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Integrated ICE solution for high-capacity pumped storage power plant

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Continued on page 2
ABB's outstanding reference list for pumped storage plants and its ability to provide an integrated ICE solution were key factors in ABB winning the contract from Kraftwerke Linth-Limmern (KLL) for the new high-capacity facility in the Linthal valley, Switzerland.

The pumped storage plant will be installed in an underground cavern and will be used to pump water from a lower reservoir in the valley to an upper reservoir 600 meters above the plant. During peak demand, water will be released from the upper reservoir to generate high-value power.

The plant will make an important contribution toward covering the need for peak power throughout Switzerland. The first of four generator sets is scheduled to go into operation at the end of 2015, with the fourth generator set to be ready by mid-2016.

ABB’s scope of supply is comprehensive and includes the generator connections, main and auxiliary transformers, medium-voltage and low-voltage switchgear, DC supply and emergency power system, field instrumentation and the plant process control system. ABB will also deliver a 380 kV gas insulated substation, which will feed electricity from the plant to the grid.

ABB is already executing a related project for KLL, supplying two turnkey substations and auxiliary power equipment for the nearby Tierfehd hydropower plant.

**Pumped storage power plant**

1. Turbine  
2. Motor/Generator  
3. Pump  
4. Valves

The upper reservoir of the KLL pumped storage plant
Expanding Abu Dhabi’s water transmission system

ABB is providing a turnkey mechanical, electrical and automation solution for a major expansion of the Shuweihat water transmission system in Abu Dhabi to help meet the emirate’s rising demand for drinking water.

The solution will almost double the volume of water supplied by the existing water transmission system from 100 to 180 million gallons (380 to 680 million liters) a day by expanding the capacity of the Shuweihat and Mirfa pumping stations.

The existing water transmission system, which was completed in 2005, transports water from the Shuweihat combined power and desalination plant, via the Shuweihat and Mirfa pumping stations, through two parallel 250-kilometer pipelines to the city of Abu Dhabi.

By expanding the capacity of the two pumping stations, ABB will enable water from a second combined power and desalination plant to use the same parallel pipelines. The expansion is currently under construction and scheduled for completion in 2011.

**EPC responsibility**

In October 2009 ABB was awarded EPC (engineering, procurement and construction) responsibility for the expansion of the two pumping stations.

ABB’s scope of supply includes pumps and related surge vessels and piping, as well as energy-efficient drives and motors, electrical balance of plant, instrumentation and control systems, civil works, and the extension of the telemetry system at the load dispatch center. ABB was extensively involved in phase 1 of the water transmission scheme, providing an integrated instrumentation, control and electrical solution for the same two pumping stations.

The integrated ABB solution will enable the pumping stations to continue to operate at the highest levels of availability and efficiency.

The customer is Abu Dhabi Transmission and Despatch Company (TRANSCO), a subsidiary of the Abu Dhabi Water and Electricity Authority (ADWEA), which is responsible for developing the high-voltage power and bulk water network in Abu Dhabi. The contract is valued at $144 million.
High efficiency modular solar power plant solutions

ABB has won another order for its high-efficiency modular solution for photovoltaic power plants. The $30 million contract from GA Solar is for a turnkey 13.3 megawatt solar power plant in northern Spain. The highly successful ABB concept produces around 15 percent more power than comparative technologies.

The turnkey concept has been developed by ABB for the global photovoltaic market and draws on ABB’s long-established position as a market leader and technology pioneer in solar energy conversion.

Available in standard containerized 1-megawatt modules that are pre-assembled and factory-tested for rapid delivery and speedy on-site installation and commissioning, the concept has proved highly successful in reducing the cost and risk of photovoltaic power plant projects.

The concept includes patented optimization technologies and a unique set of tools based on powerful ABB algorithms that determine the optimal solution for any given site, as well as the expected costs, revenues and return on investment of developing that site. The result is a turnkey concept that produces around 15 percent more power than alternative concepts, and which can be up and running within months of the contract being signed.

A Gestamp Corporation company
The 13.3 MW solution for GA Solar, part of Gestamp Corporation, will supply up to 22.6 gigawatt hours (GWh) of clean electric power a year and avoid the generation of more than 11,500 tons of CO₂ emissions.

“The project demonstrates how ABB technologies help to integrate renewable energy into our power networks, safely and efficiently, adding power capacity with minimal environmental impact’’ said Peter Leupp, head of ABB’s Power Systems division.

