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RPS Demonstration Unit based on RadICS Platform presents a synergy of reliability, safety, and maintenance cost efficiency.

> **The RPS based on RadICS Platform can be used as the basis for obtaining a unique solution that considers individual needs of the Customer**

Radics LLC has developed a Reactor Protection System (RPS), which can serve as a solid basis for building a safety-critical process control system for any type of large reactor plants (PWR, BWR, Candu) and for any advanced Small Modular Reactor (BWRX-300, TerraPower, X-energy, KP-FHR, Moltex, NuScale etc.).

The RPS is developed using the RadICS Platform, which is IEC 61508 certified and approved by the U.S. NRC. Therefore, we can confidently declare a high level of the system's functional safety. In fact, **any I&C system built on the RadICS Platform can be easily certified to both IEC standards and the U.S. NRC requirements.**

The RPS contain algorithms of the Reactor Trip System (RTS) and the Engineered Safety Features and Auxiliary System (ESFAS) that operate simultaneously. The architecture is implemented according to the 2oo4 scheme, where 4 independent channels collect information from field sensors, and 2 trains implement the majority logic and form actuator control signals. Such architecture guarantees stability of the system against a single failure. At the same time, robustness to common cause failure is provided by the internal diversity of the RPS, which is based on internal diversity of the RadICS Platform.

The digital RPS takes operation to the next level. It becomes intuitive, simple, and transparent. This is achieved using powerful tools for collecting and displaying technological information. **The operator from anywhere in the system can see in real time the value of any received signal, any diagnostic information, the status of any key, the configuration parameters of any channel, and much more.**

The level of diagnostic coverage of the RPS is more than 90%, as well as the possibility of automated testing of the main functions, which r**educes the time, resources, and the number of maintenance personnel for conducting periodic testing procedures and performing troubleshooting.** In other words, it will provide a fast return on investment and a low cost of long-term operation.

The ease of adjustment and installation of such system is determined by a widespread use of optical communication cables and a short time to adapt the system to the needs of operational personnel. **This means that the likelihood that all work is completed within the time window allocated for repairs is greatly increased.**

The use of FPGA technology ensures a deterministic sustem response time regardless of its architectural configuration – it is determined by the response speed of the RadICS Platform, which is 10 milliseconds (ms).

FPGA technology inherently has a set of necessary properties to achieve a high level of cybersecurity. **This is ensured by the fact that a unique low-level code is used with the FPGA and that no operating system is used.**

Also, there is physically no possibility of unauthorized access to safety algorithms and their modification. As for communication with external systems, one-way interfaces are used.

It is extremely difficult to perform a comparative analysis of the RPS with similar systems from other I&C vendors, because nowadays there are no actually produced alternatives available for analysis. However, the undoubted advantage is the fact that this RPS' architecture can have customized configuration according to the Customer's preferences and requirements, while maintaining all of the aforementioned benefits.