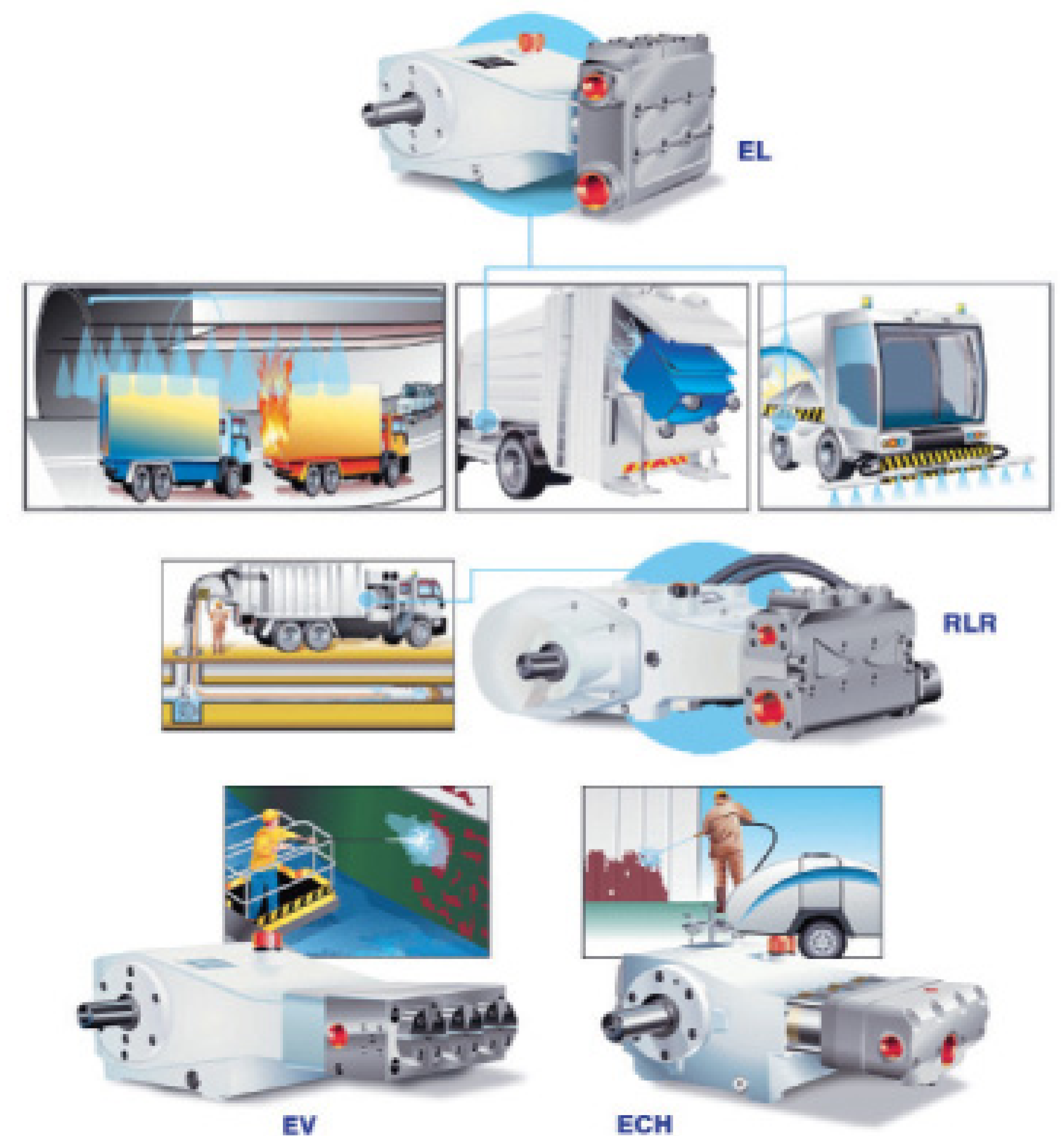
A screenshot from LeakFinder software shows how sound waves were used to pinpoint the leak in the 36-inch pipe.



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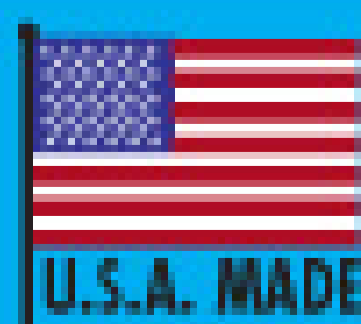
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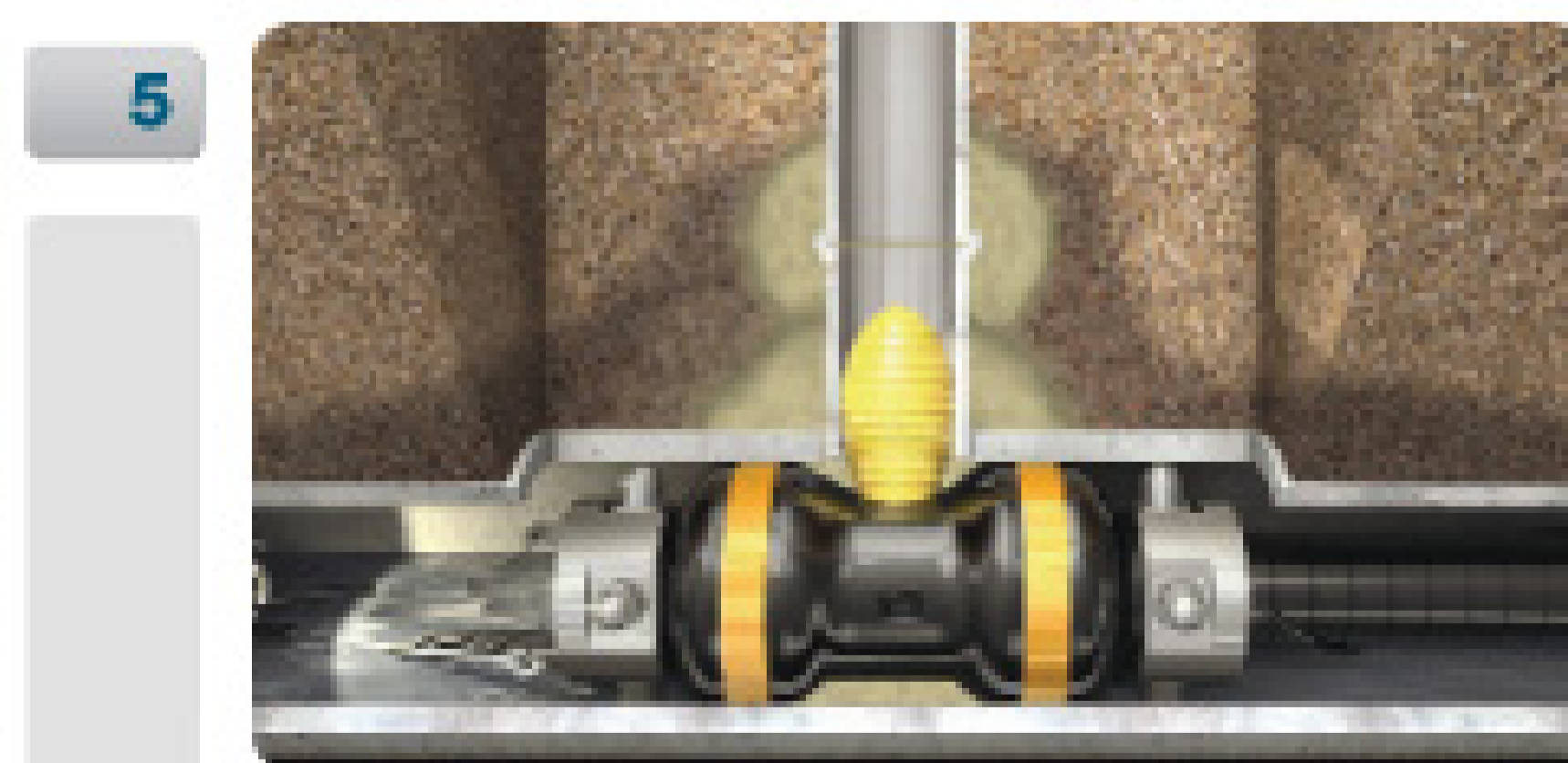
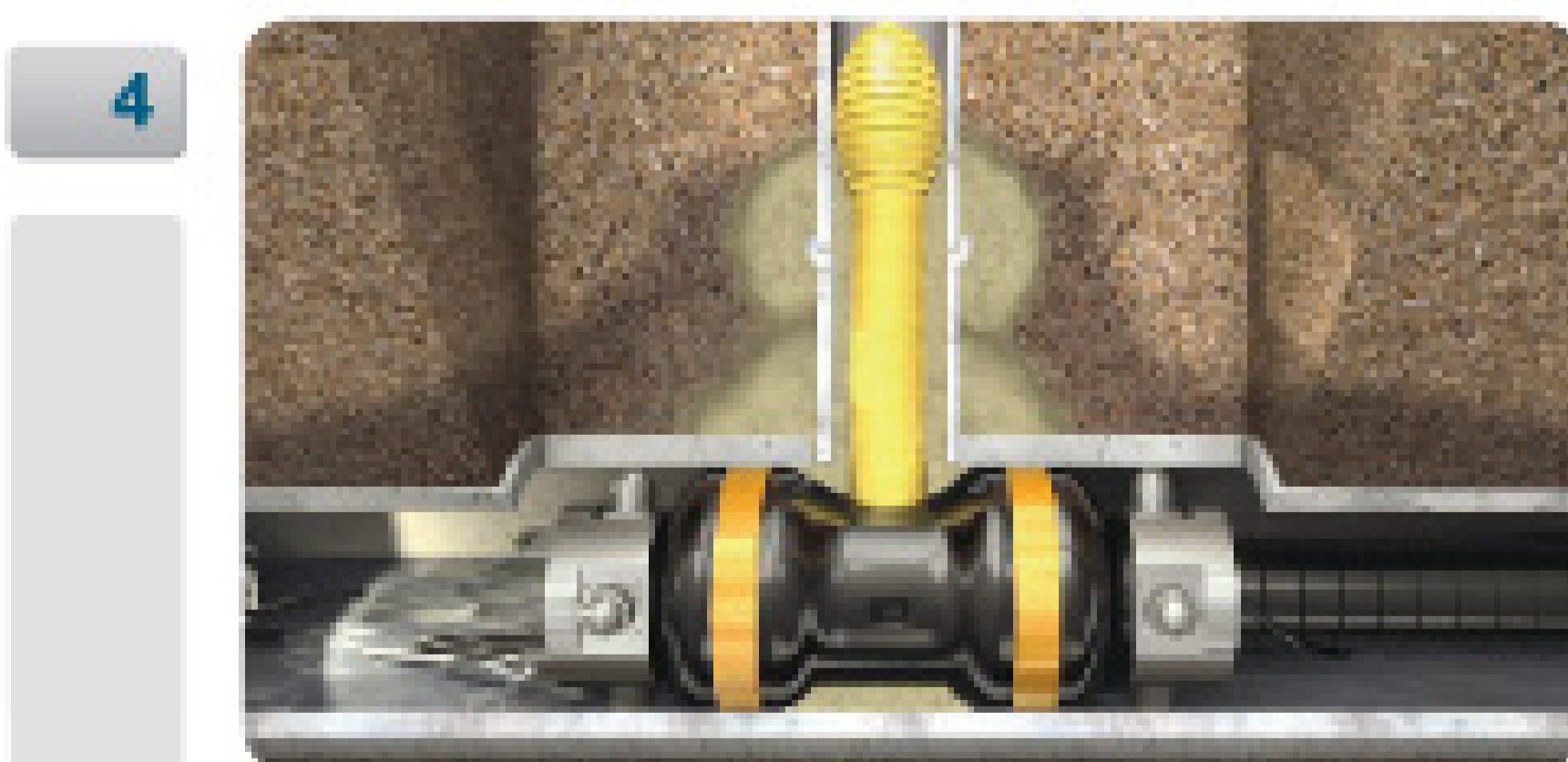
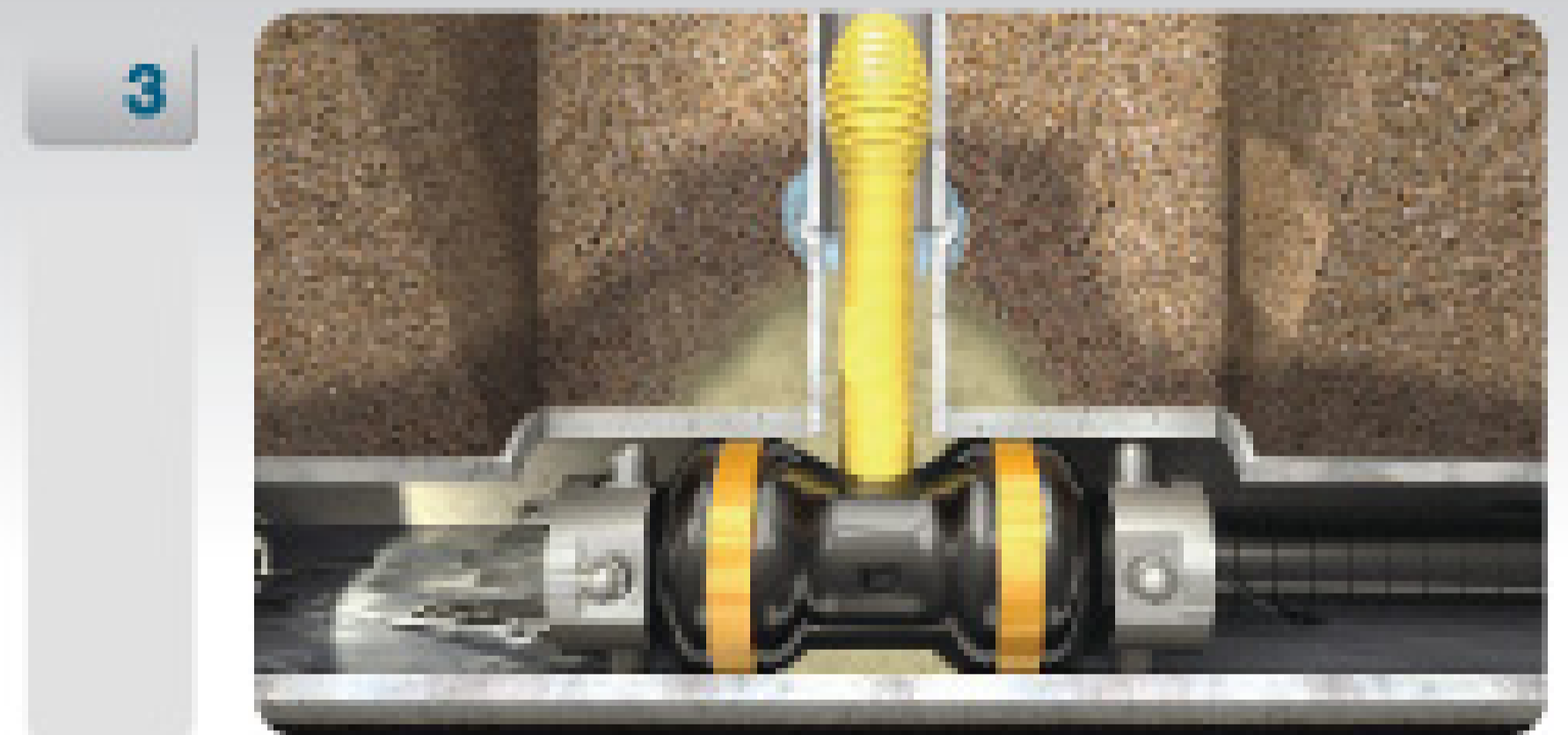
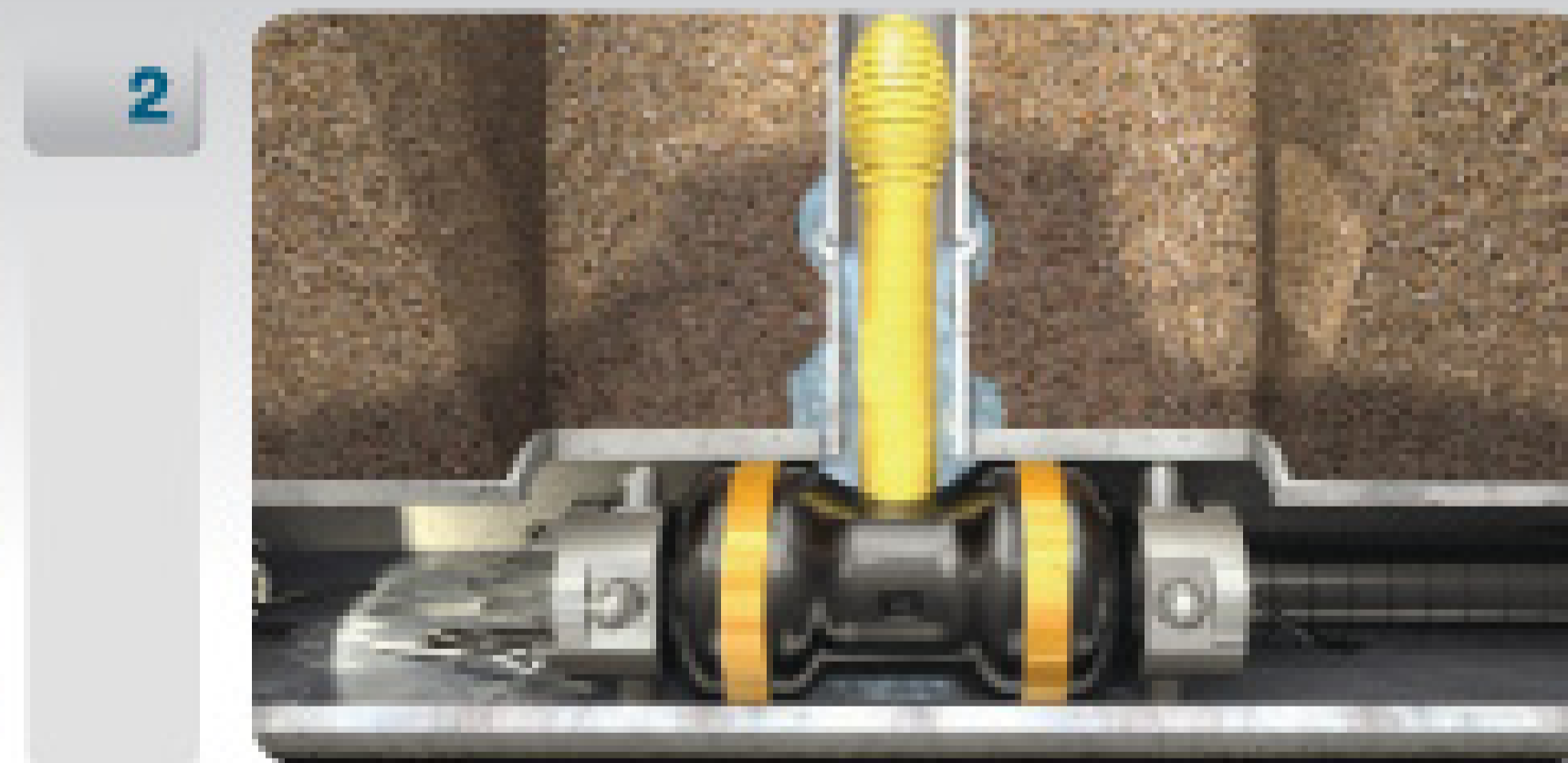
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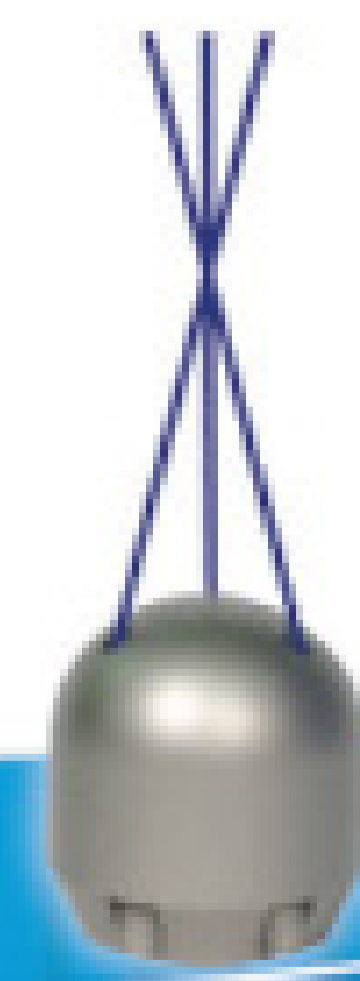
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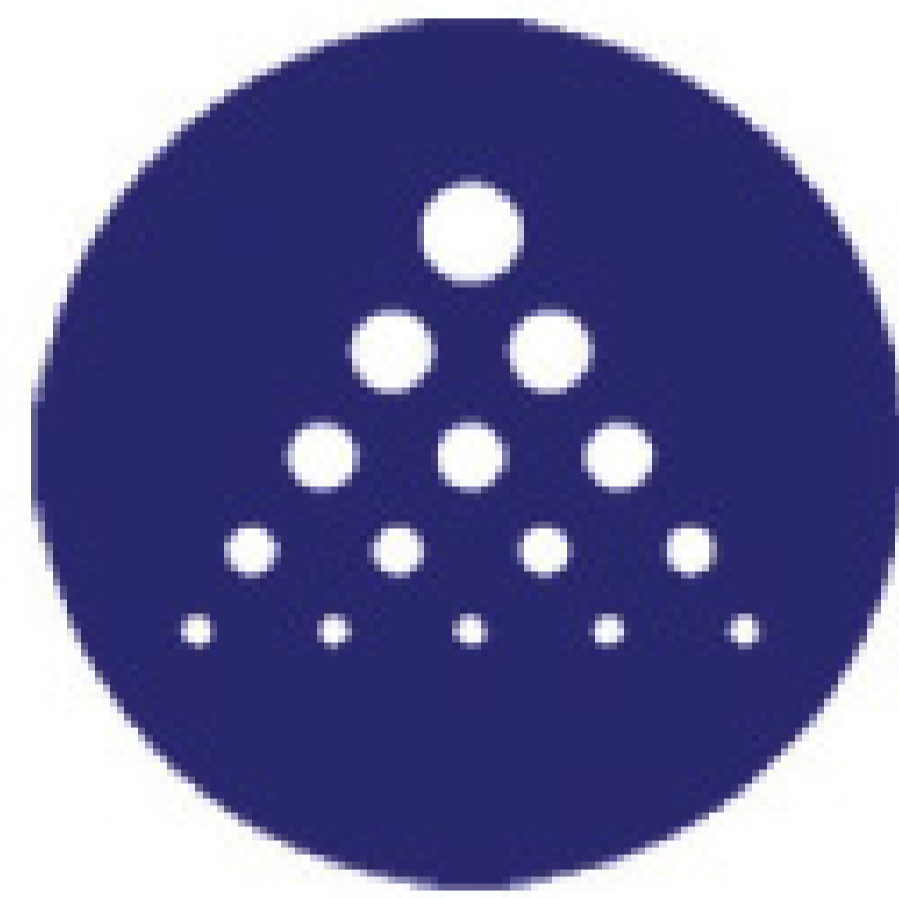
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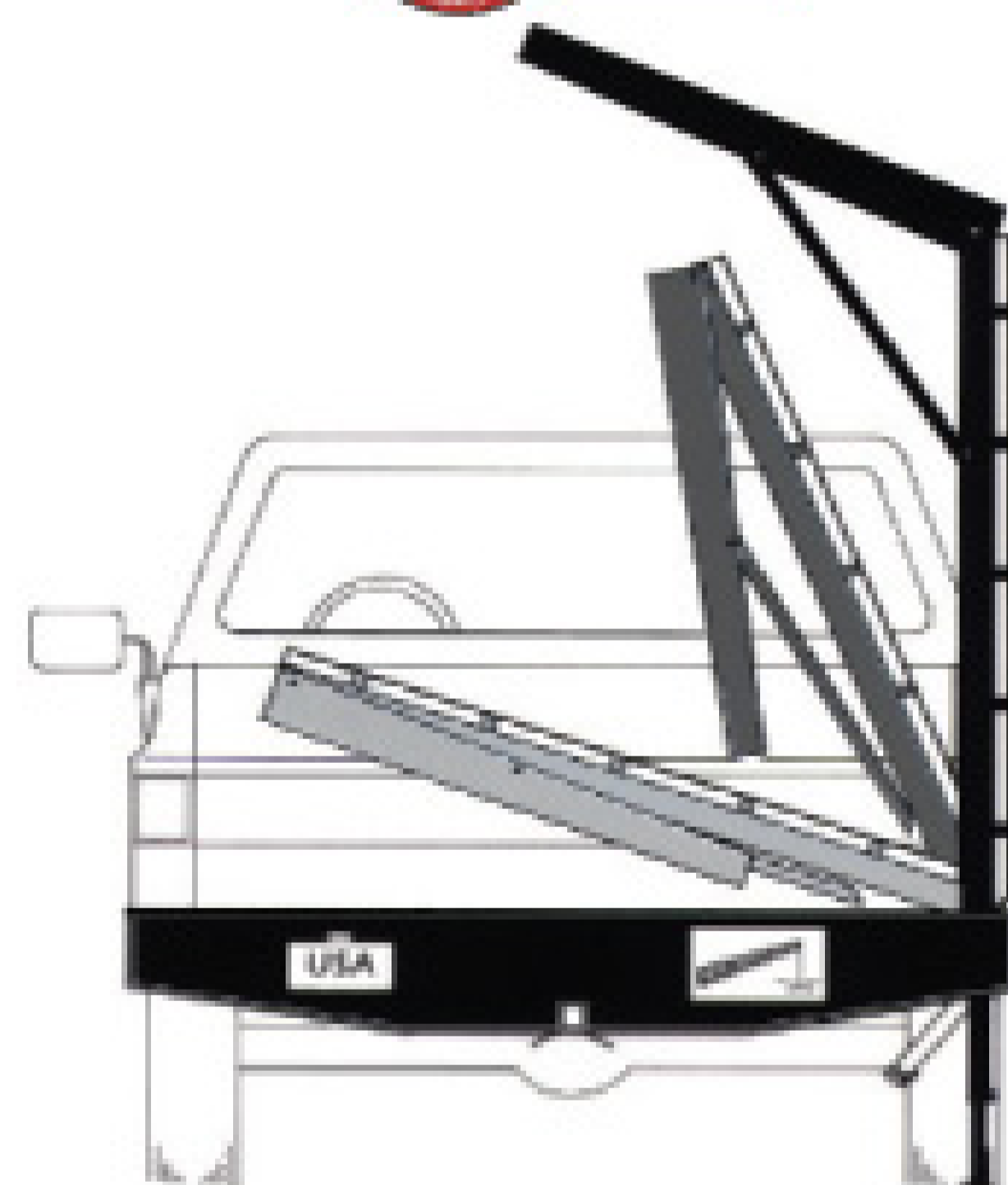
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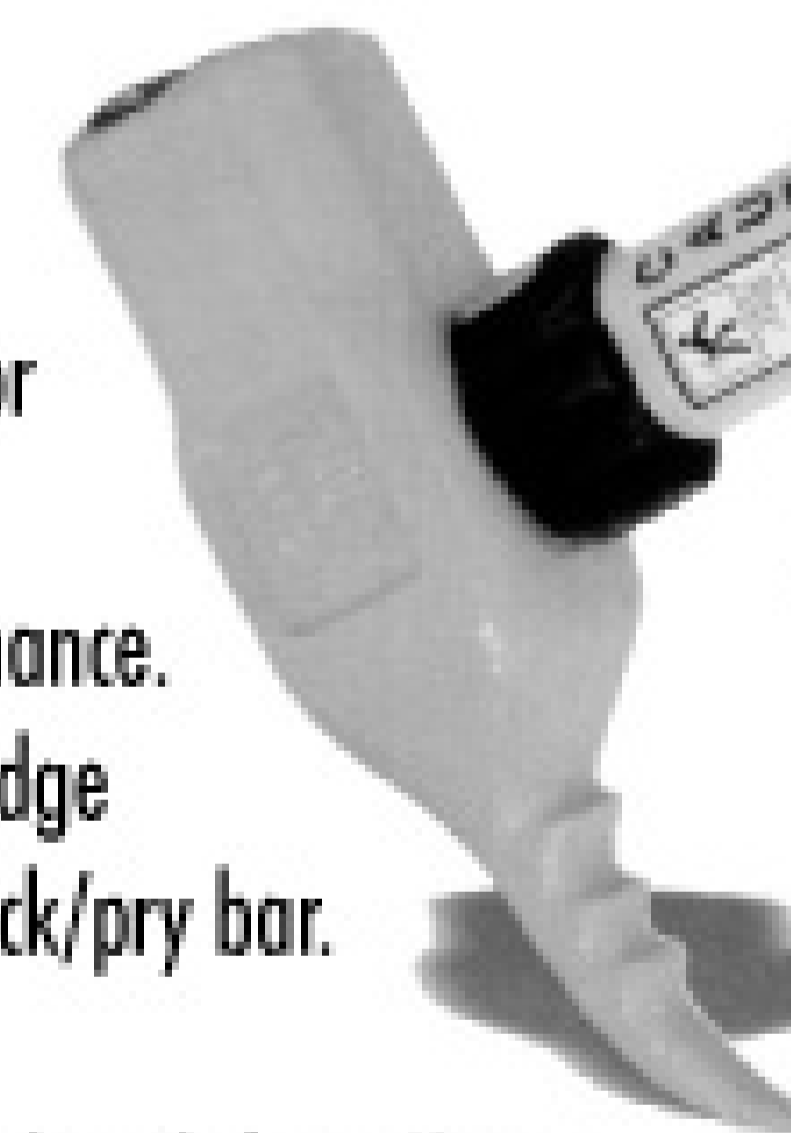


