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MARCH 2008

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**IN THIS ISSUE**

## Preparing for a flood

Backup power

Precast foundations

State wireless  
trade show

DAS site deployment

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24

# Features



20

## 20 Precast Foundations Speed Site Development, Construction

*John Cardwell*

Among other advantages, site developers will be pleased with the flexibility the precast foundations offer at environmentally and archeologically sensitive sites.

## 22 Centerspread: Tower of the Month

In this month's centerfold, Aero Solutions' monopole upgrade system improves load carrying capacity and blends aesthetically into the structure. *Photography by Scott Neil Photography.*

## 24 Fuel Cell Systems for Extended Backup Power

*Amy Anderson Clem*

The FCC ruling for backup power at central offices, cell sites, remote switches and remote terminals puts fuel cell systems in the spotlight for their reliability and extended run times.

## 39 NYSWA to Hold State Wireless Trade Show

*J. Sharpe Smith*

The event marks the first time a state wireless association has conducted a trade show.

# Departments



## about the cover

Great looking RF Transparent Concealment should be so good you don't know it's there. The cover photo is a Peabody RFTC cupola on top of a building at the Pelican Hills Golf Center in Newport Beach, CA. The screen walls for this AT&T wireless site were custom built to size and installed on-site by the GC.

*Photos courtesy of Peabody Engineering*

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14

- 6 Publisher's Note**
- 8 Editorial Comment**
- 10 PCIA Proactivities**  
Regulation presents significant obstacles to the timely development of wireless infrastructure.
- 14 Risky Business**  
Take steps to prevent flood damage, minimize property loss and offset financial losses.
- 18 Vertical Assets**  
Johnny Multiple pines for a tower at his favorite skiing destination.
- 32 Shelter-Cabinet-Enclosure Product Showcase**  
Eleven manufacturers offer products for your selection.
- 36 DAS Forum**  
Bob Ritter, esq., explains how DAS site deployment is flexible and scalable.
- 40 SWAP Meet/Meet SWAP**  
Ron Toler spotlights the Arkansas-Oklahoma Wireless Association.
- 42 Advertisers Index**
- 42 Professional Directory**

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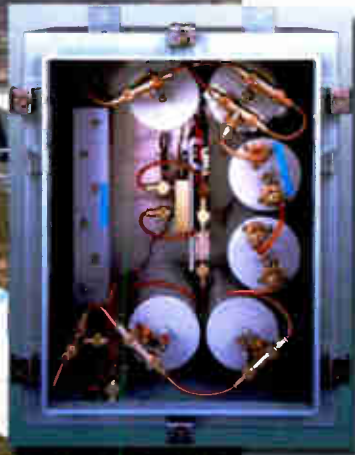
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# Professional Qualifications

Perhaps I'm somewhat of an "old school" kind of guy – despite my renowned youthful appearance. Many in this industry either heard of or worked with my father, Richard L. "Dick" Biby, P.E., over the years. He is a stickler for detail: Document every number, every fact, and every figure. Check and re-check. When you finally put your stamp as a state-licensed, registered professional engineer (P.E.) on the bottom line, it means something. The statement that accompanies a P.E.'s signature is one I believe in: "Under penalty of perjury, I state that the above is true and correct to the best of my knowledge and belief." I carry \$2 million worth of insurance to back that up, too.

Every state has a professional engineering registration standard. The standards vary from state to state, but it comes down to basically the same thing: To sign the statement, the P.E. doesn't have to review every detail of the work. The P.E. doesn't have to do the work himself. But the P.E. must fundamentally believe it is accurate and has been done correctly. The P.E. must know enough



about the subject of the work to tell whether the results are "in the ballpark". Strangely enough, this does not mean the P.E. has to have an education or training for the subject involved with the work to be certified.

For example, in some states, a structural engineer can certify engineering reports about non-ionizing radio frequency radiation. I would never sign a structural analysis – I have no formal



Richard L. 'Dick' Biby, P.E.

training for it.

In "the good old days" the FCC actually regulated a lot of the details of a communications system, and we P.E.s actually made money because people sought us out for our skills, knowledge and guidance.

Today, although relatively few matters require a P.E. certification, many jurisdictions require P.E. certification and thus the insurance coverage that goes with it for anything involving human health and safety. This comes up most often with studies of RF exposure or electromagnetic environmental studies. The structural engineering side of the house has strict requirements on certification, too.

Sorry if this seems like a rant, but that is the joy of owning the magazine: I get to use this as personal blog space sometimes.

In a coming issue, I hope to offer a feature article about certifications, associations, and training standards of various disciplines within our industry.

Meanwhile, I've received some kind letters lately, and we'll see about publishing some in the next few issues. Keep the comments coming – good, or not so good.

Make it a great month!

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by Rich Biby, Publisher  
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# On Top of the Mountain

For someone who grew up in the shadow of the 14,000-foot peaks of Colorado's Front Range mountains, the 6,288-foot height of Mount Washington in New Hampshire didn't seem to me as though it would amount to as much as, say, Pike's Peak. Yet I would hear tales about the extreme weather at Mount Washington, and also the mountain's place in telecommunications history.



My visit to Mount Washington was on the Fourth of July in 2005. One might reasonably expect good weather on the mountain during the summer, but I'm told it isn't necessarily so. Our

contributing editor, J. Sharpe Smith, not only forwarded the photograph of one of the buildings atop the mountain that was taken in winter, he made the observation that hikers are well advised to be prepared for a rapid change in the weather for the worse – much worse, even during summer climbs.

I took the relatively easy way. The auto road. It earned me a bumper sticker that reads, "I survived the Mount Washington toll road." Smith, who is an avid hiker, and who has been known to coax me along on his adventures, normally scoffs at any way of topping a mountain besides foot-power. But even he acknowledged that Mt. Washington looks so spectacular that if he had to use mechanized horsepower to make the journey, he might consider it.

Our friend Scott Fybus, who among other things – many other things – publishes the wonderful calendar with pictures of towers, wrote about at least one part of the history: "Working with John Shepard, the own-

er of a Boston department store chain, [Maj. Edwin H.] Armstrong built the first FM network atop two New England peaks: Mount Asnebumskit in Paxton, near Worcester, Massachusetts and Mount Washington itself."

Fybus continued, "Mount Washington has lots of antennas, including FM broadcast, TV, microwave and two-way radio. No cellular, though. The elevation is too high for cellular. The museum in the Sherman Adams Summit Building has some limited information and exhibits related to Armstrong's station and some other radio-related history connected with the mountain."

As we come out of the winter months and look forward to spring, we are reminded of the workers who have to perform tower construction and maintenance services in all kinds of weather. Sometimes it may not be possible. At Mount Washington, for example, the temperature has reached as low as -47 degrees. The average wind speed is 35 mph, and hurricane-force wind occurs

every third day, on average.

That's too much for me. I believe it could give Smith second thoughts. But I expect there are tower hands who

**Mount Washington has lots of antennas, including FM broadcast, TV, microwave and two-way radio. No cellular, though.**

have done what they could to continue construction and maintenance services under conditions that were far from optimum – though with due regard to safety despite the difficulties, and stopping the work when they should.

For those who do not climb the towers, I'm not sure a visit to Mount Washington offers even a taste of what it must be like, but it does offer a view. agl

## Pictures of the Month:



**Mount Washington in winter, when the actual temperature may dip to -47 degrees with a wind chill of -120 degrees. Photo: Trango Broadband Wireless.**



**Mount Washington in summer, when wild storms can spring up with little notice. It was a beautiful day with little wind during my visit.**

by Don Bishop, Exec. Editor  
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# Site Development

by **Jacqueline McCarthy, esq.**



Regulation of wireless infrastructure presents significant obstacles to the timely development of wireless infrastructure. During a time when our industry faces increasing demands for speed to market and robust infrastructure, these obstacles become all the more problematic. Fortunately, there are numerous opportunities for our industry to articulate how public policy should encourage wireless infrastructure. Also, our industry has an opportunity to aid site development through continued efforts to enact pro-siting legislation at the state level.

Federal regulatory regimes challenge wireless site development in

various stages of its "life cycle." The process established by the FCC's Nationwide Programmatic Agreement (NPA), established to coordinate approvals with state historic preservation offices and Indian tribes, has much inefficiency. PCIA's Regulatory Committee has formed an NPA Working Group to identify these problem areas and to strategize on the most effective ways of communicating these points to other stakeholders and to the FCC.

Also affecting site development in its entitlement phase is the proliferation of municipal consultants who review zoning applications, and who often add delay, cost and uncertainty to the process. PCIA takes every available opportunity to engage with jurisdictions considering the hiring of these

consultants, explaining how some of these services can actually result in *decreased* wireless coverage in their community. Likewise, PCIA's State & Local Government Committee is continually monitoring the zoning landscape nationwide to identify states in which pro-siting legislation is appropriate to defend against the practices of municipal consultants.

