PCIC EUROPE
PETROLEUM & CHEMICAL INDUSTRY COMMITTEE

16th PCIC Europe Annual Electrical and Automation Knowledge Sharing Event

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7-9 May 2019 //
Pullman Paris Centre Bercy - Paris, France ////////////////////

16th PCIC Europe Annual Electrical and Automation Knowledge Sharing Event

Final Program

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Conference Site
Pullman Paris Centre - Bercy
1 rue de Libourne 75012 Paris - France
Tel : (+33) 1 44 67 34 00

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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.

Welcome to Paris!

Dear participants in PCIC Europe knowledge sharing event,

The Petroleum and Chemical Industry Committee (PCIC) Europe wants to attract electrical and automation engineers from as many as possible chemical oil and gas companies. By selecting the venue each year in a different European country, we aim to attract the local engineering community and have them engaged for future participation. In France many chemical oil and gas activities are located at the west coast (Le Havre) the south (Marseille) and in the Rhone valley (Lyon). With the high speed train system to these regions, the PCIC Europe Committee has decided that Paris is the best fit city to host our annual event. The PCIC Europe committee also as strong ties with Paris, because we have members from companies with their head offices in Paris: Total, TechnipFMC, Air Liquide. No surprise that the key note speech will be from one of these companies.

Started 4 years ago with an automation program in parallel to the electrical program, we see an increasing influence from digitization in our target industries. After the first (steam power), second (electrical power) and third (electronics) industrial revolution we are entering the era of fourth industrial revolution: digitization and artificial intelligence (and biotechnology) and it is becoming more important part of our knowledge sharing event.

I'm proud to announce that after 3 years of proposals how to deal with Industrie 4.0, we have now several use cases in our program. Learn from actual implementation of big data capabilities to improve safety, productivity and sustainability.

The industry in Europe specifically has another challenge. The changing climate and new laws and regulation forces the chemical industry to innovate on the use of natural energy resources. More than before this increases the importance of electricity, whether it is because of its source (wind, solar), storage (batteries) or its consumption (electrical drives instead of steam/gas turbines).

PCIC Europe is revising its strategy. Your opinion as a knowledge-sharing participant is important to us. Therefore we have scheduled three parallel sessions for each of the interest areas in our event: Chemical Oil and Gas company employees, contractor and service provider/consultant employees and vendor employees. For the continuation of the knowledge sharing among electrical and automation engineers, it is a challenge to attract committee members, sponsors and authors/participants. You can help to continue the advancement technology.

A very active local committee has organized this Paris event. I appreciate the local committee members for all their efforts and regular communications to make this event a success. For continuation, we have a mix of local committee members from previous year and new members, which will also be the case for our upcoming event in 2020: Copenhagen, Denmark. I wish everybody, with her/his own interests, that PCIC Europe 2019 maybe successful in any perspective.

Welcome to Bercy-Paris

Peter Pieters
Chair PCIC Europe

The 2019 PCIC Europe technical programme

Dear attendees,

Welcome to PCIC Europe in Paris. We cannot believe that the conference was last held here in 2007 and we are delighted to be back in Paris. Looking back at the papers presented then, we realised that there are some consistent themes (electrical safety, equipment integrity and life cycle management) and some changes too – can you imagine a world in which Automation and Digitization was not high on the agenda in both projects and assets? And with the Digitization the Cyber Security becomes a key issue.

Ambitious CO_2 reduction targets of societies and governments and the associated widespread, deep electrification and automation together with aspirations towards creation and running of complete asset digital twins means we are living in exciting times.

The topic of digitization is on everyone's lips. Industrie 4.0 brings a considerable boost to the world of work. On the one hand, many more data points are collected and recorded, on the other hand, and that makes the difference, the collected data is now also used to optimize the production processes and make them more efficient and transparent.

On conference day one we have our tutorials so please do participate in these sessions: Energy transition will call for the smarter use of electric power and the use of variable speed drive technology can help in this step; as electric power increases in process plants, the ability to deal with interruptions in power becomes increasingly important;
Cyber security for assets in an increasingly connected world has moved on from the simple solutions of preventing connections to PLCs; The use of digitization in practice completes our tutorial menu.

