

NILSEN

REVIEW



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CHAIRMAN'S REPORT

greatest growth. The problems of recent years in Perth and Victoria, are now well behind us, and each business is profitable. South Australia has opened offices in Darwin and Mt Gambier, and we expect to increase our business in Thailand.

There have been a number of changes at Nilsen Technologies, directed at concentrating the company's efforts on a limited number of important and significant agencies. Over the years, we have bought the Instruments business of a number of other companies, and this has led to conflicting agencies and agencies outside our chosen fields. These have been discontinued and the business is now based on approximately 30 very good agencies, with high potential for future growth.

Nilsen Industrial Electronics our Electronic Metering company, has also experienced significant growth, and has introduced some innovative products such as MeterNet. We see exciting opportunities in the continuing deregulation of the

electricity industry throughout Australia.

Nilsen Porcelains is operating very efficiently, but is suffering from over capacity, and a major effort is underway to add new products.

The Group's joint venture with United Energy, Nilsen Power Services (NPS) was launched last June, and is already providing a high standard of service to United Energy and other customers. The aim of this business is to service all companies in the electricity industry and to build up a strong maintenance business with private industry. Progress to date has been excellent.

Overall, the Group has achieved a lot in the last 12 months. I thank all employees for their contribution and I am sure we will continue to expand in the coming year.

OJ Nilsen
Chairman

The change in March 1996 from a public listed company to a private company, fully owned by the Nilsen family, was uneventful, with little impact on the operations of the Group. The main effect was felt by Head Office, which was dismantled as a result of the privatisation.

Sales reached \$61 million in the 8 months to February and employment totalled 750.

Our Contracting and Engineering businesses in Melbourne, Adelaide, Perth and Thailand have shown the

NILSEN ELECTRIC (VIC) PTY LTD

Nilsen Electric (Vic) Pty Ltd has recently won a \$4 million contract with Fletcher Construction for the supply and installation of the electrical services to the Men's Metropolitan Prison project in Dohertys Road, Laverton. The completed works are to be on installation "Fit for Purpose", given that the works have to be installed in and form part of, a Medium and High Security Male Prison which is required to operate economically 24 hours a day for 20 years for 600 inmates.

NEV commenced the electrical works in August 1996 and the total project has to be completed by the 28th August 1997. At present we are employing 30 Electricians and are in close working proximity to other contractors with our installation.

The total project power supply consists of 2 x 2000 KVA substations. Both substations are supplied via underground HV Cables originating from independent HV aerial feeders located on the opposite sides of Dohertys Road.

Two Main Switchboards

24 Distribution Boards, - Consisting of non-essential load testing/monitoring shed contactors and controls.

Generator

Supply and installation of fully automatic diesel generator set to supply the essential electricity demand to each main switchboard.

MATV

Supply and installation of a centralised total site MATV aerial system.

Fire Alarms

Supply and installation of total automatic fire alarm system.

Supply and installation of total Light and Power installation to 21 Buildings including external Luminaires and Poles. All works are currently proceeding to program.

COMMERCIAL CONTRACTING

WESTERN LINK - CASTING YARD PROJECT (LAVERTON NORTH)

We are currently nearing completion of the Western Link -Casting Yard project for Baulderstone Hornibrook Engineering who are in turn representing the Transfield-Obayashi Joint Venture in the construction of the Melbourne City and Western Link roadways.

The Western Link - Casting Yard, when complete will produce the concrete segments which will in turn make up the elevated roads and bridge sections of the new Western Link which is to connect the Tullamarine Freeway to the Westgate Freeway.

Our component of the project was designed by consultants Scott, Wilson, Irwin, Johnston and incorporates the complete electrical scope from construction of a new 500 KVA Powercor substation through to final fit off of lighting, general power requirements.

Ably assisted by Allied Schraven Group for civil works, A- Line Switchboards and Schneider for Main and Sub-switchboards respectively and Doyleson as our light fitting supplier, we were able to complete the staging of the programmed works to the clients requirements. An initial labour requirement of 2,900 man-hours has seen 4- 5 Nilsen employees busy from mid November

'96 through to the end of March '97.

Our labour force performed extremely well within the short program as about half of our work was around the 15 metre high roof line in hydraulic booms with other trades working frantically below. Together with his capable crew of tradesmen and apprentices Stan Christie was able to carry out the tasks involved to complete the various aspects of the project to the requirements of the team of engineers based on site for Baulderstone Hornibrook Engineering.