At the construction phase, the FCC's order requiring back-up power at all wireless facilities adds a burdensome equipment requirement that affects site development. PCIA has filed a Motion to Intervene in the federal appeals process challenging the order, and we will continue to express how the order is inappropriate and ineffective.

The current regulatory environment gives us numerous opportunities to

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articulate the critical importance of wireless infrastructure. In December 2007, PCIA submitted comments to the FCC's Joint Advisory Committee on Communications Capabilities of Emergency Medical and Public Health Care Facilities ("JAC"). The JAC, which reported its findings to Congress in February, was an important forum for PCIA to explain how wireless infrastructure is necessary for all communications networks, both for public health care and in general. We also expect a similar opportunity to explain infrastructure's role in communications networks when the FCC issues its annual Notice of Inquiry regarding Section 706 advanced wireless services (i.e., broadband). In general, the aggressive deployment requirement of the recent AWS and 700 MHz spectrum auctions is an impactful platform on which to express the critical role of infrastructure.

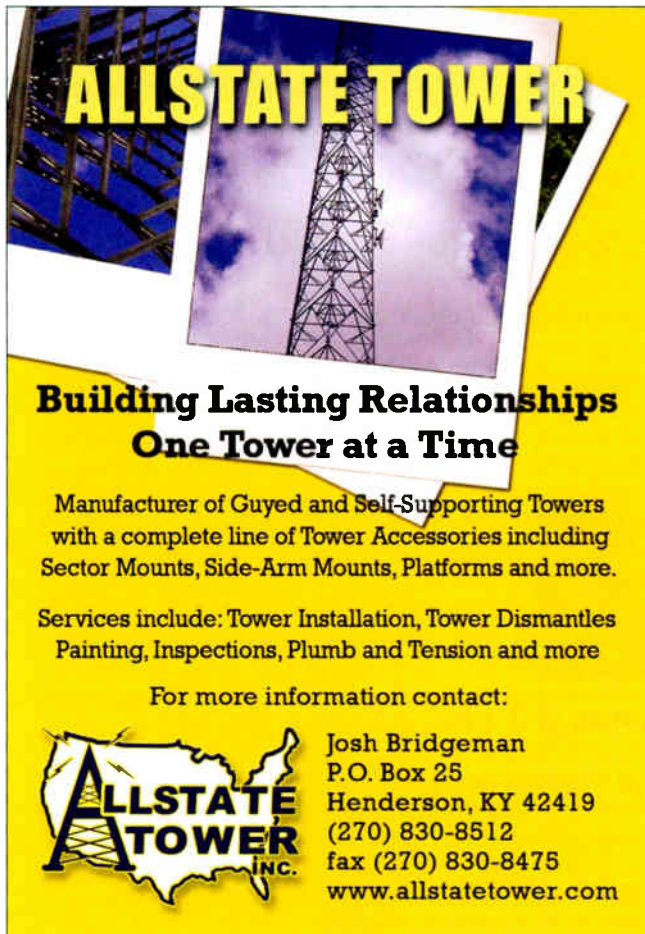
The enactment of state pro-siting legislation creates a regulatory environment where local zoning review is consistent and reasonable, and codifies "collocation by right," eliminating public hearings for sites using existing structures. Working with state wireless associations and the local expertise they offer, PCIA is coordinating efforts to enact such legislation in Alabama and South Carolina in 2008 and is monitoring some 10 states in which such legislation may be appropriate in 2009 and beyond. To follow up on recent pro-siting legislative successes in states such as Tennessee, California, Florida and North Carolina, PCIA works with the State Wireless Association Program to educate jurisdictional decision-makers about the effect of the legislation, and offers resources on how jurisdictions can comply.

PCIA's government affairs team advocates for policies that encourage site

development. We intend to influence policy makers to create a regulatory landscape that is receptive to all the benefits that wireless infrastructure brings to communities across the nation. **agi**

Jacqueline McCarthy, esq., is director of government affairs at PCIA – The Wireless Infrastructure Association, Alexandria, VA.

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World Radio History

# PLANNING AHEAD FOR A POSSIBLE FLOOD

Steps to take to prevent flood damage; minimize property loss if flooding occurs; and offset financial losses that flooding may cause.

by David Saul, AAI

Floodwaters brought by the ruthless Hurricane Katrina in 2005 damaged thousands of homes and businesses. Most communities in the United States *can* experience some degree of flooding after spring rains, heavy thunderstorms or winter snow thaws.

develop slowly over a period of days. Flash floods, however, are like walls of water that develop in a matter of minutes. Flash floods can be caused by intense storms or dam failure.

*Coastal* flooding occurs when hurricanes and storms produce heavy

houses are often swept away by the force of the water.

*River* flooding is normally seasonal because of snowmelt or heavy rains. The water fills the river basin too quickly and the river flows over its banks. The floodplain becomes covered with water, often damaging homes and other property.

*Flash* flooding is caused when small and powerful fast-flowing rivers form quickly because of excessive rainfall or dam failure, sometimes triggering catastrophic mudslides. Flash floods can be powerful enough to carry away roads, bridges, and other structures, and can occur with little warning.

Points to consider when planning for floods include:

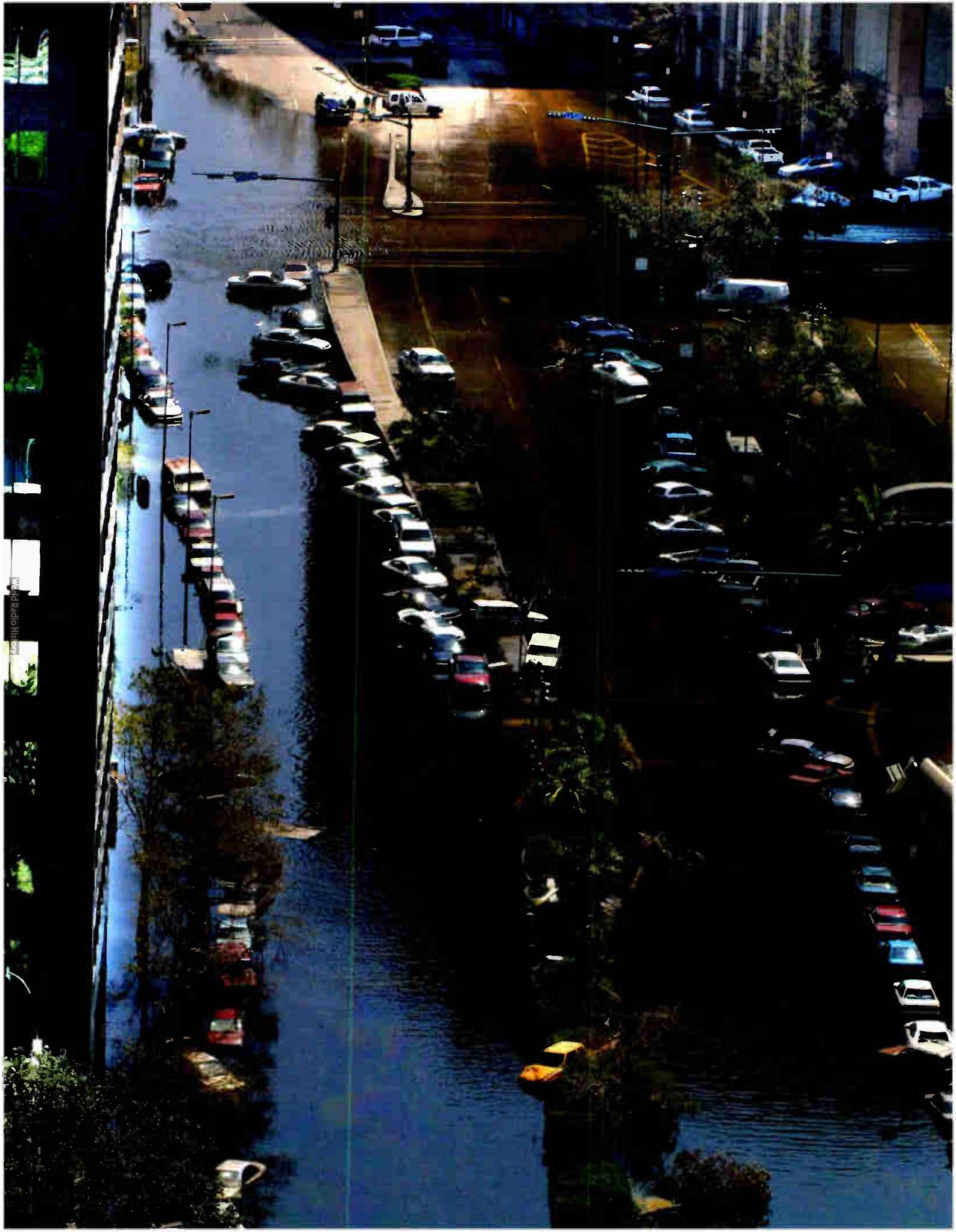
- Ask your local emergency management office or insurance agent whether your facility is in a flood plain. Learn the history of flooding in your area. Learn the elevation of your facility in relation to streams, rivers and dams.
- Review the community's emergency plan. Learn its evacuation routes. Know where to find higher ground in case of a flood.
- Establish warning and evacuation procedures for the facility. Make plans for assisting employees who may need transportation.
- Inspect areas in your facility subject to flooding. Identify records and equip-



Eyewall of Hurricane Katrina as it was making landfall on the Louisiana coast. Photo: Flight Engineer Dewey Floyd, NOAA AOC.

