The Barn Raiser

Mid-South Engineering Company

Issue No 54 Working Together Second Quarter, 2015

To Profile or not to Profile?

By: Monte Moreschi, P.E., LEED

We get questioned all the time about why we spend time creating utility profile drawings. In the world of underground utilities, we feel that is like asking why did you spend time creating elevation drawings for buildings? We however understand that profile drawings might seem unnecessary to our clients.

We have heard on numerous occasions that a good set of plans showing utility locations and a typical depth for each type of utility is all we need! We agree that underground utilities can be installed this way; however, it does cost more and does not account for gravity systems.

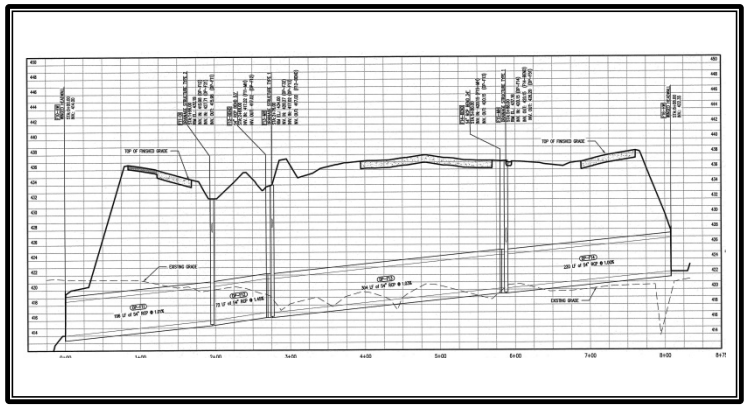
Why would it cost more? The contractor has more excavation associated with the deeper the utility, along with, OSHA requirements for trench excavations 4 feet or deeper. These costs may be negligible for short runs of utilities. In the case of large expansions or green field sites, the costs add up quickly when potable water, process water, fire suppression, gas, air, hydraulic, etc. all get a depth assigned to avoid conflicts of crossing utilities. We prefer to call these managed crossings. We also prefer to run all utilities at the minimum depth required by code and show the managed crossing in profile drawings.

Why not run at minimum depth and note how to manage the crossings on the plan sheets? This again works unless you're crossing gravity systems like storm water collection and sanitary sewer utilities. They run across several depths. In the case of a storm water collection system, the system not only gets deeper as it runs but the pipe sizes increase to accommodate increased runoff. Whether you go above or below these systems depend on their depth at the crossing, which is hard to note on plan sheets.

There is an additional advantage to profiling the sanitary sewer and storm water collection system besides managing crossing. It is the cost savings in allowing the contractor to order precast manholes and catch basins, in addition to, quicker installation when not building manholes and basins onsite. Precast manholes and catch basins can be ordered right after the PO is issued to the contractor, which also saves on installation time.

This next item actually requires profiles and that is permitting. We realize that a large majority of the client's utilities do not need permits. However, potable water and sanitary sewer do require permitting in most states. Those states also require profile sheets as part of their review to determine proper horizontal and vertical separation of potable water and waste water. Did you know that a separate fire suppression system is considered waste water? This would also be true of utilities carrying chemicals or process water.

We have seen creative ways through the years to limit profile drawings. We have seen the assigned depth of each utility, details on how to cross different utilities, and profiles of just the utility crossings. In all these cases, a good Civil Engineer has already laid out the utilities and generated a grading plan. This means that 80 percent of the work is completed for generating profile drawings! In the case of just showing the profile at the crossing, 100% of the work is done. The additional profile along the entire utility shows the contractor the depth, managed crossings, sharp vertical changes for swales and materials such as manhole and basin sizes and depth. So why let your valuable information for construction just reside on a computer, when you could be using it save money and time on your project?



