

THE INSIDER

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The Newsletter of the Municipal & Industrial Division of the Plastics Pipe Institute

 PLASTICS·PIPE·INSTITUTE™
When what's inside has to stay inside, it's polyethylene pipe.
Count on it.

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HDPE Pipe is the Only Way for Drinking Water to Cross the Chesapeake & Delaware Canal

NEWARK, Del. — A key component of Artesian Water Company's commitment to providing a reliable source of quality water to its customers was a system integration connecting two sides of the Chesapeake & Delaware Canal.

The 5,000 feet of HDPE pipe was installed with two 2,500-foot directional drills. The proactive project was implemented to maintain water supply reliability and connected Artesian's northern New Castle County system to its southern New Castle County system, adding redundancy to its potable water and fire protection service capacity. It also significantly improved the hydraulics of Artesian's overall system.



Artesian navigated the C&D Canal with 5,000 ft. of 24-inch HDPE pipe.



According to officials at Artesian, it was a complex process requiring detailed evaluation and assessment of materials and resources – and they chose high-density polyethylene (HDPE) pressure-application water pipe.

The Chesapeake & Delaware Canal is 14 miles long, 450 feet wide and 35 feet deep. It runs across Maryland and Delaware, joining the Delaware River with the Chesapeake Bay and the Port of Baltimore. Artesian has more than 70,000 metered customers, providing water service to about 231,000 residents, approximately 28 percent of Delaware's total population. Artesian's ability to successfully navigate the C&D Canal with 5,000 feet of 24-inch HDPE pipe enabled it to integrate previously separated portions of its supply system.

Working on a tight timeline, contractors finished the work between January and June, 2004. It is the largest such project completed by Artesian Water to date.

“Our standard water pipe material for crossing large bodies of water or for use in corrosive soils is HDPE,” said Adam Gould, project manager on the C&D Canal job. “This was the biggest project of its kind we've done, and because of its flexibility, HDPE was the only pipe we would have used to do it.”

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HDPE Pipe System Protects U.S. Nuclear Weapons Stockpile from Fire

AMARILLO, Texas — The high-pressure fire loop system engineer is responsible for maintaining the water supply for fire suppression at the U.S. Department of Energy/National Nuclear Security Administration's Pantex Plant near Amarillo, TX.

And because Pantex is responsible for maintaining the nation's nuclear weapons stockpile, that particular engineer becomes a pretty important person. Failures to the piping system that carries the water used to extinguish a fire in such a facility are unacceptable.

Over time, a pattern of such failures was occurring, said Melvin Suttle, the high-pressure fire loop system engineer at BWXT Pantex, the management and operating contractor at the plant. The plant operates under the highest levels of safety and security and requires a dependable piping system.

Suttle was reporting pipe breaks due to corrosion of the cast and ductile iron system; a system that was first installed in the late 1940s. The 79,000-foot long high-pressure fire loop is a dedicated water distribution system feeding fire suppression systems and fire hydrants. A break in the distribution pipe can seriously compromise the fire suppression system function.

So Suttle decided to change the way things had been done in the past. He discovered the benefits of smooth wall high-density polyethylene (HDPE) pipe for industrial water applications. In August of 2001, he purchased 60 feet of pipe – three 20-foot lengths – as a test case for Pantex.

This initial HDPE use was for an extension of the system that required 5,000 gallons per minute capacity and 40 pounds of residual pressure. "We had several design options, however, HDPE offered solutions to all the issues," Suttle said.

"Back then, the product was brand new to us," Suttle said. "It's performing very well. And knowing what I know about HDPE pipe now, I'm sure that we'll never have to see that 60-foot section of pipe again."

Today, Pantex has about 3,900 feet of HDPE installed for the high-pressure fire loop. A couple of thousand additional feet of small diameter (2-4 inch) pipe is used on the natural gas distribution system but it does not share the "safety-class" scrutiny of the fire loop and did not require qualification. Pantex has a phased plan to replace 50,000 more feet of the fire loop with HDPE pipe – preliminary drawings for the next phase were reviewed in September 2004.

"We're seeing other applications taking the lead of the natural gas industry," Gottwald said.

