# Bauerle's Bank Notes

## To Boldly Go

### October 6, 2014

Fifty years in the span of a human life is a long time. In geological terms, it is a heartbeat. Fifty years ago this year, writer Gene Roddenberry conceived the television series "Star Trek." Major parts of the meta-narrative, including the concept of warp drive, were based on then-active research projects at the Jet Propulsion Laboratory in nearby Pasadena. Fifty years ago next year, Intel co-founder Gordon Moore posited that the number of transistors in a dense integrated circuit would double every two years. This was Moore's Law, one expression of the computer revolution that has reframed our daily experience in ways few could have imagined in 1964. Ironically, the greater present day impact of Moore's observation has occurred as a result of activity occurring more than a mile below the earth's surface rather than in warp drive space travel as imagined in the "Star Trek" series. Consider the following:

- In 1990, my childhood friend Gary Osborne was charged by his company, Amoco, to either fix or get rid of the company's Egyptian oil fields. Developed beginning in the 1930's, the fields had played out. Using then-brand-new computer technology to remap the fields' geology and re-drill the fields in ways theretofore impossible to imagine, Osborne's team of oil geologists extended the life of the Egyptian fields by 30 years. Gary said his greatest satisfaction was the economic benefit Egyptian people derived from his work in the land of the Pyramids, which he and his family came to love deeply. Osborne's team's success is one of the reasons BP bought Amoco in 1998, reasoning BP could apply the Amoco geologists' new techniques to BP's aging fields in the Middle East and elsewhere.

- At the September Black and Gold Financial Team program, our partner Paul Gitnik demonstrated his powerful tool, ShaleGasUSA.com, a software application that enables users to tap an extraordinary database of information about the evolving Marcellus and Utica shale gas plays. Data about production units, volumes of gas produced, royalty rates to be paid to landowners, projected cash flows associated with particular production units and wells, and more, is all available at the click of a computer mouse. Users as diverse as exploration and production companies, banks,

trust companies and other financial services providers, and landholders are all capitalizing on this important resource that Paul's work, Moore's Law and the wide availability of computing power has made possible.

- In a move reminiscent of Osborne's redevelopment of Amoco's Egyptian oil assets, pipeline giant Texas Eastern Pipeline LP is currently rebuilding its major West to East pipelines so that gas gathered in the Appalachian Basin can be moved in the opposite direction, from Appalachia to Texas, for export to world markets once the oil industry motivates Congress to lift 1970's era restrictions on exportation of oil and gas. Earlier this year, the United States became the world's largest oil producer for the first time since the 1950's thanks to the application of computer technology on a scale forecast but not specifically envisioned by Gordon Moore in 1965.

- New England has long been dependent on fuel oil as a winter heating source due to the region's small geographic size, low population density and distance from traditional oil and gas producing states of Louisiana, Texas and Oklahoma. As a result, oil shortages in the 1970's and resultant price spikes extracted a particularly heavy economic toll in New England. Today, one of our Pittsburgh-based clients is financing a German company's manufacture in Europe of equipment that will be installed in a new factory being built in Ohio to make light weight vessels for transporting liquid natural gas to New England from the Appalachian Basin. In a parallel vein, clients from New York and Philadelphia flying to our September Black & Gold event sat next to employees of the Norwegian state oil company, coming to Western Pennsylvania to see first-hand the shale gas revolution now underway.

Consensus estimates say $1 trillion is the economic impact of the shale gas economy in the Appalachian Basin. Compare the U.S. Apollo space program in the 1960's, which cost just one-fifth as much, $20 billion in 1960 dollars or $205 billion in today's dollars. Landing a man on the moon and bringing him home safely, as President Kennedy promised to do, may have been a more daring achievement. Tapping gas reserves that tip the strategic balance by reducing dependence on the politically volatile Middle East is a more durable and important economic outcome.

In the heyday of "Star Trek," high school English teachers tut-tutted over the program's opening credits, which described the story premise as a mission, "to boldly go where no man has gone before." "One must not split the infinitive," said the grammarians. Instead, they should have marveled at what Gordon Moore's Law was unleashing: computing power on a scale that would make the Pyramids of Egypt look like ant hills in retrospect. All of us are challenged to be good stewards of this Earth, our island home. Here's a tip of the hat to those who are making that possible by constructively putting Gordon Moore's eureka moment into action.