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KNOWLEDGES AND ABILITES CATALOG FOR NUCLEAR POWER PLANT OPERATORS:

SAVANNAH RIVER SITE (SRS) PRODUCTION REACTORS (U)

APPROVED FOR USE BY:
WSRC - RRD - RTAP

ABSTRACT

The Knowledges and Abilities Catalog for Nuclear Power Plant Operators: SRS Production Reactors, provides the basis for the development of content-valid certification examinations for Senior Reactor Operators (SROs) and Central Control Room Supervisors (SUP). The position of Shift Technical Engineer (STE) has been included in the catalog for completeness. This new SRS reactor operating shift crew position is held by an individual holding a CCR Supervisor Certification who has received special engineering and technical training. Also, the STE has a Bachelor of Science degree in engineering or a related technical field.

The SRS catalog contains approximately 2500 knowledge and ability (K/A) statements for SROs and SUPs at heavy water moderated production reactors. Each K/A statement has been rated for its importance to the safe operation of the plant in a manner ensuring the health and safety of the public. The SRS K/A catalog is presently organized into five major sections: Plant Systems grouped by Safety Function, Plant Wide Generic K/As, Emergency Plant Evolutions, Theory and Components (to be developed).

The SRS catalog represents a modification of the form and content of the K/A catalogs for PWRs (NUREG-1122) and BWRs (NUREG-1123).

The NUREGs were used as a guideline to determine categories of knowledge and ability statements. The SRS Catalog format has remained relatively consistent with the NUREGs in that six knowledge categories and four ability categories are identified for each system and three knowledge categories and two ability categories are identified for each Emergency Plant Evolutions (EPE). These knowledge and ability categories have remained fairly consistent with the original NUREG statements, with minor changes being implemented for the sake of understanding and clarity. The fifteen System Wide Generic Statements for Plant Systems were taken from NUREG-1122 (PWR) and consist of eight generic knowledge statements and seven generic ability statements. The twelve System Wide Generic Statements for Emergency Plant Evolutions were also taken from NUREG-1122. These consist of five generic knowledge statements and seven generic ability statements. Both sets of Generic K/As (Systems and EPEs) underwent minor changes again for the sake of clarity.

Following initial DOE development, a Verification and Validation (V and V) team was established at SRS. A pilot effort was performed to determine a workable method for V and V of the DOE draft K/A catalog. This pilot team performed a V and V on the Process Water System and submitted the end product to DOE for concurrence. Once this workable method was established, new members were enlisted into the projects efforts. V and V Teams were formed that consisted of the following members: An SRS Subject Matter Expert, an SRS Training Representative and a Commercial Training Representative.

ABSTRACT (contd)

The V and V Process consisted of the following steps:

STEP 1: Ensure that correct SRS Terminology was used.

STEP 2: Ensure that K/A Categories fit SRS Systems and that correct system titles were used.

STEP 3: Verify that K/A statements for each Category are correct and cover sufficient level of detail. Eliminate those that do not, add those that do.

STEP 4: Determine if K/A item was critical (*) using the following criteria:

A) Item is needed to prevent or mitigate fuel failure or core melt

AND/OR

B) Item is needed to prevent or mitigate a major Release of Radioactivity

AND/OR

C) Item is needed to prevent or mitigate a challenge to a critical Safety Function

AND/OR

D) Analogous Item is rated 4.0 or greater in applicable NUREG (Very Important or essential to Safety)

Approximately 750 of the 2500 knowledge and ability statements were specified as critical. The critical Plant System K/As were made up of about 200 knowledge statements, 200 ability statements and 100 system generic statements. The critical Emergency Plant Evolution K/As consisted of about 100 knowledge statements, 75 ability statements and 75 system generic statements.

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3.8 Safety Function VIII: Control and Instrument Air Supply

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CCR Habitability System (CCRH).....3.9-5
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1 ORGANIZATION OF THE SRS CATALOG

The Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Savannah River Site Production Reactors is presently organized into five major sections. Knowledge and ability statements (K/As) are grouped according to the major section to which they pertain. This organization is shown schematically below.

PLANT-WIDE GENERIC KNOWLEDGE AND ABILITIES (28)

PLANT SYSTEMS (32)
- Knowledge Categories (K1 - K6)
- Ability Categories (A1 - A4)
- System Wide Generics (15)

EMERGENCY PLANT EVOLUTIONS (10)
- Knowledge Categories (EK1 - EK3)
- Ability Categories (EA1 - EA2)

COMPONENTS
- Component Categories (8)

THEORY
- Reactor Theory Categories (8)
- Thermodynamic Categories (10)

1.1 Plant Wide Generic Knowledge and Abilities

A group of 28 knowledge and abilities has been identified as generic to all SRS Production Reactors. These are generally administrative knowledge and abilities with broad application across systems and/or plants. They are listed in Section 2 of this SRS Catalog.

1.2 Plant Systems

Major Safety functions must be maintained to ensure safe nuclear power plant operation. The eleven major safety functions for SRS Production Reactors are:

(1) Reactivity Control
(2) Process Water Inventory Control
(3) Reactor Tank Pressure Control
(4) Heat Removal from Fuel Assemblies
(5) Heat Removal from Process Water and Auxiliaries
(6) Confinement
(7) Electrical Distribution
(8) Instrument Air Supply
(9) Instrumentation
(10) Radioactivity Release
(11) Plant Service Systems

Thirty-two plant systems have been included in the SRS Catalog based on their relationship and importance to the safety functions. Table 1 contains a list of these plant systems by safety function. It should be noted that thirteen plant systems contribute to two or more safety functions. Each plant system has a unique three digit code number.

Table 1
Plant Systems by Safety Function

Safety Function I: Reactivity Control

102	Supplementary Safety System (SSS)
111	Control and Safety Rod System (CRDS)

Safety Function II: Process Water Inventory Control

103	Emergency Cooling System (ECS)
109	Process Water System (PWS)
115	Moderator Recovery System (MRS)

Safety Function III: Reactor Tank Pressure Control

122	Blanket Gas System (BGS)
127	Reactor Tank Pressure Relief System (RPRS)

Safety Function IV: Heat Removal From Fuel Assemblies

103	Emergency Cooling System (ECS)
107	Process Room Spray (PRS)
108	Confinement Heat Removal System (CHR)
109	Process Water System (PWS)
110	Process Water Diesel Generators (PWDG)
112	Cooling Water System (CWS)
116	Process Water Pump/Motor Lubrication Oil System (PWLO)
117	Electric Load Shedding (LS)
121	Discharged Assembly Cooling (DAS)
128	River Water and PAR Pond Pumps and Valves (RWPV)
129	Disassembly Basin and Disassembly Basin Cooling and Filtration (DB/DBCF)
131	Reactor Tank Internals and Support (RTIS)

Safety Function V: Heat Removal From Process Water and Auxiliaries

112	Cooling Water System (CWS)
117	Electric Load Shedding (LS)
128	River Water System and PAR Pond Pumps and Valves (RWPV)

Safety Function VI: Confinement

104	Airborne Activity Confinement System (AACS)
107	Process Room Spray (PRS)
108	Confinement Heat Removal System (CHR)
130	Reactor Building

Safety Function VII: Electrical Distribution

105 Emergency Electrical Power (EEP)
110 Process Water Diesel Generators (PWDG)
114 Safety Related AC Circuits (SRAC)
117 Electric Load Shedding (LS)
120 Safety Related 125 VDC Power (SRDC)
125 Essential Equipment Monitor System (EEM)

Safety Function VIII: Control and Instrument Air Supply

106 Compressed Air System (CAS)

Safety Function IX: Instrumentation

101 Reactor Scram (SCRM)
117 Electric Load Shedding (LS)
124 CCR Habitability System (CCRH)
125 Essential Equipment Monitor System (EEM)

Safety Function X: Radioactivity Release

104 Airborne Activity Confinement System (AACS)
107 Process Room Spray (PRS)
108 Confinement Heat Removal System (CHR)
113 Contaminated Water Removal and Disposal System (CWR)
118 Stack Air Activity Monitoring (SAAM)
119 Building Radiation Monitoring (BRM)
121 Discharged Assembly Cooling System (DAC)
123 Cooling Water Gamma Monitoring (CWGM)
129 Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)
130 Reactor Building

Safety Function XI: Plant Service Systems

132 Domestic and Fire Protection Water Systems (DFW)
126 Reactor Effluent Water Monitoring (REWM)

1.2.1 Knowledge and Ability Stem Statements for Plant Systems

The information delineated with each plant system is organized into six different types of knowledge and four different types of ability. If there are no knowledge or ability statements following one of the knowledge or ability stem statements, it indicates that no statements were rated. The knowledge and ability stem statements for the plant systems are listed in Table 2.

Table 2
Knowledge and Ability Statements for Plant Systems

K#	Knowledge Stem Statement
K1.	Knowledge of the physical connections and/or cause-effect relationships between (SYSTEM) and the following:
K2.	Knowledge of electrical power supplies to the following:
K3.	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on following:
K4.	Knowledge of (SYSTEM) design feature(s) and/or interlocks which provide for the following:
K5.	Knowledge of the operational applications of the following concepts as they apply to (SYSTEM):
K6.	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following (SYSTEM) components:

A#	Ability Stem Statement
A1.	Ability to predict and/or monitor changes in parameters associated with operating the (SYSTEM) controls including:
A2.	Ability to (a) predict the impacts of the following malfunctions or operations on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
A3.	Ability to monitor automatic operations of the (SYSTEM) including:
A4.	Ability to manually operate and/or monitor in the control room:

1.2.2 System-wide Generic Knowledge and Abilities for Plant Systems

Fifteen knowledge and abilities have been identified as generic to all systems. They are generally administrative in nature. The fifteen system-wide generic K/As are repeated at the end of each plant system delineation in the SRS Catalog. Table 3 contains a list of the fifteen system-wide generic (SG) K/As.

Table 3
System-wide Generic Statements for Plant Systems

SG#	Statement
1.	Knowledge of operator responsibilities during all modes of plant operation.
2.	Knowledge of system status criteria which require the notification of plant personnel.
3.	Knowledge of which events related to system operation/status should be reported to outside agencies.
4.	Knowledge of system purpose and/or function.
5.	Knowledge of limiting conditions for operations and safety limits.
6.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.
7.	Knowledge of purpose and function of major system components and controls.
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedures.
9.	Ability to locate and operate components, including local controls.
10.	Ability to explain and apply all system limits and precautions.
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.
12.	Ability to verify system alarm setpoints and operate controls identified in the Abnormal Condition Control Procedures.
13.	Ability to perform specific system and integrated plant procedures during all modes of operation.
14.	Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.
15.	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for Abnormal Condition Control Procedures.

1.3 Emergency Plant Evolutions

Section 3 of the SRS Catalog contains 10 emergency plant evolutions. The listing of emergency plant evolutions was developed to include those integrative situations crossing several plant systems and/or safety functions. (Knowledge and abilities related to an abnormal situation within one specific plant system are delineated within that system and are included in the plant systems section of the SRS Catalog.)

An emergency plant evolution is any condition, event or symptom which leads to entry into Abnormal Condition Control Procedures (ACC). Three broad areas of emergency evolutions relate to reactor control, confinement control, and radioactivity releases.

It is recognized that for each condition there are degrees of severity. The ACC entry guidelines were used as the bases of classifying each condition as an emergency plant evolution. Any abnormal condition which so degrades as to threaten plant safety will result in entry into the ACCs and at that time be treated as an emergency condition.

Table 4 contains a list of the emergency plant evolutions included in the SRS Catalog. Each evolution has a unique three digit code number.

Table 4
Emergency Plant Evolutions

	Emergency Plant Evolutions
201	SCRAM Condition Present and Reactor Power Above HLFM Downscale or Unknown (ATWS)
202	Inadvertent Reactivity Addition
203	Fuel Failure
204	Partial or Complete Loss of Forced Core Flow Circulation
205	Loss of Blanket Gas
206	Reactor Tank Low Water Level
207	High Offsite Release Rate
208	Charge/Discharge Event
209	Control Room Abandonment
210	Partial or Complete Loss of AC Power

1.3.1 Knowledge and Ability Statements for Emergency Plant Evolutions.

The emergency plant evolution knowledge and ability statements are organized into three knowledge types and two ability types. If there are no knowledge or ability statements following a knowledge or ability stem statement, it indicates that no statements were rated in that category. The knowledge and ability stem statements for the Emergency Plant Evolutions are listed in Table 5.

Table 5
Knowledge and Ability Stem Statements for
Emergency Plant Evolutions

K#	Knowledge Stem Statement
EK1.	Knowledge of the operational implications of the following concepts as they apply to (EMERGENCY PLANT EVOLUTION):
EK2.	Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:
EK3.	Knowledge of the reasons for the following responses as they apply to (EMERGENCY PLANT EVOLUTION):

EA#	Ability Stem Statement
EA1.	Ability to operate and/or monitor the following as they apply to (EMERGENCY PLANT EVOLUTION):
EA2.	Ability to determine and/or interpret the following as they apply to (EMERGENCY PLANT EVOLUTION):

1.3.1 System-wide Generic Knowledge and Abilities for Emergency Plant Evolutions

Twelve knowledge and abilities have been identified as generic to all emergency plant evolutions. These system-wide generic statements are repeated at the end of each emergency plant evolution in the SRS Catalog. Table 6 contains a list of the system-wide generics.

Table 6
System-wide Generic Statements for Emergency Plant Evolutions

SG#	Statement
1.	Knowledge of system status criteria which require the notification of plant personnel.
2.	Knowledge of which events related to system operation/status should be reported to outside agencies.

3. Knowledge of limiting conditions for operations and safety limits.

4. Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

5. Knowledge of the annunciator alarms and indications, and use of Abnormal condition Control Procedures.

6. Ability to locate and operate components, including local controls.

7. Ability to explain and apply all system limits and precautions.

8. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.

9. Ability to verify system alarm setpoints and operate controls identified in the Abnormal Condition Control Procedures.

10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.

11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for the Abnormal Condition Control Procedures.

12. Ability to utilize symptom based procedures.

1.4 Components

Basic components such as valves and pumps are found in many systems. The following eight categories of components, for which additional K/As are presented, are delineated in Section 5 of the SRS Catalog. These additional K/As are more detailed or specific than those appropriate for system listings, yet at the same time they are generic to the component types. Each component type has a unique three-digit code number.

401 Valves
402 Sensors/Detectors
403 Controllers and Positioners
404 Pumps
405 Motors and Generators
406 Heat Exchangers and Condensers
407 Demineralizers and Ion Exchangers
408 Breakers, Relays and Disconnects

1.5 Theory

Fundamental theoretical knowledge which underlies safe performance on the job is delineated in Section 6 of the SRS Catalog. These K/As represent basic concepts without which other knowledge or abilities related to the operational implications of plant operation could not be mastered. Each theory topic has a unique three-digit code number.

Reactor Theory

301 Neutrons
302 Neutron Life Cycle
303 Reactor Kinetics and Neutron Sources
304 Reactivity Coefficients
305 Safety and Control Rods
306 Fission Product Poisons
307 Fuel and Target Depletion
308 Reactor Operational Physics

Thermodynamics

311 Thermodynamic Units and Properties
312 Basic Energy Concepts
313 Properties of Water
314 Thermodynamic Processes
315 Thermodynamic Cycles
316 Fluid Statics and Dynamics
317 Heat Transfer
318 Thermal Hydraulics
319 Core Thermal Limits
320 Brittle Fracture and Vessel Thermal Stress

1.6 Knowledge and Ability Statements

1.6.1 Numbering

Each knowledge listed in the SRS Catalog is identified by two characters which reference the knowledge category, and two digits which reference the number of the statement within the category. for example, K2.03 references the third statement in the second knowledge category. Similarly, the first ability category is identified as A1. To distinguish emergency plant evolution K/As from those for plant systems, an E (emergency) has been placed before the knowledge (EK1) or ability (EA1) characters.

1.6.2 Importance Ratings

Importance ratings of the K/As are given for SROs and for SUPs next to each knowledge and ability statement in the SRS Catalog. These ratings reflect the average ratings of analagous knowledge items found in the PWR and BWR NUREGs.

Table 7
SRO and SUP Importance Ratings

NUREG Rating	Importance for Safe Operation	SRS Rating
5	essential	*
4	very important	*
3	fairly important	
2	of limited importance	
1	insignificant importance	

Importance includes direct and indirect impact of the K/A on safe plant operations in a manner ensuring public health and safety.

For the purpose of restart only those K/A items that are very important or essential to Safe Operation have been identified (*) in the SRS Catalogue. Later revisions of the SRS Catalog will have a more conventional (ie: 1 thru 5) importance scale.

Sections 5 (Components) and 6 (Theory), has a different Importance Rating convention. Those K/A items identified as important (**) are job specific (ie: apply to Senior Reactor Operator (SRO), Central Control Room Supervisor (SUP) or Shift Technical Engineer (STE)). Identified items are the result of Subject Matter Expert consensus as being important to safe and proper operation during normal and abnormal conditions.

1.7 List of Plant Systems Included in SRS Catalog

1.7.1 Alphabetical List of Plant Systems

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104	Airborne Activity Confinement System (AACS)	3.6-1
122	Blanket Gas System (BGS)	3.3-1
119	Building Radiation Monitoring (BRM)	3.10-8
124	CCR Habitability System (CCRH)	3.9-5
106	Compressed Air System (CAS)	3.8-1
108	Confinement Heat Removal (CHR)	3.4-5
113	Contaminated Water Removal and Disposal System (CWR)	3.10-1
111	Control and Safety Rod System (CRDS)	3.1-6
123	Cooling Water Gamma Monitoring (CWGM)	3.10-12
112	Cooling Water System (CWS)	3.4-13
129	Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)	3.4-30
121	Discharged Assembly Cooling (DAC)	3.4-24
132	Domestic and Fire Protection Water (DFW)	3.11-4
117	Electric Load Shedding (LS)	3.4-20
103	Emergency Cooling System (ECS)	3.2-1
105	Emergency Electrical Power (EEP)	3.7-1
125	Essential Equipment Monitor (EEM)	3.7-12
115	Moderator Recovery System (MRS)	3.2-11
107	Process Room Spray (PRS)	3.4-1
110	Process Water Diesel Generator (PWDG)	3.4-9
116	PW Pump and Motor Lubrication Oil System (PWLO)	3.4-17
109	Process Water System (PWS)	3.2-6
130	Reactor Building	3.6-5
126	Reactor Effluent Water Monitoring (REWM)	3.11-1
101	Reactor Scram System (SCRM)	3.9-1
131	Reactor Tank Internals and Supports (RTIS)	3.4-35
127	Reactor Tank Pressure Relief System (RPRS)	3.3-5
128	River Water and PAR Pond Pumps and Valves (RWPV)	3.4-27
114	Safety Related AC Circuits (SRAC)	3.7-5
120	Safety Related 125 VDC Power (SRDC)	3.7-9
118	Stack Air Activity Monitoring (SAAM)	3.10-5
102	Supplementary Safety System (SSS)	3.1-1

1.7.2 Numerical List of Plant Systems

		Page No.
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102	Supplementary Safety System (SSS)	3.1-1
103	Emergency Cooling System (ECS)	3.2-1
104	Airborne Activity Confinement System (AACS)	3.6-1
105	Emergency Electrical Power (EEP)	3.7-1
106	Compressed Air System (CAS)	3.8-1
107	Process Room Spray System (PRS)	3.4-1
108	Confinement Heat Removal System (CHR)	3.4-5
109	Process Water System (PWS)	3.2-6
110	Process Water Diesel Generator (PWDG)	3.4-9
111	Control and Safety Rod System (CRDS)	3.1-6

		Page No.
112	Cooling Water System (CWS)	3.4-13
113	Contaminated Water Removal and Disposal System (CWR)	3.10-1
114	Safety Related AC Circuits (SRAC)	3.7-5
115	Moderator Recovery System (MRS)	3.2-11
116	PW Pump and Motor Lubrication Oil System (PWLO)	3.4-17
117	Electric Load Shedding (LS)	3.4-20
118	Stack Air Activity Monitoring (SAAM)	3.10-5
119	Building Radiation Monitoring (BRM)	3.10-8
120	Safety Related 125 VDC Power (SRDC)	3.7-9
121	Discharged Assembly Cooling (DAC)	3.4-24
122	Blanket Gas System (BGS)	3.3-1
123	Cooling Water Gamma Monitoring (CWGM)	3.10-12
124	CCR Habitability System (CCRH)	3.9-5
125	Essential Equipment Monitoring (EEM)	3.7-12
126	Reactor Effluent Water Monitoring (REWM)	3.11-1
127	Reactor Tank Pressure Relief System (RPRS)	3.3-5
128	River Water and PAR Pond Pumps and Valves (RWPV)	3.4-27
129	Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)	3.4-30
130	Reactor Building	3.6-5
131	Reactor Tank Internals and Supports (RTIS)	3.4-35
132	Domestic and Fire Protection Water (DFW)	3.11-4

1.8 List of Emergency Plant Evolutions

1.8.1 Numerical List of Emergency Plant Evolutions

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201	SCRAM Condition Present and Reactor Power Above HLFM Downscale or Unknown (ATWS)	4.1-1
202	Inadvertent Reactivity Addition	4.1-4
203	Fuel Failure	4.1-7
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DATE: APRIL 26, 1990

PLANT-WIDE GENERIC: 001 Plant-Wide Generic

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Knowledge of how to conduct and verify valve lineups.	*	*	
K1.02	Knowledge of lock, tag and try procedures.	*	*	
K1.03	Knowledge of radiation protection standards and related plant radiation control requirements.	*	*	
K1.04	Knowledge of plant ALARA program.			
K1.05	Knowledge of plant security requirements for controlling access.			
K1.06	Knowledge of safety procedures related to rotating equipment.			
K1.07	Knowledge of safety procedures related to electrical equipment.			
K1.08	Knowledge of safety procedures related to high temperature.			
K1.09	Knowledge of safety procedures related to high pressure.			
K1.10	Knowledge of safety procedures related to caustic solutions.			
K1.11	Knowledge of safety procedures related to noise.			
K1.12	Knowledge of safety procedures related to confined spaces.			
K1.13	Knowledge of facility protection requirements, including fire brigade and portable fire-fighting equipment usage.	*	*	
K/A NO.	ABILITY			
A1.01	Ability to obtain and verify latest procedure revision copy.	*	*	
A1.02	Ability to execute procedural steps.	*	*	
A1.03	Ability to locate and use procedure and plant directives related to shift staffing and activities.			

