

Verifiable Actions

ES-301 (pg 17 of 27)

At a minimum, each scenario set must require each applicant to respond to the types of evolutions, failures, technical specification (TS) evaluations, and transients in the quantities identified for the applicant's license level on Form ES-301-5, "Transient and Event Checklist."

ES-301, pg 18 of 27

Events that do not require an operator to take one or more substantive actions will not count toward the minimum number of events required for each operator per Form ES-301-5.

The transient & event checklist states:

Only those (malfunctions) that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

ES-301-3, Operating Test Quality Checklist

It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.

(Step 1e, General Criteria)

ES-301-4, Simulator Scenario Quality Checklist

The level of difficulty is appropriate to support licensing decisions for each crew position.

(Step 13, Qualitative Attributes)

APPENDIX D

SIMULATOR TESTING GUIDELINES

Every required operator action should be included on Form ES-D-2; this is particularly important for the critical tasks and other verifiable actions and behaviors that will provide a useful basis for evaluating the operators' competence.

Examples of submitted malfunctions (events)

APRM Failure High

- Credit given on ES-D-1 for Instrument malfunction for the ATC operator and TS for the SRO.

Verifiable action(s) for the ATC?

- Announces alarm "APRM Hi/Inop/Trip" and "Rod withdrawal block". Consults ARP. Determines that APRM 1 has critical self test fault.
- SRO Directs bypassing APRM 1.

What are the substantive actions that provide insight to the applicants competence for this event?

FCV-2210Y fails closed.

Boration for downpower in progress prior to this event. Boric acid flow goes to full scale low. No associated alarms

- Credit given on ES-D-1 for Instrument malfunction for the RO.

Verifiable action(s) for the RO?

- Recognizes FCV-2210Y is closed and boric acid flow is lost.
- No immediate response required. Manually controls boric acid flow using V2514 and BAM pumps as directed per step 6.0.9 of 2-ONP-02.01, “Boron Concentration Control”.

CEA # 59 slipped > 15" (not dropped)

Verifiable action(s) for the RO?

- Place CEDMCS control panel in off as directed by SRO
- Determine operability IAW Appendix
- Recover CEA IAW Appendix
- Resume power ascension when directed

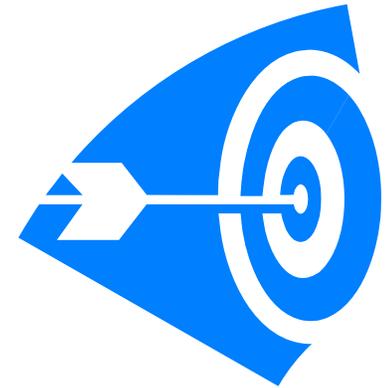
Examples with substantive actions

- Pressurizer Main Spray controller fails high causing the main spray valve to go fully open. The RO will be required to place the controller in manual and control Pressurizer pressure manually.
- 3A Recirc pump speed control fails high, the crew will not be able to lower speed and will respond per the AOI and have to trip the pump.

What are substantive action requirements?

- Looking for time dependent actions by the operator
- Similar to operator immediate actions
- Requires manipulation of the system (Not just alarm acknowledgement)
- The operator must take action without outside aid (Minimal or no SRO direction given)

How do I know if I'm hitting the mark?



- One way to ensure this is to ask yourself this question: “If the applicant does nothing in response to the event, will anything happen to the plant?”
- If the answer is “no” [because the plant will take care of itself], then the event may not provide insight to the applicant’s competence.
- On the other hand, if the applicant has to demonstrate some knowledge or skill while he/she is following a procedure that recovers or realigns, then the event may still work, even if there is no immediate consequence to the plant.

Additional items to consider

- Improve the quality of existing malfunctions.
(Change instantaneous failure on transmitters to slow failures to change the plant response and operator interaction)
- Create new malfunctions.

Scheduling an Exam

NUREG 1021, Rev. 9, Suppl. 1
ES-201, Initial Operator Licensing Process

Phil Capehart



How do we know when you want an exam?

- Regulatory Issue Summary (RIS)
- Facility exam projection over next 4 years
- Ask who will prepare the exam
- Number of applicants
- Primary exam date
- Backup exam date
- Proposed number of GFE candidates
- RIS is accessed from the NRC public web in the electronic reading room under document collections, generic communications, regulatory issue summaries.

Building the Schedule

- From the RIS responses we build the schedule and devote resources
- Facility or NRC prepared (NRC must prep 1/yr)
- Number of applicants and license level determines amount of exam material to develop
- Number of applicant will determine exam duration (1 week or 2 weeks) & number of prep weeks
- Also look at impact of Holiday weeks

Scheduling Assumptions

- [Scheduling Assumptions.doc](#)

2009	06/29 WK1	07/06 WK2	07/13 WK3	07/20 WK4	07/27 WK5	08/03 WK6	08/10 WK7	08/17 WK8	08/24 WK9	08/31 WK10	WK 11	09/14 WK12	09/21 WK13
HOLIDAY	F 3										M 7		
Chief Examiner #1		Chief Review	Chief Review	Chief Review		IP Week 0/9/0			Exam Week	Doc	Doc	Doc	
Chief Examiner #2						IP Week			Exam Week	Doc			
Chief Examiner #3	Develop Written Exam										To facility ~30 days before exam		IP Week
Chief Examiner #4								Chief Review					IP Week 3/3/3
Chief Examiner #5							Develop Op Test			To facility ~30 days before exam			IP Week
Chief Examiner #6													
Chief Examiner #7	Chief Review	Chief Review	Chief Review		IP Week 3/9/2			Exam Week 1	Doc	Exam Week 2	Doc	Doc	Doc
Chief Examiner #8					IP Week 3/9/2			Exam Week 1	Doc	Exam Week 2	Doc		
Chief Examiner #9													
Examiner #1					IP Week			Exam Week 1	Doc	Exam Week 2	Doc		
Examiner #2						IP Week			Exam Week	Doc			

NRC Prepared Exams

- Typically assign a single examiner as the primary writer of the exam
- Works well for NRC to develop the written and operating test outline and the facility provides the operating test details
- NRC plans on 8-10 weeks to write the exam (more time may be needed for new hires)

NRC Prepared Exams

- Attempt to get the operating test outline to the facility as soon as their schedule will support the dedication of individuals to the security agreement (at least 4 weeks prior to prep week)
- Goal is to have the written exam for review six weeks prior to administration

Initial Contact

- The chief examiner will contact the facility approximately 180 days (5-6 months) prior to the exam
- Will confirm projected date of the exam
- Confirm exam development
- Ask about anticipated waivers

Exam Specifics

- The chief examiner will contact the facility approximately 120 days (4 months) prior to the exam
- Confirm the dates
 - Prep week
 - Exam week(s)
 - Applications due
 - Exam submittal/review
- Confirms job responsibilities and simulator availability
- Requests reference material

Reference Material

ES-201, Attachment #2

- Item #2 - Complete index of procedures
- Item #7 - Surveillance procedures (weekly)
- Item #10 - Radiation manuals (which cover releases and release permits)
- Item # 14 - Plant curves
- Question banks both initial and requal

Contact Documentation

- The chief examiner documents this 120 day contact and arrangements in a corporate notification letter to the site VP
- If the NRC is preparing the exam, we may make these arrangements much more in advance of the 120 day mark in order to get the reference material needed for exam development

Written Exam Outline

- Random and systematic sample
- We (RII) generate the outline for the facility
- All changes to the outline must have prior approval from the chief examiner

Written Outline Documents

- Form ES-401-1/2, BWR/PWR Examination Outline
- Form ES-401-3, Generic Knowledge and Abilities Outline (Tier 3)
- Form ES-401-4, Record of Rejected K/As
 - Living document
 - Document all changes to the outline
 - From development of the outline
 - To completion of the question writing

Written Exam Quality Assurance

- Form ES-201-2, Examination Outline Quality Checklist
- Form ES-201-3, Examination security agreement

JPM Outline

- Should be developed ~75 days prior to exam
- Form ES-201-2 applies here also
- Form ES-301-1, Administrative Topics Outline
- Form ES-301-2, Control Room/In-Plant Systems Outline

Scenario Outlines

- Should be developed ~75 days prior to exam
- Form ES-201-2 applies here also
- Form ES-D-1, Scenario Outline
- Form ESS-301-5, Transient and Event Checklist

Chief Review of Outlines

- The chief examiner will review the outlines within 5 days of receiving them
- The licensee can but should not start the exam development prior to getting chief examiner outline approval
- Chief examiner can review and approve the outlines in advance of the 75 days to facilitate exam development

Exam Submittal

- The initial exam submittal is the DRAFT
- Should be received ~45 days prior to the exam
- Supporting documentation (Reference Material)

Examination Forms Required

- ES-301-3, Operating Test Quality Checklist
- ES-301-4, Simulator Scenario Quality Checklist
- ES-301-5, Transient and Event Checklist
- ES-301-6, Competencies Checklist
- ES-401-6, Written Examination Quality Checklist
- Form ES-401-4, Record of Rejected K/As

Schedule

- Typically two weeks between the prep week and the start of the exam
- 10 or more applicants will typically take more than a week to examine
- The written exam is typically the greatest challenge for development, therefore, usually given after the operating test. This allows increased time for comment resolution.

Prep Week

- Run scenarios
 - Verifiable actions for malfunctions
 - Sufficient scenario details
 - Verification of critical tasks
- Run JPMs
 - Sufficient details
 - Verification of critical steps
- Table top the admin JPMs
 - Answer keys
 - Acceptance ranges

Written Exam

- Form ES-401-9, Written Examination Review Worksheet, to document comments
- Comment incorporation
 - Face to face
 - NRC Office
 - On-site during prep week
 - Teleconference
- Given within 30 days of the operating test

Exam Approval

- Comments incorporated from reviews and prep week
- All Quality Assurance sheets complete
- NRC Branch Chief approval
- Minimal changes after approval
- Typically occurs the week before the exam is administered

2009 Examination Writers Workshop
Administrative JPMs

Frank Ehrhardt

Senior Operations Engineer, RII

Administrative JPMs

- Your Questions
 - Acceptable bands for sub steps of calculations
 - Radiation Control topics
- Examiner Observations
 - SRO vs. RO
 - Selection of surveillances for Equipment Control topic
 - Validation/Administration

Acceptance Bands

- NUREG-1021 Guidance
 - Form ES-301-3, Operating Test Quality Checklist, item 2.a.
 - Appendix C, JPM Guidelines, section B.3, Develop Performance Criteria

Acceptance Bands - A Framework for Calculations

<u>Type of Step</u>	<u>Band</u>
Value specified by procedure step.	None.
Use of table without interpolation.	None – direct lookup of a value.
Use of table with required or possible interpolation.	Rounding error associated with the interpolation.
Use of curves/graphs.	Range of dependent variable is +/- $\frac{1}{2}$ of the divisions on the curve/graph – or -- bounded by the upper and lower divisions on the graph.

Radiation Control Admin JPMS

- What subjects and tasks within this area are
 - linked to (licensed) job duties
 - operationally validat your facility?

SRO vs. RO Admin JPMs

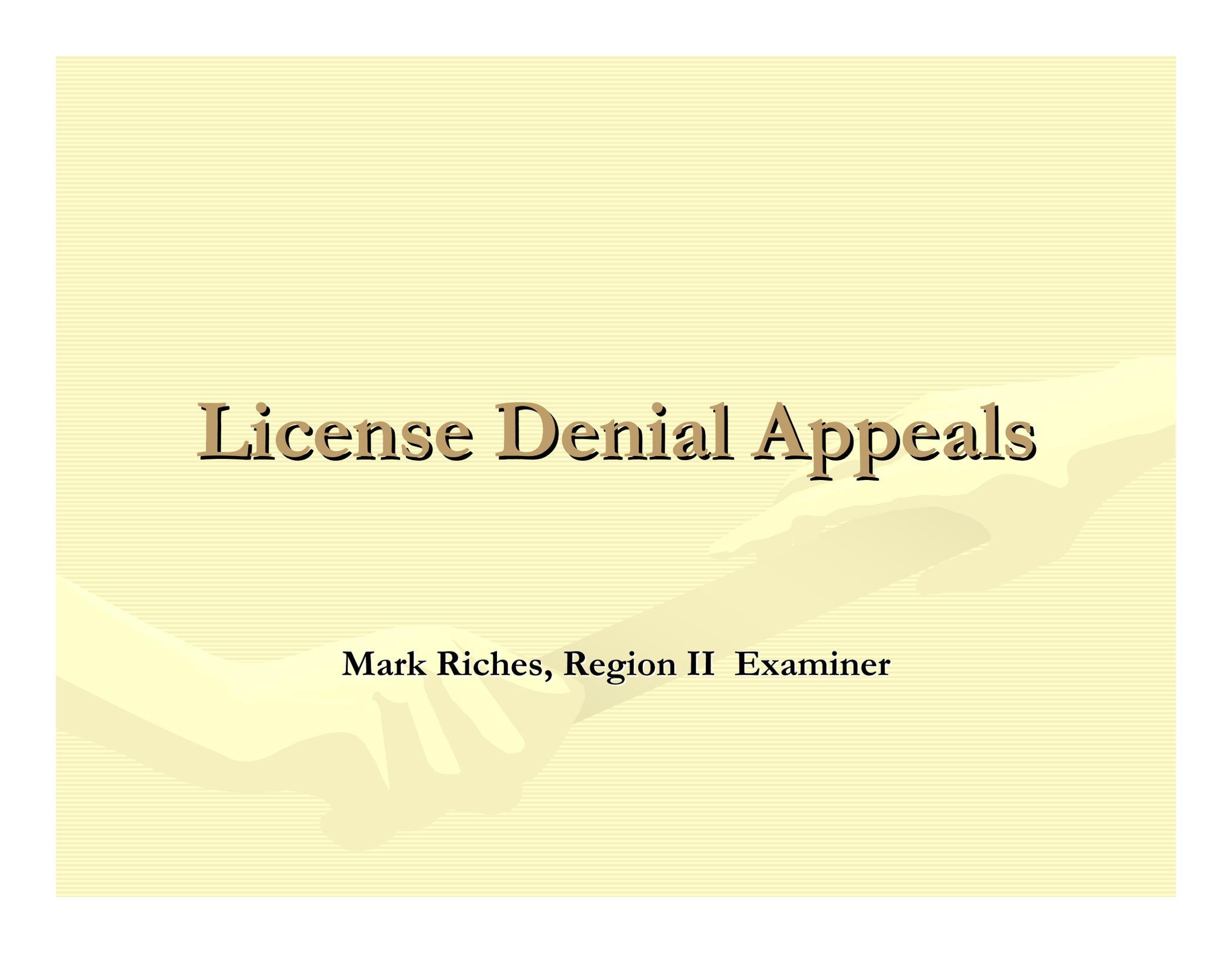
- SRO required knowledge of administrative topics is broader and deeper.
- SROs have more administrative responsibilities than ROs.
- What are the additional responsibilities and required knowledge for SROs at your facility?