We have continued to select papers and presentations with closer integration and optimisation of the automation/electrical power systems. The plenary sessions have a wide range of technical content, aimed at a broad cross-section of the attendees, with the intent to inform and provoke discussion. Parallel sessions are arranged so that papers with common themes are presented as far as possible in one room for the convenience of presenters and attendees.

In the following pages you can find details of our technical programme complete with short abstract summaries of the individual sessions to help you plan your PCIC Europe experience.

As we mentioned before, connectivity and participation are also major aims of this conference. Please take opportunity to meet the presenters, authors, exhibitors and conference organising committee; often that external engagement can lead to an opportunity in the future. The committee is happy to discuss your ideas to contribute to the future conference events and welcome your input regarding focus areas, new subjects or areas of interest. This might lead to future conference papers or tutorials, so please don't be shy.

The success of PCIC Europe depends upon contribution from attendees, including preparation and presentation of papers and tutorials. If you have an idea for a future contribution, please contact any member of the organising committee; we are happy to discuss and help.

We look forward to the success of PCIC Europe and the engaged discussion with you.

Paul Donnellan   Diedrich Thaden
PCIC Europe   PCIC Europe
Vice Chair - Technical Chair   Technical Chair Automation & Digitization

Dear Guests,

Welcome to Paris, known to all as the City of Lights, a wonderful place successfully mixing art, culture, fashion and business.

Paris has so many attractions to offer, the most famous being the Eiffel Tower, for which during the welcome reception our keynote speaker will give you many details covering technical and historical aspects, most of them unknown to the general public

Strolling along the Champs Elysées with its famous shops and restaurants is a must.

Notre Dame de Paris Cathedral overlooks the banks of the River Seine on which you will navigate during the dinner cruise to discover another Paris.

Montmartre with its hills, offers a 19th century atmosphere with its cobblestone streets, the home of many famous artists.

The business district of La Défense is located in a truly exceptional environment.
The Grande Arche, commemorating the "Declaration of Human Rights " was built in line with the Champs Elysées, the Arc of Triumph, the obelisk of la Concorde, the Tuileries gardens and the Louvre museum, forming a truly historic and stately vista.

One cannot talk of Paris without mentioning the fabulous collections of the Louvre Museum and the Orsay Museum with its dazzling collection of 19th century artwork, particularly the Impressionist masterpieces.

While staying in Paris, you will also enjoy the variety of its fine cuisine, restaurants and cafés and a lot of opportunities for museums, shopping, cabarets and musicals and nightlife.
The city just never stops and hosts hundreds of major events every year

As of 23 March 2019 Paris will welcome the famous Tutankhamen exhibition at La Cité des Sciences et de l'Industrie, merging Science and Art. Among the 150 pieces of this collection, more than 50 exhibits have never been shown and will travel for the first and last time out of Egypt!

Your hotel- the Pullman Bercy - is well located, very close to the Park of Bercy where you can appreciate green spaces and vineyards and numerous restaurants at Court St Emilion , a former trade wine center
The hotel is at only 10 min from the center of Paris by an express driverless metro .

On behalf of the local committee, I wish you a very interesting and profitable PCIC Europe conference and we will do our best to make your visit to Paris enjoyable.

Have a wonderful stay in Paris.

Jeremy Andrews – Chair | Patrick Leroux | Caroline Vollet | Alexandra Soares | Florent Baldeck | Sylvain W. Jean-Pierre | Thibaut Jouvet

Technical program

Monday May 6th, 2019

Time	
18:00 - 21:00	Registration at welcome desk
18:00 – 0:00	Hospitality suites are open – *10th floor of the hotel*

Tuesday May 7th, 2019

07:30 – 17:00: Registration at desk
07:00 – 08:00: Breakfast for authors – *Saumur Champigny*

