At the quarterly meeting of the Electricity Suppliers Liaison Committee (ESLC), a Memorandum of Agreement was signed that would permit the publication of dual numbered SANS-NRS standards. The memorandum was signed jointly by Geoff Visser, Divisional Director of Standards South Africa (StanSA), Roy Wienand, Chairman of the ESLC, and Vinod Singh, Technology Standardization Manager at Eskom. This initiative further enhances the long-standing partnership between the major stakeholders.

The ESLC, which is representative of all the major suppliers of electricity in South Africa, is the controlling and final approval body of all specifications published under the NRS logo. The administrative and financial support for the development of NRS specifications is provided by the Technology Standardization Department in the Eskom Resources and Strategy Division.

Many NRS specifications have a wider application than the national ESI. Consequently several of these NRS specifications have been adopted by StanSA, and published as national standards under the SANS (previously SABS) logo. As a result, the specifications lost its NRS-identity, leading to some confusion in the industry, and this resulted in many tender documents and purchase specifications having to be rewritten. There was also some uncertainty about intellectual property rights.

The new agreement allows an NRS specification to be reissued with a dual NRS and SANS number. Either of the two numbers may be referenced in any document. It is important to note that both numbers will have equal legal status and there will be no need to amend existing documentation. The SANS number will indicate that the standard is recognised as a national standard. The agreement also provides for a new standard to be developed jointly by both parties, and issued with both numbers.

The principle of dual numbers is an accepted practice internationally, and has been used for many years by standards bodies. In SA, dual numbered SANS-IEC and SANS-ISO standards are commonplace, and we already have triple-numbered standards with SANS-ISO-IEC or SANS-EN-ETSI combinations.

The most important condition is that of reciprocal compliance, i.e. that a product that complies with the NRS specification will also comply with the SANS standard and vice versa. If this condition cannot be met, dual numbers are not allowed.
What is the scope and objectives of IEC TC57?
The task of IEC TC57 is to prepare international standards for power systems management and control of equipment and systems used in the planning, operation and maintenance of power systems. Such systems include energy management systems (EMS), SCADA (supervisory control and data acquisition), distribution automation, teleprotection, and associated information exchange for real time and non-real time information.

What is the IEC TC57 common information model?
The common information model (CIM) is an abstract information model that represents real world objects and information entities exchanged within the value chain of the electric power industry. The model was developed using the unified modelling language (UML) and is maintained in IBM’s Rational Rose modeling tool. It can also be represented in XML using either RDF or XML Schema.

The CIM can be used in several ways. As the foundation for a semantic model (or common language), the CIM enables integration and information exchange between systems and applications used for generation, transmission and distribution management and operations. To this end, a series of standard XML messages derived from the CIM are being standardized for a variety of use cases including network expansion planning, network operation, records and asset management, maintenance and construction, operational planning and optimisation, meter reading and control, and customer inquiry. XML messages defined by organisations such as the Open Application Group (OAG) are also being standardized by reference for systems such as finance, retail, supply chain and logistics. Power system models can also be transferred as XML files in a CIM-compliant format to facilitate inter-operability between utilities and independent system operators.

As a generic data access technology the CIM navigates and accesses complex data structures in any database. It provides a hierarchical view of data for browsing and access with no knowledge of the actual logical schema used to store the data. To this end, a series of generic interface services are being standardized, including:

- Generic data access with request/reply and notification services
- High speed data access for establishing periodic transfers of large quantities of SCADA-like data
- Generic event and publishing services
- Time series data access for historical data access.

With support for graphical information built in, the CIM provides a consistent view of the world by operators regardless of which application user interface they are using.

Due to the size of the complete CIM, the object classes contained in the CIM are grouped into a number of logical packages, each of which represents a certain part of the overall power system being modelled. Collections of these packages are progresssed as separate international standards along with the message and generic interface specifications based on the CIM. The IEC 61970 series managed by TC57 WG13 includes that portion of the CIM dealing with power system resources interconnected in an electrical transmission network, including standards for power system model transfer and for the generic interface services. The IEC 61968 series managed by TC57 WG14 includes that portion of the CIM dealing with distribution management operations (i.e. the asset and spatial view of objects) as well as all the messaging standards.