Equipment Control Topic

- Surveillances selected for this topic should be administrative tasks related to managing and controlling plant systems/equipment.

Validation & Administration of Admin JPMs

- Thorough validation avoids 'discovery' during administration.
- Handing out the correct procedures and references is important.



License Denial Appeals

Mark Riches, Region II Examiner

License Denial Appeals

- Process Overview
- Responsibilities
- Region II Statistics



Overview

Focus of Presentation: **License Denial Appeals NOT:**

- Post-exam Comments
 - Submitted by the licensee (facility) OR the applicant (individual).
 - Reviewed and resolved before final grading begins.
 - Only the **applicant** initiates appeal process after exam results finalized.
- Application Denial Appeals
 - Appeal process when an application (Form 398) has been rejected because the prerequisites (i.e., experience, education, etc.) for taking a licensing exam have not been met.

Overview

T_0 = Issue Date of License Denial Letter

- Applicant has 20-day window from date on License Denial Letter to appeal the denial.
- Two request options:
 - Administrative Review
 - Informal Hearing

Overview

Administrative Review

- Assigned to Operator Licensing and Human Performance Branch (IOLB) in the Office of Nuclear Reactor Regulation (NRR).
- IOLB Branch Chief has three options for conducting the review:
 - Assign to IOLB staff to conduct the review (Typical)
 - Refer the request back to the regional office
 - Empanel a three member review board

Overview

Administrative Review (cont'd)

- 75 days from receipt of appeal to complete review (goal).
- Decides to either uphold or overturn the denial.
 - If applicant disagrees with decision can request an informal hearing.

Overview

Informal Hearing

- Request must be submitted within 20 days of denial.
- Request sent to both:
 - Office of the Secretary (SECY)
 - Assigns request to an Atomic Safety and Licensing Board (ASLB) panel.
 - Office of General Counsel (OGC)
 - Notifies IOLB staff of hearing request.
 - Assigns lawyer to represent NRC staff.

Overview

Informal Hearing (cont'd)

- ASLB will:
 - Review applicant's submittal.
 - Direct NRC staff to submit its position with supporting documentation.
- ASLB renders a decision to either uphold or overturn license denial:
 - NRC staff can request a review by the NRC commissioners if they disagree with ASLB's decision.

Responsibilities

Applicant

- Twenty days to submit a written request for an administrative review to:

**Director, Division of Inspection & Regional Support
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**

Responsibilities

Applicant

- Request must:
 - Identify item(s) for which additional review is requested.
 - Provide arguments for item(s) being appealed.
 - Include supporting documentation for the item(s) in contention.

Responsibilities

IOLB staff

- Review the items being contested along with the applicants contentions and supporting documentation.
- Request copies from the examiner of record of the data and/or observations used to arrive at the denial decision.
- Request input, as necessary, from other examiners.

Responsibilities

Regional Office:

- Examiner of Record
 - Provide copies of any original notes, comments and supporting documentation used to arrive at failure decision.
 - Provide any additional input to the process as requested by IOLB.
- Operations Branch Staff
 - Provide resources to support IOLB review as requested.

Region II Statistics

Calendar Year 2007

- # of Licensing Exams Administered - 116
- Exam Failures – 20
- Appeals – 4
- License Denials Overturned - 2

Region II Statistics

Calendar Year 2008

- # of Licensing Exams Administered - 122
- Exam Failures – 18
- Appeals – 9*
- License Denials Overturned – 4

* - One appeal associated with licensing examination administered in 2007.

Region II Statistics

Year-to-Date 2009

- # of Licensing Exams Administered - 92
 - Exam Failures – 15
 - Appeals – 6*
 - License Denials Overturned – 2
 - One appeal is still in review.
- * - All six appeals associated with licensing examinations administered in 2008.

Summary

Nobody likes appeals!

- Added resource burden on the examiner of record, the region, IOLB and the applicant.
- Delays the issuance of licenses for other applicants until appeal is resolved.
- Outcome could result in the failure of other applicants not involved in the appeal.
- Reinforces the importance of quality pre-exam validations and reviews.

Where can I find information?

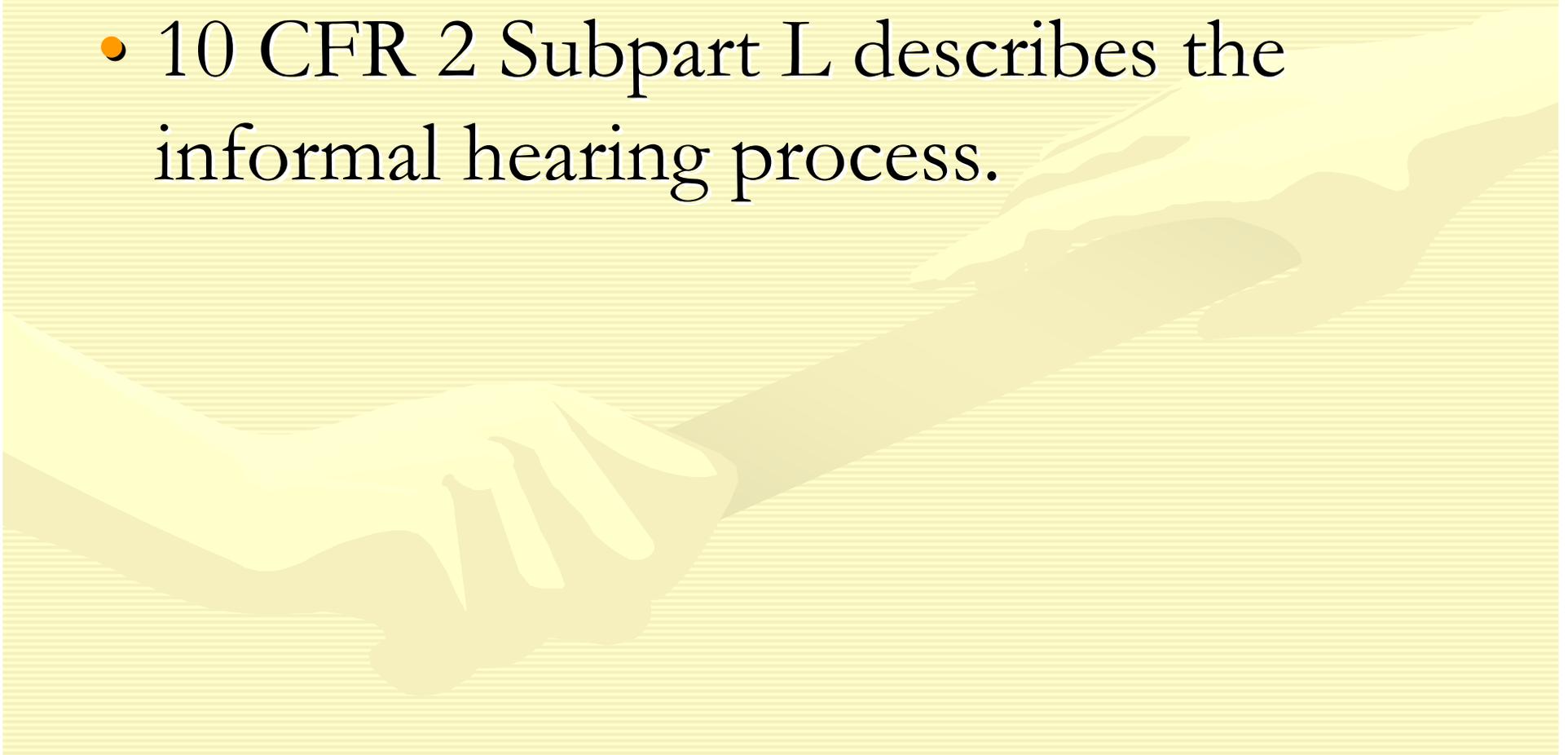
Administrative Review

- Section 502 of the Examiner's Standard (NUREG-1021) describes:
 - options available to applicants concerning both:
 - License application denials
 - License denials resulting from examination failures
 - responsibilities of all parties associated with the appeal process.

Where can I find information?

Hearings

- 10 CFR 2 Subpart L describes the informal hearing process.





Questions?

Resolution of Post-Exam Comments

Rick Baldwin - NRC Chief Examiner

Region II Post-Exam Comments

- If individuals FAIL – search the examination to determine if there are valid post-exam comments.
- If the written was developed correctly it will be hard to find questions that are appealable. But TRY!

Experience Resolving Post-Exam Comments

- The challenge is to avoid the *following*:
“Find the Points to Pass”
- We hold “YOU” (the licensees) responsible for technical justification:
 - ◆ Present complete/clear technical story
 - ◆ May require multiple revisions before comments are concise
- Make sure there is no 3rd (or 4th) correct answer

Basic Guidance (ES-403 D.1.b)

- Criteria for deleting a question
 - ◆ 3 or more correct answers, or
 - ◆ no single correct answer
- Criteria for accepting 2 correct answers
 - ◆ 2 answer selections are correct
 - ◆ 2 are incorrect
 - ◆ 2 correct answers can't be opposite or mutually exclusive of one another
 - ◆ e.g. One proposed correct answer is to shutdown and the other is to stay at power.

Unwarranted Assumptions

- NUREG 1021, Appendix E, Part B, Written Exam Guidelines states in part, “When answering a question, do *not* make assumptions regarding conditions that are **not** specified in the question unless they occur as a consequence of other conditions that are stated in the question.”
- Post exam comments have been submitted a number of times in which “arguments” centered around “assumptions” made that were unsupported by stem conditions.

Submittal of Post Exam Comments

- Prior to submitting formal post exam comments, the facility licensee may also request an informal meeting with the NRC's chief examiner to discuss the exam questions and resolve facility concerns (ES-402.C.1.h).
 - ◆ Helpful practice to understand concerns
- The facility licensee may expedite the grading process by giving draft comments to the NRC chief examiner before he leaves the site (ES-402, E.4).
 - Avoid unnecessary delays in resolution of comments
- Formal comments should be signed by an authorized facility representative and addressed to the responsible regional office (ES-402, E.4).

Submittal of Post Exam Comments (Cont)

- Remind licensees to inform the NRC of any substantive post exam comments that are stated by the applicants even if they do not support the comment
 - ◆ Good practice in ES-401 E.4 and ES-501 C.1
 - ◆ Allows better understanding of applicant concerns
 - ◆ May prevent an unnecessary appeals
- Some Appellants have claimed that technical comments have been withheld from the NRC

Extension of 5 Day Time Limit

- Requirement - 5 business days after the written exam is administered to complete post exam submittal – but:
 - ◆ OK to grant time extensions! **ASK!**
- Demand the best submittal
 - ◆ A quality submittal saves time, money and timely licensing actions!

Post exam changes - Trigger levels

- Criteria for post-exam changes – **ES-501**
 - ◆ 4 RO or 2 SRO question changes – explain why
 - ◆ 7 RO or 2 SRO question deletions – evaluate exam
 - ◆ Post exam comments that result in written exam changes or deletions will be counted in determining whether target quality exam submittal criteria was met
 - ◆ If >20% of the RO or SRO written exam questions submitted required replacement or significant modifications then the exam is considered outside the “acceptable quality range” expected by the NRC for either RO or SRO exams
- > 20% will be noted in exam report with some exceptions as permitted by Rev. 9

Post Exam Comments Requirements for Success

- Licensee should use their best SMEs to review and provide comments prior to submittal
- All assertions **must** be supported with technical references:
 - ◆ Quote procedure numbers and applicable sections (High-light applicable text)
 - ◆ Include the entire procedure in the submittal
- Do not allow “picking and choosing” references that support contentions while ignoring other information that contradicts the contention

Bases for all contentions must be “scrutable”

- Post exam comments should be:
 - ◆ Well-documented
 - ◆ Easily understood
 - ◆ Expect HQ auditor reviews
- Approval of all changes is a serious matter
 - ◆ Item was previously approved for the test
 - ◆ Why did it change?
 - ◆ May change exam pass/fail results

Why did we have to make this change to an exam that had been approved?

- Take the time to explain why previous justifications are now incorrect.
- Explain why the original thinking was flawed – how did this happen?
- Make use of independent assessments by examiners not involved with the exam
 - ◆ Use critical thinking skills
- Correct the record on why our original thoughts and logic were wrong

Consequences of Improper Resolution of Post Exam Comments

- Inappropriately licensed personnel
- Potential material false statements
- Performance indicators
- License appeals

Case Studies

Actual resolution of post exam
comments

Case Studies

Ques #1 Westinghouse PWR

Given the following conditions:

- The Unit is operating at 100% power, with all systems in a normal system alignment.
- The RO recognizes that Control Bank “D,” Group 2, and Control Bank “B,” Group 2 control rods drop just prior to a reactor trip.

Which ONE of the following is the cause of the failure?