K/A CATALOG: SRS

PLANT-WIDE GENERIC: 001 Plant-Wide Generic

		IMPORTANCE SRO	SUP	STE
A1.04	Ability to operate the plant phone, paging system, and two-way radio.			
A1.05	Ability to make accurate, clear, and concise verbal reports.	*	*	
A1.06	Ability to maintain accurate, clear and concise logs, records, status boards and reports.			
A1.07	Ability to obtain and interpret station reference material such as graphs, monographs, and tables which contain system performance data.			
A1.08	Ability to coordinate personnel activities inside the control room. (Supervisor Only)			
A1.09	Ability to coordinate personnel activities outside the control room. (Supervisor Only)			
A1.10	Ability to direct personnel activities inside the control room. (Supervisor Only)			
A1.11	Ability to direct personnel activities outside the control room. (Supervisor Only)			
A1.12	Ability to locate control room switches, controls, and indications, and to determine that they are correctly reflecting the desired plant lineup.	*	*	
A1.13	Ability to maintain process water plant chemistry within allowable limits.			
A1.14	Ability to use control and safety computers to obtain and evaluate parametric information on system and component status.			*
A1.15	Ability to take actions called for in the Emergency Procedures.		*	

DATE: APRIL 20, 1990

SYSTEM: 102 Supplementary Safety System (SSS)

TASK: Perform lineups on the supplementary safety system
Charge the supplementary safety system tanks
Place the supplementary safety system in standby readiness
Monitor the supplementary safety system
Inject poison solution into the reactor
Perform supplemental safety system component operability test
Perform supplemental safety system explosive valve inspection
Perform supplemental safety system automatic backup system annual test
Perform supplemental safety system discharge test
Perform supplemental safety system valve checks
Perform supplemental safety system check of alarm settings
Perform operability test of Supplementary Safety System Seismic Actuation Test
Monitor Supplementary Safety System Seismic Actuation System

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between SUPPLEMENTARY SAFETY SYSTEM and the following:	
K1.01	Reactor tank	
K1.02	Automatic backup shutdown - safety computer	*
K1.03	Gang temperature monitoring system	*
K1.04	Instrument air/nitrogen systems	
K1.05	Process water system	
K1.06	Confinement protection	
K1.07	Purification system	
K1.08	Neutron monitoring systems	*
K2	Knowledge of electrical power supplies to the following:	
K2.01	Explosive valves	
K2.02	Seismic Triggers	
K2.03	Solenoid Vent Valves	
K2.04	Level Instrumatation	
K2.05	Seismic Actuation Relays and Contacts	

K/A CATALOG: SRS

SYSTEM: 102 Supplementary Safety System (SSS)

		IMPORTANCE
K3	Knowledge of the effect that a loss or malfunction of the SUPPLEMENTARY SAFETY SYSTEM will have on the following:	
K3.01	Ability to shutdown the reactor in certain conditions	*
K4	Knowledge of Supplementary Safety System design feature(s) and/or interlocks which provide for the following:	
K4.01	Zero leakage to the reactor tank	
K4.02	Component and system testing	
K4.03	Indication of fault in explosive valve firing circuits	
K4.04	Dispersal of Ink upon injection into the reactor tank	
K4.05	Rapid Ink Injection	
K4.06	Controlled Ink Injection Rate	
K4.07	Leak detection	
K4.08	Storage tank level monitoring	
K4.09	Filling Ink Storage tank	
K5	Knowledge of the operational applications of the following concepts as they apply to SUPPLEMENTARY SAFETY SYSTEM:	
K5.01	Effects of moderator temperature coefficient on reactivity of the gadolinium nitrate	
K5.02	Power oscillations (as it pertains to gadolinium nitrate)	
K5.03	Shutdown margin	
K5.04	Explosive valve operation	
K5.05	Storage tank operation	
K5.06	Tank level measurement	
K5.07	SSS pull ring (manual backup shutdown)	*
K5.08	Redundant injection systems	*
K5.09	24-volt battery circuits	
K5.10	Seismic triggers	*
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following SUPPLEMENTARY SAFETY SYSTEM components:	
K6.01	Explosive valve circuit monitoring	
K6.02	Ink leakage detection system	
K6.03	SSS pull ring (Manual Backup Shutdown)	*
K6.04	Battery power supplies	
K6.05	Seismic Triggers	*

SYSTEM: 102 Supplementary Safety System (SSS)

		IMPORTANCE
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following SUPPLEMENTARY SAFETY SYSTEM components:	
K6.06	Explosive valves	*
K6.07	Solenoid Vent valves	
K6.08	INK Storage Tank	
K6.09	Level Instrumentation	
K6.10	Sparger block valves and indication	*
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the SUPPLEMENTARY SAFETY SYSTEM controls including:	
A1.01	Ink Storage Tank levels	
A1.02	Explosive valve indication	*
A1.03	Ink Storage tank pressures	*
A1.04	Valve operations	
A1.05	Reactor power	*
A1.06	Status lights and alarms	*
A1.07	SSS system lineup	
A1.08	Seismic Trigger Indication	*
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the SUPPLEMENTARY SAFETY SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Failure of the air/nitrogen system(s)	*
A2.02	Failure of the explosive valves to fire	*
A2.03	24-volt battery power supply failure	*
A2.04	Inadequate PW system flow	
A2.05	Valve closures	
A2.06	Valve openings	
A2.07	Failure to SCRAM	*
A2.08	Failure of Seismic Trigger	*
A3	Ability to monitor automatic operations of the SUPPLEMENTARY SAFETY SYSTEM including:	
A3.01	Storage tank pressure	*
A3.02	Explosive valve indication	*
A3.03	Lights and alarms	*
A3.04	System initiation	*
A3.05	Seismic Trigger actuation	*

SYSTEM: 102 Supplementary Safety System (SSS)

A4	Ability to manually operate and/or monitor in the control room:	IMPORTANCE
A4.01	Pull ring	*
A4.02	SSS from the nuclear console	*
A4.03	Reactor power	*
A4.04	Lights and alarms	*
A4.05	System initiation	*
A4.06	Explosive valve firing circuit status	*

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation	*
2.	Knowledge of system status criteria which require the notification of plant personnel	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies	*
4.	Knowledge of system purpose and/or function	*
5.	Knowledge of limiting conditions for operations and safety limits	*
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits	
7.	Knowledge of purpose and function of major system components and controls	*
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure	*
9.	Ability to locate and operate components, including local controls	*
10.	Ability to explain and apply all system limits and precautions	*
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	*
12.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures	*
13.	Ability to perform specific system and integrated plant procedures during all modes of operation	*

IMPORTANCE

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls..... *

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures..... *

DATE: April 20, 1990

SYSTEM: 111 Control and Safety Rod System (CRDS)

TASK: Latch and delatch control rod
Operate control rod to shape neutrons distribution (radially and axially)
De-energize the control rod drive system
Operate control rod manually
Establish initial conditions for reactor startup
Perform estimated critical position calculation
Manually trip the reactor (Monitor CR insertion)
Operate the control rod system to bring the reactor critical
Shift CR drive mode between automatic and manual gauge
Operate the CRS to lower power or to shutdown the reactor
Start-up and secure rod drive M/G sets
Perform shutdown margin calculations
Operate individual rods manually
Correct control rod Fault

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between CONTROL ROD AND SAFETY ROD SYSTEM and the following:	
K1.01	Process water system	
K1.02	Control computers	
K1.03	Reactor scram system	*
K1.04	Rod reversal system	
K1.05	Nuclear instrumentation system (neutron and temperature)	*
K1.06	Reactor Tank, Blanket gas system	*
K2	Knowledge of electrical power supplies to the following:	
K2.01	AG Drive motor	
K2.02	AH drive motor	
K2.03	Safety rod magnetic clutch	
K2.04	Position indication instrumentation	
K2.05	Rod reversal circuit	

K/A CATALOG: SRS

SYSTEM: 111 Control and Safety Rod System (CRDS)

		IMPORTANCE
K3	Knowledge of the effect that a loss or malfunction of the CONTROL ROD AND SAFETY ROD SYSTEM will have on the following:	
K3.01	Reactor power	*
K3.02	Flux distribution	*
K3.03	Shutdown margin	*
K3.04	Rod movement	*
K4	Knowledge of CONTROL ROD AND SAFETY ROD SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Control rod inoperability until safety rods withdrawn	
K4.02	Withdrawal of only one gang at a time	
K4.03	Control rod insertion upon a rod reversal signal	
K4.04	Control/safety rod insertion upon a reactor scram	*
K4.05	Limiting control rod speed	
K4.06	Rod sequence patterns	
K4.07	Snubbing to prevent rod or thimble damage	
K4.08	Control rod faults	
K5	Knowledge of the operational applications of the following concepts as they apply to CONTROL ROD AND SAFETY ROD SYSTEM:	
K5.01	Reactor criticality	*
K5.02	Reactor power control	*
K5.03	Flux distribution	*
K5.04	Tritium production in the rods	
K5.05	Rod worth variance	
K5.06	Rods effect shutdown margin	*
K5.07	Principles of operations of safety and control rod drives	
K5.08	Rod insertion limits	
K5.09	Interpretation of rod worth curves	
K5.10	Fission product poisoning and fuel depletion	*
K5.11	Temperature effects	*
K6	Knowledge of the applicable performance, design attributes and the effects of malfunction of the following CONTROL ROD AND SAFETY ROD SYSTEM components:	
K6.01	Rods and assemblies	
K6.02	Drive motors	
K6.03	Actuator	
K6.04	Indication and control instrumentation	*

SYSTEM: 111 Control Rod and Safety Rod System (CRDS)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the CONTROL ROD AND SAFETY ROD SYSTEM controls including:	
A1.01	Reactor power	*
A1.02	Flux distribution	*
A1.03	Rod position	*
A1.04	Blanket gas pressure	
A1.05	Reactor tank level	
A1.06	PWS temperature	*
A2	Ability to (a) predict the impacts of the following on the CONTROL ROD AND SAFETY ROD SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Drive motor failure	
A2.02	Septifoil valve closure	
A2.03	Power supply failures	
A2.04	Scram conditions	*
A2.05	Stuck rod	
A2.06	Unlatched rod	
A2.07	Single control rod drop	
A2.08	Loss of position indication	*
A2.09	Manual control system malfunction	
A2.10	Excessive scram time for a specific rod	
A3	Ability to monitor automatic operations of the CONTROL ROD AND SAFETY ROD SYSTEM including:	
A3.01	Reactor power	*
A3.02	Rod position	*
A3.03	Rod reversals	
A3.04	Rod movement interlocks	
A3.05	Latched rod or unlatched rod verification	*
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Drive motors	
A4.02	Rod positions	*
A4.03	Septifoil header flow	
A4.04	Gang toggle switches	*
A4.05	Gang pistol grip	*
A4.06	Master gang control	*

SYSTEM: 111 Control and Safety Rod System (CRDS)

		IMPORTANCE
A4	Ability to manually operate and/or monitor in the control room:	
A4.07	Trim units	
A4.08	ON/STOP trip switches	*
A4.09	Holding voltage negative pulse disconnect switch	*
A4.10	Safety rod UP/DOWN push buttons	*

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	*
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	*
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7.	Knowledge of purpose and function of major system components and controls.....	
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9.	Ability to locate and operate components, including local controls.....	*
10.	Ability to explain and apply all system limits and precautions.....	
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
13.	Ability to perform specific system and integrated plant procedures during all modes of operation.....	

SYSTEM: 111 Control and Safety Rod System (CRDS)

	IMPORTANCE
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 103 Emergency Cooling System (ECS)

TASK: Perform lineups on the emergency cooling system
Place the emergency cooling system in standby readiness.
Monitor operational sequence of emergency cooling system.
Secure the emergency cooling system
Monitor abnormal valve/pumps position alarm system
Perform ECS lineups with REMACS
Perform diesel booster pump start locally on battery circuit.
Perform emergency pump operability tests
Perform required system valve tests
Perform ECS actuation tests from AIA initiation
Perform strainer bypass opening torque checks
Perform a manual actuation of ECS

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between EMERGENCY COOLING SYSTEM and the following:	
K1.01	Cooling water system	
K1.02	Vent system	
K1.03	River water system	
K1.04	Process water system	*
K1.05	Automatic incident action system	*
K1.06	Hydraulic valve system	
K1.07	Booster pump	*
K1.08	Polybor Header	
K1.09	ECS valve leak collection system	
K1.10	Essential equipment monitor	
K1.11	REMACS	*
K1.12	Reactor tank level	*
K1.13	Load Shedding	
K1.14	Containment console	
K1.15	Supplementary Pressure relief	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Pumps	
K2.02	Valves	
K2.03	M2 Console	

K/A CATALOG: SRS

SYSTEM: 103 Emergency Cooling System (ECS)

		IMPORTANCE
K3	Knowledge of the effect that a loss or malfunction of the EMERGENCY COOLING SYSTEM will have on the following:	
K3.01	Reactor tank level	*
K3.02	Adequate core cooling	*
K4	Knowledge of EMERGENCY COOLING SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Automatic incident action logic	*
K4.02	Emergency cooling system injection sequence	*
K4.03	System redundancy	
K4.04	Polybor injection	
K4.05	Limit maximum ECS flow to prevent over stressing the inlet plenum	
K4.06	Maintain adequate core cooling, adequate assembly flow and tank level to prevent bulk boiling	*
K4.07	Cooling to secondary side of process water heat exchanger	
K4.08	System functioning after single active component failure	
K4.09	Provide required functioning upon loss of offsite power	
K4.10	Surveillance for all operable components	
K4.11	Pump and/or motor cooling	
K4.12	ECS Pump start interlock	*
K5	Knowledge of the operational applications of the following concepts as they apply to EMERGENCY COOLING SYSTEM:	
K5.01	Core cooling methods	*
K5.02	Valve interlocks	*
K5.03	Valve stroke times	
K5.04	Polybor injection	
K5.05	Cooling water system breaks	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following ECS components:	
K6.01	ECS pumps	
K6.02	Booster pump	
K6.03	Valves	
K6.04	Automatic Incident action	*
K6.05	Polybor Header	

SYSTEM: 103 Emergency Cooling System (ECS)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY COOLING SYSTEM controls including:	
A1.01	Reactor tank level	*
A1.02	ECS flow	*
A1.03	PW Plenum Pressure	
A1.04	Assembly Effluent Temperature	*
A1.05	Bldg. sump levels	
A1.06	Emergency bus loading	
A1.07	Polybor Header Pressure	
A1.08	Cooling water system pressure and flow	
A1.09	ECS valve position indications	*
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the EMERGENCY COOLING SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Inadequate net positive suction head	*
A2.02	Pump trips	*
A2.03	Valve closures	*
A2.04	Valve failure to open	*
A2.05	A.C. Power failure	
A2.06	D.C. Power failures	
A2.07	Generator failures	
A2.08	Inadequate system flow	*
A2.09	Reactor tank instrument failures	
A2.10	Motor operated valve failures	*
A2.11	Hydraulic operated valve failures	*
A2.12	Initiating logic failure	*
A2.13	Loss of pumping accident	*
A2.14	Loss of coolant accident	*
A3	Ability to monitor automatic operations of the EMERGENCY COOLING SYSTEM including:	
A3.01	Valve operation	*
A3.02	Pump start	*
A3.03	Pump discharge pressure	
A3.04	ECS system flow	*
A3.05	Reactor tank level	*
A3.06	Indicating lights and alarms	*

SYSTEM: 103 Emergency Cooling System (ECS)

		IMPORTANCE
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Pumps	*
A4.02	System valves	*
A4.03	Manual initiation controls	*
A4.04	System reset following automatic initiation	
A4.05	Reactor tank level	*
A4.06	PW Plenum pressure	
A4.07	ECS System flow	*
A4.08	Indicating lights and alarms	*
A4.09	Alternate ECS sources	*

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	*
5.	Knowledge of limiting conditions for operations and safety limits.....	*
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7.	Knowledge of purpose and function of major system components and controls.....	*
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9.	Ability to locate and operate components, including local controls.....	*
10.	Ability to explain and apply all system limits and precautions.....	*
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*

SYSTEM: 103 Emergency Cooling System (ECS)

	IMPORTANCE
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	*
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 109 PROCESS WATER SYSTEM (PWS)

TASK: Perform lineups on the PWS
Fill the PWS
Drain the PWS
Perform PWS water inventory
Monitor the PWS status and conditions
Start D.C. pumps
Start A.C. pumps
Monitor PWS pump operations

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the PROCESS WATER SYSTEM and the following:	
K1.01	Blanket Gas System	*
K1.02	Pressure Relief	
K1.03	Pump Seal System	
K1.04	Pump Lube Oil System	
K1.05	Leak Detection Systems	
K1.06	Over Flow System	
K1.07	Shield Deionized Water System	
K1.08	Cooling Water System	*
K1.09	Supplementary Safety System	*
K1.10	Leak Collection System	
K1.11	Purification System	
K1.12	Moderator Recovery System	
K1.13	Septifoil Cooling System	
K1.14	Emergency Cooling System	*
K1.15	Primary PWS supply to discharge Machine Cooling System	
K2	Knowledge of electrical power supplies to the following:	
K2.01	DC Pump Motor (Diesel Generator and start up batteries)	
K3	Knowledge of the effect that a loss or malfunction of the PROCESS WATER SYSTEM will have on the following:	
K3.01	Overflow System	
K3.02	Purification System	
K3.03	Discharge Machine Cooling System	

SYSTEM: 109 Process Water System (PWS)

		IMPORTANCE
K4	Knowledge of PROCESS WATER SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	PW flow startup	
K4.02	PW leak detection	
K4.03	Draining PWS loops	
K4.04	Control moderator pD	
K4.05	Charging and/or transferring moderator to circulating system	
K4.06	PW flow shutdown	
K4.07	PW valve interlocks	
K4.08	Draining the reactor tank	
K4.09	Filling the reactor tank	
K4.10	Detecting tank top leaks	
K4.11	Operation of system (loop) isolation valves	
K4.12	Overpressure protection	
K4.13	Moderator mixing and cooling	
K5	Knowledge of the operational applications of the following concepts as they apply to the PROCESS WATER SYSTEM:	
K5.01	Basic heat transfer concepts	
K5.02	Natural convection cooling	
K5.03	Relationship between pressure and temperature for moderator at saturation and subcooled conditions	
K5.04	Relationship between fuel assembly power and temperature differential across the fuel assembly	
K5.05	Consequences of forced circulation loss	*
K5.06	Reason for maintaining subcooling margin	*
K5.07	Need for monitoring fuel assembly thermocouples	*
K5.08	Corrosion control principles	
K5.09	Expected temperature levels in various locations of the PWS due to various plant conditions	
K5.10	Effect of intergranular attack on the PWS reactor tank	
K5.11	Contraction and expansion during heatup and cooldown	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following PWS components:	
K6.01	Components that may pose an unusually high radiologically hazard because of trapped crud	
K6.02	PW pump	*
K6.03	Reactor tank level indication	*
K6.04	Septifoil Cooling System	

K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following PWS components:	IMPORTANCE
K6.05	Valves	
K6.06	Sensors and detectors	
K6.07	Strainers	
K6.08	Controllers and positioners	
K6.09	Motors	*
K6.10	Breakers, relays, and disconnects	
K6.11	Expansion joints	
K6.12	Heat exchangers	*
K6.13	Reactor tank	*
K6.14	D_2O Plenum, spargers	*

K/A	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the PROCESS WATER SYSTEM controls including:	
A1.01	Blanket gas pressure	
A1.02	Overflow tank level	
A1.03	Bulk moderator temperature	*
A1.04	PWS flow	*
A1.05	Reactor power	*
A1.06	Reactor effluent temperature	*
A1.07	Fuel assembly average effluent temperature	*
A1.08	Fuel channel effluent temperature	*
A1.09	Radioactivity levels when venting reactor tank	
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the PROCESS WATER SYSTEM; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Loss of PWS inventory	*
A2.02	Loss of pressure blanket gas	
A2.03	Loss of force circulation	*
A2.04	Loss of heat sink	*
A3	Ability to monitor automatic operation of the PROCESS WATER SYSTEM including:	
A3.01	PWS leak detection system	*
A3.02	Confinement radiation monitoring system	

SYSTEM: 109 Process Water System (PWS)

A4 Ability to manually operate and/or monitor in the control room: IMPORTANCE

A4.01 PWS leakage calculation program using the computer and data sheets .....
A4.02 Indications necessary to verify forced circulation from appropriate level, flow, temperature indications and valve positions ..... *
A4.03 Indications and controls necessary to recognize and correct saturation conditions ..... *
A4.04 Overflow level of the PWS .....
A4.05 REMACS system ..... *

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits..... *

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions..... *

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications..... *

SYSTEM: 109 Process Water System (PWS)

	IMPORTANCE
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 115 Moderator Recovery System (MRS)

TASK: Perform lineups of the MRS
Fill and vent the MRS
Start up the MRS
Perform MRS MOV cycling tests
Perform operability checks of the MRS pumps
Perform gravity flow test of the MRS stowage tank
Operate the MRS
Shutdown the MRS
Monitor the MRS
Drain the MRS

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connection and/or cause-eff t relationships between the MRS and the following system:	
K1.01	PWS	*
K1.02	Blanket Gas System	
K1.03	Process building pumproom sumps	
K1.04	Near drain tank	
K1.05	Purification chem pumps	
K1.06	Blanket gas purification equipment	
K1.07	Ventilation system	
K1.08	Essential equipment monitor	
K1.09	Diagnostic Multiple Alarm system	
K2	Knowledge of Electrical power supplies to the following:	
K2.01	MRS pumps	
K2.02	MRS motor-operated valves	
K3	Knowledge of the effect that a loss or malfunction of the MRS will have on the following:	
K3.01	PWS	*
K3.02	ECS	
K3.03	Radiation release	
K3.04	Process Building pump room sumps	
K4	Knowledge of the MRS design feature(s) and/or interlocks which provide the following:	
K4.01	Mode of operation including flow limitations	
K4.02	Pump operating limitations	
K4.03	Function of Seal Leg	
K4.04	Protection from single active component failure	

K/A CATALOG: SRS

SYSTEM: 115 Moderator Recovery System (MRS)

K/A NO.		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to the MRS:	
K5.01	Reactivity effects of lightwater addition	
K5.02	Principle of loop seal operations	
K5.03	Liquid flow control methods	
K5.04	Vortexing while draining	
K5.05	Limitations on charge/discharge operations during MRS fill	*
K6	Knowledge of the applicable performance, and design attributes and the effects of malfunctions of the following MRS components:	
K6.01	MRS pump performance characteristics	
K6.02	Tanks	
K6.03	Valves	
K6.04	Pumps	
K6.05	Motors	
K6.06	Sensors and detectors	
K6.07	Controllers and positioners	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the MRS controls including:	
A1.01	MRS flow rate	*
A1.02	MRS storage tank level	*
A1.03	MRS storage tank pressure	
A1.04	Reactor tank level	*
A1.05	Process building pump room sumps	
A1.06	Reactor tank pressure	
A1.07	Diagnostic multiple alarm system	
A1.08	Activity monitors	
A1.09	Closed circuit T.V.	
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the MRS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	
A2.01	Failure mode for pressure, flow, pump motor amps, motor temperature, and tank level instrumentation	
A2.02	Pressure protection	
A2.03	MRS pump/motor malfunction	
A2.04	MRS valve malfunction	

SYSTEM: 115 Moderator Recovery System (MRS)

A3 Ability to monitor automatic operations of the MRS including: IMPORTANCE

A4 Ability to manually operate and/or monitor in the control room:

A4.01 Controls and indications for MRS pumps .....
A4.02 MRS flow .....
A4.03 Controls and indications for MRS water pumps .....
A4.04 Controls and indications for MRS valves .....

