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TABLES OF CROSS REFERENCES AMONG
SECY 82-111, NUREG 0700, NUREG 0835, NUREG 0801

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March 10, 1982

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TABLES OF CROSS REFERENCES AMONG

- o SECY 82-111
- o NUREG 0700
- o NUREG 0835
- o NUREG 0801

September 30, 1982

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INTRODUCTION

This memorandum cross references topical statements extracted from four NRC documents that are useful for guidance in reviewing the Human Factors Engineering designs of main control rooms and control centers outside the main control rooms.

- o SECY 82-111 (March 10, 1982)
- o NUREG 0835 (Final Draft July 19, 1982)
- o NUREG 0700 (August 1981)
- o NUREG 0801 (Revision Draft #2, May 3, 1982)

The cross references will aid the staff during preparation of revisions to Chapter 18 of the Standard Review Plan. The texts of the cross referenced topics use the terminology of the reference documents as closely as possible. This practice avoids subjectively interpreting the meanings of similar but not identical words and phrases and results in fewer cross references than may exist. In a few topics, a word from another document was placed in parentheses when it was thought to mean the same as the word adjacent to it.

The numbers at the heads of the columns in each table identify the reference documents. The numbers in the first column of each table are the paragraph numbers from which the topic statements were extracted. Numbers in the other columns of the tables are the paragraph numbers in those references which contain the same or similar statements.

Changes to the documents listed above may require changes to the cross references.

Please send corrections and suggestions to Val Pezoldt, Human Factors Engineering Branch, FTS 492-7897.

RELATIONSHIPS AMONG DOCUMENTS

SECY 82-111 outlines recommendations for fundamental requirements for emergency response capabilities to be met by applicants/licensees. SECY 82-111 also states that NUREG 0700, NUREG 0835 and NUREG 0801 are to be used as guidance regarding acceptable means for meeting these fundamental requirements. Only the following sections of SECY 82-111 are considered in this memorandum.

3. Coordination and Integration of Initiatives
4. Safety Parameter Display System (SPDS)
5. Detailed Control Room Design Review (DCKDR)

NUREG 0700 contains guidance by which the Human Factors designs of main control rooms and control centers outside the main control room can be reviewed.

NUREG 0835 contains guidance and information concerning the Safety Parameter Display System (SPDS).

NUREG 0801 describes the criteria which the staff will use to evaluate applicant/Licensee DCRDR program plans and summary reports.

TABLES

- o Table 1 is a listing of additional documents which are mentioned in the above documents.
- o Table 2 - Cross references to SECY 82-111
- o Table 3 - Cross references to NUREG 0700
- o Table 4 - Cross references to NUREG 0835
- o Table 5 - NUREG 0801 Topic Items

Note: In the tables, some numbered topics were omitted and others were placed out of their original sequence in order to clarify topical relationships.

Table 1

DOCUMENTS REFERENCED IN SECY 82-111,
NUREGS 0700, 0801, 0835

DOCUMENTS	SECY	NUREG		
	82-111	0700	0801	0835
SECY 82-111				X
NUREG 0578		X		
NUREG 0585	X	X		
NUREG 0654			X	
NUREG 0659		X		
NUREG 0660	X	X	X	
NUREG 0694		X		
NUREG 0696	X	X	X	X
NUREG 0700	X		X	X
NUREG 0737	X	X	X	
NUREG 0799		X		
NUREG 0801	X	X		X
NUREG 0814			X	
NUREG 0835	X		X	
NUREG 0899			X	
NUREG/CR-1250		X		
NUREG CR-1580		X		
RG 1.23			X	
RG 1.33			X	
RG 1.47			X	
RG 1.70		X		
RG 1.97	X	X	X	
10CFR50 App. A	X	X		
10CFR50 App. B			X	
IEEE 420	X			
IEEE 566	X			
IEEE 567 (Draft)		X		
IEEE P-827		X		
NSAC 39			X	
EPRI NP 1118SY		X		
MILH 468558		X		

Table 2 - CROSS REFERENCES TO SECY 82-111

ITEM	TOPIC	DOCUMENT AND SECTION			
		82.111	0801	0835	0700
<u>4. SAFETY PARAMETER DISPLAY SYSTEM (SPDS)</u>					
18.	Coordination of SPDS with other CR improvements	3.1, 3.3, 3.4	I-2		
19.	SPDS and other CR improvements related to operator training	3.4.c.		2.0	
20.	SPDS relationship to other emergency response activities	3.8, 3.8.a, 3.8.b, 3.8.c	Exh I-1	2.0	
21	SPDS objective	4		1.0, 2.0	
22.	Each operating reactor shall be provided with an SPDS	4.1			
23.	SPDS will supplement instrumentation required by GDC 13, 19, of 10CFR50, Appendix A	4.2		5.0, 6.0 6.1	
24.	SPDS need not be class 1E	4.2			
25.	SPDS need not meet single failure requirements	4.2			
26.	SPDS isolation from safety systems	4.2			
27.	SPDS need not be seismically qualified	4.2			
28.	SPDS information provided is plant-specific	4.3		3.0, 5.0 6.0	
29.	SPDS shall incorporate accepted HF principles	4.4		3.0, 6.0	

Table 2 - CROSS REFERENCES TO SECY 82-111, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		82.111	0801	0835	0700
30.	Minimum information which is to be provided by SPDS	4.5		3.0, 5.0 6.0	
32.	SPDS implementation plan shall be reviewed by NRC	4.6, 4.7			
33.	SPDS implementation should not be impacted by CRDR or development of emergency operating procedures	pg 8, 12 integration			
34.	SPDS design should be an input to an integrated schedule of other initiatives	pg 8, integration			
37.	Prompt implementation of SPDS is important	pg. 8, 12, integration			
31.	Licensee shall prepare a written safety analysis	4.6			
35.	Description of NRC review and safety evaluation report (SER)	pg. 11.6			
36.	Operating licensee (OL) review approach description	pg. 12.7			
<u>5. DETAILED CONTROL ROOM DESIGN REVIEW (DCRDR)</u>					
1.	DCRDR	5.			1.1
2.	Objective of DCRDR	5.	1-1		1.2
3a.	CR modification should be reviewed by persons competent in HFE and risk analysis	5.	1, 1.1, 1.1.1, 1.1.2		
4.	Recommended Detailed Control Room Design Review (DCRDR) requirements	5.1			1.4
5.	Qualified review team	5.1.a.	1, 1.1 1.1.1, 1.1.2		2.3
6.	Use of function and task analysis	5.1.b.	1-2		1.4.2

