

What initially began as one project for Clarios (formerly the battery division of Johnson Controls Inc.) in its Holland, Ohio plant ultimately grew into multiple projects spanning four states, including Delaware, Missouri, North Carolina, and Ohio.

With increased consumer demand for absorbent glass mat (AGM) batteries, driven by the popularity of start-stop vehicles and increasing power needs, Clarios needed to significantly increase production capacity with minimal impact on existing production lines within their plants. The number of cars built in North America with start-stop systems will approach 50 percent in 2020 due to more stringent environmental regulations.

To quickly increase capacity to meet market demand, Clarios partnered with GEM Inc. to drive the projects toward success.

### **IT STARTS WITH A PLAN**

In 2012, Clarios began investing in their existing plants with the growth of its AGM battery product by maximizing the use of their facilities to expand capacity. Having worked with GEM Inc., a member of the Rudolph Libbe Group (RLG) of companies on numerous successful projects over many years, Clarios contracted with them again for its Toledo, Ohio plant expansions.

As is the case with all new process-driven projects, GEM focused on the new and existing processes at the plant. Based on the complexity and speed to market needs, traditional construction methods for this project would not work. By using the Guided Process Solutions (GPS) system, GEM determined that the projects were not only feasible, but could be accomplished affordably with minimal downtime and within critical time constraints.

## **Holland, Ohio**

### **PRECONSTRUCTION PLANNING ENABLED A COMPLEX BUILD**

Careful preconstruction planning was needed for a new processing tower; however, a simple installation wasn't going to be possible since the roof of the plant was a unique design with post-tensioned concrete roof panels. For a tower to be installed, the roof had to be supported and removed. Portions of the roof large enough to bring the tower's support columns through were cut. The new concrete foundations for the tower were poured beneath existing battery equipment as it was operating.

The 75-foot high, multi-level tower was then constructed above the existing roof and operating equipment. Once completed, the battery line was relocated, and three levels of supporting process equipment were connected with the existing facility's upper floors.

Once the process tower addition was complete, the remainder of the existing roof was removed and the new process equipment—critical to the plant's success—was hung from the rafters so the floors could be finished. Once the floors were completed, the equipment was then lowered into place.



RLG's team brought not only expertise and experience to the project, but also the unique GPS approach of designing solutions tailored to the owner's individual process requirements. The company's investment resulted in increased production capacity of six million automotive AGM batteries at this facility, the first Clarios plant in North America to make them.

As the demand for new equipment was needed to keep up with customer demand, Clarios hired GEM to complete a second phase to this project, including additional steel, equipment, and a process elevator.

## St. Joseph, Missouri

### MULTI-PHASE WORK PLAN PROVES FORMULA FOR SUCCESS

As a result of the many successful projects with Clarios, in June 2017 GEM was awarded a major expansion project at its battery plant in St. Joseph, Missouri.

Additional capacity to meet growing customer demand was needed and the solution was phasing numerous projects simultaneously. GEM led the preconstruction, budgeting, bidding, and construction activities. Many projects started immediately to meet the previously scheduled shutdown for utility and process tie-ins which benefits the project by minimizing any additional impact or delays to the production schedule. The overall project was challenging due to the time constraints and the need to work around operating equipment.

GEM's work included building expansions, three new production lines, an added pasting tower and curing chambers, as well as equipment installation. In addition, extensive upgrades were needed for the mechanical and electrical systems, including a new 700hp air compressor.

Due to GEM's experience and knowledge of Clarios' process and the ability to start field activities before final design was completed, the St. Joseph project was completed in record time with minimal downtime and on budget.



