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Power & Communication Construction: Where Are We Headed?

By Mark Bridgers and Dan Tracey

Your view of the power and communication construction market depends on two characteristics: where you sit geographically and your ability to understand what energy asset owners and operators and cable and telecom system operators will need. Economic conditions are improving and financial constraints are easing, but the uncertainty of governmental influence is raising the risks and challenges in this market.

Contract Review: An Important but Often-Overlooked Aspect of Bidding

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By Gregory T. Spalj

An often-overlooked aspect of determining the appropriate price for construction work is a review of the terms of the construction contract, which can have a profound impact on the costs of construction and the payment therefor. This article provides a short list of the more important terms and conditions found in many construction contracts and subcontracts to which the contractor should at least pay attention in the pre-bid stage of construction contracting.

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Power & Communication Construction:

Where Are We Headed?

By Mark Bridgers and Dan Tracey

"The state of the economy calls for action, bold and swift, and we will act—not only to create new jobs but to lay a new foundation for growth. We will build the roads and bridges, the electric grids and digital lines that feed our commerce and bind us together." — President Barack Obama, Inaugural Address, January 20, 2009

uring 2009, Ayn Rand's 52-year-old novel Atlas Shrugged ranked as high as #33 on Amazon.com's top-selling books list. The story of a dystopian United States provides a timely example of government intervention through economic policy and regulation. Today it is especially relevant to the domestic power and communication industry given the significant and broad government influence on the design and construction of this infrastructure.

FMI forecasts a very modest combined growth of 1.5 percent for power transmission and distribution and communications related construction in 2010 (Exhibit 1). Obviously, this is not the double-digit figures hoped for, and in many ways expected, as a result of the American Recovery and Reinvestment Act (ARRA). For those of us in the construction industry, the low growth rate is not a surprise given the slow speed of the stimulus funds roll out.

While the overall forecasted growth in 2010 is low,

the individual performance of each sector and its subsectors varies significantly. As an example, replacement pipeline and electric transmission activity are demonstrating growth at much higher levels than the communications market, which FMI forecasts to continue shrinking in 2010. Growth in all sectors is negatively impacted by the excess housing inventory, which FMI does not anticipate being absorbed until 2011, at which point gas and electric distribution and telecom sectors will rebound.

The governmental impact on the electric and gas T&D markets and the telecom market is significant, far reaching, and certainly not what Ayn Rand would have preferred. At the federal level, there is generally a more positive impact on design and construction spending (Exhibit 2). State, local, and municipal impacts tend to serve as more significant obstacles. The lone exception is public utility commissions, where the number of favorable rulings in rate cases has increased dramatically

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Exhibit 1





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over the last three to five years. Regulatory Research Associates reports approximately 71 gas or electric rate cases in 2007 versus 65 cases in for 2008 and an additional 65 or more cases in 2009, representing a marked increase in activity from the previous ten years.



Transmission & Distribution

John Maynard Keynes saw the government as a spend-

Exhibit 3

er of last resort during economic crises and was confident it could be effective in taking a longterm view to organize and encourage investment. President Obama may have torn a page from the Keynesian dogma. Of all power segments, transmission and distribution (T&D) construction is the most positively impacted by federal government oversight, regulation,



and funding.

T&D construction is the focus of much attention as a result of President Obama's promise to upgrade our ailing grid and create a "green" superhighway for power. But is a high-voltage transmission system built to accommodate renewable energy wishful thinking? FMI forecasts a healthy 6 percent growth in T&D-related construction in 2010 (Exhibit 3). The overall growth rate for this segment will not begin aggressive acceleration until the housing inventory is absorbed, which FMI does not anticipate until 2011.

"I expect to see the state, which is in a position to calculate the marginal efficiency of capital goods on long views and on the basis of the general social advantage, taking an ever greater responsibility for directly organizing investment...."

– John Maynard Keynes, The General Theory of Employment Interest and Money, 1935.

Electric Transmission & Distribution

There are four dominant drivers of electric transmission and distribution construction in FMI spending forecasts:

- 1. Homebuilding/electricity demand
- **2.** Smart grid
- 3. Aging infrastructure/reliability efforts
- 4. Renewable power generation

FMI forecasts a slow resumption of growth for homebuilding and energy demand through at least 2011 and aging infrastructure issues are well understood. In the descriptions below, we focus on understanding the impact smart grid and renewable power will have on the T&D sector.

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Smart Grid Impact

In the utility world today, few topics are as hot, yet as confusing, as the smart grid. With companies like Cisco predicting the underlying communications network will be "100 or 1,000 times larger than the internet," there is good reason to be excited.¹ Experiments in converting cities over to a "smart grid" are well under way, with Boulder, Colo., and Austin, Tex., leading the way.

In Boulder, Xcel Energy invested \$100 million to build one version of a smart grid. All in, Xcel installed 200 miles of fiber optic cable, 4,600 residential and small business

Easy/Relatively Inexpensive		Hard/Relatively Expensive			
Distribution Related	Customer Commun- ication	Customer Self or Utility Management	Grid Management Related	Grid Reliability Related	"Smart" or Artificial Intelligence Application
 Automated meter reading 	 Automated metering infrastructure integrated into utility systems 	 Energy use analysis Load profiling 	 Advanced materials for improved conductivity or technologies applied to substation manacement 	 Remote event detection, prevention, management, and resolution 	 Distributed generation Smart appliances Utility scale renewables are cost effective

Note: List is not all inclusive and is simply meant to provide examples of what type of people, process, or technology changes that are implied by each range of function.

Source: Numerous sources compiled by FMI

transformers, and more than 16,000 smart meters. The project has been a success. Customer complaints about voltage fluctuation were reduced to zero from 60 a couple years earlier.²

Xcel's work in Boulder is one example of a smart grid, but how else might the concept be applied and how will it impact construction spending? While there is no consistently accepted definition, a smart grid generally consists of a spectrum of opportunities, some of which are already in high use (Exhibit 4). It is FMI's opinion that the impacts to both distribution and transmission construction activity are years away with the exception of meter replacement, which is accelerating.

With the grid approaching capacity and more power set to come online, the Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability has partnered with industry to begin shoring up transmission lines using high-temperature superconducting (HTS) cables. The first such project was completed in April 2008 when the American Superconductor Corporation and Long Island Power Authority energized a 2,000-ft., 138-kV cable capable of transmitting 574MW of energy. The project cost \$58.5 million and would not be possible without a \$28.5 million subsidy by the DOE.

Also underway is a \$39 million project on New York City's network, operated by ConEdison. Dubbed "HY-DRA," the project is dependent on the Department of Homeland Security for \$25 million in funding.³ As NRG Energy CEO David Crane explained, "If we are not doing things completely differently by 2030, we will be in a world of hurt...."⁴ The ARRA, better known as the stimulus program, appropriated \$6 billion to support the DOE's loan guarantees of \$60 billion for renewable energy and electric transmission projects. While undoubtedly a noteworthy and positive measure, utilities and transmission developers are having trouble obtaining permit approval to site and build transmission lines. Standing in their way is a maze of both state and federal regulations, with the two sets often misaligned.

In California, a state known for its progressive stance on regulating transmission construction, Governor Schwarzenegger announced he would veto legislation requiring 33 percent of the state's energy to come from renewable sources by 2020, instead choosing to mandate the change through executive order. His action is out of concern for what his communication director called a "poorly drafted, overly complex bill...that will kill the solar industry in California and drive prices up like the failed energy deregulation of the late 1990s."⁵ The source of the conflict was a provision that allowed California utilities to buy power from outside the state.

Renewable Power Impact

"The United States...lacks a modern interstate transmission grid to deliver carbon-free electricity to customers in highly populated areas of the country...'Green power superhighways'...carrying electricity from remote to populated areas...the key to any cost-effective plan is the use of high-voltage transmission lines in place of the low-voltage lines commonly deployed in the U.S.

Continued on page 12

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today."6

Green transmission corridors, particularly those in support of wind energy, are already a significant driver of transmission construction across the U.S. and at the same time address reliability and aging infrastructure concerns. A number of transmission congestion studies and work by the Federal Energy Regulatory Commission (FERC) resulted in the start of a process to accelerate transmission grid infrastructure build out. Exhibit 5 identifies 21 areas where major (over 345-kV and more than 50 miles long) transmission lines have been proposed, planned, or are under construction. These projects range in cost from hundreds of millions to billions of dollars and represent a large chunk of total U.S. transmission spending between 2010 and 2014.

The wind power market accounted for 42 percent of new electricity generation in 2008 with roughly 8,500 MW brought online.⁷ While the 2009 numbers had not been released at the time of publishing, the year is likely to finish with somewhere in the neighborhood of 7,000 MW being added. Wind energy is the fastest growing, most significant, and therefore the most relevant of renewable energy sources today. Given the incentives incorporated into the ARRA, FMI expects it will continue to thrive. Texas remains the clear leader in wind power generation with over 8,700 MW installed, although Pennsylvania and Wyoming both saw more growth during 2009. Visibility has raised competition dramatically in this segment for designers and contractors who have operated in it for years.

