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PCIC Europe Mission

To provide an international forum in the heart of the major source of petroleum products for the exchange of electrical and instrumentation 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 Europe Strategies

1. The PCIC Europe Annual Conference will be held in locations of industry strength, and its location will be rotated annually in an effort to attract national and international participation.

2. PCIC Europe will proactively promote participation by a broad base of PCIC Europe representatives, 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 Europe papers is essential for the PCIC Europe mission and is given highest priority. Application oriented papers are given priority.

5. The technical content of the PCIC Europe Annual Conference will be continuously evaluated and updated to reflect the evolving needs of the industry.

6. Participation of users, manufacturers, consultants and contractors will be encouraged in the activities of PCIC Europe to strengthen the conference technical base.

7. PCIC Europe will offer tutorials directed towards enhancing the technical, communication, and interpersonal skills of petroleum and chemical industry engineers.

The following papers will be presented at the PCIC Europe 2019.

Ref.	Title	Authors
EUR19_01	**VFD NOVEL INTER-HARMONICS ACTIVE DAMPING SOLUTION** Despite obvious advantages of utilasing large VFDs, they have some design parameters, which require special attention. In particularly, VFDs distort the input current and voltage sinusoidal waveforms which affect the power supply quality leading to undesirable consequences, such as overheating due to the harmonics content and torsional oscillations due to inter-harmonics. This paper will provide an overview of both VSI and LCI VFD's and will discuss general theory behind inter-harmoninc's and associated torque pulsations. It aims to explain what inter-harmonics are, how they are generated in the VFD and what are typical solutions to mitigate negative inter-harmonics effects. Also, it will show a novel development for inter-harmonics mitigation based on both theory, factory testing and successful field operation.	**Jeremy Andrews** *Siemens AG* **Peter Kalbfleisch** *Siemens* **Ilya Nariyev** *Fluor Corporation*
EUR19_03	**Root cause analysis of compressor failure by machine learning** The machine learning revolution is starting to be implemented in machinery maintenance and has become inevitable in highly industrialized and integrated plants. These measures save time, money and effort through new and dynamic condition-monitoring strategies. Moreover, knowledge can be extracted from these models about the potential root causes of machinery breakdowns. This results in key information to prevent similar situations in the future. Finding patterns in these breakdowns and root causes through advanced data analytics is not commonplace however. This case study then develops a strategy to implement predictive modeling and to perform root cause analysis on a compressor unit running at one of the largest refineries in Europe. Findings are presented to field experts and are deemed to add to their intuition due to the presence of unanticipated triggers. We show that root causes can be identified by constructing an intelligent data pipeline based on a multitude of readily available sensor data.	**Bram Steurtewagen** *Ghent University* **Dirk Van den Poel** *Universiteit Gent*
EUR19_04	**Standard Approach to Perform Power System Stability Studies in Oil and Gas Plant** Many large Oil and Gas plants have installed cogeneration or gas and steam generators to increase efficiency, reduce electricity cost, and to improve system reliability. Adding synchronous generators to a power system tremendously increases system complexity and brings in stability concerns. Power system stability requires all synchronous machines in an interconnected electrical system to remain in synchronism. Otherwise the generators will become unstable or lose the stability, which can quickly propagate across the entire network to cause system-wide shut down. Following IEEE recommended practice this paper addresses approaches to perform transient stability study and helps engineers to understand required protections and operations to ensure stable operation of the system. Relevant IEEE standards and task force reports (IEEE Std. 1110-2002, IEEE Std. 421.5-2005, IEEE PES-TR1-2013) are referenced in the paper.	**JJ Dai** *Eaton Corporation* **Richard Dourian** *Eaton*

