EI ASSOCIATES

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2017 CORPORATE/INDUSTRIAL ISSUE

Multi-Plant As-Built P&ID Documentation

Reagent Chemical is the largest distributor of HCl in the U.S. OSHA recently attempted to change regulations that would bring users of aqueous hydrochloric acid under the jurisdiction of OSHA's Process Safety Management (PSM) regulations. Before OSHA changed its policy on the inclusion of aqueous solutions of hydrochloric acid being regulated under the PSM regulations Reagent Chemical, as well as other process industrial companies, were required to develop and maintain OSHA approved P&IDs for their facilities. In the United States this means that P&ID's must be developed to International Society of Automation (ISA) standards. Reagent Chemical proactively implemented a program to prepare comprehensive record documentation for all their existing facilities.

With input from Reagent Chemical staff EI Associates developed standard P&IDs for sites located in Middlesex, NJ and Williamsport, PA. P&IDs for the two initial sites then served as the basis for all sixteen additional Reagent Chemical sites located in nine states throughout the US.

The following items were documented on the P&IDs:

A. All process equipment/process component valves, tanks, and piping.

B. P&IDs reflecting the existing as-built conditions.

C. Detailed piping information covering materials of construction, pipe size, service, flow direction, in-line elements (traps, filters, strainers, etc.).

D. Detailed component information for all valves, pumps, etc.

E. Materials of construction of all components.

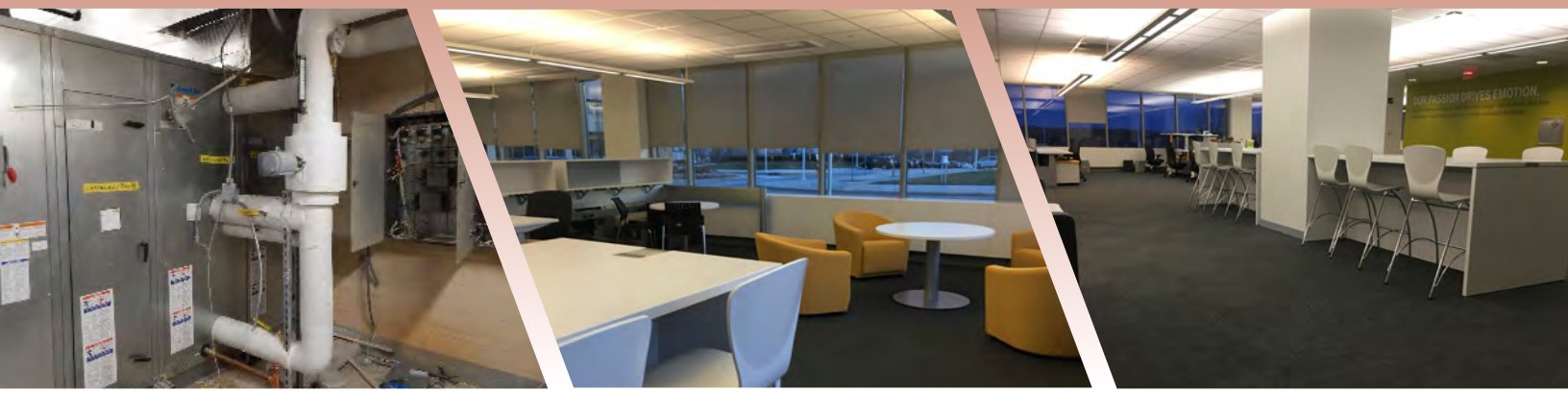
F. Name and tag information for all process equipment components.

G. Identify all gauges, transmitters, level controllers, and pressure switches.

Corporate Headquarter Restack and HVAC Replacement

EI Associates is currently assisting a Fortune 100 client with the architectural "restack", interior redesign, and replacement of mechanical systems at their North American corporate headquarters. The project involves two complete floors of interior office areas totaling 96,400 GSF. This project will improve adjacencies and overall layouts, incorporate our client's new global corporate standards, and create a collaborative-type environment befitting their 21st century workplace. This new corporate design standard incorporates an egalitarian arrangement of individual workplace, collaboration, concentration and team areas.

The project also involved the concurrent renovation of selected building mechanical systems including the replacement of original central station air handlers, the replacement of original supply and return ductwork, comprehensive duct cleaning of all supply and return systems and duct shafts, and the complete rebalancing of the entire HVAC system. In addition the work also included the replacement of the entire antiquated perimeter induction air system involving 585 units. The new system will improve temperature control, reduce energy consumption and eliminate prior overheating issues at perimeter spaces.