Looking forward to 2010, many analysts predict a banner year for wind farm construction as the legislative environment appears to be moving in favor of renewable energy. While FMI is in agreement that 2010 through 2012 will likely be some of the strongest years on record for domestic wind energy construction, we are also mindful of tight credit markets, utility power purchase agreements demand, and an investor community reluctant to fund riskier renewable energy projects. Nearly everyone is optimistic on wind power construction, but a soon-to-be-released report from Ion Consulting of Denver, Colo., is much more pessimistic. In "Near-Term Outlook for U.S. Wind Market Sector," Ion cited four drivers that will significantly constrain wind power construction:

- **1.** Ignorance of the role a utility has in determining the demand for new wind additions
- **2.** The bubble of merchant wind projects where a utility was signing their very first PPA
- **3.** Lower demand for power that will likely defer 4,500 MW of new renewables
- 4. Financial market constraints that will likely con-

tinue through 2011

While FMI is not nearly as pessimistic, we see significant challenges beyond 2012 when domestic wind power growth will likely slow significantly as the industry faces severe interconnection and transmission infrastructure challenges.

Gas and Liquid Transmission & Distribution

FMI forecasts positive but unbalanced growth for gas pipeline construction in 2010 forward. New service construction is essentially nonexistent, while higher-pressure distribution and pipeline replacement work are exhibiting significant growth. Also affecting gas T&D is the uncertainty around emission standards, which continue to discourage the development of new coal-fired assets, and with nuclear power still five to seven years off, gas-fired capacity will be a vital part of base load generation construction going forward. Overall, FMI forecasts 3 to 5 percent annual growth for the



Sources: Department of Energy, National Interest Electric Transmission Corridors and Congestion Study, National Electric Transmission Corridor Report

(http://nietc.anl.gov/nationalcorridor/index.cfm); FERC transmission Project listing (www.ferc.gov/industries/electric/indus-act/trans-invest/orders.asp); Edison Electric Institute (EEI), Transmission Projects at a Glance, January 2008; Industry reports, new articles, and press releases, compiled by FMI. gas and liquids T&D construction market. This cumulative growth rate will accelerate once the housing inventory is absorbed, which FMI does not anticipate happening until at least 2011.

- **1.** FMI's forecasted growth rates for the four main pipeline categories include:
- Gas distribution: An unbalanced growth rate of 3 to 5 percent
- **3.** Gas submarkets/gathering: Peaked in 2007/2008 with flat or slow growth until gas prices rebound
- **4.** Gas transmission: Growth of 6 to 10 percent, mostly in large, long-duration projects
- **5.** Liquids transportation: Growth in a wide range of 3 to 8 percent, dependent on \$60/barrel oil and regulatory pressure to purchase oil from North American resources

Submarkets/Gathering Lines

A report released in June 2009 from the Potential Gas Committee⁸ estimated U.S. reserves of natural gas are 35 percent higher than two years ago, thanks in large part to new hydraulic fracturing technology that allows extraction from shale.⁹ Extraction of shale gas, particularly from the Rocky Mountain and Appalachian regions, has grown rapidly and now accounts for approximately 5 percent of total U.S. production, according to the Gas Technology Institute.

The growth in domestic reserves has driven the construction of gathering line networks over the last five years, but it has not been without its problems. Evidence is beginning to surface that hydraulic fracturing puts nearby drinking water at risk of becoming contaminated with methane, 2-butoxyethanol phosphate, and other chemicals used in the extraction process. In Pavilion, Wyo., for example, the Environmental Protection Agency (EPA) is investigating the potential contamination of several drinking wells.¹⁰

Also, according to the EPA, roughly 3 trillion cubic feet of methane leak into the air every year. The energy department projects worldwide gas production to rise nearly 50 percent in the next 20 years; emissions through undetected leaks could soar unless monitoring is significantly expanded. But this isn't necessarily bad news. Despite the \$11,000-per-well head price, British Petroleum began introducing methane-catching devices on New Mexico well sites. From 2000 to 2004 emis-

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Gas Type/Name	Chemical Composition	Typical Analysis (mole %)
Methane	CH ₄	87 - 96%
Ethane	C ₂ H ₆	1.5 - 5.1%
Propane	C ₃ H ₈	0.1 - 1.5%
iso - Butane	C4H10	0.01 - 0.3%
normal - Butane	C4H10	0.01 - 0.3%
iso - Pentane	C5H12	trace - 0.14%
Normal - Pentane	C5H12	trace - 0.04%
Hexanes plus	C6 H14	trace - 0.06%
Nitrogen	N ₂	0.7 - 5.6%
Carbon Dioxide	CO ₂	0.1 - 1.0%
Oxygen	O ₂	0.01 - 0.1%
Hydrogen	H ₂	trace - 0.02%

sions there dropped 50 percent, and by 2007 they had essentially ended. $^{\rm n}$

Over the long-term, FMI expects growth in the construction of gathering lines to be directly related to the upstream gas sourcing and drilling efforts. More stringent environmental and permitting requirements will slow or lengthen this effort. According to Neil Ellerbrook, chairman and CEO of Vectren Corp., "Our industry will probably see more regulation, especially in the area of access to new natural gas supply. On the other hand, given the fact that our customers have been leaders in energy efficiency and conservation for the past 40 years, we are well positioned...."¹²

for FERC, 2009 had 172 miles of transmission pipe approved for construction and was a slow year compared to 2008, in which 2,140 miles were approved. Many of the larger projects that fall under FERC jurisdiction follow multi-year timelines, and therefore construction activity cannot always be directly tied to permitting. Wright said the recent decline is likely a result of the market catching up from the blazing rate of permitting, approval, and construction activity over the past few years, and he is optimistic that 2010 will be much stronger. There are currently 2,600 miles of pipeline under review or in pre-filing stages.

Rock-bottom natural gas prices and expanding domestic supply result in varied construction activity. Though extraction activity has slowed as the natural gas price has fallen, pipelines are still being constructed to support additional generation capacity from a cheap, relatively clean fuel source. The various forms of natural gas have very few or only one carbon

atom, making it the cleanest fossil fuel in terms of carbon emissions (Exhibit 6). More than 17,000 of the 27,000 miles of pipeline planned or under construction before 2012 will transport natural gas.¹⁴ Domestic pipeline construction is driven by low commodity prices, which slow some distribution construction but accelerate gas use in power generation. Many 2009 projects, however, have been pushed to 2010 due to the economic downturn, declining energy demand, and financial constraints (Exhibit 7). Case in point, U.S. crude oil production for the month of October 2009 averaged 5.36 million barrels per day, a five-year low last seen in 2005.¹⁵

Pipeline owners and operators are particularly wary of the federal government's more widespread regula-

Gas Transmission

Transmission and largediameter pipe will see 6 to 10 percent growth, particularly to support the natural gas fired power generation market. As of fall 2009, 74 natural gas-fired generation projects valued at more than \$20 billion were scheduled for construction kickoff during 2010 alone.¹³ Many of these will require significant pipeline construction to supply the facility with fuel.

Much of the current spending for 2010 is carry-over projects begun in previous years. According to Jeff Wright, director of energy projects

Exhibit 7

Large diameter natural gas pipeline projects:

- Rockies Express (REX): At over 1,600 miles, REX is one of the longest natural gas pipelines in North America. Construction was completed in late November 2009 by a consortium that included Kinder Morgan Energy Partners, Sempra Pipelines & Storage and ConocoPhillips. The \$6.8 billion project carries 1.6 Bcf/d, or enough to heat 4 million homes.
- Rockies Alliance Pipeline (RAP): This 1.3 Bcf/d pipeline proposed by Questar and Alliance Pipeline Inc. has a proposed timeline that includes FERC application in 2010, construction start in spring 2011 and an online date of October 2012.
- Ruby Pipeline: This \$3 billion pipeline submitted its initial application to Federal Energy Regulatory Commission (FERC) in January 2009 with construction planned for sometime in 2010. El Paso Corp. owns the 1.5 Bcf/d pipeline that brings gas from the Rockies to supply west coast utilities. The project has a stated goal is to be "carbon neutral" in construction.
- Appalachian Gateway Project: Dominion is in pre-filing process for the \$600 million project, with construction scheduled to begin in 2011.
- Mackenzie Valley Pipeline: Still in the planning stages, the outlook is optimistic for this multi-billion dollar
 pipeline. It will bring an estimated 1.2 Bcf/d of natural gas from Mackenzie Delta in Northwest Territories
 to southern Canada and the United States.

Source: Ives, Buddy, "Pipeline Activity May Slow But Won't Be At Crawling," Pipeline & Gas Journal, March 2009.

tion of emissions. The EPA's final rule on who has to report greenhouse gas emissions leaves out interstate pipelines, but it remains unclear as to whether the pipeline industry will be mentioned specifically in yetto-be published requirements. Pipelines generate greenhouse gases from at least two sources: the engines that run compressors and the methane from the compressor itself.

Liquids and Crude Transport

Canada is becoming an increasingly important trading partner as the U.S. looks to hit the previous President's goal of reducing foreign oil imports by 75 percent by 2025. Currently, Canada is the largest source of crude and crude product imports to the U.S., and the only supplier that sends oil over land.¹⁶ Once reaching the U.S., the vast majority of movement of crude is via pipeline (Exhibit 8). The Alberta Clipper Pipeline project has received approval from U.S. State Departments and construction has begun on the \$3 billion project from Hardisty, Alberta, to Superior, Wis. The 672-mile Canadian leg is already mechanically complete, and the pipeline will go into service when construction has finished on the remaining 328 miles in the U.S.

The \$12 billion Keystone pipeline is currently under



construction to bring oil from the oil sands of northeastern Alberta to refineries in Patoka, Ill., and Cush-Continued on page 16



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ing, Okla. The Illinois leg is complete, and work is progressing on the Oklahoma leg. $^{\rm 17}$

Communications

FMI forecasts 2009 will close with communication construction spending down 35 percent, as compared to 2008 (Exhibit 10). This drop of nearly \$9 billion in put in place work is not unexpected and is projected to continue into 2010 with an additional drop of 9 percent. As we discussed in last year's utility construction outlook, these relatively wild swings in communications-related spending are not unexpected as the communications market tends to amplify broad economic swings because of the quick-turn and fast-pace of many communications infrastructure projects.

