PCIC MIDDLE EAST
PETROLEUM & CHEMICAL INDUSTRY CONFERENCE

3RD CONFERENCE

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9-10 February, 2015
InterContinental Hotel - Abu Dhabi, UAE

FINAL PROGRAM

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Conference Site

Abu Dhabi InterContinental Hotel
King Abdullah Bin Abdul Aziz Al Saud Street, Abu Dhabi, UAE

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3rd Annual PCIC Middle East Conference

Welcome! As the Local Committee, it is our pleasure to welcome you to the 3rd Petroleum & Chemical Industry Committee (PCIC) Middle East conference. The location of Abu Dhabi has been selected due to its buoyant position as a commercial hub for oil and gas projects within the Middle East and also for the welcoming hospitality of its people and easy travel from all regions. The InterContinental Hotel in Abu Dhabi is selected as the meeting venue, providing a professional, yet relaxing atmosphere for attendees to explore two productive days of professional development and networking, with an opportunity to explore the beach, pool or other sights of Abu Dhabi within close distances.

The PCIC Middle East attracts leading technical experts in electrical equipment, with a focus towards applications of the oil, gas and petrochemical industries. The selected speakers for technical discussion represent global electrical equipment manufacturers, engineering and design leaders and decision makers from project owners and end-user companies. The technical presentations will cover a large array of topics including electrical power system challenges, motors in explosive environments and the reduced environmental impact & improved safety of power transformers.

We will also have experts from certification authorities that will update us on the latest requirements, developments and future expectations of this ever-changing and increasingly competitive industry.

Since 2004, PCIC Europe built its success in involving electrical and instrumentation engineers from all countries in Europe. Most of them are working for international companies sharing working interests with Middle-East key players. Given the continued growth of the Oil & Gas and Petrochemical industry in this region, we are pleased to welcome you to this Middle-East dedicated conference.

At the end of our 2 day event, all our attendees will be invited to enjoy a networking session with food & beverages along with delegates from the expanding Oil & Gas community of the Middle East and the world. We hope that you will enjoy this conference and feel comfortable to participate in the exchange of experience and information among the many experts. Our wish for you is to provide you with best-in-class professional development, new contacts through networking opportunities with industry experts and a conference environment that promote interaction and open discussions.

It has been our pleasure to prepare this meeting and as your Local Committee, we look forward to meeting you in Abu Dhabi!

PCIC Middle East Local Committee
Allen Gibson – Chair | Arvind Paretkar | Hossain Shaikh | Krishnamurai Singh | Walid Diab | Umesh Mandlekar | Luc Chantepy

PCIC MIDDLE EAST
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Welcome to Abu Dhabi

The PCIC Middle-East Conference is now well installed in Abu Dhabi, United Arab Emirates.
Organized on a yearly base, this event is becoming the premier forum in the Middle East for the exchange of experience and good practices regarding the safety and practical applications of electricity and instrumentation in the petroleum, chemical and pharmaceutical industries.

Our speakers are selected by our Technical Committee as they are well-recognized authors globally and belong to major companies such as:
• End Users: BP, Dow Chemical, Hess, Sabic, Saudi Aramco, Exxon, Total
• Engineering and services companies: Technip,
• Manufacturers: ABB, Eaton, Emerson, Rockwell, Schneider-Electric, Siemens

These experts from users, engineering companies, manufacturers, regulators, certifying bodies and international standardization organizations present technical papers to share with attendees their experience and lessons learnt.

During coffee breaks, lunch and after the last technical session, time is left for networking and discussions around subjects of mutual interest. From the previous conference we could see that the connections between attendees does not stop at the end of the conference, but continue al along the year. PCIC Middle-East is the must-attend conference for all electrical and instrumentation engineer willing to enhance their expertise and become a reference expert in the region and beyond.

In that perspective I shall be very pleased to welcome you at the next Abu Dhabi Conference.