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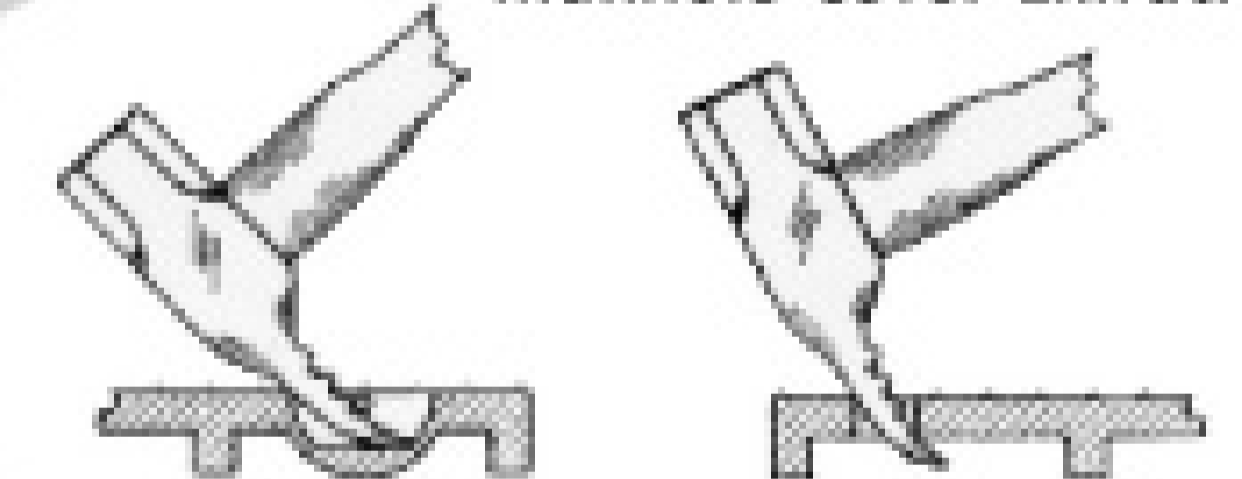
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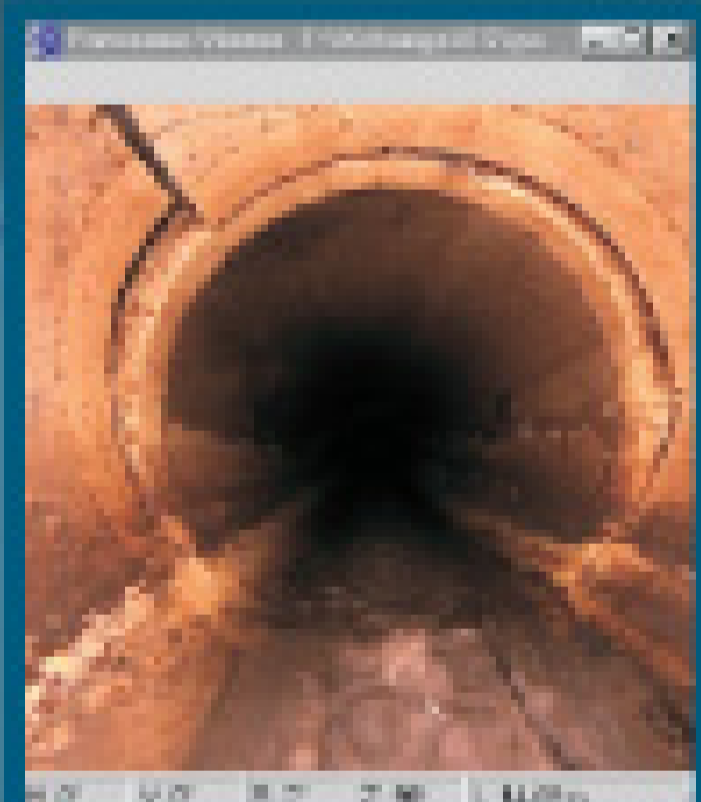
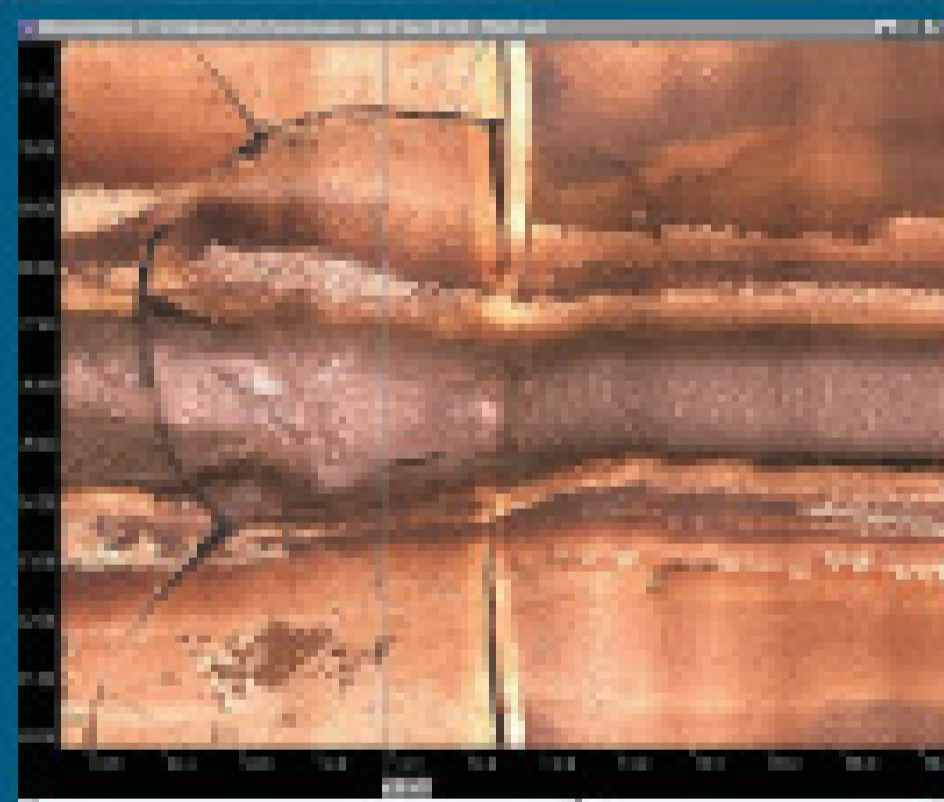
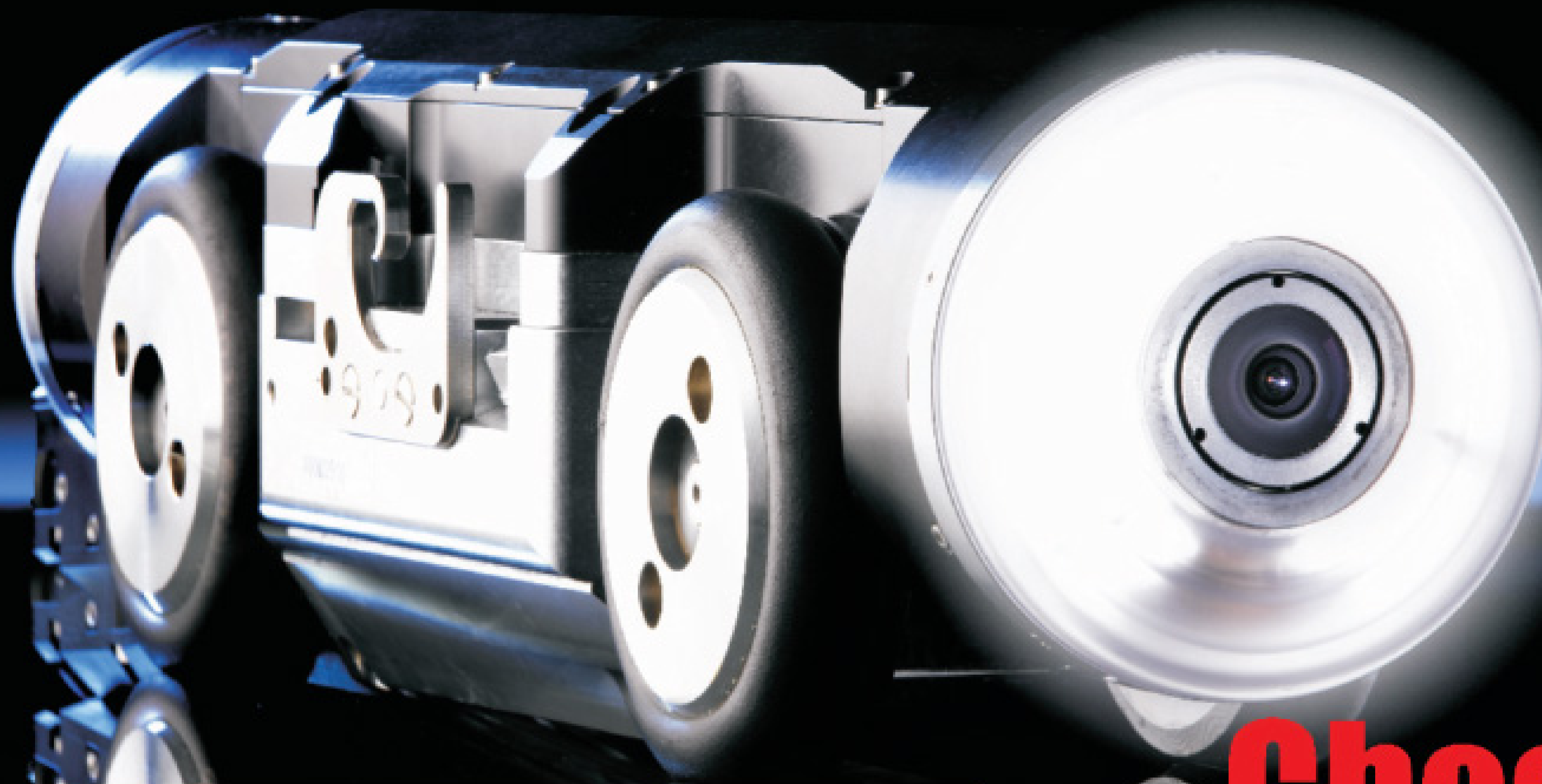
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# TOUGH DUTY

