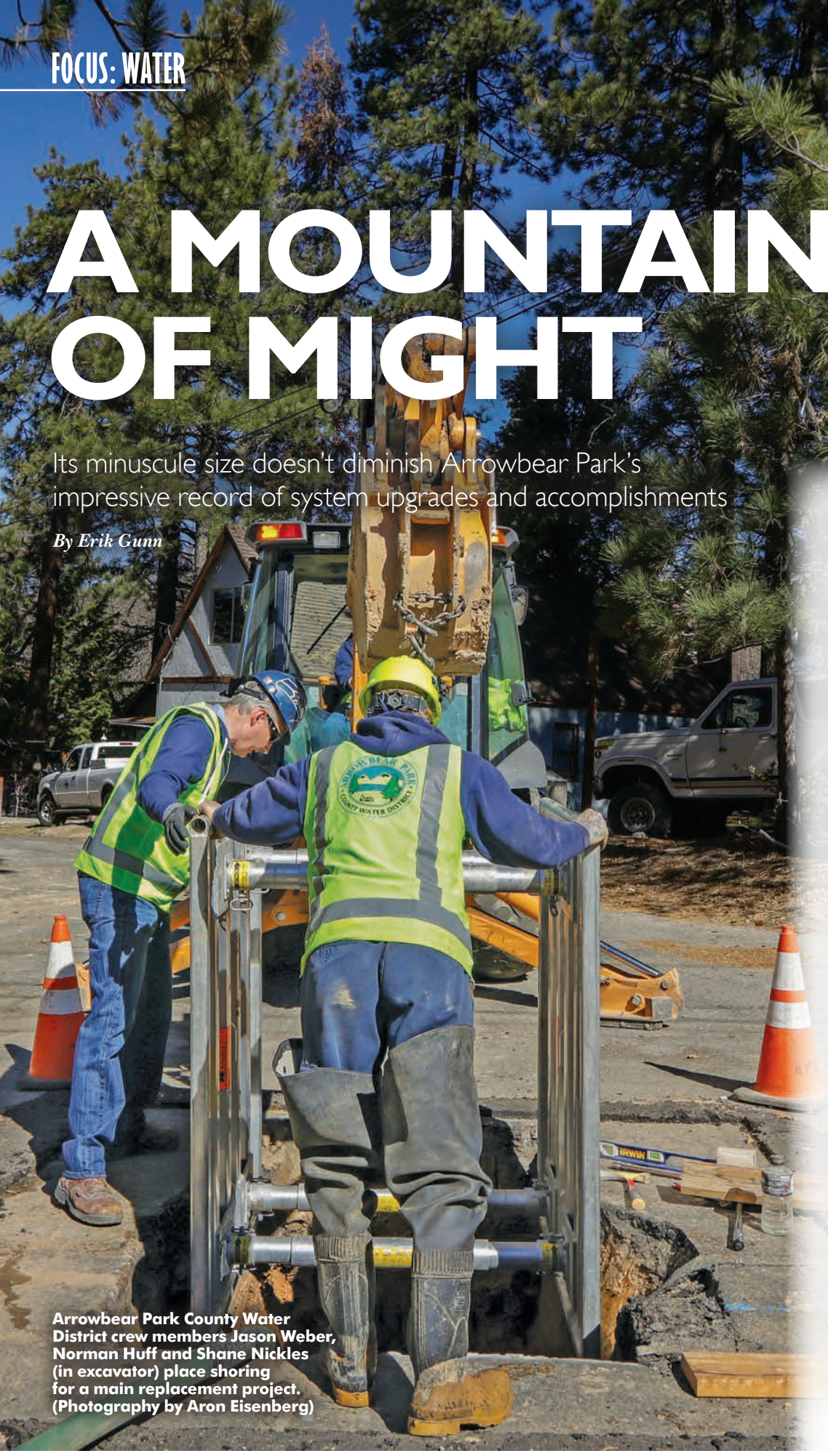
# A MOUNTAIN OF MIGHT

## Its minuscule size doesn't diminish Arrowbear Park's impressive record of system upgrades and accomplishments

*By Erik Gunn*



**Arrowbear Park County Water District crew members Jason Weber, Norman Huff and Shane Nickles (in excavator) place shoring for a main replacement project. (Photography by Aron Eisenberg)**

Call it the Little Utility That Could.