- A. Logic Cabinet Oscillator failure
- B. Logic Cabinet Master Cyclor failure
- C. Power Cabinet Thyristor failure
(original correct answer)**
- D. Power Cabinet Logic error

PWR Q1 Licensee Contention

- Accept C (original answer) and D as correct.
 - ◆ C - requires 2 failed thyristors to cause 2 groups of rods to insert
 - ◆ D – a “power cabinet logic” failure causes an “urgent failure” alarm – but no such alarm was stated in the stem of the question
 - ◆ By design however, the Power Cabinet “Urgent Failure” should actuate, and issue a hold current to the affected rods to prevent the rods from dropping
 - ◆ Applicants assumed Urgent Failure alarm “had₁₆ not activated” (additional failure?)

NUREG 1021, Appendix E states:

*“ When answering a question, **do not** make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions stated in the question. For example, you should not assume an alarm has activated unless the question so states or the alarm is expected to activate as a result of the conditions that are stated in the question.”*

Q-1 NRC RESOLUTION

- Answer C is not correct
 - ◆ The stem does not state or imply 2 separate thyristor failures
- Answer D is not correct
 - ◆ The Urgent Failure alarm is an expected condition that is a consequence of the logic error
 - ◆ The applicant should have recognized that the a hold current would have been applied as a consequence of a logic error
- No correct answer

Case Study

Ques #2 Westinghouse PWR

Given the following conditions:

- The Unit has been at 100% power for 3 weeks. All systems are in normal alignment.
- RCS boron concentration is 1000 ppm.
- A controlled power reduction to 50% is to be performed.

Using the references provided and maintaining control rods at their current position, assuming no change in xenon concentration, which ONE of the following describes the approximate amount of boric acid required to initially maneuver the plant to 50% power?

- A. 700 - 800 gallons
- B. 850 - 950 gallons
- C. **1000 - 1100 gallons (original correct answer)**
- D. 1150 - 1250 gallons

PWR Q-2 Licensee Contention

B and C (original answer) should be considered correct based on the tolerances and inaccuracies introduced to determine this answer.

- ◆ tolerances between the proposed correct answers (“B” or “C”) fall within the tolerances and margin of error obtained when calculating the correct answer to this problem.
- ◆ the required amount of boric acid that needs to be added is between 900 and 1100 gallons.
- ◆ the small size of the scale ($\sim 3/8$ of an inch 20 represents a difference of approximately 200

PWR Q-2 Contention (cont)

- Degree of difficulty was high:
 - ◆ “The candidate needs to use three different graphs to obtain the desired boron concentration change (135 ppm) to plot on the far right column of the nomograph.
 - ◆ Assuming a small error on reading each curve, the starting point on the nomograph of 135 ppm will have some numerical tolerance in addition to the interpolation tolerance.

PWR Q-2 Licensee Conclusion

- The intent of the question was to evaluate the candidates' ability to calculate the amount of boric acid addition for a given power change.
- By choosing either answer "B" or "C" this knowledge and ability is demonstrated to be within an acceptable margin of error as explained above.

PWR Q-2 NRC Resolution

The Background...

- Original question asked for the “minimum” amount of boric acid to “initially” maneuver to 50% power
- NRC challenged the question based on the potential confusion that might be caused by asking a candidate to decide a “minimum” amount for a downpower
- NRC suggested asking the applicant to determine the amount of boric acid to accomplish the 50% decrease.
- NRC suggested the answers and distracters be ranges of boric acid quantities, only one of which should include the correct answer.

PWR Q-2 NRC Resolution

The Decision

- Original submittal – as administered
 - ◆ Licensee answer was 900 gals
 - ◆ NRC review indicated closer to 950 gals
- Post-exam review showed a problem
 - ◆ Licensee corrected answer was 966 gals
 - ◆ NRC review indicated 970 gals
- Resolution – deleted the question
 - ◆ Answer did not lie in either “B” (850-950) or “C” (1000-1100) error bands

PWR Q-2 Bases for Resolution

- Precise answer was not captured by any of the ranges of boric acid quantity provided by the four answers/distracters.
 - ◆ “B” + “C” covered a range of 850-1100 gallons
 - ◆ 250 gallons would challenge the discriminatory value of the question.
 - ◆ None of the right answers were within the range of B or C
- No correct answer for the question was provided

Case Study

Ques #3 General Electric BWR

The plant has experienced a loss of offsite power and the following conditions exist:

- Buses 1C and 1D are being supplied by their respective EDGs
- RPV pressure is being maintained at 935 psig with Isolation Condensers
- Oyster Creek has been informed that offsite power will be restored no sooner than 72 hours

If a plant cooldown is commenced at the **MAXIMUM** allowable cooldown rate, what will be the **MINIMUM** time it takes to clear the shutdown cooling interlocks, assuming a constant cooldown rate?

- A. 1.9 hours
- B. 2.2 hours
- C. 19 hours
- D. 22 hours

BWR Q-3 Licensee Contention

- Max cooldown is 10 °F/hr unless:
 - ◆ HPI available and make to iso-condenser
 - ◆ Original question assumed not true
- But – CRD provided HPI source and fire diesels provided makeup to iso-condenser on a loss of offsite power
- So – maximum cooldown limit is 90 °F/hr (admin limit)
- Recommend change correct answer to “B”

BWR Q-3 NRC Response

- But – let’s look again CAREFULLY at the cooldown calculation:
 - ◆ Maximum allowable cooldown rate is 90°F/hr.
 - ◆ Starting temperature @ 935 psig is 538 °F
 - ◆ SDC interlocks clear @ 350 °F
 - ◆ Required cooldown of 188 °F to clear SDC interlocks
- $188^{\circ}\text{F} / 90^{\circ}\text{F/hr} = 2.088 \text{ hrs} \neq 2.2 \text{ hrs}$ (“B”) - even with rounding up
- Are any of the answers really correct?

BWR Q-3 Final Resolution

- Deleted the question from the exam
 - ◆ “best” or “closest” answer is not the “right” answer
 - ◆ When asking for calculated values, provide acceptable error bands in the answer key
- Additionally – what is the “plausible” error for distracter “D”
 - ◆ What “math error” would be plausible?
- Quality of technical review is important

Backup Slides

SRO-Only Questions

“Special attention is required to ensure that the SRO examination tests at the appropriate level.”

Bruno Caballero, RII

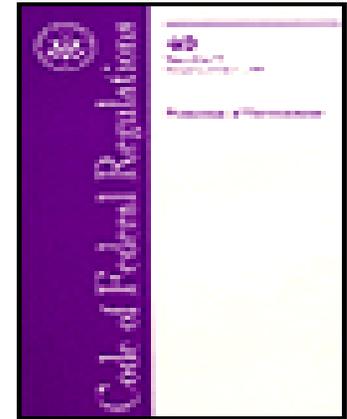
Presentation Objectives

1. Review 10CFR55 & NUREG 1021 requirements for SRO-only questions
2. Assess proposed questions to see if the SRO-only requirements are met
3. Q&A's / Feedback

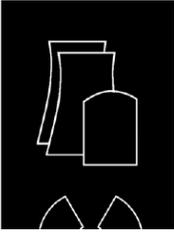
Objective # 1

***Review 10CFR55 &
NUREG 1021 req'ts for
SRO test items***

10CFR55 Requirements



- RO Exam: 14 topics
[10CFR55.41(a) and (b)]
- SRO Exam: 14 RO topics + 7 SRO topics
[10CFR55.43 (a) and (b)]
- Refer to handout for exact wording



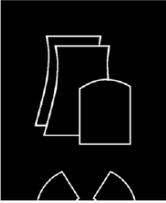
NUREG-1021, ES-401 Requirements

The K/As for the SRO examination will be drawn from those K/As in the “A2” and “G” columns in the SRO-only section of the exam outline and from all K/A categories related to fuel handling facilities. [ES-401, Section D.1.c, page 5 of 33]



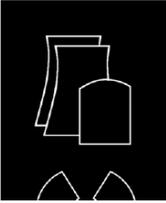
NUREG-1021, ES-401 Requirements

A question at the SRO-only level should test one (or more) of the 7 items listed under 10CFR55.43(b) that the K/A is linked to, or test at a level that is unique to the SRO job position as determined from the facility's learning objectives. [ES-401, Section D.1.b, page 4 of 33]



NUREG-1021, ES-401 Requirements

The 25 SRO-level questions shall evaluate the additional knowledge and abilities required for the higher license level in accordance with 10CFR55.43(b) or the facility licensee's learning objectives. [ES-401, Section D.2.d, page 7 of 33]



Important caveats....

- The fact that a licensee trains its ROs to master certain 10CFR55.43 items does NOT preclude the item from being used as an SRO test item. [OL Feedback Web page Item 401.36]
- The fact that a K/A is linked to both 10CFR55.41 and 10CFR55.43 does NOT mean that the K/A cannot be used to develop an SRO-only question, nor does it exclude the K/A from sampling on the RO exam.
[ES-401, Section D.1.c, page 5 of 33]

Summary of SRO item Requirements

- Ensure the K/A is either an “A2” or a “G”
- Choose 1 of the 7 items in 10CFR55.43(b) that most easily lends itself to the K/A. Most often...but not limited to.....
 - Item # 2 (Tech Specs & Bases)
 - Item # 5 (Procedure Selection)
- Write the question to target both the K/A and the SRO topic from 10CFR55.43(b)

Objective # 2

***Assess proposed
SRO questions to see
if the requirements
are met***

KA: 003 Dropped Control Rod

AA2.01

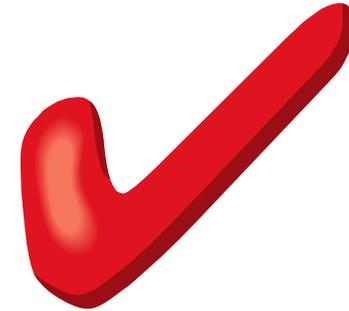
Ability to determine and interpret the Rod position indication to actual rod position as they apply to the Dropped Control Rod

- CFR: 43.5/ 45.13
- RO 3.7/ SRO 3.9

Unit 3 was at 100% power when Control Bank "D" rod M-8 dropped into the core. The following conditions exist one hour after retrieval of Rod M-8 was completed in accordance with 3-0NOP-028.3, "Dropped RCC":

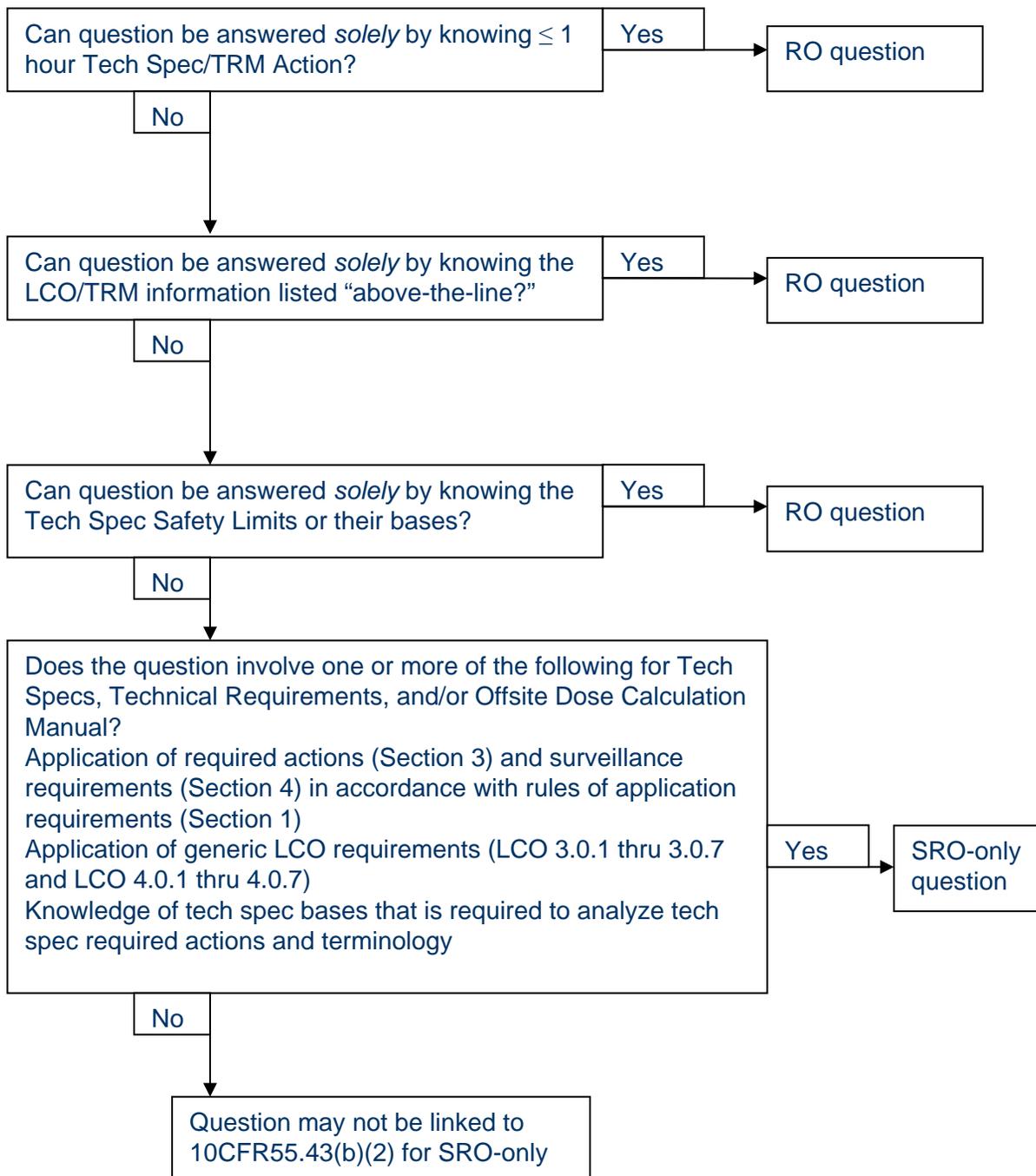
- Reactor power: 49%
- "D" Bank step counters at 180 steps
- RPI indications for Bank "D" rods:

Control Rod	RPI Indication
M-8	167
H-8	166
D-8	195
H-4	160
H-12	199



Which ONE of the following is correct in accordance with TS 3.1.3.1, "Movable Control Rod Assemblies - Group Height"?