Time	*Margaux*	*Saint Emilion 1&2*
08:30 – 08:45	Welcome	Welcome
08:45 – 10:15	Tutorial – Electrical EUR19_09 - Description, selection and feedbacks of use of MV VSD technologies in Oil&Gas	Tutorial – Automation EUR19_07 - Protect your cyber assets and keep them safe
10:15 – 10:45	Coffee / Sponsor tables – *Espace Haut Medoc*	
10:45 – 12:15	Tutorial – Electrical EUR19_02 - Motor Bus Transfer Tutorial	Tutorial – Digitization EUR19_36 – Development of Digitization in Oil & Gas Engineering Processes
12:15 – 13:15	Lunch – *Espace Patio*	
13:15 – 13:30	Welcome & Notices – PCIC Europe Chair	
13:30 – 14:15	Plenary session – Electrical EUR19_21 – OLPD condition monitoring of complete networks for Oil & Gas: Field experience after 2 years	
14:15 – 15:00	Plenary session – Digitization EUR19_08 - Implementation of the FSO2 life extension program by using big data and IIoT	
15:00 – 15:30	Coffee / Sponsor tables – *Espace Haut Medoc*	
15:30 – 16:15	Paper - Electrical EUR19_23 - IEC/IEEE 60079-30 1 & 2 Trace Heating for Explosive Atmospheres	Paper – Automation EUR19_28 - Fleet analytics and advanced diagnostic for rotating equipment
16:00 – 18:00	Hospitality suites are open – *10th floor of the hotel*	
18:00	Keynote speeches (*Margaux*) followed by the social event (*outside the hotel, see page 12*)	

Electrical track – Digitization track – Automation track

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Wednesday May 8th, 2019

07:30 – 16:00: Registration at desk

Time	Saint Julien 1&2	Saint Julien 3	Saint Emilion 1&2
08:30 – 09:15	Paper – Electrical EUR19_20 - Large Synchronous Motors, Starting and Synchronism Under Unusual Circumstances	Tutorial – Digitization EUR19_38 - Big data in Operation: From use case to Insite	Paper – Digitization EUR19_17 - A Model-Driven Approach for Situational Intelligence & Operational Awareness
09:15 – 10:00	Paper – Electrical EUR19_18 - Benefits Of Replacing Steam Turbines With Electric Drives And What To Consider		Paper – Automation EUR19_11 - Optimizing Olefins Plant Operations to Reduce Energy Consumption
10:00 – 10:30	Coffee / Sponsor tables – *Espace Haut Medoc*		
10:30 – 11:15	Paper – Electrical EUR19_16 - The importance of analysis and simulation for generator applications	Paper – Electrical EUR19_27 - Advantages and Challenges of Modular Solutions for Electrical Substations	Paper – Digitization EUR19_35 - Hollistic Approach to Cybersecurity in O&G
11:15 – 12:00	Paper – Electrical EUR19_04 - Standard Approach to Perform Power System Stability Studies in Oil and Gas Plants	Paper – Electrical EUR19_14 - Arc flash hazard management for low-voltage switchgear - a fresh look	Paper – Digitization EUR19_12 - Advanced Predictive and Intelligent Analysis Methods for Machine Life Extension
12:00 – 13:00	Lunch – *Espace Patio*		
13:00 – 13:45	Paper – Electrical EUR19_22 – Effects of Arc-Back Fault in VSD Systems and How to Protect against Them	Paper – Electrical EUR19_30 - The New Requirements of ISO 80079 Series for the O&G Industry Process Equipment	Paper – Digitization EUR19_03 - Root cause analysis of compressor failure by machine learning
13:45 - 14:30	Paper – Electrical EUR19_29 - Large Compressor Motor Failure Due to Environmental Conditions	Paper – Electrical EUR19_06 - Software technique for the advanced analysis of motor currents	Paper – Automation EUR19_10 - Best Practice in Risk Assessment
14:30 – 15:00	Coffee / Sponsor tables – *Espace Haut Medoc*		
15:00 – 15:45	Paper – Electrical EUR19_26 - Differential Protection for MV motors - a comparison of methods	Paper – Digitization EUR19_34 - Digitalization in Medium Voltage Variable Speed Drive Systems	Paper – Digitization EUR19_33 - Cloud-based technologies for secure, reliable and efficient energy supply
15:45 – 16:30	End-users engagement	Contractors and consultants engagement	Suppliers engagement
16:00 – 0:00	Hospitality suites are open – *10th floor of the hotel*		