Table 2 - CROSS REFERENCES TO SECY 82-111, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		82-111	0801	0835	0700
7.	Use of function and task analysis to verify SPDS parameters	5.1.b.	1-2		1.4.2
8.	Compare display and control requirements with CR inventory	5.1.c.	1.2,3		1.4.2
9.	CR survey to identify deviations from accepted HF principles	5.1.d.	1, 1.3, 3.2		1.4.2
10.	Assessment to determine which HEDs are to be corrected	5.2	1, 1.3 3.2		1.4.3
11.	Verify that design improvements will provide necessary corrections	5.3	3.3		
12.	Licensees must submit a program plan describing accomplishment of DCRDR, assessment of HEDs and verification of improvement	pg. 11.1	1.3, 1, 1.1.1 1.2, 1.3		1.4.1, 2., 3., 4.
<u>OTHER GUIDANCE</u>					
13.	Selected licensees will be "in-progress" audited	pg. 11.2	2, 2.1, 2.2		
14.	Licensees shall submit a summary (DCRDR) report	pg. 11.3	3, 3.1 3.2, 3.3, 3.4		5.
15.	NRC will inform licensee if a pre-implementation audit will be performed	pg. 11.4	4, 4.1		
16.	What NRC will perform when conducting an audit	pg. 11.5	2.1, 2.3		
17.	Reference list of existing documentation for SPDS and DCRDR	pp 3, 8, 9, 12			

Table 3 - CROSS REFERENCES TO NUREG 0700

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>1. INTRODUCTION</u>					
1.	Purpose and Scope of Control Room Design Review (CRDR)	1.1			5., 4.
2.	0700 Guidelines are for new or existing CR designs	1.1		3.0, 1.0	5.1
3.	New designs need more comprehensive analysis	1.1, App. B, Exh. B-1		3.0 6.0	5.1
4.	Generic approach encouraged	1.1			
5.	Five objectives of CRDR	1.2	I-3, Exh. I-2		5.
6.	Relationship to other Human Factors Programs	1.3	Exh. I-1	3.0	3.1, 3.3, 3.4
<u>The Control Room Design Review Process</u>					
7.	Four phases of CRDR Process Planning	1.4, Exh. I-1	I-2		
<u>Planning</u>					
8.	Formal planning phase recommended	1.4.1			pg. 11.1
9.	Planning should meet objectives of guidelines	1.4.1			pg. 11.1 5.1
10.	Review results should be useable	1.4.1			
11.	Plans should assure that HFE is applied to CRDR	1.4.1			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
192.	Plans should include design of data base	1.4.1	1, 1.5 App. B		
13.	Management should be involved	1.4.1			
14.	Objectives & tasks should be fully understood	1.4.1			
15.	Work plan and schedule should be defined	1.4.1			pg. 11.1
16.	Take operational constraints into account	1.4.1			
17.	Resources needed should be available	1.4.1	1.1.1, 1.1.3		
18.	A formal preliminary planning report should be prepared	1.4.1, 1.4.4.1	I-1, I-3-1, 1., 1.4		pg. 11.1
		1.1.1			
<u>Review</u>					
20.	The review phase is to identify and document HEDs or absence of needed features.	1.4.2, 1.4.3	1, 1.2, 3.2.2		5.1.d
21.	A system point of view is recommended. The six review processes are:	1.4.2 1.4.2	1.2		
22.	(1) o Review operating experience o plant performance records o survey of CR operators	1.4.2 1.4.2 1.4.2			
23.	(2) Review and analysis of system functions and CR operator tasks	1.4.2			5.1.b 5.1.c
24.	(2) Establish instrumentation and equipment requirements and performance criteria	1.4.2			4.2
25.	(3) Inventory of instruments and equipment includes description of performance features	1.4.2			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
26.	(4) Survey CR and check instrumentation controls and equipment against HE guidelines	1.4.2			5.1.c
27.	(5) Verify task performance capabilities of CR inventory against requirements derived from task and function analysis	1.4.2		7.0	5.3
28.	(6) Validate CR functions in context of operational sequences	1.4.2		7.0	
29.	Identify relationships and dependencies among operators and plant processes	1.4.2			3.8, 3.8.a, 3.8.b, 3.8.c
<u>Assessment and Implementation</u>					
30.	Assessment of HEDs and Implementation of corrective actions	1.4.3	1.3, 3.2		3.1, 3.3, 3.4 5.2, 4.6, 4.7, pg. 8, integration
31.	Assessment of HEDs should include:				
	o Determine safety significance	1.4.3			
	o Determine lack of safety significance	1.4.3			
	o Select design improvements	1.4.3			
	o Justify not fully correcting HEDs	1.4.3			
	o Ensure integration of human factors into other CR related projects	1.4.3			
	o Make cost effectiveness analyses	1.4.3			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
32.	Implementation of corrective actions should include:				
	o Establish priorities for implementing	1.4.3	1.3		pg. 12, integration
	o Establish schedules for corrections	1.4.3			pg. 12, integration
33.	Corrective actions should be implemented promptly	1.4.3	1.3		pg. 12, integration
34.	Corrective action schedules should be coordinated with operator retraining and operational considerations	1.4.3	1.3		3.4.c
<u>Reporting</u>					
35.	Two steps in CRDR reports	1.4.4			
36.	Program planning should be reported in a preliminary report	1.4.4.1			pg. 11.1
37.	Content of preliminary report	1.4.4.1			
38.	CRDR should be reported in a Final Report	1.4.4.2	3.		pg. 11.3
39.	Three topics in final report	1.4.4.2	1.3.3, 3., 3.4		
	o Methodology	1.4.4.2	1.2		
	o Findings	1.4.4.2	3.1		
	o Implementation	1.4.4.2	3.2, 3.3		
40.	Definition of Terms	1.5			
<u>2. PLANNING PHASES</u>					
41.	Planning Phase - Objectives	2.1			pg. 11.1
42.	Planning and Preparation functions	Exh. 2-1			
43.	Management function include analysis of objectives and constraints	2.1	1.1.1		

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
44.	Management functions include commitment of resources	2.1	1.1.3, 1.1.4, 1.4		
45.	Review team functions include layout of detailed work plan and schedule	2.1	1.1.1, 1.4		
46.	Review team functions include gathering and becoming familiar with reference materials and equipment needed for CRDR	2.1, 2.3	1.1.1		
47.	Review team should evaluate needs for data collection and recording forms	2.1, 2.3			
48.	Plans should include maintaining and working with review data	2.1	1.		
<u>Management Responsibilities</u>					
49.	Management coordination and other responsibilities should include overall support of CRDR process	2.2	1.1.3		
50.	Integration of CRDR with other Human Factors analyses and concerns	2.2			3.1, 3.3, 3.4
51.	Development of SPDS and upgrading of emergency support facilities	2.2		1.0	3.8 3.4.c
52.	Assessment of shift manning, training, personnel qualification procedures upgrading	2.2			
<u>Review Team Selection</u>					
53.	Review Team selection and other needs	2.3	1.1.4	7.0	5.1.a
54.	Composition of basic technical team	2.3	1., 1.1, 1.1.2	7.0	5.1.a

