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BY CHRISTY KRONE

Restoring, Protecting Everglades Pump Stations

The Comprehensive Everglades Restoration Plan (CERP) was authorized by Congress in 2000 as a plan to “restore, preserve, and protect the south Florida ecosystem while providing for other water-related needs of the region, including water supply and flood protection.” The \$10.5 billion, 35+ year multi-agency project is the largest hydrologic restoration project ever undertaken in the United States.

The Picayune Strand Restoration Project is a component of CERP. Wetlands will be restored in Picayune Strand (Southern Golden Gate Estates) and in adjacent public lands by reducing over-drainage while restoring a natural and beneficial sheetflow of water to the Ten Thousand Islands National Wildlife Refuge. The project includes 83 miles of canal plugs, 227 miles of road removal, and the addition of three pump stations and spreader swales to aid in rehydration of the wetlands.

In partnership with the South Florida Water Management District (SFWMD), the U.S. Army Corps of Engineers (USACE) will operate the three large pump stations, which will transport water gathered from canals to previously drained wetlands and help maintain current levels of flood protection.

ABOUT THE PUMP STATIONS

The Picayune Strand project includes the construction of three pump stations: Merritt, Faka Union and Miller Pump Station.

The Merritt Pump Station facility includes a spreader canal and tie-back levee. It has two 75-cubic-feet-per-second (cfs) electrical pumps and four 220-cfs diesel pumps for a total capacity of 1,030 cfs. The maximum design flow for flood protection is 880 cfs using the four high-flow pumps.

Now operational, the Merritt Pump Station transports water from the Merritt Canal into a spreader basin for release to the downstream restoration area. Part of the project also included plugging 13.5 miles of canals to block water flow and the removal/degrading of 95 miles of roads and tram lines. The Merritt Pump Station was completed in 2014.

NEGATIVE SIDE WATERPROOFING INSIDE THE PUMP STATIONS

Soon after completion, hydrostatic pressure caused the Merritt Pump Station pump rooms, which are located 20 feet below grade, to fill with up to eight feet of water.

To remedy the problem, SFWMD recommended a Xypex

coating application (Concentrate and Modified) as the waterproofing repair materials because of the agency's prior success with the product. The USACE agreed that the leaking Merritt pump station room walls should be waterproofed with Xypex products.

Application procedures included patching of leaking tie holes with Xypex Patch'n Plug, standard repair detail for the slab and wall interfaces followed by a two-coat application of Xypex Concentrate and Modified. The waterproofing coating application was completed in late 2015. After 7-14 days, all six pump rooms were completely dry and remain dry to date.

The Faka Union Pump Station had similar hydrostatic water pressure water intrusion issues. This facility pumps water from the Faka Union Canal into a spreader basin for release into the downstream restoration area and includes a spreader canal and tie-back levee. The pump station includes three 100-cfs electrical pumps and five 470-cfs diesel pumps for a total capacity of 2,650 cfs.

The maximum design flow for flood protection is 2,350 cfs using the five high-flow pumps. The project also included plugging 12 miles of canal to block flow and removal of 100 miles of roads. As with the Merritt Pump Station, Xypex Patch'n Plug was used to waterproof and repair the tie holes and Xypex Concentrate and Modified were applied to the wall surfaces.

