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dust



smell & odours



tobacco smoke



mold



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fine dust



building chemistry



exhaust fumes

Making ChemTech the best in its field

by Glynnis Koch

Having begun another new year, the ChemTech team has again resolved to rise to the challenges that inevitably occur as a result of the changes taking place in the media environment, both locally and internationally, and, naturally, in the world around us.

I think it is no boast to state that our magazine (ChemTech, for short) is the only publication in Africa for chemical engineers which focuses comprehensively on all unit operations in the chemical engineering field. The publication provides a wide-ranging overview of chemical engineering in South Africa and the South African chemical industry in general.

The magazine's focus will, as ever, be on providing its readers, in South Africa and also beyond its borders, in African countries such as Egypt, the DRC, Ghana, Zimbabwe, Zambia and Botswana, to name a few, and overseas, with in-depth technical information on areas of expertise of specific interest to chemical engineers and technicians and those involved in related sectors.

We aim to cater to differing levels of readers' interests by having various types of content, such as technical articles, case studies, short communications, hands-on practical advice columns; letters to the editor and feedback, company profiles, student news and more besides.

In particular, the challenges presented by the state of the availability and the quality of water in South Africa constitute serious constraints on our country's development. Pertinent in the extreme for ChemTech is the matter of ongoing deterioration of water quality. We shall be concentrating on topical articles on the importance of water's role, highlighting solutions to the

problems facing us, which unfortunately are becoming ever more critical as the effects of climate change make themselves more apparent.

Allied to the water issue are the subjects of renewable energy production, and the achieving of sustainable energy provision in the country. The spectrum of subject matter will also include nuclear developments in our country and, for example, the new Carbon Tax Bill. Our consulting editor, Carl Schonborn, PrEng, has written a new series of articles on just such important subjects and these will be published in the next few issues.

We all need to be aware that the key to learning is sharing and communicating what we know and remembering that success for one is success for all. Let's try to keep other 'players' in the loop and frequently give our opinions on matters of importance. After all, chemical engineering touches on virtually everything one can imagine, in one way or another.

I heartily encourage you to increase your personal telephonic or email interaction with me, to discuss ideas you may have for the magazine; I am sure there are many of you out there who could contribute positively to the magazine and its continuous development.

Please support our endeavours to bring both problems and their solutions to light by contributing your knowledge on particular aspects and by ensuring your products, processes and projects are clearly seen in advertisements within the magazine, or online on our dedicated site at www.crown.co.za/chemical-technology

Let's use our publication as a useful tool with which to make the most of this opportunity for growth and change.

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E-mail:
chemtech@crown.co.za

Website:
www.crown.co.za

Consulting editor:
Carl Schonborn, PrEng

Editor:
Glynnis Koch
BAHons, DipLibSci (Unisa),
DipBal (UCT)

Advertising:
Brenda Karathanasis

Design & layout:
Colin Mazibuko

Circulation:
Karen Smith

Publisher:
Karen Grant

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J Warwick

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APE Pumps

shows its turnkey capabilities in Malawi

APE Pumps recently completed a major portion of an upgrade project financed by the World and European Investment Banks to rehabilitate pipelines and pump stations supplying water from the Shire River to Blantyre, Malawi.

APE Pumps has recently completed a major portion of the €16 mil (approximately R300 mil) upgrade project being financed by the World and European Investment Banks to rehabilitate pipelines and pump stations supplying water from the Shire River to Blantyre, Malawi.

APE Pumps controlled all phases of both projects from tender, through design and manufacture, to installation and commissioning. The work comprised two separate contracts awarded by the Blantyre Water Board, together valued at some R200 mil and managed as turnkey projects shared between the company's Johannesburg works and the Kolkata factory of holding company, Worthington Pumps India.

The first and larger of the two contracts, to upgrade the Chileka pump station, was awarded in April 2013. It was followed in October 2013 by a contract to complete the upgrade of raw water and high-lift pumping stations at Walker's Ferry, begun by a foreign company which had subsequently defaulted. At Walker's Ferry, located some 40 km northwest of Blantyre on the Shire River, water is pumped through a water treatment plant via two pipelines to a high-lift pump station. This station transfers the water 26 km to the Chileka pump station, which in turn boosts the water flow all the way to storage tanks in Blantyre.

The refurbished raw water pumping station at Walker's Ferry consists of six pump units, each extracting water from the Shire River at a rate of 1 350 m³/h and head of 35 m. After transfer to the purification plant, two further pump stations each housing three pumps in parallel and one on standby, then transfer the water to the Chileka pump station.



For the work at Walker's Ferry, which required the rehabilitation of all aspects of the existing water intake works and high-lift pump station, APE Pumps established an on-site workshop. At Chileka, 26 km away, the upgrade work making up the larger of APE's two contracts, comprised the manufacture, installation and commissioning of eight multi-stage pumps with electric motors, all motor controls and associated valves, and civil work that included demolishing and re-building all concrete plinths and bases in the existing pump house.

The eight pumps installed at Chileka are multi-stage units manufactured by APE's sister subsidiary Mather+Platt, each with a capacity of 750 m³/h at a head of 550 m. Drive on all pumps is provided by 1 650 kW electric motors. The combined pump-motor efficiency exceeds 75 %.

The majority of manufacture for the two contracts took place at the APE Pumps/Mather+Platt works at Wadeville, Johannesburg, with equipment for the electrical arm of the project being supplied by Worthington Pumps, India. Besides the pumps themselves, APE Pumps also supplied all other mechanical and fluid handling equipment for the project, including valves and manifolds.

Peter Robinson, managing director of APE Pumps, said: "This project has taken APE Pumps further along its evolutionary path from a pure manufacturer of pumps to a projects company with complete turnkey capability. We are currently in the process of acquiring a second projects firm to take us further along this path, and we are working on our CIBD rating to help us get there," he said.



An API 610 multistage petrochemical pump installed in Harrismith for Petro SA.

Viking pumps perform well in South Africa

WPIL, through its international subsidiary WPIL international (Singapore), has acquired the pump business of PSV Holdings comprising 100 % shareholding in APE pumps and Mather & Platt. Strong brands such as APE/Mather+Platt SA have enhanced WPIL's global footprint further, while the addition of the APE range of oil and gas pumps (API standard) has added to the WPIL product portfolio.

Mather+Platt is the local distributor for Viking Pump which offers one of the industry's broadest selection of pumping technologies. For example, the Viking range of internal gear pumps is selling very well into the South African market. This pump uses two rotating gears which un-mesh at the suction side of the pump in order to create a vacuum which pulls fluid into the pump.

Other types of pumps, such as external gear pumps, vane pumps and rotary lobe pumps are all used in industrial and mining applications in particular, as well as in petrochemical processing, chemical processing, pulp and paper and the food industry.

For more information on APE Pumps and Mather+Platt, please contact Dave Johnson, Marketing & Business Development Manager, Mather+Platt on tel: +27 11 824 4810/ 079 490 7428, email dave@matherandplatt.com or go to www.matherandplatt.com.

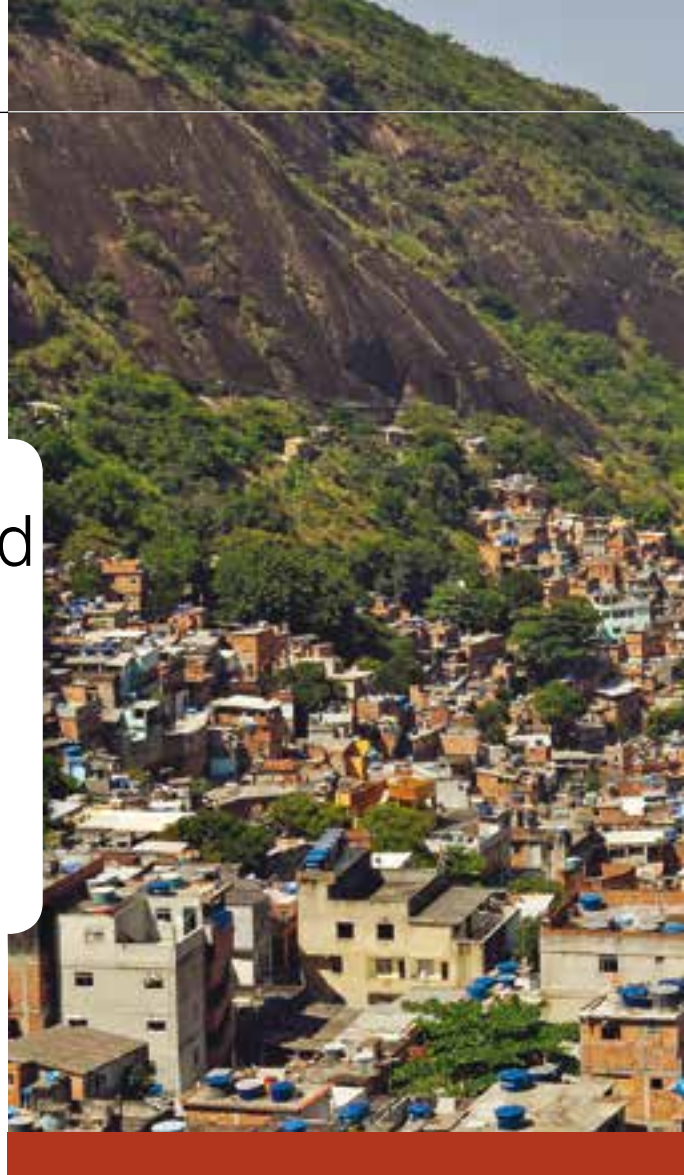


The refurbished raw water pumping station at Walker's Ferry consists of six pump units, each extracting water from the Shire River at a rate of 1 350 m³/h and head of 35 m.