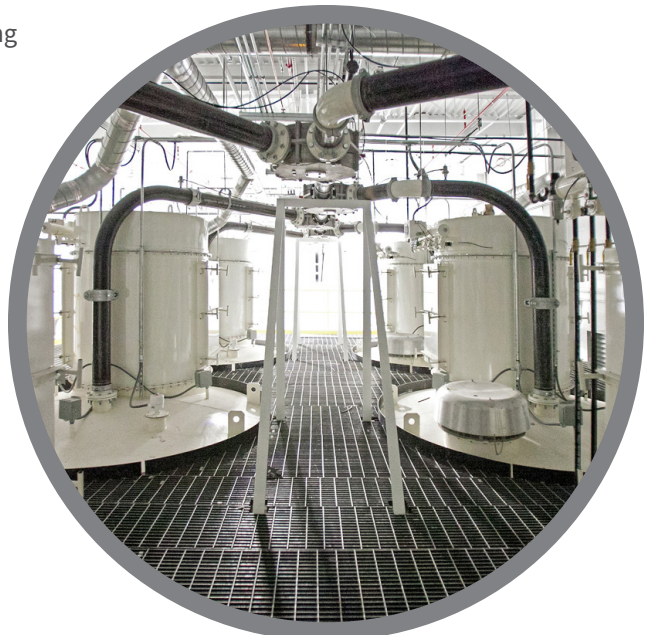
## Middletown, Delaware

### UNIQUE CHALLENGES AND A DEMANDING SCHEDULE

Next up Clarios called on GEM's GPS team to complete an oxide and pasting line expansion at its battery production facility in Middletown, Delaware. Coordinating with plant personnel on cost and schedule early in the expansion design phase was key to the success of this project. Critical components of the project were maintaining traffic flow and keeping production online with zero unplanned downtime for the plant.

Planning the project in phases resulted in production staying online and actually increasing productivity. The GPS team worked carefully around existing operating equipment and plant personnel to stay on schedule and meet project goals. Phase one of the project involved the installation of new equipment. Phase two involved the demolition of old equipment and installation of new equipment as well as two pasting lines alongside existing operating production equipment.

By summer 2017, the project was successfully completed on-schedule and on-budget.



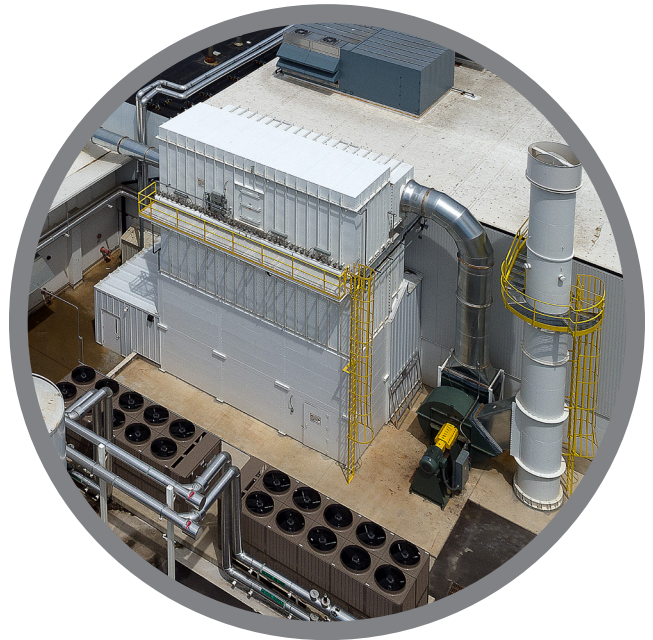
## Kernersville, North Carolina

### PROCESS TAKES CENTER STAGE

Based on its previous success, Clarios continued its partnership with the GPS team to design and build its Kernersville plant addition and process upgrades. Similar to all GPS projects, the pre-construction phase is critical to understanding the project goals and process needs prior to the design phase. Process takes center stage -- everything else, from facility sizing, equipment layout, and needed utilities then evolves.

To accelerate the project, GEM convened an intensive design session with all project stakeholders. That group established a schedule to determine a basis of design, allowing GEM to create a detailed scope of work that met the owner's needs and critical milestones, including accurate budget and schedule.

Work performed includes a new oxide facility expansion, electrical upgrades, equipment setting, process piping, HVAC, and plumbing. This project is currently under way and on track to be finished in fall 2019.



## Building a Relationship

GEM's team of multi-disciplined experts brought not only expertise and experience to these projects, but also a unique and collaborative approach tailored to the owner's individual process requirements. By meeting established deadlines, making the most of downtime, and projecting accurate budgets, GEM was able to build a positive working relationship with Clarios, resulting in additional projects at plants throughout the U.S.

**To learn more about Guided Process Solutions,**  
**visit: [RLGbuilds.com](http://RLGbuilds.com) or contact**  
**Brandon Gartee, Business Development Manager at**  
**[Brandon.Gartee@RLGBuilds.com](mailto:Brandon.Gartee@RLGBuilds.com) or 419.720.2677.**

