

Case Study:

Upgrade of Generator Paralleling Switchgear, Breakers, Controllers and Doors

Multinational Financial Institution
Seattle, WA



Situation:

The customer found themselves in an aged building that had 20-30 year old switchgear. At each scheduled Switchgear maintenance visit they became less and less confident that when the maintenance window was over that their Switchgear would re-energize and come back on line. A decision was made to retrofit multiple facets of their line-up to include the breakers in the three generator sections and two feeder sections. The customer also desired greater system functionality and communication with the BMS system that the existing analog system would not provide; therefore they opted for a complete controls upgrade also.

Challenge:

Up front SAI realized that there were two main challenges. Since this paralleling gear was not manufactured by SAI, an in depth site survey was need to insure that the new Square D NW breakers would fit appropriately in the existing sections. The second challenge was understanding what added system functionality the customer was looking for out of their equipment and then writing the logic in order to accomplish it, while being controlled by the new digital controls package. The third challenge was logistical in nature. Normal delivery of this type of equipment is on an eighteen wheeler, to a standard loading dock, however tractor trailers are not allowed in downtown Seattle, therefore specialized transportation would be necessary.

Solution:

The SAI project team returned with the information that was collected at the site survey. They sat down with our in-house electrical, mechanical and controls groups in order to devise a strategy. The E&M engineers determined that the Square D NW breakers would fit in the existing sections, however new cradles and bus stabs needed to be designed and manufactured. Along with the mechanical design, our controls engineers designed the new ladder logic to work in conjunctions with the new breakers and provide both the functionality and also tie into the existing Building Management System (BMS). Once the customer solution was designed and built, our experienced Project Management Team scheduled specialized transport given the challenges that we were faced with the downtown Seattle delivery, and delivered the project on time and free from damage. The switchgear was retrofitted on site and brought on-line with minimal scheduled down-time, thus meeting and exceeding all customer expectations.

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Integrated Solutions

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Case Study:

Retrofit of existing Generator Paralleling Switchgear

Regional Hospital
Danville, IN



Situation:

The Hospital's facilities group knew that their existing Generator Paralleling Switchgear needed to be upgraded with new generator circuit breakers, which would require new bus stab connections and breaker roll in service. There was also a requirement to upgrade the existing analog meters to fully digital meters, providing them with a great deal of useable data, along with functional control of their switchgear because of the updated breakers and logic that would be provided. With the additional data points that could be gained from the updated components, the customer desired to have a physical tie into their existing building management system also.

Challenge:

Up front SAI realized that there were several challenges. Since this paralleling gear was not manufactured by SAI, an in depth site survey was needed to insure that the existing sections would appropriately house the new Square D NW breakers. Upon further review we found that we would need to modify both the line and load side bus connections in order to make appropriate mechanically tie into the new breakers. Also, in order to change out the analog meters and replace them with digital meters, we would need to design, fabricate and paint to match new doors where the new meters would be mounted. Finally, an in depth understanding of the added functionality and the data that the customer was looking to gather from the

switchgear into there BMS was going to be gathered and programmed into the logic of the updated switchgear package.

Solution:

The SAI project team reviewed all of the information collected at the site survey. They then returned to the factory and sat down with our in house electrical, mechanical and controls engineering staff, to discuss the design strategy. At the end of this meeting the mechanical engineers began to design the bus connections that will be used to make the line and Line and Load side bus connections on the new Circuit Breakers and insure that it would fit the existing enclosure. They also took the measurement that were provided from the site survey and designed the new doors that would be added with the new digital meters. At the same time our sourcing team worked with our OEM partner to insure timely delivery of the breakers at preferred discount rates that we share with our customers. With the new functionality and communication requirements in hand our controls engineers designed the digital monitors and controls system to meet the customer needs. Once all aspects of this Retrofit project were in tact, the system was tested in house prior to shipment, and then delivered to the site for the final install. In the end, SAI met and exceeded all customer expectations with limited scheduled downtime.

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Case Study:

Retrofit of existing Generator Paralleling Switchgear

Washington DC



Situation:

This Government facility wanted their aged analog controlled Switchgear to be updated to a fully functional, digitally controlled gear Line-up with redundant manual control panels installed in each cubicle. Along with the increased functionality, they desired the ability to pull communications logs from the Switchgear and any important alarms/data that was outputted from the newly retrofitted Switchgear line-up into their Building Management System (BMS).

Challenge:

Up front, the first issue that we were going to run into was security clearance into a highly secure government facility that a great deal of "confidential" information passes through. SAI would need to gain security clearance for the on-site retrofit team in order for them to do the job. Once this occurred, SAI was to go in to take existing measurements as the facility planned to re-use the current circuit breakers, current transformers and the bussing that was in the existing system. We needed to familiarize ourselves with the existing control scheme in order for our in-house controls engineers to tie into the digital controller and redundant analog controllers to insure system functionality and controls output to the BMS. Given that all of the controls were new, SAI would custom cut and paint the new doors to match with the existing equipment that was in place.