Water for a sustainable world

Urbanisation

by Bhushan Tuladhar, Andre Dzikus and Robert Goodwin, all of UN-Habitat United Nations Human Settlements Programme)



Over the past several decades, ever-growing demands for – and misuse of – water resources have increased the risks of pollution and severe water stress in many parts of the world. The frequency and intensity of local water crises have been increasing, with serious implications for public health, environmental sustainability, food and energy security, and economic development. Although the central and irreplaceable roles that water occupies in all dimensions of sustainable development have become progressively recognised, the management of water resources and the provision of water-related services remains far too low on the scales of public perception and of governmental priorities. As a result, water often becomes a limiting factor, rather than an enabler, to social welfare, economic development and healthy ecosystems. The fact is there is enough water available to meet the world's growing needs, but not without dramatically changing the way water is used, managed and shared. The global water crisis is one of governance, much more than of resource availability, and this is where the bulk of the action is required in order to achieve a water-secure world.

Prologue: The future of water – A vision for 2050

by Richard Connor, Joana Talafré, Karine Peloffy, Erum Hasan and Marie-Claire Dumont, all of WWAP

Water in a rapidly urbanising world

Cities have become the place where development challenges and opportunities increasingly come face to face. In 2014, 3,9 billion people, or 54 % of the global population, lived in cities, and by 2050, two-thirds of the global population will be living in cities (United Nations Department of Economic and Social Affairs - UNDESA, 2014). Furthermore, most of this growth is happening in developing countries, which have limited capacity to deal with this rapid change. Cities impact the hydrological cycle in several ways by:

- extracting significant amounts of water from surface and groundwater sources;
- extending impervious surfaces thus preventing recharge

of groundwater and exacerbating flood risks;

- polluting water bodies through the discharge of untreated wastewater.

Since much of the water consumed by cities generally comes from outside the city limits, and the pollution they generate also tends to flow downstream, the impact of cities on water resources goes beyond their boundaries. Cities also import significant amounts of food, consumer goods and energy from outside the city, which requires large amounts of water at the point of production, transportation and sale, this virtual demand of cities greatly exceeds direct water use (Hoekstra and Chapagain, 2006).

At the same time, as centres for innovation, cities provide



Rocinha Favela, Brazil. (Photo Ahln)

opportunities for more sustainable use of water, including treating used water to standards that enable it to be used again. They are well positioned to rapidly adopt conservation measures, and the concentration of people in compact settlements can reduce the cost of providing services such as water supply and sanitation. Furthermore, cities can connect with their hinterlands and support the protection of water resources in their surrounding areas by actively engaging in watershed management or providing Payment for Ecosystem/environmental Services (PES).

Challenges

Access to water supply and sanitation

Rapid urbanisation, increased industrialisation, and improving living standards generally combine to increase the overall demand for water in cities. By 2050, global water demand is projected to increase by 55 %, mainly due to growing demand from manufacturing, thermal electricity generation and domestic use, all of which mainly results from growing urbanisation in developing countries (Organisation for Economic Co-operation and Development – OECD) [1].

As easily available surface water and groundwater sources have been depleted in many urbanised areas, cities will have to go further or dig deeper to access water, or will have to depend on innovative solutions or more advanced technologies such as reverse osmosis for desalination, or reclaimed water to meet their water demands.

Although the Millennium Development Goals (MDG) tar-

get on access to safe drinking water – as measured by the proportion of population using an improved drinking water source (Pro-poor policies in Kampala: www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/02/24/000442464_20140224140639/) – was met in 2010, the progress in urban areas has not been able to keep up with the rapid pace of urbanisation. Between 1990 and 2012, the number of urban residents who did not have access to an improved drinking water source decreased by 1 percentage point. However, in absolute terms, the number of people in urban areas without access to an improved drinking water source increased from 111 million to 149 million [2], indicating that access to drinking water is actually deteriorating where the most rapid urbanisation is outpacing public services. The situation is worse in sub-Saharan Africa, where urbanisation is happening most rapidly. In this region, the percentage of people who enjoyed piped water on their premises, which is the preferred option for urban areas, actually decreased from 42 % to 34 % [2]. This clearly indicates that access to ‘safe’ drinking water sources continues to be a major problem in cities in the developing world.

Similar to trends in drinking water, the number of urban residents without access to improved sanitation increased by 40 %, from 541 to 754 million, between 1990 and 2012 [2]. Therefore, although sanitation coverage is generally higher in urban areas, because of rapid urbanisation, increasing numbers of urban residents, particularly the poor, are unable

to access improved sanitation. Also, due to higher population densities in urban areas, the health consequences of poor sanitation can be pervasive. In urban Cambodia, for example, 54 % of the people in the poorest quintile still defecate in the open, while among the richest 40 % of the population, this has gone down to zero.

The increase in the number of people without access to water and sanitation in urban areas is directly related to the rapid growth of slum populations in the developing world and the inability or unwillingness of local and national governments to provide adequate water and sanitation facilities in these communities. While there has been some progress in moving people out of slum conditions, it has not been enough to counter population growth in informal settlements. The world's slum population is expected to reach 889 million by 2020 [3]. As slum dwellers are generally more likely to suffer inadequate access to safe water and sanitation and are also more vulnerable to the impacts of extreme weather events, water management in cities, particularly slum settlements, will be a major challenge in the future. In some informal settlements, however, local communities and the private sector have come up with innovative solutions. In Mombasa, for example, where only about 15 % of the people have access to piped water supply, more than 80 % have access to an improved water source because they receive water from kiosks.

Pollution and wastewater management

Many cities in developing countries do not have the necessary infrastructure to collect and treat wastewater. In the absence of proper drainage systems, sewage mixes with stormwater causing further pollution. It is estimated that up to 90 % of all wastewater in developing countries is discharged untreated directly into rivers, lakes or the oceans, causing major environmental and health risks [4]. This has huge social and economic impacts due to increased health care costs and lower labour productivity. Wastewater also has impacts on the global environment as wastewater-related emissions of methane, a powerful global warming gas, and nitrous oxide could rise by 50 % and 25 %, respectively, between 1990 and 2020 [4].

There is clearly a need to expand wastewater treatment systems and improve efficiency of existing treatment plants.

While some developing countries such as Chile have been successful in treating almost all their wastewater [5], experience from most developing countries indicates that wastewater management can be expensive and most cities do not have or allocate the necessary resources for this. Moreover, the cost of the wastewater collection is often underestimated.

There is a need for more innovative options for such as decentralised wastewater treatment solutions and biogas production for reusing and recycling wastewater and reducing the cost of wastewater management [6].

Institutional capacity and water governance

Given the rapid pace of urbanisation, the institutional capacity of local and national governments and water utilities to increase investments and manage the delivery of services is becoming critical, especially in cities with old and poorly maintained water and sanitation infrastructure and cities in the developing world. High rates of unaccounted-for water (mainly due to leakages), unsustainable tariffs and weak systems of governance are typical manifestations of the growing capacity gaps in many urban areas. Leakage results in loss of revenue, higher chances of drinking water contamination and outbreaks of waterborne diseases, which will further reduce water service quality and the consumers' willingness to pay.

Climate change and water-related disasters

Because the impacts of climate change are complex and unpredictable, the availability of and demand for water are highly likely to be affected. Water and sanitation infrastructure may be at risk because of extreme events and sea level rise. With increased urbanisation encroaching upon natural drainage paths and changed land use caused by urbanisation resulting in increased runoff, there is also an urgent need for more sustainable urban drainage systems to address the issues of inundation and water contamination. As the urban poor tend to live in concentrated and highly vulnerable areas such as river banks, they are more vulnerable to the impacts of climate change. Coping with the effects of climate change will therefore require cities to strengthen planning and management capacities related to water and integrate water management with overall urban development.





Responses

The dedicated goal for water and its five targets proposed by UN-Water 2014 [7] as part of the post-2015 agenda for sustainable development, are very relevant for the sustainable use of water in the urban context. The targets provide an appropriate framework for responding to the challenges of managing water in cities.

Pro-poor policies for safe water supply and sanitation

Rapid urbanisation is outpacing public service provisions in the developing world and the overall number of people without access to safe water and sanitation in urban areas is increasing. The proposed target on universal access to safe water, sanitation and hygiene should stimulate action to address this critical issue. Furthermore, as the target also includes an element of progressively eliminating inequalities in access, it would encourage policy-makers to address the needs of the urban poor. In doing so, governments and service providers can learn from experiences of successful and innovative initiatives that focus on the needs of urban poor and create an enabling environment for service delivery (Pro-poor policies in Kampala: www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/02/24/000442464_20140224140639/).

Integrated urban water management

The proposed target on sustainable use and development of water resources can benefit from experiences of integrated urban water management (IUWM) systems in

various countries. IUWM calls for the alignment of urban development and basin management and brings together water supply, sanitation, and stormwater and wastewater management, and integrates these with land use planning and economic development. Implementation of IUWM will require appropriate institutional structures, policies, careful planning, capacity-building and investment in systems such as protection of upstream catchment areas, rainwater harvesting and recharge, water demand management and water reuse.

Urban water governance

The target on equitable, participatory and accountable water governance will require strong political commitment, appropriate policy and legal frameworks, effective institutional structures, efficient administrative systems and capable human resources. It will also require investments in water infrastructure, renewal, operations and maintenance. A study estimates that one dollar of water and sewer infrastructure investment increases private output (gross domestic product) in the long-term by US\$6,35 and yields a further US\$2,62 output in other industries. These benefits accrue in terms of jobs created, final output and private sector investment [8]. Experiences from cities around the world have shown that it is possible to improve the performance of urban water supply systems and increase revenue and profits, while continuing to expand the system and addressing the needs of the poor, provided that there is strong leadership and good governance.