As we near completion of this project the facility is already producing concrete bridge and elevated roads segments in preparation for construction of the Western Link roadway.

We are confident that our performance on this project will hold us in good stead for further works associated with the Western Link project which will continue for another couple of years.

Project supervisor Mark Wiesner is well assisted by the site foreman Stan Christie. On site the tradesmen are Tim Hubeek, David Vella and Numer Atienza. The value of this total project is approximately \$380K.

Nilsen Group celebrates its 80th Birthday

In 1996 the NILSEN GROUP of companies celebrated it's 80th Birthday of providing a wide range of services and products to the Australian and International industry it serves. NILSEN continues to offer a high quality of commitment to its customers and staff throughout its businesses and is looking forward to the next 80 Years.

The company currently employs 750 people and has a very low level of staff turnover. This can be seen in the following table.

YEARS SERVICE	NUMBER
5-10	110
10-15	44
15-20	27
20 - 25	10
25 +	23
TOTAL	214

As can be seen from this table 30% of our workforce has been with NILSEN for more than 5 years and one individual has been with us for more than 40 years.

Nilsen on the INTERNET (www.nilsen.com.au)

The NILSEN GROUP of companies, like most companies in this day and age, are looking to the future and where business will be sourced and how to remain competitive in this ever changing environment.

There has been a lot of talk about the Internet as the next billion dollar industry over the next few years. Although this may be some time off there is a view in the NILSEN GROUP that the Internet offers a whole new way of thinking and opens up a new area of communication and opportunity to serve both the company and its customers better.

With this in mind NILSEN are on the Internet at www.nilsen.com.au. This site is currently under development so will be expanding and changing a lot over the next six months. We are constantly reviewing how this site can best serve both the internal and external needs of NILSEN our customers and suppliers. So log on, have a look and tell us what you would like to see on here. We are looking forward to this project as we head rapidly toward 2000 and an ever-changing way of doing business.

MORE NATIONAL AND STATE EXCELLENCE AWARDS FOR NILSEN!



Congratulations to Nilsen Electric Western Australia for winning the 1996 NECA National Award in Sydney recently for the P & O Conaust terminal upgrade (see front cover). In presenting the Award to Nilsen Electric WA, the judge commented 'Nilsen are distinguished for the comprehensive H.V. Upgrade and Light Installation on a fully operational port that allowed operations to continue unhindered with flexible programming and management of the project - we were impressed'.

As the win for Nilsen Electric in Western Australia follows on from

Nilsen Electric South Australia's winning of the NECA Excellence Award in 1995 for the Adelaide Medical Centre for Women and Children, this now makes two years in a row that Nilsen has taken out this prestigious award!

Not to be left out of it altogether Nilsen Electric SA again took out their State award for the second year in a row, for the Westpac Data Centre at Lockleys and also received a "High Commendation" (the runner up Award) at the National Awards. There is now an impressive history of winning of Excellence Awards by Nilsen over the last few years:

1996 - Nilsen WA wins the NECA National Award for projects under \$500,000.

1996 - Nilsen WA wins ECA of WA State Certificate of Excellence overall winner for projects under \$500,000 (Commercial Sector).

1996 - Nilsen SA wins NECA National High Commendation for projects over \$500,000

1996 - Nilsen SA wins NECA State Award for overall excellence

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1994 - Nilsen WA wins ECA of WA State Certificate of Excellence overall winner for projects over \$500,000 (Commercial Sector)

1994 - Nilsen Vic wins NECA State Excellence Award for projects under \$500,000

NILSEN, COMMITTED TO EXCELLENCE!

SHOPPING CENTRES

Nilsen W.A. are currently carrying out the electrical installation for the Southland Shopping Centre (new eight cinema complex, food hall, car parks, Action store, 38 speciality shops, restaurant, Time Zone, mall extensions and H.V. and L.V. extensions) for the Reed Group, with completion scheduled for September 1997.



HOSPITALS AND HOSPITALITY



won the design and building of a new hotel at North terrace in Adelaide, which will be the third hotel the Company has helped develop along this prime Adelaide boulevard, and it is only a few hundred metres along from another Nilsen project, the new campus for the

Nilsen does both equally well!