ABB’s scope of supply includes all the electrical equipment to connect the power reliably to the grid, including medium- and low-voltage switchgear, transformers and a medium-voltage substation.

It also includes ABB’s patented control and automation technologies that enable the tracker system to follow the sun’s movements across the sky more efficiently and harness more power during conditions of weak light.

ABB is also responsible for the design, engineering, erection, civil works and commissioning of the plant, which is scheduled for completion in 2010.

ABB has recently supplied several power and automation solutions for photovoltaic and thermosolar power plants in North America and the Mediterranean region, including Totana, Andasol and Extresol in Spain, Hassi R’Mel in Algeria, and the Sierra SunTower solar park in California.
The ABB solution will provide the coal-fired supercritical power plant with a state-of-the-art distributed control system that will enable precise control of the main plant parameters and help the plant to operate at the highest levels of efficiency and availability.

NTPC is progressively adopting supercritical and ultra-supercritical technology to raise the cycle efficiency of its power plants. This will be achieved at Barh 2 by adopting a steam pressure of 247 kg/cm², a higher hot reheat temperature of 593°C and a super heater temperature of 565°C. Barh 2 is an extension to the 1,980 MW Barh 1 super thermal power plant, which is also under construction.

NTPC estimates that by adopting supercritical technology with a unit configuration of 6x660 MW or 5x800 MW, coal consumption can be reduced by up to 30 million tons over a period of 25 years compared to a typical 4,000 MW subcritical plant with a unit configuration of 8x500 MW. The resultant reduction in CO₂ emissions is estimated to be about 33 million tons.

Supercritical control solution for India’s largest power company

ABB has won an order from National Thermal Power Corporation Ltd (NTPC), India’s largest power company, to supply an integrated control and instrumentation solution for the 2x660 megawatt Barh 2 supercritical power plant in the state of Bihar, northern India.

The ABB solution will provide the coal-fired supercritical power plant with a state-of-the-art distributed control system that will enable precise control of the main plant parameters and help the plant to operate at the highest levels of efficiency and availability.

NTPC’s Barh supercritical power plant is located in the state of Bihar, northern India. Barh 2 is an extension to the 1,980 MW Barh 1 power plant, which is also under construction.

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Extensive scope of supply

ABB’s scope of supply for Barh 2 is extensive. It includes a distributed control system for the main power plant and auxiliary systems, field instrumentation including process analyzers and emission monitoring systems, a plant information management system, and large video screen systems for the central control room. ABB is also responsible for design, engineering, installation and commissioning.

The ABB solution utilizes advanced function libraries for precision control of the process parameters to achieve the highest levels of plant efficiency and availability. Other benefits include reduced stress on critical components and extended equipment operating life.

Barh is part of an NTPC initiative to enhance power supply at a rapid pace and help meet India’s growing electricity requirements. When completed, the site will have a generating capacity of 3,300 MW and will be one of the largest power plants in NTPC’s fleet of 26 generating facilities.
New ABB concept improves project collaboration

Effective collaboration is the key to efficient control system engineering and design. ABB TeamWork is a new concept that enables ABB and the customer to access and review ongoing projects via a dedicated and secure website.

Known as ABB TeamWork and initiated in North America, the concept enables ABB and its customers to improve the project execution process by utilizing the advanced capabilities of the System 800xA platform to collaborate more effectively during control system engineering and design.

Results to date show that the concept improves communication between project participants and avoids costly errors caused by late, inconsistent or misinterpreted data. Previously these errors did not surface until the factory acceptance test, and were usually caused by the design data of third-party equipment vendors arriving after the configuration engineering had begun.

ABB TeamWork resolves these issues by enabling project participants to access and review their System 800xA solution as it progresses via a dedicated and secure web portal.

**Shortens project schedules**

Typically, project reviews consist of printouts of system logic diagrams and graphics. These are often difficult and time-consuming to digest and review. By directly accessing project hardware and configurations to review macro, graphic and logic information, ABB TeamWork shortens project schedules.

Periodic reviews are performed with tie-back simulation on live graphics and configurations. This insight into what the delivered system’s response will be, leads to a better understanding of the functionality of the system. Additionally, third-party reviews by other stakeholders, like plant operators, can easily be facilitated. As the system is reviewed, issues can be logged and then tracked by project team members through the resolution process to ensure that they are not lost. This greatly reduces the traditional factory acceptance test time.

