

## **Problem Statement:**

The current K/A catalog requires Reactor Operators (ROs) and Senior Reactor Operators (SROs) to commit to memory 1 hour or less Technical Specifications (TS) action statements. ROs are not required by 10CFR55 "Operators' Licenses" to have this knowledge and SRO memorization of hundreds of TS action statements has limited practical benefit.

## **Facts:**

The following is the related current knowledge item in NUREG 1122 (PWR) and NUREG 1123 (BWR) generics section:

2.2.39 Knowledge of less than or equal to one hour Technical Specification action statements for systems.  
(CFR: 41.7 / 41.10 / 43.2 / 45.13)  
IMPORTANCE RO 3.9 SRO 4.5

The following is the related knowledge requirements from 10CFR55 "Operator's Licenses":

- 41.7 Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
- 41.10 Administrative, normal, abnormal, and emergency operating procedures for the facility.
- 43.2 Facility operating limitations in the technical specifications and their bases.
- 45.13 Demonstrate the applicant's ability to function within the control room team as appropriate to the assigned position, in such a way that the facility licensee's procedures are adhered to and that the limitations in its license and amendments are not violated.

Pertinent information from NUREG 1021 "Operator Licensing Standards for Power Reactors":

(ES-401, p 1 of 33, B,) "Each K/A stem statement has been linked to the applicable item number in 10 CFR 55.41 and/or 55.43. Preparing the license examination using the appropriate K/A catalog, in conjunction with the instructions in this NUREG-series report, will ensure that the examination includes a representative sample of the items specified in the regulations."

(ES-401, p 4 of 33, 4<sup>th</sup> bullet) "A question at the RO level should test one (or more) of the 14 items listed under 10 CFR 55.41(b) that the K/A is linked to, or test at a RO level as determined from the facility's learning objectives."

## **Discussion:**

SROs are trained to use the TS as a reference in determining the operability of a system and determining the required actions. Unless a reactor scram is required immediately, the SRO will refer to the TS prior to performing an action. There are currently no ABWR TS requirements to immediately scram the reactor.

SRO knowledge of TS is required by 10CFR55 43.2 and 45.13. Knowledge of TS from memory is currently limited to those with an action statement of an hour or less by K/A 2.2.39; however, this includes hundreds of items that have limited significance to safety (Please see Attachment 1 for examples of 1 hour or less action statements from the ABWR TS). Knowledge of TS action statements that lead to shutting the reactor down in an hour or less have typically been the focus of exam questions for this item. Recognition and application of TS will continue to be evaluated by other portions of the licensed operator examination.

ROs are not required to be able to interpret or apply TS. ROs are trained to recognize potential TS implications for systems and relay that information to the SROs for operability determination and required actions. RO recognition of TS significance will continue to be evaluated by other portions of the licensed operator examination.

**Options:**

1. Maintain the existing wording and require ROs and SROs to memorize hundreds of TS items.
2. Modify 2.2.39 to read "Knowledge of Technical Specification action statements for systems that require a plant shutdown in one hour or less."
  - a. IMPORTANCE RO 4 SRO 5
  - b. IMPORTANCE RO 2 SRO 5
3. Develop additional knowledge stems to clarify the difference between ROs and SROs
4. Delete 2.2.39 as the required knowledge and ability is already measured by several other K/As

**Recommendation:**

Option 2.b is recommended – Modify 2.2.39 to read "Knowledge of Technical Specification action statements for systems that require a plant shutdown in one hour or less" and change the RO Importance rating to 2.

Option 1 requires significant memorization without enhancing safety and does nothing to clarify the differences between an RO and an SRO. This option may lead to having an RO knowledge item without a cross-reference to 10CFR55.41.

Option 2.a clarifies the knowledge requirement to know from memory important TS actions but can still lead to having an RO knowledge item without a cross-reference to 10CFR55.41.

Option 3 could clarify the difference between the RO and SRO level of knowledge; however, it further dilutes the significance and narrows the focus of a question based on the selected item.

Option 4 considers merit; SROs are trained to use TS and procedures to operate the plant. Conducting most plant operations from memory will result in re-training or discipline. It is recognized; however, that there may be some very significant TS actions that require immediate identification. These should be known from memory.

Option 2.b eliminates ROs from being tested on TS action statements. Option 2.b clarifies the knowledge requirement for SROs to those items that have an importance to safety. Option 2.b is consistent with the testing methodology of NUREG 1021.

Both ROs and SROs will continue to be evaluated for their knowledge of TS via other existing knowledge and ability items. As an example, recognition that a system has TS implications is covered by 2.2.22 "Knowledge of limiting conditions for operations and safety limits." This knowledge (by both ROs and SROs) identifies the need to refer to the TS for further guidance. Correct application of TS guidance is further examined under several other knowledge items.

2.2.39            Knowledge of limiting conditions for operations and safety limits.  
(CFR: 41.5 / 43.2 / 45.2)  
IMPORTANCE RO 4.0 SRO 4.7

# Attachment 1

## RHR Shutdown Cooling System—Hot Shutdown 3.4.7

### 3.4 REACTOR COOLANT SYSTEM (RCS)

#### 3.4.7 Residual Heat Removal (RHR) Shutdown Cooling System—Hot Shutdown

LCO 3.4.7 Three RHR shutdown cooling subsystems shall be OPERABLE, and, with less than 5 reactor internal pumps (RIPs) in operation, at least one RHR shutdown cooling subsystem shall be in operation.