Urban poverty Phnom Penh, Cambodia. (Photo by Jonas Hansel, 2012, opendevelopment-mekong.net)

Sustainable sanitation

Effective management of water resources and reduction of water pollution will require investment in sustainable sanitation systems which are technically appropriate, economically viable, socially acceptable and environmentally sound. These may include promotion of reuse, treatment of wastewater to an appropriate level for the intended reuse option, and integration of sanitation systems with overall water resource and urban planning and design [9]. Since transportation accounts for much of the cost of wastewater management, decentralised systems that treat wastewater close to the source, using simple technologies that maximise recycling of water and nutrients, can be more effective, particularly in poor and peri-urban settlements.

Wastewater systems can also generate energy; treated wastewater can be reused, thus contributing to water, energy and food security and therefore health and economy. In Accra, urban vegetable gardens irrigated by treated wastewater provide up to 90 % of the vegetable needs of the city [10]. On-site sanitation, which is still the main approach used in most urban areas in Africa and Asia, is a challenge as well as an opportunity. If faecal sludge is not managed properly, it can cause major health risks and pollution, but avoiding extensive sewer systems leads to investment savings and allows for more innovative decentralised options that are less water- and energy-intensive can be explored.

Adaptation to climate change and water-related disasters

The World Bank estimates that the global costs of adaptation from 2010 to 2050 will be US\$70 – 100 billion a year [11]. The sectors requiring the main bulk of this investment will be water supply and flood protection, infrastructure and coastal zones, with urban areas requiring an estimated 80 % of the total funding required for adaptation. As most of this investment will be needed in developing countries, where the infrastructure and systems are yet to be built, there are possibilities for making future cities 'climate smart', thus reducing climate risks and maximising environmental and economic benefits. For example, cost-benefit assessments of early warning systems for storms, floods, and droughts undertaken throughout Asia indicate potential returns of up to US\$559 for each US\$1 invested [12].

Some cities like Singapore have taken adaptive measures to increase the resilience of urban water supply and sanitation systems. To avoid seawater intrusion into reservoirs, most reservoir dams are much higher than the predicted sea level rise, and, if needed, the gates can be further raised. By diversifying its water sources to include rainwater harvesting, reclaimed water and desalination, the city has reduced its vulnerability to prolonged dry periods [13].

Acknowledgement

This article forms Chapter 6 of the WWAP (United Nations World Water Assessment Programme). 2015. The United Nations World Water Development Report 2015: Water for a Sustainable World. Paris, UNESCO.

Figures have been excluded and generic images have been added in this presentation.

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Water Quality Management and Risk Assessment

Date: 10th to 11th March 2016

Indaba Hotel – Fourways, Johannesburg, South Africa

Nathchar Innovative Business Solutions (NIBS) has taken a strategic decision to host a two-day workshop (with 2 CPD points) on Water Quality Management & Risk Assessment Workshop 2016. The event is scheduled to take place from 10-11 March 2016 at Indaba Hotel, Fourways, Johannesburg, South Africa.

The provision of safe and reliable water should be the cornerstone of municipal services. Water of good quality is necessary for domestic, environmental, industrial, recreational and agricultural uses. For those working in water management, it is important to understand the rationale for and be practically competent in the monitoring and management of water quality.

This course will seek to explain the technical and practical aspects of water and wastewater treatment, the regulatory requirements needed for Blue Drop and Green Drop status and best practices to meet the Blue Drop/Green Drop criteria, and management of water quality performance.

Specific attention will also be given to the compilation, revision and application of Water Safety Plans and Wastewater Risk Abatement Plans. Guideline documents that were drawn up for the Water Research Commission on these topics will be used extensively during the course.

Topics will include:

The Blue Drop Programme

- Overview of the Programme
- Aims and Objectives
- Current Status: Blue Drop Certification
- Need for Support to Municipalities
- Criteria for Blue Drop Status, including the new No Drop requirements

Water Safety Plans (WSPs)

- Understanding WSPs
- Systems Evaluation and Description (using the WHO and WRC tools)
- Risk Identification and Assessment: catchment, water source, treatment works and reticulation
- Risk mitigation (drawing up of Control Measures)

Process Controllers and Supervisors: Operation, Maintenance and Management Skills

- Registration of Treatment Works and Process Controllers
- Skills Audits
- Training Programs: Needs and Available Programmes

Water Quality Monitoring Programmes

- Minimum Requirements of the Departments of Water Affairs
- Drawing up Operational and compliance Monitoring Programmes
- Laboratory Validation



Management of Drinking Water Quality Performance

- Reporting and Communication of Drinking Water Quality
- Publication of Water Quality Performance
- Customer satisfaction

Drinking Water Audits, Analysis and Management Programs

- Process Audits, Contracts and Risk Management Analysis
- Management of Action Plans
- Asset Registers, Capital Budgets and Maintenance Budgets

Dr Herman N S Wiechers, who will be the course leader, obtained a PhD. from the University of Cape Town in the fields of water and wastewater chemistry and treatment. He has worked at various institutions, such as the National Institute for Water Research of the CSIR, the Chamber of Mines, Chemical Services, the Water Research Commission, Eskom, and others.

Dr Wiechers' fields of expertise include: Water and Wastewater Chemistry and Pollution and its amelioration, Mine Water Management and Treatment, Environmental Management (Governance, Ecosystem Management, and EIAs), Climate Change, Air Emission Control Strategies, Solid Waste Management (General and Hazardous Waste) and Project Management.

Should you wish to book your seat for this exciting workshop prior to me contacting you, please do not hesitate to call us on +27 11 047 4521 or email info@nibs-sa.co.za, or go to www.nibs-sa.co.za

WSSCC appoints renowned sustainable development expert

In mid-January this year, the Water Supply and Sanitation Collaborative Council (WSSCC) announced that Amina J Mohammed, Environment Minister of the Federal Republic of Nigeria, will serve as its new Chair, effective as of April 5, 2016.

The former Assistant-Secretary General and Special Advisor to the Secretary General on Post-2015 Development Planning, Ms Mohammed will chair the Steering Committee and guide the work of WSSCC's Geneva-based Secretariat, its operations in 20 countries in Africa and Asia, and its 5 000 members in 150 countries.

Hosted by the United Nations Office for Project Services, WSSCC is the part of the United Nations devoted solely to the sanitation and hygiene needs of the most vulnerable people around the world. "WSSCC embodies the transformative spirit of the Sustainable Development Goals, promoting WASH at the national level as a strategic entry point for attaining multiple targets," says Ms Mohammed. "By improving sanitation and hygiene at scale in

sub-Saharan Africa, South and Southeast Asia, in particular, the Council is playing an important role in improving education and health, and in empowering women. I am proud to Chair an organisation that understands that equality and universality must go hand-in-hand towards achieving a sustainable development agenda."

As the Secretary-General's Special Advisor on Post-2015 Development Planning, Ms Mohammed worked systematically to ensure the successful adoption by Member States of the Sustainable Development Goals in September 2015. She is an Adjunct Professor at Columbia University and previously held the position of Senior Special Assistant to the President of Nigeria on the Millennium Development Goals, serving three Presidents over a period of six years. In 2005 she was charged with the coordination of the debt relief funds (\$1 billion per annum) towards the achievement of the Millennium Development Goals in Nigeria.

The appointment of Ms Mohammed will build upon WSSCC's tradition of having a

Chair with experience serving as a senior official of the United Nations and who is a current or former government official. WSSCC is an organisation that prides itself on the intersection of state and non-state actors, and the appointment of Ms Mohammed will ensure that this continues.

In her role as Chair of WSSCC, Ms Mohammed plans to draw upon her experience and network of contacts in politics, business, academia, and demonstrated knowledge of the United Nations, to raise awareness about practical solutions to improving sanitation and hygiene. Under her leadership, WSSCC intends to continue its current growth, notably of its Global Sanitation Fund, a catalytic facility that supports the establishment of national sanitation and hygiene improvement programmes in Africa and Asia.

For more information contact: Alison Bradley, at tel: +41 79 926 72 51, (alison.bradley@wsscc.org) or David Trouba, +41 79 293 26 00

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Using biotechnological principles in a technological context

Nature provides an excellent palette of highly effective membranes capable of highly selective vectorial transport of a large number of molecular species. It is therefore striking that the membrane industry has developed synthetic separation membrane processes in a very different way.

Traditional separation membranes are mostly dense polymeric films where advanced chemistry is used to control the surface properties of the films produced. A wide range of polymers and production techniques have been used resulting in a great diversity in structure and function of separation membranes tailored to a wide variety of applications. Separation is usually described in terms of pore/solute size, pore/solute charge and dielectric effects, coupled with diffusion or convective flow. Occasionally, more complex partitioning and transport mechanisms are used; however, most synthetic membranes may be broadly described as polymer sheets containing micron to nanometre sized holes.

This is in stark contrast to the bewildering complexity of biological membranes. Thirty percent of the human genome codes for membrane proteins, and a typical mammalian cell membrane hosts several hundred lipid types.

One way leading to a better understanding of membranes and membrane

transport is to focus on a few of its components and features. This understanding is crucial if we want to exploit – or mimic – nature's tremendous capability for selective membrane transport. In the development of biomimetic membranes it is important to know the morphological descriptors such as the amount and intrinsic properties of amphiphiles (lipidic or block copolymeric types) forming the membrane, the equilibrium thickness, and the coverage. Also important are the properties of interaction: the stability against mechanical perturbations (eg, viscoelastic responses to changes in hydrostatic or osmotic pressure differences, the rate of regeneration (self-healing), the ease with which functional peptides or proteins can be adsorbed/incorporated and, once incorporated, how proteins interact with the amphiphilic matrix; and surface (eg, electrostatic) energetics.