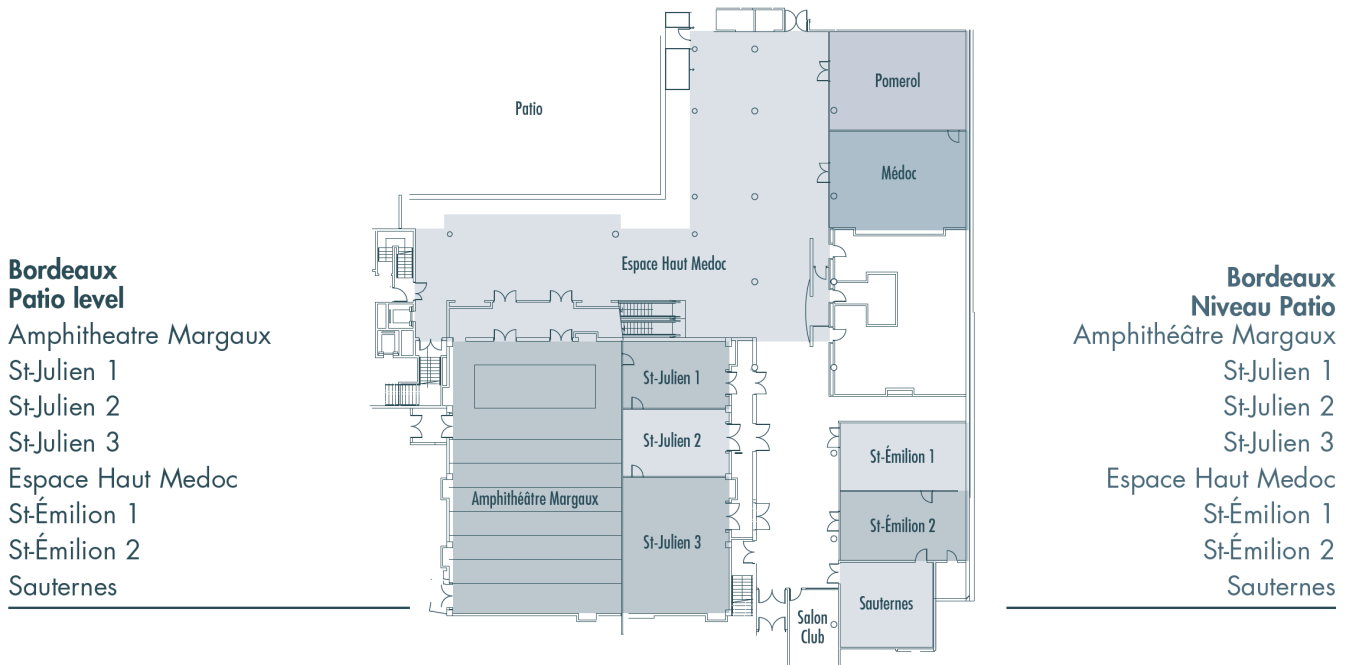Electrical track – Digitization track – Automation track

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Thursday May 9th, 2019

07:30 – 13:00: Cloakroom (coffee break area)

Time	*Saint Julien 1&2*	*Saint Julien 3*	*Saint Emilion 1&2*
08:30 – 09:15	Paper – Electrical EUR19_15 – Integrated Moto Compressor versus Conventional Solution		EUR19_37 - Integrated Process & Power Management Systems at the age of digitalization
09:15 – 10:00	Paper – Electrical EUR19_13 - Integrated Drives Skid and Artificial Lift Solution for ESP application	Paper – Electrical EUR19_32 - Lithium-ion Batteries for Explosive Atmosphere	Paper – Digitization EUR19_19 - Digitalization for an Electrical Driven Compressor
10:00 – 10:30	Coffee / Sponsor tables – *Espace Haut Medoc*		
10:30 – 11:15	Plenary – Automation (*Margaux*) EUR19_05 - Communication Network Optimization for Subsea Processing Fields Development		
11:15 – 12:00	Plenary – Electrical (*Margaux*) EUR19_01 - VFD novel inter-harmonics active damping solution		
12:00 – 12:30	Closing (*Margaux*)		

Electrical track – Digitization track – Automation track

Conference rooms floorplan

**Bordeaux
Patio level**
Amphitheatre Margaux
St-Julien 1
St-Julien 2
St-Julien 3
Espace Haut Medoc
St-Émilion 1
St-Émilion 2
Sauternes

**Bordeaux
Niveau Patio**
Amphithéâtre Margaux
St-Julien 1
St-Julien 2
St-Julien 3
Espace Haut Medoc
St-Émilion 1
St-Émilion 2
Sauternes

NB. For to the Margaux room, please access only through Saint Julien 3 room.

