

AQUA WATER SUPPLY CORPORATION:
RESPONSE, RECOVERY & LESSONS LEARNED IN THE BASTROP TEXAS
WILDFIRE

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ABSTRACT

On a blistering hot Sunday afternoon during the most formidable drought in Texas history, a wildfire broke out in the worst possible place in central Texas. It was the biggest wildfire in Texas history and scared even the most seasoned wildfire fighters who came from places as far away as California. The Texas Governor described it as “the most wicked” wildfire he had ever seen.” Blown up with 40 mph winds, the fire consumed almost the entire Lost Pines State Park, 1600 family homes, and 55 square miles of hundred year old loblolly pines. Aqua Water Supply Corporation lost some or all pressure in seventy percent of its 1000 square mile service area. Learn how Aqua prepared for such an emergency, how it responded during the crisis, the specific steps it took towards recovery, and the lessons learned from this disaster. The company went from gray ashes to blue water in less than ten days.

KEYWORDS

Emergency, Preparedness, Response, Recovery, Fire, FEMA, ICS, NIMS

INTRODUCTION

Aqua Water Supply Corporation is a non-profit member-owned rural water supplier serving the fast-growing Bastrop County which is just east of Austin. The company has a service area of almost 1000 square miles and is 40 years old with about 17,800 connections and nearly \$100 million in capital assets. Aqua Water Supply has 67 full-time and 3 part-time employees, and has no association whatsoever with Aqua Texas or Aqua America. A 2009 wildfire burned a number of homes in Aqua’s service area, but it was hardly a warm-up for the 2011 Labor Day “Bastrop Complex” wildfire. Whereas the 2009 wildfire consumed a couple dozen homes in a few days, the 2011 wildfire consumed 1,600 homes & outbuildings in a few hours.

PREPARATION

Both the General Manager and the Assistant General Manager had recently attended the excellent and free-of-charge FEMA MGT-343 course: “Disaster Management for Water & Wastewater Utilities.” The course was drafted and led by Ms. Karen Tuttle, a water utility manager that eked out a recovery after Hurricane Andrew leveled southern Florida. The insights Karen shared were invaluable in helping Aqua prepare for the disaster, respond during the crisis, and commence the recovery efforts.

In addition, nearly all of the senior staff at Aqua had been through the “Incident Command” series (ICS) of training lessons offered free-of-charge and on-line by FEMA. So, they were mentally & physically prepared for the disaster. They also knew what to anticipate in terms of inter-agency coordination because they had been through the National Incident Management System (NIMS) training. But nothing could have truly prepared them for what they would experience in fighting this wildfire.

While class-room training is invaluable, there is even more value to conducting table-top exercises and actual drills in the field. Table-top exercises are inexpensive ways to conduct any type of “What if...” exercises. Aqua has used such exercises to review both its emergency preparedness and for its security assessment. In fact, one table-top security exercise revealed a serious and previously undiscovered vulnerability wherein malevolent contamination might damage or destroy the entire Aqua distribution system. It was so serious that Aqua immediately invested about \$45,000 in additional security equipment.

Aqua also conducted field drills for the emergency deployment of its standby generators. The drill revealed that while a particular size truck was rated to tow the generator load, it certainly would not be able to tow it very far or very long. Though the truck and generator made it to the deployment site, the truck began overheating as it was pulling into the treatment plant. This turned out to be a simple and valuable learning experience.

As Aqua was embarking on its next generation Emergency Response Plan, it began a simultaneous overhaul of its Business Continuity Plan. As part of a broad table-top exercise, we asked ourselves what we would do if our headquarters were completely destroyed? What would we need to get back up and running as soon as possible? We assessed the critical elements of the business and prioritized recovery steps. As a result of this exercise, Aqua secured Memorandums of Understanding with two hotels in the area, in case the company ever needs to set up temporary offices. Aqua also joined Texas Water/Wastewater Area Response Network (TXWARN), and the Rural Water Emergency Assistance Cooperative (RWEAC). These mutual aid networks proved to be invaluable in Aqua’s actual response to the fire.

From a telecommunications standpoint, Aqua considered how its members would be able to reach Aqua if our facilities were gone? It only took a few hours to set up an agreement with our telecom provider that would enable Aqua to instantly auto-forward all inbound calls to new telephones and, if needed, inbound calls could even be forwarded to existing company cell phones.