Jean-Charles Guilhem
PCIC Middle East Chairman

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The 2014 PCIC Middle East technical program

A very warm welcome to our 3rd Middle-East annual technical conference; I am delighted to share with you our technical programme which I trust you will not only find stimulating but also an opportunity to network with your industry peers from across the globe.

As always our effort is to provide a balanced programme incorporating our strategic topics of Safety in workplace, Extreme Environments, Good Design Practice and finally Equipment, systems and components. This year not only does the technical programme address these areas but also significantly benefits from an increased regional focus with the contribution from Saudi Aramco with its paper describing the Manifa central processing facility islanding scheme (ME-131), this is the first conference paper to directly originate from the Middle-East and to us is a significant milestone in addressing the need for home grown talent to talk to the region.

We look forward to the success of PCIC Middle-East and the engaged discussion at conference. Please take opportunity to meet with the conference organising committee to discuss your ideas to contribute to the future conference events as we specifically welcome your input.

Justin Mason
PCIC Europe Vice Chair (Technical Chair)

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PCIC Middle East Mission

To provide an international forum in the heart of the major source of petroleum products for the exchange of electrical applications technology relating to the petroleum and chemical industry, to sponsor appropriate standards activity for that industry, and to provide opportunity for professional development.

PCIC Middle East Strategies

1. The PCIC Middle East conference will be held in locations allowing a maximum number of engineers to attend.

2. The PCIC Middle East conference will be a means to promote participation and sharing of experience by a broad base of engineers, with an emphasis on both younger and senior engineers.

3. Attendees will be encouraged to participate in technical activities including authorship of papers and participation in IEC standards development including IECEx.

4. The quality of PCIC Middle East papers is essential for the PCIC Middle East mission and is given highest priority. Application oriented papers are given priority.

5. The PCIC Middle East committee members ensure that the technical content of the conference will meet the evolving needs of the industry and meet the expectations of those working in the location where the conference is held.

6. Participation of engineers from all types of companies involved in the industry will be encouraged, including end users from international and national oil companies, local and international engineering companies, local and international manufacturers and regulation bodies.

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Program

Day 1 – Monday February 9th, 2015

8h00 – 9h00	**Registration / Attendee Arrival**
9h00 – 9h30	Welcome address
9h30 – 10h15	Best practices in hazardous area HMI design : bringing control where it hasn't been before (ME-88)
10h15 – 11h00	Competency validation of electrical staff – How it enhances workplace safety and asset protection (ME-120)
11h00 – 11h30	**Coffee break**
11h30 – 12h15	Arc Flash versus Arc Resistant ; two different concerns (ME-78)
12h15 – 13h00	Annual Thermography Inspection Of Mission Critical Electrical Infrastructure - The Performance Gap (ME-31)
13h00 – 14h30	**Lunch**
14h30 – 15h15	Is overvoltage protection useful in MV distribution equipment (ME-148)
15h15 – 16h00	Modular integration of process equipment packages for oil and gas facilities (ME-70)
16h00 – 16h30	**Coffee break**
16h30 – 17h15	Lighting fundamentals for explosive atmospheres (ME-95)
17h15 – 18h00	Manifa central processing facility islanding scheme (ME-131)
18h00	**Cocktail**

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Program

Day 2 – Tuesday February 10th, 2015

9h00 – 9h30	Registration / Attendee Arrival
9h30 – 10h15	On-line partial discharge (OLPD) insulation condition monitoring solutions for rotating high voltage (HV) machines (ME-28)
10h15 – 11h00	Unified electrical and control systems for oil & gas using IEC61850 (ME-71)
11h00 – 11h30	Coffee break
11h30 – 12h15	Assessing low-voltage arc hazards (ME-67)
12h15 – 13h00	Humidity Effects in Substations (ME-33)
13h00 – 14h30	**Lunch**
14h30 – 15h15	Safe power supply for oil rigs – How to select circuit-breakers for switching generators (ME-83)
15h15 – 16h00	Equipment monitoring for temperature related failures using thermography cameras (ME-84)
16h00 – 16h30	**Coffee break**
16h30 – 17h15	Why datasheet and characteristics curves can tell you about your turbogenerator (ME-103)
17h15 – 18h00	Implementation issues when using IEC61850 to deliver a fully integrated Electrical Network Management and Control System (ME-118)

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The following papers will be presented at the 3rd PCIC Middle East Conference.