Ref.	Title	Authors
EUR19_05	**Communication Network Optimization for Subsea Processing Fields Development** A new generation of subsea equipment on process and power systems have been qualified which requires state-of-the-art technology to support the requirements on communications, safety and reliability. This paper evaluates the communication network requirements for complex subsea processing systems, proposing a comprehensive design basis that covers environmental operation conditions, communication and reliability. A detailed study of the system requirements has been conducted to ensure the most stringent demands would be met. Moreover, this paper proposes a network topology capable of handling the subsea process and power systems. Physical and logical interfaces are taken into consideration for the design using industry standards, modern network interfaces such as fiber optics SFPs and electrical fast Ethernet. Extensive experimental results for electrical Ethernet links and their compliance with the standards and the system requirements are presented in this paper, to assure reliable and suitable communication system. The performed tests cover the physical and data link layers of fast Ethernet.	**Juliano Pimentel** *Aker Solutions Ltd.* **Jawad Arif** *Aker Solutions Limited*
EUR19_06	**Software technique for the advanced analysis of motor currents** The paper presents a software technique for the condition monitoring of electric motors based on the advanced analysis of motor currents. This revolutionary technique combines the classical analysis of steady-state motor currents (MCSA) with the analysis of starting motor currents (ATCSA). For this latter, advanced signal processing tools are applied. The technique enables to detect the presence of several types of faults such as rotor failures and eccentricities. In the paper, the technique is applied to different real industrial cases of different sectors including petrochemical applications and related to different types of machines such as cage induction motors, wound rotor induction motors or synchronous motors driving different types of loads.	**JOSE ALFONSO ANTONINO-DAVIU** *UNIVERSITAT POLITECNICA DE VALENCIA*
EUR19_08	**Implementation of the FSO2 life extension program by using big data and IIoT** The purpose of the paper is to present the implementation of FSO2 life extension program by using big data and the Industrial Internet of Things (IIoT).We will explain why it was decided to implement the program and how to use big data and the Industrial Internet of Things (IIoT), all of which resulted in our advanced techniques and advance predictive maintenance for a FSO2 life extension program. The implementation of the FSO2 life extension program started in 2014 . The FSO2 was approved with a design service life of 15 years without dry docking by ABS class. The target of this project was to create both a program and a solution to the ABS class for extending a 10-year life extension without any dry docking. The conclusion explains the current situation and the next steps.	**Apichat Bamrungwong** *PTT Exploration and Production Public Company Limited*

Ref.	Title	Authors
EUR19_10	**Best Practice in Risk Assessment** When dealing with risk reduction, a number of risk assessment methods are currently used to design appropriate safeguarding. At present time, it is crucial for the industry to operate plants at minimum risk levels and optimum capacity. Determining generally accepted risk tolerability criteria is paramount in order to avoid both over- and under-engineering. This study has been conducted in order to investigate thresholds of tolerability that have been applied in real projects. We have analyzed the differences and commonalities and we have striven to consolidate the average results into a reference Risk Matrix. This general Risk Matrix thus obtained represents industry common practice with respect to personal safety. This tool can be used as a practical reference in risk assessment. For small and middle end-users, the tool can provide a valid starting point for risk reduction considerations in new projects. Since the whole Functional Safety framework in a plant rests on the applied risk tolerability criteria, we consider this study relevant beyond the national borders. This paper is developed with the permission from the original authors of the Dutch SIL Platform....	**Elena Mauro** *Yokogawa Europe*
EUR19_11	**Optimizing Olefins Plant Operations to Reduce Energy Consumption** To reduce the energy usage of olefins plants it is necessary to have well-trained operators and maintenance personnel, optimized processes, and knowledge of equipment health and process unit performance capabilities. This can be accomplished using advanced software applications implemented on an open architecture for ease of integration with existing systems. The components of the overall solution include: Dynamic training simulators for skills development of control room operators; Virtual Reality (VR), Augmented Reality (AR) and Mobility Platforms for enhancing the effectiveness of field operators; Asset health and performance monitoring software for improving asset reliability; A control loop management application; Model-based advanced process control software for operating closer to constraints; Online process and utilities optimization software for minimizing energy usage based on process unit performance capabilities and constraints. This presentation will describe system functionality, how they interact to support overall energy optimization, and provide estimates of the benefits they can be expected to deliver.	**Martin Turk** *Schneider Electric*

