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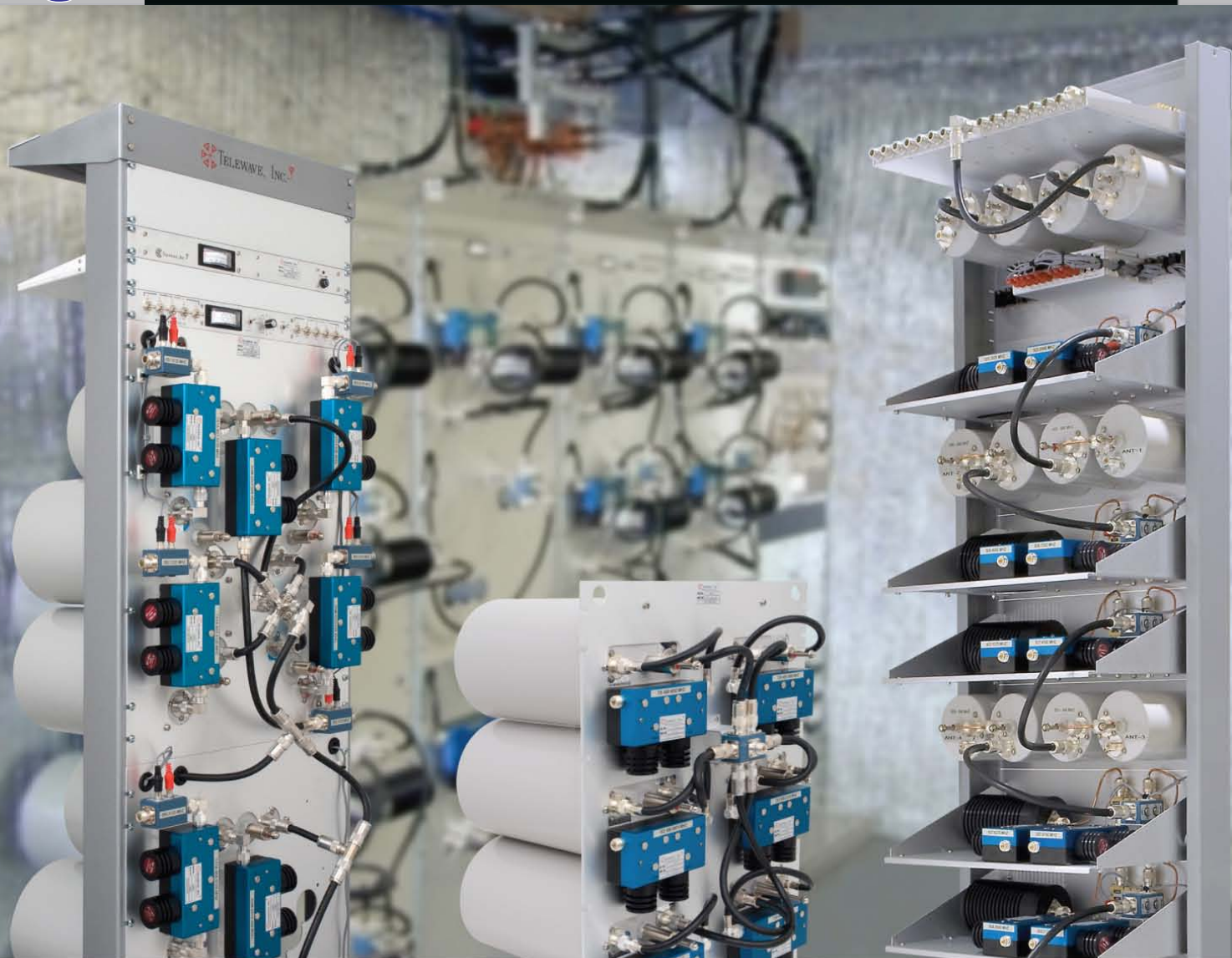
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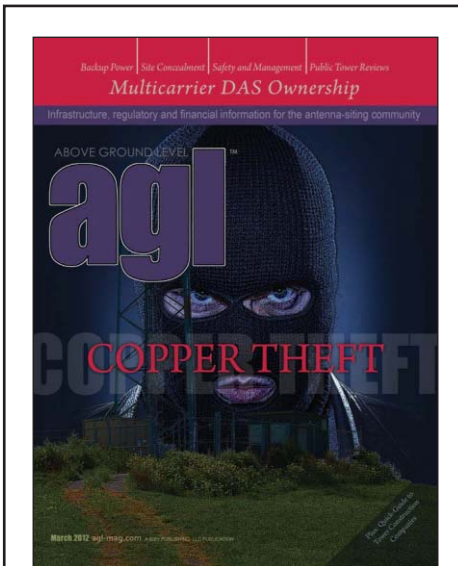
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on the cover

Copper theft makes local headlines when the metal is stolen from cell sites, street lights, power lines, buildings under construction and Christmas displays. Most telecom site operators seem to take copper theft in stride, finding most theft prevention steps to be too much trouble. See the article on page 12.

Cover design and site photography by Scott Dolash

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editorial comment

Billionaire Blues

Even billionaires sometimes have the blues.

Billionaire Phil Falcone, who leads Harbinger Capital's effort to place LightSquared's wholesale wireless telecommunications network in the L-band mobile satellite frequencies near the GPS band, stands to lose \$2 billion if he fails, and make maybe \$15 billion if he succeeds.



Years ago, police and fire departments noticed radio interference from Nextel Communications base stations. Using frequencies originally intended for high-elevation, distant base stations, Nextel's new base stations were being placed throughout metropolitan areas at low-elevation sites. Thus, Nextel's transmitters moved closer to police and fire department receivers.

"If you weren't transmitting, I wouldn't have interference," Nextel's neighbors said.

Forced relocation

Nextel fixed the problem by persuading the FCC to force its neighbors to move in a frequency rebanding program that Nextel paid for.

Now, LightSquared wants to put transmitters in metropolitan areas where they may cause interference with GPS receivers.

"If you transmit, I'll receive interference," LightSquared's neighbors already said. Because millions of GPS receivers could be affected, the FCC is listening, despite the fact that LightSquared's new base stations would operate in a way that the FCC already authorized. Remember Nextel?

It won't be as simple as installing filters on existing GPS receivers —

By Don Bishop, Executive Editor
dbishop@agl-mag.com

there are too many. However, LightSquared says that new GPS receivers should include sufficient filtering, and lifecycle replacement of older GPS receivers will solve the problem. The interference can't be solved by forcing GPS to change frequencies. However, LightSquared has volunteered not to use some of its frequencies that lie closest to the GPS frequency band.

Converting to a more valuable use

Just as Fleet Call (Nextel's prior name) did, Harbinger bought spectrum priced for one use and then converted it to a more valuable use by persuading the FCC to go along. Many fought Nextel and lost. Many are fighting Harbinger's operating company, LightSquared, and so far, they are winning.

On Jan. 18, LightSquared came roaring back with accusations that GPS industry insiders and government end-users manipulated the latest round of interference tests to make the situation look much worse than it is. The testing was done in secrecy, the testing protocol focused on obsolete and niche market devices least able to withstand potential interference, and the testing standard did not reflect reality, LightSquared said.

"LightSquared has agreed to meet every technical guideline requested by the FAA, FCC and NTIA and will continue to work in collaboration with the federal government to resolve the GPS interference issues," a company statement said.

Tower owners

Watching from the sidelines, tower owners might hope that LightSquared prevails. Having another wireless network operator may mean an additional broadband tenant for tens of thousands of towers.

It might mean salvation to Phil Falcone. Speaking about the persistent opposition to LightSquared, Falcone told *Forbes*, "This is more than I bargained for." ■



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Towers That Mean Business

The art and science of tower management



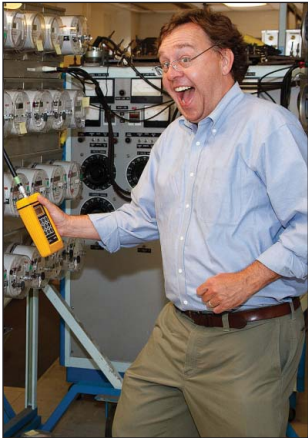
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publisher's note

And the Results Are In!

As you read this, the quarterly results are in from all the tower companies, and I'm sure they are good.



However, to meet the deadline for this, a good, old-fashioned print magazine, I am writing this column before seeing the results. Even so, I am sure that the reason most companies cited for their success involved

the letters E, L and T. (Rearrange the letters for the answer.)

Dedicated to the siting industry

I'm receiving more and more comments that say *AGL* borders on being more of a technology magazine and not so much a siting magazine. Fair enough. We could cover every detail of the technical and spectrum issues, the details of some vertical applications (as our colleagues and well-respected friends at *Urgent Communications* do) or both. Instead, we remain dedicated to the siting industry, and not through the use of superficial press releases, who's who, what's the new toy and, all too often, who-got-promoted-this-week kind of news items. Well, to be honest, we do cover tragedies and, one can hope, successes.

Tragedies occur all too often, and we would all like to find better ways to meet our project goals while making it possible for all of our employees (contractors or otherwise) to work safely and make it home for dinner. Our goal is to offer complete, meaningful and educational information about the industry. We are not a newspaper and we are not a research proceedings

By Rich Biby, Publisher
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publication. We'll have to figure out what we actually are, but we're pretty happy with it, whatever it is.

I'll have to pause here and give a shout out to the folks at the National Association of Tower Erectors (NATE), who do their best to represent those who actually pour the concrete, climb the tower and do the true dirty work. NATE has a great publication, *Tower Times*, which contains a lot of safety information. NATE members, who primarily are the owners of tower rigging and construction companies, receive the publication as a membership benefit. *Tower Times* does a great job addressing climbing, rigging, construction and a host of issues related to the construction of towers — all towers, big and small.

I'm writing this on the morning of the first day of the annual NATE conference and exposition. This year, the convention is in San Antonio. I regret that due to previous obligations, I could not attend. We wish NATE the best.

LightSquared

Those poor guys at LightSquared. They can't get a break. What a long history they have within the wireless family dynasty. We'll skip the history lesson and just say that the owners and the management of the company received permission from the FCC to do what they proposed to do. Unfortunately, the GPS community decided, with or without good backup and all of the facts, to adopt the decision that the LightSquared wireless network deployment

would cause, at the very least, a degree of interference to a limited number of GPS users. This came about in spite of the licensing agreement, statement of acceptance of interference and a completely wide-open receiver front end (i.e., no filtering of adjacent frequency occupancy) of primarily consumer devices.