-----NOTES-----

1. All RHR shutdown cooling subsystems and reactor internal pumps may be removed from operation for up to 2 hours per 8 hour period.
  2. One RHR shutdown cooling subsystem may be inoperable for up to 2 hours for performance of Surveillances provided one of the remaining RHR shutdown cooling subsystems is OPERABLE.
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APPLICABILITY: MODE 3 with reactor steam dome pressure < 0.932 MPaG.

#### ACTIONS

-----NOTE-----

LCO 3.0.4 is not applicable.

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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required RHR shutdown cooling subsystems inoperable.	A.1 Initiate action to restore required RHR shutdown cooling subsystem(s) to OPERABLE status.	Immediately
	<u>AND</u>	

(continued)

# Attachment 1

## RHR Shutdown Cooling System—Hot Shutdown 3.4.7

### ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 Initiate action to be in MODE 4.  <u>AND</u> A.3 Verify an alternate method of decay heat removal is available for each required inoperable RHR shutdown cooling subsystem.	Immediately   1 hour
B. No RHR shutdown cooling subsystem in operation.  <u>AND</u> Less than 5 RIPs in operation.	B.1.1 Initiate action to restore one RHR shutdown cooling subsystem to operation.  <u>OR</u> B.1.2 Initiate action to restore at least 5 RIPs to operation.  <u>AND</u> B.2 Verify reactor coolant circulation by an alternate method.   <u>AND</u> B.3 Monitor reactor coolant temperature and pressure.	Immediately   Immediately  1 hour from discovery of no reactor coolant circulation  <u>AND</u> Once per 12 hours thereafter  Once per hour

# Attachment 1

SCIVs  
3.6.4.2

## 3.6 CONTAINMENT SYSTEMS

### 3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

LCO 3.6.4.2 Each SCIV shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,  
 During movement of irradiated fuel assemblies in the  
 secondary containment,  
 During CORE ALTERATIONS,  
 During operations with a potential for draining the reactor  
 vessel (OPDRVs).

#### ACTIONS

-----NOTES-----

1. Penetration flow paths may be unisolated intermittently under administrative controls.
  2. Separate Condition entry is allowed for each penetration flow path.
  3. Enter applicable Conditions and Required Actions for systems made inoperable by SCIVs.
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CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more penetration flow paths with one SCIV inoperable.	A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	8 hours
	<u>AND</u>	(continued)

# Attachment 1

SCIVs  
3.6.4.2

**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2</p> <p style="text-align: center;">-----NOTE----- Valves and blind flanges in high radiation areas may be verified by use of administrative means. -----</p> <p>Verify the affected penetration flow path is isolated.</p>	Once per 31 days
<p>B. -----NOTE----- Only applicable to penetration flow paths with two isolation valves. -----</p> <p>One or more penetration flow paths with two SCIVs inoperable.</p>	<p>B.1</p> <p>Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.</p>	4 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	<p>C.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>C.2 Be in MODE 4.</p>	12 hours  36 hours

(continued)

# Attachment 1

SCIVs  
3.6.4.2

**ACTIONS (continued)**

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A or B not met during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	D.1 -----NOTE----- LCO 3.0.3 is not applicable. -----  Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>	
	D.2 Suspend CORE ALTERATIONS.	Immediately
<u>AND</u>		
D.3 Initiate action to suspend OPDRVs.	Immediately	

# Attachment 1

## AC Sources –Refueling 3.8.2

### 3.8 ELECTRICAL POWER SYSTEMS

#### 3.8.2 AC Sources –Refueling

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

- a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems –Shutdown"; and
- b. One or more diesel generator(s) (DG) capable of supplying at least one division of the required OPERABLE features via the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.10.

APPLICABILITY: MODE 5 with water level in the refueling cavity  $\geq 7.0$  meters above the reactor pressure vessel flange, or during movement of irradiated fuel assemblies in secondary containment.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required offsite circuit inoperable.	-----NOTE----- Enter applicable Condition and Required Actions of LCO 3.8.10, with one required division de-energized as a result of Condition B. -----	
	A.1.1 Initiate action to restore required offsite circuit to OPERABLE status supplying power to all required ESF buses.  AND	Immediately
		(continued)

# Attachment 1

AC Sources –Refueling  
3.8.2

**ACTIONS (continued)**

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.1.2 Declare affected required feature(s) with no power available from an OPERABLE offsite circuit inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	<u>AND</u>	
A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately	
<u>AND</u>		
A.2.4 Initiate action to restore required offsite circuit to OPERABLE status supplying power to all required ESF buses.	Immediately	

(continued)

# Attachment 1

AC Sources -Refueling  
3.8.2

**ACTIONS (continued)**

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or more required DGs inoperable.	B.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	B.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	<u>AND</u>	
	B.3 Initiate action to suspend OPDRVs.	Immediately
	<u>AND</u>	
	B.4 Initiate action to restore required DG(s) to OPERABLE status.	Immediately

# Attachment 1

## DC Sources – Shutdown 3.8.5

### 3.8 ELECTRICAL POWER SYSTEMS

#### 3.8.5 DC Sources – Shutdown

LCO 3.8.5 DC electrical power subsystem(s) shall be OPERABLE to support the required OPERABLE features and the electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 4 and 5,  
During movement of irradiated fuel assemblies in secondary containment.

#### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	<u>AND</u>	
		(continued)

# Attachment 1

## DC Sources – Shutdown 3.8.5

### ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

### SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.5.1 For DC sources required to be OPERABLE the following SRs are applicable: SR 3.8.4.1    SR 3.8.4.4    SR 3.8.4.7 SR 3.8.4.2    SR 3.8.4.5    SR 3.8.4.8. SR 3.8.4.3    SR 3.8.4.6	In accordance with applicable SRs