Mobile infrastructure will likely lead the way as communicationrelated construction looks to rebound. According to a new report by ABI Research¹⁸, even under the worst recovery scenarios mobile service revenues should continue to grow at roughly 1.2 percent annually through 2014.¹⁹ Even communications construction growth

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Exhibit 9 Top 10 Wireless Cities

- 1. Tallinn, Estonia
- 2. Seoul, South Korea
- 3. Taipei, Taiwan
- 4. Singapore City
- 5. Paris, France
- 6. London
- 7. Stockholm, Sweden
- 8. Hong Kong
- 9. San Francisco
- 10. Sao Paulo, Brazil

Source: Alvssa Danigelis. DiscoveryTech

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Market Forecast

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will not occur without governmental impact, however, as stimulus packages bolster Asian-Pacific communications firms thereby increasing their ability to compete in North America. Exhibit 9 illustrates the United States' lackluster performance in linking the country wirelessly, with only one city making DiscoveryTech's "Top 10 Wireless Cities." The list was compiled by surveying attendees at the 2008 International Summit for Community Wireless Networks.

As more funding continues to encourage smart grid build out, competition for the communications aspect of these projects will increase. Major defense contractors are leveraging their experience in setting up secure military communications to provide similar services for domestic utilities. Last summer, for example, Southern California Edison named Boeing a "security partner" on a \$62 million project to connect a 32 MW energy storage facility to the grid. Lockheed Martin, too, is involved with eight utilities positioning themselves for DOE funds. In particular, they are chasing a \$150 million project proposed by AEP and a \$38 million pilot project by PPL Electric Utilities in Harrisburg, Pa.²⁰

Two firms sure to make headlines for their ambitious infrastructure upgrades in 2010 are Verizon and Clearwire. This year Verizon will complete the first phase of its massive system upgrade to FiOS, and BroadbandDSLReports.com said there may be a delay before the next phase of construction begins. Karl Bode, a frequent writer and blogger on broadband topics, explained, "We're seeing every indication that Verizon wants to pause and try to ramp up subscriber uptake in the areas they've deployed to before building out further."²¹ Over the past five years Verizon has invested more than \$17 billion in its communications grid. The mobile WiMax firm Clearwire LLC may be even more ambitious than Verizon in 2010, with the goal of 120 million users by year end. This will require quadrupling its current footprint. Clearwire CTO John Saw said, "We just raised another \$2.8 billion, and I'm going to spend all of it."²²

Conclusion

Your view of the power and communication construction market depends on two characteristics: where you sit geographically and your ability to understand what energy asset owners and operators and cable and telecom system operators will need. Economic conditions are improving and financial constraints are easing, but the uncertainty of governmental influence is raising the risks and challenges in this market. Owners of energy and communications infrastructure will tend to be more conservative and focused in their spending habits over the next two years, while designers and contractors will need to have clarity about the direction, velocity, and behavior of the markets they serve. One size will not fit all in the power and communication markets over the next two to three years, and FMI encourages firms to take the time to understand the dynamics of governmental oversight and regulation, funding availability, and economic demand factors on the markets they serve.

Unlike many private companies, utility, cable, and telecom owners have long been guided by govern-

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mental and regulatory pressures. Perhaps this is why Americans who revile at the thought of state-controlled enterprise in industries such as banking and insurance are happy to put pressure on Washington to improve our nation's utility and telecom infrastructure. In closing, this quote from President John F. Kennedy reminds us of the unique government and regulatory environment that utilities, telecom companies, and the design and construction firms that serve them will be forced to navigate: "Washington is a city of Southern efficiency and Northern charm."

Mark Bridgers and Dan Tracey are consultants with FMI Corp., which provides management consulting, training, and investment banking services to the worldwide construction industry. They can be reached at (919) 785-9351 or mbridgers@fminet.com. For more information, visit www.fminet.com.

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neers engaged in exploration for and development of natural gas within the area. Every effort is made to recruit the most knowledgeable experts because they are responsible for preparing resource estimates for each of the geologic provinces within their area. Natural gas recoverable from coal seams is evaluated through joint efforts of the AWCs and a Coalbed Methane Work Committee. More information on the group can be obtained at http://geology.mines. edu/pgc/aboutpgc.html.

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Contract Review: An Important but Often Overlooked Aspect of Bidding

By Gregory T. Spalj

he pre-bid stage of a construction project involves many forms of inquiry, fact gathering, and analysis, all designed to determine the digits to the left of the decimal point in the lower righthand corner of the last page of the bid form. Contractors may conduct site investigations, review technical specifications for the work, evaluate the financial results of previous, similar work, and solicit quotes from subcontractors and suppliers. But one often-overlooked aspect of determining the appropriate price for construction work is a review of the terms of the construction contract. The terms and conditions in the contract can have a profound impact on the costs of construction and the payment therefor.

While a review of the proposed contract by the contractor's construction lawyer is always advisable, often the size of the contract may not justify the expenditure associated with a comprehensive legal analysis of the risks. There are, however, certain general contract provisions that substantially increase a contractor's risk and therefore deserve special attention when determining the appropriate price for the work. If the job is a significant one for the contractor, the contractor should send the proposed contract to its construction lawyer for review

and ultimate negotiation with the owner.

Even in the rare case where the owner may refuse to negotiate its contract terms, a legal review will alert the contractor to risks that it is undertaking on the project so that the price can be adjusted accordingly. Those of you who have heard me speak or have read papers I have authored on the "art" of contract negotiation know that I consider it a form of risk brokering. In a perfect world, risks would be assumed based on who controlled the likelihood of their materializing and who could, therefore, best protect against the risk. In other words, the financial consequences of a risk controlled by an entity should be borne by that entity and no other, and the risk no one controls should be insured against. Risks involving more than one parties' conduct should be shared according to fault.

But in reality, what generally happens in contract negotiation is that the owner attempts to shift as much risk as possible on the contractor, and the contractor in turn tries to pass as much of that risk to subcontractors and suppliers as it can. Consequently, savvy contractors will review the contract terms and object to unacceptable terms before submitting a bid. If the owner refuses to negotiate (or is a governmental entity that cannot negotiate) and if the

project's contract terms pose greater risk to the contractor, the contractor should expect a greater reward, and therefore the contractor's price should be adjusted upward. For example, if the contract contains a differing site conditions clause, the contractor may lower its price because the contractor knows that, should subsurface conditions differ from those anticipated, the contractor may demand that the owner pay the ensuing extra costs. (More about that later in this article.) The key here is: read the contract terms. You cannot make intelligent decisions without "intelligence," which in this case means reading the contract you are being asked to sign.

Legal Watc

What follows is a short list of the more important terms and conditions found in many construction contracts and subcontracts—and some that are implied by the courts regardless of the language of the contracts—to which the contractor should at least pay attention in the pre-bid stage of construction contracting.

Flow Down Clauses

The project owner can exert its influence on contract terms between the contractor and its subcontractors by including a contract provision requiring the contractor to bind its

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Legal Watch

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subcontractors to the terms of the general contract. A typical provision, found in many industry standard forms, will read something like this:

The contractor shall require each subcontractor, to the extent of the work to be performed by the subcontractor, to be bound to the contractor by the terms of the contract documents, and to assume toward the contractor all the obligations and responsibilities which the contractor, by these documents, assumes toward the owner and the architect. All subcontracts shall preserve and protect the rights of the owner with respect to the work to be performed by the subcontractor so that the subcontracting thereof will not prejudice such rights. All subcontracts shall allow to the subcontractor, unless specifically provided otherwise in the contractor-subcontractor agreement, the benefit of all rights, remedies and redress against the contractor that the contractor by these documents, has against the owner. Where appropriate, the contractor shall require each subcontractor to enter into similar agreements with his sub-subcontractor.

The effect of this clause, when combined with the subcontract provisions discussed below, is to bind the subcontractors to the terms of the general contract. These clauses are important for two reasons. First, contractors must obtain agreements with their subcontractors that actually incorporate the terms of the general contract into the subcontract. Otherwise, the general contractor will find itself bound to the owner for the failure of its subcontractor to perform, but without a corresponding remedy against the subcontractor. Second, the subcontractor must be aware of such a provision and ascertain that the terms of the general contract are acceptable.

Differing Site Conditions and Site Investigation Clauses

Most contracts attempt to allocate the responsibility for extra costs

resulting from unexpected site conditions to the contractor, the owner, or both. A typical differing or changed condition clause would read something like this:

Should concealed conditions encountered in the performance of the work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract, be encountered, the contract sum shall be equitably adjusted by change order upon claim by either party made within 20 days after the first observance of the conditions.

Differing or changed conditions clauses were developed by the federal government so that its contractors did not have to bid "worse-case scenario" for risks that might lurk underground. The theory is that if there is a mechanism for allowing a price adjustment if conditions differ from what should have been anticipated, then the contractor can bid a lower price as it has less risk of the unexpected.

However, these clauses are usually coupled with a site investigation clause requiring the contractor to do its homework and preventing a contractor from recovering any compensation for differing or changed conditions that would have been disclosed had the contractor performed an investigation beforehand:

By executing the contract, the contractor represents that he has visited the site, familiarized himself with the local conditions under which the work is to be performed, and correlated his observations with the requirements of the contract documents.