As any investor does, I know the sound of my dollars swirling around in the cold porcelain bowl, just before the swishing sound of my money accelerating to a location completely out of my reach. I feel sorry for those who invested in LightSquared, primarily the hardworking employees and all of the contractors. Sure, Philip Falcone will have lost many millions of dollars or even a billion or two. However, as can happen with any entrepreneurial roll of the dice, he simply lost this round. The

idea for LightSquared's network was a great idea, but it was missing some degree of skill or luck. Having been around the FCC and wireless spectrum issues for about 30 years (although I'm only 46), I know that sometimes those with luck are much more profitable than those with technology, skills or connections.

Heybrother, you got a billion to spare? Until next time ... ■



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site concealment

Come Together, Right Now

By Sean McLernon

With 20 years of history in this wireless world, we like to think our team at Stealth Concealment Solutions brings a lot of experience to every project. You would like to believe that's true for every vendor involved in this business.



But sadly, it's not. And that's why I've long thought that the concealment business is overdue for a set of standards, a credo, systemwide protocols and such. I think it's high time concealment has its own industry association.

Think about it: Back in the day, concealment was merely a transaction to be completed. Over time, we've been brought in earlier as sites became more challenging and required sophisticated designs that would gain zoning approval.

It's become clear that carriers should bring us in even earlier. It would avoid a world of problems down the road. But their fear is that we'll drive up the costs of the site. Ironically, not bringing us in is the more expensive play. Good concealment can save you time, and that saves you money.

And that's precisely the reason we need to come together. We experts can't continue to build and sustain sites for the wireless industry if we can't do a better job of educating customers about what success looks like.

We see the customers' perspective: They do a handful of these sites a year (i.e., many sites still don't require concealment). It's difficult to develop institutional expertise with one or two projects a month spread out over a big country. By the time the next concealed job crops up, they've lost all lessons learned.

It's therefore incumbent on us to make

this process as easy, transparent and reliable as possible.

Cooperation

So how do we get from our current culture to one in which we're all speaking the same language? It's called cooperation. Or, because it involves competitors working together, I guess I'll borrow that '90s word: cooptation.

Sure, we compete fiercely in the concealment business. Victory is hard won. But what if we came together at a higher level to bring order and predictability to the process?

First and foremost, we should standardize the materials, testing protocols and installation requirements for all the primary product lines: poles, trees and rooftops. Establishing an industry baseline would protect both the customer and

First and foremost, we should standardize the materials, testing protocols and installation requirements for all the primary product lines.

the vendor and make it just a little easier to order a project.

With everybody cooperating on materials and protocols, we could then turn our attention to the sites.

Regrettably, all too many customers feel like they're smack dab in the middle of the battle between the contractor installing the materials and the concealment company fabricating them.

Frankly, they are right. Contractors and concealment companies should work together to make certain the customer

is insulated from the madness that can accompany a build. Working together to create site/installation standard operating procedures, we can collectively improve the reputation of the concealment function.

Working together could hold additional promise for competitors. By combining forces, we may develop the muscle to help customers choose the right contractors. Imagine if we could begin to influence the selection of a custom rooftop contractor, knowing that his experience with flagpoles has no bearing on the task at hand.

Through serious and regular interaction, the association could educate others, preventing contractors from underbidding a job. We could elicit contractor input during the fabrication stage as an excellent way to leverage their vast on-site experience to build the best, most cost-effective and longest-lasting site.

By working together, concealment vendor and site contractor would become strategic partners with the customers who have the ultimate responsibility for success.

There is entirely too much riding on these projects in the short term (think customer satisfaction) and in the long term (think sustainability of the site for these two essential parties) to manage these relationships at arm's length.

As concealment professionals, we owe it to our customers and their contractors to lead the way. It's time to take the customer out of the middle and bring the two key parties together, right from the start.

Simple? Nah. But this industry thrives on doing the impossible. I'm sure we can come together and lead the effort to drastically improve our ability to design, build and install the best sites. ■

Sean McLernon is chief executive officer of Stealth Concealment Solutions, North Charleston, S.C. His email address is seanmc@stealthsite.com.



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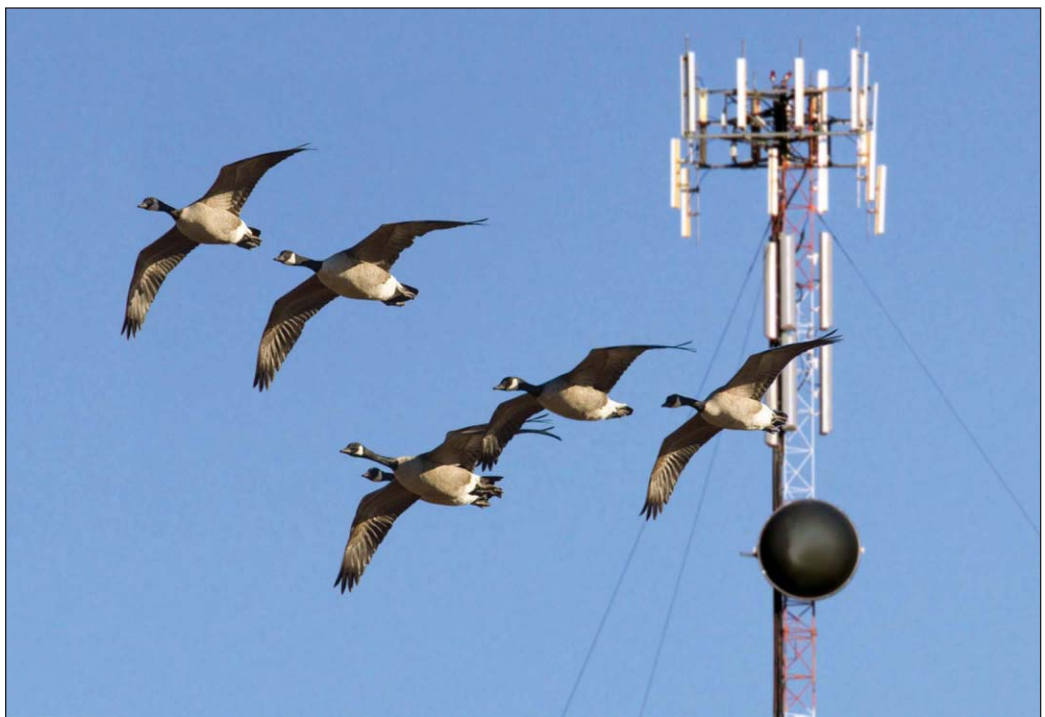
The Public Gets to Review Towers for Environmental Issues

By J. Sharpe Smith

In an order on remand released Dec. 9, 2011, in response to a court decision that favored a conservation group, the FCC gave notice of procedural measures it said it was taking to ensure that the environmental effects of proposed wireless towers are considered prior to construction, including a pre-application public notification process. [See “FCC Sets Course for Dealing with Migratory Bird Issue,” November 2011 *AGL*.]

The FCC said it was acting in accordance with the Court of Appeals for the District of Columbia Circuit decision in *American Bird Conservancy v. FCC*, which held that the FCC’s antenna structure registration (ASR) procedures did not offer the public an opportunity to request an environmental assessment for proposed towers that the commission considered excluded from review under the National Environmental Policy Act (NEPA).

As a matter of course, the public will be given an opportunity to comment on the environmental effects of a tower proposal prior to the filing of a completed ASR application for the new antenna structure. The applicant will be required to provide notice of the



proposal to the local community, and the FCC will post information about the proposal on its website.

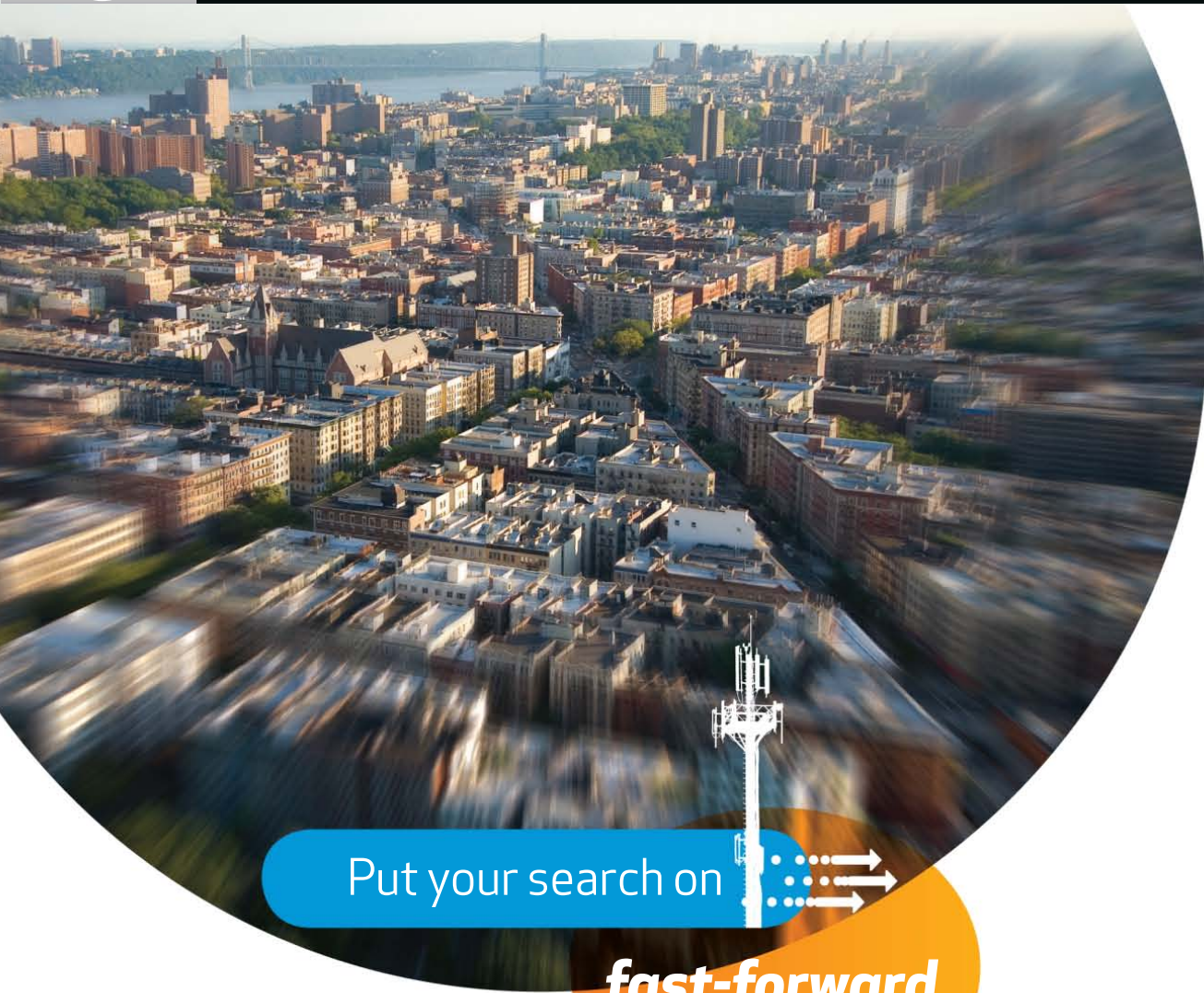
The public comments will be reviewed to determine whether an environmental assessment (EA) would be required for the tower. The public will also get to look at tower proposals already deemed to require an EA before an ASR application is made. Additionally, the FCC will require an environmental notice if an ASR applicant on an existing tower changes the lighting to a less-preferred lighting style.

