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Our Interview with
PCIA President & CEO

Jonathan Adelstein

SPECIAL POWER ISSUE

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Product Showcase

May 2014 /// Volume 11 /// No. 05



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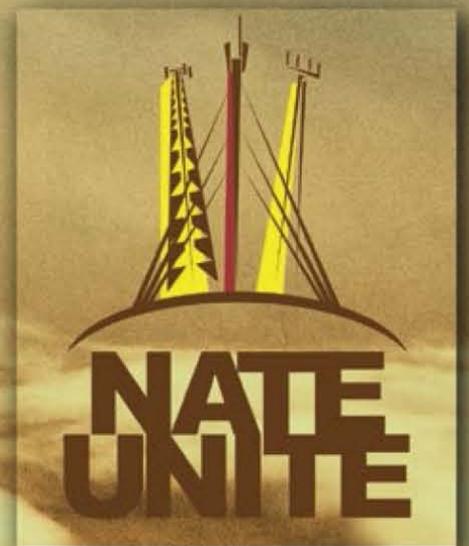
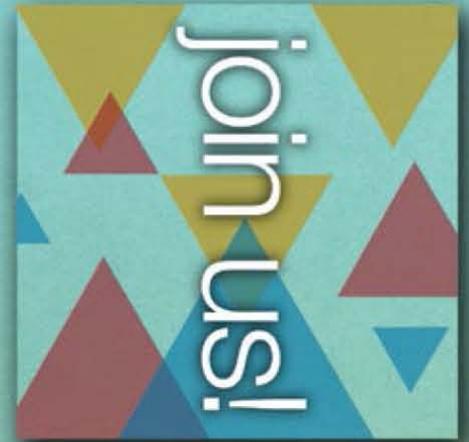
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Jonathan S. Adelstein, president and CEO of PCIA – The Wireless Infrastructure Association. See article on page 16.

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It Starts with Power

Shots fired at a Pacific Gas & Electric substation in south San Jose, Calif., a little more than a year ago punctuated the increasing need for improving security for the U.S. electrical grid and for providing key facilities with independent sources of power. Labeled variously as vandalism, sabotage and terrorism, the action included cutting fiber-optic cables that disabled some 9-1-1 service and shooting bullets into at least 17 transformers. Thus penetrated, the transformers leaked cooling oil, causing power from the substation to fail. Repair took 27 days, during which the utility rerouted power to avoid a blackout.

The cable damage interrupted landline and cell phone service in parts of the South Bay for about a day until AT&T restored service.

Authorities, utility company executives and security specialists have much to say about the electrical grid's vulnerability to possible attempts to destroy key parts of it that would cripple the delivery of electricity to vast areas of the country. What's clear is that present and former officials are speaking out about it. What's not as clear is what steps are being taken, if any, aside from incremental security improvements.

What's at stake goes far, far beyond maintaining the operation of cell sites that sustain the operation of wireless telecommunications networks. However, cell sites fall within the

subject matter covered by *AGL Magazine*, so that's where our focus lies, and we leave some of the larger questions of overall electrical grid security to others.

Contrast the United States with India. The electrical grid in India is unreliable, and as a result, the majority of cell sites there have backup power. Many run entirely on generator power. During a power blackout in July 2012 that cut power to 700 million people in India, the mobile telephone network was largely unaffected. Although many cell sites in the United States have backup power, few operate entirely with off-grid power sources. An anticipated wave of small cell deployments may lead to more use of independent, renewable power sources because the cells use less power overall, and offsetting the cost of digging and trenching to run extra power lines to some of the sites may prove to be attractive.

Providing alternative primary power and providing backup power to telecommunications sites contributes to wireless network reliability and security. This special *AGL Magazine* issue on power systems and backup power looks to contribute to the solution for improving the security of electrical power for telecommunications services.



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EDITORIAL COMMENT



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PCIA Springs Forward

Welcome to the PCIA — The Wireless Infrastructure Association issue. It still feels a little funny to be looking forward to going to PCIA in the spring, but change is always good.



Jonathan S. Adelstein continues to lead PCIA with enthusiasm as our advocacy voice for wire-less infrastructure. From local

and state governments to the FCC, he is helping to ensure that our industry is building at a pace to meet the demands of today's wireless technology. I had the opportunity to sit with Jonathan and discuss not only PCIA's initiatives, but also issues that affect the critical necessity of having complete national wireless coverage for our businesses, our safety, our homes and our lives. Read the feature article on page 16 to learn his perspective.

New CTIA Leader

A word of congratulations to CTIA — The Wireless Association is in order with the hiring of former FCC Commissioner Meredith Attwell Baker as CEO. CTIA has been a strong industry advocate. Having Baker at the helm ensures that CTIA will continue to represent the wireless industry with the strength and professionalism we saw under Steve Largent's leadership. CTIA takes the fall spot now in September, and this year, its convention will return to Las Vegas.



Welcome Change

It's good to see so many changes in state and local ordinances in favor of infrastructure lately. Between the shot clock and such steps as Georgia enacting a state law to limit municipal requirements, we might just get some projects completed. I've been a little surprised lately here in Virginia with some municipalities almost encouraging some development. That's a welcome change. Of course, the pendulum eventually will swing the other way if the projects are not well done and responsibly deployed. The proliferation of locations transmitting energy will continue to increase, the radiation centers will continue to move lower and the backhaul needs will continue to grow. The type of sites we are deploying is definitely changing.

LTE Training

Lately, I've been learning a lot about LTE, and I've had the chance to spend some time with Scott Baxter once again. Scott started, as did many of us, as a broadcast consultant. He was one of the first people I worked with in cellular in Nashville, Tenn., in the analog days. Scott eventually became

a CDMA training guru for Nortel and then started offering training on his own. CDMA morphed into LTE, and Scott has become an LTE expert. He has a pretty amazing library of training materials that he's put together during many years of work. Unlike so many for-profit organizations, Scott puts everything up on the Web for free access. We walked through about every detail of LTE with his course "590" under the free library directory at www.scottbaxter.com. I can't say enough good things about Scott and his abilities. Add him to your go-to list for training and consulting.

If you're here at PCIA in Orlando, I look forward to seeing you during the next few days. Stop by the AGL Media Group booth to say hello and give us feedback about our publications, newsletters, conferences and growing list of media products.



Rich Biby, Publisher
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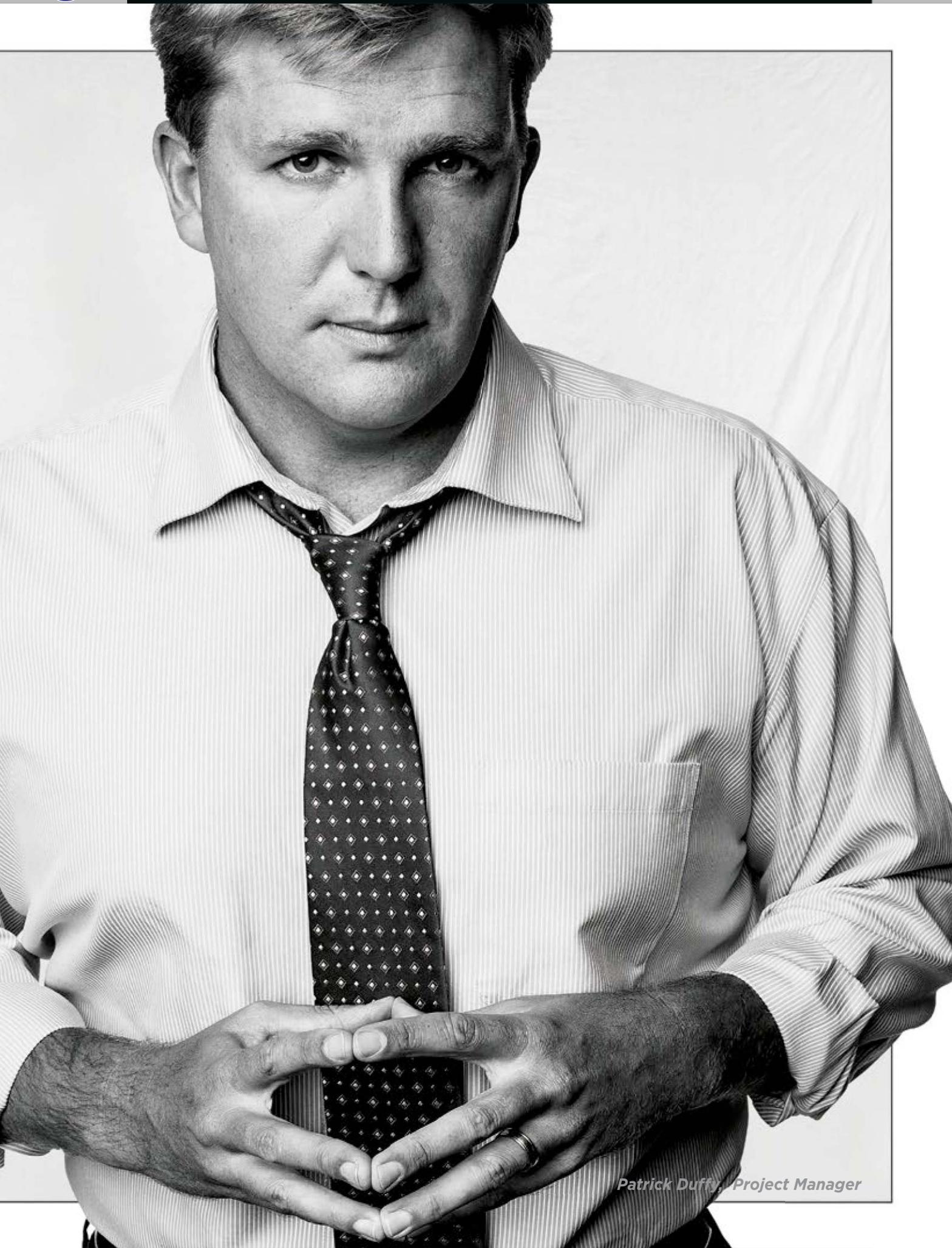
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Patrick Duffy, Project Manager

PCIA's Tim House

PCIA is expanding its membership to include companies that share a wide view of the wireless communications industry, companies that see the promise of infrastructure and come to PCIA for help to spread the message.

By Patricia Troxell-Tant

PCIA – The Wireless Infrastructure Association is a trade association representing companies that make up the wireless telecommunications infrastructure industry. Its more than 190 members include the carriers, infrastructure providers and professional services firms that own and manage more than 130,000 telecommunications facilities throughout the world. PCIA promotes the infrastructure necessary to make high-speed wireless available at all times and places as a catalyst for job creation, productivity and economic growth.

Tim House joined PCIA in December 2007. He is responsible for overseeing the association's external communications, marketing and sales efforts, including the Wireless Infrastructure Show, membership, new initiatives and strategic partnerships. He has more than 20 years of experience in a variety of marketing and communication disciplines.

Prior to joining PCIA, House spent nearly a decade at Discovery Communications where he was primarily responsible for developing consumer product marketing strategies for

Discovery's hit shows. His campaigns produced three *New York Times* best sellers and have been featured in *Ad Age*, *USA Today*, *TV Guide*, the *Washington Post* and the *New York Times*.

On Jan. 31, I interviewed House on behalf of *AGL Magazine*. What follows are my questions and his remarks, edited for length and style.

AGL Magazine: What have been some major successes during your time with PCIA?

House: The greatest success is the growth of our membership and the growth of our annual Wireless Infrastructure Show. When I arrived in 2007, the upcoming show for 2008 was being affected by some turmoil and external market conditions. Although we thought that the trade show industry was on an upswing, the market changed that. To overcome the market conditions and have success with the 2008 show, putting value back into it, and then to have continued success in 2009 and every year since then has been really gratifying.

Meanwhile, membership is nearing 200 companies. We set a goal of

attracting and retaining 200 companies many years ago, and even though there is a trend toward consolidation, we are having great success.

AGL Magazine: The State Wireless Association Program launched in 2005 and PCIA became the facilitator of a national state wireless program and movement. What is SWAP doing today, and how is it progressing? What role does PCIA serve in SWAP?

House: SWAP is a great story that demonstrates our commitment to advocacy for the industry. It's amazing to admire its growth since 2005, as it now includes 29 associations covering 38 states. PCIA's approach is to ask what we can do to support them. With their success at the grassroots level through advocacy and events, the program is powerful.

Because each association has different events and online communities, we have to be both committed and flexible regarding the type of support we provide. Our approach has always been to try to give them whatever they need. We have had a dedicated director for SWAP since

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Tim House

2007. We've added a manager to assist with community-building support and guidance.

During the past six years, PCIA

spent \$1.45 million supporting state wireless associations because that's how much we believe in them.

AGL Magazine: In what other national programs is PCIA involved?

House: I'm proud to be involved in Warriors for Wireless and with an initiative launched in January that's called U.S. Tech Vets.

Since its inception, PCIA has supported the Women's Wireless Leadership Forum. The WWLF initiative has grown from roughly 60 participants to more than 400. Together with many sponsors, WWLF conducts regular events at regional and local levels. It's a tremendous success.

The wireless industry is predominantly male. To provide support for each other, for women who just want a sounding board, to know that there's support and guidance there, is really important to us. We've invested in it, believe strongly in its mission, and have seen tremendous results.

AGL Magazine: PCIA has opened its membership beyond traditional wireless companies. What do those new member relationships look like and mean to PCIA?

House: Infrastructure takes on many meanings. You have original equipment manufacturers, tower companies, small cell providers and others. Wireless infrastructure

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provides service to carriers and from there to consumers. The strength of the network is what helps sell wireless communications service.

PCIA has been able to appeal to companies that share that wide view of the industry. An example is John Deere. The company came to us and said, "We see the future of agriculture production and accuracy as being driven by wireless.

All of our tractors will run on wireless. We can make farming more efficient. And, in fact, up to \$14 billion can be returned to the U.S. economy through this efficiency. Help us bring wireless to rural America. Help us bring wireless to farming." We spent the last year educating people about that.

There are traditional wireless companies, carriers and infrastruc-

ture providers. But PCIA has member companies that see the promise of infrastructure and have come to us for help to spread that message.

Many more potential members of this kind are out there when you consider that Spotify and Facebook, just to name two, have businesses built around their users being able to have access to their service on mobile devices everywhere. It's important to them. Infrastructure and the network are important to them. We embrace that.

There are applications in transportation such as positive train control. Connected automobiles are important — particularly for safety and access to information. That's what we see coming. All of them benefit from a strong wireless network.

AGL Magazine: Explain TowerXchange and PCIA's interest in this organization.

House: This is our first year to partner with TowerXchange. They had success creating an event in Africa and are focused on other emerging markets. I was impressed that they committed to creating and distributing meaningful content, and then using that content as a foundation for an event. As PCIA looks to international opportunities, particularly Latin America, we approached TowerXchange late last year. We were in sync on Latin America, and we're looking forward to this event with them and hopefully many more.

Patricia Troxell-Tant is president and CEO of Solution Seven. For more information about PICA – The Wireless Infrastructure Association, visit www.pcia.com.

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PCIA's Jonathan S. Adelstein

Wireless infrastructure providers help wireless carriers overcome a spectrum shortage, limitations in technology roll outs and ever-increasing subscriber consumption of video. It means business. A lot of business.

By Richard P. Biby, P.E.

PCIA – The Wireless Infrastructure Association is a trade association representing companies that make up the wireless telecommunications infrastructure industry. Its more than 190 members include the carriers, infrastructure providers and professional services firms that own and manage more than 130,000 telecommunications facilities throughout the world. PCIA promotes the infrastructure necessary to make high-speed wireless available at all times and places as a catalyst for job creation, productivity and economic growth.

Jonathan S. Adelstein assumed the role of PCIA president and CEO on Sept. 17, 2012. He previously was the administrator of the U.S. Department of Agriculture's Rural Utilities Service (RUS). Before that, he was an FCC commissioner. And before joining the FCC, Adelstein held a number of senior staff positions in the U.S. Senate.

As RUS administrator, Adelstein oversaw a \$60 billion portfolio of rural electric, water and telecommunications infrastructure loans. As part of the American Recovery and Reinvestment Act of 2009, he

spearheaded the strategic investment of \$3.5 billion into rural broadband infrastructure expansion to stimulate economic development and provide new or improved broadband service to millions of residents, businesses and community facilities across rural America. Adelstein has advocated improvements to rural telecommunications and broadband service.

On Jan. 31, I interviewed Adelstein. What follows are my questions and his remarks, edited for length and style.

AGL Magazine: Tell us about PCIA, your background and your time at the FCC.

Adelstein: PCIA has been at the forefront of various wireless industries. It's emerged and evolved with the industry over 65 years and now is a leader in promoting policies that facilitate the creation, expansion and improvement of wireless networks. I spent 25 years with federal government agencies and with the U.S. Senate. It was an opportunity to see the global view that the federal government takes.

Most recently, I was running the Rural Utilities Service where we

distributed funds under the Recovery Act, the so-called stimulus bill. We were able to try to stimulate broadband deployment in rural areas where it otherwise might not have happened as well or as quickly.

I was also an FCC commissioner, overseeing the telecommunications and media sectors. Nearly 15 percent of the U.S. economy is under the purview of the FCC. We had a huge responsibility to protect consumers while helping to foster the industries that serve consumers. Throughout all those years, I always did my best to try to promote broadband deployment.

In 1999, we held the first rural broadband summit on Capitol Hill. Sen. Tom Daschle sponsored an event, bringing in the chairman of the FCC and leaders of AT&T and smaller companies to discuss how to get broadband out to rural areas, which really wasn't on the radar screen so much in 1999. We recognized this as the future not just of rural America but of the whole telecommunications sector.

It's been a great career and it's really capstoned by having the opportunity to help this industry



meet huge challenges in ramping up wireless infrastructure to meet the demands of consumers for more and more data over their smartphones, over their tablets, and in daily use on the go.

AGL Magazine: What is PCIA's mission?

Adelstein: The mission of PCIA is to help our members succeed in delivering wireless broadband everywhere. We promote infrastructure necessary to allow consumers all of the bandwidth they need, first for voice, and now broadband, for job creation, productivity and economic growth. We do this daily on federal, state and local levels.

Many issues come down to localities that sometimes resist the rapid deployment of broadband. Fewer and fewer are doing so. They're starting to recognize that they need broadband. It's not NIMBY anymore; it's PIMBY, which is "please in my backyard," especially in places that are underserved. We're trying to set the framework nationwide so that people welcome broadband and so we don't get caught in regulatory morasses that slow deployment and divert capital. It should be easier everywhere to deploy broadband and to collocate on existing infrastructure. We've been successful in paving the way for efficient wireless network deployment so consumers

and businesses can benefit from all the amazing opportunities that broadband provides.

AGL Magazine: The FCC has an NPRM (Notice of Proposed Rulemaking) out concerning accelerated broadband deployment. What is PCIA's position on streamlining the process? What does it mean for the industry?

Adelstein: We're thrilled that the FCC came up with an NPRM that encompasses almost all of our priorities. This is the culmination of years of work on many fronts. The FCC has teed up our major concerns in a way that it could address barriers nationwide and rapidly streamline

Fortunately, Congress made it a national priority to quickly deploy broadband and allowed us to change equipment and collocate by right as long as it doesn't substantially change the size of the tower or base station, which has sped up the 4G deployment process.

deployment wherever our members are expanding wireless broadband. The previous FCC chairman, Julius Genachowski, when he came to our PCIA show in October of 2012, agreed to come up with something like this, and he followed through. His successor, Acting Chairwoman Mignon Clyburn, put out this proceeding.

AGL Magazine: Section 6409(a) is an important law. What's PCIA's position on it?

Adelstein: Congress approved The Middle Class Tax Relief and Job Creation Act of 2012 that among other things authorized the deployment of a nationwide interoperable public safety wireless network. A key provision of that Act was Section 6409(a), which allows collocation by right on existing facilities and allows minor modifications without going through a new, redundant zoning process. In the old days, a collocation or modification opened the door for localities to re-review the underlying structure, sometimes even conditioning approval on changes to it. For example, if you have a coffee shop in a strip mall and you want to change it into a café, all you need is a building permit. You don't have to go through a rezoning for the strip

mall. That's essentially what localities were making wireless carriers do. If they wanted to change out or collocate on an existing tower, they had to go through a new zoning process. It made no sense.

Fortunately, Congress made it a national priority to quickly deploy broadband and allowed us to change equipment and collocate by right as long as it doesn't substantially change the size of the tower or base station, which has sped up the 4G deployment process. As the chairman and CEO of AT&T, Randall Stephenson, told me, 4G deployment and antenna change outs have happened faster than any other technology they've deployed. Every day, when our carrier members are trying to get their 4G deployed, they're finding more regulatory hurdles they might have suffered in the past are eased.

Some regulatory problems remain. Once again, at our October show, then-Chairman Genachowski agreed that the FCC would define some terms that Congress didn't, such as what "base station" means. What "collocation" means. In the FCC infrastructure NPRM, the agency proposed to define all of the terms of Section 6409 so that the law's application is consistent and predictable across the country. For example,

while many local jurisdictions are swiftly moving on these minor modifications, one local authority could purport "substantial change" to include planting a new shrub at a cell site. In the end, 6409(a) makes it easier for local officials by simplifying the process for these minor modifications, which gets paperwork off their desks and gets our members on with quickly building out broadband in their communities.

It reminds me of the days when the railroad came to town. In the old era, it could mean a death for a town if the railroad passed it by. Big cities would wilt, and other cities that were small would grow quickly, depending on the route the railroad chose. You didn't have communities saying, "We don't want the railroad here. If the railroad comes here, we're going to charge you a bunch of fees or we're going to hold up for a while." They said, "Please, come through our community." And it's the same thing with broadband.

Increasingly, local officials and local communities are recognizing that this is like the railroad of days of old and that they need these facilities, and they're welcoming them. Section 6409 gives them a backstop. Whenever the community says, "Slow this down. I don't like this or that in my backyard," local officials can say, "The federal government has made it a national priority to deploy broadband. I don't have the ability to say no to that under Section 6409. So, let's move on an issue that could actually help our community." And all the other issues that they have they can spend their time on rather than

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having to re-debate something that's already been zoned and have another fight that does nothing but slow down broadband and slow down economic development in that community.

AGL Magazine: Distributed antenna systems (DAS) and small cells are a large part of the NPRM. What is the FCC looking to change?