A flood is a great flowing or overflowing of water, especially over land areas that are normally dry. There are several types of flooding. Most floods

rains or drive ocean water onto land. Coastal flooding is also produced by tidal waves created by storms, earthquakes, or volcanoes. Beaches and



ment that can be moved to a higher location. Make plans to move records and equipment in case of flood.

- Purchase a NOAA Weather Radio with a warning alarm tone and battery backup.
- Listen for flood watches and warnings, defined as follows:

*Flood Watch* – Flooding is possible. Stay tuned to NOAA radio. Be prepared to evacuate. Tune to local radio and television stations for additional information.

*Flood Warning* – Flooding is already occurring or will occur soon. Take precautions at once. Be prepared to go to higher ground. If advised, evacuate immediately

Consider the feasibility of flood-proofing your facility. There are three basic methods.

1. Permanent flood-proofing measures are taken before

a flood occurs and require no human intervention when floodwaters rise.

They include:

- Filling windows, doors or other openings with water-resistant materials such as concrete blocks or bricks. This approach assumes the structure is strong enough to withstand floodwaters.
- Installing check valves to prevent water from entering where utility and sewer lines enter the facility.
- Reinforcing walls to resist water pressure. Sealing walls to prevent or reduce seepage.
- Building watertight walls around equipment or work areas within the facility that are particularly susceptible to flood damage.
- Constructing floodwalls or levees outside the facility to keep flood waters away.
- Elevating the facility on walls, columns or compacted fill. This approach is most applicable to new

construction, though many types of buildings can be elevated.

2. Contingent flood-proofing measures



**Purchase a NOAA Weather Radio with a warning alarm tone and battery backup. Photo: NOAA.**

are also taken before a flood but require some additional action when flooding occurs. These measures include:

- Installing watertight barriers called flood shields to prevent the passage of water through doors, windows, ventilation shafts or other openings.
- Installing permanent watertight doors.
- Constructing movable floodwalls.
- Installing permanent pumps to remove floodwaters.

3. Emergency flood-proofing measures are generally less expensive than those listed above, though they require substantial advance warning and do not satisfy the minimum requirements for watertight flood-proofing as set forth by the National Flood Insurance Program (NFIP). They include:

- Building walls with sandbags.
- Constructing a double row of walls

with boards and posts to create a “crib,” then filling the crib with soil.

- Constructing a single wall by stacking small beams or planks on top of each other.

- Participate in community flood control projects.
- Consider the need for backup systems:
  - (1) Portable pumps to remove flood water.
  - (2) Alternate power sources such as generators or gasoline powered pumps.
  - (3) Battery-powered emergency lighting.

Business owners considering whether or not to purchase flood insurance should carefully consider that 75 percent of presidentially declared disaster areas are flood-related; one-fourth of flood

insurance claims are filed by business owners located in low or moderate flood zones; and of all known natural disasters, flooding is the most common and widespread.

The decision whether to purchase flood insurance is often made with regard to the flood zone in which the business is located. However, the statistics cited prove that floodwater do not respect risk classifications and flood-zone maps. Purchasing flood insurance merits serious considerations by all business owners.

Flood insurance typically is not included in standard business policies. If you need help in determining what your current policies already cover and where your flood coverage gaps may be, call your insurance agent. **agl**

David Saul is vice president of Atlantic Risk Management, Columbia, MD, and an accredited risk advisor in insurance (AAI). His email address is: [dsaul@atlanticrisk.com](mailto:dsaul@atlanticrisk.com).



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# Beauty Is In the Eye...

by R. Clayton Funk

One day Johnny Multiple is flipping through the channels on his television in his office, tired of all the bad financial news and the talking heads on various cable channels saying the stock market will crash resulting in the loss of billions of dollars. He stops on a channel showing people skiing, snowboarding and enjoying outdoor time in the mountains.



“That’s it!” he decides, talking aloud to himself. “I need a break and skiing sounds like the perfect vacation for a long weekend!” Johnny hops on line, books his flight and hotel room at his favorite ski resort, Motherlode, in less than 15 minutes, and gets back to focusing on work since he knows in less than 48 hours he’ll be away from his computer and ubiquitous wireless access for a much needed break.

Two days later Johnny is riding up a chair lift to the top of the mountain at Motherlode. The weather before he got to the resort had perfect conditions for establishing a base of packed powder with a top layer of several inches of freshly fallen snow. Johnny, in taking some deep breathes, begins to relax and appreciate the scenery.

The mid-day sun is trying to peak through the clouds; the wind is lightly blowing through the trees; the ski runs don’t look too crowded; and the view down the mountain and through the various valleys is spectacular. His serenity is broken by his phone ringing with his newly downloaded jingle, “I’m All Out of Love” by Air Supply.

“What?!?!” he thinks to himself, “my phone shouldn’t work up here.” Fumbling with his ski gloves and trying not to drop his poles, Johnny pulls out his phone and sees where it is his investor, Betty Boardmember from Flush with Cash

Capital. Pausing for a moment and debating whether or not to answer it, Johnny just lets his phone ring through to voice mail, mildly miffed that his ringing phone interrupted his mellow thoughts.

But Johnny couldn’t stop thinking about the phone working this high up on the mountain. He starts scanning the trees and tree line, seeing if he can spot a camouflaged tower. His experienced eye keeps looking for the tell tale sign

of a “tree” that is 30-50 feet taller than any other existing tree and with branches that look anything but natural – but he can’t find where the signal may be coming from. Based on everything he knows he doesn’t think the wireless signal and coverage would be so strong if the wireless company tried to shoot the signal up the mountain from the rooftop antennas installed in the ski village. How did they get coverage, Johnny asks himself, as



the chair lift nears the top of the mountain ... *and then he sees it.*

Now Johnny has seen many, many towers in his day. He's been rendered speechless at the sight of a newly built monopole built less than a quarter-mile from the ocean, the steel glistening from the sunlight as it bounced off the water. He's been awestruck at some unique engineering feats that have resulted in towers being able to be erected in some incredibly challenging places and at heights over 2000 feet AGL. He's been amazed at how a tower originally built for four carriers can be modified to hold a seventh carrier because the carriers have no other options. But what stood before him took his breath away and caused him to freeze in his tracks immediately after getting off the chair lift.

The 100-foot self-supporting tower, resting solidly at the very top of the mountain less than 50 yards from him, loaded with antennas and lines, gave Johnny the obvious answer as to how his phone worked coming up the ski lift. He eyeballed the tower, the one, common, wood-paneled, large shelter with multiple doors and subdivided for carriers, the sizeable backup generator, all the coaxial cable running up all three legs and thought: *perfection.*

At this moment the struggling sun broke through the clouds and the rays illuminated the ice loaded on the steel and antennas and lines, giving the tower the appearance of a brilliantly sparkling diamond. Johnny couldn't move, despite the cries of people trying to get off the ski lift, yelling at him to move to the side and get out of the way. "How did they get that built? How did they get approved? Who owns it?" he wondered, before glimpsing the FCC-mandated sign that showed 800 Pound Gorilla Tower Company to be the site owner.

With no warning, all of the sudden Johnny found himself flat on his back, snow running down the back of his ski jacket as his legs were swept out from under him by a fellow skier who couldn't stop himself getting off the chair lift.

"Hey, you idiot!" the wayward skier exclaimed. "Quit looking at that freakin' tower and get out of the way! Those

things are ugly, anyway." Picking himself up and brushing off, the disgruntled skier took off but not before giving Johnny an unfriendly salute.

Too bad he couldn't understand and appreciate the masterpiece in front of his eyes, Johnny thought, more content than ever as he skied away to do his first run of the day. He knew that after an exhilarat-

ing ride down the mountain he would be treated time and time again at the top of the lift with the sight of the tower that he wished he owned. **agi**

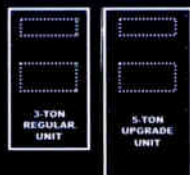
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# Precast Foundations Speed Site Development, Construction

Among other advantages, site developers will be pleased with the flexibility the precast foundations offer at environmentally and archeologically sensitive sites.

by John Cardwell

Environmentally friendly precast foundations made of individual concrete blocks can reduce construction schedules by as much as 75 percent. The use of precast foundations makes site construction easy to manage. Many sites using such foundations are built in a single day.