Incorporation by Reference Provisions

Your initial task is to determine exactly what documents and clauses are included in your contract. Exactly what is incorporated into a particular contract varies between the different standard form contracts and may be modified or altered in any given situation. For example:

The Instructions to Bidders, the Proposed Description of Assembly Units, Material and Construction Specifications, Construction Sheets, Special Drawings, and Plans are hereby by reference incorporated herein and together with the Construction Agreement constitute the Contract.

A document incorporated by reference into a contract is just as much a part of the contract as any of the language in the contract itself. Such documents are equally binding and should be reviewed by the contractor prior to bidding.

This is especially significant in federal government and federally funded construction contracts. These agreements often incorporate by reference specific regulations, statutes, and contract clauses that are published in the *Federal Register*. The text of these clauses is frequently omitted from the bid documents or contract documents, but because of the "Incorporation by Reference" clause in the contract, the contractor will be bound in accordance with their terms.

Subcontractors should be particularly careful of the incorporation by reference clause. Many standard subcontract forms say that the subcontractor acknowledges receipt of the general contract, the General Conditions, plans, and specifications and that the terms of those documents are to be incorporated into the subcontract to the extent they apply to the subcontractor's work. There are many risk shifting clauses typically found in the General Conditions, and the subcontractor should insist upon receiving and carefully reviewing these documents before incorporating their terms into the subcontract.

Indemnification Clauses

The owner usually attempts to require the contractor to indemnify the owner for all losses incurred related to the construction work. Unsurprisingly, owners prefer to make the contractor liable for anything and everything that happens on the job related to the project. For example:

The Contractor shall indemnify and hold the Owner, its employees, agents, officers and other contractors, harmless from any and all claims, suits, liabilities or actions of any kind arising out of or relating to the work of the Contractor and its agents, officers, employees, and subcontractors and suppliers at any tier.

Such a clause can put all liability onto the contractor even for problem caused by or otherwise the responsibility of the owner. For example, assume that the owner's representative drives his truck into a backhoe of the contractor and is injured. As the liability for the employee's claim "relates to the work" of the contractor, the contractor would be liable for all damages regardless of the fact that the owner's employee may have been negligent.

The effectiveness of such indemnification provisions is limited by many statutes that render indemnification agreements unenforceable to the extent that they attempt to shift liability from a negligent party to a non-negligent party to a construction contract. It is important to note, however, that this limitation may be overcome if the contracting parties provide for effective insurance coverage for indemnity.

Contractors should avoid these all-

inclusive indemnity clauses. Instead, liability for claims on a construction project should be allocated based on fault. In other words, if the owner or its agents are 90 percent at fault and the contractor is 10 percent at fault, the contractor should only be required to pay 10 percent of the loss. This is an equitable division of liability that encourages each party to control all risks in their own power.

No Damages for Delay Clauses

An owner will frequently attempt to limit its liability to the contractor for delay damages by including

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Legal Watch

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a clause in the contract that merely allows the contractor to receive an extension of time and no monetary damages for owner-caused delay. A typical provision is as follows:

If the contractor is delayed by the owner or architect or any agent or employee of either, the contractor's sole and exclusive remedy for the delay shall be the right to a time extension for completion of the contract and not damages. This provision does not preclude the owner's recovery of damages for contractor-caused delay under other provisions of the contract documents.

Most of the standard contract forms do not include a clause limiting the contractor's recovery of damages for delay. "No Damages For Delay" clauses are generally enforceable, but they are strictly construed by the courts. The contractor may circumvent such a clause and recover additional damages if the delay (a) was not contemplated by the parties, (b) amounted to an abandonment of the contract by the owner, (c) resulted from the owner's bad faith or arbitrary action, or (d) resulted from the owner's active hindrance or interference with the contractor's work.

Notice Requirements

If a contractor is going to recover extra compensation or time extensions from the owner, it must comply with contractual notice requirements. Every contract requires the contractor to provide the owner with some type of notice for various claims, and the contractor should be careful to adhere to these notice provisions. Notice provisions vary, so identify and be familiar with the ones in your particular contract. Pay particularly close attention to those claims for which notice is usually required, including differing site conditions, changes, and delays. Also determine how much notice the owner must

give the contractor if it wishes to take over the work or terminate the contract.

Like all contract provisions, notice obligations may be waived or modified by conduct or informal agreement. For instance, the owner's actual knowledge of and acquiescence in the work has been held by the court to impliedly waive the notice requirement. Other instances in which the notice requirement has been waived include: (1) a course of dealing that repeatedly disregards the requirement, (2) a promise to pay for extra work orally requested by the owner and performed in reliance upon the promise, or (3) any other actions or omissions by the owner inconsistent with an intent to insist upon the requirements. However, it is never advisable for a contractor to neglect to comply with notice requirements in the expectation that a court will conclude that the owner waived its right to notice. A legal case is an expensive proposition, particularly when it is a case for waiver of clear contractual notice requirements based on he-said-shesaid oral evidence.

Pay-When-Paid and Pay-If-Paid Clauses

The general rule is that, as between the contractor and the subcontractor. the contractor bears the risk of an owner's insolvency or an architect's refusal to certify an application for payment. This rule flows from the relationship between the parties. The contractor is in privity of contract with the owner and thus is in a position to protect itself from the risk of late payment or insolvency through the use of contract clauses, guarantees, and similar devices. A subcontractor, in contrast, is not in privity with the owner and therefore is not able to protect itself from the owner's late payment or insolvency.

Contractors have attempted to shift the risk of the owner's late pay-

ment or insolvency to subcontractors through the use of "pay-if-paid" clauses. In most jurisdictions a payif-paid clause will be effective only if written in unequivocal, unambiguous language. An effective pay-ifpaid clause would likely be created by the following: "Payment by the owner to the general contractor is a condition precedent which must occur before the general contractor will be obliged to pay the subcontractor. The subcontractor hereby assumes the risk of the owner's insolvency or of late payment by the owner to the general contractor and agrees that payment to the subcontractor will be made only with funds received by the general contractor from the owner in payment for work performed by the subcontractor."

If clear and unambiguous language is not used, the courts will likely interpret the clause as a "paid-when-paid" clause, meaning only that the contractor will pay the subcontractor either after it gets paid by the owner *or* within a reasonable period of time after the subcontractor's payment application. This is more a matter of the timing of payment as opposed to the right to it.

Termination Clauses

Termination clauses also vary considerably from contract to contract. A typical termination provision provides for termination by the contractor and the owner as follows:

Termination by the Contractor

If the work is stopped for a period of 30 days under an order of any court or public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the contractor or a subcontractor or their agents or employees or any other persons performing any of the work under a contract with the contractor, or if the work should be stopped for a period of 30 days by the contractor because the architect has not issued a certificate for payment . . . or because the owner has not made payment thereon..., then the contractor may, upon seven additional days' written notice to the owner and the architect, terminate the contract and recover from the owner payment for all work executed for any proven loss sustained upon any material, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

Termination by the Owner

If the contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the contract documents, then the owner, upon certification by the architect that sufficient cause exists to justify such action, may, without prejudice to any right or remedy after giving the contractor and his surety, if any, seven days' written notice, terminate the employment of the contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the contractor and may finish the work by whatever method he

deems expedient. In such case the contractor shall not be entitled to receive any further payments until the work is finished.

Termination clauses are important because of the significance of their impact and the finality of their effect. Contractors must be aware of the notice provisions in termination clauses when developing their agreements with subcontractors. The contractor should allow itself ample time to cure a subcontractor's default before the owner is permitted to terminate the general contract.

Greg Spalj is a member of the PCCA and represents many of its members. He has a national law practice representing construction contractors. He can be reached at (612) 359-7631 or gspalj@fwhtlaw.com.

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New USDA Broadband Funds Focus on Middle- and Last-Mile Projects

griculture Secretary Tom Vilsack in January announced the selection of 14 broadband infrastructure projects that will receive more than \$309 million through funding made available by the American Recovery and Reinvestment Act. An additional \$3.5 million in private investment brings the total to more than \$313 million. Altogether, Congress awarded USDA \$2.5 billion in Recovery Act funding to help bring broadband services to rural unserved and underserved communities.

Below is a complete list of recent Recovery Act Broadband award recipients by state.

Alaska

• Southwestern Alaska, United Utilities, \$43,982,240 grant and \$44,158,522 loan. The funding will provide middle-mile connectivity to 65 communities.

Alabama

• Butler, Butler Telephone Co., Inc., \$3,892,920 grant. The funding will provide high-speed DSL broadband service to remote, unserved households within its rural service territory. The system is being built so that it can be easily upgraded to accommodate future services.

California

• San Joaquin, Tranquillity, and Fresno, Audeamus, \$2,741,505 grant and \$2,741,505 loan. The proposed project is a fiber-based broadband infrastructure for the unserved and underserved communities in this service area. A last-mile project, it will provide access to approximately 1,500 households, local businesses, and anchor institutions in the communities.

lowa

- Meriden and Archer, C-M-L Telephone Cooperative Association, \$1,519,225 grant and \$1,519,225 loan, \$1,525,315 in matching funds. Funding will provide services via a fiber optic network to rural communities with high-speed internet exceeding 20 Mbps.
- Bennett, Delmar, and Lowden, F & B Communications, Inc., \$1,609,162 grant and \$1,628,588 loan.

Funding will provide services via high-speed fiber optic network with speeds exceeding 20Mbps. System will allow for expansion at a future date.

Springbrook, LaMotte Telephone Company, \$187,815 grant and \$187,815 loan. The funding will provide services from a 300-foot tower and Wi-Max installation for wireless broadband service in the surrounding area.