Nilsen has been highly successful in the Health Care and Hospitality Industry. In Western Australia, Nilsen Electric WA are currently carrying out the electrical installation for the Joondalup Health Campus in the suburb of Joondalup and Mount Hospital in the City of Perth for John

Holland Construction and Engineering Pty Ltd and Health Care of Australia, (Consultants - Wright Mackay & Associates) and in South Australia, Nilsen Electric SA is currently involved with two large regional hospitals at Mount Gambier and Port Augusta for Hansen Yuncken and Baulderstone respectively. The SA Company has also recently

University of South Australia now being handed over for the 1997 academic year.

At the same time, Nilsen Electric Vic. Is working on a large 'hospitality' project of another type, the Laverton prison, so it can truly be said that Nilsen can offer the best electrical service in any 'home away from home'!

EGG SHAPED SEWAGE PROCESSORS

Nilsen W.A. are nearing completion of the electrical and instrumentation installation for the Woodman Point Waste Water Treatment Plant (Egg-Shaped Digester- Stage 1) for Thiess Contractors and their consultant Bassett Consulting Engineers with completion scheduled for March 1997. The 'eggs' were the main part of the Water Corporation's \$30 million waste water project at Woodman Point. Thiess Contractors in February 1997 were awarded the next stage of this project and have engaged Nilsen WA as part of their team once again to complete the final stage of this first of project in Australia, with completion scheduled for December 1997.

ACCREDITATION

Nilsen W.A. received QA Accreditation to ISO 9001 in February 1997 (Accredited by "Bureau Veritas Quality International" - BVQI). Nilsen continue to set high standards in the industry.

CITYLINK AND WESTERNLINK PROJECTS

In Melbourne, people wishing to travel on freeways from either south eastern, western or northerly routes find they end several kilometres short of each other resulting in the sort of traffic congestion that large cities are often renowned for. Melbourne's largest current infrastructure development project is the connection and widening of these freeways to allow uninterrupted travel through the City.

This privately funded project is being executed by the Transfield Obayashi Joint Venture (TOJV) and requires the construction of new roads and tunnels. The size of the project has meant TOJV had to subcontract some of the works. The Westernlink portion has been awarded to Baulderstone Hornibrook Engineering (BHE). As a result of the modifications to the road network, both companies needed to relocate existing electrical infrastructure such as overhead lines, 66 kV underground power cables and multicore supervisory cable used by the supply authorities to control and protect the electricity system. The nature of the work is very specialised with very few contractors being able to provide experienced high voltage cable installation, termination and testing along with overhead line expertise and low voltage multicore termination skills. Within its first few months of operation, Nilsen Power Services was awarded contracts by TOJV and BHE in excess of \$2.3M to relocate and

augment these assets which are owned by Citipower.

NPS' project manager, Brian Grace, is managing all the work associated with the contracts which includes directional boring under the Moonee Ponds Creek and several of Melbourne's major roads.

Co-ordination with the principal's environmental consultants ensured the strict environmental controls were properly implemented resulting in the six crossings not having any impact on the Creek. Brian also liaised with Citipower to ensure they were satisfied with the quality and standard of the

work on their assets and coordinated outages with them to allow completion of the work.

To date the projects have gone extremely well with NPS' extensive cable jointing capacity being key in ensuring completion deadlines could be met.

INTRODUCING NILSEN POWER SERVICES

Nilsen Power Services was formed in May last year when Nilsen Electric (Vic) and United Energy decided to form a joint venture to take advantage of the service opportunities arising from the deregulation of Victoria's electricity industry. In the short time since then, we have been awarded significant maintenance and high voltage construction contracts by United Energy, Citipower, Eastern Energy, Powercor, Solaris, VPX and Powernet. This has not been restricted to the electrical supply industry as NPS has performed work for major industrial and commercial customers such as Hoechst, BHP Steel, ICI, Melbourne Metropolitan Fire Brigade and the Victorian Arts Centre. Expertise with underground power and control cables has been used in several subcontracts for Melbourne's City Link project as well as numerous Urban Residential Developments (URD).