Hospitality suites (located on the 10th floor)

ABB
Etap
Schneider Electric
WEG

Welcome Reception on Tuesday May 7th, 2019

From 18:00 to 19:15: Welcome speech and keynote speakers (Margaux room)

18:00 – 18:15: PCIC Europe Chair welcome speech by **Peter Pieters**

PCIC Europe has invited for the 2019 Paris conference, 2 keynote speakers who will make a presentation during half an hour each.

18:15 – 18:45: How an O&G company, such as Total, can tackle the Energy transition, to meet the climate challenge. Which part should Power play in the future?
By **Ladislas Paszkiewicz**, Total/Strategy & Climate.

18:45 – 19:15: The story of the Eiffel Tower told for engineers.
By **Joshua Buswell,** Tour guide, coach & trainer in tourism.

19:30: Departure from the Pullman Paris Centre – Bercy hotel to the boat
Refer to your map and follow instructions (approx. 10 min walking).

From 20:15 to 23:00: Dinner Cruise
"Le Paquebot", a comfortable liner (85 m length) will welcome you at "Quai de Bercy" as from 19:50 (boat departure at 20:10) for an unforgettable cruise on river Seine partly during day, and partly during night, offering 2 different views of the capital city. During the cruise, a buffet will be served. Authors & co-authors will be invited for a family photo.

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* **Vijay Ganesan** *Siemens*
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 Ltd.*
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 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.The 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* **James Ladd** *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, 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 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 & Operational Awareness** 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 CO_2 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. This 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 Equipamentos Elétricos* **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 further finding, of OLPD condition monitoring, and the remedial actions implemented consequently to avoid failures and unwanted outages. This is an example of how site strategy can be shifted from a time-based maintenance regime toward a more condition-based maintenance regime. As well, innovation of data analysis tools and a case study of an OLPD and Motor Current Signature Analysis (MCSA) test campaign is shown; this approach has now justified the deployment of a permanent continuous monitoring system.	**Riccardo Giussani** *HVPD Ltd* **Dane McGreevy** *HVPD Ltd* **Dibyendu Bhattacharya** *BP Exploration Operating Company Ltd* **Alex Polley** *HVPD 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* **Ivo Wouters** *SABIC* **Rudolf H.D. Pomme** *DEKRA* **Richard H. Hulett** *Thermon*
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	**Advantages and Challenges of Modular Solutions for Electrical Substations** Operators in the Oil & Gas Industry require more frequently turnkey modular solutions, to create unique and fully customizable solutions, ready to operate on site ("plug and play" solutions). In accordance with Client's specifications, ambient conditions and transport size limitations, modular substations were required for a major oilfield in Kazakhstan. The project proceeded with a modular design containing mechanical/electrical/instrument equipment, ventilated and/or air conditioned. Modules were designed and constructed as pre-assembled units. This type of design allows modules to be disassembled into transportable units. After fabrication modules were dis-assembled transportation to Kazakhstan to be re-assembled on site. Advantages of modularization are: Reduced craft labour hours at site, reduction in peak manpower, reduced fall related hazards on site, higher overall productivity for fabrication, reduced site congestion, reduced site related security concerns, ability to perform QA/QC checks. The article will explore advantages of a Modular approach in the construction of Electrical Modular Packaged Substations.	**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* **Ido Amihai** *ABB*