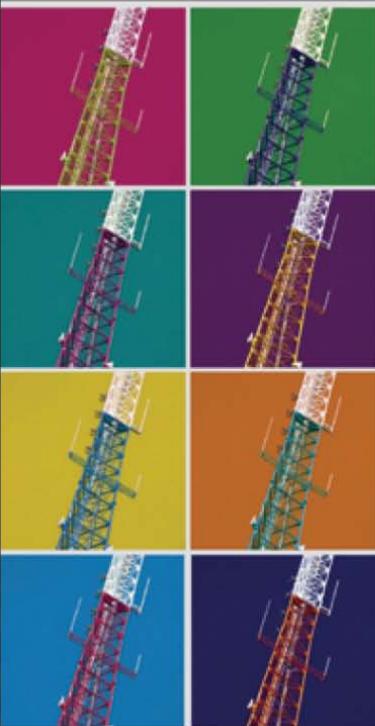
Adelstein: The rulemaking is

considering excluding small cells and DAS from compliance with certain provisions of the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA).

Wireless facility installations like DAS and small cells weren't contemplated when the Commission adopted rules for compliance with NHPA and NEPA, and not much has changed since 1996. Since then, national programmatic agreements have been reached on how collocations work and what is subject to the NHPA and NEPA. We're concerned about the prospect of having to go through a federal review for every node in a DAS. For example, with a DAS with 300 nodes, each one is treated like a giant cell tower and has to go through the same regulatory review. That doesn't make sense. It will slow deployment of small cells and DAS.

We got the FCC to agree to ask for public comment on a definition that represents an industry consensus for how to exclude small cells and DAS from Section 106 and NEPA. It is a potential breakthrough because without the exemption, DAS developers could have a problem in quickly deploying the systems. Despite their small size, DAS facilities are governed by the laws established for siting large macrosites. Smaller communications facilities have the potential to provide capacity infill in conjunction with the macro network. Macrosites are always going to be the first choice because they provide service to the broadest area and the most consumers per site. But where you have targeted capacity needs and where it's difficult to site new macrosites, wire-

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less facility developers increasingly will rely on small cells. The major carriers are already ramping that up. They've been building DAS for many years. We have to make sure that regulatory policy keeps up with what's happening with technology in the field.

AGL Magazine: The NPRM is also looking to broadband Section 332, which governs the shot clock. What does PCIA believe needs to be done?

Adelstein: Section 332 sets up reasonable time limits for local authorities to process wireless siting applications. The FCC interpreted "reasonable period of time" as 90 days for collocations and 150

Smaller communications facilities have the potential to provide capacity infill in conjunction with the macro network. Macrosites are always going to be the first choice because they provide service to the broadest area and the most consumers per site.

days for new towers. It was a visionary provision enacted by Congress in 1996, and the FCC's interpretation was recently upheld by the Supreme Court. Through this notice, the FCC can provide clarity on long-standing issues of tolling the shot clock for application completeness and esure excessive moratoria on siting applications are a thing of

the past.

The FCC also queued up the idea of having "deemed granted" at the end of the review process if a local community doesn't make a decision within the shot clock period. Lack of a decision would be considered to be a decision to approve. Most communities are increasingly recognizing the need to give broad-

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band deployment a higher priority, and that it is not something you want to throw all kinds of barriers in front of. The FCC wants to make sure the best practices of the most visionary communities are adopted in the federal rules.

AGL Magazine: What legislation is PCIA working on as a priority or critical issue?

Adelstein: Congress has decided to queue up the idea of revisiting the Communications Act. It was originally

written in 1934. It hasn't been changed since 1996. Each week, we see something new on the AGL Media Group website, some new developments on emerging technology. People are trying to weigh how those fit with the old rules, just like the need to take DAS and small cells out from under old regulatory requirements. There are many questions about how to improve upon some of the good legislation that Congress enacted in 1996.

We're looking at how to promote deployment and innovation, and we're glad that Congress has taken a look at dusting off that old law and finding ways to move even faster on deployment. Thankfully, we have seen a federal priority on deployment; Congress backed us in 2012 with Section 6409; the White House has talked about speeding deployment on federal lands; and the FCC has done everything it can to move forward and expedite deployment.

With the federal government making this a national priority, it is a good time to revisit the law. When PCIA approaches policymakers and explains what we're trying to do, they say, "How can we help? How can we get barriers out of the way of deployment?" I believe Congress will ask, "How do we again, as we did in '96, move the ball forward? What are some issues that you're running into? How can we make sure that going to federal court is not your only option when somebody unreasonably delays wireless deployment?"

We are stepping up our efforts in talking to Congress about our issues so they're aware of the problems. It will take many years before legislation

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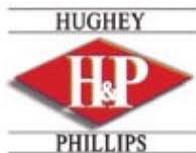
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comes out to Congress, but we want to be there at the ground level, making sure that our points are being made and that our concerns are being addressed.

AGL Magazine: Any state legislation?

Adelstein: State governments recognize the power of wireless broadband. In 2013, six states enacted legislation streamlining deployment: New Hampshire, Connecticut, North Carolina, Wisconsin, Missouri and Washington. Several others are considering similar policies. Some of those were built upon the legislation that Congress enacted in 2012. Some states have gone well beyond what Congress enacted. States are playing a constructive role, and we're continuing to work with them. Some states are

a lot further along than others.

States that aren't making progress with facilitating wireless deployment have prevented their own citizens from having access to broadband that otherwise the carriers would want to provide. Carriers can't place new antennas where they need to be. It's sad, because a small minority can hold up what the majority wants. For example, in San Francisco where many mobile applications are developed, it is almost impossible to get new antennas sited. Mobile apps are being developed there, but developers can't even try them out in their own backyard. The opposition is being kowtowed to by local officials who aren't getting with the program and driving economic development not only in the Bay Area, but also across the state

of California and nationwide.

We're making the case vociferously that these states need to get with it. They need to either get out of the way or help us to deploy. Don't get in the way of capital. State public utility commissions also play a large role in broadband deployment, particularly when it comes to pole attachments. We are working with PUCs to make sure the pole attachment regimes are fair, that they facilitate rapid deployment and that they do so at rates that encourage deployment.

AGL Magazine: What is the next step in facilitating these deployments?

Adelstein: The FCC issued a pole attachment order in 2011 that was upheld by the D.C. Circuit last fall.

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The order leveled the playing field for wireless attachers by establishing equitable access to poles, reasonable rates, and predictable timelines. While some states have opted to regulate pole attachments on their own, we're pleased that more and more of them recognize the practicality of the FCC's rules. We're working with PUCs in Ohio, Washington and California to streamline access of wireless pole attachers and wireline backhaul providers and to review the rate structures.

When PUCs do that, they're increasingly coming down on the side of fair rates or deferring to the FCC's structure because they want to see those poles being used efficiently and effectively. As wireless carriers infill particularly dense areas, utility poles are great places to position DAS

and small cell equipment in a way that is unobtrusive to the neighbors. Why wouldn't states want to encourage that? States with higher pole attachment rates see less wireless deployment. It's a call the PUCs can make, but that's why states increasingly are coming down on the side of a fair rate structure along the lines of what the FCC has proposed.

We've seen progress with a process to streamline procedures for wireless facility deployment on federal lands since the president issued an executive order on the subject. The White House convened an inter-agency working group on several occasions to discuss how they should streamline their procedures. The White House agreed to our request to conduct what we call an "industry day" to meet with a

veritable alphabet soup of federal agencies from DOD and RUS to DHS, GSA, DOT and, of course the FCC. Many agencies such as BLM have a lot of land for possible wireless facility deployment. We talk about how to make the government a partner in using federal land and buildings to deliver broadband to unserved and underserved areas. The General Services Administration (GSA) controls access to federal buildings, for example. We need their help. The president recognized that in putting this executive order out.

We brought our members to the White House to discuss it. The White House is putting this matter front and center, and I believe we'll find some real solutions coming out of this. Let's face it, some wireless facility



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A current FCC rulemaking proceeding proposes to streamline the review process for DAS and small cell antennas, including specific proposals to eliminate the review process for communications facilities collocated on utility poles older than 45 years and new deployments in a utility right of way.

developers won't even try to place sites on federal land because it's such a hassle. That's a wasted opportunity because many coverage gaps might be served from federal land. All kinds of opportunities are being missed. I'm pleased that the president has set agencies on a path toward solving some of the problems with leveraging federal land. We're at the cutting edge of this effort.

AGL Magazine: Tell us about the HetNet Forum.

Adelstein: What we call the HetNet Forum today started in 2006 as the DAS Forum, in recognition of the fact that the small cell trend was one that could really shake up the industry. PCIA's board of directors had a lot of foresight and vision in recognizing

the small cell and DAS trend so long ago. That has given us a head start. In spring 2013, we changed the name to reflect the group's increasingly diverse membership that encompasses a variety of companies using all the tools in the toolbox to deliver wireless broadband to consumers. Whether it's indoors or outdoors, rural or urban, licensed spectrum or Wi-Fi, we are ready to figure out how to infill. The HetNet Forum is active in confronting these issues.

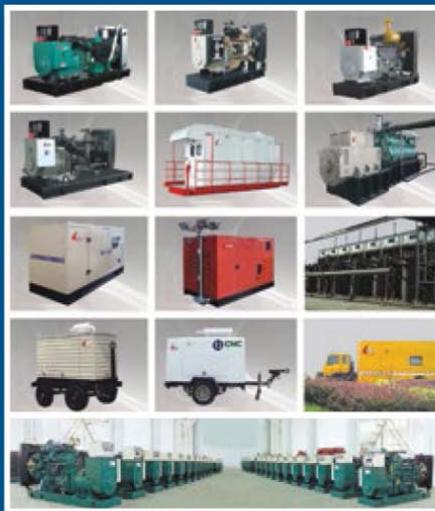
I'm looking forward to PCIA's HetNet Expo in Chicago October 12-14 as the culmination a lot of the work we've done since 2006 to bring the industry together, talk about best practices, help on the regulatory front and look at the latest technologies.

The macro side of the industry brings in much more revenue, and it's a steady business that people understand. There are new developments on the HetNet side and, although it's a smaller part of the wireless infrastructure business, it's growing rapidly. Many people have questions about how the HetNet industry will evolve. There's no place better than the HetNet Forum to hash those issues out, and HetNet Expo will be the must-attend event for everybody to get together in one place to figure out where we're going and how we're going to get there together even faster.

The HetNet Forum is 60 member companies strong, and we're adding members virtually every week. There's a huge amount of interest in this field. Vendors and carriers are putting increasing attention on it as they infill their networks. I'm looking at all varieties of the HetNet that may be used to provide the means of

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AGL Magazine: Small cell deployments are expected to represent 70 percent of all new cell builds. How is the explosion of the small cell deployment affecting the industry?

Adelstein: Small cells represent a tremendous opportunity for the industry. Most of the nation has wireless coverage. But the issue now is turning to capacity. For the next four years, Cisco Systems predicts an eleven-fold increase in global data demand, given the huge uptake of tablets and smartphones. We're going to have a wireless data crunch, not

just a spectrum crunch. Spectrum is one of three component elements that cause it. The other two are technology for the network and handsets, and video consumption.

Carriers must be able to obtain more spectrum. The carriers and PCIA are doing everything we can to find more spectrum. It takes a long time to identify it, get it freed up, and get the handsets in place to actually use it. That could be a multiyear process.

Technology improvements increase the efficiency of networks. The biggest, most recent improvement is 4G technology, but it only increases capacity about 40 percent. The improvement is not immediately reflected because it takes time for consumers to upgrade

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to 4G handsets. Less-efficient 3G handsets remain in use. So, you really achieve perhaps a 15 percent capacity increase each year, we are guessing.

Meanwhile, what happens when somebody gets a 4G phone is that he uses much more video because it flows so much more smoothly. The

increased video consumption overwhelms the little bit of technological efficiency increase and tends to overwhelm the networks, especially in dense and urban areas.

Thus, we are looking now for solutions. We spoke with the president of AT&T network operations who

said, "When you're in a spectrum-constrained world, you have to turn to densification of the networks." There's really no way around it. The carriers are pursuing all three of these levers at the same time. I often kid that you know you're in trouble when the quick solution is infrastructure because infrastructure is never that quick. But it's a surefire solution. It could be expensive, and it could be tedious, but carriers are pursuing infrastructure with all the means at their disposal.

We hear from the major carriers that they're deploying a huge number of new small cells, they're expanding DAS and they're placing network equipment inside buildings because that's where the consumer demand for wireless service is. It takes demand off of the macro network if they can get antennas inside buildings. We're also seeing a lot of Wi-Fi offload.

Small cells are an important part of the capacity solution, working in conjunction with macrocellular networks, to deliver much needed wireless capacity.

AGL Magazine: Network reliability appears to be under review again in the wake of several hurricanes and other emergencies. What's PCIA's position on ensuring wireless network reliability?

Adelstein: PCIA members are investing heavily in ensuring consumers and communities can be connected in times of emergency. Many times, wireless infrastructure providers have no control over backhaul and electricity. When the power goes down, it's difficult to keep a cell site

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operational. Sometimes, it is impossible to reach a site to refill generators. Sometimes, local authorities resist allowing cell site users to install generators. They may have anti-noise ordinances. Federal rules apply to hazardous materials, and batteries and fuel used for cell site power fall under those rules. Some people want it both ways. They say, "Do this, but then we're going to throw all kinds of hurdles in your way of doing it." We're working with the federal government to make sure that when a carrier wants to install equipment to ensure reliability, they don't have hurdles in the way. Carriers are committed to network reliability.

One of the best ways to achieve reliability is with redundancy. There should not be hard and fast requirements when it comes to reliability. The FCC needs to be flexible, but local governments need to be helpful, too. Local officials may sit there and say, "Well, you can't put that cell site up." If the one next to it went down and they would have let us put the second cell site up, they would have one that's working. Then they come and say, "Well, where's the reliability here?" Well, where's the deployment? You stood in the way back then, and then you complain when your own actions result in not having adequate coverage. Or, they may ask, "Why don't you put the generator in the basement?" What happens when there's a flood? The basement floods and the generator won't work. Then they ask, "Why don't you have power on this thing?" Well, where did you tell us to put the generator?

We understand local communities have individual requirements, but

they have to think about the consequences of their restrictions and how to work with us to promote reliability and promote redundancy. At least redundancy will help you to obtain reliability. It leads to resiliency because usually you don't see all of the cell sites in an area go down unless the entire grid goes down. The more cell sites that are up, the greater the possibility for continued coverage. Let us deploy sites, and everybody will be in a safer position in times of emergency.

Our members are committed to meeting the needs of their communities. We understand that wireless connectivity during an emergency is critical. We need to work with federal, state and local officials to make sure that we can be as helpful as we can, understanding that it's not a one-size-fits-all solution, and there are many circumstances. When Hurricane Sandy happened, people said, "The cell tower's down." The cell tower wasn't down. The cell tower was standing there. Not one cell tower went down. What they meant was that that tower is no longer operational. More often than not, it was because power or backhaul went down.

We need to work on the reliability of the grid. The United States has an ancient grid. I used to be the financier of the grid when I was at the Rural Utility Service. The old Rural Electrification Administration saw the need to invest and upgrade, and there are some big issues there. Let's include them as part of the solution because telecommunications is just one of the many critical services that go down when the electric grid goes down.

AGL Magazine: How critical is FirstNet for the future? What is PCIA doing to support its effort?

Adelstein: FirstNet is a critical initiative that's long overdue. When I was on the FCC, we tried to get the 700-MHz D Block of spectrum, which was designated for public safety communications, out and usable. Nobody put a real bid in on it. That slowed us down. After 9/11, we wanted to make sure that first responders had access to wireless broadband networks that were interoperable on a nationwide basis. One of the great disappointments of my career at the FCC was the failure of the D-Block auction to get spectrum out where it needed to go and put it to use.

It took an act of Congress, and I'm so grateful that we got that in 2012. FirstNet has a great leadership team in place. Bill D'Agostino Jr., FirstNet's general manager, spoke at our show. He was on the cover of *AGL Magazine* in February. He understands our industry. He understands our needs. He's been an executive with companies that have deployed wireless infrastructure networks. We can talk in shorthand with Bill. He gets it, and he's going to be able to build a network that's second to none. PCIA is doing everything it can to help. We're providing feedback when FirstNet has questions.

The United States has a wireless network that's the envy of the world. Our broadband wireless networks are well ahead of Europe's. I remember back when I was on the FCC, we were worried about falling behind. Now, the Europeans are asking, "How do we get ahead?" FirstNet is going to

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be able to emulate that experience and build on what we've done using existing infrastructure that is widely built out in this country.

It's an imperative for our country. We never again want to see those fireman go up as they did in the New York World Trade Center and not have access to communications to know when they need to get out, to be able to talk to each other, and to see what's happening in real time with broadband data. We need to make sure that fireman gets home to see his kids at night. We'll do everything we can to make sure that happens and support First-Net any way we can.

AGL Magazine: You have a show coming up. Tell us about it.

Adelstein: We moved our Wireless Infrastructure Show to May. Everyone is looking forward to seeing and hearing from the best and brightest in the industry. People make deals every year at our show. They come to see the latest trends in technology and regulation, to gather intelligence and to meet everybody in one place. The event continues to grow and thrive because we are committed to serving our attendees, exhibitors and sponsors and delivering the highest-quality experience.

This year, the Wireless Infrastructure Show is in Orlando at the Rosen

Shingle Creek Resort.

In addition to some terrific networking events, we have a great lineup of speakers. We have industry luminaries who will enlighten us about where the industry is headed. We'll talk about the latest trends. We'll have a special track on small cells and DAS. We'll be talking about the latest innovations in 4G deployments. We'll be focused on the big, emerging market of Latin America with a special track that we're co-hosting with TowerXchange. We think this is going to be the best show we've ever had.

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Lincoln Antenna Site: A Case Study In Problem Solving

Is your tower project daunting? Come along with ComSites West and see what it took to build its Lincoln Site. Solving someone else's problems holds the key to site approval, and this site had its share of problem solving during its four-year development.

By Charlie Feick and Keith Chambers

Activating a wireless communications facility site in Lincoln, Calif., came four years after our company, ComSites West (CSW), embarked on what

became a challenging tower development project. One of the fastest-growing cities in the state, Lincoln won the National Civic League's All-American City Award in

2006. Home to more than 38,000 people and incorporated in 1890, Lincoln lies 25 miles northeast of Sacramento in Placer County.

To determine where Lincoln's

need for broadband telecommunications service would be the greatest, we surveyed the area and prospective wireless carriers that might rent tower space. We found the greatest need would be in a growing master-planned community named Lincoln Crossing, in an adjacent commercial district and along a route that would become the Lincoln Highway 65 Bypass. The survey revealed that a vacant 17-acre city-owned land parcel would be ideal for covering the area with wireless signals. At the same time, it would satisfy the city's tower siting setback requirement of 500 feet from all residential uses.

The city had plans for the parcel, too: a future park, the Chief Robert Jimenez Community Park, named in honor of a retired police chief with 32 years of service. The bypass provides the park border on the south and west. Bypass construction was underway when the tower project started, and it opened on Oct. 8, 2012. The Lincoln Crossing community clubhouse and recreation center borders the park on the east and a soon-to-be-constructed expansion to the Lincoln Crossing planned development will border the park on the north.

We obtained a long-term ground lease with the city and began a lengthy entitlement process. A Lincoln Crossing homeowners' association soon made its opposition known. The land parcel involved a longstanding, sensitive conflict between the Lincoln Crossing community and the city. Zoning specialist Tim Miller of Site-Com Wireless organized a meeting with the homeowners' association in hopes of better understanding the opposition and finding a workable solution.

Support for Service

Discussions revealed strong support for broadband services a tower would bring. What dissatisfied the community was the city's lack of progress for many years to develop a park at the project site. As a condition for supporting the tower project, the community wanted to see park development work start.

The city said it wouldn't have the financial resources for park develop-

ment for at least 10 years. Carrier demand for the site was immediate, so it fell to the homeowners' association and us to find funds to develop a combined wireless site and park.

CSW designed a park master plan and phased construction plans to guide current and long-term Jimenez Park development and to construct a portion of the community park. The homeowners' association created a charitable, 501(c)(3) nonprofit



Just prior to concrete being poured, a crane lowers a reinforcing rebar cage into the east tower's foundation bore.



A crane lifts the west tower's third and final tower section into position.

integrate the parcel reconfigurations, account for future improvements that the homeowners' association and the land developer wanted, and prepare a civil design and interim park construction specifications, all concurrent with finalizing the wireless site design and improvement plans.

Landscaping

We hired the Roseville, Calif.-based landscape architecture firm Fuhrman Leamy Land Group. The firm worked in conjunction with the city and the homeowners' association to develop a park master plan for the reconfigured 17 acres. Together with the city, CSW developed the wireless facility architectural design. The design integrates the architecture, colors, materials, finishes and textures of the neighboring homeowners' association clubhouse. No one's budget included the cost to construct the park as designed, even in phases, so with the homeowners' association's encouragement and the city's approval, the Fuhrman Group developed an interim park design that included significant site preparation and grading. The design includes an irrigated-turf playing field at the site of a future lighted baseball field. The interim park design also has improved off-street parking for park users and overflow parking for the homeowners' association clubhouse.

We also hired the Roseville, Calif.-based civil engineering and planning firm Frayji Design Group to develop civil engineering designs to use with the Fuhrman Group's landscape design to finalize the park master plan. Subsequent to adoption of the master plan, Frayji Design Group developed civil engineering designs

and improvement plans to build Jimenez Park (including drainage, grading, vehicle circulation and parking) and for CSW's wireless facility. The plans integrate the wireless facility with the park's design and improvement plans. Frayji Design Group oversaw and played an instrumental role in bringing about the timely processing of CSW's and the park's improvement plans with the city.

Council Approval

After numerous iterations of the park master plan, the city's parks and recreation committee unanimously approved the result. After three public hearings, the city council unanimously approved it. CSW took the city-approved master plan that included the wireless site design to the city's planning commission, which unanimously adopted our Mitigated Negative Declaration. The commission also unanimously approved our conditional use permit (along with 49 conditions of approval) and our site and architectural design.

