ARTICLE

Liquor bottling plant eliminates shutdowns with AVC

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A liquor bottling facility in Florida has nine bottling lines working two 10 hour shifts to produce 75,000 cases of rum per day, (3,750 cases of rum per hour). The large size bottles run at 400 bottles per minute with miniatures running at up to a 1,000 bottles per minute; a high speed process designed to supply the company's total American market.

This is a highly automated plant and was built for high efficiency operation but the productivity was well below expectations due to facility shutdowns caused by frequent power quality events. The most common PQ problem facing industry is sag events, which according to EPRI (Electric Power Research Institute) account for over 92% of events. As facilities do not get advance warning of impending voltage sags, unexpected stoppages can result in delays of more than one hour to restore production to the normal bottling line speeds.

The site had been suffering from multiple voltage fluctuations each month, particularly during the Florida storm season with sag events experienced between a few milliseconds to one second in duration and single phase voltage sags were recorded as low as 35% of normal voltage. In some of the worst sag events the line is interrupted and causes bottles to actually break on the production line. These bottles require clearing away but worse, the rum content is actually highly flammable and requires other special considerations in comparisons to such other bottling as beer. Once cleaned away the machine is restarted and can then re-commencement filling, labelling and repacking the full bottles into their cardboard cases. If the production lines were down for 60 minutes then close to 4000 cases were lost in a normal 20 hour production day. "The value of losses can be as high as $40-50,000 per event if you take into account the scrap costs, lost taxes, rework, and overtime to recover lost production," says Vernon Pryde, ABB International Sales Manager. "Historically 20 unplanned stoppages per annum were normal and this would result in a $500,000 loss".

The local utility investigated the problem and power quality data showed that the vast majority of events occurred on the distribution network (26.4KV system) between the main substation feeding the plant and the plant's incoming switchgear. A further survey was made of the different types of electrical equipment used at the plant and although each critical PLC (Programmable Logic Controller) was protected with a UPS (Uninterruptible Power Supply), the very high levels of plant automation

saw literally thousands of servo and adjustable speed drives operating without any protection. These drives are utilised in the complex unpacking, filling and then repacking robotic process machines and are generally too extensively distributed throughout utility increasing its remote vegetation control to reduce the incidence of trees in the transmission lines during storms, they investigated a dedicated underground feeder to eliminate lightening strike but this was rejected as “too expensive” and so the recommendation was for the installation of an on site active voltage conditioner at the main supply point to the facility.

The criteria the utility used to evaluate the conditioner options was: the percentage of sag correction provided, speed of response, ease of installation, system cost, efficiency, ability to phase balance continuously, delivery times and previous experience. The online characteristics of the ABB PCS100 Active Voltage Conditioners are capable of correcting 3-phase voltage sags up 30 percent as well as providing continuous voltage regulation so any voltage between 100 percent and 90 percent is always corrected back to 100 percent. Voltage balancing, voltage harmonic reduction and flicker elimination are all valuable features also and led to a final decision to choose an ABB 2 MVA, 26.4 KA AVC. As well as the product performance, the flexibility of an outside enclosure and a fast delivery were key factors in the choice of the ABB product.

Within the first three months of operation it had successfully protected the customer from 27 significant events and the following storm season provided the ultimate test with three hurricanes affecting the region. Another benefit of the ABB AVC installation is that maintenance costs of up to $350,000 pa before the installation were reduced to $100,000 pa - a fantastic bonus saving for the facility that comes about because the site voltage is now controlled and all electrical plant lasts longer when outside deviations are blocked by the AVC. That contributed with the reduced interruption to production to an investment payback period of less than 12 months, an excellent return on investment!”

To find out more about ABB’s power protection solutions:
Web: www.abb.com/ups
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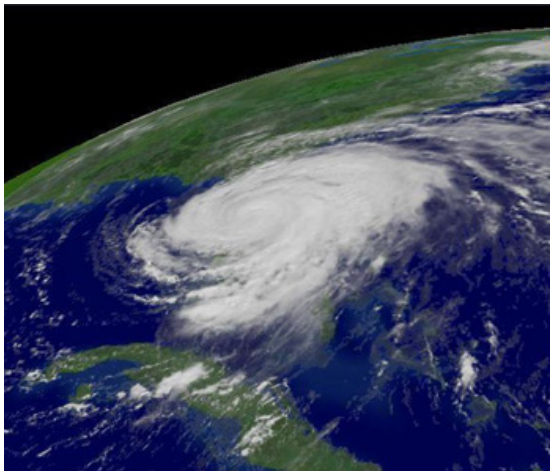

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01 One of the protected high speed bottle filling machines
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02 Final quality inspection of an AVC during production
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03 Data logging showed 356 severe events in 24 hours during Hurricane Frances but the AVC continued protecting the plant. Wind speeds of 120 MPH (200 Km/h) were recorded adjacent to the AVC and the worst that happened was the airfilters on the air conditioning units were blown inside out by the excessive wind pressure
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04 The 2000 kVA 26 KV PCS100 AVC in its dedicated container on-site

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