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits..... *

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

SYSTEM: 115 Moderator Recovery System (MRS)

	IMPORTANCE
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

DATE: APRIL 20, 1990

SYSTEM: 122 Blanket Gas System (BGS)

TASK: Manually supply helium to the BGS
Perform lineup of the BGS
Monitor radioactivity of the BGS
Monitor BGS pressure
Monitor the BGS helium and oxygen content

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the BLANKET GAS SYSTEM and the following:	
K1.01	PWS and PWS overflow	
K1.02	Blanket Gas Sampling	
K1.03	Ventilation	
K1.04	Head tank pump seal	
K1.05	Purification coolant return tank	
K1.06	Helium and oxygen supply	
K1.07	Pressure Relief System	
K1.08	Automatic Incident Action	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Gas blowers	
K2.02	BGS motor-operated valves	
K3	Knowledge of the effect that a loss or malfunction of the BLANKET GAS SYSTEM will have on the following:	
K3.01	Process Water System	*
K3.02	Airborne Activity Confinement System	
K3.03	Moderator Recovery System	
K3.04	SCRAM	*
K4	Knowledge of BLANKET GAS SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Fuel failure detection	*
K4.02	Prevent explosive gas mixtures	*
K4.03	Dilution of D2 gas	
K4.04	D2 Recombination	

K/A CATALOG: SRS

SYSTEM: 122 Blanket Gas System (BGS)

K/A NO.		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to the BLANKET GAS SYSTEM:	
K5.01	Radiological advantages of inert gas	
K5.02	Radiological decomposition	
K5.03	Gas recombination process	
K5.04	Gas analyzers	
K5.05	Maintain PWS subcooled	*
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following BLANKET GAS SYSTEM components:	
K6.01	Pressure detection system	
K6.02	Addition of makeup gas	
K6.03	Valves	
K6.04	Radiological monitors	
K6.05	Temperature detection systems	
K6.06	Sensors and detectors	
K6.07	Controllers and positioners	
K6.08	Moisture separators	
K6.09	Blowers	
K6.10	Recombiners	
K6.11	Gas Analyzers	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the BLANKET GAS SYSTEM controls including:	
A1.01	Helium and oxygen concentrations	
A1.02	D2 gas content	
A1.03	BGS pressure and temperature	
A1.04	Status lights and alarms	
A1.05	Radioactivity in gas stream	
A2	Ability to (a) predict the impacts of the following on the BLANKET GAS SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Blower failure	
A2.02	High Activity	*
A2.03	Gas analyzer failure	
A2.04	BGS valve malfunction	
A2.05	Automatic Incident Action	*

SYSTEM: 122 Blanket Gas System (BGS)

		IMPORTANCE
A3	Ability to monitor automatic operation of the BLANKET GAS SYSTEM including:	
A3.01	BGS temperature and pressure during operations	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	BGS pressure control	
A4.02	Helium and oxygen concentration	
A4.03	Status lights and alarms	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	*
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	*
7.	Knowledge of purpose and function of major system components and controls.....	
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9.	Ability to locate and operate components, including local controls.....	
10.	Ability to explain and apply all system limits and precautions.....	
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13.	Ability to perform specific system and integrated plant procedures during all modes of operation.....	

K/A CATALOG: SRS

SYSTEM: 122 Blanket Gas System (BGS)

	IMPORTANCE
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 127 Reactor Tank Pressure Relief System (RPRS)

TASK: Perform lineup on the Reactor Tank Pressure Monitor Relief System activation of the Reactor Tank Pressure Relief system

K/A NO.	KNOWLEDGE	
K1	Knowledge of the physical connections and/or cause-effect relationships between the REACTOR TANK PRESSURE RELIEF SYSTEM and the following:	
K1.01	Process Water System.....	
K1.02	Blanket gas system.....	
K1.03	Emergency cooling system.....	
K1.04	Plenum leak detection system.....	
K1.05	Contaminated liquid removal system.....	
K1.06	Guide tubes.....	
K2	Knowledge of electrical power supplies to the following:	
K3	Knowledge of the effect that a loss or malfunction of the REACTOR TANK PRESSURE RELIEF SYSTEM will have on the following:	
K3.01	Blanket Gas Pressure Control.....	*
K3.02	Reactor tank pressurization.....	
K3.03	Ability to rapidly depressurize the reactor tank.....	
K4	Knowledge of REACTOR TANK PRESSURE RELIEF SYSTEM design feature(s) and/or interlocks which provide the following:	
K4.01	Prevent system vacuum.....	
K4.02	Prevention of lifting top shield and plenum.....	
K4.03	Overpressure control.....	
K5	Knowledge of the operational applications of the following concepts as they apply to the REACTOR TANK PRESSURE RELIEF SYSTEM:	
K5.01	Principles of loop seal operation.....	
K5.02	Water column/gas pressure relationship.....	
K5.03	Vacuum breaker operation.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following REACTOR TANK PRESSURE RELIEF SYSTEM COMPONENTS:	
K6.01	Vacuum breaker.....	
K6.02	Gas relief tube.....	
K6.03	U Leg.....	*

K/A CATALOG: SRS

SYSTEM: 127 Reactor Tank Pressure Relief System (RPRS)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the REACTOR TANK PRESSURE RELIEF SYSTEM controls including:	
A1.01	Blanket gas pressure.....	*
A1.02	Reactor tank water level.....	
A1.03	U Leg level.....	
A2	Ability to (a) predict the impacts of the following on the REACTOR TANK PRESSURE RELIEF SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Large break LOCA.....	
A2.02	Loss of water level in U Leg.....	*
A2.03	Contaminated liquid removal system.....	
A3	Ability to monitor automatic operation of the REACTOR TANK PRESSURE RELIEF SYSTEM including:	
A3.01	Blanket gas pressure.....	*
A3.02	Reactor tank water level.....	
A3.03	Lights and alarms.....	
A4	Ability to manually operate and/or monitor in the control room:	

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....
2. Knowledge of system status criteria which require the notification of plant personnel.....
3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....
4. Knowledge of system purpose and/or function.....
5. Knowledge of limiting conditions for operations and safety limits.....
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....
7. Knowledge of purpose and function of major system components and controls.....

K/A CATALOG: SRS

SYSTEM: 127 Reactor Tank Pressure Relief System (RPRS)

	IMPORTANCE
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9. Ability to locate and operate components, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	

K/A CATALOG: SRS

DATE: April 20, 1990

SYSTEM: 107 Process Room Spray System (PRS)

TASK: Manually operate Process Room Spray
Operate Process Room Spray strainers
Perform Process Room Spray operability test
Perform line-up on Process Room Spray System.

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the PROCESS ROOM SPRAY SYSTEM and the following:	
K1.01	Well water system	*
K1.02	Service water system	*
K1.03	Cooling water system	*
K1.04	Discharge machine cooling and flushing	
K1.05	50-million gallon basin	
K1.06	Instrument air	
K1.07	Keep fill system	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Spray pumps	
K2.02	Motor operated valves	
K2.03	Service water pumps	
K2.04	Strainers	
K2.05	Spray nozzle Hydraulic Units	
K3	Knowledge of the effect that a loss or malfunction of the PROCESS ROOM SPRAY SYSTEM will have on the following:	
K3.01	Air Activity Confinement System	*
K3.02	Process water purity during charge/discharge	
K3.03	Fuel assembly cooling capability during charge/discharge	*
K4	Knowledge of PROCESS ROOM SPRAY SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Prevent overheating of dropped assembly	*
K4.02	Adequate spray coverage IE hydraulic nozzles and nozzle location	
K4.03	Cool Process Room air IE limit release due to carbon filters	*
K4.04	Minimum spray response time IE Keep full	
K4.05	Water Source redundancy	*

K/A CATALOG: SRS

SYSTEM: 107 Process Room Spray System (PRS)

		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to the PROCESS ROOM SPRAY SYSTEM:	
K5.01	Fuel assembly decay heat	*
K6	Knowledge of applicable performance designs attributes and the effects of malfunctions of the following PROCESS ROOM SPRAY SYSTEM components:	
K6.01	Spray Nozzles	
K6.02	Spray pumps	
K6.03	Strainers	
K6.04	Valves	
K6.05	Hydraulic units	
K6.06	Adjustable nozzle controls	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the PROCESS ROOM SPRAY SYSTEM(S) CONTROLS including:	
A1.01	Status lights and alarms	*
A1.02	Adjustable nozzle system control	
A1.03	Filters compartment temperature	*
A1.04	Process Room Airborne Radiation	*
A1.05	Spray Flow	
A2	Ability to (a) predict the impacts of the following on the process room spray system(s); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Dropped assembly	*
A2.02	Incident action	*
A2.03	Loss of redundant spray system water sources	*
A2.04	Loss of spray pumps	*
A2.05	Loss of instrumental air	
A3	Ability to monitor automatic operations of the PROCESS ROOM SPRAY SYSTEM including:	

SYSTEM: 107 Process Room Spray System (PRS)

		IMPORTANCE
A4	Ability to manually operate and/or monitor in the control room.	
A4.01	Adjustable nozzle controls	
A4.02	Master spray switch	*
A4.03	Individual spray switch	
A4.04	Spray flow	*
A4.05	Status lightes and alarms	*

System Generic K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	*
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge limiting conditions for operations and safety limits.....	*
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	*
7.	Knowledge of purpose and function of major system components and controls.....	
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9.	Ability to locate and operate components, including local controls.....	*
10.	Ability to explain and apply all system limits and precautions.....	
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedure.....	*
13.	Ability to perform specific system and integrated plant procedures during all modes of operation.....	

SYSTEM: 107 Process Room Spray System (PRS)

	IMPORTANCE
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: April 20, 1990

SYSTEM: 108 Confinement Heat Removal System (CHR)

TASK: Monitor CHR in standby readiness
Monitor Automatic operation of CHR (L Reactor)
Actuate CHR manually

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the CONFINEMENT HEAT REMOVAL SYSTEM and the following:	
K1.01	Disassembly basin	*
K1.02	REMACS	*
K1.03	Pump Room	*
K1.04	Disassembly Basin Makeup system	*
K1.05	Airborne activity Confinement System	*
K1.06	Reactor tank temperature	
K1.07	Reactor tank integrity	
K1.08	Diagnosis of multiple alarms	
K1.09	Process Building Pump Room systems	
K2	Knowledge of electrical power supplies to the following:	
K2.01	valves	
K3	Knowledge of the effect that a loss or malfunction of the CONFINEMENT HEAT REMOVAL SYSTEM will have on the following:	
K3.01	Airborne activity confinement system exhaust temperature	*
K3.02	Offsite radiation release rate	*
K3.03	Disassembly basin level	*
K3.04	Pump room level	
K4	Knowledge of CONFINEMENT HEAT REMOVAL SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Redundancy (allow operation with one active failure)	
K4.02	Evaporation of water drained from the disassembly basin to the -40 ft. level	*
K4.03	Continued cooling and shielding of assemblies in the disassembly basin	*
K4.04	Disabling system operation under conditions where its use is not required	

K/A CATALOG: SRS

SYSTEM: 108 Confinement Heat Removal System (CHR)

K/A NO.	K5 Knowledge of the operational applications of the following concepts as they apply to the CONFINEMENT HEAT REMOVAL SYSTEM:	IMPORTANCE
K5.01	Gravity flow of water as a function of head.....	
K5.02	Thermal desorption of Iodine from confinement filters	*
K5.03	Principles of fuel meltdown	
K5.04	Monitor pin operation	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following CONFINEMENT HEAT REMOVAL SYSTEM components:	
K6.01	Monitor pins	*
K6.02	Disassembly basin addition and makeup weir boxes	*
K6.03	Valves	
K6.04	Process building Pump Room	
K6.05	Nitrogen Gas Accumulator	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the CONFINEMENT HEAT REMOVAL SYSTEM.	
A1.01	Reactor Tank Level	*
A1.02	Process building pump room systems	*
A1.03	Activity monitors	*
A1.04	Diagnosis of multiple alarms	
A1.05	M-2 Console	*
A1.06	Disassembly basin level	*
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the CONFINEMENT HEAT REMOVAL SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Sump Pump operation	*
A2.02	Motor Room Flooding	
A2.03	Disassembly basin level	*
A3	Ability to monitor automatic operation of the CONFINEMENT HEAT REMOVAL SYSTEM including:	
A3.01	Fusible plugs in monitor Pins	*
A3.02	Actuation valve operation	*
A3.03	Disassembly basin level control	*

SYSTEM: 108 Confinement Heat Removal System (CHR)

	A4 Ability to manually operate and/or monitor in the control room.	IMPORTANCE
A4.01	Actuation valves	*
A4.02	Sump Pump	*
A4.03	Disassembly basin makeup operation	*
A4.04	Pump and motor room levels	*
A4.05	105 Building air temperature alarm	
A4.06	Levels Radioactivity	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation	*
2.	Knowledge of system status criteria which require the notification of plant personnel	*
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies	*
4.	Knowledge of system purpose and/or function	*
5.	Knowledge of limiting conditions for operations and safety limits	
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits	
7.	Knowledge of purpose and function of major system components and controls	*
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure	*
9.	Ability to locate and operate components, including local controls	*
10.	Ability to explain and apply all system limits and precautions	*
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	
12.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures	*
13.	Ability to perform specific system and integrated plant procedures during all modes of operation	*

IMPORTANCE

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

DATE: APRIL 20, 1990

SYSTEM: 110 Process Water Diesel Generator (PWDG)

TASK: Startup Process water diesel generators
Switching process water diesel generators
Placing process water diesel generator in standby
Shutting down process water diesel generator
Log Keeping

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the PROCESS WATER DIESEL GENERATOR and the following:	
K1.01	Process water pump AC motors	*
K1.02	Process water pump DC motors	*
K1.03	Cooling water system	
K1.04	Instrument air system	
K1.05	Station Battery	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Breaker Control Power	
K2.02	Fuel oil pumps	
K2.03	Lube oil pumps	
K2.04	Battery charger	
K2.05	Generator flash field	
K3	Knowledge of the effect that a loss or malfunction of the PROCESS WATER DIESEL GENERATOR will have on the following:	
K3.01	Process water system	*
K4	Knowledge of PROCESS WATER DIESEL GENERATOR design feature(s) and/or interlocks which provide for the following:	
K4.01	Generator trips	
K4.02	Field flashing	
K4.03	Governor control	
K4.04	Containment operations	*
K5	Knowledge of the operational applications of the following concepts as they apply to the PROCESS WATER DIESEL GENERATOR:	
K5.01	Load Control	
K5.02	Loss of Circulation flow	*
K5.03	Governor control	
K5.04	Relationship between generator load and process water flow	

K/A CATALOG: SRS

SYSTEM: 110 Process Water Diesel Generator (PWDG)

K/A NO.	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following PROCESS WATER DIESEL GENERATOR components:	IMPORTANCE
K6.01	Breakers	
K6.02	Fuel oil pumps	
K6.03	Lube oil pumps	
K6.04	Battery charger	
K6.05	Cooling Water system	
K6.06	D.C. power	
K6.07	32 volt battery	
K6.08	Process water diesel generator cooling water system	
K6.09	Process water diesel generator fuel oil supply system	
K6.10	Process water diesel generator lube oil system	
K6.11	Process water diesel generator starting system	
K6.12	Jumpers	
K6.13	Woodward Governor	

K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the PROCESS WATER DIESEL GENERATOR controls including:	
A1.01	Lube oil temperature	
A1.02	Fuel consumption rate	
A1.03	Operating voltages, currents, temperatures	
A1.04	Generator Load	
A1.05	Cylinder temperature differential	
A1.06	Cooling water temperature	
A1.07	Engine speed	
A1.08	Process water flow	
A2	Ability to (a) predict the impacts of the following on the PROCESS WATER DIESEL GENERATOR; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Overspeed	
A2.02	Operating unloaded	
A2.03	Containment operations	*
A2.04	Failure of Battery charger	
A2.05	Loss of instrument air	
A2.06	Loss of lube oil	

SYSTEM: 110 Process Water Diesel Generator (PWDG)

		IMPORTANCE
A3	Ability to monitor automatic operations of the PROCESS WATER DIESEL GENERATOR including:	
A3.01	Indicating lights, meters, and recorders	
A3.02	Cooling water system operations	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Status lights and alarms	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7.	Knowledge of purpose and function of major system components and controls.....	
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9.	Ability to locate and operate components, including local controls.....	*
10.	Ability to explain and apply all system limits and precautions.....	
11.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*

SYSTEM: 110 Process Water Diesel GeneratOR (PWDG)

	IMPORTANCE
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 112 Cooling Water System (CWS)

TASK: Perform lineups of the CWS
Perform CWS valve tests
Fill and vent the CWS
Perform CWS pump test
Start up the CWS system
Operate CWS pumps in various configurations
Isolate CWS from individual components
Shutdown the CWS
Perform CWS flow path verification
Perform alternate CWS flowpath lineups

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between COOLING WATER SYSTEM and the following:	
K1.01	Process water system	*
K1.02	Cooling water system	
K1.03	Shield system	
K1.04	Disassembly basin	
K1.05	Process room spray system	*
K1.06	Emergency Cooling System	*
K1.07	Emergency Cooling Water (ECW) pump	
K1.08	Storm sewers, diversion boxes	
K1.09	Process water pump/motor cooling system	*
K1.10	Oxalic acid addition system	
K1.11	Effluent sumps	
K1.12	Electric load shedding system	
K1.13	REMACS	*
K2	Knowledge of electrical power supplies to the following:	
K2.01	CWS valves	
K2.02	CWS pumps	
K2.03	Emergency Cooling Water (EWC) pumps	
K2.04	Effluent sump pumps	
K3	Knowledge of the effect that a loss or malfunction of the COOLING WATER SYSTEM will have on the following:	
K3.01	Ability to remove heat from the PWS and its components	*
K3.02	Emergency Cooling System	*
K3.03	Secondary loads cooled by CWS	

K/A CATALOG: SRS

SYSTEM: 112 Cooling Water System (CWS)

K/A NO.		IMPORTANCE
K4	Knowledge of COOLING WATER SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Cooling with loss of offsite power	
K4.02	Prevent freezing of PW	*
K4.03	Limiting potential reactivity effects due to moderator temperature changes	
K4.04	Backup supply to the Emergency Cooling Water system	*
K4.05	Establishment of CW recirculation upon a loss of river supply	*
K4.06	Gravity flow	*
K4.07	Pump protection	
K5	Knowledge of the operational applications of the following concepts as they apply to COOLING WATER SYSTEM:	
K5.01	Purpose of venting system when draining or filling	
K5.02	Pump cavitation	
K5.03	Pressure measurements	
K5.04	Heat exchanger operation	
K5.05	Water hammer	
K6	Knowledge of the applicable performance, design attributes and the effect of malfunction of the following COOLING WATER SYSTEM components:	
K6.01	Basin/makeup	*
K6.02	Instrument air supplied valves	
K6.03	Hydraulically operated valves	
K6.04	Electrically operated valves	
K6.05	190 bldg pumps	
K6.06	All heat exchangers	
K6.07	Sensors and detectors	
K6.08	Controllers and positioners	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the COOLING WATER SYSTEM controls including:	
A1.01	CWS flow, temperature and pressure	
A1.02	Process water temperature	
A1.03	Air compressors performance	
A1.04	Diesel generators performance	
A1.05	Shield system heat exchanger performance	
A1.06	Effluent sump level	
A1.07	Reactor power	
A1.08	Gamma monitor levels	

K/A CATALOG: SRS

SYSTEM: 112 Cooling Water System (CWS)

