Clarification Guidance for SRO-only Questions
Rev 1 (03/11/2010)

Purpose

The purpose of this document is to promote *consistency* for examiners and licensees when developing and reviewing Senior Reactor Operator (SRO)-only written test items.

Scope

This document provides clarifications and guidance for fulfilling the intent of 10 CFR 55.43 and NUREG 1021, ES-401, as they pertain to SRO-only written test items. The use of this document is not a regulatory requirement and shall be used on a voluntary basis. The following provisions are applicable:

1. This document does not impose any requirements or expectations on licensees beyond those in NUREG 1021.
2. This document does not replace or eliminate the requirements or the need to be familiar with NUREG 1021.
3. Anyone discovering a conflict shall promptly bring it to the attention of the responsible NRC Region Office or the Headquarters (HQ) Program Office.
4. NUREG-1021 always takes precedence if a conflict is identified.
5. Bracketed [ ] items reference the source of the guidance.

References

- K/A catalogs (NUREG 1122 and NUREG 1123)
- 10CFR55.43 Written examination: Senior operators.
- NUREG 1021, Rev. 9, Supplement 1, "Operator Licensing Examination Standards For Power Reactors"
- 2006 Region 2 Examiner's Workshop SRO-only topic presentation (ADAMS Accession Number ML062060498)
- Operator Licensing Feedback Web page questions 401.29, 401.30, 401.35, 401.36, and 401.37 @ http://www.nrc.gov/reactors/operator-licensing/op-licensing-files/ol-feedback.pdf

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I. NUREG 1021, -1122, -1123 Sample Plan Requirements [ES-401, Section D.1.c]

SRO-only K/A statements MUST be either an:

- "A2" statement. [All emergency/abnormal "A2" catalog statements are linked to 10 CFR 55.43(b). Plant systems "A2" statements are still valid SRO-only K/A material even though some do not have a 10 CFR 55.43 designator in the catalog.]

    - One exception: In Tier 2, Group 2, selection does not have to be A2 provided it is related to fuel handling facilities and procedures per 10 CFR 55.43(b)(7).

OR

- "G" statement. [in the case of Tier 3, linked to 10 CFR 55.43 in the K/A catalog] [OL Feedback Item 401.29]

Example below shows K/A categories for SRO-only Points

ES-401 PWR Examination Outline Form ES-401-2

Facility:		Date of Exam:																
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2		G*		Total
1. Emergency & Abnormal Plant Evolutions	1				N/A					N/A			18					6
	2												9					4
	Tier Totals												27					10
2. Plant Systems	1												28					5
	2												10					3
	Tier Totals												38					8
3. Generic Knowledge and Abilities Categories		1		2		3		4					10	1	2	3	4	7

II. Some examples of additional knowledge and abilities as they pertain to an SRO license and the 10 CFR 55.43(b) topics [ES-401, Section D.1.c]:

A. Conditions and limitations in the facility license. [10 CFR 55.43(b)(1)]

Some examples of SRO exam items for this topic include:

- Reporting requirements when the maximum licensed thermal power output is exceeded.
- Administration of fire protection program requirements such as compensatory actions associated with inoperable sprinkler systems, fire doors, etc.
- The required actions for not meeting administrative controls listed in Technical Specification (TS) Section 5 or 6, depending on the facility (e.g., shift staffing requirements).
- National Pollutant Discharge Elimination System (NPDES) requirements, if applicable.
- Processes for TS and FSAR changes.

Note: The analysis and selection of required actions for TS Sections 3 and 4 may be more appropriately listed in the following 10 CFR 55.43 topic.

B. Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)]

Some examples of SRO exam items for this topic include:

- Application of Required Actions (Section 3) and Surveillance Requirements (SR) (Section 4) in accordance with rules of application requirements (Section 1).
- Application of generic Limiting Condition for Operation (LCO) requirements (LCO 3.0.1 thru 3.0.7; SR 4.0.1 thru 4.0.4).
- Knowledge of TS bases that are required to analyze TS required actions and terminology.
- Same items listed above for the Technical Requirements Manual (TRM) and Offsite Dose Calculation Manual (ODCM).

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on knowledge of ≤ 1 hour action statements and the safety limits since Reactor Operators (ROs) are typically required to know these items.

