FARS
(Firefighter Air Replenishment Systems)
CODE ADOPTION
WORKBOOK
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ABOUT THIS WORKBOOK

This workbook was created to help the leadership of the fire service understand firefighter air replenishment systems (FARS), assess their value to life safety in their jurisdictions and provide a road map to successfully adopting a FARS code.

For more information about FARS, please visit rescueair.com.
WHAT ARE FARS?
A STANDPIPE FOR AIR.

Firefighters need two things to effectively fight fire: water and air.

Complex structures like multi-story buildings, large “big box” style structures and tunnels create significant logistical challenges for the delivery of water and air. The fire service solved the problem of supplying water in these structures by requiring water standpipes.

FARS, a standpipe for air, solves the problem of air supply.

Until recently, air was supplied the old-fashioned way: manually transported by a "bottle brigade" up the stairs in multi-floor buildings or deep into large horizontal structures.

FARS applies the water delivery concept to air.

A FARS is a standpipe for air permanently installed in a building. It is the fastest, safest, most efficient way to deliver air replenishment to firefighters in complex structures.
FARS eliminates the need for the air bottle brigade. Instead, air is supplied by a department’s mobile air unit through a secure exterior connection panel. Firefighters refill their SCBA at fill stations located throughout the structure, and they can do it under full respiration in less than two minutes.

FARS are comparable to other building-installed systems, such as those use in hospitals for delivery of medical gasses like oxygen. These systems are regulated under NFPA 1989, 1901, 99 and NFPA 1 as well as the International Fire Code and Uniform Plumbing Code.

This is the future of firefighter health and safety, and it is available now. More than 500 buildings in 10 states are equipped with these systems, and they are required in more than 80 jurisdictions across the country. And more cities are adding this requirement to their fire codes every year.

There is no faster, safer, more reliable or more efficient way to deliver air replenishment to firefighters.
HOW DO FARS WORK?

A FARS is a building-installed standpipe for air. Using FARS, firefighters can refill their SCBA at stations located throughout a structure in two minutes or less under full respiration and in an IDLH environment.

The system includes a secure exterior connection panel. The department's mobile air unit (MAU) connects through the exterior panel to the FARS' piping and distribution system and charges the system with a constant supply of air. FARS also includes an air storage system capable of refilling 100 SCBA prior to the arrival of the MAU.

In mid- and high-rise buildings, fill stations are typically located in stairwells at two to three floor intervals. In large horizontal structures, the fill stations are located near the water standpipes.

FARS works with standard equipment used in every jurisdiction, and because it is a building-installed system, it has no negative impact on department budgets.
WHAT DO FARS COST?

Numerous factors affect the cost of a FARS, including the local AHJ requirements for system components, current union labor rates and the overall cost of doing business, which is higher in some parts of the country than in others.

In Texas, for example, a recent system cost 1/16th of 1 percent of the overall construction cost. The cost of a comparable system in a recent project in California was just over 1/4th of one percent of the total construction cost.

Here is a cost comparison to other fire and life safety systems based on some recent projects completed by RescueAir, the FARS industry leader:

- Fire Alarm Systems . . . $4 to $7 per square foot
- Fire Sprinklers . . . . . $2 to $7 per square foot
- FARS . . . . . . . . . . . 22 cents to 79 cents per square foot

A FARS retrofit can be accomplished for nearly the same price as new construction. Because of the small, 1/2” stainless steel tubing used to distribute the air, and the fact that the route of distribution is typically within the stairwells, there is usually only a 2-3% increase in cost between a retrofit and new construction.

There are numerous ways by which system cost can be minimized, including early design consultation between the FARS provider and the builder.

A more detailed analysis of the cost of FARS appears in the Supporting Materials section of this workbook.
FAQs ON ADOPTING FARS

Fire Department leadership can expect pushback from one of country's best organized and well-funded lobbying groups, the Building Owners and Managers' Association (BOMA).

BOMA and organizations like them have historically opposed any safety feature that adds costs to buildings, including FARS and fire sprinklers, and have pushed back against existing regulations that do so. In addition, they often are successful in minimizing, limiting, stalling or getting exemptions to new safety requirements like facade inspections and maintenance.

Because they are active contributors to political campaigns at the local, state and national levels, they have tremendous influence on policy regarding safety standards. They often use misinformation to support their position. It is important that Fire Departments understand the power of this organization and others like them, recognize their tactics, and be proactive in mitigating their influence when advocating for new or strengthened safety codes.

Here is an excerpt from BOMA's website regarding FARS:

"ICC appendix chapters are not part of the body of the codes and therefore not automatically included when state and municipal governments adopt ICC codes. This ensures BOMA affiliates and members will have maximum influence on inclusion of FARS mandates as the 2015 ICC codes are considered for state and local code adoption ... BOMA International opposes the inclusion of provisions mandating the installation of firefighter air replenishment systems (FARS) in building, fire, and other national model codes for both newly constructed and existing buildings."

You can find additional examples of safety pushback at the end of this section.
Following are some comments, concerns and frequently asked questions every Fire Chief should be prepared to address during the FARS code adoption process.

Q. Why does our jurisdiction need FARS?
A. We are seeing an increase in building types that present logistical challenges for the delivery of air and water. These include mid-rise buildings, high-rise buildings, large “big box” style structures such as Wal-Marts or warehouses, and tunnel systems. We can get water when and where we need it through the water standpipe system. But air is delivered by hand. It is analogous to the antiquated method of using hand buckets instead of hoses to deliver water. As these buildings proliferate, fires in these structures are becoming more common. We need an air supply solution that keeps pace with the demands these structures put on the fire department.

Q. This is going to cripple development in our city. Developers will move their projects to cities that don’t require this.
A. Several chiefs have faced this objection, including Chief Alan Brunacini in Phoenix. Phoenix has had a FARS requirement since 2004, put in place when PFD lost a firefighter to a LODD when he ran out of air in a supermarket fire. Between 2004 and 2015, downtown Phoenix experienced explosive growth -- over $4.7 billion in development. Similar arguments were made in San Francisco, San Jose, and other cities. There is no data linking the adoption of a FARS code to a negative impact on development.

Q. Adding this regulation will worsen our city’s housing shortage, as fewer developments will be slated for construction.
A. Downtown Phoenix added nearly 3,000 new residential units in the period after FARS adoption through 2015. Again, there is no data linking the adoption of a FARS code to a negative impact on development.