NPS tremendous success in this short period of operation, especially considering its' low profile approach to the market, is due to a number of unique contributing factors. Other organisations provide low cost labour but fail to deliver additional value to customers. Traditionally, most work requests are raised when an item of equipment breaks down. The response to this is generally reactive; a verbal request for fast action with little more to show for everyone's efforts than an invoice at the end of the day. The true or root cause and contributing factors to the fault are rarely identified, and if they are, they are generally not reported, documented or used to change maintenance strategies in the future. So what happens? Maintenance crews keep repairing the same faults, time after time again. And why? We're often told "nobody has any

time to do this because we are too busy fixing what has just broken down."

International surveys show about 50 to 60% of most organisations maintenance is reactive, 35% is preventative and less than 5% is predictive or proactive. This means that most maintenance crews will come to work each day, not knowing what they will be doing for at least half of it. World's Best Practice suggests a maintenance mix of 50% predictive, 20% proactive and 25% percent preventative will result in around only 5% reactive maintenance delivering up to 40% savings in maintenance costs. This requires a move away from time based maintenance and fault repair.

If these savings are so substantial why aren't organisations achieving them?

We believe it is because few people start at the beginning when looking at the maintenance requirements of their assets. They should formulate maintenance policies and strategies that will produce the required business outcomes, not a bland 10% increase or decrease on last years budget. The policies are best based on an audit of the condition, duty and maintenance history of each item of equipment with an assessment of the risk and consequence of its failure. The validity of the selected strategy should be confirmed by comparing its potential impact with that of past practices. It is then the work can be planned. Implementing the work requires an effective works management system and a highly skilled work force able to identify the cause of problems and trained to report recommendations of how they can be overcome in the future. This knowledge may then be used to

update maintenance strategies resulting in a continuous improvement process.

It is this approach to maintenance, coupled with NPS' unique wide range of specialist services, that has attracted many major clients to request either a complete maintenance package or just selected services specific to their current needs. To back this, NPS has specialist service vehicles, over sixty specialist technicians and trades people, a fully equipped work shop and spares store backed by 24 hour fault service.

Diagnostic techniques, such as thermography, vibration analysis, transformer oil testing and plant auditing form the basis of NPS' conditioning monitoring capability. We service protection, control and communication systems as well as electrical assets from 66 kV down to 240V. Our paint and workshops allow us to refurbish HV circuit breakers and load break switches, perform transformer overhauls and fabricate specialised components. Underground power and supervisory cable installation, repair and fault location, substation construction compliment this range of services.

NPS unique ability to analyse an organisation's current work methods and recommend validated improvements, manage the work policies and strategies with practical solutions, provide change management training to help organisations work in a more effective manner and provide inhouse expert labour set us apart from the rest of the industry where consultants, software vendors or labour hire companies offer only part solutions without any effective implementation.

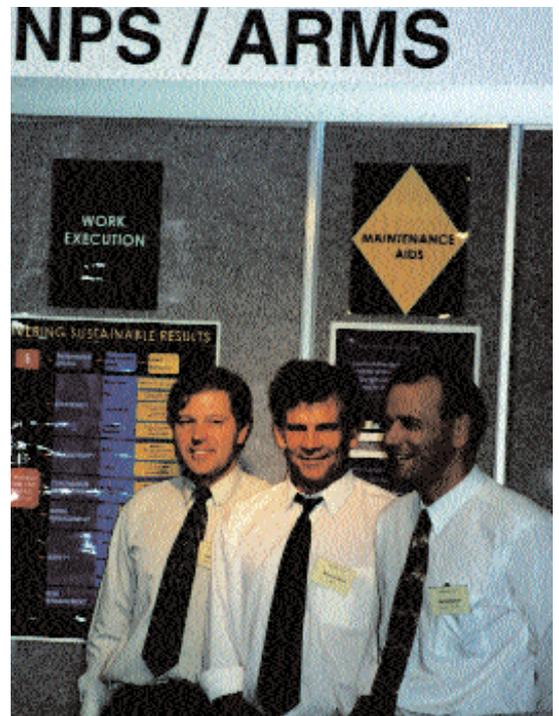
SYDNEY MAINTENANCE CONFERENCE

A three man team from Nilsen Power Services manned a trade stand at the recent Mainstream 97 maintenance conference in Sydney. Rob Bellsham General Manager said that this was an exercise in declaring our presence to the industry. Mick Drew held a one hour demonstration of the NPS maintenance aids which generated a lot of interest from organisations who were looking for help in moving from reactive maintenance to proactive maintenance. Many organisations attending the conference also said they didn't have time to use their works management systems or their

company's IT package did not allow them to effectively plan their maintenance and were commented that NPS was uniquely placed to help them overcome these problems. John Szmalko said the number and quality of new business leads far exceeded his expectations.

