TELEPERM® XS Based Modular Safety I&C

Tailored approach to securely prepare the I&C for long-term plant operation

The Challenge
For long-term operation, nuclear operators need to secure the safe operatability of I&C systems until the end of the plant life. This has to be considered both in exchanging I&C systems and original equipment in new plants. Modernization drivers:
- Limited support from analog I&C suppliers
- Obsolescence
- Safety/reliability/availability issues
- System maintainability and O&M costs
- Safety improvements
- Demand for extended I&C performance.

Especially in case of plant life extension, this typically requires the replacement of I&C systems. The transition to digital technology provides many advantages, provided some challenges can be mastered:
- Regulatory compliance/licensability
- Available technology transition expertise
- Secured long-term support

The Solution
AREVA’s approach to digital safety I&C modernization is based on applying elements of its market-leading TELEPERM® XS digital safety I&C platform. Modular structures and standardized interfaces ensure the link-up to remaining equipment. Licensability has been proven in various countries to different codes/standards.

I&C systems are often upgraded in a modular and phased approach. TELEPERM® XS fits to anything from a stand-alone small system up to a comprehensive modernization approach. After the first system installation, the infrastructure can be used and extended for additional systems to be modernized. Each system upgrade follows a phased approach, typically starting with a study and concept phase. AREVA applies its broad expertise in I&C and nuclear engineering.

Key Features
- AREVA’s I&C competence and experience
  - Interface and integration management
  - Licensing support
  - Requirements specification and design
  - Manufacture and testing
  - Installation and commissioning
- AREVA’s nuclear engineering expertise
- Easy implementation of process optimizations and overall performance improvements
- Allows modular and scalable I&C modernization from single cabinet to multi-cabinet solutions
- TELEPERM® XS is designed for all kind of safety applications and can be a preferred solution for non-safety applications
- Customized application solutions
  - Hardware architecture
  - Software functionality
  - Redundancy
- Ready to fulfill plant-specific requirements
  - Functionality
  - Response time
  - Failure assumptions
  - Space availability
  - Power supply
Your benefits at a glance

- Use of market-leading TELEPERM® XS digital safety I&C platform (reliable, validated, versatile, compatible, economical)
- Use of AREVA’s broad I&C and nuclear expertise
- Worldwide proven licensability
- Modular and scalable approach fits plant needs
- Comprehensive training modules
- Comprehensive after-sales support options
- Secured investment to future oriented technology for the long-term and to secure plant life
- Reliable and proven successful safety I&C modernization

Examples of different sizes:

Small applications:
- Sizewell B (UK): I&C for continuous boron measurement (COMBO) for fuel storage pools (2 cabinets)
- Atucha 2 (Argentina): Reactor Control System (4 cabinets)

Medium sized, combined applications:
- Qinshan 1 (China): RPS, Neutron Flux Excore Measurement (21 cabinets; ~1300 signals)
- Oconee 1-3 (USA): RPS+ESFAS; emergency power turbine safety governor control system (18 cabinets per unit)

Comprehensive I&C modernizations:
- Ringhals 1 (Sweden): Comprehensive I&C modernization of various I&C systems in a modular approach; diverse RPS, neutron flux power range monitoring, residual heat removal system, safety ventilation system (35 cabinets; ~5400 signals)
- Beznau 1-2 (Switzerland): Emergency Feedwater Control System, Reactor Control, Reactor Protection System

TELEPERM® XS References

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Status: 06/2013
* VVER and Chinese designs merged

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