Ref.	Title	Authors
EUR19_12	**Advanced Predictive and Intelligent Analysis Methods for Machine Life Extension** The pro-active advanced maintenance techniques are used to evaluate mechanical conditions and performance of wellhead booster compressor aiming to extend the intervals between major maintenance services. This paper discusses how to set optimum preventive maintenance frequencies using advanced tools specific for reciprocating machinery for machine health and condition monitoring. The combination of advanced tools, data acquisition, and intensive data analysis to establish failure trends of machine conditions are provided literally as a guideline in this paper. It has been proven that this integrated approach can predict conditions and support decision-making to extend machine service interval from 48,000 to 72,000 hrs without compromising safety and machine reliability. It is effective way that can reduce 26% of maintenance expenses equivalent to USD 620,000 per unit. The techniques are also applicable for diesel/gas engine generators. In conclusion, the use of advanced predictive maintenance with intelligent analysis method can provide valuable information to extend machine service life, improve reliability and save maintenance costs.	**Winyou Rinnanont** *PTT Exploration and Production PLC.* **Apichat Bamrungwong** *PTT Exploration & Production PCL.* **Graisit Teerawongsakul** *PTT Exploration & Production PCL.*
EUR19_13	**Integrated Drives Skid and Artificial Lift Solution for ESP application** This Paper on Integrated Drives Skid and Artificial Lift Solution for ESP application will try to shed light on the current approach being adopted by the End-Users and Contractors on the ESP Artificial Lift deployments while using a segregated bits-and-pieces approach of its sub-systems. The current approach is ultimately leading to a less than potential optimized Solution that is losing the added values on the system parameters output, commercial benefits, energy efficiency and quality, digitization and after deployment maintenance and support. We will address the Integrated Solution approach at sub-systems level with a Solution Integrated Architecture: 1. Drive System for ESP and Artificial Lift 2. Well Automation, Telemetry and SCADA 3. Electrical Power Distribution and Back-up System 4. Integrated Skid for Drives and Equipment 5. Operation and Management Software Application Suite The Added Value Proposition shall be presented on the back-drop of some selected example	**Martin Mancuso** *Schneider Electric* **Safouan Hage** *Schneider Electric* **Atakan Oran** *Schneider Electric*

Ref.	Title	Authors
EUR19_14	**Arc flash hazard management for low-voltage switchgear – a fresh look** Operating, maintenance and arc flash hazard management policies for low-voltage switchgear have changed over the last decade. Even arc flash resisting switchgear design was the norm with major manufacturers for many years and heavy guarded PPE was relatively unknown. A low-voltage switchgear tested according to IEC/TR 61641 criteria 1 to 7 is common practice today yet many operators apply arc flash energy calculation according to IEEE 1584-2002, in absence of any IEC standard, to determine the level of PPE required for its personnel. However, such calculation typically do not consider the actual switchgear design. In return, working on a switchgear can become cumbersome due to those calculation results and potentially required higher graded PPE. Testing and measurement results on ABB low-voltage switchgear indicate that it is recommended to have a fresh look at arc flash hazard management for operation and maintenance. The measured results for arc flash energy differ from simple calculation. This paper will provide an insight to the test and measurement results of arc flash energy exposure and the potential for safe switchgear operation and maintenance.	**Gunnar Zank** *ABB* **Aravind Manjunatha** *ABB* **Narasimha Baliga** *ABB*
EUR19_15	**Integrated Moto Compressor versus Conventional Solution** Up to 30 MW, thanks to the development of high speed induction motors and active magnetic bearings, integrated Moto-Compressors represent today an alternative solution to conventional compression trains using turbines, for both onshore and offshore applications. The process gas is used to cool both the motor and the magnetic bearings making the unit fully hermetic. The first part of the paper describes the integrated solution from an architecture stand point, driven single-stage or multi-stages compressors. This seal less and oil free technology offers numerous advantages such as simplicity, compactness, robustness with zero hydrocarbon emission with very limited maintenance. The second part deals with gas classification and qualification in terms of contaminants (Water, H2S, CO2 ...) and process conditions as the process gas is directly in contact with the motor components (stator, rotor, cabling and magnetic bearings). The third part focuses on the advantages of using an Active Front End Voltage Source Inverter without sinus filter in association with the high-speed motor. Today, the technology is available for most of upstream oil and gas applications....	**Lionel Durantay** *General Electric* **Alain Gelin** *Total* **Edouard Thibaut** *Total* **Yoann Yoann Vidalenc** *Baker Hughes General Electric*
EUR19_16	**The importance of analysis and simulation for generator applications** The approach to the selection of the right generator circuit breaker for each specific generation plant has globally changed, thanks to the introduction of new IEC/IEEE 62271-37-013 Standard. According to this Standard, the process of selection of the generator circuit breaker shall be accompanied by a proper, effective analysis of the main parameters and characteristics of the plant, which can vary from project to project. This is crucial to achieve the full protection of all generator plant assets with the best fitting generator breaker according to the latest Standard. This paper is aimed right to explain the Standard prescriptions about generator circuit breaker assessment and selection, after a brief technical background, to provide an overview on the main tools currently used for this purpose and, finally, what are the main customer benefits coming from this approach.	**ANDREA FERRUCCIO** *ABB* **Andreas Brandt** *ABB*