Ref.	Title	Authors
EUR19_29	**A Large Compressor Motor Failure Due to Environmental Conditions** This paper covers the failure of a propane compressor synchronous motor, 19,000HP, 13.2kV. The damage extent in the motor was sever causing a stator ground fault and rotor mechanical damage. The main findings extracted concluded that the rotor material failed due to Stress Corrosion Cracking (SCC). Accordingly, excessive corrosion and dirt ingress was visible inside the machine enclosure. This was abnormal for motors enclosure designed with Totally Enclosed Air-Air Cooled (TEAAC) type, which prevent any interaction with the outside environment. A detailed inspection was conducted on heat exchanger tracing the inside water leak and, where it was found to be coming from gaps between the heat exchanger tubes and the enclosure wall. These gaps exposed the machine's internal parts to the outside corrosive environment in the form of water, fine dust and moisture reaching the internal parts of the motor by the forced air cooling fans. This paper will address the failure in details, which also explains the importance of having a Totally Enclosed enclosure in an environment such as the Middle East, as opposed the open WP-II enclosures commonly used around the world.	**Zeyad Balkhyour** *Saudi Aramco* **Salah Al-Ali** *Saudi Aramco* **Ali Al-Ameer** *Saudi Aramco* **Hussain Balfaqih** *Saudi Aramco*
EUR19_30	**The New Requirements of ISO 80079 Series for the O&G Industry Process Equipment** The paper discusses the new challenges for process equipment manufacturers due the new requirements presented by ISO 80079-34, 80079-36 and 80079-37. As a support for the debate, the paper includes a real case study on an air compressor package for a petrochemical installation classified as zone 2 IIA T3, equipped with a frequency converter. Special attention will be given on manufacturing procedures and tests requirements, which include the avoidance of dangerous electrostatic potentials.	**Estellito Rangel Junior** *Consultant* **Waldiberto Pires** *WEG Motors*
EUR19_32	**Lithium-ion Batteries for Explosive Atmosphere** The use of electrical energy is growing constant in the world. Lithium-ion batteries have been largely used in these cases, therefore they are studied in the past years, with the aim of improve the level of safety guaranteed during their operation. Anyway, safety issues are still present, and the main topic is to avoid the rise of hazardous events, which may be associated to short circuits, over-charge / over-discharge electric currents and overheating. These dangerous conditions may lead to exothermic chain reactions inside the storage system, which then may release toxic and/or flammable gases and finally catch fire. These problems have to be verified in all applications and in particular in the case of installation of Lithium-ion battery in Explosive Atmosphere. The goal of this Paper is the evaluation of the most safety type of Lithium technology in order to minimize the possible ignition source in the environment with presence of Explosive Atmosphere. Moreover, the paper analyzes the ability of the battery manager system (BMS) to remove the ignition risk residual evaluating its minimum Safety Integrity Level (SIL) in order to grant a sufficient reliability.	**Kim Fumagalli** *Excen* **Roberto Sebastiano Faranda** *Politecnico di Milano* **Massimiliano Bielli** *Politecnico di Mialno*

Ref.	Title	Authors
EUR19_33	**Secure, Reliable and Efficient Energy Supply in Production Processes Using Cloud-Based Technologiesl** In recent times, a variety of cloud-based offerings have entered the market with the aim to support process and chemical industries to being supplied and using energy as securely, reliably and efficiently as possible. In this paper, we discuss in depth the opportunities and risks that come along with cloud-based technologies in these environments, especially in the context of secondary assets. We take the perspective that the benefits of data-driven and platform-based approaches outweigh well-known risks such as cyber and data security threats, corrupted sensor data, setting up and managing communication and data infrastructure, sensitive data sharing concepts, and more. On the other hand stand the benefits of ubiquitous process transparency, along with data-based levers for cost savings and performance increase which are hardly accessible by traditional means. Examples illustrated in this paper cover cloud-based approaches to secure asset and patch management, energy efficiency services, and power quality analytics. State-of-the-art industrial offerings and their technical realization are evaluated and discussed.	**Dr. Ralf Blumenthal** *Siemens AG* **Felix Cadelcu** *Siemens AG* **Dr. Christian Blug** *Siemens AG*
EUR19_34	**Digitalization in Medium Voltage Variable Speed Drive Systems** Digitalization has become inevitable for any industry due to its value adds like, optimizing efficiency, reducing downtime, easy asset tracking and preservation etc. This is also aided by the advancement in technologies and the falling cost of digitalization itself. Even though the back bone of digitalization is digital data storage, communication and data processing, integrating it with specific application requires good domain knowledge itself. This paper talks about digitalization in the field of Medium Voltage (MV) drive systems. This paves way to new business models giving several advantages to every player involved in oil and gas business employing a MV drive system. Different stages to achieve complete digital transformation is explained. The application of digitalization for MV drive systems over the entire life time of the products and the resulting value adds are explained in detail.	**Umesh Mandlekar** *Siemens AG* **Vijay Ganesan** *Siemens AG*
EUR19_35	**Holistic 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, 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* **James Ladd** *Schneider Electric*