Perhaps the most challenging part of biomimetic membrane development is to understand the interaction between the membrane and its support – in particular when this support also is porous and thus can support mass transport across the membrane. In Aquaporin's case the biomimetic membrane with embedded aquaporins must support pressures up to 10 bar and allow a water flux > 100 l/m² h. Therefore the development of the Aquaporin Inside™

membrane is closely linked to the simultaneous development of suitable porous support materials.

Aquaporin A/S is a global cleantech company located in Copenhagen, Denmark which is dedicated to revolutionising water purification by means of industrial biotech techniques and thinking. The use of biotechnological principles in a technological context is a novel upcoming field with large commercial perspectives.

The main strategy is to develop the Aquaporin Inside™ technology capable of separating and purifying water from all other compounds. Primary market focus includes industrial water treatment, treatment of difficult waste water streams and other niche segments where the Aquaporin Inside™ technology closes a technological gap in today's water treatment. Secondary market focus includes desalination of seawater and pressure retarded osmosis applications. Pilot production of the first generation Aquaporin Inside™ membranes was initiated in 2014 and membrane samples are available for testing upon request.

For more information contact:

Aquaporin A/S, Copenhagen. Tel: +45 82 30 30 82; email: aquaporin@aquaporin.dk or go to <http://www.aquaporin.dk/>.

Call for Papers for FILTECH 2016

With the FILTECH Show taking place from 11-13 October 2016, the City of Cologne in Germany will turn into the top meeting-place for all those involved with filtration and separation and adjacent sectors.

With 350 exhibitors the world's largest filtration Show will take place for the first time at the new venue KoelnMesse. The FILTECH Congress with more than 200 presentations will offer a representative cross-section of current research findings, global developments and new approaches.

Special highlights are a plenary and six survey lectures in which internationally renowned experts give a comprehensive overview of state of the art knowledge and techniques concerning important aspects of separation technology.

More information is available at:

www.filtech.de.



International collaboration results in **new non-seal canned motor pump**

by Bryan Orchard

What do you get when you combine a powerful motor with a high-efficiency hydraulic system? The new Ecochem Non-Seal series of canned motor pumps is making a major impact in the pump industry, not only because of its reliability, but also because the pump comes in several flexible design variants.

With its latest series of canned motor pumps, KSB has completed the update of its chemical pump series. The MegaCPK pump was introduced in 2012 and the Magnochem was successfully launched in 2014. In May this year, KSB introduced its Ecochem Non-Seal.

KSB has been cooperating very closely with the Japanese company Nikkiso on canned motor pumps since 2008. "We have combined the powerful motors with the hydraulic system of the MegaCPK," explains Dr Nobert Kastrup, Head of Product Development at KSB. "The user benefits from our cooperation in many ways, from the operating reliability, for example, as well as from the selection chart having closely spaced sizes and from the high efficiency."

The Ecochem Non-Seal canned motor pump is used for handling aggressive, flammable, explosive, toxic, volatile or valuable liquids in the chemical and petrochemical industries, in environmental engineering and industrial applications with temperatures of up to 400 °C. In brief, whenever operating reliability is paramount.

To cover as many applications as possible the new type series comes in four variants: The standard variant, called HN, covers the majority of applications. The term 'standard' can be misleading in this context. "We are talking about hazardous, combustible fluids, such as hydrofluoric acid or carcinogenic substances as well as other products for which conventional standardised chemical pumps must be designed with a double seal," says Dr Kastrup.

The HN variant, which is suitable for temperatures of up



to 180 °C, has been developed with the total cost of ownership (TCO) value in mind. The high added value for the user is primarily achieved by a high overall efficiency of both the hydraulic system and the motor. The Ecochem Non-Seal pump has benefited from the MegaCPK's hydraulic system and efficiency being optimised. The efficiency has been raised by 19 % compared with the previous models.

Many users can now choose a smaller pump size and lower their investment costs. Similar achievements can be expected from the new Ecochem Non-Seal series as the hydraulic system of the MegaCPK was essentially transferred to the Ecochem Non-Seal. A small, but interesting side effect is that in the three years since the launch of MegaCPK, the pump has recorded the lowest warranty costs ever in the company's history. In other words, it is an extraordinarily dependable pump users can rely on.

When the going gets tough

What really sparks pump developer Kastrup's interest are applications outside the standard range. The high-temperature variant HT, for example, covers applications of up to 400 °C. Such extreme conditions require a special design which separates the motor space from the hydraulic section. An auxiliary impeller has been added to cool the fluid in the rotor space via a heat exchanger.

In normal conditions, the fluid is transported to the motor space when the highest pressure in the pump section is reached, and a partial flow lubricates the pump-end bearing.



Another partial flow between the rotor and the can absorbs the heat and flows back through the rear bearing and the hollow shaft. Logically, the pump section and the rotor space have to be connected. This design is out of the question for fluids with high temperatures or fluids containing particles which must not enter the rotor space. So the two spaces are separated from each other in the corresponding design variant.

For fluids with a low boiling point, such as ammonia or light hydrocarbons, another variant with the code HP is available. With these fluids a few degrees difference in temperature can cause vaporisation. This variant has been specifically designed to maintain the pressure in the rotor space at the same high level as the pressure produced by the main hydraulic system. An integrated auxiliary hydraulic system circulates the coolant and lubricant in the rotor space. This securely prevents vaporisation of the fluid in the rotor space and mechanical seals.

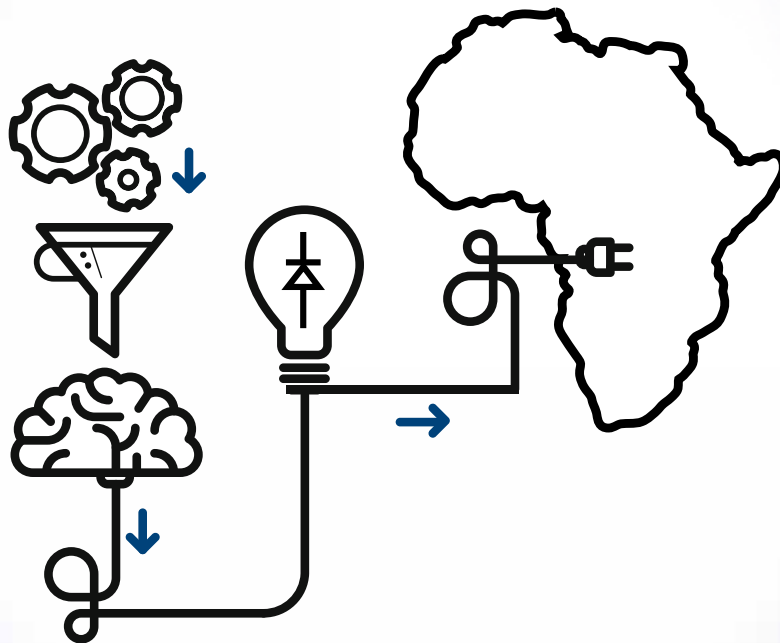
The fourth variant of the new type series is based on the same design. The HS variant has been developed for solids-laden fluids. "Generally, the can is relatively thin between the rotor and stator in order to keep energy losses to a minimum," explains Dr Kastrup. "When handling solids-laden fluids, solid particles can wear through the sheet metal and enter the stator space." The HS variant covers applications with ferritic particles in the fluid, which would accumulate in the magnetic field of the motor and result in wear at the motor. Other applications this model caters for



Ecochem HP variant has an integrated auxiliary hydraulic system that circulates the coolant and lubricant in the rotor space.

are fluids which form deposits or polymerise quickly. KSB has developed a special sealing concept and cooling liquid flow paths which make the fluid passage reliable as well as energy-optimised.

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Doing all the hard work in the pump

Next to the hydraulic system, the motor is certainly decisive for reliability and energy efficiency. Here, too, the user can choose from many flexible options. The new Ecochem Non-Seal is available for motor ratings from 1,2 to 75 kW, also in combination with a variable speed system. No compromises are made when it comes to safety. Users can choose from a variety of monitoring options: motor monitoring with an overcurrent relay combined with temperature monitoring of the rotor space; motor and rotor space monitoring with PTCs only; or PTCs in the motor combined with temperature monitoring of the rotor space.

In addition, the following operating conditions can be monitored directly: high-inertia starting, high frequency of starts, running on two phases, high ambient temperature, insufficient cooling or additional heat build-up by the frequency inverter. The PT 100 functions as a passive component in the potentially explosive atmosphere and measures the rotor space temperature of the pump. Installed in a protective well, defective resistance thermometers can be replaced without draining the pump. Connection is to a three-wire system by intrinsically safe wiring. The motor housing is available for pressure classes PN 25/40 and can be used up to -50 °C.

At the heart of the pump – the plain bearings

Being 100% reliable is a canned motor pump's most important characteristic. A major contributor are the plain bearings, which have proven their extreme robustness in comprehensive tests on test beds at KSB in Pegnitz and at Nikkiso in Japan, as well as at PCK Schwedt. Even hot water close to vapour phase does not affect the bearings. They come in two variants: The standard bearing is made of SiC. The material SiC 30 contains a special carbon structure, which increases the bearing tolerance to high loads or partial vaporisation of some fluids.

To indicate the wear in the plain bearing Nikkiso's E-Monitor has been adapted to the new pump. It displays the condition using the traffic light colours green (everything in order), yellow (some wear, please monitor) and red (bearing needs to be replaced). Behind it is an additional, non-contacting sensor which monitors the rotor position. It measures changes to the magnetic field as well as the thrust and radial bearings.

Safety is delivered by the new Ecochem Non-Seal, which also considers explosion protection. The new Ecochem Non-Seal fulfils the requirements of Atex and is available in classes T1 to T5. This is the result of various measures. The surface temperatures are extremely low, for example, as the heat from the stator is very effectively transferred to the fluid handled without the fluid heating up too much due to high motor efficiencies.

