

**NRC Website Operator
Licensing References**

2013 Exam Writers' Conference
Dan Bacon



U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

**Feedback
and
Questions**

**Coffee
and
Donuts**

Objectives

- Discuss the reference material available on the NRC Website
- Discuss Operator Licensing Program Feedback (aka FAQs)
- Discuss where to find frequently used forms
- Discuss FAQs posted within the last year or so

What Operator Licensing Reference Material is available on the NRC Website?

- We will first discuss what is available and where it can be found.
- We will then visit the website and demonstrate how to access this information.

KEY TOPICS

Generic Fundamentals Examinations
BWR Exam
PWR Exam

Exam/Requalification Inspection Schedules
Region I
Region II
Region III
Region IV



- Regulations, Guidance, and Communications
- Licensing Process
- Oversight Program
- Public Involvement
- Related Documents and Other Resources
- Generic Fundamentals Examinations
- Operator Licensing Program Feedback
- Contact Us About Operator Licensing



Operator Licensing Program Feedback

- Commonly referred to as FAQs
- Twenty-one categories total
- Seventeen categories are based on sections of the Operator Licensing Examination Standards for Power Reactors (NUREG-1021)
- One category is for Requalification Inspections (IP-7111.1)
- One category is for Simulation Facilities
- One category is for 10 CFR 55
- One category is for questions that do not fit another category (General)



Recently Published FAQs (9/21/2012)

- Gen 53 - Must detailed medical evidence be submitted with NRC Form 396 (associated with either an initial or license renewal application) for minor medical conditions related to corrective lenses or hearing aids?
- The short answer is "no." During the 10CFR55 rule change in 1987, the NRC received public comments that detailed medical evidence should not be required to be submitted for common conditions, such as corrective lenses and hearing aids. The staff agreed and modified Form 396 to require medical evidence only for restrictions other than corrective lenses or hearing aids. As NRC Form 396 was again modified in later years to accommodate new restrictions (such as "no solo," "shall take medication," and "shall submit medical status report"), the requirement to "attach supporting medical evidence for NRC review" was moved to the section header for simplicity, rather than include it with each applicable license restriction in the list.

Where can NRC Forms be found?

- (1) Click on the "Licensing Process" link, and links are provided for applicable forms under the related topic areas
- (2) Click on "FORMS" under the "POPULAR DOCUMENTS" heading at the bottom of the web page

NRC Website Operator Licensing Reference Material

- www.nrc.gov
- "NUCLEAR REACTORS" tab on top of home page
- "Operator Licensing" on dropdown menu

Questions?

NRC Website Operator Licensing References

2013 Exam Writers' Conference

Dan Bacon





Feedback and Questions



Coffee and Donuts

Objectives

- Discuss the reference material available on the NRC Website
- Discuss Operator Licensing Program Feedback (aka FAQs)
- Discuss where to find frequently used forms
- Discuss FAQs posted within the last year or so

What Operator Licensing Reference Material is available on the NRC Website?

- We will first discuss what is available and where it can be found.
- We will then visit the website and demonstrate how to access this information.



KEY TOPICS

Generic Fundamentals Examinations

BWR Exam

PWR Exam

Exam/Requalification Inspection Schedules

Region I

Region II

Region III

Region IV

- 
- [Regulations, Guidance, and Communications](#)
 - [Licensing Process](#)
 - [Oversight Program](#)
 - [Public Involvement](#)
 - [Related Documents and Other Resources](#)
 - [Generic Fundamentals Examinations](#)
 - [Operator Licensing Program Feedback](#)
 - [Contact Us About Operator Licensing](#)

Operator Licensing Program Feedback

- Commonly referred to as FAQs
- Twenty-one categories total
- Seventeen categories are based on sections of the Operator Licensing Examination Standards for Power Reactors (NUREG-1021)
- One category is for Requalification Inspections (IP-7111.11)
- One category is for Simulation Facilities
- One category is for 10 CFR 55
- One category is for questions that do not fit another category (General)

Recently Published FAQs (9/21/2012)

