

# A Unique Industrial Application that Supports the Beauty of Designing with Remote Power Control



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**SPEC PROCESS ENGINEERING & CONSTRUCTION IS NO STRANGER TO PROVIDING UNIQUE PROJECTS WITH SPOT ON SOLUTIONS. SUCH WAS THE CASE WHEN THEY WERE BROUGHT IN TO REPLACE A PLANT'S FAILING GENERATOR.**

*This paper was developed based on an interview with Andrew Paul one of SPEC Process Engineering & Construction's leading electrical engineers to learn more about a unique application they designed that utilized the switching, sequencing and web interface of the LynTec RPC panels.*

## BACKGROUND

The beauty business relies on aerosols to deliver products to consumers, but the propellants in many of these are considered highly flammable. To minimize the risk of combustion, important considerations need to be made in the rooms where the aerosol cans are filled. Monitoring the rooms for the presence of LEL's (lower explosive limits) is one such way to determine if a "gas" room is operating at a safe level or not and to trigger corrective measures to return the levels to the desired range.

## THE PROJECT

The client for this project was having a dangerous problem at one of their factories on the assembly lines used for injecting aerosols into beauty products. This process was conducted in the facility's gas rooms, chambers where highly flammable propellants were being injected into beauty product canisters. All in all, they had 5 assembly lines with 2 gas rooms per line for a total of 10 rooms. In each of these unmanned rooms, the assembly processed pressurized cans of shaving cream, hair spray, mousses and other beauty products with aerosols. The rooms are fully automated and canisters would come in on a conveyor filled with product to be pressurized. To maintain the safety of the room, huge primary and secondary exhaust fans were present and were backed up by a 30kW generator.

## THE CHALLENGE

The challenge they were facing centered on a generator that kept tripping. The project's leading engineer, Andrew Paull explains in more detail; "Our client had air quality LEL sensors (lower explosive limit sensors) present in their gas rooms to constantly monitor the rooms for a certain mixture of flammable gases called arsols. Too much, or too little of these gases will not ignite, however, just the right mixture of flammable gas and oxygen will. The LEL sensors know the delicate balance for this mixture and test for its lower limits.

The client's gas rooms are equipped with exhaust systems and should the "right" formula for a potentially hazardous atmosphere be identified, a sequential program begins an automatic shut down. The exhaust systems in these rooms are critical, and for whatever reason, if you lost utility power to the exhaust system, the backup generator would automatically kick in. However, our client's stand by generator which provided the backup power was failing and the client absolutely could not have the exhaust in these rooms go down."

The problem they were having was a block loading issue that tripped out the generator which was causing an unacceptable and unsafe condition. All of the loads fed from this generator were kicking on at the same time,

which was exceeding something on the generator causing it to trip out and the SPEC group was determined to figure out why.

## IDENTIFYING THE REAL PROBLEM AND FINDING A BETTER SOLUTION

The client was convinced that their 30kW generator was the reason the exhaust fans would lose power causing the assembly lines to stop and the client had resigned themselves to funding a purchase of a larger, more powerful generator. However, the SPEC team wasn't so sure, and when testing the system, Paull found that if he switched the loads individually, the backup generator was able to handle all of the loads. The real issue was that the inrush of all of the systems coming on at once was killing the generator.

At first, Paull figured he would address this with power relays and a PLC (programmable logic controller). In this way he could incorporate motorized breakers, power relays and a sequence timer to flip the client's breakers on one at a time. Something like a small PLC that would close contacts at 10 second intervals and not stress the 30kW generator. However, in his research he came across some information on the LynTec Remote Power Control and he was intrigued by the features. The more he investigated, the more he knew it would far outperform the client's previous panel board that had no controls and provide the ultimate solution to their "failing" generator.

Paull comments, "What was happening was that the motor starting inrush would hit the generator, then the transformer inrush would hit it at the same time and this would tax the generator



## ABOUT SPEC & ANDREW C. PAULL, P.E.

SPEC is a process engineering firm based in Burlington, Massachusetts, just north of Boston and, serving the northeastern US. The company offers full design-build services and over the past 17 years, has developed a method that has enabled them to be one of the fastest and most efficient firms in the industry. Working in a variety of industries including specialty chemicals, coatings, pharmaceuticals, energy storage, cellulosic ethanol, solar panels, biopharmaceuticals, nanotechnology, and microelectronics, SPEC specializes in technically demanding manufacturing projects. Specifically, the engineering team is well versed in new manufacturing processes, use of solvents, flammables & other raw materials that require special handling and regulatory approval, specialized utility and environmental requirements. After two decades of experience, the firm's project execution model has become an industry standard for speed, budget control & engineering accuracy.

Andrew has been with SPEC since 2004 and their Senior Electrical Engineer since 2008. He has been involved in a multitude of projects ranging from Class 100 clean rooms to food processing plants to petrochemical facilities. He has significant experience in developing and implementing electrical hazardous area classifications for various flammable materials.

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## ABOUT LYNTec

*LynTec brings to market electrical protection and circuit switching capabilities in the same enclosures. In doing so, the company has always found ways to save space, lower system installation costs and build trusted relationships with audio system and lighting designers. Its expansion into electrical and lighting controls, and now its growth into expanded lighting control, energy monitoring, built in power conditioning, and mobile applications continues to position the company as a leading resource for the AV and lighting industries and an integral partner for sustainable energy practices. For more information visit [www.LynTec.com](http://www.LynTec.com).*

output breaker enough that it would open and knock everything off line. This meant that the piping would shut down, valves would close, the conveyors stop, all penetrations would be sealed and production would come to a complete halt. This was severely problematic since every power blip and every power bump or scheduled shut down for maintenance would cause the sensors to go down, the systems to go black, and the client would have to bring everything up one at a time". He adds, "My first inclination was to build a custom control panel (a cost of approximately \$15-20K) and buy panel relays and remote hard switches. However in my research, I saw a picture of the LynTec panel board with the Square D panel and PLC built into it and at \$ 7 – 8K this was a substantial savings over the custom panel.