NPS' asset reliability and maintenance specialist approach was summed in their slogan:

...Delivering Performance Improvement...



From Left to Right: John Szmalko, Mick Drew and Rob Bellsham

TWO NEW 25 YEAR MEMBERS IN S.A.!



The Group welcomes two new 25 Year Members in South Australia.

At a function held in Adelaide recently, two more 25 Year Members were welcomed by Mr. Allan Trimble on behalf of Mr. John Nilsen. Welcomed were Phil Geytenbeek and Phil Mellow, both of whom have now been with the Contracting Division of Nilsen Electric (S.A.) for more than 25 years.

As Mr. Trimble outlined in his speech, this was another indication of the strength of Nilsen, the Nilsen Group and the Nilsen companies. It is because Nilsen is a company of dedicated people all working to a common goal.

The function was attended by many past and present 25 year members and provided a great opportunity not only for all to reminisce, but also for those that "have gone before" to pass on the Nilsen values that have made the company in South Australia, and the Group overall, the strength in the industry that it is today

*Above:
Allan Trimble (right) congratulating
Phil Geytenbeek*

*Left:
Allan Trimble (right) congratulating
Phil Mellow*



SMART 1, A “HOLE” NEW VENTURE FOR NILSEN!



When Sedco Forex looked to import a new technology, transportable, land based drilling rig to do exploratory work for Santos at the Moomba gas and oil field in the far north of SA and it needed urgent conversion to Australian Standards it called on local SA company “Air Ride” to do the upgrading and called on Nilsen to do the upgrading of the electrical and instrumentation.

The project involved much flameproof equipment and highly specialised gas detection and pressure sensing equipment, operating at unusual voltages and frequencies. The project was completed inside of some 10 weeks, under considerable difficulty as much of the original documentation was difficult to obtain.

For those interested in some of the more technical aspects, the rig (Named “Smart 1”) uses “small hole” technology, boring a hole only five inches in diameter down to a depth of some 12,000 to 14,000 feet! (Sorry, the exploration industry still talks in feet and inches but that is a 125mm hole some 4 kilometres deep!) The rig is totally self contained and provides its own pressurised mud at some 6000 pounds per square inch to keep the drill bit cool! When you remember that a traditional drilling rig bores a hole about three times the diameter of the Smart 1 rig, you can see why this technology can save 40% of the cost of drilling each hole, and that could be a saving of \$1M or \$ 2M per hole! No wonder they call it the “Smart one”!

All Nilsen work had to be certified by survey and, needless to say, it all passed with flying colours. Good luck to Sedco Forex and Santos on this exciting new venture.

HMAS “RANKIN” DELIVERED ON TIME AND ON BUDGET.

Nilsen Electric SA will say farewell to what has become a familiar sight, the propulsion switchgear for the last of the current series of “Collins Class” submarines, the HMAS “Rankin”, the largest non nuclear submarines in the world.

For the past seven years the company has been building the propulsion switchgear, delivering one set approximately every twelve months and it has been a major contract for the Adelaide based company. Because of this project, the company has gained very substantial skills from the technology transfer associated with it and many have learned highly specialised skills and to work to the requirements of defence level Quality Assurance systems. A credit to the Nilsen team!

Not only was the project delivered on time and on budget, but the quality achieved by Nilsen was acknowledged by all involved to be equal to the best in the world, which in the defence industry really means the company has become of age!

Nilsen now hope that they will be able to use these skills on other similar projects.

Submarine Switchboard



CATEGORY 5 COMMUNICATION CABLES POSE NO PROBLEM TO INSTALLERS IF THE BASICS ARE UNDERSTOOD



A complete Datacom Technologies AN test system, supplied by Nilsen Technologies.

The LANcat Vx Category 5 Cable Tester and Talk Set provides automatic Two-Way NEXT (Near End Cross Talk) from both ends of the link; Wiremaps including visual display of crossed and failed pairs; Attenuation, noise, cable length; Propagation Delay and Impulse Noise.

SPEED AND CLASSES

Data communication by cable is just one aspect of a 'transmission line'. While the process takes place over copper wires, there are limitations on the 'signalling speed' which are chiefly the inductance and capacitance per unit length. In the optical fibre world the limits are set by the existence of 'modes' (the paths along which light can travel) and the attenuation of the light energy by the fibre.

