

### **Safety, Reliability and Performance Upgrades to existing Reyrolle LM-x Panels**

#### **Motivation to Upgrade Reyrolle LMT/R/S Switchgear with Modernized Type Tested enhancements**

An unplanned electrical outage can cause serious disruptions to your operations with dire consequences costing lots of money in lost wages, loss in productivity, loss of lives and the replacement of damaged equipment. Affecting us in our homes, offices, hospitals, restaurants, factories, roads, mines, communication networks, in fact we are so dependent on electricity that just about every facet of our lives is affected.

The causes of these electrical outages may be as a result of one or more of the following:

- Equipment failure as a result of not being maintained or operated properly
- Switchgear components reaching the end of their life expectancy
- Lack of knowledge and training
- Network changes resulting in the switchgear being overstressed
- Equipment not being modified as per manufacturer's advice
- Old and unsafe technology still being employed
- Switchgear 'true' condition difficult to determine visually, "In on-site evaluation tests carried out by Reyrolle on elderly oil switchgear, it was found that on more than 50% of oil switchgear thought to be in good condition, the circuit breakers had faults or were operating outside of their design envelope and in some cases would have failed to operate correctly under system fault conditions".

The pace of technology makes today's 'cutting edge' seem 'old hat' tomorrow, but age need not equate to obsolescence. Modernization can protect the customer's investment by....

- Extending the equipment lifespan,
- Raising the equipment Safety, Reliability and Performance standards.

Traditionally equipment management strategy followed by plant operators was to replace switchgear when it had reached the end of its economic lifecycle. This choice provided maximum equipment lifespan and the latest technology and safety features on replacement, but usually implied high economic investment.

Such a replacement strategy does not necessarily fit with the overall needs of a plant:

- The life expectancy of the plant as a whole may not match that of the new switchgear.
- The downtime of the plant to enable replacement of the switchgear may not fit with operational and production commitments.
- The timing of the switchgear replacement may not match the capital expenditure plans of the business.
- Such a strategy does not necessarily represent the optimal life cycle costs.

RPS Switchgear, (formerly Reyrolle Pacific), are pleased to offer Type Tested retrofit safety enhancements to existing LM-x switchboards to give internal arc withstand safety to the latest IEC62271-200 standard for 25kA for 1 second, AFL with a substation ceiling height down to 2.8m. These safety enhancements help customers find the best safety and life cycle management options for their equipment. Each option with different advantages and costs, and enables customers to select the specific solution that best fits the overall business strategy of the plant. Alternative choices for customers include:

1. The fitting of an Arc-proof Front Door with the Racking-Through-the-Door feature. A cost effective first and most important SAFETY feature to protect persons in front of the switchgear, where the operator is potentially most exposed when the breaker is being racked in and out of service and essential operational side of the switchboard.
2. Fitting of CB Chamber IAC Vented Back Plate to the rear of the CB chamber of the elderly LM-x panels thus;
  - a) Providing added vermin proofing
  - b) Provide internal arc venting
  - c) Maintaining panel heating within chamber
  - d) Prevent access to live parts on elderly LMT panel design
3. The replacing of the existing oil or elderly SF<sup>6</sup> Circuit Breakers with our modern LMVP vacuum circuit breaker.
  - a) The replacement of the oil circuit breaker with the RPS vacuum unit is obviously the most significant improvement in operator SAFETY and business risk, by removing old oil-filled circuit breakers from the substation.
  - b) Extending the CB life expectancy from 2,000 to >10,000 operations and way beyond
  - c) Environmental consideration would be to replace elderly SF<sup>6</sup> Circuit Breakers. Effects caused by SF<sup>6</sup> is 23,000 times stronger than CO<sub>2</sub>
  - d) It is recommended to replace the SIC (Secondary Isolating Contacts) with P&S (Plug & Socket) to improve contact reliability and external CB testing
4. Fitting of end 'blast sheets' at each end of the switchboard to prevent burn-through should the arc fault be in the end panel of the switchboard
5. Fitting of vent flaps and arc expansion chambers to the top of the rear of the switchboard to further improve safety at the front of the switchboard for internal arc faults in either the CT chamber or the Bus-bar chamber.

Rack-Behind-Arc-Proof-Closed-Door



CB Chamber IAC Vented Back Plate



Replacing LMT CB's with RPS LMVP CB's in Cape Town N1 Substation



IAC End Blast Sheets