Typical sites built using this method include a precast foundation, an equip-

ment shelter, a precast screen wall and a monopole antenna support. To date, nearly 200 sites have been developed with the precast foundations.

market for a single purpose: rapid deployment of permanent cellular network sites. Since then, the foundations also have been used for other applications. The post-tensioned foundations are deployed at grade level and rarely require excavation. As a result, some locations previously not considered practical for telecommunications sites

minimal effect upon the native soil.

Precast foundations were designed for permanent installation, but they can be disassembled and removed from a site with minimum effect upon the environment. Site acquisition professionals sometimes find an advantage when they discuss their use with potential landlords because a precast foundation can solve site remediation problems. Landlords are becoming increasingly wary of the potential for creating a need to make environmental disclosures. Should a site be removed from their property, they may not want the burden of disclosing buried remnants of the monopole caisson. Because the native soil remains undisturbed and caissons are not required, a precast foundation eliminated the problem. Reflecting the fact that precast foundations tread so lightly on the environment, many municipalities waive site remediation fees where they are used.

Precast foundations also eliminate the need for drilling rigs and mixing concrete on site. That can be an advantage for site construction at rugged, remote locations. For example, a precast foundation was used to build a site for the Marine Corps atop Baker Peak on the Barry M. Goldwater Gunnery Range in Yuma, AZ. The logistics were complex because the military wanted to replace an existing site, built using freight trailers placed on a mountaintop. The replacement included a large-square-footage equipment shelter and three monopoles.



may be usable with the new method. For example, precast foundations work well at environmentally and archeologically sensitive sites. The foundations can be deployed at contaminated sites, such as those found in industrial areas, with

may be usable with the new method. For example, precast foundations work well at environmentally and archeologically sensitive sites. The foundations can be deployed at contaminated sites, such as those found in industrial areas, with

**20** above ground level



A view of a prepared site shows conditions just before the precast foundation is placed.



Work to place the precast foundation began at 8 a.m., and at 9 a.m., the last block of the foundation is being set.



Workers install post-tensioning hardware and adjust the post tensioning to 50 percent.



By 10:30 a.m., the post tensioning has reached 100 percent, and the foundation is complete.



By afternoon, workers set, anchor and ground the shelter and the monopole.



Prior to the end of the day, the monopole is stacked, and the installation of equipment begins.

The existing site was demolished, the location was prepared for new construction, a precast foundation was deployed and a precast building was assembled, three monopoles were stacked, electrical power was connected and the tests were completed for the electrical and HVAC systems in 10 days.

Precast foundations a suitable for monopoles, equipment shelters, equipment cabinets, power/telco pedestals, generators, and fencing that can include a precast screen wall with a split-face block formliner finish. Stealth applications include monopoles and mono-

poles. To further reduce how noticeable the site might be, a buried controlled environment vault can be used to place equipment below grade.

Various monopole configurations work with precast foundations. It is possible to coordinate with the monopole manufacturer to design and deliver anchoring hardware to cast into the "pole block" at the factory. Monopoles as high as 180 feet have been installed on precast foundations with few design restrictions. Various equipment shelters also work with the foundations, whether the shelters themselves are precast or not.

Meetings can be arranged to familiarize potential users of precast foundations with their applications from the perspectives of construction management, engineering, site acquisition, purchasing and consulting. Meetings also can be arranged to offer representatives of municipal government information prior to submitting proposed sites for plan review. **agi**

John Cardwell is Account Executive —Western Region for Oldcastle Services Indianapolis, IN. He can be reached by email [john.cardwell@oldcastleprecast.com](mailto:john.cardwell@oldcastleprecast.com)

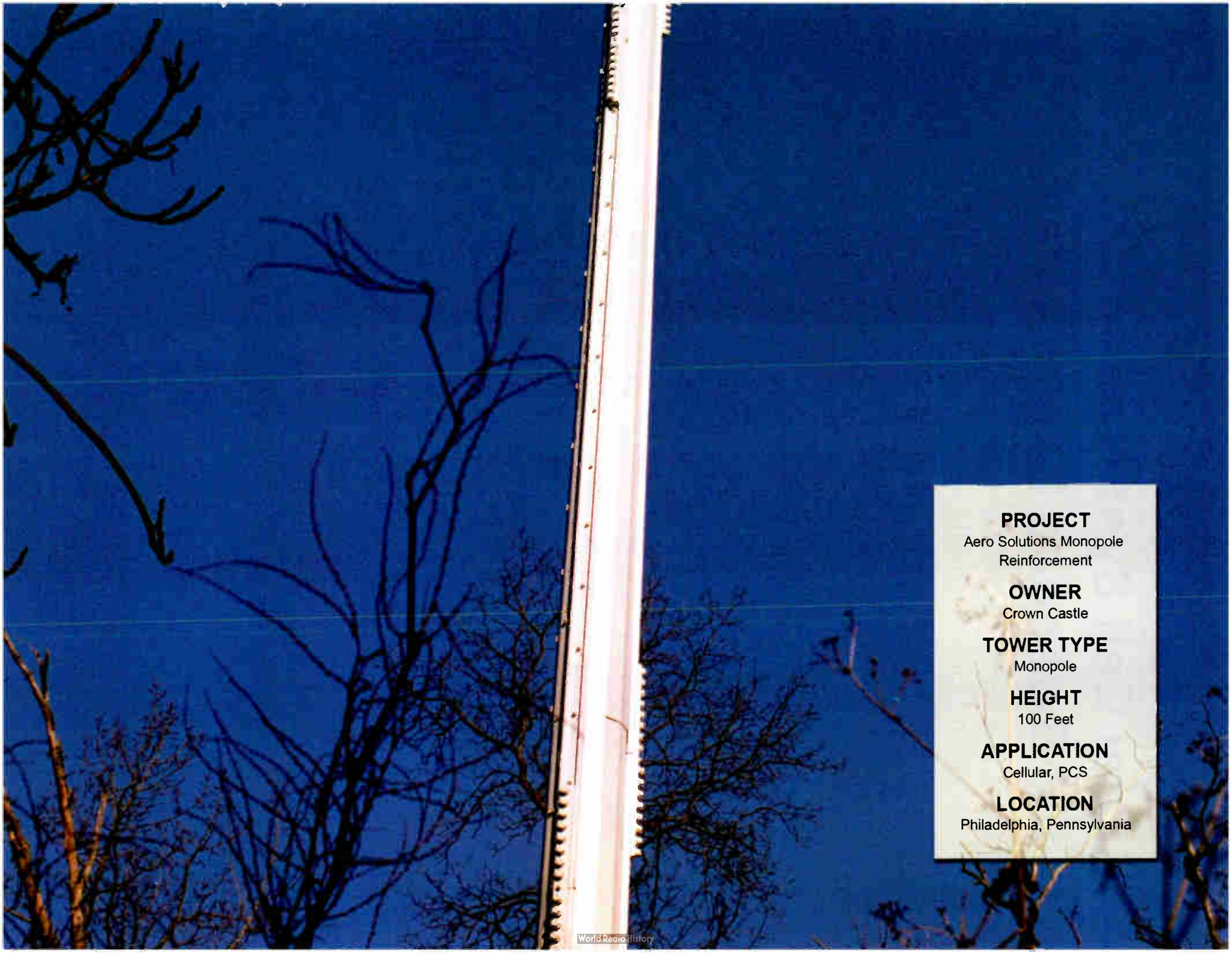
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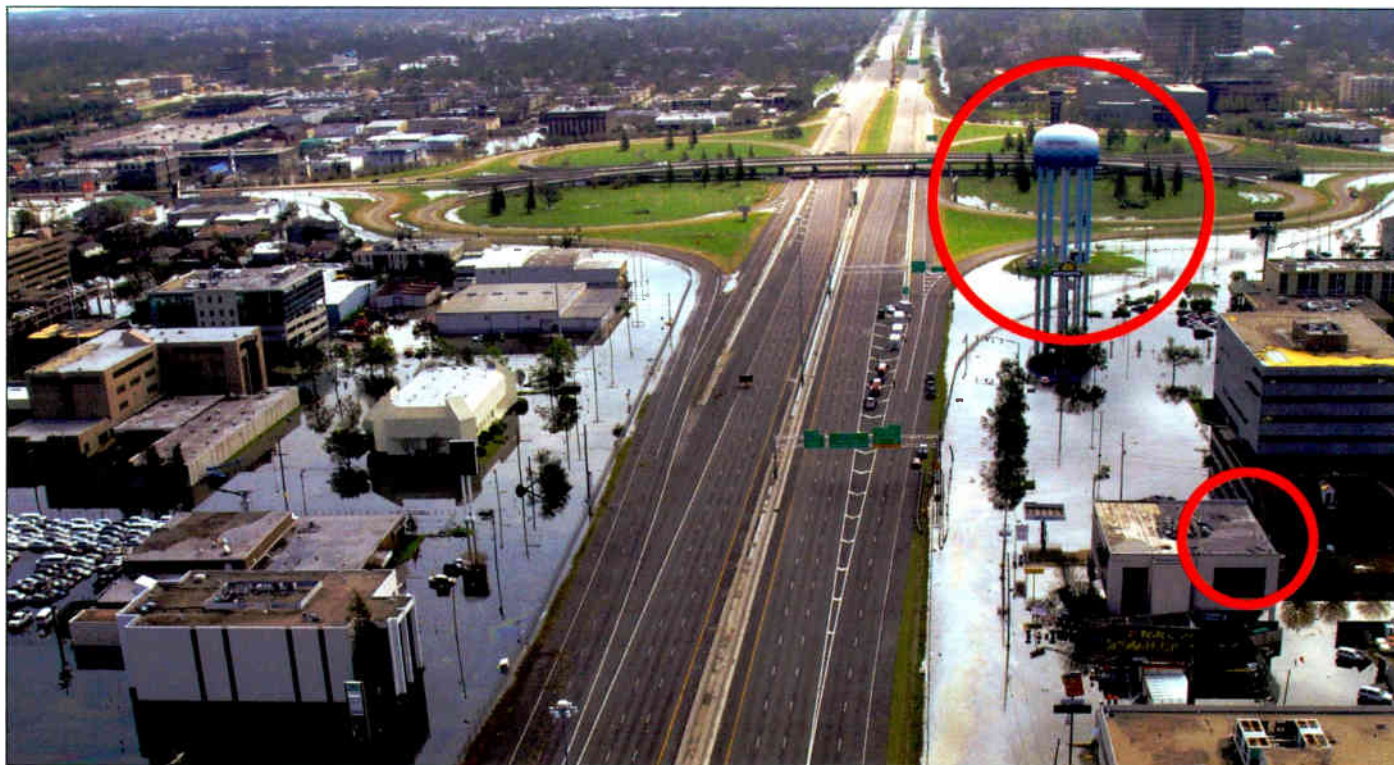
Cellular, PCS

