MARCH 4-7, 2019, HOUSTON, TX

ABB Customer World
Utility Curriculum
Applications and best practices

Monday, March 4, 2019

GCB service solutions for time and cost savings

1:00 – 2:00 p.m. Room: 350B

To address continually decreasing operation and maintenance (O&M) budgets, ABB has developed innovative services for generator circuit-breakers (GCB) to save cost and time on-site. Attend this session to learn about the three main programs ABB offers to maintain your GCBs on your schedule – service contracts, Interrupter swaps and mechanism refurbishments – as well as other service options.

Safety benefits of our new MECB

1:00 – 2:00 p.m. Room: 350A

In this presentation, we will take a deep dive into the new design features of the metal enclosed capacitor banks (MECBs) that ensure the safety of users and infrastructure. With arc flash regulations and the high demand for arc resistant designs, let's take a look at how ABB's capacitor bank performs.

Long-term planning for a grid modernization program

1:00 – 2:00 p.m. Room: 350E

Grid modernization will play a crucial role in maintaining the electric supply necessary for a modern economy. ABB partnered with a Midwest utility to create a program for improving one of the nation's oldest grid infrastructures to support the Motor City's continued revitalization and transformation. Challenges tackled by the project team cover spatial load forecasting, asset condition assessment, system design and optimal investment planning. This presentation will introduce the approach taken to plan for modernizing Detroit's grid infrastructure, as well as several key results.

Microgrids in the Caribbean: Case studies

1:00 – 2:00 p.m. Room: 350D

Caribbean islands are working to address a number of new challenges in their power delivery. While they constantly aim to improve system resiliency, they are also working to integrate renewables, and reduce operating costs and carbon emissions. This session will cover how some island countries are working to address these issues. We will cover the Grand Bahamas Microgrid, Aruba Controls and Jamaica's 24.5 MW microgrid.

Case study: CenterPoint Energy and Hurricane Harvey

1:00 – 2:00 p.m. Room: 350F

In this session, we will examine CenterPoint's intelligent grid and how it helped them respond to Hurricane Harvey. Advanced distribution management systems (ADMS) outage management and automated switching enhanced CenterPoint's ability to identify outages and restore power more quickly.

Design of energy storage systems

2:30 – 3:30 p.m. Room: 350D

Explore the process of developing the preliminary design of an energy storage system. Topics to be covered include an overview of energy storage technology, selection of the power conversion system (PCS), storage medium selection and sizing of components. This session will focus on the importance of having an energy storage system appropriately designed to match the intended application.

Simplicity in relay protection system design

2:30 – 3:30 p.m. Room: 350F

Simplicity is one of the key elements of a good relay protection system design, along with reliability, selectivity and speed. However, with the evolution of protection relays, protection schemes have evolved in a way that they can be described as anything but simple. This presentation will analyze the evolution of protection system design, and the advantages and disadvantages of the current approach.

Call to action: Developing robust security incident response practices across the whole organization

2:30 – 3:30 p.m. Room: 350A

Most cyber security standards require power operators to have an incident response (IR) plan. But for many, the plan is not exercised with the frequency and intensity needed to build the IR "muscle memory" that enables teams to smoothly and respectably execute an incident. Are HR, communications, legal and operations teams able to execute their IR roles and responsibilities? How can your organization prepare work with external stakeholders in an incident, like suppliers, service providers and outside agencies? How can you measure your organization's IR resiliency and drive to improve?

Switchgear retrofitting

2:30 – 3:30 p.m. Room: 350B

This presentation will detail the benefits of retrofitting low voltage and medium voltage switchgear. Retrofitting allows all the capability and technology of new switchgear without the disadvantages of replacing the gear.

Grid modernization and the integration of renewable generation

2:30 – 3:30 p.m. Room: 350E

This session will discuss grid modernization, how renewable generation impacts the grid and how utilities can use grid edge technologies to better leverage renewable assets. Key concepts to be presented include renewable characteristics, renewable saturation, balancing at the grid edge and transmission versus distribution investments.

Extending the life of your generator circuit breaker

4:00 – 5:00 p.m. Room: 350F

Protecting generation assets is crucial to maintaining plant reliability, and ensuring the ongoing operating performance of the generator circuit-breaker (GCB) is critical. Learn techniques to keep this valuable asset operating with maximum reliability. Topics will include proper application of GCBs, life cycle maintenance strategies, solutions for reducing plant shut down time (arcing chamber swap) and remote digital solutions for asset management.