The FCC took action in the context of its ongoing rulemaking proceeding, addressing the effects of communica-

tions towers on migratory birds, a proceeding that began in 2006.

Evidence in the record indicates that the effect of towers on migratory birds increases with tower height. Thus, as an interim measure, an EA must be filed for all proposed registered towers over 450 feet in height for FCC staff review until an ongoing programmatic environmental analysis of the ASR program is completed.

“We expect to take final action in the migratory birds proceeding following completion of the programmatic EA and, if necessary, any subsequent programmatic environmental impact statement (EIS),” the FCC said in its order. ■



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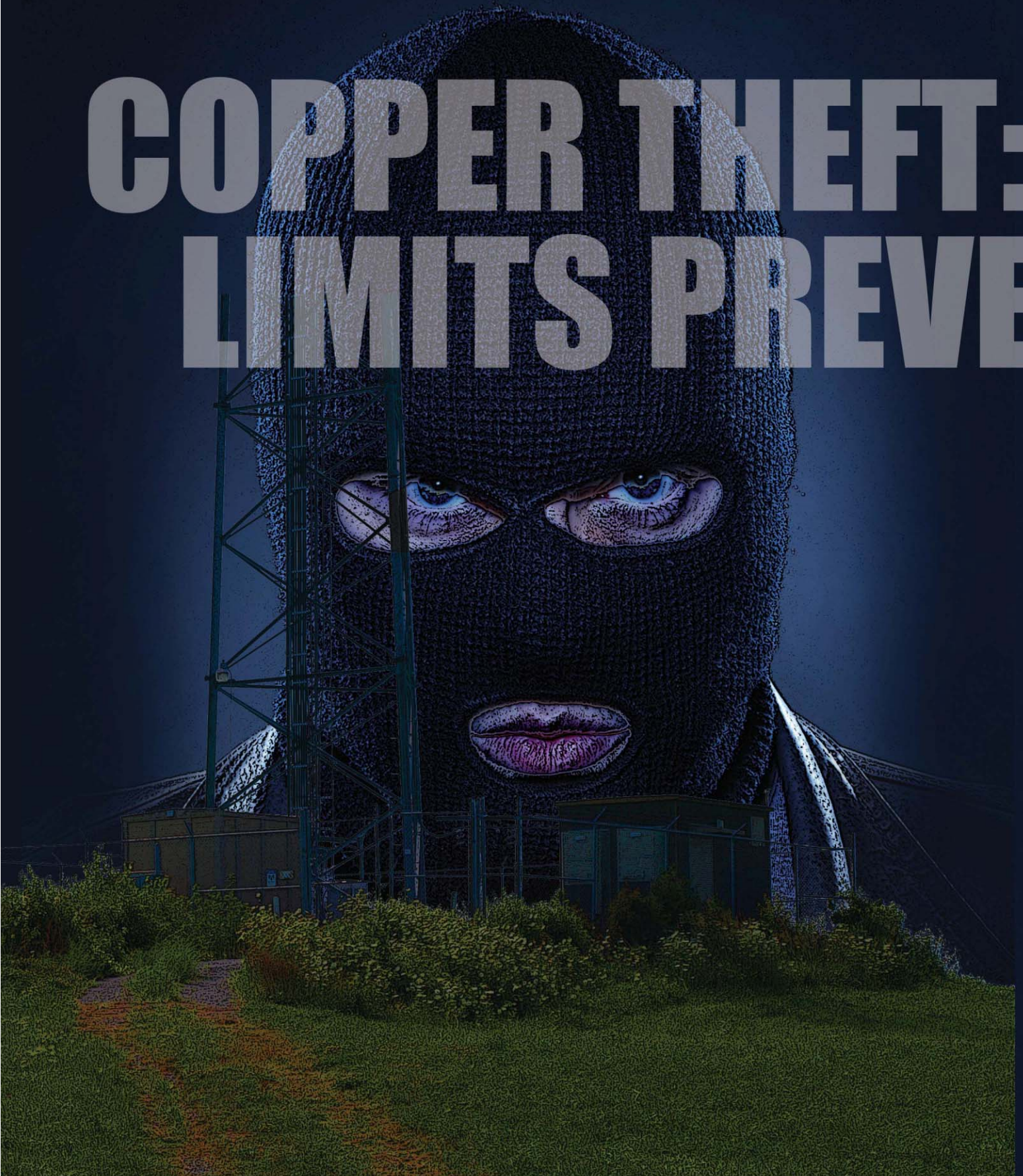
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SITE SECURITY

COMPLACENCY PREVENTION EFFORT

By Don Bishop

Many telecommunications antenna site owners and operators and many carriers have concluded that preventing copper theft is worth only a limited effort, balancing the expense of protecting multiple sites versus the expense of restoring a few sites after theft damage.

Copper theft affects antenna site owners and operators when thieves steal copper cable and copper plates used for electrical grounding, power transmission and antenna feed-lines. The difference between material cost alone and the total replacement cost can be a wide

gap. The materials stolen may be valued in the hundreds of dollars to the low thousands of dollars, but adding in the labor cost to install replacements can boost the expense of restoring a site following theft to tens of thousands of dollars.

Despite the high expense of restoring antenna sites damaged by theft, site owners and operators have relatively little interest

in taking steps to prevent theft because those steps, too, are expensive. Installing what's necessary to prevent theft in multiple sites apparently exceeds the expense of restoring one site or a few sites that may be damaged by theft.

Danger

Copper thieves are bold, they are fearless (or clueless) of the danger, and they are willing to go

site security

to great lengths to score a quantity of copper to sell for scrap. Although copper sells for as much as \$4 per pound as scrap, this is much less than the value of the manufactured goods that use the copper. Copper thieves strike anywhere there is copper, certainly not just antenna sites. Power lines (both high-voltage transmission lines and low-voltage distribution lines), power transformers, air conditioners, and even extension cords used to power outdoor Christmas displays number among the products they steal.

Fred Daniel, who has built and managed many antenna sites since 1965, said that aside from video surveillance, he uses warning signage, monitored alarms, restricted key blanks to resist duplication, dual deadbolts on doors and regular inspections.

“Unfortunately, sometimes the thief turns out to be a friend of a trusted service shop employee,” Daniel said, “so we have also used Torx security screws to protect equipment in open racks. We attach cabinets to the floor with security fasteners. We have sometimes used older cabinets to hide new equipment. There are no perfect measures because the thief usually has time on his side. I suspect the best defense is simply to make it so difficult to steal copper from an antenna site that they shop elsewhere.”

Daniel listed the reasons he believes some antenna site owners may have lost interest in trying to prevent copper theft:

- **Security cost** — Even with \$2,000 worth of closed-circuit television equipment, the equipment is of

limited usefulness. Unless we install hidden cameras along the access road to capture license plates, a photo of the thief is usually of little value to the police. We find we need more cameras than initially budgeted. Simply adding security signs is often just as effective.

- **Lighting** — If the facility can be observed from the road or adjacent homes or businesses, bright lighting seems effective to reduce vandalism. Criminals do not like to be seen.
- **Tamper-proof fasteners** — Interconnecting copper elements with tamper-proof fasteners dramatically impairs thieves. Pliers and vise-grips have limitations.
- **Better-protected equipment** — Manufacturers and installers have



Oak Ridge National Research Laboratory experts helped install a cost-effective security system to guard a utility substation against copper thefts.

learned that not all sites are created equal. Even with a good ground system, damage will sometimes occur. Therefore, they have improved the lightning and power surge protection of the equipment by using encapsulation. In other words, the equipment is enclosed, and all power, RF and data connections in and out of the cabinet pass through lightning and surge protection bonded to the cabinet rails and exterior at a common point. Sometimes, the interior of the building is effectively encapsulated, thereby providing an additional level of protection, even if all external grounding is missing.

- **Resignation** — Often, people simply become exhausted fighting the good fight, and they wait for better standards and practices to evolve.

Not theirs to worry about

A representative of a manufacturer responded to *AGL's* request for an opinion about copper theft prevention, but he asked not to be identified for the sake of his employer. He said that he had looked into the matter of copper theft at cell sites and the various prevention measures. He communicated the most with owners of sites where lightning is most prevalent and the theft of grounding materials would place sites at greater risk.

He said that most of the owners he spoke with told him that they had heard about the damages caused by lightning strikes, but that it had never happened to their sites. He said they seemed to accept the costs of holes cut in fences and damages to gates as a fact of life. Meanwhile, he said, the equipment stolen didn't belong to them, it belonged to the carriers, so it wasn't theirs to worry about.

As for the carriers, he said they were beginning to adopt simple methods such as dipping buss bars in roofing tar or painting them with a special coating to reduce their resale value. Some were stamping their names on the bars to reduce the incentive to steal them.

In summing up, he said that the losses never reached a level high enough to lead site owners, site operators and carriers to consider stronger alternatives for preventing copper theft.

Substation protection

Meanwhile, some utility companies are taking expensive measures to prevent copper theft from substations because the damage resulting from theft can be substantial. "In 2009, an attempted theft of copper cable at a Power Marketing Administration substation sparked an explosion and fire that tripped three transmission lines offline," information sent to *AGL* by the Oak Ridge National Laboratory reads. "Although the utility recovered by rerouting the substation's power, other power providers have experienced blackouts and loss of service from similar copper theft attempts."

ONRL said that the 2009 incident resulted in more than \$1 million in damages. As part of the response efforts, the Department of Energy's Office of Health Safety & Security collaborated with the laboratory and multiple subcontractors to help assess the substation's vulnerability and implement cost-effective security measures to prevent future theft attempts.