Ref.	Title	Authors
ME-28	On-Line Partial Discharge (OLPD) Insulation Condition Monitoring Solutions for Rotating High Voltage (HV) Machines On-Line Partial Discharge (OLPD) Insulation Condition Monitoring Solutions for Rotating High Voltage (HV) Machines This paper presents a review of the sensor and monitoring options available to oil & gas operators for the on-line partial discharge (OLPD) insulation condition monitoring of in-service rotating high voltage (HV) machines. The paper includes a review of the most popular OLPD monitoring solutions presently available in the marketplace, to monitor the insulation condition of: •HV Generators, using high voltage coupling capacitor sensors; •Direct line-fed Ex/ATEX HV Motors, using remote OLPD monitoring with wideband PD sensors located at the central switchboards; •Variable Speed Drive (VSD) Ex/ATEX HV motors, using 'twin-sensor' HVCC or HFCT sensors with synchronous, 6-channel data acquisition. The background to this paper are the IEEE-PCIC 2012 and 2013 papers that were originally published by the lead author (in joint papers by HVPD and Chevron). These papers covered the OLPD condition monitoring of rotating HV machines including a new technique for the remote OLPD monitoring of direct line-fed Ex/ATEX HV motors using wideband sensors located at the central switchboards of a facility. The paper also reports on a new, advanced OLPD monitoring technique to monitor the stator winding insulation condition of HV motors supplied by variable speed drives. This uses a 3-phase, 'twin-sensor' installation (of either HVCC or HFCT sensors depending on the VSD/Motor design) with one sensor per phase in the VSD output terminal box and one sensor per phase in the HV motor terminal box. By applying the technique of synchronous, 6-channel data acquisition and 'precedence' detection ('which pulse came first?') measurements, it is then possible to measure the partial discharge activity with the stator winding of the VSD motor whilst discounting the high frequency electromagnetic (E/M) 'noise' pulses caused by the VSD's switching electronics. Case studies of the OLPD monitoring of 6.6kV, 11kV and 13.8kV rotating machines are provided in the paper.	Lee Renforth HVPD Ltd Lee.Renforth@hvpd.co.uk Marc Foxall HVPD Ltd Marc.Foxall@hvpd.co.uk Riccardo Giussani HVPD Ltd Riccardo.Giussani@hvpd.co.uk Thomas Raczy HVPD Ltd Thomas.Raczy@hvpd.co.uk