It may not be easy disciplining employees, but failure to confront performance issues can lead to worse problems down the road

By Ken Wysochy

Few managers relish calling out an employee for poor performance. The reasons can vary, but the outcome is always the same — an unpleasant experience for both parties, not to mention their colleagues.

Jason Yarborough, utilities director in Palm Bay, Fla., and a 12-year public sector veteran, knows this from experience. In his early years as a manager, he supervised an employee who was an ethnic minority and a practicing Muslim. He was also a chronic underperformer, but Yarborough avoided confronting the issue because he was intimidated by the religious and racial elements involved.

Ultimately, the employee forced the issue when Yarborough found him asleep on the job — cause for

him doing things right as well as disciplining him for doing things wrong. That way, he might have been a more productive employee. Or we might have terminated him earlier.”

## Keeping track

Yarborough’s experience underscores the importance of progressive discipline, which he was exposed to later during an intensive, 8-week human resources certification program at a nearby college. That training has made all the difference for him.

Proper disciplinary action is no small matter. At the least, public sector managers who don’t practice progressive discipline expose themselves and their employers to liability in union arbitration cases. The absence of discipline also

with each infraction, is effective.

Imposing such discipline isn’t always easy. It requires a written policy, and to implement it properly, managers must compile extensive documentation. But the policy assures employees that they won’t be fired for minor infractions, and it gives employers solid ground from which to defend against legal challenges.

A manager who believes discipline is necessary must first put the situation in context. Yarborough paints a hypothetical scenario where an employee improperly fills out a wastewater treatment compliance report that must be submitted monthly to a state agency. “First of all, I’d find out if the employee knew how to fill out the report properly,” Yarborough says. “It’s not fair if I never gave the employee the resources to succeed — in this case, training in how to fill out the report.

“If I determine they have the training and resources, then I look at the severity of the problem. Did it result in a warning from the state, or thousands of dollars in fines? Then I look at the employee’s personnel file and see if they’ve had problems in the past. If there’s no history, then I’d give a verbal warning. If not, a written warning would be appropriate. And if the employee already had incurred time off without pay, I’d have to start looking at termination.”

## Documentation is key

Written documentation of

**We invite readers** to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive team. Or ask a question about a specific issue on which you would like advice. Call editor Ted Rulseh at 800/257-7222, or e-mail [editor@mswmag.com](mailto:editor@mswmag.com).

warnings is critical. “I’ve had employees with nothing but ‘ataboys’ in their file, which makes it awful difficult to terminate them,” Yarborough says. “Nowadays, people file lawsuits at the drop of a hat. And if the matter goes before the ultimate arbiter — a judge or a jury — written warnings are essential. Otherwise it looks like you’re terminating a stellar employee.”

This is especially true when dealing with unions, as many municipal managers do. Yarborough notes that Florida is an at-will state, where employees and employers can sever their relationship without any liability. “But the union contracts are pretty intense in terms of looking out for the interests of employees,” he says.

“So if you go to arbitration, you want to be sure you have a paper trail that supports and justifies any actions you took. Don’t leave anything to chance. If you leave out any pieces of the puzzle, an arbiter won’t be able to piece it together.”

Managers must document specific behavior, not just vaguely note, for example, that the employee has a bad attitude.

“You need to focus on things that are observable and can be documented,” he says. “I can’t document that a guy maybe had a fight with his wife and that’s why he’s angry at work. But I can document things such as the employee raised his voice at fellow employees, swore, or acted aggressively.”

On the other hand, managers should also follow the credo of

**“So if you go to arbitration, you want to be sure you have a paper trail that supports and justifies any actions you took. Don’t leave anything to chance.**

**If you leave out any pieces of the puzzle, an arbiter won’t be able to piece it together.”**

Jason Yarborough

termination. But in retrospect, he believes that more direct feedback about the employee’s performance — good and bad — would have helped immensely.

“If I had been a more seasoned manager with more training, I would have handled it differently,” Yarborough observes. “I would have developed a better paper trail and provided more direction — caught

creates low morale among employees who see laggards and rule violators still receiving paychecks while they do the heavy lifting. At worst, inaction can foster costly and protracted lawsuits.

At some point in a career, almost every public sector manager will have to discipline an employee. Progressive discipline, in which the severity of the penalty increases

"catching someone doing things right" and document such instances in personnel files.

"Positive comments along with written warnings show you are balanced and fair, and see employees in their totality," Yarborough notes. "It shows I was a fair and reasonable manager, which is the legal yardstick by which things are measured in court."

#### The last resort

If terminating employees is the only option left after repeated disciplines, Yarborough suggests doing it at the end of the day on a Friday. "If you're dealing with someone of the opposite sex, it's also important to have another person in the room — preferably another woman, if you're a man — so there's no way the departing

leaders can make a huge difference in challenging disciplinary cases. "Try to build a relationship with the union representative," Yarborough suggests. "Go out for lunch once a month, even if it's a Dutch treat. I'm not saying you should go out and buy a relationship, but you should develop a partnership. A less-than-productive employee with a bad attitude isn't good for anyone — the union, the employees or the employer.

"All things being equal, if you have a good relationship, the union is more likely to side with helping you out. If it's an adversarial relationship, they won't help you out on a small matter or a large matter."

Yarborough also suggests that managers solicit input from unions in sticky disciplinary situations.

**"All things being equal, if you have a good relationship, the union is more likely to side with helping you out. If it's an adversarial relationship, they won't help you out on a small matter or a large matter."**

Jason Yarborough

employee can make untrue allegations about anything," he advises.

"In fact, having a third party present is a good idea even if it's only a disciplinary action. That way, it never comes down to your word against the employee's word. And again, I highly recommend that the third party be a person of the opposite sex."

Good relationships with union

"Don't try to cram a solution down an employee's throat," he says. "You don't have to be Draconian. You don't always have to come down on someone like an 800-pound gorilla."

Practicing progressive discipline may not make it easy to discipline employees. But it could go a long way toward making an unpleasant task a little more palatable. ♦

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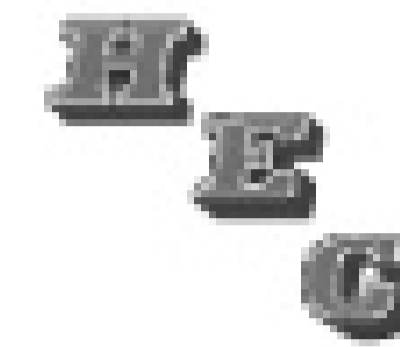
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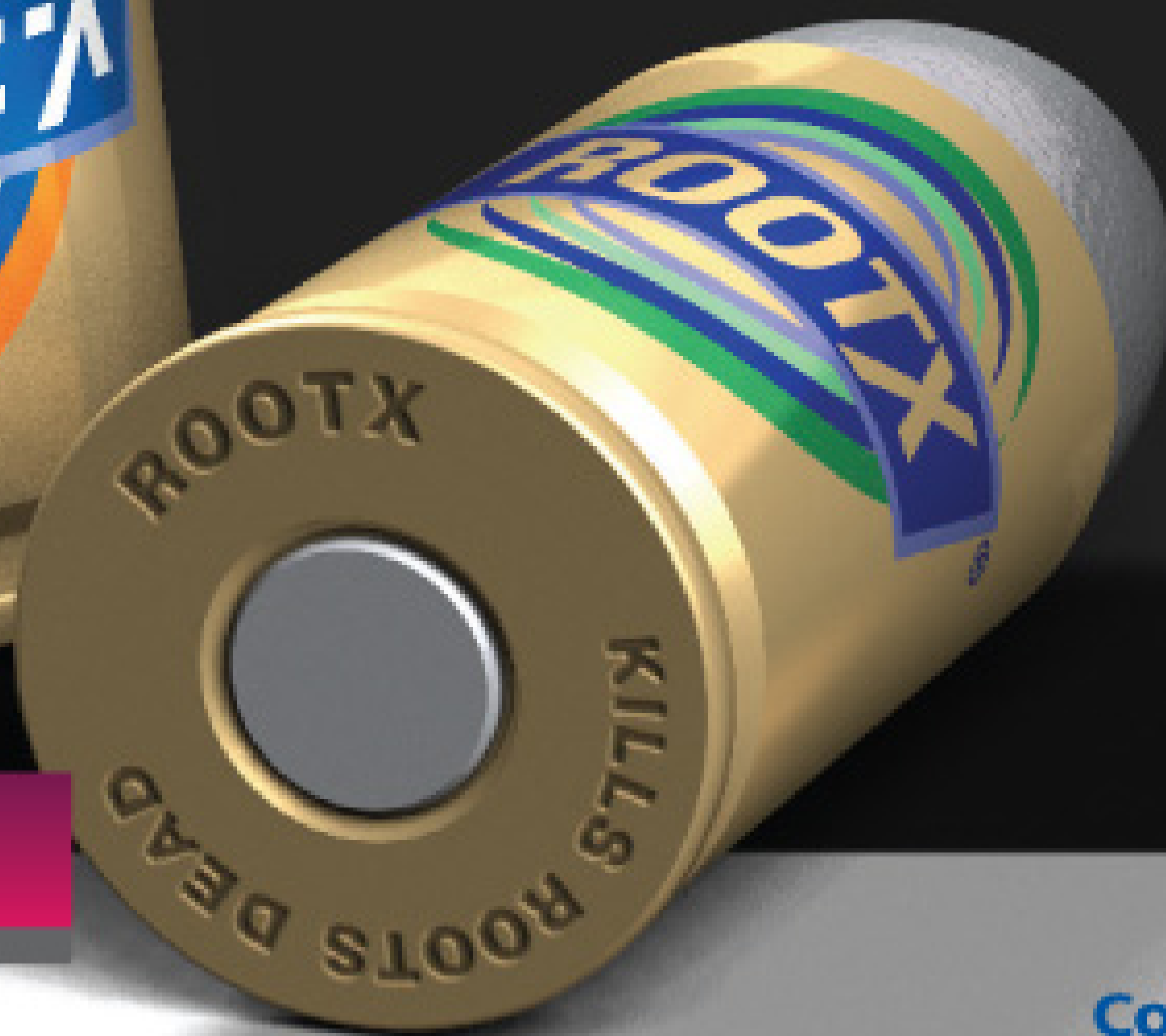
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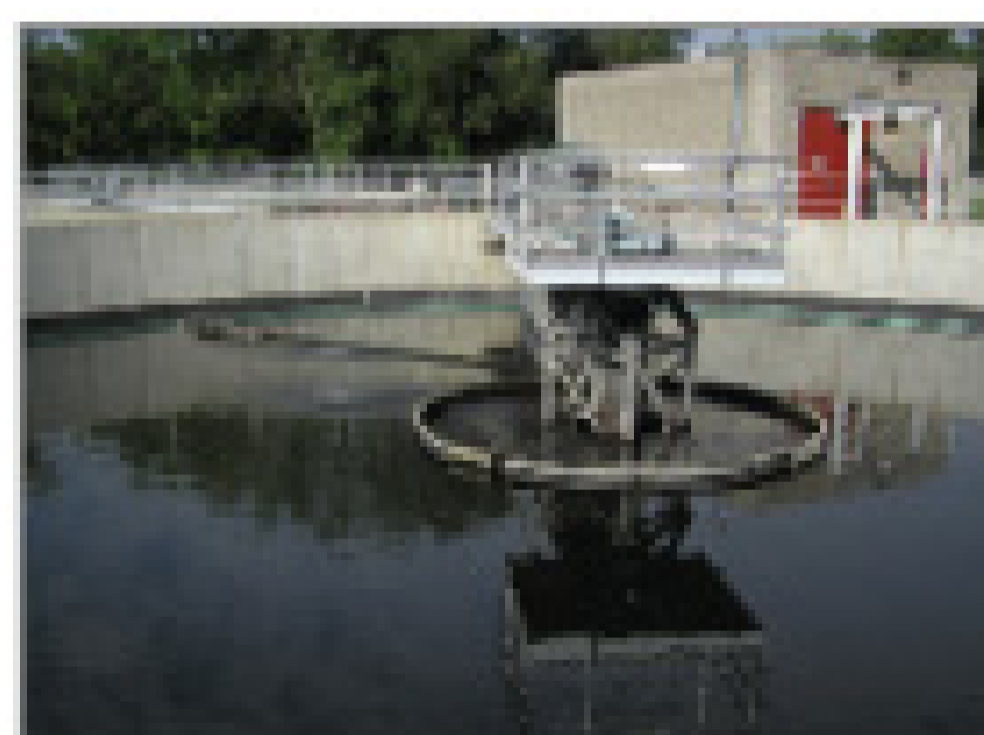
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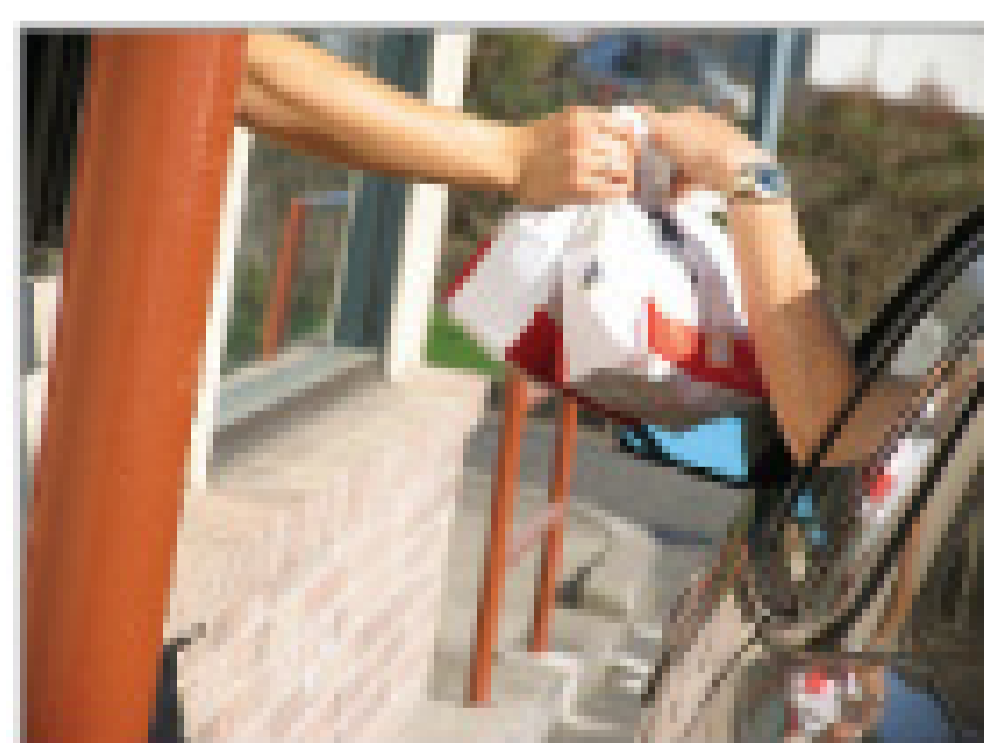