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
55.	Size of review team	2.3	1.1.2		
56.	Use of specialists to supplement basic teams	2.3	1.1.2	7.0	5.1.a
57.	Need for a project director (administrator)	2.3, 2.2	1.1.2		
58.	Function/Duties of project director (administrator)	2.3, 2.2	1.1.2		
59.	Need for special documentation systems (e.g., photographer, etc.)	2.3			
<u>Data Management</u>					
60.	Data management needs	2.4	1.5, App. B		
61.	Input data reference material needed prior to review (18 items)	2.4.1			
62.	Additional items which may be useful	2.4.1			
63.	Output data should include:				
	o A record of the results of each CRDR task	2.4.2			
	o Use of standard forms recommended	2.4.2			
	o 6 types of forms that may be needed	2.4.2, Exh.3-8, Exh.3.3, Exh.3.5			
	o Compilation and summaries of review process findings are required for assessment of safety implications and delineation of CR improvements	3.9	1.5, App. B		
	o Use of automated data base management system	2.4	1.5, App. B		
	o Checklists	2.4			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
	o HED forms	2.4			
	o Inventory forms	2.4			
	o Special measurement forms	2.4			
	o Documentation control forms	2.4			
	o Operator questionnaire/interview forms	2.4			
<u>Equipment and Workspace</u>					
64.	Equipment and workspace review team needs	2.5	1.1.3		
65.	Use of mockups	2.5			
<u>Scheduling</u>					
66.	Scheduling of tasks	2.6	1.4		
67.	Schedule of uninterrupted work effort	2.6			
68.	Coordination of tasks and data	2.6			
69.	Schedule to minimize interferences	2.6			
70.	Schedule should include period from planning through final report	2.6			
71.	Schedule should include assignments of responsibilities and functions of individual team members	2.6	1.1.1		
72.	Schedule should include team member activity in review, assessment and implementation schedules	2.6	1.1.1		
<u>3. REVIEW PHASE</u>					
73.	Review phase objectives	3.1	3.		
74.	Review should determine that CR provides complete information, capabilities and performance aids for effective accomplishment of operator functions and tasks	3.1			4.2 4.5 5.1.d

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
75.	Review should identify characteristics which detract from operator performance	3.1	3.1		
	<u>Review Processes</u>				
76.	Six review processes	3.2, Exh. 3-1			
77.	(1) Review should examine operating experience, plant records, LER experience and survey operating personnel	3.2			
84.	Review process philosophical basis	3.2			
85.	Component perspective focuses on the means of control	3.2			
86.	Task and function perspective focuses on operator interfaces with plant processes	3.2			5.1.b
	<u>Operating Experience Review (1)</u>				
99.	Operating Experience Review (OER) involves two steps	3.3			
100.	Examination of available documents	3.3.1			
101.	Objective is to identify and alleviate conditions that may cause problems	3.3.1.1			
102.	Approach methodology for OER	3.3.1.2			
103.	Past history can be limited to 5 years	3.3.1.2			
104.	Limit effort to CR operations or HEDs	3.3.1.2			
105.	Any problems reviewed should be recorded	3.3.1.2			
106.	Seven recommended contents of record summary	3.3.1.2			
107.	Five sources of review information	3.3.1.3			
108.	Prepare a list of sources reviewed and summaries of problems	3.3.1.4			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
109.	OER staff reviewer qualifications	3.3.1.5			
110.	Team review is recommended	3.3.1.5			
111.	CR operating personnel survey	3.3.2			
112.	Objective of survey	3.3.2.1			
113.	OER is intended to draw out special knowledge of operators about system features and problems	3.3.2.1			
113a.	OER needs all levels of operations staff	3.3.2.1, Exh. 3-2			
114.	Interview approach recommended	3.3.2.2			
115.	Self-administered questionnaire not as effective as interviews	3.3.2.2			
116.	Survey topic area content	3.3.2.2			
117.	Nine topics recommended	3.3.2.2			
118.	Topic area definition	3.3.2.2			
119.	Topic area factors should be explored and may be evaluated differently for different reactor operating modes and different system events	3.3.2.2			
120.	Structured open-ended approach recommended	3.3.2.2, App. C			
121.	Interview questionnaire examples	3.3.2.2			
122.	Interview philosophy	3.3.2.2			
123.	Survey procedure	3.3.2.2			
124.	Use of sampling procedures	3.3.2.2			
125.	Sampling objective	3.3.2.2, Exh. 3-2			
126.	Survey methods and concerns	3.3.2.2			
127.	Interviewers should have training and experience	3.3.2.2			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
128.	Interviewers should be familiar with CR	3.3.2.2			
129.	Interviewers should be knowledgeable of HFE concerns	3.3.2.2			
130.	Interviewers should have wide range of experience	3.3.2.2			
131.	Recommended length of questionnaires and interviews	3.3.2.2			
132.	Sources of interview information and references	3.3.2.3, App. C			
133.	Methodology for examining results of interviews and questionnaires	3.3.2.4			
134.	Retain interview protocols for later references	3.3.2.4			
135.	Retain description of interview procedures	3.3.2.4			
136.	Recommended information to retain	3.3.2.4			
137.	Staff qualifications	3.3.2.5			
138.	Who should prepare interview protocols and questionnaire	3.3.2.5			
139.	Staff should not be members of plant/licensee/utility personnel structure	3.3.2.5			
140.	What experience and training the staff should have	3.3.2.5			
78.	(2) Review should include systems functions, task analyses	3.2			5.1.b
79.	Review should establish requirements for instrumentation, equipment, materials and operator task performance criteria	3.2			4.2, 4.4, 4.5, 5.1.c