Ref.	Title	Authors
ME-31	**Annual Thermography Inspection of Mission Critical Electrical Infrastructure – The Performance Gap** One of the most common causes of power outages and a primary cause of electrical arc flash incidents is compromised joints / terminations. The accepted "Best Practice" has, until now, been periodic thermal scans (typically annual), often utilising thermal windows. However, there is a significant "Performance Gap" between the perceived levels of risk mitigation obtained from this technology, and the actual level delivered. These critical issues include: workers remain exposed to risks; it represents an inspection less than 1% of operational time & often not reflecting the most critical operating phases; the measurement is taken externally, & is thus reliant on both equipment & operator skills to correlate to the true internal temperature, and it remains stand alone un-integrated data rather than dynamically integrated information. We shall examine how new vendor neutral innovative technology has evolved to provide the "Next Technology Step", via permanently installed non contact IR sensors which resolve these critical issues and close the "Performance Gap" which exists; thereby providing enhanced levels of protection, safety, operational uptime, and improved asset integrity. The critical importance of real time dynamic load based thermal alarm adjustment technology in dual power feed facilities and it's relevance to the oil & gas industry in on-shore, off-shore and marine applications will be discussed and illustrated in detail. Finally, examples of major global & local projects which selected and successfully installed IR based continuous monitoring technology will be provided, together with the reasons which have motivated it's adoption and specification by major E&P & OEM organizations	Ross Kennedy QHI Group Ltd Ross@qhigroup.com Daniel Thomas QHI Group Ltd Dan.Thomas@qhigroup.com
ME-32	**Industrie 4.0 – What can the Oil & Gas and Petrochemical sector learn from this "Future of Manufacturing" concept?** Over the last years the developed countries realized that no economical growth could be sustainable without a solid industry. To relocate the industrial activities back home, developed countries identified the concepts of "Future of Manufacturing" as a potential solution. The purpose is to mobilize all the technologies, all the know-how and all the great ideas that could drive to invent the most competitive industry in the world. From this generic concept, some developed countries are currently mobilizing their local champions around ambitious programs. In Germany the "Future of Manufacturing" concept has been branded "Industry 4.0" by reference to the fourth industrial revolution. As first global exporter, Germany intends to maintain its industrial leading position through the Indusrie 4.0 program launched at large scale in Hannover Fair 2013. With the customer at the center of the decision ring, the first goal of Industrie 4.0 is to cut time to go to market and to optimize the whole added value chain from the design phase to first production. The purpose of this paper is to present the leads of Industrie 4.0 as one of the most advanced programs of the "Future of Manufacturing" and to investigate the areas where it could benefit to the Oil & Gas and Petrochemical sector. Industrie 4.0, as the other similar programs, is primarily developed to fit with the manufacturing industry. Therefore its implementation in the process industries is not trivial and supposes adjustments. From first examples, the paper will highlight the areas where manufacturing industries good practices may find immediate application in Oil & Gas and Petrochemicals industries and the areas requiring more specific approach.	Jean-Charles Guilhem 2B1st Consulting

Ref.	Title	Authors
ME-33	**Humidity Effects in Substations** This paper discusses the causes and effects of humidity within indoor substation environments and methods of mitigating these factors. This report briefly explains relative humidity and partial discharge, and the effect of high relative humidity on the inception or level of partial discharge. The report covers the environmental factors in switchgear design standards and the manufacturer's literature. The report covers best practice for the design of substations and internal environment control, the factors affecting the environment within a substation and methods of mitigating these factors. This report demonstrates why it is extremely important to control the substation environment and this can be achieved by minimising moisture ingress into substations and controlling the temperature and humidity within the building.	Tony Byrne EA Technology Limited Tony.Byrne@eatechnology.com Alan Preece EA Technology Limited Alan.Preece@eatechnology.com
ME-67	**Assessing Low-Voltage Arc Hazards** An electrical protection program is an essential component of any power system. These programs reduce the risk of damage to equipment and processes, but more importantly, they minimize your staff's exposure to potentially-fatal arc flash hazards. One of the core components of such a program is the ability to identify and analyse high-risk arc flash areas in your electrical system. When identifying arc flash hazards, there is one critical issue that must be considered: In many electrical facilities, protective device trip settings have been set only on bolted 3-phase short circuit criteria. Yet low-voltage arc faults less than 1.0kV may produce a current magnitude significantly smaller than the circuit's maximum 3-phase bolted short circuit current. While the released incident energy should be smaller at lower current magnitudes, overcurrent devices may take longer to trip, causing the release of incident energy up to several minutes. Today, the process of identifying and analysing high-risk arc flash areas typically falls under two calculation methods: NFPA 70E and IEEE 1584. Although both methods consider low-current magnitude, each has a different way of accounting for its effect in the calculation of incident energy.	Albert Marroquin ETAP albert.marroquin@etap.com Shervin Shokooh ETAP shervin.shokooh@etap.com
ME-70	**Modular Integration of Process Equipment Packages for Oil and Gas Facilities** An integrated design approach to a modular process equipment package is discussed. By incorporating the electrical, instrumentation and control equipment on the same platform as the process equipment, a higher level of modular integration is achieved. The benefits include a reduced number of on-site equipment terminations and the ability to pre-commission equipment prior to installation resulting in lower installed costs. The area classification, installation and transit barrier requirements for an integrated modular design approach are reviewed.	Allan Bozek EngWorks, Inc abozek@engworks.ca Allen Gibson Roxtec allen.gibson@roxtec.com