INSIDE THE MILLER PUMP STATION

Due to the success of the Xypex waterproofing applications at the Merritt and



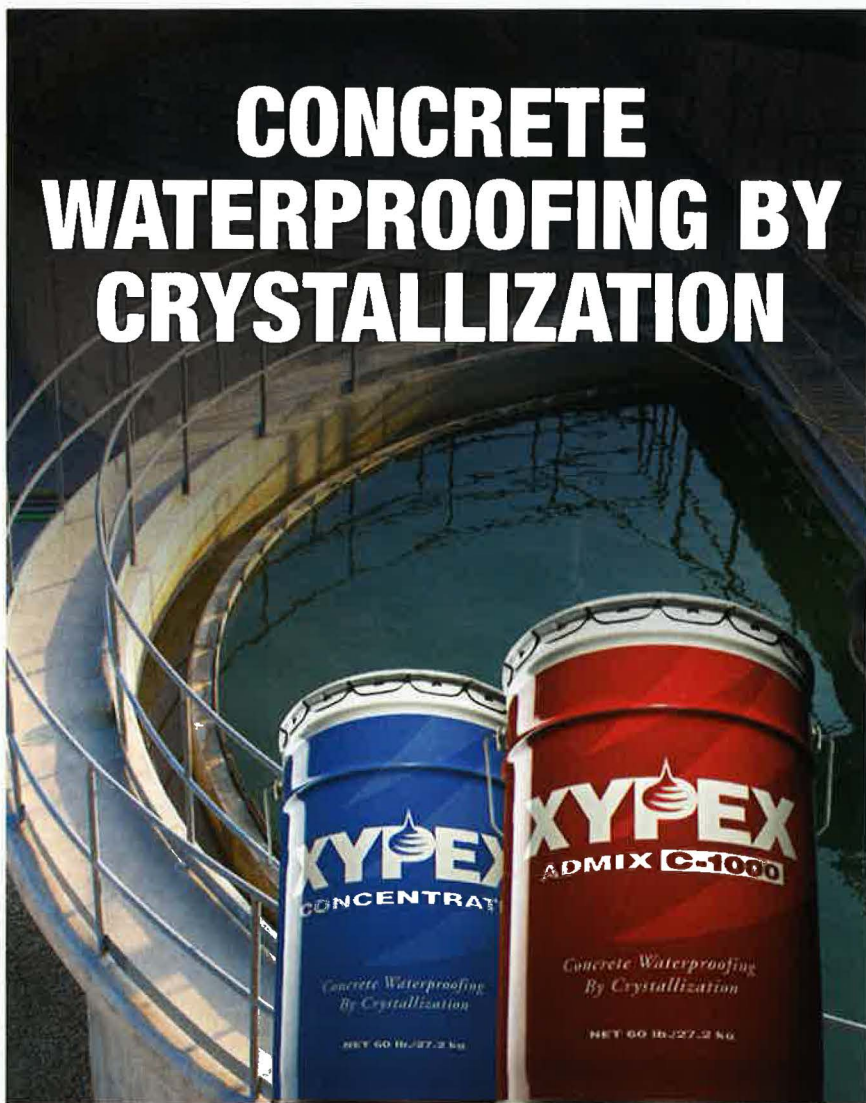
As a preventative measure, Xypex's crystalline waterproofing admixture was used for the concrete utilized in the construction of the Miller Pump Station.

Faka Union pump stations, both USACE and SFWMD decided to specify Xypex crystalline waterproofing admixture for the concrete used in the construction of the Miller Pump Station as a preventative measure.

The pump station lies in an area of high water table, approximately 30 feet below grade, an area continually subjected to extreme hydrostatic water pressure. During the placement of the pump station slab, five mobile generators

--- See XYPEX con't on page 48

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----- SCREEN con't FROM page 23

we've characterized the influent and determined a suitable screen and grid to protect equipment, the remaining question is: will it fit physically and hydraulically?

The existing channel dimensions and hydraulic profile are extremely important when determining the screening equipment that can fit. What is the existing downstream water



Within a screen type, each manufacturer differs in materials of construction, frame design, protection of moving parts from grit and debris, carrying capacity, and how the screen is cleaned.

----- XYPEX con't FROM page 29

continually pumped water from the site to facilitate concrete placement.

Crews began work on the Miller Pump Station in 2013. The project is on track for completion in 2018. To date, Xypex Admixture C-500 has been used in the more than 26,000 cubic yards of concrete required to construct the Miller Pump Station facility. The waterproofing treatment will provide permanent waterproofing and chemical protection even under extreme hydrostatic pressure.

When complete, the Miller Pump Station will pump water from the Miller Canal into a spreader basin for release into the downstream restoration area. The Miller Pump Station comprises two 75-cfs, low-flow pumps and six 235-cfs pumps (with one 75-cfs and one 235-cfs unit serving as a back-up pump) for a capacity of 1,250 cfs and eight bays.

CRYSTALLINE TECHNOLOGY

Xypex crystalline technology is designed to react with the by-products of cement hydration in the capillary tracts and voids of concrete to produce a non-soluble crystalline structure that fills and plugs the pores and capillary tracts, plugging them against the penetration of water-dissolved chemicals such as chlorides, sulfates and acids. Unlike coatings and membranes, this "crystallization" becomes a permanent, integral part of the concrete substrate and will not peel or flake off like a coating. It can be installed as a surface treatment on

level and what controls it? Are there any upstream water level limitations? There are guidelines for velocities both in the approach to a screen and through a screen grid. The velocity recommended through a grid varies depending on how clean a screen is. Some screens types are designed for 30 percent blinding while others need a more conservative 50 percent.

Will the equipment be inside or outside and need heat tracing? Are there limitations on the space for a screen (both headroom and angle of inclination)? Is there water available for equipment that requires it? Will conveyors or a water sluice be needed to bring screenings to a common washer/compactor? These are all important questions to ask when selecting the right screen to do the job. **WW**

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Xypex admixture at Miller Pump Station concrete batch plant.

the positive or negative side of a concrete structure or used as an admixture during the batching of the concrete mix. **WW**

About the Author: Christy Krone is a sales representative for Xypex in Florida. Xypex's crystalline technology has been serving concrete users around the world for more than forty years. To learn more, visit www.xypex.com.

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