After a system is shipped, customers or ABB engineers can continue to access a virtual copy of the delivered system. This is extremely useful for operator familiarity training and engineering testing of potential field changes.

**Win-win situation**

Access to the ABB TeamWork network is made via a secure, clientless, SSL-based virtual private network (VPN), that utilizes the best available encryption with two-factor authentication to ensure a high level of security.

Improved dialog, reduced design missteps and less need for costly travel are among the benefits reported by customers. Above all the concept enables ABB to produce a more tightly integrated solution in less time and with less need for changes due to late or inconsistent data. Enhanced collaboration between the ABB project team and the customer results in a win-win situation for both parties and successful completion of the project.

ABB currently has 20 projects using ABBTeamWork for remote access by the project teams. Customers are using it more and more, and some have even conducted the factory acceptance tests by remote.
Controlling the U.K.’s largest combined cycle power plant

ABB is providing a System 800xA for Power Generation distributed control system for RWE npower’s new 2,000 megawatt power plant at Pembroke in Wales, which will be the largest and most efficient combined cycle power plant in the U.K. The order comes on the strength of a similar ABB solution for RWE npower’s new 1,650 MW combined cycle power plant at Staythorpe, which is scheduled to start production later this year.

The new combined cycle power plant at Pembroke will consist of five Alstom KA26 single-shaft units with a combined capacity of 2,000 MW. The plant will be built on a site that previously housed an oil-fired power plant. Construction is expected to take three years.

Both Pembroke and Staythorpe are part of RWE npower’s strategy to replace power plants approaching the end of their life with cleaner, more efficient gas-fired combined cycle units. Modern combined cycle power plants like the ones supplied by Alstom are able to achieve efficiencies of nearly 60 percent, are 30 percent less expensive to build, more compact and less complex than coal-fired steam generating plants.

Once completed, Staythorpe will reduce average annual CO₂ emissions by up to 7.5 million tons compared to an existing coal-fired power station producing the same amount of electricity. Both power plants – Staythorpe and Pembroke – will enable RWE npower to make an important contribution to the U.K. government’s target of reducing CO₂ emissions by 25–30 percent by the year 2020.

Plant-wide System 800xA solution

ABB is providing a fully integrated distributed control system based on System 800xA for Power Generation for all five units at Pembroke. The solution includes workstations for operators, maintenance and engineering personnel; a monitoring station for management; process stations for the five units and the plant’s common system; and interfaces to field devices like the continuous emission monitoring system, gas chromatography system, cleaning system, water treatment plant and other subsystems.

It also includes Power Generation Information Manager (PGIM), with an expansion option for integrated alarm management in accordance with EEMUA 191*. ABB’s EGATROL and TURBOTROL gas and steam turbine process control systems, which together form a completely integrated process control system that provides extended visualization of the plant, complete the package.

Boosting plant competitiveness

System 800xA provides operators and maintenance engineers with previously unheard of access to information – everything from current plant data to technical documentation and manuals.

This quick access to available information, more complete than ever before, brings the quality of the decisions made in power plants to an entirely new level. The result is a more competitive power plant, which is particularly important in the highly deregulated U.K. electricity market.

The information management system is not only used to archive operating data over several years, but also to provide reports and statistics on plant equipment.

*Engineering, Equipment and Materials Users’ Association
Located near the coastal city of Bahía Blanca, the gas and oil-fired plant is owned and operated by Pampa Energía, the largest fully integrated electric utility in Argentina. After 20 years of operation the distributed control systems for both units, which ABB originally supplied in 1989 and 1991 respectively, were in need of modernization. Pampa Energía selected ABB to upgrade the systems and provide them with cutting-edge capability within a very short delivery schedule.

The solutions for both units evolve the existing Network 90 installations to state-of-the-art distributed control systems equipped with a Power Generation Portal human machine interface for the supervisory and operator stations. ABB’s scope of supply includes retrofitting the Bailey France 9020 regulatory control system for the thermal cycle and steam boiler, as well as modernizing the auxiliary control systems with S800 remote I/O (input/output) systems.

The I/O systems handle around 1,900 signals per generating unit, including those for the generator cooling system and seals, turbine and boiler temperature monitoring, compressor control, data logging, chemical monitoring and seawater pump control. ABB is also responsible for engineering, configuration, factory and site acceptance tests, customer training, supervision of the installation, and commissioning.