The design specifies a 21-foot-by-98-foot (roughly 2,000-square-foot) architecturally compliant equipment building with an integrated and enclosed exterior utility services yard and two 110-foot monopoles. The rad centers consist of six panel antennas, whether active or inactive, and antennas at each rad center are confined within a 7-foot-diameter horizontally projected envelope. The specifications are intended to minimize the visual expansiveness of the antenna array and to maintain a consistent overall appearance. After filing the city's Notice of (CEQA)

organization, the Lincoln Community Recreational Development Foundation, to assist with fundraising.

The homeowners' association's plans to expand its clubhouse and recreation facilities complicated the work. So did the school district when it relinquished its right to acquire a land parcel immediately adjacent to the park, thus making the parcel available for residential development. The changes made it necessary to reconfigure the park boundaries,



Site plans called for installing preliminary landscaping near the Highway 65 bypass to satisfy visual mitigations pursuant to the conditional use permit and with the homeowners' association's cooperation and assistance.

Determination and when time allowed for an appeal of the planning commission's decision expired without challenge, CSW developed construction documents and obtained a building permit.

Structural Engineering

We hired Streamline Engineering of Granite Bay, Calif., as the lead architectural and engineering firm to provide structural engineering for the equipment building and its foundation. The building is made of CMU block with stucco and cultured stone finishes. The finishes and the

metal roof match the nearby Lincoln Crossing community clubhouse. The building has a central one-and-a-half story room with a roll-up entry door for the city to use to store Jimenez Park maintenance equipment. Three separate radio equipment rooms on each side of the central room make for six individual equipment spaces tailored to the needs of the broadband carriers. Each room has in-room grounding connections to the site's ground ring, electrical and fiber service stub-ups from CSW-supplied electrical switch gear and fiber splice boxes, and 6-inch-diameter conduit

stub-ups (12 per room) for running antenna feedlines underground from the rooms to the monopoles. The rooms also have dedicated cable entry ports. The rooms are ready for finishing and equipment installation by the carriers to meet their individual specifications.

We hired Musco Lighting of Oskaloosa, Iowa, for an illumination study and to prepare a sports-lighting design for the park's future softball and baseball fields, including some light fixtures that would be attached to CSW's two monopoles. The study determined monopole placement in relation to the future ball fields and light fixture elevation.

Carrier Rad Centers

Next, it fell to us to design how to stack four carrier rad centers above the proposed lighting fixture positions with accommodation for adequate tip-to-tip antenna separation.

Valmont Structures of Valley, Neb., engineered and fabricated the monopoles. CSW provided the antenna design for both poles, which included six cellular/PCS panel antennas for each rad center and two whip antennas atop each pole for the city's public safety radio communications. Musco Lighting specified the light fixture bracket integrated into each pole along with fixture accessory brackets and ports and a protective channel internal to the poles to shield the fixture's wiring harness from possible damage during installation or removal of antenna feedlines routed inside the poles.

Construction Begins

With all permits in hand, CSW

AGL Tower of the Month

An image of the Lincoln antenna site towers appears as the *AGL* Tower of the Month in the center spread.

set about constructing what most probably would deem is not your ordinary cell site.

Constructing the wireless facility demanded care, from siting the monopoles and the building to the large amount of trenching and underground work involved in bringing utility services to the tower site and to the park. We selected

Quality Telecom Consultants of Rocklin, Calif., to construct the facility. Construction specialist Matt Veazey of SiteCom Wireless assisted us with oversight and construction management.

Because the two monopoles would support future sports lighting, they had to be situated in the exact location specified by Musco's illumination study. There could be no room for error and no relocation, no matter how minor in scale, of the foundation should complications arise in drilling foundation piers. Precautions were taken to ensure a successful drilling on the first attempt.

PG&E, AT&T and SureWest installed three-phase electrical and fiber-optic telecommunications from the nearest public utility right of way

to the new site in a single joint trench extending 1,200 feet to the CSW-supplied electrical switch gear and fiber splice boxes in the equipment building's utility yard. Traffic-rated splice boxes placed midway along the route provide for future extension of power and fiber to serve the build out of Jimenez Park.

Satisfying the Requirements

The building's foundation had to be set in exacting conformance with the finish grades established for the future park. Construction of the equipment building had to satisfy the requirements of CSW's CUP, namely, the careful and skilled application of stucco, cultured stone and metal roofing to match the neighboring

SITING AND ZONING



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homeowners' association clubhouse.

After installing the monopoles, we had steel doghouses fabricated and installed at their bases to protect each carrier's antenna feedlines between their conduits and their dedicated cable entry ports.

The West Sacramento, Calif.-based geotechnical engineering and testing firm of Wallace-Kuhl & Associates we hired provided extensive geotechnical evaluations, recommendations and special inspections to support the wireless facility construction, the landscaping and civil design work for the park, and the construction of the interim park improvements. All aspects of construction of CSW's wireless facility and the interim park improvements had to strictly

Today, the Lincoln city government, its community and CSW can take pride in the efforts and commitments they cooperatively made to see eventual completion of Jimenez Park and significantly improved wireless coverage from CSW's current broadband carriers at the site, MetroPCS, AT&T and Verizon, become a reality.

adhere to the geotechnical recommendations and submit to rigorous testing and inspection.

Park Development

The interim park development had to be completed simultaneously with the construction of our wireless facility. This involved overall site preparation

and grading the seven-acre area encompassed by the interim park and constructing temporary hardscape features. At the direction of the city, the work had to conform with the city's public bidding and construction processes, and it had to be administered by way of a formal public construction contract and construction documents.



SITING AND ZONING

/ FEATURES /



At the completed facility, the center room provides storage for the city's park maintenance equipment and public safety radio equipment. Three room spaces to each side of the center room are reserved for the carriers' radio equipment. On the tower to the left, MetroPCS occupies the uppermost rad center and AT&T Mobility occupies two rad centers directly beneath. On the tower to the right, Verizon Wireless occupies the uppermost rad center.

SITING AND ZONING

Following public bidding, the contract was awarded and work proceeded. Shortly thereafter, the initial site work was completed, leaving the park site in a condition ready to accept the preliminary, but permanent, irrigation equipment installation and some permanent and temporary landscaping. Accordingly, the homeowners' association set to work on the initial park irrigation and landscaping, once again at the direction of the city and in accordance with the city's public bidding and construction process. Much work

related to completing the interim effort remains to be done. The build out of Jimenez Park is still quite some time away.

REWARDING PROJECT

The Lincoln Site has been a challenging and rewarding project for CSW, and one that we believe the community embraces. Today, the Lincoln city government, its community and CSW can take pride in the efforts and commitments they cooperatively made to see eventual completion of Jimenez Park and

significantly improved wireless coverage from CSW's current broadband carriers at the site, MetroPCS, AT&T and Verizon, become a reality.

ComSites West looks forward to future wireless communications site developments in Lincoln and throughout Northern California.

Charlie Feick is director of sales and marketing at ComSites West. His email address is charlie@comsiteswest.com. Keith Chambers is the company's general manager.

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Time for a Power Refresh in the Outside Plant?

Outdoor telecom power cabinet retrofitting enhances efficiency and cuts costs. High-efficiency power systems that are smaller, cooler, more feature-enhanced and powerful allow more placement choices.

By Aaron Arellano

The last big remote cabinet power refresh helped to usher in the digital subscriber line (DSL) era. Demand was dropping for dial-up Internet access and new, higher-capacity power systems were needed to introduce the megabit Internet access speeds promised by DSL.

Today, the telecom industry is moving to fiber-optic networks and quadruple-play services (broadband Internet access, telephone, television, wireless), which means it's time for a fresh look at the DC power systems required to drive these service initiatives.

Can the cost of new telecom power system installations be offset by the increased power efficiency, remote monitoring and battery control capabilities, and added revenue from mobile data service enhancements facilitated by deployment at retrofitted sites? These are some of the questions being asked as service providers consider their power needs for the next decade.

One thing is certain: Site selection and permitting are becoming more difficult and building costs continue

to rise. Therefore, in many cases, revamping existing telecom cabinets is the only reasonable option for creating outside plants that are up-to-date. The trick is to utilize the most efficient, lowest-cost way to leverage existing structures and build an overlay network inside.

It sounds like a tall order, but several key DC power system innovations now available allow outside plant professionals to do more with less. The good news is that recent technology advancements have produced reliable, highly efficient, space-saving power systems that are not only feature rich, but also leave plenty of room for new equipment that addresses today's very different telecom network needs.

Use existing cabinets?

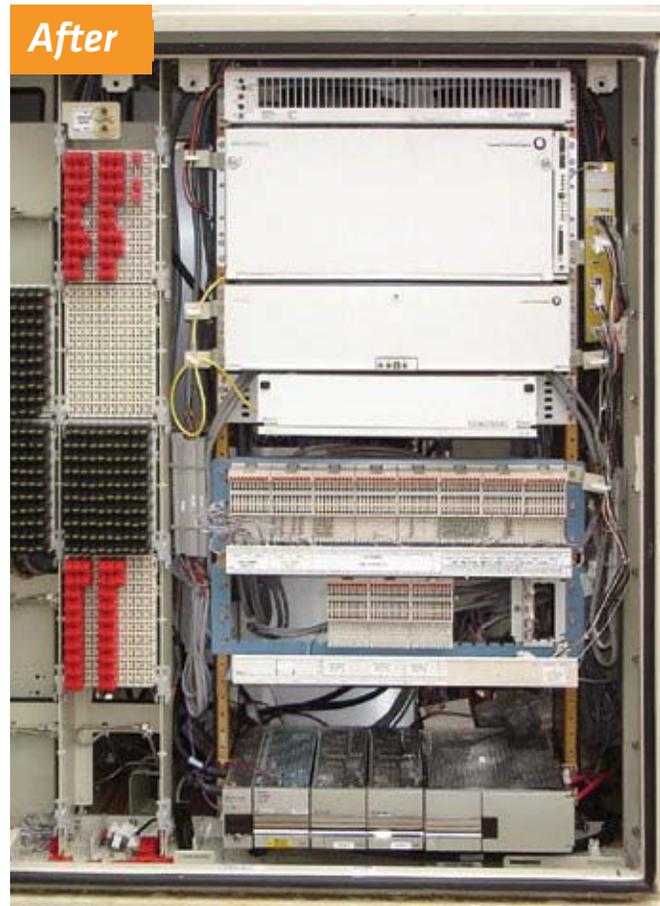
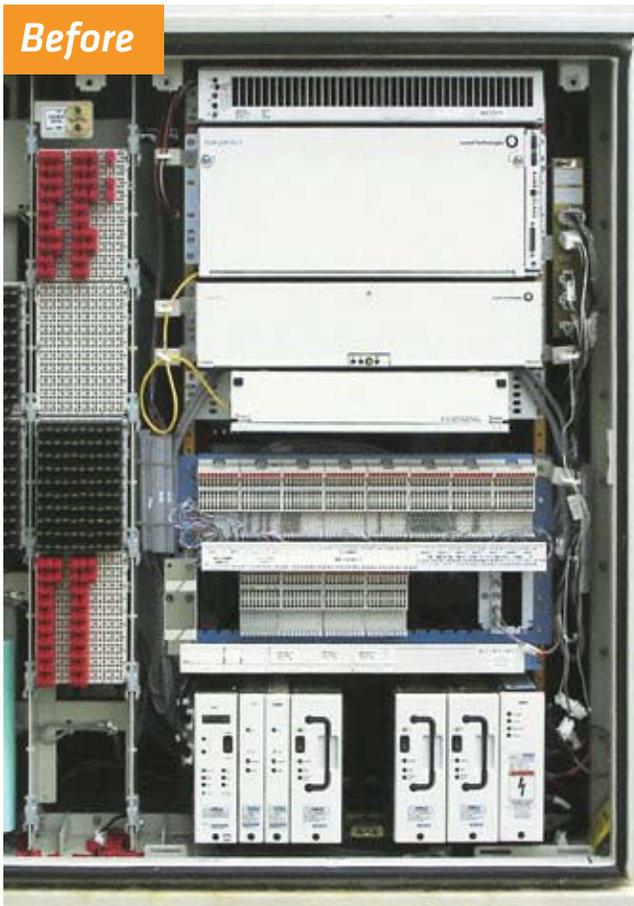
There are multiple reasons for a telecom to consider refreshing the power equipment in existing outdoor cabinets:

Replacement of obsolete power equipment: After five to 10 years, legacy power systems and rectifiers become obsolete. New replacement parts become difficult to obtain or are no longer made. Even if new or

refurbished parts are available, it can be costly and time-consuming to search for, order and install non-standard components from multiple sources, with no guarantee of reliability replaced. Moreover, other parts on these older systems could fail at any time.

Allowing outdated power equipment to remain not only causes inconsistency with parts, repairs and functionality, it also makes maintenance record-keeping and system management extremely difficult. The space occupied by older, larger units, leaves little to no room for adding new voice and data equipment necessary for meeting evolving communication demands.

Energy and space efficiency: Cabinets retrofitted with new high-efficiency power and distribution systems are much more energy- and space-efficient. These systems are capable of unprecedented levels of AC-to-DC conversion efficiency — as high as 97 percent efficient — and can provide double the power capacity, but with a much smaller overall footprint. Designed to allow high-power



New, high-efficiency power and distribution systems are more energy- and space-efficient. They can provide double the power capacity with a much smaller footprint. These photos show equipment replaced in the lower right section of the cabinet.

density in less space with smaller components, some new systems have less depth yet contain core rectifiers with a capacity as high as 100 amps. These space-saving units also emit far less heat than older systems, thereby minimizing cabinet cooling needs and decreasing operator energy costs.

Improvements in battery management: Legacy power systems have battery maintenance technology that is outdated, minimally effective and without proper data security. Battery testing cannot be conducted remotely, but must be done manually during on-site visits as part of a technician's routine tasks. Older system alarms require on-site

response and inspection. Some of these systems can't monitor the effect of outdoor temperatures on battery charge and reliability.

In contrast, advanced power systems are designed with controllers that vastly improve battery management capabilities, including automated remote monitoring that permits testing,

analysis and control from the central office terminal (COT).

This gives operators crucial 24/7 information on all sites simultaneously and reduces technician tasks during routine site visits. It provides immediate insight into system alarms, delaying or circumventing the need for long-distance travel to

Advanced power systems are designed with controllers that vastly improve battery management capabilities, including automated remote monitoring that permits testing, analysis and control from the central office terminal (COT).

/ POWER SYSTEMS /



Before

After

Replacing obsolete, oversized telecom equipment buys operators extra space in current cabinets, permits cohesive documentation, improves system management capabilities, decreases operating expenses and provides a migration path to installing other essential technology, all of which will enable implementation of even more carrier services going forward.

POWER SYSTEMS

check on the situation in person. Individual sites can also be monitored via mobile phone, using the IP address of the specific power cabinet equipment. This enables quick and easy trouble shooting from anywhere, and is extremely beneficial when it is difficult or impossible to investigate from a computer or the COT — a huge convenience factor.

New power systems also have battery voltage and thermal control features that are engineered to regulate battery charge, prevent inconsistencies during charging, and extend battery life. These systems have climate compensation capabilities that provide more or less voltage to power system

batteries as needed, keeping them fully charged regardless of outdoor temperature. During cold weather, the system supplies more power to increase battery warmth and voltage. In hot weather, less power is supplied in order to decrease voltage and cool the battery. This helps maintain a uniform battery charge and prolong battery performance.

Security enhancements: Support for SNMPv1, SNMPv2 and SNMPv3 is another important element of modern controllers, because this provides improved security with encryption of data that is communicated between the management center and remote terminal site.

Uniform documentation for cohesive control: Wide-ranging replacement of older power systems with standardized equipment and uniform documentation enables maintenance and management to be done in a consistent manner. It gives operators cohesive control over their outdoor cabinets and makes future repairs and upgrades by new technicians much easier, saving both time and money.

Even higher efficiency: In the last wave of DC power plant updates, many cabinets were equipped with systems that at the time, boasted efficiencies ranging from the upper 80 percent to low 90 percent level.

High-efficiency power systems that are smaller, cooler, more feature-enhanced and powerful are now available, enabling telecom operators to refresh existing structures, rather than planning and budgeting for the building of new ones.

Cost savings from that extra efficiency was a driving factor. However, state-of-the-art power systems can feature efficiency levels as high as 97 percent. The additional cost savings to be derived from this boost in energy efficiency, when combined with the many other significant benefits provided by today's technological advances in

DC power systems, makes a pronounced, highly effective difference for telecom operators.

Time for a Refresh

The escalating demand for services such as mobile data delivery, has increased the need for upgraded telecom power systems at remote sites. Fortunately, high-efficiency

power systems that are smaller, cooler, more feature-enhanced and powerful are now available, enabling telecom operators to refresh existing structures, rather than planning and budgeting for the building of new ones.

Replacing obsolete, oversized telecom equipment essentially buys operators extra space in current cabinets, permits cohesive documentation, improves system management capabilities, decreases operating expenses and provides a migration path to installing other essential technology, all of which will enable implementation of even more carrier services going forward.

Aaron Arellano is product manager at Eltek.

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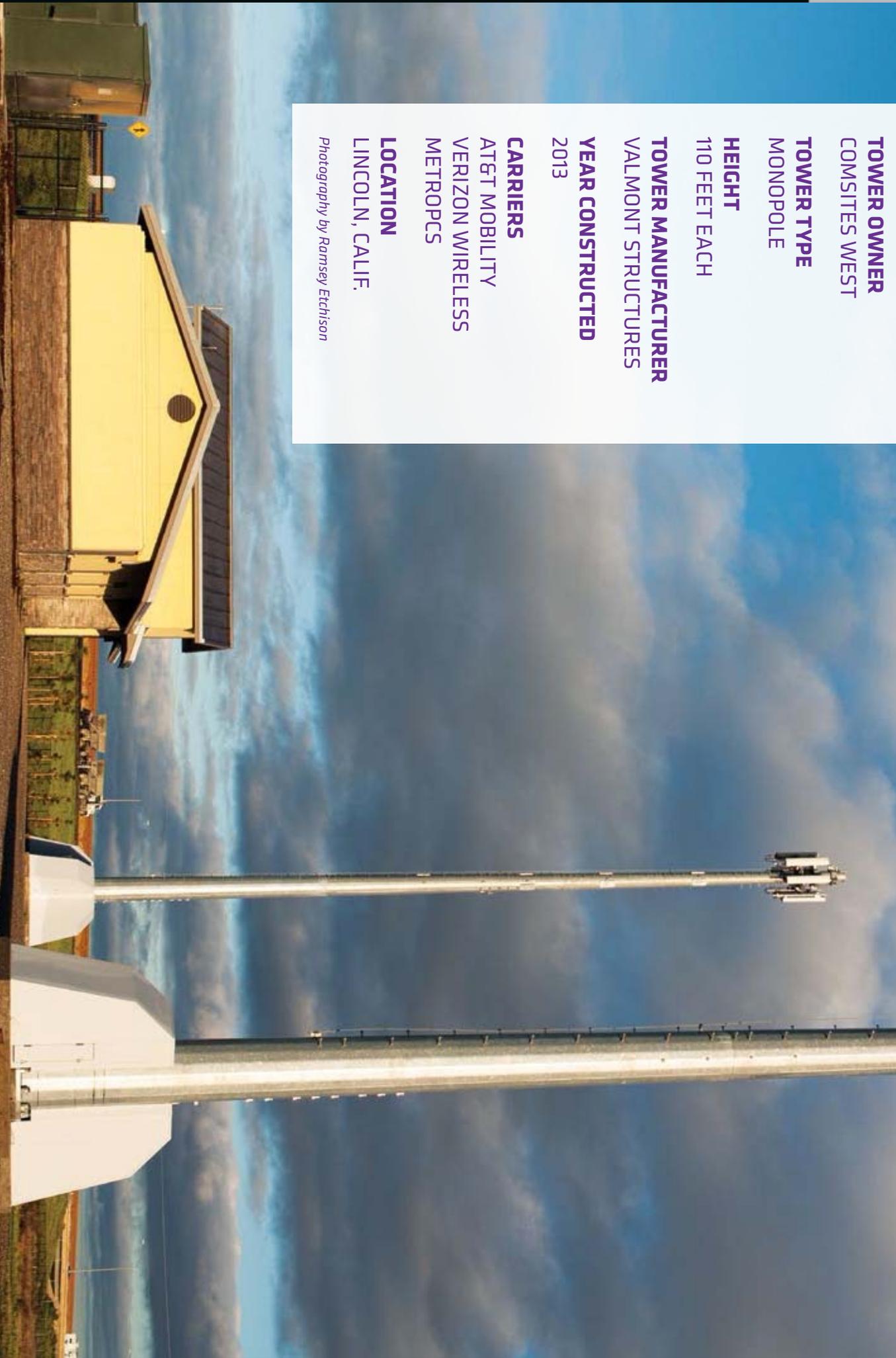
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Hybrid Power Systems For Telecom Sites

Effective metrics for evaluating the efficiency of hybrid power systems at telecom cell sites use a system-level approach for determining tower energy efficiency.

By Mitch Peterson and Ramya Winstead

Telecom networks are growing most rapidly in regions with no grid or an unreliable grid. India, for example, experienced massive power outages in late July 2012 that affected some 600 million people and many of the country's 350,000 cell sites. In large parts of Asia, Africa and Latin America, a cell site often requires power from a diesel generator set running 8, 12 or even 24 hours a day. It's not surprising, therefore, that billions of dollars are spent each year on diesel fuel to provide power at these sites.

To reduce such costs and the associated carbon footprint, power-system suppliers to the telecom

industry have developed a number of hybrid, or cycling, systems that combine diesel generator sets with batteries using a system controller. Hybrid systems can also include solar, wind and fuel cell elements, but the most common systems use generator sets and batteries; these are the hybrid systems discussed in the following information.

In these systems, the generator set charges the batteries. Once the batteries are fully charged, the generator set is turned off and the batteries then power the loads of the site. When the charge of the batteries declines to a specified level, the generator set is started again to recharge the batteries.

Efficiency and Cost Reduction

The makers of these hybrid systems have made various claims for improved energy efficiency and reduced costs. Some companies have asserted that their systems reduce fuel consumption or generator set run hours by as much as 70 percent, with claims of 40 to 60 percent reductions being common.