"ORNL's expertise in systems integration and vulnerability assessment gave us the requisite knowledge to help this site with its security upgrades," said Brigham Thomas, project manager of ORNL's Global Nuclear Security Technology Division.

Perimeter security

A team including representatives from ORNL, DOE, the utility and several subcontractors installed what the laboratory called a comprehensive and affordable perimeter security system consisting of energy-efficient lighting, surveillance cameras that operate in a high-voltage environment

and an anti-cut, anti-climb fence system with integral intrusion detection cable. Engineers from ORNL's facilities and operations directorate helped ensure safe construction practices. The complete system protects a perimeter area of 3,600 linear feet.

"This security system will deter future vandalism attempts, allow security officers to conduct surveillance remotely and will automatically alert security officers of an attempt to breach the perimeter so the officers can enact a

In 2009, an attempted theft of copper cable at a Power Marketing Administration substation sparked an explosion and fire that tripped three transmission lines offline.

proper response," Thomas said.

The security system installation, calibration and performance testing were completed in early 2011. Since the implementation, the substation has not reported any security issues. Thomas said the utility is looking at funding projects to replace fences at similar sites that could be attractive to copper thieves.

"The utility has made this type of fence their new standard," Thomas said.

Copper thieves do not confine themselves to substations that can be fenced, however. Northern Indiana Public Service reported that 2,300 feet of wire was stolen during thefts in a neighborhood near downtown Gary, Ind., in late August 2010. The thieves climbed power poles and cut live electrical lines to steal the equivalent of about 600 pounds of copper.

In St. Paul, Minn., thieves cut and stole electric cords used to power lights in 50 Christmas decorations installed in the city's Phalen Park last November. The scrap value of the copper in the cords would be minimal, officials said, but replacing the cords cost \$2,500.

As long as scrap copper sells for a price high enough, thieves will be motivated to steal it, even from cell sites. ■

backup power

Fuel Cells Help Maintain Cell Service During Storms and Natural Disasters

From hurricanes to earthquakes, cell phone service has become a critical necessity during storms and other natural disasters around the world. And keeping these services going against the wrath of nature is a clean, reliable backup power source: fuel cells.

By Kathy Fosberg

Natural disasters around the world — such as Tropical Storm Irene in the United States and the recent Chilean earthquake — remind us, as if we could ever forget, how essential reliable cell phone service has become in our lives.

As Irene's ferocious winds and heavy rains downed trees and millions of people across the East lost power and traditional landline based phone service in August 2011, cell phones became all the more important.

We used our cell phones to check on the safety of relatives and friends, stay in contact with work, get the latest news in our communities, look at photos and video of storm damage, order take-out food and even to network socially. In fact, status updates on Facebook and tweets about the frustrations of losing power were made possible by using smartphones that maintained their Internet and cell connections, technology that didn't exist in the past during hurricanes such as Hurricane Gloria in 1985.

Despite widespread power outages, cellular phone service stood up well to Irene. According to a *New York Times*



Photo Courtesy of IdaTech

The ElectraGen ME backup power system includes a fuel processor to extend backup time. A fuel processor uses a liquid fuel to make hydrogen on site and on demand.
Photo courtesy of IdaTech.

report on Aug. 28, 2011, the FCC said that a handful of radio sites and thousands of wire lines went down during the storm, leaving 132,000 landline subscribers without service. The FCC said that 1,400 cell sites along the coast were down, and several hundred

were running on backup power.

In other parts of the world, the earthquake that occurred off the Chilean coast in February 2010 had a magnitude of 8.8 on the Richter scale, with intense shaking that lasted for about three minutes. It ranks as the sixth-largest earthquake ever to be recorded by a seismograph. The destruction from this magnitude earthquake was massive. Medical and police services reacted immediately, but reliable communications service was critical in order to ensure the delivery of help to a community in need. Without a backup power source, the police, fire and medical communication equipment would not operate.

These examples show how absolutely essential backup power for telecommunications is to support power outages that may occur during storms and natural disasters.

Telecommunications companies such as AT&T, MetroPCS, Motorola, Sprint, T-Mobile and Verizon are turning to fuel cells for backup power to cell tower sites and switching stations because they last longer than batteries, are extremely reliable, and can be sited

in rugged terrain and extreme weather climates, according to Fuel Cells 2000.

Cleaner backup power

In anticipation of power outages, most telecom sites have backup power systems — traditionally consisting of valve-regulated lead-acid batteries (VRLA), battery strings or generators.

These traditional solutions are not always appropriate for sites requiring extended run times (days versus hours), and they can be unreliable. A battery string can be expected to provide anywhere from one to four hours of backup power, but battery

Telecom service providers increasingly are investing in fuel cell systems for backup power. Fuel cells use hydrogen and oxygen, the molecules that create water, to produce electricity with no pollution.

functionality is negatively affected by age, temperature, deterioration of charge during down time and corrosion. In addition, there are environmental problems with the disposal of batteries.

A diesel or propane generator — on its own or in combination with batteries — provides longer backup. The problem with generators is that they are noisy, produce noxious emissions, and, because they have several moving parts, they need frequent maintenance, repair and lubrication. Additionally, failure to start up because of a discharged starting battery is a concern with generators.

A cleaner alternative backup power is emerging. Telecom service providers increasingly are investing in fuel cell systems for backup power. Fuel cells use hydrogen and oxygen, the molecules that create water, to produce electricity with

no pollution. We see it as a green power generation alternative that is on the rise. Clean and energy efficient fuel cells can help reduce CO₂ emissions by 50 percent, decrease other toxic emissions and deliver additional environmental and efficiency benefits. They also are very quiet, less costly to maintain and not a target for theft.

The typical run time for one of to-

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IdaTech, a fuel cell manufacturer in Bend, Ore., manufactures the ElectraGen

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backup power

ME backup power system that includes a fuel processor to extend backup time. A fuel processor uses a liquid fuel to make hydrogen on site and on demand. Fuel processing is the act of converting hydrogen-rich fuels into pure hydrogen gas as needed, then feeding the pure hydrogen directly into a fuel cell stack. IdaTech has developed fuel processors for a variety of common fuels including methanol, a liquid found in windshield washer fluid and many other common products. By using energy-dense liquid fuel, the ElectraGen ME fuel cell system with its liquid fuel processor can provide backup power for days, compared with just a few hours of backup time for systems fueled by compressed hydrogen.

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starts at its designated set point. Having met its starting criteria, the system begins to reform fuel. The liquid fuel is heated

When there is a loss of power for the electric grid, the system senses the drop in the DC bus voltage and automatically starts at its designated set point.

to the vapor point and is converted into a hydrogen-rich gas. Next, the gas enters the hydrogen purification module and pure hydrogen is delivered to the fuel cell

module. Electricity is generated in the fuel cell stack by the chemical reaction between hydrogen from the fuel processor and oxygen in ambient air. The system will start exporting power to the load in about one minute and reach full power in three and a half minutes, providing 5 kilowatts of power to the telecom site. When grid electricity is restored, the fuel cell automatically stops powering the site and returns to standby mode, ready for the loss of grid power.

With continued growth and reliance on cell phones, telecom carriers around the world will continue to recognize the need for backup power, and with today's energy-consciousness and sustainability efforts, they will increasingly turn to a greener and sustainable solution: advanced fuel cell systems. ■

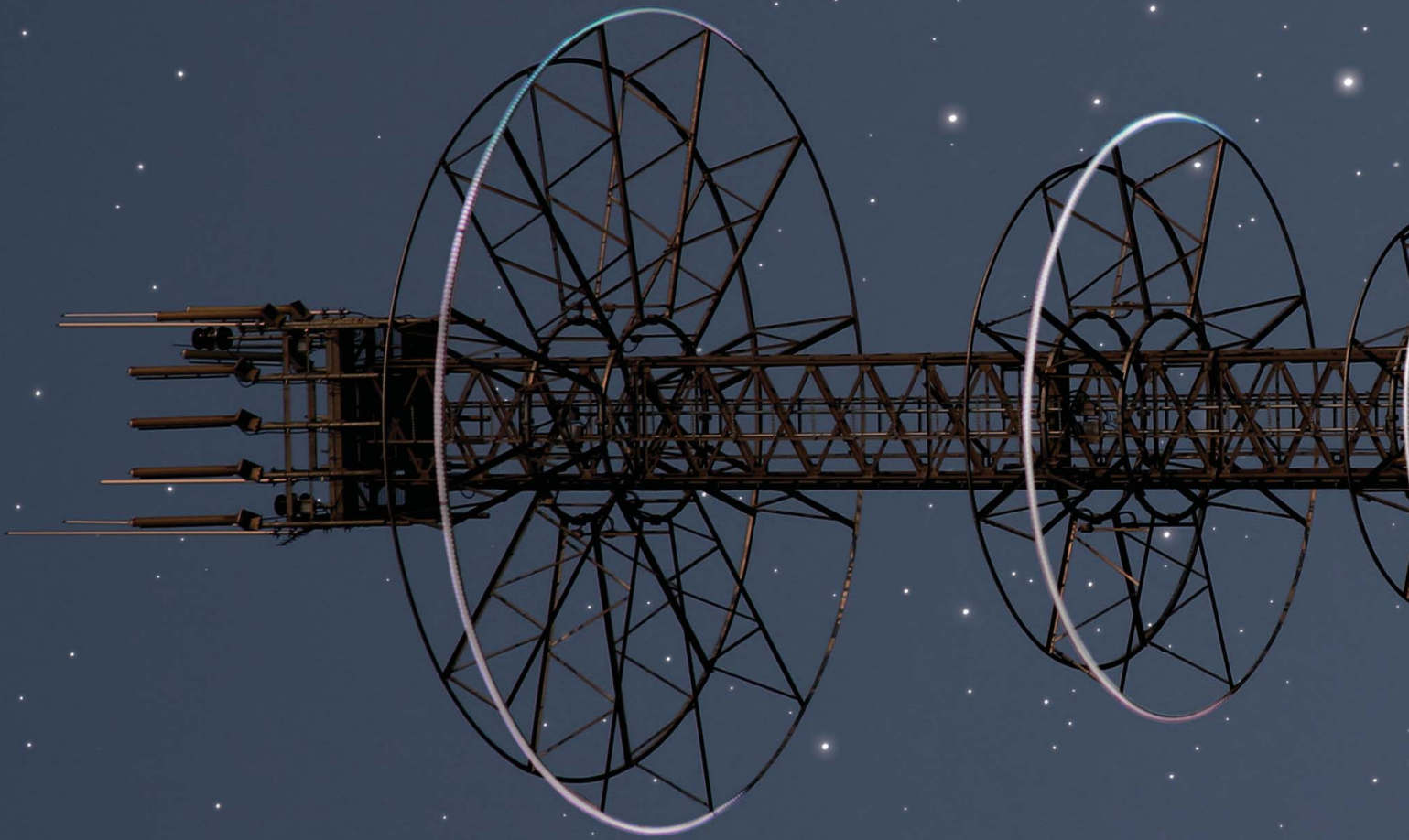
Kathy Fosberg is marketing communications manager at IdaTech, Bend, Ore.

