

DOIX 52.001

12/21/92

NOTE TO: J. Fox  
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GE Nuclear

FROM: Chet Poslusny

SUBJECT PROPOSED SCOPE OF OPERATING EXPERIENCE REVIEW FOR ABWR HUMAN FACTORS  
ENGINEERING DESIGN FOR ABWR

Enclosed for your use is a proposed scope of an operating experience review which is related to the resolution of the open item include in the DFSER. This is provided as a followup to the phonecall held with the staff last month. We expect that a call will be required to discuss what actions GE plans to take to close out this item. As per GE's Issue Resolution Schedule, this item should be completely resolved by the end of January.

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see attached distribution

## OPERATING EXPERIENCE REVIEW

### Background:

The accident at Three Mile Island (TMI) in 1979 and other reactor incidents illustrated that significant problems have existed in the design philosophy of Human System Interfaces (HSIs). There have been many studies as a result of the TMI accident and other incidents. Utilities have implemented both NRC mandated changes and additional improvements on their own initiative. However, the changes were formed based on the constraints associated with backfits to existing Control Rooms (CRs) using early 1980s technology which limited the scope of corrective actions that might have been considered, i.e., more effective fixes could be used in the case of designing a new CR with the modern technology typical of advanced CRs. Problems and issues encountered in similar systems of previous designs shall be identified and analyzed so that they are avoided in the development of the current system or, in the case of positive features, to ensure their retention.

### Content of an Operating Experience Review:

Issues shall be identified for review and analysis. Issues shall be tracked via the Human Factors Engineering Tracking System. Human performance issues, problems and sources of human error shall be defined. Design elements which support and enhance human performance shall be identified.

### Example Issues:

Display Factors	Alarm Factors
Control Factors	Organization of Alarms
Information Processing Factors	Alarm Prioritization
Communication Factors	Loss of Alarm Systems
Training Factors	Nuisance Alarms
Procedures	Number of Alarms
Staffing Factors	Inoperable Instrumentation
Content of Alarms	Key Lock Switches
Recorders	Safety Function Monitors
Functional Grouping	Lighting
Noise	Equipment Layout
Coding Conventions	Demarkation
Labeling	Anthropometry
Equipment Layout	
Use of Normal Displays during Accident	

The operating experience review shall include both a review of literature pertaining to the human factors issues and operator interviews on the relevant issues identified.

The following sources both industry-wide and plant- or subsystem-relevant should be included in review of the identified issues.

#### Government and Industry Studies

- INPO's Significant Operating Event Reports related to human performance
- Industry Studies performed by NRC (e.g., Wrong Unit Wrong Train, Local Control Station Design Configurations, Remote Shutdown Stations and other NRC NUREG'S)
- EPRI (Nuclear Power Reports) related to human performance
- NRC Generic Letters, Information Notices and Bulletins related to human performance
- OECD Halden Reactor Project reports
- AEOD Study on the Analysis of Human Factors of Operating Events

#### Licensee Event Reports

- All LERs for 1990, 1991, and 1992 for general human performance issues and LERs for the same years at a selection of BWRs for BWR specific issues\*
- Incident Investigation Team (IIT) Reports
- Augmented Inspection Team (AIT) Reports involving human performance

#### Outage Analysis Reports

- Outage Analysis Reports for a Selection of BWRs\* for the past three years

#### DCRDR Reports

- Human Engineering Discrepancies identified in DCRDRs for a selection of BWRs\*

#### Applicant Specific Studies and Reports Related to the Example Issues (This could include GE or other vendor reports)

\* Following is a proposed list of a selection of BWRs:

Clinton	Dresden 2,3
Hatch 1,2	Grand Gulf
Hope Creek	Limerick 1,2
Nine Mile Point 2	Perry 1,2
Pilgrim	River Bend
Susquehanna 1,2	WNP 2