In the hills of Southern California, the Arrowbear Park County Water District might be among the smallest agencies of its kind anywhere. With about 12 miles each of water and sewer mains, the district has just seven employees and serves a year-round population just shy of 1,400 people — residents of the community of Arrowbear Lake.

Its small size hasn't kept the operation down. The water district is about a quarter of the way through a major infrastructure project replacing the last 4 miles of old 2-inch steel waterlines with 6- and 8-inch C900 PVC. It has also found a way to cut manhole repair costs without cutting corners.

And it's done all this using its own crews instead of contracting out the work — saving money in the process while expanding the skills of its employees.

"I would say we just have a can-do attitude," says Norman Huff, general manager for the water district. "We're not afraid to tackle a project. We like to figure out a better way to do things or a more frugal way to do things."

And did we mention fire protection? The Arrowbear Park County Water District doesn't just supply area residents with clean water and collect their wastewater. It also operates a volunteer fire department serving the community.

### Early growth

Snowmelt-fed Arrowbear Lake is in the San Bernardino Mountains, about 100 miles due east of Los Angeles. The Arrowbear Park County Water District was founded in 1953. "It grew out of two or three people who had some wells here and shared their well water with neighbors," Huff explains. "As the area was growing, they felt there was a need to be something more structured to provide services for the community."

The initial system consisted of the water wells and a distribution system of 2-inch steel water mains. As the system grew in the 1970s, some of those mains were replaced with asbestos cement pipe. In the 1990s, major supply mains were replaced with 8-inch C900 PVC.

The sewer collections system was installed in 1977 to replace individual, private septic systems. The district's dual-pump lift station then sends the wastewater to the regional 1.0 mgd wastewater treatment plant operated by the neighboring Running Springs Water District.

Last year, the district was recognized by the American Water Works Association for 50 years' service to the water industry — an award, Huff says, that mainly recognized the utility's longevity.

The water supply continues to rely on five wells in the system. The district also was an early adopter of ion-exchange technology to remove groundwater uranium found after testing in the early 1970s.

Groundwater uranium — a common byproduct of decomposing granite — was at levels ranging from 54 to 118 pCi/L (picocuries per liter), which is well below immediately harmful levels but still several times higher than Environmental Protection Agency and the California Department of Water Resources limits, leading to the ion-exchange remediation. After a recent rehabilitation of one

## PROFILE:
## Arrowbear Park County Water District, Arrowbear Lake, California

**CUSTOMERS:**
966 water and 965 sewer connections; year-round population, 1,396; weekend and holiday population, 3,000-plus

**SERVICE AREA:**
Arrowbear Lake (6-square-mile mountain resort community)

**WATER VOLUME:**
1 mgd capacity, 0.134 mgd average

**NUMBER OF EMPLOYEES:**
7

**INFRASTRUCTURE:**
5 wells 170 to 240 feet deep; 12 miles of water mains; 90 hydrants; 12 miles of sewer mains and 1 sewer lift station