Q. This system will take up rentable square footage in buildings, negatively impacting the bottom line and harming local business.
A. FARS does not take up rental space and is primarily installed behind walls or in the firefighting stairwell. A small enclosure may be needed in the lower area of the structure, similar to what is used for Fire Control Panels or Sprinkler Control Rooms. The assertion that any components of FARS would eliminate rentable space is not supported by facts. There is no evidence of this in any structures in which FARS currently exists.

Q. FARS are proprietary/single sourced. That’s why they cost too much.
A. More than one entity has patented different means and methods for FARS. One FARS supplier with such a patent has licensed its technology to certified installers, who

bid competitively on FARS projects in their geographic region. This ensures competitive pricing.

Q. What do these systems cost to install and maintain?
A. FARS is estimated to cost less than one-eighth of one percent of a building's total cost and is one-third or less the cost of standpipe/sprinkler systems. A recent piece by Chief David Rhodes (included in this workbook) put the cost of FARS at between 22 cents and 79 cents per square foot, depending on project location and the cost of labor and materials in that area. Maintenance is estimated at $2,000-$4,000 a year and can be done by a licensed fire testing company.

Q. Who is responsible for maintenance?
A. The building owner is responsible for testing and maintenance. There are numerous companies that can provide this service including trained and certified fire protection, plumbing and mechanical contractors.

Q. Building and fire codes now require fire service elevators. Why do we need elevators and FARS?
A. Elevators are a necessary part of moving personnel and equipment to distant locations in structures. What elevators cannot do is provide immediate air replenishment to those distant spots without considerable delay. Air needs to be supplied immediately, just like water, and only FARS can do that. The other consideration is the reliability of elevators in situations where the building is already in distress. They often do not work during fires and can trap responders or cause further delays to the firefight.

Q. Major fires are low frequency events. FARS are unnecessary.
A. As buildings go higher with larger footprints, the incidence of major fires in complex structures is rising. The recent Grenfell Tower fire in London killed 79 people. The inability of the firefighters to replenish their air supply, the lack of fire sprinklers in the building, and cheap, flammable building materials all contributed to the number of fatalities. The recent Honolulu high-rise fire killed three people. Reports said the fire crews used human chains to get equipment up the stairs to the fire. Remember, it takes air and water to fight a fire. Firefighters deserve both, in ready supply.

To put it in perspective, the series of terrorist attacks in London has been the subject of international news over the last few years and has spurred numerous cities to invest in terrorism response strategies and tactics. Ironically, nearly twice the number of people died in the London Grenfell Tower fire than have died in terrorist attacks throughout the entire U.K. since the year 2000.

Major earthquakes are also low frequency events, yet buildings throughout earthquake zones are required to meet seismic safety standards.

The more likely threats to life safety -- unsafe buildings and outdated means and methods for protecting them -- are not being addressed.
Q. We've heard that the air quality is questionable in these systems, and can actually cause health issues for firefighters who use them.
A. The air in a FARS is the same as the air in a firefighter’s SCBA, sourced from the department’s mobile air unit or the system’s air storage system. All systems are equipped with an air monitoring system which monitors six key points 24/7, including the system pressure, carbon monoxide levels and moisture. FARS are tested and certified on a quarterly basis in accordance with International Fire Code and NFPA standards. Copies of testing results are sent to the local fire department. In addition, the system is equipped with isolation valves that allow firefighters to isolate the system remotely from the Fire Command Center or manually at any of the fill stations. In nearly 20 years, there has never been an issue with air quality in any of the hundreds of systems installed.

However, there is ample evidence that demonstrates the link between the effects of exposure to toxic smoke and LODDs and occupational cancer.

Q. Do these systems mean the Fire Department can have fewer personnel on shift?
A. FARS is not considered a replacement for personnel. Rather, it is a life saving tool that allows more firefighters to be devoted to critical tasks such as fire attack and search and rescue. In a major fire in a complex structure such as a high rise, as much as one-third of the personnel on scene are staffing a "mule train" that does nothing but hand-carry SCBA up many flights of stairs or deep into structures, then carrying the empties out for refilling. FARS allows for faster, safer, more efficient firefighting, and saving time means saving lives and property.

Below are some examples of recent pushback on building safety codes and regulations. There are many more.

Wisconsin fire chiefs oppose easing of rules on sprinklers and electrical codes
Proposed changes to state regulations that would reduce requirements for electrical protections and sprinklers in new homes, college dorms, hotels and other buildings fly in the face of reason, state firefighters and building inspectors said during a public hearing Tuesday in Eau Claire. The proposal would halt nationally required expansion of devices used to prevent fires and electrocutions in new building projects. The state Department of Safety and Professional Services, which sponsored the hearing, backs those code changes, saying they are too expensive for builders and homebuyers. "The simple fact is sprinklers work," Robert Ugaste, Wauwatosa fire chief and president of the Wisconsin State Fire Chiefs Association, said during the hearing at HSHS Sacred Heart Hospital. "I don't understand why the administration would want to remove that regulation.”

Court overturns Minnesota home fire sprinkler requirement
A state agency failed to present enough evidence to justify requiring all new homes bigger than 4,500 square feet to include fire sprinklers, a Minnesota Appeals Court panel decided Tuesday. The three judges unanimously overturned the state Department of Labor and Industry's rule. "After making a careful and searching inquiry of the record, we
conclude that the 4,500-square-foot threshold for one-family dwellings is arbitrary and not supported by substantial evidence in the record," the ruling said. "Based upon precedent from our Supreme Court, there must be a 'reasoned determination' as to why particular standards were chosen in an administrative rule. ... Because the record does not include evidence of any reasoned determination to indefinitely exempt new one-family dwellings under 4,500 square feet, the sprinkler rule must be declared invalid."

Fire chiefs and others have lobbied the Minnesota Legislature to require sprinklers in homes, saying they can save lives. Eventually, chiefs agreed to at least require them for larger homes. When lawmakers could not pass that requirement, the Department of Labor and Industry began the process of taking action itself.

**BEMIDJI PIONEER**

### After fatal blazes, San Francisco fire safety panel seeks improved alarm systems

A six-member task force set up after a pair of deadly blazes in San Francisco this year is planning to call for stricter standards for fire alarms in apartment buildings. The group, which includes top officials from four city departments, plans to recommend Tuesday that San Francisco's fire and housing codes be amended to require that fire alarm systems in all apartment buildings be loud enough to wake sleeping residents. However, the task force is not expected to call for requiring all older apartment buildings to install sprinkler systems, one of the key ideas Supervisor Jane Kim floated and tenant advocates pushed for earlier this year. Property owners fought against that potential requirement, arguing it would worsen the city's housing crisis because installing sprinklers would lead to tenant displacement. The city mandates that newer buildings be outfitted with sprinklers. About 83 percent of the residential and commercial buildings damaged by fire over the last five years did not have sprinkler systems, according to data presented by fire officials during a Board of Supervisors committee hearing in April.