Simple tools to support meeting NERC TPL-007 requirements

4:00 – 5:00 p.m. Room: 350A

NERC is requiring utilities to perform a system analysis to understand solar storm impact on power systems to ensure grid stability. Tools ABB has developed support understanding transformer performance during solar disturbances. This presentation will cover the causes of geomagnetic induced currents (GICs), the effect of DC and GIC on power transformers, the impact of a GIC event on power systems, determining the GIC capability of a transformer design, and the system impact of a GIC event. We will also present results of actual system studies.

Retail to wholesale power: How do we get there with solar+storage?

4:00 – 5:00 p.m. Room: 350D

Rooftop solar plays a critical role in grid transformation. However, as solar penetration levels approach the point where the system can no longer benefit from new daytime generation, storage is needed. To drive solar+storage growth, the industry started seeking new rate designs and incentives to benefit generation/distribution systems and retailers. The session covers how retail and wholesale are blending into a new business model with alternative revenue streams and what opportunities solar+storage can bring to this integrated world.

AI applications in asset performance management, storm response, forecasting and utility operations

4:00 – 5:00 p.m. Room: 350E

The digitalization of utilities is moving forward at an accelerating rate. The implementation of software, connectivity and devices creates and provides more data that can shared across the utility enterprise to improve operations. Investments in analytics, including artificial intelligence (AI), can drive situational awareness and better decision making. This presentation will review asset performance management, storm response and forecasting, and how AI is improving utility operations.

Transformer asset management: Do more with less

4:00 – 5:00 p.m. Room: 350B

Market pressures lead companies to reduce budgets for transformer maintenance and replacements – and ask more from existing assets. The ABB Ability™ Transformer Intelligence portfolio helps reduce transformer maintenance costs by optimizing transformer asset management and supporting units in service.

Tuesday, March 5, 2019

Finding a solution to address low oil IFT in transformers

10:30 – 11:30 a.m. Room: 350B

The state of transformer oil is a the key parameter influencing equipment life expectancy and reliability. Recently, testing returned a low oil interfacial tension (IFT) value in some newer transformers, which was not understood. After extensive tests, ABB discovered that low oil IFT does not affect the dielectric properties of oil-paper insulation. There is need to correlate IFT as an indicator only, and not the sole decisive rule for action. It has to be strongly correlated with critical operational properties of the oil, such as breakdown voltage (BDV), power factor (PF) and acidity.

ConEdison Jamaica substation plug and switch system

10:30 – 11:30 a.m. Room: 350F

ConEdison of New York City faces the extreme challenge of supplying reliable power to a major city on the world stage, with growing demand and real estate costs that prohibit system expansion. Plus, the ConEdison system is one of the oldest in the world, making upgrades an even bigger challenge. At the Jamaica substation, set on a city block in Queens, a single breaker would trip out two feeders of this sensitive substation. With no room to add additional breakers and/or disconnects, ConEdison turned to ABB for a compact solution. The result was the two-breaker plug and switch system (PASS).

Leveraging distributed energy resources: Case studies

10:30 – 11:30 a.m. Room: 350D

Distributed energy resources (DERs) present an exciting opportunity to improve how electricity is produced and delivered to consumers. DER technologies are rapidly approaching widespread market viability and are establishing electrical distribution systems as fertile ground

for innovation. ABB will share two case studies based on work performed by the U.S. Power Consulting team. The presentations will cover selecting the optimal DER portfolio and leveraging energy storage as a cost efficient alternative to traditional grid solutions.

Mission critical communications fuel the benefits of grid digitalization

10:30 – 11:30 a.m. Room: 350E

This session addresses the communications issues associated with grid digitalization and how to ensure that your critical communications infrastructure is ready for the demands of digitalization. The rapid growth in data and devices resulting from the digital grid requires a highly reliable and secure communications infrastructure to handle the device connectivity and volume of data. This session will focus on realizing the full benefits of grid digitalization by ensuring that your communications infrastructure is ready for the digitalization challenge.

Boiler modulating control and burner management replacement at Canadian Nuclear Laboratories

10:30 – 11:30 a.m. Room: 350A

In this session, we will present the Canadian Nuclear Laboratories (CNL) design-build contract that was awarded to ABB to convert an oil fired boiler to natural gas and replace obsolete boiler modulating controls, burner management system and instrumentation. The scope included full mechanical design, supply and construction of the new natural gas train, the redesign of the oil fuel train, and the installation and recommissioning of the boiler control systems.

Advanced microgrids in the last frontier

1:30 – 2:30 p.m. Room: 350D

Of the over 150 communities in rural Alaska, about 70 include grid-scale renewables in microgrid applications. Backed by over two decades of renewable integration experience in the harsh conditions of the 49th state, Alaska microgrids continue to expand the boundaries of traditional power system operation – some pushing penetration levels of variable renewables on a regular basis of up to 100%. This overview will examine the motivating factors for pioneering these advanced microgrids and review the success of each by comparing the theoretical objectives with the real-world outcomes.