		IMPORTANCE
A2	Ability to (a) predict the impacts on the following on the COOLING WATER SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Low basin level	
A2.02	Pump trips	
A2.03	Valve malfunctions	
A2.04	Emergency generator failures	
A2.05	Loss of PWS coolant	*
A2.06	Loss of, or inadequate, heat exchanger cooling flow	*
A2.07	Loss or malfunction of instrumentation	
A2.08	Loss of CWS line integrity	*
A2.09	High radiation level in heat exchanger effluent	
A3	Ability to monitor automatic operations of the COOLING SYSTEM including:	
A3.01	Gravity cooling water flow	
A3.02	Pump discharge valves	
A3.03	CWS components operation associated with load shedding.....	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Pumps	
A4.02	Valves	
A4.03	Individual heat exchanger flow	
A4.04	CWS header flow and pressure	
A4.05	CWS SCRAMS	
A4.06	REMACS	*
A4.07	Basin level	
A4.08	CW gamma monitor	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	*

SYSTEM: 112 Cooling Water System (CWS)

	IMPORTANCE
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate components, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	*
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

DATE: APRIL 20, 1990

SYSTEM: 116 PW Pump & Motor Lubrication Oil System (PWLO)

TASK: Start the PW pump and motor A.C. lube oil pumps
Monitor the operation of the PW pump & motor lube oil system
Adjust cooling water to the bearing lube oil cooler

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the PW PUMP & MOTOR LUBRICATION OIL SYSTEM and the following:	
K1.01	Process water pump bearings	
K1.02	Process water pump motor bearings	
K1.03	Process water pump gear reducer	
K1.04	Cooling water system	
K1.05	PW pump motors	
K1.06	Control computer	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Auxiliary lube oil pump	
K3	Knowledge of the effect that a loss or malfunction of the PW PUMP & MOTOR LUBRICATION OIL SYSTEM will have on the following:	
K3.01	Process Water A.C. pumps/motors	
K3.02	Process Water D.C. pumps/motors	
K3.03	Sensors and detectors	
K4	Knowledge of PW PUMP & MOTOR LUBRICATION OIL SYSTEM design feature(s) and/or interlocks which provide the following:	
K4.01	Adequate lubrication of the PW pump & motor	*
K5	Knowledge of the operational applications of the following concepts as they apply to the PW PUMP & MOTOR LUBRICATION OIL SYSTEM:	
K5.01	Method used to prevent PW pump shaft seizure	*

SYSTEM: 116 PW Pump & Motor Lubrication Oil System (PWLO)

K/A NO.		IMPORTANCE
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following PW PUMP & MOTOR LUBRICATION OIL SYSTEM components:	
K6.01	Loss of lube oil cooling water	
K6.02	Failure of PWS pump gear changer	
K6.03	Breakers and relays	
K6.04	Filters	
K6.05	Non-reversing clutch	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the PW PUMP & MOTOR LUBRICATION OIL SYSTEM controls including:	
A1.01	PW pump vibration	
A1.02	PW pump and motor bearing temperature	
A1.03	PWS pump gear reducer oil reservoir levels	
A1.04	Lube oil flow	
A2	Ability to (a) predict the impacts of the following on the PW PUMP & MOTOR LUBRICATION OIL SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Problems associated with pump and motor bearing temperatures	
A3	Ability to monitor automatic operation of the PW PUMP & MOTOR LUBRICATION OIL SYSTEM including:	
A3.01	Auxiliary lube oil pump operation	
A3.02	Lube oil temperature	
A3.03	Status lights and alarms	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Control computer	
A4.02	Status lights and alarms	

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

SYSTEM: 116 PW Pump & Motor Lubrication Oil System (PWLO)

	IMPORTANCE
2. Knowledge of system status criteria which require the notification of plant personnel.....	
3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....	
4. Knowledge of system purpose and/or function.....	
5. Knowledge of limiting conditions for operations and safety limits.....	
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9. Ability to locate and operate components, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 117 Electric Load Shedding (LS)

TASK: Perform Load Shed Functional Test
Monitor Load Shed For Proper Operation

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the ELECTRIC LOAD SHEDDING SYSTEM and the following:	
K1.01	115 kV site grid.....	
K1.02	Safety computers.....	
K1.03	Process Water pumps.....	*
K1.04	Cooling Water pumps	*
K1.05	Emergency GM diesel generators.....	*
K1.06	PAR pond cooling water pumps.....	
K1.07	River pumphouse cooling water pumps.....	
K1.08	Diesel driven booster pump.....	
K1.09	Emergency cooling water pumps.....	
K2	Knowldege of electrical power supplies to the following:	
K2.01	Load shedding panel.....	
K3	Knowledge of the effect that a loss or malfunction of the ELECTRIC LOAD SHEDDING SYSTEM will have on the following:	
K3.01	115 kV site grid frequency/voltage.....	
K3.02	SRS generating facilities.....	
K3.03	13.8 kV distri ution system.....	
K3.04	Reactor building emergency electrical power systems.....	*
K4	Knowledge of ELECTRIC LOAD SHEDDING SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	System actuation.....	*
K4.02	Prevention of unscheduled reactor shutdowns.....	
K4.03	Pump operability checks.....	
K4.04	Reactor shutdown checks.....	*

SYSTEM: 117 Electric Load Shedding (LS)

K5	Knowledge of the operational applications of the following concepts as they apply to the ELECTRIC LOAD SHEDDING SYSTEM:	
K5.01	Effect on electrical components of reduced voltage.....	
K5.02	Effect on electrical components of reduced frequency.....	
K5.03	Core Cooling.....	*
K6	Knowledge of the applicable performance design and attributes the effects of malfunctions of the following ELECTRIC LOAD SHEDDING SYSTEM components:	
K6.01	Load shedding panel.....	
K6.02	Grid frequency sensors.....	
K6.03	Pump operability sensors.....	
K6.04	Emergency GM diesel generator start relays.....	*
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the ELECTRIC LOAD SHEDDING SYSTEM controls including:	
A1.01	Effect on instrumentation and controls of switching power supplies.....	
A1.02	Bus voltage.....	
A1.03	Bus frequency.....	
A2	Ability to (a) predict the impacts of the following malfunctions on the LOAD SHEDDING SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigage the consequences of those abnormal conditions or operations:	
A2.01	Loss of 230 kV purchased power.....	
A2.02	Loss of 115 kV site generated power.....	
A2.03	Drop in Grid frequency.....	
A3	Ability to monitor automatic operations of the LOAD SHEDDING SYSTEM including:	
A3.02	Reactor plant status.....	*
A3.02	Breaker position.....	
A3.03	Status of the emergency GM diesel generators.....	*
A3.04	Process water pumping capacity.....	*
A3.05	Cooling water pumping capacity.....	*

SYSTEM: 117 Electric Load Shedding (LS)

	A4 Ability to manually operate and/or monitor in the control room:	IMPORTANCE
A4.01	Emergency GM diesel generator.....	
A4.02	Bus frequency.....	
A4.03	Bus voltage.....	
A4.04	Assembly effluent temperature monitoring.....	*
A4.05	Process water flow.....	*
A4.06	Cooling water flow.....	*

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....
2. Knowledge of system status criteria which require the notification of plant personnel.....
3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *
4. Knowledge of system purpose and/or function.....
5. Knowledge of limiting conditions for operations and safety limits.....
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....
7. Knowledge of purpose and function of major system components and controls.....
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure..... *
9. Ability to locate and operate components, including local controls..... *
10. Ability to explain and apply all system limits and precautions.....
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....

SYSTEM: 117 Electric Load Shedding (LS)

IMPORTANCE

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal conditions control procedures..... *

DATE: APRIL 20, 1990

SYSTEM: 121 Discharged Assembly Cooling System (DAC)

TASK: Perform support activities with associated irradiated assembly handling

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between DAC and the following:	
K1.01	Disassembly Basin	
K1.02	Irradiated components	
K1.03	Emergency cooling water system	
K1.04	Process room water seal	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Clarified water pumps	
K2.02	Secondary light water (CW) pump	
K2.03	PW chem pumps	
K3	Knowledge of the effect that a loss or malfunction of the DAC will have on the following:	
K3.01	Area radiation levels	
K3.02	Fuel assembly cooling	*
K3.03	Fuel handling operations	
K3.04	Emergency cooling water system	
K4	Knowledge of DAC design feature(s) and/or interlocks which provide for the following:	
K4.01	Radiation protection	
K4.02	Discharge machine irradiated assembly cooling	*
K5	Knowledge of the operational applications of the following concepts as they apply to DAC:	
K5.01	Discharge machine irradiated assembly cooling	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following DAC components:	
K6.01	Clarified water pumps	
K6.02	Secondary light water (CW) pump	
K6.03	PW chem pumps	

SYSTEM: 121 Discharged Assembly Cooling System (DAC)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the DAC equipment including:	
A1.01	Process water flow	
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the DAC; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Loss of PW and CW Cooling pumps	
A2.02	Process water supply	
A2.03	A.C. electrical power failures	
A3	Ability to monitor automatic operations of the DAC including:	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Area radiation monitoring	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7.	Knowledge of purpose and function of major system components and controls.....	
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	

SYSTEM: 121 Discharged Assembly Cooling System (DAC)

IMPORTANCE

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 128 River Water and PAR Ponds Pumps and Valves (RWPV)

TASK: Maintain CW basin level
Monitor automatic operation of the River Water system

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the RIVER WATER AND PAR POND PUMPS AND VALVES and the following:	
K1.01	CW basin	
K1.02	Cooling Water system.....	
K1.03	Load shedding.....	
K1.04	Emergency Cooling Water system.....	
K1.05	Service Water system.....	
K1.06	River pumphouse valve hydraulics.....	
K1.07	CW pumphouse and water plant air system	
K2	Knowledge of electrical power supplies to the following:	
K2.01	River water pumps.....	
K3	Knowledge of the effect that a loss or malfunction of the RIVER WATER AND PAR POND PUMPS AND VALVES will have on the following:	
K3.01	Cooling water system.....	
K3.02	Process water system.....	
K3.03	Service water system.....	
K3.04	Emergency cooling water system.....	
K4	Knowledge of RIVER WATER AND PAR POND PUMPS AND VALVES design feature(s) and/or interlocks which provide for the following:	
K4.01	Control of CW basin level.....	
K4.02	River water system redundancy.....	
K5	Knowledge of the operational applications of the following concepts as they apply to the RIVER WATER AND PAR POND PUMPS AND VALVES:	
K5.01	CW basin water usage requirements.....	

K/A CATALOG: SRS

SYSTEM: 128 River Water and PAR Ponds Pumps and Valves (RWPV)

K/A NO.	ABILITY	IMPORTANCE
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following RIVER WATER AND PAR POND PUMPS AND VALVES COMPONENTS:	
K6.01	RWS Distribution Header.....	
A1	Ability to predict and/or monitor changes in parameters associated with operating the RIVER WATER AND PAR POND PUMPS AND VALVES controls including:	
A1.01	CW basin level.....	
A1.02	Cooling water system flow.....	
A1.03	Emergency cooling water system flow.....	
A1.04	RWS Header Pressure.....	
A2	Ability to (a) predict the impacts of the following on the RIVER WATER AND PAR POND PUMPS AND VALVES; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Failure of CW basin remote level control.....	
A2.02	Loss of river water supply for a sustained period.....	*
A2.03	Low CW basin level.....	
A3	Ability to monitor automatic operations of the RIVER WATER AND PAR POND PUMPS AND VALVES including:	
A3.01	River water system pressure.....	
A3.02	CW basin level.....	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	River water header pressure.....	
A4.02	CW basin level.....	

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

SYSTEM: 128 River Water and PAR Ponds Pumps and Valves (RWPV)

IMPORTANCE

3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits.....

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures..... *

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: --129 Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)

TASK:
Perform lineups on DB/DBCF
Monitor DB/DBCF
Stop DBCF
Startup DBCF
Fill the disassembly basin
Startup the DBCF in different pump/heat exchanger combinations
Perform disassembly basin purification using filter
Perform disassembly basin deionizing
Backwash sand filters
Perform sludge removal from the settler tank
Perform decay heat removal using DBC
Perform disassembly basin purge and makeup
Perform VTS and machine basin water lineups using sandfilters
Perform skimmer operations
Perform particulate removal from the basin
Perform coagulant addition to the basin
Perform purging to remove tritium
Monitor pH of disassembly basin
Perform chemical additions to basin
Drain the disassembly basin

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION SYSTEM and the following:	
K1.01	Irradiated components.....	
K1.02	Process room.....	
K1.03	Discharge machine.....	
K1.04	Confinement heat removal.....	
K1.05	Process sewer.....	
K1.06	Basin purge and makeup.....	
K1.07	Settler tank.....	
K1.08	Tank trailer.....	
K1.09	50,000,000 gallon basin.....	
K1.10	Plant air systems.....	
K1.11	River water system.....	
K1.12	Cooling water system.....	
K1.13	Nuclear Incident monitor.....	*

K/A CATALOG: SRS

SYSTEM: 129 Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)

		IMPORTANCE
K2	Knowledge of electrical power supplies to the following:	
K2.01	Basin pumps	
K2.02	Heat exchanger cooling supply pumps	
K2.03	Valves	
K2.04	Filter system supply pumps	
K3	Knowledge of the effect that a loss or malfunction of the DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION SYSTEM will have on the following:	
K3.01	Decay heat removal	*
K3.02	Irradiated component cooling	
K3.03	Discharge machine	
K3.04	Confinement heat removal system	
K3.05	Radiation shielding	*
K3.06	Emergency cooling water system	
K3.07	Process room ventilation seal	
K3.08	Water quality	
K3.09	Area radiation levels	
K3.10	Disassembly basin fission product concentration	
K3.11	Disassembly basin temperature	
K3.12	Disassembly basin water level	*
K3.13	Disassembly basin clarity	
K3.14	Discharging operations	
K4	Knowledge of DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Sludge removal	
K4.02	Maintaining adequate basin temperature	
K4.03	Maintaining adequate basin level	
K4.04	Supplemental heat removal capabilities	
K4.05	Redundancy	
K4.06	Basin clarity	
K4.07	Water quality control	
K4.08	Radiation Protection	
K4.09	Process room ventilation integrity	
K4.10	Emergency cooling water supply	
K4.11	Basin overflow	

SYSTEM: 129 Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)

K/A NO.		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION SYSTEM:	
K5.01	Heat removal mechanisms.....	
K5.02	Pump cavitation.....	
K5.03	Discharge assembly decay heat generation.....	
K5.04	Shielding.....	
K5.05	Filtration operation.....	
K5.06	Water quality control.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION SYSTEM Components:	
K6.01	Basin overflow weirs.....	
K6.02	Deionizers.....	
K6.03	Disassembly Basin Circulation pumps.....	
K6.04	Heat exchanger cooling supply pumps.....	
K6.05	Vertical tube storage basin.....	
K6.06	Deposit and Exit canal.....	
K6.07	Sandfilters.....	
K6.08	Filter system supply pumps.....	
K6.09	Settler Tank.....	
K6.10	Heat exchanger tube failure.....	
K6.11	Recycle pump.....	
K6.12	Air scrub fan.....	
K6.13	Chem addition pump.....	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION controls including:	
A1.01	Basin level.....	
A1.02	Basin temperature.....	
A1.03	Pump discharge pressures.....	
A1.04	Settler tank level.....	
A1.05	Filter differential pressures.....	
A1.06	Radiation levels.....	
A1.07	Basin chemistry.....	
A1.08	Basin clarity.....	
A1.09	Basin activity levels.....	

SYSTEM: 129 Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)

A2 Ability to (a) predict the impacts of the following on the DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:

IMPORTANCE

A2.01 High basin level.....
A2.02 Low basin level.....
A2.03 Pump trip.....
A2.04 Valve closures.....
A2.05 Valve openings.....
A2.06 High basin temperatures.....
A2.07 River water system supply failures.....
A2.08 Cooling water system supply failures.....
A2.09 Emergency cooling water system aligned to disassembly basin.....
A2.10 Inadequate basin chemistry.....
A2.11 Low basin clarity.....
A2.12 High filter differential pressures.....
A2.13 Loss of Instrument Air.....

A3 Ability to monitor automatic operations of the DISASSEMBLY BASIN AND DISASSEMBLY BASIN COOLING AND FILTRATION SYSTEM including:

A3.01 Valve operation.....
A3.02 Pump trips.....
A3.03 System indicating lights and alarms.....

A4 Ability to manually operate and/or monitor in the control room:

A4.01 Disassembly basin level.....
A4.02 Nuclear Incident Monitor.....
A4.03 Temperature.....

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....

4. Knowledge of system purpose and/or function.....

SYSTEM: 129 Disassembly Basin and Disassembly Basin Cooling and Filtration System (DB/DBCF)

IMPORTANCE

5. Knowledge of limiting conditions for operations and safety limits.....

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 131 Reactor Tank Internals and Supports (RTIS)

TASK:

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the REACTOR TANK INTERNALS AND SUPPORTS and the following:	
K1.01	Process water system.....	
K1.02	Control Rod and Rod Reversal.....	
K1.03	Moderator Recovery.....	
K1.04	Supplemental safety system.....	
K1.05	Blanket Gas.....	
K1.06	Reactor Tank Pressure Relief.....	
K2	Knowledge of electrical power supplies to the following:	
K3	Knowledge of the effect that a loss or malfunction of the REACTOR TANK INTERNALS AND SUPPORTS will have on the following:	
K3.01	Tank water level.....	
K3.02	Tank pressure.....	
K3.03	Bulk moderator cooling.....	
K3.04	Plant radiation levels.....	
K3.05	Ink Injections.....	
K4	Knowledge of REACTOR TANK INTERNALS AND SUPPORTS design feature(s) and/or interlocks which provide for the following:	
K4.01	Separation of fluid flow paths within the core.....	
K4.02	Core orificing.....	
K5	Knowledge of the operational applications of the following concepts as they apply to the REACTOR TANK INTERNALS and SUPPORTS:	
K5.01	Thermal Limits.....	
K5.02	Tweld Stress.....	*
K5.03	Forced flow and convective heat transfer.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following REACTOR TANK INTERNALS AND SUPPORT components:	
K6.01	Sparjets.....	
K6.02	Septifoils.....	

K/A CATALOG: SRS

SYSTEM: 131 Reactor Tank Internals and Supports (RTIS)

K6 Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following REACTOR TANK INTERNALS AND SUPPORT components:

		IMPORTANCE
K6.03	Safety Rod Thimbles	
K6.04	Semi Permanent sleeves	
K6.05	T Welds	*
K6.06	Top Shield	

K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the REACTOR TANK INTERNALS AND SUPPORTS controls including:	
A2	Ability to (a) predict the impacts of the following on the REACTOR TANK INTERNALS AND SUPPORTS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Control rod drop	
A2.02	Excessive heatup/cooldown rate	*
A3	Ability to monitor automatic operations of the REACTOR TANK INTERNALS AND SUPPORTS including:	
A4	Ability to manually operate and/or monitor in the control room:	

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation
2. Knowledge of system status criteria which require the notification of plant personnel
3. Knowledge of which events related to system operation/ status should be reported to outside agencies
4. Knowledge of system purpose and/or function
5. Knowledge of limiting conditions for operations and safety limits
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits
7. Knowledge of purpose and function of major system components and controls

K/A CATALOG: SRS

SYSTEM: 131 Reactor Tank Internals and Supports (RTIS)

	IMPORTANCE
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate components, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	*
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal conditions control procedures.....	