Campus Chilled Water Piping Replacement

EI Associates is assisting a major international telecommunications corporation with the replacement of major portions of its deteriorated campus underground chilled water piping. The piping is part of a chilled water loop which supplies critical cooling water from a Central Chilled Water plant to numerous office buildings, electronics labs and support facilities. The existing 42" diameter chilled water piping is over forty years old and was constructed of thin-walled schedule 10 carbon steel piping which is badly pitted and deteriorated and has been the subject of significant on-going leaks. Portions of the piping system are buried approximately 16' below grade making it extremely difficult to repair. The campus buildings served by the chilled water system contain sensitive electronic laboratories that require 24 hours/day, 365 days/year cooling to remain in operation. Shut down of these buildings and laboratories is not an option for the client. EI Associates commenced with the preparation of a Feasibility Study to evaluate both the below-ground and above-ground chilled water piping replacement options. Due to the logistics of the existing piping depth, layers of multiple underground utilities, and the high risk and loss of an interruption to service, an above-ground replacement option was selected. A detailed investigation and study was also conducted to determine the best procedure for isolating chilled water lines and back feeding buildings with chilled water to keep them online without requiring shut down of the chilled water plant during the replacement work. A comprehensive "Cut-In" procedure and all necessary drawings were developed to provide step-by-step instructions regarding valve operations, demolition, new construction work and restoring the system to its original operating state at the completion of the project.

EI designed new chilled water piping, connections to the existing Chilled Water Plant and all transition and campus interconnection points, as well as new low-height pipe rack structure to support the above-ground chilled water piping. The design of site restoration, landscaping elements and partial architectural enclosures was also provided to screen the pipe rack structure within the campus setting. The design required extensive site survey, geotechnical and ground penetrating radar (GPR) efforts to accurately locate existing site features, underground utilities and determine the presence of historic fill so that pipe support foundations could be properly located and designed.

Proposed Chilled Water Piping shown without Landscaping/Screening Elements

Facility Design for API Development

The development of APIs (active pharmaceutical ingredients) is a lengthy and costly process. To ensure the proper design, construction and operation of facilities, systems and infrastructure to support API development, the following must be carefully considered:

- Containment and Control Strategies: Closed system processes, liquid vs. powder processes, contained pneumatic conveying, material transfer controls such as isolators with rapid transfer ports (RTP), downflow booths, gloveboxes and glovebags and PPE to protect personnel from exposure to API chemicals
- Reactors: Reactor materials of construction (all glass, glass-lined carbon or stainless steel, Type 316L SS or Hastelloy C), operating pressures, safety, heat transfer, agitation and cleaning
- Separation Equipment: Vacuum distillation, liquid-liquid extraction and centrifuge systems
- Drying Equipment: Tray dryer and filter dryer systems
- Pollution and Waste Control: Dust control, scrubbers, carbon adsorption, isolation/neutralization tanks
- Process Utilities: Water (city or USP/point-of-use, loop or bulk raw material), compressed air, gases (compressed gas cylinders, liquid-filled Dewar bottles), vacuum (liquid-ring, once-through oil and dry vacuum pumps), heat-transfer media (reactors equipped with temperature control modules (TCM), heat exchanger and pump)
- Facility Layout and Design: Unidirectional personnel/material flows to avoid cross contamination, utility access, materials of construction, interior finishes, cGMP, cleanability and maintenance and ergonomics
- Environmental Conditions: cGMP/containment required air changes and pressurization, ISO classification, recirculation vs. once-through air
- Electrical Classification: Class 1, Div. 1 or 2 or Class 2, Div. 1 or 2

EIA's in-depth pharmaceutical processing and design experience provides a strong knowledge base. Our in-house team of pharmaceutical facility specialists includes the significant API facility expertise of Mr. Yasha Zelmanovich, EIA's Process Engineering Manager. Yasha has over 30 years of process pharmaceutical experience and has co-authored "Designing a Facility for API Development", published in CEP magazine.

Campus-Wide "P4P" for B-D

Pay for Performance (P4P) is a comprehensive energy efficiency program that provides incentives towards whole-building energy improvements. As an approved NJ P4P Partner EI Associates recently assisted Becton-Dickinson's Facilities Engineering team and the Office of Global Sustainability on the implementation of major Energy Conservation Measures (ECMs) at their Franklin Lakes, NJ campus.

The Becton-Dickinson P4P program involves the execution of several projects covering the installation of two new high efficiency boiler plants which utilize condensing high-efficiency natural gas boilers, new central system HW pumps, new central exhaust stack and new boiler controls; replacement of three 525 ton electrical centrifugal chillers with new magnetic bearing water cooled centrifugal chillers; the conversion of constant volume lab exhaust fans to VFD units with new controls; and the replacement of three existing electric domestic hot water boilers with gas fired boilers.