It's easy to see how a hybrid system can reduce costs when the grid is unreliable and diesel fuel is therefore a significant component of operating expenses, or opex. Whether the source is the grid or the generator set, electricity accounts for up to 65 percent of opex. In areas with an unreliable grid, diesel fuel can

POWER SYSTEMS

	Generator-Only	Hybrid	Comments
Diesel Generator Hours/Day	16	10	
Grid Hours/Day	8	8	
Battery Hours/Day	N/A	6	
Diesel Generator Hours/Year	5,840	3,650	
Diesel \$ as % of Total Energy \$	84%	77%	37.5% Reduction
Grid \$ as % of Total Energy \$	16%	23%	31.5% Reduction

Table 1. Site energy usage and costs. In some locations, the grid may be more expensive than diesel fuel.

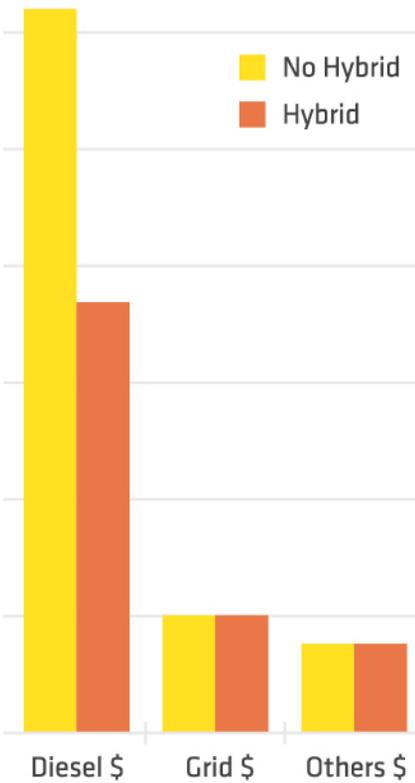


Figure 1. Typical opex allocation for a cell site

account for 80 to 90 percent of this electricity cost. So reducing the fuel used by the generator set can have a significant, positive effect on opex.

Hybrid systems reduce opex by improving the overall efficiency of the power system. Hybrid systems reduce genset run hours, thus reducing preventive and corrective maintenance costs.

Reducing run times for the generator set can also have a positive effect on

capital expenses, or capex, by extending the useful life of generator sets. The usual practice is to replace them after around 14,000 hours of use. For a generator set running 12 hours a day, that means replacement in about three years. Cycling between the generator set and the batteries can stretch those 14,000 hours over a much longer time.

Comparing Systems

Table 1 gives representative energy and fuel figures for a cell site with a generator-only system and with a hybrid system. The assumptions include grid availability for eight hours per day for both kinds of power systems.

Energy efficiency drives diesel fuel costs, which make up a substantial portion of opex. In this example, the cost of diesel fuel is reduced by 37.5 percent with the hybrid system. Opex, in turn, is a significant part of the total cost of ownership (TCO). Grid and other costs (mostly maintenance) are similar for the two kinds of systems (see Figure 1).

Useful Metric for Energy Efficiency

Because energy efficiency drives opex, it is crucial to have a useful metric of efficiency. The problem with many of the efficiency claims is they do not measure efficiency

at the same point in the system. Some consider just the run time or efficiency of the generator set, while others consider the total fuel consumed independent of the loads on the system. This variation in measuring hybrid performance prevents comparisons between systems and makes it difficult to evaluate how changes in system configuration can affect savings.

Components of a Hybrid System

To determine a useful metric, let's first look at the components that make up a typical hybrid system at a cell site that also has a connection to the grid (see Figure 2).

Cell Site Power Efficiency

The most efficient system always yields the lowest opex. Selecting the most efficient system requires an apples-to-apples comparison of hybrid systems and their different effects on opex (see Figure 3).

Transmission loads kilowatt-hours:

Transmission loads are components in a cell site with the essential function of transmitting communication signals that generate revenue. The energy consumed to accomplish this function is used in efficiency calculations. Under this definition, the energy consumed in recharging the batteries or powering the air conditioner loads

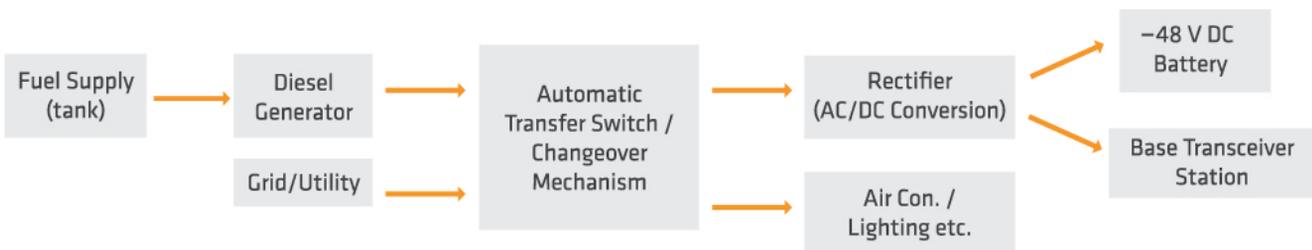


Figure 2. The power at a cell site can come from the grid or from a generator set. In a battery-generator set hybrid system, energy is stored in batteries.

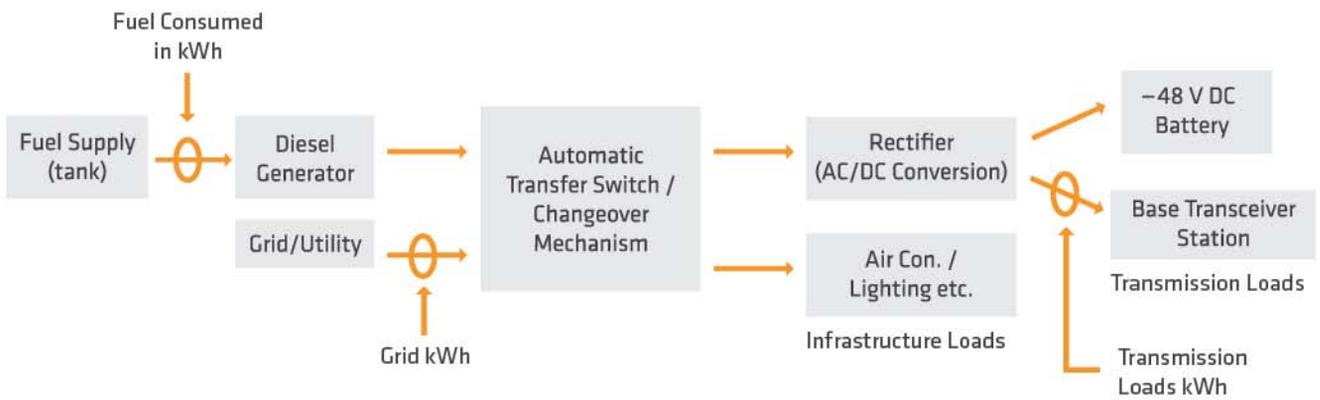


Figure 3. This block diagram shows a typical cell site with measurement parameters for calculating efficiency metrics.

is not a part of the useful energy output of the system; rather, it is energy consumed in an intermediate step, not directly powering the transmission loads.

Fuel consumed kilowatt-hours:

This is the energy equivalent of the fuel consumed by the diesel generator to power the hybrid system.

Grid kilowatt-hours:

For cell sites that have a grid connection, the energy input from the grid becomes an essential factor to consider in the efficiency calculations.

Infrastructure loads:

Environmental control systems and lighting are among the components required for site operation, but they are not a part of the loads dedicated to transmission. However, these loads play a significant role in the energy consumption of a site.

System losses:

All other components in the system contribute to the energy losses in a hybrid system. This approach does not quantify compo-

nent-level efficiency; rather, it takes a system view of efficiency. We propose a metric that allows comparisons between systems using the parameters defined in the previous section. The metric, tower energy efficiency-fuel (TEE_f) measures the efficiency of converting diesel fuel to power the transmission load.

$$TEE_f = \frac{\text{Transmission Load kWh}}{\text{Fuel Consumed kWh}}$$

Here the kilowatt-hours used to power the transmission load are related to the fuel consumed only when the grid is not available.

Reasons for Differences in Efficiency

The causes for differing efficiency results among hybrid systems include:

- **Power system component sizing:** The relative sizes of the generator set, batteries and rectifiers are key to maximizing efficiency.
- **Percentage of grid availability:**

The more reliable the grid, the less will be the gains in efficiency of the hybrid system over a generator-only site. Conversely, when a generator set is the only source of energy, the cost of the kilowatt-hours consumed is represented entirely by the cost of diesel fuel.

• **Mix of transmission versus infrastructure loads:**

The greater the requirement for infrastructure loads, the less will be the gains in efficiency of the hybrid system. The requirement for these loads is driven by geographical region, climate and installation location of the cell sites. Managing infrastructure loads can contribute significantly to overall system efficiency.

The control strategy used to manage these contributors to system efficiency adds potential for improving overall system performance.

Identify Efficiency Differences

Using the TEE_f metric allows the comparison of performance differences that result from changes in system components and control strategy. We used a typical system configuration as follows:

The problem with many of the efficiency claims is they do not measure efficiency at the same point in the system.



Cummins Power Generation hybrid power systems.

Average transmission load
= 1.5 kilowatts
Battery size = 500 ampere-hours
Generator size = 15 kilovolt-amperes
Rectifier size = 5.2 kilowatts

Table 2 shows the results. It shows that for a no-grid application, the fuel savings from non-hybrid to the two hybrid scenarios vary from 20 to 30 percent, resulting from a 3 to

5.6 percent improvement in TEE_f. Changes in system components can yield even more variation. Also note that TEE_f provides a comparison of systems' effectiveness for optimizing diesel fuel usage.

Data Center Analogy

These energy efficiency metrics are similar to the power usage effectiveness (PUE) metric widely used in data

centers. PUE is a standard developed by The Green Grid consortium (www.greengrid.org) to provide a clear answer to the primary issue surrounding energy efficiency within the data center, which is how much power is devoted to driving the actual computing/IT components (servers, storage and networking equipment, for example) versus the ancillary support elements such as cooling and lighting.

System Load	No Grid (kWh)			Grid - 8 hrs (kWh)		
	No Hybrid	Cycle Strategy 1	Cycle Strategy 2	No Hybrid	Cycle Strategy 1	Cycle Strategy 2
Transmission Load Per Day	36	36	36	36	36	36
Fuel Consumed Per Day	290	230	200	193	153	133
Grid Usage Per Day	0	0	0	13	13	13
TEE _f	12.4%	15.7%	18.0%	12.4%	15.7%	18.0%

Table 2. Examples of TEE_f and TEE.

POWER SYSTEMS

/ POWER SYSTEMS /

Conclusion

Backup power systems are common in developing regions with unreliable grids, and they are becoming more common even in some developed countries because of legal man-

dates. Diesel generator sets are the most common power systems, often supplemented with batteries. Alternative energy sources, including solar, wind and fuel cells, will be increasingly popular as ways to re-

duce costs and carbon footprints. Whatever the combination of energy inputs, it is important to make sound, apples-to-apples comparisons of efficiency and cost.

To that end, a system-level definition of power system efficiency is the most useful, and efficiency should be calculated based on the amount of energy used to power the essential radio function of the cell site. Reaching that system-level efficiency requires examining and balancing the operation of all the components. In terms of cost, the goal is to reduce opex, which in many cases means reducing the amount of diesel fuel consumed, while still providing the power for the essential load.

The proposed metric, tower energy efficiency-fuel (TEEF), considers the power system as a whole, focuses on the essential function of the cell site and makes it possible to compare the relative advantages of various kinds of hybrid systems and their costs.

Cummins Power Generation is continuing to test various models of hybrid systems involving diesel generator sets to determine the proper balance of component operation to deliver optimal efficiency at the system level. It is part of our commitment to providing reliable power while reducing its cost and carbon footprint.

Mitch Peterson is a technical advisor with Cummins Power Generation. He leads engineering teams in the development of power generation products and control systems. Ramya Winstead is a senior electrical engineer at Cummins. She develops and tests hybrid power system solutions for the telecom market.

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The Importance of Power Management in a Multitenant Environment

Network availability, reliability and quality depend on a continuous energy supply. Especially at cell sites with multiple tenants, power management pays off in helping to maintain multiple power sources.

By Ben Stump

Power — all networks require it. Whether you have cell sites, huts or vaults, roadside cabinets, or a utility facility, power is critical for on-site equipment, 24 hours a day, seven days a week. This power can come from multiple sources such as commercial power services, generators (diesel or propane), batteries, wind turbines, solar panels and hydrogen fuel cells. The challenge is managing the power effectively and efficiently to ensure network availability at all times for all tenants.

Today's telecommunications environment is extremely competitive, not only for subscribers but especially for service providers (carriers). They need to minimize expenses wherever possible, and that has led to multitenant environments at most cell sites. It is not uncommon for a tower operator to have three or four tenants at a cell site, each with different power demands. Can this be managed effectively?

Understanding Power Sources

Almost every site has at least two power sources, and most have three or more. These sites often utilize commercial power as the main source

and batteries and generators for backup power when commercial power fails. Unfortunately, primary power failures are too common. To maintain five nines (99.999 percent) network availability, which is often a requirement in a service provider's service level agreement (SLA), an effective transition among different power sources is critical.

Additionally, an SLA often requires that a site be running on generator power within a designated time after a commercial power failure (often four minutes). Being able to monitor, track and report on how long the batteries have been discharging until the generator is producing clean power is important to avoid SLA penalties.

In addition to network availability, power management is critical for understanding costs. For example, a tower operator or service provider is billed at a different rate by the power company for commercial power based on the time of day and overall usage per month. The cost of using a generator and consuming fuel is a different cost than using batteries or commercial power. In a multitenant environment, each tenant will have

different power requirements based on the equipment being used. To ensure accurate billing, it is important to understand how much power each tenant is using from each source and at what cost.

The ability to monitor and ultimately manage site power remotely is critical to a tower operator's and service provider's success. If a power failure occurs from adverse weather conditions, equipment failure, malicious activity or contractor error, for example, there could potentially be lost revenue, network downtime, safety problems and lost customers. Understanding the status of site power (both primary and backup) and the ability to fix issues without a site visit is imperative.

Comprehensive Management

Power is unpredictable — you don't know when a power source will fail and how long it will be unavailable. For industries where a steady power supply is critical, having a comprehensive power management solution is imperative. Because power can come from multiple sources, you need the ability to manage all of these

Intelligent Power Management

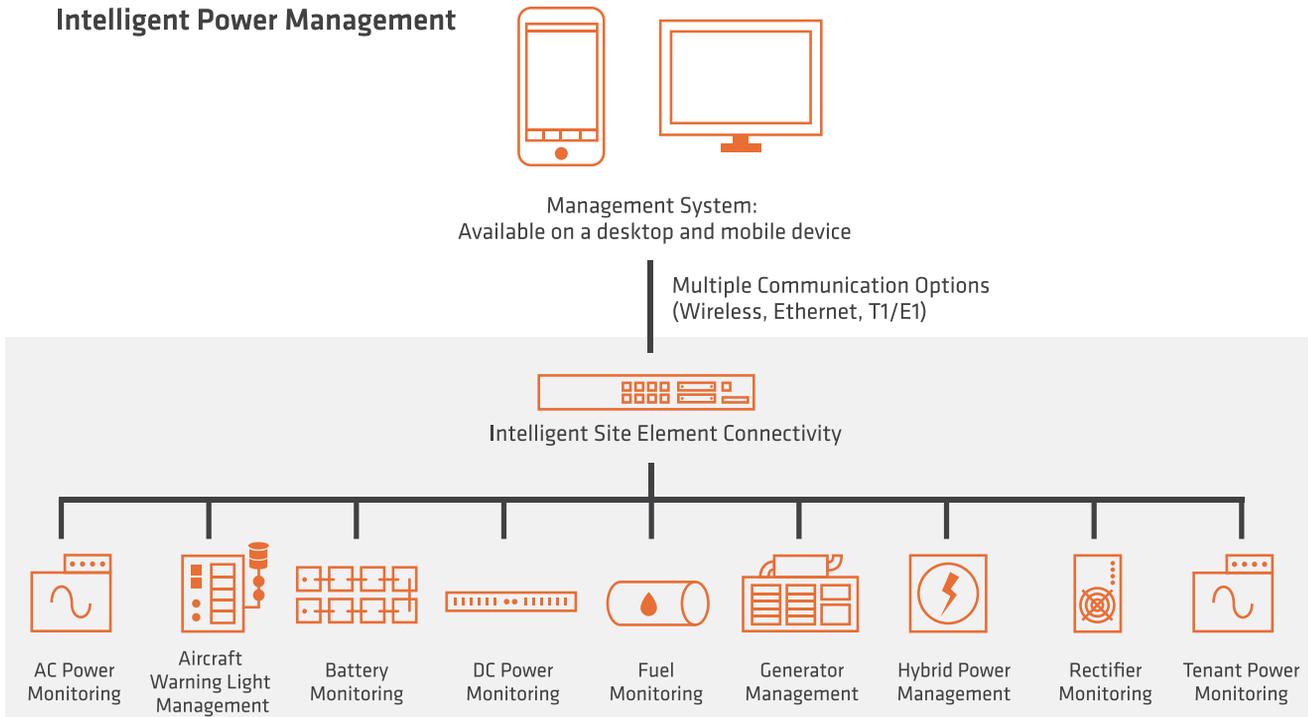


Figure 1. A complete power management solution should include monitoring and management of AC and DC power, batteries, generators and fuel, hybrid power, multiple tenant power consumption per power source and rectifiers.

sources and understand how the power is distributed throughout the site. A complete solution (Figure 1) should include monitoring and management of multiple aspects including:

- AC (commercial) and DC power
- Batteries
- Generators and fuel
- Hybrid power
- Multiple tenant power consumption per power source
- Rectifiers

A comprehensive power management solution is able to quickly identify when a power problem exists at a site. For example, assume a cell site is running on commercial power with batteries and a generator for backup power. When an outage occurs, several activities should happen automatically: The tower operator would be notified of the outage immediately, and the batteries start discharging

to provide site power while the generator warms up. Once the generator is ready, it would assume the site load from the batteries until commercial power is restored.

During a storm, however, commercial power may not be restored for many hours. A long commercial power outage could lead to the generator running out of fuel. With a power management solution, once again, the tower operator would receive advance notification when the fuel level is getting low. Because there are usually many generators in a tower operator's network, the tower operator would also have the capability to run a report to identify which generators will run out of fuel first. This helps prioritize site visits to ensure the generators continue running.

A power management solution should also provide a tower operator

with proactive warnings based on power status. Here are a few examples where the tower operator will receive a preventative warning, although the site is still available:

- A generator has failed to stop, but commercial power has been restored.
- There is an unexpected drop in fuel level.
- There is an unexpected high discharge rate for batteries.

As tenants, service providers are only interested in paying for their actual power consumption at a site. Because the cost of different power sources varies, a power management solution must have the ability to break down the usage per source and time of day to enable billing at the appropriate kilowatt-hour rates.

To ensure the network availability and quality required in today's world, remotely managing sites is essential.

/ POWER SYSTEMS /



POWER SYSTEMS

Managing power is no exception. Whether it is monitoring AC and DC power, batteries, generators, hybrid power alternatives or a specific tenant's power usage, the ability to remotely monitor and manage power without having to visit a site helps to achieve a huge savings.

Batteries – a Critical Asset

Virtually every site uses batteries or battery strings as the initial source of backup power, making them one of the most critical assets at a site. It is necessary to understand the status at any point and how they are functioning over a length of time.

Battery monitoring is important to ensure that tower operators and services providers always understand battery status and are notified when a potential issue arises. Because there are several factors that affect long-term battery performance and reliability, such as discharge frequency, depth of discharge, environmental conditions (temperature) during discharge, equipment load and maintenance, continual access to reports and measurements must be available through the power management solution. This can extend the useful life of batteries by automating controls to ensure the batteries are primarily exercised during optimal conditions.

Identifying estimated runtime remaining on batteries provides visibility into when a site may lose power. This is especially important during natural disasters and inclement weather when commercial power may be unavailable for extended periods. For example, if commercial power fails, the site batteries will be relied on to carry the site load while the

Site Power Distribution

- Commercial Power Duration
- Generator Runtime
- Battery Discharge Duration

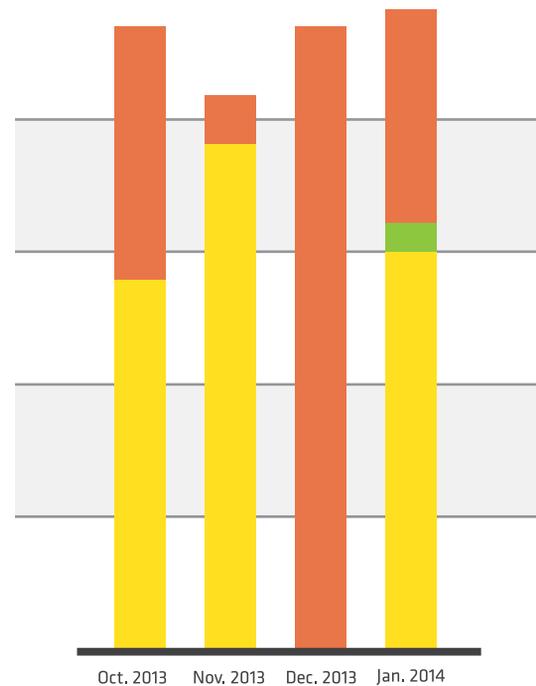


Figure 2. A comprehensive power management solution enables an operator to understand, at any time and without a site visit, how power is distributed throughout a site.

generator is warming up. Once the generator is ready, the batteries will stop discharging as the site load is transferred to the generator. The generator will continue running until commercial power is available or until it runs out of fuel. If the generator runs out of fuel, the batteries will start discharging to continue site availability.

Throughout this power disruption, a power management solution should keep the operator informed of the overall power status on a single or multisite basis. Automatic notifications should occur as the site load is redistributed from one power source

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POWER SYSTEMS

to another, when the generator's fuel reaches predefined low and very low levels, and when batteries are charging, discharging or fully discharged. When the operator receives these alarms, the operator should have the ability to run reports showing how much run-time is available for the generator and how much battery time is remaining. This information is extremely important in identifying the sites that will lose power first, helping prioritize refueling visits and ultimately helping maintain five-nines network availability.