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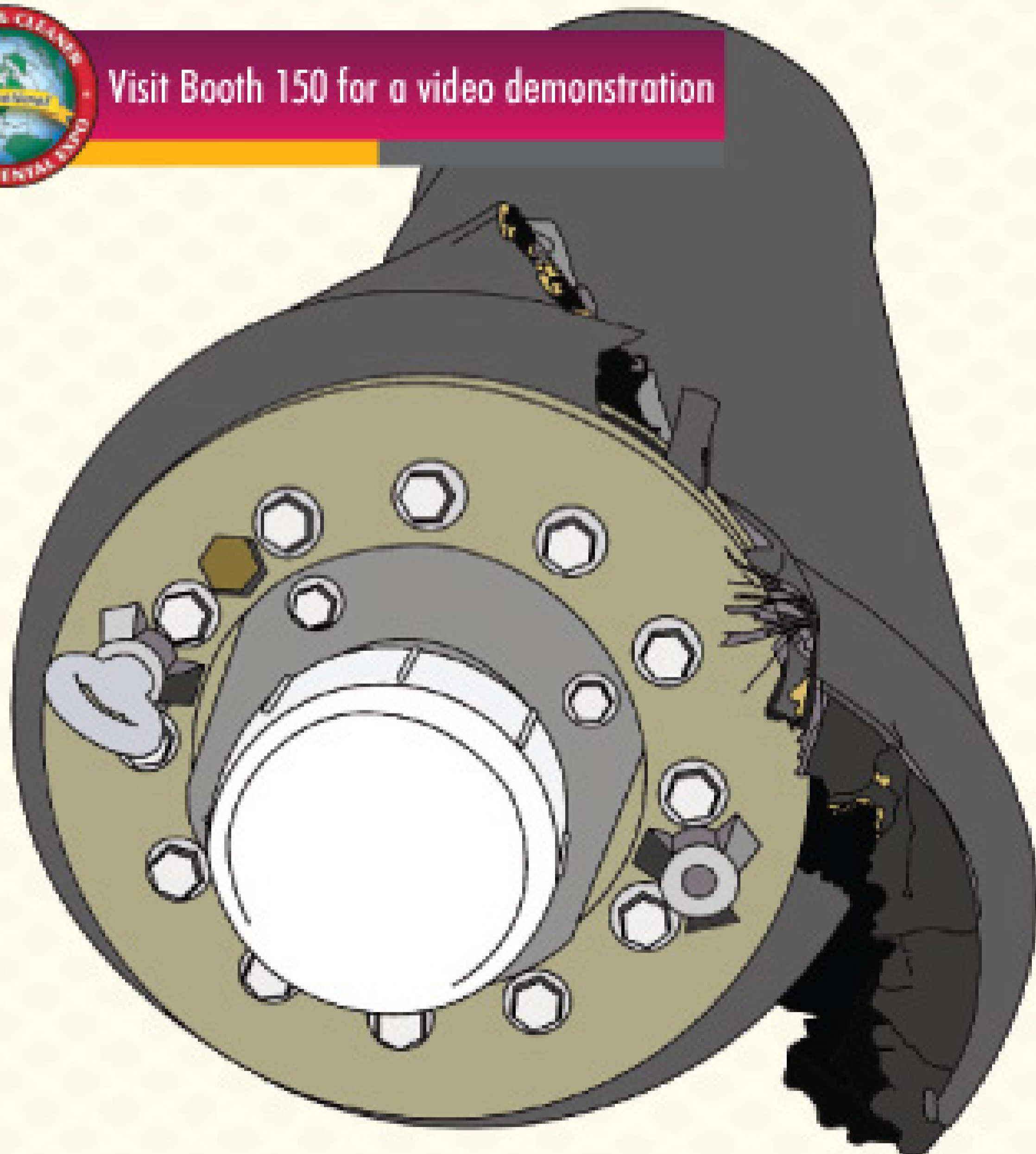
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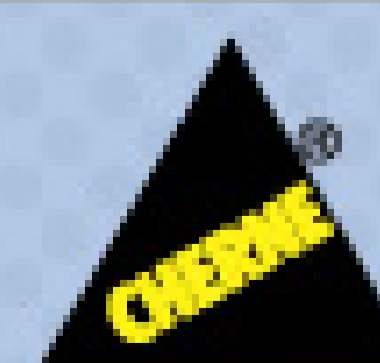
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### Federal Signal Opens Long Beach Solutions Center

Federal Signal Environmental Solutions Group has opened its fifth FS Solutions center. The Long Beach, Calif., center will stock high-performance parts and accessories for the company's Guzzler, Vactor and Jetstream brands, as well as other makes and models of waterblasters and vacuum loaders.



### WinCan Moves to New Location

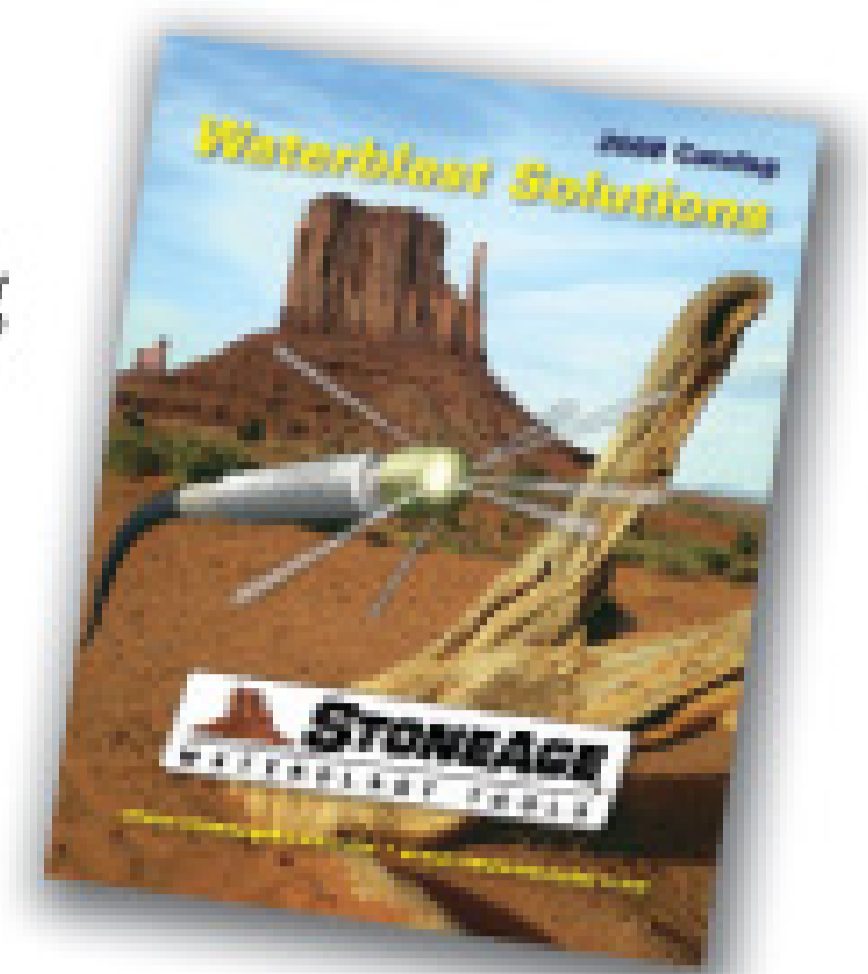
WinCan America Inc. has moved to 4921 Alexander Blvd., NE Suite B, Albuquerque, N.M. The company's phone number and fax line remain unchanged.

### RapidView Appoints Leslie Regional Manager

RapidView LLC has appointed Guy Leslie regional sales manager for the Southeast United States and the Caribbean Islands. He brings more than 20 years of sales experience to his position and will oversee sales for all of the company's pipeline inspection and rehabilitation products.

### StoneAge Catalog Available Online

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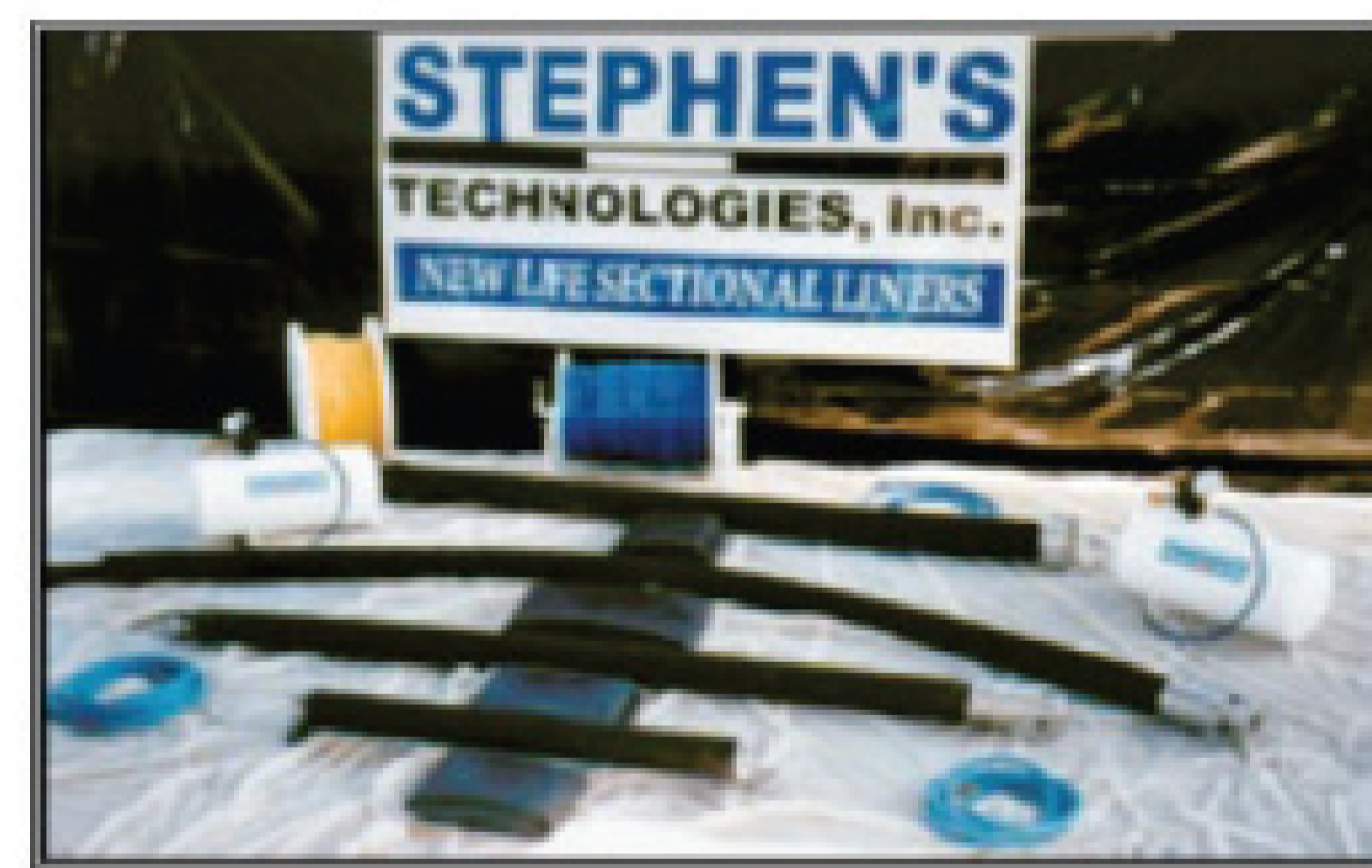
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Booth 8073



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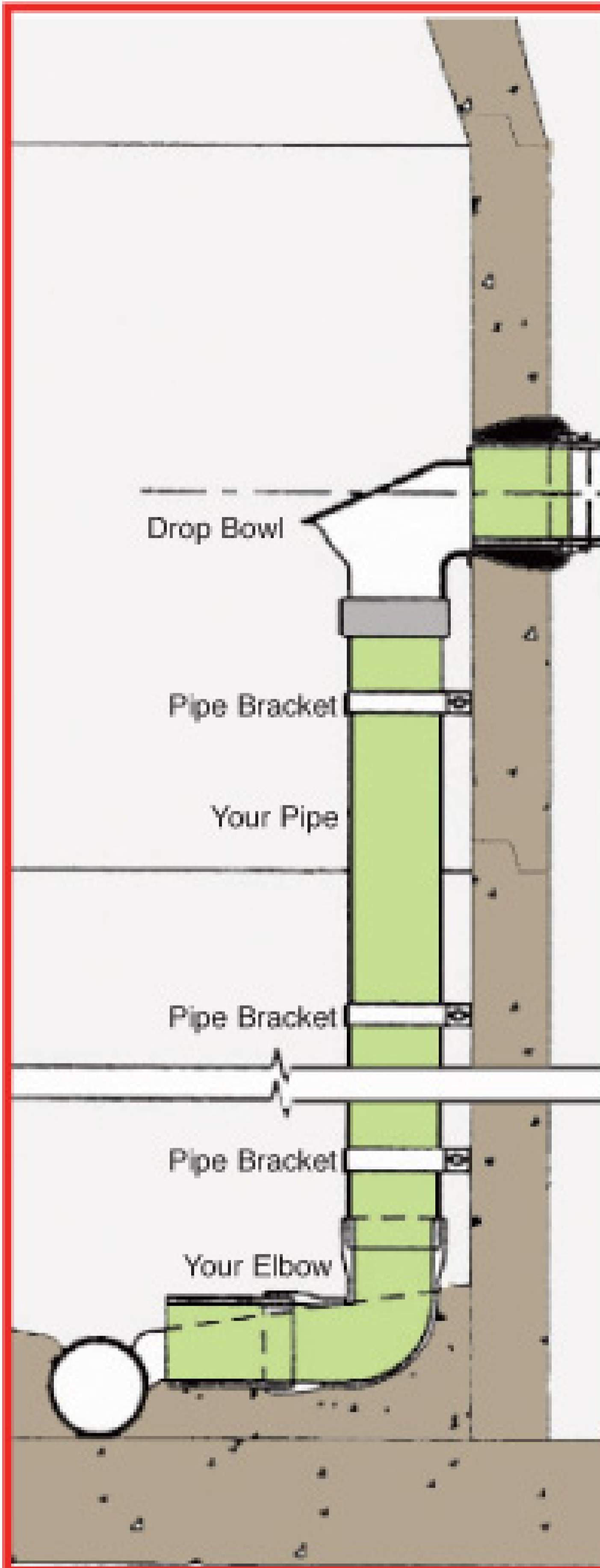
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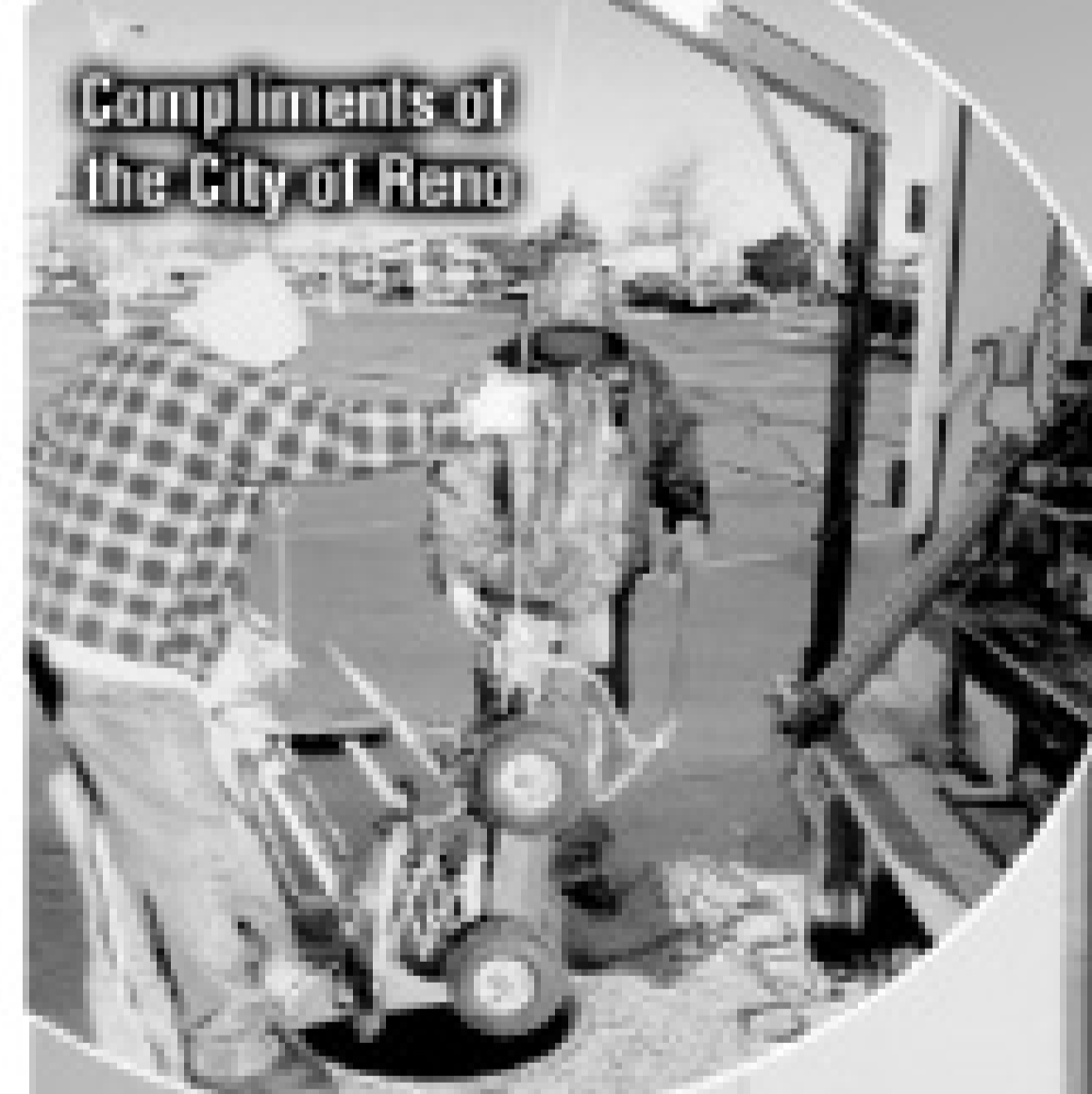


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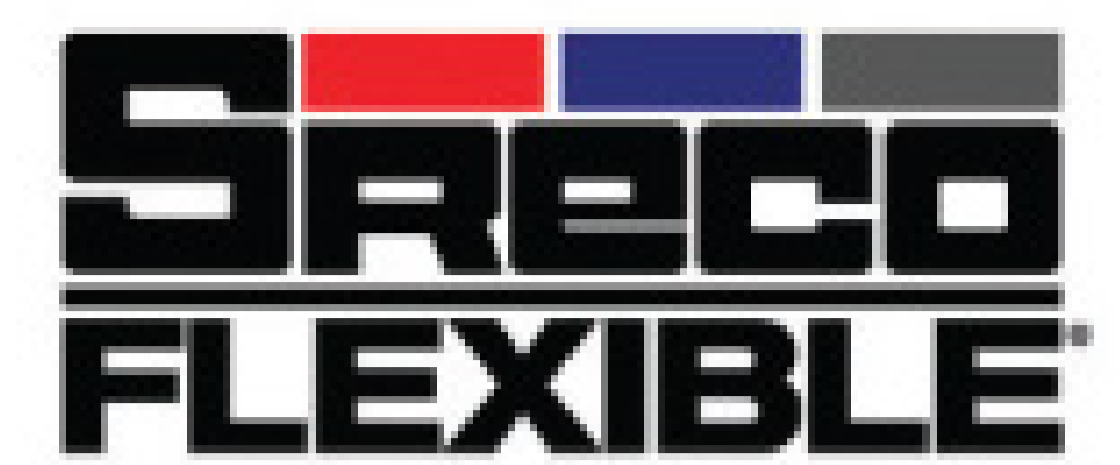
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## National Public Works Week

The theme for the American Public Works Association's (APWA) National Public Works Week (May 18-24) is "The Future is Now." The objective is to raise awareness of public works issues and increase confidence in public works employees.