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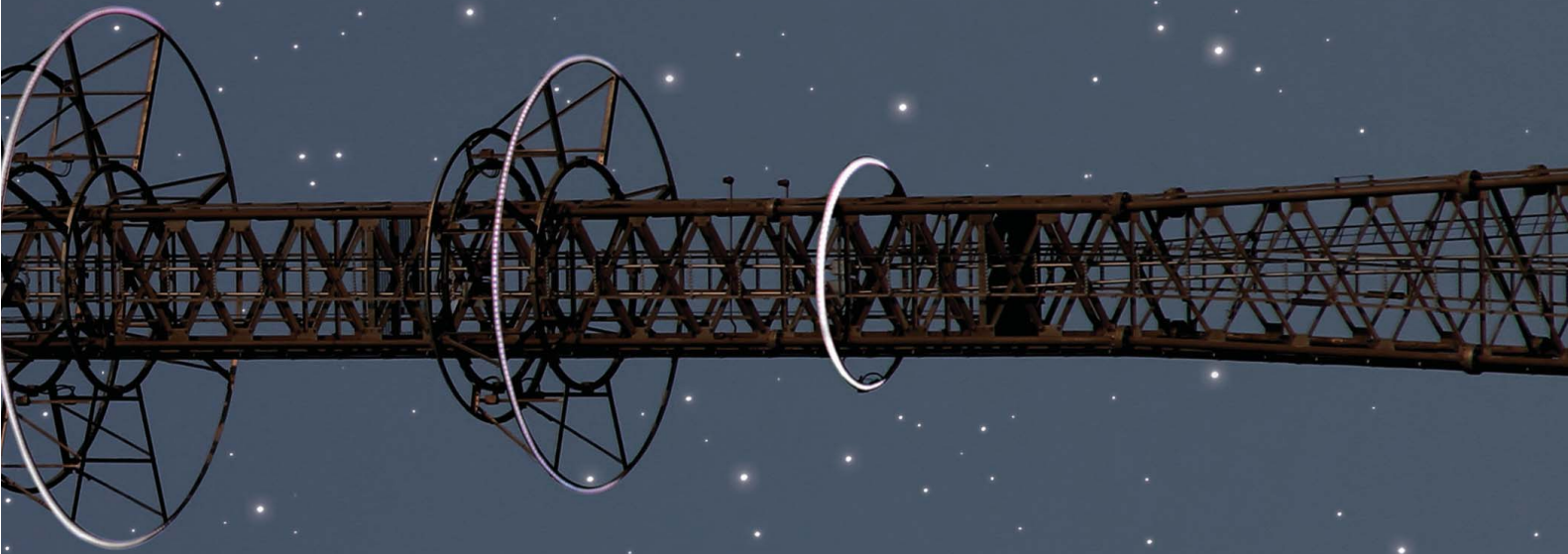
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Am I Management?

A new Occupational Safety and Health Administration (OSHA) case blurs the lines between employees and supervisors during inspections.

By Mark A. Lies II and Elizabeth Leifel Ash

On August 17, 2009, three journeymen electricians from M. C. Dean, an outside contractor, were servicing electrical installations at a warehouse owned by Ryder Transportation Services. One of the journeymen electricians fell through a skylight on the warehouse roof and suffered fatal injuries. Following this accident, OSHA issued citations to Ryder as the “controlling” employer under the agency’s multi-employer worksite doctrine, alleging that Ryder was in the position to control access to the skylight and failed to properly guard the skylight on the roof of its warehouse. OSHA cited M.C. Dean as the actual exposing employer, alleging that M.C. Dean also failed to properly guard the skylight.

A previous article [November 2011 *AGL*, “OSHA Expands Fall-hazard Liability for Host Employers”] addressed the cita-

tion issued to Ryder and made recommendations related to the obligations of a “host” or controlling employer that hires contractors to perform specialized work at its facility (see www.environmentalsafetyupdate.com/osha-compliance). The following information explains the citation issued to M.C. Dean and the recent decision from an administrative law judge upholding that citation, specifically the finding that an hourly journeyman electrician was a “supervisor.”

Employer knowledge

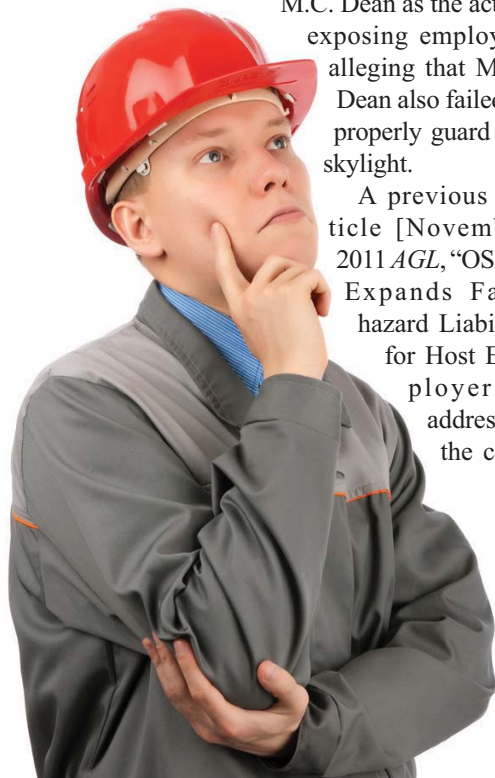
The Occupational Safety and Health Act and regulations promulgated by OSHA do not impose strict liability. Employers are not liable under the Act or a particular OSHA standard simply because a violative condition exists or an accident has occurred. An OSHA citation can only be upheld if OSHA proves that the employer *either knew, or, with the exercise of reasonable diligence, could have known of the presence of the violative condition*. Because many employers are corporations, it may be difficult to determine what a corporation “knows.” Case law involving OSHA citations, therefore, has established a general rule that the actual or constructive knowledge of an employer’s foreman or supervisor can be imputed to the employer. In other words, if OSHA can prove that a supervisor or foreman knew or, with the exercise of reasonable diligence, could have known that a violative condition exists, OSHA can satisfy the employer knowledge element of its burden of proof in a contested case.

Who is a supervisor or foreman?

According to Review Commission precedent, “[a]n employee who has been delegated authority over other employees, even if only temporarily, is considered to be a supervisor for purposes of imputing knowledge to an employer.” *Diamond Installations Inc.*, 21 O.S.H. Cas. (BNA) 1688, 1690 (O.S.H.R.C. 2006). Thus, it is not the employee’s title or compensation structure that controls whether he or she is a supervisor, but whether, in substance, the employee is empowered to direct other employees on behalf of the employer.

Under this broad rule, even hourly employees assigned to be a “lead” for a day could be considered part of management for purposes of imputing knowledge to the employer. Such was the case for M.C. Dean. The company argued that because all three journeyman electricians working at the Ryder site were hourly employees, the company could have had no knowledge of any potentially hazardous condition that they encountered on the roof, and the OSHA citation should be vacated. The administrative law judge rejected the company’s argument, finding that one of the hourly journeyman electricians was, in fact, a “supervisor.” The judge found that the journeyman electrician in question had been assigned as the “lead” for the day of the accident, and had been delegated the ability to control the method and manner in which he performed the assigned tasks, as well as the ability to assign tasks to the other journeymen.

Ultimately, the judge found that M.C. Dean had delegated supervisory authority to the journeyman electrician for the day



of the accident, and that his knowledge of the potentially hazardous condition was properly imputed to the employer.

Beware of OSHA inspection conduct

Perhaps the most vexing part of the M.C. Dean case for employers is the judge’s acknowledgement that the ultimate determination that the “lead” journeyman electrician was a supervisor was inconsistent with OSHA’s own behavior during its inspection. During the inspection, OSHA interviewed the “lead” journeyman electrician outside of the presence of M.C. Dean’s legal counsel and in fact denied the company’s counsel the right to be present at the employee interview. Under existing case authority, the employer has a right to be present for interviews of management representatives. M.C. Dean further argued at trial that if OSHA had believed the “lead” journeyman to be a member of management during its inspection, M.C. Dean’s legal counsel would have had the right to be present during his interview. The judge did not address this argument in her findings.

This conduct by OSHA during its inspection is an example of the difficult quandary into which OSHA can place an employer on deciding how to respond.

On the one hand, if the “lead” journeyman is an hourly employee, he would have the right to be voluntarily interviewed by the OSHA inspector in private (although any employee has the right to have another individual of his selection present for the interview), but his knowledge of an alleged hazard could not be imputed to the employer.

On the other hand, if the “lead” journeyman is a management employee, his knowledge could be imputed to the employer, but his interview would have to be held in the presence of counsel or another management representative at the employer’s election.

The judge’s decision affirming the citation based upon the testimony of the “lead journeyman,” despite this conduct by OSHA, is essentially a validation of OSHA’s conduct, which deprived M.C. Dean of its constitutional right to counsel. The lesson to be learned is that employers must not rely on an inspector’s representation that a particular employee

will not be considered as part of management during the interview process and the employer may have to assert its rights or they are waived. In the following section, we have outlined some recommendations for fronting this issue during an OSHA inspection.

Recommendations

What the M.C. Dean case teaches is that the threshold for determining which


employees are “management” for purposes of OSHA liability is minimal and can change daily based on the roles and responsibilities of a particular individual at a particular job site. This has implications not only for imputing knowledge of potentially hazardous conditions to the employer, but also for allowing OSHA to obtain binding legal admissions of liability against the employer during the course of an inspection through an




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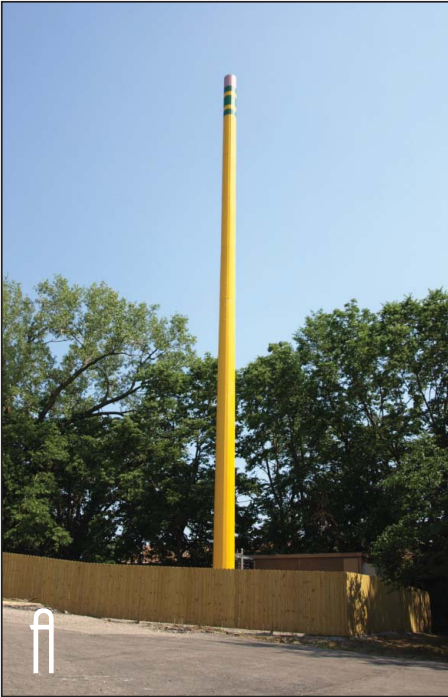
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employee whom the employer does not consider to be a member of management with authority to make such admissions.