**KQED**

### L.A. files $20-million lawsuit against Da Vinci Apartments developer over huge downtown fire

The Los Angeles city attorney has filed a $20-million lawsuit against the developer of the downtown Da Vinci Apartments project, claiming its negligence was responsible for the damage caused by a massive 2014 fire at the project construction site. The Dec. 8 fire destroyed the 75,000-square foot, seven-story complex alongside the 110 Freeway. The blaze forced the closure of the freeway and the intense heat cracked at least 160 windows at the headquarters of the Los Angeles Department of Water and Power. The lawsuit, filed Thursday, claims the project developer, Geoffrey H. Palmer, and his company, GH Palmer Associates, failed to have an appropriate fire protection plan. The suit claims the developer failed to compartmentalize construction, install fire walls or doors on the property or have an appropriate water supply to fight a fire. It also failed to provide security to prevent a person from going on the property and burning it down, the lawsuit claims.

**LA TIMES**

### Some Chicago high-rise owners still playing with fire

Chicago has 716 high-rises that were built before 1975 and are required by the city to make fire safety upgrades. But 303 of them haven't verifiably completed those improvements. Some of those lagging high-rises are close to finished, Chicago
Department of Buildings Commissioner Judy Frydland reports. Owners of other buildings say they are ready and await city inspection. But as many as 176 buildings are still behind the curve on these vital improvements. That's a potentially deadly gamble. Let's review: The city back in 2004 set a reasonable deadline of 2012 for building owners to finish this work. Many of them didn't make it, though. So the city granted an extension to 2015. At the time, Mayor Rahm Emanuel urged owners to act quickly: "This is not like a final exam where you wait until the last hour of the last day to figure this out. I expect you to use this time to put in place a sprinkler system and the safety and security systems you need. ... I don't expect you to use the time all the way to the end." Many owners apparently ignored Emanuel's plea. Some tried to blow smoke at former city Buildings Department boss Felicia Davis, complaining about the expense and architectural difficulty of the upgrades. Davis didn't buy it. She sued scores of high-rise building owners who dawdled on making fire safety improvements. Some 77 building owners are now in court and, Frydland says, cooperating with the city. Another 51 buildings finished upgrades after the city sued. The rest of the buildings not yet in compliance? The legal hammer comes down on them on April 30, Frydland tells us. That's when she says the city will file suit against scores of buildings that have failed several inspections or those that have not yet scheduled a city inspection to prove that they have completed upgrades. "We want to finish this," Frydland tells us. "We're not going to wait any longer. Enough is enough."

CHICAGO TRIBUNE

Home builders sue Florida fire district over new sprinkler ordinance

Lee County builders want to shut off Estero Fire Rescue District's sprinkler ordinance. The Lee Building Industry Association, Inc., and the Florida Home Builders Association filed a joint lawsuit in Lee County Circuit Court in an attempt to halt the fire district's recent sprinkler ordinance. The lawsuit also asks a judge to review whether the fire district followed state law when it created the ordinance, according to Chené Thompson, a private lawyer hired by the builders. Thompson said Lee County has rules that conflict with Estero's ordinance, and they need a judge to sort it out. "We are kind of stuck in the middle," Thompson said. "We want to resolve some of the uncertainty." During their meeting Tuesday, Estero fire commissioners agreed to hold a closed-door executive session next week to discuss the lawsuit with the district's lawyer, Charles Schoech. Commissioner Dick Schweers, who serves as the fire commission's chairman, said the sprinkler ordinance is meant to keep Estero residents safe. "Our charge is to protect property and save lives," Schweers said. In October, Estero fire commissioners signed off on the ordinance that requires all newly built one- and two-family homes within the district to install automatic fire-sprinkler systems. They later decided to delay enacting the rules until July 31, following pushback from Lee County officials.

NAPLES DAILY NEWS
There are 3 codes and standards covering FARS:

- Appendix L of the 2015 ICC International Fire Code
- Appendix F of the 2015 Uniform Plumbing Code
- The new FARS Annex to be included in 2018 NFPA 1

You can better protect the lives of your crews and the people of your community by adopting one of these codes in your next code cycle.

Based on best practices of Fire Departments that have successfully adopted FARS codes, following is a recommended course of action:

1. **Research the FARS codes and determine what system requirements work best for your jurisdiction.** Considerations include:
   - Type of structures/occupancies to cover (mid-rise, high-rise, large "big box" style structures, tunnels)
   - Type of air replenishment method to require (quick fill or rupture containment)
   - Number and location of fill stations
   - Location of exterior connection panel (can be on the side of the building or on a monument located some distance from the structure)
   - New construction only
   - New construction and retrofits

2. **Include the FARS appendix language in your next code adoption submission to your municipality's governing body.** It is not recommended that you submit a FARS code separately or out of your regular code adoption cycle.

3. **Reach out to other fire departments that have successfully implemented a FARS code for advice and counsel.**
4. Be prepared to justify the need and answer questions on cost, health and safety implications, single source, etc. That means doing your research and being fully informed.

5. Line up support.
   - Get your local firefighters union on board.
   - Approach the local plumbers union for support.
   - Consider having preliminary, informal conversations with safety-friendly members of your governing body.
   - Assess the political climate and consider reaching out to a FARS provider for help with pro-active government affairs/policy outreach to members of your municipal government.

6. Make the process inclusive. Have a plan in place, ready to present to your governing body, outlining how you will reach out to all stakeholders to present accurate information on FARS and the code adoption, and clearly address the concerns of the stakeholders. These stakeholders should include:
   - The local chapter of the Building Owners and Managers' Association
   - Tenant associations
   - The firefighters union
   - The plumbers union
   - The FARS industry (including local fire protection companies who bid competitively on FARS installations in your region)
   - The local and national chapters of fire service health and safety organizations like the NFFF, the Fire Smoke Coalition, the Firefighter Cancer Support Network, the National Fire Safety Directors Association, etc.
   - Nationally recognized fire service health and safety experts
On March 14, 2001, Phoenix Firefighter and Paramedic Bret Tarver died in the line of duty after his self-contained breathing apparatus ran out of air inside a burning supermarket. He was 40 years old and an 8-year veteran of the force.

Tarver was one of the first crewmembers to arrive at the scene. The 5-alarm blaze eventually involved 120 firefighters, more than one-third of the average number of personnel on duty in Phoenix on any given day.