Of the estimated $3M project cost EI Associates obtained approximately $1.2M in NJCE P4P incentives on behalf of Becton-Dickinson. Now complete, the ECMs were recently measured to save Becton-Dickinson over 5.0MM kWh per year and provide nearly $600,000/year energy savings, resulting in a project ROI of 3.5 years. The net total energy savings equates to the power consumption of nearly 427 average U.S. homes and eliminates over 2 million pounds of greenhouse gases.

New R&D Electron Micro Scope Lab

A major Confidential Client is constructing an acoustically insulated, aluminum-paneled room on the laboratory ground floor at their east coast Research & Development Center. The room will house a new electron microscope, which is very sensitive to temperature, humidity, vibration, and certain electromagnetic waves. EI Associates prepared the basis of design and the detailed design for the room. The room will be isolated from the upper floors and constructed utilizing an Aluminum Faraday Cage within the existing perimeter walls of the existing laboratory. Cooling panels will be mounted to the perimeter walls to maintain the strict temperature, humidity, and vibration criteria. EI Associates designed the HVAC, sprinkler, power, lighting and life safety improvements.

The new ceiling and walls utilize Quiet Rock and aluminum panels with acoustical fireproof insulation. The concrete floor in the lab is covered with aluminum panels and a finish flooring product. EI Associates engineered an aluminum trolley beam, bolted to the ceiling for use with a conventional, removable steel trolley so that electron microscope can be serviced by removal of the top section.

News, Notes & Events

EI announces the hiring of the following employees:

- Joseph West, Director of Industrial Projects. Joe formally served as Director of Operations for Jacobs Engineering.
- Edward A. Benovengo, Jr., AIA, Sr. Project Manager. Ed previously led the architectural group for Lockwood-Greene/CH2M Hill.

EI announces the following promotions:

- James P. Hunter, RA promoted to Project Manager. Jamie has been with EI for over 10 years and previously served as Project Architect.
- Adam R. Caravaglia, P.E. promoted to Manager, Mechanical Engineering. Adam served as a Sr. Mechanical Engineer with EI for over 8 years.
- Yasha Zelmanovich, Manager Process Engineering, promoted to Vice President of Engineering. Yasha brings over 30 years of Industrial, Pharmaceutical and Specialty Chemical facility engineering experience.
- Congratulations to Edward M. Norin, P.E. Ed was recently recognized by the American Institute of Chemical Engineers (AIChE) for over 50 years of membership.

New Projects

- Air Liquide – Plant Expansion
- Celgene, Summit, NJ – Office and Lab Renovations
- DSM Nutritionals, Belvidere, NJ – Multiple Structural and Foundation Applications; CIP System P&ID Development
- ExxonMobil, Annandale, NJ – High Tech Lab, Pilot Plant
- Firmenich, Plainsboro, NJ – Laundry Scent Test Facility Upgrades
- IFF, Hazlet, NJ – Plant Modifications
- Merck, Rahway, NJ – Cafeteria Renovation
- NJDPMC, Trenton, NJ – Secure Work Environment, Fire Alarm System, Roof Replacement
- Par Pharmaceuticals, Spring Valley, NY – Manufacturing Plant Improvements
- Reagent Chemical, Multiple US Locations – As-Built P&ID Documentation, Pipe Bridge and Tank Platform Foundation Design, Thermal Oxidizer Vent/Deflagration Design
- Rockaway Township, Rockaway, NJ – Construction Management Services for Concession Building
- Sandoz, Princeton, NJ – PJM Energy Program
- Sun Chemical, Carlstadt, NJ – Pilot Laminator Installation

On-Going PM and Engineering Services for Corbion

EI Associates has been providing on site Project Management and Process, Structural, Mechanical Engineering as well as Architectural Services to Corbion – Purac for nearly 2 years at their facility in Totowa, NJ. Additonally EI has executed several multi-discipline projects at this plant involving manufacturing and the general facility operations. Facility work executed by EI Associates has covered Code Compliance, building mechanical and electrical studies and documentation, loading dock improvements, and office area additions.

EI Associates designed manufacturing improvements for the Medium Blending Operation which involved catwalk and platform structures to link the existing three blending lines and the existing elevated mixer/blenders. Pneumatic charging of ingredients was incorporated to improve the safety and physical requirements of the previous manual charging process which utilized fork lifts, manual bag slitting and manual dumps. EI Associates also reconfigured an existing high bay blending room that contained four, High Volume bag dump stations. This project involved modifying an existing fire rated separation wall to permit pallet entry into the filling area through high speed roll-up shutters sequenced with incoming material flow into the building.

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