The right pump for each application

A general trend towards seal-less pumps is noticeable, be it canned motor pumps or mag-drive pumps. Considering that the European process industry increasingly produces valuable products, this trend becomes even more significant. What pump suits what application? "Canned motor pumps are more compact in design.

They do not need to be aligned. They have a pump casing and a motor housing acting as a second barrier. If any fluid should leak, the pump has its outer protection," summarises Dr Kastrop.

As KSB offers its Magnochem mag-drive pump with a dynamic seal which acts as a second barrier, this argument is no longer as decisive as it used to be. A close-coupled variant is also available

which does away with the need for alignment.

"The decision on the pump type is partly based on the operators' philosophy," comments Dr Kastrop. From his point of view the canned motor pump does better in life cycle costs as no wear occurs at the rolling element bearings in the bearing brackets. If SiC bearings are used, the pump actually does not need any maintenance for several years. On the other hand, Magnochem pumps are very easy to service. The outer rotor of the magnetic coupling and the bearing bracket can be serviced without having to open the pump section. The pump casing with impeller as well as the can with the inner rotor can remain in the piping without any leakage escaping to the atmosphere.

Dr Kastrop's conclusion: "The Ecochem Non-Seal pump brings the update of our standardised chemical pumps to a conclusion. Users around the globe can be assured that, no matter where they are, they will receive a reliable pump which meets KSB's stringent quality requirements. All updated pump series are characterised by absolute operating reliability, outstanding efficiency through an enhanced hydraulic system and, with that, optimised energy efficiency."

For more information contact

Christoph P Pauly, KSB Aktiengesellschaft, Frankenthal, Germany. Tel: +49 6233 86 3702; email: Christoph.pauly@ksb.com www.ksb.com.



Ecochem HN is the standard variant.

AES firms win Level 4 BEE Certification



Sister companies AESSEAL and AESPUMP are to expand their apprenticeship programmes to ensure retention of Level Four BEE certification, recently re-assessed upwards from Level Five.

The two companies, which together employ a staff of some 110, have seven active apprentices undergoing alternate terms of theoretical training at Dinyane Education in Secunda, while on-the-job mentorship at the company's Secunda workshops ensures a steady stream of qualified fitters and turners after completion of their two-year course.

An annual intake of between three and five apprentices each year ensures programme continuity, and AES group management believes that the programme is already delivering returns on the investment made in it.

The amended regulations issued under the Preferential Procurement Policy Framework Act of 2000 have resulted in substantial reconfiguring of the BEE certification codes, shifting emphasis away from mere BEE compliance towards BEE strategy and true company empowerment.

The AES group's own target compliance would also be helped by ongoing sponsorship of black undergraduates studying towards their bachelor's degrees in commerce and finance, Murray said. "Our highly rated apprenticeship programme has been at the heart of our recent upgrade to Level Four accreditation," explained Murray, "but we want to expand it further because we believe that this emphasis on skills development will, over time, lead to a self-correction of the key pillar of black ownership."

Murray said that the new codes, although hard work, are positive in that companies will have to make real changes in order to maintain or improve their BEE ratings.

"The enterprise and supplier development criteria have changed dramatically, and will lead to every large enterprise applying individual and carefully considered strategies to each and every key supplier," said Murray. "This means that we will ourselves be under scrutiny by our own key customers, and it is therefore our intention to comply to our utmost ability. It is inevitable that the BEE portion of any tender will carry considerably more weight under the new codes."

As an example of the changes, Murray explained that the new codes award only five points for spending as much as 80 % of procurement spend with suppliers in possession of a BEE certificate, whereas the old codes awarded between 12 and 15 points for a lower 70 % procurement spend with BEE certificated suppliers.

Murray also acknowledged that enterprise and supplier development will represent a challenge for AES, because the required ramping-up of local production capability will be difficult to achieve for any company that imports a finished, custom-engineered product.

"The new codes demand a clear strategy if you are going to remain sufficiently competitive to remain a key supplier to customers who are themselves under pressure to maintain their own BEE ratings," Murray concluded.

For more information contact Rob Waites (managing director) on tel: +27 11 466 6500 or email: rwaites@aesel.co.za

Verderflex peristaltic pumps for reliable wastewater performance

In 2013, Smart Storm, a leading international wastewater instrumentation manufacturer in the UK, embarked on a design exercise to replace its existing waste water sampler with a new product that would meet the harsh demands of industrial wastewater sampling. The new product, known as the Hydrocell sampler, included the Universal Smart Instrument (USI) as its instrument controller, which offers the only wastewater sampler on the market with a graphical user-friendly interface and Windows CE programming.

"To ensure that the new product exceeded the specification of the existing product and that of our competitors we also required the pump to perform to a higher standard than that of the old sampler pump," said Smart Storms managing director, Dr John Duffy.

"After exhaustive tests on numerous pumps, the Verderflex R3DC OEM pump was

chosen. We choose the Verderflex pump because its vertical lift capacity of 9 m far exceeded that of other manufacturers pumps, its reliability was very impressive and it was extremely robust," he added.

"Often the pump is the weakest part of a wastewater sampler so reliability is paramount. Sending engineers to site to repair pumps is extremely costly and time-consuming. We have now been using Verderflex pumps on our samplers for two years and we have not had a single failure. We use the pump across our complete sampler range from single bottle samplers to multi-bottle refrigerated samplers.

The pump has a thick-wall tubing, and in addition to its high lift capability and a DC motor, which can accommodate speed and flowrate variations, it can handle flow rates up to 3,4 l/min.



For more information contact:

Verder Pumps SA on tel: +27 11 704 75 00, email: info@verder.za or go to www.verder.co.za.



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Voith Turbo introduces latest innovations in servo valves

The new DECV servo valve (Direct Electronic Copy Valve) from Voith Turbo represents the latest development of this product, which has already proven itself in countless hydraulic control systems. "It combines excellent operating characteristics and robustness with innovative valves and associated electronic control," Derain Pillay, vice-president: power, oil and gas, comments.

Impulse response and accuracy means that the Voith Turbo DECV is responsive to demanding drive tasks. A step response of only seven milliseconds places the DECV firmly in the class of highly dynamic valves. A hysteresis of under one percent is achieved thanks to the direct actuation.

Pillay explains that the development of the Voith Turbo DECV is focused on applications with high mechanical loads. "The DECV's extraordinary parameters are also confirmed outside laboratory conditions in its daily work environment." For example, this servo valve has already proven itself in punching/nibbling machines that clock up a g-force in the hundreds ($>2\ 000\ m/s^2$).

The Voith Turbo DECV is unaffected by oil impurities, and can be used with oil of cleanliness class 19/17/14 as per ISO 4406. This oil-quality level can be achieved by means of a common bypass filter system. Comparable servo valves often require higher purity levels, which means using expensive pressure filters. The Voith Turbo DECV, on the other hand, plays a major role in helping to reduce operating costs.

The programmable control electronics of the Voith Turbo DECV offers all common interfaces,



which simplifies integration into existing systems. The HS4-SV2 controller used contains a configurable PLC/CNC, in addition to the control amplifier. Frequently-occurring user cycles are already integrated, and can be customised easily via field buses for specific requirements.

For more information contact:

Terry-Lynn McIntosh on tel: +27 11 418 4000 or email: Terry.Mcintosh@voith.com.

A breakthrough in the valves sector and gas industry

For some years now, one of the central demands from the valve sector and gas industry has been for a seal material that has suitable low temperature flexibility, and which conforms to the DIN EN 14141 standard. Up until now, there simply hasn't been a suitable FKM seal material available.

But now, the independent seal manufacturer C Otto Gehrckens has developed the low temperature flexible 'Vi 840' FKM compound. This has been successfully tested according to DVGW DIN EN 682 (type GBL). What's more, this material has that all-important low temperature flexibility of more than $-40\ ^\circ\text{C}$, which means it therefore fulfils the requirements of DIN EN 14141.

With a TR-10 value of $-40,1\ ^\circ\text{C}$, this high-tech compound is suitable for use at temperatures of right down to $-46\ ^\circ\text{C}$, and therefore fulfils the important API 6A and 6D standards. Furthermore, its resistance has been demonstrated and proven according to the DIN EN 13787 standard.



According to the manufacturer, this combination of properties for an FKM seal material is hitherto unique in the market, and therefore represents an enormous advance in seal technology for the valves sector and gas industry.

For more information contact:

Henning Wrage on tel: +49 (4101) 5002 348 or email: h.wrage@cog.de.

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Endress+Hauser CIP technologies saving at least 20 % energy

Recent innovations in technology now enable plant operators to calculate the optimal mix of water, chemicals, temperature and flow required to achieve safety standards while saving at least 20 % in energy cost and by reducing the downtime for cleaning by at least 20 %.

A typical clean-in-place (CIP) process requires large amounts of water, chemicals and energy. It is estimated that, on average, a food and beverage plant will spend 20 % of each day on cleaning equipment, which represents significant downtime for a plant.

Energy usage varies depending on the process. For example, a milk plant is likely to use 13 % of its energy on CIP, whereas a powdered milk, cheese and whey process is likely to use 9 % of its energy on CIP. In a fruit jam manufacturing facility in England, cleaning hoses in the fruit room were identified as one of the highest end users of water in the facility (17 % of total site water consumption).

Many manufacturers are unsure of how their CIP systems are performing. Therefore additional steps are often introduced as a safeguard to ensure adherence to sanitation standards. This practice results in higher consumption of water, chemicals, and energy than is necessary in order to avoid the contamination issues.

A number of companies have addressed CIP improvements with small modifications such as altering the chemical concentration, or by adjusting the time taken for each stage of the CIP process. However, very few food and beverage manufacturers have put tools in place that render the CIP process efficient.