Fast-track delivery
ABB successfully delivered and commissioned the solution for the first unit within four months of winning the contract. The benefits for Pampa Energía were immediate and include improved availability and reduced operating costs. The solution provides operators, maintenance staff and management with the reliability of a secure platform and with greater flexibility for the monitoring and control of the entire plant. As with all ABB distributed control systems, the solution enables Pampa Energía to easily enhance the system as its needs and requirements evolve. ABB will complete the upgrade of the second generating unit and of the regulatory control systems of both units during a planned maintenance shutdown in 2010.

The Piedra Buena power plant is owned and operated by Pampa Energía, Argentina.
ABB has signed a frame agreement worth $73 million with Kernkraftwerk Leibstadt (KKL) to refurbish and upgrade the non-safety-related operational control and automation system at the 1,220 megawatt Leibstadt nuclear power plant in Switzerland.

Leibstadt is the largest of five nuclear power plants in Switzerland and is owned jointly by six Swiss energy companies.

ABB will replace the existing multiple control systems with a single solution based on its extended automation platform for power plants, System 800xA for Power Generation. ABB will design, engineer, install, commission and test the solution, and is also responsible for upgrading the KKL simulator used for operator training.

To avoid any disruption in electricity supply, the project will be carried out in phases that coincide with planned annual outages, starting in 2011 and running until 2018. Prior to installation, each stage of implementation will be extensively tested on a full-size test bed and on the KKL training simulator. The solution will be executed with high redundancy to enhance reliability and ensure trouble-free and safe operations.

The initial scope of the new control system will include the heating, ventilation and cooling systems, the demineralization plant and the cooling tower make-up water system. It will later be extended to incorporate the water steam cycle, the turbine controls, operational reactor support systems and other elements, under a frame agreement between ABB and KKL.

System 800xA has been successfully deployed in power generation applications across the world, and has numerous applications in many other process industries. Its single platform allows operators to view and control plant systems from a central or remote location. It also incorporates processes that maintain the highest levels of safety and reliability, while at the same time optimizing specific process parameters like energy and/or cost efficiency.
Replacing a control system with live changeover at the world’s largest coal-fired power plant

ABB has replaced a control system – with live changeover and zero loss of production – at the Kendal Power Station in South Africa, the largest coal-fired power plant in the world.

Owned and operated by Eskom, Africa’s largest electric utility, the 6 x 686 megawatt (MW) power plant has a total installed capacity of 4,116 MW.

Built between 1982 and 1993, Kendal has availability levels of well over 90 percent and holds several performance records in Eskom’s fleet of 20 power plants in South Africa. Availability was, therefore, a key issue when Eskom selected ABB to replace the control system for the facility’s water treatment and condensate polishing plants.

All six units had to continue producing at full load while the old control system was replaced with the new ABB System 800xA-based solution. This required ABB to commission the new system before the old one was decommissioned, and it gave ABB a window of only four hours to complete some parts of the changeover.

The existing cabling, instruments and drives had to be reused; if there was any failure while commissioning, Eskom wanted the option to change back to the old control system. The old cubicles also had to be reused, which meant that the new system could only be installed with the water treatment plant in operation.

An additional safety concern for ABB was that the changeover from the old 24V DC battery charger system, which powered the existing distributed control system, also had to be performed live.

Implementing the solution

ABB’s scope of supply was to design, manufacture, install and commission a System 800xA-based distribution control system (DCS) with 18 redundant controllers and a new control room. ABB also provided a new archiving system and an interface to the existing archiving system, as well as training and full documentation.

Special cable looms were designed to make it possible to plug into the old DCS field cabling to make the live changeover possible. Temporary stands were used to allow placement of the new DCS components next to the existing ones during the phased changeover; and the controller cubicle design was modified to make it possible for a one-to-one replacement of the old control system.

Only when all system components were commissioned onto the new system was the old DCS removed and the new ABB DCS moved into the existing cubicles.

ABB completed the project on time and without any production loss or safety incident. Plant areas were changed over in sequence and switched to automatic the same day. This resulted in manpower and financial savings for Eskom because no local operation was necessary during the changeover activities.

With the ABB solution in place, the quality of water production has improved and the use of chemicals decreased.
Modernizing a biomass plant control system

ABB has upgraded an aging UNIX-based distributed control system for a Dong Energy straw and woodchip-fired combined heat and power plant in Denmark. “ABB was the only company who could provide a solution that met our requirements for price, system security and functionality,” says the customer.