To help public works agencies achieve these objectives, APWA created the web-based *National Public Works Week How-To Guide*, available at [www.apwa.net](http://www.apwa.net).

## Roping in Trenchless Technology

The No-Dig Show, "Roping in Trenchless Technology," in Dallas, Texas, April 27 to May 2, will present more than 100 technical papers. Besides lateral and mainline trenchless discussions, an open forum will address water, sewer, and stormwater issues.

The Common Ground Alliance is sponsoring a Damage Investigation and Claims Resolution Workshop. NASSCO will administer its Pipeline Assessment Certification and Manhole Assessment and Certification programs. The North American Society for Trenchless Technology will offer a Good Practices course on New Installation Methods.

Pre- and post-conference short courses and workshops include An Intro to Trenchless Technology: New Construction Techniques and Rehabilitation Methods, and Horizontal Directional Drilling Good Practices Guidelines. For more information, go to [www.nodigshow.com](http://www.nodigshow.com).

## Urban Water Management

Urban Water Management, An Integrated Water Quality Conference and Exhibition, is March 31 to April 2 at the Louisville (Ky.) Marriott. It will focus on the integration of stormwater best management practices, Phase II regulations, green infrastructure, and funding of municipal water management programs.

Presentations will cover design, construction, maintenance, and emerging technology for urban water quality. Tom Schueler, director of the Chesapeake Stormwater Network, will give the keynote address. The featured short course is "Stormwater for the Practicing Engineer (and Scientist)" by Gary R. Minton, Ph.D., P.E. For more information, go to <http://uwm08.events.pennnet.com/fl/index.cfm>.

## Feds act on perchlorate and chromium

Release of the Food and Drug Administration study of exposure to perchlorate in food products will help U.S. EPA decide whether to regulate perchlorate in drinking water. The FDA assessment found that even the highest dietary levels of perchlorate among toddlers is less than EPA's reference dose of 0.7 micrograms/kg/day. A final regulatory determination for perchlorate and other chemicals on the second Contaminant Candidate List is expected later this year.

A provision added in Congress to the fiscal 2008 EPA spending bill would have the agency regulate chromium 6 on its own rather than be covered as it is now under a standard for total chromium. The National Toxicology Program found that while chromium 6 is a human carcinogen when inhaled, the effects of long-term exposure to hexavalent chromium compounds in water supplies are uncertain.

## LEARNING OPPORTUNITIES

### Trenchless Technology Courses

The North American Society for Trenchless Technology has these classes:

- March 25 – Pipe Bursting Good Practices, Las Vegas
- March 26 – HDD Good Practices Guidelines, Las Vegas
- April 27 – May 2, No-Dig Conference & Exhibition, Dallas
- April 27 – An Introduction to Trenchless Technology, Dallas
- April 30-May 1 – New Installation Methods Good Practices, Dallas
- April 30-May 1 – HDD Good Practices Guidelines, Dallas.

Visit [www.nastt.org](http://www.nastt.org).

### UW-Madison Engineering Courses

The University of Wisconsin-Madison Department of Engineering Professional Development is offering the following CEU, LU, PDH classes. They are at the Madison campus unless indicated otherwise:

- March 10-12 – Asset Management for Water and Wastewater Utilities (J941)
- March 25-26 – Mastering the Fundamentals of Culvert Hydraulic Design (J758), Las Vegas.
- March 27-28 – Drainage Engineering Fundamentals for Non-Engineers (J761), Las Vegas.
- April 7-8 – Municipal Engineering Fundamentals for Non-Engineers (J491)
- April 14-15 – Mastering the Fundamentals of Culvert Hydraulic Design (J759)
- April 17-18 – Drainage Engineering Fundamentals for Non-Engineers (J762)
- April 28-29 – Pumping Equipment and Systems: Selecting, Operating, Maintaining, and Troubleshooting (J660)
- April 30-May 2 – Preventing Deficiencies in Design and Construction of Water and Wastewater Projects (J797)

Call 608/262-2061 or visit [http://epdweb.engr.wisc.edu/course\\_categories.lasso](http://epdweb.engr.wisc.edu/course_categories.lasso).

### American Public Works Association

APWA has these courses as classroom workshops or as audio/Web-based broadcasts:

- March 6 – Mastering the Media: Telling the Public Works Story Your Way (Web).
- March 10-12 – Construction Inspection: A Review, Atlanta, Ga.
- March 20 – Target Emergency Preparedness No. 3: After the Disaster – Reimbursement (Web).
- April 17 – Innovative Funding – Getting to the End of the Rainbow (Web).
- May 7-9 – Public Fleet Management Workshop, Grimsby, Ont.
- May 15 – Delta Force Readiness! Developing Tomorrow's Elite Corps of Public Works Leaders (Web).

Call Carrie Merker at 816/472-6100; ext: 5213 or visit [www.apwa.net](http://www.apwa.net).

### American Water Works Association

The American Water Works Association offers these CEU/PDH seminars:

- March 6-7 – Compensation Strategies to Strengthen Workforce Recruitment, Retention, and Motivation, Las Vegas.
- April 16-18 – Financial Management: Cost of Service Rate-Making, Boston, Mass.

Call 800/926-7337 or visit [www.awwa.org](http://www.awwa.org).

### North Carolina

The state university at Raleigh is offering these courses:

- April 2 – Sediment and Erosion Control: Latest Information with Hands-On Demonstrations
- March 6 – Introduction to Geographic Information

Call Joni Tanner at 919/515-1678 or visit [www.soil.ncsu.edu](http://www.soil.ncsu.edu), then Training, Short Courses and Workshops.

*Municipal Sewer & Water* invites your national, state or local association to post news items in this column. Send contributions to [editor@mswmag.com](mailto:editor@mswmag.com).

## CALENDAR

### March 30-April 2

Customer Service Conference and Exposition, sponsored by the American Water Works Association, Detroit, Mich. Call 800/926-7337 or visit [www.awwa.org](http://www.awwa.org).

### March 30-April 2

Information Management & Technology Conference and Exposition, sponsored by the American Water Works Association and Water Environment Federation, Detroit, Mich. Call Paul Olson at 800/926-7337 or visit [www.awwa.org](http://www.awwa.org).

### March 30-April 3

Ground Water Summit by the National Ground Water Association, Memphis, Tenn. Call 800/551-7379 or visit [www.ngwa.org](http://www.ngwa.org).

### March 31-April 2

Urban Water Management Water Quality Conference & Exhibition, Louisville Marriott, Ky. Call Joanie Harrington at 918/832-9305 or visit <http://uwm08.events.pennnet.com>.

### April 6-8

Water Security Congress, sponsored by the American Water Works Association, Cincinnati, Ohio. Call Dana Trujillo at 303/347-6240 or visit [www.awwa.org](http://www.awwa.org).

### April 27-May 2

North American Society for Trenchless Technology No-Dig Show, Gaylord Texan Resort and Convention Center, Dallas, Texas. Call 330/467-7588 or visit [www.nodigshow.com](http://www.nodigshow.com).

### May 4-7

National Clean Water Policy Forum, Renaissance Mayflower Hotel, Washington, D. C. Call 202/833-2672 or visit [www.nacwa.org](http://www.nacwa.org).

### May 18-22

National Monitoring Conference, sponsored by the National Water Quality Monitoring Council, Atlantic City Convention Center, N.J. E-mail [Monitoring2008@wef.org](mailto:Monitoring2008@wef.org) or visit [www.wef.org](http://www.wef.org).

### May 19-21

New England Interstate Water Pollution Control Commission Annual Nonpoint Source Pollution Conference, Progress through Partnerships: Collaborating to Protect Our Watersheds at the Mystic Marriott Hotel and Spa, Groton, Conn. Call Laura Chan at 978/323-7929 or visit [www.neiwpc.org](http://www.neiwpc.org).

### May 20-23

Customer Service Week Conference, Grand Hyatt, San Antonio, Texas. Call 903/893-3214 or visit [www.cisconference.org](http://www.cisconference.org).

### June 1-3

International Water Association-Water Environment Federation Wastewater Treatment Modelling Seminar, Château Mont-Sainte-Anne, Qué. Call Bruce Johnson at 720/286-5373 or visit [www.modelcau.org/WWTmod2008](http://www.modelcau.org/WWTmod2008).

### June 1-4

PennTec Annual Conference, Penn Stater Conference Center, State College, Pa. Call 717/642-9500 or visit [www.pwea.org](http://www.pwea.org).

### June 8-12

American Water Works Association Annual Conference and Exhibition, Georgia World Congress Center, Atlanta. Call 800/926-7337 or visit [www.awwa.org](http://www.awwa.org).

### June 22-25

National Environmental Health Association Educational Conference and Exhibition, Tucson, Ariz. Call 303/756-9090 or visit [www.neha.org](http://www.neha.org).

### July 15-18

National Association of Clean Water Agencies Summer Conference and Meeting, Hilton Hotel, Anchorage, Alaska. Call 202/833-2672 or visit [www.nacwa.org](http://www.nacwa.org).

### Aug. 3-7

StormCon North American Surface Water Quality Conference and Exposition, Orlando World Center Marriott, Fla. Call 805/682-1300; ext: 129 or visit [www.stormcon.com](http://www.stormcon.com).

### Aug. 17-20

American Public Works Association Congress: The Best Show in Public Works, Morial Convention Center, New Orleans, La. Call 800/848-2792 or visit [www.apwa.net](http://www.apwa.net).

### Sept. 21-24

Distribution Systems Symposium and Exposition for Distribution, Engineering and Plant Operations Professionals, Austin, Texas. Call Tricia Loughhead at 800/926-7337 or visit [www.awwa.org](http://www.awwa.org).