In general, fibre is much faster than copper and for this reason it is used as 'backbone' cabling (in a high rise office or other commercial building, it will connect the individual office floors to one another). Copper is used to interconnect the equipment on a particular floor, each floor connecting to the fibre backbone through 'optical to electrical' converters or network interface cards (NICs).

CLASS 5

This cable can operate at 100 MHz and represents the most frequently asked for type, even though actual communication speed to be used once the network has been commissioned

and tested at 100 MHz may be lower. It is generally supplied as either twisted four pair, or twenty-five pair and either unshielded (UTP) or screened (STP). Another popular category is class 3., which is mainly used for telephony.

The tighter the twist of the conductors, the more likely that the immunity to electromagnetic interference, will be increased. Screening also improves this but can cause interference problems if not properly grounded.

INSTALLATION AND PERFORMANCE

You may not have a say in the exact style of cable to be used, it having been specified. The story here is, however, no different to other real-life situations; 'you get what you pay for'! Premium category 5 cable with precise conductor-to-conductor spacing and fluorinated ethylene propylene (FEP) insulation is available, providing very stable performance. The user may have to pay more but ends up with a more reliable network!

Performance can be degraded by installation details such as cable bending, stretching, proximity to fluorescent lighting and heat. Moisture can also degrade performance. Installation precautions given by cable manufacturers include suspension above the metal ceiling supports. Hangers can be used as an alternative to cable trays, and specially designed types are available. Sharp edges and tight bends should generally be avoided, although there are special (but pricey) cables which permit this. Correct termination is important as 'cross talk' between cable pairs can be introduced through untwisting and by kinking and crimping.

TESTING CATEGORY 5 INSTALLATIONS

To test an installation, a tester such as the LANcat Vx is needed. These days, your local electrical wholesaler

is likely to supply you one, or you can contact specialist companies. The tests which need be made are:

Wire Map

This checks twisted pair links for pin-to-pin continuity.

Length

Verifies that the link does not exceed the maximum permissible length (90 metres, typically).

Attenuation

Measures the reduction in signal strength over the length of the link.

Near End Cross-Talk (NEXT)

Measures the amount of signal coupling from one wire pair to other wire pairs in the link.

The above tests are the minimum required to prove the copper data communication cable part (the so called 'horizontal' portion because it is usually the wiring on a floor). As already mentioned, the 'backbone' connecting the floors together in a typical 'smart' building is likely to be optical fibre). Although fibre-optic cabling and termination is a different 'kettle of fish', the ability to test that side, basically expands a contractor's capacity to take on more of an overall responsibility. The problems likely to be encountered are bad connections, splices and excessive bending.

The LANcat Vx can be used with the FIBERcat (illustrated on the right). This precision optical power meter permits rapid detection of optical fibre installation errors including bad connections, splices and fibre mismatch.



NILSEN TECHNOLOGIES STRENGTHENS ITS THRUST IN ELECTRICAL TEST AND MEASUREMENT INSTRUMENTATION

Highly significant recent additions to our instrumentation scope are the range of Baur HV and cable testing products and the measurement bridges and ancillary devices from Vettiner. Both companies are recognised as international leaders in their particular fields.

IMPROVING POWER QUALITY, AN OPPORTUNITY FOR BOTH ELECTRICITY DISTRIBUTOR AND CONSUMER

Power quality is a collective term describing electrical power parameters such as sags, swells, impulses, momentary interruptions, frequency variations and harmonics. Described in purely technical terms, some mind-numbing explanations and analyses can be offered which from a consumer's aspect, would be hard to correlate to his everyday experience of power quality. The subject of power quality, particularly when seen from the consumer's point of view, is a potential source of 'added value' business for electrical energy distributors and those electrical contractors who are prepared to specialise in power quality issues. To argue, for example, that a problem in the electrical reticulation within a client's premises is not the province of the distribution company, is to lose sight of the new competitive climate. Distribution companies are becoming increasingly cast in the role of 'common carrier', leaving the field of energy trading open to third parties. Solving a customer's power quality problems is one of the 'add-on' services that can create goodwill and make that consumer less likely to end up doing business for his