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 104 Airborne Activity Confinement System (AACS)

TASK: Perform lineups on the airborne activity confinement system
Replacement of containment filters
Operate ventilation fans
Perform functional check, test and inspections

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the AIRBORNE ACTIVITY CONFINEMENT SYSTEM and the following:	
K1.01	Compress Air System	
K1.02	Automatic incident action system	*
K1.03	Process room	
K1.04	Motor room	
K1.05	Heat exchanger rooms	
K1.06	Pump room	
K1.07	Purification area/crane maintenance area	
K1.08	Contaminated water storage tank systems	*
K1.09	Assembly area HVAC	
K1.10	Activity monitors	*
K1.11	Confinement Heat Removal System (CHRS)	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Exhaust fans	
K2.02	Supply fans	
K2.03	Dampers	
K2.04	K damper emergency air compressors	
K2.05	Main exhaust fans from EG sets	
K3	Knowledge of the effect that a loss or malfunction of the AIRBORNE ACTIVITY CONFINEMENT SYSTEM will have on the following:	
K3.01	Atmosphere to process room differential pressure	*
K3.02	Atmosphere to motor room differential pressure	*
K3.03	Atmosphere to pump room differential pressure	*
K3.04	Off-site release	*

K/A CATALOG: SRS

SYSTEM: 104 Airborne Activity Confinement System (AACS)

		IMPORTANCE
K4	Knowledge of AIRBORNE ACTIVITY CONFINEMENT SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Moisture removal	
K4.02	Radioactive particulate filtration	
K4.03	Charcoal filter Iodine removal	
K4.04	Automatic realignment due to incident action	*
K4.05	Damper interlocks	*
K4.06	Fan interlocks	*
K5	Knowledge of the operational applications of the following concepts as they apply to the AIRBORNE ACTIVITY CONFINEMENT SYSTEM:	
K5.01	Principles of fan and damper operation	
K5.02	Characteristic of filter operations	
K5.03	Radiation detector theory	
K6	Knowledge of the applicable performance, design attributes and the effect of malfunctions of the following AIRBORNE ACTIVITY CONFINEMENT SYSTEM components:	
K6.01	Fans	
K6.02	Dampers	
K6.03	Filters	
K6.04	Plenums	
K6.05	Emergency air compressors (K dampers)	
K6.06	EG sets	
K6.07	Activity monitors	
K6.08	Instrumentation and Controls	
K/A NO.	ABILITY	
A1.	Ability to predict and/or monitor changes in parameters associated with operating the AIRBORNE ACTIVITY CONFINEMENT SYSTEM controls including:	
A1.01	System flows	
A1.02	Process room differential pressure	
A1.03	Motor room differential pressure	
A1.04	Pump room differential pressure	
A1.05	Actuator tower to process room differential pressure	
A1.06	105 Building temperature alarm	

SYSTEM: 104 Airborne Activity Confinement System (AACS)

		IMPORTANCE
A2	Ability to (a) predict the impacts of the following on the AIRBORNE ACTIVITY CONFINEMENT SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Low system flow	
A2.02	High system flow	
A2.03	High building temperature	
A2.04	Fan trips	
A2.05	Damper closures	
A2.06	Electrical failure	
A2.07	Compressed Air System failure	
A2.08	Automatic Incident Action	*
A3	Ability to monitor automatic operations of the AIRBORNE ACTIVITY CONFINEMENT SYSTEM including:	
A3.01	Normal system operations	
A3.02	Incident action	*
A3.03	Confinement Heat Removal System Operations	*
A3.04	Plant shutdown operations	
A3.05	EG set operations	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Fans	*
A4.02	Dampers	*
A4.03	Off-site release levels	*
A4.04	Flow	*
A4.05	Differential pressure	*
A4.06	Building temperature alarm	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation	*
2.	Knowledge of system status criteria which require the notification of plant personnel	*
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies	*
4.	Knowledge of system purpose and/or function	*
5.	Knowledge of limiting conditions for operations and safety limits	*

K/A CATALOG: SRS

SYSTEM: 104 Airborne Activity Confinement System (AACS)

	IMPORTANCE
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	*
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9. Ability to locate and operate components, including local controls.....	*
10. Ability to explain and apply all system limits and precautions.....	*
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	*
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

DATE: APRIL 20, 1990

SYSTEM: 130 Reactor Building

TASK: Perform Reactor Room Leakage Tests

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between REACTOR BUILDING and the following:	
K1.01	AACS fans and/or filter compartments.....	*
K1.02	Contaminated water removal system.....	*
K2	Knowledge of electrical power supplies to the following:	
K3	Knowledge of the effect that a loss or malfunction of the REACTOR BUILDING will have on the following:	
K3.01	Radiological releases.....	*
K4	Knowledge of REACTOR BUILDING design feature(s) and/or interlocks which provide for the following:	
K4.01	Contain fission products following a LOCA.....	*
K4.02	Confinement isolation.....	*
K4.03	Disassembly basin criticality control.....	*
K4.04	Disassembly basin personnel exposure control.....	
K5	Knowledge of the operational applications of the following concepts as they apply to REACTOR BUILDING:	
K5.01	Minimum disassembly basin levels.....	*
K5.02	Exhaust stack release rates.....	*
K5.03	Determination of confinement integrity.....	*
K5.04	Differential pressure measurement.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following REACTOR BUILDING components:	
K6.01	Actuator Tower.....	
K6.02	Disassembly basin.....	
K6.03	Assembly Area.....	
K6.04	Process Room.....	
K6.05	Exhaust stack.....	
K6.06	Purification.....	

K/A CATALOG: SRS

SYSTEM: 130 Reactor Building

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the REACTOR BUILDING controls including:	
A1.01	Disassembly basin level.....	
A1.02	Applicable radiation levels.....	
A2	Ability to (a) predict the impacts of the following on the REACTOR BUILDING; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Seismic events.....	*
A2.02	Flooding.....	
A2.03	Tornado's.....	
A2.04	Loss of Coolant Accidents (LOCA).....	
A2.05	Loss of disassembly water level.....	
A2.06	Inadvertent criticality-disassembly basin.....	*
A2.07	Loss of disassembly basin cooling.....	
A3	Ability to monitor automatic operations of the REACTOR BUILDING including:	
A3.01	105 differential pressure.....	
A3.02	Confinement system integrity.....	*
A3.03	Monitor status lights and alarms.....	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Confinement system.....	*

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....
2. Knowledge of system status criteria which require the notification of plant personnel.....
3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *
4. Knowledge of system purpose and/or function.....
5. Knowledge of limiting conditions for operations and safety limits.....

SYSTEM: 130 Reactor Building

	IMPORTANCE
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate components, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

DATE: APRIL 20, 1990

SYSTEM: 105 Emergency Electrical Power (EEP)

TASK:

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the EMERGENCY ELECTRICAL POWER and the following:	
K1.01	AC power distribution system	*
K1.02	Essential loads	*
K1.03	CWS cooling water for diesel cooling heat exchanger	
K1.04	125 Vdc station batteries	
K1.05	Dirty lube oil system	
K1.06	REMACS	*
K2	Knowledge of electrical power supplies to the following:	
K2.01	125 VDC GM Battery Charger	
K2.02	Emergency bus	
K2.03	GM control power	
K2.04	GM fuel oil system	
K3	Knowledge of the effect that a loss or malfunction of the EMERGENCY ELECTRICAL POWER will have on the following:	
K3.01	ECS pumps	*
K3.02	Exhaust fans	*
K3.03	Spray pump	*
K3.04	Control rod drive motors	
K3.05	Compressed Air System	*
K3.06	Sump pumps	*
K3.07	Blanket gas blowers	
K3.08	PW and CW valves	
K3.09	CW effluent sump pumps	
K3.10	Other electrical loads	
K4	Knowledge of EMERGENCY ELECTRICAL POWER design feature(s) and/or interlocks which provide for the following:	
K4.01	Loss of normal AC supply	*
K4.02	Load shedding starting signals	

K/A CATALOG: SRS

SYSTEM: 105 Emergency Electrical Power (EEP)

		IMPORTANCE
K4	Knowledge of EMERGENCY ELECTRICAL POWER design feature(s) and/or interlocks which provide for the following:	
K4.03	Mimic panel starting push buttons	*
K4.04	Emergency bus power supplies	
K4.05	Starting system, manual transfer switches	
K4.06	Auto-start reset circuit	
K4.07	Non-parallel operation interlock (K Area)	
K5	Knowledge of the operational applications of the following concepts as they apply to the EMERGENCY ELECTRICAL POWER:	
K5.01	Low voltage trips in transformer rooms	
K5.02	Overspeed trip	
K5.03	Load shedding operation	
K5.04	Tie operation for redundant bus	*
K5.05	Power seeking switches for AACS exhaust fans	
K5.06	Auto/manual starting circuits for GM diesel	*
K5.07	Auto-start failure test	
K6	Knowledge of the applicable performance, design attribute and the effects of malfunctions of the following EMERGENCY ELECTRICAL POWER components:	
K6.01	GM Diesel and starter	*
K6.02	Generator	*
K6.03	CCR Instrumentation and Controls	*
K6.04	Breakers and switch gears	*
K6.05	Emergency bus	*
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the EMERGENCY ELECTRICAL POWER controls including:	
A1.01	GM Diesel power output	
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the EMERGENCY ELECTRICAL POWER; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences those abnormal conditions or operations:	
A2.01	Failure of GM Diesel to start	*
A2.02	GM Diesel overloads	*
A2.03	Loss of CW cooling water	

SYSTEM: 105 Emergency Electrical Power (EEP)

		IMPORTANCE
A3	Ability to monitor automatic operations of the EMERGENCY ELECTRICAL POWER including:	
A3.01	Automatic start and loading	*
A3.02	Parallel operation for load testing (L Area)	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Setting up for automatic operation	*
A4.02	Manual start, loading and stopping	*
A4.03	Manual/automatic starting capability indication	*
A4.04	Normal and emergency supply breaker position and operation	*
A4.05	Tie breaker operation to redundant bus (L Area)	
A4.06	Manual load reductions during emergencies	*

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	*
2.	Knowledge of system status criteria which require the notification of plant personnel.....	
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	*
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	*
7.	Knowledge of purpose and function of major system components and controls.....	
8.	Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9.	Ability to locate and operate components, including local controls.....	*
10.	Ability to explain and apply all system limits and precautions.....	

	IMPORTANCE
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

DATE: APRIL 20, 1990

SYSTEM: 114 Safety Related AC Circuits (SRAC)

TASKS:

K/A NO.	KNOWLEDGE	IMPORTANCE
K1.	Knowledge of the physical connections and or cause-effect relationships between SAFETY RELATED AC SYSTEM and the following:	
K1.01	Graphic Panel instruments and controls (I/C)	*
K1.02	M-2 Console I/C	*
K1.03	Ventilation Panel I/C	*
K1.04	P-Panel I/C (Safety Rods)	
K1.05	Trim Panel I/C (Control Rods)	
K1.06	Nuclear Instrumentations (HLFM,FC,ETC.)	*
K1.07	Health monitoring Racks	
K1.08	Safety Computers	
K1.09	Control computers	
K1.10	SCRAM annunciator power	*
K1.11	Nuclear Console	*
K1.12	NIM Annunciator panel	*
K1.13	Gang temperature monitor (GTM)	
K1.14	Shutdown annunciator panel	
K1.15	Load shedding circuit	
K1.16	Misc. CCR panels (Jack Panel, Pump Cav. Recorder, APM, ETC)	
K1.17	Cooling water gamma monitor (CWGM)	
K1.18	SSS System Indication	*
K1.19	Seismometer	
K1.20	Tritium monitors (STM, BTM)	*
K1.21	CCR Annunciation	
K2	Knowledge of electrical power supplies to the following:	
K2.01	B-1 Panel	
K2.02	Emergency Bus	
K2.03	Uninterruptable Power Supplies (UPS) For:	
	Remacs	*
	Safety Computer	*
	CWGM	*
	Automatic Incident Action (AIA)	*
	GTM	*
	Fission Counters	*

K/A CATALOG: SRS

SYSTEM: 114 Safety Related AC Circuits (SRAC)

		IMPORTANCE
K3	Knowledge of the effect that a loss or malfunction of the SAFETY RELATED AC SYSTEM will have on the following:	
K3.01	Rod equipment room	
K3.02	Safety Computers	
K3.03	Control Computers	
K3.04	IR Panel (UPS, battery back up)	*
K3.05	ATS (Automatic transfer switch)	*
K3.06	Ventilation Panel	*
K3.07	Health monitoring racks	
K4	Knowledge of SAFETY RELATED AC SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Automatic transfer switch operations	
K4.02	Uninterruptable Power Supply operation	
K4.03	Source of power to Emergency Buses upon loss of normal 480 VAC	
K4.04	Source of power to instrument panels following loss of normal power.....	
K5	Knowledge of the operational applications of the following concepts as they apply to SAFETY RELATED AC SYSTEM:	
K5.01	Electrical science	
K5.02	Electrical component operation (ATS, UPS, etc)	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following safety related AC system components:	
K6.01	Uninterruptable power supplies to the following:	
	CWGM	
	GIM	
	Fission counters	
	AIA	
	Remacs	
	IR panels	
	Safety computers	
K6.02	Floating Emergency bat. system	
K6.03	Automatic transfer switch	
K6.04	I-panels	
K6.05	Breakers	

SYSTEM: 114 Safety Related AC Circuits (SRAC)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the SAFETY RELATED AC SYSTEM controls including:	
A1.01	Mimic bus on the electrical panel	
A1.02	ATS panels	
A1.03	Power availability panel	*
A2	Ability to (a) predict the impacts of the following on the SAFETY RELATED AC SYSTEM; and (b) based on those predictions, used procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	ATS Transfer	
A2.02	Abnormal battery readings	
A2.03	Failure of MG/MA sets	
A2.04	Loss of Transformer room	*
A2.05	NIM Annunciator alarm panel	*
A2.06	Loss of power to safety computer	
A3	Ability to monitor automatic operations of the SAFETY AC SYSTEM including:	
A3.01	GM diesel generators	
A3.02	ATS transfer	
A3.03	Battery charging	
A3.04	UPS operation	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Start GM diesel generators	*
A4.02	SCRAM power availability circuit	*
A4.03	Local start and alignment of the motor generator-motor alternator (MGMA)	
A4.04	Local operation of UPS manual transfer switch	
A4.05	Local operation of instrument power panels	
A4.06	Local operation of ATS manual transfer switch	

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

SYSTEM: 114 Safety Related AC Circuits (SRAC)

	IMPORTANCE
3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....	
4. Knowledge of system purpose and/or function.....	
5. Knowledge of limiting conditions for operations and safety limits.....	
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate components, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 120 Safety Related 125 VDC Power (SRDC)

TASK:

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the SAFETY RELATED 125 VDC POWER and the following:	
K1.01	Caterpillar starter motors 32 VDC tap.....	
K1.02	Loads (switch gear, lighting panels, annunciator panels and control panels)	
K1.03	Battery room ventilation	
K1.04	Ground detection (L Area)	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Power supply to the M-G sets	
K3	Knowledge of the effect that a loss or malfunction of SAFETY RELATED 125 VDC POWER will have on the following:	
K3.01	Components using D.C. control power (breakers, switchgear & annunciators)	
K3.02	Systems with D.C. components (solenoids)	
K3.03	Diesel generator starter motors (GM & Cat)	*
K4	Knowledge of SAFETY RELATED 125 VDC POWER design feature(s) and/or interlocks which provide for the following:	
K4.01	Transfer switches (automatic and manual)	
K4.02	Breaker interlocks, permissive	
K4.03	Instrumentation and alarms	
K4.04	M-G sets	
K5	Knowledge of the operational applications of the following concepts as they apply to SAFETY RELATED 125 VDC POWER:	
K5.01	Hydrogen generation during battery charging	
K5.02	DC electric theory	
K5.03	Electrical breaker principles	

K/A CATALOG: SRS

SYSTEM: 120 Safety Related 125 VDC Power (SRDC)

K/A NO.		IMPORTANCE
K6	Knowledge of the applicable performance, design attributes and the effects of malfunction of the following SAFETY RELATED 125 VDC POWER components:	
K6.01	M-G sets	
K6.02	Manual and automatic transfer switches	
K6.03	Batteries	
K6.04	Distribution panels	
K6.05	Breakers	
K6.06	Switch gear	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with the operation of SAFETY RELATED 125 VDC POWER controls including:	
A1.01	Power availability	
A1.02	CAR 125 VDC distribution panel	
A2	Ability to (a) predict the impacts of the following on the SAFETY RELATED 125 VDC POWER; and (b) based on those predictions, use procedures correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Grounds	
A2.02	Loss of ventilation during charging	
A2.03	Electrical faults	
A2.04	Malfunctions of the M-G sets	
A3	Ability to monitor automatic operations of the SAFETY RELATED 125 VDC POWER including:	
A3.01	Alarms and indicating lights	
A3.02	Automatic transfer switches	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	CCR 125 VDC Distribution panel breakers	

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....
2. Knowledge of system status criteria which require the notification of plant personnel.....

SYSTEM: 120 SAFETY RELATED 125 VDC Power (SRDC)

	IMPORTANCE
3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....	
4. Knowledge of system purpose and/or function.....	
5. Knowledge of limiting conditions for operations and safety limits.....	
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate components, including local controls.....	*
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 125 Essential Equipment Monitoring (EEM)

TASK:

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between the EEM and the following:	
K1.01	Control computer.....	
K1.02	Airborne Activity Confinement system (AACS).....	*
K1.03	Contaminated Water Removal and Disposal system (CWR).....	
K1.04	Process Room Spray system.....	
K1.05	Emergency Cooling system (ECS).....	*
K1.06	Confinement Heat Removal system (CHR).....	
K1.07	Process Water system (PWS).....	*
K1.08	Cooling Water system (CWS).....	
K1.09	Moderator Recovery system (MRS).....	
K2	Knowledge of electrical power supplies to the following:	
K2.01	EEM.....	
K3	Knowledge of the effect that a loss or malfunction of the EEM will have on the following:	
K3.01	Automatic Monitoring.....	*
K4	Knowledge of EEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Automatic Monitoring.....	
K5	Knowledge of the operational applications of the following concepts as they apply to the EEM:	
K5.01	Power availability and control circuit operability of essential equipment.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following EEM components.	
K6.01	EEM Cabinet.....	

SYSTEM: 125 Essential Equipment Monitoring (EEM)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the EEM:	
A1.01	ECS.....	*
A1.02	CWR.....	
A1.03	CWS.....	
A1.04	PWS.....	*
A1.05	MRS.....	
A1.06	AACS.....	*
A2	Ability to (a) predict the impacts of the following on the EEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Control Computer.....	
A3	Ability to monitor automatic operations of the EEM including:	
A3.01	Annunciator plate and alarm.....	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	EEM Circuits when control computer lost.....	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	*
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7.	Knowledge of purpose and function of major system components and controls.....	

K/A CATALOG: SRS

SYSTEM: 125 Essential Equipment Monitoring (EEM)

	IMPORTANCE
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate components, including local controls.....	*
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	

DATE: APRIL 20, 1990

SYSTEM: 106 Compressed Air System (CAS)

TASK:

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and or cause-effect relationships between COMPRESSED AIR SYSTEM and the following:	
K1.01	108 Bldg cooling water system	
K1.02	User Devices (Sensors, activators, breathing air connections)	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Joy Air Compressors	
K2.02	Standby Air Compressors	
K2.03	Damper Backup Air Compressors	
K2.04	Dryers	
K3	Knowledge of the effect that a loss or malfunction of COMPRESSED AIR SYSTEM will have on the following:	
K3.01	Process Instrumentation	
K3.02	Central Control Room Dampers	
K3.03	Airborne Activity Confinement System (AACS) (dampers, seals, latches)	*
K3.04	Process Water System (PWS)	
K3.05	Purification System	
K3.06	Cooling Water System	
K3.07	Disassembly basin systems	
K3.08	Supplementary Safety System (SSS)	
K3.09	Shield System	
K3.10	Process room Spray System	*
K3.11	Breathing air supply	
K4	Knowledge of COMPRESSED AIR SYSTEM design features(s) and/or interlocks which provide for the following:	
K4.01	Standby air to instrument air	
K4.02	AACS main exhaust fan damper air to instrument air	
K4.03	Dryer bypasses	
K4.04	Plant air to instrument air	

K/A CATALOG: SRS

SYSTEM: 106 Compressed Air System (CAS)

		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to COMPRESSED AIR SYSTEM:	
K5.01	Gas laws	
K5.02	Dieseling effects	
K5.03	Dew Point	
K5.04	Mechanical principles of air compressors and dryers	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following COMPRESSED AIR SYSTEM components:	
K6.01	Air Compressors	
K6.02	Instrumentation and Controls	
K6.03	Valves	
K6.04	Dryers	
K6.05	Filters	
K6.06	Receivers (Instrument, plant, standby, and AACS main exhaust fan damper air).....	
K6.07	Moisture Separators	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the COMPRESSED AIR SYSTEM controls including:	
A1.01	Instruments Air pressure and dew point	
A2	Ability to (a) predict the impacts of the following on the COMPRESSED AIR SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Air dryer and filter malfunctions	
A2.02	Air line rupture	
A2.03	Cooling Water loss to compressors	
A2.04	Compressor failures	
A3	Ability to monitor automatic operations of the COMPRESSED AIR SYSTEM including:	
A3.01	Air Pressure and dew point	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Pressure gauge	

SYSTEM: 106 Compressed Air System (CAS)

IMPORTANCE

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits.....