SRO-only knowledge generally cannot be claimed for questions that can be answered *solely* based on expected RO TS knowledge. RO's are typically expected to know the LCO statements and associated applicability information, i.e., the information above the double line separating the

ACTIONS from the LCO and associated applicability statements (standardized TS; see example below)

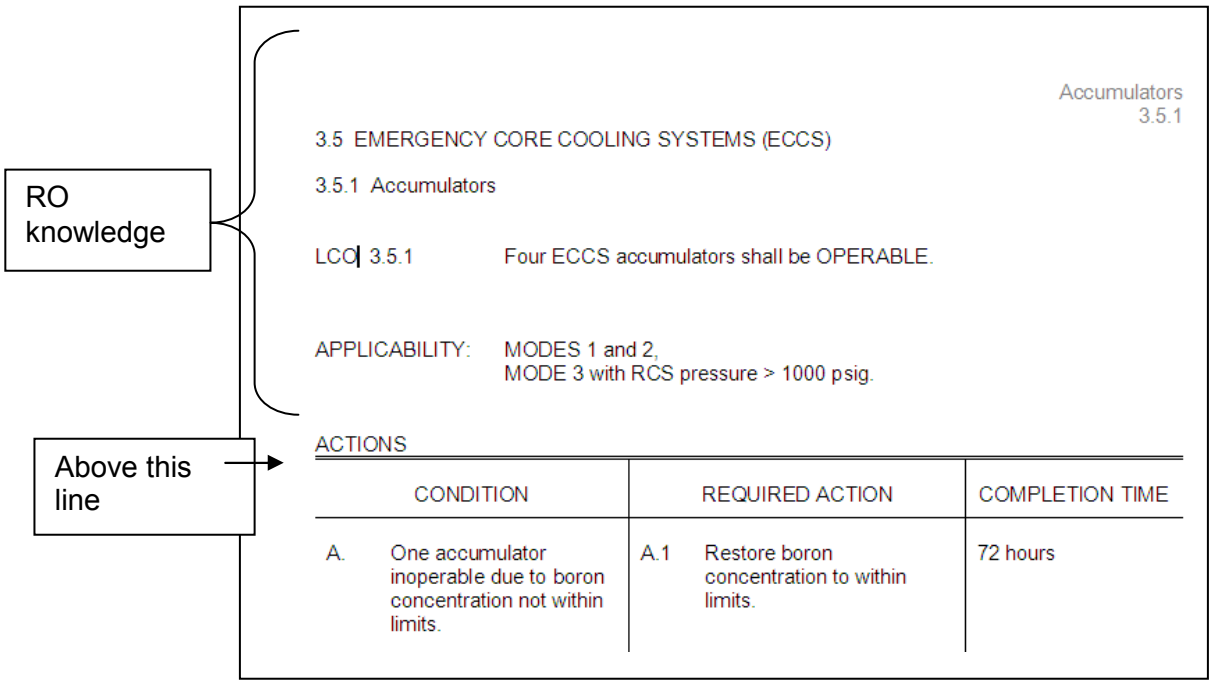
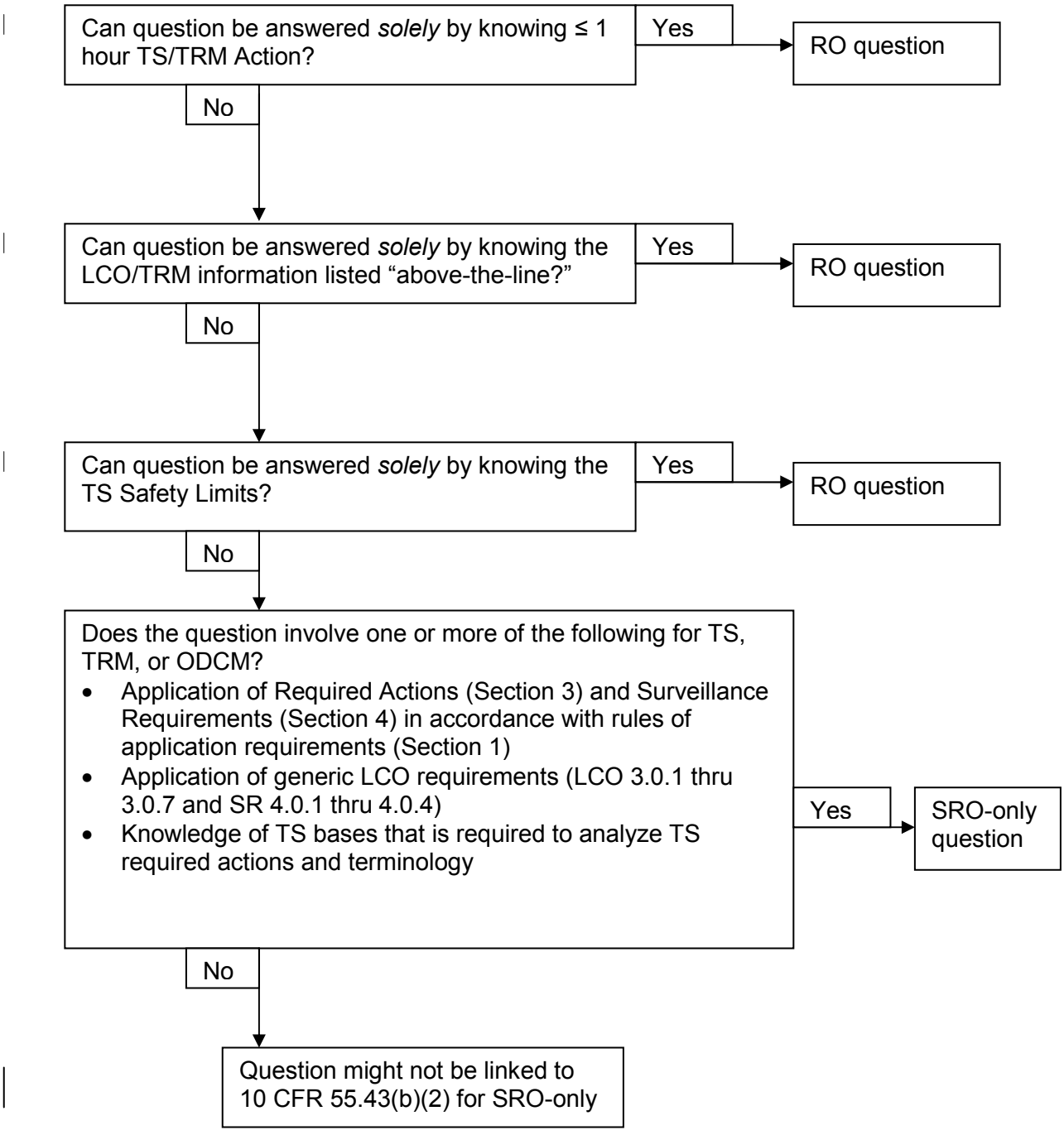


Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)



C. Facility licensee procedures required to obtain authority for design and operating changes in the facility. [10 CFR 55.43(b)(3)]

Some examples of SRO exam items for this topic include:

- 10 CFR 50.59 screening and evaluation processes.
- Administrative processes for temporary modifications.
- Administrative processes for disabling annunciators.
- Administrative processes for the installation of temporary instrumentation.
- Processes for changing the plant or plant procedures.

Section IV provides an example of a satisfactory SRO-only question related to this topic.

D. Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions. [10 CFR 55.43(b)(4)]

Some examples of SRO exam items for this topic include:

- Process for gaseous/liquid release approvals, i.e., release permits.
- Analysis and interpretation of radiation and activity readings as they pertain to selection of administrative, normal, abnormal, and emergency procedures.
- Analysis and interpretation of coolant activity, including comparison to emergency plan criteria and/or regulatory limits.

SRO-only knowledge should not be claimed for questions that can be answered *solely* based on RO knowledge of radiological safety principles; e.g., RWP requirements, stay-time, DAC-hours, etc.

E. Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10 CFR 55.43(b)(5)]

This 10 CFR 55.43 topic involves both 1) assessing plant conditions (normal, abnormal, or emergency) and then 2) selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed. One area of SRO level knowledge (with respect to selecting a procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

The applicant's knowledge can be evaluated at the level of 10 CFR 55.43(b)(5) by ensuring that the additional knowledge of the procedure's content is required to correctly answer the written test item, for example:

- Knowledge of when to implement attachments and appendices, including how to coordinate these items with procedure steps.
- Knowledge of diagnostic steps and decision points in the emergency operating procedures (EOP) that involve transitions to event specific sub-procedures or emergency contingency procedures.
- Knowledge of administrative procedures that specify hierarchy, implementation, and/or coordination of plant normal, abnormal, and emergency procedures.