Tarver was 75 feet inside of the structure when he became disoriented and incapacitated. Several of his colleagues tried to rescue him, including his partner who also ran out of air. They were unable to pull him to safety. It was the first firefighter fatality on the fireground for the Phoenix Fire Department (PFD) in more than 20 years. Three other firefighters were injured, but survived.

Tarver’s death led to a realization that the department lacked an offensive firefighting plan for commercial buildings, and needed specialized plans, equipment and training to address fires in non-residential structures.

Over the next year the department reviewed its standard operating procedures and fireground operational activities at the strategic, tactical and task levels in an effort to prevent such a tragic event from ever happening again.
Then Fire Chief Alan Brunacini, Assistant Chief Bob Khan (who later became fire chief) and IAFF Local 493 President Billy Shields asked the Deployment Committee to determine exactly what happened during this fire and identify how the department could improve firefighter safety in non-residential, complex structures. Representatives of the National Institute of Occupational Safety and Health (NIOSH), the Arizona Occupational Safety and Health Agency (OSHA) and the National Fire Protection Association (NFPA) assisted them in their investigation.

After researching and ultimately recommending a number of safety and training improvements, PFD leadership became advocates for what was then a new concept in air management, a building-installed air standpipe system called a firefighter air replenishment system (FARS) that allows firefighters to refill their air bottles at designated fill stations within a structure. At the time, the city had approximately 185 buildings that stood 6 floors or higher and many more slated for construction. The logistics of delivering air within those structures presented clear challenges that the PFD believed could be best addressed with FARS.

PFD researched and thoroughly vetted FARS technology. As part of their due diligence, and before recommending a code change to their city council, the department wanted to test the system in their live burn tower, located in their main training center. By testing a live system in a staged emergency, they could ascertain if the system truly lived up to its anticipated value and if the system would perform under live burn conditions. They also hoped to get valuable feedback on use of the system from their trainees. FARS passed this vetting process with flying colors.

In April of 2004, a joint venture between the Phoenix Fire Department, FARS provider RescueAir and the Arizona Public Service Company put the state’s first FARS system into APS’s new 20-story headquarters building. APS is Arizona’s largest and longest-serving electricity utility organization, at the time serving more than 1.1 million customers in 11 of the state’s 15 counties. The system was unveiled in April of 2004 to much press attention.

“This system gives life to the firefighters above ground without them having to carry every breath of air with them up to the highest floors of a building,” Assistant Chief Khan told the Arizona Republic during a FARS press demonstration.

According to the Arizona Republic, APS wanted to be the first in the Phoenix metro area with FARS in its building. Patrick Gilmore, the company’s senior facilities real estate manager, told the newspaper that while APS leases its space at the Arizona Center, they occupy virtually the entire building and wanted to keep their employees safe.

“It’s our people,” Gilmore said. “We’ve always been a good corporate citizen. My father was a firefighter, so I was an easy mark (when the project was suggested).”
Later in 2004, PFD went forward with a recommendation to add FARS to the city’s building code. Chief Brunacini would later comment on pushback from the City Council: "I was accused of stalling development in the fastest growing city in the southwest."

Brunacini took an unusual tactic. He told the council members to hold their breath while he finished his presentation. "That's what you are asking our people to do, a football field up in the air," he said.

The city approved the FARS requirement, making Phoenix one of the first cities in the country with a FARS code for new construction. Shortly thereafter, a number of cities in Maricopa County adopted similar requirements, including Glendale, Mesa, Chandler and Tempe.

At the unveiling of the system at the APS building, Khan remembered Tarver and the tragedy that served as the catalyst to bring a FARS code to Phoenix. “A system like that could have saved his life,” Khan told the Arizona Republic. “If there’s a firefighter struggling to get out of a stairwell and he’s without air, it could save his life.”

ROGERS, AR
FARS AS A COMMUNITY RISK REDUCTION STRATEGY

The National Fire Academy in Emmitsburg, MD believes the issue of risk reduction is extremely important. So much so, that it dedicates an entire year of its Executive Fire Officer’s Program to training leaders within the fire service to identify and address risk reduction within their jurisdiction. At least one small fire department takes the issue just as seriously.

Located in Northwest Arkansas, the Rogers Fire Department serves the City of Rogers and the surrounding areas of Benton County. On July 1, 2015, the City of Rogers consolidated the Building Inspections Department with the Fire Marshal’s Office to create the newly formed Risk Reduction Division (RRD). According to Battalion Chief Travis Hollis, the division’s head, the eleven-member division has improved efficiency,
created a one-stop shop and given the fire department greater oversight on issues that impact the safety of firefighters and civilians.

Northwest Arkansas is one of the fastest growing metropolitan areas in the United States. Hollis’ department has kept pace, increasing in size 60% over the past 10 years. Hollis says, “Pro-public safety communities are rare these days and we live in a city and community that is pro-public safety.”

Hollis is a 20-year veteran of the fire service with 13 years experience as a fire marshal, so identifying new risks comes easily. He explains, "We see a lot of construction and new technology coming through the metro area. As a Fire Ops guy at heart he says, "Any building that’s constructed I look at as ‘How are we going to put this fire out?’" If a change is warranted, Rogers is more than willing to make it at the local level. Hollis also serves on both Arkansas State Building and Fire Code Boards; a lot of what they do locally through ordinances eventually gets implemented on the state level.

One such change came about in 2006 when a developer was looking to build a 20-story hotel in Rogers. High-rise firefighting is a labor intensive operation, and with a minimum staffing of just 22 firefighters per shift at the time, the Rogers Fire Department questioned how it would supply breathing air to their firefighters. A relatively new technology existed, the Firefighter Air Replenishment Systems (FARS). The only problem was, few fire departments had experience with FARS and those that did were mostly on the West Coast. So Rogers modeled its first ordinance after one in Reno, Nevada. “We just wanted to get an ordinance in place so when this building came we would have something.”
PEER RESOURCES

Following are some peer resources within the fire service who can share their personal experience with the FARS code adoption process.