Ref.	Title	Authors
EUR19_17	**A Model-Driven Approach for Situational Intelligence & Automation in Oil & Gas** In order to design, operate, and maintain an oil and gas facility, one must first understand its behavior. A model-driven engineering and operation solution is required to analyze and identify problems early on and then improve design to ensure further problems are less likely. Predictive models are already shaping our experiences. They recommend products and services based on our habits. Predictive model of electrical power network serves as a “digital twin” of the system including network topology, engineering parameters, and other pertinent information with real-time data acquired for depicting the actual operation of the system. Predictive simulation models help engineers and operators increase their understanding of systems in a cost-effective and repeatable environment by offering Situational Intelligent & Automation. This paper will include the benefits of adding such a system, the challenges that must be overcome and the lessons that have been learned from the implementation of several of these systems. It will also serve as a handbook on justification for a model-driven power management and automation of oil and gas facilities.	**Shervin Shokooh** *ETAP* **Geir Nordvik** *Unitech Power Systems*
EUR19_18	**Benefits Of Replacing Steam Turbines With Electric Drives And What To Consider** Steam turbines have been used for decades throughout the oil and gas industry as prime movers in a wide range of facilities. However, many financial, operational, and environmental benefits can be achieved by replacing these machines with electric drives. In addition to reducing CO2 emissions by utilizing electricity from renewable sources, electric drive trains offer increased efficiency and operational flexibility. This is particularly the case when production steam from the existing turbine is used for process heating. Making the switch to an electric drive, however, is not a simple task and requires pre-engineering, equipment expertise, and analysis of the existing drive train, utilities, foundation, process control system, and associated electrical and mechanical interfaces in order to confirm technical feasibility and ROI. This paper will outline when it makes technical sense to make the switch from a steam turbine to an electric drive and explain how to execute such a project from concept to start of operation. The paper will also outline the many benefits provided by electric drive trains and discuss lessons learned from real-world revamp projects.	**Gunther Schwarz** *Siemens AG* **Ralf Gillmann** *Siemens AG*