**ANNUAL OPERATING BUDGET:**
Fiscal year 2018-19, $1,063,360

**WEBSITE:**
www.arrowbearwater.org

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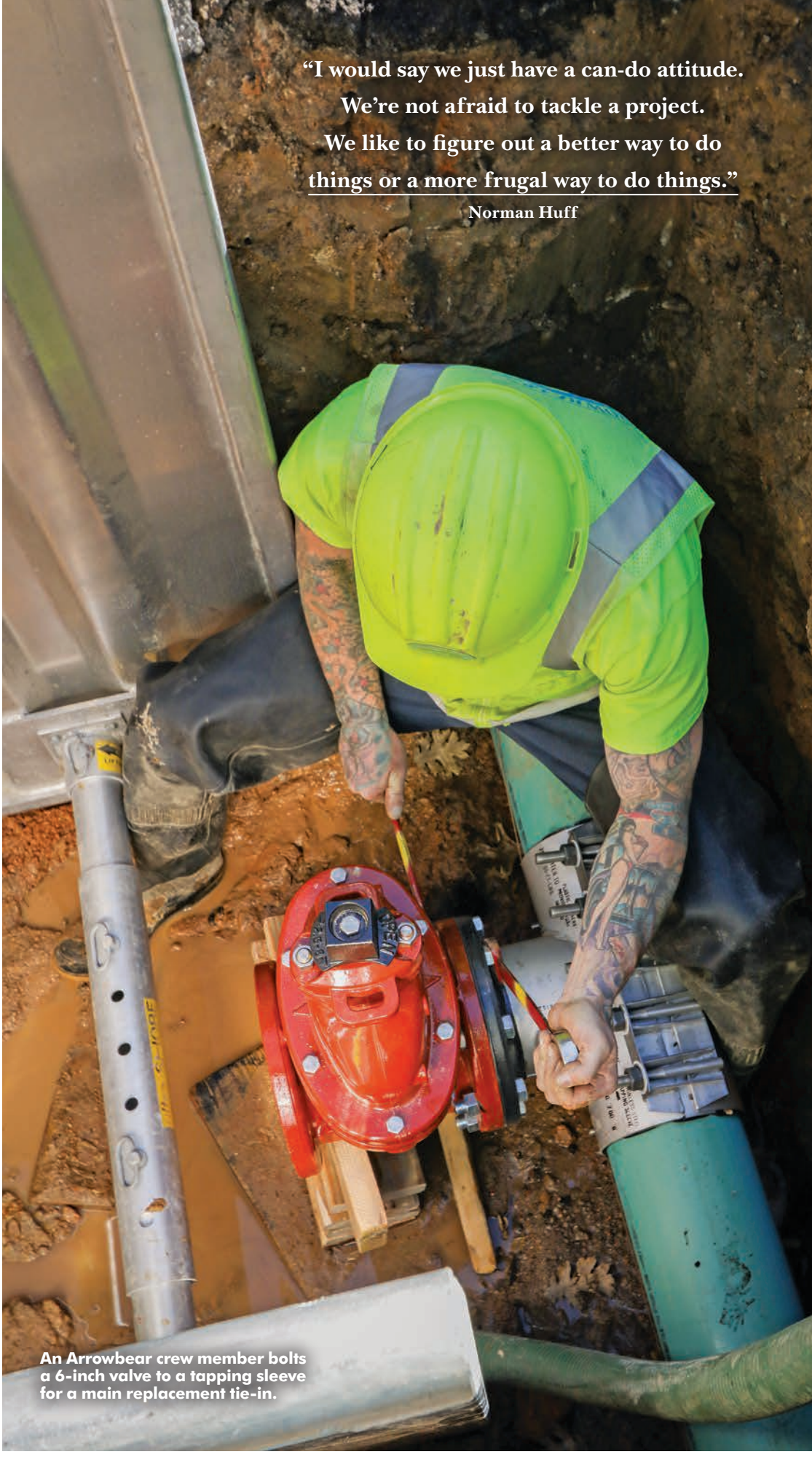
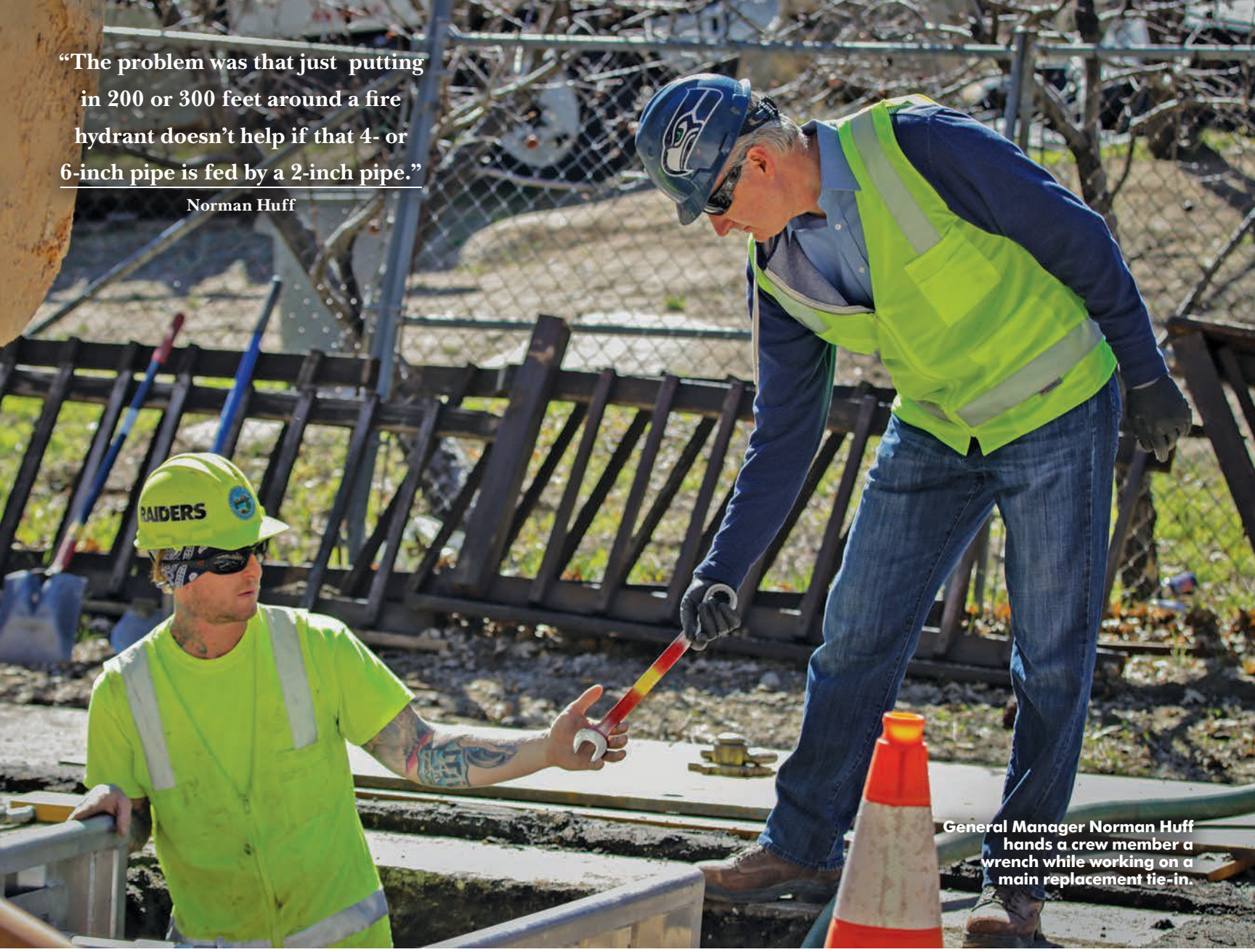