Ref.	Title	Authors
EUR19_37	**Integrated Process and Power Management Systems at the age of digitalization** Integrated Process and Power Management systems are key for project optimization, system simplicity and operational flexibility in electro-intensive O&G plants. The Value of integrated systems through the life-cycle of the plant from design & engineering to construction and operation is widely understood as having positive impact on CAPEX and OPEX as well as the reliability of operations. With the advancement of digital technologies and the impact of data analytics in operational profitability, project personnel are now looking for the digital ready integrated system architectures and management platforms. This paper discusses the next generation of integrated process control and electrification system architectures and management platforms, that inherently enables digital performance management of plant wide assets and processes. The key concept of least cost data path according to the function served within the integrated system enables cost effective and cyber secure digital architectures while preserving the integrity and reliability complex plant control systems.	**Safouan Hage** *Schneider Electric* **Shebin Jalal** *Schneider Electric* **Martin Mancuso** *Schneider Electric* **James Ladd** *Schneider Electric*

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

Ref.	Title	Authors
EUR19_02	**Motor Bus Transfer Tutorial** 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.	**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.	**Benjamin Dickinson** *ABB* **Svein Henry Hagen** *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*

Ref.	Title	Authors
EUR19_36	**Development of Digitization in Oil & Gas Engineering Processes** Digitization penetrates all the levels of the Oil & Gas and Petrochemicals industry value chain. In this tutorial, an end user, an engineering company, an original equipment manufacturer (OEM) and a digital solutions provider share their experience on good practices to facilitate the digital transition along the engineering process. The purpose is to highlight the key milestones that companies should follow to establish a new business model with their partners, set up their data management and start working on digital twin. Through this presentation, the authors will remind the most relevant standards to support the digital journey.	**Jean-Charles Guilhem** *2B1st Consulting* **Cécile Gaudeaux** *Air Liquide* **Nathalie Capresin** *Saipem* **Hans Keller** *Siemens*
EUR19_38	**Big data in Operation: From use case to Insite** During this tutorial some use cases will be exposed about the use of Big data on Operation: - In a TOTAL refinery: R&D has investigated a solution for a sensor which can be installed in ATEX area type 1 - In NESTE Oil plant: implementation of IoTs and development of algorithms in order to anticipate the incidents (predictive maintenance) - In Air Liquide: presentation of SIO (Smart and Innovative Operation), the digital transformation of Operation through the use of data for predictive, optimisation and performance improvement of the plants.	**Cécile Gaudeaux** *Air Liquide* **Jean-François Rauch** *Air Liquide* **Florian Thomines** *SNEF* **Victor Brissot** *SNEF* **Jean-Baptiste Leger** *SNEF*

PCIC Europe Code of Conduct

1. PCIC Europe missions

The scope of the association is to hold an annual technical conference in Europe in the field of electrical, non-electrical and safety related items in connection with production, treatment and transport of crude oil and related raw materials and products, chemicals and chemical products and products of the Pharmaceutical Industry.

The purpose is to share good practices and improve competencies of engineers working in the field of process industries.

2. Purpose of the Code of Conduct

European Petroleum and Chemical Industry Committee (PCIC Europe) is a not-for-profit association managed and operated by representatives of the process industry on a voluntary basis. Therefore it can only work from the dedication and commitment of the volunteers in charge.

PCIC Europe Conferences involve different categories of people: Organizing Committees, Authors, Delegates and Sponsors. Each one of these categories has rights and duties to contribute to the success of the conferences. These rights and duties are described in different documents available when someone is joining one of these categories.

In any case these documents may be subject to interpretation and cannot claim to be exhaustive. In order to avoid misunderstandings and misleading expectations, this Code of Conduct intends to draw the guidelines to contribute positively to the development of PCIC Europe and eliminate inappropriate behaviour that could compromise PCIC Europe missions.

3. Member / Organizing Committees

The members of the different Organizing Committees are volunteers. Generally their respective time allocation and costs are supported by their respective companies.

Therefore the different Organizing Committees members:

· Shall register at the conference according to the conference terms and conditions

· Shall not benefit of any advantage regarding the conferences

· Shall not use their position in the Organizing Committee to "invite" people or give any advantage to other conference Delegate, Author, Sponsor.