When buying new batteries, a manufacturer's warranty is typically included. However, if something happens to the batteries during the warranty period and the owner wants a replacement, manufacturers are often requesting documentation on how the batteries have been utilized over their lifespan. For example, they

may want a report that details how often the batteries are being discharged, the depth of discharge and the environmental conditions during the discharge period. Basically, manufacturers want to ensure they are not replacing batteries that have been operating in poor conditions such as high temperatures, which shortens battery life.

The Good and the Great

Intelligent power management: It's critical for a network's success in today's "always on" world. Whether you are a tower operator, service provider or mobile subscriber, a comprehensive power management solution will make your life easier because it will help ensure network availability, reliability and quality.

A comprehensive power management solution enables an operator to understand, at any time and

without a site visit, how power is distributed throughout a site (see Figure 2). This data can be used to identify inefficiencies in equipment due to improper equipment size. Because most site power disturbances are caused by site equipment, the data can also identify problems with the equipment itself. This helps optimize energy consumption.

Operating cost reductions are a major benefit of power management. Because fuel levels are monitored remotely, refueling schedules can now be based on actual fuel levels and estimated runtime remaining. This can save considerable time and cost, especially if sites are in distant or hard-to-reach locations. Remotely monitoring, managing and controlling power systems reduces site visits for problems that can be fixed remotely, but if a site visit is required, the technician can be prepared with the

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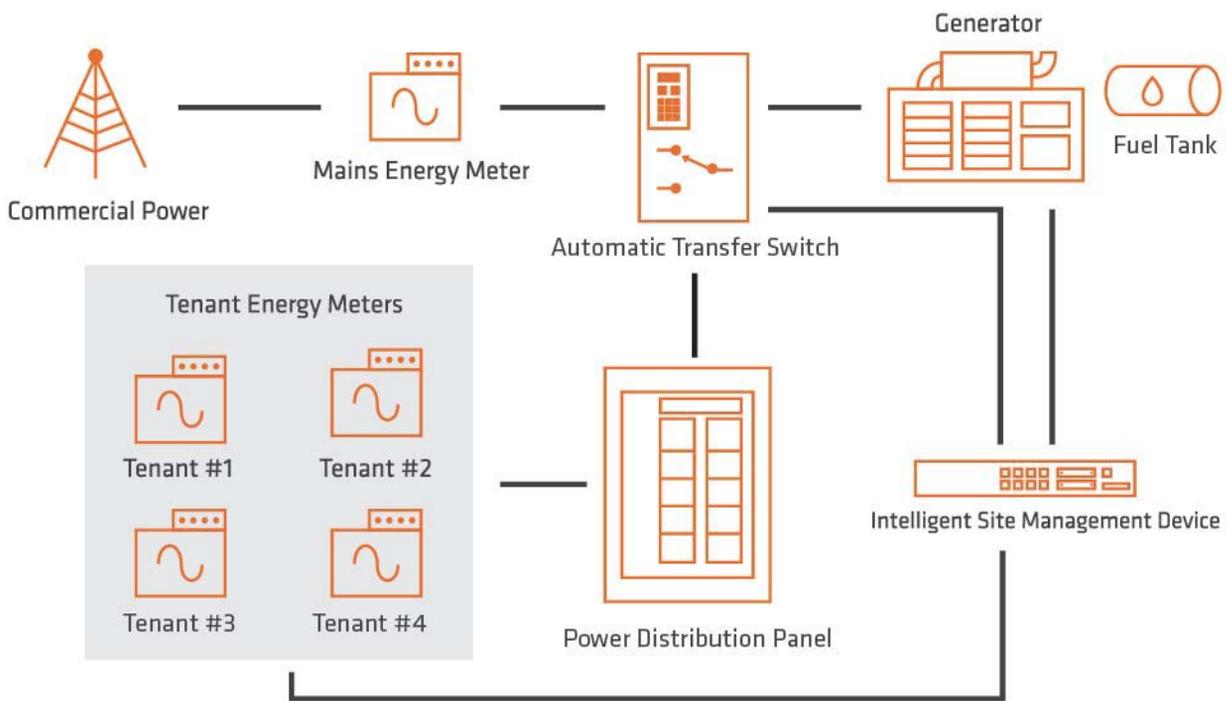


Figure 3. With intelligent power management, each tenant is accurately billed for actual power consumption without the need to visit each site. A breakdown of each tenant's use of the different power systems enables billing at different rates. The service provider benefits from only being charged for actual consumption.

appropriate equipment by knowing where the issue resides before ever leaving, ultimately improving technician efficiency. Additionally, proactive maintenance helps ensure that equipment will be maintained and in proper working order, helping minimize site failures.

Accurately billing each tenant based on actual power consumption at the site is possible without having to visit each site. The operator can easily understand the breakdown of each tenant's use of the different power systems to enable billing at different rates. The service provider benefits by only being charged for actual consumption (see Figure 3).

A power management solution can also help with equipment pur-

chase planning. An operator will have sites with two, three, four or more tenants and will know how much power is utilized by a specific number of tenants based on the equipment installed. If more equipment or another tenant must be added to a site, the operator can use the data obtained from reports to know what power equipment (generator, batteries, etc.), if any, needs to be replaced to handle the new power load. It is no longer necessary to have network downtime caused by not knowing what will happen when more load is placed on the power systems.

Comprehensive power management: It's no longer optional for sites that need to be available every

hour of every day. An intelligent power management solution is critical for tower operators and their tenants for monitoring, managing, and controlling multiple sources of power to ensure site availability, minimize operating costs and maximize network quality.

Ben Stump is senior vice president and chief technology officer of Westell Technologies where he provides vision and leadership in defining corporate strategy for Westell products and technology. He has more than 15 years of telecommunications experience in operations support systems and technology, operations and engineering for network operators worldwide.

POWER SYSTEMS

Backup Power: Environmental Obligations and Risks

Wireless carriers may demand site assessments and investigations to limit their potential liability for cleanup and recovery costs that may arise at tower sites, particularly with pre-existing contamination.

By C. Douglas Jarrett, Trent M. Doyle and Gregory A. Clark

One consequence of the extensive wireless service outages caused by Superstorm Sandy is that wireless carriers are routinely requiring tower license agreements to accommodate the installation of backup power systems, including license agreements for space on 50- to 200-foot monopoles. (Backup power capabilities for rooftop transmitters present different challenges.) Backup power systems can take various forms, including diesel- or propane-fired generators with associated fuel storage tanks, fuel cells or batteries. In some instances, wireless carriers may be looking to tower operators to assume management of these backup power assets.

It is an open question, at best, whether the FCC or Congress will mandate backup power systems for cell sites, particularly in light of industry objections to mandatory requirements in the aftermath of Hurricane Katrina. (The FCC has proposed a rule that would require facilities-based wireless providers to submit, daily, during and immediately

after major disasters, the percentage of cell sites within their networks that are providing commercial mobile radio services. This information would then be publicly disclosed by the FCC.) Nonetheless, the reality is that backup power systems are likely to be a standard component in tower license agreements for years to come.

Tower owners and operators should be cognizant of environmental compliance obligations associated with backup power systems in light of the telecommunications industry's challenges in meeting these requirements. Beginning in the late 1990s and continuing through 2013, the U.S. Environmental Protection Agency (EPA) entered into numerous consent decrees with wireline and wireless carriers to address noncompliance with the environmental laws and regulations triggered by the installation and management of backup power systems. In a number of instances, the consent decrees included multi-year compliance plans and "voluntary contributions" to the United States Treasury in excess of \$1 million.

As the major wireless carriers divest themselves of tower assets, owners and operators of cell sites (tower, pad, surrounding space and equipment, including backup power systems) should be proactive in addressing environmental compliance obligations and risks in order to protect their substantial, long-term investments. Even if the wireless carrier is responsible for operating and maintaining the backup power assets, the tower owner may still be the party named in an environmental enforcement action brought by a state agency or the EPA. Although assigning compliance responsibilities and including indemnity provisions in tower license agreements can address the costs for resolving an enforcement action, the tower owner probably cannot insulate itself from liability for noncompliance, which, for a single tower site, can result in penalties of tens of thousands of dollars.

Compliance Obligations

To meet backup power demands, a

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Even if the wireless carrier takes on responsibility for operating and maintaining the backup power assets, the tower owner may still be the party named in an environmental enforcement action brought by a state agency or the EPA.

diesel- or propane-fired generator with one or more fuel storage tanks on-site is typically deployed at a cell site. Depending on the generator's size (e.g., kilowatt, horsepower, or btu/hr rating), frequency of operation (e.g., hours per year), and location, an air permit may be required to install and operate the generator. Permitting requirements vary significantly by state. In some, an application describing the equipment and potential emissions must be filed prior to installation, while in

others little or no paperwork is required as the equipment may be covered by an existing general permit or permit-by-rule that sets out terms and conditions the owner/operator must satisfy. In some states, generators that are below a certain size (e.g., 50 to 250 horsepower), operate infrequently (e.g., typically less than 250 or 500 hours per year), and combust only natural gas, propane or fuel oil (with less than 0.5 percent sulfur) are exempt from air permitting requirements. Beyond the permitting

obligation, the equipment may be subject to EPA New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) emissions standards or both, which can trigger a host of additional obligations, including emission limits. Suffice it to say, in most situations, a facility with a backup generator will, at a minimum, be required to keep records of hours of operation, fuel consumption and fuel sulfur content.

The presence of a diesel or propane storage tank on-site to supply the backup generator can trigger a number of compliance obligations. Diesel and propane both qualify as hazardous chemicals, and, therefore, right-to-know reporting requirements must be considered. Emergency Planning & Community Right-To-Know Act (EPCRA) §311 and §312 requirements

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will be triggered if approximately 1,500 gallons or more of diesel is present at the tower site at any one time during the year. This means the facility will need to make a one-time notification to the State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC) and local fire department by providing those parties with a material safety data sheet (MSDS) for the fuel. Also, by March 1 of each year the facility will need to complete and submit a hazardous chemical inventory form (e.g., Tier I or II form) to those same parties. (EPA has developed software to facilitate electronic reporting. Visit <http://www2.epa.gov/epcra-tier-i-and-tier-ii-reporting>. Some states utilize their own software, forms or both.)

Given their potential to leak and because of the increased cost and long-term liability concerns with underground storage tanks (USTs), many owners and operators of tower sites may want to avoid reliance on USTs.

Propane can trigger similar requirements though the 10,000-pound reporting threshold corresponds to approximately 2,500 gallons of propane, which probably would be more than what most tower facilities will maintain on-site.

If a tower site has aboveground diesel storage capacity in excess of 1,320 gallons and there is a reasonable expectation that a leak could make it into the navigable waters or adjoining shoreline, then the site will need a Spill Prevention, Control and Countermeasure (SPCC) plan. As a practical matter, unless a release of oil would have no chance of affecting a body of water, prudence dictates an assumption of potential contact with navigable water. The tower site owner or operator must prepare, implement and periodically update an SPCC plan. Ordinarily, a licensed professional

engineer must review and certify the plan, although a self-certification option is available in many states for facilities with oil storage capacity less than 5,000 gallons. The tower site owner and operator should always determine whether the state (or states) in which it operates cell sites has an aboveground storage tank (AST) program, which may impose other obligations.

Given their potential to leak and because of the increased cost and long-term liability concerns with underground storage tanks (USTs), many owners and operators of tower sites may want to avoid reliance on USTs. However, if USTs are present at the tower site, then the owner and operator of the site would need to make certain the detailed registration, tank integrity, testing, recordkeeping and reporting requirements of state



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Environmental Laws and Regulations Typically Triggered by Backup Power Systems

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires owners and operators of facilities with hazardous chemicals present above specified thresholds to satisfy certain reporting obligations. Per **EPCRA § 302**, facilities with listed extremely hazardous substances (EHSs) present at or above a specified threshold planning quantity (TPQ) must notify the State Emergency Response Commission (SERC) and designate and notify the local emergency planning committee (LEPC) of a facility emergency coordinator within 60 days of the hazardous chemical's presence above the TPQ.

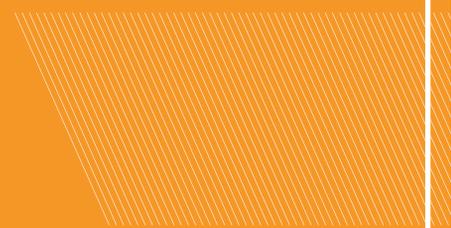
Per **EPCRA § 311**, facilities with 10,000 pounds or more of a hazardous chemical for which they are required to maintain a material safety data sheet (MSDS) by the Occupational Safety and Health Administration (OSHA) must submit copies of those material safety data sheets (MSDS) to the SERC, LEPC, and local fire department within three months of the chemical's presence above the threshold. Per **EPCRA § 312**, those same facilities must submit an annual inventory report regarding the hazardous chemicals to the LEPC, the SERC, and the local fire department by March 1 of each year. Importantly, some states impose filing fees and state-specific right-to-know report-

ing obligations with lower thresholds. **EPA's Spill Prevention, Control, and Countermeasure (SPCC) rule** requires owners or operators of certain facilities to prepare and implement SPCC plans that contain measures to prevent and control oil spills. Subject facilities are those with an aggregate aboveground oil storage capacity of greater than 1,320 gallons and that because of their location could reasonably be expected to discharge oil into the navigable waters of the United States or adjoining shorelines. Some states also impose their own registration, monitoring, annual fee, recordkeeping and other obligations on the owner or operator of aboveground storage tanks (ASTs) containing petroleum products above specified thresholds.

EPA's Underground Storage Tank (UST) regulations, which are primarily administered by state authorities, subject the owners and operators of USTs storing petroleum and certain hazardous substances to registration, tank integrity, testing, recordkeeping and reporting requirements. UST owners and operators are also required to report and clean up releases from their USTs and maintain funds or insurance sufficient to clean up releases and compensate third parties.

Pursuant to **the Clean Air Act**, facilities with sources of potential air emissions, such as combustion products from fossil fuel-fired backup generators, may face **State Implementation Plan (SIP)** air permitting requirements. Moreover, the installation and operation of the engines in the backup generators may trigger emission restrictions, monitoring, reporting, and record keeping obligations under federal **New Source Performance Standards (NSPS)** and **National Emission Standards for Hazardous Air Pollutants (NESHAP)**.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), often referred to as **Superfund**, imposes liability for cleanup costs from hazardous substances that are disposed of or released (e.g., leak) into the environment, on a range of potentially liable parties including current owners and operators of the site/and or facilities at which the releases occur.



The FCC's increased emphasis on continuity of service during disasters and emergencies suggests that wireless carriers will pursue more robust backup power resources, which may increase the regulatory requirements applicable to cell sites.

and federal UST regulations are satisfied. Backup power systems that rely on fuel cells or batteries pose fewer environmental compliance obligations than generators and fuel storage tanks. However, if lead-acid batteries are utilized, then EPCRA reporting obligations may be triggered given that the sulfuric acid present in such batteries is regulated as an extremely hazardous substance (EHS) — because lead itself is also considered a hazardous chemical. EPCRA §302 requirements will need to be met if 1,000 pounds or more of sulfuric acid is present on-site in the batteries. EPCRA 311 and 312 obligations will arise if 500 pounds of sulfuric acid is present on-site at any one time.

The nature of the typical activities and materials at tower sites is such that risk of those activities creating CERCLA liability would appear to be rather low. Diesel fuel is exempt from CERCLA's definition of a hazardous substance under the so-called "petroleum exclusion." Thus, leaks of diesel alone from a site's ASTs or USTs, for example, would not give rise to potential CERCLA liability. However, if the leaked diesel mixes with a hazardous substance prior to release (e.g., through corrosion and mixture with materials from a tank bottom), the petroleum exclusion would not apply, and the mixture could be subject to CERCLA. Regard-

less, leaks could still create potential liability for the tower owner and the tank operator under state cleanup laws as well as potential tort liability.

Risks with Existing Contamination

Concerns about existing environmental contamination at the cell site from prior activities at the site or on adjacent real estate are both a source of potential liability and a potentially difficult issue during negotiations between tower owners and wireless carriers. Demands from carriers to conduct soil sampling or a Phase I Environmental Site Assessment as a condition to executing the lease or reserving the right to walk away from the lease pose a challenge. If the results are not acceptable to the carrier and it walks away from the lease, the owner is then confronted with the unenviable options of initiating a cleanup, assessing whether a release reporting obligation is triggered or taking no action.

There are several options that could be pursued by the site owner to alleviate the prospective licensee's or tenant's concerns. The first is an extensive title search and zoning history of the site that would confirm, based on the identity of prior owners, that the possibility of significant pre-existing contamination is remote. This history may be enough to persuade the wireless carrier to forgo

the soil sampling and site assessment. This may be the best option for tower owners that have owned the property for years, especially decades.

In other instances, a conservative, preventive approach in site acquisitions probably is the best approach. For tower operators acquiring sites or towers, the prospective owner should consider requiring the seller to conduct a Phase I Environmental Site Assessment, reserving the right not to acquire or lease the site if the results are not acceptable. Depending on the extent of existing contamination, one approach is to enter into a compliance plan with the state to remediate the site. In these instances, the seller typically bears the cleanup costs, directly or indirectly. Another is to establish eligibility for CERCLA's Bona Fide Prospective Purchaser (BFPP) defense when acquiring a site. When a BFPP's potential CERCLA liability is based solely on the purchaser being an owner or operator of a facility, the defense is a complete bar to liability if the BFPP does not impede the performance of a response action or natural resource restoration and satisfies eight statutory requirements.

One option that may work in some instances is to both secure a long-term license agreement with a carrier and resolve site contamination issues to determine whether the carrier can qualify for the BFPP defense, which the EPA, through agency guidance, has extended to tenants in certain circumstances.

Conclusion

The FCC's increased emphasis on continuity of service during disasters

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and emergencies suggests that wireless carriers will pursue more robust backup power resources, which may trigger additional environmental obligations. When negotiating lease or license agreements with wireless carriers, tower owners should carefully consider the environmental obligations that may arise from the carriers' operations and be prepared to ensure those obligations will be satisfied on an ongoing basis. The prudent approach is for tower owners to seek an indemnity extending beyond the term of the agreement from wireless carriers for environmental damages and regulatory compliance. Notwithstanding how a license agreement or lease may allocate risks between the parties,

In light of concerns about environmental risks, tower owners should be prepared for wireless carriers to demand site assessments and investigations to limit their potential liability for any cleanup and recovery costs that may arise in connection with the site, particularly for pre-existing contamination.

the tower owner should recognize that EPA or state authorities may well pursue the site owner or operator for noncompliance with the applicable statute or regulation.

In light of concerns about environmental risks, tower owners should be prepared for wireless carriers to demand site assessments and investigations to limit their potential liability for any cleanup and recovery

costs that may arise in connection with the site, particularly for pre-existing contamination. A proactive approach for addressing carriers' concerns probably is the best course of action.

C. Douglas Jarrett, Trent M. Doyle and Gregory A. Clark are attorneys with Keller and Heckman. Visit www.Khlaw.com.



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ENVIRONMENTAL OBLIGATIONS

NATE Unite 2014 Convention Takes Laser-like Focus on Safety for Tower Workers

It's all about coming home from jobs done safely for workers who climb telecommunications towers as part of their tasks. Faced with rising fatality numbers, NATE promotes safety awareness as OSHA ramps up jobsite inspections and safety rule enforcement.

By Don Bishop

Activity at the NATE Unite 2014 convention that started on Feb. 23 in San Diego at the Town and Country Resort & Convention Center extended over a whopping seven days, with the events that were open to all attendees concentrated in three days. Conducted especially for the benefit of telecommunications tower technicians who climb towers as part of their work and for the benefit of their employers, a hefty schedule of training and educational sessions, along with an exhibit hall, luncheons and festive receptions, vied for the attention of those attending the National Association of Tower Erectors convention.

OSHA Cracks Down

Dr. David Michaels, who heads the federal Occupational Safety and Health Administration as a U.S. assistant secretary of labor, laid down the law in a recorded video speech played during one of the luncheons as a keynote address. "We must make 100 percent tie-off the norm in this industry," he said. "The fatality rate in your industry is extremely high,

and tower workers have a risk of fatal injury perhaps 25 to 30 times higher than the risk for the average American worker. This is clearly unacceptable." He said that OSHA investigations found that many of the workers killed at tower sites were wearing harnesses that were not tied off. *AGL Magazine* published Michaels' speech on page 18 of the April issue.

Tie-off Campaign

At the convention, NATE announced a campaign by the Wireless Industry Safety Task Force to encourage manufacturers, general contractors, wireless carriers, tower owners and direct employers of tower technicians to commit to 100 percent tie-off. "One hundred percent tie-off is the law and needs to be strictly emphasized and adhered to at all times," said Pat Cipov, NATE chairwoman. The task force consists of safety and operations executives representing wireless carriers, tower owners, manufacturers, construction management companies and NATE.

The education campaign will entail paid advertising, earned media, public



OSHA chief Dr. David Michaels, pictured in his video speech, said the fatality rate in tower construction and wireless infrastructure installation and maintenance is unacceptable.

service announcements and an outreach to state wireless associations, according to Todd Schlekeway, NATE's executive director. "Seventy-three percent of the accidents and fatalities in this industry are strictly related to not being tied off properly," he said. "We're going to educate not only the industry, but also the general public. We're talking about developing

some advertisements for mainstream media, publications like the *Wall Street Journal* and *USA Today*.”