Ref.	Title	Authors
ME-71	**Unified Electrical and Control Systems for Oil & Gas using IEC 61850** The IEC 61850 communication technology provides a highly reliable and fast interface which can be installed with reduced engineering effort. Critical operations in Oil & Gas ICSS will benefit from increased availability of its electrical system by employing IEC 61850 communication technology. A typical application of IEC 61850 in the Oil & Gas ICSS is the monitoring of compressor motors and other low voltage switchgear supplying power to the platform. In all monitored devices, development of any fault or any abnormal conditions which might lead to a fault will be known to the operator within a few milliseconds. This is achieved by the use of intelligent electronic devices (IEDs) which communicates bay level data from the motors to an OPC server via IEC 61850 Client – Server (MMS) communication service. The communication profile in IEC 61850 uses the MMS standard, which uses Ethernet and TCP/IP to handle the information transport. The data is sent from the IED to the OPC server as reports which can be triggered by a change in the data read from the bay. In the system discussed in this paper, IEC 61850 interface is used to integrate low voltage switchgear to offshore ICSS system. The status of the bay level devices, thermal alarms, motor load shed and breaker healthiness are monitored continuously from the ICSS with minimal time delay between the report creation at the IED and data availability at the ICSS. Integrating the electrical system into the ICSS using IEC 61850 communication technology empowers the customer with unparalleled visibility to their assets and provides a large amount of diagnostic data to the integrated alarm/event and asset management system.	Laya Sathyadevan ABB laya.sathyadevan@gb.abb.com
ME-78	**Arc Flash versus Arc Resistant; two different concerns** These two wordings became common in the industry when speaking about the possible consequences of an arcing fault on an electrical installation or within an electrical switchboard, and they are often mixed together. However, their relevancies differ significantly regarding the conditions of the event considered as well as the characterization which can be performed on any piece of equipment. Arc Flash protection is related to the protection of an operator from the direct thermal radiation from an electrical arc, and how such thermal radiation can be quantified, while Arc Resistant classification, or Internal Arc Classification, characterize the capability of a closed piece of equipment (switchboard) to withstand the effect of an internal fault without creating a burn risk for individuals around. This paper aims at reminding the basis of these two concepts and at showing how they should complement each other for personal safety, according to the various environment and working conditions. It will also illustrate the scopes of the applicable reference documents, documents which are partly voluntary standards and partly regulation.	Didier Fulchiron Schneider-Electric Didier.fulchiron@schneider-electric.com