**Chief Mario Trevino** (ret.), San Francisco, CA
mario.h.trevino@gmail.com
206-518-6609

**Chief Alan Brunacini** (ret.), Phoenix, AZ
alanbrunacini@cox.net
602-228-4261

**Chief Sam Greif**, Plano, TX
samg@plano.gov
972-941-7041

**Chief Greg Ruiz**, Tempe, AZ
greg_ruiz@tempe.gov
480-858-7212

**Chief Gordon Routley**, (ret., current consultant), Montreal, Canada
jgroutley@aol.com
514-872-7498

**Assistant Chief Chuck Montgomery**, Glendale, AZ
cmontgomery@glendaleaz.com
623-930-4401

**Fire Marshal Lynne Kilpatrick**, Sunnyvale, CA
lkilpatrick@sunnyvaleca.gov
408-730-7219

**Fire Marshal Tony Yuen**, Berkeley, CA
ayuen@ci.berkeley.ca.us
510-981-5502

**Chief Tom Jenkins**, Rogers, AR
tjenkins@rogersar.gov
479-621-1179

**Fire Marshal Paul Mercurio**, Clayton, MO
pmercurio@claytonmo.gov
314-290-8487
PARTIAL LIST OF CITIES WITH FARS CODES

Phoenix, AZ
Glendale, AZ
Tempe, AZ
Chandler, AZ
San Francisco, CA
San Jose, CA
Sacramento, CA
Sunnyvale, CA
Pearland, TX
Plano, TX
Midland, TX
Frisco, TX
Southlake, TX
Rogers, AR
Reno, NV
Renton, WA
South Salt Lake City, UT
Tuscaloosa, AL
Gulf Shores, AL
Clayton, MO
Cape Girardeau, MO
Branson, MO
Fairbanks, AK
Longmont, CO
Pueblo, CO
SUPPORTING MATERIALS

FOLLOWING IN THIS WORKBOOK

ARTICLES

• "What is the cost of FARS?" by David Rhodes

• "FARS vs. Elevators: A 3-Part Series" by Captain Mike Gagliano, Seattle Fire, co-author, *Air Management for the Fire Service*

• FARS FAQs compiled by Rescue Air Systems, Inc.

AVAILABLE ON THE RESCUEAIR YOUTUBE CHANNEL

• youtube.com/user/RescueAirSys

WEBINAR

• Fire Engineering webinar: "Getting Air Where You Need It At The Biggest Fire of Your Life"

VIDEO

• Mike Gagliano gives a three minute demo of FARS

• FARS presentation at the 2016 NFFF Technology Summit by Chief Mario Trevino & Captain Mike Gagliano with Chief Alan Brunacini

• Chief Alan Brunacini and Captain Mike Gagliano talk FARS

MORE

• Please visit rescueair.com/education-and-training for links to numerous training materials, videos, articles, white papers and more related to FARS education and training.
What is the Cost of Firefighter Air Replenishment Systems (FARS)?

By David Rhodes

Modern Firefighting

It would be unthinkable in the modern era to recommend that firefighters use buckets of water delivered by a bucket brigade to extinguish a fire. You would probably be laughed out of the room if you suggested that standpipes shouldn't be required to move water up into a high-rise building. Imagine the bucket brigade or the hose stretch and the staffing needed to accomplish what a simple standpipe allows us to do with water. Unthinkable, right? However, when it comes to air we do exactly what we did over a century ago with water. We use the bucket brigade tactic to manually shuttle air cylinders into a building, sometimes one or two at a time, to replenish our air. The logistics needed to accomplish this in a high-rise, large area box building or tunnel can dramatically affect our ability to quickly gain control of an incident. The fire service cannot allow these large modern engineering successes to deny us our two primary basic needs: air and water.
FARS

Appendix L of the 2015 ICC International Fire Code supports local departments in requiring firefighter air replenishment systems (FARS) and treating them as equally vital to life safety as standpipes are for water. Let’s face it, firefighters up on the 18th floor with plenty of water and no air to breathe must retreat to an area where they can change out cylinders and then move back up to continue operations. Usually that can only be done late in the incident when staffing allows for the shuttling up of cylinders. When firefighters are required to enter buildings that are larger than the typical residential structure, the logistics of being able to supply air becomes a major hurdle. Having air refill stations inside a large area box store or manufacturing plant, or along the tunnel of a transit system, or up 10 or 70 floors in the sky is no longer fantasy. It’s in the code!

Using Facts when Faced with Opposition

With any new requirements adopted by the Authority Having Jurisdiction (AHJ) come the doomsday predictions of developers and investors who claim that, "These new requirements will force us out of business," or the assertion that the systems are so cost prohibitive that the development will move to another city that doesn’t require them. The fire service has heard and continues to hear these arguments even for the older, existing codes. The local AHJ is always in give-and-take mode, maintaining the balance between keeping the public and firefighters safe while considering the arguments that come from both the development community and local politicians.

Proactive dialogue and being armed with facts are the fire officials’ best tools in the efforts to uphold their sworn oath to protect lives and property. So, what is the cost of installing a FARS system in a building that is planned for construction in your area? The cost of a system, including design, manufacturing, and installation has historically averaged approximately $245,000. The overall cost is determined by the type of system components required by the AHJ, the size of the building and some variations in labor costs across the country.

Strategy and Cost

Knowing these cost up front can go a long way in the trenches for the fire official who is fending off political inquisitions, proposed trade-offs and threats of moving the development due to an inflated cost estimate provided by a developer, lobbyist or politician. The reported cost of FARS has been doubled and even tripled in some areas of the country to play on the emotions of politicians and encourage them to put pressure on fire departments to abandon the requirement.

Partnerships and relationships are the key to getting the equipment required that not only protects your firefighters, but also allows your firefighters to deliver service to the customer. Here are some actual costs for two recent systems. One
system is in Texas and the other is in California. Almost every other geographic region will fall within these two examples.

Let’s look at two recent projects for a good comparison of the types of buildings, size and FARS cost. Remember, the difference in cost between these two projects is primarily driven by the local AHJ requirements for system components, union labor rates and the overall higher cost of doing business in California.

**FARS Project Profile (Texas):**

- Project consists of two 18-story towers
- 1 million total square feet
- Total construction cost = $325 million
- Total FARS cost = $218,000
- FARS cost per square foot: $0.22 or 22 cents

**FARS Project Profile (California):**

- Project consists of two 8-story towers
- 612,000 square feet
- Total construction cost = $180 million
- Total FARS cost = $485,000 or $242,000 per tower
- FARS cost per square foot: $0.79 or 79 cents

Here is a comparison to other fire and life safety systems:

- Fire Alarm Systems: $4 - $7 per square foot
- Fire Sprinkler: $2 - $7 per square foot
- FARS: 22 cents - 79 cents per square foot

**The Cost of Retrofitting an Existing Building**

Unlike sprinkler systems, a FARS retrofit can be accomplished for nearly the same price as new construction. Because of the small ½” stainless steel tubing used to distribute the air and fact that the route of distribution is typically within the stairwells, there is usually only a 2-3% increase in cost.

