



## Editorial

>> Marc Cheves, PS

# THE American Surveyor

A FOOT IN THE PAST... AN EYE TO THE FUTURE

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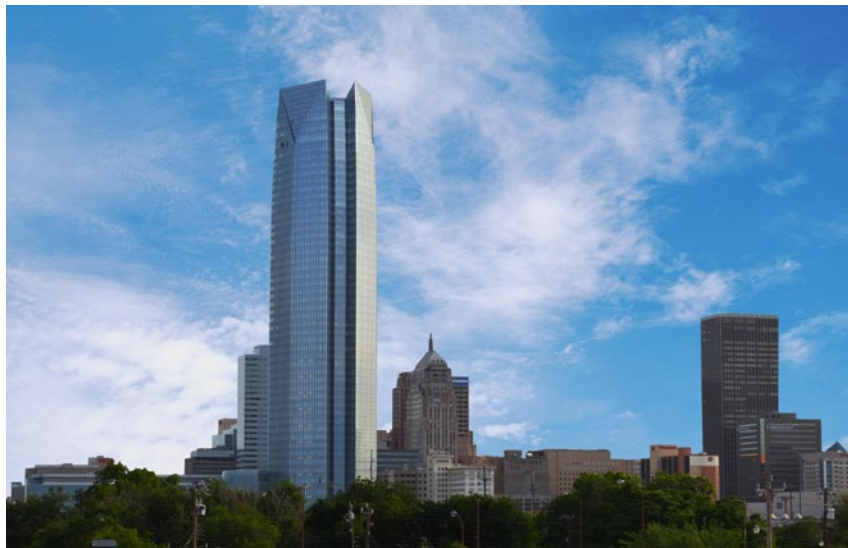
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## Oil & Gas Surveying



A building built by oil, the new Devon Tower in downtown Oklahoma City easily dwarfs the existing skyline.

**W**ith boots tied to the construction economy, it's no secret that surveyors have endured the worst economic downturn since the end of WWII. Those who have been surveying for a while have seen many ups and downs, but for each downturn, after at most a year, were able to get back to the business of building America. Some parts of the country have fared better than others. When falling oil prices worldwide brought drilling in Oklahoma and Texas to a standstill in the mid-80s, firms had to tighten their belts. Many of the folks we knew scrambled to find work elsewhere, including me. Fortunately there was plenty of construction in Maryland at the time. As I moved my young family across the country, the words of John Keating—the man who gave me start in surveying nearly 50 years ago and subject of this month's cover feature—played over and over in my head: "Marc, in surveying you have to go where the work is..." No doubt many of our readers have similar stories to tell.

For better or worse, the economy of the state of Oklahoma rises and falls with the state of the oil industry. While jobs in the housing market have all but dried up, oil and gas jobs have picked up from Texas to Alberta, as well as along the Appalachians and wherever the shale formations occur. Where well heads are pumping, the oil and gas industries spread a lot of money around at the local level, providing jobs and buying locally when possible. Like the survey industry, oil and gas producers tend to promote from within, and "go-getters" with initiative and capability stand a good chance of being noticed.

When it comes to accuracies, oil and gas surveying, which consists primarily of well locations and pipelines, have differed in the past from land development

surveying. And because the oil companies need to determine how much pipe to buy, pipelines are surveyed along the lay of the land—the horizontal world of surveying doesn't exist, and slope distances are paramount.

Conversely, surveying for easements and anything tied to a land corner demands a horizontal perspective. Two types of crews were often used to accomplish the work. In the late 70s, the Oklahoma Board of Registration enacted what became a Full Employment Act by requiring all easements to be tied to at least two PLSS corners. Previously, oil companies had obtained blanket easements, allowing them to basically do whatever they wanted wherever they wanted. Rising land values and a desire to restrict the oil companies from having a free rein opened the door for boundary surveying.

Well locations were equally “loose,” with the surveyors using 200-foot chains to measure, say, 1320' down a road and then “throwing” a rough 90 before measuring 1320' out to the center of a quarter section. Likewise, plane tables and alidades with enormous folding 16-foot stadia rods were used to get the elevation of the drilling floor. Starting elevations were obtained from quad sheets, often a road intersection. As technology has progressed, however, the capabilities of “seeing” underground have vastly improved, and petroleum geologists have come to demand tighter locational specs for well locations. Of course, now the companies doing this work use GPS wherever possible.

My personal record for miles of pipeline staked in one (long) day was 35,000 feet, all at 200 feet per station with pluses at fences and road crossings and other features. We were working northwest of Lamar, Colorado and staking a TXO transmission line for this rich gas field. There was a certain satisfaction one got from looking back at a row of laths and flats stretching off into the distance. I ended up with my Kansas and Colorado surveying licenses simply because of the oil and gas work we were doing in those states. Once again, it was about going

Federal Building downtown. The skyline has been transformed, and tourism has increased dramatically. Oklahoma City has even attracted an NBA team, the Oklahoma City Thunder. The 52-story Devon Tower skyscraper is more than twice as tall as the existing buildings. Devon Energy has been around since 1971, and is the largest independent natural gas producer in New Mexico, and the second largest natural gas producer in Texas. In Wyoming, Devon produced an average of 4,500 barrels of oil per day and 241 million cubic feet of natural

**“There was a certain satisfaction one got from looking back at a row of laths and flats stretching off into the distance.”**

where the work was. Sometimes we'd make it a family affair. We have some old photos of our three kids gathered around in their PJs and me in the chair of a motel room in Colorado studying for the survey exam I'd be taking the next morning. While my head was swimming with the Colorado statutes pertaining to land surveying, they were busily planning with Mom what to see and do at the Dinosaur Museum in Grand Junction.

Although few of us ever got rich surveying, stories abound of outrageous money being spent by the oil companies when it came to getting the information they needed. In those pre-cell phone days, calls from a truck phone often ran \$1 per minute, and because the towers that ran the system only had a limited number of channels, it was often hard to get a line. I once heard of a drilling supervisor who left the phone connected for hours at a time—even if he wasn't talking on it—because whatever was happening on the rig was costing thousands of dollars per hour and he just wanted a guaranteed line when he needed it.

The steady rise in oil and gas production in Oklahoma has brought a welcome financial relief to the hard-hit capital of Oklahoma that was depressed even before the devastating bombing of the F. Murrah

gas per day in 2010. Operating onshore throughout North America, it produces 4 percent of the natural gas used in the United States.

When it comes to the U.S. reliance on oil, politics, hydrocarbons, and environment are understandably sensitive subjects. The fact remains that our civilization runs on oil, and until a cost-effective replacement is found, it will continue to do so. One thing I learned early in my oil and gas surveying career was that there's still plenty of oil, the exploration for which depends on the price per barrel. As evidence of this, witness the explosion in natural gas exploration: it's been so successful that the number two natural gas company, Chesapeake Energy, recently cut back on its activities because the price of natural gas has fallen by half since 2007. I surmise that once the price of hydrocarbons reaches a certain level, we will make a switch. Personally, I think it'd be great if we could switch to hydrogen to power our vehicles and warm our homes. Thanks to companies like Topographic and pipeline surveyors who have trudged their way across muddy, plowed fields, and over hill and dale, there is an existing natural gas pipeline network already in place. For those who are willing to go where the work is, good things have a way of following. 



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