Ref.	Title	Authors
ME-83	**Safe power supply for oil rigs - How to select circuit-breakers for switching generators** Industrial networks like power supply at oil rigs or drilling ships consist of turbines, generators and transformers at medium voltage and consumers at low voltage side. The connections are realized mostly via cables in combination with a very compact design. These circumstances are the reasons why demands on components in these power supplies have to be evaluated seriously. One important component to be selected is the circuit-breaker which has to switch the generator. Typical oil rig networks and possible failures are analysed. Simulations show special requirements regarding short-circuit breaking capability, the rise of recovery voltage and DC-Components. The requirements are discussed and are the basis for selection of circuit-breakers. Circuit -breakers for switching of generators have to fulfil special requirements which are stated in standard IEEE C37.013. However, in some cases circuit-breakers tested acc. to IEC 62271-100 can also be used. A comparison between the two standards will show the main differences and give a hint how to decide for the correct type	Siemens AG nils.anger@siemens.com Hong Urbanek Siemens AG hong.urbanek@siemens.com Dieter Saemann Siemens AG dieter.saemann@siemens.com
ME-84	**Equipment Monitoring for Temperature Related Failures using Thermography Cameras** In electrical equipment, automation and oil & gas industries, the benefits of using temperature measurement to detect equipment failures are well understood. There are several ways of measuring temperatures of equipment to prevent catastrophic failures. Traditionally, these methods either include electrical contact, which could create weak points, or remote sensing with optical fibre, which has reliability issue due to energy scattering over longer distances. In either case, it only allows predetermined point measurements and cost of each sensor is high. In this paper, we propose the method of using a long wave infrared (LWIR) thermal camera to remotely measure temperatures of the objects. It is capable of detecting thermal radiation at the bandwidth of 8 µm – 13 µm. This translates to sensing object temperatures between -70 °C and +250 °C. A standard LWIR camera is only capable of measuring relative temperatures in a scene where higher pixel values represent warmer objects. In order to measure absolute temperatures, the LWIR camera needs to go through an extensive calibration process. This is due to radiation being affected by atmospheric conditions, the radiation itself being a mix from several sources, and difficulty translating radiation measurements to absolute values of temperatures. The solutions developed to solve these challenges and to meet the Norwegian requirements defined by Last Mile Communications will be described in this paper. A case study of the Lyse Energi substations will be presented.	Alan Wang Schneider-Electric Alan.Wang@schneider-electric.com Terrence Hazel Schneider-Electric terry@terencehazel.com Ronny Hjørnevik NorAlarm Ronny.Hjornevik@noralarm.no Øyvind Fjeld Last Mile Communication oyvind@lastmile.no

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Ref.	Title	Authors
ME-88	**Best Practices in Hazardous Area HMI Design: Bringing control where it hasn't been before** In the oil fields of Alberta, Canada well-head operators struggle to deploy control HMIs that are capable of enduring the cold winds and ice of the harsh winters. Conversely, in Saudi Arabia, searing temperatures and corrosive sands demolish panel computers and control assets at a rapid pace. While the environments of an Oil and Gas field are diverse around the globe, they all share a commonality of being in harsh and often remote locations. Assets in the field are critical to ensure revenue return, operational safety and environmental health. As the Oil and Gas industry moves toward the digital age, control and asset management is growing more safe and efficient. However, to ensure that your oil and gas operation will run continuously, HMI systems cannot be delicate and hard to repair	Thomas Nuth Moxa Inc Thomas.Nuth@moxa.com Daniel Liu Moxa Inc daniel.liu@moxa.com
ME-103	**What Datasheet and Characteristics Curves can tell you about your Turbogenerator** The available information about a turbo-generator, which is presented directly in the structure of a datasheet or indirectly in the form of characteristic curves, is often not fully explored. The combination of performance parameters provided by the data sheet and characteristic curves, sometimes redundant, can be organized in a way of being able to tell stories about boundaries and design considerations that answer to the frequent questions of their owners. The own knowledge of simple concepts behind the construction of the characteristic curves already provides an extensive understanding of the turbo-generator operation. The purpose of this paper is to present a briefly way of extracting the maximum information from basic documents often provided with the proposal of the turbo-generator, helping to increase the understanding of its operation.	Elissa Carvalho WEG Equipamentos Elétricos S.A elissac@weg.net
ME-118	**Implementation issues when using IEC61850 to deliver a fully integrated Electrical Network Management and Control System** In this paper we examine the issues, and discuss their resolution, as identified during the implementation of a fully integrated islanded Electrical Network Management and Control System that features active power management using IEC61850 as the primary integration mechanism. We will show that early definition of the system functional requirements is essential to permit engineering of an optimal solution and that the selection of IEDs combined with the Ethernet network design will yield significant reductions in the complexity of the system both during implementation and subsequent operation.	Michael Wilson Powell UK Michael.Wilson@Powellind.com Steven Mouncey Powell UK Steven.mouncey@powellind.com Charles Pestell Powell Industries Inc. Charles.Pestell@Powellind.com Mannan Electricwala Powell Industries Inc. Mannan.electricwala@powellind.com

