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BUILDING COMMUNITY

HDPE PIPE DIRECTIONALLY DRILLED TO PROTECT ENVIRONMENTALLY SENSITIVE COLORADO SPRINGS LANDMARK

COLORADO SPRINGS, Colo. - Imagine standing below a geological rock formation that is so stunning it bears the name “Garden of the Gods”. With that in mind, envision having to construct a water pipeline across this national landmark without disturbing its beauty or alarming the citizens who admire it on a daily basis. Caretakers are so particular about the delicate environment of the park that they cut the grass with a team of horses pulling a sickle.

Officers of Colorado Springs Utilities (CSU) stood under these skyward jutting rocks and decided the only way to install the new line and keep everyone happy, would be with a horizontal bore.

While under tight regulations that limit the use of heavy equipment on the park, CSU completed a 2,700-foot bore to install 12-inch DIPS 3408 SDR-9 CP Performance series 4000 high-density polyethylene (HDPE) pipe. The line is providing potable water to a subdivision and increased fire flow protection to an expanding community.

“In many cases, pipeline construction is an eyesore to communities and traditional open-trench methods would be impossible for this project,” observed Tony Radoszewski, executive director of The Plastics Pipe Institute, Inc. (PPI).

“While being good caretakers of their Garden of the Gods, the forward-thinking city officials of CSU have joined together and are embracing new technologies for the water department that have been in use in the gas department for years,” Radoszewski continued. “By doing this, CSU is also becoming a model of study for other municipalities who are in search of potable water applications that are long-term investments, environmentally safe, leak-free and more affordable upon installation.“

In the past, CSU operated as three divisions. Each utility worked separately to set rates, do construction and perform maintenance. During the past few years, they have combined all of the departments into one and reorganized so that construction and maintenance includes all three utilities under one heading.

“We’re trying to get more bang for our buck,” said Richard Bond, construction maintenance section leader for CSU. “One year we slashed $25 million off our utility budget by investing in equipment that will satisfy the needs of all three of the utilities, instead of each utility trying to buy their own equipment separately.”

Perhaps the exchanging of ideas and technologies between the gas and water

departments has been the biggest advantage. The water department borrowed horizontal boring techniques from the gas department that has saved thousands in asphalt repair expenditures alone.

"The CSU gas department has been using HDPE pipe since 1967 and had the know-how to bring this material to the water department," said Pal Brown, construction supervisor overseeing the directional drilling crew on site. The municipality has performed four water jobs using HDPE and is excited about the savings that have amassed due to the ease of installation. The long-term savings, due to no leaks, is a figure that could be staggering.

According to the U.S. Environmental Protection Agency, more than $138 billion needs to be spent on America's water infrastructure through the year 2014 just to make it comply with current regulations. More than half this amount is needed for new distribution systems. Since HDPE pipe does not rust or leak at the joints, many experts in the water business are promoting HDPE for the necessary improvements to the nation's infrastructure problems.

"HDPE is what is going to happen to the waterworks business," said Don Cole, executive vice president of Mountain States Pipe & Supply. "Of all the piping that is currently available in the lower pressure classes, HDPE has the most going for it. No cathodic protection is required, you can do most of the assembly out of the ditch, no thrust blocks or joint restraints are required, and it's totally leak free. This material has found a home in water works"

Along with supplying the pipe and fusion equipment for the project, Mountain States has also offered their consulting expertise to CSU for the past four HDPE jobs. Jack Madore is HDPE product manager for Mountain States and has 17 years experience with HDPE pipeline construction and design.

"What makes this project unique is that we are using HDPE as it was designed to be used," said Madore. "Most of the time, HDPE is just used where there is a high chance for failure of conventional materials, like a river bore or highway crossing. This is because HDPE is tough and flexible and with fused joints, there is little chance of separation upon pull back when boring. HDPE has piggybacked its way into the municipal market on the back of directional drilling."

"When CSU brought us in, their experience with conventional materials told them to bolt straight lengths in between mechanical fittings," continued Madore. "After explaining that we could fuse everything together and eliminate half the fittings, all the joint restrains, thrust blocking and possible leak paths, they were now seeing a much more cost-effective, long-term, and leak-free system. The logic behind it all is simple. If you can put it together and then take it apart mechanically, sooner or later it will leak. With fusion you are leak free as long as the material remains in service."

For this project, reducing tees instead of swivel tees for the hydrant extensions were used, as well as fusion fittings wherever possible. The only mechanical fittings that were used were at the valve connections. "What makes this job shine is that they are taking advantage of all of the benefits of PE

and using it in the entire system to make it a fool-proof system," said Madore.

For the fire-hydrant selection, the city used a Mueller AquaGrip PE 12 x 6 reducing tee. It was fused inline, then a valve was installed between the main and the fire hydrant using a Mueller AquaGrip fitting, which is a stab-compression-style fitting that attaches to the bottom of the fire hydrant without the use of internal stiffeners.

The biggest advantage of HDPE besides its long life expectancy, are its heat-fused joints which make the pipe a single homogenous pipeline. Joints in traditional piping materials are the biggest source of leakage. They are also the pathway for contaminates to enter the pipe system. Additionally, due to the longer 20-foot pipe section length, 135 joints were eliminated for the 2,700-foot bore alone when compared to traditional piping materials.

CSU used McElroy Manufacturing's TracStar No. 412 fusion machine to join the pipe together. The TracStar is mounted on a mobile track system, which makes it an all-terrain machine. It is powered by a diesel engine and was used to pull the pipe out on the location with little disturbance to the terrain.

The bores were completed with a great amount of difficulty as a lot of rocks were encountered. An American Augers Model DD4 was used, "which is quite the little workhorse," said Brown. It was needed on this job because more rocks than solid soil were encountered.

"HDPE has been the standard pipe for the gas industry in the U.S. for about 30 years," stated PPI's Radoszewski, "and continues to make a strong foothold in the water market. It has a proven record of being a no-leak system and municipalities such as CSU are helping others to understand its characteristics and how they translate into cost and construction advantages over other materials."

The Plastics Pipe Institute, Inc. (PPI) is a Texas-based, non-profit organization, founded in 1950, that is the major trade association representing all segments of the plastic piping industry. PPI is dedicated to expanding awareness about plastic pipe systems and promoting plastics as the material of choice for pipe applications. It is the premier technical, engineering and industry knowledge resource that publishes data for use in development and design of plastic pipe systems. Additionally, PPI collaborates with industry organizations that set standards for manufacturing practices and installation methods. For more information about PPI and its available information, go to: www.plasticpipe.org.