**An Arrowbear crew member bolts a 6-inch valve to a tapping sleeve for a main replacement tie-in.**




**"The problem was that just putting in 200 or 300 feet around a fire hydrant doesn't help if that 4- or 6-inch pipe is fed by a 2-inch pipe."**
**Norman Huff**

General Manager Norman Huff hands a crew member a wrench while working on a main replacement tie-in.

of its wells, it installed another pair of vessels using newer electronic-control technology.

Producing 48 million gallons per year, Arrowbear Park County Water District's wells are so prolific that last year the district sold 16 million gallons — one-third of its output — to the neighboring Running Springs Water District, Huff says.

## Replacement project

Not long after Huff started at the water district in 2013, he learned about a 3,800-foot stretch of 2-inch steel mains slated to be converted to larger PVC pipe that had lingered for years on the master plan.

"Every time they would update the engineer's estimate on it, it would jump up another $10,000 to $20,000," Huff says. The district "was kind of paralyzed with sticker shock, and the board would put it off for another year."

On top of that, some of the most frequently repaired line segments of 2-inch steel weren't even part of that section. He called for a step back to reassess the rest of the steel pipe in the system.

"It came out to about 22,000 feet, or about 4 miles," Huff says. "We used several criteria to prioritize which ones we would want to do first."

Priority No. 1 were lines repaired most often. Right behind were lines that fed fire hydrants and needed to increase water flow — a critical feature in the wildfire-prone mountain communities.

Previously, Huff says, the district had upgraded pipe serving fire hydrants to 4- and 6-inch material. "The problem was that just putting in 200 or 300 feet around a fire hydrant doesn't help if that 4- or 6-inch pipe is fed by a 2-inch pipe."

## Self-reliance

Four miles of pipe replacement might not challenge a medium-size or larger city. But that was nearly six times the length of the original stretch that had prompted the survey — a stretch less than a mile long that had flummoxed the community on how to pay for its replacement.