The table-top exercise of “what we would do if we lost our facility” also revealed that we would lose our IT servers. By working with our third-party IT provider, Aqua was able to take advantage of their Backup Disaster & Recovery (BDR) services which constantly backs up our servers to three separate off-site server bunkers. Even under the worst circumstances, our IT provider estimates it would require a maximum of twelve hours to get the system completely back on line. In comparison, two of the five largest water utilities in Texas are using backup technologies at least two decades out of date with no off-site backup servers.

The last step to close the loop on this portion of the exercise is to determine how Aqua could fulfill the Customer Service function following a local disaster? This question was solved by installing laptop computers in the Customer Service department, so that Customer Service Representatives could “rip & run” in the event of an approaching storm or hurricane.

RESPONSE

The response phase of the disaster is the period during which the utility is actively involved in fighting the fire, sand-bagging for the upcoming flood, etc. And make no mistake, Aqua personnel were in the field fighting the fire. Their first challenge was to keep water in the system when almost 1200 member homes burned to the ground. In most cases, the meters were destroyed along with the homes, and as a result, treated water was simply pouring out the 1200 broken connections. At the peak of the wildfire, there were 800 fire fighters engaged in fire suppression using 300 - 400 “brush trucks,” which are small to mid-size self-sufficient tanker/pumper units designed for fighting wildfires. These brush trucks needed to refill their tanks every few hours in order to continue fire suppression efforts. While Chinook helicopters were dipping water out of local ponds to try to stem the advancing front, the brush truck crews worked to save individual homes and outbuildings.

The fire started on Sunday, September 4, 2011 at about 2:00 pm. With Texas experiencing the worst drought on record, months of scorching heat had produced explosive tinderbox conditions. Once the fire began, it was out of control within minutes and being blown southward by soft and steady winds. Police began emergency evacuation of communities in the path of the fire. The fire was approaching at breakneck speed and virtually all evacuees had to leave with only the clothes they were wearing.

Monday, September 5th was Labor Day. Nevertheless, Aqua requested that all available employees immediately return to the office. Close scrutiny of the SCADA system showed key pumps that fed the fire area were already running unusually long cycle times. Management surmised that Aqua had lost quite a few connections to the fire. Of major concern was the possibility of losing all water pressure in and around the burning areas. If that happened, the fire fighters would be severely hindered and the consequences could be disastrous for homeowners in the burning areas. So, teams of Aqua field personnel were deployed to the fire area to assess the situation firsthand.

This meant Aqua teams would be required to directly enter the areas that were still burning out of control. There was no backup, nor the possibility for emergency extractions, because all emergency response personnel were already jammed with hundreds of requests for assistance. The “rules of engagement” were straightforward. Personnel were deployed in teams. While one person was checking burned meter boxes and turning off water, the other was to never lose sight of the escape route. Never let the fire ring the team. Don’t take any chances. And, when in doubt – get out!

The immediate observations & reports from the teams were pretty saddening. So far, the fire had destroyed about one in three homes in an area of about 5,000 acres and 600 homes. The situation would only get worse.

Aqua’s “M” pump station feeding the burning area had lost power because fire had burned the power lines to the pump house. A quick visit revealed fire was still burning all around the pump station and a pair of fire fighters were nearby trying to save a home. Aqua decided to deploy one of its’ shiny new Baldor TS 250 generators at the site to get the pump station back on line. Just before leaving the site, a worker set up a garden hose to spray a continuing mist over the generator.

Late in the afternoon on Labor Day, the wind velocity began to pick up and by evening the fire was racing south backed by 30-40 mph winds. The fire burned at a hellish pace taking on an increasingly wider front as it raced south. What had been an out of control wildfire was now a firestorm. Flames clawed almost 400 feet into the night sky. A couple of very experienced wildfire fighters from California said they had never been so scared in their entire lives. Miraculously, no fire fighters were lost in the racing inferno.

When dawn broke on Tuesday, September 6, families had been evacuated from almost 2,000 homes in the area. Experienced wildfire fighters and their brush trucks were pouring into Bastrop County from all over the country. It would eventually total more than 800 fire fighters in all. The new Bastrop Convention center was converted into the headquarters for the Incident Command Post (ICP), and within hours, the parking lot was stuffed with satellite trucks from every major news network. The first major news briefing took place that morning. Meanwhile, Aqua converted its Board room to the Aqua ICP.