**LOCATION**

Philadelphia, Pennsylvania

# Fuel Cell Systems for Extended Backup Power

The FCC ruling for backup power at central offices, cell sites, remote switches and remote terminals puts fuel cell systems in the spotlight for their reliability and extended run times.



Based on the recommendations made by an independent panel reviewing the effect of Hurricane Katrina on communications networks, the FCC adopted a rule requiring communications providers to have significant backup power. The ruling requires providers to maintain emergency backup power for a minimum of 24 hours for central offices and eight hours for cell sites, remote switches and remote terminals

that are normally powered from local AC commercial power. The ruling is encouraging providers to reassess their existing backup power systems and explore new technologies capable of providing cost-efficient extended-run backup power systems. The problems that arise as carriers search for solutions with extended run times – such as space concerns, sustainable energy and environmental considerations, upgrade

cost and concerns about timing – are not insignificant.

So what options are available to harden sites and comply with the ruling? There are the traditional solutions – lead-acid batteries and generators, among others – but with each of those options comes a host of problems. Battery-based solutions are heavy and temperature sensitive. They have a limited lifetime, and they are costly to dispose of when they reach the end of their service life. Generators are robust but require maintenance, are difficult to site and are not “environmentally friendly.”

## PEM fuel cell

The need for reliable extended-run

**In this aerial view of flooding in New Orleans taken on Aug. 30, 2005, notice two small cell sites, the one at the water tank tower and the one with three panel antennas on a bracket at the corner of a small commercial building. They're almost too small to see in this wide view. The FCC would require even the small site on the rooftop corner to have at least eight hours of backup power. Photo by Jocelyn Augustino/FEMA.**

**24** above ground level



by Amy Anderson Clem



backup power systems has been an on-going challenge for the telecommunication industry. Several members of the proton exchange membrane (PEM) fuel cell community have developed and are providing innovative, robust and application-appropriate solutions to meet those needs. These PEM fuel cell systems typically range in power output from 1 kW to 5kW and operate on cylinders of compressed hydrogen to provide backup power with low emissions. Over the past few years, several telecommunication providers have successfully deployed systems on their networks. The FCC's ruling highlights that the requirement for longer run times has become a non-ne-

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At this telecommunications site, an integrated fuel cell system works together with a solar panel array to provide extended-run backup power.

and content and cell phones function as the primary means of communications, reliable backup power is of particular importance.

In parallel, recent natural disasters – highlighted particularly by the FCC post-Katrina ruling – county- or state-wide power outages and national security threats have shown a need for increased backup time requirements in light of recent widespread events that resulted in days of grid power outages. Fuel cell systems are installed in a variety of locations, with most sites presenting unique installation challenges. One recurring issue at many of these sites is that compressed hydrogen is not feasible in some backup situations due to siting, hydrogen delivery and fueling issues.

A challenge to site managers is meeting these increased backup power run time requirements while avoiding the siting issues associated with valve-regulated lead-acid (VRLA) batteries, diesel generators and compressed hydrogen fuel tanks. Included in the challenge is identifying a solution

gotiable component to carriers' backup power solutions. On the commercial side, telecommunication providers are competing with one another and working to differentiate themselves

based network quality and reliability. As a result, fuel cell backup power systems are being deployed at more and more outside plant facilities. As cellular networks process more data



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**180 towers**  
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**Diamond Communications, LLC**

**Millennium Telecomm LLC**  
*has conveyed the assets comprising*  
**19 Towers**  
*in Minnesota and Wisconsin*  
*to*  
**SBA Towers II LLC**

**ALBS Wireless Services, LLC**  
*has conveyed the assets comprising*  
**17 Towers**  
*in Illinois*  
*to*  
**Diamond Communications, LLC**

**Horvath Towers, LLC**  
*has raised*  
**\$8,000,000**  
*in equity capital*  
*from*  
**Peppertree Capital Fund, LP**

**Tower Site Solutions, LLC**  
*has conveyed the assets comprising*  
**7 Towers**  
*in Georgia and South Carolina*  
*to*  
**Optasite, Inc.**

**CitySwitch LLC**  
*has conveyed certain tower assets*  
*in Georgia and Indiana*  
*to*  
**SBA Towers II LLC**

**Horvath Communications, Inc.**  
*has conveyed the assets comprising*  
**9 Towers**  
*in Indiana and Ohio*  
*to*  
**Optasite, Inc.**

**Big Bend Towers, LLC**  
*has conveyed certain tower assets*  
*in Florida and Georgia*  
*to*  
**SBA Towers II LLC**

**Eastern Shore  
Wireless Company, LLC**  
*has conveyed a PCS license in Salisbury, MD*  
*representing approximately*  
**195,000 Pops**  
*to*  
**Verizon Wireless**

**Tower Acquisition**  
*has agreed to convey certain tower assets*  
*to*  
**SBA Towers II LLC**

**Independence Media Holdings**  
*has conveyed the assets comprising*  
**3 Towers**  
*in Illinois*  
*to*  
**Optasite, Inc.**

**Master Towers, LLC**  
*has sold one tower in Eugene, OR*  
*to*  
**SBA Towers II LLC**

**4253311 Canada Inc.**  
*has conveyed its WCS licenses*  
*to*  
**NW Spectrum Co.**

**TriCo Wireless PCS, Inc.**  
*has conveyed certain PCS licenses in  
West Virginia representing approximately*  
**180,000 Pops**  
*to*  
**Verizon Wireless**

**TriCo Wireless PCS, Inc.**  
*has conveyed certain PCS licenses  
in Minnesota representing approximately*  
**414,000 Pops**  
*to*  
**Nsighttel Wireless, LLC**

**Highland Cellular Holdings, Inc.**  
*has conveyed certain PCS licenses in Ohio  
representing approximately*  
**400,000 Pops**  
*to*  
**Centennial  
Communications Corp.**

**Leap Wireless Liquidating Trust**  
*has conveyed its PCS license serving  
Pueblo, CO representing approximately*  
**324,000 Pops**  
*to*  
**Commnet Wireless, LLC**

**TriCo Wireless PCS, Inc.**  
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that meets the new standard for clean, "green" and cost-effective solutions. are the next evolution of fuel cell backup power technology for telecommuni-

**The reformer's ability to convert the liquid fuel into a hydrogen rich stream on demand eliminates the need to store hydrogen cylinders on site.**

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cations tower sites. These systems run on liquid fuels and can operate for days without refueling. They can offer a complete backup power solution

runs for days, like a generator.

With reliable solutions allowing clean sustainable extended run backup power, some fuel cell systems provide truly extended run times to meet those challenges and can be used by communications providers to comply with the FCC ruling.

