

# Human Factors Engineering

Control Room Design, Modernization and Upgrades



A modern control room can improve overall safety metrics, maximize operator performance, and reduce operation and maintenance costs.

As utilities modernize their infrastructure and upgrade to digital control systems, they have the opportunity to improve operator performance by reducing human error with the latest in advanced display technologies. Solid application of human factors processes and principles can mitigate operator workarounds and burdens. Ensuring optimal design of digital displays, state-of-the-art main control room layout and efficient operating procedures can maximize human performance in the control room.

## Unparalleled Experience

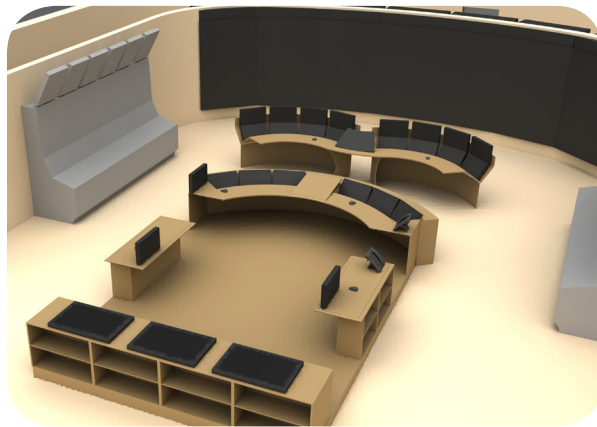
AREVA's main control room and Human Factors Engineering (HFE) design team is a multidisciplinary team with industry expertise in human factors, main control room design and research, licensing, human-system interface development, task analysis, functional requirements analysis, function allocation, and HFE verification and validation (V&V, formerly detailed control room design review).

## Proven Success

AREVA has attained a complete Safety Evaluation Report from the NRC for the HFE program of the U.S. EPR™ design certification, confirming that this program meets the latest U.S. regulatory requirements.

## International Expertise

AREVA's HFE team is a global leader in state-of-the-art human-system interface and control room design. With AREVA, customers receive the benefits of a well-established and NRC-accepted HFE program with proven success and experience. Due to AREVA's global presence, operating experience, benchmarking, and lessons learned can be drawn upon from around the world.



*3D model of a hybrid control room layout concept*

## Advanced Digital Technology

AREVA has its own award-winning 1E Safety-Related Digital TELEPERM™ Safety platform and also has extensive experience with designing and installing other Non-Safety-Related Digital Control System platforms. The HFE/control room design team works with sub-suppliers and AREVA's own technology to find the design solution that best meets customer needs.

In this high-consequence industry, employees are often the last lines of defense against an unwanted outcome. Why would we not spend time and resources to ensure that this critical element in the system, the human, is operating at peak performance? Let AREVA's HFE team help you reach the next level in system safety and reliability and reduce human error.

## Human Performance Improvement

AREVA's HFE team uses human performance and process improvement tools and training to help reduce human errors and to bolster safety within the control room and operations outside the control room on such activities such as maintenance work and outages.

## Benefits:

**Expertise.** AREVA's HFE team is multidisciplinary with industry expertise in human factors, main control room design and research, licensing, human-system interface development, task analysis, functional requirements analysis, function allocation, and HFE verification and validation.

**Proven Success.** AREVA has attained a complete safety evaluation report from the NRC for the HFE program of the U.S. EPR™ design certification, confirming that our HFE program meets the latest U.S. regulatory requirements.

**Custom Solution.** The HFE/control room design team works with sub-suppliers and AREVA's own technology to find the design solution that best meets customer needs. Our services include:

- Design of digital annunciators and Safety Parameter Display Systems
- Plant computer upgrades
- Design of displays and controls for control room mods
- Procedure modification and development
- Design for maintenance (interfaces, safety and procedures)
- Address INPO scores due to operator workarounds and burdens
- Design of local control stations
- Human factors program development



*Human factors research lab for advanced main control room development, located at the Center for Advanced Engineering Research*

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## To err is human... 80% of all accidents are due to human error.

Seemingly simple mistakes like forgetting a step in a procedure or misreading a status update have led to detrimental outcomes. The fact is, even our best performers make mistakes and these mistakes are only worsened with poorly designed human interfaces.

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