HDPE water distribution system passes with flying colors at Vandenberg Air Force Base

Pipe installers at Vandenberg Air Force Base (VAFB) are getting a history lesson as they dig up water systems that had been in the ground since the 1940s.

The ancient and outdated concrete and cast iron pipes they're replacing were starting to break more often. The service lines were not cut and capped at the mains - instead, they were cut and capped at the individual buildings. Consequently, these dead-end service lines between the main and the demolished building provide areas of stagnant water – a serious health issue.

Vandenberg AFB is situated about 150 miles northwest of Los Angeles and supports a population of about 16,500, including the military, their family members, contractors, and civilian employees.

Phase I of the water distribution system overhaul is about 65 percent complete. It covered the south cantonment area – the part of the base with the largest concentration of housing facilities and other buildings. Phase II will begin in the spring of 2003, and the project will be finished approximately 14 month later. Specialty Construction – led by Superintendent Brian Newsom – is the contracting firm for both phases.

More than 72,000 feet of 6-inch to 18-inch high-density polyethylene (HDPE) pipe will be installed in the cantonment area (main base area) the nearly 100,000-acre facility. The Vandenberg AFB engineer, project designer and Army Corps of Engineers representatives had a specific set of criteria they used to decide which pipe material best suited this application.

"It's harsh to say, but we just don't have the bodies here to constantly maintain our infrastructure," said Shauna Grider, P.E., an engineer at Vandenberg AFB for more than seven years. "It had to be something that would last a long time. And it had to be a material that could withstand a low amount of maintenance."

Grider and her colleagues had experience with HDPE pipe for sewer and wastewater systems but never for smoothwall pressure applications.

"We didn't know enough about it at first," Grider said. "But when the research came back, we learned we could achieve a theoretical zero-leak joint. Plus, this being a high seismic zone, the flexible nature of the HDPE pipe will give with the movements in the earth."

Polyethylene pipe provides a leak-free system through its joining process – heat fusion – that produces strong, totally sealed connections. Further, polyethylene is a dielectric material and is frequently used as an insulating material for electrical conductors. Because it is a non-conductor, polyethylene is simply not subject to corrosion.

The Plastics Pipe Institute (PPI) reports that HDPE pipe is used for more than 90 percent of the fuel gas distribution piping in the United States because of its reliability, leak-free performance and resistance to corrosion.

"Many municipalities – and in this case a military base with a population of 18,000 – are now using HDPE pipe to construct a leak-free and corrosion-resistant water distribution

system to deliver water to their residents and employees," said PPI Executive Director Rich Gottwald. "As a result, they're avoiding the problems and maintenance costs associated with leaky systems."

A PPI-member manufacturer is supplying all the pipe and a PPI-member distributor is providing the fittings and fusion equipment. The distributor worked with the contractor to get the equipment and instruct them how to sidewall fuse the pipe together directly in the field.

"There are literally hundreds of connections to make on a project of this magnitude," said Steve Wilson of High Country Fusion. "Because of the ability to fuse the pipe in the field, Specialty Construction could lay the pipe first and then go back and install the tees and other connections and fittings. With so many connections, doing the work in the field makes installation easier."

Since much of VAFB sits on beach soil and generally soft ground, non-HDPE pipe materials would require the use of thrust blocks. As the water pressure passes through the pipe joints of other types of pipe in a marshy area, there would not be enough soil support to keep the joints from potentially coming apart.

"With HDPE pipe and heat fused joints, there's nothing to break apart." Gottwald said. "The joint is as strong or stronger than the pipe itself."

"Before we chose HDPE, we really didn't know if it gave us any advantage over PVC," said Grider. "For this project, the overriding issue became stopping the leakage because of the fused joints and the HDPE material lasting forever."

Wilson said that his experience has been that government agencies are choosing HDPE for water distribution more often.

"It'll be there functioning 150 years from now with little or no infiltration or exfiltration," Wilson said.

"There are a lot of advantages to installing this type of pipe for this application," Newsom said. "For the VAFB installation, this is going to be a really good system because it allows them to both mechanically join fittings and fuse fittings onto the pipeline. It doubles the installers' capability and options for joining the pipe on the line."

About PPI

The Plastics Pipe Institute is the major trade association representing all segments of the plastics piping industry. Member companies share a common interest in broadening market opportunities that make effective use of plastics piping for water and gas distribution, sewer and wastewater, oil and gas production, industrial and mining uses, power and communications duct and irrigation. More information is available at www.plasticpipe.org.

About Vandenberg AFB

The installation is about 150 miles northwest of Los Angeles, and is presently operated by Air Force Space Command's 30th Space Wing. Vandenberg AFB is the only military base in the United States from which unmanned government and commercial satellites are launched into polar orbit. It is also the only site from which intercontinental ballistic

missiles are test fired into the Pacific Ocean, and splash down at the Kwajalein Atoll within the Marshall Islands.

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