**Fuel cell solutions**

Of the estimated 200,000 cell sites in the United States, tower companies operate about 115,000, and mobile-phone carriers manage the remaining 85,000. To comply with the FCC ruling for backup power, carriers are faced with no small task. However, solutions

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**Dual integrated fuel cell systems provide extended-run backup power.**

exist that provide truly extended run backup power. For sites requiring eight or more hours of backup power, a fully integrated fuel cell solution consisting of a fuel cell, a reformer designed to convert a liquid-fuel into high-purity hydrogen, fuel storage and balance of plant for remote monitoring suits the application. Such a system integrates two proven technologies – fuel reforming and purification through the reformer and power generation through the fuel

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cell – into one compact solution, to reduce footprint, improve serviceabil-

The re-former’s ability to convert the liquid fuel into a hydrogen rich stream

**Methanol is environmentally friendly as it biodegrades rapidly in air, soil and water, and can be made from renewable resources**

on demand eliminates the need to store hydrogen cylinders

ity and produce seamless power with a straightforward design.

on site. In addition, using a methanol/water mixture as the fuel allows a far

more compact fuel storage option and therefore a significantly smaller system footprint. The methanol/water fuel is significantly more energy dense with more kilowatt-hours of energy output per pound than compressed hydrogen cylinders. These factors make the integrated fuel cell solution ideal for many locations, such as remote telecommunications towers and government public safety radio sites, at which frequent hydrogen delivery is not practical.

**Advantages of methanol**

When telecommunications providers need extended-run backup power fuel cell systems, methanol is an excellent fuel. As a fuel, methanol offers a number of significant advantages over other hydrocarbons like natural gas, propane and gasoline – long-term storage capabilities and low temperature freeze resistance are among them. The methanol fuel mixture is a dense source of energy, requiring significantly less space to store. Methanol is already available in many consumer products, such as windshield washer fluid, engine additives, and transportation fuel, which ensures its availability to meet strict industry specifications. In addition, methanol is environmentally friendly as it biodegrades rapidly in air, soil and water, and can be made from renewable resources.

From an operational standpoint, methanol has an extremely low sulfur content that simplifies the reforming process, therefore reducing capital, operating and maintenance costs of a fuel cell system. With its low energy chemical bonds, methanol can be reformed to a hydrogen rich stream at relatively low temperatures (250°C to 350°C) while the other hydrocarbon fuels require higher temperatures (800°C to 900°C) for reformation. The lower reforming temperature ensures a faster system startup, improved efficiency, lower fuel processor costs and a longer fuel processor life. In this case, these factors contribute to the higher reliability, which is crucial to successful extended run critical power supply for remote sites.

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carrier in the United Kingdom, was tasked with replacing a liquid petroleum gas (LPG) generator at a remote off-grid radio transmission and base transceiver station (BTS) site in a natural park in Wales. At the difficult-to-access remote site, it was essential that the power remain on, as the site supports critical public safety communications. Finding an environmentally sound solution for the off-grid location was attractive to the carrier, yet dependability, reliability and seamless transition to power were all mandatory elements for the replacement system.

After evaluating many different fuel cell systems, Orange UK selected the integrated fuel cell solution and a liquid-fueled extended-run module for an extended-run solution. The 5 kW integrated fuel cell system was installed to work in combination with a 2.5 kW solar panel array, a 2.5 kW wind turbine and a 1000 AH battery bank to power telecom-

## The FCC's ruling has encouraged telecommunication carriers to evaluate the existing backup power systems

munications equipment located on the site. The fuel cell system was installed during the spring of 2007, replacing the LPG generator, and provides critical backup power for the hybrid system.

### Meeting the FCC's requirements



The FCC's ruling has encouraged telecommunication carriers to evaluate the existing backup power systems deployed across their networks and plan upgrades for sites that do not meet the backup power requirements. Traditional battery solutions, generators or fuel cell systems using bottle hydrogen are only practical for a limited number of sites. For remote locations, such as telecommunication towers where frequent hydrogen delivery is not possible, the integrated fuel cell system

is an ideal solution. By operating on a compact liquid fuel, these systems remove the need to use hydrogen gas as a fuel and eliminate logistical concerns. The fuel cell systems are designed to provide clean, reliable extended backup power for critical telecommunication sites. Integrated solutions can meet these new requirements by eliminating the need for on-site hydrogen storage, providing days rather

than hours of runtime and complying with the FCC ruling. **agl**

Clem is marketing communications manager at IdaTech, Bend, OR. IdaTech manufactures the ElectraGen XTi system, the integrated fuel cell solution described in the article. It sells a methanol/water fuel mixture called HydroPlus to use with the system.

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Fibrebond has developed a product to meet the needs of customers who require back-up power and yet are challenged by lease space. To meet this challenge, Fibrebond designed a new precast concrete shelter capable of supporting a generator on its rooftop via a special integrated steel platform. The initial project features a 9 ft. 8 in. by 18 ft. building that occupies a 10 ft. by 20 ft. leased space. However, buildings can be custom designed to work in the amount of lease space available.

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### Concrete and Steel Building Systems

Factory-built concrete and steel building systems from Modular Connections serve as wireless communication shelters, telephone system huts, fiber optic PoP facilities and 9-1-1 radio system shelters.

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[www.modularconnections.vpweb.com](http://www.modularconnections.vpweb.com)



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Fiberscreen fiberglass panels from Peabody Engineering are custom-molded to the size, texture and look as required for each site. The products are delivered ready to install. Fiberscreen panels have molded-in returns that connect together and to the building from behind. The concealment system is designed to blend in. Most any surface and color can be matched. Different looks include split-face brick, stucco, Spanish tiles, wooden shingles and plain cement walls. Special surfaces can be made to match site requirements. [www.peabodyconcealment.com](http://www.peabodyconcealment.com)

#### Shelter

Thermo Bond Buildings are designed, built, and wired to protect critical electronic equipment from the environment. The shelters are built to customer specification, with sizes ranging from 4 ft. x 6 ft. up to 24 ft. wide by 42 ft. in length. The specs that follow describe a "standard" Thermo Bond building; however, many custom options in materials and design are available. The minimum floor loading will be 200 pounds per square foot. The minimum roof loading will be 100 pounds per square foot. The minimum roof impact resistance will be 220 foot-pounds with no damage to either the exterior or interior of the roof or shelter. The minimum wall wind load is 120 mph. The enclosure is designed to stop air infiltration through any wall, floor or roof items when exposed to winds of 50 mph.

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### Metal Cabinets

The EPIC (Equipment Protection Integrated Cabinets) Series cabinet from VFP to provide a versatile space-efficient equipment housing. A modular bay provides expansion flexibility. Each bay is typically 30 in. or 60 in. deep and 30 in. wide. This size offers space for one or two standard equipment racks per bay. The metal cabinets are made with non-corrosive metals such as stainless steel or "galvaneal" coated metal. The cabinets come in any size or configuration. Quick disconnect HVAC units assist with quick modification of cooling configurations. Options include pre-wired and pre-installed interior components, such as lights, convenience receptacles, power distribution, HVAC systems, UPS systems, and generators.

[www.vfpinc.com](http://www.vfpinc.com)

### Tower Enclosures

FWT has developed a host of tower enclosure products including the Tree-Cell monopole, flagpoles, church and clock towers, stadium light poles, self-supporting towers with cladding, as well as painted monopoles that match the surrounding elements.

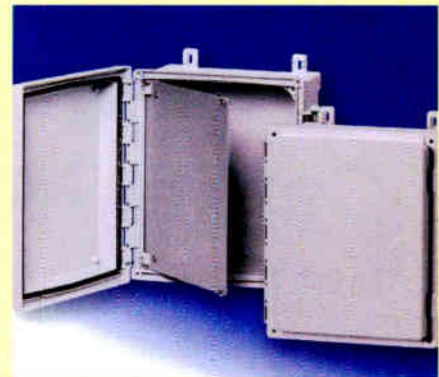
FWT's flagpole is both a communication site for cellular and a virtually undetectable, yet fully functional flagpole. Concealed lighting communication sites offer communities and wireless carriers yet another alternative in meeting a wide range of aesthetic requirements. Another hidden site option is shopping center signage, which is a self-supporting tower that has been encased in cladding to match the exterior of a shopping center. To establish a church cell site, FWT first erects either a painted monopole, which matches the exterior of the church, or a self-supporting tower, upon which cladding or brick is added to match the church facade.

[www.fwtinc.com](http://www.fwtinc.com)

### Weather, Vandal Resistant Shelter

Oldcastle's NXT-G shelter is lightweight, yet strong enough to withstand the elements. The G shelter is rugged and vandal resistant. Factory-assembled, it can be easily transported to difficult site locations like rooftops and sites with restricted space or limited access. If site access poses an obstacle, the kit form can be delivered to the site and assembled there. Heavily insulated wall panels decrease energy expenses and can be upgraded to a one- or two-hour fire rating. Sizes range from 120 square feet up to 340 square feet. Shelters adhere to most building codes. Options include remote alarms, fire suppression and first aid systems.