Risks of inefficient and ineffective CIP systems

Food safety and litigation

With many hundreds of metres of pipework, and a multitude of valves, pumps and instrumentation that make up a typical CIP system, the risk of equipment failure is high and can happen at any stage of the process with a potential impact on food safety. It is quite difficult to verify that all aspects of the cleaning process have been taken into account. Consider the instance of an operator who runs a cleaning process and does not even realise that a particular component (such as a pump) did not work because no alarm was generated.

The result of improper cleaning is costly to a plant in violation of food and beverage industry safety regulations. The all-too-frequent incidences of food safety disasters around the globe are often caused by simple mistakes or faulty processes in a food or beverage factory which lead to sickness, injury, and even death for those who consume contaminated products. In addition to the human tragedy, these contamination incidents lead to the expense of product recalls, loss of confidence in a company's brand, and ultimately loss of revenue. Food safety authorities conduct plant audits to ensure that the critical control points



identified as HACCP (hazard analysis and critical control points) are monitored and reviewed for regulatory compliance and continuous improvement. In the event of a contamination incident, full traceability (enabled by software) and 'proof of clean' will reduce the legislative and legal impact.

Production downtime

Lowering operational expenditure and reducing waste to lower the cost of production without impacting product quality are universal goals of food and beverage enterprises. However, when a CIP process is in operation, production is stopped. This impacts profitability. As a result, two tendencies manifest themselves which are both negative to the business:

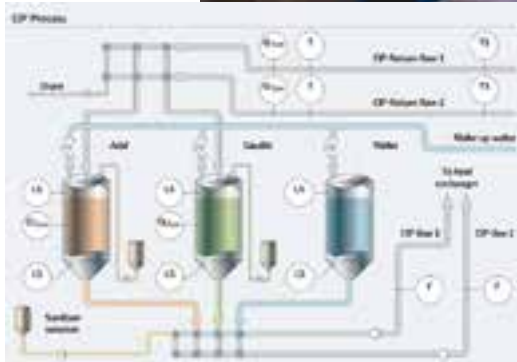
- 1 When a problem occurs, there is a natural reaction to avoid seeking the root cause of the problem. Such an intervention could involve even more time-consuming maintenance work.
- 2 With the risk of contamination at the forefront of most operators' minds, the tendency of the CIP operator is to overcompensate with increased cleaning time.

Fortunately, new Endress+Hauser CIP technologies alleviate the above problems because of significant improvements in efficiency:



Proline Promag H100 electromagnetic flowmeter

More advanced CIP automation enables dramatic reductions in troubleshooting time in the event of a problem, cutting what once took hours to perform into minutes of diagnostics.



Left: CIP process

Above: Electromagnetic flowmeter

An optimised CIP process can reduce cleaning times by up to 20 %. If CIP currently takes around five hours of each day, a 20 % reduction in cleaning time will deliver approximately an extra hour of production time.

High consumption of energy and water

Efficiency improvement does not only focus on reducing cycle time, as well as energy, water, and chemical consumption. The primary purpose of the CIP system is to remove fouling from the equipment. When production equipment is not completely clean, expensive raw materials have to be thrown out. Effective cleaning results in fewer instances of contamination and therefore improved production efficiency.

The cleaning function, however, is energy intensive. Almost half of a milk-processing facility's energy is used to clean the processing lines and equipment. Calculating the precise temperature needed to clean equipment is critical to reducing the energy consumption. For every 1 °C reduction in CIP temperature there will be a 1/60th reduction in the energy needed to heat the fluid.

The amount of water or chemicals used can also be reduced by introducing recovery tanks so that the liquid can be re-used instead of sent down the drain.

Loss of innovation and flexibility

Food and beverage manufacturers must innovate in order to remain competitive. Recipes need to be improved and new product lines developed. Therefore, CIP systems need to be flexible in order to adapt to different types of fouling on the equipment as product lines evolve. Operators need to be able to alter cleaning recipes to suit particular types of fouling, whether product (sugar, fat, protein, or minerals) or microbial (vegetative microorganisms, or spore forming microorganisms) and ensure that the CIP system is operating in an efficient manner. Chocolate, for example, will require

a different cleaning recipe for butter than it will for flour. Modern CIP systems, equipped with automation software enable a simple drill down into any aspect of the process. This traceability of the system offers a number of benefits:

1. Operators can check each CIP operation to verify that it has worked correctly
2. Diagnostics are simple to perform and deliver detailed information on each element of the cleaning cycle
3. Faults and issues can quickly be highlighted and rectified
4. Plant managers can generate detailed operational reports
5. Food security reporting to regulators is easy to assemble and more comprehensive

Conclusions

Recent innovations in technology now enable plant operators to calculate the optimal mix of water, chemicals, temperature and flow required to achieve safety standards while saving at least 20 % in energy cost and by reducing the downtime for cleaning by at least 20 %.

Installing instrumentation in the process lines provides real-time control and follow-up, as well as making the process completely traceable, and this allows fast access to the process data, such as concentration, temperature, speed and phase shift. This way it achieves the maximum washing effect, measures the phase separation, determines when a cycle starts or finishes, and also quantifies water and chemical consumption, which are increasingly more common challenges.

In addition, all the steps in the process can be easily traced and automatically documented, which simplifies any auditing requirements that need to be performed by regulatory inspectors. With Endress+Hauser's detailed portfolio, which has instrumentation designed for the food and beverage industry – any manufacturing plant will be able to automate and overcome the challenges facing this process.

For further information contact:

Natlee Chetty, Industry Manager – Food and Beverage, Endress+Hauser, on tel: +27 11 262 8000, email: Natlee.Chetty@za.endress.com or visit <http://bit.ly/23n8F08>

Emerson to automate massive petrochemicals project in Egypt



Emerson and Carbon Holdings, the privately owned Egyptian petrochemical firm, recently announced that Emerson Process Management has been selected to provide automation and reliability technologies and services for Carbon Holdings' Tahrir Petrochemicals Project at Ain Sokhna, Egypt. Emerson's initial scope of work is estimated at \$US150 million.

When completed, the approximately \$US 6,9 billion Tahrir project will be the largest petrochemical plant in Egypt and the largest naphtha cracker plant in the world. It will produce 1,5 million metric tons per year of ethylene that will then be further processed into polyethylene. Other major products will include propylene, polypropylene, hexene, butadiene, benzene, and styrene.

As Main Automation Contractor, Emerson will apply best practice technologies and ser-

vices to help ensure the facility is completed on time and within budget. Engineering services include designing the plant for optimum availability, and Emerson will also provide a robust reliability programme that includes consulting services, equipment health monitoring, and a reliability service centre for ongoing local support and expertise.

The announcement was made at Emerson's Middle East headquarters in Dubai where David Farr, chairman and CEO of Emerson, met with Basil El-Baz, chairman and CEO of Carbon Holdings, for the signing of a memorandum of understanding regarding the contract award.

"Investments of this size require us to select partners that have a long history of handling large, complex projects and the expertise to produce a reliable plant with dependable output," said Carbon Holdings' El-Baz. Designed to

serve both local and export markets, the Tahrir Petrochemicals complex will be constructed in Egypt's Suez Special Economic Development Zone, with raw materials received and products shipped from the Gulf of Suez. Financing for the mega-project is expected to come from the export credit agencies of the United States, Korea, Italy and the Overseas Private Investment Corporation, as well as direct investors. Under the memorandum of understanding, Emerson will also make a preferred equity investment in Tahrir Petrochemicals.

Further information is available from

Michael Eksteen, Emerson Process Management, tel: +27 11 451 3700; email: Michael.Eksteen@Emerson.com; or go to www.Emersonprocess.com/MEA.

Optiwave 1010: New radar level transmitter for bypass chambers and magnetic level indicators

With Optiwave 1010, Krohne introduces a new radar level transmitter for bypass chambers and magnetic level indicators. The 2-wire FMCW radar level transmitter is designed as a cost-effective solution for the continuous level measurement of liquids in bypass applications in various industries, eg, chemical, power, water and wastewater, or automotive.

OPTIWAVE 1010 can be combined with the Krohne BM 26 Advanced bypass chambers and magnetic level indicators (MLI), thereby adding a 4...20 mA HART output to the mechanical devices. The combinations can be conveniently ordered as a whole, e.g. as BM 26 W1010 (Optiwave 1010 welded to BM 26 Advanced). Alternatively, it can be welded on any bypass chamber with internal diameter 38...56 mm / 1.5...2.2". Thus it is also an ideal solution for other MLI manufacturers to add a level radar measurement option to their product range.

OPTIWAVE 1010 is competitively priced to replace reed chains, magnetostrictive and

simple TDR transmitters that are typically used with bypass chambers or MLIs. In addition to a measuring accuracy of $\pm 5 \text{ mm} / 0.2''$, the FMCW principle offers a much better overall accuracy in bypass applications: while reed chain and magnetostrictive principles are measuring the float position which depends on the product density, the FMCW radar directly measures the liquid surface.

Application range for Optiwave 1010 includes almost any liquids with process temperatures $\leq +150^\circ\text{C} / +302^\circ\text{F}$ up to 40 barg / 580 psig and measuring ranges up to 8 m / 26.2 ft. With clean liquids of dielectric constant $\epsilon_r \geq 3$ the device measures the surface directly, for $\epsilon_r < 3$, a float with target is used.

Optiwave 1010 features a dual process seal system that allows for removal of the converter under process conditions. The 2-wire loop-powered HART device is pre-configured in the factory and is delivered ready to use. Application-specific adjustments are possible via Hart/ DD and DTM.



Optiwave 1010 FMCW radar level transmitter for bypass chambers and magnetic level indicators (MLI).

