Human Factors Research and Applications

Purpose

Research to help ensure that the human-system interface in nuclear plants and other industrial facilities contributes to the overall safety of operations.

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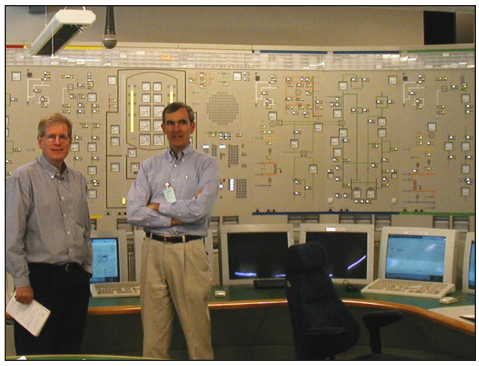
Digital recorder upgrades

The human factors research performed at Brookhaven National Laboratory (BNL) contributes to understanding and enhancing the effectiveness of human performance in high-risk, high-reliability systems and organizations. The research is conducted by an interdisciplinary team with expertise in behavioral science, operations, instrumentation and control, system engineering and risk assessment. Applications of the work include both design and evaluations.



BNL staff reviewing the design of a control room

Control Room Modernization

BNL is working with industry to develop human factors guidance for digital instrumentation and control systems as well as hybrid control rooms for plant upgrades currently under way in the United States.

Advanced Reactors

BNL is investigating the role of human performance in advanced reactors to identify issues associated with their operation and maintenance. New research will be identified along with the corresponding research facilities required. In addition, regulatory review guidance will be identified that will be needed to address these new and energizing issues.

Advanced Control Room Design Review Guidelines

Control rooms being developed with digital instrumentation and controls differ substantially from conventional ones. BNL is conducting research to provide design review guidance for these computer-based control rooms. The guidance consists of design review procedures, guidelines for aspects of human systems-influenced design, such as alarms, displays, and 'soft' controls, user-system interaction, computer-based procedures, communications, workstations, and local control stations. In addition, a software application was developed to support the design review process and use of the guidelines.

International Human Factors Programs

BNL is supporting the human factors needs of the international nuclear community through programs involving a variety of clients, including:

- International organizations (such as the IAEA)
- Research organizations (such as the Halden Reactor Project in Norway)
- Government agencies (such as SKI in Sweden)
- Private companies (such as Mitsubishi in Japan and Soluziona Ingeniería in Spain)

These programs span a wide variety of activities, including conducting research studies, performing safety analyses, performing design reviews, designing control room modifications, and assisting in the development of regulatory design review guidance. In addition, BNL has provided training to nuclear industry professionals from many different countries. These courses have included general human factors, control room design and evaluation, and safety analysis.

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