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Source Water Protection

Safeguarding water quality

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the replacement of cementitious coatings, the polyurea coating can cost effectively provide decades of protection."

With the proper crack repair and surface preparation, the polyurea coating can be a thick film applied directly to the concrete or similar substrate. An alternate application method that can sometimes mitigate the need for surface or crack repairs is to pre-spray the polyurea to geotextile fabric panels placed above the onsite substrate, fusing the panel edges together with more polyurea.

Because of the polyurea's ability to set and cure quickly, it also minimizes wastewater treatment plant or infrastructure downtime. The resulting savings can translate into thousands of dollars per hour, and days of service interruption can be avoided.

When extensive cracks were found in a concrete clarifier shortly before a chemical plant's opening, Osborn turned to the polyurea for superior protection and fast installation. After repairing all cracks greater than 20-millimeters (mm) wide in the clarifier with a concrete repair grout, Osborn prepared and primed the floor and walls with VersaFlex VF 20 primer before applying 80-100 mils of FSS 45DC polyurea.

"The polyurea allowed us to provide a warranty against potential future cracks opening in the concrete because of its crack-bridging ability," says Osborn. "We were able to spray the polyurea as thick as needed in one application. Since it sets and cures rapidly, structures can put be back in service very soon after spraying."

While traditional coatings such as cementitious, epoxies, and polyurethanes will prematurely fail if not installed under a relatively narrow range of temperatures, the polyurea is designed for installation and use from -40°C to 176°C. It will withstand decades of freeze-thaw cycling and wide variations of temperature and humidity.

"When you're above ground in the Midwest US, you have freeze and thaw with concrete expansion, contraction, and cracking," says Jennifer Hoop, president of Conco Spray Solutions, an Indianapolis, Indiana-based contractor specializing in the rehabilitation and protection of municipal infrastructure including potable, storm, and wastewater systems. "We needed a lining that would move with the structure through the different seasons and tank temperature differentials. For that, polyurea works very well."

To withstand extreme weather conditions at a northern Indiana wastewater treatment plant, Hoop selected the polyurea for a secondary containment area around ferric chloride tanks. "After filling in cracks with grout and restoring the concrete, we sprayed the polyurea on geotextile to provide a really nice containment area for the ferric chloride tanks," she says.

Hoop says that the polyurea has an added benefit in reducing continual clarifier maintenance. "Typically, clarifier maintenance crews need to use high-pressure power washers for hours to clean solid waste from concrete surfaces," says Hoop. "Since the polyurea provides waterproofing and has a cleanable surface, crews can simply hose down the clarifier to clean it. This can cut required weekly clarifier cleaning by two-thirds."

"For wastewater-related rehabilitation, polyurea is a superior coating for any application that requires crack bridging, longevity, chemical, and temperature resistance, as well as fast turnaround," concludes Hoop.

Author's Note

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Rugged communications systems for harsh conditions

Every year, serious accidents occur at water and wastewater treatment facilities, and these are often attributable to a breakdown in the communications systems that monitor and control the flow of critical plant processes through various treatment stages and vessels.

Most of the functions of treatment plants are monitored and controlled by cable-based communications systems, and because they are exposed to very harsh chemicals and elements, it is vital to plant safety that these systems – including cables, RTUs, and enclosures – are operating with optimal speed and reliability.

Today's efficient water resource recovery plants are basing their communications network infrastructures on ultra-reliable, high-speed fiber optic cabling coupled with connection and control devices that are designed to withstand the harsh environments within those plants. This approach not only protects against environmental accidents but can also ensure optimum plant throughput, security, and compliance.

The primary physical attributes that are usually required of cable in this environment are chemical resistance, impact resistance, and the ability to bend without damaging the cable jacket or fiber strands inside.

Tight-buffered, tight-bound cable has many advantages over loose tube or ribbon-type cable, which is still in use at some treatment plants. This type of cable offers fluoropolymer jacketing built to withstand severe chemical environments long-term, including the caustic vapors present in most water treatment plants.

These cables also offer impact and moisture resistance over loose-tube, gel-filled type cable constructions. In wastewater treatment plants, this durability is vital to maintaining PLC, RTU and SCADA signal integrity as well as overall network-wide transmission reliability for optimal plant performance.

Optical Cable Corporation's (OCC) BX Series breakout and DX Series distribution cable are commonly used in wastewater treatment plant applications. These cables offer exceptional physical characteristics, including bend, crush, impact, and chemical resistance across a broad thermal operating range. Rugged, tight-buffered cables are also capable of reducing attenuation loss, speeding installation, and maximizing operational time.

OCC pioneered the design and production of tight-buffered cables for demanding military field applications. The company currently manufactures a broad range of fiber optic cables for high bandwidth transmission of data, video, and audio communications. OCC is based in Roanoke, Virginia, United States (US).

QED Environmental Systems wins 2016 GreenGov Presidential Award

An innovative groundwater treatment system that runs on battery power and recharges with solar power recently won the 2016 GreenGov Presidential Award. The system is installed at a former nuclear weapons production facility in Rocky Flats, Colorado, United States (US). The award celebrates outstanding achievement in the pursuit of former US President Obama's federal sustainability goals by federal civilian and military personnel, agency teams, agency projects, facilities, and programs.

The US company QED Environmental Systems was part of the team that won the Keeping It Clean Award. The system design enhances safety, improves groundwater treatment reliability, reduces long-term maintenance and costs, and reduces waste.

The QED team was honored for a project that used air strippers to reconfigure the East Trenches Plume Treatment System (ETPTS) at the Rocky Flats site to improve treatment effectiveness and meet strict water quality standards. The air strippers remove volatile contaminants from the groundwater by transferring them into the air. The equipment blows high volumes of air through the contaminated water; contaminants are quickly dispersed, diluted, and often degraded in the air discharge. Frequently, the air concentrations are low enough that further treatment is not required.

Air stripping can require significant amounts of energy to power the air blower and any other process components, such as pumps and controls. The decommissioned facility no longer had onsite electrical power, presenting a significant challenge to the engineering team to find a treatment configuration witha highly efficient energy footprint. To address these challenges, QED designed a custom process and controls system that operates with limited 12-volt DC solar panels and batteries. A unique control panel design, using innovative on- and off-cycle programming, along with sizing features, enabled the equipment to remain within the required power budget for around-the-clock, unattended operation.

QED was brought on board to work with the project team by S.M. Stoller Corporation, which provides technical consulting and engineering services to the US Department of Energy (DOE). QED worked with Navarro Research and Engineering Inc., a contractor to the US Department of Energy Office of Legacy Management.

QED Vice President of Technology, Dave Fischer, acknowledged the award, saying, "We have designed equipment for large, high-flow air strippers for drinking water utilities that were sensitive on energy use but had never before had to consider timing and power demand for this type of equipment. We thoroughly enjoyed the challenge and are proud to be part of this great accomplishment." QED is based in Dexter, Michigan, US.