Dong Energy is Denmark’s largest power generator, producing 50 percent of the country’s electric power and 40 percent of its district heating. The company operates a fleet of power generation facilities in northern Europe, many of which are combined heat and power (CHP) plants fueled by straw and wood chips.

One of the CHP plants is Masnede on the main Danish island of Zealand. The plant produces 10 megawatts of electricity for the high-voltage grid and 22 megajoules of heat for the local municipality of Vordingborg and its population of 46,000. It consumes 32,000 tons of straw and 10,000 tons of wood chips a year. A rapid startup turbine plant for short-term peak load demand is also located at the site.

Masnede was equipped by ABB in 1996 with a UNIX-based control system, which after 13 years of service was in need of modernization. Dong Energy wanted to switch from UNIX to a PC- and Windows-based solution.

“Before selecting ABB we approached the market for solutions but none of the other major suppliers could meet our requirements for price, system security and functionality,” says Jesper Bolin, operations manager for the plant.

Side-by-side operation

Other Dong requirements included installation and commissioning during a three-week shutdown for scheduled maintenance, the ability to run the old and new systems side-by-side for six months so that operators could learn and adjust to the new technology, and trouble-free conversion of the graphics.

“The changeover from one system to another was smooth and successful,” says Bolin. “This was partly due to our taking an active role throughout the entire process, but also to the almost 100-percent successful conversion of the graphics.”

The solution comprises a System 800xA for Power Generation control system in redundant configuration with two operator panels and remote operation connection to a nearby Dong power plant. It also includes ABB’s Power Generation Information Manager for the long-term storage of events, alarms and trend data.
ABB is performing a turbine control retrofit for all 12 units of Saudi Electricity Company’s (SEC) PP5 power plant in Riyadh. Based on System 800xA for Power Generation, the solution provides SEC with an unrivaled level of operational flexibility.

PP5 is a 12 x 50 megawatt oil-fired power plant that was built in the late 1970s. After 30 years of service and with spare parts becoming increasingly difficult to procure, the existing analog turbine control system was in need of modernization. SEC selected ABB.

Based on ABB’s System 800xA for Power Generation, the solution is a state-of-the-art retrofit package for gas turbines that integrates the turbine control systems of all 12 units into a common multi-location network and provides a single look and feel for turbine operations.

In addition to 800xA the solution includes an integrated ABB information management system (PGIM) for historical process data (analog and digital) and alarm and events storage based on OPC and SQL technology. Located in different rooms spread across the site, all 22 operator working places are linked to the plant network and a high-performance ABB fieldbus that gives them full access to all 12 gas turbines, thereby providing SEC operators with a high degree of operational flexibility.

The solution performs all the core functions – control, sequencing, speed measurement conditioning, vibration monitoring, shaft position monitoring, hydraulic and protection control, etc. – that are essential for the efficient and reliable operation of the gas turbines.

ABB has previously supplied a similar solution for SEC’s PP8 power plant in Riyadh, the successful experience of which contributed significantly to this repeat order.
Dow selects System 800xA

U.S. chemical giant, Dow Chemical Company, has selected ABB’s System 800xA for Power Generation for phase 1 of a new high efficiency cogeneration power plant at the Stade chemical production complex in northern Germany. Dow has named System 800xA the ‘most effective technology’ on the market in distributed control systems.

The new gas and hydrogen-fired boiler plant is part of an integrated energy concept developed by Dow to secure the long-term supply of power and steam for the Stade complex at economical cost and with minimal environmental impact. Stade is a key site in Dow’s global network of production centers, producing some two million tons of chemicals a year at 18 production plants on a 550 hectare site.

ABB is providing a distributed control system for the new power plant based on its System 800xA for Power Generation platform. The solution includes AC 800M controllers, AC 800M high integrity controllers for integrated safety functions, and S800 I/O technology. ABB is also responsible for engineering, supply and commissioning of the control system.

Preferred automation platform

ABB will execute the project under its existing global framework agreement with Dow for control system solutions, service and support. Dow has selected System 800xA as the most effective technology on the market for achieving production excellence in distributed control systems, and uses System 800xA as its preferred process control platform at production sites all over the world.

System 800xA will enable the new power plant to operate at high levels of efficiency and availability, and will provide integrative and operational capabilities that are unique to the System 800xA for Power Generation platform.