Accordingly, it is recommended that all employers carefully evaluate the degree to which they delegate authority to a shift "lead," "field supervisor" or other hourly employees and consider the following:

In assigning a shift "lead" who is an hourly employee, ensure that the individual is fully trained to inspect the worksite and identify potentially hazardous conditions and report any such conditions immediately to management. On construction sites, this individual would be the "competent person."

Consider alternatives to assigning a shift "lead," such as assigning a management point person to direct the method and manner of the work with input from field personnel as the job progresses.

When assigning a shift "lead" who is an hourly employee, delegate specifically rather than broadly. Instead of giving the "lead" person a general instruction to "get the job done safely," give specific instructions as to the method and manner in which the job is to be done, i.e., specific practices to be followed or equipment to be used to limit the assertion that the employee has general supervisory authority.

In the event of an OSHA inspection, ensure that the inspector is immediately directed to a management point person instead of the informal shift "lead." If the OSHA inspector remotely infers or somehow states that a shift "lead" is a supervisor, then the employer should insist on having legal counsel and/or another management representative present during any interviews with the "lead." Ask OSHA to commit to its position in writing and if the inspector will not do so, which is likely, then the employer must memorialize in writing what the inspector represented.

If OSHA considers an hourly employee to be a member of management, legal counsel and/or another management representative have the right to attend the employee's interview. If the inspector refuses to permit legal counsel or other members of management to attend the interview, the employer may refuse to allow the interview to proceed until legal counsel is consulted or the area director is called to address the issue.

If the employer decides to allow the interview to proceed, notify the inspector in writing that the interview is being allowed "under protest," and that the employer will object to the introduction of any evidence obtained during the interview.

If the employer carefully assesses the status and responsibilities of each of its employees prior to an OSHA interview and asserts its rights to be present at the interview, if warranted,

the employer can avoid a potential waiver of its rights and the prospect of an unrepresented employee making binding admissions of legal liability during an OSHA interview. ■

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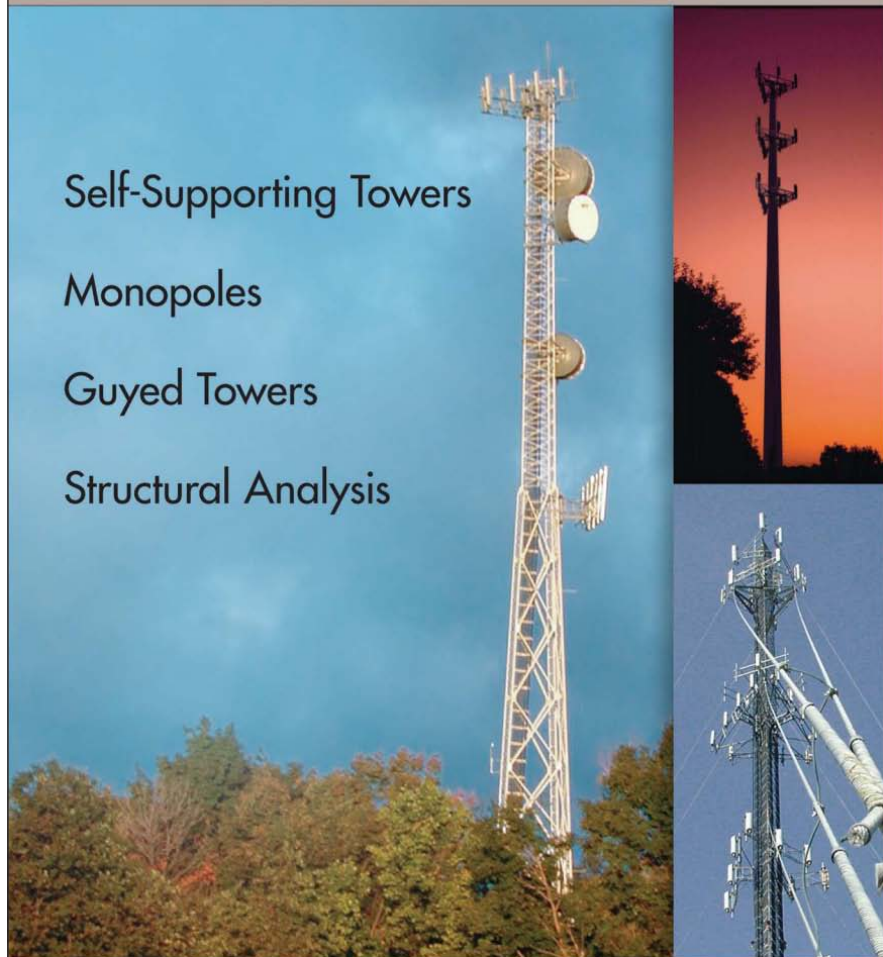
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the evolution of multicarrier das

Ownership Equals Control

During the next five years, expect to see the shared distributed antenna system (DAS) model, with building owners maintaining control of a DAS funded by participating carriers, come to prominence as the model of choice.

By Seth Buechley

An in-building distributed antenna system (iDAS), once installed, becomes the property of a carrier, a building owner or a third-party owner. Inextricably linked to the issue of ownership is the more important issue of control. We shouldn't cynically assume a desire to control the DAS is only for the purpose of extracting profit or limiting competition. For example, building owners desire control because they feel ultimately responsible for delivering critical services, including public safety and commercial wireless, inside the walls of their venue. Carriers desire control of the DAS so they can modify and upgrade systems without asking permission or aligning timetables with other carriers participating on the DAS. And finally, third-party owners desire control of the DAS to generate a return on their investment and ensure they can live up to the terms of any service-level agreements they offer to carriers that lease space on their DAS.

The tension associated with DAS ownership will increasingly resolve itself naturally through a shared DAS

model focused on what each party already owns. In every case, the building owner owns the building and the carriers own the spectrum. Building owners are not accustomed to giving up control or rights to critical infrastructure and carriers guard their networks closely. Both are equally motivated to improve the experience of shared cus-



tomers within the indoor environment. The trend is toward building owners owning and maintaining a multicarrier, shared DAS, which is funded entirely by participating carriers.

When bucket plans were the norm, a DAS could be seen as an expensive drain on carrier networks. In today's data-centric world, carriers are migrat-

ing toward tiered-pricing data plans, meaning DAS finally has the potential to be considered a legitimate revenue generator, even at this early stage of the data consumption curve. Most building owners are grateful when a carrier provides a DAS and is willing to forego any type of rent. However, savvy building owners with high-traffic

locations are beginning to push carriers for commitments of adequate capacity and the latest network technologies.

This new reality of carrier willingness to invest in DAS presents a significant challenge for many third-party ownership models. When carriers are willing to fund DAS deployments through a direct alliance with building owners, how do

the third-party owners articulate the value of their involvement? The market seems to be revealing sharp distinctions between iDAS and outdoor DAS (oDAS) business models. oDAS more closely resembles the traditional tower model in that both are developed in a complex regulatory environment. The first oDAS developer to overcome the

regulatory hurdles (zoning, public hearings, federal, state and local permitting) earns a built-in value for carriers unwilling to wade into an uncertain months-long regulatory process themselves. Sometimes it's easier to pay rent and move on. Conversely, with iDAS, there is no regulatory hurdle or permitting requirement to overcome. Tower companies, Wall Street successes if ever there was one, have long held DAS to be fertile ground for profitable business expansion. However, they face growing challenges in the changing dynamics of the iDAS space. For third-party owners, the DAS action will be in the iDAS (small-cell) space for the foreseeable future.

Building owners, when they get some help with carrier licensing and DAS management, almost always prefer to own the multicarrier DAS infrastructure in order to exercise some measure of control over their wireless destiny. Carriers, on the other hand, are embracing a variety of multicarrier DAS ownership policies. AT&T's Antenna Solutions Group, for instance, prefers to own multicarrier DAS with the goal of bringing other carriers on board and generating a return on their investment. Many major venues, lacking a compelling alternative, have embraced this new program. Other venues are concerned about AT&T's ability to attract and manage the other carriers and are choosing to accept AT&T's financial investment on the condition that they retain ownership of the DAS infrastructure and the other carrier relationships.

With increasing demand for mobile applications and the need to upgrade thousands of DAS systems to support LTE, we will see a variety of models explored in the name of pragmatism. During the next five years, expect to see the shared DAS model, with building owners maintaining control of a DAS funded by participating carriers, come to prominence as the model of choice. ■

Seth Buechley is president of Solid Technologies USA, a provider of distributed RF and optical transport networks. For more information, visit www.solidtechusa.com.