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>Review of Systems Functions and Analysis of Control Room Operator Tasks (2)</u>					
141.	Review of System Functions	3.4			
142.	Review objective	3.4.1			
143.	Analysis of Control Room Operator Tasks	3.4	3.1,		
		3.4.2.4			
144.	Definition of system function	3.4			
145.	Definition of CR operator task	3.4			
146.	Analysis for new CR design vs analysis for existing CR design	3.4			
147.	Function and task optimization versus reallocation	3.4			
148.	Identification of operator action input and output requirements	3.4,			
		3.4.2.4			
149.	Top-down approach recommended	3.4.2			
150.	Identify plant operating systems and subsystems to facilitate definition of functions and tasks	3.4.2.1			
151.	Identify subsystems to level of major components (e.g., pressurizer, steam generators, recirculation pumps)	3.4.2.1			
152.	Event sequences selected for analysis should reflect the spectrum of plant operations	3.4.2.2			
153.	Emphasis should be on abnormal and emergency conditions	3.4.2.2			
154.	Event sequence selected will be plant specific	3.4.2.2			
155.	Preliminary analysis necessary to select the best set of event sequences for review objectives	3.4.2.2			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
156.	Minimum set of recommended events	3.4.2.2			
157.	Scope of failure event sequence review	3.4.2.2			
158.	Four items should be included in the review scope	3.4.2.2			
159.	Three factors should be considered in assessing systems with respect to safety	3.4.2.2			
160.	Function identification	3.4.2.3			
161.	System function associated with selected operating events should be documented	3.4.2.3			
162.	Two actions recommended for function identification	3.4.2.3			
163.	(1) Use of functional flow block diagrams for each sequence	3.4.2.3			
164.	(1) Include interactions of CR operating crew and communication outside CR	3.4.2.3			
165.	(1) Codes should be assigned to indicate allocation of functions to man or machine	3.4.2.3			
166.	(1) Codes should indicate where control of function resides (e.g., automatic, CR manual, local manual, etc.)	3.4.2.3			
167.	(1) It is important to update diagrams and records to agree with existing allocations of functions	3.4.2.3			
168.	(2) Control room operator function should be analyzed in detail	3.4.2.3			
169.	(2) Analysis should identify operator interfaces and show relative sequence of operator involvement with and across systems and subsystems	3.4.2.3, Exh 3-3			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
170.	(2) Procedures should be helpful in identifying operator functions and interfaces	3.4.2.3			
171.	(2) Functions identified should be complete and must represent what actually goes on in the selected event sequences	3.4.2.3			
172.	Task identification and analysis	3.4.2.4			
173.	Instrumentation and equipment required for task performance should be analyzed for each event sequence	3.4.2.4			4.2, 3.4.c, 5.1, 4.5
174.	Task analyses should be performed for each event sequence	3.4.2.4			
175.	Particular attention should be given to describing decision-making tasks and action/decision relationship	3.4.2.4, Exh. 3-4			
176.	All data needed for decision-making tasks should be defined	3.4.2.4			5.1, 4.5
177.	Task analysis should specify subsystems with which and across which the operator interacts	3.4.2.4			
178.	Machine-paced operator tasks should be specified with particular care	3.4.2.4			
179.	Failure-related tasks will define the response time required of operators	3.4.2.4			
180.	Failure-related tasks will help define the dynamic response needed from instruments, displays and indicators	3.4.2.4			3.4.c 4.5 5.1

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
181.	Eight kinds of task descriptive information needed	3.4.2.4, Exh. 3-5			
182.	Information sources on top-down system requirements definition methodology	3.4.3.1			
183.	Sources of plant descriptive data include schematics, CR layout diagrams, P&IDs, operating procedures, technical specifications, operator training materials, action plan items and other studies, etc.	3.4.3.2			
184.	Other sources may be NSS vendors, AE, operators	3.4.3.2			
185.	Three results of system function review may be used to perform the task analyses	3.4.4			
186.	Task data should be organized into requirements for CR workstations/panels for comparison with CR inventory	3.4.4			
187.	The comparison can verify CR design or identify HEDs	3.4.4			
188.	The data base from review/analysis results should be kept on file for other uses (e.g., training, procedures, staffing, new CR technology, etc.)	3.4.4			
189.	Staffing	3.4.5			
190.	Recommended multiple disciplines and experience for function review and task analyses staff members	3.4.5		7.0	5.1.a

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>Control Room Inventory (3)</u>					
80.	(3) Control room inventory should itemize and describe CR components provided to compare with requirements delineated in system function and task analyses	3.2			5.1.c
191.	Control Room inventory	3.5	B-2, Exh. B-1		
192.	Objective of CR inventory is to establish a set of reference data for comparison with requirements determined by operator task analysis	3.5.1			
193.	The inventory should be on a panel-by-panel or other work station basis	3.5.2			
194.	It is recommended that the inventory be maintained by an automatic data management system	3.5.2			
195.	What the inventory should identify and include	3.5.2			
196.	An item coding scheme using unique identifiers is recommended	3.5.2, Exh. 3-6			
197.	Suggested methodology for coding scheme	3.5.2			
198.	Inventory information sources	3.5.3			
199.	Direct observation of CR is essential	3.5.3			
200.	Photomosaic preparation is recommended	3.5.3, App. D			
201.	What the inventory should contain	3.5.4			
202.	How the inventory should be organized	3.5.4			
203.	Inventory staff member recommendations	3.5.5			
204.	Recommended qualifications of inventory staff members	3.5.5			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>Control Room Survey (4)</u>					
81.	A survey should determine that components (switches, meters, etc.) and environment (e.g., lighting, noise/sound, etc.) are designed to accommodate basic human characteristics (e.g., physical size and perceptual-motor capabilities)	3.2			4.4 5.1.d
87.	Control Room Survey - A comparison of CR design features with Human Engineering guidelines	3.2.1 3.6			
88.	Discrepancies are based on designs which deviate from Human Factors guidelines	3.2.1, 6.	3.1, 3.2.2		4.4, 5.1.d
89.	Discrepancies include environmental factors	3.2.1, 6.	Exh. 3-3		
207.	CR survey objective	3.6.1			
208.	CR survey identifies HEDs without judgment as to potential effects	3.6.1			
209.	Use of checklist is recommended	3.6.2.1, Exh. 3-7			
210.	Comments on checklists	3.6.2.1			
211.	HED details should be recorded on a discrepancy record	3.6.2.1, Exh. 3-8			
212.	What should be in the discrepancy record	3.6.2.2, Exh. 3-8			
213.	Separate discrepancy records are recommended	3.6.2.2			
214.	Each discrepancy should identify the CR and panel location and component	3.6.2.2			
215.	Identifying names and numbers should be the same as those used in the CR inventory	3.6.2.2			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
216.	Use of color photographs is recommended	3.6.2.2, App. D			
217.	Photographs should be numbered to relate them to the HED records	3.6.2.3			
218.	Discussion of survey procedures for individual guideline topics	3.6.2.4			
219.	Individual guideline topic perspective, survey orientation and measurement requirements for:	3.6.2.4		3.0 5.0	
220.	o Control Room workspace	3.6.2.5, App. E			
221.	o Communications	3.6.2.6			
222.	o Annunciator Warning Systems	3.6.2.7			
223.	o Controls	3.6.2.8			
224.	o Visual Displays	3.6.2.9		3.0, 5.0	4.4, 4.5
225.	o Labels and Location Aids	3.6.2.10			
226.	o Process Computers	3.6.2.11			
227.	o Panel Layout	3.6.2.12			
228.	o Control Display Integration	3.6.2.13			
244.	CR survey information sources	3.6.3, App. A, 6			
245.	What the results of the survey should include	3.6.4			
246.	Recommended survey staff disciplines and experience	3.6.5			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>Verification of Task Performance Capabilities (5)</u>					
90.	Verification of task performance capabilities	3.2, 3.7 3.2.2		7.0	
91.	Two issues should be examined in verifying satisfaction of requirements for specific individual tasks	3.2.2, 3.7.2		7.0	
82.	Verify availability by comparing task analysis requirements for needed instruments controls and equipment with inventory of instruments controls and equipment present in the CR	3.2, 3.4, 3.5, 3.2.2, 3.7.2, 3.7.2.1	1.2, 1.3, 1.5,	7.0	5.3
93.	Verify that all equipment and interfaces will support task accomplishments	3.2.2, 3.7.2, 3.7.2.2		7.0	5.3
94.	Verify that unnecessary items are not present in the CR	3.2.2			
248.	Verification objective is to assure that operator tasks can be performed with minimum potential for human error	3.7.1		7.0	5.3
249.	Focus of verification is on instruments and equipment, not operator skills and knowledge	3.7.1		7.0	5.3
250.	Verification is associated with task execution	3.8.1		7.0	5.3
251.	The verification process consists of two steps	3.7.2		7.0	5.3
252.	Verify availability of equipment needed to implement each task	3.7.2, 3.7.2.1		7.0	5.3