How can the standards be implemented in South Africa?
Utilities in South Africa are not that different from those in other parts of the world where these standards are being effectively applied. These standards can be applied in the following ways:

- Purchase products and systems that offer interfaces to external systems/applications based on the CIM (i.e. they use the CIM as the way to represent the data when it is presented at public interfaces), or at the very least, interfaces that offer compliant services as defined in the standards. This can be done on a project-by-project basis.
- Adopt a model driven integration (MDI) methodology based on the CIM and possibly some other supporting enterprise models, such as the OAG and Open GIS Consortium (OGC), as an effective way to create a semantic architectural layer information exchange throughout the enterprise. What this means is that the CIM is used as the common language for information exchange and data access across the enterprise transcending individual projects. This brings maximum benefit to the utility, and ensures a scalable solution.

Using the CIM and related standards as an ontology or semantic model behind all information exchanges ensures data consistency and integrity regardless of the systems involved and the time frame of implementation. It helps ensure user access to data is consistent and reliable, independent of which system supplies the data.

Of course, common sense should prevail as to exactly where and when to change to a standards-based integration framework, rather than forcing all systems to change at the same time.

Are there cases of these standards implemented in other countries?
Many utilities and energy companies as well as independent system operators (ISOs) in North America, Europe, and Asia are already using...
Continued from page 62

these standards for system integration, power system model exchange, messaging, data access, virtual data warehousing, and other applications with a variety of systems, including energy management, SCADA, outage management, asset management, work management, network planning, maintenance and construction, security, distribution management, and many others. These standards are also used for inter-utility data exchange to support network reliability and power markets. The Electric Power Research Institute (EPRI) has published a reference list of existing utility companies, applications, suppliers, and articles regarding the use of the CIM, generic interface, and messaging standards.

One often hears about the IEC 61850 standards. What do these standards cover and how do they relate to the IEC TC57 CIM?
The IEC 61850 series of standards are also produced by IEC TC57. The IEC 61850 standards apply to data collection from field devices and for the modelling and configuration of equipment and intelligent electronic devices (IEDs) within substations. The IEC 61968/61970 series of standards dealing with the CIM provide data models, messages and interfaces for information exchange between business applications and systems within an enterprise as well as between utilities. There is a natural interface between these two standards within a SCADA master station, typically via a database. For example, IEC 61850 may be used to collect field data, which is stored in the SCADA master database, and then subsequently accessed or published in CIM format for use by advanced network applications, such as power flow applications and state estimator.

IEC TC57 WG19 is tasked with ensuring harmonisation between the IEC 61850 models and the IEC 61968/70 CIM, where applicable, to create a seamless interface between these two series of standards, so that any data that is dealt with in both standards has a common representation used by both.

METERING CODE OF PRACTICE RECOGNISED AS A REGULATORY STANDARD

NRS 057 electricity metering code of practice has been revised, and is currently being finalised for approval by the Electricity Suppliers Liaison Committee (ESLC) to be published as a single code of practice to replace the previous first edition of NRS 057, parts 1, 2 and 4.

The NERSA, which was instrumental in motivating the original development of NRS 057, confirmed in October 2005 that the NERSA Board had formally accepted NRS 057 as a regulatory standard to be applicable to all electricity licensees in South Africa.

The revised edition of the code of practice specifies the requirements to be adhered to by electricity licensees and their agents in operating and servicing new and existing metering installations that are to be used for billing purposes. It is applicable to metering installations in their entirety, including all measuring transformers, wiring/cabling, metering panel construction, active and reactive meters and data loggers, and associated test facilities. It sets out best practices to be adopted by electricity licensees wherever practicable.

It is recognised that some of the requirements of NRS 057 might only be practicable to implement progressively, and in that regard it is expected that stakeholders will come together in the near future to agree on an implementation plan for compliance with NRS 057.

In particular, the process of registering laboratories either as accredited test laboratories (manufacturers and their testing agents), or as accredited calibration laboratories (licensees or their calibration agents) will need to be agreed with SANAS, with the involvement of all stakeholders.

NRS AWARD 2005 TO GREG WHYTE

Greg Whyte was employed as chief engineer at Eskom Distribution Technology. His main area of responsibility was the design of HV, MV and LV underground cable systems, which includes cables, cabling accessories, switching devices, transformers, insulation co-ordination and protection philosophies.

Greg contributed significantly, in some cases as working group chairman, to the development of the following NRS specifications:

NRS 004: Mini-substations
NRS 006: Ring main units
NRS 012: Cable terminations in air filled enclosures
NRS 013: MV cables
NRS 053: Accessories for MV cables
NRS 074: LV cables
NRS 077: HV cables

A number of these NRS specifications have been adopted as SA National Standards.