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

DATE: April 20, 1990

SYSTEM: 101 Reactor Scram System (SCRM)

TASK: Monitor Reactor Scram
Perform safety rod operability test

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between REACTOR SCRAM SYSTEM and the following:	
K1.01	Nuclear Instrumentation	*
K1.02	Average Effluent Temperature	*
K1.03	Assembly Coolant Flow	*
K1.04	PW Plenum Pressure	*
K1.05	CW Supply Header Flow	*
K1.06	Individual Heat Exchanger CW/PW flow	*
K1.07	Septifoil Coolant Pressure	*
K1.08	PW Pump Power Supply	*
K1.09	Blanket Gas Pressure	*
K1.10	Moderator Level	*
K1.11	Control System Power Supply	*
K1.12	Seismic Activity	*
K1.13	Safety Computer Operability	*
K1.14	Safety Computer ECHO Scram	*
K1.15	Rod Control System	*
K1.16	Load Shedding	*
K2	Knowledge of electrical power supplies to the following:	
K2.01	Safety Computer System	
K2.02	Rod Control System	
K2.03	Scram circuitry	
K3	Knowledge of the effect that a loss or malfunction of the REACTOR SCRAM SYSTEM will have on the following:	
K3.01	Cooling water system	
K3.02	Blanket gas system	
K3.03	Process water system	
K3.04	The magnitude of heat energy that must be absorbed by the confinement during accident/transient conditions	*
K3.05	The ability of the core cooling systems to provide adequate core cooling during LOCA's	*

K/A CATALOG: SRS

SYSTEM: 101 Reactor Scram

		IMPORTANCE
K4	Knowledge of REACTOR SCRAM SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	System redundancy and reliability	
K4.02	The prevention of supplying power to a SCRAM bus from multiple power sources	
K4.03	Bypassing individual SCRAM channels or Safety Computers	
K4.04	Manual system activation	*
K4.05	Automatic backup shutdown-safety computer (ABS-S/C)	*
K4.06	Negative Pulse Voltage	
K4.07	Safety Rod Snubbing	
K5	Knowledge of the operational applications of the following concepts as they apply to the REACTOR SCRAM SYSTEM:	
K5.01	Bases for Reactor Scram Setpoint	
K6	Knowledge of the applicable performance, design attributes, and the effects of malfunctions of the following REACTOR SCRAM SYSTEM components:	
K6.01	Automatic back-up shutdown-safety computer	*
K6.02	Safety Rods	
K6.03	Master SCRAM Relays	
K6.04	Pilot SCRAM Relays	
K6.05	Control Rods	
K6.06	Sensors	
ABILITY		
A1	Ability to predict and/or monitor changes in parameters associated with operating the REACTOR SCRAM SYSTEM controls including:	
A1.01	Individual relay status	
A1.02	System status light and alarms	*
A1.03	SCRAM circuitry voltage	
A1.04	Reactor power	*
A1.05	Rod position information	*
A1.06	Safety computer	
A1.07	Rod Control Power	

SYSTEM: 101 Reactor Scram

		IMPORTANCE
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the REACTOR SCRAM SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	SCRAM circuitry failure (ATWS)	
A2.02	SCRAM system testing	
A2.03	Nuclear instrument system failure	
A2.04	Safety Computer Failure	*
A2.05	High Assembly average effluent temperature	*
A2.06	Very low assembly flow	*
A2.07	Very high assembly differential pressure	*
A2.08	Very high assembly temperature	*
A2.09	Load shedding activation	*
A2.10	High reactor power/rate	*
A2.11	Low PW plenum pressure	*
A2.12	Low CW supply header flow	*
A2.13	Low individual heat exchanger CW flow	*
A2.14	Low Control rod coolant supply pressure	*
A2.15	Low PW Pump power supply voltage	*
A2.16	Low blanket gas pressure	*
A2.17	Low moderator level	*
A2.18	High Seismic Activity	*
A2.19	Loss of power to SCRAM circuitry	
A3	Ability to monitor automatic operations of the REACTOR SCRAM SYSTEM including:	
A3.01	Reactor Power	*
A3.02	Individual system relay status	*
A3.03	Safety Rod position	*
A3.04	Safety Computer	*
A3.05	Control Rod Positions	*
A4	Ability to manually operate and/or monitor in the Control Room:	
A4.01	Manual Scram	*
A4.02	Bypass Safety computer	
A4.03	Bypass individual scram signals	*
A4.04	Reactor Power Level/Distribution	*
A4.05	Rod Position	*
A4.06	System status lights and alarms	*
A4.07	Safety rods switch (es)	
A4.08	Negative Pulse Disconnect Switch/Voltage	*
A4.09	SCRAM input parameters	*

SYSTEM: 101 Reactor Scram

SYSTEM GENERIC K/As	IMPORTANCE
1. Knowledge of operator responsibilities during all modes of plant operation.....	*
2. Knowledge of system status criteria which require the notification of plant personnel.....	
3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....	
4. Knowledge of system purpose and/or function.....	*
5. Knowledge of limiting conditions for operations and safety limits.....	*
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	
7. Knowledge of purpose and function of major system components and controls.....	*
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9. Ability to locate and operate components, including local controls.....	*
10. Ability to explain and apply all system limits and precautions.....	*
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	*
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	*
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 124 CCR Habitability System (CCRH)

TASK: Perform lineups on central control room habitability system
Startup the central control room habitability system
Shutdown the central control room habitability system
Verify/initiate purge mode of operation
Perform central control room habitability system operability test

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationship between the CCR HABITABILITY SYSTEM and the following:	
K1.01	Radiation Monitoring system	
K1.02	Instrument Air system	
K1.03	Fire protection	
K1.04	REMACS	
K1.05	DMA/Control Computer	
K1.06	Steam system	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Fan motors	
K2.02	Damper motors	
K2.03	Refrigeration compressors (chillers)	
K2.04	Chilled water pumps	
K3	Knowledge of the effect that a loss or malfunction of the CCR HABITABILITY SYSTEM will have on the following:	
K3.01	Control Room envelope radiation levels	*
K3.02	CCR temperature	
K3.03	CCR pressure differential	
K3.04	Control Room smoke/toxic gas levels	
K4	Knowledge of CCR HABITABILITY SYSTEM design feature(s) and/or interlocks which provide for the following:	
K4.01	Control Room envelope temperature control	
K4.02	Control Room envelope pressure control	
K4.03	Control Room envelope airborne radiation levels	
K4.04	Control Room envelope smoke levels	

K/A CATALOG: SRS

SYSTEM: 124 CCR Habitability System (CCRH)

K/A NO.		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to the CCR HABITABILITY SYSTEM:	
K5.01	Airborne contamination (radiological, toxic gas, smoke)	
K5.02	Differential pressure control	
K5.03	Temperature control	
K5.04	Control Room abandonment	*
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following CCR HABITABILITY SYSTEM components:	
K6.01	Fans	
K6.02	Chilled Water system	
K6.03	Dampers	
K6.04	Refrigeration Compressors (chillers)	
K6.05	Heaters	
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating the CCR HABITABILITY SYSTEM controls including:	
A1.01	CCR pressure	
A1.02	CCR temperature	
A1.03	Control Room envelope radiation levels	*
A2	Ability to (a) predict the impacts of the following on the CCR HABITABILITY SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	High plant radiation	*
A2.02	Fire and the resulting heat and smoke	*
A2.03	Loss of instrument air	
A2.04	High/Low control room temperature	
A3	Ability to monitor automatic operations of the CCR HABITABILITY SYSTEM including:	
A3.01	Modulating dampers	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Fans	
A4.02	Environmental conditions	
A4.03	Portable breathing air equipment	

SYSTEM: 124 CCR Habitability System (CCRH)

IMPORTANCE

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits.....

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls..... *

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures..... *

DATE: APRIL 20, 1990

SYSTEM: 113 Contaminated Water Removal and Disposal System (CWR)

TASK: Perform lineups of the CWR
Perform manual operations of the CWR
Monitor automatic operations of the CWR
Perform manual diversion of the sump pump discharge
Monitor storage tank levels
Confirm system reliability using essential equipment monitors (EEM)
Shutdown the CWR

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connection and/or cause-effect relationships between the CWR and the following systems:	
K1.01	PWS and CWS	
K1.02	AACS	
K1.03	Process Sewer	
K1.04	Process room spray system	
K1.05	Reactor pressure relief and overflow lines	
K1.06	Moderator Recovery system	
K1.07	Confinement Heat removal system	*
K1.08	REMACS	*
K1.09	Essential Equipment Monitor System (EEM)	
K1.10	Automatic Incident Action System (AIA)	*
K2	Knowledge of bus power supplies to the following:	
K2.01	Sump Pumps	
K2.02	Diversion valves	
K2.03	Radiation monitors	
K2.04	Sensors and Detectors	
K3	Knowledge of the effect that a loss of the CWR will have on the following:	
K3.01	PWS pumps	*
K3.02	Radioactive release during accidents	*
K4	Knowledge of the CWR design feature(s) and/or interlocks which provide the following:	
K4.01	Prevent/delay flooding of PW DC pumps	*
K4.02	Pump operation in normal/flooded conditions	
K4.03	Control of release of radioactivity to the environment	*
K4.04	Recovery of PW	
K4.05	Sump pump operating limits	
K4.06	Diversion valves operation	*

K/A CATALOG: SRS

SYSTEM: 113 Contaminated Water Removal and Disposal System (CWR)

K/A NO.	ABILITY	IMPORTANCE
K5	Knowledge of the following theoretical concepts as they apply to the CWR:	
K5.01	Fluid Flow	
K5.02	Radiological theory	
K5.03	Pump & valve theory	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following CWR components:	
K6.01	Diversion valves	
K6.02	Breather valves	
K6.03	Pump room dams	
K6.04	Sumps	
K6.05	Sump pumps	
K6.06	Sensors and detectors	
K6.07	Radiation monitors	
K6.08	Controllers and positioners	
K6.09	Breakers, relays, and disconnects	
K6.10	Liquid storage tanks	
K6.11	Process Room Drains	
K6.12	Process Sewer	
A1	Ability to predict and/or monitor changes in parameters associated with operating the CWR controls including:	
A1.01	Storage tank monitoring	
A1.02	Pump operability	
A1.03	Environmental radiological release	*
A2	Ability to (a) predict the impacts of the following malfunctions or operations on the CWR; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:	
A2.01	Malfunction of sump pumps	*
A2.02	Failure of storage tank level indication	
A2.03	Failure to automatically divert	*
A3	Ability to monitor automatic operation of the CWR including:	
A3.01	Sump pump operation	
A3.02	Automatic diversion	*
A3.03	Radiological monitoring system	

K/A CATALOG: SRS

SYSTEM: 113 Contaminated Water Removal and Disposal System (CWR)

A4	Ability to manually operate and/or monitor in the control room:	IMPORTANCE
A4.01	Sump pump operation	*
A4.02	Operations of diversion valves	*
A4.03	Radiological monitoring system	
A4.04	REMACS	*

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....
2. Knowledge of system status criteria which require the notification of plant personnel.....
3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *
4. Knowledge of system purpose and/or function.....
5. Knowledge of limiting conditions for operations and safety limits.....
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....
7. Knowledge of purpose and function of major system components and controls.....
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....
9. Ability to locate and operate components, including local controls.....
10. Ability to explain and apply all system limits and precautions.....
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

SYSTEM: 113 Contaminated Water Removal and Disposal System (CWR)

IMPORTANCE

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

DATE: APRIL 20, 1990

SYSTEM: 118 Stack Air Activity Monitoring (SAAM)

TASK: Operate Stack Air Activity Monitoring
Perform Stack Air Activity Monitoring Functional Test
Operate Filter Breakthrough Monitoring System
Sample Exhaust Air
Calculate Stack Losses
Respond to Abnormal Air Stack Activity Alarms

K/A NO.	KNOWLEDGE	
K1	Knowledge of the physical connections and/or cause-effect relationships between STACK AIR ACTIVITY MONITORING and the following:	
K1.01	Assembly failure detector system.....	*
K1.02	Reactor building effluent monitoring system.....	
K1.03	CWS tank monitor.....	
K1.04	DMA Computer.....	
K1.05	WINDS Computer.....	
K1.06	Filter breakthrough activity monitors.....	
K1.07	Monitor desk.....	
K1.08	Airborne Activity Confinement System.....	*
K1.09	REMACS.....	
K1.10	CCR alarms/annunciators.....	
K1.11	CCR indicators/recorders.....	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Activity monitors.....	
K2.02	Stack sampling pumps.....	
K3	Knowledge of the effect that a loss or malfunction of STACK AIR ACTIVITY MONITORING will have on the following:	
K3.01	Moderator Leak Detection.....	*
K3.02	Stack Release Monitoring Capability.....	*
K4	Knowledge of Stack Air Monitoring design feature(s) and/or interlocks which provide for the following:	
K4.01	Process water leak detection.....	
K4.02	Airborne release monitoring capability.....	
K5	Knowledge of the operational applications of the following concepts as they apply to the Stack Air ctivity Monitoring:	
K5.01	Calculating stack losses.....	

K/A CATALOG: SRS

SYSTEM: 118 Stack Air Activity Monitoring (SAAM)

K6 Knowledge of the applicable performance design attributes and the effects of malfunctions of the following Stack Air Activity Monitoring Components:

K6.01 Stack Exhaust Kanne Chambers.....
K6.02 Berthold Tritium Monitors.....
K6.03 Total Stack Exhaust Activity Monitor.....
K6.04 Stack Tritium Monitor.....
K6.05 Noble Gas Monitor.....

K/A NO. ABILITY

A1 Ability to predict and/or monitor changes in parameters associated with operating STACK AIR ACTIVITY MONITORING controls including:

A1.01 Lights, alarms, and indications associated with normal operations.....
A1.02 Lights, alarms and indications associated with surveillance testing.....

A2 Ability to (a) predict the impacts of the following on STACK AIR ACTIVITY MONITORING; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:

A2.01 Assembly failure..... *
A2.02 Process water leak..... *
A2.03 Ventilation filter breakthrough..... *
A2.04 Loss of coolant accident..... *
A2.05 A.C. electrical failure.....
A2.06 Dropped assembly..... *
A2.07 CHR Initiation..... *

A3 Ability to monitor automatic operation of the STACK AIR ACTIVITY MONITORING including:

A3.01 Status lights and alarms.....
A3.02 Recorder indications.....
A3.03 Stack Flow.....

A4 Ability to manually operate and/or monitor the CCR:

A4.01 REMACS.....
A4.02 Ventilation damper positions.....

SYSTEM: 118 Stack Air Activity Monitoring (SAAM)

IMPORTANCE

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits.....

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....

12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures..... *

13. Ability to perform specific system and integrated plant procedures during all modes of operation.....

14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....

15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures..... *

DATE: APRIL 20, 1990

SYSTEM: 119 Building Radiation Monitoring (BRM)

TASK: Monitor Building Radiation Monitoring System
Perform Source Checks on Building Radiation Monitoring System
Respond to Abnormal Radiation Alarms

K/A No.	KNOWLEDGE	
K1	Knowledge of the physical connections and/or cause-effect relationships between BUILDING RADIATION MONITORING and the following:	
K1.01	Process water system.....	
K1.02	Cooling water system.....	*
K1.03	Blanket gas system.....	
K1.04	Containment Basin.....	*
K1.05	Ventilation system.....	*
K1.06	Contaminated water removal system.....	
K1.07	Process room spray system.....	
K1.08	Charge/discharge operations.....	
K2	Knowledge of electrical power supplies, both normal and backup, to the following:	
K2.01	Monitors.....	
K2.02	Sample pumps.....	
K3	Knowledge of the effect that a loss or malfunction of BUILDING RADIATION MONITORING will have on the following:	
K3.01	Effluent release monitoring, both normal and emergency.....	*
K3.02	Assembly failure detection.....	
K3.03	Moderator leak detection.....	
K3.04	Personnel exposure.....	
K3.05	Airborne activity confinement system monitoring.....	
K4	Knowledge of BUILDING RADIATION MONITORING design feature(s) and/or interlocks which provide for the following:	
K4.01	Effluent release monitoring.....	
K4.02	Assembly failure detection.....	
K4.03	Process water leak detection.....	
K4.04	Personnel exposure.....	
K4.05	Airborne activity monitoring.....	

SYSTEM: 119 Building Radiation Monitoring (BRM)

		IMPORTANCE
K5	Knowledge of the operational applications of the following concepts as they apply to the BUILDING RADIATION MONITORING:	
K5.01	Units of radiation, dose and dose rate.....	
K5.02	Biological hazards of radiation.....	
K5.03	Assembly failure detection.....	
K5.04	Process water leak detection.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following BUILDING RADIATION MONITORING:	
K6.01	Assembly failure detection system.....	
K6.02	Reactor building effluent monitoring.....	*
K6.03	CWS Tank monitor.....	
K6.04	Overflow tank room activity monitor.....	
K6.05	Cooling water gamma monitor.....	
K6.06	High blanket gas activity monitors.....	
K6.07	High moderator activity monitor.....	
K6.08	High reactor plenum skirt activity monitor.....	
K6.09	High activity Reactor Building floodwater monitor.....	
K6.10	High filter area activity monitors.....	
K6.11	High activity to Process Water Storage Tank monitors.....	
K6.12	Process Room drain monitor.....	
K6.13	Health physics area radiation monitors.....	
K6.14	Nuclear incident monitoring systems.....	*
K/A NO.	ABILITY	
A1	Ability to predict and/or monitor changes in parameters associated with operating BUILDING RADIATION MONITORING controls including:	
A1.01	Lights, alarms, and indications associated with normal operations.....	
A1.02	Lights, alarms, and indications associated with surveillance testing.....	
A2	Ability to (a) predict the impacts of the following on BUILDING RADIATION MONITORING; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Assembly failure.....	
A2.02	Process water leak.....	
A2.03	Loss of coolant accident.....	*
A2.04	A.C. electrical failure.....	
A2.05	Dropped assembly.....	*

SYSTEM: 119 Building Radiation Monitoring (BRM)

A3 Ability to monitor automatic operation of the Building Radiation Monitoring including:

A3.01 Recorder indications.....
A3.01 Meter indications.....
A3.03 REMACS.....
A3.04 Monitor desk.....

A4 Ability to manually operate and/or monitor in the control room:

A4.01 Monitor source checks.....
A4.02 Alarms and annunciators..... *
A4.03 Indicators and recorders.....

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....

2. Knowledge of system status criteria which require the notification of plant personnel.....

3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *

4. Knowledge of system purpose and/or function.....

5. Knowledge of limiting conditions for operations and safety limits.....

6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

7. Knowledge of purpose and function of major system components and controls.....

8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....

9. Ability to locate and operate components, including local controls.....

10. Ability to explain and apply all system limits and precautions.....

11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications..... *

SYSTEM: 119 Building Radiation Monitoring (BRM)

	IMPORTANCE
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 123 Cooling Water Gamma Monitoring (CWGM)

TASK: Perform lineups of the cooling water gamma monitor system
Monitor the cooling water gamma monitors
Calibration of the system

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between COOLING WATER GAMMA MONITORING and the following:	
K1.01	Process water system	
K1.02	Cooling water system	*
K2	Knowledge of electrical power supplies to the following:	
K2.01	Detector power supply	
K2.02	Instrumentation power supply	
K2.03	Recorder power supply	
K3	Knowledge of the effect that a loss or malfunction of the COOLING WATER GAMMA MONITORING will have on the following:	
K3.01	Meter indications	
K3.02	Recorder readings	
K3.03	Indicating lights	
K3.04	Alarms	*
K4	Knowledge of COOLING WATER GAMMA MONITORING design feature(s) and/or interlocks which provide for the following:	
K4.01	PWS heat exchanger tube failure indication	*
K4.02	Alarms	
K5	Knowledge of the operational applications of the following concepts as they apply to COOLING WATER GAMMA MONITORING:	
K5.01	Gamma detector theory	
K6	Knowledge of the applicable performance, design attributes and the effect of malfunction of the following COOLING WATER GAMMA MONITORING components:	
K6.01	Electronics	
K6.02	Meters	
K6.03	Recorders	
K6.04	Gamma-sensitive detector	*

K/A CATATLOG: SRS

SYSTEM: 123 Cooling Water Gamma Monitoring (CWGM)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the COOLING WATER GAMMA MONITOR controls including:	
A1.01	Meters and recorder readings	*
A1.02	Alarm setpoint calibration	
A2	Ability to (a) predict the impacts of the following on the COOLING WATER GAMMA MONITOR; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Power supply failures	
A2.02	System calibration	
A2.03	Sensor failures	
A2.04	Meter and recorder failures	
A2.05	Process water heat exchanger tube failures	*
A3	Ability to monitor automatic operations of the COOLING WATER GAMMA MONITOR including:	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Meter/recorder readings	
A4.02	Indicating lights	*
A4.03	Alarms	*

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation..... *
2. Knowledge of system status criteria which require the notification of plant personnel.....
3. Knowledge of which events related to system operation/ status should be reported to outside agencies..... *
4. Knowledge of system purpose and/or function.
5. Knowledge of limiting conditions for operations and safety limits.....
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....

SYSTEM: 123 Cooling Water Gamma Monitoring (CWGM)

	IMPORTANCE
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	*
9. Ability to locate and operate components, including local controls.....	*
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*

DATE: APRIL 20, 1990

SYSTEM: 126 Reactor Effluent Water Monitoring (REWM)

TASK: Monitor temperatures flows & pressure
Monitor for radioactivity

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between REACTOR EFFLUENT WATER MONITORING and the following:	
K1.01	Sample sink ventilation system.....	
K1.02	Coolant return tank.....	
K1.03	Purification system.....	
K1.04	Radioactivity monitoring.....	*
K2	Knowledge of electrical power supplies to the following:	
K3	Knowledge of the effect that a loss or malfunction of the REACTOR EFFLUENT WATER MONITORING will have on the following:	
K3.01	System inventory.....	
K3.02	Radiological releases.....	
K3.03	Determination of fuel integrity.....	
K3.04	Chemical Balance.....	
K4	Knowledge of REACTOR EFFLUENT WATER MONITORING design feature(s) and/or interlocks which provide for the following:	
K4.01	Radiation levels of the process fluid.....	*
K5	Knowledge of the operational applications of the following concepts as they apply to REACTOR EFFLUENT WATER MONITORING:	
K5.01	Chemistry.....	
K5.02	Fluid flow.....	
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following REACTOR EFFLUENT WATER MONITORING components:	
K6.01	Temperature monitors.....	
K6.02	Pressure monitors.....	
K6.03	Radioactivity monitoring.....	*
K6.04	Flow monitors.....	
K6.05	Fuel Failure Instruments.....	

K/A CATALOG: SRS

SYSTEM: 126 Reactor Effluent Water Monitoring (REWM)

K/A NO.	ABILITY	IMPORTANCE
A1	Ability to predict and/or monitor changes in parameters associated with operating the REACTOR EFFLUENT WATER MONITORING controls including:	
A1.01	Pressure.....	
A1.02	Temperature.....	
A1.03	Flow.....	
A1.04	Radioactivity.....	*
A1.05	Contaminates.....	
A2	Ability to (a) predict the impacts of the following on the REACTOR EFFLUENT WATER MONITORING; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:	
A2.01	Chemistry controls.....	
A2.02	Assembly failure.....	*
A2.03	Leakage and/or Breaks from contaminated systems to atmosphere or to other process systems.....	*
A3	Ability to monitor automatic operations of the REACTOR EFFLUENT WATER MONITORING including:	
A4	Ability to manually operate and/or monitor in the control room:	
A4.01	Conductivity.....	

SYSTEM GENERIC K/As

1.	Knowledge of operator responsibilities during all modes of plant operation.....	
2.	Knowledge of system status criteria which require the notification of plant personnel.....	*
3.	Knowledge of which events related to system operation/ status should be reported to outside agencies.....	*
4.	Knowledge of system purpose and/or function.....	
5.	Knowledge of limiting conditions for operations and safety limits.....	
6.	Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....	*

SYSTEM: 126 Reactor Effluent Water Monitoring (REWM)

	IMPORTANCE
7. Knowledge of purpose and function of major system components and controls.....	
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....	
9. Ability to locate and operate componerts, including local controls.....	
10. Ability to explain and apply all system limits and precautions.....	
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....	
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....	
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	

K/A CATALOG: SRS

DATE: APRIL 20, 1990

SYSTEM: 132 Domestic and Fire Protection Water (DFW)

TASK: Monitor the fire detection/alarm equipment

K/A NO.	KNOWLEDGE	IMPORTANCE
K1	Knowledge of the physical connections and/or cause-effect relationships between DOMESTIC AND FIRE PROTECTION WATER and the following:	
K1.01	Fire hydrants.....	
K2	Knowledge of electrical power supplies to the following:	
K2.01	Fire protection alarm panel.....	
K3	Knowledge of the effect that a loss or malfunction of the DOMESTIC AND FIRE PROTECTION WATER will have on the following:	
K4	Knowledge of DOMESTIC AND FIRE PROTECTION WATER and design feature(s) and/or interlocks which provide for the following:	
K5	Knowledge of the operational applications of the following concepts as they apply to DOMESTIC AND FIRE PROTECTION WATER:	
K5.01	Effect of water spray on fissionable material.....	*
K6	Knowledge of the applicable performance, design attributes and the effects of malfunctions of the following DOMESTIC AND FIRE PROTECTION WATER components:	

K/A NO.	ABILITY
A1	Ability to predict and/or monitor changes in parameters associated with operating the DOMESTIC AND FIRE PROTECTION WATER controls including:
A2	Ability to (a) predict the impacts of the following on the DOMESTIC AND FIRE PROTECTION WATER; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations:
A3	Ability to monitor automatic operations of the DOMESTIC AND FIRE PROTECTION WATER including:

SYSTEM: 132 Domestic and Fire Protection Water (DFW)

A4 Ability to manually operate and/or monitor in the control room: IMPORTANCE

A4.01 System alarms and indicating lights.....

