New Ammonia Plant Starts Fast with Emerson's Total Automation Solution

RESULTS

- Passed required 60-day production test the first time with no stoppages
- Produced several million dollars in extra revenue through fast startup
- Added $4.1 to $5.8 million revenue every year due to increased uptime

"Emerson's Factory Acceptance Testing was the best we've had with a MAC in the past three years."

Mike Barthelemy,
KBR Project Procurement Manager

APPLICATION

New 2,000 metric ton per day liquid ammonia plant is located near the Red Sea at Ain Sokhna, Egypt. This greenfield plant began production in 2009 following fast-track engineering, procurement, and construction (EPC) based on the Construction Industry Institute's PEpC procedures.

CUSTOMER

Egypt Basic Industries Corporation's (EBIC) owns and operates the highly efficient $550 million ammonia plant designed and built by KBR, a world leading EPC firm. The turnkey plant is based on a KBR proprietary ammonia process technology.

CHALLENGE

When KBR was chosen as the EPC for a proposed ammonia plant in Egypt, the company proceeded to design and build a world-class plant with state-of-the-art automation and controls. KBR scaled up their proven design and also wished to capture an additional two percent more productivity than conventional ammonia plants around the world – and get it on-stream quickly to take advantage of high ammonia pricing. The EBIC contract also required successful completion of a 60-day production test and acceptance requirement. This was a critical performance standard. If the test had to be stopped and restarted, heavy additional cost to KBR would result and negatively affect the financial success of the project.

SOLUTION

In designing the plant, KBR opted to follow the Construction Industry Institute's PEpC model, which allows leeway in the selection of suppliers of highly engineered components that have a significant impact on productivity. As a result, the specification for automation and control components contained unusual breadth and depth regarding performance, diagnostics, and asset management, aimed at capturing additional capacity and desired improved reliability and performance during operations.

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Process Management

KBR based the automation and control system decision on who would provide the best chance of passing that 60-day test the first time as well as who could deliver the better installed and commissioned cost (TICC). As a result, Emerson was selected as the Main Automation and Control (MAC) supplier and brought into Front End Engineering and Design (FEED) at an early stage when crucial decisions were being made. Picking the automation and controls near the beginning proved to be highly beneficial, permitting other key aspects of the design work to go forward more quickly. KBR also provided its excellent operator training package to enhance resource capabilities early.

The completed plant includes Emerson's total automation and control solution, featuring the PlantWeb® field architecture with FOUNDATION™ fieldbus communications protocol and DeltaV™ plant automation system, which operates the plant very smoothly with KBR's licensed control software. AMS Suite predictive maintenance software is fully integrated with DeltaV, so field-generated diagnostics are brought directly into the control room as well as the maintenance shop. Operating personnel receive real-time alerts if key instruments, control valves, or rotating equipment begin to show signs of degradation, so corrective action can be taken before an unscheduled shutdown occurs.

AMS Suite with Emerson field equipment proved its value very early. The integrated solution was instrumental in commissioning and faster startup. In fact, the 60-day production test was completed successfully, allowing the plant to go operational very quickly and assuring a low TICC.

According to Emerson's Project Sponsor Brian Nordmann, "AMS Suite was 'huge,' helping the plant achieve a high level of availability due to minimal downtime. This, combined with KBR's advanced control strategy running on DeltaV, was worth increased productivity of $27,750 per day on average. Additional uptime of five to seven days directly attributable to predictive maintenance with AMS Suite is worth $4.1 to $5.8 million annually."

The increased strategic solution productivity, extra days of uptime, and fast startup of the sold-out plant represented a revenue gain of well over $15 million during the first year of operation. Over the longer term, EBIC is achieving its goal of two percent added productivity while attaining "world class" ammonia plant status.

"KBR project expectations were met or exceeded, and with a lower total installed and commissioned cost!"

Mike Barthelemy,
KBR Project Procurement Manager

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