Kansas

• Western Kansas, Rural Telephone Service Co., Inc., \$49,588,807 grant and \$51,612,842 loan. Funding will provide service in an area 99.5 percent unserved/underserved and provide a rural infrastructure required for economic stability, education, and healthcare. The company is a cooperative and RUS partner on 32 other projects. It leads a team of seven companies with this shovel-ready project.

Tennessee

• Northern Tennessee, North Central Telephone Cooperative, Inc., \$24,715,709 grant and \$24,964,000 loan. The funding will provide the necessary infrastructure to provide advanced voice, video, and data services that exceed 20Mbps to remote and rural communities in the service area.

Louisiana

 Morehouse Parish, Northeast Louisiana Telephone Company, Inc., \$4,359,000 grant and \$8,124,600 loan. Funding will provide an active Ethernet system with symmetrical speeds of 20 Mbps. The system will be using buried fiber to the premise.

Missouri

• Ralls County, Ralls County Electric Cooperative, \$9,548,908 grant and \$9,548,909 loan. Funding for this project will provide a fiber optic network to residential and commercial members and the underserved safety and anchor agencies in the service area. This is a State of Missouri demonstration project, and non-proprietary data will be shared.

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North Dakota

- Burleigh County, BEK Communications Cooperative, \$1,986,473 grant and \$2,016,571 loan, \$2,016,572 in leveraged funds. The funding will provide fiber-to-the-premises broadband service to underserved homes and anchor institutions. This will aid business growth and support public safety in rural areas highly dependent on internet business income.
- Traill County, Halstad Telephone Company, \$2,027,600 grant and \$2,027,600 loan, \$10,000 in leveraged funds. The funding will provide fiber-to-the premises broadband service to unserved homes and businesses in Traill County.

Oregon

• Marion County, Gervais Telephone Company, \$314,430

grant and \$314,430 loan. This project extends Gervais Telephone Company's existing fiber network by building out from the nearest fiber splice point through the funded service area. This project will provide broadband connectivity to residential and business end users, as well as to four anchor institutions.

Virginia

• Alleghany County, NTELOS Telephone Inc., \$8,062,088 grant and \$8,062,088 loan. The funds will provide broadband infrastructure to unserved and underserved homes, businesses, and critical community institutions in this rural county. A fiber-based project, it will enable work-from-home jobs and foster economic development and improve health, education, and public safety services.

Commerce Department Awards Broadband Funds

he Department of Commerce's National Telecommunications and Information Administration (NTIA) recently announced grants totaling \$63 million to expand broadband access and adoption in Massachusetts, Michigan, and North Carolina. Funded by the American Recovery and Reinvestment Act, NTIA's Broadband Technology Opportunities Program (BTOP) provides grants to support the deployment of broadband infrastructure in unserved and underserved areas, enhance and expand public computer centers, and encourage sustainable adoption of broadband service. These investments will help bridge the technological divide, boost economic growth and create jobs, NTIA said.

"High-speed internet access is the lifeblood of today's economy," Commerce Secretary Gary Locke said. "Having access to the internet's economic, health, and educational benefits should be as much of a fundamental American right as attending a quality school. Our best minds should be able to talk to one another, create and innovate regardless of where they come from. These grants are an important step toward expanding high-speed internet access into the unserved and underserved areas of the country."

NTIA received nearly 1,800 applications during the first BTOP funding round and is currently awarding grants on a rolling basis. NTIA has awarded 15 grants totaling approximately \$200 million under the program.

BTOP grants fall into one of three categories. Infrastructure grants build and improve connections to communities lacking sufficient broadband access. Public computer center grants expand computer center capacity for public use in libraries, community colleges, and other public venues. Sustainable broadband adoption grants fund innovative projects to increase broadband subscription levels in areas or among population groups where the technology has traditionally been underutilized.

The following grants were announced:

- Massachusetts, University of Massachusetts-Lowell: \$780,000 broadband adoption grant with an additional \$196,000 in applicantprovided matching funds to promote broadband awareness and computer literacy among vulnerable populations.
- Michigan, Merit Network, Inc.: \$33.3 million infrastructure grant with an additional \$8.3 million in matching funds to build a 955mile advanced fiber-optic network through 32 counties in Michigan's Lower Peninsula. The project also intends to directly connect 44 community anchor institutions and will serve an area covering 886,000 households, 45,800 businesses, and an additional 378 anchor institutions.
- Michigan, Michigan State University: \$895,000 public computer center grant with an additional \$235,000 in matching funds to expand 84 existing library computer

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centers and establish four new computer centers.

• North Carolina, MCNC: \$28.2 million infrastructure grant with an additional \$11.7 million in matching funds and in-kind contributions to build a 494-mile middle-mile broadband network passing almost half the population of North Carolina in 37 counties. The network will build new rings in the western and eastern regions of the state, which will connect to 685 miles of existing infrastructure in the urbanized central region, expanding the reach of the North Carolina Research and Education Network, an established broadband service for community anchor institutions in the state. NTIA recently announced that a second round of BTOP applications will be accepted through March 15.

FERC Explores Efficient Integration of Renewables into the Grid

he Federal Energy Regulatory Commission (FERC) announced in January that it is taking a fresh look at regulatory policies to integrate the rapidly increasing number of variable energy resources into the nation's power grid in the most efficient and non-discriminatory manner while maintaining power system reliability.

FERC issued a Notice of Inquiry seeking public comment on whether to reform any of its rules or procedures as the nation's generation portfolio expands to include more variable energy resources such as wind, solar, or non-storage hydro generating plants. Growing use of these types of facilities presents unique challenges to the electric power industry, such as location constraints and limited ability to dispatch, but also offers benefits such as low marginal energy costs and reduced greenhouse gas and other emissions.

"We are seeing a rapid expansion in the use of renewable energy technologies around the country that have the potential to reduce greenhouse gas emissions and electricity costs for consumers," FERC Chairman Jon Wellinghoff said. "To accommodate that expansion, it is our job to ensure that FERC has in place the market and operational reforms necessary to ensure that all wholesale electricity tariffs are just, reasonable, and not unduly discriminatory."

Commenters should take a broad look at the issues concerning the integration of variable generation resources and should address any effects of variable energy resources on the following subject areas:

- Data and reporting requirements, including accurate forecasting tools,
- Scheduling flexibility and incentives for accurate scheduling of variable energy resources,
- Forward market structure and reliability commitments,
- Balancing Authority Area size and coordination,
- Suitability of reserve products,
- Capacity market reforms, and
- Redispatch and curtailment practices.

FERC Approves Florida Gas Expansion Project

he Federal Energy Regulatory Commission (FERC) recently approved Florida Gas Transmission's (FGT) \$2.45 billion Phase VIII Expansion Project to serve natural gas-fired electric generators and utilities in Florida.

In authorizing the project, FERC imposed 43 conditions requiring FGT to mitigate any potential adverse environmental impacts identified by FERC staff after its analysis of the proposal.

FGT will add more than 483 miles

of pipeline loops, laterals, and mainline and install 213,600 horsepower of compression at eight existing and one new compressor stations. The company also will acquire the existing 22.7-mile Martin Lateral, currently owned by Florida Power & Light Company (FPL), that will serve power plants located in Manatee, Martin, Miami-Dade, and Suwannee counties. The expansion will create 820,000 MMBtu per day of capacity on FGT's system from Alabama to Florida. FGT will initiate service in two phases timed to meet customers' energy needs. The Phase 1 facilities are scheduled to begin service by July 1, 2010, and involve construction and operation of the Manatee Lateral and the FPL Manatee Metering and Regulating Station to serve FPL's Manatee Power Plant in Florida.

Phase 2 service is scheduled to start by April 1, 2011. It involves construction and operation of the remaining Phase VIII Expansion Project facilities.

Report Says Stimulus Spending Won't Significantly Help Households Without Broadband

nalysis of most recent FCC data (January 2008) reveals that about 45 million of the more than 117 million U.S. households have no internet service and when "no internet" households are added to those households using dial-up to reach the internet, the number of non-broadband households approaches 58 million, according to a new market research study from the Insight Research Corporation. These 58 million nonbroadband households represent 49 percent of the households in the U.S.

According to Insight Research's market analysis study, "Rural Versus Urban Telecommunications in the US: Changes in Markets and Technologies, 2009-2014," projecting the FCC 2008 data to year-end 2009 and taking into account further broadband penetrations, it is estimated that 40 million households will still lack broadband access at the close of 2014. Current federal stimulus spending of \$6.4 billion would allow for an investment of \$164 per household to provide broadband access to the non-broadband households. The availability of such a small investment amount per household casts serious doubt that any significant expansion of broadband access will result from this government action. This position is further bolstered by the argument that, at the current estimate of \$1,500 per household, at

least \$60 billion would be needed to deploy universal broadband access.

"Certainly the current administration recognizes the direct relationship between extending broadband access to all Americans and the future health of our economy, but the current allocation of funds is just not going to get the job done," said Robert Rosenberg, president of Insight Research. "Our analysis found that a substantial portion of the 49 percent without broadband had no computers in their homes. There is a chicken and egg problem here that needs to be considered by our policy-makers."

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FCC Identifies Critical Gaps in Path to Future Universal Broadband

he task force gathering data and developing draft proposals for the Federal Communications Commission's National Broadband Plan has identified critical gaps in the nation's policies, programs, and practices that must be filled before America can take advantage of the technological advantages that universal adoption and deployment of affordable, robust broadband can bring. These gaps range across all elements of the broadband ecosystem, including networks, applications, devices, and end-user adoption.