**Some Common Myths About FARS Cost:**

*FARS requires major design changes to building plans.*

- Early planning prevents the need for any significant changes. Most projects can be incorporated into existing plans with little or no change.
FARS require additional space to be added, which adds high cost to developments.
- FARS equipment can be installed in existing mechanical rooms, storage closets, parking decks, and un-rentable dead space.

FARS takes up too much rentable space.
- A system that includes storage capability to refill cylinders without a Mobile Air Unit can be installed in un-rentable dead space, storage closets, in parking decks or in existing mechanical rooms.

FARS design and installation cost are so high they are impractical.
- In the two examples cited above, the cost of the Texas system was 1/16th of 1 percent of the total construction cost; the cost of the California system was just over 1/4 of 1 percent of the total construction cost.

FARS installations cause delays that slow down construction.
- FARS are installed and sequenced during the typical mechanical, plumbing and fire protection installation phase. Since the system is primarily based in the stairways, the only other sub-trade with whom coordination is required is the standpipe/sprinkler contractor. This does not result in substantial coordination or delays.

Summary

FARS industry experts are always available to help local departments and developers work through design and cost projections to get you the answers you need to inform your decisions.

Departments should reach out to FARS suppliers in advance of a project, and encourage developers to do so as well. These experts can help departments and developers work through design options and cost projections, and provide accurate information on cost, scheduling, location of the system and more.

Your department has the ability now, supported by Appendix L of the 2015 ICC International Fire Code, to make your own determination on what types of buildings should trigger a FARS requirement in order to provide the highest level of protection for your firefighters and the building occupants. Educate yourself and your community leaders with the facts, and develop relationships with the building community and suppliers ahead of time.
David Rhodes is a 32-year fire service veteran currently serving in an urban Fire Department. He is a Chief Elder for the Georgia Smoke Diver Program, a member of the Fire Department Instructors Conference (FDIC) Executive Advisory Board, a Hands-on-Training Coordinator for the FDIC conference, an Editorial Advisor and author for Fire Engineering, Fire Rescue and Fire Apparatus and Equipment Magazine. He is the creator of the Hump Day SOS Blog on FireEngineering.com. He serves as an Advisory Board Member for Underwriters Laboratories Firefighter Safety Research Institute. He serves as an Incident Commander for the Georgia Emergency Management Agency - All Hazards Incident Management Team and is a Task Force Leader for the Georgia Search and Rescue Team. He is president of Rhodes Consultants, Inc., which provides public safety training, consulting and promotional assessment centers.
Any firefighter who has experienced fire in buildings of multiple stories understands the challenges of getting equipment to upper floors. Fire departments devote significant time and resources to developing strategies that can answer the daunting challenges posed by buildings with floors beyond the reach of ladders, and with variables that make time an even greater enemy than it already is at typical fires.
At every fire, one thing remains the same: firefighters need air and water to affect a successful outcome. Many other tools are important, but these two are essential. All the truckies in the world, with chainsaws revving and halligans swinging, will simply turn the building into a parking lot if water is not quickly and efficiently brought into the firefight. All the water in the world will be no more than a surround and drown if firefighters are not supplied with the necessary air to engage an interior attack and sustain that effort until the fire is extinguished. We can argue about a lot of things in our profession, but this is not open for debate: We need air and water.

Getting these two critical elements to upper floors, along with the rest of the stuff we need, has always been a challenge. The problem of water delivery was solved through water standpipes, fire pumps and sprinkler systems. These are in place in most buildings where upper floor access is difficult, and should be mandated in all of them.

Until recently, fast, reliable, safe air delivery remained a more difficult problem to solve. The development of firefighter air replenishment systems (FARS) provides a solid answer. FARS has even become a part of the 2015 ICC International Fire Code with the addition of Appendix L. These systems should also be mandated in every building that presents challenging access issues, whether due to height or overall size of the structure. These include mid- and high-rise buildings, large "big box" style structures and tunnels. The reality is that firefighters are going to go into these structures when they catch fire and fulfill their calling to the citizens. That is not an item that is open to serious debate among professional firefighters. In return, we should expect that those putting these huge structures into our communities provide the necessary systems for us to handle the inevitable emergencies that will occur. FARS is the obvious answer to the problem of delivering air when and where we need it.

**Elevator Going Up?**

The two primary avenues for getting air to upper floors have historically been via stairwells and elevators. Since everyone recognizes the dreadful slog it is to haul air bottles up stairwells, it is used as the last option. Knowing this, I’ll focus on the more accepted practice of sending equipment up with elevators. Many departments hesitate to use elevators for personnel if there is any chance that it may service a floor that is on fire, but most would allow their use for equipment. And this is a reasonable option. Instead of hauling your air up the stairs, with all the physical and logistical challenges that presents, you load up an elevator car and send it up.

Let’s be clear, though: elevators are the option we are settling for only because the choice was between the elevator and the stairwell. The availability of FARS provides a better option that ensures air will be available when and where firefighters need it, from the outset of the fire. There are many reasons this is
preferable, but over the course of the next few articles we’ll look at three of them that are critical to our success: time, manpower and system malfunction. When these three elements are considered, FARS becomes the obvious choice for ensuring firefighters have the air they need.

**Time Keeps on Ticking, Ticking, Ticking...**

From the moment the alarm sounds sending you to the fire, you are behind. The fire has already started and is typically gaining ground as you are bunking up, driving in and starting the firefight. Unless you have decided on a defensive strategy to attack the fire, time is typically not your friend.

The single biggest problem with elevators as a solution to getting air to upper floors is that it takes time and a lot of it. Even bigger departments, with resources available quickly, struggle with the pinch point of getting air from the rigs, into the building, onto the elevator and then out again to the staging floor. It is not an evolution that is easy to practice and, no matter how much you plan for it, it remains a difficult thing to do as the fire continues to burn. And all the while, firefighters attacking the fire are diminishing their air supplies and needing to make decisions on what to do when they get low or run out. The fire does not wait for the elevator to get loaded with bottles or for the staging floor to get them on to the backs of firefighters in need.

We have all seen the articles or video clips of air bottles being thrown on carts or hand trucks in an effort to get resupply to upper floors. And this is being done amidst the reality of an intensive firefighting effort that includes multiple apparatus, hose everywhere, challenging access issues, significant life safety concerns, and multiple priorities wanting the elevator car for their uses. Many other types of equipment are needed to battle these fires and will challenge for space in the elevator.

The predictable delays in the firefight may lead to degradation of the structural integrity of the building. Smoke and fire gases will continue to make their way throughout the structure, increasing the dangers to everyone in the building. The problems get worse as the delays get longer. Getting air via an elevator is a later stage process that will only get going as sufficient manpower arrives, a system is put into place to make it happen, and that system starts to operate. Should air really be relegated to a later stage priority?