Solution:

The SAI project team reviewed all of the information collected at the site survey. They then returned to the factory and sat down with our in-house mechanical and controls engineering staff, to discuss the design strategy. At the end of this meeting the mechanical engineers began to draft the new doors in CAD to match with the existing switchgear dimensions from the site. Once designed, the design was sent to manufacturing to custom cut, punch and paint so they would be ready for the controls install once programmed. At the same time, our controls engineers reviewed the customer specified scope for the upgraded digital controllers, along with programming in the redundant manual control panel, in order to integrate the appropriate logic package to meet the customer needs. Once all aspects of this Retrofit project were in tact, the system was tested in-house prior to shipment, and delivered to the site for the final install. In the end, SAI met and exceeded all customer expectations with limited scheduled downtime.

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Case Study:

Retrofit of existing Generator Paralleling Switchgear with Design to Match generator section addition

Regional Hospital, New York, NY



Situation:

This New York hospital needed to expand their footprint and their critical power usage. The need for a modification to their standby power system was necessary. The scope of this project was to modify the existing Russelectric master control section along with the existing generator sections that were in place already. In addition, a 900kW generator was to be added along with adding a new, 3rd generator control section to accommodate the new generator to the paralleling and distribution switchboard line-up. SAI also needed to include provisions for load shed and the third generator in the updated master PLC program.

Challenge:

Up front SAI realized there were several challenges. We were to re-use the existing master and generator cubicles, circuit breakers and current transformers and bussing, requiring an in depth site survey to ensure that the new section would match the size and color of the existing switchgear line-up. Also, in installing new digital controllers in the generator sections and a new manual controller into each generator section, we would need to design, fabricate and paint to match new doors where the controllers would be mounted. Given that we were asked to provide load shed and a third generator, we needed to upgrade the master PLC program and add a master section redundant PLC with I/O modules, along with a 15" touch screen operator interface module and a Mosaic mimic control panel that would

be added to the upgraded master control section. With the complexity of this application, an in depth understanding of the additional hardware and desired system functionality would need to be gathered. The customer was looking to export all usable data and alarm logs from the switchgear and push it into their BMS in order to be able to react quickly if and when the need did arise.

Solution:

The SAI project team reviewed all of the information collected at the site survey and the follow up meeting with the building engineers. They then returned to the factory and sat down with our in-house mechanical and controls engineering staff to discuss the design strategy. At the end of this meeting the mechanical engineers began to design the new doors that would be added to the line-up with the new digital controls package. With the new functionality and communication requirements in hand, our controls engineers designed the digital monitors and controls system to meet the customer needs along with adding both the touch screen operator interface and the mimic control panel. Once all aspects of this Retrofit project were in tact, the system was tested in-house prior to shipment, and delivered to the site for the final install. In the end, SAI met and exceeded all customer expectations with limited scheduled downtime.

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Case Study:

'Design to Match' for existing Generator Paralleling Switchgear

Leading International Insurance Agency
Livingston, NJ



Situation:

Customer was adding a new generator that needed to be paralleled into the existing line up of generators and tied into the existing paralleling switchgear line-up. This will need to be done in both the North and the South Switchgear Systems. Both line-ups needed to add four sections each, one for each of the following needs: Generator Controls, Distribution, Master Controls and one bus duct section for ease of installation.

Challenge:

Up front SAI realized that there were several challenges. Since this paralleling gear was not manufactured by SAI, an in depth site survey was need to insure that the new sections could be designed and built to exactly match with the existing line-up. Between extensive digital photography, site measure and extensive note taking, SAI would need to compile a detailed BOM that will be needed to complete the job while maintaining the exact form, fit and functionality of the existing line-up.

Solution:

The SAI project team began with an in depth review of the information that was collected at the site survey. The Project management and service team then sat down with our in house electrical and mechanical engineering staff, where they began to design the sections according to the existing manufacturers design criteria to insure a perfect aesthetic match. Once the design teams engineered the framing, enclosure, bussing and controls detail, our sourcing team began to source appropriate GE breakers to match the breaker manufacturer and models in the existing line-up. The new generator control cubicle was outfitted with the appropriate Logic Controller, Synchronizer, status panels, switches and meters to control the new as built system while taking control of all existing functionality of the original gear. This solution was duplicated for the North Line-up also. The installation and tie in occurred seamlessly while keeping scheduled downtime to a minimum, thus meeting and exceeding all customer expectations.

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