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P4.181 Computer based architecture to control Water Detritiation Process

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Water Detritiation Systems (WDS) are used for CANDU (to remove tritium from heavy water) and also ITER. A water detritiation facility was developed at ICSI Rm. Valcea based on Liquid Phase Catalytic Exchange (LPCE) combined with Cryogenic Distillation (CD). Initial application was for developing Cernavoda Tritium Removal Facility, but later these combined technologies were considered for fusion application (ITER WDS & ISS).

This paper presents control architecture of LPCE process from "Pilot Plant for Tritium and Deuterium Separation" (PESTD) ICSI Rm. Valcea, including hardware considerations and software implementation. To control the process it was used a concept based on DCS and SCADA application software that controls process and a complex architecture of servers, clients and operator workstations. The architecture of control system combined with hardware configuration and software applications avoid process control interruption and keep it within safety limits.

Dedicated faceplates to control equipment were developed to permit fine adjustments during transients and flexibility in change parameters of process. For safety purpose, in order to avoid human errors, specific authorization functions for operators were created together with interlocks to limit operator intervention.

This new system is constructed to respond to updated requirements for PESTD related to process configuration, safety (hydrogen safety in principal) and control of the process considering Romanian regulatory standards. The result of the work is complex as LPCE process is complex and can be used to any similar application. The expertise is used to complete all systems in PESTD using similar computer based technology. The approach used in PESTD can be considered for other similar facilities, the most significant change will be safety related as each facility has own safety requirements.

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