- A. Only Control Rods H-4 and H-12 exceed the Allowed Rod Misalignment
Restore rod alignment w/i 1 hour or enter TS 3.0.3
- B. Only Control Rods H-4 and H-12 exceed the Allowed Rod Misalignment
Restore rod alignment w/i 1 hour or be in Mode 3 w/i the following 6 hours
- C. All Bank "D" control rods exceed the Allowed Rod Misalignment
Restore rod alignment w/i 1 hour or enter TS 3.0.3
- D. All Bank "D" control rods exceed the Allowed Rod Misalignment
Restore rod alignment w/i 1 hour or be in Mode 3 w/i the following 6 hours



Unit 3 is at End of Core Life and Control Bank D Rod M-8 dropped into the core.

One hour after retrieval of Rod M-8, the SRO directs the RO to *"Verify all RCC Assemblies are Aligned to Within the Allowed Rod Misalignment of Step Counters."*

- The "D" Bank step counters currently read D-180 steps.
 - RPI indications are:
- | Control Rod RPI | Indication |
|-----------------|------------|
| M-8 | 167 |
| H-8 | 166 |
| O-8 | 195 |
| H-4 | 160 |
| H-12 | 199 |



As defined by Tech Specs, which ONE of the following describes the condition of Control Bank "D" rod indications and the required SRO response (if any)?

- A. Only Control Rod H-4 exceeds the Allowed Rod Misalignment
Direct RO to restore H-4 alignment w/i 1 hr or reduce power <75% w/i 1 hr
- B. Only Control Rods H-4 & H-12 exceed the Allowed Rod Misalignment
Direct RO to restore H-4 & H-12 alignment w/i 1 hr or Hot Standby w/i 6 hrs.
- C. All control rods in Bank "D" exceed the Allowed Rod Misalignment
Direct RO to restore all Bank "D" rods alignment w/i 1 hr or Hot Standby w/i 6 hrs
- D. All control rods in Bank "D" are within the Allowed Rod Misalignment
No SRO response is required

K/A 295021 Loss of Shutdown Cooling

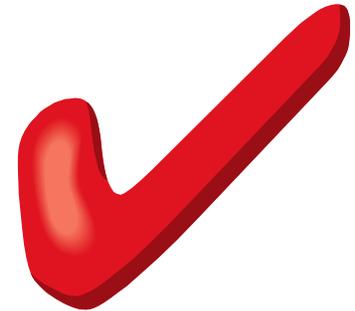
AA2. Ability to determine and/or interpret the following as they apply to LOSS OF SHUTDOWN COOLING :

AA2.03 Reactor water level

- CFR: 41.10 / 43.5 / 45.13
- RO 3.5 / SRO 3.5

Unit 1 was in Mode 3 with "1B" Residual Heat Removal (RHR) aligned for Shutdown Cooling (SDC) at 7,700 gpm with the following conditions:

- o Reactor Coolant temperature/pressure 274°F/ 30 psig
- o Reactor Water Level +37 inches
- o Both Reactor Recirculation Pumps are secured

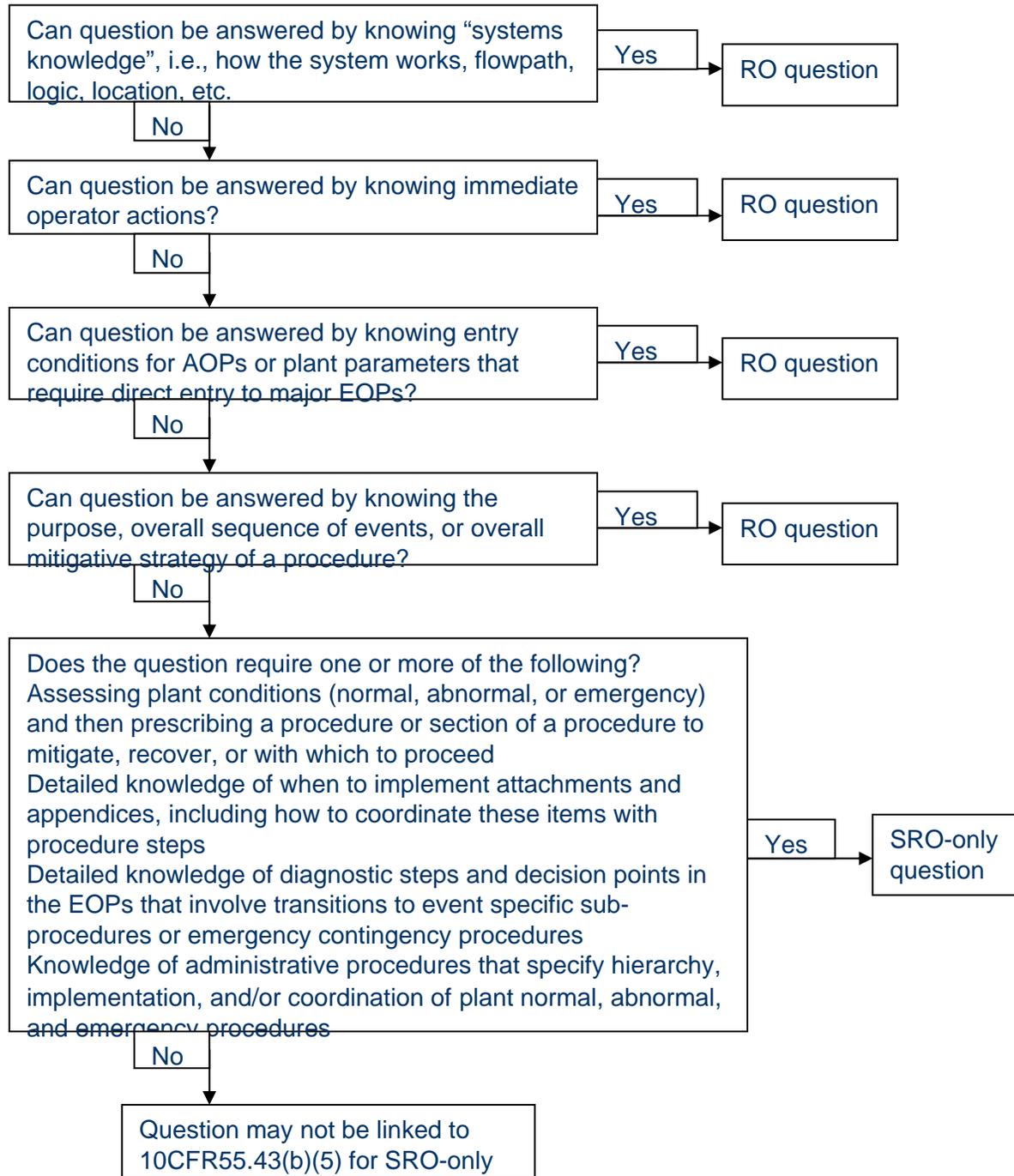


Subsequently, the "1B" RHR pump tripped and neither RHR loop could be aligned for SDC. Which ONE of the following choices completes both statements?

Reactor water level _____ adequate to ensure natural circulation.

The operator is required to increase monitoring of temperature and pressure IAW 34AB-E11-001-1, "Loss of Shutdown Cooling," by using _____.

- A. is / 34GO-OPS-013-1, "Normal Plant Shutdown," Attachment 1, "Cooldown Depressurization Check"
- B. is **NOT** / 34GO-OPS-013-1, Attachment 1
- C. is / 34GO-OPS-015-1, "Maintaining Cold Shutdown or Refuel Condition," Attachment 1, "Monitoring Cold Shutdown And Refuel Parameters"
- D. is **NOT** / 34GO-OPS-015-1, Attachment 1



Unit 1 is in Hot Shutdown with "1B" Residual Heat Removal (RHR) aligned for Shutdown Cooling at 7700 gpm with the following conditions:

- o Reactor Coolant temperature / level 220°F / +37"
- o Both Reactor Recirculation Pumps are secured

UNSAT

An electrical fault causes 1E11-F009, "SDC Suction VLV" to Close. It cannot be re-opened. Which ONE of the following choices completes the following statements?

Reactor water level (1) adequate to ensure there is a flow path available for reactor coolant natural circulation. The Shift Supervisor will direct performance of (2).

- A. is **NOT** / 34SO-B31-001-1, "Reactor Recirculation System", Section 7.1.2, "Recirc pump A(B) Startup"
- B. is / 50AC-MNT-001-0, "Maintenance Program" section 8.1.7, "Emergency Maintenance"
- C. is **NOT** / 34SO-E11-010-1, "RHR System" section 7.4.2, "Shifting Shutdown Cooling Loops"
- D. is / 34GO-OPS-013-1, "Plant Shutdown" Attachment 1, Cooldown / Depressurization Check", every 15 minutes

Objective # 3 **Q & As and
Feedback**

401.11 - Tech[nical] spec[ifications] (TS) are too complicated to memorize. They should be open reference or better yet covered by the operating exams (JPM). We do not want our operators to spend valuable time memorizing TS, nor do we want them to operate from memory.

The NRC does not expect operators to memorize the TS, nor does it endorse operating the plant from memory. However, the NRC does expect operators to recognize TS entry conditions, immediate actions, and (in the case of senior operators) bases when presented in a multiple choice format on the written examination. If they do not compromise the integrity of other questions on the exam, it is acceptable to provide extracts from the TS to the license applicants for use in answering application-level questions.

401.30 - Regarding ES-401, Section D.2.d: Cannot write SRO only questions for all seven items listed under 55.43(b). Only three items lend themselves to SRO only type questions. Need multiple examples and training for writing SRO only questions for all seven items.

Comment noted. The operator licensing program office is looking into the quality and consistency of SRO-only questions and may develop additional guidance in this area. This is also a good topic for discussion during NRC and industry item-writing workshops, which the NRC will support to the extent possible. ***SRO-only Clarification Guidance Document has examples for all 7 items in 55.43 (b).***

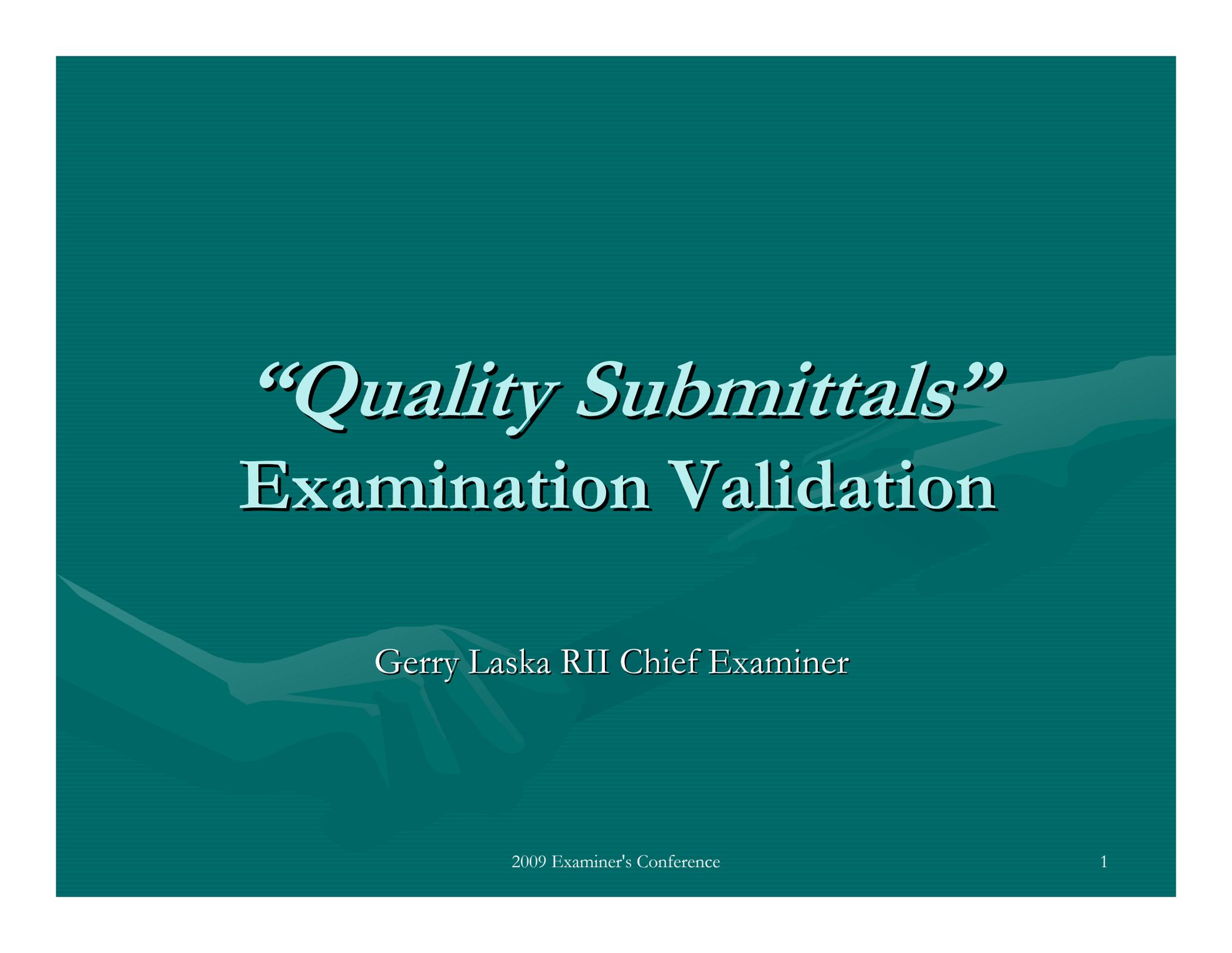
What's the difference between RO and SRO procedure knowledge? For example, both 10 CFR 55.41(b)(10) and 55.43(b)(5) require emergency operating procedure (EOP) knowledge.