This later stage mentality is exactly what most departments are settling for when elevators (or the stairwell) are the primary source of air supply. On paper, it appears to be just another aspect of the ICS flowchart that needs to be filled out. In reality, the time needed is not supportable when an alternative exists that meets our needs immediately.
Determine for yourself what you would like for your next adventure at a fire on an upper floor:

You've managed to get up the stairs to floor 10, two floors below the fire, and are connecting up to the standpipe. All the crew are breathing heavily due to the exertion of getting up so many flights of stairs but you go on air and begin the firefight on floor 12. Due to the exertion needed to get to floor 12, your cylinders don't last as long as they might at a house fire and your crews start to get low on air. How long will it take your department to get resupply via an elevator? Do you keep fighting the fire with no air re-supply? Do you go back down to the staging floor, which will not be set up adequately for a long time? What is your plan?

For firefighters whose city requires FARS, that answer becomes very simple. Approximately every 2-4 floors are panels with transfill hoses connected to the air standpipe. In two minutes or less, your bottles are transfilled on your back under full respiration without even having to remove the bottle. There is no waiting for someone to decide air needs to be loaded into an elevator. There is no reliance on getting air to the staging floor as it already exists in the building’s air supply system. There is negligible delay in the firefight.

For later stage operations the rupture containment air fill stations can be used, similar to what most cascade systems provide just to refill bottles. A small team can utilize this part of the system to keep staging full of fresh cylinders for firefighters returning from rehab.

**Time is not on our side**

Just as the challenges of getting a smooth operation running at high-rise fires takes some time, so too does changing how we think about approaching these fires. Our minds get locked into certain ways of doing things and it can be tough to turn that thinking around. Many aspects of dealing with air and air management seem to fall into this category.

A simple review of all the strategic/tactical/logistical challenges that will be a reality at your next significant mid- or high-rise fire should reveal the potential flaws in current emergency plans. As it pertains to time, we need air and water as quickly as possible. It is an early stage priority. There is nothing quick about elevator re-supply even in the best of conditions. And that's assuming they work!
Read Part 2 of FARS vs. Elevators here:
rescueair.com/fars-vs-elevators-the-choice-is-obvious-part-2

Read Part 3 of FARS vs. Elevators here:
rescueair.com/wpcontent/uploads/2017/01/FARSvsElevatorsPt3FINAL.pdf

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FAQs On FARS

General Questions

Q. What states have FARS?
A. We know of FARS installations in California, Oregon, Washington, Nevada, Colorado, Arizona, Texas, Florida, Missouri and Maryland. FARS are installed in Fire Department Training Towers in Phoenix, AZ; Tempe, AZ; the Glendale (AZ) Regional Public Safety Training Center; Nashville, TN; San Francisco, CA; Sunnyvale, CA; and the Maryland Fire Rescue Institute (MFRI) at the University of Maryland.

Q. Our department policy prohibits filling SCBA while on the firefighters' back. Will FARS still work for us?
A. The codes cover two filling methods for FARS. The AHJ can choose which method best fits with its department policies and procedures. With either method, firefighters can refill their air bottles at stations located throughout a building.

The emergency fill method features an interior fill panel that uses the RIC-UAC fitting and allows firefighters to refill their air cylinders under full respiration even if they are in an IDLH environment. Firefighters simply attach a quick fill connection from the air panel to their SCBA. These interior air fill panels allow for at least two cylinders to be filled simultaneously.
The rupture containment method features the interior fill station and incorporates a rupture-proof containment station and an air control panel in addition to the quick fill connection for instant access. These rupture containment air fill stations are placed in protected areas throughout the structure.

Q. What about the fire floor affecting these lines? Are there shut offs on each level?
A. There are independent shut-offs to isolate the floors should areas above get damaged. Even if a leak is caused by something that happens during the emergency, the system will still be able to operate due the size of the piping. Unlike a standpipe system, pressure would still be maintained, though in a lesser amount.

Q. If FARS were installed in a building, would this give a firefighter the ability or discretion to commit to the fire longer before going to rehab if he or she felt OK?
A. That would be a matter of local policy and should be referred to in your operating guidelines. FARS would allow you to refill your air much more rapidly, without additional wasted energy, and to do so from the outset of the fire. The need for rehab is still a necessary component of fireground operations. FARS allows a conversation on options available in a large structure fire that otherwise is not possible.

Q. Is there any way that you can quantify your increased efficiency associated with a FARS system versus traditional air transfer protocol?
A. The simplest answer is you’ll have air immediately, you won’t need to waste precious resources to haul it up to fire/staging and you can quickly get crews rotated. This is especially important in the early stages of the fire, and that is when we have the least amount of personnel on scene. The efficiency of FARS versus any other method of getting air to crews cannot be overstated.
Q. Is FARS a better option than twin cylinder SCBA?
A. Yes, for a couple of reasons. The twin cylinder SCBA is a technology that has not progressed beyond concept stage. FARS is in place, working and has a proven record of success. In addition, any SCBA model is still limited by capacity and needs refill. FARS takes care of that.

Q. Is there a power backup for the cascade system?
A. Fortunately, there is no power requirement to get air to firefighters at large structures fires when a FARS system is installed. The system utilizes air driven by boosters to refill SCBA bottles.

Q. What kinds of pressures does the system operate on? You have 2216 psi, 4500 psi and 5500 psi cylinders out there.
A. FARS incorporates pressure regulators enabling operations at all SCBA pressures up to 5500 psi.

Q. What do you say to fire service leaders who say, “We’ll bring our own air?”
A. You should bring your own air, just like you bring your own water. Bringing your own water doesn’t keep you from using standpipes or fire pumps in buildings that have expanded challenges due to their height or size. Why waste significant time, effort and resources hauling air up the stairs when the same quality of air can be provided immediately near the floors where you are attacking the fire? Bringing your own air up is the fallback plan when all else fails. FARS is just the next common sense technology, much like standpipes and fire pumps.

Q. How long does it take to transfill a bottle?
A. Filling a bottle using the rupture containment method will take approximately 2 minutes. Using the emergency air fill panel (transfill method) can take 45 seconds to 1 minute depending on the control setting. As with all cascade systems, the longer fill time allows for less of a “hot fill” to occur and allows for a fuller bottle. But when speed is required, your bottle can get filled rapidly via the transfill method.

Q. Can an air rig do the job just as well as FARS?
A. They are different systems meant for different applications. The mobile air unit (MAU) has little impact on getting air quickly to upper floors unless it can be connected to a FARS system. If FARS is not in place, firefighters are left with manually delivering bottles to staging areas. MAUs are ground delivery systems. They are not a legitimate substitute for FARS when air is needed at upper floors or at great distances inside large structures.