Ref.	Title	Authors
EUR19_19	**Digitalization for an Electrical Driven Compressor** Gassco, Equinor, ABB have for several years studied and improved operations of electrical driven compressor systems at industrial plants.One achieved goal in this project was an improvement of the drive control to avoid trip of compressors due to voltage dips in the electricity supply.This worked led to further enhancement of the drive algorithms to be able to increase system rating and efficiency.Late in 2017 it was decided to start using digital solution to look for further possible improvements to the already developed solutions and increase the efficiency of how the process train is monitored. By having access to high quality across systems and automate analysis, efficiency is greatly improved and new possibilities unlocked. Data is collected through various onsite systems such as DriveMonitor, historian and dedicated controllers.In addition to this, a data-pump/data-diode is used to get the data from the OT networks over to the IT network and access to cloud storage.The proposed paper will cover the history of changes, project insights and experiences. With a main focus on how we believe digitalization secures the success of this project and cyber sec issues....	**Hans-Bjarne Claussen** *ABB as* **Arne-Marius Ditlefsen** *ABb as* **Ben Velde** *Gassco as* **Erling Lunde** *Equinor as*
EUR19_20	**Large Synchronous Motors, Starting and Synchronism Under Unusual Circumstances** Large synchronous motors are widely used as prime movers of high power rotating equipment in petrochemical plants because of their high efficiency and capability to provide reactive power compensation. These motors do, however, introduce additional complexity during the starting process when compared to induction machines, even when started direct-on-line. This paper will evaluate the different modes of synchronization and analyze the starting process using waveform measurements from the rotor and stator, under normal and unusual circumstances such as voltage drop, overload and damaged parts. Practical measurement using the IEEE 1255 standard and telemetry data will be used to investigate real cases. This information will then be used to generate a guide table which end users can utilize to quickly set up protective relays, excitation systems and troubleshoot starting issues. Index terms - Synchronous motors, starting waveform analysis, synchronism, telemetry, electric machines.	**Mateus Nicoladelli de Oliveira** *WEG* **Thiago Leite Borim** *WEG Equipamentos Elétricos* **Todd Begalke** *Electric Machinery – WEG Group*
EUR19_21	**OLPD CONDITION MONITORING FOR OIL AND GAS: FIELD EXPERIENCES AND LESSONS LEARNED** In this paper the authors are presenting the continuation of the previous work of on-line partial discharge (OLPD) condition monitoring challenges and solutions explained through case studies presented at the 2016 European Petroleum and Chemical Industry Conference (PCIC). This paper presents the field experiences and the lessons learned after two years of continuous OLPD monitoring carried out on a complete HV network comprising rotating machines, transformers, switchgears and HV feeders for an oil and gas facility in Central Asia. The paper reports how maintenance and repairs have been prioritised on the basis of the OLPD condition monitoring (CM) results and how the site strategy has been shifted from a time-based maintenance regime toward a more condition-based maintenance regime. The paper also reports how the OLPD CM data changes after a maintenance campaign and evidence of the issues previously detected by the CM system are reported.	**Riccardo Giussani** *HVPD Ltd* **Dane McGreevy** *HVPD Ltd* **Dibyendu Bhattacharya** *BP Exploration Operating Company Ltd*

Ref.	Title	Authors
EUR19_22	**Effects of Arc-Back Fault in VSD Systems and How to Protect against Them** VSD related arc-back faults have been discussed in technical forums without detailed explanation. However, consequences of the fault mechanism are generally unknown. Scientific literature generally tend to ignore it. In IEEE 551, the phenomenon is described only for a theoretically ideal system without losses, transformer saturation and other components. This paper aims to explain the theoretical background of arc-back and by simulations to demonstrate the actual performance of real system having resistances reducing the stresses. This type of single diode failure causes high thermal and dynamic stresses on drive input transformers being known to be behind transformer failures (production loss, long recovery times). Also VSD transformer protections, e.g. by rectifier monitoring, against this detrimental mode of component failure are analyzed and discussed. Authors' aim is to get the phenomena know and understood. It shall also be noticed in standards and specifications of VSD. The overall target is to improve system reliability by increasing understanding of the importance of the correct specifications of drive transformers and drive protection.	**Heli Ojalammi** *ABB Oy, Transformers, Finland* **Mikko Västi** *Vaasa University of Applied Sciences, Finland* **Wim van der Merwe** *ABB MV Drives, Switzerland* **Esa Virtanen** *ABB Oy, Transformers, Finland*
EUR19_23	**IEC/IEEE 60079-30 1 & 2 Trace Heating for Explosive Atmospheres** IEC/IEEE 60079-30 Parts 1 & 2 are standards jointly developed by the IEEE and the IEC. This joint development represents the complete harmonization of the European and North American certification and design requirements for Trace Heating in Explosive Atmospheres. In addition to type tests for product certification, this standard has extensive requirements so that Certifying Bodies can determine the manufacturer's ability to predict maximum sheath temperatures for trace heaters in explosive atmospheres. This paper provides background for understanding the joint development process and provides an overview of the key technical requirements found in the standards. This paper will also discuss the first three years of experience by industry in using this standard.	**Ben Johnson** *Thermon*
EUR19_24	**Hollistic Approach to Cybersecurity in O&G** O&G market face the same cybersecurity threats as corporate systems, but it is essential to understand that IT and OT security solutions cannot be deployed interchangeably in protecting the operational network. Although part of the same organization, the teams have different priorities and often have different skillsets; therefore, if a Pipeline Management System fails, genuine human and environmental safety risks occur. In these critical environments, safety, availability, and reliability are paramount and must be maintained at all times. Historically, security was focused on keeping out potential attackers through a perimeter-based defense. Today, the standard thinking is to expect a successful attack, and to design and defend a network with a defense-in-depth approach to minimize and mitigate any damage. This approach involves a multi-layered, multi-technology, and multi-party strategy to protect critical assets. Security cannot be one-off incident and response; it must be treated in a life cycle manner involving everything from awareness to response and the security life cycle should be addressed through an appropriate Risk Control Framework...	**Jose Peinado** *Schneider Electric* **Bernardo Martin Mancuso** *Schneider Electric*