For more information contact

John Alexander on tel +27 11 314 1391; email: salesza@krohne.com or go to www.krohne.com.

VEGA Controls SA launches new era for VEGA in South Africa

VEGA Controls SA (Pty) Ltd has been appointed by VEGA Grieshaber KG as the sole authorised distributor for the South African market, from 1 January 2016. VEGA Grieshaber KG is the manufacturer and supplier of the complete range of VEGA level, pressure and nucleonic instrumentation.

The new company will take over the day-to-day business activities of VEGA Instruments SA (Pty) Ltd, under the leadership of African Region – Group Director, John Groom and Natalie Barnes as Director.

Natalie Barnes joined VEGA in 2006 and has worked in the sales and service departments of the company in a number of capacities. Her last position was Head of Internal Sales, Projects and Service.

Natalie will continue to add value to the new company, and expects to see future growth in both the company's people and its business. She states, "My vision for VEGA is to remain a leading brand within the industry, exceeding our customers' expectations."

John Groom announced that VEGA Controls SA (Pty) Ltd has entered into an Employee Shares Opportunity Programme Trust that will collectively own a 26% share of VEGA Controls SA. This will mean that the staff collectively contributes to the success of the company within South Africa.

For more information please contact:
Chantal Groom on +27 11 795 3249 or email chantal.groom@vega.com.



Natalie Barnes, Director VEGA Controls SA (Pty) Ltd.

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The service can be provided at the plant (on-site) or in the laboratory (off-site). It is geared in particular for companies involved in water and waste water treatment as well as companies involved in the chemical, food and pharmaceutical industry. It is also suitable for the mining, cement, oil and gas



Siemens is offering a new service for the calibration of measuring devices in process instrumentation.

and energy production industries.

The calibration and verification services fulfill the highest standards in terms of quality, reliability and traceability. The calibration equipment used for on-site calibration and calibration in the laboratory is certified in accordance with national and international standards; factory calibration is ISO/IEC

17025 certified. Users are subsequently furnished with a calibration and verification certificate. Exact calibration prevents unplanned downtime which in turn reduces total operating costs, safeguarding the quality of the end products.

For further information, please go to: www.siemens.com/piscv



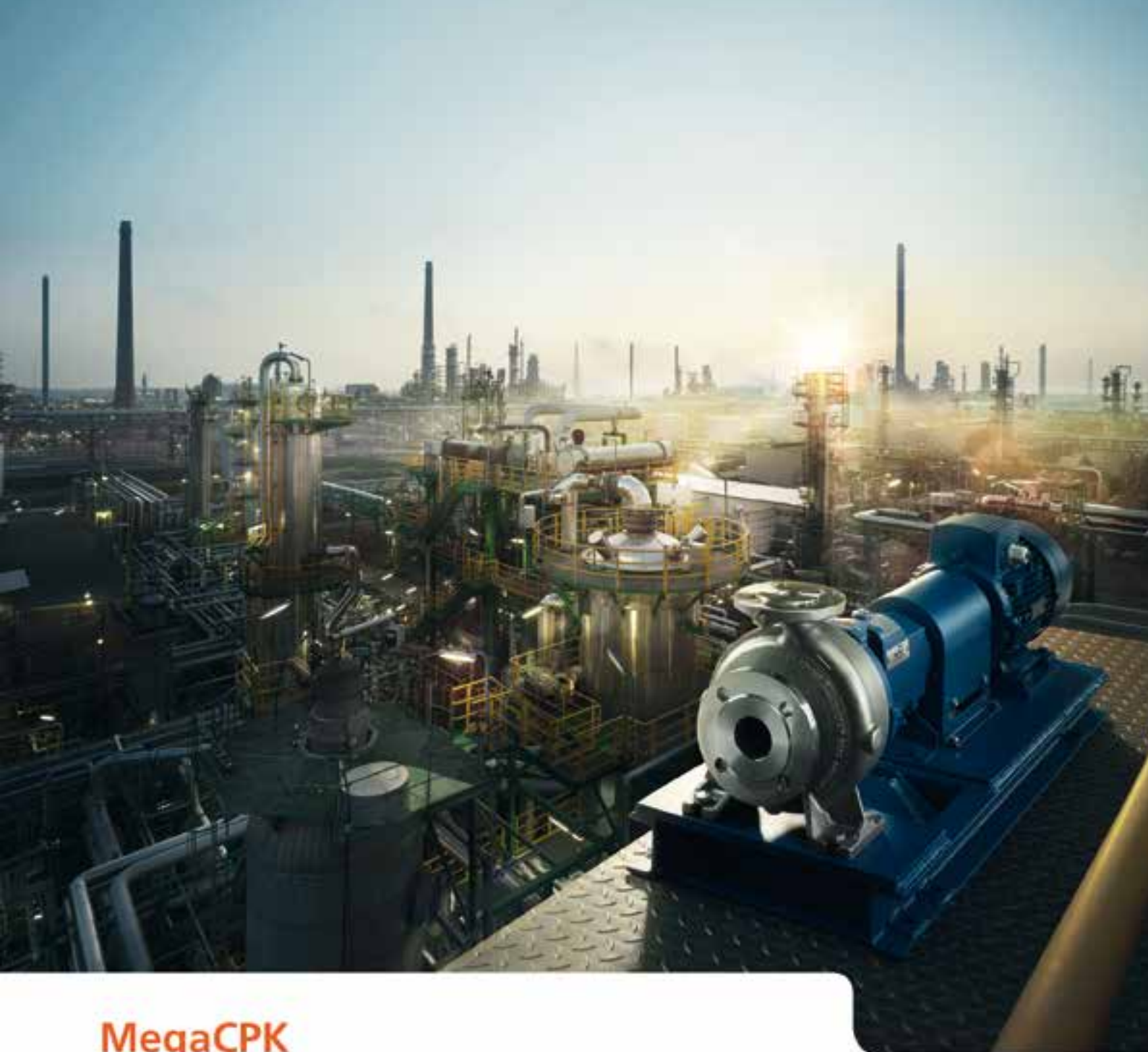
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What is happening with SAChE IChemE membership fees?

In contrast to previous years, members of SAChE IChemE (previously only SAChE) were invoiced in December for membership fees instead of June. The increase in membership fees has also been more than the inflation rate and in some cases even more so. This resulted in the SAChE Offices receiving many queries and regretfully also some resignations. Allow me to answer three questions:

- Why the increase in fees?
- Why had members been invoiced earlier than previously? and
- Is it still worthwhile to be a member of SAChE IChemE?

Why the increase in fees?

There are a number of factors that led to an increase in fees including:

- All SAChE members became SAChE IChemE members in 2015 with benefits of being a member of both SAChE and IChemE. In order to pay for the benefits received from IChemE, the membership fee of all members had been increased by the equivalent of £35 to finance their IChemE membership.
- During 2015 the membership grades of SAChE were aligned with that of IChemE which resulted in the "Under 30 Graduate" membership grade falling away. In the past the fees for SAChE graduate members who were younger than 30 were less than that of graduate members older than 30.
- The value of the rand depreciated significantly against most foreign currencies in the last quarter of 2015. For the 2015 fees, an exchange rate of R18/£ was used when setting the fees and at the time of setting the 2016 fees, it was decided after much deliberation to use an exchange rate of R23/£. This is an increase of about 28% and is seemingly not enough since the rand is continuing to weaken.
- The part of the fees to finance the SAChE services had been increased by 6% which might also not be enough since inflation is anticipated to increase by more than 6%.
- For student members that graduate there is a significant increase when their highly subsidised student fees fall away and they become graduate members.

Why have members been invoiced earlier than before?

There are basically two reasons:

- In 2015 the SAChE financial year was finally aligned with that of IChemE. The financial year of SAChE used to run from 1 June to 31 May and had to be changed to that of IChemE that runs from 1 January to 31 December.
- In the beginning of 2015 the phasing in of the IChemE service fees for SAChE members had not been finalised and the final

arrangement was only agreed upon early in March whereupon invoicing of members could happen.

Is it still worthwhile to be a member of SAChE IChemE?

My answer to this is an unequivocal yes and the first reason for saying this is simply value for money. For most SAChE IChemE members, the discount that they receive on IChemE membership fees and ECSA fees are more than their total SAChE IChemE subscription fees. The part of the SAChE IChemE fees that are due to receive the full benefits of being IChemE is levied at a significantly reduced rate, i.e. £35 per member vs individual international membership fees of between £86 and £129. In addition SAChE IChemE members currently get a discount from the Engineering Council of South Africa on their ECSA annual fees of up to R1 230 per year.

Secondly as members of IChemE which is the largest international chemical engineering society, members receive all the benefits of belonging to IChemE. Details of IChemE benefits include:

- Networking through Special Interest and Member groups.
- Participation in the community that is IChemE: leading global professional body and network for chemical engineers
- Access to professional registrations and qualifications in the UK
- Advice, support and mentoring re professional registrations and qualifications
- Daily global profession news through *The Chemical Engineer tce-online* alerts
- Daily global IChemE news provided through icheme.org
- Monthly tce magazine (also available as e-tce)
- Monthly member news bulletins
- Access to Knovel process engineering e-resources
- Access to IChemE webpages including CPD resources
- Access to discounted professional training courses
- Access to discounted professional events
- Access to discounted publications and professional journals
- Inclusive membership of one IChemE Special Interest Group with access to others
- Process Safety toolkits etc.

Thirdly, for South African chemical engineers, service benefits provided through SAChE include:

- Regular conferences, courses, seminars, workshops and meetings through its branches in: Gauteng, Highveld, KwaZulu-Natal, Vaal and Western Cape.
- National and International conferences.
- Recognised by ECSA as a Voluntary Association, category A.
- Liaison with engineering and scientific associations on subjects of interest to wider audiences.
- Provision of factual career information about chemical engineering to scholars, parents and teachers.