Ref.	Title	Authors
ME-120	**Competency Validation of Electrical Staff - How it Enhances Workplace Safety and Asset Protection** Competency validation of responsible persons, operatives/technicians and designers as laid out in IEC 60079 Standard Part 14 Annex A is an important feature in enhancing workplace safety and to assist in protecting the capital asset from total loss or large scale downtime. Competency of electrical staff who work in explosive atmospheres or those who select and design electrical equipment for explosive atmospheres is a legal requirement for employers under the European ATEX Directive which becomes a legal responsibility with in-country regulations such as DSEAR in the UK. This paper considers the development of competency validation for these staff in the aftermath of the Piper Alpha offshore disaster and how these developments have given rise to a safety chain approach, to identify and then continuously improve the weakest link. The paper promotes that Competency Validation can be achieved by utilising a certification body that is accredited to ISO / IEC 17024 : 2012 – Certification of Persons, as this allows an internationally accepted uniform approach for major users in the oil, gas and chemical sectors. This paper is especially useful for developing countries to learn the hard lessons that have brought about the development of both Legal Regulations and International Standards, without having to endure the difficult learning curve that mature major users have experienced.	Martin Jones JT Limited martinjones@jtltraining.com Peter Bennett EEMUA – Engineering Equipment Material Users Association
ME-131	**Manifa Central Processing Facility Islanding Scheme** Manifa Central Processing Facility (CPF), the world's fifth largest oilfield is connected using 25 manmade islands and 20 kilometers of causeways. The current production of the CPF is to pump heavy crude oil of 650,000 barrels per day (bpd). The full capacity of the plant is 900,000 bpd and anticipated some time during next year.generation includes two Combustion Gas Turbine Generators (CGTG's), two Heat Recovery Steam Generators (HRSG's) and two Steam Turbine Generators (STG's), with total generation capacity of ~500 MW. Two tie lines at 115 kV connect the Manifa CPF to the external utility system. Power Management System (PMS) controls the Manifa CPF frequency, once the Manifa CPF islands from external grid. Some of the severe external disturbances require Manifa islanding operation in less than 15 cycles, to maintain the system stability. For this very critical CPF, it is required to quickly identify the islanding condition correctly. This paper will discuss the islanding scheme design details for local and remote signals. For significant power exchange with external grid, local measurement based islanding can correctly and quickly identify the islanding condition. Discussion Points 1. Local measurement based islanding scheme and challenges. For this scheme traditional elements such as under/over voltage, under/over frequency, df/dt and fast df//dt etc. are implemented. 2. Manifa CPF islanding scheme design discussion and details. Field event and results comparison from factory test close loop simulations. 3. Sensitivity of various detection methods and low power exchange islanding detection. 4. (Wide Area Monitoring) based Islanding scheme using Synchrophasor. For this scheme element such as angle difference, slip frequency / acceleration etc will be implemented.	Ahmad S. Besher Saudi Aramco Ahmed.Besher.1@aramco.com Kahtan Mustafa Saudi Aramco kahtan.mustafa@aramco.com Ali A. Asiri Saudi Aramco Ali.Asiri.7@aramco.com Adel I. Awaji Saudi Aramco adel.awaji.1@aramco.com

Ref.	Title	Authors
ME-148	Is Overvoltage Protection Useful in MV Distribution Equipment? Relevancy of overvoltage protection on MV networks is discussed according to the network structure and the switching equipment installed. Over-voltages can be generated by natural phenomena like lightning, by network faults like earth fault or by interaction of the switchgear with the network components. Simulation of a distribution network is presented to show the amplitude of the over-voltages and their rate of occurrence. Based on the results of the simulation guidelines for protection are proposed. Although the best place to install protection is closest to the protected equipment, protection is often installed on the switchboard. Installation examples are given for a new MV distribution switchboard design.	Didier FULCHIRON Schneider Electric didier.fulchiron@schneider-electric.com Hans SCHELLEKENS Schneider Electric hans.schellekens@schneider-electric.com Jean-Marc BIASSE Schneider Electric jean-marc.biasse@schneider-electric.com