

True as Steel

Global steelmaker implements a value-added project delivery method



By Ronald Knapik, Donald Tanis & Paul Whitmore

When global steelmaker ThyssenKrupp sought advanced water and wastewater treatment through a unique design, build, operate and maintain (DBOM) approach for its new state-of-the-art \$5-billion carbon steel and stainless steel processing facilities near Mobile, Ala., it turned to Veolia Water. The steelmaker was seeking a partner with proven experience in this type of project delivery method, and it wanted one who would complement its own desire to build value-added partnerships with diverse suppliers.

DBOM Builds Value

Veolia's DBOM project delivery offering provides clients with a complete scope of services and picks up the long-term responsibility to maintain performance as a single solution provider for design, construction and long-term plant operations. This approach allowed ThyssenKrupp, when signing the agreement, to have a complete understanding of the service fees over the life of the contract.

The cornerstone of DBOM project delivery and the ability to offer predictable service fees is based on the ability to accept responsibility for plant performance through its useful life cycle. Operational commitments are delivered through a comprehensive performance guarantee that is contractually supported for the complete term of the project; in this case, the Thyssen-Krupp contract performance guarantees were structured as long-term warranties. This allowed Veolia to leverage its current portfolio of operations agreements and associated best practices, and incorporate those into the design and operational facets of the project. The company also remedies any shortcomings in meeting the performance guarantee. Under this approach, DBOM project delivery provides a number of benefits.

The design of the facility is a true life-cycle cost favoring optimal plant design. This includes the selection of optimal quality components, construction materials, redundancy, automation and instrumentation. The operations and maintenance teams participated extensively in design reviews, helping to ensure the plant was built with operability in mind at the outset, including assurances



The plant was built with operability in mind, with operations and maintenance teams participating in design reviews.

WASTEWATER TREATMENT

that best practices were applied in plant design and that decisions were made based on a life-cycle evaluation of the project. This allowed for the balancing of capital expenses versus the net present value of long-term operating costs.

ThyssenKrupp is protected from shortcomings in plant design, which are now the responsibility of Veolia, and include:

- Technical support during startup and over the life of the agreement, on either a temporary or dedicated basis;
- Major overhauls or rework that are required to



The facility's multifaceted wastewater treatment system consists of three separate treatment systems.



The lime solo.

- maintain performance, should they be necessary;
- Maintenance planning initiated during project design and followed through construction to help ensure reliable operations during the life of the project;
- Complete staffing responsibility, including any additional operations labor and/or associated expense; and
- Providing operational expertise focused on water and wastewater treatment, allowing the steelmaker to focus on its challenges of building and starting up a new mill.

ThyssenKrupp's investment in this complex allowed the company to expand its 200-year-old metallurgical expertise and its technical support and to build on an already successful business model. The stainless steel melt shop is designed to facilitate an initial annual operating capacity of 1 million metric tons, in combination with cold rolling and finishing facilities. A dual-purpose hot strip mill has the capability to roll both stainless and carbon slabs. With a total capacity of 5.2 million metric tons per year, it can roll 4.1 million metric tons of flat carbon steel end products per year. Cold rolling and hot-dip coating finishing mills provide for higher value-added carbon steel end products.

Water Treatment

The steel industry is a major water user and, as such, requires innovative and complex treatment options before, during and after the various onsite processes. Due to the significant quantities of water required and ThyssenKrupp's emphasis on sustainability and resource recycling, high-quality process water and stringent advanced wastewater treatment were critical in system design.

The treatment systems were designed and built by N.A. Water Systems, a division of Veolia Water. Veolia is capable of treating 14.4 million gal of Tombigbee River water per day (2,275 cu meters per hour) and makes industrial service water for ThyssenKrupp's use in the mill. Veolia utilizes proprietary ActiFlo technology to produce water to the contract specification. As with any major source of river water, swings in turbidity are a given; operationally, the system was designed for flexibility and responds rapidly to account for influent swings through a unique sand-ballasted technology approach.

ThyssenKrupp specified that Veolia build and operate a wastewater system capable of handling the many different types of steel-making wastes, including spent acids, oil emulsions, operational cleaners and even sanitary wastes from the facilities used by employees.

The end result is a robust design and consistent operation of multifaceted wastewater treatment system. Three separate wastewater treatment systems were designed, including a unique minimal-footprint moving-bed biofilm reactor, followed by an activated

sludge process, and metals precipitation and removal systems that in total treat more than 5 million gal of wastewater per day (790 cu meters per hour). The final effluent flow reaches receiving waters meeting all permit and environmental standards.

Staffing Approach

This project employed a phased approach to hiring staff during the course of the construction of the new water and wastewater treatment facilities. In this manner, the operational team understands how Thyssen-Krupp’s plant was constructed and assists in the startup, which pays dividends throughout the life of the project.

Full staffing meant hiring 15 people who provide around-the-clock operational coverage, with the last staff being hired several months prior to commissioning. All training was completed before operations began and with Veolia’s team on board from the beginning. The operators who will run the system participated in the early stages of commissioning it. This builds value in the long run and avoids the inefficiency and problems associated with the “handover” approach of other types of delivery methods.

Steel Mill Startup

Water was a critical resource that was necessary to allow the various steel production mill startups to

proceed on schedule. The project delivery method proved successful, as it was one of the initial systems to start up on the site.

Today, the mill continues to ramp up to full capacity, as construction continues on the remaining portions. The infrequent operations that a startup offers can be incredibly challenging for operational staff. Today, Veolia invests technical resources and continues to work with ThyssenKrupp to handle the challenges these present to water and wastewater treatment plant operations. As the steelmaker advances its goal of full production at a world-class facility, it does so with the knowledge and comfort of having expert assistance with water and wastewater treatment needs. **iwwd**

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