Ref.	Title	Authors
EUR19_25	**ECS for interconnected O&G OFFSORE facilities - A success story** From FEED to start-up, the key aspect and focus turning out successfully each phase of the project FEED: Set definition of network architecture - communication protocols - contractual interface and coordination with other packages (e.g. OPC, SCADA, UCP and IED) - I/O list - functions (control) and supervision (HMI) of power generation and electrical distribution systems - data acquisition, storage and monitoring - performance and obsolescence. Detail design: execution of the above definitions – issuing testing procedures - run interface validation tests with other packages – assembly of ECS and simulator (dummy) ECS hardware – development of ECS software - FAT and iFAT. Supervision of Installation and mechanical completion on site At-shore commissioning Offshore commissioning and start-up Above challenges have been successfully overcome thanks to a collaborative approach all along the project's realization, done in an open mindset & teams' strong involvement.	**GUILLAUME ROBINE** *TOTAL SA* **PHILIPPE AUSCHER** *GE Power*
EUR19_26	**Differential protection for MV motors – Comparison of methods** The target of the paper will be to present the different methods used to ensure differential protection for MV motors. This protection function is mostly used to protect induction and synchronous motors against phase-to-phase faults. In the event of such faults, the quick response of the differential element may limit the damage that may have otherwise occurred to the motor. The different methods will be presented together with the environment (lay-out, impact on motor design, sensors to be supplied. ..). A case study will be presented, simulations will be done to show stability and accuracy of each solution in case of trip. Settings calculation and overall design will be addressed. Advantages and draw backs will be presented considering implementation and design.	**Cécile GAUDEAUX** *Air Liquide* **Caroline VOLLET** *Schneider Electric* **David CORBET** *Schneider Electric*