- Gen.53 - Must detailed medical evidence be submitted with NRC Form 396 (associated with either an initial or license renewal application) for minor medical conditions related to corrective lenses or hearing aids?
- The short answer is “no.” During the 10CFR55 rule change in 1987, the NRC received public comments that detailed medical evidence should not be required to be submitted for common conditions, such as corrective lenses and hearing aids. The staff agreed and modified Form 396 to require medical evidence only for restrictions other than corrective lenses or hearing aids. As NRC Form 396 was again modified in later years to accommodate new restrictions (such as “no solo,” “shall take medication,” and “shall submit medical status report”), the requirement to “attach supporting medical evidence for NRC review” was moved to the section header for simplicity, rather than include it with each applicable license restriction in the list.

Where can NRC Forms be found?

- (1) Click on the “Licensing Process” link, and links are provided for applicable forms under the related topic areas
- (2) Click on “FORMS” under the “POPULAR DOCUMENTS” heading at the bottom of the web page

NRC Website Operator Licensing Reference Material

- www.nrc.gov
- “NUCLEAR REACTORS” tab on top of home page
- “Operator Licensing” on dropdown menu



Questions?

**ALTERNATE PATH
AND TIME-CRITICAL JPMs**

2013 Exam Writers' Workshop

Mark Bates



ALTERNATE PATH JPMs

- ▶ 10CFR55.40 Implementation
- ▶ "... The Commission shall also use the criteria in **NUREG-1021** to evaluate the written examinations and operating tests prepared by power reactor facility licensees pursuant to paragraph (b) of this section."
- ▶ "(b) Power reactor facility licensees may prepare, proctor and grade the written examinations required by 10CFR55.41 and 10CFR55.43 and may prepare the operating tests required by **10CFR55.45**, subject to"



ALTERNATE PATH JPMs

- ▶ 10CFR55.45, Operating Tests
 - Identify annunciators and condition indicating signals and perform appropriate remedial actions when appropriate.
 - Identify the instrumentation systems and significance of facility instrument readings.
 - Use procedures, manipulate controls, etc.



ALTERNATE PATH JPMS

- ▶ NUREG-1122 and -1123 (K/A Catalogs for PWRs and BWRs, respectively)
 - K6 - Knowledge of the effect of a loss or malfunction on the following [SYSTEM] components:
 - A2 - Ability to (a) predict the impacts of the following malfunctions or operations on the [SYSTEM], and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
 - Other K/As also may be tested using alternate path JPMS ("cause-effect" relationships, power supplies, etc.)

ALTERNATE PATH JPMS

- ▶ Purpose
 - With regard to the operating test, 10CFR55.45 specifically requires an assessment of the examinees' understanding of and ability to perform actions specified in the regulation. Alternate Path JPMS are used to assess such understanding during the walk-through (a.k.a., JPM) because they require examinees to evaluate unplanned conditions or events while executing procedures and to implement acceptable, alternative methods of accomplishing the assigned task. [NUREG-1021, Appendix A]

ALTERNATE PATH JPMS

- ▶ Definition
 - Alternate paths incorporate malfunctions of instrumentation or components that require the examinee to perform actions other than those performed when a system responds normally. [NUREG-1021, Appendix C]
 - Alternate path JPMS, JPMS in which malfunctions occur, are used to provide a methodology to evaluate whether an examinee has the skills and knowledge at the level needed to safely operate the system. [NUREG-1021, Appendix C]

ALTERNATE PATH JPMs

▶ History

- Why do we have Alternate Path JPMs?
 - Alternate Path JPMs were developed when pre-scripted questions were eliminated from the walkthrough portion of the exam.
 - Questions previously were used to evaluate knowledge of how to respond when the expected plant response was not obtained.
 - Alternate Path JPMs are now used to test the individual operator knowledge/abilities associated with malfunctions.