SRO-only knowledge should not be claimed for questions that can be answered *solely* using "systems knowledge"; e.g.:

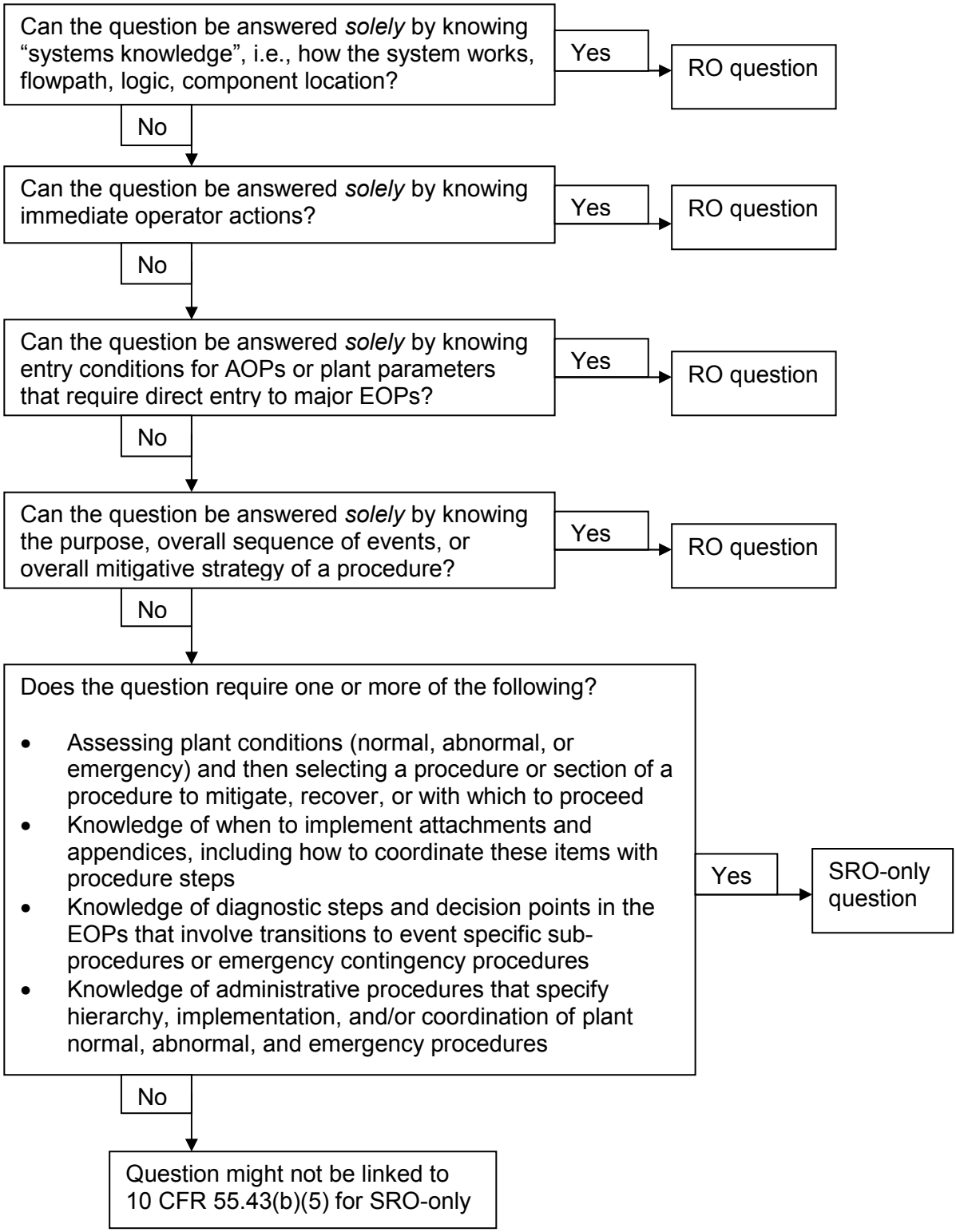
- how the system works.
- system flow path.
- component locations, etc.