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# DAS Site Deployment: Flexible and Scalable to Meet Carrier Needs

by Bob Ritter, esq.

Ask distributed antenna system (DAS) network providers, equipment manufacturers and carrier deployment executives about the future of DAS, and to a person the reflex answer is the same, "It's a tool in the tool kit." But what exactly does that mean for carrier site development teams and the infrastructure providers that serve them?

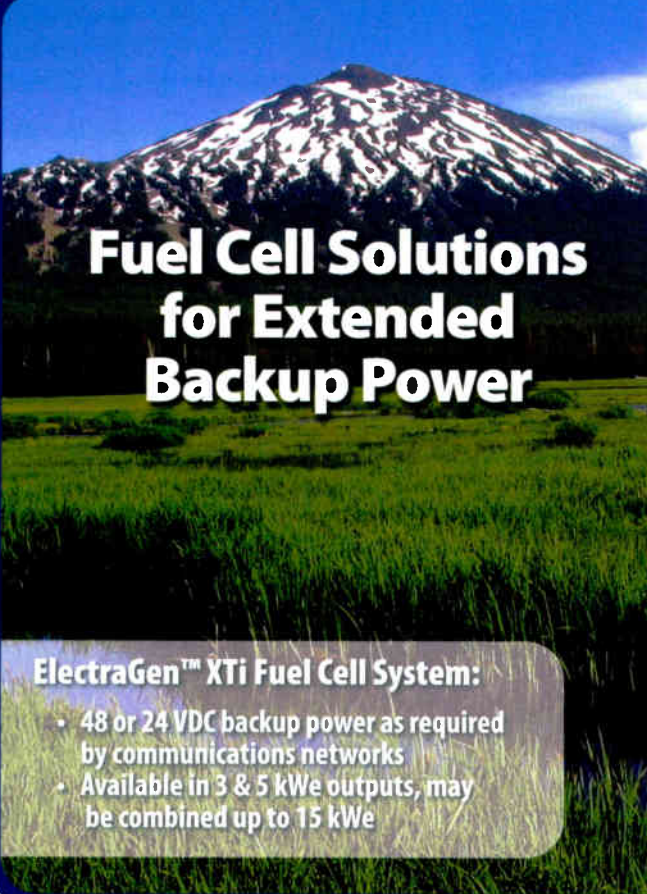
For wireless deployment managers and DAS providers, flexibility, scalability and timely deployment are keys to making DAS a useful tool. "Car-

riers want solutions which meet their budgets and deadlines. You can have the most amazing technology in the world, but if it doesn't meet those two goals, it won't sell," explained David J. Tanczos, Crown Castle's vice president of national site development. "In our five-plus years of experience in helping to evolve DAS, we have learned that DAS providers must be nimble and economical to succeed." Two recently completed Crown Castle deployments in the Pacific Northwest and Northern

California highlight this flexibility.

"As the nation's largest infrastructure provider, we offer a four-point value proposition to our customers to meet their deployment challenges," noted Tanczos. "If there are no available assets – either ours or a competitor's – available for collocation, Crown will develop a tower or a DAS network as appropriate. We recognize that to be helpful, any development project has to be scaled to our customer's coverage priority."

Crown Castle last year completed its



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A remote access node in Seattle includes two omnidirectional antennas placed in a favorable position at the top of a light pole that has no medium-voltage distribution lines to obstruct antenna placement.



Workers install part of a distributed antenna system on a utility pole in Seattle. Crown Castle used both panel and omnidirectional antennas at the remote antenna nodes depending on the surrounding terrain.

largest DAS project to date, a network blanketing high-value areas of Seattle. The 47-mile network route touches several upscale neighborhoods surrounding downtown Seattle that have long been coverage headaches due to challenging geography and local zoning concerns. Crown Castle handled design, permitting and construction for the entire network, providing a turnkey solution to the customer.

After successful launch of the network with the anchor tenant, Crown Castle recently commenced deployment of a second carrier to the network in rapid fashion since no additional permitting was required. "The equipment used to build the network supports multiple carriers, so the second tenant only required insertion of an additional card into the equipment box at each antenna location," explained Robert Gundermann, Crown

Castle's western DAS site development manager. "This scalability is a major advantage of neutral-host networks. As with towers, carriers can deploy much more rapidly by DAS collocation than through building networks from scratch."

In contrast to the large Seattle network, Crown Castle deployed a small network in Northern California to target a critical coverage gap on the edge of Silicon Valley. State Route 9, a vital transportation link

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carrying over 35,000 vehicles per day, has long been a carrier problem because it is a state scenic corridor which traverses some

## It is critical that DAS fit within the carrier's financial model

of the most expensive residential communities in America, explained Gundermann. "It was not an easy approval process,"

Gundermann continued. "We needed to obtain 21 different state and local approvals, but we were willing to take on the challenge so that our customers only have to sign a license agreement with us to get on the air. That's also why we constructed a multi-carrier neutral host network to accommodate up to four carriers."

In its two most recent collocations on the network, Crown Castle used a flex-

ible approach to reduce carrier cost.

For one customer, Crown Castle installed a rooftop repeater at the network hub location to send and receive signals from an existing macro site 200 feet away. "By feeding from the existing site, the customer saves roughly \$250,000 in capital cost. As a former carrier deployment manager, I understand what a huge benefit this represents," noted Pedro A. Miraz, Crown Castle's director of DAS development and implementation. "It is critical that DAS fit within the carrier's financial model, and we will be as creative as we can to deliver projects which fit the RF and financial benchmarks our customers need and demand."

For another customer recently installed on the system, the process was reversed. Crown Castle was able to add macro antennas to the roof of the hub location to leverage use of the base stations installed for the DAS network. "For our customer, this is an important 'two-for-one' solution," stated Miraz. "They got the DAS corridor coverage, while also covering the downtown area around the hub location. We were able to use our positive landlord and community relationships to garner additional benefit for our customer."

Tanczos added, "Because of our size and strong carrier relationships, our customers can trust us to propose the right solution. The vast majority of our customers' network deployments continue to occur on conventional towers. However, in certain circumstances, DAS becomes an appropriate solution that we believe we can provide on a cost-effective basis for our customers."

"With over 23,500 tower locations, existing DAS networks in key locations, local sales executives, and an active nationwide site development team, Crown Castle is always looking to leverage existing strengths while innovating for the future," said Tanczos. "We strive to be our customer's first choice, and we can help to solve their coverage challenges." **agl**

Ritter is an attorney with Crown Castle USA, Canonsburg, PA. His email address is [bob.ritter@crowncastle.com](mailto:bob.ritter@crowncastle.com). Crown Castle is a member company of the DAS Forum, [www.thedasforum.org](http://www.thedasforum.org).

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# NYSWA to Hold State Wireless Trade Show

by J. Sharpe Smith

In what will soon become a practice for all state wireless associations, a full day of education and dialogue is promised as the New York State Wireless Association convenes its inaugural 2008 Trade Show and Conference, to be held March 20 at the Saratoga Hotel and Conference Center, Saratoga Springs, NY.

Seminars will fill the morning, followed by a keynote speaker and luncheon. The afternoon will feature more seminars and time on the trade show floor.

"What is unique about our program is that it will cover what is going on in New York State, and it is accessible to people who may not have the time or the budget to travel to one of the national shows," said Adam Walters, one of the conference promoters.

The NYSWA tradeshow and conference are targeting a broad audience, beyond the executive level. Essentially anyone who works in the wireless industry in New York State is invited, from site acquisition to RF technical support.

Sessions will provide updates on the cellular build out of the Adirondack Northway corridor, environmental risks and how they should be dealt with through the National Environmental

Policy Act, a technology update and the effect of the FCC's cell site backup power mandate.

"We want to look at a long-term view of where the wireless communications industry is going and how it will affect the people of New York State," said Walters.

One of NYSWA's functions is to encourage a dialogue with municipal officials concerning the siting of wireless facilities. One of the afternoon sessions has been designated to educating these officials on the basics of wireless communications, wireless carriers and applications for new antenna site facilities.

"We want to try to dispel some of the myths and misunderstandings," said Walters. "What is needed is a dialogue on siting and operational issues. We are very excited about that."

The gathering will take place almost a year after the NYSWA became the 15th state wireless association and it marks the



**Adam S. Walters, secretary of NYSWA, on a conference session with municipal officials: 'We want to try to dispel some of the myths and misunderstandings.'**

first time a state wireless association has attempted a conference.