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
229.	Information coding systems should make it possible to record comparison findings efficiently	3.7.2.1			
230.	Comments on coding system and its use	3.7.2.1			
231.	Three reasons for an uncoded item	3.7.2.1			
255.	Verification findings should be recorded both from inventory and task perspectives	3.7.2.1		7.0	5.3
256.	Task uses should be recorded in inventory documentation to verify the use of each system	3.7.2.1			
232.	Objective of verification of HF suitability is to identify interface problems that may affect task performance	3.7.2.2		7.0	5.3
233.	Use of checklists is recommended	3.7.2.2, 3.6			
234.	Suggestions on verification process	3.7.2.2			
235.	Task verification process information sources	3.7.3			
236.	What should be in the recorded results of the task verification process	3.7.4			
237.	It is recommended to use the HED type form to record verification HED discrepancies	3.7.4, Exh. 3-8		7.0	5.3
238.	Verification HED discrepancies might not be keyed to Section 6 guidelines	3.7.4		7.0	5.3
239.	Verification HED discrepancies might be keyed to task and function requirements	3.7.4		7.0	5.3
240.	Staff capability and experience recommendations for verification process	3.7.5			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0601	0835	82-111
<u>Validation of Control Room Functions (6)</u>					
83.	Validation of Control Room Functions	3.8			
243.	Validation process is to determine whether functions allocated to the CR operators can, in fact, be accomplished effectively	3.2, 3.8.1, 3.2.3	1.2, 1.3, 1.5, 3.1		7.0
96.	Validation should determine that the CR is adequate to accommodate the integrated interactions and dependencies of operating crew and equipment	3.2.3			7.0
97.	Interaction and dependencies include workload, division of responsibilities, communication, supervision	3.2.3			
98.	Sources of information for identification of discrepancies in functional integration	3.2.3, 3.8, 6.			
257.	Validation may identify HEDs not evident in other system review processed	3.8.1			7.0
258.	Validation may identify how earlier identified HEDs may come into play during interactive operations	3.8.1			7.0
259.	Validation is associated with function execution	3.8.1			7.0
260.	Validation evaluates the integrated CR configuration	3.8.1			7.0
261.	Emphasis should be on ascertaining and evaluating plant status and diagnosing transients	3.8.1			
262.	Comments on factors involved in validation (e.g., operator workload, display response times, display complexity, etc.)	3.8.1			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
263.	Event sequence walk-through and talk-through are recommended	3.8.2			
264.	Comment on cautions to be observed	3.8.2			
265.	Use of simulators recommended	3.8.2			
266.	Suggested techniques for validation	3.8.2, App. B			
267.	Seven minimum events to be included in validation process	3.8.2			
268.	Additional events should be considered	3.8.2			
269.	Suggested walk-through process	3.8.2			
270.	Use of audio/video recording	3.8.2			
271.	HE guideline review recommended after each walk-through	3.8.2			
272.	Information sources of validation process	3.8.3			
273.	Methodologies guidance	3.8.3, App. B, 3.5			
274.	What should be included in the written results of the validation	3.8.4			
275.	Staffing requirements are same as for verification process	3.8.5, 3.7.5			
<u>Compilation of Discrepancy Findings</u>					
276.	Compilation of overall review process discrepancy findings (HEDs) can be done in two recommended ways: (1) by topic group, and (2) by system/work station groups	3.9	1.5 App. B		
280.	Contributions of both groups of discrepancies to interaction problems should be identified	3.9			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>4. ASSESSMENT AND IMPLEMENTATION</u>					
281.	Assessment and implementation	4.	1.3, 3.2, 3.3		5.2
283.	Five objectives of assessment of HEDs and implementation of corrective actions	4.1	1, 1.3 3.2		5.2
284.	Special emphasis should be placed on the assessment and implementations affecting operator performance under abnormal or emergency conditions	4.1			5.2
<u>The Assessment Process</u>					
285.	The assessment process is intended to identify HEDs which can affect operator performance with unacceptable consequences	4.2	1.3		5.2
286.	The assessment process is intended to determine the extent of corrections and justify decisions not to fully correct HEDs	4.2	1.3, 3.2		5.2
287.	Recommended process for assessing HEDs	4.2.1, Exh. 4-1			
288.	Assessment for safety consequences (e.g., Tech Spec safety limits, operating limits, limiting condition for operations)	4.2.1.1			
289.	Assess for both individual and aggregate basis	4.2.1.1			
290.	NUREG 0801 is a source of information on developing and applying assessment factors	4.2.1.1	3.2, 3.2.1, 3.2.3 Exh 3.1, Exh 3.2, Exh 3.3		

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
291.	Selection of design improvements	4.2.2	3.2		
292.	Recommended process for analysis and identification of specific CR design improvements	4.2.2, Exh. 4-2			
293.	Selection among correction by enhancement, design (alternative) improvement or not-correcting	4.2.2, Exh. 4-2			
294.	Other HF programs with which corrections should be coordinated	4.2.2, 1.3	3.2.1		3.1, 3.3, 3.4
295.	Corrections should not introduce new problems	4.2.2			
296.	Analysis for correction by enhancement	4.2.2.1			
297.	Examples of enhancements	4.2.2.1			
298.	Enhancements should be verified	4.2.2.1, 3.2.2			
299.	Use of photomosaics or mock-ups is recommended	4.2.2.1			
300.	Implement enhancement prior to design review	4.2.2.1, 4.3.1			
301.	In some cases, implementation should be delayed until after an analysis of design alternatives	4.2.2.1, 4.2.2.2			
302.	Analysis of design alternatives	4.2.2.2, App. B			
303.	Four steps in resolving HEDs that cannot be corrected by surface enhancement	4.2.2.2			
304.	(1) Reassess function review	4.2.2.2, 3.4			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
305.	(2) Review the allocation of the function	4.2.2.2			
306.	(3) Verify the allocation of the function	4.2.2.2, Exh. 4-2			
310.	(4) Validate design modifications	4.2.2.2			
307.	Design responsibility should rest with nuclear engineers, I&C engineers and other experts using HF engineering advice	4.2.2.2			
308.	NUREG 0700 guidance may lack design solution details	4.2.2.2		3.0	
309.	Comments on considerations of design alternative corrections	4.2.2.2			
311.	Comments on validation	4.2.2.2			
312.	Use of photomosaics or mockups or simulators	4.2.2.2			
313.	Each HED should be assessed for the extent of correction	4.2.2.3	3.2, 3.3		
314.	Full compliance with guidelines is desired	4.2.2.3			
315.	Partial conformance may be justified	4.2.2.3			
316.	Some design solutions may be physically impossible	4.2.2.3			
317.	Incomplete corrections should be justified	4.2.2.3			
<u>Implementation</u>					
318.	Implementation	4.3	1.3, 3.2, 3.3		