SRO-only knowledge should not be claimed for questions that can be answered *solely* using fundamental knowledge of:

- the basic purpose, the overall sequence of events that will occur, or the overall mitigative strategy of a procedure.
- any AOP entry condition.
- plant parameters that require direct entry to major EOPs; e.g., major Westinghouse EOPs are E0, E1, E2, E3, ECA-0.0, and Red/Orange Functional Restoration Procedures and major General Electric EOPs are Reactor Vessel Control, Primary Containment Control, Secondary Containment Control, and Radioactive Release Control.
- immediate operator actions of a procedure.

Section IV and V of this document provide several satisfactory and unsatisfactory examples of test items related to this 10 CFR 55.43(b)(5) topic.

Figure 2: Screening for SRO-only linked to 10 CFR 55.43(b)(5)
(Assessment and selection of procedures)



F. Procedures and limitations involved in initial core loading, alterations in core configuration, control rod programming, and determination of various internal and external effects on core reactivity. [10 CFR 55.43(b)(6)]

Some examples of SRO exam items for this topic include:

- Evaluating core conditions and emergency classifications based on core conditions.
- Administrative requirements associated with low power physics testing processes.
- Administrative requirements associated with refueling activities, such as approvals required to amend core loading sheets or administrative controls of potential dilution paths and/or activities.
- Administrative controls associated with the installation of neutron sources.
- Knowledge of TS bases for reactivity controls.

G. Fuel handling facilities and procedures. [10 CFR 55.43(b)(7)]

Some examples of SRO exam items for this topic include:

- Refuel floor SRO responsibilities.
- Assessment of fuel handling equipment surveillance requirement acceptance criteria.
- Prerequisites for vessel disassembly and reassembly.
- Decay heat assessment.
- Assessment of surveillance requirements for the refueling mode.
- Reporting requirements.
- Emergency classifications.

This does not include items that the RO may be responsible for at some sites such as fuel handling equipment and refueling related control room instrumentation operability requirements, abnormal operating procedure immediate actions, etc. For example, an RO is required to stop the refueling process when communication is lost between the control room and the refueling floor, therefore, this is a task that is both an RO and SRO responsibility and is not SRO-only.

III. Justification for Plant Specific Exemptions

The 25 SRO-only questions ***shall*** evaluate the additional knowledge and abilities required for the higher license level in accordance with 10 CFR 55.43(b). [NUREG 1021, Section ES-401D.2.d]

The fact that a facility licensee trains its ROs to master certain 10 CFR 55.43 knowledge, skills, and abilities does NOT mean that they can no longer be used as a basis for SRO-only questions. [Operator Licensing Feedback Web page Item 401.36 @ http://www.nrc.gov/reactors/operator-licensing/op-licensing-files/ol-feedback.pdf]

The SRO-only test item is required to be tied to one of the 10 CFR 55.43(b) items. However, if a licensee desires to evaluate a knowledge/ability that is not tied to one of the 10 CFR 55.43(b) items, then the licensee can classify the knowledge/ability as "*unique to the SRO position*" provided that there is documented evidence that ties the knowledge/ability to the licensee's SRO job position duties in accordance with the systematic approach to training (SAT).

- **Justification**: A question that is not tied to one of the 10 CFR 55.43(b) items can still be classified as "SRO-only" provided the licensee has documented evidence to prove that the knowledge/ability is "*unique to the SRO position*" at the site. An example of documented evidence includes:

  - The question is linked to a learning objective that is specifically labeled in the lesson plan as being SRO-only (e.g., some licensee lesson plans have columns in the margin that differentiate AO, RO, and SRO learning objectives) [NUREG 1021, ES-401, Section D.2.d]

    AND/OR

  - A question is linked to a task that is labeled as an SRO-only task, and the task is NOT listed in the RO task list.

IV. Examples of Satisfactory SRO-only questions

Westinghouse: E07 Saturated Core Cooling
EA2.2 Ability to determine and interpret the following as they apply to the (Saturated Core Cooling): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments. (CFR: 43.5/ 45.13): 3.3/3.9

A Steam Generator Tube Rupture has occurred and the crew is performing actions contained in EOP-4.2, *SGTR with Loss of Reactor Coolant - Subcooled Recovery*. The following plant conditions currently exist:

- All Critical Safety Function (CSF) Status Trees are GREEN except:
  - Core Cooling - YELLOW due to RVLIS level
  - Inventory - YELLOW due to RVLIS level
- The crew has determined that the RHR Sump Level (based on RWST drawdown) is LESS than expected.

Which ONE (1) of the following identifies the required implementation of procedures for this event?