· Shall not disclose unofficial information from internal documents or discussions to third parties without prior agreement from the organizing committee

· Shall adhere to anti competition rules as described in paragraph 7

4. Authors

The Authors contribute to the success of the conferences by the quality of their papers and presentations. In compensation they contribute to promote the expertise of their respective company. The PCIC Europe copyright is intended to give permission to PCIC Europe to publish the paper and to use it to promote its Technical Conferences. The copyright also states that the contents of the paper are the sole responsibility of the author(s). Authors retain all rights to the technical contents.

Therefore the Authors:

· Shall register at the conference (as a minimum the presenting author) according to the conference terms and conditions

· Shall not benefit of any advantage regarding the conferences

· Shall not use their position to "invite" people or give any advantage to other conference Delegate, Author, Sponsor.

· Shall adhere to competition law code PCIC Europe as described in paragraph 7

5. Sponsors

The Sponsors are essential to the financing of the conferences and PCIC Europe is committed to maximize Sponsors visibility in respect with the sponsorship terms and conditions. PCIC Europe is also welcoming Sponsors initiatives that may contribute to the conference attractiveness within the PCIC Europe commercialism rules and sponsorship terms and conditions.

In purchasing a sponsorship, the Sponsors:

· Shall register their representatives at the conference according to the conference terms and conditions

· Shall not benefit of any advantage

beyond the sponsorship terms and conditions regarding the conferences.

· Shall not use their position to "invite" people or give any advantage to other conference Delegate, Author, Sponsor.

· Shall adhere to competition law code PCIC Europe as described in paragraph 7

6. Delegates / Conference attendees

The venue of the Delegates is the fundamental goal of PCIC Europe and in that respect all efforts are mobilized to satisfy them. As part of these efforts PCIC Europe is calculating the registration fees fairly in order to maximize the conference attendance. In addition PCIC Europe is welcoming all remarks and suggestions from the Delegates for improving the conferences year to year.

In registering at the conference, the Delegates:

· Shall register at the conference according to the registration terms and conditions

· Shall not benefit of any advantage beyond the registrations terms and conditions regarding the conferences.

· Shall not transfer his/her registration to another person

· Shall not use their position to "invite" people or give any advantage to other conference Delegate, Author, Sponsor.

· Shall adhere to competition law code PCIC Europe as described in paragraph 7

7. Competition Law Code PCIC Europe

All members of and participants to meetings and events of PCIC Europe (collectively "Participants") are held to comply with the prevailing antitrust and competition law rules. For that purpose, each Participant shall:

· avoid to discuss or share any commercial and/or strategic company information, including information about prices, profit margins or costs, bids, offerings, market share, distribution practices, terms of sales, specific customers or vendors

· avoid to engage in any agreements - formal or otherwise - to fix or set prices or allocate products, markets, territories or customers;

Participants will ensure that meetings and conferences are preceded by an agenda listing legitimate topics and are followed by minutes in compliance with antitrust and competition law rules. Participants

agree not to exchange any commercially sensitive or company strategic information during any formal and informal PCIC Europe gathering.

Non-compliance with this Competition Law Code may, at the discretion of the PCIC-Europe Executive Committee, result into the withdrawal of PCIC Europe membership and exclusion from PCIC Europe's activities.

8. Freedom from Commercialism

The technical papers, tutorials and poster and related presentations will be free from commercialism by all authors whether affiliated with manufacturers, users, or contractors. It is acceptable to present valid technical data. It is not acceptable to show company logos, use company names, use trade names, use trademarks, use facility names, or use facility locations. This applies to written paper, the presentation file, and to the contents of the oral presentation. Company names may only be used together with the authors' names and email addresses at the start of the paper and the first slide of the presentation file. They may not be included anywhere else in the presentation file, including the information band in the bottom of the slides.

During question and answer sessions, participants shall refrain from asking any commercial questions. The PCIC Europe appointed session chair shall stop any discussions that contain commercial content. Sponsors shall confine commercialism at the conference within the limits agreed with PCIC Europe.

9. Closing remark

This code of conduct is required to be accepted by:

· authors and presenters, during the paper submission process,

· conference attendees, when registering

· sponsors, when accepting PCIC Europe sponsor quotation

· committee members, before the General Assembly accepts their nomination