The "SRO-level" questions must evaluate the additional knowledge and abilities necessary for "assessment of facility conditions and selection of appropriate procedures during ... emergency situations." Questions that evaluate the knowledge of specific bases for EOPs (K/A 2.4.18) and/or the operational implications of EOP cautions (K/A 2.4.20), but not the higher level "assessment and selection" knowledge, would generally not be valid "SRO-level" questions.

One area of SRO level knowledge (with respect to prescribing or selecting any procedure) is knowledge of the content of the procedure versus knowledge of the procedure's overall mitigative strategy or purpose.

Presentation Objectives

1. Review 10CFR55 & NUREG 1021 requirements for SRO-only questions
2. Assess proposed questions to see if the SRO-only requirements are met
3. Q&A's / Feedback



“Quality Submittals” Examination Validation

Gerry Laska RII Chief Examiner

Discussion Goals

- Discuss Internal Validations
- Written Examinations
- Walkthrough/Admin JPMs
- Scenarios

Why is it important to validate tests?

- Test validation process improves the adequacy of test items and examinations.
- Improves test quality, validity and reliability
- Reduces rework

*“Validation: The key to a fair
and discriminating
examination.”*

- Every examiner survey mentioned **“Exam Validation”** as a challenge!

SAT process recognizes *two* levels of validation: INTERNAL AND EXTERNAL

- **Internal validation** occurs *during* examination product development.
- As a process conducted *prior* to the examination, internal validation seeks to identify and correct technical and psychometric problems *before* those examinations are administered

INTERNAL VALIDATION

- **Improves** the instrument and reduce the number of post examination problems that might have occurred.
- **May reduce** the number of post-examination comments associated with item flaws and consequently lower the number of appeals.

INTERNAL VALIDATION

- The validation process **should** be one that is defined, structured, and documented.
- Note: The exam team should remain as **stable** as possible. Permanent members of the team provide continuity for new examination development and can train new members.

INTERNAL VALIDATION

- Note: Under **NO** circumstances should any member of the intended test group be a part of any validation activity.

Validation - Written

- Validation prior to submittal
 - Resources – experienced operation staff
- Written Examinations-should be validated for:
 - Technical Content and Correctness
 - Operational validity
 - K/A Match
 - Understanding /readability (does it make sense)
 - Same psychometric items as listed in the 401-9

Validation - Written

- Staff who are validating the examination should be familiar with current plant operations.
- Use of only trainers to validate can result in the “way we used to do it”, or the way another plant did it.

Validation - JPMs

- Examiners/JPM developers need to know where components are actually located. (especially electrical fuses etc)
- How a specific piece of equipment operates. (air regulators for PORV)
- JPMs should cues should also be validated
- Validation time normally set by training staff that have knowledge of the JPM.

Validation - JPMs

- Validate the termination of the JPM
- How long it took an average operator to perform
- Length of time to administer (including set-up)

Validation - Scenarios

- Scenarios should be validated by an operations crew if possible.
- Applicant actions should be directed by procedures, and these procedures should be verified to be correct (revision).

Validation - Scenarios

- All critical tasks should be validated against the NUREG-1021 which states (in part): The task must include
 - Safety Significance
 - Cueing
 - Measurable Performance Indicators
 - Performance Feedback

Validation - Scenarios

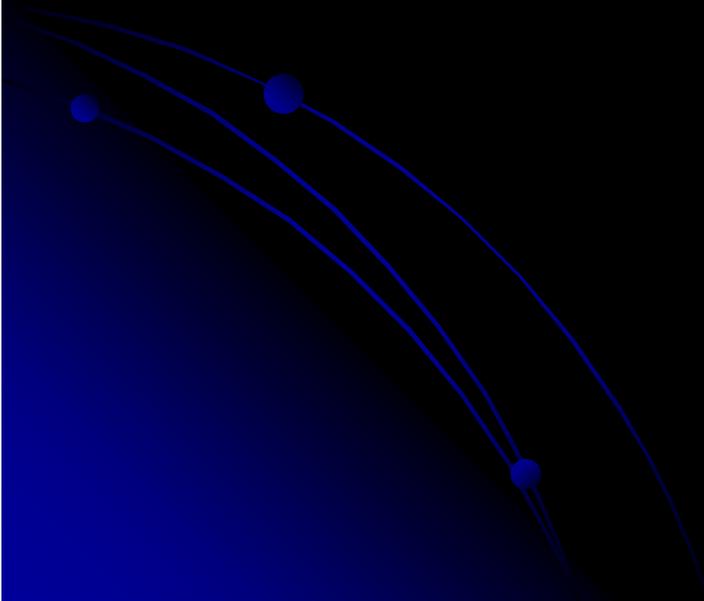
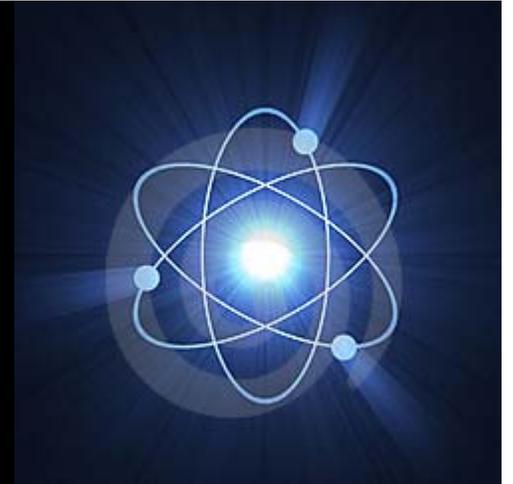
- Just because an item is a critical task in LOR, does not mean that it will be a critical task in the initial exam.



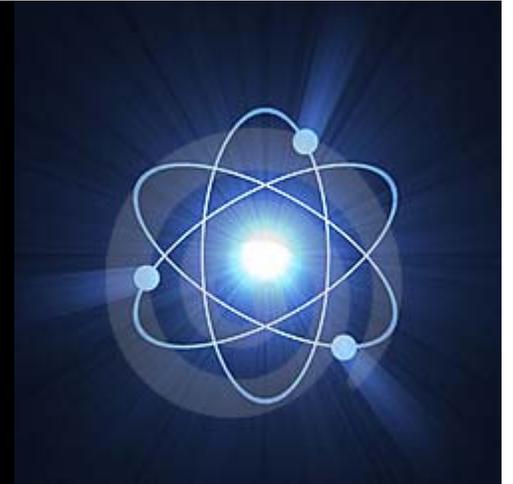
Your Thoughts?

How to Submit A Written Exam for NRC review

Presented
by
Ron Aiello



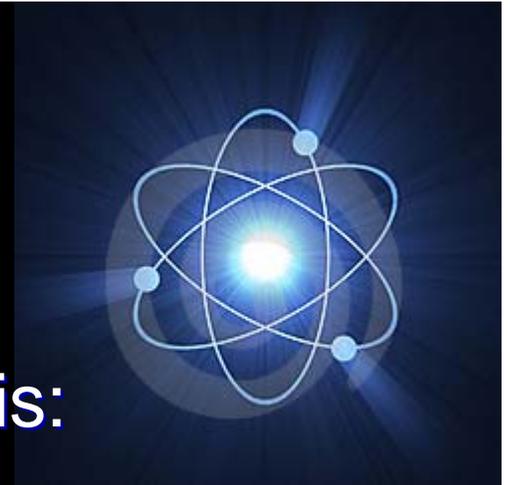
Operator Licensing is
constantly changing



It reminds me of the story of
“Little Red Riding Hood”

The modern day version of course

In the Olden Days



One might have seen something like this:

Given the following plant conditions:

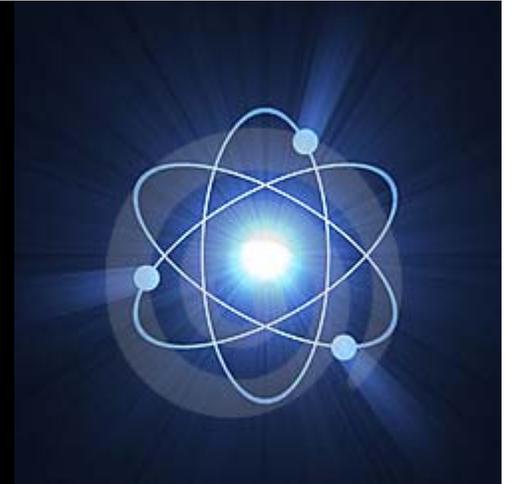
- Refueling is complete and RCS loops have been filled.
- The team has started the “A” reactor coolant pump (RCP) for the 90-minute run.
- Immediately after pump start, annunciator A-E5, RCP 1A VIBRATION ALERT/DANGER, alarms



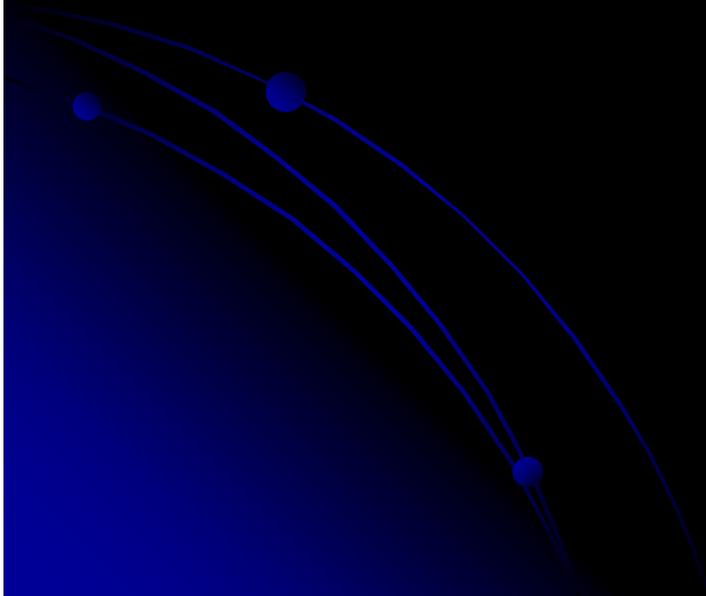
Which **ONE** of the following would require the team to trip the “A” RCP?

- a. Either a seismic danger **OR** a proximity alert setpoint is exceeded.
- b. Either a seismic danger **OR** a proximity danger setpoint is exceeded.
- c. The seismic danger **AND** the proximity danger setpoints must **BOTH** be exceeded.
- d. Either a seismic alert **OR** a proximity danger setpoint is exceeded.

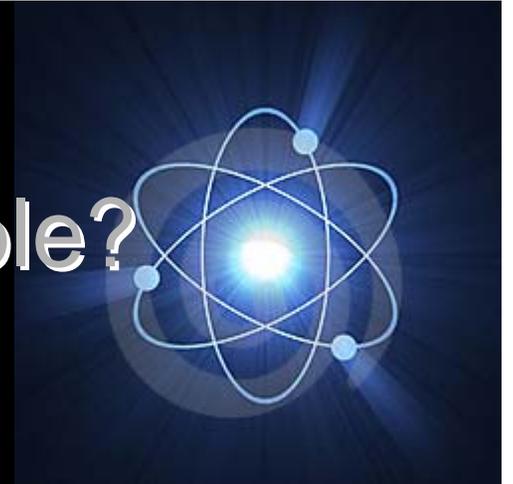
Distracter analysis



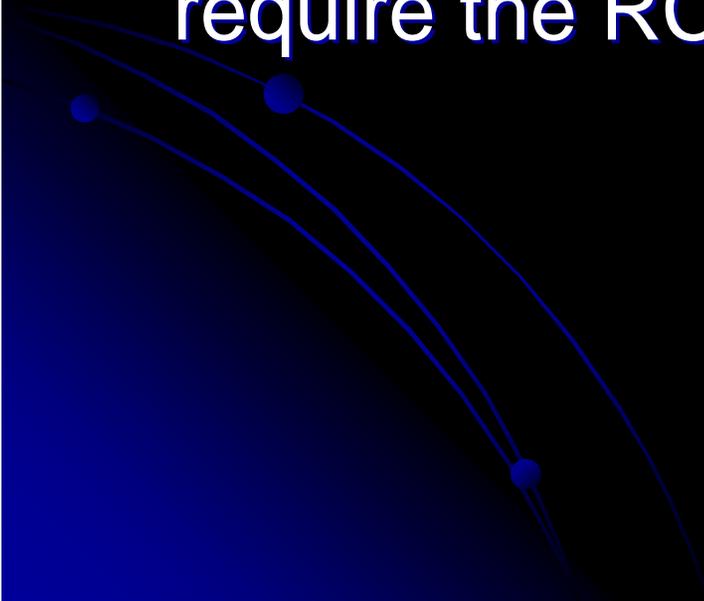
Any vibration that exceeds the danger setpoint requires the RCP to be tripped



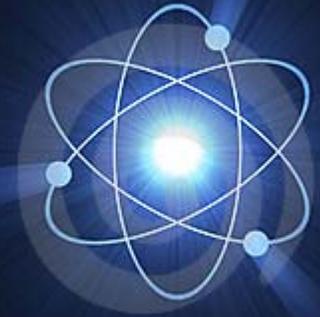
Why is the Question plausible?



There could be a candidate misconception concerning the RCP vibration values that require the RCP to be tripped.

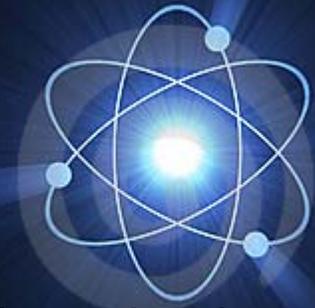


Why are Distracters a, c, & d incorrect?



- a. – The proximity alert does not require tripping the RCP
- b. – Correct Answer**
- c. – Either the proximity danger or the seismic danger vibration requires the RCP to be tripped
- d. – seismic alert does not require tripping the RCP

What are the problems with this Question?