New arena of power generation set in motion with MOU

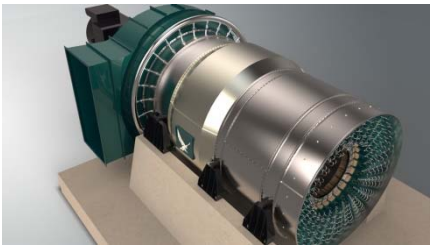
By: Sandia National Laboratories

Albuquerque, N.M. – Sandia National Laboratories and eight other companies and research organization will collaborate to advance a distributed power system that can produce cleaner, more efficient electricity.

The memorandum of understanding (MOU) focuses on the development of a fossil-fueled energy system based on supercritical carbon dioxide (S-CO^2) Brayton cycle technology.

Organization signing the memorandum with Sandia are Peregrine Turbine Technologies and its subsidiary PTT Distributed Energy Systems of Wiscasset, Maine; Vacuum Process Engineering of Sacramento, California; Mid-South Engineering of Hot Springs, Arkansas; and four partners from Huntsville, Alabama, CFD Research Corp., the U.S. Space & Rocket Center at NASA's Marshall Space Flight Center, Government Energy Solutions Inc. and the Energy Huntsville Initiative.

Sandia's Brayton Lab hyperlink as follows: (http://energy.sandia.gov/energy/nuclear-energy/advanced-nuclear-energy/nuclear-technology-users-facility-ntuf/) in Albuquerque is the only S-CO^2 research facility of its kind. The partners plan pilot testing there using a gas turbine engine based on a 6-megawatt energy-generating system developed by Peregrine Turbine Technologies. A second prototype engine would likely be tested at the U.S. Space & Rocket Center.



This illustration depicts the 6-megawatt distributed energy generating system developed by Peregrine Turbine Technologies.

"This is the first large collaboration to identify partnerships that will take the Department of Energy's lab-scale technology and accelerate its development to commercial industry deployment of a highly efficient, low carbon emission, electrical power generator," said Gary Rochau, manager of Sandia's Advanced Nuclear Concepts Department.

The agreement allows the organizations to work easily together to accomplish similar goals: advancing the commercialization readiness of the supercritical carbon dioxide Brayton cycle technology, providing world-class testing and analysis and encouraging the establishment of U.S.-based, high-value technology and manufacturing jobs.

Jim Pasch, principle investigator of the S-CO^2 Brayton Cycle Research and Development Program, and Darryn Fleming, principal investigator of the S-CO^2 Brayton Heat Exchange Program, investigate a turbine and compressor inside a test facility at Sandia National Laboratories. (Photo by Randy Montoya)

The term "supercritical" refers to the semi-liquid state of carbon dioxide when it is above its normal critical temperature and pressure, allowing S-CO^2-based systems to operate with high thermal efficiency.

Improving power generation is part of Sandia's mission to strengthen national energy security, Rochau said, "The supercritical carbon dioxide Brayton cycle can replace steam system in a smaller size with higher efficiency, lower cost, lower emissions and with distributed power generation, reducing the burden on the national power grid," said Rochau.

"Technology could bring about large-scale improvements in production across most energy sectors, especially solar, nuclear and gas turbine. Potential economic and environmental benefits include reduced fuel consumption and emissions and the ability to generate power from a variety of heat sources," he said.

Peregrine Turbine Technologies is developing a power generation turbine engine that uses super critical carbon dioxide as a working fluid. CEO David Stapp said it could be 30 percent to 60 percent more efficient than current technology.

Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corp., for the U.S. Department of Energy's National Nuclear Security Administration. With main facilities in Albuquerque, N.M., and Livermore, Calif., Sandia has major responsibilities in nation security, energy and environmental technologies and economic competitiveness.

Corporate Office
1658 Malvern Avenue - Hot Springs, AR 71901
501-321-2276 - FAX: 501-624-4214

Cary Office
200 Mackenan Dr. Cary, NC 27511
919-481-1084 – Fax: 919-481-1184

Millinocket Office
70 Spring St. Millinocket, ME 04462
207-723-6871 – Fax: 207-723-6872

MID-SOUTH ENGINEERING
www.mseco.com
Experience and Innovation Working for You