During the night, the fire had expanded by about 15,000 acres and it had also backflashed through the previously burned areas to consume the remaining fuel that had not burned in the first pass. About 95% of the homes in the area were burned to the ground. A typical burned home consisted of a concrete slab, maybe a brick fireplace, charred appliances, and the occasional metal roof. Experts estimated temperatures in the fire reached nearly 4,000 degrees Fahrenheit. The fire burned so hot that it vaporized the PVC plumbing within the concrete slabs. What had been aluminum wheels on cars were now aluminum puddles below scorched rims.

By Tuesday morning, Aqua’s water system was almost completely flat. The fire had burned through the heart of the system, and some or all pressure had been lost in roughly 65% of its 1000 square mile service area. Aqua raced back to the M pump station to check on its \$75,000 Baldor generator. The homes saved by the fire fighters had saved on Monday were destroyed by

Tuesday morning. One hundred year old loblolly pines were charred posts. Cedar tree stumps were burning holes two and three feet deep into the ground. But the quick thinking of the worker that set up the garden hose to overspray the generator had saved it. The red Baldor generator stood out brightly in a landscape that was now only gray and black.

It was at this point that Aqua sent out requests for help with the TXWARN network. Within 24 hours, the City of Austin delivered three more generators to add to Aqua's pair, along with about 24 more radios, enough to outfit all field operators. Moreover, they sent an entire crew completely outfitted with a haul truck & backhoe, a debris truck, and all the spare parts they could carry. In addition, the City of Bryan sent two field operators to help, as did Travis County Water District #17. These folks graciously provided extraordinary help & assistance during the crisis and Aqua will be forever indebted to them.

The author began participating in the news briefings at the ICP on Wednesday morning and giving updates on the status of the county's water system. Hundreds of families were uprooted and clamored to know the status of their homes and when they would be allowed to reenter the area. Meanwhile, the fire had slowed but was still burning out of control. A wall of black smoke reached almost 10,000 feet in altitude and slowly drifted south in the breeze. Wildfire fighters were still pouring into the area and work began in earnest to create dozed firelines and backburns, while still other teams once more worked to save homes one at a time.

Insurance companies flooded the city of Bastrop with their mobile teams & offices. Piles of donated goods began building up at the ICP, especially water, Gatorade, breathing masks and eye drops. Officials from the Texas Department of Emergency Management and FEMA were on site from almost the first day. The Small Business Administration arrived, and the author was surprised to learn that it is their standard practice to set up camp in disaster areas and offer emergency loans for home mortgages.

As part of its Emergency Preparedness, Aqua had prepared a list of critical customers, charted their water consumption, and knew exactly how long each could last without water. The M.D. Anderson rodent research center was completely self-sufficient if it lost water, but the M.D. Anderson primate research center could only last about 30 hours without water. One by one, the addresses of the critical customers were checked off against the burned areas to be sure none were in danger of running out of water.

A half-dozen schools lost all pressure because of the fire, but none the schools actually burned because the playing fields and parking lots kept the flames away. It became clear to Aqua that parents needed to get their kids back in school, so they could get on with the task of meeting with insurers, aid agencies, FEMA, and so on. Aqua set as its first priority to get all of the schools back on line and ready to conduct classes by the following Monday morning, which was announced at the Thursday morning briefing. By 5:00 pm Saturday, pressure had been reestablished at all schools, the lines had been flushed and disinfected, and all samples had passed the bacteriological tests. Indeed, the schools would be ready for business on Monday morning.

In one of its last morning briefings, as a gesture of faith & sympathy, Aqua offered free water to all of its homeowners who lost their homes for the duration of the time it would take to clean their lots and rebuild their homes. It was a spontaneous idea of the author, but I genuinely wondered if my Board was going to fire me for such largesse. Instead, it made the Aqua Board of Directors exceptionally proud and the gesture was lauded by the 16,000 Aqua customers who did not lose their homes. As they say in golf, sometimes it's better to be lucky than good!