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Booth 67

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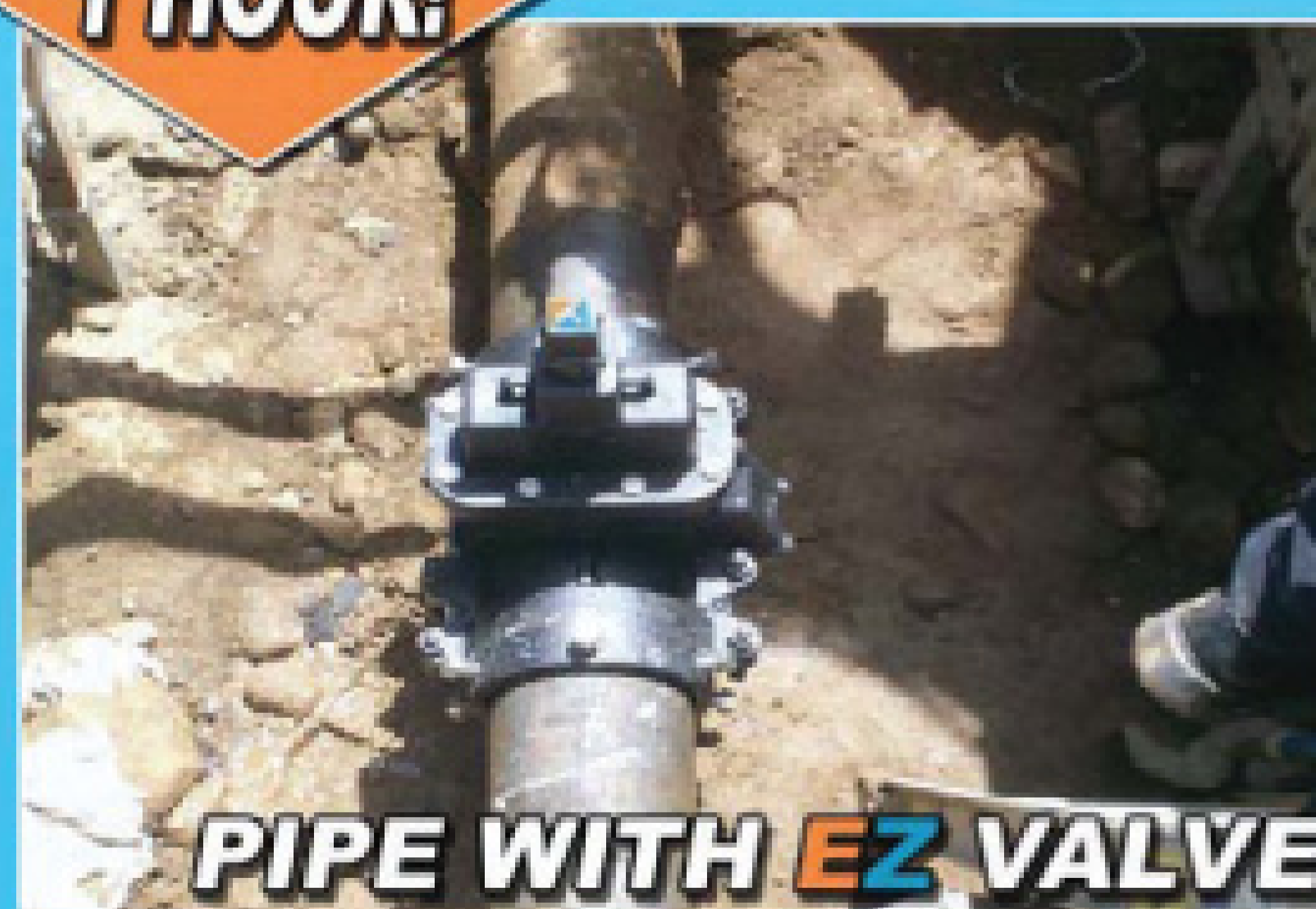
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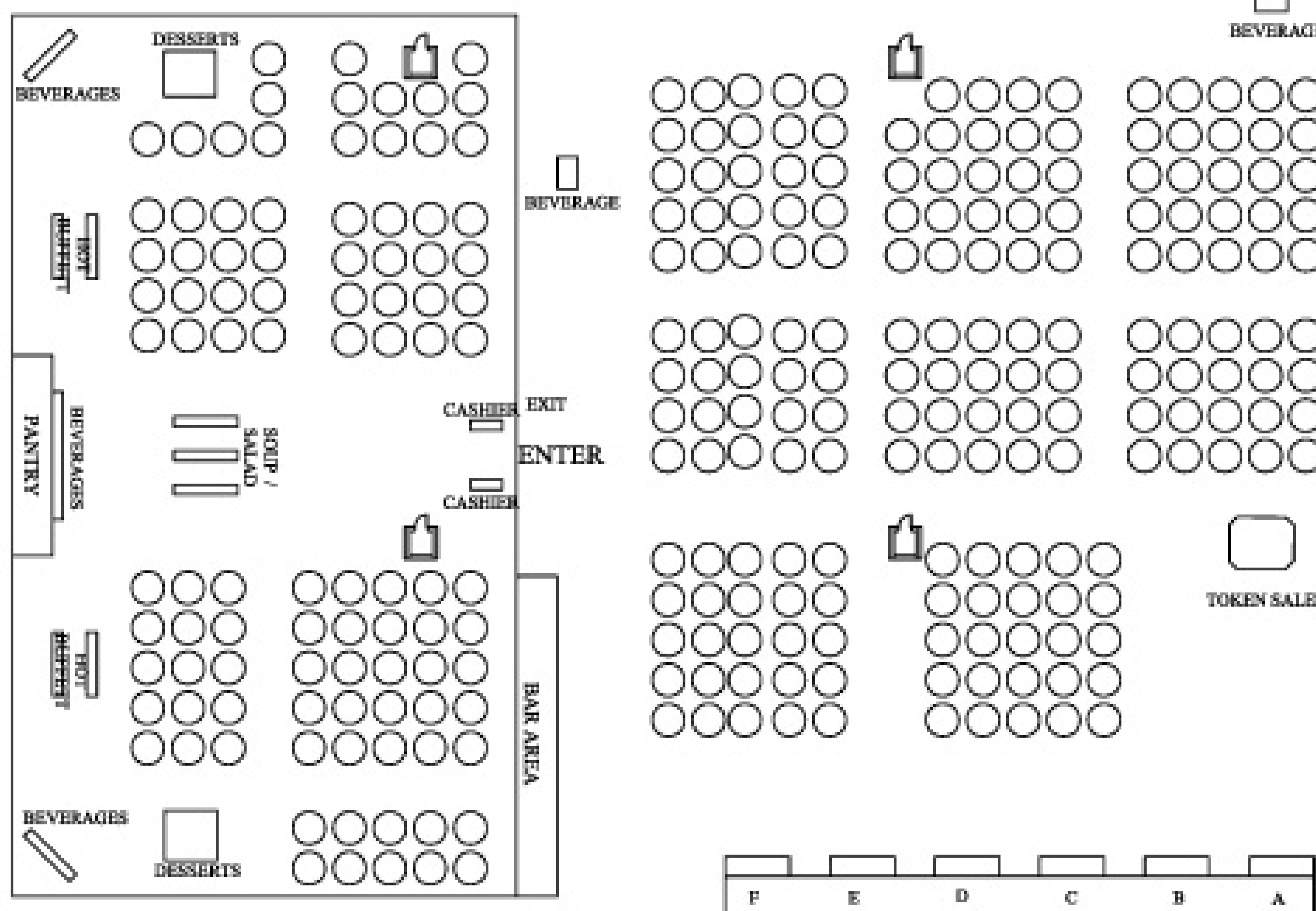
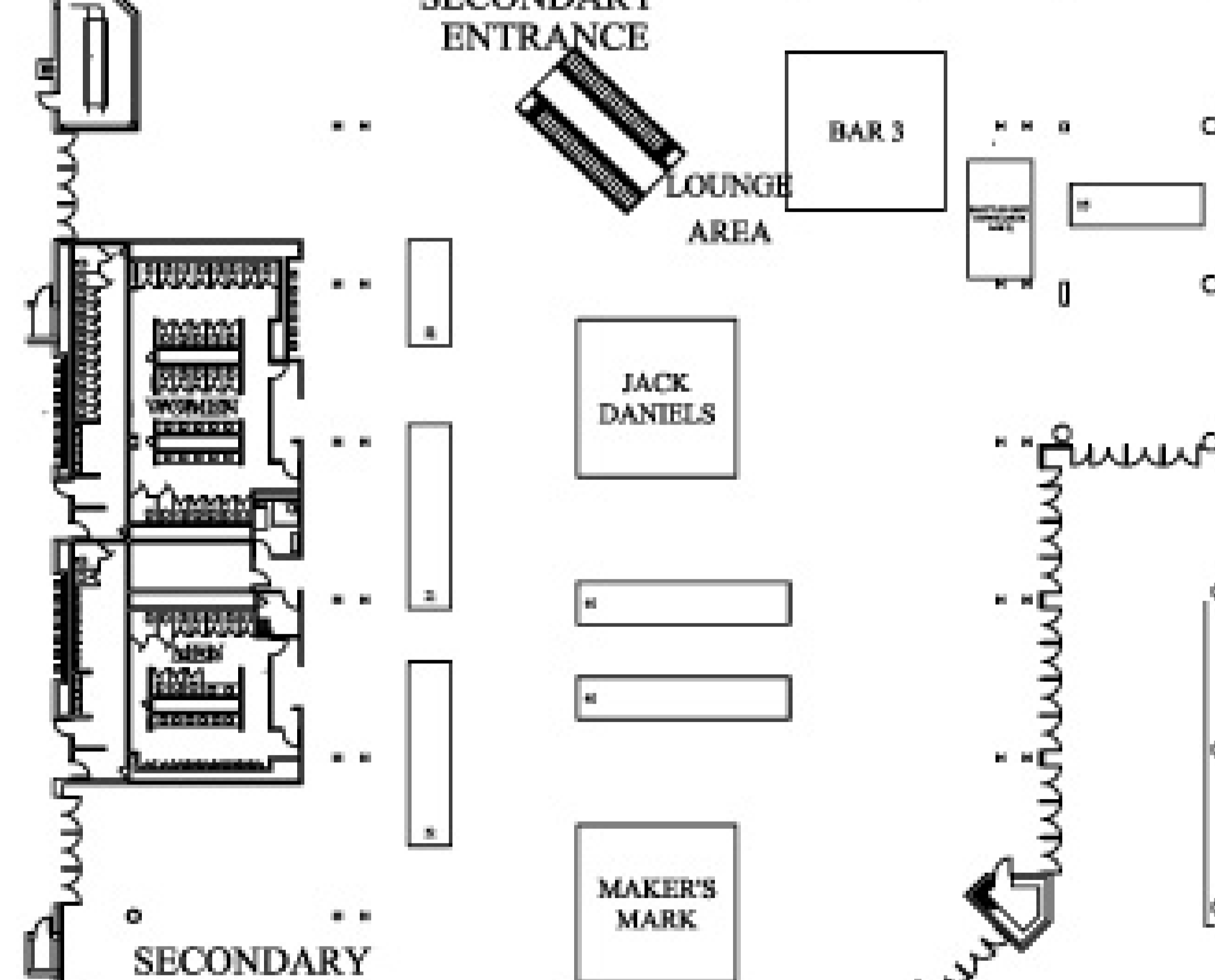
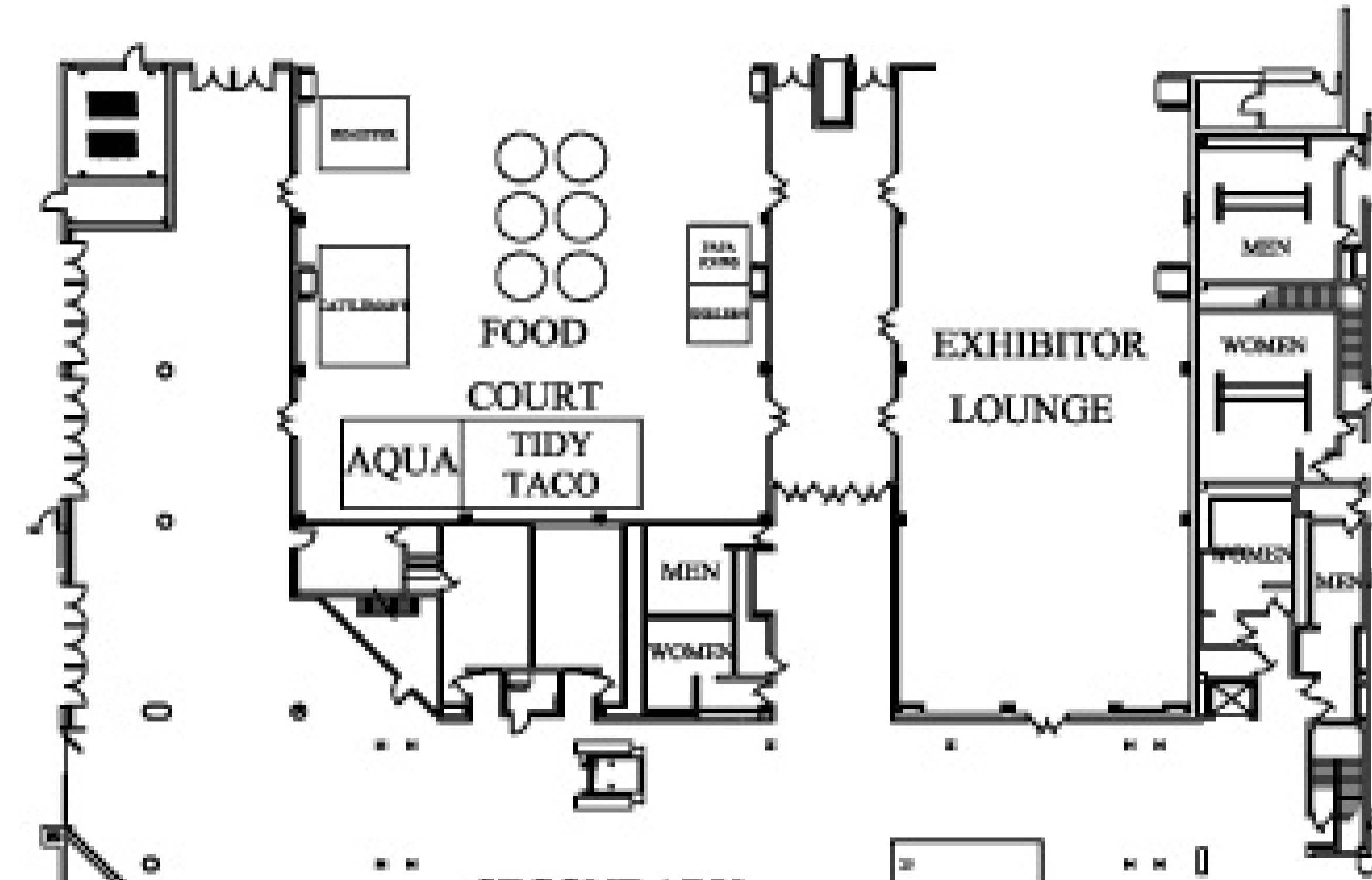
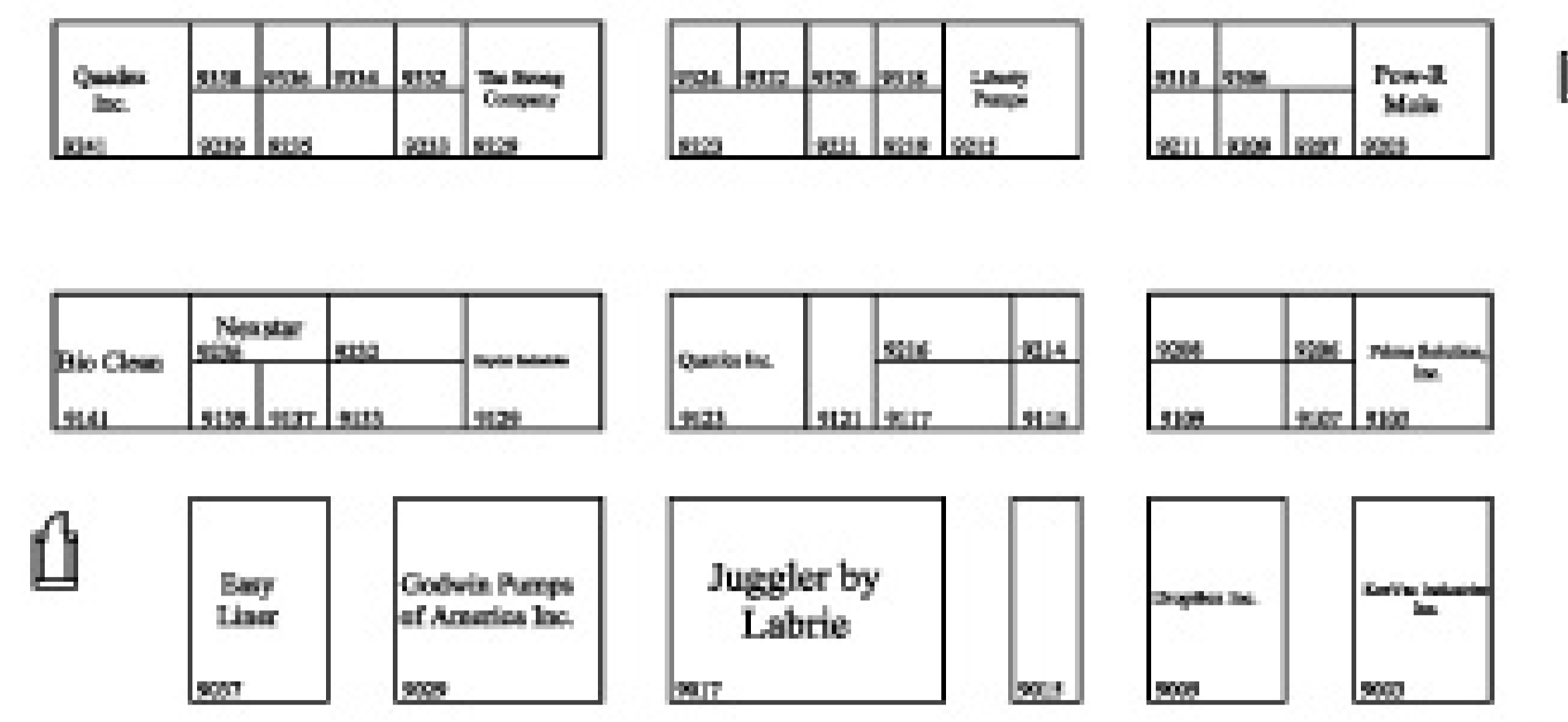
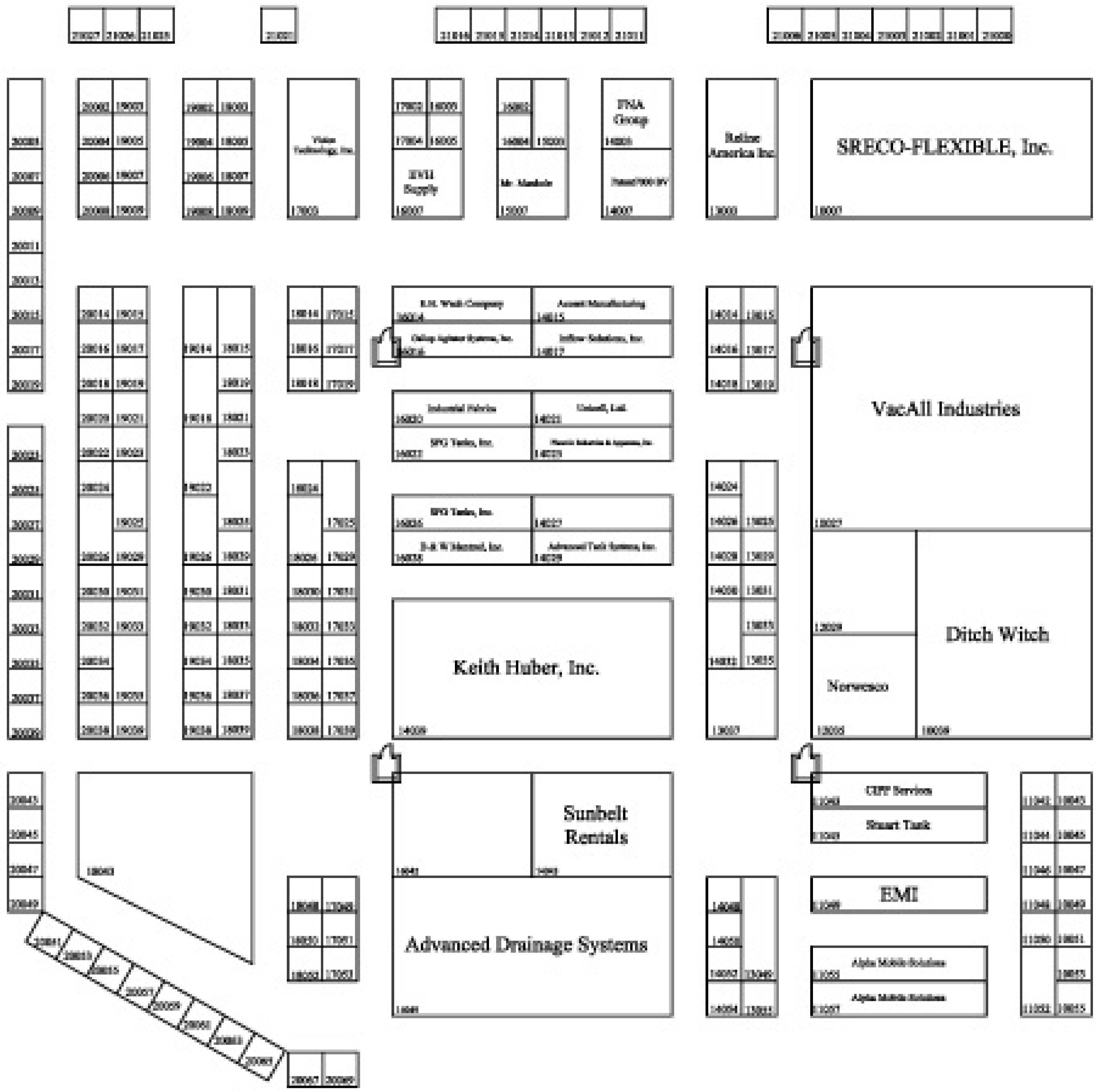


**PIPE WITH EZ VALVE**

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# 2008 Pumper & Cleaner Expo Floorplan

SERVICE DESK  
(Near Booth 7217)



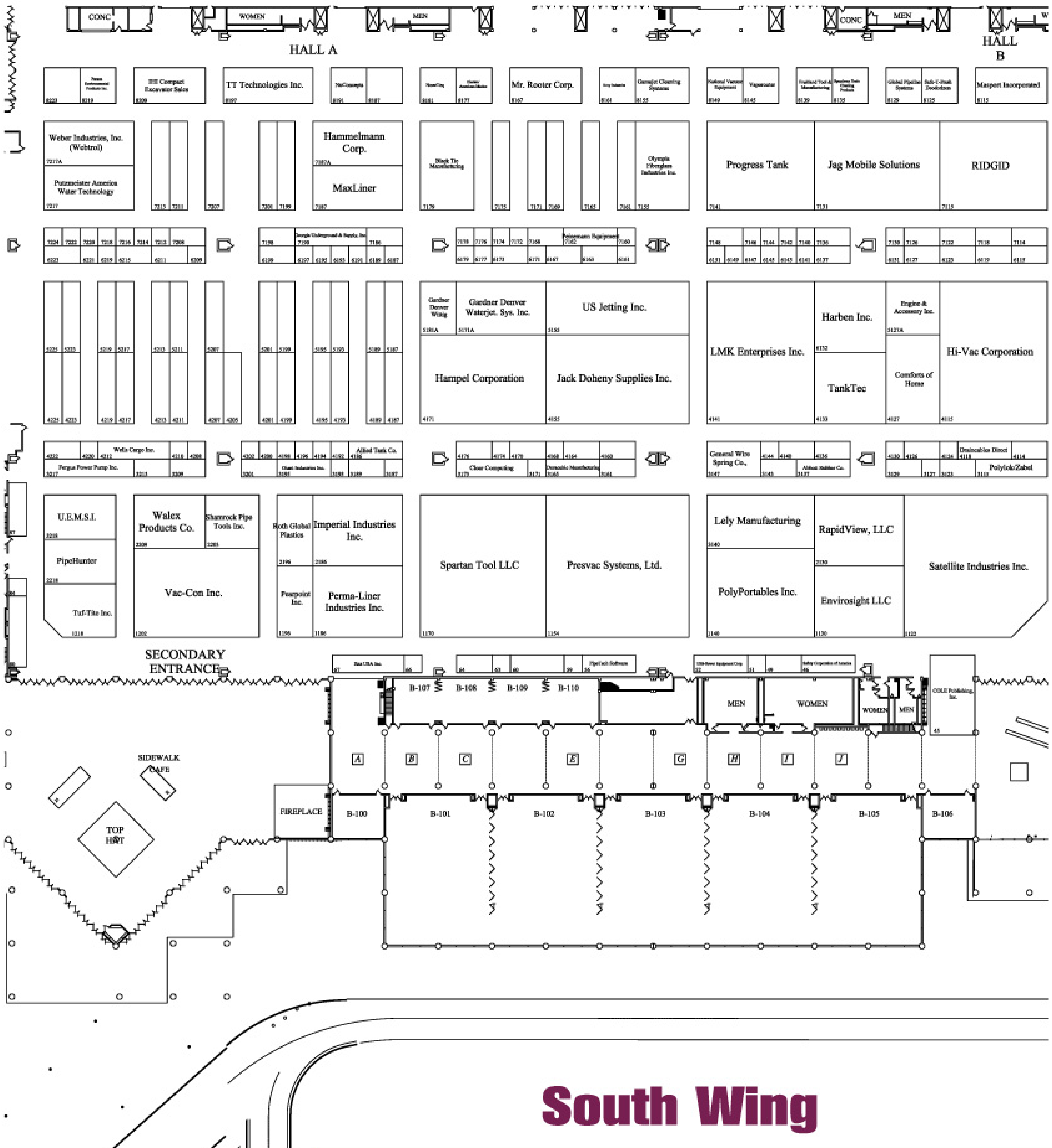
- |          |                 |         |           |               |           |
|----------|-----------------|---------|-----------|---------------|-----------|
| F        | E               | D       | C         | B             | A         |
| PORK BBQ | ROASTED CHICKEN | LASAGNA | HOT BROWN | FRIED CHICKEN | PRIME RIB |

## North Wing

FLOORPLAN CURRENT AS OF 1-18-08. SUBJECT TO CHANGE WITHOUT NOTICE.