The Question asked: Which ONE of the following would require the team to trip the “A” RCP?

Do you need the initial conditions to answer the Question?

Given the following plant conditions:

- Refueling is complete and RCS loops have been filled
- The team has started “A” reactor coolant pump (RCP) for the 90-minute run
- Immediately after pump start, annunciator A-E5, RCP 1A VIBRATION ALERT/DANGER, alarms

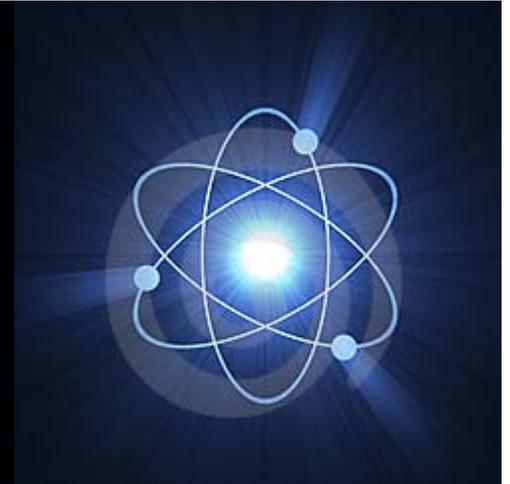
If you have either a “true” seismic danger **OR** a “true” proximity danger setpoint is exceeded



Does it make any difference if:

- Refueling is complete and RCS loops have been filled
- The team has started “A” reactor coolant pump (RCP) for the 90-minute run
- Immediately after pump start, annunciator A-E5, RCP 1A VIBRATION ALERT/DANGER, alarms

Psychometrics



This Question is full of holes.

Let's look at choices "a" and "b" first

- a. **Either a seismic danger OR a proximity alert setpoint is exceeded.**
- b. **Either a seismic danger OR a proximity danger setpoint is exceeded.**

If "a" was correct "b" would be correct also

Therefore, the applicant will chose "b" over "a" because he knows there is only one correct answer

Now lets look at “c” and “d”



- c. - The seismic danger **AND** the proximity danger setpoints are **BOTH** exceeded.
- d. - Either a seismic alert **OR** a proximity danger setpoint is exceeded.

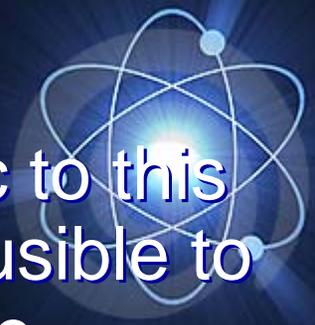
If “d” was correct “c” would be correct also

Therefore, the applicant will chose “c” over “d” because he knows there is only one correct answer



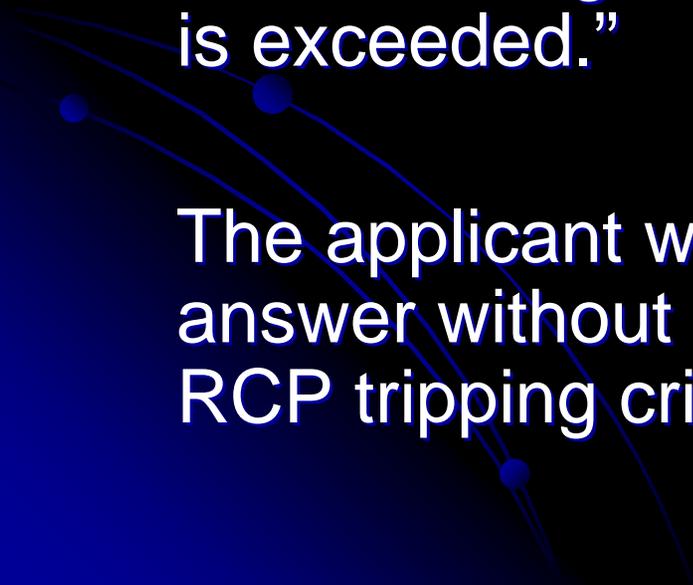
Now we have a situation where the applicant must choose between “b” and “c”

- b. Either a seismic danger **OR** a proximity danger setpoint is exceeded.
- c. The seismic danger **AND** the proximity danger setpoints are **BOTH** exceeded.

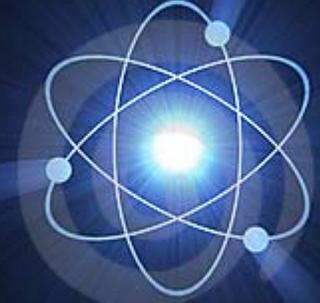


If the applicant applies redundancy logic to this question, he will realize that it is not plausible to require both the seismic danger **AND** the proximity danger setpoints to trip the pump.

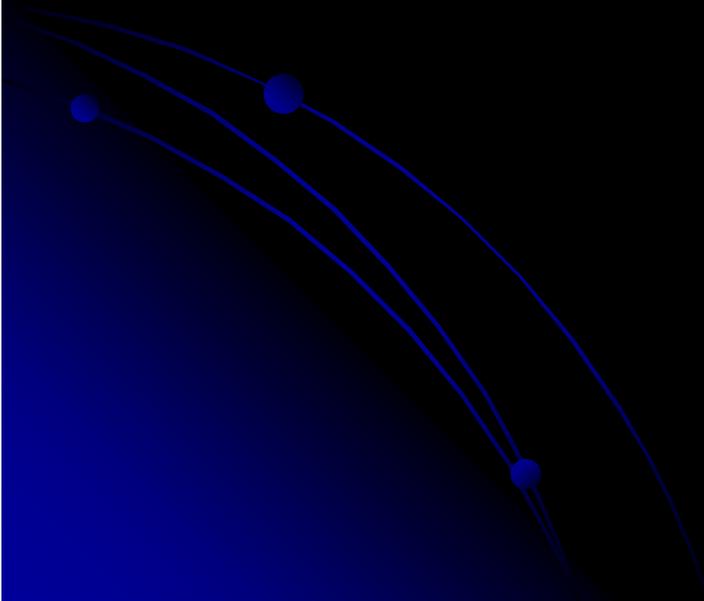
Therefore, he will select choice “b” “Either a seismic danger **OR** a proximity danger setpoint is exceeded.”



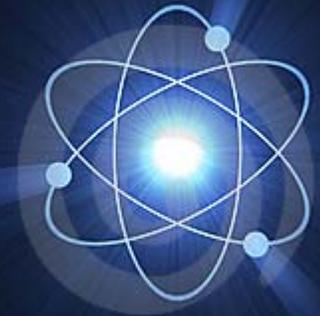
The applicant was able to select the correct answer without knowing any specifics about RCP tripping criteria.



If you do a proper distracter analysis which includes why each distracter is wrong as well as why the distracter is plausible, you will catch this type of mistake.



Let's look at a question with good supporting documentation



- Keep in mind that this question is not very intellectually challenging but it does illustrate what we are looking for in proper documentation.
- Sometimes getting our points across can be painful. This reminds me of another story...



With the plant initially at full power, the following conditions are given:

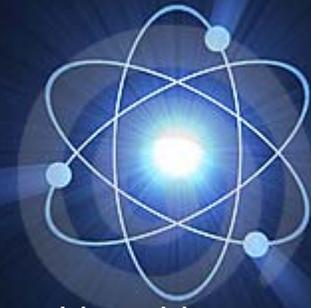
- A complete loss of all offsite power occurs.
- The plant has tripped.
- Due to various failures, NO diesel generators are currently available.
- Efforts to restore DG 1B-B have been initiated.
- Numerous alarms are in, including:
 - * 41-B, "CST A LEVEL LO-LO"
 - * 128-A, "SFP LEVEL HI/LO"
- CST "A" level indicates there is 5,000 gallons in the tank, and slowly dropping.
- SFP level indicates 1 foot below the low level alarm setpoint and slowly dropping.



Which ONE of the above alarm conditions will the SRO address first, and what procedure provides the needed guidance to address the condition?

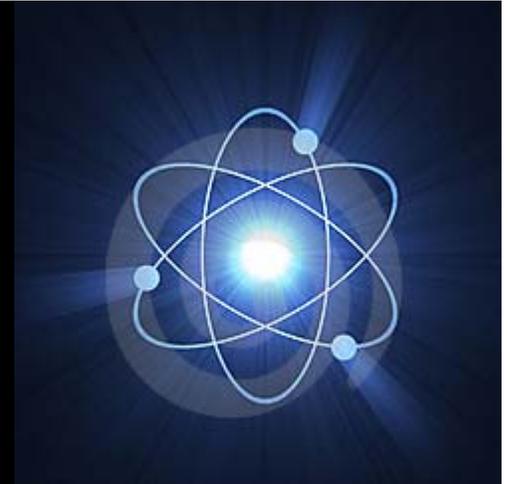
	<u>Highest Priority Alarm</u>	<u>Procedure</u>
a.	41-B, "CST A LEVEL LO-LO"	SOI-2&3.01, "Condensate and Feedwater System"
b.	41-B, "CST A LEVEL LO-LO"	ECA-0.0, "Loss of Shutdown Power"
c.	128-A, "SFP LEVEL HI/LO"	ECA-0.0, "Loss of Shutdown Power"
d.	128-A, "SFP LEVEL HI/LO"	AOI-45, "Loss of Spent Fuel Pool Level or Cooling"

Now lets look at the distracter Analysis



- a. Incorrect. It is plausible to believe that the System Operating Instruction would provide guidance to refill a tank that has a low level. In fact, the Alarm Response Instruction for low level in this tank directs refilling the tank using the given SOI; however, in this case, with the level already so low, the ECA-0.0 takes precedence to promptly ensure AFW has a suction source.
- b. CORRECT. The alarm setpoint for low-low level in the Condensate Storage Tank corresponds to 116,000 gallons in the tank. With the given inventory in the stem (5,000 gallons) the SRO must recognize that loss of suction to the turbine driven AFW pump (the only one available) is imminent. ECA-0.0 directs dispatching operators to manually transfer the suction source of AFW from CST to Emergency Raw Cooling Water.
- c. Incorrect. It is plausible to believe that low level in the Spent Fuel Pool is a paramount concern, given the potential for radiological release due to loss of heating, combined with loss of inventory in the pool. Further urgency (and plausibility) is added to this distracter by stating that the level is continuing to drop. However, the drop is slow and there is plenty of inventory above the top of the fuel before prompt action must be taken, in comparison to the imminent loss of AFW suction source. The procedure (ECA-0.0) is plausible, since that procedure will be in use by the crew.
- d. Incorrect. It is plausible to believe that low level in the Spent Fuel Pool is a paramount concern, given the potential for radiological release due to loss of heat removal, combined with loss of inventory in the pool. Further urgency (and plausibility) is added to this distracter by stating that the level is continuing to drop. However, the drop is slow and there is plenty of inventory above the top of the fuel before prompt action must be taken, in comparison to the imminent loss of AFW suction source. The procedure (AOI-45) is correct, adding further plausibility to this distracter.

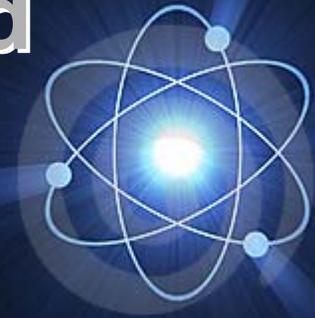
State the KA



000056 G2.4.45 Loss of Offsite Power

Ability to prioritize and interpret the significance of each annunciator or alarm

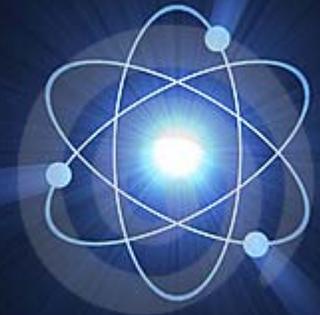
State why the KA is matched and how the question is applicable to SRO Only



The applicant is presented with two alarm conditions, both of which seem important, and then must recall and apply knowledge of design features of the Spent Fuel Pool and what approximate water level is effective for shielding, and how that may be affected by given conditions.

Knowledge of Condensate Storage Tank level requirements must be applied, in conjunction with diagnosing the plant event and which procedure is in effect, and how that procedure's requirements impact strategies regarding maintenance of level in the Condensate Storage Tank.

State the Cognitive Level



HIGH: The applicant must synthesize a multitude of plant conditions, understanding of system design features, diagnose the event in progress, and procedure usage, to arrive at a course of action based on assessment of priorities, including a final determination of which procedure guides these actions.

Supporting Documentation



[REDACTED]		LOSS OF SHUTDOWN POWER	ECA-0.0 Rev 19
Step	Action	Expected Response	Response Not Obtained
17.	CONTROL	Intact S/G NR levels between 29% and 50% [39% and 50% ADV].	
18.	EVALUATE	DC bus loads:	
	a.	INITIATE AOI-40, Station Blackout, to shed non-essential DC loads and restore AC power.	
	b.	MONITOR DC power supply: <ul style="list-style-type: none"> • 125 Vdc vital batteries. • 250 Vdc batteries. 	
	c.	NOTIFY TSC to evaluate other non-essential DC loads.	
19.	MONITOR	CST volume greater than 200,000 gal.	<p>NOTIFY TSC to evaluate alternate CST makeup source.</p> <p>INITIATE CST refill USING SOI-59.01, Demineralized Water System.</p> <p>IF CST volume drops to less than 5000 gal, THEN DISPATCH operators to AFW pumps to manually perform suction transfer to ERCW.</p>

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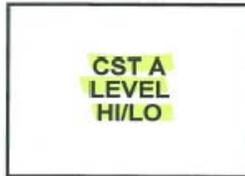
SRO 79

- b. **CORRECT.** The alarm setpoint for low-low level in the Condensate Storage Tank corresponds to 116,000 gallons in the tank. With the given inventory in the stem (5,000 gallons) the SRO must recognize that loss of suction to the turbine driven AFW pump (the only one available) is imminent. ECA-0.0 directs dispatching operators to manually transfer the suction source of AFW from CST to Emergency Raw Cooling Water.