SF6 gas: Regulatory update, leak mitigation and e-gas development

1:30 – 2:30 p.m. Room: 350A

Join this panel discussion of SF6 gas industry experts to learn about the current regulatory environment and the role of SF6 gas in greenhouse gas contributions. Discussion topics include existing and proposed SF6 gas environmental regulations, importance of proper gas handling for environmental compliance, SF6 gas leak mitigation techniques and latest update on the development of an environmentally-friendly alternative to SF6 gas.

Assess it so you won't regret it

1:30 – 2:30 p.m. Room: 350B

Age, environmental impact and operational patterns contribute greatly to the gradual deterioration of substation equipment. Factors influencing substation performance include the design/layout, quality of maintenance actions taken and spare parts availability. When the substation life cycle reaches its design limits, it is time to make a decision about its future. Multiple technical solutions can be considered to reduce risk and extend the substation life, but the first step to identifying the optimal solution is to assess the current substation condition.

The path to the digital substation: One utility's approach

1:30 – 2:30 p.m. Room: 350E

IEC 61850 is the true enabler of digital substations. National Grid (NG), a utility operating in New York and New England, has recognized this fact over the last two years. This session will talk about the path taken by NG to choose their partner for digital solutions and how they intend to deploy their next digital substation. It will give a utility's perspective on ways to implement digital substations by working within the operational constraints of a utility.

ABB's AssetShield resilient power transformer: Helping utilities protect key infrastructure

1:30 – 2:30 p.m. Room: 350F

ABB has developed a solution to help utilities to enhance physical security and reliability for key infrastructure in an innovative and cost-effective way. Power transformers are one of the most critical assets in the grid. Malevolent attacks and extreme environments have the potential to damage this key equipment. Failure of a transformer can result in service interruption, considerable revenue loss, and may incur replacement and other collateral costs.

Discovering more ways to use optical sensing technology

3:00 – 4:00 p.m. Room: 350E

Non-conventional instrument transformers (NCIT) have reached maturity as fully digital current measurement devices in high voltage substations and medium voltage switchgear applications. The fiber optic current sensor (FOCS) is an innovative NCIT solution that delivers significant operational performance, driven by environmental and safety priorities. Explore smart grid substation benefits of FOCS such as traditional approaches for current sensing and monitoring, new applications like geomagnetic induced current (GIC) detection, and slip-over applications for metering on cable terminators.

Transmission equipment diagnostics: Best practices in this digital era

3:00 – 4:00 p.m. Room: 350F

Technology advancements not only improve equipment but improve the methods and tools used to perform testing and diagnostics of that equipment. ABB's panel of experts will discuss best practices in maintenance diagnostics using new tools and techniques that leverage digital platforms and new technology. Topics will include remote monitoring and diagnostic tools, the transformer inspection robot, radiography, partial discharge testing, cable testing and life stretch.

Augmented reality for HV service support

3:00 – 4:00 p.m. Room: 350B

During this hands-on demonstration, participants will experience the use of ABB's augmented reality (AR) service support solution. Using an AR visual device, participants will learn how to use the basic functions of the device and perform a simple repair on a training breaker while guided by remote support through the AR device. In addition to using the device, learn about basic considerations for using service, and receive an overview of service support contracts and an overview of training support with augmented reality.

Autonomous resilient grids: Vision for a nested transactive grid

3:00 – 4:00 p.m. Room: 350D

We will provide an overview of grid transformation, followed by a vision for an autonomous power grid as a manifestation of the internet of things (IoT). The vision aspires to a transactive energy grid with intelligence distributed among all components to achieve improved reliability, resiliency and efficiency. It presents the concept of a nested transactive grid to model the distribution as a nested set of virtual microgrids that can each act as a market. The architecture facilitates transactive exchanges and enables the use of DERs for higher resiliency in normal and emergency conditions.

TXpand - Fire risk mitigation in oil-filled power transformers with ABB's rupture resistant tank

3:00 – 4:00 p.m. Room: 350A

Oil-filled transformers can suffer from internal arcs due to electrical failures during operation. Then a fast gas volume increase takes place, and an explosion can occur with severe damage either to equipment itself or surrounding personnel. ABB has fully developed and tested the rupture resistant tank concept, which is a transformer tank designed so that overpressure is not allowed without reaching a tank rupture limit at a certain level of energy arc. In 2017, ABB practiced the first worldwide real test on a full size transformer tank for a major 20 MJ dielectric fault.