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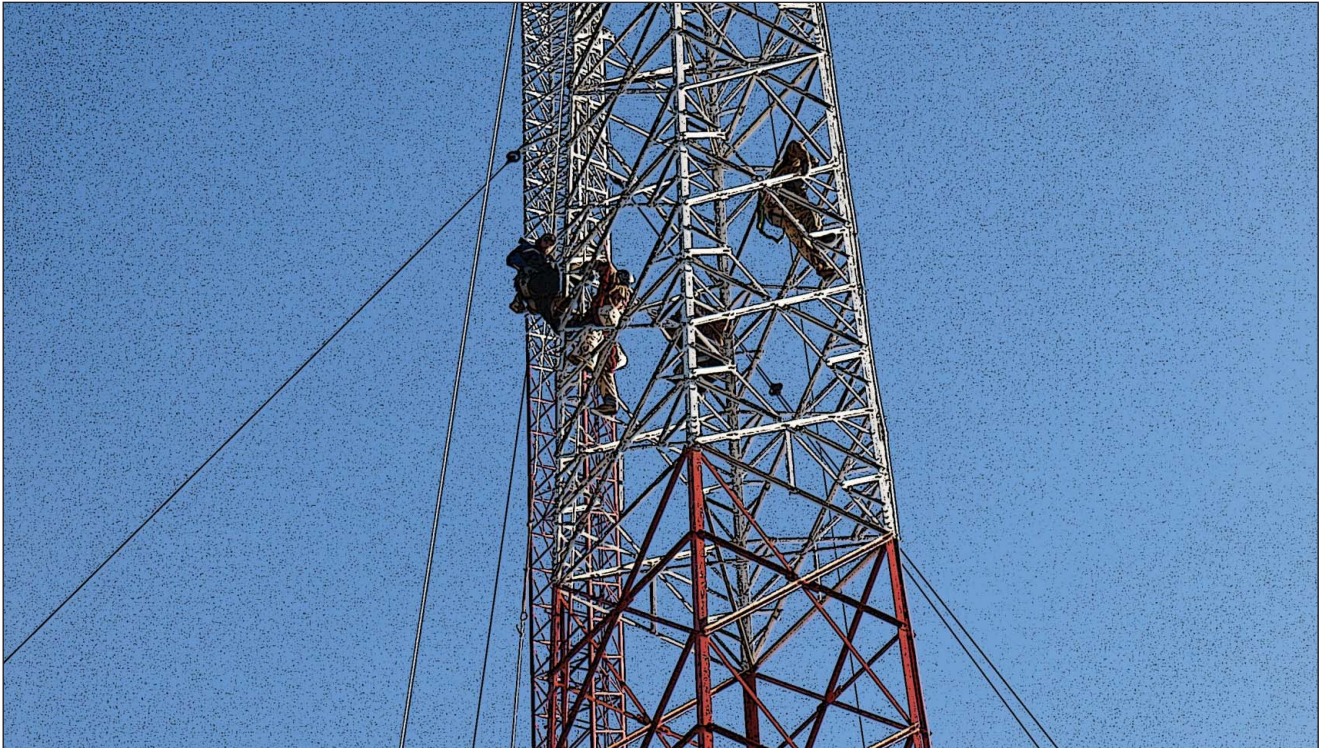
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Quick-Guide to Tower Construction and Service Companies



As a supplement to January's 2012 Buyers Guide, here is a list of tower construction and service companies, where they operate, the types of sites they build and additional information on the types of services they provide.

1. Antenna installation
2. Build-to-suit
3. Foundation installation
4. Lighting system installation
5. Microwave installation
6. Platform installation
7. Power and grounding installation
8. RF equipment installation
9. Shelter installation
10. Site construction
11. Site maintenance
12. Site modifications
13. Tower construction
14. Tower reinforcement



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 Area served: National
 Services: 1, 5-10, 12-14

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Types of sites: Tower, rooftop, DAS
Area served: National
Services: 1-14

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Types of sites: Tower, rooftop, DAS
Area served: National
Services: 1, 3-10, 12-14

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See ad on page 7



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Area served: National
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Types of sites: Tower, rooftop, DAS

Area served: National

Services: 1-14

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Area served: West

Services: 1-14

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Types of sites: Tower, rooftop, DAS

Area served: National

Services: 1-14

1. Antenna installation
2. Build-to-suit
3. Foundation installation
4. Lighting system installation
5. Microwave installation
6. Platform installation
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Scott B. Smith

scottsmith@excellcommunications.com

(919) 771-1961

www.excellcommunications.com

Types of sites: Tower, rooftop, DAS

Area served: Southeast

Services: 1-14

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Area served: National

Service: 13

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Types of sites: Tower, rooftop, DAS

Area served: National

Services: 1-14

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Area served: National

Services: 1, 2, 5, 10-11, 13



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Quality Tower Services

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Houston, TX 77080
George A. Jackson
meredit@specialtydrilling.com
(713) 722-9119
www.qualitytowerservices.com

Types of sites: Tower, rooftop
Area served: National
Services: 1, 3-7, 9-14



Quanta Wireless Services
5132 State Highway 12

Norwich, NY 13815
Steve Marshall
smarshall@quantaservices.com
(607) 336-1689
www.quantawireless.com

Types of sites:
Area served: National
Services: 1-8, 10-14
Quanta Wireless Solutions has more than 50 years of comprehensive telecommunications experience. The company has the ability and experience to implement all areas of wireless network needs. From search ring candidates to network integration of LTE networks and large-scale DAS, Quanta Wireless Solutions can provide turnkey services or services for a specific phase of a network project. Quanta Wireless Solutions is dedicated to safety, quality and on-time delivery of network goals.



Experts in Regulatory Compliance...

NIR Theoretical Analysis

- Online project management means higher accuracy and faster turnaround times
- Automatic email status updates
- Access projects and reports at any time from anywhere
- All documents and studies stored in online archive – retrieve at your convenience

EME Compliance Surveys

- Expert rooftop analysis and documentation

AM Detuning Services

- Fast and efficient
- Free bulk screening

Intermodulation Studies

- Evaluate potential interference before a problem arises
- Meet regulatory requirements of leading cities and tower companies

NIR/MPE Studies

- Theoretical and on-site
- FCC and OSHA compliance

1. Antenna installation
2. Build-to-suit
3. Foundation installation
4. Lighting system installation
5. Microwave installation
6. Platform installation
7. Power and grounding installation
8. RF equipment installation
9. Shelter installation
10. Site construction
11. Site maintenance
12. Site modifications
13. Tower construction
14. Tower reinforcement



sales@waterfordconsultants.com
(703) 596-1022



Sabre Turnkey Solutions

555 Enterprise Drive
Edmond, OK 73013
Lila Lee Burns
lburns@sabreindustries.com
(405) 216-0555
www.sabreturnkeysolutions.com
Types of sites: Tower, rooftop, DAS
Area served: National
Services: 1, 3-14



SBA Communications

5900 Broken Sound Parkway NW
Boca Raton, FL 33487-2797
information@sbasite.com
(800) 487-SITE
www.sbasite.com

Types of sites: Tower, rooftop
Area served: National
Services: 1-14

As a first choice provider of wireless infrastructure solutions, SBA continues to set the standard for customer satisfaction by building better wireless. Its clients depend on SBA to provide their wireless infrastructure needs at all stages. The company focuses on tower ownership, leasing, site management, site development, construction and technical services.

See ad on the back cover

SimplexQ

8120 Doyle Springs Road
Little Rock AR, 72209
James Sledge
sledge@simplexq.com
(501) 554-3587
www.simplexq.com

Types of sites: Tower, rooftop, DAS
Areas served: Midwest, Southwest, Southeast
Services: 1-14
Other: RF and lighting maintenance



SiteMaster

6914 S. Yorktown, Suite 210
Tulsa, OK 74136
Jim Hopkins
jhopkins@sitemaster.com
(918) 269-5094
www.sitemaster.com

Types of sites: Tower, rooftop, DAS

Area served: National

Services: 1-14

SiteMaster inspects, builds and maintains towers. For over 14 years, SiteMaster has delivered infrastructure services on a national basis. The company has performed audits, new site builds, overlays, and decommissionings with quality and integrity. SiteMaster's experienced team continues to grow and evolve with the industry while embracing new technologies and standards, including experience/certifications on PIM testing, FTTC, hybrid cable, RRH/Us, MW (IP), DAS and PMP.

WWLF
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LEADERSHIP FORUM

The WOMEN'S WIRELESS LEADERSHIP FORUM (WWLF) is a volunteer association for professional women in the wireless communication industry.

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buyers guide

1. Antenna installation
2. Build-to-suit
3. Foundation installation
4. Lighting system installation
5. Microwave installation
6. Platform installation
7. Power and grounding installation
8. RF equipment installation
9. Shelter installation
10. Site construction
11. Site maintenance
12. Site modifications
13. Tower construction
14. Tower reinforcement



Slatercom-WCD
7905 State St.
Salem, OR 97317
Al Slater
ads@slatercom.com

(503) 581-5550
www.slatercom.com
Types of sites: Tower, rooftop
Area served: West
Services: 1-14
Slatercom-WCD is a Dialight master distributor of FAA-certified LED obstruction lighting products, including the new high-intensity lighting system as used on towers and other obstruction hazards more than 550 feet tall. The company's extensive Dialight inventory allows prompt shipment of any Dialight FAA lighting product, including the new high-intensity system. Solar-powered obstruction systems, standard and special lighting systems and controllers can be shipped with short lead times.

See ad on page 38

SSC
9225 Indian Creek Pkwy., Suite 400
Overland Park, KS 66210
David Blaha
dblaha@ssc.us.com

(913) 438.7700
www.ssc.us.com
Types of sites: Tower, rooftop, DAS
Areas served: Midwest, Southwest, Southeast
Service: 2
SSC provides services to the telecommunications, development, and construction industries. The company's full range of in-house services and abilities makes it uniquely capable of handling all aspects of the most challenging projects. SSC strives hard to serve clients, solve their problems and communicate effectively.

Stainless
1140 Welsh Road, #250
North Wales, PA 19454
Ed Deetscreek
ed.deetscreek@stainlessllc.com
(215) 631-1323
Types of sites: Tower, rooftop
Area served: National

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Services: 1-8, 10-14
Stainless provides design, engineering, fabrication and installation service for towers of any height up to 2,000 feet to customer specifications for durability and dependability under extreme conditions. Stainless offers existing tower analysis, modifications, maintenance, inspections, repair and construction, and 24-hour emergency services.

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70 Pleasant Hill Road
Mountainville, NY 10953
Richard P. Kummerle, P.E., P.P., P.G.
rpzimmerle@tectonicengineering.com
(800) 829-6531
www.tectonicengineering.com

Types of sites: Tower, rooftop, DAS
Area served: National
Services: 1-14
Other: Full turnkey
Tectonic Engineering and Surveying Consultants provides a full spectrum of site acquisition, A/E professional services and program management. Tectonics' staff of 400 is located throughout regional and project offices nationally, providing site acquisition, permitting, zoning, due diligence, NEPA/SHPO, Phase 1, civil, structural and geotechnical engineering and tower analysis.