The task force developed the list of challenges from data gathered in a series of nearly 40 workshops and field hearings, from more than 10,000 comments on the National Broadband Plan Notice of Inquiry and 15 public notices, and in the analysis of existing studies and data. The process of gathering and analyzing information is ongoing and includes a new survey commissioned by the task force that will, for the first time, provide extensive data about households that don't adopt broadband.

The task force is developing a range of options for consideration by the commission for bridging the gaps in the pathway to universal broadband. The FCC is required by the American Recovery and Reinvestment Act of 2009 to submit the National Broadband Plan to Congress by February 17.

Following are key gaps identified by the task force.

Federal Universal Service Fund (USF) Structure

Doesn't support broadband deployment and adoption despite more than \$7 billion spent to subsidize telecommunications annually

- **1.** The majority of USF funding supports affordable phone service, not broadband.
- 2. The four USF programs (high-cost support for rural phone service, support for advanced services in schools and libraries, support for phone service to low-income families, and rural health care support) are not coordinated to maximize deployment opportunities to fill broadband gaps.
- **3.** High-cost funding mechanism rewards inefficiency and funding not determined by broadband needs.
- **4.** An unsustainable funding mechanism and increased demands for support have doubled the amount paid by consumers since 2000.
- **5.** Accountability is limited for use of high-cost fund for broadband support.

Broadband Adoption Gap

Increases the cost of digital exclusion to society

- **1.** Broadband adoption levels vary widely across demographic groups.
- 2. Nearly 90 percent of families with incomes of \$100,000 or more subscribe to broadband services, compared to 35 percent with incomes of \$20,000 or less.
- **3.** Rural households are less likely to subscribe than urban households.
- **4.** Only 40 percent of Hispanic households subscribe, followed by 46 percent of African-American households, while 65 percent of white households subscribe.

Consumer Information Gap

Undermines competition, innovation, and choice

- **1.** Consumers lack information about actual performance of their broadband service compared to the advertised speeds.
- **2.** Consumers can't accurately compare performance of competing service.
- **3.** Application providers lack knowledge of network performance, dampening innovation.

Spectrum Gap

Frustrates mobile broadband growth

- **1.** Smart phone sales are expected to overtake standard mobile phones by 2011.
- 2. Smart phone subscriptions have increased by 690 percent since 1998, while over-the-air TV viewer-ship decreased by 56 percent.
- **3.** Identifying available spectrum, reallocating it, and assigning it is often a long, multi-year process.
- **4.** Spectrum is also critical for public safety, telemedicine, smart grid, and civic engagement applications.

Deployment Gap

High costs can limit broadband deployment

- 1. "Middle mile" costs for transit and transport of internet traffic can cost rural providers up to \$150 per subscriber annually, almost three times as much as network operations, and can be a serious barrier to rural broadband.
- **2.** The lack of efficient coordination when digging trenches for fiber and other expensive infrastructure

costs dramatically increases the cost of deployment.

- **3.** Other outside plant costs, including pole attachments, also drive deployment gap.
- **4.** Deployment gaps for access to advanced, highspeed broadband occur in the small business market marketplace, in rural areas, and to consumers in many residential neighborhoods across the nation.

Television Set-Top Box Innovation Gap Hinders convergence, utilization, and adoption

- 1. The convergence of video, TV, and internet protocol-based technology is creating a new broadband medium that could drive adoption and utilization.
- **2.** Lack of devices is a major barrier for adoption: 99 percent of U.S. households have a TV versus 76 percent with PCs.
- **3.** Retail navigation device and set-top-box market competition has not emerged, limiting innovation.

Personal Data Gap

Users need to control their own information

1. Personal data is increasingly digitized and moving to the internet "cloud."

- **2.** Users have little control over their personal information.
- **3.** Ensuring privacy and security will enable a new generation of applications and improve top national priorities that would benefit by secure but accessible personal information.

Harnessing broadband to achieve key national purposes (better health care, education, government performance and civic engagement, economic opportunity, public safety, improvements in energy conservation and environmental protection) requires better connectivity, although the level of connectivity necessary depends on the nature of the institutions and applications.

Achieving these goals, however, will also require a broadband ecosystem that provides people with training and support in digital skills, ready access to computers and mobile devices, better applications, better security, and other needs. Further, the ecosystem requires that incentives be aligned to encourage the use of broadband applications; today, there are a number of rules that discourage the use of broadband.

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NIOSH Update: Aging Workers at Higher Risk of Death, Severe Injury

report of conference presentations and discussions among participants from the National Academies of Science, universities and research institutions, and representatives of professional associations, industry, and labor recommends attention to workplace environments to maintain "work ability" as workers age, along with legislative fixes and research to fill in knowledge gaps for keeping workers healthy and productive.

According to researchers using U.S. Bureau of Labor Statistics (BLS) data, older workers are more severely injured and die with greater frequency from work-related injuries than younger workers. Older workers also have longer recovery periods than younger workers. These findings raise health care delivery and economic issues for the nation, as more workers are choosing to delay retirement due to collapsed 401 (k) plans and savings. BLS uses workers age 55 and older in its calculations, although the rates rise sharply for those workers over age 65. Other agencies and organizations define the term as age 50 or 55 and up. The Department of Labor uses age 40 as a starting point for "older worker."

"The issue of healthy aging is critically important as the U.S. economy is revitalized," said National Institute for Occupational Safety and Health Director John Howard, M.D. "As we go forward in time, the demand for workers will grow, but fewer workers will be entering the workforce and a larger proportion of the workforce will be older. This is a simple reality of demographics. Having a healthy, productive workforce will help sustain economic growth in the decades ahead. We must take steps now to help all workers stay safe and healthy at work as they age. We must also take steps to address the special needs of older workers who, more and more, will be staying on the job past traditional retirement age."

The conference paid particular attention to workers in physically demanding jobs, including construction. Construction workers already suffer the highest number of fatalities in any U.S. industry. But the death rate among construction workers 55 years and older was nearly 80 percent higher than that of construction workers younger than 35 in 2007. And like the rest of the workforce, the average age of a construction worker is rising; it was 40.4 in 2008, which is 4.4 years older than in 1985. The average retirement age among construction workers is 61. "Our nation loses an average of four construction workers every workday to a job-related incident, and that's been consistent for more than a decade," said Pete Stafford, executive director of the Center for Construction Research and Training. "As we start to rebuild our nation's crumbling infrastructure and venture into green jobs, we want to make sure jobsites do not become a source of pain and death for older workers who have so much to contribute, especially in mentoring younger workers."

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The full conference report and presentations from national and international researchers on occupational health and safety issues can be found on the Society for Occupational and Environmental Health's website, www.soeh.org.

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Safety News

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DOT Issues New Rules for Pipeline Safety

S. Transportation Secretary Ray LaHood recently announced new federal regulations for operators of natural gas and hazardous liquid pipelines. The two rules will include a requirement for operators of natural gas distribution pipelines to adopt integrity management programs similar to current requirements already in place for larger transmission pipelines. In addition, the U.S. Department of Transportation (DOT) is calling for strengthened management and oversight of control room operations for all types of DOT-regulated pipelines.

"The public deserves and expects a national pipeline transportation system that meets the highest safety standards," said PHMSA Administrator Cynthia L. Quarterman. "These rules will improve public safety by requiring integrity management programs and installation of excess-flow valves for the first time for natural gas distribution pipelines, in addition to improving the operations of the nation's pipeline system control rooms."

Integrity management programs combine periodic inspection and testing of a pipeline's condition with continuous management processes to collect, integrate, analyze, and apply information about possible threats. The new integrity management rule for natural gas distribution pipelines incorporates the same basic principles as requirements for transmission pipelines but accommodates the significant differences between the two pipeline types.

In addition, the rule requires distribution operators to install excess-flow valves in new and replaced services for single-family residences where conditions are suitable for their use. Unlike requirements for transmission pipelines that are limited to "high-consequence areas," the new distribution integrity management rules will be applied to an operator's entire system.

DOT developed the rules in cooperation with Congress, the NTSB, and the pipeline industry.

Construction Equipment Visibility

tudies show that highway and street construction workers are at a significant risk of fatal and serious nonfatal injuries while working in and around a street/highway construction jobsite. In addition to the risk of injury from passing motor vehicle traffic outside the work zone, there is an equally hazardous risk of injury from movement of construction vehicles and equipment within the work zone.

In analyzing the data collected on fatalities and serious nonfatal injuries occurring from 1992-1998, researchers from the National Institute for Occupational Safety and Health (NIOSH) have concluded that "safety efforts must also protect construction workers within work zones who are working on foot around moving vehicles and equipment...." Collision occurrences have been attributed in part to limited visibility around the equipment.

NIOSH has developed a website (go to www.cdc. gov/niosh/topics/highwayworkzones and click on "Construction Equipment Visibility") that provides detailed diagrams to assist in visualizing the areas around various construction vehicles and equipment that are unable to be seen from the operator's position. These areas are commonly referred to as blind areas.

For each construction vehicle, three different blindarea diagrams are available to represent the ability of the operator to see an object at three different elevations: ground level, 900 mm (3 feet), and 1500 mm (4 feet 11 inches). The 900-mm plane represents the average height of a channelizing device, e.g. construction barrels that are commonly used in road construction. The 1500-mm plane corresponds to the height of a 4-foot 11-inch person.

NIOSH is providing this information on blind areas primarily for safety personnel and instructors to use as a training aid to develop awareness about hazardous areas around construction vehicles and equipment due to limited visibility. The test procedures for developing the blind-area diagrams are also given on the site. This information is provided in the event safety personnel or instructors would like to develop their own blind-area diagrams.