"If we brought in a contractor to do the work, we were looking at anywhere from $250 a foot to all the way up to $400 a foot," Huff points out — $5.5 million to nearly $9 million to get it all finished, or anywhere from five to nearly 10 times the district's annual operating budget.

Before coming to Arrowbear Park County Water District, Huff had already managed pipeline installation projects. With that experience, "I proposed doing it in-house using our full-time employees."

He knew he could manage the project. But could the district's own crew of three full-time water and sewer technicians do the work? And how were they going to juggle it with their other

day-to-day responsibilities — everything from fixing leaks to reading meters?

"We knew it wouldn't be something like the contractor would do — go in and get something done in a relatively short period of time," Huff says. Instead, it would require chipping away, bit by bit, while making sure crews could keep up with their day-to-day demands.

## Rising to the occasion

Huff and his team started with a pilot project — one of the worst streets as measured by the track record of previous leak repairs.

Some of those lines had already been repeat customers for repairs over the past few years: "We would go down to fix a leak and we would find a 6-inch stainless steel clamp just 6 inches away," he recalls.

Despite "a bit of a learning curve" as he puts it, the water district crews readily took to their new duties and the skills needed to carry them out.

They already had learned a lot on the job, he points out, such as operating excavation equipment to dig trenches where repairs were needed. They had learned how to use mechanical joint couplers for section repairs and were experienced at valve replacement.

"So they didn't need a lot of training," Huff says. "They just had to have someone show them: Here's how we lay it out, here's how we install the mechanical couplings for tees and valves and things like that. Installing something new is actually a little easier sometimes than replacing old stuff."

They took care to learn how to navigate the web of underground utilities — like buried sewer and natural gas lines — on the narrow streets of the mountain community. And they learned the protocol of laying new water pipe while keeping the old pipe active to minimize service disruption.

The district also acquired a HammerHead Trenchless boring machine, and crew members were trained to use it. And the district stocked up on road plates.

## Bit by bit

"Our typical goal is to lay two 20-foot sticks a day of the new pipeline, or 40 feet per day," Huff explains. That means digging a trench, connecting new pipeline to where the previous installation left off, then doing backfill and compacting the soil in which the new pipe rests. The road plates go on top to cover the open trench. "And then they come back the next day, start from that point and keep going."

So far the district has completed about 1 mile of the 4 miles of pipeline scheduled for replacement. The targeted deadline calls for finishing the job about nine years from now.

Incremental? Yes — but it allows the district's crew to slowly and steadily advance the project without ignoring the daily emergency calls from around the community.

In the summer, the district supplements its three field technicians with temporary interns from a county agency to introduce new high school graduates to trades. "We provide them training and work experience that they can then put on a résumé," Huff says.

It also helps move along pipeline replacement

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more smoothly. "Then it's possible to have two of our three guys work with a temp on the pipeline project. And if there's a leak or something else that needs to be handled that just comes up, we can have one of our guys take the temps and go work on that."

### Pros and cons

If there's one reason Huff envies his big-city counterparts, it's for their ability to spread expenses over a large base of ratepayers. "If we were bigger, if every little thing wouldn't impact our ratepayers as much, the cost would be spread out," he says.

For instance, it's unavoidable for the district to assess minimum fees on its customers to offset fixed costs. Not surprisingly, vacation homeowners who swell the population for about half the year question why they have to pay when they aren't around. In a much larger community, there's not a significant drop in revenue when part-time residents leave and shut off their service: "You've got thousands of other connections to absorb that loss."

But on a personal level, he likes the flexibility such a small department demands. It keeps him close to the work itself.

"I enjoy wearing a lot of hats," admits Huff, who steps in on tasks like preparing CAD drawings for excavation permits.