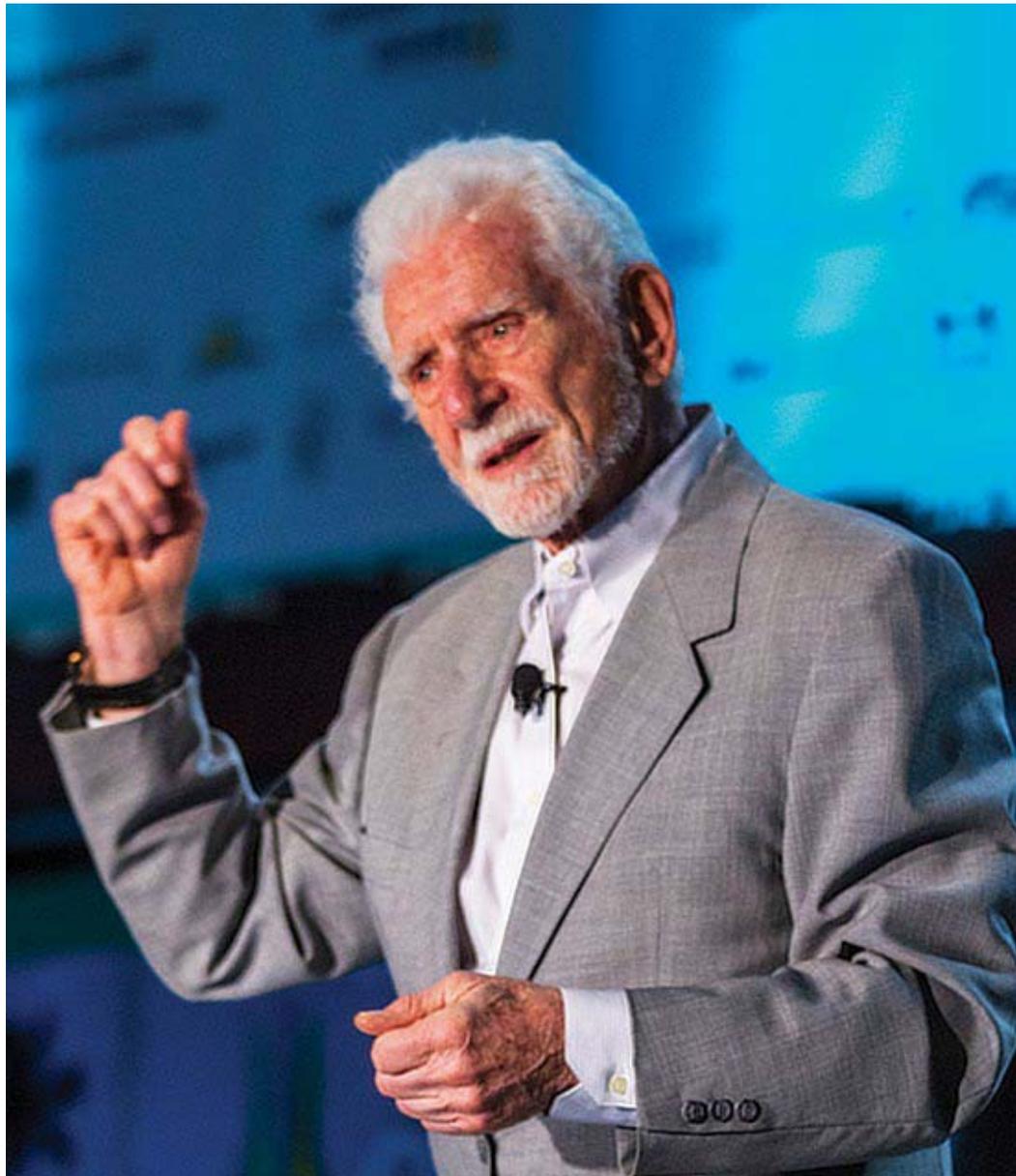
Historical Futurist

A second keynote speaker, Martin Cooper, focused less on current safety concerns and more on technology trends. “I call myself a historical futurist,” Cooper joked. “I talk a lot about history, but a history that’s so far back that all of the people who participated with me are either gone or they can’t remember anymore. I talk about the future that’s so far ahead that none of us are going to be there, so I’m unaccountable in that regard.”

Cooper and his wife, Arlene Harris, are chairman and president, respectively, of Dyna, which they co-founded in 1986. Cooper is executive chairman of ArrayComm. Harris and Cooper co-founded GreatCall, which offers Jitterbug cell phone products and services.

In 1973, Cooper made the first call in public on a portable cell phone developed by a team of engineers he led at Motorola, leading to his reputation as the father or inventor of the cell phone. “The nature of the cell phone was based on one simple proposition: that people are mobile,” he said.

A future technology Cooper talked about involves monitoring personal biometrics to forestall disease and reduce the cost of health care. “What can a doctor tell about you when they’re making one measurement during an annual physical?” he asked. “Your measurements are changing throughout the year. What if you could do a physical examination every minute? If something started to go



Marty Cooper said forestalling disease through biometric monitoring and a resulting reduced cost for health care, customizing education for children and eliminating hierarchical structures in corporations hold the keys to future increases in productivity.

wrong, you would know it, and you would know it because the comparison is made with your own measurements.”

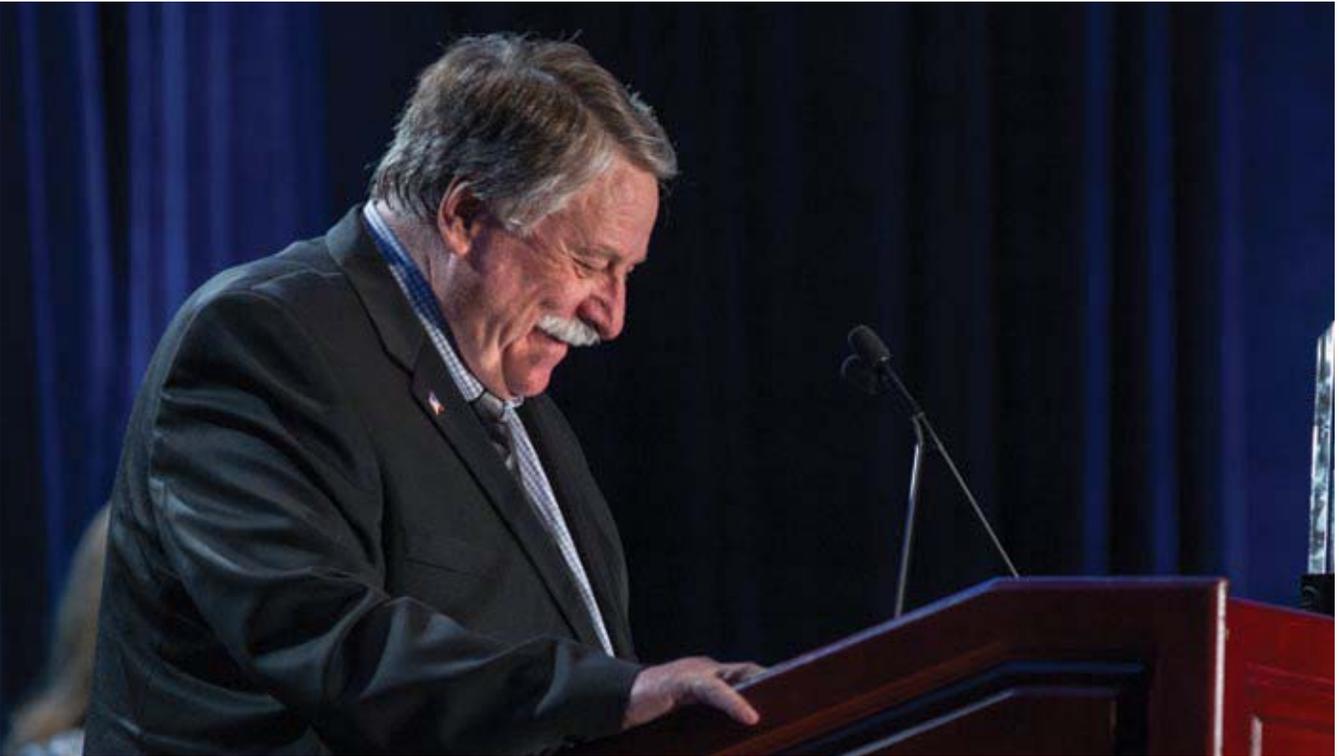
Cooper foresees a reshaping of education and corporate structure that customizes education for children and eliminates hierarchies in corporations. “We have more and more of our youngsters who do not want to

get into hierarchical organizations,” he said. “They want to go do things themselves. That is going to be a major revolution. I predict that it is going to increase our productivity and have a great impact on our society.”

Distinguished Service Award

Gordon Lyman, who has more than

/ CONVENTION COVERAGE /



Bill Carlson, recipient of the Lifetime Service Award. Carlson, chief executive officer of Tower Systems, brought together a group of 65 tower contractors to establish NATE in 1995.

NATE UNITE 2014

45 years of experience in the telecommunications industry, received NATE's Distinguished Service Award, given to recognize direct and individual contributions to the association's mission that profoundly affected its success. He is the chairman of NATE's OSHA Relations Committee, president of Safety LM-Systems and vice president of Westower Communications.

"Lyman has been a devoted NATE member since the association was founded and has dedicated thousands of hours of volunteer time to help write and produce safety resources, develop industry standards and conduct tower technician sessions," said Jim Tracy, NATE's vice chairman.

Lyman said his involvement began as NATE took on obligations in its relationship with OSHA for the issue

of tower workers riding the line, which refers to workers being lifted by mechanical means to elevations on towers. "Our duty was to write standards for base-mounted hoists and for gin poles," he said.

He thanked Westower Communications, saying for all the years he has attended NATE conventions, the company paid for the expense. "The corporate structure of Westower always asked, 'What does Westower get out of NATE?'" Lyman said. "I always tell them, 'Nothing. What you're doing is helping lead the industry and make a better place.' All these years, that is what has driven me. I want this industry to be a good, safe place to work."

Lyman thanked Don Doty, chief executive officer of Stainless, for helping whenever Lyman asked,

and Ernie Jones, president of Consolidated Engineering, who has worked with Lyman on the gin pole and construction standards.

Lifetime Service Award

Bill Carlson, who in 1995 brought together an initial group of 65 tower contractors to establish NATE, received the association's Lifetime Service Award. Carlson is president and chief executive officer of Tower Systems. The service award is given to recognize a significant and long-term contribution to the success of NATE's mission.

"Carlson is a visionary who has led by example and worked tirelessly to establish a culture of safety and professionalism in the wireless infrastructure and tower construction communities," said Pat Miller, chair-



Gordon Lyman, recipient of the Distinguished Service Award, flanked by NATE Chairwoman Pat Cipov and Vice Chairman Jim Tracy. Lyman is chairman of the OSHA Relations Committee.

woman of NATE’s Member Services Committee. “In a career filled with outstanding achievements, perhaps Bill’s greatest legacy is his role as the founder of the National Association of Tower Erectors.”

Carlson recalled the first meeting, which he said some expected would be a brawl or a big fight. “I wasn’t concerned about that,” he said. “I was concerned about selling the idea of NATE.” He said he soon found that the contractors at the meeting weren’t interested in voting about NATE, they were interested in building it.

“We got it put together in a hurry,” he said. “Everyone did what he was supposed to do and got it done in record time. By the second meeting, we were up and running. That’s what it’s like when you work with people

like we had then, that first 65. And there’s a lot more of them here today. I just hope you keep the same attitude. You have to keep building. Don’t quit.”

Exhibits and Receptions

Todd Schlekeway, NATE’s executive director, said the exhibit hall was sold out. “The exhibitors are a large reason this conference is a success,” he said. Convention-goers were given an opportunity to participate in drawings for prizes given by exhibitors.

NATE conducted three question-and-answer sessions in the exhibit hall. One was about the association’s gin pole safety guidelines resource. Another was about the NATE Star Initiative. The third was with Marty Cooper, one of the keynote speakers.

Aaron Pitts, chairman of NATE’s Trade Show Committee, said the

convention had 98 exhibitors. He said the association sold a substantial number of sponsorships. “That makes up the huge deficit that it takes to make this show run,” he said.

Pitts said registration for the convention reached 1,300, reflecting a three-year upward trend in attendance.

The convention featured evening receptions with individual themes of a luau, a beach party and a fiesta.

Educational Sessions

This year, NATE introduced a track of sessions intended to serve administrators among the convention-goers. “We’ve had leadership and technical tracks in the past,” said Pitts. “We hope the administrative track will appeal to people who don’t fit into one of the other categories.”

/ CONVENTION COVERAGE /



Bruce Eades



Robert Jystad



Mike Fitch



Eduardo Inzunza

Insurance

Bruce Eades, regional president of **Insurance Office of America**, was the single speaker at a session about **safety and risk management**. “I am really concerned about the industry you’re in right now, in the area of workers’ compensation insurance,” he said. “If insurance companies stop writing policies for the tower industry, we’re in trouble. It’s very serious.” He outlined steps for companies to take

to become best in class, which he said would help companies obtain insurance and help them keep their premiums as low as possible.

Eades said one aspect of operations affecting insurance is hiring practices. “Right now, in your industry, the hiring practices are the poorest I’ve ever seen,” he said. “I heard of a tower crew that showed up at a McDonald’s on a Monday morning. They liked the guy that rang up their coffee purchase, and he’s on a tower by Wednesday. It’s awful. We have to clean up the hiring practices.”

Trends

At a session about **future trends in the wireless industry** moderated by **Robert Jystad**, founder of the **Channel Law Group**, four speakers offered remarks. The panel was presented under a partnership between NATE and the California Wireless Association (CalWA) to offer sessions on emerging topics. Jystad is president of CalWA.

Mike Fitch, a consultant on telecommunications and infrastructure with Fitch Strategies, spoke of good news for tower construction and maintenance companies in citing

American Tower as saying their customers’ number one preference, the most technologically efficient and the most cost-effective option for wireless infrastructure, continues to be towers. “Whether those towers are as tall as they’ve been historically or whether the heights start to come down a bit as cells become smaller and smaller, nonetheless, it means a lot more towers,” he said. Fitch said that in rural America, “towers will very much be the preferred first option, much less so in really congested, dense urban areas where the traffic is more likely to justify the increased cost and complexity of distributed antenna system (DAS) networks, small cells or other solutions.”

Eduardo Inzunza, global business development leader for RF test solutions at **JDS Uniphase**, more commonly known as JDSU, focused his talk on Long Term Evolution (LTE) technology. He said the best way to make the most use of radio-frequency spectrum is with the modulation technology used in LTE. He warned of interference concerns, giving as an example user devices that might ping pong among small cells and femtocells, reducing net-



Musical entertainment for the third night's reception, held in the exhibit hall, reflected the theme of a fiesta. The National Association of Tower Erectors conducted training sessions for three more days after the conference and exhibition ended.



Richard M. Grimes



Scott Longhurst



Julian Quattlebaum



Beau Aero

work throughput, if small cells and femtocells are not deployed carefully enough.

Inzunza said that advances with multiple-input, multiple-output (MIMO) communications that increase the number of antennas used from two to four, and then from four to eight, could also cause problems. "With LTE, we'll have to look into all of the signals that are present and being transmitted by one specific antenna or the other specific antennas because otherwise, the operators are not going to be able to reach the throughput that is being demanded by their customers."

Richard M. Grimes, chief executive officer of **Capital Tower Group**, concentrated on the subject of DAS deployment. He said his company has been involved with DAS in five vertical markets, health care, transportation, sports entertainment, hospitality and universities. "You may really want to pay attention to what's happening in those venues and maybe be a little bit proactive about what's going on," he said.

To give one example, he said that as a strategic venue, health care is an "exploding vertical market." He said

that opportunities extend beyond the in-building wireless system to include a complementary macrosite on the roof, whether on a tower or a roof mount. "Pay attention to what's going on with the hospitals," Grimes said. "Call the IT guys and find out what projects are going on or what proposals they are entertaining. It could be that some opportunities fall in line with some of the relationships that you have."

Scott Longhurst, president of **Trillium Companies**, talked about the public safety wireless network set to be built by the First Responder Network Authority (FirstNet). He said FirstNet offers some business opportunities for tower construction and maintenance companies. "They will be utilizing existing public safety facilities, repeater towers, shared substations and fire stations where available," he said. "FirstNet also will be trying to utilize existing towers. But many of those towers will need to be upgraded or replaced to allow for the additional equipment. Obviously, a tremendous amount of new constructions will be required to develop this network on a nationwide basis."

Julian Quattlebaum, an attorney

with **Channel Law Group**, covered ideas that he said are in the works or at least imagined for machine-to-machine applications. "An example would be the ability to have electronic devices in the home or implanted in the body and connected wirelessly all the time for a doctor to be able to obtain the data needed without the patient having to travel to a hospital, which there might not even be time to do," he said.

For another example, Quattlebaum mentioned self-driving cars. "Self-driving cars will not only eliminate such problems as drunk driving, but will also, I suspect, make the train obsolete," he said. "There's no reason to have a train if the car can drive you there anyway without your having to interact with it. Another beautiful thing about smart cars is that you don't have to worry about parking anymore. Your car can drop you off at the house, and then go find a place to park by itself somewhere. Those cars will need all sorts of antennas."

Safety Products

Beau Aero, president of **GME Supply**, moderated a session about **new products for safety** that included

/ CONVENTION COVERAGE /



Nate Bohmbach



Craig Firl



Michel Goulet



Matt Hunt

four panelists. He said that 15 years ago, many tower technicians were using safety equipment that they made themselves, for lack of manufactured safety products. “But our industry has grown to get the respect of some of the world’s top manufacturers,” he said.

Nate Bohmbach, a product safety manager at **Ergodyne**, said that the tower construction and maintenance industry is doing an excellent job with fall protection programs, which is first priority.

“What’s often an afterthought is the idea of managing objects at height,” he said. “One of the biggest risks is dropped-object prevention, which comes with three areas of cost: injury and fatality, equipment damage and lost productivity. We encourage engineering solutions that prevent the drop altogether. Administrative controls also can help.”

Craig Firl, North American technical manager at **Capital Safety**, said there have been many developments in safety equipment in recent years.

“We’ve seen a big push to make the equipment more comfortable so more people will wear it,” he said. “Fifteen or 20 years ago, we used heavy-duty nylon. Today, we have lighter materials, but the key is the strength. Aluminum hardware has worked its way into the market.”

Michel Goulet, professional division manager at **Petzl America**, said stitching patterns are starting to become more interesting in an attempt to make the equipment as light and breathable as possible for greater comfort. “Lightweight equipment can help tower technicians perform their jobs better,” he said.

Matt Hunt, rescue safety market manager at **Sterling Rope**, said his company has seen a shift from 5/8-inch rope to 1/2-inch rope. “With engineering and fiber technology, we worked it down to 1/2-inch rope that is light when it is spread out over a couple of hundred feet,” he said. “Some manufacturers are headed into the realm of 7/16-inch rope.”

Safety Program

Edwin G. Foulke, a partner in the **Fisher & Phillips** law firm, was the single speaker at a session



Keynote speaker Marty Cooper talks with a NATE board member, Don Train, president of Train’s Towers.



Karen Page



Edwin G. Foulke



Patti Ringo



Natasha Ernst

that explained **how to develop an effective safety program**. Foulke was chairman of the Occupational Safety & Health Review Commission in the administration of George H.W. Bush and was the head of OSHA in the administration of George W. Bush. “Many companies believe they have a great safety program, but they don’t,” he said. “This isn’t just mom-and-pop companies. It includes Fortune 100 companies.”

Foulke said that safety cannot be a part-time endeavor. “If you think to yourself, ‘I’ve got a safety program, we do training, we check the boxes, we don’t have to worry about anything else and we’ll just go about our work,’ you’re not going to have great safety. And unfortunately, because of how dangerous the work is, someone is going to be killed. We want to make sure that we are protecting our employees, but we don’t want a safety program so rigid that they are afraid to do anything.”

Health Care Reform

Karen Page, a benefits consultant with the **Gallagher Benefit Services** subsidiary of Arthur J. Gallagher & Co., was the single speaker at a

session about **health care reform**. She focused her remarks for employers with fewer than 50 full-time employees, which the 2010 Affordable Care Act defines as a small group for insurance purposes. “With regard to compliance, there are four major components,” she said. “If you have fewer than 50 full-time employees, you don’t have to worry about the employer share mandate. You don’t technically have to offer coverage at all.” But small groups that choose to offer insurance have to meet the mandates.

She said a second component involves fees and reporting to the government. A third covers the mandates, and the fourth has to do with notices that employers must provide to employees. “The government has made it fairly easy,” Page said. “They provided templates and models so you can pull them, although there is work behind creating them and preparing them. You need to provide those to your employees, if you haven’t already.”

Small Cells

Robert Jystad reprised his role as moderator for another NATE-CalWA session that paid attention to

opportunities in small cells. The session featured four speakers. “Small cells are a relatively new technology that we expect will be deployed on a massive scale both indoors and outdoors,” he said.

Patti Ringo, a project manager with **Black & Veatch**, said small cells encompass femtocells, picocells, microcells, remote radio heads and DAS. “For deployment, it’s all the same,” she said. “It’s a few small boxes and a couple of antennas. Sometimes, the antennas are integrated into the box. It has some battery backup. It’s the normal stuff, just at a smaller scale. Yet, from an RF aspect, it is definitely different. The use of small cells has to do with the data output and not so much the coverage. It’s a capacity play.”

Eduardo Inzuna, global business development leader at **JDSU**, said the objective of using small cells is to improve capacity and coverage. “We are not going to be able to place a lot more macrosites,” he said. “Those still will be needed, and they will be changing with MIMO antennas. That will affect small cells, too, although we do not know when. A macrosite can operate as an umbrella

NATE's "100% Tie-Off 24/7 Campaign"



Clifford M. Wilcox of Advanced Safety Pros signs the model tower to affirm his company's commitment to 100 percent tie-off.

An education campaign launched by the Wireless Industry Safety Task Force, the "100% Tie-Off 24/7 Campaign," encourages manufacturers, general contractors, wireless carriers, tower owners and direct employers of tower technicians to commit to 100 percent tie-off while working on towers.

During the convention, NATE displayed a model tower and asked all committed NATE members and their employees to sign it. "Take a moment to put your signature on the tower and affirm your commitment to 100 percent tie-off," NATE

Executive Director Todd Schlekeway said. "We also plan to devote a specific Web page on NATE's website to this issue where NATE member companies will be able to download a pledge card on which they will affirm their commitment to 100 percent tie-off."

Pat Cipov, NATE chairwoman, said it might be a good idea for member companies to get their employees to recommit to 100 percent tie-off. "Not all of our employees follow the rules or what they're taught," she said. "It's another step that might help you get them to recommit."

with small cells within it that interact with it, mainly for capacity. At the same time, we need to be careful about the environment where we make installations."

Natasha Ernst, an attorney with **Channel Law Group**, spoke about using utility poles with small cells. "The public right of way is heavily regulated," she said. "Small cell installations must comply with the National Environmental Protection Act's nine-point checklist, the same as a macrosite. You also have Section 224 of the Telecommunications Act, which is the pole attachment law. Twenty-nine states follow the FCC Section 224 pole attachment, and 21 states and the District of Columbia have their own pole attachment laws. Ohio, Washington and California have proceedings underway to expand access for wireless telecommunications attachments."