Renewable substation designs

4:30 – 5:30 p.m. Room: 350D

Wind and solar continue to be the primary growth in generation, and this trend is expected to only continue to increase. Designing and building cost effective substations to support these generation sites and interconnect to the grid are key to financial success. In this session, you will learn new ways of designing the substation to minimize material cost as well as onsite construction time and money. By designing these features in from the start, a developer can reduce their risk in the project, improve onsite safety and reduce labor costs on site while improving system reliability.

HVDC interconnectors: A cost effective, reliable way to solve grid challenges

4:30 – 5:30 p.m. Room: 350F

High-voltage direct current (HVDC) is a highly efficient alternative for transmitting large amounts of electricity over long distances and for special purpose applications. HVDC technology is easily controlled and can stabilize and interconnect AC power networks that are otherwise incompatible. As a key enabler in the future energy system based on renewables, HVDC is truly shaping the grid of the future.

Modernizing your underground distribution network for improved safety, reliability and resiliency

4:30 – 5:30 p.m. Room: 350E

The need for reliability, safety and resiliency in our power networks is driving grid modernization and forms the basis of every utility's key performance indicators. Outdated, aging equipment increases the risk of failure, while the lack of modern control and automation puts field personnel at risk and exposes customers to wider outages during equipment failure and severe storms. Fortunately, the rapid evolution of power equipment, monitoring and automation technologies is improving the capabilities of equipment and automation in critical areas, such as underground utility vaults.

Cyber security in nuclear power generation

4:30 – 5:30 p.m. Room: 350A

The increasing frequency and magnitude of cybercrimes, along with new types of threats, drive the need for enhanced cyber security programs to protect power generation facilities. Nuclear power plants, like other critical infrastructure, are more vulnerable than ever to cyberattacks. In response, ABB has implemented cyber security measures in its nuclear asset and operations management software that integrate with the broader company to provide multiple layers of defense.

Life cycle support and extension: Bringing new life to old equipment

4:30 – 5:30 p.m. Room: 350B

This presentation will detail our capabilities in supporting customer equipment through the entire life cycle.

Wednesday, March 6, 2019

The new IEC/IEEE standard for generator circuit-breakers: How it changes the game

10:30 a.m. – 11:30 a.m. Room: 350A

The growing worldwide demand for energy combined with the distributed electrical power generation structure has brought a rapid spread of generator applications. The need for power producers to ensure safety and protection, continuous operation and full protection of the generation assets under all fault conditions require a better definition of the performances that a generator circuit-breaker (GCB) must fulfill. The new IEC/IEEE 62271-37-013 Standard is the first global standard to defines this. We will present the main characteristics of the standard to clearly show why it is relevant.

Gas-insulated substations for coastal urban environments

10:30 – 11:30 a.m. Room: 350F

The installation of substations with gas-insulated switchgear (GIS) allows for substation technology to be installed close to urban load centers and in locations with environmentally challenging aspects. Coastal cities with limited space, possible flooding or other natural disasters lurking around the corner are the reason to switch to economic, compact substation designs.

Impact of renewables on substation transformers

10:30 – 11:30 a.m. Room: 350D

As DERs are added to the transmission and distribution grids, there is a need to analyze the impacts on the power system, starting with the substation transformer (ST). This session will analyze impacts of the reverse power on the ST for various operating conditions and compares the finite element (FE) analysis results for various transformer designs under reverse power flow. We will also discuss how switching and fault conditions influence the voltage at the ST terminals leading to transient and steady state over voltages and show how the effect may worsen with DERs.

OMS to ADMS transition: CPS Energy San Antonio's experience

10:30 – 11:30 a.m. Room: 350E

CPS Energy in San Antonio deployed an outage management system (OMS) and SCADA to improve customer service, reliability and outage restoration more than a decade ago. Even though OMS and SCADA are components of the advanced distribution management system (ADMS), the OMS to ADMS transition requires extensive planning and infrastructure investment in communication and field devices, which often prevents utilities from realizing the full benefits of the ADMS. CPS is defying this notion by deploying the ADMS incrementally. This presentation will discuss CPS' gradual expansion from OMS to ADMS.

Arc flash mitigation: Protecting people and equipment

10:30 – 11:30 a.m. Room: 350B

This presentation will review the necessity of arc flash mitigation and the service products to support mitigation.

Success stories: Microgrids in the Caribbean

1:30 – 2:30 p.m. Room: 350F

Caribbean utilities constantly aim to improve their system resiliency. ABB is building out three significant projects in the Caribbean this year, including a record sized hybrid project in Jamaica. We will cover the Grand Bahamas microgrid, Aruba Controls and Jamaica's 24.5 MW microgrid.