OSHA Releases Workplace Injury and Illness Information

very year since 1996 the Occupational Safety and Health Administration (OSHA) has collected work-related injury and illness data from more than 80,000 employers. For the first time, the agency has made the data from 1996 to 2007 available in a searchable online database, allowing the public to look at establishment or industryspecific injury and illness data. The workplace injury and illness data is available at www.osha.gov/pls/odi/ establishment_search.html as well as data.gov.

OSHA uses the data to calculate injury and illness incidence rates to guide its strategic management plan and to focus its Site Specific Targeting Program, which the agency uses to target its inspections.

"Making injury and illness information available to the public is part of OSHA's response to the administration's commitment to make government more transparent to the American people," said David Michaels, assistant secretary of labor for OSHA. "This effort will improve the public's accessibility to workplace safety and health data and ensure the agency can function more effectively for American workers."

Information available at the websites includes an establishment's name, address, industry, associated Total Case Rate, Days Away, Restricted, Transfer case rate, and the Days Away From Work case rate. The data is specific to the establishments that provided OSHA with valid data through the 2008 data collection. The database does not contain rates calculated by OSHA for establishments that submitted suspect or unreliable data.

An OSHA press release said that data.gov provides expanded public access to valuable workforce-related data generated by the Executive Branch of the federal government. Although the initial launch of data. gov provides a limited portion of the rich variety of federal datasets presently available, the public is invited to participate in shaping the future of the site by suggesting additional datasets and site enhancements to provide seamless public access and use of federal data.

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Helping Hands in Africa Update

By Herb Fluharty

s many of you may remember, at the 2008 winter convention in Cabo, PCCA members were introduced to Helping Hands in Africa (HHIA) at the annual Prayer Breakfast by its founders, Mike and Michelle Tessendorf. PCCA members responded to their powerful message by donating more than \$15,000 to this lifesaving work.

Since the 2008 meeting, my wife and I have twice returned to South Africa and discovered another exciting way to assist Mike and Michelle. They need very simple concrete buildings for their programs. As I write this, John Fluharty and I are preparing for a trip to two villages in South Africa to figure out how to get these structures built.

The following information is meant to provide a second look at the work of HHIA and the reasons why we believe building community centers is an important next step in helping these children.

HHIA works in extremely poor villages that have been severely impacted by the AIDS pandemic. Unemployment in these villages runs as high as 85 to 90 percent, and 50 to 60 percent of the children are orphaned. Children are raising children as their parents have died and their village lacks structure in how to deal with such an overwhelming situation. The most basic human needs in these villages are not met. Churches are either nonexistent or their leadership is completely overwhelmed with the enormity of the situation.

Helping Hands starts ministering in a village by procuring approval from the local authorities (village headsman, village pastors, etc.) to begin their program(s). Once approval is received, Helping Hands begins working with the local pastor and church leaders to set up a program for the most pressing need. In most cases this is a feeding program. Feeding programs typically start under a tree or in a donated little structure that has been abandoned. Top right is a picture of a start-up feeding program in one of the Villages. Food is served by filling the bowls of the children who patiently wait in line. Although this picture, which was taken on a sunny winter day, isn't all that discouraging, think of these children when it is raining and the ground is muddy or when it is cold and the wind is blowing hard or when it is 95 degrees and the sun is beating down on them. There is no place for them to get out of the elements to enjoy what for many is their only meal of the day.

Contrast the picture at the top with the pictures below. The changes are dramatic. Children have a place to gather to eat and escape the elements when necessary.

There is laughter that rings out from all around the room. The children know that no matter what the conditions are outside, they will have a meal that can be eaten in relative comfort. As can be seen, the children are primarily eating with their hands out of bowls they

Michelle Tessendorf tells PCCA members about the dire situation in Africa and explains what Helping Hands in Africa is doing to help.

brought for themselves, but the atmosphere is so much different.

Feeding programs are a very good start, and starving children now have food every day, but the transformation of the community needs more than a feeding program. To make a lasting change to the village, more programs need to be put in place, and a church/community center is key to administering these additional programs. Once a building is constructed, a preschool can be developed that will give the most vulnerable children a jump start on their schooling. When an after-school learning center is established to help children whose parents and/or guardians are mostly illiterate, the success rate in school is increased significantly. Church and spiritual training can now be held in a building in which the pastor and congregation can take pride. The village pastor, as a direct result of the church building being in place, starts to become the focal point of the village, administering many programs that accelerate the transformation of the village. The church/community center sends a strong message of hope, permanency, and possibility.

In villages where Helping Hands in Africa has worked for a number of years, the transformation is powerful. Children are staying in school and graduating from high school for the first time ever. Community leaders are becoming empowered to apply for, and receive, government housing grants for their village to replace dilapidated shacks with very modest homes. Guardians of orphans are applying for and receiving childcare grants to allow them to take better care of their grandchildren, nieces, and nephews, etc. Small businesses are springing up as people feel empowered to take back control of their circumstances. A spirit of hope replaces the feeling of despair at the enormity of the problems the village faces.

Currently there are two villages where Helping Hands has established some basic programs, but the villages are being held back by the lack of resources to finish structures that were started 2-plus years ago. The buildings, shown below, are ready to be built out and will be a key to accelerate the transformation of the village once completed.

These villages need someone to reach out and help them accelerate their path to a higher degree of self-respect and self-sufficiency by helping complete the structures so that additional programs can be established. A permanent structure will encourage hope, community pride, and possibility for the future.

It is our hope that PCCA members can play a significant role in helping HHIA to finish these very important structures that contribute

so greatly to the self-sufficiency of a village and the future of these children. I believe this is very doable. Let's talk!

Herb Fluharty, of Mears Group, Inc., is a past president of PCCA. He can be reached at herbert_fluharty@ hotmail.com.

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Member News

MasTec Closes Precision Pipeline Acquisition

asTec, Inc. announced in November that it had completed the acquisition of Precision Pipeline, LLC, and its related affiliate. The transaction included a payment of \$132 million in cash, the assumption of \$34 million of Precision's debt, and an earnout.

The acquisition extends MasTec's presence into the interstate pipeline industry and will complement MasTec's existing energy infrastructure service offerings, which include natural gas gathering systems, midstream pipelines, processing plants, and compression stations. The acquisition also expands MasTec's pipeline geographical coverage. With the acquisition of Precision, MasTec becomes one of the leading pipeline contractors nationwide, capable of providing end-to-end construction services to oil and gas producers, as well as to mid-stream and interstate natural gas and petroleum pipeline operators.

MasTec believes that U.S. energy policy goals will continue to favor clean, domestic sources of energy, and the company expects to be a leading player in that effort in both renewable energy and natural gas pipeline construction. With recent developments in drilling and completion technologies for oil and gas, particularly the new shale gas fields, MasTec expects new production fields to be developed and old fields to be expanded. MasTec expects that the resulting incremental production will provide continuing construction opportunities as oil and gas producers and pipeline operators move oil, gas, and refined products to markets via pipelines.

Precision has experienced significant growth over the past several years and generated \$303 million of revenue and \$37 million in EBITDA in 2007 and \$507 million of revenue and \$93 million in EBITDA in 2008. For the full year of 2009, Precision estimates revenue of slightly less than \$300 million and EBITDA of about \$60 million. As of September 30, 2009, Precision had more than \$500 million in backlog.

"We are very pleased with the acquisition of Precision," said Jose Mas, MasTec's president and CEO. "Precision's strong management team and dedicated workforce will provide MasTec with additional capacity and exposure to the natural gas and petroleum industry in markets which we expect will show significant profitable growth in the years to come."

New 3-Ton Grundowinch from TT Technologies

T Technologies has introduced a 3-ton winch to its line of Grundowinch hydrostatic constanttension winches. Ideal for pulling CIPP liners, fold and form liners, conventional and specialty sliplining, CCTV, and cable through innerduct, the new Grundowinch is a unique winch for the trenchless contractor.

The Grundowinch can pull up to 3,280 feet of 3/8inch cable at pulling speeds of up to 160 feet per minute. In addition to a 3-ton pulling capacity, the winch offers infinite speed

control throughout the pulling range. The new winch is compact and highly portable for pulling in easements and backyards, and it also features a level winding mechanism and a twin capstan cable management system.

A-D Technologies Sells Equipment Business to Plumettaz Inc.

n December 11, A-D Technologies announced the sale of its cable laying equipment business marketed under the ARNCO brand name to Plumettaz Inc., a subsidiary of Plumettaz Holding SA, makers of the Plumett brand of cable laying equipment. Concurrent with this sale, the two companies have entered into a distribution agreement where A-D Technologies will continue to offer placing equipment and trailers under the ARNCO name that are provided by Plumettaz Inc. And from the middle of 2010, A-D Technologies will also offer the full range of Plumett brand jetting and cable placing equipment in North America, including new equipment specifically designed for laying power cable.

Plumettaz has a strong history as a leading global

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manufacturer of cable laying equipment and said this transaction demonstrates its strategy to introduce new technology for the telecommunications and energy cable markets. The company also said it is pleased to partner with A-D Technologies in support of its newest cable pushing product, the ARNCO MaxxTrak II, and help expand its presence in North America.

A-D Technologies will market both the ARNCO and Plumett brands through its network of manufacturers' reps and field technical personnel. The equipment will now be assembled at the Plumettaz facility in Buford, Ga.