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
319.	An implementation schedule should be prepared for every verified improvement	4.3, 4.3.1, 4.3.2	3.2, 3.2.3, 3.2.4, Exh. 3-4		4.7, pg. 8, integration
320.	Procedures should be established to ensure that the documentation of implemented improvements extends to updating of operating procedures, drawings, training programs, etc.	4.3		2.0	
321.	HEDs should be corrected promptly	4.3	3.2, 3.2.3, 3.2.4		
322.	Implementation delays should be justified	4.3			
323.	Provision should be made to obtain feedback on how improvements work out in practice	4.3			
324.	Emphasize the correction of HEDs with safety significance	4.3			
325.	Comments on time schedules for corrections	4.3, 4.3.1, 4.3.2			
326.	Enhancement solutions comments	4.3.1			
327.	Design alternative solution comments	4.3.2			
328.	Implementation schedule should be developed on the basis of assigning priority to correction of HEDs with significant safety consequences	4.3.2			4.7, pg. 8, integration pg. 12, integration

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
<u>5. REPORTS</u>					
329.	Seven factors to be considered in developing an implementation schedule	4.3.2			
330.	Reports should be submitted to NRC which document procedures for conducting the CRDR and the results of the review	5.			pg. 11.1, pg. 11.3
<u>Program Plan Report</u>					
331.	What should be in the program plan report	5.1	1.,		
332.	When the report should be submitted	5.1			
333.	The five parts of the program plan report	5.1			
334.	1) Review plan section	5.1.1, 2.1			
335.	2) Four areas to be included in the management and staffing section	5.1.2, 2.2, 2.3			
336.	3) Documentation and document control section	5.1.3, 2.4			
337.	4) Six minimum tasks to be done in the review procedures section	5.1.4, 3.2			
338.	5) Assessment procedure section	5.1.5, 4.			
<u>Detailed Control Room Design Review Report</u>					
339.	Detailed CRDR report is to be submitted at the conclusion of the CRDR	5.2	3.		
341.	What documents should exist to support the CRDR	5.2			
342.	Recommended format and content for CRDR report	5.2	3.1, 3.2, 3.3 3.4		

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
343.	1) Methodology	5.2.1			
344.	1.1) Review plan section	5.2.1.1			
345.	1.2) Management and staffing section	5.2.1.2			
346.	1.3) Documentation section	5.2.1.3			
347.	1.1, 1.2, 1.3 above need provide only material which updates and revises the original planning material submitted to NRC	5.1, 5.2			
348.	1.4) The review procedures section should contain six topics	5.2.1.4, 5.1.4			
350.	(1) Three things which should be in the operating experience review	5.2.1.4			
351.	(2) Seven processes which should be described in system function review and task analysis	5.2.1.4			
352.	(3) Two things which should be in the control room inventory	5.2.1.4			
353.	(4) Two things which should be in the control room survey	5.2.1.4			
354.	(5) Verification of task performance capability	5.2.1.4			
355.	(6) Validation of control room functions	5.2.1.4			
356.	Discussion of organization and content of the review findings section	5.2.2			
358.	2) Control room-wide survey findings	5.2.2.1			
359.	(2.1) Workspace and environment	5.2.1.1, 6.1			
360.	(2.2) Communications	5.2.1.2, 6.2			
361.	(2.3) Annunciator warning system	5.2.1.3, 6.3			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
362.	(2.4) Labels and location aids	5.2.1.4, 6.6			
363.	3) Panel/work station findings (organization into one section per work station is recommended)	5.2.2.2, 6.4, 6.5, 6.7, 6.8, 6.9,			
364.	4) Other review findings which were determined from operating experience review, task performance capability verification and operating crew function validation	5.2.2.3			
365.	5) The implementation section should describe two things	5.2.3			4.7
366.	(5.1) What the Completed Improvements section should contain	5.2.3.1			
367.	(5.2) What the Proposed Improvements section should contain (e.g., implementation schedules, follow-up verification, program plan)	5.2.3.2			
6.	CONTROL ROOM HUMAN ENGINEERING GUIDELINES	6			
	<u>APPENDICES</u>				
	<u>Reference Materials</u>				
368.	Bibliography	A.1			
369.	Guideline References Matrix	A.2			
	<u>Systems/Operations Design Analysis Techniques</u>				
370.	Objectives	B.1			
371.	Information Sources	B.2			
372.	Analysis Team Staffing	B.3			
373.	Approach	B.4			
374.	Function Analysis	B.4.1			

Table 3 - CROSS REFERENCES TO NUREG 0700, cont.

ITEM	TOPIC	DOCUMENT AND SECTION			
		0700	0801	0835	82-111
375.	Allocate Functions	B.4.2			
376.	Verify Function Allocation	B.4.3			
377.	Validate System Integration	B.4.4			
378.	Control Room Design Specification	B.5			
379.	References	B.6			
	<u>Control Room Operating Personnel Interview Protocol</u>				
380.	Guidelines for Operator Interviews	C.1			
381.	Selected Interview Questions	C.2			
	<u>Photography Guidelines</u>				
382.	Types and Objectives of Photographic Support	D.1			
383.	Panel-by-Panel Mosaic Photographs	D.2			
384.	Discrepancy Photographs	D.3			
385.	Guidelines for Photography	D.4			
	<u>Guidelines for Environmental Measurements</u>				
386.	Sound Survey Procedures	E.1			
387.	Lighting Survey Procedures	E.2			
388.	Humidity/Temperature Procedures	E.3			
389.	Air Velocity Survey Procedures	E.4			