Among other things, the solution enables Dow to integrate the power plant electrical system with the process control systems via the IEC 61850 standard for interoperable intelligent electronic devices.

It also integrates the safety and protection systems, providing Dow with the option of combining the control and safety functions within the same controller or keeping them separate within the same system.

AREVA selects UNITROL® 6080

AREVA, the world leader in the design, construction and modernization of nuclear power plants, has selected the latest addition to ABB’s UNITROL family of automatic voltage regulators and excitation systems for retrofit at the Grohnde nuclear power plant in Germany.

The highly successful UNITROL 6000 family is in operation at Grohnde nuclear plant

ABB already has several references for UNITROL retrofits at nuclear power plants in Germany, but this is the first nuclear retrofit for the new UNITROL 6080, which ABB recently developed to replace the long-established UNITROL F. The UNITROL 6080 is part of ABB’s hugely successful UNITROL 6000 family of automatic voltage regulators and excitation systems. Compact and modular in design, UNITROL 6080 offers an extensive range of functionality and meets the highest availability requirements of nuclear power plant applications.

For this particular project ABB provided a highly customized solution, with AREVA responsible for adapting all interfaces to the existing environment. The engineering concept features mechanical segregation of each cabinet to ensure high security and prevent failure propagation, and the system is specially designed to withstand the effects of seismic activity.

ABB is also responsible for interface engineering to the power plant control system, commissioning, simulation/testing, and customer training. Commercial operation is scheduled for April 2010. Grohnde has a total capacity of 1,360 megawatts and was commissioned in 1985. The plant is majority-owned by E.ON, one of Europe’s largest utilities.
The plant is an important element in China’s West-East Electricity Transmission Project, the purpose of which is to transport large volumes of electrical energy from power plants in western China, where there are huge coal and hydro resources, to the manufacturing and population centers of the eastern and coastal provinces.

ABB is providing a fully integrated distributed control and information management solution that will help the supercritical power plant to operate at the highest level of efficiency. The first unit is scheduled to start generating at the end of 2010.

The System 800xA for Power Generation solution will include functions like boiler control and protection, turbine control, electrical system monitoring, unit auxiliary system control, air cooling, desulfurization control, device management and asset optimization.

This will be the first distributed control system in China to integrate on a large scale devices using the three main communication protocols – HART, FOUNDATION Fieldbus and PROFIBUS.

System 800xA will seamlessly integrate the plant devices and enable operators and staff to monitor, operate, manage and maintain each device from a single interface, regardless of communication protocol.

Shandong Luneng Development will also benefit hugely from the open and scalable architecture of System 800xA, which will enable the company to easily integrate new functionality and evolve the system as needs and requirements change.
ABB is showcasing an extensive range of leading-edge technologies and hosting three days of lectures and presentations at this year’s Power-Gen Europe event in the Netherlands.

As usual ABB will have a strong presence at the annual Power-Gen Europe conference and exhibition for the European power industry, and will present a comprehensive range of performance-enhancing technologies in the fields of power generation, renewable energy and grid stability.

Among the many products and solutions on display are examples of how ABB’s flagship automation platform, System 800xA, improves power plant alarm management and protects customers’ previous capital investments when they embark on a DCS upgrade.

In renewable energy ABB is highlighting its innovative turnkey instrumentation, control and electrical solutions for solar energy plants, and will demonstrate how the effects of fluctuating power output from wind farms can be controlled by ABB unit and turbine control technology. Among the many products that ABB will present are variable speed drives that substantially reduce the energy consumption and CO₂ emissions of power plants; power system stabilizers that attenuate power swings; and a new biodegradable dielectric insulating medium with a remarkable range of benefits, BIOTEMP®.

During each of the three days ABB representatives will host lectures and presentations on a broad array of topics of importance to the power generation industry. Subjects include new concepts of plant lifecycle management, optimized automation systems for solar power plants, and automatic voltage regulators and static excitation systems for nuclear applications.

Visit our stand at Power-Gen Europe 2010 (RAI Amsterdam, booth H60).
**Flame scanner**
The ABB Uvisor™ SF810i flame scanner product line has recently been awarded the SIL2 certificate from the TÜV organization of Germany.

Safety Integrity Level (SIL) classification applies to safety related applications of control instrumentation, where unsafe operation could lead to very high economic losses or be hazardous to human life or the environment. ABB works continuously to improve its products and systems to ensure that their safe and reliable operation is at one of the highest levels in the power generation market.