Q. How much air does a system have prior to arrival of the mobile air unit?
A. That depends on how the Fire Department designs the criteria requirements that specify the fill time and total amount of SCBA to be refilled. A typical on-site air storage system will deliver on demand 100-200 SCBA 45 cubic foot 4500 psig of air for firefighting operations before any supplemental air is delivered from mobile air units.

Q. Has anyone ever used the FARS system at a fire and had it work?
A. FARS has been used extensively and successfully at the Phoenix FD burn tower and at the Glendale Regional Public Safety Training Center, as well as in live high-rise drills for years. Thus far, there have been no recorded events where FARS has been used at a live fire event.
Q. If we got the code approved for our city, would it be retroactive to all these buildings that are already standing?
A. The 2015 IFC FARS Appendix L does not specify new or existing construction or the type of structure. Those decisions are left to the local Fire Department. There is nothing precluding the local Fire Department from requiring FARS in new and existing buildings.

Q. In a typical FARS system, how many fill stations are in place?
A. The 2015 IFC FARS Appendix L specifies air fill stations or panels be located every three floors. However, the local Fire Department can base their decision on operational needs specific to the department and place air fill stations or panels at intervals less than this. Typical installations have them every 2-3 floors. In a horizontal structure, fill stations are typically placed near water standpipes.

Questions On Air Quality & Reliability

Q. How is air quality ensured?
A. FARS are clean, dry, closed breathable air systems. In accordance with 2015 IFC Appendix L, all FARS are equipped with an air monitoring system, which allows the Fire Department to monitor the system's moisture, carbon monoxide and pressure 24/7.

"L104.15 Air monitoring system. An approved air monitoring system shall be provided. The system shall automatically monitor air quality, moisture and pressure on a continual basis. The air monitoring system shall be equipped with not less than two content analyzers capable of detecting carbon monoxide, carbon dioxide, nitrogen, oxygen, moisture and hydrocarbons."

The system is monitored via the buildings fire alarm system and panel as a supervisory signal. FARS can also be monitored around the clock by the private sector via web-based monitoring. Should any air quality readings exceed IFC 2015 Appendix L or NFPA 1989 requirements, signals are immediately sent to the fire alarm panel, activating audible and visual alarms. The AHJ and private sector monitoring companies are notified of the supervisory signal and respond accordingly to the AHJ protocol.

In addition, the system is equipped with isolation valves that allow firefighters to isolate the system remotely from the Fire Command Center or manually at any of the fill panels.
Q. How is the system certified?
A. All jurisdictions that require these systems have rigid specifications regarding the design, installation, testing and certification processes. Certification typically occurs at five checkpoints in the process of installation and is always part of an on-going safety maintenance program.

- **Check One:** The installing contractor provides design drawings, engineered calculations and complete product data sheets that include all components of the FARS. The complete submittal package is referred to both the Building and Fire Departments for approval.
- **Check Two:** Officials from Building and Fire Departments perform field inspections during the installation process.
- **Check Three:** Air samples are taken from the installed system and sent to an independent laboratory for analysis and certification.
- **Check Four:** The Fire Department performs practical tests and drills using the system to confirm the functionality and compatibility of the system with the Fire Department’s existing equipment.
- **Check Five:** The building owner presents proof of an on-going testing and certification program to the Building and Fire Department prior to receiving a final certificate of occupancy.
- **On a go-forward basis:** The building owner is required to provide an on-going periodic testing and certification program in accordance with IFC Appendix L Section L106 Inspection, Testing And Maintenance. The owner is required to provide the Fire Department with the name and contact information of the testing and certification contractor. The contractor is notified by the Fire Department that the contractor must give notice to the Fire Department if the building owner cancels the testing and certification contract.

Q. We're concerned about private sector testing and certification for a life safety system. How do we know the air is safe to breathe?
A. Every Fire Department relies on the private sector to test and certify its breathing air equipment. Fire Department personnel typically do not collect air samples or perform testing or certification of their SCBA cylinders, breathing air compressors or the air within the Fire Department cascade systems. They hire private sector companies to perform these functions. FARS are tested and certified in accordance with NFPA 1989 by private sector companies just as the Fire Department's SCBA/breathing air program are tested and certified. The air quality in the FARS can always be trusted to be as breathable as the air in the Department's SCBAs.

Q. OK, but SCBA cylinders, cascade systems and compressors are all housed within our department. How can we be sure of air quality in a system that is building-installed and outside of our control?
A. FARS are comparable to other building-installed systems, such as those in hospitals for delivery of medical gasses like oxygen. These systems are regulated under NFPA-99 CH-5 Gas & Vacuum Systems, and serve hundreds of thousands of people on a daily basis without incident.
Q. How can we be assured the system will be reliable when needed?
A. Through inspection, testing and maintenance (ITM) requirements as outlined in Appendix L of the 2015 International Fire Code (IFC), FARS are routinely inspected for reliability of proper air quality and proper component function. According to 2015 IFC Appendix L:

“L106.1 Periodic inspection, testing and maintenance. A FARS shall be continuously maintained in an operative condition and shall be inspected not less than annually. Not less than quarterly, an air sample shall be taken from the system and tested to verify compliance with NFPA 1989. The laboratory test results shall be maintained on site and readily available for review by the fire code official.”

Q. Who owns and is responsible for the care and maintenance of the FARS?
A. As is the case with other building protection and life safety systems such as fire alarm systems, fire sprinklers systems and smoke control systems, the FARS is owned and maintained by the building owner.

Q. Who ensures that the air monitoring systems are being supervised?
A. “L104.15.2 Alarm supervision, monitoring and notification. The air monitoring system shall be electrically supervised and monitored by an approved supervising station, or where approved, shall initiate audible and visual supervisory signals at a constantly attended location.”

Q. Who is qualified to install FARS and perform ITM work on FARS?
A. Trained and certified fire protection, plumbing and mechanical contractors are qualified to perform this work. Some FARS providers have developed a certification course for those responsible for these functions. They recommend that code enforcement agencies require, through state or local ordinances, that any individual who installs or performs work on FARS should have this certification.

As is the case for all building-installed life safety and protection systems, it is crucial that code enforcement officials ensure that building owners maintain their systems so that they will function properly in an emergency situation. With proper installation and ITM standards, meaningful code enforcement, responsible ownership, and adherence to the 2015 IFC Appendix L, FARS can be guaranteed to deliver a safe and reliable source of breathing air in time of need.