A. Transition to EOP-4.3, SGTR w/ Loss of Reactor Coolant – Saturated Recovery.
Implementation of the CSF Yellow Path procedures is not allowed while in EOP-4.3.

B. Remain in EOP-4.2.
Implementation of the CSF Yellow Path procedures is not allowed while in EOP-4.2.

C. Transition to EOP-4.3, SGTR w/ Loss of Reactor Coolant – Saturated Recovery.
The actions of both Yellow Path procedures must be performed.

D. Remain in EOP-4.2.
The actions of both Yellow Path procedures must be performed.

Justification: The question requires the applicant to assess plant conditions and to know the content of procedures in order to select a required course of action. Linked to 10 CFR 55.43(b)(5).

IV. Examples of Satisfactory SRO-only questions (cont'd)

EPE: 295028 High Drywell Temperature
EA2.01 Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Drywell temperature. (CFR: 41.10/ 43.5/ 45.13): 4.0*/4.1*

Following a small break LOCA on Unit Two (2) the following conditions exist:

Drywell temperature	270°F
Drywell pressure	5.0 psig
Torus pressure	2.5 psig
Torus level	+5 inches
Reactor pressure	395 psig

Containment H_2O_2 Monitors CAC-AT-4409 & 4410 are not available at this time. Chemistry has been notified but they have not yet sampled the drywell.

Which ONE (1) of the following procedures provides the required actions that mitigate these plant conditions?

A. SEP-05, Primary Containment Purging.

B. SEP-10, Section 4, Defeating Drywell Cooler LOCA Lockout.

C. SEP-03, Suppression Pool Spray Procedure.

D. SEP-02, Drywell Spray Procedure.

Justification: The question requires the applicant to assess plant conditions and to know the content of procedures in order to select a required course of action. These procedures are not major EOPs, i.e., they are supplementary emergency procedures directed from within the major EOP. Linked to 10 CFR 55.43(b)(5).

IV. Examples of Satisfactory SRO-only questions (cont'd)

Generic APE: 027 Pressurizer Pressure Control System (PZR PCS) Malfunction
AA2.15 Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails high.
(CFR: 43.5/ 45.13): 3.7/4.0

Unit 1 initial conditions:

- Time = 10:00
- Reactor Power = 100%
- 1-RC-PORV-1455C (Pzr Pressure PORV) indicates open
- Both Pzr Spray Vlvs indicate open
- RCS Pressure = 2200 psig decreasing
- 1-AP-31.00 (Increasing or Decreasing RCS Pressure) initiated

Current conditions:

- Time = 10:01
- Reactor Power = 97%
- RCS Pressure = 2100 psig increasing
- Spray valve in MANUAL and closed
- 1-RC-PORV-1455C in MANUAL and closed

Based on these conditions, which ONE (1) of the following identifies (1) the pressurizer pressure control component that failed high and (2) the status of 1-RC-PORV-1455C operability in accordance with Technical Specifications?

A. 1-RC-PT-1444
PORV is OPERABLE

B. 1-RC-PT-1444
PORV is INOPERABLE

C. 1-RC-PT-1445
PORV is OPERABLE

D. 1-RC-PT-1445
PORV is INOPERABLE

Justification: The first part of the question can be answered using RO knowledge of systems. The second part of the question can only be answered by an SRO applicant if he/she knows the information in the TS bases. No reference was provided. This question is linked to 10 CFR 55.43(b)(5).

IV. Examples of Satisfactory SRO-only questions (cont'd)

Generic K/A G2.2.6: Knowledge of the process for making changes to procedures. (CFR: 41.10/ 43.3/ 45.13): 3.0/3.6

The plant has developed a new surveillance test procedure with the following attributes:

- The test procedure involves a process that was NOT previously described in the FSAR
- The test procedure does NOT constitute an un-reviewed safety question
- The test procedure will require a change to Tech Specs

Which ONE (1) of the following identifies whether a license amendment is required and whether the surveillance test procedure can be implemented without NRC approval in accordance with 00056-C, 10 CFR 50.59 Screening and Evaluations?

A. License amendment is NOT required; NRC approval is NOT required

B. License amendment is NOT required; NRC approval is required

C. License amendment is required; NRC approval is NOT required

D. License amendment is required; NRC approval is required

Justification: The question is linked to one of the duties reserved for the SRO licensed individual, i.e., 10 CFR 55.43(b)(5) (Procedures used to obtain authority for design and operating changes to the facility).

