

Freeport-McMoRan Morenci Wastewater Treatment Plant

Location: Morenci, Ariz.
 Owner: Freeport-McMoRan Morenci
 Designer: Evoqua Water Technologies
 Contractor: Evoqua Water Technologies
 Manufacturer: Evoqua Water Technologies
 Cost: \$4.5 million
 Project Size: 347 gpm
 Facility Size: 868 gpm peak



The Freeport-McMoRan Morenci mine is the largest copper mine in North America. The mine services own, maintain and operate the wastewater treatment plant for Morenci, Ariz.; Clifton, Ariz.; and the site itself. The original treatment facility was constructed in 1950, and as the population of Morenci and Clifton grew, the plant was challenged to handle the treatment flow.

The officials of the copper mine needed to expand the mining operation onto and beyond the existing treatment plant site. This development required establishing a new site for the wastewater treatment facility and designing and then building a new facility.

A pre-engineered field-erected packaged concentric ring wastewater treatment system was designed and installed as part of the new plant near the Freeport-McMoRan Mine Site in Morenci. The plant is located south of the operating mine site on Corral Road.

The project specification identified major components of the system and established minimum performance, quality, control and monitoring standards for each component. The equipment (biological process) supplier was responsible for providing and installing equipment, materials, control systems and components required for a complete and functional system that meets the performance requirements specification. The system primarily will be comprised of coated welded steel tanks and shall be field-erected by the seller. The field erection will include installation of the tanks, stairs, walkways, grating and handrail, clarifier and its equipment, internal tank piping, pumps, mixers, aeration, instrumentation, and electrical systems.

The design, equipment supply, and construction was on a narrow time frame. The project schedule allowed one year for equipment delivery, construction and commissioning. Three weeks after the bid, the

Freeport-McMoRan project manager contacted Evoqua brand Davco and suggested that the schedule be shortened by five months. The original schedule allowed one year for construction and final commissioning of the new wastewater treatment facility.

"It wasn't just trimming the weeks off, when you take five months off a schedule. We were definitely looking for every opportunity throughout the project just to save time everywhere we can," said Chris Redford, facility and project owner and project manager.

The two project teams worked closely, and soon there was a plan that would satisfy the seven-month schedule. Davco construction crews would work two different shifts, seven days a week, with every second and third weekend off.

"We [Evoqua] run a double shift, just to stay on target," said Todd Huffman, project superintendent. "So we had a day shift and a night shift cause the time frame was reduced

so much."

The new design included an activated sludge biological nutrient removal (BNR) process in a field-erected treatment plant system—a welded steel tank construction.

"It takes a great team on Evoqua's side to bring a project in, especially when the time frame is reduced in half," Huffman said. "Once we got the order from the mine, from Freeport, then we had to go through engineering, design stages, manufacturing, then it comes to the field. We have to build the project in the field. You just have to have a great team to bring everything together. The most important thing at the end of the day is that we have a happy and satisfied customer."

The plant and copper mine are zero discharge. The wastewater treatment plant effluent is discharged to the copper mine's tailings holding reservoir, which collects and holds the copper mine's process and runoff water.

This water is then processed and reused in the copper mine.

"This has always been, for many years, our goal to be zero discharge," Redford said. "It is Arizona and water is a precious commodity. And for that reason, we try to recycle water in any way possible. It has always been zero discharge."

The complete site included office and laboratory facilities and onsite storage buildings. The project was executed, and the commissioning of the new BNR treatment system was achieved within the seven-month schedule and within the project budget.

"The support that we had from contractors was phenomenal," Redford said. "We basically had a very difficult schedule to meet, and rather than having contractors complain and say there's no way, they worked with us. We were a partnership. We were able to get the project done on time and within budget." 