The Client’s Needs

Shintech, Inc., the largest producer of polyvinyl chloride (PVC) in the United States, desired to become more vertically integrated in its production operations in addition to expanding its capacity to meet growing demand in the North American market. This vertical integration included the production of the PVC precursor vinyl chloride monomer (VCM) from a dedicated in-plant chlor-alkali facility.

In order to achieve the desired production goals, major chemical processing equipment was necessary to generate the large quantities of high-quality sodium chloride as raw material needed to support the chlor-alkali plant operations. Other process needs for the plant included concentration equipment of the by-product caustic soda.

Veolia Water Technologies was selected to provide the salt purification plant and caustic soda evaporation system for Shintech’s new Plaquemine facility. This was due to Veolia’s commercially demonstrated experience in this industry with the ability to manage and execute large-scale, turnkey construction projects.
Technology Solutions
The salt purification system, essentially the heart of the plant, consisted of a single-stage HPD® salt crystallizer fed from an upstream reactive brine pre-treatment process. Driven by mechanical vapor recompression (MVR), the system is designed with a nameplate capacity of 820,000 metric tons per year (mtpy) of high-quality sodium chloride that is utilized in the chlor-alkali plant. When completed, this system would be the largest, single-stage evaporated salt system in the world.

The companion project awarded involved a by-product of the chlor-alkali plant. An HPD evaporator system was designed to concentrate the merchant membrane cell caustic from 32 wt% to 50 wt%. This system would produce 1,520 metric tons per day (mtpd) of sodium hydroxide on a dry basis.

The concentration system was designed as a steam-driven, triple-effect, HPD falling film evaporation train and is configured to maximize steam economy. The challenge for Veolia was to design the system with a minimum turndown of 15% of design capacity required by Shintech.

The Results
Due to successful execution of the projects and performance of the HPD salt purification and caustic concentration systems, Shintech again selected Veolia for further expansion of the Plaquemine facility.

A nearly identical plant was constructed adjacent to the original site. Both the new salt crystallizer and caustic evaporation systems were started up in early 2011.

Turnkey Project Execution
Veolia was initially awarded the salt plant as a turnkey project due to their extensive experience in design, management, and building the largest evaporated salt plants in the world. Recognizing the ability to execute complex projects, the caustic concentration system project was also awarded on a turnkey basis. This full-system supply and installation allowed Shintech to focus on other aspects of the plant.

The scope of both projects also included:
• Civil works including foundations and pilings
• Structural steel
• Mechanical piping, valves, and insulation
• Electrical, controls, and instrumentation
• Startup, commissioning, and operator training support