"More than 90 percent of our country's natural gas distribution lines are made of polyethylene pipe. What engineers and contractors are realizing is that if PE pipe is safe and reliable enough to carry natural gas, it certainly is also for water."

“**The most satisfying part was making the case for HDPE as the environmentally-positive choice.**”

**Melvin Suttle
High Pressure Fire Loop System
Engineer at BWXT Pantex**

Passing the Environmental Test

Using those first 60 feet of HDPE pipe as a test case three years ago convinced Suttle and

his colleagues to continue to use HDPE pipe at BWXT Pantex.

The most satisfying part was making the case for HDPE as the environmentally-positive choice, Suttle said. He said that was the sticking point with the initial designs, due primarily to the risk of contaminants leaching into the water supply. HDPE is also ideally suited to horizontal directional drilling installation (HDD), which was an additional job requirement. The original 18-inch HDPE pipe was installed under two railroad tracks, a roadway and a security corridor using HDD.

"I documented that first project as much as I possibly could," Suttle said. "I visually inspected every piece of pipe personally and every fused joint to everyone's satisfaction."

The result was a system that delivered the required capacity with 46 pounds of residual pressure.

HDPE Pipe Seminars Focus on Drinking Water System

WASHINGTON, D.C. — For the sixth straight year, manufacturing experts and engineers from across the country will educate participants on aspects of design and installation of HDPE piping systems for water, sewer and industrial applications at the Plastics Pipe Institute's (PPI) one-day seminars. PPI is the industry's source for information on drinking water system solutions.

Hundreds of water system designers, civil engineers, public works specifiers and utility managers have already taken advantage of PPI's series of one-day seminars on "Designing and Installing High-Density Polyethylene (HDPE) Piping Systems."

Specific topics at the seminars will include engineering properties and design, joining, system connections and sliplining.

Seminars will be conducted in the following cities:

- June 8, 2005 – Charleston, South Carolina
- July 27, 2005 – Austin, Texas
- Sept. 18, 2005 – Tampa, Florida
- Nov. 16, 2005 – Vancouver, British Columbia

The seminars are recommended for municipal and consulting engineers, contractors and academia

as each seminar features leading experts who can speak to how HDPE pipe is the ideal material for numerous applications. HDPE pipe is virtually leak free, easy to install and cost effective.

A design engineer who attended a recent Columbus, Ohio, seminar said he achieved a greater understanding of calculations used to maximize output with PE.

A professional engineer from a Pennsylvania water company said he attended so that he could learn more about the use of PE pipe as 'another way of doing things' in his home city. He first started using PE pipe for the first time three years ago and put in about eight miles of it with great success.

Each seminar participant receives a copy of the PPI Handbook of Polyethylene Pipe, a comprehensive instructional manual covering a wide range of applications and problem solving solutions for users of polyethylene pipe. Participants also are offered 0.7 Continuing Education Units (CEUs).

Sign up or get additional information on an individual seminar by e-mailing PPI at mgray@plasticpipe.org. More information is available at www.plasticpipe.org.

AWWA Manual 55 to be a Vital Resource for Design Engineers

A collaborative effort of 10 engineers on behalf of the Plastics Pipe Institute (PPI), completed their work toward the publication of AWWA's Manual 55. The document is written as a resource for Design Engineers to use as a design manual for the installation of high-density polyethylene (HDPE) pipe for water applications.

Examples of HDPE pipe topics covered in the manual include:

- Engineering properties
- Pipe production and quality control
- Flow hydraulics
- Underground installation
- Maintenance and safety
- Design calculations
- Sizing pipe
- Joining and fitting

"It's written in a way that design engineers can pick it up and easily get real-world examples and calculations about of the kind of system

they're looking to install," said Nancy Conley, who chaired the PPI committee that coordinated the writing.

The AWWA manual will be a natural supplement to PPI's existing Handbook of PE Pipe, already available at its web site, www.plasticpipe.org. The PE Pipe Handbook covers technical and real-world information about additional applications for PE pipe, including fuel gas and conduit; specifications; test methods; codes for PE pipe systems; HVAC applications and marine applications.