kilowatt-hours, with another 'energy trader'. Gregory Rauch, Senior Application Engineer with Basic Measuring Instruments, explained that, at the individual consumer level, one can solve power quality problems such those caused by loose wiring and grounding connections, overheating of neutrals, transients and harmonics. The subject of harmonics is one that is becoming increasingly important through the prevalence of computers, communication equipment and power electronics such as switching power supplies and variable speed drives. These customer loads frequently act as significant harmonic generators and can consequently cause problems including excessive voltage regulation, high neutral currents and negative sequence components which often affect the torque output as well as smooth running of electric motors. Instruments such as those available from Basic Measuring Instruments which are capable of highly detailed harmonic analyses including power flow direction are an essential tool for the investigation of power quality.

NILSEN TECHNOLOGIES APPOINTED AS AUSTRALIAN DISTRIBUTOR FOR BAUR CABLE TESTING AND HV TESTING INSTRUMENTATION

Bob Harris, National Marketing Manager, was pleased to advise the appointment of Nilsen Technologies as national distributor for the electrical test and measurement instrumentation of Baur (Austria). Baur is a leader in world markets. The range of Baur instrumentation includes advanced Echometers with application to LV, communication and HV power cables. The Baur IRG 90 Echometer is capable of basic fault-distance resolution to less than 1 metre (in the 100 MHz sampling mode) and has a measuring range in excess of 100 km. Testing of high impedance fault conditions is facilitated through Baur's Secondary Impulse Method (SIM). Other Baur equipment distributed by Nilsen

Technologies, includes burn down transformers, surge generators (which can be used in SIM testing arrangements) and acoustic fault location apparatus.

NILSEN TECHNOLOGIES ANNOUNCES THE INTRODUCTION OF THE VETTINER SPC1A SCHERING BRIDGE FOR LOSS ANGLE DETERMINATIONS

Nilsen Technologies has been appointed as national distributor for Vettiner test and measurement instruments. The Vettiner range of equipment includes a wide range of AC bridges, transformer testing equipment as well as Epstein lamination testers. The Vettiner SPC1a Schering Bridge is typical of the measurement bridge series and is suitable for the highly accurate determination of dielectric capacitance and loss angle of insulators. The capacitance measurement range is given by the value of the standard capacitor employed and a set of compressed gas standard capacitors from 50 to 400 pF are available, yielding a measurement range with the SPC1a of 0.8 pF to 0.32 μ F. Loss angle ($\tan \delta$) can be measured from 0.001 % to 100 %. Null indication is provided by means of a Lissajou curve display on the bridge's cathode ray tube. In addition to the standard capacitors, other auxiliary equipment includes a range of power supplies with testing voltages from 1 kV to 40 kV. Test cells for liquid insulation testing as well as solid materials add to the application field.

HIOKI FAST WAVEFORM RECORDERS ARE CE-APPROVED

Ken Muraoka, who has been handling the export of Hioki Test and Measurement instruments to Australia since the late sixties recently visited Hioki's National Distributor, Nilsen Technologies. He visited Nilsen Technologies offices in West Australia, South Australia, Victoria, New South Wales and Queensland to discuss the latest



From Left to Right: Bob Harris, Marketing Manager Nilsen Technologies; Ashok Sundaram, Power Electronics Manager, EPRI; Gregory Rauch, Senior Application Engineer, Basic Measuring Instruments Inc.; Keith Allen, Marketing Product Manager, Electrical T&M Nilsen Technologies

developments in instruments including Hioki's large range of waveform recorders such as the Hioki

model 8845 and 8852 waveform recorders which have gained CE-approval. These multi-channel analog

and digital recorders are ideally suited to solving difficult to diagnose problems in equipment such as PLCs, CNC machines, fast acting circuit breakers and power electronics. Bob Harris, National Marketing Manager of Nilsen Technologies stated that the close cooperation with Hioki, built up over close to four decades, meant that the two partners were able to achieve a product well-suited to local requirements.



The photo shows from left to right, Ken Muraoka (Hioki); Kevin Gardiner, National Sales Manager; Bob Harris, National Marketing Manager; Taras Maciburko, General Manager; Keith Allen, Product Marketing Manager, Electrical T&M and David Orchard, Product Marketing Manager, Electronic T&M

Smart electricity meters from Nilsen Industrial Electronics installed in commercial and apartment buildings

The experience of the Melbourne Exhibition Centre with CALMU static three-phase metering, indicates the opportunities for their application in a commercial installation where the bulk supply comprises of a 'large' user and a number of smaller users (exhibitors in this case). The CALMU meters will also become more important with deregulation of the electrical energy industry.