ALTERNATE PATH JPMs

▶ Five characteristics of alternate path JPMs:

1. Valid success path
2. Procedurally driven
3. Logical sequence
4. Independent of crew dynamics
5. Validated in advance

[NUREG-1021, Appendix C]

ALTERNATE PATH JPMs

▶ Valid Success Path

- May require the applicant to analyze initial conditions to determine an alternate method for completing the task, mitigating a system-related problem that occurs during the task, or realigning the system. [NUREG-1021, Appendix C]
- A representative of Operations Management, as well as the Exam Development Team, should agree on the technical validity of the defined success path.

ALTERNATE PATH JPMs

- ▶ Procedurally Driven
 - A procedure must address the actions that are required. [NUREG-1021, Appendix C]
 - Alarm Response Procedures
 - AOP / ONP
 - Response-Not-Obtained
 - Precaution or Limitation
 - Caution or Warning
 - Administrative Procedures (Conduct of Operations)
 - Operations Policy

ALTERNATE PATH JPMs

- ▶ Logical Sequence
 - The sequence should be logical, but it should not evolve into a "mini-scenario".
 - The examinee should not be expected to correct a problem by entering ARPs, then AOPs, and then transition into the EOPs - this is better tested on the dynamic portion with the help of team members.
 - Does this mean that (for example) it should not be expected that E-0, Reactor Trip or Safety Injection (Westinghouse), entry be tested?

ALTERNATE PATH JPMs

- ▶ Independent of Crew Dynamics
 - JPM should allow the examinee to complete the task, or mitigate the problem that occurs during a task, without having to rely on the actions of other control room operators.
 - What does this mean?
 - Does this prevent the booth operator from performing field actions (simulating) when requested by the examinee? Is this OK as the action for an Alt Path?
 - Does this prevent another board operator from being on the simulator floor to address other items unrelated to the JPM?

ALTERNATE PATH JPMs

- ▶ Validated in Advance
 - Each JPM should be validated before exam administration (actually before the draft submittal) and should not be changed thereafter.

ALTERNATE PATH JPMs

- ▶ Litmus Test
 - The actions required to complete the task must be different than the actions expected based on the initiating cue for the task.
 - FAQ 301.9 (Feedback from NRC public website):
 - Although most alternate path JPMs do involve some sort of system fault, the goal is to assess the applicant's response to a situation that is not as it should be or is somehow different from what the applicant might have expected based on the initiating cue for the task.

ALTERNATE PATH JPMs

- ▶ Does a "respond-to-plant conditions" JPM (a.k.a. "no-tell" JPMs) qualify as alternate path?

ALTERNATE PATH JPMs

- ▶ Do “respond-to-plant conditions” JPMs (a.k.a. “no-tell” JPMs) qualify as alternate path?
 - No
 - If a “no-tell” JPM is used, then the event itself should not be considered as the alternate path.
 - After the initiating event, IF an additional failure or malfunction occurs that requires the applicant to mitigate or address that additional malfunction, then it would be an acceptable Alternate Path JPM.

ALTERNATE PATH JPMs

- ▶ “No-Tell” Example: Przr PORV Fails Open
 - If the action for successful completion of the JPM is to close the PORV, then the JPM does not qualify as an alternate path.
 - If the PORV does not close when the operator attempts to close it and the operator then closes the block valve in response, then the JPM does qualify as an alternate path.

ALTERNATE PATH JPMs

- ▶ Response-Not-Obtained
 - Q: Does use of the RNO constitute an Alternate Path JPM?

ALTERNATE PATH JPMs

- ▶ Response–Not–Obtained
 - Q: Does use of the RNO constitute an Alternate Path JPM?

- ▶ Maybe
 - The RNO is a syntax that presents an If/Then conditional statement. If the conditions are addressing a malfunction, then the RNO may be appropriate for providing guidance for an alternate path.

ALTERNATE PATH JPMs

- ▶ Example where use of the RNO would not qualify as an Alternate Path:
 - Phase 'B' CIS has just occurred. The examinee is instructed to manually perform the attachment to verify alignment of Phase 'B' valves.