41-A

SOURCE
1-LS-2-229B
1-LS-2-229A

SETPOINT
High level: El. 759'
Low level: El. 747'



Note

The high level alarm corresponds to approximately 360,000 gals as indicated on 1-LI-2-230A and the low level alarm corresponds to an indicated level of approximately 210,000 gals.

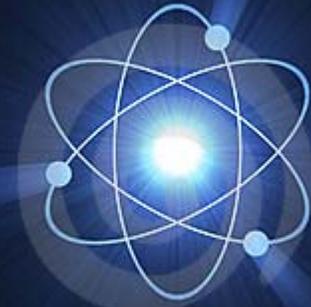
Probable Cause:

1. Hi: Excessive makeup to CST
2. Lo: Excessive condensate usage or leak

Corrective Action:

- [1] CHECK level indication on 0-LI-2-230A [1-M-2].
- [2] IF level is high, THEN STOP makeup to CST A per SOI-59.01, *DEMINERALIZED WATER SYSTEM* or per SOI-2&3.01, *CONDENSATE AND FEEDWATER SYSTEM*, as applicable.
- [3] IF level is low, THEN REFER TO Tech Specs (LCO 3.7.6), and INITIATE makeup to CST A from one of the following sources as listed in preferred order:
 - [a] From CST B per SOI-2&3.01, *CONDENSATE AND FEEDWATER SYSTEM*
 - [b] From DI Water Storage Tank per SOI-59.01, *DEMINERALIZED WATER SYSTEM*.
- [4] IF level is low AND cause is unknown, THEN DISPATCH Operator to check for system leakage.

References: 1-47W610-2-3
1-47W804-1
SOI-2&3.01
Tech Specs (LCO 3.7.6)



- a. Incorrect. It is plausible to believe that the System Operating Instruction would provide guidance to refill a tank that has a low level. In fact, the Alarm Response Instruction for low level in this tank directs refilling the tank using the given SOI; however, in this case, with the level already so low, the ECA-0.0 takes precedence to promptly ensure AFW has a suction source.

Date _____

INITIALS _____

To show that this procedure does contain some direction for filling CST.

8.4 Transfer Water between CSTs

- [1] **SELECT** transfer operation:
 - A. CST A to CST B
 - B. CST B to CST A
- [2] **REQUEST** Chemistry verify that water is acceptable for transfer. _____
- [3] **ENSURE** receiving CST is prepared for fill, manhole covers in place and tight, blind flanges installed and tight. _____
IV
- [4] **IF** transferring CST A to CST B, **THEN**
OPEN the following valves:
 - A. 1-ISV-2-502, CONDENSATE TRANSFER PMP U1 SUCTION ISOL [T16N/718]. _____
 - B. 2-ISV-2-515, CONDENSATE TRANSFER PMP U2 DISCHARGE ISOL [T16N/718]. _____
- [5] **IF** transferring CST B to CST A, **THEN**
OPEN the following valves:
 - A. 2-ISV-2-503, CONDENSER TRANSFER PMP U2 SUCTION ISOL [T16N/718]. _____
 - B. 1-ISV-2-514, CONDENSATE TRANSFER PMP U1 DISCHARGE ISOL [T16N/718]. _____
- [6] **START** COND TRANSFER PUMP, with 0-HS-2-236 [0-JB-290-481, T15M/708], **AND**
MONITOR pump parameters. _____
- [7] **WHEN** transfer is complete, **THEN**
STOP Cond Transfer Pump. _____

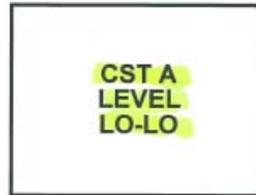


a. Incorrect. It is plausible to believe that the System Operating Instruction would provide guidance to refill a tank that has a low level. In fact, the Alarm Response Instruction for low level in this tank directs refilling the tank using the given SOI; however, in this case, with the level already so low, the ECA-0.0 takes precedence to promptly ensure AFW has a suction source.

41-B

SOURCE
1-LS-2-230

SETPOINT
EI 731'



Note

The lo-lo level alarm corresponds to approximately 116,000 gals as indicated on 1-LI-2-230A.

Probable Cause:

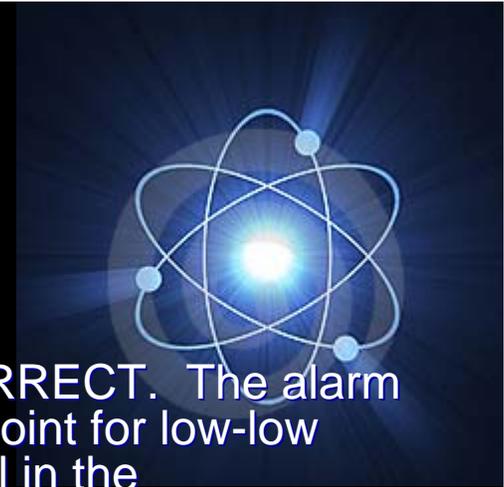
1. Insufficient makeup to CST A versus system usage or loss

Corrective Action:

- [1] REDUCE demand from CST, if possible.
- [2] MAKEUP to CST A at maximum possible rate.
- [3] IF AFW Pumps are running, THEN MONITOR AFW Pump Suction Valves for swap to ERCW Discharge Header suction.
- [4] REFER TO Tech Specs (LCO 3.7.6).

References:

1-47W610-2-3
1-47W803-2
Tech Specs (LCO 3.7.6)



- b. **CORRECT.** The alarm setpoint for low-low level in the Condensate Storage Tank corresponds to 116,000 gallons in the tank. With the given inventory in the stem (5,000 gallons) the SRO must recognize that loss of suction to the turbine driven AFW pump (the only one available) is imminent. ECA-0.0 directs dispatching operators to manually transfer the suction source of AFW from CST to Emergency Raw Cooling Water.

2.2.9 Instrumentation and Control Requirements (continued)

Instrumentation setpoints and ranges for the SFPCCS are identified in Tables 3.3-1 and 3.4-1.

There are no instrumentation and controls associated with the fuel pool gates.

B. Controls of SFPCCS

All components of the system are controlled manually. All pumps in the system are started and stopped using hand switches mounted on the pumps. All system valves are manual.

2.2.10 Makeup and Level Requirements

Fill and normal pool makeup water is provided from the RWST or CVCS. A backup system takes water from either the primary water system or the demineralized water system.

Emergency pool makeup is provided from the RWST which is seismically qualified per Ref. 7.1.4A. Pool makeup can also be provided from the fire protection system (system 26) utilizing fire hoses in the vicinity of the pool.

Early detection of SFP leakage is provided by water level monitor which alarms in the MCR. There are also drain channels behind each of the stainless steel liner weld areas which collect any leakage and direct it to a common drip funnel which is monitored during normal surveillance of the spent fuel pool area. The minimum water level is at 748.96' elevation which is 25.9' above the top of spent fuel stored in the SFP storage racks.

2.2.11 Radiation Shielding Requirements

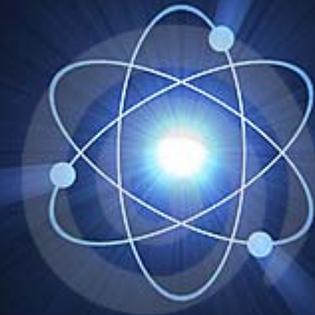
Grade elevation surrounding the SFP is 728.0' while the bottoms of the pools are at 709.23'. Thus, the entire height of the approximate 14.8 feet spent fuel storage racks are well below grade for effective horizontal shielding. The depth of water over the spent fuel in storage (approximately 26') and the refueling cavity provide shielding to limit the dose rate at the surface of the water to a maximum of 2.5 mr/hr (Ref. 7.1.5F) when handling spent fuel over the stored fuel.

Filters and demineralizers, are located in shielded compartments. Connections are provided for sluicing spent resins from the demineralizers to the spent resin storage tank of the waste disposal systems. Filters are provided with hinged tops and designed for removal of spent filter cartridges to the solid waste packaging station under shielded conditions to protect operating personnel. Refer to Ref. 7.1.1E and 7.4J.

The SFPCCS is designed to limit radiological release as defined in WB-DC-40-64, Ref. 7.3N.

2.2.12 Environmental Qualification Requirements

The SFPCCS has been designed to accommodate the effects of the environmental conditions associated with normal maintenance, testing, plant operation, and postulated accidents which require the system to function. The criteria listed below shall be used for the design and procurement of new equipment for plant additions, and for the procurement of replacement equipment.



- c. Incorrect. It is plausible to believe that low level in the Spent Fuel Pool is a paramount concern, given the potential for radiological release due to loss of heating, combined with loss of inventory in the pool. Further urgency (and plausibility) is added to this distracter by stating that the level is continuing to drop. However, the drop is slow and there is plenty of inventory above the top of the fuel before prompt action must be taken, in comparison to the imminent loss of AFW suction source.

NPG System Description Document	SPENT FUEL POOL COOLING AND CLEANING SYSTEM	N3-78-4001 Rev. 0015 Page 33 of 68
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3.3.2 Instrumentation (continued)

D. Level

Instrumentation is provided which gives an alarm in the control room when the water level in the SFP reaches either the high or low level condition. This level indication ensures that the fuel remains covered with adequate water for shielding and cooling of the fuel.

Provides insight on maintaining Aux. FW, as compared to addressing a low level alarm in the Spent Fuel Pool.

3.4 Precautions, Limitations, and Setpoints (i.e., SFP alarm less significant priority)

3.4.1 Precautions and Limitations

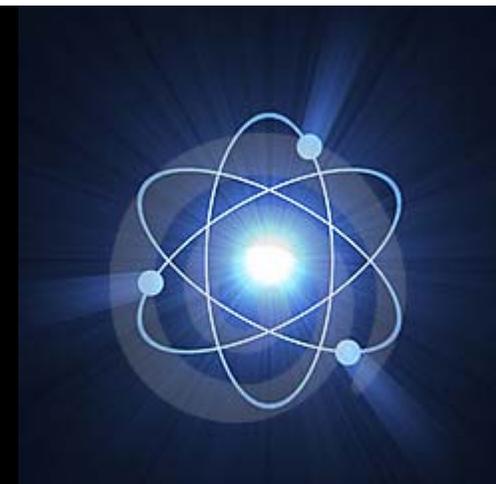
- A. Following the addition of makeup to the SFP the boron concentration should be checked by sample analysis. The concentration should be maintained equal to or greater than as specified in the Technical Specifications (e.g., LCO-3.9.9).
- B. Clean-up flow through the demineralizer/filter system should not exceed the design flow rate of 100 gpm or the maximum temperature of 140°F to preclude damage to the ion-change media. See Section 4.7 for additional flow requirements.
- C. The SFP filter should be changed when the differential pressure exceeds 20 lb/in².
- D. To avoid heat exchanger tube vibration and excessive load do not exceed twice the shell side design cooling water flow specified in the heat exchanger instruction manual (Ref. 7.1.2J, E-Spec 679102).
- E. Containment isolation valves 1-78-557 and 1-78-558 (at Penetration No x83) and 1-78-560 and 1-78-561 (at Penetration No x 82) are locked closed during normal operation. Potentially this could trap water between the inboard and outboard isolation valves. Following a LOCA or MSLB, the containment ambient air temperature is greater than the temperature of the trapped fluid. The trapped fluid will heatup and overpressurize the piping due to thermal expansion. To prevent this occurrence, the piping between the CIVs shall be drained at the end of each refueling outage.
- F. The fuel pool gates are to be removed from their "in use" positions only under balanced water head conditions.

3.4.2 Setpoints

See Table 3.4-1 for a tabular arrangement of the system alarm set points and their function.

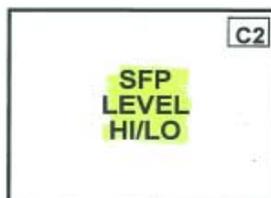
3.5 Physical Arrangements

The SFP is located on elevation 757.0 in the auxiliary building. The SFPCCS pumps and heat exchangers are located on elevation 737.0 in the auxiliary building between column lines A5 and A11 and between column lines W and X. These components are located at this elevation to ensure operability during a design basis flood. The skimmer pump, strainer, and filter are located in this area also. The refueling water purification pumps and filters are located in the auxiliary building on elevation 692.0 between column lines A5 and A6 and between column lines V and X.



SOURCE
0-LS-78-3

SETPOINT
749' 2-1/2" increasing
748' 11-1/2" decreasing



NOTE: With the transfer canal open and CNTMT sealed during refueling, CNTMT press changes could displace water to the SFP. Changes in Aux & Rx Bldg ventilation will affect SFP and Refueling Cavity levels.

Probable Cause:

1. HI
 - a. Abnormal heatup of water
 - b. Excessive makeup to SFP
2. LO
 - a. SFP Gate Leakage ¹
 - b. Normal evaporation
 - c. SFP liner leaking

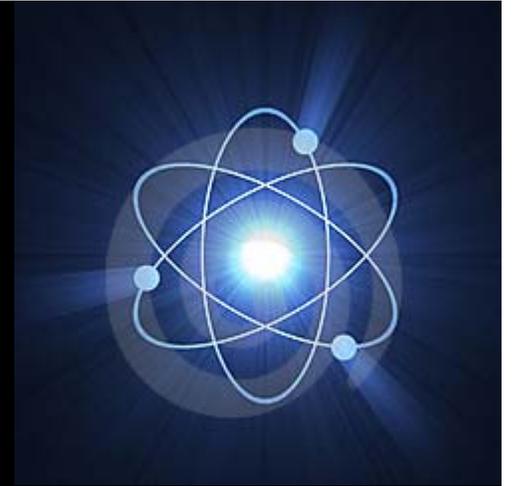
Corrective Action:

- [1] **DISPATCH** Personnel to inspect SFP Gate for leakage,¹ SFP level and liner leak indicators.
- [2] **IF** water level approaches SFP vents,
THEN
 - [a] **SHUT DOWN** Fuel Handling Area Exhaust Fans.
 - [b] **DETERMINE** cause of HI level.
 - [c] **ADJUST** SFP level using SOI-78.01, Spent Fuel Pool Cooling And Cleaning System.
- [3] **IF** in Mode 6 and SFP water level is LO,
THEN ¹
REFER TO AOI-29, Dropped Or Damaged Fuel Or Refueling Cavity Seal Failure.
- [4] **IF** in Modes 1-5 and SFP water level is LO,
THEN
REFER TO AOI-45, Loss of Spent Fuel Pool Level or Cooling.