Sean Scully, a former public sector urban planner who now works with **CalWA**, said local jurisdictions control the right of way used by small cell installations. He said government processing of applications for permits is about equity, not efficiency. "They're not interested in doing it quickly or efficiently," he said. "It's about doing it fairly for everyone, so you just get in line, regardless of how important your project may be. It's not a merit-based environment, and hard work is discouraged. Unions tend to frown on hard work. And if you really become a hard worker, you're going to get a lot more work. That's the environment you're going to be dealing with."

He said the processing of permit applications also is rife with incon-

NATE UNITE 2014



Sean Scully



Steve Gordon



Randy Cadieux



Gordon Lyman

sistencies with the application of rules and policies. “On a different day, the same guy will tell you a different process,” he said. “If you ask them, you’re asking for trouble. Don’t ask them for what you have to do.” He said applicants are better off reading the regulations for themselves than asking questions about them.

Capstan Hoist Safety

Steve Gordon, a senior product manager in the **Hubble Systems Chance Hotline Tool Group**, was the single speaker at a session about **capstan hoist safety**. “When we talk about capstan hoist safety, we’re talking about two different applications,” he said. “In this industry, some put the hoist mounts on the tower. If you mount it on something that looks like it’s not giving a tight bind with the chain, put a block of wood behind the chain so it isn’t binding around a small structure. Make sure you’re mounting it on something that’s strong enough to take 1,000 pounds of pull, and more. You always want a safety factor. Keep in mind you’re lifting up on the load, so you don’t want to put it on something that can pull itself up. With the hoist

on a truck, 3,000 pounds of load can start moving the truck around.”

Training and Development

Randy Cadieux, founder of **V-Speed**, was the single speaker at a session about **resource management training and development for tower crews**. “Emphasize a system safety approach, leadership and teamwork,” Cadieux advised. “Make sure your operational and safety goals are aligned. Your crews can do a lot of things. They’re very smart and they can do workarounds. They can patch gaps in safety. But don’t make that your sole source of safety.”

Cadieux said it’s important to have good safety equipment and good system design, and to make sure crew members are the last line of defense by tying off. “But don’t make them the only line of defense,” he said. “Empower them through these processes and equip them so they can help you meet safety and performance goals.”

Gin Pole Standard

Gordon Lyman, president of **Safety LMSystems**, and **Ernie Jones**, president of **Consolidated Engi-**

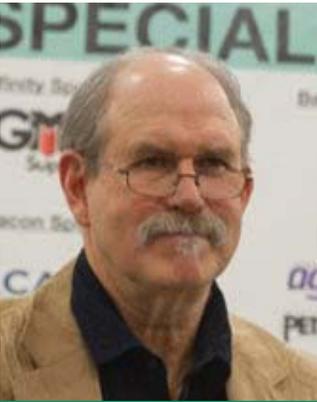
neering, co-chaired the gin pole standard and the construction standard. They spoke at a question-and-answer session for an **introduction to the new NATE gin pole safety guidelines resource**.

“If you are using a gin pole for any type of construction work, you should be following the TIA standard,” Lyman said. “You should not be using a gin pole unless you have a current load chart for the pole and you have training.” He said NATE produced a generalized outline of what workers should do when they use a gin pole, and the document is for sale on the NATE website.

Jones said many gin poles already in use needed new charts and guidelines to allow their proper use and to make them qualified under current requirements. He said that for existing gin poles, the NATE guidelines outline requirements from the standard that the user needs to know and for which the user needs to be trained.

“There is a four-part qualification procedure for existing gin poles,” Jones said. “The first is to have the gin pole inspected in a particular way. The second is to have drawings describing the gin pole, its members,

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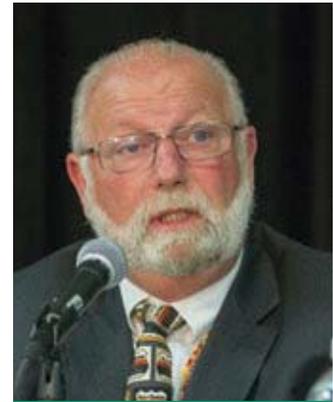
Ernie Jones



Rob Medlock



Ed Dennis



Jocko Vermillion

its geometry, its member thicknesses, etc., combined with the roosterhead. The third is to have a qualified engineer build a load chart specifically for the set of plans that describes the gin pole. The fourth is a requirement that the user of the chart and the gin pole be knowledgeable of what's in the standard, so there is a training verification for the user."

Tower Accidents

Rob Medlock, a vice president at **Safety Controls Technology**, served as moderator for a session about the **primary reasons for tower accidents**. His panel included three speakers. He said that tower accidents are on the rise. "If you ask a safety and health professional who investigates accidents, they're going to talk about root causes," he said. "It

could be things like the weather and fatigue. But the root cause I want you to think about is a breakdown in the safety management system."

He said that safety and health professionals are of the opinion that all accidents are preventable. "If we know the primary reasons, they lead toward prevention," Medlock said.

Ed Dennis, safety director at **Pinpoint Services**, said it's not just the training provided to tower hands, it's the training provided to the managers, supervisors and front office staff that's key to preventing tower accidents. Without that kind of support on a contractor level and up the chain, he said, "the folks in the field who supervise tower hands or inspect and approve jobsites or check on work progress" cannot be as effective as they need to be. "I don't really believe that some of our customers from a contractor standpoint really know exactly what's going on out there, and sometimes I don't think our front office knows what's going on out there," he said.

Gordon Lyman, president of **Safety LMSystems**, said safety is reflected in company leadership mindset, in process and in paperwork. "If you have safety processes



Gordon Lyman, left, and Ernie Jones get ready to start a question-and-answer session in the exhibit hall at NATE Unite 2014. They answered questions about the new NATE gin pole safety guidelines resource.

and you're not checking them, it sends the message that safety is not important to you," he said. "And if it's not important to you, it's not going to be important to anyone else."

Lyman said another problem is that the goals and rewards of safety are minimal. "You may go six months or a year without any change, and when that happens, it's hard to stay motivated," he said.

"That's the key reason for all the accidents we have," Lyman said. "It's casualness and lack of care. Our crews work unsupervised, basically, and they can do whatever they want to do. No one is looking over their shoulders. They're out in the middle of nowhere. They have to have the will to do it right every day. You have to challenge your workers every day, and the main message is that safety is important. To me, the word safety means doing your job right. That's where we could improve to help the industry and make sure that we cut down on accidents."

Jocko Vermillion, a vice president

at **Safety Controls Technology**, said he started as a tower hand and worked his way up to foreman. He later owned a tower company where an accident caused a fatality. "I thought I managed safety well, and when I had the fatality I couldn't understand what failed in my system," he said. "I was at the site that morning and had a toolbox talk." He said he reexamined his entire safety system.

Later, as an investigator for OSHA, Vermillion said he found two main reasons for accidents: lack of training and a failure of the safety system somewhere along the line. He said safety system failure can be traced to neglecting to upgrade the system and to complacency. "People who have an OSHA investigation tend to upgrade their system immediately, and that makes them a better company," he said.

Vermillion said there were 18 fatalities in the industry in 2006, and he investigated all of them. "Each was unique and stood on its own," he said. He said he found no commonality of causes among them except that most



Todd Schlekeway, executive director of the National Association of Tower Erectors, holds a replica of the Motorola handset that keynote speaker Marty Cooper used to make the first cell phone call in public in 1973.

of them stemmed from a system failure somewhere. He said he worked with six of the companies whose employees were fatally injured at towers last year, and that each company upgraded their safety system before the OSHA investigation was completed, "just so they don't have it again."

Overloaded Antenna Mounts

Aaron Pitts, operations director at **P&D Antenna Service**, moderated a session with four speakers about **overloaded tower antenna mounts and safety**.

Brandon Chapman, engineering and technical support manager at **Valmont Site-Pro 1**, said a properly engineered antenna mount will have written design criteria that explain site conditions, a wind load calculation



You can't see the rest of Ann Irwin, but this is her hand, holding her cell phone after Marty Cooper autographed it for her. Cooper, a keynote speaker at the NATE Unite 2014 convention, signed cell phones after his question-and-answer session in the exhibit hall. Irwin is vice president of sales at Solaris Technologies.

/ CONVENTION COVERAGE /



Aaron Pitts



Brandon Chapman



Heather Gastelum



Dale Heath

broken down into frontal and tangential components, and a dead load. "If all these things are in place, hypothetically speaking, you have an engineered mount," he said. "As we know, that's hard to do in today's industry because there are so many changes from site to site. Trying to get something engineered every time is extremely hard."

Chapman said that when carriers started using remote radio units,

dead load became a more important factor than wind load. "I used to think that 150 pounds was extreme on an antenna mount for a single location," he said. "But I'm doing mounts now that are up to 300 pounds for a single location because of the RRUs and heavier antennas. It's a drastic change."

Heather Gastelum, senior manager of tower operations at **T-Mobile Towers**, said when the RRU issue started, she was aware that

with the previous structural analysis methods, the mounts were never calculated for overall wind load. She said it was up to the manufacturers to provide mounts that were sound.

"That has changed, and we require an analysis specific to that mount because the carrier owns that mount and they're responsible for what they put on the mount," she said. "The secondary RRU collars are a great option; however, when they're nested

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Beau Aero, standing, with his panelists in a session about new products for safety. Manufacturing personal protection equipment that is lighter and more comfortable is a step the panelists said could help tower climbers.



John Paul Jones



Mark A. Lies II

super-close, we request that the climb path be kept free and clear, but not all of them are manufactured that way.” She said that 2,000-pound and 3,000-pound loads on antenna mounts are a lot to contend with.

Dale Heath, steel product line manager at **CommScope**, said both the tower and the mounts are engineered for set parameters such as weight and wind load. He said when they are combined, for the most

part they are not engineered together as a single unit. “They’re looked at as additional dead load on the structure and additional wind load,” he said. “If we don’t do the due diligence to find out what’s going on with the mount through the structure, we haven’t completed the analysis.” He said the question is whether tower workers are walking out onto a site that was analyzed from that perspective, because they are the ones risking

their lives when they step out onto the mounts.

John Paul Jones, vice president of training at **Safety LMSystems**, said preconstruction surveys are paramount. “Know what you’re up against before you get out there, if you can,” he said. “Getting the data to the crews is key. Educate your employees on how to read and understand the drawings. Then, if it’s not matching up, start making phone calls. One of the biggest things that troubles me is the carriers or the tower owners allowing the antenna system modification to be installed ahead of the structural modification.”

Employment Law Liability

Mark A. Lies II, a partner in the **Seyfarth Shaw** law firm’s Chicago office, was the single speaker at a session about **OSHA and employment law liability**. He said OSHA is going to be looking at the contracts



Bill Carlson, NATE’s founder, cuts the ribbon to open the exhibit hall at the NATE Unite 2014 convention in San Diego. The exhibit hall was sold out with 98 exhibitors. The convention registered 1,300 people to attend.

/ CONVENTION COVERAGE /



Benjamin Hudgins



Casey Bush



Kari Willis



Chris Arranaga

of everyone present at a tower jobsite. He said all of the employers represented at the site are going to have to weave together their responsibilities for activities at the site. "I've been through OSHA citations," he said.

"They collect all the contracts, and then they say, 'You didn't do what your contract said. You were supposed to do this. You were supposed to do that.'" He said no one should make any assumptions about outside

contractors. "You need to find out what their qualifications are and what safety programs they have," he said.

Social Media

Benjamin Hudgins, an account executive with **Displayworks**, moderated a session about **effective social media, networking and marketing for the tower industry**, the third session presented in a partnership between NATE and CalWA. His panel included three speakers.

Casey Bush, account director at **Global Results Communications**, said that the idea for companies using Twitter is to create a community, whether it's an engagement with industry associations, partners, decision-makers, customers, other companies or thought leaders. "It's not about doing all the talking," she said. "Once you start following groups, there's a lot of information that you can gather."

Bush said LinkedIn is another community-builder that is more polished and professional than Twitter. "Creating a company page and keeping it updated is an easy way to ensure that you're staying current," she said.

She said Facebook is more casual



Jim Tracy, left, vice chairman of the National Association of Tower Erectors, talks with an attendee at the NATE Unite 2014 convention in San Diego. Tracy is president of Legacy Telecommunications.

than LinkedIn. “Keeping content short is key,” Bush said.

Kari Willis, president of **E-Factor** and executive director of CalWA, said looking at competitors to see what social media they use can help with making choices to allocate time and resources for social media activity. “You want to interact,” she said. “You don’t want to just post about your company or promotions. It’s annoying, and it’s wasted content and time.”

Willis advised those who would be starting to use social media for the first time to pick one, either Twitter, LinkedIn or Facebook, and learn to do one of them well, instead of attempting all three at the outset.

Chris Arranaga, president and chief executive officer of **Gorilla Marketing**, spoke about W3C compliance for websites. “All of the social media interaction is designed to drive traffic to your website or

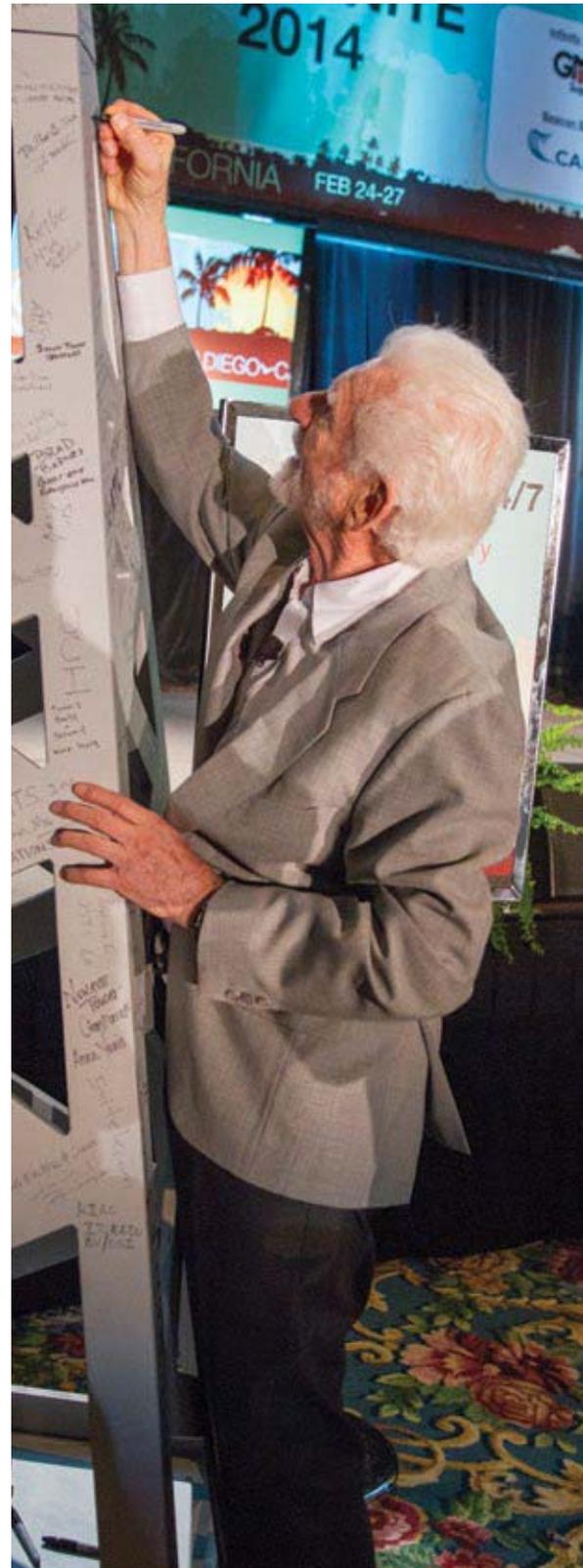
to you through a phone number,” he said. “If your website is not in compliance with W3C, it will be penalized by the search engines.”

Arranaga gave advice that before engaging in social media, a company should make sure that its website landing page, image and structure are set up to receive the benefit of the exposure so the company will be rewarded for the effort it puts into social media activity.

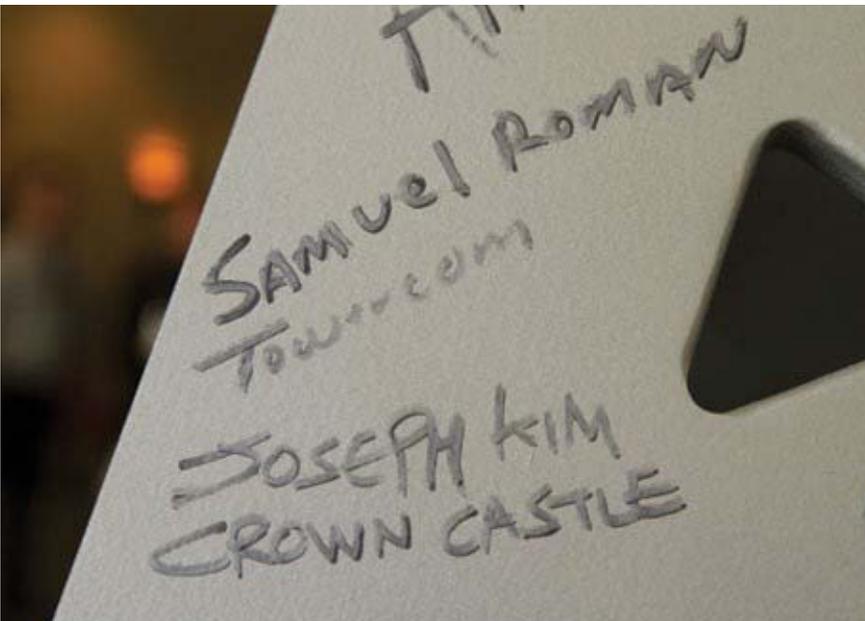
Future NATE Conventions

The Trade Show Committee chairman, Aaron Pitts, said the 2015 convention will be in Orlando, Fla., and it will mark NATE’s 20th anniversary. He said the 2016 convention will be in New Orleans. In 2017, NATE will have its convention in Fort Worth, Texas.

Photography by Don Bishop



Marty Cooper signs the model tower used to represent the Wireless Industry Safety Taskforce’s “100% Tie-Off 24/7 Campaign.”



Samuel Roman of Towercom and Joseph Kim of Crown Castle International signed the model tower displayed at the NATE Unite 2014 convention. The signing affirms a commitment to 100 percent tie-off when performing work on towers.



Utility Conference Centers on Joint Use, Wireless Collocation

Small cells, joint-use pole attachments, new regulations, dispute resolution, unauthorized attachments and rate issues top the list of hotbutton topics discussed at the conference.

By Mike Harrington

Held March 5–7 at the Renaissance Long Beach Hotel in Long Beach, Calif., the Utilities Joint Use and Wireless Collocation Summit 2014 filled three days with presentations from leaders in the electric utility, wireless telecom and tower infrastructure industries. The utility conference is hosted by

the UtiliSite Council, a part of the Utilities Telecom Council (UTC) based in Washington, D.C. The UTC lobbies lawmakers and government regulators on behalf of its member utilities. Launched in 2007, the UtiliSite Council offers electric-power utilities working with commercial wireless carriers a variety of support

services, including antenna sitings, traffic backhaul and construction. The council was formed when nationwide demand to expand wireless, telecom and broadband access began forcing utilities to cooperate with wireless companies on collocating wireless equipment on utility poles. Collocation allows multiple carriers

Wireless carriers are ready to partner with the utilities on master lease agreements (MLAs) as small cell deployments create opportunities for cellular carriers and utilities to work together in new ways that are mutually beneficial.

in the same space for enhanced coverage ability using fewer towers. Typically, wireless carriers piggy-back their antennas or distributed antenna system (DAS) networks on existing electrical power structures, especially poles and towers. The overall goal is to save time and money, increase broadband coverage and prevent the skyline from being cluttered with utility and wireless towers.

Joint use generally refers to action taken by electrical power utilities to share the use of utility-owned electric distribution poles to support fiber-optic cable, coaxial cable and copper wires owned by wireline and wireless telecommunications companies, and by cable TV companies. The FCC is also now pushing to expand broadband into rural and underdeveloped areas of the United States, while employing joint use and collocation.

This year's UtiliSite Council conference featured more than two dozen speakers pitching solutions for hot-button problems concerning joint-use pole attachments, new regulations, dispute resolution, unauthorized attachments, rate issues, DAS and wireless collocation. Session titles included: "Utility Forum I, Wireless - Decommissioning," "Utility Forum II: Joint Use - Success through Cooperation," "Regulatory Update," "New FCC AM Radio Protection Rules," "Small Cell-Laying the

Groundwork," "Influencing Zoning Boards and Wireless Facilities Codes" and "After LTE - An Examination of What Comes Next?"

At the heart of the conference is the UTC's Wireless Practices Survey, essentially a biennial survey of UTC members that creates a wealth of statistical information. Preliminary 2013 survey data was provided in presentations at the conference; final 2013 survey reports will be released to members in the spring.

"The survey gauges the market momentum and general attitudes toward joint use and collocation," said **Paul Lekan**, director of marketing and communications, UTC. "The fundamental reason the UTC exists is to improve the process and efficiency of working together on collocation and joint use. And the survey really does that," Lekan said.

Lekan also said that the 2013 survey was the first one to divide the subject matter and specifically target joint use — not just wireless collocation. "We had input data from over 130 utilities regarding their practices on collocation," he said. "And that information is used as a benchmark to determine where utilities are at in the process — and where utilities can improve."

Conference in a Nutshell

Timothy Gasser, project manager

of wireless collocation communication sitings and services for Puget Sound Energy, who moderated the session "Influencing Zoning Boards and Wireless Facilities Codes," provided this take on the overall conference: "Members voted to focus on small cells at the 2014 conference because the topic has been getting so much coverage in industry publications, including *AGL Magazine*. We were very fortunate in getting some top-notch speakers from the carriers, the OEMs and from other major players in the small cell arena. As an infra-structure owner, I personally doubled my level of knowledge at the conference."

