

By Jim Jones

keeping *Corrosion* out

New integral
restraint system
saves big on
installation time



South St. Paul, Minn., was the site where an old stockyard was being redeveloped into Bridgepoint Business Park. John Sachi, senior engineer with the city of South St. Paul, had several serious issues and challenges with which to contend.



The first was that the job site was only several hundred yards from the Mississippi River. All ditches were open-cut with a minimum depth of 8 ft. With that in mind, the water table was above the trench bottom.

The soil conditions were very poor; they consisted of mostly sand and peat with blue clay on the bottom. Because of the high organic content of the soils, the soil resistivity was low and quite corrosive. The combination of high water, acidic soil, peat and sand called for additional special precautions to be made for corrosion protection and for preventing joint separation.

South St. Paul officials chose C900 PVC water main pipe for the piping system. The entire system had to be restrained due to long-term settlement that was going to occur in the roadbed and other areas. The original system was designed using wedge-action external restraints on either side of each joint of the

PVC pipe; each restraint joint then had to be polywrapped for corrosion protection.

A New Restraint System

The contractor, Frattalone Co., proposed using the BullDog restraint system, which is integral to the PVC pipe and PVC pressure fittings. It eliminated the need for the external mechanical joints on the outside of the pipe; all the material that is vulnerable to corrosion is on the inside of the pipe and not in contact with the hot soils.

Frattalone agreed to install the BullDog pipe and fittings at the same cost as the C900 pipe with the external wedge-type restraints. These large external restraints are labor-intensive to install. Each gland has six to eight bolts and wedges that have to be hand-tightened, and this would have had to be done at each joint and at each fitting location. After installing these



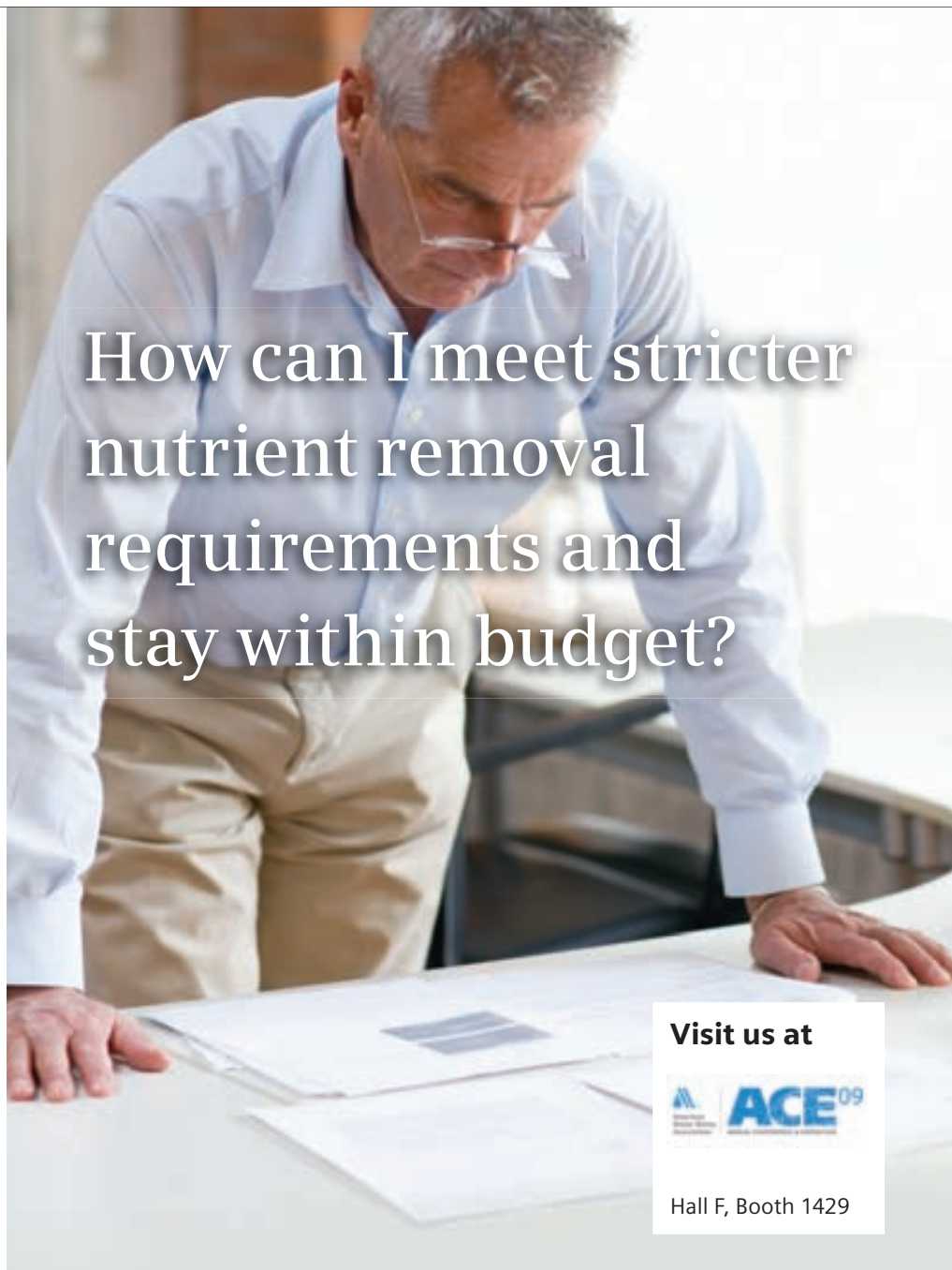
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two large wedge-action-ductile-iron glands, they need to be connected with threaded rod, which requires that more nuts be hand-tightened. The entire assembly is then polywrapped for corrosion protection.

The Bulldog restraint system cuts installation time by 95%. It is easier to install than an external joint restraint—there are no bolts or nuts to torque, and users need only to push the pipe together the same as they would with any gasketed bell-and-spigot pipe joint. The insertion force is the same as that of a standard C900 PVC pipe. The performance of the joint exceeds that of external pipe-to-pipe restraints.

Business Park Project

Total pipe on the Bridgepoint Business Park project was approximately 5,000 ft of C-900 DR 18 PVC pipe with an integral Bulldog restraint. There were also approximately 30 PVC pressure fittings using the same restraint technology.

The project was installed in two phases because the excavated material needed to be kept on the job site. After the first phase was installed—which had approximately 2,500 ft of Bulldog pipe and 12 to 15 Bulldog pressure fittings—the system was tested to 150 psi and passed. Because this was the first installation of this product in the area, the system was left pressured at 150 psi for 15 days with no leaks or pressure loss. It was estimated that each 8-in. Bulldog pipe joint took approximately two to three minutes to install versus an external ductile restraint that took approximately 45 minutes to install.

Horizontal Directional Drilling

One of the ideal applications for the Bulldog restraint system is horizontal directional drilling (HDD), a technology that is widely used for installing pipelines. This technology has revolutionized the way underground infrastructure is installed in highly congested urban areas, beneath rivers and in other environmentally sensitive areas.

HDD installation involves pulling pipe through a reamed bore path. Until recently, the pipe typically used was a butt-fused thermoplastic pipe, which had to be pre-assembled on an adjacent right-of-way, and then pulled as a continuous length of pipe. With the Bulldog system, PVC pipe can now be installed one joint at a time during the pullback operation. This type of system is commonly called the “cartridge method,” which is preferred in locations where rights of way or easements are limited.

The Bulldog restraint system can be used for joint restraint, HDD installations or as a more cost-effective restrained pressure pipe for casing installations. Regardless of the application, the labor savings are huge compared to traditional systems.

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