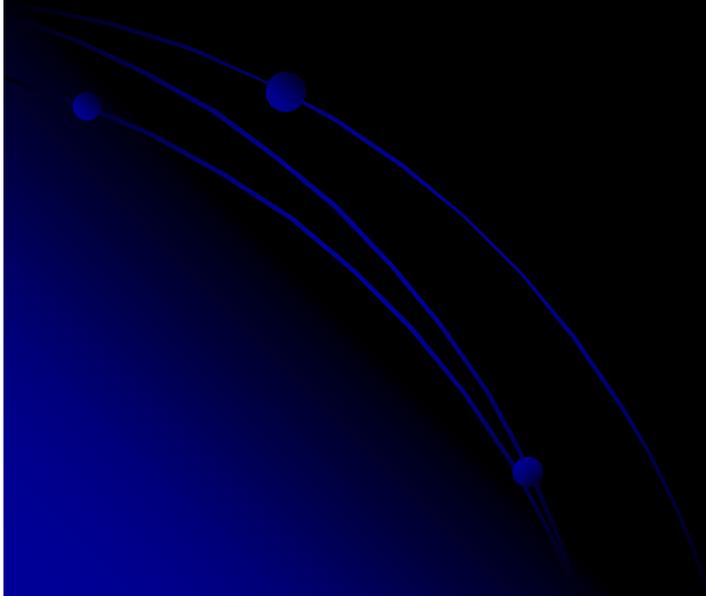
(continued on next page)

- d. Incorrect. It is plausible to believe that low level in the Spent Fuel Pool is a paramount concern, given the potential for radiological release due to loss of heat removal, combined with loss of inventory in the pool. Further urgency (and plausibility) is added to this distracter by stating that the level is continuing to drop. However, the drop is slow and there is plenty of inventory above the top of the fuel before prompt action must be taken, in comparison to the imminent loss of AFW suction source. The procedure (AOI-45) is correct, adding further plausibility to this distracter.

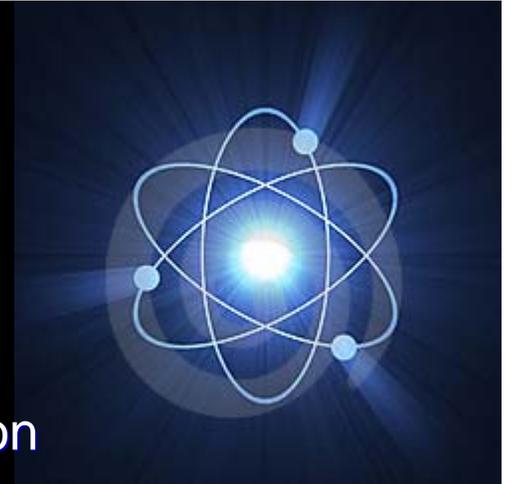
Post Exam Analysis Miss frequency



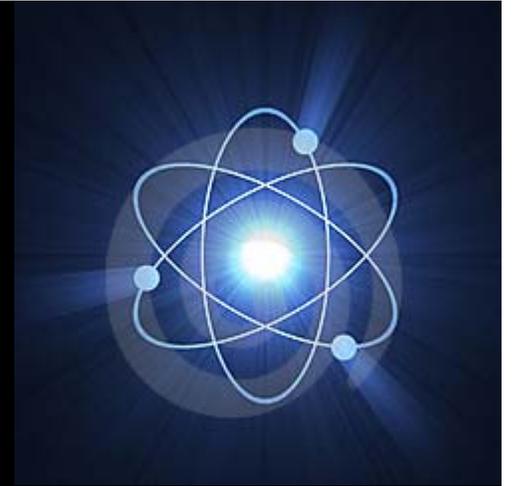
25% of the applicants missed this question



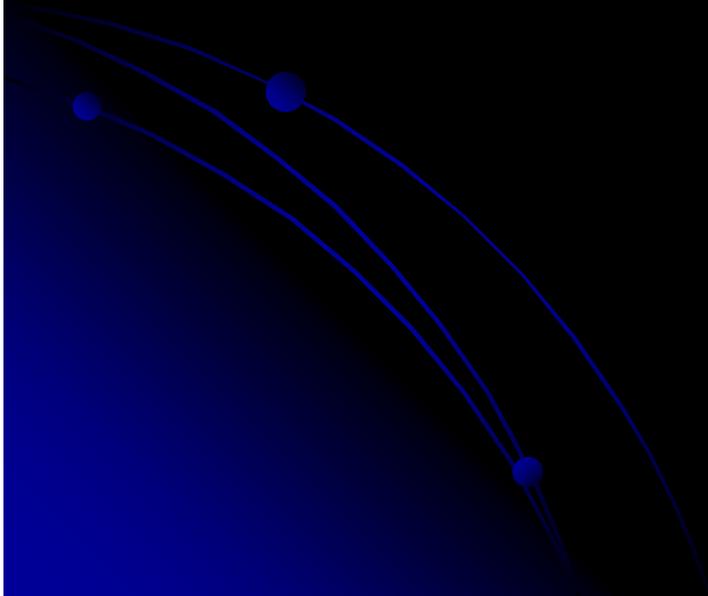
Summarizing



- Add bullets that are necessary to answer the question
- Add bullets to support distracters
- Streamline the question so only pertinent information is included
- A good distracter analysis will state why the choice is right or wrong AND it will state why the choice is plausible
- Add a statement to support how you meet the KA
- Add a statement to support why and how the question is SRO only if applicable
- Add **highlighted** reference material to support the answer as well as the distracters
- Add learning objectives
- Tab each question with its supporting reference material and put each question packet in 3 ring binders



Questions?



Question to KA Match

How good is good enough?

Gerry Laska RII Chief Examiner



KA Mismatch Problems

- Two part KAs. Which part do you have to meet?
- Components that serve two functions.
- Three part distractors.



KA Mismatch Problems

- Malfunctions (not actually having one).



Two Part KAs

When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement.

If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A.



Two Part KAs

- **013A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and**
(b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; Loss of instrument bus



Two Part KAs

Unit 1 is operating at 100% power. Given the following failures:

Containment Pressure channel II fails high

Loss of 1ERPD

Containment Pressure Channels read:

Channel I: 0 psig

Channel II: +5 psig

Channel III: 0 psig

Channel IV: -5 psig



Two Part KAs

Which of the following statements explains the impact on the Engineered Safeguards Features (ESF) system and expected operator actions.

- A. Only train “A” safety injection action logic is satisfied.
Only train “A” safety injection equipment starts.
Perform EP/1/A/5000/E-0, Reactor Trip and Safety Injection actions.

- B. Neither train of safety injection actuation logic is satisfied.
Perform AP/1/A/5500/029, Loss of Vital or Aux control Power to restore power to 1ERPD



Two Part KAs

- C. Train “A” and “B” safety injection actuation logic are satisfied.
Train “A” and “B” safety injection equipment starts.
Perform EP/1/A/5000/E-0, Reactor Trip and Safety Injection actions.

- D. Train “A” and “B” safety injection actuation logic are satisfied.
Only train “A” safety injection equipment starts.
Perform EP/1/A/5000/E-0, Reactor Trip and Safety Injection actions.



Does the question meet the KA?

- At first glance it appears to, there are procedure in the answer and distractors.
- After further review, the question can be answered without any procedure knowledge, just systems knowledge.



Components that serve two functions

- 025AK1.01 Loss of Residual Heat Removal System
- Knowledge of the operational implications of the following concepts as they apply to Loss of Residual Heat Removal System: Loss of RHRS during all modes of operation.



Unit 1 plant conditions:

- Load Shed has occurred concurrent with a LBLOCA
- 1A and 1B LPI pumps failed to start

Based on the above conditions which ONE of the following describes actions to restore LPI flow in accordance with EOP Enclosure 5.1 (ES Actuation)?



Manual reset of Load Shed is

- A. Not Required / Align flow path and start 1C LPI pump.
- B. Required / Align flow path and start 1C LPI pump.
- C. Not Required / Start 1C LPI pump immediately.
- D. Required / Start 1C LPI pump immediately after load shed.



Does the question meet the KA?

- No
- The question does not test the loss of RHRS. LPI pumps have two functions, Injection (safety functions 2 and 3).
- Decay heat removal safety (safety function 4).



Three part distractors

- KA 055EA1.01 Station Blackout – Ability to operate and monitor the following as they apply to a station blackout: In-core thermocouple temperatures



Three part distractors

Unit 1 initial conditions:

Reactor power 100%

Current conditions:

Station Blackout

RCS temperature 2 minutes after trip

T_c 550⁰F

T_h 556⁰F

CETC 558⁰F

SG Pressures 1010 psig and stable



Three part distractors

Based on the conditions above:

Which ONE of the following describes the response of the RCS heat removal parameters over the next 5 minutes during the establishing of natural circulation?

(Assume Power Has Not Been Restored)



Three part distractors

RCS T_{cold}

RCS T_{hot}

CETCs

A. Stable

Stable

Increasing

B. Decreasing

Stable

Stable

C. Stable

Increasing

Increasing

D. Decreasing

Increasing

Stable



Three part distractors

All the applicant needs to know is the first two parameters.

The K/A required the applicant to demonstrate the ability to operate and monitor; as they apply to a station blackout: In-core thermocouple temperatures



Malfunctions

(not actually having one or having it backwards)

- **KA 071K3.04 - Knowledge of the effect that a loss or malfunction of the Waste Gas Disposal System will have on the following: Ventilation system**



Malfunctions

Rad Waste AUO reports the Radiation Control Valve, 0-FCV-77-119, has automatically closed terminating a WGDT release.

Select from below the most likely cause of the termination.



Malfunctions

- A. The Running ABGTS Fan Trips
- B. Waste Gas decay Tank being released indicates 25 psig and stable.
- C. Rad Monitor 90-400 module shows an amber warning light illuminated.
- D. High Hydrogen concentration alarm on the Waste Gas Analyzer Panel.



Question to KA Match

- These were 4 examples of KA mismatches but are not all inclusive.
- Exam writers must always be mindful of changes to questions, and how the change may effect the KA match.



Question to KA Match

- If you (the exam writer) have a question about how to match a K/A, **DO NOT** hesitate to call your Chief Examiner for clarification.



Questions?



“Quality Submittals”

Examination Challenges and Lessons Learned

Gerry Laska RII Chief Examiner

Discussion Goals

- Convey to Stakeholders the challenges examiners have experienced since the last exam writers conference.
- Present the positive aspects of the examination process the examiners have experienced.
- Solicit Feedback on how we can do our job better (more efficiently).

Challenges

- Examination Submittals being less than adequate.
- Appears that overall submittals are improving.
 - Some staff turnovers have contributed to repeat submittals that were less than adequate.

Written Examinations

- SRO Only questions (Presentation by Bruno)
- K/A Matches (Presentation by Gerry)
- Plausible Distractors/Operational Validity

Administrative JPMs

- SRO and RO JPMs (Presentation by Frank)
How many need to be different
What makes a JPM SRO only
- JPM Validation (operations expectations/time)

Walkthrough JPMs

- Validation (Operations expectations/time)
- Discriminating Tasks (one step JPMs)

(Presentation on validation by Gerry)

Scenarios

- Verifiable Actions (Presentation by Phil)
- Validation (Presentation by Gerry)
- Streamline scenarios for time (goal is 90 min)
- Intend to give 3 scenarios per day.
- Procedures used on simulator must be the same that procedures used to validate.

Scenarios

- Critical Tasks (when is task met?) (is it critical for this scenario?)
- Minimum number of malfunctions/tasks not being met, until after the major transient.

Administration

- How to Submit an Exam for NRC Review (Presentation by Ron)
- Scheduling of Exams (Presentation by Phil)

Administration

- VPs signing of the 398, What does it mean?
 - Training program complete
 - Reactivity manipulations completed
 - Final determination is made that the individual is going to sit for the examination.
 - Waivers asked for any items not completed

Administration

- Appeals (Presentation by Mark R.)
- Examination Failures and Waivers
 - Waivers are not automatic, previous examination performance will be reviewed prior to granting a waiver.
 - Post Examination Comments (Presentation by Rick B.)

Administration

- Flash Drive/Memory Sticks/Thumb Drives
 - New Policy The Computer Security Office (CSO) and the Office of Information Services (OIS) have completed a vulnerability assessment of the MXI thumb drive. This assessment determined that the MXI thumb drive issued by NRC is resistant to malware such as the Conficker worm. As a result, NRC issued MXI thumb drives may now be used with non-NRC computers

Positives

- Licensees starting exam development earlier.
- Some licensees are placing a shift SRO or RO on the exam development team.
- Staff work well with examiners, and are very professional.

Positives

- Many RII Licensees have welcomed, and seem comfortable with, the clarification provided regarding Tech Specs.
- Some increased communication between exam developers and chief examiner/NRC.

Communications

- Communicate early and often with Chief Examiner.
- Communicate with your management.
- If Chief is not available, or you have an issue that needs to be rectified, feel free to call the Branch Chief.

The background is a solid teal color. In the lower half, there is a faint, semi-transparent image of two hands shaking, rendered in a lighter shade of teal. The text "Your Thoughts?" is centered in the upper half of the image.

Your Thoughts?