Ref.	Title	Authors
EUR19_27	**Packaged Solutions Advantages in according to Safety in Design (SID) requirement** Operators in the Oil & Gas Industry require more and more frequently turnkey modular solutions, to create unique and fully customizable solutions, ready to operate when installed on site (“plug and play” solutions). In accordance with Client’s specifications, ambient conditions and transport size limitations, 15 modular substations were required for a major oilfield in Kazakhstan, one of the world’s deepest producing sites and one of the largest discoveries in recent history. The project proceeded with a modular design for the majority of the process and utility areas. Modules were industrial-type structures containing mechanical/electrical/instrument equipment, piping and lifting devices required for various processes and maintenance, and heated and ventilated and/or air conditioned. Modules fabricated outside of Kazakhstan were designed and constructed as pre-assembled units. This type of design allows modules to be disassembled into transportable sizes and weights. After fabrication modules were dis-assembled for barge or truck transportation to Kazakhstan to be re-assembled on site. Advantages of modularization: - Reduced craft labour...	**Luigi Bellofatto** *SKEMA*
EUR19_28	**Fleet analytics and advanced diagnostic for rotating equipment** The scope of this paper is to illustrate how low cost sensing and distributed computing allow to monitor and optimize large fleets of assets, with a particular focus on rotating equipment. We present a solution to take advantage of the latest IoT technologies, to support the end users with services and expertise, by turning data insights into direct action that “close the loop” and generate user value in the physical world. The funding layer of this infrastructure is data harvesting, by enhancing existing equipment capabilities by applying intelligent sensors. In process industries, the most critical assets are the rotating equipment, such as electrical motors, pumps, compressors and fans: these devices are designed to collect the fundamental data about the status and insert them into the infrastructure. The engineers in the service centers monitor the status of each machine, diagnosing upcoming issues and helping to define the best strategies for a smooth and profitable site operation: the availability of data and insights enables the development of custom build predictive maintenance algorithms fitting the specific needs of each production site.	**Piotr Lipnicki** *ABB* **Marco Heese** *ABB*

The following tutorials will be presented at the PCIC Europe 2019.

Ref.	Title	Authors
EUR19_02	**Motor Bus Transfer Applications, Issues and Considerations** To maintain plant operation and process continuity in power plants and industrial facilities, synchronous fast and in-phase transfer methods are described that transfer motor buses from a main source to an alternate source under planned or emergency conditions. Case studies of live, in-service transfers prove the consistently reliable and smooth nature of the synchronous transfers, employing a new torque ratio criterion as a measure of success. However, the widely-used residual voltage (slow) transfer method closes the alternate source breaker when the motor bus voltage falls to about 25% rated, paying NO attention to the phase angle between the disconnected motor bus and the alternate source. A large phase angle at close causes damaging torques and can result in premature motor failure and mechanical failures, and loss of process. Dynamic conditions that occur immediately prior to and during bus transfer are presented and revealed in the field data, linking their relevance to application of motor bus transfer methods.	**Carol Cohen** *Beckwith Electric Company* **Thomas Beckwith** *Beckwith Electric Company* **Murty Yalla** *Beckwith Electric Company*
EUR19_07	**Protect your cyber assets and keep them safe** ABB Ability™ Cyber Asset Manager Imagine a solution that automatically detects any new device connected to your network, and then records the asset vendor, IP address and other parameters. What if the solution could inform you when a new device was connected, and let you query the database for such as which devices have certain software versions installed? Which ones have a version of firmware that just announced a vulnerability? What if you could set up rules that automatically notified you of changes to the system? Cyber Asset Manager with the Asset Inventory Module does all this and more. ABB Ability™ Security Monitoring Security monitoring is the automated process of collecting and analyzing indicators of potential security threats, then triaging these threats for appropriate action. This solution detects suspicious behavior or unauthorized changes on your assets or network, and then determines which types of behavior should trigger alerts to inform the security operations center. Please join us to learn how we can help you maintain and manage your cyber assets.	**Svein Henry Hagen** *ABB* **Benjamin Dickinson** *ABB*
EUR19_09	**Description, selection and feedbacks of use of MV VSD technologies in Oil&Gas** Nowadays within the Oil & Gas industry, MV Load Commutated Inverter (LCI) and MV Voltage Source Inverter (VSI) are commonly used to drive compressors and pumps at variable speed. LCI's are mainly used for large power applications >20 MW such as LNG plant or Petrochemical applications whereas VSI's are mainly used for power <20MW with a trend to use VSI more and more to higher power. The first part of this tutorial describes the VSI and LCI technologies, topologies and control strategies with Pro and Con's. The second part of this tutorial provides Operator lessons learned and feedbacks regarding the use of VSI and LCI on Oil & Gas sites for onshore and offshore applications.	**Edouard Thibaut** *Total E&P* **Faradj Tayat** *Total E&P*

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