SAIChE

NEWS



SAIChE COUNCIL MEMBERS

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SAIChE contact details
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 fax: (0) 86 672 9430;
 email: saiche@imweb.co.za;
 saiche@icheme.org
 website: www.saiche.co.za

- Participation in the ongoing process of reviewing and updating Tertiary educational facilities and curricula for Chemical Engineering.
- The provision of guidance to recent graduates and to industry in the effective use of the engineer-in-training period, to the benefit of employee and employer.
- The improvement of the technical competence of our members through continuing education programs that include seminars, conferences, courses and plant visits. Most of these activities are conducted at branch level.
- The promotion of industrial sponsorship for Chemical Engineering departments at Universities and Technikon.
- Publication of the *South African Chemical Engineering Journal*.
- Distribution of the *Chemical Technology* magazine published by Crown Publications to all members of SAIChE IChemE.
- Liaison with other Engineering Institutions in matters of general importance to engineers, including national issues that involve representations to Government and matters of public interest.
- Liaison between SAIChE and the WCEC connects our engineers to the international environment of Chemical Engineers.
- Attracting Technicians and Technologists to Chemical Engineering and the more effective utilisation of Professional Engineers.
- Accreditation of CPD points to relevant chemical engineering activities.

Although SAIChE IChemE provides many services and benefits to its members, the best way to benefit from the organisation is to become involved. Become involved in your local branch, meet and stay in contact with other chemical engineers, grow your networks, attend seminars, broaden your horizons, attend professional development courses to grow your own professional skills, help to develop other engineers, share your views with the profession.

I look forward to 2016, to stay in contact with chemical engineers in South Africa and internationally, to learn from others, to stay informed about issues that our wonderful profession are involved in and to do my little bit to make South Africa and the world a better place.

Dawie van Vuuren
 President SAIChE IChemE

Interview with Dr Kapil Moothi

by Michelle Low



Wilfried Kraus presenting award to Dr Kapil Moothi on 30 October 2015, at the Federal Ministry in Berlin, Germany. (Source: FONA 2015)

Dr Kapil Moothi is one of the winners from the 2015 Green Talents – International Forum for High Potentials in Sustainable Development competition. A high-ranking jury of experts selected 28 up-and-coming scientists from numerous scientific disciplines. More than 550 applications from over 90 countries were received (<http://www.greentalents.de/>).

ML: How did you hear about the competition?

KM: My interest in Germany as a key location for sustainable development and cutting edge research was sparked after I attended the DAAD-NRF In-Country Scholarship Holders meeting held in Stellenbosch during 2011–2013. I heard about the exciting research work being conducted in Germany and the Green Talents competition. The award provides a platform to young talents to share their views on green concepts and to make our world a better place.

ML: What is your project about?

KM: My area of interest encompasses Sustainable Technology and Nanotechnology Waste Water Treatment. The project described development of a carbon nanotube-infused membrane (and its module) for wastewater treatment. It really is gratifying to learn that the research we are conducting in South Africa is world-class in terms of quality and research output. Since the award was based on merit, to be chosen as being amongst the world's best, makes me feel proud to be South African.

ML: How was the two week visit in Germany during 2015?

KM: There was interaction with leading experts, world-renowned research institutions and companies. Getting connected to the science community and exchanging ideas with its key innovators allowed us to lay the foundation for the fully funded research stay (up to three months) at an institution of my choice in 2016. That is when I plan to

increase scale of wastewater treatment, and conduct experimental studies in a reproducible and repeatable method.

ML: Why a PhD?

KM: The defining moment in my life was the day I started school. It was from this day, that I would spend the next 20 years or so, learning (resulting in a PhD in Chemical Engineering). I set high academic standards, and I aimed to achieve my PhD before the age of 30! Resilience and perseverance is especially important in this field. I was awarded my PhD in 2014 at the age of 28; this achievement has truly been an important one in my life (one that I am proud of). I advise students who want to pursue their PhD to use the experience to grow and develop as a person and as an academic.

ML: What is next?

KM: As of 2016, I am a Senior Lecturer at the University of Johannesburg in the Chemical Engineering department. In 2015, I founded a company, Nano4Every1[®] in order to commercialise the membrane module. My plan is to seek development funding from National Research funding agencies prior to engaging venture capitalists or 'angel investors'. Thus, I will carry on increasing the value of the technology portfolio and the company by developing the technology.

Connect!

LinkedIn: <https://za.linkedin.com/in/kapilmoothi>

Researchgate: https://www.researchgate.net/profile/Kapil_Moothi

Greentalents: <http://www.greentalents.de/kapil-moothi-phd-in-chemical-engineering-nanotechnology-29-south-africa-.php>

Want to be interviewed for Spotlight? Contact Michelle at email Michelle.Low.za@gmail.com.

Time to rethink eWaste strategy

Not only is the introduction of mandatory protection of personal data a huge challenge for companies, but now organisations are being prompted to rethink how they approach the reuse, recycling or recovery of their eWaste. Xperien suggests the new Protection of Personal Information (PoPI) Act will have serious consequences in the near future.

The successful adoption of this Act will depend on a comprehensive understanding of the digital aspect of the new laws. Companies will be forced to change their processes to ensure that the personal information and data they collect is protected. The PoPI Act is awaiting an implementation date, it will hold organisations liable for the safety of their information. Companies could face massive fines, civil claims and reputational damage claims if they fail to upgrade information technology security systems ahead of the implementation of the Act.

Xperien CEO Wale Arewa says the PoPI Act will force companies to change their attitude towards IT security. "When we partnered with IACT-Africa, we soon realised that instead of it being a burden, as it is seen by most organisations, the PoPI Act actually presented us with opportunities."

"That's our experience as well. Over the past eighteen months our clients have repeatedly seen compliance with the PoPI Act as a support and not a hindrance to business growth," comments John Cato, founder and CEO of IACT-Africa. "This has happened by recognising how the PoPI Act philosophy of respecting data privacy in South Africa, in



much the same way as in other parts of the world, is opening the door to develop new products and services," adds Cato.

"These range from advanced document and device shredding capabilities, which more effectively destroy paper and electronic documents, to new online education offerings focused on PoPI Act compliance, to providing competitive advantage in demonstrating market leadership compared to one's competitors in the areas of good governance and legislative compliance."

Xperien and IACT-Africa both recognise that many organisations have until now not thought seriously about the disposal of digital devices which could contain personal information as defined in the PoPI Act. "Something as innocent as the office copier,

fax or printer has a potential to blow a hole in your compliance efforts unless properly managed," says Dr Peter Tobin, IACT-Africa consultant and CEO of PTC, IACT-Africa's strategic partner in the field of PoPI Act compliance. "When talking to our clients about compliance with the PoPI Act, we take a holistic view. This includes looking at the lifecycle of all their digital devices and the risks those items represent in terms of non-compliance if not handled correctly," he adds. "As a result, we have partnered with Xperien for full PoPI Act compliance in the area of eWaste disposal and recycling," says Cato.

For more information contact:

Xperien on +27 11 462 8806 or visit www.xperien.com



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Call for registration

You are cordially invited to register for the South African Institute of Electrical Engineers (SAIEE) Smart Grid Conference to be held between 23rd and 25th February 2016 at the Eskom Academy of Learning in Midrand, Johannesburg. All SAAE members will be allowed to register at the same registration fee as SAIEE members. Also please note that an additional 20% discount applies if registration is done on or before 31st January 2016.

The conference will address the business and technology aspects associated with Smart Grids by providing a platform for industry to discuss cutting edge innovations in Smart Grid technology, including addressing how the current electricity grid and distribution network can be evolved to a Smart Grid. In addition to local expert contributions, an impressive list of international experts in the area of Smart Grids will deliver a number of keynote presentations. These include:

Professor Massoud Amin: Presently Director of the Technological Leadership Institute at the University of Minnesota and considered to be the “father of Smart Grids” having presented four White House briefings and nine Congressional briefings on the concept of Smart Grids since 2003. It was during his tenure at the Electric Power Research Institute in the early 2000s that he conceived and articulated the vision of a smart self-healing grid, which uses computers, sensors, communication and control in parallel with the electrical grid to enhance reliability, increase resilience and reduce the cost of energy.

Professor Qing-Guo Wang: Currently a full professor in the Department of Electrical and Computer Engineering at the National University of Singapore and in 2016 will be a visiting Professor within the Intelligent Systems Institute in the School of Electrical Engineering at the University of Johannesburg. His research interests include modeling estimation, prediction, control, optimization and automation of complex systems. He has published some 400 technical

papers and authored or co-authored six books, and co-holds five patents both in the USA and Singapore.

Kurt E. Yeager: Currently Vice Chairman of the Galvin Electricity Initiative, a non-profit organization focused on transforming the reliability and value of the USA’s electricity services.

Lee Stogner: Currently President of the Vincula Group, a consultancy in the USA that specializes in the Internet of Things.

Programme

In addition to the four invited keynote speakers as mentioned above, keynote addresses will also be presented by representatives from our two endorsement partners: SANEDI and IITPSA, as well as a keynote presented by the Chairman of Converged Partners.

Other components of the 3-day programme :

- 9 Plenary presentations
- 25 technical and business presentations covering 5 tracks:
 - Smart Grid and the Internet of Things
 - AMI security and communication
 - Smart Grid economics and revenue management
 - Smart power grid management
 - Smart Grid case studies
- There will also be two panel discussion sessions addressing:
 - How do we manage South Africa’s ageing generation and distribution infrastructure?
 - How can metros and municipalities operate to ensure that revenue generated from electricity sales is sustainable?

The full and detailed programme can be found online at the Conference’s website: www.saae.org.za

Contact the SAAE:

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