As I found out more about the sequencing capabilities of the LynTec RPC and its web monitoring, I knew we had a better solution for the client." Had SPEC done as the client originally asked and oversized the existing generator, they would have spent upwards of \$80,000 to handle the inrush when there was no need to. The final solution provided the client with tremendous savings and additional options for future system scalability and control, an improvement in both cost and functionality.

To complete the change over, SPEC replaced the existing panel which was due to be replaced regardless due to the age of the equipment, ripped out the distribution to the panel board and reran the circuits installed in parallel. The project was handled on a weekend shut down to swap over branch circuits and feeders and the LynTec products worked exceptionally well upon start up.

## Q&A WITH ANDREW PAULL

We had a chance to ask Andrew Paull some additional questions about this project, the LynTec products, and his thoughts on the importance of web monitoring and system scalability for power control.

**Q:** This was such a unique application for the LynTec product, do you see other applications like this?

**A:** I definitely see the LynTec solution as a way to replace industrial engineering control panels. When you think about it, most people put in a generator that is sized for the loads for Day 1, but then power needs grow and your generator stays the same. At some point, your generator can handle the full running load, but not the inrush and this is where having LynTec to sequence the way you want the loads to come on works so well.

**Q:** How did you find working with the programming for the LynTec software?

**A:** It was so intuitive; I did the programming myself. They had a video series on RPC setup that was very helpful and you can use their virtual server to experiment with the GUI. You can do it from anywhere. I even train my clients' teams on the system.



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**Q:** Was there anything in particular about the programming aspects that you felt was really helpful?

**A:** The LynTec software allows you to set all sorts of alerts to trigger external alarms, emails and other notifications. In other applications, we've use the LynTec software to set thresholds for the max loads per circuit and if we see it jump an amp or two we investigate it proactively to make sure we look at the equipment before it fails. It is a great monitoring tool and when we've showed it to the facility guys, they light up. They love looking at the loads and amperage and having the ability to lock down the panel boards when they want to and open them up to access and check whenever and wherever they need to.

**Q:** Anything else you want to add about this project?

**A:** The LynTec solution even provided the client's maintenance team with some additional assurances. There was concern every time the system went down that when it came back up it would start in mid-function and could potentially cause some damage or bodily harm. By creating a time of day sequence at the end of the shift, they were assured that there was no chance that the equipment would come back live because it would have been shut down at the breaker.

## FINAL THOUGHTS

Although the initial challenge SPEC faced on this project centered on a supposed "failing" generator, a leading SPEC engineer asked the question "Why? What he identified & found, enabled SPEC to provide the client with an alternative solution that saved them from purchasing a new generator& provided a fail-safe for their assembly line as well as a simple way to provide on/off sequencing and future scalability.

## SOME POWERFUL TIPS

When a stand by generator system is being designed many considerations come in to play beyond those used to size a normal commercial electrical service. Most importantly generators need to be able to handle the in rush or starting current for large -motors.

For instance, a typical air conditioning condenser will draw five to six times its running current as starting current in the first few seconds of operation. If two air conditioners are allowed to start at the same time the problem is doubled. This inrush demand may exceed the capacity of the generator or the engine driving it causing voltage sags and frequency shifts or in the case of SPEC's beauty client, a complete generator system failure.

Be certain to consider the in rush and plan for sequencing your equipment to come back on line. Another issue is that during an electrical outage not all of the 'normal' circuits need to be powered. By selectively turning off non-critical loads the generator size can be reduced or the fuel consumption is lessened to extend the runtime on a tank of fuel. If non critical loads can be turned off during an electrical emergency, less electricity is required to remove heat from the facility.

Good practices for all and ones that LynTec can customize power control solutions for.



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## **ABOUT CHRISTOPHER MAIONE**

Christopher Maione is a recognized leader and expert in the AV industry with over 28 years of audiovisual expertise. His forward thinking and progressive approach to business led him to found and become the managing partner of one of the world's leading AV consulting firms earning the company accolades as a leader in AV solutions and technologies. In his new company, Christopher Maione Associates, Maione employs the same stringent procedures and protocols that enabled his previous company to achieve global success and a reputation for the highest quality of work. Maione now focuses his attention on AV System Integrators, Manufacturers and Fortune 500 clients to help them identify strategic ways of handling their clients, products, & projects. Maione has a talent for forecasting trends and identifying emerging technologies that substantially impact the AV industry. Based on his own business model, he encourages colleagues to strive for excellence and consistently challenges the AV industry to improve its practices, grow its services, and develop better products in an effort to set a higher standard and respond to the changing needs of clients. Well versed in all aspects of AV, IT, Integrated Technologies, Industry Standards, Green AV and best practices and protocols, Maione is an Adjunct InfoComm Faculty Member and CTS-D/CTS-I provider and serves on a variety of key industry standard committees. In doing so, he continues to set industry benchmarks for quality & compliance. For more info please contact [info@chrismaione.com](mailto:info@chrismaione.com).



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