Terracon Consultants


18001 W. 106th Street, Suite 300
Olathe, KS 66061
Craig Pruett
cspruett@terracon.com
(303) 423-3300
www.terracon.com
Types of site: Tower, rooftop, DAS
Area served: National


Services:
Other: Phase I environmental site assessments (ESA), National Environmental Policy Act (NEPA) reviews, geotechnical engineering, construction materials engineering and testing and special inspections

Tower Guys

P.O. Box 3443
Matthews, NC 28106
Denise Hooks
denise@towerguysinc.com
(704) 845-1004
www.towerguysinc.com
Types of sites: Tower
Area served: Southeast
Services: 1, 3, 5, 13







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product showcase — power and backup power systems



Solar Power

Kyocera Solar has expanded its MyGen product line of all-inclusive kits for residential and light commercial solar energy installations to include the scalable MyGenflex, which offers increased versatility for installation, expansion and monitoring service. It features Kyocera's 240-watt solar modules and M215 micro-inverters from Enphase Energy, which convert direct current produced by solar modules into alternating current from each individual module in an array. Enlighten monitoring and analysis software from Enphase monitors each micro-inverter and solar module in the system.

www.kyocerasolar.com



Site Inverter

The Site Inverter 300 from **ICT** provides AC power at off-grid, DC-powered communications sites for links, multiplexers, switches, RTUs, DVRs and other components that require AC input. The Site Inverter 300 is a single rack unit high, mounts in a 19-inch equipment rack and is available for 12-, 24- and 48-volt DC systems. All models feature 300 watts or 2.6 amps of true sine wave output, more than 90 percent efficiency and low idle current draw.

www.ict-power.com



Backup Power

The ElectraGen ME fuel cell system from **IdaTech** provides backup power for cell sites. These backup power fuel cell systems are available in 2.5-kilowatt or 5-kilowatt models in 24-volt DC or 48-volt DC configurations. The ElectraGen ME fuel cell system includes a fuel reformer that converts methanol and water liquid fuel into hydrogen gas to power the fuel cell system. By generating hydrogen on site and on demand, the need for delivery and storage of bottled hydrogen is eliminated. Fuel cell systems with fuel reformers can provide extended-run backup power for days.

www.idatech.com

Hybrid Power System Technologies

Caterpillar offers a wide range of hybrid telecom systems that provide power solutions incorporating renewable resources, including solar photovoltaics, wind turbines, batteries, diesel or gas generator sets and power electronics. By using available renewable resources and operating the generator set at peak efficiency points, hybrid power systems provide reductions in total owning and operating costs, decreasing fuel consumption and maximizing system reliability. In comparison with the costs of grid extension or fuel delivery to remote locations, hybrids can offer several benefits to telecommunications operators: decreased fuel consumption by 30 to 100 percent, extended maintenance and replacement intervals, and payback periods of three years or less. Diesel and battery fuel sources are combined for 30 to 50 percent fuel reduction. Solar and diesel-battery are combined for 50 to 100 percent fuel reduction. The combination of diesel, battery and wind can also provide 50 to 100 percent fuel reduction.

www.cat.com

Outdoor Power Solutions for Telecommunication Networks

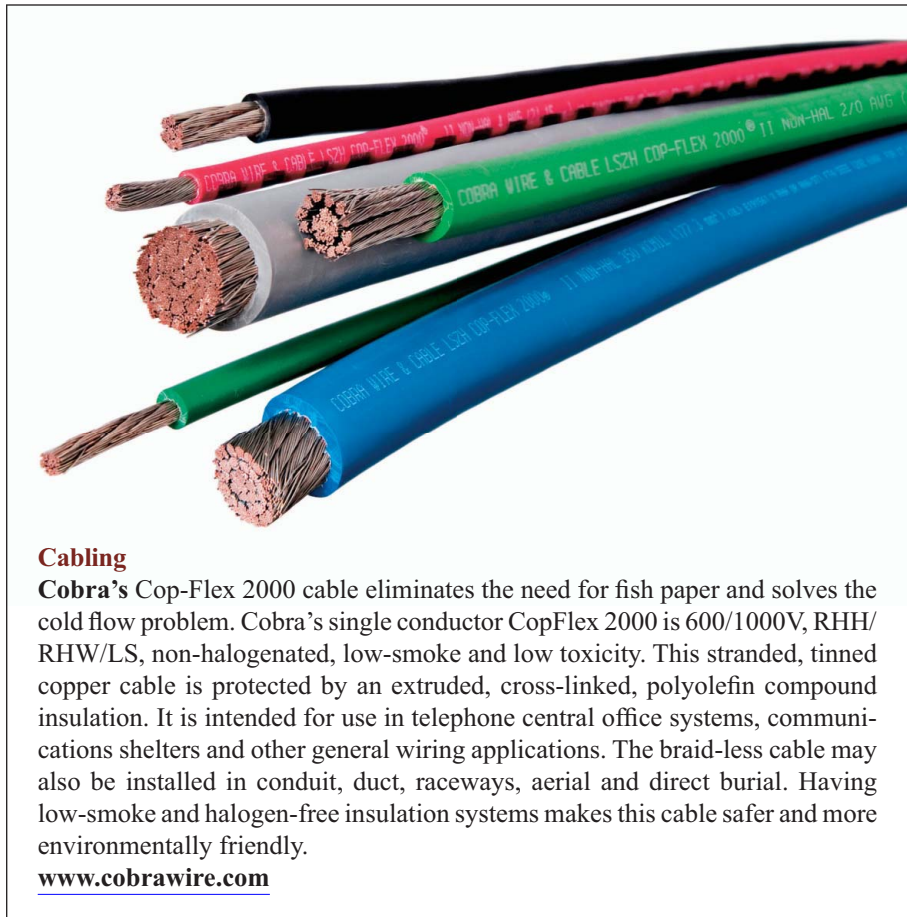
SunWize systems are complete integrated power systems for critical telecommunication loads, including base transceiver stations (BTS), microwave, switches, fiber optics and repeaters. Ease of transportation and rapid deployment make SunWize systems a cost-effective power choice along with longevity and low maintenance. SunWize power stations are complete, integrated, solar power systems designed for site loads requiring 12/24/48 volts DC or 110/240 volts, 50Hz/60Hz AC. Wired to NEC standards, each power station provides safe and reliable power without the expense of installing utility power. The solar array tilt is easily adjustable to maximize solar energy output. The systems are mounted on galvanized steel structures or trailers engineered to withstand harsh environments and high wind loads. SunWize power stations provide continuous DC power with battery backup from a DC source. These fully integrated, galvanized units use DC primary power to charge a 12-, 24- or 48-volt DC sealed battery bank while powering the DC load, or AC load with integral inverter option.

www.sunwize.com

Telecom Backup Power Solution

EnerSys industrial batteries and **Altegr** now jointly offer extended runtime power solutions that combine fuel cell technology with pure-lead batteries. This power generation approach is an alternative to diesel generator alternative, which uses EnerSys SBS batteries with Eon technology for battery backup during common outages and fuel cells for extended runtime for catastrophic power loss (8–48+ hours).

www.extendedruntimesolutions.com



Cabling

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www.cobrawire.com



Fuel Cell

ReliOn fuel cell solutions provide reliable, scalable, environmentally benign backup power solutions in myriad configurations, designed and built to suit telecommunications power requirements. ReliOn power solutions may be rack-mounted indoors or housed in a rugged, compact enclosure tested to Telcordia GR-487-CORE and CSA safety regulations. Hydrogen fueling solutions offer runtime options from hours to weeks between refueling. ReliOn products are designed for easy installation and simple, cost-effective operations and maintenance. Remote monitoring and control software allows for off-site interaction, further reducing O&M costs.

www.relion-inc.com

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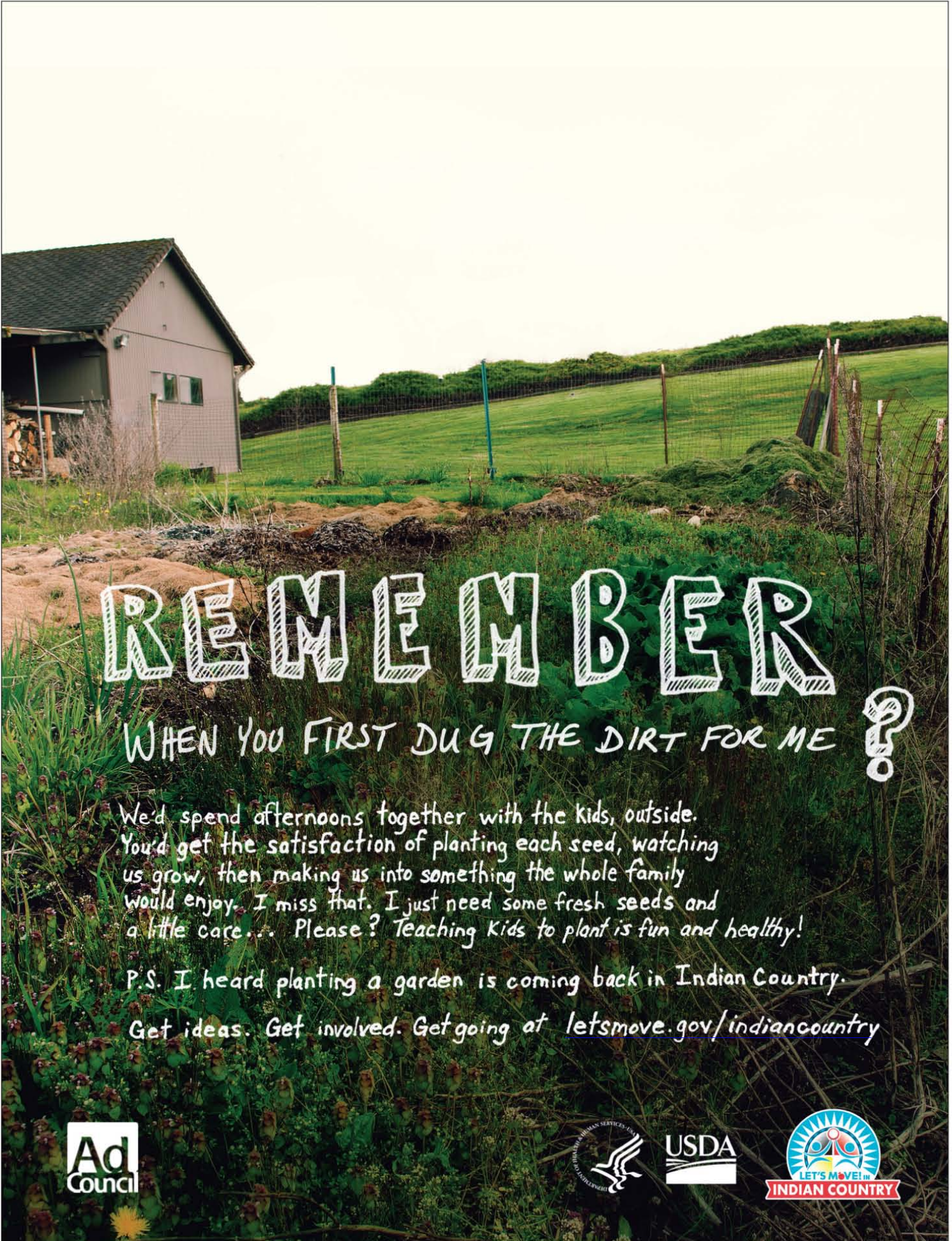
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