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## Rand Water Automates Water Treatment Operations Using GE Multilin Universal Relays

*South African facility uses latest automation technology to achieve 6 year ROI*

**Markham, ON, June 17<sup>th</sup>, 2002** – Rand Water, South Africa’s largest potable water supplier based in Johannesburg, is the first operation of its kind to utilize Universal Relay (UR) technology from GE Multilin to automate operations at a new water treatment facility in Daleside. The site’s newly constructed substation also represents the first time that the company has purchased its own



*88kV to 11kV Substation*

substation facility for its water treatment operations. Daleside uses four UR F60 Feeder Management and two UR T60 Transformer Management relays to integrate high speed interlocking and protection functionality to facilitate automation and communications between the relays and Rand Water’s PLC and SCADA systems over a redundant fibre optic communications network. Rand is also using six UR M60 Motor Management relays to ensure correct phase rotation and assist personnel in maintaining the motors at the site.



*11kV F60 Feeder Protection to Pumphouse*

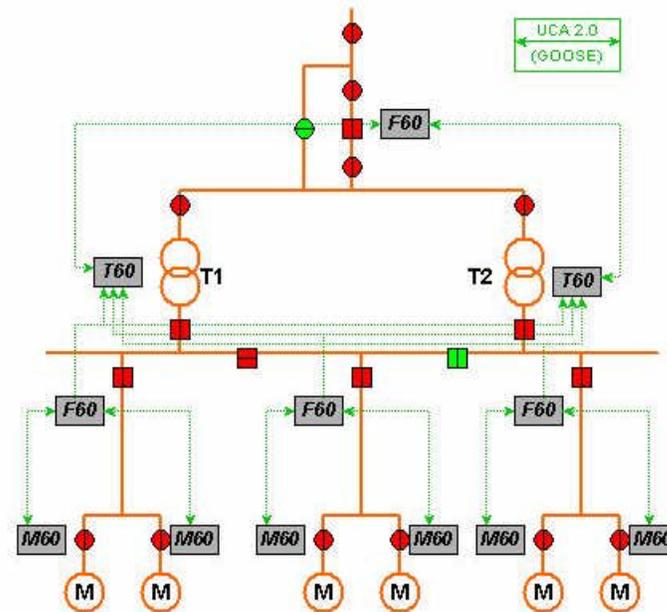
Alaric Pagel, Chief Electrical Engineer for Rand Water, says that the purchase and full-scale automation of the substation will provide substantial economic benefits to the company. “By applying the latest technology and utilizing the relays in a unique scheme, we were able to integrate a number of components to control pumping from the substation and reduce maintenance and overall costs. This scheme will definitely deliver big financial savings over the

long term. In fact, we anticipate that the system will pay for itself within six years. The key is the fully integrated Ethernet-based control and protection functions. With Ethernet connectivity we can read any information and perform control functions from our SCADA system without having to hard wire each breaker. I've never seen a design like this before, but it is very effective in reducing cost and improving efficiency.”

### **Configuration Details**

Pieter Hill, General Manager, Protection & Control, Drivecor (Pty) Ltd., the GE distributor and electrical engineering company responsible for the installation, commissioning, maintenance and support of the URs, explains the configuration at the Daleside site. “The substation is fed by an 88kV overhead line from the local electrical supply utility ESKOM. One 88kV circuit breaker supplies power to both transformers, which in turn step the voltage down to 11kV. This configuration, in which one HV circuit breaker serves both transformer feeds, is known as a “Jericho scheme” and is used to save on the cost of an additional circuit breaker.”

### **Daleside Protection Scheme**



“Since Rand Water wanted a fully automated scheme with full protection and control functionality, the UR was the obvious technology to use,” says Hill. The UR’s PC-based architecture allows for peer-to-peer communications over a fibre optic communications network using Modbus TCP for remote interrogation and control between the SCADA, PLC and relay systems, and MMS/UCA goose messages for exchanging information between the URs. This scheme also delivered substantial savings on the amount of hard wiring required between bays.

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One unique innovation that Drivecor implemented was a “virtual control mode” across the LAN so that Rand Water could select their modes of operation from a remote location to supervise the equipment under normal operating conditions, as well as to perform routine maintenance. “If the relays are instructed to select a ‘maintenance mode’, the F60s on the circuit breakers feeding the pumping station will initiate a trip of their respective circuits, and the M60s open the motor contactors and lock them out so that maintenance personnel can safely begin their job,” explains Hill.



*Pumpstation with M60 panels in background*

The FlexLogic™ programmable software allowed Drivecor™ to incorporate a “spin test” into the programming logic of the M60 relays so that Rand could initiate a 500ms spin of their motors to confirm correct phase rotation as well as to improve maintenance. FlexLogic was also used on the F60s and T60s to fully automate the Jericho scheme to allow for possible faults on the power transformer, as well as for implementing busbar blocking.

“This is definitely a unique use of UR technology,” says Pagel. “Building a new substation from the ground up provided us with a wonderful opportunity to try it out. So far, we’ve been more than pleased with the results.”

**About Rand Water:**

During almost a hundred years of service, Rand Water has built a solid reputation for delivering high quality, potable water to its bulk consumers. As a ‘wholesaler’ of potable water, last year Rand Water delivered approximately 964,000 megalitres of water to local authorities, large industries and mines. This translates to an annual average daily quantity of 3400 mega-litres (or 3400 million litres). For more information, please visit [www.randwater.com](http://www.randwater.com).

**About Drivecor (PTY):**

Drivecor, based in Johannesburg, South Africa, is an electrical engineering company that specializes in protective relaying and substation automation. Drivecor has a regional office in Durban, South Africa. The company has worked on numerous UR projects for utility and industrial

customers, and has installed over 250 URs to date, making it the leading provider in the country. For more information, please call (031) 764 2212 or email [drivecor@drivecor.co.za](mailto:drivecor@drivecor.co.za).

**About the UR**

GE Multilin's microprocessor-based UR product family supports open standard EPRI UCA™ MMS/Ethernet protocol. All UR products combine peer-to-peer high-speed communication capabilities with modularity, flexibility and field-programmable FlexLogic™ control for simplified substation automation. UR products include the F35 Feeder Protection Relay, the F60 Feeder Management Relay, the C30 Controller, the L90 Line Differential Relay, the C60 Breaker Management Relay, the T60 Transformer Management Relay, the L60 Phase Comparison Relay, the B30 Bus Differential Relay, the D60 Line Distance Relay, and the M60 Motor Management Relay.

**About GE Multilin**

GE Multilin, a division of GE Industrial Systems, is a global leader in the design, manufacture, sales and service of protection, metering, control and automation systems as well as telecommunication networks for utility, industrial and general industry applications. For more information, visit the website at:

<http://www.geindustrial.com/multilin>.

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