In Victoria, consumers using more than 750 MWhr per annum are contestable customers, meaning that they are free to approach licensed energy traders for the 'best deal'. In New South Wales, that will be the situation in July, 1997. In both States, the barrier will be lowered to consumers with an energy usage of at least 160 MWhr in July, 1998. Other States can be expected to follow suit, though at a slower pace.

The 'contestable' market is operated on load profile information as measured at 15 minute or 30 minute, precisely timed, contiguous time-slots. 'Smart' meters are used for this purpose. Energy in these timed blocks

is offered for sale by generators and purchased by energy traders who on-sell to consumers or large users (who could trade directly with the generator). The concept is simple enough when metering installed for the consumer measures energy usage in synchronously-timed thirty minute time slots, identical to those being used by the generator (and at all other measuring points).

The Melbourne Exhibition Centre has CALMU 3-phase meters installed for revenue and internal cost allocation (eg: to exhibition organising companies). All of the meters can be interrogated via a PACTLAN communication network. The main supply revenue meters are owned by Citipower who distribute power to the Melbourne Exhibition Centre. The internal meters are owned and operated by the Centre. Citipower accesses the main supply meters with its own software.

The Melbourne Exhibition Centre uses its own meters and the software (PACS) to bill its own customers. Other CALMU features include automatic meter reading schedules, tariff change programmability, different levels of password access and the ability to interrogate the meters for instantaneous data such as present load, voltage, current, frequency, etc for energy monitoring and management. The CALMU meters are manufactured by Polymeters Response International PRI UK and are distributed by Nilsen Industrial Electronics Pty. Ltd.

CALMU three-phase meters provide energy consumption profiles and can be remotely monitored .



CALMU meters are economically priced so that, on an installed and amortised basis, they are capable of paying for themselves in terms of potential energy cost savings, within a few months.



Incoming power revenue metering at the Porter Street Apartment Complex

APARTMENT BUILDINGS IN MELBOURNE AND BRISBANE

Smart meters are ideally suited for electrical energy revenue metering in apartment complexes. Melbourne-based electricity distributor, Citipower placed Nilsen EMS2600 meters in the apartment complex built on the old Leggetts Ballroom site in Porter Street, Prahran.

The complex provides four separate electricity meter panels respectively accommodating 15, 20, 30 and 31 EMS2600 single-phase meters. These, together with a CALMU three-phase meter required for metering energy consumption in common areas, are connected to Citipower's central office via the public switched-telephone network (PSTN). The data collected from 96 apartment meters is routed to the PSTN via a modem/multiplexer connected to a Nilsen MeterNet NC4000 server and the CALMU three-phase meter.

The Admiralty Towers Residential Complex, overlooking the Brisbane River, in Brisbane's Central Business District was the first Nilsen MeterNet site in Australia and utilises 375 Nilsen EMS 2600's.

MeterNet, which was developed by Nilsen Industrial Electronics Pty Ltd is a remote meter reading and control system for the 'smart' Nilsen EMS2600 single-phase electrical energy meters and Nilsen's range of CALMU 3-phase meters. The

MeterNet system can be used for broadcasting or individual addressing of meters. Energy accumulation and other registers of the EMS2600 can be read and data files created using Nilsen-developed MeterSoft. These files can also be compiled for transfer to the electricity distributor's billing computer. The MeterNet server can be connected to up to 144 meters and when expansion is necessary, servers can be cascaded with each additional server connecting up to 144 meters.

The Nilsen PC-based MeterSoft software interrogates meters for billing purposes as well as providing load control of night-rate hot water heating. In addition, administrative functions including connect and disconnect services can be implemented when required. Error flag detection on individual meters provides tamper alert. Communication with meters is protected by a password thus preventing unauthorised reprogramming or resetting of tariff information. Other features include connect/disconnect, set time, selection of active tariff, configuring of meter parameters, checking meter time and date, etc. MeterSoft is a user-friendly Windows-based software package and with just a single PC, it is possible to access meter networks across large geographical areas.



The NC4000 Server (left) and EMS 2600 Meter as used at the Porter Street complex in Prahran, Victoria.

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