# 2008 Pumper & Cleaner Expo Floorplan

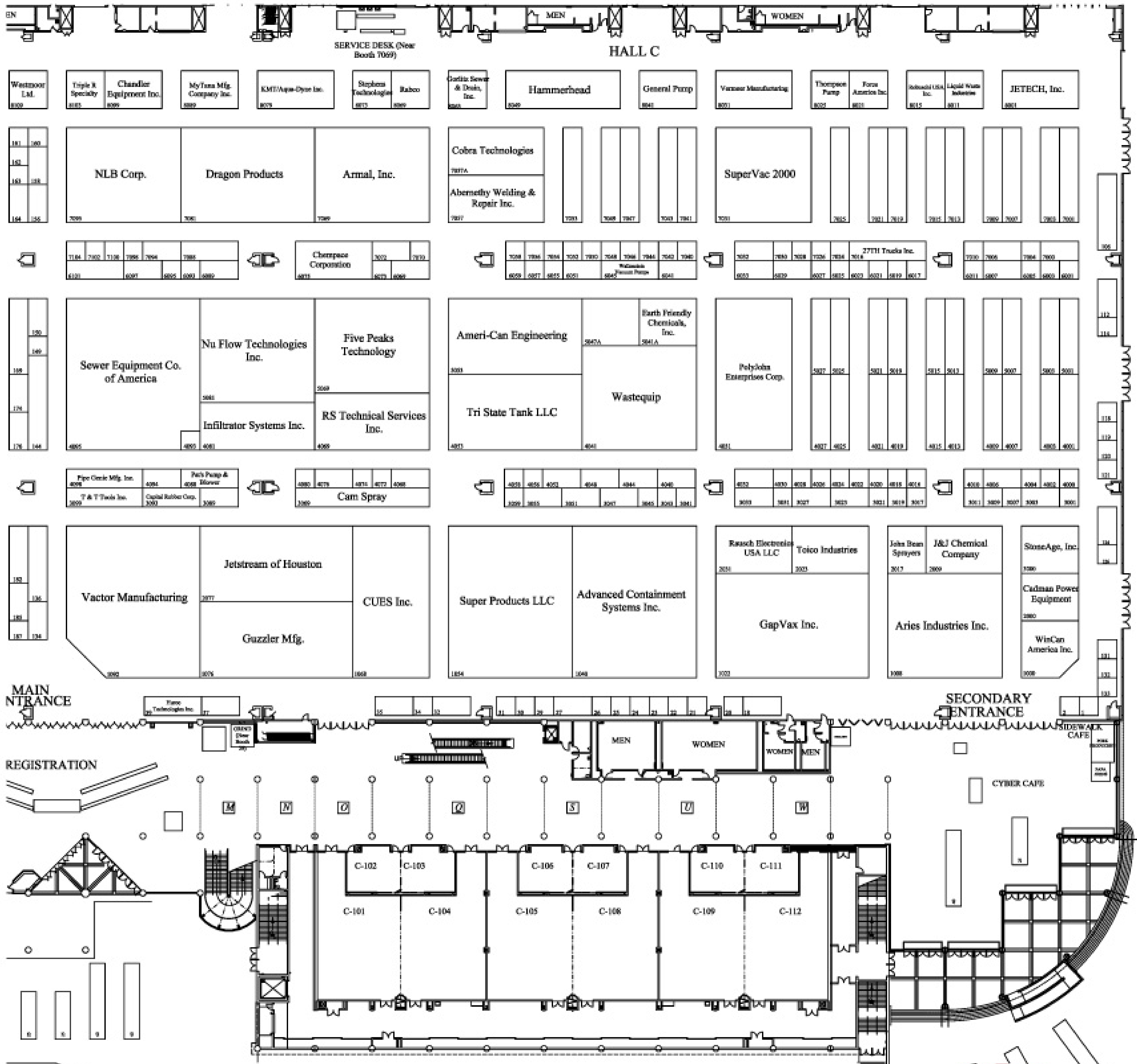


**South Wing**



# FEBRUARY 27-29, MARCH 1, 2008

## KENTUCKY EXPOSITION CENTER • LOUISVILLE, KY



FLOORPLAN CURRENT AS OF 1-18-08. SUBJECT TO CHANGE WITHOUT NOTICE.





# FEBRUARY 27-29, MARCH 1, 2008

## KENTUCKY EXPOSITION CENTER • LOUISVILLE, KY

# 2008 Exhibitor List

List is current as of 2-12-08.  
List is subject to change without notice.

Company Name	Booth Number
27TH Trucks Inc.	.7015, 7016, 7019, 7021, 7025
3T Equipment Co., Inc.	.21021
A & L Systems, Inc.	.10043
A Corp./Roater-Man	.9015, 9115
A Global Chemical Co.	.4168
A.R. North America, Inc.	.19025
A.W. Cook Cement Products	.6057
Abbott Rubber Company	.3137
Abernethy Welding & Repair Inc.	.7057
Accent Manufacturing	.14014, 14015
ACE DuraFlo Systems	.13017
Acra Trailer	.7052, 7053
Adler Tank Rentals	.18035
Advance Pump & Equipment	.5199, 5201, 6199
Advanced Containment Systems Inc.	.1040
Advanced Drainage Systems	.14049
Advanced Infrastructure	.3059
Advanced Pressure Systems	.3023
Advanced Tank Systems, Inc.	.14028, 14029
Advanced Wastewater Systems	.3009
AerraTech, LLC	.21000
AGCO-Ag Chem Division	.7212, 7213
AK Industries	.27
All Star Equipment Sales, Inc.	.21015
Allan J. Coleman	.182
AllGreen Manufacturing, LLC	.20037
Allied Construction Products, LLC	.84
Allied Graphics	.7098
Allied Tank Co.	.4186, 4187, 4189, 4193
Almetek Industries	.16002
Alpha Mobile Solutions	.11052, 11055, 11057
Alpine Leasing, Inc.	.7172
AlumaMats	.7102
Ameri-Con Engineering	.5053
American Industrial Components	.6161
American Liquid Waste Magazine	.19030
Amerik Engineering	.3033
ANC Marketing, LLC	.19019
AP/M Permaform	.19023
Aqua Ben Corporation	.4056
Aqua Blast Corporation	.6221
Aqua Mele Technologies	.4170
Aqua-Zyme Disposal Systems Inc.	.163
Arcan Enterprises Inc.	.4074
Aries Industries Inc.	.1008
Armal, Inc.	.7069
Arthur Products	.9109
Ashland Trap Distribution, Co.	.3011
Ashtead Technology Rentals	.9208
Atlanta Rubber & Hydraulics Inc.	.4160
Avanti International	.7136
B & W Montrad, Inc.	.16028, 17029
Bad Dog Tools	.121
Badger Truck Center/Badger VACS	.5207, 6209
Baker Waste Equipment	.18003
BakerCorp.	.7126
Bandlock Corporation	.4080
Banjo Corp.	.19014
BASE Engineering	.4030
BB & T Insurance Service	.19015
BDP Industries	.7006, 7007, 7009
Benjamin Franklin Franchising	.4015, 4016
Best Enterprises Inc.	.7207, 7208, 7211
Betts Industries	.7216
Big Fish Environmental, LLC	.20029
BigEasyLift	.18024
Bio Clean	.9141
Bio Microbes Inc.	.7130

Company Name	Booth Number
Black Tie Manufacturing	.7179
Blue Angel Pumps	.19026
Beatman Industries	.20024
Bord Na Mona	.4124
Besserman Tank & Truck	.5003, 6003
Bestman Tool Co.	.9320
Brenlin Co., Inc.	.6167
Bright Dyes/Division Kingsate Chemicals	.3055
Bright Technologies	.4194, 4195
BS Design Corp.	.4192
BuTech Pressure Systems	.24
BW Technologies by Honeywell	.6005
Cadman Power Equipment	.2000
CAG Truck Capital	.9137
Cam Spray	.3069
Can Clay	.20027
Canoe Creek Apparel	.11050
Canplas Industries, Ltd.	.20038
Cape Cod Biochemical Co.	.149
Capital Partners	.7070
Capital Rubber Corp.	.3093
Cat Pumps Corporation	.4068
CCI Spectrum / SpectraShield	.7024
Center Capital Corporation	.186
Century Chemical Corporation	.124
Cartel International	.18039
Champion Pump Company, Inc.	.3007
Chandler Equipment Inc.	.8099
Chelsea Products/Div. of Parker	.4044
Chem Tech Products	.7140
Chempace Corporation	.6075
Chempure Products Corp.	.9332
ChemStation International	.14032
Chem Industries Inc.	.150
CIPP Services	.11042, 11043
City Meter, Inc.	.20014
Clear Computing	.3173
Clearstream Waste Water Systems Inc.	.2
Cloverleaf Tool Co.	.176
Cobra Technologies	.7057A
Code Red Safety	.7224
COLE Publishing, Inc.	.45
Comforts of Home	.4127
Community Leasing Associates	.9322
Compliance Industries, Inc.	.9121
Compliance Solutions	.119
Concentric Enviro, Inc.	.18030
Concept Engineering Group	.7058
Concrete Sealants Inc.	.6069
Consolidated Pipe & Tube Co., Inc.	.7220
Consolidated Treatment	.9306
Containment Solutions Inc.	.3143
Contek Inc.	.7214
Control Chief	.9137
Coon Manufacturing, Inc.	.3189
Cougar Industries Inc.	.3051
Coxreels	.7010
Crescent Tank Manufacturing	.7174, 7175
Cretex Specialty Products	.4004
Crust Buster/Schmitz Bros.	.64
CUES Inc.	.1068
CuraFlo	.17037
Custom Biologicals Inc.	.7004
Cyclops Electronics, Inc.	.4200, 4201
Dahle USA	.21
Data Works Solutions	.13029
De Neef Construction Chemicals	.6041
Deal Associates	.6059
DekoRRa Products	.6147

Company Name	Booth Number
Del Vel Chemical Co.	.7122
Del Zotto Products	.5025, 6025
Delta Environmental	.21002
DermaRite Industries LLC	.7148
Ditch Witch	.10039
Domestic Sanitation Systems	.131
Doug Meadows Co. LLC	.162
Dragon Products	.7081
Drainables Direct	.4118
Dresser Roots Blower	.174
DropBox Inc.	.9009
Dultmeier Sales	.18036
Durable Manufacturing	.3165
Dyna-Vac Equipment	.7168, 7169, 7171
E.H. Wash Company	.16014, 17015
Earth Friendly Chemicals, Inc.	.5041A
Easy Liner	.136, 9037
Ecological Laboratories Inc.	.4094
Ecological Tanks, Inc.	.6055
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1997 Sreco HV 2000 truck jet, 65 gpm, 2000 psi water pump, 1500 gallon aluminum water tank. Was a city owned unit. Located in Dallas. 972-938-1905. [www.empireequip.com](http://www.empireequip.com). (CPBM)

Vactor water jet on a 1998 Ford F-800, Cummins diesel, 17,338 miles, automatic, 1000 gallon water tank. Needs water pump. This truck is like new. 972-938-1905. [www.empireequip.com](http://www.empireequip.com). (CPBM)

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1985 Camel, single axle Ford 8000, Meyers pump, 80 GPM, 2,000 PSI. Price \$17,000. Call 503-969-9557 or 503-682-2723. (C3)

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1981 Vactor 810, great condition, on GMC Brigadier chassis, rebuilt diesel/diesel, 2000 psi/60 gpm, new 500' hose, 35K miles. \$26,500 OBO. [www.direct-current.com/vactor](http://www.direct-current.com/vactor). Call Aaron 248-921-1910. (CBM)

2000 Aquatech B-15 on a Sterling L9513, PD blower, 65 gpm, 2000 psi pump, rear hose reel, 1500 gallon water tanks, 15 yard debris tank. Was a city owned unit. Located in Dallas. 972-938-1905. [www.empireequip.com](http://www.empireequip.com). (CPBM)

Low hours, 1995 Vac-Con, 12-yd. debris, new water pump, newly rebuilt Roots blower, auto. trans., AC, tank vibrator, privately owned. \$65,000. 1-800-930-1123 or 954-981-2133. (CPBM)

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1998 Vactor 2110 on a Freightliner FL80, 28,213 miles, 2-stage fan, 80 gpm, 2,000 psi pump off system accumulator. Was a city owned unit. Located in Dallas. 972-938-1905. www.empireequip.com. (CPBM)

2004 Vactor on International, 16" PD blower, OMSI gear box, 15,000 miles, 600 hose reel rotating & telescopic, 80 gal. @ 2000 psi, extendible boom. Asking \$187,000. Call Dan 561-310-4011, Todd 561-602-2397. (CBM)

1998 VacCon V312THA on a Ford LT8000, 3-stage fan, 65 gpm, 2000 psi pump, extendible boom, articulating hose reel, 12 yard debris tank, new paint. Was a city owned unit. Located in Dallas. 972-938-1905. www.empireequip.com. (CPBM)

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Buy direct from the factory, Pearpoint used vehicles (utility vans and step vans) with equipment, (optional) software and computers. Equipment has warranty and prices range from \$45k-\$90k. Contact Pearpoint 800-688-8094 x 245 for further details. (CMBM)

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## TV INSPECTION

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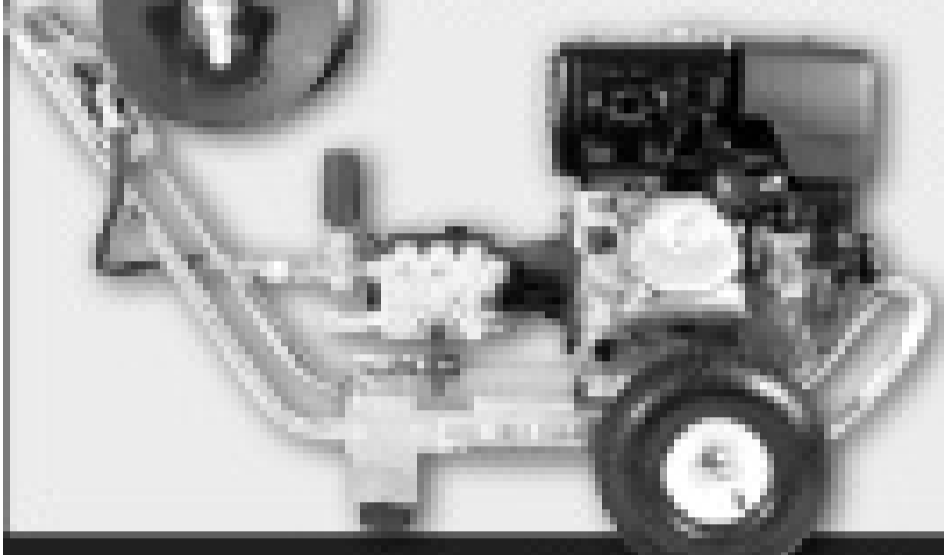
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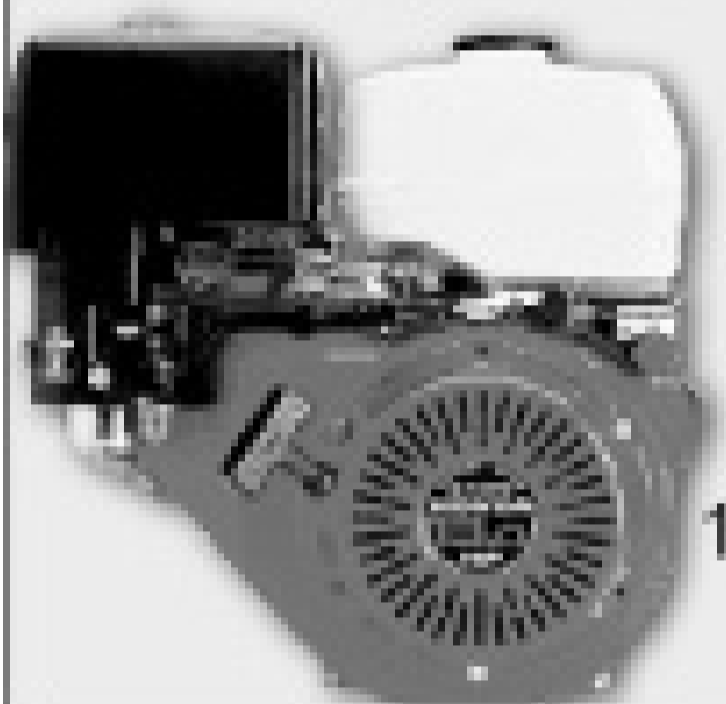
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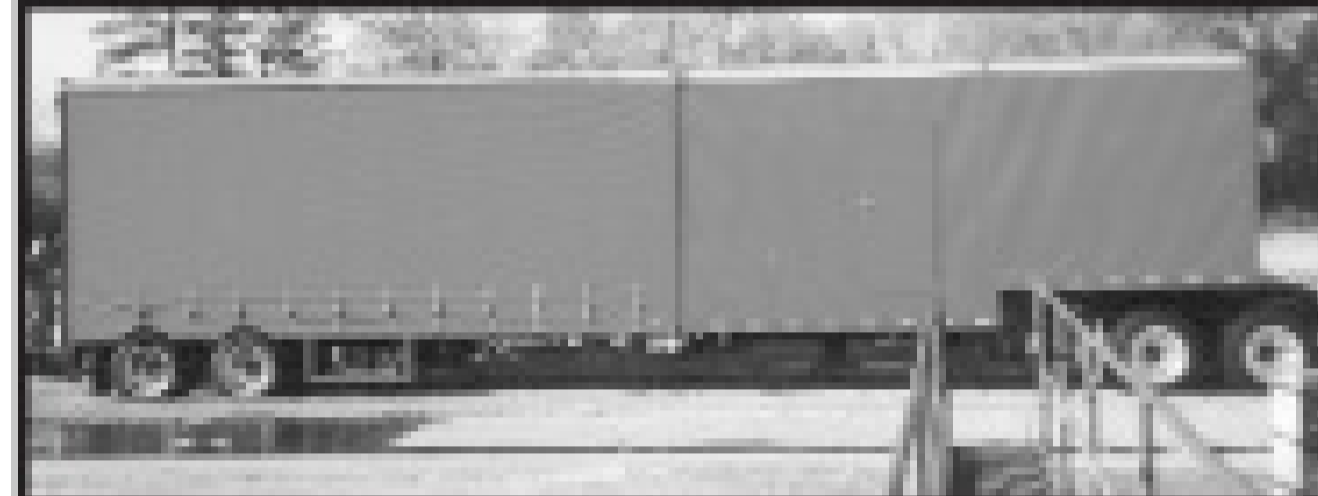


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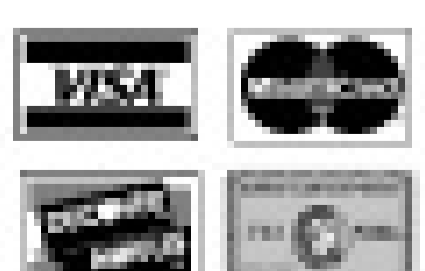
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# Product Spotlight

## Pipeline Current Mapper Detects Pipe Flaws at Long Distances

By Ken Wysocky

When the protective coating on steel water and gas pipelines starts to deteriorate, corrosion isn't far behind. But trying to locate those corrosion-prone areas with a transmitted current can frustrate technicians, as interference, congestion, and the presence of other metallic structures underground complicate the process.