Grid overhaul: How DTE is increasing capacity to prepare for the future

1:30 – 2:30 p.m. Room: 350B

Age, environmental impact and operational patterns contribute greatly to the gradual deterioration of substation equipment. DTE Energy has been experiencing this challenge firsthand. Their current network has had many problems arise due to its age and limitations. Aside from reliability issues, this has caused DTE's operations and maintenance costs to become burdensome. DTE realized that their aging grid needs an overhaul to mitigate these problems. The grid overhaul also functions as a proactive measure to combat the growing load requirements in the Metro Detroit area.

Operator effectiveness and the control room in the age of digitalization

1:30 – 2:30 p.m. Room: 350A

Digitalization is transforming nearly every aspect of our lives by improving efficiency, collaboration and by closing the loop between data and action. When implemented properly, utilities can become self-sustaining, predictive, adaptive and able to evolve by learning from the past. The DCS is crucial to this success. With old, obsolete control rooms, operators are significantly distracted, impairing the generator from capitalizing on or even generating actionable data. Changing the control room to an operations-centric model is necessary to achieve the efficiency benefits of digitalization.

The role of DERs in renewable integration and resolving California's solar glut

1:30 – 2:30 p.m. Room: 350D

On March 6, 2018, the California Independent System Operator (CAISO) saw around 50 percent of its generation served by solar resources. Considering the limited amount of solar generation in California 10 years ago, this shows a massive change that is still continuing rapidly. Such a large presence of solar generation is causing market issues such as curtailment of solar generation and extended periods of negative market prices. This session will discuss how DERs, along with grid digitalization technologies, can be used to resolve solar glut issues in California.

Digitally integrated transformers

1:30 – 2:30 p.m. Room: 350E

This session will discuss profile changes in power generation and consumption, and how digitally integrated power transformers will shape the future. The ABB Ability™ Power Transformer provides digital capabilities standard from the factory. It's built on a future-proof platform that delivers health data and actionable intelligence to optimize reliAbility™, availability and productivity while improving capital efficiency. With this innovative technology in mind, we will highlight the importance of understanding the condition of power transformers and how digital insights benefit your operations.

Distributed generation challenges and solutions for electric distribution operations

3:00 – 4:00 p.m. Room: 350D

Today's regulatory renewable energy goals, more economical solar photovoltaics (PV), distributed energy resources (DER) and rising utility rates have resulted in rapid growth of solar PV distributed generation deployments. The higher penetration of PV is creating new electric utility distribution operations challenges. We will review the challenges and solutions to address these issues. We'll also look at a future vision for advanced distribution management systems (ADMS)/DER management systems (DERMS) and potential new utility business models regarding distribution transactive energy markets.

GCB replacement success story: Grand River Energy Center

3:00 – 4:00 p.m Room: 350B

Come walk through a generator circuit-breaker (GCB) replacement case study, from the electrical and mechanical GCB sizing, to the installation, to the final testing and commissioning. You'll leave with a clear idea of how ABB approaches GCB replacements.

Cyber security: Third party secure integration and data exchange

3:00 – 4:00 p.m. Room: 350F

Most of ABB's DCS and SCADA installations need to integrate and exchange data with third party systems. Usually, the focus is on securing the SCADA and DCS communications and applications, but actually there is a major security risk when integrating third party PLCs, DCSs, RTUs and other sources of information, as the control network is believed to be secure by default. The same applies when outputting information (from historians, web services or other communications protocols) without taking into consideration the possible risks to the control system.

One on one conversation: Common questions from customers on BESS

3:00 – 4:00 p.m. Room: 350E

ABB enabled customers to leverage battery energy storage systems (BESS) to support island, remote and grid tied utility applications and customers. We will discuss the current status of the market and how ABB has the longest operating history of any BESS in the world. Our panel will share additional insights into different chemistries and how BESS will be shaping the future of the energy industry, as well as leveraging this technology to integrate with gas peaker plants.

Digital programs to accelerate environmental sustainability and safety programs and compliance

3:00 – 4:00 p.m. Room: 350A

While Industry 4.0 is enabling important gains in efficiency and profitability, it's also supporting significant gains in safety and sustainability. Digital solutions focused on sustainability and safety make work flows and reporting easier for our colleagues, but it also can help provide unparalleled visibility across an organization, helping improve cultural alignment and awareness. From improvements in PPE to industrial energy efficiency optimization, workers have a greater opportunity to individually make a measurable contribution to safety and sustainability.