SYSTEM GENERIC K/As

1. Knowledge of operator responsibilities during all modes of plant operation.....
2. Knowledge of system status criteria which require the notification of plant personnel.....
3. Knowledge of which events related to system operation/ status should be reported to outside agencies.....
4. Knowledge of system purpose and/or function.....
5. Knowledge of limiting conditions for operations and safety limits.....
6. Knowledge of bases in technical specifications for limiting conditions for operation and safety limits.....
7. Knowledge of purpose and function of major system components and controls.....
8. Knowledge of the annunciator alarms and indications, and use of the corresponding procedure.....
9. Ability to locate and operate components, including local controls.....
10. Ability to explain and apply all system limits and precautions.....
11. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....
12. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....
13. Ability to perform specific system and integrated plant procedures during all modes of operation.....
14. Ability to perform without reference to procedure those actions that require immediate operation of system components or controls.....
15. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: **201 SCRAM Condition Present and Reactor Power Above HLFM Downscale or Unknown (ATWS)**

REF: SRS: SAR (1989) Chapter 15, Accident Analysis, 15.6 Anticipated Transients without SCRAM (ATWS)

K/A NO.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE HLFM DOWNSCALE OR UNKNOWN:	
EK1.01	Reactor water level effects on reactor power.....	*
EK1.02	Gadolinium nitrate effects on reactor power.....	
EK1.03	Shutdown gadolinium nitrate volume.....	
EK1.04	Margin of Control.....	*
EK1.05	Loss of Core Cooling Capability as initiating event.....	*
EK1.06	Loss of Blanket Gas Pressure as initiating event.....	*
EK1.07	Uncontrolled Reactivity addition as initiating event.....	*
EK2	Knowledge of the interrelations between SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE HLFM DOWNSCALE OR UNKNOWN and the following:	
EK2.01	Reactor Scram System.....	*
EK2.02	Automatic Backup Shutdown System.....	*
EK2.03	Supplementary Shutdown System.....	*
EK2.04	Airborne Activity Confinement System.....	*
EK2.05	Rod Drive System.....	*
EK2.06	Flux monitoring systems.....	*
EK2.07	Reactor tank water level.....	*
EK2.08	Blanket Gas Pressure.....	*
EK2.09	Process Water System temperature.....	*
EK2.10	Process Water System flow.....	*
EK2.11	Rod position indicating system.....	*
EK2.12	Alternate gadolinium injection methods.....	*
EK2.13	Safety Computer.....	*
EK3	Knowledge of the reasons for the following responses as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE HLFM DOWNSCALE OR UNKNOWN:	
EK3.01	SSS injection.....	*
EK3.02	Various alternate methods of rod insertion.....	*
EK3.03	ABS-SC circuitry.....	*
EK3.04	Maintaining PWS flow.....	*
EK3.05	Maintaining CWS flow.....	*
EK3.06	Automatic Incident Action.....	*

K/A CATALOG: SRS

EPE: 201 SCRAM Condition Present and Reactor Power Above HLFM Downscale or Unknown (AIWS)

K/A NO.	ABILITY	IMPORTANCE
EA1	Ability to operate and/or monitor the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE HLFM DOWNSCALE OR UNKNOWN:	
EA1.01	Reactor Scram System	*
EA1.02	Automatic Backup Shutdown System	*
EA1.03	Supplementary Shutdown System	*
EA1.04	Rod Drive System	*
EA1.05	Flux monitoring systems	*
EA1.06	Rod position indicating system	*
EA1.07	Alternate gadolinium injection methods	*
EA1.08	Channel effluent temperatures	*
EA1.09	Safety Computer	*
EA1.10	Process water system flow	*
EA1.11	Cooling water system flow	*
EA1.12	Reactor Tank Level	*
EA1.13	Blanket Gas Pressure	*
EA1.14	ECS Flow	*
EA2	Ability to determine and/or interpret the following as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE HLFM DOWNSCALE OR UNKNOWN:	
EA2.01	Reactor power	*
EA2.02	Reactor tank water level	*
EA2.03	Blanket Gas Pressure	*
EA2.04	SSS tank pressure	*
EA2.05	Rod position	*
EA2.06	Confinement conditions	*
EA2.07	Channel Effluent Temperatures	*
EA2.08	Process system flow	*
EA2.09	Cooling water system flow	*
EA2.10	ECS flow	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	*

K/A CATALOG: SRS

EPE: 01 SCRAM Condition Present and Reactor Power Above HLFM Downscale or Unknown (ATWS)

	IMPORTANCE
4. Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.....	*
5. Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures.....	*
6. Ability to locate and operate components, including local controls.....	*
7. Ability to explain and apply all system limits and precautions.....	*
8. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
9. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....	*
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*
12. Ability to utilize symptom based procedures.....	N/A

K/A CATALOG: SRS

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 202 Inadvertent Reactivity Addition

REF: SRS: SAR (1989) Chapter 15 Design Basis Accidents, 15.4 Reactivity and Power Distribution Anomalies.
-Gang Rod Withdrawal at Full Power
-Gang Rod Withdrawal at Low Power
-Single Rod Withdrawal
-Partial Rod Insertion
-H20 Addition
-Increase in Secondary Cooling

K/A No.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to INADVERTENT REACTIVITY ADDITION:	
EK1.01	Prompt critical.....	*
EK1.02	Reactivity anomaly.....	
EK1.03	Margin of control.....	*
EK1.04	Fuel thermal limits.....	*
EK1.05	Abnormal reactivity additions.....	
EK1.06	CWS Temperatures.....	
EK1.07	Light water addition.....	
EK1.08	Xerox Burnout.....	
EK1.09	Charging/Discharging Errors.....	*
EK1.10	Rod withdrawal/insertion accidents.....	
EK1.11	Reactor Tank level.....	*
EK2	Knowledge of the interrelations between INADVERTENT REACTIVITY ADDITION and the following:	
EK2.01	Reactor scram system.....	*
EK2.02	Fuel thermal limits.....	*
EK2.03	Fuel temperature.....	*
EK2.04	H20 addition.....	
EK2.05	Neutron monitoring system.....	*
EK2.06	Moderator temperature.....	
EK2.07	Reactor Power.....	*
EK2.08	Control Rod System.....	*
EK2.09	Hydraulic limits.....	*
EK2.11	Process water Flow/cooling water flow.....	
EK3	Knowledge of the reasons for the following responses as they apply to INADVERTENT REACTIVITY ADDITION:	
EK3.01	Reactor scram.....	*
EK3.02	Rod movement interlocks.....	
EK3.03	Rod drive speed limits.....	

K/A CATALOG: SRS

EPE: 202 Inadvertent Reactivity Addition

K/A NO.	ABILITY	IMPORTANCE
EA1	Ability to operate and/or monitor the following as they apply to INADVERTENT REACTIVITY ADDITION:	
EA1.01	Reactor scram system.....	*
EA1.02	Reactor Power.....	*
EA1.03	Control rod system.....	*
EA1.04	Rod position indication system.....	*
EA1.05	Neutron monitoring systems.....	*
EA1.06	H20 addition.....	
EA2.07	Increased Process water/cooling water Cooling.....	
EA2	Ability to determine and/or interpret the following as they apply to INADVERTENT REACTIVITY ADDITION:	
EA2.01	Reactor power.....	*
EA2.02	Reactor period.....	*
EA2.03	Cause of reactivity addition.....	*
EA2.04	Violation of fuel thermal limits.....	*
EA2.05	Violation of Hydraulic limits.....	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel.....	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies.....	*
3.	Knowledge of limiting conditions for operations and safety limits.....	*
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.....	*
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures.....	
6.	Ability to locate and operate components, including local controls.....	
7.	Ability to explain and apply all system limits and precautions.....	
8.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*

K/A CATALOG: SRS

EPE: 202 Inadvertent Reactivity Addition

	IMPORTANCE
9. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....	*
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*
12. Ability to utilize symptom based procedures.....	N/A

K/A CATALOG: SRS

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 203 Fuel Failure

REF: NUREG 1122: Inadequate Core Cooling

K/A NO.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to FUEL FAILURE:	
EK1.01	Consequences of uncovering the core	*
EK1.02	Calculating subcooling margin	*
EK1.03	Definition of saturated liquid	
EK1.04	Processes for removing decay heat from the core	*
EK1.05	Definition of subcooled liquid	
EK1.06	Definition of critical heat flux	
EK1.07	Effect of cavitation on pump flow	
EK1.08	Convective heat transfer mechanism	
EK1.09	Formation of fission and trituim gases	
EK1.10	Thermal limits	*
EK1.11	Fuel and moderator temperature coefficients	
EK1.12	Steam void coefficient	
EK2	Knowledge of the interrelations between FUEL FAILURE and the following:	
EK2.01	PW Pumps	
EK2.02	Reactor Tank level	*
EK2.03	Stack Activity	*
EK2.04	Blanket gas system	*
EK2.05	Confinement heat removal	*
EK2.06	Rotovalves	
EK2.07	ECS system	*
EK2.08	Sensors and detectors	
EK2.09	Process Room spray	*
EK2.10	Air Activity Confinement system	*
EK3	Knowledge of the reasons for the following responses as they apply to FUEL FAILURE:	
EK3.01	Activating the ECS	*
EK3.02	Reactor SCRAM	*
EK3.03	Conditions which cause a decrease in assembly flow	
EK3.04	Assembly flow instability	
EK3.05	Activating Process Room spray	*
EK3.06	Activating Confinement Heat Removal	*

K/A CATALOG: SRS

EPE: 203 Fuel Failure

K/A NO.	ABILITY	IMPORTANCE
EA1	Ability to operate and/or monitor the following as they apply to FUEL FAILURE:	
EA1.01	Assembly inlet and outlet temperature	*
EA1.02	Bulk moderator temperature	*
EA1.03	Blanket gas activity	*
EA1.04	PW flow	
EA1.05	Confinement heat removal	*
EA1.06	Process water radioactivity	
EA1.07	Fission and tritium gas monitors	*
EA1.08	Activate the ECS	*
EA1.09	ECS valve control switches and indicators	*
EA1.10	Process room spray	*
EA1.11	Safety computers	
EA2	Ability to determine and/or interpret the following as they apply to FUEL FAILURE:	
EA2.01	Variations in assembly flow	*
EA2.02	Presence of fission and tritium gas	*
EA2.03	Flow instability	
EA2.04	Area radiation alarms	

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	*
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	*
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures	*
6.	Ability to locate and operate components, including local controls	*
7.	Ability to explain and apply all system limits and precautions	*
8.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	*

K/A CATALOG: SRS

EPE: 203 Fuel Failure

	IMPORTANCE
9. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....	*
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*
12. Ability to utilize symptom based procedures.....	N/A

K/A CATALOG: SRS

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: **204 Partial or Complete Loss of Forced Core Flow Circulation**

REF: SRS: SAR (1989) Chapter 15, Accident Analysis 15.3 Decrease in Process Water System Flowrate
- loss of process water AC pumping power
- combined loss of process water and cooling water AC pumping power
- closure of rotovalves in process water loops
- process water pump shaft break
- loss of blanket gas pressure
- localized flow blockages

K/A NO.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION:	
EK1.01	Power/Flow distribution.....	
EK1.02	Thermal Limits.....	*
EK1.03	Definition of saturation temperature.....	
EK1.04	Hydraulic limits.....	*
EK1.05	Core Cooling.....	*
EK2	Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION and the following:	
EK2.01	Reactor Scram System.....	*
EK2.02	Nuclear Instrumentation.....	
EK2.03	Reactor Power.....	
EK2.04	PW flow indication.....	*
EK2.05	Loss of PW Water AC pumping power.....	
EK2.06	Closure of rotovalves in PW loops.....	
EK2.07	PW pumps shaft break.....	
EK2.08	Loss of PW DC pumping power.....	*
EK2.09	Localized flow blockages.....	
EK2.10	Emergency Cooling System.....	*
EK2.11	Control Rod System.....	
EK3	Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION:	
EK3.01	Reactor Tank Level response.....	
EK3.02	Reactor Power response.....	
EK3.03	Reverse Flow in loop with pump failure.....	
EK3.04	Reactor SCRAM signals.....	*
EK3.05	Rod Reversal.....	

K/A CATALOG: SRS

EPE: 204 Partial or Complete Loss of Forced Core Flow Circulation

		IMPORTANCE
EK3	Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION:	
EK3.06	PW flow/temp indication	*
EK3.07	Blanket gas pressure response	
EK3.08	Assembly flow/temperature response	*
EK3.09	Subcooling Margin	
K/A NO.	ABILITY	
EA1	Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION:	
EA1.01	Process Water System	*
EA1.02	Reactor Scram System	*
EA1.03	Rod Reversal Circuit	
EA1.04	PW Rotovalves	
EA1.05	Neutron Flux Monitors	
EA1.06	Reactor effluent temperature instrumentation	*
EA1.07	Automatic Incident Actuation (AIA) System	*
EA1.08	Emergency Cooling System	*
EA2	Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION:	
EA2.01	Neutron Flux Monitors	
EA2.02	PW pump/system flow instrumentation	*
EA2.03	Reactor effluent temperature instrumentation	
EA2.04	Essential Equipment Monitoring (EEM)	
EA2.05	Loss of circulation logic	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	*
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	

K/A CATALOG: SRS

	IMPORTANCE
5. Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures.....	
6. Ability to locate and operate components, including local controls.....	
7. Ability to explain and apply all system limits and precautions.....	
8. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
9. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	
10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....	
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*
12. Ability to utilize symptom based procedures.....	N/A

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 205 Loss of Blanket Gas

REF: SRS: SAR Chapter 15, Accident Analysis 15.3.5 Decrease in Process Water flowrate due to loss of blanket gas pressure.

K/A No.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to LOSS OF BLANKET GAS:	
EK1.01	Definition of saturation temperature.....	
EK1.02	Relationship between Blanket gas pressure, assembly flow core cooling and steam formation in reactor tank....	*
EK1.03	Definition of pump cavitation, and net positive suction head.....	
EK2	Knowledge of the interrelations between LOSS OF BLANKET GAS and the following:	
EK2.01	Process water pumps.....	*
EK2.02	Assembly effluent temperature.....	*
EK2.03	Reactor scram system.....	*
EK2.04	Purification isolation.....	
EK3	Knowledge of the reasons for the following responses as they apply to LOSS OF BLANKET GAS:	
EK3.01	Verification of pressure alarm.....	
EK3.02	Actions contained in DPSOIs for loss of blanket gas.....	*
K/A NO.	ABILITY	
EA1	Ability to operate and/or monitor the following as they apply to LOSS OF BLANKET GAS:	
EA1.01	Concentration of deuterium gas and oxygen.....	
EA1.02	Pressure control.....	
EA1.03	Pressure recovery.....	
EA1.04	Helium makeup to the Blanket Gas System.....	
EA1.05	Purification isolation.....	
EA2	Ability to determine and/or interpret the following as they apply to LOSS OF BLANKET GAS:	
EA2.01	Conditions which will cause a decrease in PWS flow.....	*
EA2.02	Normal values for PWS pressure.....	
EA2.03	Effects of PWS pressure change on key components in the plant.....	
EA2.04	Conditions requiring plant shutdown.....	*

EPE: 205 Loss of Blanket Gas

		IMPORTANCE
A2	Ability to determine and/or interpret the following as they apply to LOSS OF BLANKET GAS:	
EA2.05	Consequences of loss of pressure in PWS; methods for evaluating pressure loss.....	
EA2.06	Probable leakage paths for Blanket Gas.....	
EA2.07	PWS Pressure.....	
EA2.08	Action to be taken if Blanket Gas pressure instrument fails high.....	
EA2.09	Action to taken if Blanket Gas instrument fails low.....	

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel.....	
2.	Knowledge of which events related to system operation/status should be reported to outside agencies.....	
3.	Knowledge of limiting conditions for operations and safety limits.....	
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.....	
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures.....	*
6.	Ability to locate and operate components, including local controls.....	*
7.	Ability to explain and apply all system limits and precautions.....	
8.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	
9.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
10.	Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....	

EPE: 205 Loss of Blanket Gas

	IMPORTANCE
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*
12. Ability to utilize symptom based procedures.....	N/A

K/A CATALOG: SRS

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 206 Reactor Tank Low Water Level

REF: SRS: SAR (1989) Chapter 15 Accident Analysis, 15.6 decrease in PWS inventory
- leaks and failures of small lines
- process water heat exhanger tube leak
- loss of coolant accident

K/A NO:	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the followingconcepts as they apply to REACTOR TANK LOW WATER LEVEL:	
EK1.01	Adequate core cooling.....	*
EK1.02	Maintaining forced circulation.....	*
EK1.03	Reactivity additions due to light water addition.....	
EK1.04	Radiation levels and releases	*
EK1.05	Flooding concerns.....	
EK2	Knowledge of the interrelations between REACTOR TANK LOW WATER LEVEL and the following:	
EK2.01	Reactor tank level indication.....	*
EK2.02	Plenum pressure.....	
EK2.03	Process water system.....	
EK2.04	Emergency cooling system.....	*
EK2.05	Moderator recovery system.....	
EK2.06	Reactor scram system.....	*
EK2.07	Airborne activity confinement system.....	*
EK2.08	Confinement heat removal system.....	*
EK2.09	Process room spray system.....	*
EK2.10	Contaminated water removal and disposal system.....	
EK2.11	Automatic incident action system.....	*
EK2.12	Diagnosis of multiple alarms system.....	
EK2.13	Closed circuit TV system.....	
EK2.14	Blanket Gas System.....	
EK3	Knowledge of the reasons for the following responses as they apply to REACTOR TANK LOW WATER LEVEL:	
EK3.01	Emergency action initiation.....	*
EK3.02	Moderator recovery system initiation.....	
EK3.03	Automatic incident action initiation.....	*
EK3.04	Core temperature increase.....	*
EK3.05	Increase in cooling water gamma monitors.....	*
EK3.06	Tripping all AC motors.....	
EK3.07	Close all septifoil valves and rotovalves.....	
EK3.08	Increase in stack activity.....	*
EK3.09	Isolating Blanket Gas.....	

K/A CATALOG: SRS

EPE: 206 Reactor Tank Low Water Level

K/A NO.	ABILITY	IMPORTANCE
EA1	Ability to operate and/or monitor the following as they apply to REACTOR TANK LOW WATER LEVEL:	
EA1.01	Emergency cooling system	*
EA1.02	Moderator recovery system	
EA1.03	Automatic incident action	*
EA1.04	Diagnosis of multiple alarms system	
EA1.05	Cooling water system	
EA1.06	Closed circuit TV system	
EA1.07	Process water system	
EA1.08	Reactor tank level	*
EA1.09	Airborne activity confinement system	*
EA1.10	Emergency actions	*
EA1.11	Assembly effluent temperatures	*
EA2	Ability to determine and/or interpret the following as they apply to REACTOR TANK LOW WATER LEVEL:	
EA2.01	Reactor tank level	*
EA2.02	Reactor power	*
EA2.03	Plenum pressure	
EA2.04	Adequate core cooling	*
EA2.05	Actions to be taken on Hi temperatures	*
EA2.06	Leak location	*
EA2.07	Reactivity effects of light water addition	
EA2.08	Rate of inventory loss and time to action	*
EA2.09	Automatic incident action initiations	*
EA2.10	Stack activity	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	*
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	*
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures	*

K/A CATALOG: SRS

EPE: 206 Reactor Tank Low Water Level

	IMPORTANCE
6. Ability to locate and operate components, including local controls.....	*
7. Ability to explain and apply all system limits and precautions.....	*
8. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....	*
9. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures.....	*
10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....	*
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures.....	*
12. Ability to utilize symptom based procedures.....	N/A

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 207 High Off-Site Release Rate

REF: NUREG 1123, 295017 High Off-Site Release Rate

K/A NO.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to HIGH OFF-SITE RELEASE RATE:	
EK1.01	Biological effects of radioisotope ingestion.....	
EK1.02	Protection of the general public.....	*
EK1.03	Wind direction effects on off-site release.....	*
EK2	Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following:	
EK2.01	Fission product production versus reactor power.....	
EK2.02	Radwaste.....	
EK2.03	Airborne activity confinement system.....	*
EK2.04	Plant ventilation systems.....	
EK2.05	Stack activity monitoring system.....	*
EK2.06	Site emergency plan.....	*
EK2.07	Control room ventilation.....	
EK2.08	Process rad monitoring system.....	
EK2.09	Process room spray.....	*
EK2.10	Confinement heat removal.....	*
EK3	Knowledge of the reasons for the following responses as they apply to HIGH OFF-SITE RELEASE RATE	
EK3.01	Damper alignments.....	*
EK3.02	Plant ventilation.....	
EK3.03	Implementation of site emergency plan.....	*
EK3.04	Power reduction.....	
EK3.05	Control room ventilation.....	

