

BRINE TREATMENT PLANT CONSTRUCTION

CLIENT:	CONFIDENTIAL
MARKET:	Chemical Process Petrochemical Refining
LOCATION:	Baltimore, MD
SERVICES:	<ul style="list-style-type: none">• Project Management• Architectural, Site/Civil Permitting and Plant Tie-In Support• Process, Mechanical, Electrical, Structural, & Automation Engineering• Installation & Commissioning Services
COMPLETED:	2018-2020
VALUE CLASS:	\$1.5MM

ABOUT: *The Client is located in New Castle, Delaware and manufactures and delivers industrial chemicals. The Client offers products which includes sodium hypochlorite, caustic soda, chlorine, and caustic potash which are used in applications such as water and wastewater treatment, drain cleaning, swimming pool chlorination, and paper processing.*



PROJECT DETAILS

A chemical company which manufactures industrial inorganic chemicals planned to construct a new Brine Treatment Plant to double their manufacturing capacity at their Delaware City, DE, plant. This chemical manufacturer planned to modify their existing salt handling and brine production area with the addition of a weir installation and other modifications to the brine saturator pit. Additional areas within the plant construction included: pre-coat and body feed systems, filter press operations, brine guard filters installation, filtered brine tank, Brine Ion Exchange (BIE) processing skid with columns, pure brine storage tank and a recycle process water tank. All new equipment was housed in a new, approximately 6,500SF prefabricated metal building built on a concrete slab with depressed areas to accommodate the process demands.

TAI provided the engineering and design work needed for the plant construction project including the site civil engineering, permitting application and expediting, process piping design, mechanical engineering, electrical engineering, and automation & controls engineering all based on a design/build approach. In addition, TAI provided minor architectural and structural support.

A summary of the base scope of work included in this project was as follows:

1. Purchase Specifications and Equipment/Vendor submittal reviews for the process equipment and instrumentation.
2. Site Civil, Process, Mechanical, Electrical and Controls engineering and design to prepare "Issued For Permit & Construction" drawings for the Brine Treatment Plant Scope of work.
3. Engineering Project Management to expedite and coordinate the development of permit and construction documents.
4. Project scheduling and permit expediting work to accelerate the project schedule.
5. All construction management to bring the project in on schedule with phased implementation to dovetail with the existing production process.
6. All new DCS (DeltaV) and PLC/HMI (Rockwell) programming for the new process and equipment. The new DCS programming was added to an existing system. The PLC/HMI programming was on all new controls equipment and was tied into the DCS system.

Specifically, TAI provided the following:

TAI provided a Project Manager and personnel to manage Quality Assurance. TAI also prepared designs in accordance with applicable codes and standards including, but not limited to: ISA, NFPA, NEC, ASME, API, ICC, and IBC.

TAI provided Civil, Process, Structural, and Mechanical Engineering design services to generate plant and process layouts with all the structural and safety features needed for the new process and equipment. The new equipment included:

- Bulk Storage Tanks
- Filter Presses
- Guard Filters
- Brine Ion Exchange Rubber-lined Columns
- Valves
- Pumps
- Agitators
- Compressed Air System

Electrical Engineering

- TAI design and engineering personnel coordinated with process and mechanical drawings to acquire load information and allowable space dimensions for the electrical distribution equipment. TAI met with customer's project and operations personnel to obtain clear input on the project's requirements.
- TAI coordinated with the Building MEP engineer to ensure the entire project's Electrical design, including grounding and Lightning Protection was complete.
- TAI designed the electrical distribution from existing plant power source to a new MCC for all process and building loads. TAI was responsible for the design of all electrical distribution and local motor control (HOAs).
- TAI provided a Cable tray design for power and control cable as needed in the processing area of the plant.
- TAI provided the Heat Trace design for a small amount of over-the-roof piping.
- A full set of schematic drawings was provided.

Instrumentation, Automation and Process Controls Engineering

- TAI provided the following project Controls Equipment:
 - o Level, Flow, Temperature, and Pressure Transmitters
 - o High-Level Switches
 - o On-Off Control Valves (with Limit Switch feedback)
 - o Proportional Control Valves (with Position feedback)
- TAI provided agitator, pump and motor control details.
- TAI provided the design of instrumentation and controls wiring for all equipment.
- TAI provided specification and design for an I/O Panel, pneumatics Panel, junction boxes, and control room modifications with appropriate termination drawings, per the customer's requirements.
- TAI provided all new DeltaV DCS hardware, configuration, and programming. This was an extension to an existing DeltaV installation. The programming for all new process equipment for operations was phased in as the new production equipment was available. The phased implementation allowed for the continuation of existing production that was eventually replaced by the new, extended facility.
- TAI provided a new Brine Ion Exchange (BIE) PLC and HMI for local visibility and control of this portion of the process. The new PLC was connected to the DeltaV system to allow graphical representation and supervisory control of the BIE process on the DeltaV operator interface stations.
- TAI purchased and installed all new instrumentation and controls equipment. TAI provided the start-up commissioning services to assure proper operation of the processes and comfort level of the operators using the new control system graphics.
- A full set of schematic drawings was provided.