Table 4 - CROSS REFERENCES TO NUREG 0835

ITEM	TOPIC	DOCUMENT AND SECTION	
		0835	0801
<u>1. INTRODUCTION</u>			
1.	Purpose/function of SPDS	1.0, 2.0	
2.	NUREG 0835 provides SPDS Human Factors (HF) evaluation guidance	1.0	Exh I-1
<u>2. ROLE AND FUNCTION OF SPDS</u>			
3.	How SPDS will enhance operator performance	2.0	
4.	Operator training needed for expected results	2.0	
<u>3. SCOPE OF NUREG 0835</u>			
5.	SPDS review guidance is about 1/2 Human Factors Engineering (HFE) and 1/2 existing NRC guidance	3.0	
6.	0835 guidance emphasizes CRT displays	3.0	
7.	NUREG 0700 and NUREG 0801 HFE display and computer guidance not sufficient to adequately review SPDS functional requirements	3.0	
8.	0835 guidance will complement NUREG 0700	3.0	
9.	Review guidelines for SPDS functional criteria	3.0, 5.0	
10.	HFE review guidelines for SPDS displays	3.0, 6.0	
11.	Use of non-CRT displays is not precluded	3.0	
<u>4. USE OF SPDS REVIEW GUIDANCE</u>			
12.	References useful to SPDS reviewers	4.0, 9.0	
13.	Display of multivariate data (?)	4.0	
14.	Pertinence of other references should be verified by user	4.0	

Table 4 - CROSS REFERENCES TO NUREG 0835, cont.

ITEM	TOPIC	DOCUMENT AND SECTION	
		0835	0801
<u>5. REVIEW GUIDELINES FOR SPDS FUNCTIONAL CRITERIA</u>			
15.	Nine categories of SPDS functional criteria	5.0	
15a.	Table of functional criteria referenced to NUREG 0696 and NUREG 0700, page 8 thru 34		
<u>6. REVIEW GUIDELINES FOR SPDS DISPLAYS</u>			
16.	Design specifications of SPDS systems are not explicit	6.0	
17.	SPDS primary function is to assist CR personnel	6.0	
18.	Data display formats are not rigidly specified	6.1	
19.	What data displays should contain	6.1	
20.	Five minimum plant functions designated to be displayed	6.1	
21.	Licensee is free to determine other functions and display	6.1	
22.	Single CRT displays (primary)	6.1	
23.	Multiple CRT displays (secondary)	6.1	
24.	Single displays should be continuously visible	6.1	
25.	Use of prompting to obtain more information	6.1	
26.	Hierarchical organization of displays	6.1	
27.	Change of status notifications	6.1	
28.	Means to select hierarchical levels	6.1	
29.	Formats should be labeled and easy to read and interpret	6.1	
30.	Display characteristics and content	6.1	
31.	Time history of parameters should be available	6.1	
32.	Display techniques should enhance operator detection, perception, comprehension	6.2	

Table 4 - CROSS REFERENCES TO NUREG 0835, cont.

ITEM	TOPIC	DOCUMENT AND SECTION	
		0835	0801
33.	Six enhancement techniques	6.2	
34.	Graphical representation of parameters	6.2	
35.	Scaling considerations for displays	6.2.1, 6.3.2, 6.3.3	
36.	Variable scaling factors	6.2.1	
37.	Parameter identification labels and symbols	6.2.2	
38.	Perceptual aids, color, symbols, mimics, overlays, blinking, flashing	6.2.3, 6.3.1, 6.3.2	
39.	Perceptual aids detailed guidance for	6.2.3.1-4	
	Color	6.2.3.1	
	Symbols and mimics	6.2.3.2	
	Overlays	6.2.3.3	
	Blinking and flashing	6.2.3.4	
40.	Display patterns to enhance operator recognition	6.2.4, 6.3.3	
41.	Pattern change to enhance operator recognition	6.2.4	
42.	Pattern characteristics	6.2.4	
42a.	Comments on the use of shape coding, color coding, alpha-numeric coding of top level and lower level displays	6.2.4	
43.	Status setpoints to establish operating references	6.2.5	
44.	Four examples of displays	6.3	
45.	Bar Charts	Figs. 1, 2, 6.3.1, 6.3.2	
46.	Bars need unique ID	6.3.1, 6.3.2	
47.	Use of color coding and change of color	6.3.1, 6.3.2	
48.	Reference to normal value needed	6.3.1	

Table 4 - CROSS REFERENCES TO NUREG 0835, cont.

ITEM	TOPIC	DOCUMENT AND SECTION	
		0835	0801
49.	Circular profile display	Fig. 3, 6.3.3	
50.	Chernoff face displays are unacceptable for SPDS	Fig. 4, 6.3.4	
<u>7. VERIFICATION AND VALIDATION OF SPDS</u>			
51.	Licensee should conduct a verification and validation (V&V) program during design, installation and implementation to assure reliable and accurate SPDS information for operation	7.0	3.3
52.	V&V program should include 5 items listed	7.0	3.3
53.	V&V needs qualified personnel team who were not part of design, development and installation of SPDS	7.0	1.1, 1.1.1, 1.1.2
54.	NSAC 39 is one source for V&V program guidance. Other programs which accomplish the same goals may also be acceptable.	7.0	
<u>8. NRC STAFF HUMAN FACTORS REVIEW OF SPDS</u>			
55.	NRC plans to conduct a post-implementation review of SPDS	8.0	
56.	When NRC will conduct the post-implementation review	8.0	
57.	Licensees may request a pre-implementation review	8.0	
58.	NRC conditions for pre-implementation review	8.0	1.3.2 1.3.4

Table 5 - NUREG 0801 TOPIC ITEMS

ITEM	TOPIC	0801 SECTION
<u>INTRODUCTION</u>		
1.	Need for task analysis	I-2
2.	Need for detailed Control Room Design Review (DCRDR)	I-1
3.	Evaluation of DCRDR program plan by NRC	I-1, I.3.1, 1.
4.	Scheduled visits for NRC site audits of DCRDR	I-1, I.3.2, 1., 2.1, 2.2, 3.1 1.
5.	Evaluation of DCRDR (Summary) report	I-1, I.3.3, 3.
6.	Preparation of NRC Design Evaluation Report (DER)	I-1, I.3.4
7.	All physical and operational change modifications in CR should be coordinated with DCRDR	I-2
8.	Need for operator retraining and procedure upgrading	I-2
10.	Consideration should be given for normal, abnormal and emergency operating conditions	I-2
11.	An ongoing HF engineering program should be developed	I-2
12.	HF analyses should ensure that future changes do not degrade improvements	I-2
13.	Four DCRDR phases to be performed and evaluated	I-3
14.	Evaluation criteria	I-3, Ch 1, 2, 3 4
15.	Relation between 4 review phases and NRC evaluation steps	Exhibit I-2

Table 5 - NUREG 0801 TOPIC ITEMS, cont.