K/A NO.	ABILITY	
EA1	Ability to operate and/or monitor the following as they apply to HIGH OFF-SITE RELEASE RATE:	
EA1.01	Airborne activity confinement system.....	*
EA1.02	Plant ventilation systems.....	
EA1.03	Stack activity monitoring system.....	*
EA1.04	Process rad monitoring systems.....	
EA1.05	Process room spray.....	*
EA1.06	Confinement heat removal.....	*

K/A CATALOG: SRS

EPE: 207 High Off-Site Release Rate

		IMPORTANCE
EA2	Ability to determine and/or interpret the following as they apply to HIGH OFF-SITE RELEASE RATE:	
EA2.01	Off site release rate	*
EA2.02	Total number of curies released	*
EA2.03	Radiation levels	*
EA2.04	Source of radiation release	*
EA2.05	Meteorological data	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	*
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures	*
6.	Ability to locate and operate components, including local controls	*
7.	Ability to explain and apply all system limits and precautions	*
8.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	*
9.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures	*
10.	Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	*
11.	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures	*
12.	Ability to utilize symptom based procedures	N/A

K/A CATALOG: SRS

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 208 Charge/Discharge Event

REF: SRS: SAR Chapter 15, Accident Analysis, 15.7 Radioactive Release from a subsystem or component

K/A NO:	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to CHARGE/DISCHARGE EVENTS:	
EK1.01	Radiation exposure and release hazards.....	*
EK1.02	Shutdown margin.....	
EK1.03	Inadvertent criticality.....	*
EK1.04	Methods to verify subcriticality.....	*
EK2	Knowledge of the interrelations between CHARGE/DISCHARGE EVENTS and the following:	
EK2.01	Fission counters.....	*
EK2.02	Disassembly basin.....	
EK2.03	Radiation monitoring equipment.....	
EK2.04	Process room ventilation.....	
EK2.05	Disassembly basin area ventilation.....	
EK2.06	Disassembly basin cooling.....	
EK2.07	Stack activity monitoring.....	*
EK3	Knowledge of the reasons for the following responses as they apply to CHARGE/DISCHARGE EVENTS:	
EK3.01	Incident ventilation control.....	*
EK3.02	Actuating process room spray.....	*
EK3.03	Abnormal increase in fission count rate.....	*
EK3.04	SSS Actuation.....	*
EK3.05	Offsite notifications.....	*
EK3.06	HP surveys.....	
EA1	Ability to operate and/or monitor the following as they apply to CHARGE/DISCHARGE EVENTS:	
EA1.01	Airborne activity confinement system.....	*
EA1.02	Disassembly basin cooling.....	
EA1.03	Process room spray.....	*
EA1.04	Radiation monitoring equipment.....	
EA1.05	SSS.....	*
EA1.06	Fission counters.....	*
EA1.07	Process room ventilation.....	
EA1.08	Disassembly basin ventilation.....	
EA1.09	Stack activity monitoring.....	*

K/A CATALOG: SRS

EPE: 208 Charge/Discharge Event

EA2 Ability to determine and/or interpret the following as they apply to CHARGE/DISCHARGE EVENTS:

		IMPORTANCE
EA2.01	Area radiation levels	
EA2.02	Disassembly basin level	
EA2.03	Airborne contamination levels	
EA2.04	Occurrence of fuel handling accident	
EA2.05	Emergency action level identification and declaration	*
EA2.06	Changes in fission count rate	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures	
6.	Ability to locate and operate components, including local controls	*
7.	Ability to explain and apply all system limits and precautions	
8.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	
9.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures	
10.	Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	
11.	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures	
12.	Ability to utilize symptom based procedures	N/A

K/A CATALOG: SRS

DATE: APRIL 20, 1990

EMERGENCY PLANT EVOLUTIONS

EPE: 209 Control Room Abandonment

REF: NUREG 1123: 295016 Control Room Abandonment

K/A NO:	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to CONTROL ROOM ABANDONMENT:	
EK1.01	ALARA	
EK1.02	Smoke and toxic gas levels	
EK2	Knowledge of the interrelations between CONTROL ROOM ABANDONMENT:and the following:	
EK2.01	Remote monitoring and control system (REMACS)	*
EK2.02	CCR habitability	
EK3	Knowledge of the reasons for the following responses as they apply to CONTROL ROOM ABANDONMENT:	
EK3.01	Reactor SCRAM	*
EK3.02	Disabling control room controls	*

K/A NO.	ABILITY	
EA1	Ability to operate and/or monitor the following as they apply to CONTROL ROOM ABANDONMENT:	
EA1.01	Reactor scram system	*
EA1.02	Control rod system	
EA1.03	Control room ventilation	
EA1.04	River water system	
EA1.05	Reactor tank water level	
EA1.06	Control room/local control transfer mechanisms	*
EA1.07	Blanket gas pressure	
EA1.08	Emergency cooling	
EA1.09	AIA incident switch	
EA1.10	Process water system	
EA1.11	Airborne activity confinement system	
EA1.12	Cooling water system	
EA1.13	SSS	
EA1.14	Confinement heat removal system	
EA1.15	Contaminated water removal and disposal system	
EA1.16	REMACS	*

K/A CATALOG: SRS

EPE: 209 Control Room Abandonment

		IMPORTANCE
EA2	Ability to determine and/or interpret the following as they apply to CONTROL ROOM ABANDONMENT:	
EA2.01	Reactor power	*
EA2.02	Reactor tank water level	
EA2.03	Blanket gas pressure	
EA2.04	Confinement negative pressure	*
EA2.05	AACS damper and fan alignments	*

SYSTEM GENERIC K/As

1.	Knowledge of the system status criteria which require the notification of plant personnel	*
2.	Knowledge of which events related to system operation/status should be reported to outside agencies	*
3.	Knowledge of limiting conditions for operations and safety limits	
4.	Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	
5.	Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures	
6.	Ability to locate and operate components, including local controls	*
7.	Ability to explain and apply all system limits and precautions	
8.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications	*
9.	Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures	
10.	Ability to perform without reference to procedures those actions that require immediate operation of system components or controls	
11.	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures	*
12.	Ability to utilize symptom based procedures	N/A

K/A CATALOG: SRS

DATE: APRIL 26, 1990

Emergency Plant Evolutions

EPE: 210 Partial or Complete Loss of A.C. Power

Reference: NUREG 1123, 295003 Partial or Complete Loss of A.C. Power

K/A NO.	KNOWLEDGE	IMPORTANCE
EK1	Knowledge of the operational implications of the following concepts as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER:	
EK1.01	Undervoltage/degraded voltage effects on electrical loads	
EK1.02	Reduced frequency effects on electrical loads	
EK1.03	Electrical bus tie-breakers.....	
EK1.04	Effect of battery discharge rate on capacity.....	
EK1.05	Failsafe component design	
EK1.06	Automatic transfer switch operation	
EK1.07	GM load and start limits	*
EK2	Knowledge of the interrelations between PARTIAL OR COMPLETE LOSS OF A.C. POWER and the following:	
EK2.01	115 kV site electrical distribution system	
EK2.02	Reactor area normal power system	
EK2.03	Reactor building emergency power systems	*
EK2.04	River water system	
EK2.05	Cooling water system	
EK2.06	Process water system	
EK2.07	Load shedding	*
EK2.08	A.C. electrical loads and backups	
EK2.09	Containment substation	
EK3	Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER:	
EK3.01	Manual and auto transformer room bus transfer	
EK3.02	Load shedding	*
EK3.03	Reactor scram	*

K/A NO.	ABILITY	
EA1	Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER:	
EA1.01	Reactor area normal power system	
EA1.02	Reactor building emergency power systems	*
EA1.03	Systems necessary to assure safe plant shutdown	*
EA1.04	D.C. electrical distribution system	
EA1.05	Reactor power, tank level, and assembly temperature ..	*

K/A CATALOG: SRS

EPE: 210 Partial or Complete Loss of A.C. Power

		IMPORTANCE
EA2	Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER:	
EA2.01	Cause of partial or complete loss of A.C. power	*

SYSTEM GENERIC K/As

1. Knowledge of system status criteria which require the notification of plant personnel.....
2. Knowledge of which events related to system operation/status should be reported to outside agencies..... *
3. Knowledge of limiting conditions for operations and safety limits.....
4. Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.....
5. Knowledge of the annunciator alarms and indications, and use of the abnormal condition control procedures.....
6. Ability to locate and operate components, including local controls..... *
7. Ability to explain and apply all system limits and precautions.....
8. Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.....
9. Ability to verify system alarm setpoints and operate controls identified in the abnormal condition control procedures..... *
10. Ability to perform without reference to procedures those actions that require immediate operation of system components or controls.....
11. Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for abnormal condition control procedures..... *
12. Ability to utilize symptom based procedures..... N/A

K/A CATALOG: SRS

SRS K/A CATALOG-COMPONENTS
COMPONENT: 401 VALVES

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	The operation of safety valves			**
K1.02	The operation of relief valves			**
K1.03	Cautions for placing a valve controller in manual mode	**	**	**
K1.04	Manual operations of motor operated valves (MOV) with motor inoperable	**	**	**
K1.05	Principles of operation and purpose of check valves	**	**	**
K1.06	Operation of manual valves and verification of position with indicator lights and various physical indicators	**	**	**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 402 SENSORS/DETECTORS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
	FLOW			
K1.01	Theory and operation of flow detectors			**
K1.02	Modes of failure			**
	LEVEL			
K1.03	Theory and operation of level detectors			**
K1.04	Modes of failure			**
	PRESSURE			
K1.05	Theory and operation of pressure detectors			**
K1.06	Modes of failure			**
	TEMPERATURE			
K1.07	Theory and operation of temperature detectors	**	**	**
K1.08	Modes of failure			**
	POSITION DETECTORS			
K1.09	Theory and operation of position detectors			**
K1.10	Modes of failure			**
	NUCLEAR INSTRUMENTATION			
K1.11	Theory and operation of fission chambers, ion chambers, gamma thermometers (APM)	**	**	**
K1.12	Neutron monitoring, indication units and levels	**	**	**
K1.13	Failure modes of fission chambers and ion chambers			**
	RADIATION DETECTORS			
K1.14	Operation of ion chambers, G-M tubes, scintillation detectors and proportional counters (BIM)			**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 402 SENSORS/ DETECTORS

	IMPORTANCE		
	SRO	SUP	STE
K1.15 Use of portable and personal radiation monitoring instruments	**	**	**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 403 CONTROLLERS AND POSITIONERS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Operation of valve controllers	**	**	**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 404 PUMPS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
	CENTRIFUGAL			
K1.01	Identification, symptoms and consequences of cavitation	**	**	**
K1.02	Consequences of operating a pump dead-headed or for extended recirculation times	**	**	**
K1.03	Need for net positive suction head (NPSH); effects of loss of suction			**
K1.04	Fluid hammer and methods of prevention	**	**	**
K1.05	Discuss the relationship between pump speed, head, flow and power without using formulas or calculations			**
K1.06	Describe the problems that will occur if a pump is operated at low flow conditions for extended periods of time	**	**	**
K1.07	Define shut-off head			**
K1.08	Define pump run-out			**
K1.09	Explain the effects on flow and system pressure of operating centrifugal pumps in parallel or series			**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 405 MOTORS AND GENERATORS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Relationship between pump motor current (ammeter reading) and the following: pump fluid flow, head, speed and stator temperature	**	**	**
K1.02	Reason for limiting the number of motor starts in a given time period	**	**	**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 406 HEAT EXCHANGERS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SIE
K1.01	Relationship between flow rates and temperatures	**	**	**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 407 DEMINERALIZES AND ION EXCHANGERS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Purpose of a demineralizer			**
K1.02	Reason for demineralizer temperature and flow limits			**

SRS K/A CATALOG-COMPONENTS
COMPONENT: 408 BREAKERS, RELAYS AND DISCONNECTS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Purpose for racking out breakers (de-energize components and associated control and indication circuits)	**	**	**
K1.02	Local indication that breaker is open, closed or tripped	**	**	**
K1.03	Meaning of power supply circuit breaker indicator lights and capability to remotely open and close	**	**	**
K1.04	Operation of various push buttons, switches and handles and the resulting action on breakers	**	**	**
K1.05	Function of thermal overload protection device			**
K1.06	Interpreting one-line diagram of control circuitry	**	**	**
K1.07	Safety procedures and precautions associated with breakers, including MCC bus breakers, high, medium and low voltage breakers, relays and disconnects	**	**	**
K1.08	Effects of closing breakers with current out of phase, different frequencies, high voltage differential, low current, or too much load			**
K1.09	Effect of racking out breakers on control and indicating circuits and removal of control power on breaker operation	**	**	**
K1.10	Function, control and precautions associated with disconnects	**	**	**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 301 NEUTRONS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SITE
K1.01	Define prompt and delayed neutrons			**
K1.02	Describe neutron moderation			**

K/A CATALOG: SRS

SRS K/A CATALOG-THEORY
REACTOR THEORY: 302 NEUTRON LIFE CYCLE

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SITE
K1.01	Define critical, subcritical and supercritical with respect to a reactor	**	**	**
K1.02	Define K-excess			**
K1.03	Define Margin of Control	**	**	**
K1.04	Define reactivity	**	**	**
K1.05	Evaluate change in Margin of Control due to changes in plant parameters			**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 303 REACTOR KINETICS AND NEUTRON SOURCES

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Explain the concept of subcritical multiplication			**
K1.02	Define reactor period	**	**	**
K1.03	Explain the effect of delayed neutrons on reactor period			**
K1.04	Explain prompt critical, prompt jump, and prompt drop			**
K1.05	Given the power equation, solve problems for power changes and period			**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 304 REACTIVITY COEFFICIENTS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SITE
K1.01	Define the temperature coefficient of reactivity	**	**	**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 305 SAFETY AND CONTROL RODS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STF
K1.01	Relate veeder units and control rod position	**	**	**
K1.02	Predict direction of change in reactor power for a change in control rod position	**	**	**
K1.03	Define reactor scram	**	**	**
K1.04	State the purpose of flux shaping and rod sequencing			**
K1.05	Describe effects of partial control rods on axial and radial flux	**	**	**
K1.06	Describe the relative strengths of safety rods, cadmium rods and lithium control rods	**	**	**
K1.07	Describe the relative strengths of the two types of partial rods	**	**	**
K1.08	Discuss why the procedures for safety rod withdrawal require that the reactor not go critical on the safety rods	**	**	**
K1.09	Describe how the operator can verify that the Margin of Control requirements are satisfied	**	**	**
K1.10	Explain why the reactor must be shutdown if certain safety rods are inoperable			**
K1.11	Explain the significance of having a 1/M less than .85 with only 48 safety rods withdrawn			**
K1.12	Explain the significance of having a value for M of greater than 1.5 after a group of safety rods is withdrawn			**

K/A CATALOG: SRS

SRS K/A CATALOG-THEORY
REACTOR THEORY: 305 SAFETY AND CONTROL RODS

		IMPORTANCE SRO	SUP	STE
K1.13	Explain the significance of having a value for M of greater than 2.0 after a group of safety rods is withdrawn			**
K1.14	Explain how the rod tip region affects control rod operation	**	**	**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 306 FISSION PRODUCT POISONS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	State the characteristics of Xenon-135 as a fission product poison	**	**	**
K1.02	Describe the production of Xenon-135	**	**	**
K1.03	Describe the removal of Xenon-135	**	**	**
	Describe the following processes and state their effect on reactor operations:			
K1.04	--Equilibrium Xenon	**	**	**
K1.05	--Maneuvering Xenon	**	**	**
K1.06	--Xenon following a scram	**	**	**
K1.07	Describe the effects that Xenon concentration has on flux shape, assembly temperature and control rod patterns	**	**	**
	Plot the curve and explain the reasoning for the reactivity insertion by Xenon-135 versus time for the following:			
K1.08	--Initial reactor startup and ascension to full power	**	**	**
K1.09	--Reactor startup with Xenon-135 already present in the core	**	**	**
K1.10	--Power changes from steady-state power to another	**	**	**
K1.11	--Reactor scram	**	**	**
K1.12	--Controlled reactor shutdown	**	**	**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 306 FISSION PRODUCT POISONS

		IMPORTANCE SRO	SUP	STE
K1.13	Explain the process and reasons for the Control Room Operator to compensate for the time dependent behavior of Xenon-135 concentration in the reactor	**	**	**
K1.14	Describe the results of and reasons for Xenon effects on axial or radial flux distributions			**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 307 FUEL AND TARGET DEPLETION

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SIE
K1.01	Explain the use of targets in the reactor	**	**	**
K1.02	Describe the effect of core burnup on control rod and target reactivity worth	**	**	**
K1.03	Describe the effect of extended shutdowns on control rod and target reactivity worth	**	**	**

SRS K/A CATALOG-THEORY
REACTOR THEORY: 308 REACTOR OPERATIONAL PHYSICS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
	Startup and approach to criticality			
K1.01	List parameters which should be monitored and controlled during the approach to criticality	**	**	**
K1.02	List reactivity control mechanisms which exist for plant conditions during the approach to criticality	**	**	**
K1.03	Describe the count rate and period response which should be observed for rod withdrawal during the approach	**	**	**
K1.04	Relate the concept of subcritical multiplication to predicted count rate and period response for control rod withdrawal during the approach to critical	**	**	**
K1.05	Explain characteristics to be observed when the reactor is very close to critical	**	**	**
	Criticality			
K1.06	List parameters which should be monitored and controlled upon reaching initial criticality	**	**	**
K1.07	Define criticality as related to a reactor startup	**	**	**
K1.08	Describe reactor power and period response once criticality is reached	**	**	**
K1.09a	List parameters which should be monitored after the reactor is critical until reaching initial low power (point of adding heat)	**	**	**

		IMPORTANCE SRO	SUP	STE
K1.09b	List parameters which should be monitored after the reactor is critical until reaching low power (75 MW)	**	**	**
K1.10	Explain procedures for adjusting reactor period during this phase of startup	**	**	**
K1.11	Discuss the concept of low power (75 MW) and its impact on reactor power	**	**	**
K1.12	Describe reactor power and period response prior to reaching low power (75 MW)	**	**	**
K1.13	Explain characteristics to look for when low power (75 MW) is reached	**	**	**
	Power increase to full power			
K1.14	Describe parameters to be monitored and controlled during power increase to full power	**	**	**
K1.15	Describe reactor power and period during power increase to full power	**	**	**
K1.16	Explain procedures for establishing and controlling power increase to full power	**	**	**
K1.17	Describe the means by which flux will be flattened after reaching full power	**	**	**
K1.18	Describe parameters which will be monitored and controlled while flux is being flattened	**	**	**
K1.19	Discuss why flux is flattened and the results if it is flattened improperly	**	**	**

		IMPORTANCE SRO	SUP	STE
K1.20	Discuss the reasons for and the effects of partial rod movements during power operation			**
K1.21	Explain the effect that changes in coolant water temperature will have on reactor power level			**
K1.22	Explain reactor power response to control rod insertion during shutdown	**	**	**
K1.23	Explain the necessity for inserting control rods in a predetermined pattern during normal reactor shutdown			**
K1.24	Define decay heat	**	**	**
K1.25	Explain the relationship between decay heat generation and: A) power level history, B) core burnup and C) time since reactor shutdown			**
K1.26	Discuss how the Estimated Critical Position would be affected by changes in CW temperature, time since shutdown, core burnup and previous power history			**

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 311 THERMODYNAMIC UNITS AND PROPERTIES

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SITE
K1.01	Convert between absolute and relative vacuum scales			**
K1.02	Describe how the plant pressure and level sensing instruments work			**

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 312 BASIC ENERGY CONCEPTS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE

(TO BE COMPLETED LATER)

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 313 PROPERTIES OF WATER

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Describe the effects of temperature on the properties of water and D2O	**	**	**
K1.02	Describe the effect on heat transfer capability when water and D2O boil	**	**	**
K1.03	Explain why plenum pressure decreases during rapid power reductions	**	**	**

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 314 THERMODYNAMIC PROCESSES

K/A NO. KNOWLEDGE	IMPORTANCE SRO	CUP	STE

(TO BE COMPLETED LATER)

K/A CATALOG: SRS

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 315 THERMODYNAMIC CYCLES

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE

(TO BE COMPLETED LATER)

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 316 FLUID STATICS AND DYNAMICS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Explain the reasons for and effects of water hammer	**	**	**

SRS K/A CATALOG-THEORY
THERMODYNAMICS 317 HEAT TRANSFER

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Describe three mechanisms of heat transfer			**
K1.02	Explain methods of calculating core thermal power	**	**	**
K1.03	Calculate core thermal power using a simplified heat balance	**	**	**
K1.04	Describe how the presence of gases, flouing, blockage or steam can affect heat transfer and fluid flow in heat exchangers	**	**	**
K1.05	Describe how steam or flow blockage can effect heat transfer in a fuel assembly	**	**	**

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 318 THERMAL HYDRAULICS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SIE
K1.01	Explain the necessity for maintaining DC pump flow after the reactor is shut down and the results if pumps are stopped	**	**	**

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 319 CORE THERMAL LIMITS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	STE
K1.01	Define Tilt Ration and how it is monitored and controlled	**	**	**
K1.02	Define Radial Shape Factor and how it is monitored and controlled	**	**	**
K1.03	Define Roof-Top-Ratio and how it is monitored and controlled	**	**	**
K1.04	Define Axial Power Shape and how it is monitored and controlled	**	**	**
K1.05	Define Pad and how it is monitored and controlled	**	**	**
K1.06	Explain the reasons for monitoring assembly Pad and the effects if it is not done properly	**	**	**
K1.07	Define Burn Out Risk	**	**	**
K1.08	Describe how an operator could observe that the process water is approaching the boiling temperature	**	**	**
K1.09	Describe the typical temperatures in the process water system at full power	**	**	**

SRS K/A CATALOG-THEORY
THERMODYNAMICS: 320 BRITTLE FRACTURE AND VESSEL THERMAL STRESS

K/A NO.	KNOWLEDGE	IMPORTANCE SRO	SUP	SITE
K1.01	Explain how the addition of cold Emergency Cooling System water can affect the integrity of the reactor tank	**	**	**

END

DATE
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5/21/92