The latest Pipeline Current Mapper, or PCM+, from Radiodetection Ltd., overcomes that problem with an accurate unit that integrates location and mapping technology, says Peter Mann, pipeline products specialist.

The system is comprised of a transmitter and a handheld receiver. While the transmitter applies a 4 Hz AC test signal to the pipe, the receiver uses advanced digital signal processing to read the signal strength and map the pipeline for up to 29 miles. Current leakage indicates coating defects. The unit's long-range capability results in fewer transmitter connection points, speeding up surveys.

The receiver, in an all-weather housing, has enough memory to store up to 1,000 data points. It takes three seconds to make measurements, versus eight seconds on the company's previous model. It also provides real-time, continuous depth measurement, as opposed to only push-button readings.

One pound lighter than its predecessor, the receiver is more ergonomic, runs on dry cell or rechargeable batteries, and has a high-contrast display panel. It is Bluetooth-enabled and so can upload mapping data to a Personal Digital Assistant (PDA) or a PC. Even without a PDA, a technician can download the information from the receiver onto a computer back at the office.

"With the old receiver, you could store readings, download them onto a PC, then manually enter them onto a spread sheet," Mann notes. "Now, with a software application that's available on our web site, the receiver can send data to a computer. The data is then automatically displayed in graphical format. You can also plot data live, on the fly, right there in the field, and see right away if there is coating damage."

If the PDA is equipped with global positioning system (GPS) software, GPS data can be incorporated into the mapping data, allowing production of highly accurate geographic information system (GIS) maps.

After the receiver identifies a pipeline section with current leakage, an A-frame accessory helps technicians pinpoint the defect to within three feet. This minimizes excavations. Crews then resolve the problem by repairing the damaged coating, applying a rectifier to boost the cathodic protection, or replacing the pipe. **For information: 877/247-3797, [www.radiodetection.com](http://www.radiodetection.com).**



PCM+ from Radiodetection Ltd.



## Vactor Prodigy Offers 9-Yard Debris Tank Option

The HXX Prodigy vacuum excavator from Vactor Manufacturing features an optional 9-yard debris tank mounted on a tandem axle

chassis. A 6-yard tank comes standard. Lighter and more compact than the full-size Vactor HXX HydroExcavator, the Prodigy is designed for mobile applications and offers either air or water excavation. **For more information: 800/627-3171; [www.vactor.com](http://www.vactor.com); Expo booth 1092.**

## Insight Launches XPress Camera Inspection System 60

The XPress camera inspection system from Insight Vision offers DVD, USB memory card and network recording capability, digital footage counter, camera test port and on-screen menu. Camera heads

include the 7/8-inch Micro for color video in 1-inch to 8-inch pipes, the 1.3-inch self-leveling head for 2- to 12-inch pipes, and the ProVision Straight View. **For more information: 800/488-8177; [www.insightvisioncameras.com](http://www.insightvisioncameras.com); Expo booth 156.**

## General Pipe Introduces Lightweight J-2900 Jetter

The maneuverable Jet-Set J-2900 gas-powered waterjetter from General Pipe Cleaners weighs 173 pounds, offers 3,000 psi, and measures 25 1/2 inches long, 28 1/2 inches wide and 42 inches high. Powered by an 11-hp Honda engine, the unit features a 4-gpm triplex pump with Vibra-pulse on demand. A 300-foot capacity hose reel with reel brake and brass swivel is mounted on a heavy-duty frame with two pneumatic tires. Safety features include a thermal relief valve, back-flow check valve and inlet filters. **For more information: 800/245-6200; [www.drainbrain.com](http://www.drainbrain.com); Expo booth 3147.**





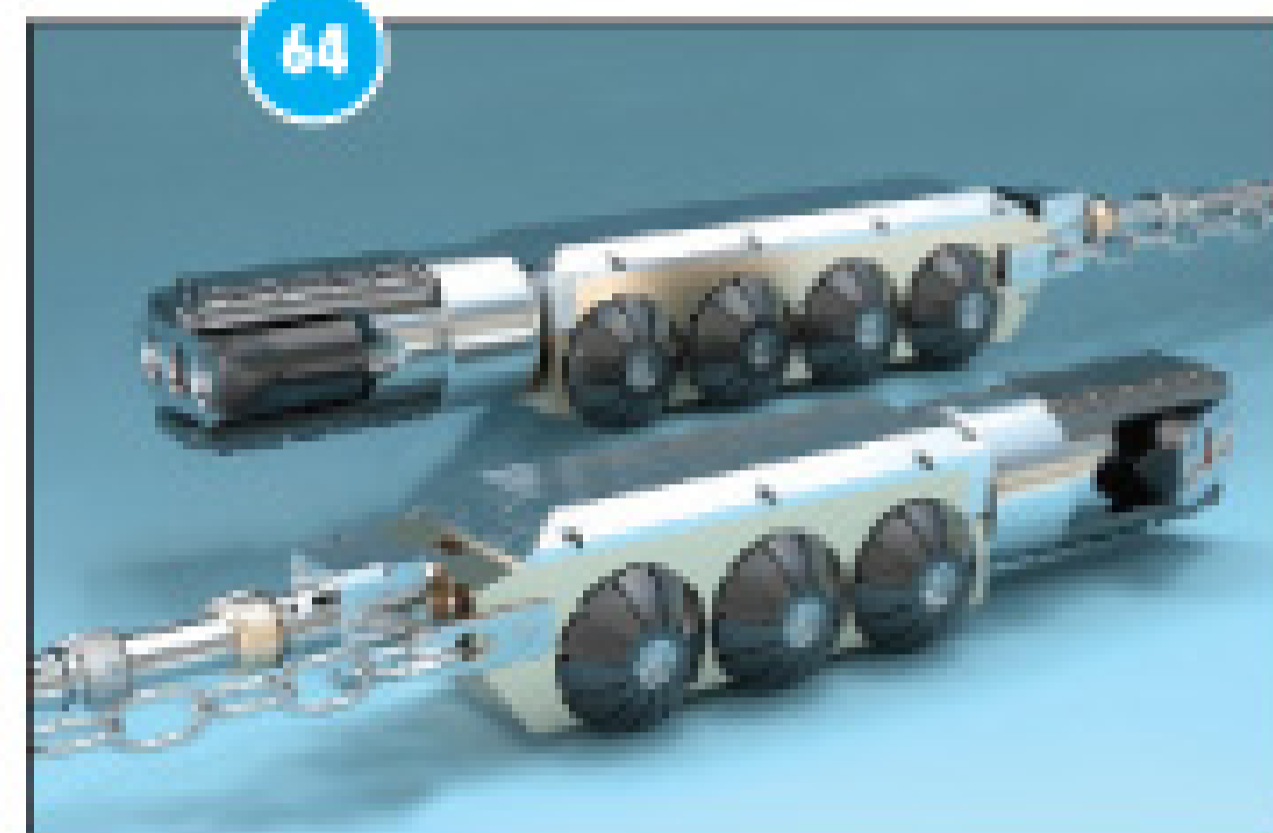
## Reelcraft Designs Self-Contained Hose Trailer

The self-contained hose reel trailer from Reelcraft eliminates the need for a dedicated maintenance vehicle. Designed for grounds maintenance applications requiring

up to 1-inch I.D. by 100 feet of hose, the trailer bed also offers additional space for tool trays and other accessories. The wheelbase matches typical work vehicles, with wheels mounted inside the trailer bed to prevent snagging on trees and shrubs. The 32-inch trailer tongue allows for sharp turns and easier backup. **For more information:** 800/444-3134; [www.reelcraft.com](http://www.reelcraft.com); Expo booth 6051.

## Cobra Introduces High-Performance 6-Inch Crawler

The high-performance 6-inch crawler from Cobra Technologies is designed for pipes from 6 to 24 inches in diameter. Small enough to inspect 6-inch relined pipe, the crawler is available as either a steerable version with eight-wheel drive or as a non-steerable version with six-wheel drive. Machined from naval brass and stainless steel, it offers the same features found on Cobra's 8-inch crawler, as well as a new PTZ camera (Version 9.0) with optional continuous 360-degree rotate function. Wheels are provided and a remote elevator for larger pipes is being designed. **For more information:** 800/443-3761; [www.cobratec.com](http://www.cobratec.com); Expo booth 7057A.



## Pearpoint Launches Upgraded Inspection System

The upgraded P330+ flexiprobe control module from Pearpoint features advanced digital video functionality and the universal easy-fit brush skid set for customized use in a range of pipe diameters. The control module has an 8-inch ultra-bright industrial TFT screen and uses a Compact Flash that can record up to 8GB of full VGA digital video, or up to seven hours. Video can be transferred via USB cable to a PC or laptop for editing using the included FlexiSight software. The system's digital platform enables users to zoom, pan and rotate images during recording or playback, as well as take still images of problem areas and send them via Bluetooth wireless technology to compatible mobile phones. The durable new keypad also can be operated while using gloves. **For more information:** 800/688-8094; [www.pearpoint.com](http://www.pearpoint.com); Expo booth 1196.

## StoneAge Offers Inserts for Operation Manuals 11

StoneAge Inc. has converted its operation manuals into condensed and simplified inserts that are available at the company's web site. Each insert includes detailed operation, troubleshooting, maintenance, disassembly and reassembly information, and are included with each new tool and overhaul kit. **For more information:** 866/795-1586; [www.stoneagetools.com](http://www.stoneagetools.com); Expo booth 3000. ♦

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# SKY'S THE LIMIT

A new location marks the growth of NASSCO as a leading source of training and education for the industry

By Irv Gemora

**F**ive years ago, only a crystal ball could have shown how quickly NASSCO would grow. At the time, our headquarters office space in Pikesville, Md., appeared to have plenty of room for the foreseeable future.

But with the tremendous success of the PACP program, the doubling of our membership, and the increased volume of paperwork to keep up with it all, we realized we needed more space. That growth rate continues today with no end in sight, and I couldn't be happier about it.

After an exhaustive search of properties and buy versus rent

options, we decided to rent a property for our new headquarters that allowed us to more than double our office space and provide some important extra benefits:

- A larger classroom for training and education that comfortably seats 20-30.
- A demonstration room available for rent exclusively to NASSCO members to showcase their products and services, host events and schedule meetings.
- A heated warehouse with roll-up garage door. With more than 1,000 square feet, this heated space can accommodate a truck and more, enabling members to show-

case their offerings.

NASSCO's new home is in Owings Mills, Md., conveniently between Philadelphia, Pa., and Richmond, Va. I mention this geography because somewhere between \$9 billion and \$11 billion of EPA consent decree work is happening now in this area and will continue for the next 10-12 years.

Many contractors and suppliers who work in the Mid-Atlantic States or want to work in the area either belong to NASSCO or should. Not only are we in an ideal location, but we provide services and support to help members grow their businesses.

NASSCO's growth is exciting, and if you are not a member yet,



I hope you will consider joining us. We are committed to our mission of setting standards for the trenchless technology industry and providing our members with the best networking, education and training to make them successful. Come and be part of this exciting ride. ♦

Irv Gemora is executive director of NASSCO. He can be reached at [director@nassco.org](mailto:director@nassco.org).



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**For information on member benefits, training programs, and to complete an application online, visit our Website at [www.nassco.org](http://www.nassco.org) or call us at 1.410.486.3500.**



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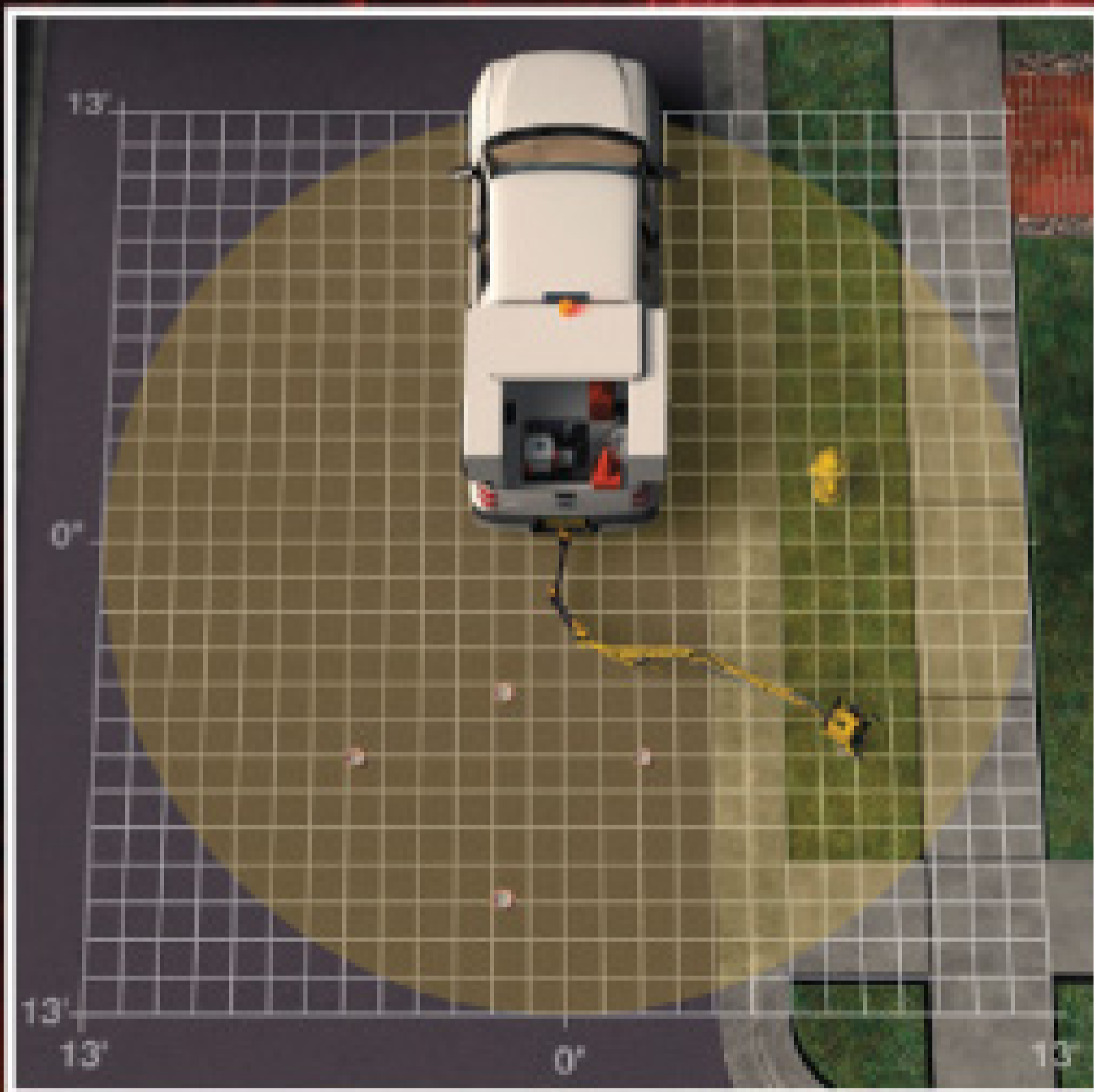
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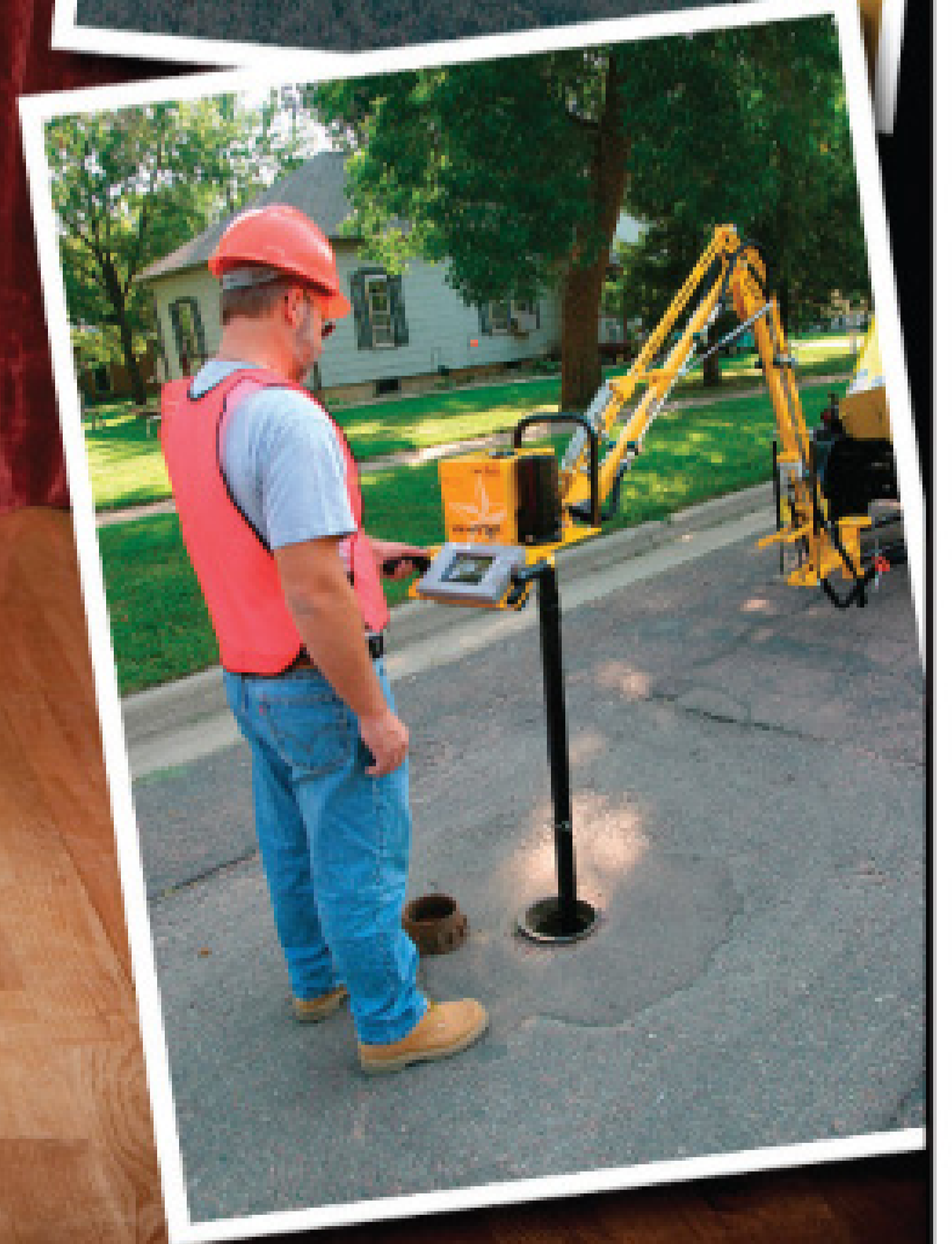
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