The conference's secondary focus was the effect of government regulations, Gasser said. "Utilities are still coming to grips with the 2011 FCC rulemaking on pole attachments and new rules under consideration for wireless carriers — particularly those involving NEPA/SHPO (National Environmental Policy Act/State Historic Preservation Office), which have the potential to make attachment to utility poles more attractive."

The conference also covered examples of how working with local jurisdictions to modify their wireless communications facilities codes can make collocation on utility and streetlight poles easier. "After the issue of backhaul, getting quick approval from the permitting jurisdictions will be a major challenge to deploying small cells," Gasser said. Finally, the conference helped to highlight how the line between traditional joint use and wireless collocation is continuing to blur, with small cell deployment expected to be

a significant change factor.

In his keynote address, “Major Developments in the Wireless Industry,” telecommunications consultant **Michael Fitch** echoed a line that has become like a mantra to UTC members — namely, the first sentence from the FCC’s 2010 National Broadband

Plan: “Broadband is the great infrastructure challenge of the early 21st century.” He added that, because their newer devices need more bandwidth, wireless carriers will need an additional 300 megahertz of wireless spectrum in five years and 500 megahertz in 10 years.

So far, the FCC has adopted 180 megahertz with 120 megahertz sought in TV spectrum incentive auctions postponed to 2015. Fitch sees continuing major demand for wireless infrastructure of all types — 4G upgrades, ubiquitous wireless broadband, FirstNet - and, therefore,

Common Myths about the Nationwide Programmatic Agreement

Myth: Construction of a facility in a utility right of way is automatically exempt from review, regardless of tower height.

Fact: You must complete NPA review if the facility would constitute a “substantial increase” in size over existing structures in the row within the vicinity of the proposed construction.

Example: Building a new 100-foot tall monopole in a utility right of way where the tallest existing structure in the right of way is 80 feet.

Fact: Even if you meet criteria for exemption, you still must notify and consult with Native American Tribes.

Myth: I only have to worry about historic properties if I am building a new tower.

Fact: If you are installing an antenna on an existing tower or even a “non-tower” structure (or allowing a third party to collocate), you need to make sure that you

are exempt under the collocation agreement or that you fit within exemption under The Nationwide Programmatic Agreement (NPA).

Example: If you are installing a multiple address system antenna on an existing utility distribution pole, it may be subject to NPA review.

Example: If you allow a licensee to install an antenna on your utility distribution pole, the burden is on the licensee to comply. Make sure that attachers comply with the collocation agreement and NPA and that they have adequate documentation.

Myth: If I have a multiple address system (MAS) with a master station and several remote stations, I don’t have to complete review for remote stations because they are not authorized on a site-specific basis.

Fact: Review is required for MAS remote stations licensed under Part 101 of the FCC’s rules. Even

though MAS remotes are not individually licensed by site, remotes may only be operated under a license issued by the FCC and license grant conditioned on NPA compliance for all sites operated pursuant to license.

Myth: NPA does not apply to facilities located on land that has been previously disturbed.

Fact: There are no exemptions based solely on whether land has been disturbed. You must review exemptions to see if they apply and, if not, must identify and evaluate impacts on historic properties and consult with Native American tribes.

Example: If you are building a tower on a utility substation property, it is not automatically exempt because ground has already been disturbed.

Source: Lerman Senter law firm, Washington, D.C.

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a DAS and small cell boom. The small cell market is expected to reach \$2.7 billion in 2015, according to Infonetics Research. Meanwhile, PCIA, a trade association representing the wireless infrastructure industry, estimates a \$35 billion-a-year investment in wireless broadband.

In his keynote address, "Wireless Future: Challenges and Opportunities," **Phillip French**, executive director of Verizon' western area network engineering and operations, talked about Verizon expanding its capacity and coverage for 4G LTE and how it will need to deploy infrastructure deeper into its own network and further out on the edge.

"The data storm is here," French said. "Global mobile data traffic grew 81 percent in 2013. Last year's world-wide mobile data traffic was nearly 18 times the size of the entire global

Most carrier de-stalls are opportunities in disguise. In decommissioning, it isn't always necessary to follow the letter of the lease.

Internet in 2000. Mobile video traffic exceeded 50 percent for the first time in 2012. Mobile video traffic was 53 percent of traffic by the end of 2013. Over two-thirds of the world's mobile data traffic will be video by 2018. In 2013, a fourth-generation (4G) connection generated 14.5 times more traffic on average than a non-4G connection. Mobile video will increase 14-fold between 2013 and 2018."

French said that wireless carriers are ready to partner with the utilities on master lease agreements (MLAs) as small cell deployments create opportunities for cellular carriers

and utilities to work together in new ways that are mutually beneficial. He added that Verizon wants to partner with the utility companies for small cell deployments in the right of way - and that dark fiber is a priority. Finally, French itemized "Keys to Success for All" in his presentation. "Define mutually agreed upon terms via MLA," he said. "Provide premium 4G LTE services for customers, support public safety, create opportunities for infrastructure to be used for other communications systems and start now,"

In her "Small Cell: Laying the



The Renaissance Long Beach Hotel, location for the Utilities Joint Use and Wireless Collocation Summit 2014.

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/ CONVENTION COVERAGE /

Groundwork” presentation, **Alda Licis**, senior director of small cell products at the Zayo Group, related her company’s successes working with utilities. She detailed small cell integration successes in five case studies, all of which emphasized the importance of open communication and collaboration. “Since Zayo already has attachment agreements in place with many utilities across the United States, we understand and respect the utilities’ standards and need for safety around operations and maintenance,” she said. “As an electrical engineer myself, I believe this has been integral to our success.” Licis outlined the common thread of her success stories as follows.

In the first phase, establish the

partnership between the utility and the carrier, in which the utility communicates its standards and processes, the carrier communicates its desired equipment configuration, and the collaboration between the two begins.

In the second phase, the execution of the partnership, the utility establishes where equipment may be installed. If the equipment is to be installed above the power zone, utilities will require Zayo to use an approved vendor to complete this work. The approved vendor may install pole-top extensions, antennas and coaxial cables. Zayo’s contractor installs radios, cabinets and all remaining cabling in the communications zone and below. Zayo then

applies for construction permits with local municipalities.

Licis said her success in the third phase, involving solidifying the partnership, recognizes that utility poles are prime vertical real estate to host small cells and that carriers plan to further densify their networks in the future. Many carriers have established 2014 targets with an exponential increase coming in 2015. This requires bringing local municipalities into the partnership to educate them on small cell installations and understanding their zoning and permitting processes to agree upon installations that satisfy all parties.

Zayo provides fiber backhaul for carriers and turnkey services from site acquisition to commissioning of small

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cells. Zayo has more than 250 nodes in various stages of implementation.

Regulatory Business

Brett Kilbourne, UTC's vice president and deputy general counsel delivered the regulatory update presentation, which reviewed the latest developments at the state and federal levels regarding joint use and wireless collocation. His presentation touched on a pending rulemaking at the FCC to exempt DAS networks and small cells from regulatory requirements involving environmental and historical impacts and to clarify the scope of amendments to the Communications Act under Section 6409, pertaining to state and local approval of the siting of wireless collocations.

"The gist of my presentation was that the FCC's wireless infrastructure siting proceeding could pave the way for small cells and DAS networks on utility infrastructure and that there are several other proceedings regarding spectrum allocations, pole attachments and rural broadband that could also create new opportunities for wireless infrastructure deployment," he said.

Kilbourne said that UTC supports streamlining environmental and historical review of the deployment of small cell and DAS infrastructure. It supports clarifying the scope of the wireless collocation provisions of the Spectrum Act. It favors implementing Section 332(c)(7) to define collocations, to preempt local moratoria and to

"deem granted" applications where the state or locality fails to act within a reasonable period.

The UTC executive said the wireless NPRM should accelerate 4G for small cell and DAS. He said if proposals in the NPRM are enacted, it would mean additional spectrum opportunities at 700 MHz, 4.9 GHz and 3.5 GHz, and it also could mean increased access to utility infrastructure for broadband network build outs. "Wireless collocation on distribution poles is also likely to accelerate after FCC revisions to pole attachment rules, and ILEC/utility joint use relationships will be tested," he said.

Kilbourne said that commercial reliability proceedings and network hardening best practices that may

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result from the NPRM could mean additional opportunities. Rural broadband funding may provide opportunities for joint builds as fiber is being deployed on utility infrastructure. And the NPRM's consideration of RF exposure could mean additional reporting requirements.

Wireless Decommissioning

As the industry consolidates and carriers transition from 3G to 4G technologies, an increasing number of sites are being decommissioned. The wireless decommissioning session examined the utility industry's past, present and future outlook on lease churn and decommissioning telecommunication carrier sites. The session revealed effects of site decommissioning, such as increased rent churn, reduced carrier new builds because of coverage redundancy and increased carrier modifications to existing sites when adding incompatible technology.

Daniel Turnpaugh, president and chief consultant at Erlanger, Ky.-based CI Telecom Group, offered a detailed case study on decommissioning a microwave tower portfolio that he headed up from 2001 through 2004. "Basically, I wanted to show UtiliSite members that when carriers no longer need a macrosite, a range of alternatives opens up for the site," Turnpaugh said. "Those alternatives include making a deal with the vacating carrier for the orderly decommission of the site, leasing the site to the succeeding carrier or another carrier, holding the site for future lease-up, sale of the site to a third party user (usually a noncarrier such as a utility, government or amateur radio operator) and,

A current FCC rulemaking proceeding proposes to streamline the review process for DAS and small cell antennas, including specific proposals to eliminate the review process for communications facilities collocated on utility poles older than 45 years and new deployments in a utility right of way.

if all else fails, decommissioning of the site."

Turnpaugh offered some tips on decommissioning. He said that most carrier de-stalls are opportunities in disguise. In decommissioning, it isn't always necessary to follow the letter of the lease. "It's time to wheel and deal," he said. And he advised utilities to keep an open dialog with destall carriers, other carriers, their own telecommunication departments, other utilities, broadcasters, governments, railroads, oil and gas companies, wireless Internet service providers and financial firms.

Joint Use Poles and Audits

At the session "Incumbent Local Exchange Carriers ILECs and Utilities – A New Paradigm or Still Business as Usual," **Thomas Magee**, a partner in the Washington, D.C.-based Keller and Heckman law firm, said, "The new paradigm that ILECs (incumbent local exchange carriers) want is anticompetitive. They can't have all the advantages of a pole owner but pay cable-company and CLEC (competitive local exchange carrier) attachment rates. It would be like having their cake and eating it, too."

In the "SHPO Review of Utility Poles and Towers" session, **Kevin M. Cookler**, an attorney with Lerman

Senter, Washington, D.C., addressed the FCC's preconstruction environmental and historic preservation review requirements that apply to communications facilities collocated on utility poles and other utility infrastructure, and to new towers deployed in a utility right of way. He lauded FCC proposals in a current rulemaking proceeding to streamline the review process for DAS and small cell antennas, including specific proposals to eliminate the review process for communications facilities collocated on utility poles older than 45 years and new deployments in a utility right of way (see "Common Myths about the Nationwide Programmatic Agreement" on page 88). In the "Conducting a Pole Attachment Audit" session, **Gary Vondrasek**, a contract administration specialist at JEA in Jacksonville, Fla., described how utilities and attaching entities are working together to audit their attachments and their infrastructure for purposes of better determining total rents and ensuring operational safety and reliability. "These audits leverage GIS (graphic information systems) and other technologies to help inventory and manage the attachments that are being made to utility infrastructure, whether on distribution or transmission

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facilities,” he said. Vondrasek offered these lessons learned: Involve the pole attachers, communicate early on for budgeting purposes, allow feedback on requests for proposals, allow quality assurance and quality control of data, and schedule weekly project meetings.

In “Joint Use Audits—National Grid,” **Charles Kosinski**, telecommunications coordinator at National Grid, Waltham, Mass., listed important aspects of successful audits. Among them are data integrity, the use of an audit coordinator, and keeping the joint use record owner involved. Also important are using a written procedure, notifying the attachers and

importing the field findings and record updates. Having effective survey personnel makes a difference, as does defining the scope, data elements and deliverables for the audit. He said it’s important to secure support from senior management and the information systems and legal departments and, finally, to receive payments.

Future Conference

UTC has scheduled a national meeting, UTC Telecom 2014, for May 6–9 in Phoenix. The keynote speaker will be John Foley, chief executive officer of CenterPoint Companies, which provides training

for high performance. Foley was a fighter pilot in the U.S. Navy and a member of the Blue Angels flight demonstration squadron.

Program topics include the smart grid, trends in wireless critical infrastructure communications, risk management, cybersecurity, wide-area networks, a reprise of some of the UtiliSite Council’s coverage of small cells, and possible utility participation in the FirstNet public safety wireless communications network. More information is available at www.utc.org.

Mike Harrington is a freelance writer in Prairie Village, Kan.

Product Showcase

Power Systems and Backup Power



RACK-MOUNT POWER SUPPLY

The **DuraComm RLP-2048BBSCLVD** is a 20-amp, 48-volt rack-mountable power supply that integrates battery backup, smart charging and a low-voltage disconnect in a single, compact, stand-alone device. The unit features a floating ground configuration and can be used in a positive or negative output configuration as required by the applications. The diode-isolated circuit provides fast and seamless transfer to battery power when primary power is lost. The smart-charging and low-voltage-disconnect features of these models improve and extend the life of the battery through more efficient charging and over discharge protection. The RLP series saves time, cost and rack mount space. DuraComm also offers an RLP-1048BBSCLVD for sites requiring 10 amps or less.

www.duracomm.com

PARTNERSHIP OFFERS ENHANCED POWER SOLUTIONS

Westell has an enhanced power and battery monitoring solution via a partnership with BatteryDAQ. Westell has integrated BatteryDAQ's Sentry

battery monitoring solution with Westell's Optima management system and remote suite of products. This integration will provide advanced battery monitoring, management, control, remote site access and testing capabilities to ensure battery backup power is always available. The solution provides real-time data on the status of every battery string and individual cell across multiple sites. Additionally, historical data can be used for future battery planning.

www.westell.com

BACKUP AND EMERGENCY POWER SYSTEMS

Emergency generators from **Sabre Industries Telecom Services** offer emergency and backup power in the event of site power failure. Applicable to any situation, from natural disasters to brownout, the generators guarantee up-time and continued operation for all backup power requirements. The generators feature a John Deere Tier 3 engine and an enclosure with a significant dBA noise level improvement over typical units. The integrated monitoring system has over 150 points of auditing capability with 20 key targeted points managed daily. In addition, it has the ability to add monitoring services for lights, batteries, security and HVAC systems. The units carry a standard warranty for 18 months or 2,000 hours, whichever comes first. They are supported for maintenance

and warranty by John Deere's national dealer network. Sabre Industries also offers a variety of generator refueling programs through Midwest Underground Technology (MUTI). Both emergency and nonemergency programs are available from a single point of contact, 24/7 and 365 days a year for diesel and propane generator fueling.

www.sabreindustries.com

BACKUP BATTERIES FOR CYCLE APPLICATIONS

Batteries for cycle operation are part of **Trojan Battery's** industrial, flooded line of batteries for renewable energy and backup power applications. The batteries are designed to support large daily loads where the batteries are cycled regularly. The industrial product family is used in large off-grid photovoltaic (PV) systems, off-grid hybrid PV systems, grid-tied PV systems with battery backup and smart-grid peak-shifting systems. The line comprises removable 2-volt cells bundled in a secondary containment case to form single, high-capacity 4-volt and 6-volt battery solutions, assembled in a polypropylene housing.

www.trojanbattery.com

BASE STATION WITH BUILT-IN BACKUP POWER

Nokia Siemens Networks and **Ballard Power Systems** have developed a mobile network that can continue to operate during power blackouts. The

solution consists of the Flexi Multi-radio base station and an integrated fuel cell backup system. The base station and fuel cell combination provides 4.5 kilowatts of power for 40 hours on a single tank of fuel, and it offers a smaller footprint than lead-acid battery configurations.

www.ballard.com



DIESEL-BASED GENERATOR SOLUTIONS

Cummins Power Generation offers integrated power generation systems for telecom cell site applications. The T series of diesel generator sets features a heavy-duty diesel engine with outputs from 8 kVA to 38 kVA, 50 or 60 Hz, and single- or three-phase power. An optional excitation boost system enhances motor-starting and fault-clearing short-circuit capability, and alternator sizes offer selectable motor-starting capability. The PowerCommand 1.1 control system provides generator set system integration, including automatic remote starting and stopping, alarm and status message display. Other features include an automatic transfer switch and a manual bypass switch

aglmediagroup.com

integrated inside, a lockable 1,000-liter fuel tank and 1,000-hour service intervals for changing fuel, oil and air filters.

www.cumminspower.com



FUEL CELL BACKUP SYSTEM

ReliOn's E-2500 fuel cell system offers hydrogen fueling solutions for telecom and other mission-critical applications. Systems of various sizes are available that offer runtime capacity from hours to weeks between refueling. These fuel cell solutions provide reliable, scalable and environmentally benign backup power solutions for a variety of applications. The E-2500 power solutions may be indoor rack-mounted or offered housed in a rugged, compact enclosure tested to Telcordia GR-487-CORE and CSA safety regulations. Remote monitoring and control software allows for off-site interaction, reducing operation and maintenance costs.

www.relion-inc.com

INTELLIGENT SOLAR SYSTEM MONITORING

Enphase's Enlighten monitoring software is designed to continuously monitor the health and performance of every solar module and micro-inverter in an array. It helps solar power system owners and installers

by providing operational data on the performance of each solar module. Enlighten's Web-based analytics identify and alert owners and installers to any deviation in performance, rather than only monitoring the inverter. This offers a step up in system protection because total solution monitoring provides earlier notification of potential problems, reducing the cost of maintenance and system failure. Enlighten can also be accessed via a Web-enabled mobile device, allowing remote troubleshooting and updates.

www.enphase.com

FUSE AND ALARM PANEL

Westell's latest GMT fuse and alarm panel offers some of the industry's highest GMT amperages available in a compact and cost-competitive package. The NPGMT1305 is a full front-access panel that features 20-amp fuses in a dual 100-amp bus, making it suitable for applications with limited space. With standard Westell fuse panel features such as variable operating voltage (± 12 volts, ± 24 volts and ± 48 volts) and cascading output lugs, the panel exceeds the requirements of both legacy and next-generation networks.

www.westell.com

HYBRID POWER SYSTEM TECHNOLOGIES

Caterpillar offers hybrid telecom power solutions that incorporate renewable energy sources. Sources include photovoltaics, wind turbines, batteries, diesel or gas generator sets and power electronics. By using available renewable resources and operating the generator at peak efficiency points, hybrid power systems

/ DEPARTMENTS /

offer lower total ownership and operating costs. They also feature more efficient fuel utilization and higher efficiency, which helps operate the system at peak performance and optimizes system reliability.

www.cat.com



HIGH-CAPACITY HYBRID BATTERY BACKUP

Durathon battery technology from **GE Energy Storage** is an environmentally friendly technology that uses sodium chemistry to capture excess energy from the diesel fuel generators. When the generator is off and the battery is fully charged, it feeds the stored power back to the cell tower. Each cell is hermetically sealed within its own metal case and is strung together with other cells in a thermally insulated battery module, which ensures that the battery's external surfaces remain within 10 degrees Celsius to 15 degrees Celsius of the surrounding ambient temperature. The technology can function in a variety of extreme conditions and store twice the energy of lead-acid batteries, while lasting up to 10 times longer. This

becomes an ideal solution for areas that are isolated or difficult to access because it can reduce fuel consumption by up to 40 percent.

www.geenergystorage.com/telecom

SOLAR AND WIND POWER

Solar Trackers from **Windular** automatically slew to the correct azimuth at dawn and follow the bearing of the sun until sunset. This function ensures maximum efficiency, winter or summer. The units mount anywhere on the tower stack, although optimum placement is at the lowest areas just above the BTS cabinets and waveguide bridges. The units will not impede on valuable compound space and require no extra square footage of conventional real estate.

The company's 10-kilowatt wind turbine systems bolt to the tower, as would a set of antenna sector mounts.

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The turbine carriage is actively driven around the tower circumference, seeking the best wind possible. The system is controlled with reliable microelectronics that can be remotely monitored by a network operations center or by Windular.

The 10-kilowatt turbines supply substantial and reliable amounts of electricity under most wind conditions. A single unit can generate enough electric power to offset the annual electrical consumption of a typical carrier, including air conditioning requirements.

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www.windular.com



DC-DC CONVERTERS

Phoenix Contact offers a DC-DC converter for converting output from 48-volt batteries to 24 volts DC to power the control system, making it suitable for telecom HVAC applications. The converter, part of the Quint Power family, can give an alarm

based on battery voltage, notifying the user before the batteries go into deep discharge.

The converters can boost voltage over long wire runs, regulate battery voltage output and isolate ground loops. With Phoenix Contact's Selective Fuse Breaking technology, the converters provide up to six times nominal current for 12 milliseconds. The units also feature Power Boost technology, providing up to 125 percent of the rated output for demanding loads. The power supplies' advanced diagnostics make it easy to check status.

The housings are made of extruded aluminum for improved cooling and longer service life. This also decreases the heat load in cabinets. The converters carry UL 508 Listing and Class I, Div. 2 approval.

www.phoenixcontact.com/usa_home

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- 69.....Electric Conduit Construction
- 32.....Engineered Endeavors
- 90.....Federal Emergency Management Agency
- 11.....FieldSense
- 07.....Flash Technology
- 57.....Fullerton Engineering Consultants
- C3*.....GME Supply
- 24.....Hughey & Phillips
- 30.....Linda Rooney
- C2*.....National Association of Tower Erectors
- 08.....Network Building & Consulting
- 66.....OSHA
- 27.....Peabody Concealment
- 13.....Phillips Lytle
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- 05.....Sabre Industries
- C4*.....SBA Communications

- 98.....Shulman Rogers
- 66.....Slatercom-WCD
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- 22.....Stout & Company
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- 30.....Telewave
- 12.....TWR Lighting
- 60.....U.S. Dept. of Transportation
- 35.....U.S. General Services Administration
- 49.....Unimar
- 14.....Utility Service Communications
- 62.....Valmont SitePro 1
- 56.....Valmont Structures
- 15.....Waterford Consultants
- 91.....Western Iowa Tech Community College
- 98.....White Buffalo Environmental

*C2, C3 & C4 indicate cover pages

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