

C. Level of Difficulty Discussion and Exercise (SLIDE)

1. Background

- a. At the Commission's direction, the staff hired a contractor (ICF) to study interregional consistency and possibility of recentralizing operator licensing.
- b. Report (SECY-93-309) made several recommendations including improved guidance on level of difficulty.
- c. HOLB convened a panel of examiners to review the scope, depth, and complexity (difficulty) of a sample of scenarios and to recommend improvements.

2. Methodology (SLIDE)

- a. Seven examiners reviewed 59 scenarios used during 23 initial operating tests across the 5 regions. Each scenario set was reviewed by a panel of 3 or 4 examiners and rated for level of knowledge using Bloom's Taxonomy and level of difficulty using a 5-point scale. (more detail later)
- b. The panel also evaluated the quantitative attributes of each scenario and the effects of crew augmentation on performance.

3. Conclusions and Recommendations

- a. Scenarios that require the applicants to analyze and solve problems and execute a large number of actions are generally more difficult because they require the operators to integrate a number of systematic conditions, analyze interrelationships, and take actions in response to their effects.
- b. Scenarios that consist of a series of unrelated malfunctions that require little or no operator response are generally easier because they test the applicants only at the fundamental/memory and comprehension levels; i.e. the applicants simply have to demonstrate that they know where to find the applicable procedure without testing an in-depth understanding or analysis of the information.
- c. While variations in scenario level of difficulty were evident, these variations were not considered significant. Most (~83%) of the scenarios were found to be of appropriate difficulty with ratings between 2.0 - 4.0. Scenarios within that range are acceptable for inclusion in the examination.

Scenarios at the extreme scores (1.0 - 1.99 and 4.01 - 5.0) are non-discriminatory because they are either too easy or too difficult and therefore should not be included in the examination.

- d. The number of scenario quantitative attributes, such as malfunctions or critical tasks, is not always indicative of scenario difficulty. In general, as the number of the quantitative attributes increased, the difficulty rating also increased; however, the increases do not appear significant and there are no obvious threshold numbers that could be used to identify inappropriate scenarios (non-discriminatory scenarios that are either too easy or too difficult). The panel did not recommend modifying the

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requalification examination quantitative scenario attributes for initial examination scenarios. (SLIDE)

However, in an attempt to put bounds on the level of difficulty in Rev 8 of the ES, we have adopted target bands for seven of the quantitative criteria discussed in Appendix D and reviewed by the panel. The Commission had considered directing the staff to develop a system of metrics to ensure that the facility-developed exams do not become easier over time.

- e. Table-top, level of difficulty exercises should be incorporated in the examination techniques courses.

4. Exercise

- a. Each examiner will individually review the selected scenarios and evaluate the following items:

Level of Knowledge - Using Bloom's Taxonomy, classify the scenario as functioning at one of three levels (refer to page 3-5 of the Examiners' Handbook):

- Fundamental Knowledge (simple memory)
- Comprehension
- Application/Analysis/Problem Solving

Level of Difficulty - Rate each scenario using a five-point scale (1 = low; 5 = high) and prepare a one or two sentence explanation of the basis for the rating.

- b. After arriving at an individual rating, discuss the scenario among yourselves and determine group ratings for level of difficulty and knowledge. We will then discuss the scenarios and the panel ratings.

## LEVEL OF DIFFICULTY

### 1. Background

- Commission direction
- Recentralization study
- Panel evaluation

### 2. Methodology

- Panel of experts
- Evaluate knowledge level
- Evaluate level of difficulty
- Count quantitative attributes

### 3. Conclusions

- $LOD \propto$  amount of action / analysis / problem solving
- Variation generally not significant
- Not always  $\propto$  to attributes