"We, at NYSWA, see education as a key role for the State Wireless Association Program, creating discussion and providing important information on the issues of the day," said Walters. "We also see the municipal outreach as a critical component to all the state wireless associations. We think the trade show is a great way to meet that obligation."

A show floor of 25 booths and more than 350 attendees are expected.

Registration is \$50. Register online at [www.newyorkstatewireless.org/events.htm](http://www.newyorkstatewireless.org/events.htm) or contact Steve Ruzzo at [steve.ruzzo@lighttower.com](mailto:steve.ruzzo@lighttower.com); 508-397-1765; or Abby Harrington at [abby.harrington@lighttower.com](mailto:abby.harrington@lighttower.com), 813-892-1815. To become a sponsor, place an ad in the brochure or to exhibit, contact Adam Walters at [AWalters@phillipslytle.com](mailto:AWalters@phillipslytle.com). **agl**

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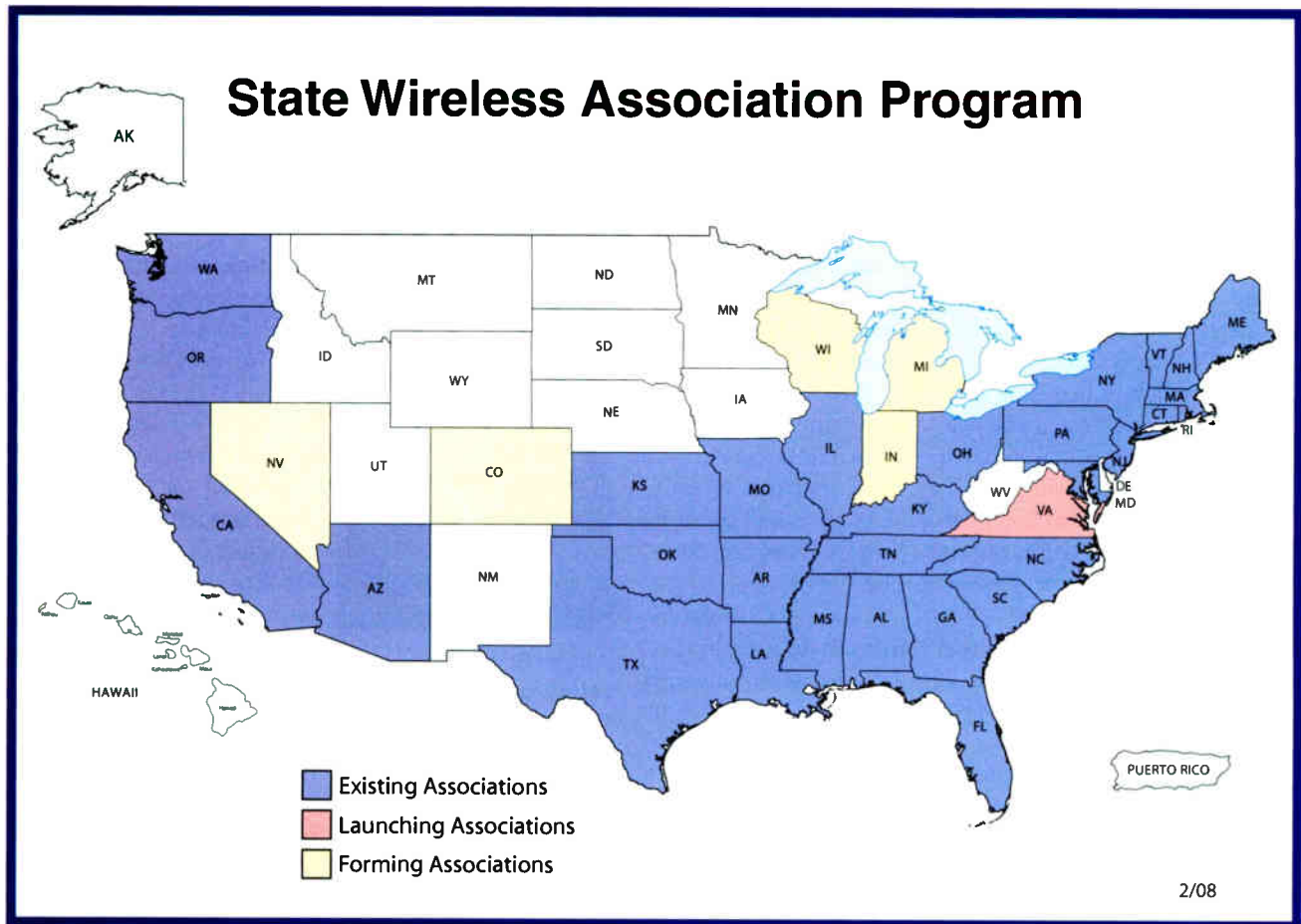
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**State Wireless Association Program**



# Meet: Arkansas-Oklahoma Wireless Association

by Ron Toler, president



## Arkansas-Oklahoma Wireless Association (AOWA)

**Meeting Location:** Rotates Between Little Rock and Oklahoma City

**Date Formed:** 2005

**Website:** [www.arokwireless.org](http://www.arokwireless.org)

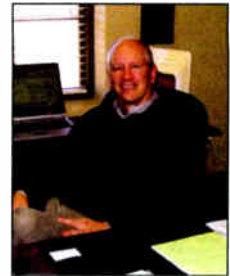
**State Charity:** Big Brothers Big Sisters

**President:** Ron Toler  
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[toler@siteexcell.com](mailto:toler@siteexcell.com)

The first meeting of the Arkansas-Oklahoma Wireless Association was held Oct. 19, 2005 in Fayetteville, AR. From that meeting of about 45 attendees, we have grown to a membership of 207. We are very proud of that growth and what the association has been able to accomplish. In fact, on the day of our first meeting, two of our board members and I attended a meeting with local municipal and county zoning officials to discuss the wireless industry and its purpose and goals. We as an organization feel very strongly that our purpose is to increase positive public awareness of our industry, and this is one of the many ways we are able to do that.

In the spring of 2005, I was approached by several people about forming a state wireless association. Frankly, I was skeptical about the value of this type of organization and delayed pursuing this. That summer, I attended the joint

meeting of the Tennessee, Georgia, and Alabama associations held in Birmingham. At the meeting, they brought together representatives from various Native American tribes, the FCC, and other leaders in the industry. There were panel discussions regarding the ongoing issues with the NEPA/SHPO requirements and various speakers. Several of our current board members were in attendance, and we immediately recognized the impact these associations could make in the community. When we got back to Little Rock we held an organizational meeting, and we were able to launch later that year. I think I can speak for all of our board members and dedicated officers and volunteers that it has been a rewarding experience and well worth the effort.



As I mentioned earlier, we have grown to a membership of over 200, and through our golf tournaments have raised in excess of \$20,000 for our designated charity, Big Brothers Big Sisters. We have been involved in re-writing legislation in Oklahoma pertaining to telecommunications facilities, and our legislative committee headed by Lee Ann Fager has been involved in other meetings with zoning boards and communities in Arkansas and Oklahoma.

Our goal in 2008 will remain the same as it has been since our inception: to continue to cultivate relationships between our industry and the communities we serve. **agl**

### AOWA Calendar/Events :

- Jan 31:** 1st Quarter Meeting – Hot Springs, AR
- Apr 16:** 2nd Quarter Meeting – Oklahoma City
- Jul 16:** 3rd Quarter Meeting – Little Rock, AR
- Oct 15:** Annual Charity Golf Tournament – Oklahoma City
- TBD:** 4th Quarter Meeting

### AOWA Board Members :

- Vice president:** Curtis Branch  
*Evergreenindustries1@cox.net*
- Secretary:** Chad Tuttle  
*ctuttle@btgengineering.com*
- Treasurer:** Mike Smith  
*msmith@smithradio.com*
- Memberships:** Alissa Coffield  
*Coffield@dynamicwireless.com*  
Brooke Irby  
*brooke@kgiwireless.com*  
Lee Ann Fager  
*Lee.ann.fager@clearwire.com*

Allstate Tower .....	12	Nello .....	32
AM Coordination Services .....	42	Oldcastle Precast .....	33, 35, 37, 39
Atlantic Risk Management.....	inside front cover	Peabody Engineering .....	26
Bard Manufacturing .....	19	Pendulum Instruments (XL Microwave)....	10
Biby Publishing .....	32, 42	PolyPhaser .....	28
CTIA/Tower Summit.....	38	Radio Waves .....	21
Farlight.....	30	Sabre Towers & Poles .....	9
GlenMartin .....	11	Specialty Tower Lighting.....	12
Higgs Law Group.....	42	SRP Telecom.....	29
Hutton Communications .....	17	State Wireless Association Program .....	40
IdaTech .....	36	Subcarrier Communications .....	back cover
ITL .....	10	Telewave.....	5
Lawrence Behr Associates .....	25	Times Microwave.....	13
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