RECOVERY

The Recovery phase of the disaster begins when the response stage ends. FEMA officially declared that the Response stage ended in mid-October, and hence began the Recovery phase. Nevertheless, the Aqua field technicians worked tirelessly and the entire Aqua system was back on line ten days after the fires started. In all, about 1,200 Aqua customers lost their homes including three Aqua employees. One of the most frustrating elements of the response & recovery was that as pressure was built back up in the system, a new crop of leaks would spring up every morning. Consequently, technicians that had just repaired all the leaks in one subdivision would have turn back around, and make yet another sweep through the same area. This went on for maybe six, eight or ten cycles! Though it was exasperating, it was unavoidable.

Aqua's initial contacts with FEMA occurred even while the company was still fighting the fire, during the response phase of the wildfire. The company was relieved to learn it would receive 75% reimbursement for all water system equipment required to put the system back into the same condition it was before the fires. In its very first meeting with FEMA, Aqua was asked to give a rough estimate of its loss? The company put the figure at \$300,000. The community in total lost about \$400 million. If losses are under \$500 million FEMA labels it a "disaster" – over \$500 million and it's a "catastrophe." Go figure.

Now that Aqua had reached the recovery phase, it was faced with a dilemma. In order to receive the 75% FEMA reimbursement, Aqua would have to buy and install up to 1,200 meters at lots that contained no homes. A major concern existed, because already there was a steady trickle of Aqua customers coming to Customer Service to request permanent disconnects. Many folks had moved to the area to build custom homes and be surrounded by the beautiful loblolly pines. Now, they were all gone and their community was a lunar landscape. Why stay?

It also became clear that, sadly, many families living in old single- and double-wide trailers had no homeowners insurance. Even today, their trailers remain rusting piles of charred metal frames exactly where they fell during the fire. One supposes the County will eventually get around to cleaning up the abandoned lots. But it is only four months after the fire and the County is still dealing with mountains of debris and debris management. By all appearances it will take the better part of a year to clear away and manage all the separate types of debris.

Though Aqua believed it was risky, for better or worse, Aqua decided to replace all burned meters even though a home may not be built on the lot for some years – if ever. This would be necessary in order to receive the \$225,000 in FEMA reimbursement money.

LESSONS LEARNED

At 17,600 connections, Aqua is too big to conduct business like a small rural water supplier, and too small to have all the tools of a large water municipality. But the company was fortunate enough to have a good GIS system and an experienced GIS leader on staff when the fires hit. Because we needed GIS maps and a lot of them. We were constantly marking the locations of leaks, the deployment of field teams, and which streets had been swept for leaks. Each day the field crews assembled for a morning briefing, came back to the ICP, delivered their updates and grabbed a hot lunch. Then, they returned at the end of the day with another round of updates. We marked up about a dozen maps per day.

Aqua was very fortunate that none of its field operators were injured or burned during the response phase. One lesson learned was that if we had to do it over, we would have immediately ordered Nomex fire resistant clothing for all field operators. The Nomex clothing is not cheap at about \$350 for a shirt & trousers. But with glowing embers constantly floating down like snow, and with our workers constantly hunched over valve boxes in the ground, somebody could have had their shirt catch on fire in an instant.

Another lesson learned was the value of radios and the additional safety net they provided. It's a pretty sobering experience when you pull up to a police checkpoint and they say, "You know you are on your own, right?" But with the radios, everybody knew where everybody else was almost all the time. In addition, the next time you see a Police Officer, Fire Fighter or EMS Technician, take a close look at their radio and you will see a prominent orange button on the top. That's the "Man Down" button. When pressed, the microphone automatically opens for 10 seconds, and your distress call is broadcast to every radio in the county. That's a comforting factor when you are out in the field with fires still burning out of control all around you.

Aqua also learned to be flexible. For example, we were being held up by our IT system when we tried to create a new Work Order template specifically for fire repairs. After some hours of meeting and laying out on paper what information we wanted on the Work Orders, we abandoned the idea of having the computer generate its usual Work Orders. Instead, we simply typed up what we wanted on a piece of paper, and photocopied it, and used these as Work Order forms to record the work for all fire repairs.

Finally, the importance of good company communications cannot be over-estimated. The company used a combination of live morning news briefings, daily press releases, radio interviews, and sent out e-mail messages to every address on file. Before the fire, the company had about 1,500 e-mail addresses on file. Today, it has more than 7,000. With e-mail, the company could prepare a clear and concise message with "Boil Water" information, updates and forecasts, that was not subject to auditory interpretation. In the end, e-mail turned out to be the most effective communication channel.

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