### 4. Rev. 8 and LOD

**FACILITY: SURRY / VENDOR: WESTINGHOUSE**

SCENARIO #1 TITLE: 1-1 Steam Line Break/ATWS

SCENARIO #2 TITLE: 1-2 SGTR/Faulted SG

QUANTITATIVE ATTRIBUTES	SCN 1	SCN 2	AVG
TOTAL MALFUNCTIONS	8	5	6.5
MALFUNCTIONS AFTER EOP ENTRY	2	3	2.5
ABNORMAL EVENTS	3	4	3.5
MAJOR TRANSIENTS	2	1	1.5
EOPs ENTERED/EOPs REQUIRING SUBSTANTIVE ACTIONS	1/1	1/1	1
EOP CONTINGENCIES/ CONTINGENCIES REQUIRING SUBSTANTIVE ACTIONS	2/1	0/0	0.5
CREW CRITICAL TASKS	2	1	1.5
LEVEL OF KNOWLEDGE	C	C	-

NOTE: C - COMPREHENSION

**LEVEL OF DIFFICULTY (PANEL AND REGION RATINGS)**

SCENARIO #	EVAL 1	EVAL 2	EVAL 3	EVAL 4	AVG	REG
1	3	3	3	3	3	3
2	2	3	2	3	2.5	3

**EXPLANATION OF LEVEL OF DIFFICULTY**

SCENARIO 1: Straightforward scenario. Basic knowledge of EOPs.  
Each malfunction is isolated event. Many mechanistic failures.

SCENARIO 2: Straightforward scenario. Each malfunction is an isolated event.

## AVERAGE SCENARIO SET QUANTITATIVE ATTRIBUTES

FACILITY	A	B	C	D	E	F	G	H
Peachbottom	5.5	1.5	0.5	1.5	1	1	2	2.5
Pilgrim	4.3	0.3	2	1	2	0.7	0.7	2
NMP1	6	2	1.5	1.5	2.5	1.5	2.5	4
Grand Gulf	6	1	1	2	2	1	2	3.5
Hatch	6.3	1	1.7	1	1.7	1	1.3	2.7
Lasalle	5.7	0.3	2	1.7	2	1	2.3	3
Dresden	5	0.5	3.5	1.5	2.5	1	1.5	3
Riverbend	5.5	0.5	1	1	1.5	0	1	2.4
WNP2	5	0	2.5	2	1.5	1.5	1	2.5
Maine Yankee	4.5	1.3	2	1.3	1.5	0.3	1	1.3
Beaver Valley	6.5	2	5	1	1.5	0.5	1.5	2.1
Indian Point	6	0.5	4.5	1.5	1	1.5	2	2.3
Zion	7.7	1.3	6.3	1.3	1.7	1.3	2.7	3.2
Braidwood	7.5	2	4.5	1.5	1	0.5	2.5	3.4
DC Cook	7.3	2.3	3.3	1.7	1	1.7	2	2.9
Crystal River	4.7	1.7	2.3	1.3	1	0	2	2.3
Harris	7.3	2.3	3.3	1.7	1.3	1	4.7	2.6
Surry	6.5	2.5	3.5	1.5	1	0.5	1.5	2.8
Watts Bar	5.7	1	3.7	1.7	1.3	1.3	2.7	2.6
Fort Calhoun	6.7	1.3	3.7	1.3	1	0	2	2.1
South Texas	5	1	2.3	1.3	1	0	2.7	1.8
Palo Verde	8	1	6	2	1.5	1	1.5	2.7
SONGS	6	1	3.5	2	1	1	2	2.1

- A TOTAL MALFUNCTIONS
- B MALFUNCTIONS AFTER EOP ENTRY
- C ABNORMAL EVENTS
- D MAJOR TRANSIENTS
- E EOPs ENTERED/EOPs REQUIRING SUBSTANTIVE ACTIONS
- F EOP CONTINGENCIES/CONTINGENCIES REQUIRING SUBSTANTIVE ACTIONS
- G CREW CRITICAL TASKS
- H AVERAGE LEVEL OF DIFFICULTY