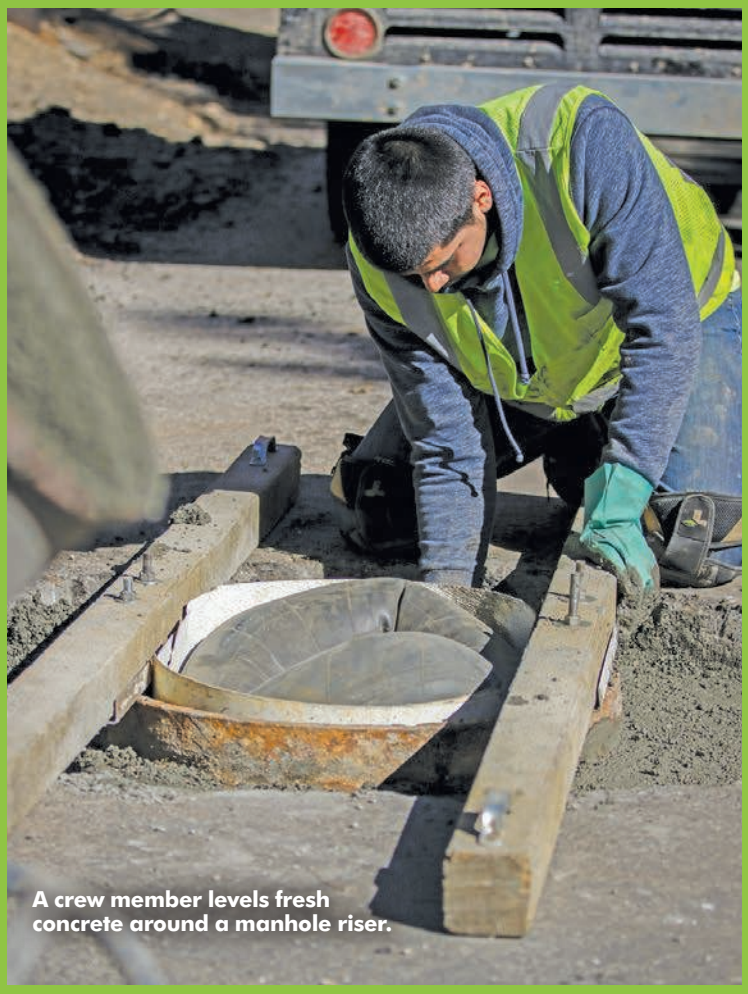
"It would be nice if we had an engineering department or something to take care of all that, but I consider that a perk of my job," he says. "I can go out and grab a shovel and work on the pipeline with the guys. It gives me some exercise, a little sunshine, and gets me out from behind the desk."

It's all part of a culture in which, however small, the Arrowbear Park County Water District has figured out how to pull together and do what's needed to see that local residents get reliable water service.

"I just think we have a really good mindset here," Huff says. "Necessity, as they say, is the mother of invention. We really take that to heart, and we just figure out how to get it done." ✦



## PENNY-PINCHING



**A crew member levels fresh concrete around a manhole riser.**

Frugality is a watchword for the Arrowbear Park County Water District, as Norman Huff, general manager, points out.

Manhole repairs are a case in point.

To keep the community's roads in tiptop shape for travelers, paving projects are frequent. That requires regularly raising manholes to grade level after roads are paved over. That means jackhammering out the top ring, replacing it with a new one and installing prefab concrete or plastic filler rings to bring the lid to the proper height.

But filler rings "are a little pricey," Huff says, "and if you get the concrete ones, they're really heavy." If their preset thicknesses don't exactly match the new height for the road, that can make it hard to set the manhole lid flush with the new surface. And if the road is off plumb from the manhole shaft, spacer rings that are on a bias are needed to correct for the angle.

"If you brought a contractor in to raise the manholes, they'd be right around $2,000 to $2,500 a manhole."

That could add up quickly. The district conducts video inspection and cleans about one-fifth of its sewers every year, and it typically raises 20 to 25 manholes a year to prepare for the procedure.

Arrowbear Park County Water District's solution combines a special jig the employees designed and built: flexible fiberglass sheeting and an industrial-size tire inner tube.

"Once we break out the manhole, then we mount the steel ring [at the top of the manhole shaft] in our jig" to support it, Huff explains. The repair crew wraps the inside of the opening with a fiberglass sheet and uses the inner tube to hold it in place, creating a form for the concrete.

"Then we just pour concrete in. Once the concrete is set, we take the jig out and our manhole is perfectly level with the new road grade," he says.

And it's a lot less costly than $2,000 a pop.

"With this, depending on how high we have to raise it, it's eight or 12 bags of concrete and our manpower."