V. Examples of Unsatisfactory SRO-only questions

APE: 008 Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
AA2.22: Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: Consequences of loss of pressure in RCS; methods for evaluating pressure loss. (CFR: 43.5/ 45.13): 3.8/4.2

- A pressurizer steam space LOCA has caused PPLS and SIAS actuation.
- CETs are stable at 550°F.
- RCS pressure is stable at 1300 psia.
- Pressurizer level is 20% and rising.
- HPSI flow is 390 gpm.

With no operator action and assuming temperatures remain constant, how will pressurizer level, pressurizer pressure, and HPSI flow respond?

A. Pressurizer level will stabilize slightly above 20%, pressure will lower and HPSI flow will increase.

B. Pressurizer level will rise to 100% , pressure and HPSI flow will remain constant.

C. Pressurizer level will rise to 100%, pressure will rise and HPSI flow will decrease.

D. Pressurizer level will stabilize slightly above 20%, pressure will rise and HPSI flow will decrease

The question stem does not link to one of the seven 10 CFR 55.43(b) statements even though the K/A is linked to 10 CFR 55.43(b)5. The question only tests assessment of plant conditions. An RO is expected to understand integrated system response.

Generic K/A G2.1.7: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.
(CFR: 41.5/ 43.5/ 45.12/ 45.13): 4.4/4.7

Reactor power is 29% during a reactor startup when the reactor operator trips the main turbine due to high vibration. Which ONE (1) of the following identifies the required procedures?

The SRO should now anticipate implementing procedures that will:

A. Maintain reactor power less than 29% since power will increase after the main turbine trip.

B. Recover from the reactor scram caused by the turbine trip.

C. Recover vessel level using the feed and condensate system.

D. Scram the reactor.

The question is asking for plant response and what to do about it, NOT selection or application of a procedure. An applicant can answer the question using integrated plant and system knowledge, i.e., knowledge that is not unique to the SRO.

V. Examples of Unsatisfactory SRO-only questions (cont'd)

APE: 065 Loss of Instrument Air
AA2.06 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: When to trip reactor if instrument air pressure is deceasing.
(CFR: 43.5/ 45.13): 3.6*/4.2

Unit 1 is currently at 82% power. A down power is in progress to remove the 1A MFW pump from service. Which ONE (1) of the following plant conditions would require you to direct an IMMEDIATE manual trip of the reactor?

A. Instrument air pressure is currently 59 psig and lowering.

B. 1A and 1B SG levels are 75% and increasing.

C. BOTH heater drain pumps trip.

D. 4.16 KV bus 1B3 de-energizes due to an electrical fault on the bus.

The justification for this question was that the SRO is responsible for directing the action to trip the reactor; however, the RO is still required to know immediate reactor trip criteria listed in the abnormal procedure. Just because the SRO directs the action does not mean that the knowledge is unique to the SRO position.

K/A 007 Pressurizer Relief Tank / Quench Tank System (PRTS)
G2.2.44: Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (CFR: 41.5/ 43.5/ 45.12): 4.2/4.4

Given the following:
- Unit 1 is at 100% power, RCS pressure indicates 2225 psig and stable.
- 1B-F1, PRZ RELIEF TK HI PRESS alarm is received.
- PRT pressure indicates 14 psig and rising slowly.
- PRT temperature is 92°F and stable.
- PRT level is 70% and stable.

Which ONE (1) of the following describes the appropriate operator response?

A. Ensure PZR PORVs are closed, and PG and N2 to PRT are isolated.
Go to 1-AP-16, Increasing Primary Plant Leakage.

B. Ensure PZR PORVs are closed, and PG and N2 to PRT are isolated.
Vent the PRT in accordance with 1-OP-5.7, Operation of the Pressurizer Relief Tank.

C. Submit a WR. Verify PG water alignment and cool the PRT by draining and refilling in accordance with 1-OP-5.7.

D. Submit a WR. Cool the PRT by draining and refilling in accordance with 1-OP-5.7. Refer to 1-AP-16, Increasing Primary Plant Leakage.

The justification for this question was that each choice required selection of procedures. However, this is not SRO-only because choices also include responsive actions which an RO can deduce using systems knowledge; therefore, procedure selection is not actually required to answer the question.