ITEM	TOPIC	0801 SECTION
16.	Relationships among NUREG 0660 (Tasks I-C, I-D, III.A.1), NUREG-1.97 and the DCRDR	Exhibit I-1
17.	DCRDR program plan contents	1.3., 1
18.	Resident Inspector recommendations for site audits	1.3.2
19.	Content of DCRDR (summary) report (SR)	1.3.3
20.	Purpose of NRC site audits	1.3.2
21.	When to submit DCRDR (summary) report	1.3.3
22.	HED corrective actions in DCRDR (summary) report	1.3.3
23.	HED SR evaluation acceptability, areas	1.3.3
24.	Pre-implementation audits	1.3.4
25.	Basis for NRC DER	1.3.4
26.	Content of NRC DER	1.3.4
<u>1. EVALUATION OF DCRDR PROGRAM PLAN REPORT</u>		
27.	Feedback to licensee/applicant	1.
28.	DCRDR Team	1., 1.1, 1.1.1, 1.1.2
29.	Preparation and content of program plan report	1., 1.1.1
30.	Quality Assurance Program	1.
31.	DCRDR methodology	1.
32.	DCRDR schedule and schedule evaluation	1., 1.4, Exh. 1-2
33.	DCRDR information management	1., 1.5, App. B
34.	DCRDR team composition	1.1, 1.1.2
35.	DCRDR documentation of team member experience, qualifications, organization	1.1, 1.1.2, 1.1.2.1, 1.1.2.2, 1.1.2.3, 1.1.2.4
36.	DCRDR team evaluation criteria	1.1
37.	DCRDR management and structure	1.1.1
38.	Use of Human Factors personnel	1.1.1
39.	Support group descriptions	1.1.1

Table 5 - NUREG 0801 TOPIC ITEMS, cont.

ITEM	TOPIC	0801 SECTION
40.	DCRDR team member participation	1.1.1
41.	DCRDR disciplines needed to perform review task	Exhibit 1-1
42.	DCRDR team assignments	1.1.1
43.	DCRDR team composition and qualifications	1.1.2
44.	DCRDR interaction with other utility organizations	1.1.3
45.	DCRDR team authority to obtain access, support, non-interference	1.1.3
46.	DCRDR team personnel orientation program content and processes	1.1.4
47.	DCRDR review methodology tasks should be listed	1.2
48.	DCRDR NRC evaluation criteria to be used	1.2, 3.
49.	Program plan report should describe any proposed alternate DCRDR methodology if it differs from NUREG 0700 guidance	1.2
50.	DCRDR standards used to identify HEDs should be described	1.2
51.	Source data and description of previous work used should be included	1.2
52.	Use of flowcharts to clarify written DCRDR methodology descriptions is recommended	1.2
53.	All DCRDR source data should be made available to NRC staff	1.2
55.	Complete description of proposed DCRDR methodology is needed	1.2
56.	HED assessment methodology	1., 1.3, 3.2
57.	HED description of alternate assessment methodology used should be described	1.3
58.	Four HED methodology evaluation criteria	1.3
59.	1) HED degree of degradation of operator performance	1.3

Table 5 - NUREG 0801 TOPIC ITEMS, cont.

ITEM	TOPIC	0801 SECTION
60.	2) HED effect on plant safety	1.3
61.	3) HED interactions among HEDs	1.3
62.	4) HED corrective action implementation priority	1.3
62a.	DCRDR schedule and schedule evaluation	1.4, Exh. 1-2, 1.
67.	DCRDR data collection, recording, storage, retrieval	1.5
68.	DCRDR need for information management system description	1.5
69.	Seven HED information items which should be available from the system	1.5, Appendix B
70.	HED information format and documentation procedure	Appendix B
<u>2. NRC SITE AUDITS DURING THE REVIEW PHASE</u>		
71.	Site audit purpose	2.1
72.	Site audit criteria/selection of sites, scheduling	2.1, 2.2, 3.1
74.	Site audit tasks to be performed by NRC	2.3
75.	Site audit resolution of areas of concern	2.4
76.	Site audit proposals for changes	2.4
77.	Site audits may develop needs for clarification of NUREG 0700 and 0801	2.4
<u>3. EVALUATION OF DCRDR SUMMARY REPORT</u>		
78.	DCRDR (summary) report evaluation	3.
79.	DCRDR (summary) report objectives of review phase	3.
80.	DCRDR summary, NUREG 0700 Section 3 identifies the 6 review tasks	3.
81.	DCRDR should include description of and reasons for changes from program plan submitted	3.
83.	When to submit DCRDR (summary) report	3.
84.	DCRDR identification of HEDs	3.1

Table 5 - NUREG 0801 TOPIC ITEMS, cont.

ITEM	TOPIC	0801 SECTION
85.	Nine things an HED description should include	3.1
86.	HED assessment method to determine control room design deficiencies	3.2, 3.2.1, Exhibit 3-1
87.	HED assessment method to determine need for corrective action	3.2, 3.2.3
88.	HED assessment method to determine corrective action priority	3.2, 3.2.4
89.	Resolution of HEDs that caused documented operator errors	3.2.1
90.	Factors which shape operator performance	Exhibit 3-2, Exhibit 3-3
91.	HED corrective actions should be integrated with all other CR modifications	3.2.1
92.	Ranking of HEDs should include effects on degradation of operator performance	3.2.2, Exh. 3.2, Exh. 3-3, 3.2.4
93.	Four categories of corrective action priority	3.2.4, Exhibit 3-4
94.	Justification for corrective actions to be implemented on lower than recommended priority schedule should be provided	3.2.4
95.	Any safety related HED or operator degraded performance HED is recommended to be corrected on a short schedule	3.2.4
96.	Criteria for evaluating proposed corrective actions	3.3
97.	Need for summary report to describe how the corrective actions meet the evaluation criteria	3.3
98.	The objective of DCRDR is to achieve overall CR improvement	3.4
99.	Summary report should summarize steps to achieve the objective	3.4

Table 5 - NUREG 0801 TOPIC ITEMS, cont.

ITEM TOPIC	0801 SECTION
100. Four examples of resolutions of control room wide problems.	3.4
101. Use of mockups, simulators, mosaics to evaluate corrective actions proposed prior to implementation is encouraged	3.4
<u>4. PREPARATION OF DESIGN EVALUATION REPORT</u>	
102. Pre-implementation audit site selection	4.1
103. Reason for selection for pre-implementation audit	4.1
104. Time frame of pre-implementation audit	4.1
105. NRC Design Evaluation Report (DER)	4.2
106. Basis of DER	4.2
107. Purpose of DER	4.2
<u>APPENDICES</u>	
108. Reference documents for programs related to DCRDR	A
109. Management of HED information	B
110. Three phases of HED information management	B-1
111. Pre-identification of CR survey guidelines	B-2
112. Equipment ID and guidelines	B-2, Exhibit B-1
113. Recording of HED data	B-2
114. Storage and retrieval of data	B-3
115. Automated data processing	B-3
116. Identification of relationships among HEDs	B-3
117. Sample HED Report Sheet	Exhibits B-2, B-3
118. Glossary of phrases	C