Manual 55 is currently with the editors and publishers at AWWA and will be printed and available for distribution this year.

For more information, please contact Camille Rubeiz at crubeiz@plasticpipe.org.

Canal Crossing (continued from page 1)

Contractors faced the added challenge of a 150-foot drop in elevation from the water main on land to a depth of 50 feet below the canal bottom. Larry Anderson of Spring & Associates said a 50-foot to 70-foot drop is normal.

Camille Rubeiz, P.E., director of engineering for the Plastics Pipe Institute, says polyethylene is the only commonly used pipe material that is truly flexible.



Its smooth surface allows extruded PE pipe to maintain excellent flow properties.

"It's the combination of flexibility and leak-free joints that allows for unique and cost-effective types of installation methods that the rigid PVC and ductile iron pipes can't use with bell-and-spigot connections," Rubeiz said. "Installation methods like horizontal directional drilling, pipe bursting, sliplining, plow and plant, submerged or floating pipe can save considerable time and money in most potable water applications."

CDM, Inc., was responsible for charting the pipe's course with design drawings and working with the owner of the canal, the U.S. Army Corps of Engineers, on the proper permits. CDM's engineers, Artesian project managers and the Army Corps worked together to finish the project ahead of deadline.

"The directional drilling with HDPE pipe is conducive to minimizing disturbances during the project," said Bill Cesanek, AICP, vice-president for CDM.

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PLASTICS PIPE INSTITUTE™

Plastics Pipe Institute

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The Municipal & Industrial Division
1825 Connecticut Ave., NW, Suite 680
Washington, DC 20009
Telephone: (202) 462-9607
Fax: (202) 462-9779
www.plasticpipe.org

President: Rich Gottwald

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HDPE Water Main Pipe Installed with Minimal Disruption

ESSEX, Md. — In waterfront communities all across the country, such as those along a 175-mile stretch of eastern Baltimore County in Maryland, pleasure boating is a multi-million dollar industry.

As of last May, luxury boat owners in Dundalk, Essex and Middle River can store their craft year-round at the Sunset Harbor Marina, home of the county's first "boatel" – a three-level facility with capacity to store craft up to 40 feet long.

One of the selling points of the new 62,000 square-foot, \$3 million facility was a state-of-the-art fire protection sprinkler system. To those boat owners, protecting against fire means protecting their investment.

And as county officials were making decisions on how to upgrade the local infrastructure to accommodate the boatel, they were reminded of a persistent problem.

"The existing 8-inch ductile iron pipe was installed in 1968 and had about 10 failures in the last 10 years," said Mike Mazurek of the Baltimore County Dept. of Public Works and project engineer. "That particular section of the northeast part of the county near Chesapeake Bay has very corrosive soils."

The solution was to install more than 2,000 feet of smoothwall high-density polyethylene (HDPE) water pipe. The result was positive

for the residents in two ways – the water main that served the existing homes and businesses was upgraded, and the marina boatel now benefits from a reliable, leak-free water distribution system for fire protection.

"I was very familiar with HDPE as a piping material," said the contractor and project engineer Vern Dettman of J. Fletcher Creamer & Son, Inc. "We've installed it a lot in fiber optic applications, pipe bursting, sewer applications and electric conduit applications. We started out with 16-inch lines, went to 12-inch about halfway down, and used side-saddle fusion to connect to the hydrants. It was very easy to put in."

Dettman added that traffic along Browns Ave. – the residential street where the pipe was installed – was not disrupted in the process. All of the fusion was done above ground, the existing pipe was just left in place, and the HDPE pipe was simply lowered into the trench.

"Many of the features of HDPE pipe were a benefit to the engineers on this project," said Camille Rubeiz, P.E., director of engineering for the Plastics Pipe Institute. "The above-ground fusion, light weight, ease of installation, and especially the leak-free system. The business of protecting multi-millions of dollars worth of property – luxury boats – from fire must be done with a reliable water delivery system."

The Municipal & Industrial Division of the Plastics Pipe Institute wants to deliver information in a way that's most efficient for you. If you're interested in receiving future information via e-mail, please notify PPI at 202-462-9607.