Greg’s knowledge of the latest international technologies and best practices ensured that these were included in the specifications, although his colleges were at times not always open to the change. An example of this is the use of cable termination material for MV systems.

He is well known and respected in the electricity distribution industry for his contributions.

Greg has in the past, as an Eskom employee, also contributed directly to STANSA and IEC technical committees and working groups and continues to do so from his current position with a supplier of electrical insulating components.
The NRS Project Management Agency (Eskom) produces NRS specifications for the electricity supply industry in collaboration with Standards South Africa (StanSA) on behalf of the Electricity Suppliers Liaison Committee (ESLC).

The following new NRS documents have been approved by the ESLC:
NRS 009-8: Electricity sales systems - Part 8: Code of practice for the management of secure modules. This part of NRS 009 sets out the practices to be implemented by users of electricity sales systems for the management of secure modules.

NRS 037-3: Telecontrol protocol - Part 3: Inter-control centre communications protocol. This standard was prepared to establish and promote uniform requirements for inter-control centre communications protocols used on electricity supply authorities’ telecontrol systems.


NRS 077: HV XLPE insulated cables and accessories. This specification covers the requirements for single core XLPE-insulated cables and accessories for systems with nominal voltages of 44 kV, 66 kV, 88 kV and 132 kV. The test methods and requirements specified are in accordance with IEC 60840.

NRS 078-2: Long span all dielectric self-supporting fibre optic cables - Part 2: Installation guidelines. This standard identifies the essential methods for stringing, tensioning, jointing and terminating all dielectric self-supporting (ADSS) fibre optic cable for use on overhead power lines.

NRS 081: Specification for single-mode non-dispersion shifted optic fibres. This specification details the requirements of single-mode non-dispersion shifted optical fibres used in both the 1,310 nm and 1,550 nm wavelength regions. It is not intended to cover the requirements of reduced (low or zero) water peak fibres.

The following revisions of NRS documents have been approved by the ESLC:
NRS 009-4: Electricity sales systems - Part 4: National prepayment electricity meter cards. The requirements for a prepayment meter number, previously specified in NRS 009-4-2, have been incorporated into the requirements of NRS 009-6-7. This part of NRS 009 specifies those characteristics of a national prepayment electricity meter card that, for the purposes of a transaction, uniquely identify the prepayment metering equipment allocated to a customer.

NRS 043: Joint use of structures for power and telecommunication lines. This specification is applicable in cases where power lines, of nominal phase-to-phase voltage up to and including 33 kV, share a route with telecommunication lines.

NRS 060: Code of practice for clearances for electrical systems with rated voltages up to and including 145 kV, for the safety of persons. The following NRS documents are to be published as interim specifications: (i.e. where there is an expectation that the specification would be amended frequently)
NRS 009-6-10 (2nd interim): Interface standard for network vending. The purpose of this specification is to provide the necessary information to implement the XMLVend protocol as part of an online prepayment electricity vending system.

NRS 089: Maintenance of electrical network. Recognising that not all electricity distributors are in a position to develop maintenance plans, the NRS 089 series was developed to provide minimum requirements for maintenance of electricity networks. NRS 089 covers maintenance policy, strategies and standards of power transmission and distribution equipment and their control systems as well as the procedures in performing the maintenance work.

The following NRS documents are expected to be published shortly:
NRS 000: Definitions. Updated to reflect definitions from 2004 NRS publications.
NRS 037-1: Telecontrol protocol - Part 1: RTU to control centre protocols. This part of NRS 037 was prepared to establish and promote uniform requirements for communication protocols used on electricity supply authorities’ telecontrol systems used in electricity supply authorities’ telecontrol systems.
NRS 057: Electricity metering (revision). This code of practice specifies the requirements to be adhered to by electricity licensees and their agents in operating equipment and their control systems as well as the procedures in performing the maintenance work.
NRS 074-1: Low Voltage (600/1000 V) cable systems for underground electrical distribution. This part of NRS 074 specifies the preferred construction and testing requirements for low voltage power cables for application in South African distribution networks.
NRS 034-1: Guidelines for the planning of electricity distribution networks.

The NRS website may be accessed at http://www.nrs.eskom.co.za

Vinod Singh
Technology Standardization Manager
Eskom, Resources and Strategy