"We are excited to enter into this distribution agreement to offer Plumettaz' equipment in North America," said A-D Technologies President and CEO Paresh Chari. "We remain committed to our loyal customers. With this new arrangement, we will be able to offer a wider range of equipment serving various needs. We have had a long relationship with Plumettaz in various parts of the world and believe this is a win-win for both companies."

Cordless Power Duct Slitter Provides Quick Cuts

eneral Machine Products, Inc. recently introduced the Cordless Power Duct Slitter to its line of more than 1,100 power utility, telecom, and CATV tools and equipment. The rugged tool features a battery-powered blade that offers a mechanized method for trimming and slitting innerduct utility conduit, providing a fast and easy alternative to the brute force typically required when cutting innerduct by hand. Because it is cordless, there is no power cord to get tangled in, and its portable capability allows the tool to be operated anywhere on the jobsite.

The duct slitter features a blade diameter of 3 ³/₈ inches and is adjustable to cut innerduct of 1 to 2 inches in diameter. Its compact design is easily maneuverable and fits comfortably in a worker's hand. At 12 ³/₈ inches long and weighing 6 pounds, it stores conveniently in most toolbox-

The Cordless Power Duct Slitter comes with a rechargeable 9.6-volt battery and a battery charger, which weighs 1.19 pounds and charges batteries to full capacity in one hour.

The duct slitter is constructed with a multi-directional cutting guide to assist with cutting innerduct longitudinally and also around its circumference. It features a blade guard and a safety stop built into the switch to prevent accidental starts. The tool can be used for both utility and telecommunications cable placement and is durable enough to withstand the most difficult work site conditions. It is backed by a one-year warranty.

FMI's 2010 U.S. Markets Construction Overview

MI, a leader in consulting and investment banking services for the construction industry, released its 2010 U.S. Markets Construction Overview, offering insight into some of the construction industry's most complex business challenges.

This year's overview consists of three major pieces: a compilation of strategic issues in the current environment, important trends observed in 13 client groups served by FMI, and the third quarter 2009 forecast. A few highlights include:

- With slowing private markets, there will be increased demand for firms capable of performing large, complex projects.
- Expect more influx from Asia in the future, with particularly strong representation from Japan, China, and India.
- Engineering firms will continue to integrate up and down the supply chain.
- 2010 will be a year of fundamental change for many markets and firms.
- The global trend of "sustainable" will move to "actively beneficial."
- Petrochemical, nuclear, and utility markets are particularly attractive for specialty contractors.

FMI has published the *U.S. Markets Construction Overview* annually since 1985. It includes a comprehensive report on vital put in place construction trends and forecasts the growth or decline in each market segment, noting both short- and long-term considerations.

Ditch Witch Unveils New Pipe-Bursting System

itch Witch has announced the release of the PR100, the company's newest and most powerful pipe bursting system. Each component of the PR100 (the bursting unit, power pack, and job box) is designed and manufactured by the Ditch Witch organization.

The PR100 bursting unit can fracture or cut any type of existing pipe (clay, PVC, steel, cast iron, or ductile iron) and pull in new pipe of up to 16 inches in diameter with 100 tons of pullback force. Stoutly built with heavy-duty, commercial-grade steel, the PR100 has the power to replace all types of water, sewer, and utility pipe.

The PR100's heavy-duty components are designed to provide strength and stability during operation, as well as long life, minimal wear, and low maintenance. Reinforced steel shrouds protect each unit's hydraulic cylinders from damage and debris.

The PR100 is designed with clean, simple hydraulics, including highquality ORS and SAE fittings. Loadsensing hydraulics cause the bursting unit to automatically downshift when a load is introduced and allow higher speeds during makeup and breakout, which increases productivity.

The PR100's power pack features a 60-hp Cummins engine that is fully enclosed, fully accessible and, at 83 dBA, is the quietest in its class. The power pack has numerous features designed to improve operator productivity, including remote drains and an auxiliary pump for running hydraulic power tools.

An exclusive feature of the PR100 is a rugged steel job box that comes with the system as standard equipment. The job box is packed with essential tools for operation.

City Build Launches New Website

ity Build Utility Supply, a telecom and utility product supplier located in Houston, Tex., recently launched a new website (www.citybuildsupplies. com) to provide greater customer service and further meet its customers' needs by improving the overall sales experience. In keeping with its culture of exceeding customer expectations, City Build has added most of its products online with pricing, and a Quote Builder feature allows customers to request product quotes from the website without having to pick up the phone.

"Our customers are doing more and more online and want to be able to browse for products and request quotes quickly from the web," said Robert Juarez, company founder. "This is just another example of how we're meeting and exceeding our customers' needs every day."

With the addition of the Quote Builder, the customer can create a list of products for a project and send the quote request via the website for volume pricing. This type of customer and distributor communication will

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allow City Build to deliver greater value, saving the customer money and time. The Quote Builder works similar to a standard e-commerce shopping cart, where users select items and quantity needed. However, the customer is not checking out and paying; they're sending a request for quote and volume pricing.

Products that City Build sells and stocks online include:

- Fiber Splicers
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- Safety Equipment

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Dallas Convention Center	Dallas, Texas
PCCA Mid-Year Meeting	July 7 - 10,2010
The Lodge at Torrey Pines	La Jolla, California
DCA Mid-Year Meeting	July 14 - 17, 2010
La Costa Resort & Spa	Carlsbad, California
Utility Construction EXPO '11	January 18 - 21, 2011
El Conquistador Resort	Los Croabas, Puerto Rico
UCT 2011	January 25 - 27, 2011
George R. Brown Convention Center	Houston, Texas
PCCA 66 th Annual Convention	February 18 - 23, 2011
Sanctuary Cap Cana	Cap Cana, Dominican Republic
DCA Annual Convention	March 1 - 6,2011
El Conquistador Resort	Los Croabas, Puerto Rico
CONEXPO - CON/AGG 2011	March 22 - 26, 2011
Las Vegas Convention Center	Las Vegas, Nevada
WINDPOWER 2011	May 22 - 25, 2011
Anaheim Convention Center	Anaheim, California

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Underground Utility Protection Policy

- **A.** This section pertains to the protection of all existing underground utilities that exist within and adjacent to work areas. "Paint Marks" or "Flags" as provided by Local One Call (811) or other utility locate services shall NOT be accepted as exact or definitive.
- **B.** It shall be the responsibility of the Contractor to physically locate any and all existing utilities within and adjacent to the work zone prior to initializing work.

PART 2 – GENERAL

- **A.** All utilities within 10 feet of a work zone MUST be found and seen prior to the start of any excavation operations.
- **B.** Potholing shall be performed to verify the location and depth of the existing utilities.
- **C.** Backhoes, trenchers or other types of mechanical equipment shall not be used to find underground utilities within 10 feet of a work zone.
- **D.** At no time shall picks, round, pointed shovels, or any other type of sharp tool be used for locating utilities.
- **E.** Only square, blunt, non-sharp tools may be used for hand digging.
- **F.** Vacuum Excavation shall be allowed with the use of high-pressure water (up to 4,000 psi) with an approved non-cutting nozzle. Zero degree nozzles are not allowed.
- **G.** Vacuum Excavation may also be allowed utilizing high-pressure air (with dust containment system) or dry vacuum.
- **H.** For more information regarding the use of Vacuum Excavation go to: www.vacuumexcavation.com

PART 3 – EXECUTION

- **A.** Contractor shall contact One Call (811) utility locate service (in writing) at least 48 hours in advance to order locates within and adjacent to the work zone.
- **B.** Contractor shall notify all other known utility companies (those not affiliated with One Call) at least 48 hours in advance to order locates within and adjacent to the work zone.
- **C.** All utility crossings are to be exposed (using methods described in Part 2 above) prior to any excavation.
- **D.** All existing utilities running parallel and within 10 feet of either side of the intended work shall be physically located.

- **E.** Contractor shall not assume that utilities found will continue on the same line and grade.
- **F.** Underground utility pothole spacing and frequency shall be as follows:
 - **1.** Gas & Electric lines within 25 feet of the work zone shall be potholed and marked every 25 feet to verify the line has not changed directions.
 - **2.** Gas & Electric lines greater than 25 feet from the work zone shall be potholed at least once on each end of the limits of excavation.
 - **3.** Fiber Optic lines shall be potholed every 25 feet within the work zone.
 - **4.** Telephone & Cable Television lines shall be potholed every 50 feet within the work zone.
 - **5.** Water, Sewer & Reuse Utilities (less than 8" in diameter) shall be potholed every 25 feet within the work zone.
 - **6.** Water, Sewer & Reuse Utilities (8" through 24" in diameter) shall be potholed every 50 feet within the work zone.
 - **7.** Water, Sewer & Reuse Utilities (greater than 24" in diameter) shall be potholed every 100 feet within the work zone.
 - **8.** At least two (2) potholes shall be obtained for each utility within the work zone regardless of the size of the work zone.
- **G.** Material returned to the inspection hole shall be the original soil compacted back in place.
- **H.** All inspection holes shall be returned to original surface condition.

PART 4 – PERMITTING & SAFETY

- **A.** It shall be the responsibility of the Contractor to ensure that all applicable permits for underground work have been obtained prior to commencement of work.
- **B.** All work shall be performed by licensed underground contractors.
- **C.** Contractor shall prepare and follow a written safety plan. This safety plan shall be provided to the permitting agency and shall be made available onsite.
- **D.** Safety plan shall include a site map and show all known existing utilities and shut-off valves.
- **E.** Shut-off valve handles (for all existing water, sewer, reuse, gas & electric utilities) are to be in place through the duration of the work for immediate operation if needed.

Go to www.undergroundutilityprotectionpolicy.com to download and print the entire section.