Left Column	RNO
◦ Valve B1 closed?	Manually close Valve B1

ALTERNATE PATH JPMs

- ▶ Example where use of the RNO would meet the intent of an Alternate Path JPM:
 - ▶ [1] ___ MANUALLY TRIP REACTOR ... (*Rx trips*)
 - ▶ [2] ___ VERIFY TURBINE TRIP:
 - ▶ a) Manually Trip Turbine (*turbine does not trip*)
 - ▶ b) Verify all Turbine Stop Valves – CLOSED (*valves NOT closed – failure during performance of task*)

- ▶ [2] RNO
 - ▶ b) Put both EHC Pumps in PTL.
 - IF Turbine is still NOT tripped, THEN manually run back Turbine.
 - IF Turbine cannot be run back, THEN close MSTVs and Bypass Valves.

ALTERNATE PATH JPMs

- ▶ Performance Criteria (Standard)
 - Criteria must be objective.
 - Criteria must be supported by procedures, analysis, vendor information, etc. – especially when there is a time requirement.
 - How soon must a valve be closed? How soon must an EDG be stopped? How soon must the reactor be tripped?
 - Preferable to have the standard for successful completion tied to a plant parameter.
 - e.g.: close PORV BV to avoid reactor trip.

ALTERNATE PATH JPMs

- ▶ Objective Criteria:
 - 4 to 6 Alternate Path JPMs for ROs and Instant SROs.
 - 2–3 Alternate Path JPMs for Upgrade SROs. [NUREG-1021, Form ES-301-2]
- ▶ Form ES-201-2 also contains one line-item that requires a signature for verification that the exam contains the required number of alternate path JPMs.
- ▶ Smart to target 5.

ALTERNATE PATH JPMs

- ▶ Questions?

TIME-CRITICAL JPMs

- ▶ What is a “time-critical” JPM
- ▶ “Time-critical” JPMs evaluate tasks identified in the facility’s JTA that must be completed within a defined time period for each licensed position.
 - Time requirements must have a basis:
 - E-Plan classification / communication requirement
 - Safety implications – time bounded by analysis

TIME-CRITICAL JPMs

- ▶ Successful Completion of JPM
 - To successfully complete a time-critical JPM, the operator must perform the “time-critical” steps within a pre-specified time period, in addition to successfully performing all of the critical steps that are not time-critical.

TIME-CRITICAL JPMs

- ▶ Checklists
 - Form ES-301-3, “Operating Test Quality Checklist”
 - Form ES-701-7, “LSRO Operating Test Quality Checklist”

TIME-CRITICAL JPMs

- ▶ Appendix E, Policies and Guidelines for Taking NRC Examinations
 - Examiner will state to the applicant that the task contains time-critical elements.
 - The examiner will not provide the actual time requirement to the applicant.
 - Time-critical JPMs have been validated by your facility and must be completed within the predetermined time interval in order to obtain a satisfactory grade for that JPM.

TIME-CRITICAL JPMs

- ▶ Questions?

ALTERNATE PATH AND TIME-CRITICAL JPMs

2013 Exam Writers' Workshop

Mark Bates



ALTERNATE PATH JPMs

- ▶ 10CFR55.40 Implementation
- ▶ “... The Commission shall also use the criteria in NUREG-1021 to evaluate the written examinations and operating tests prepared by power reactor facility licensees pursuant to paragraph (b) of this section.”
- ▶ “(b) Power reactor facility licensees may prepare, proctor and grade the written examinations required by 10CFR55.41 and 10CFR55.43 and may prepare the operating tests required by 10CFR55.45, subject to”

ALTERNATE PATH JPMs

- ▶ 10CFR55.45, Operating Tests
 - Identify annunciators and condition indicating signals and perform appropriate remedial actions when appropriate.
 - Identify the instrumentation systems and significance of facility instrument readings.
 - Use procedures, manipulate controls, etc.

ALTERNATE PATH JPMs

- ▶ NUREG-1122 and -1123 (K/A Catalogs for PWRs and BWRs, respectively)
 - K6 – Knowledge of the effect of a loss or malfunction on the following [SYSTEM] components:
 - A2 – Ability to (a) predict the impacts of the following malfunctions or operations on the [SYSTEM], and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
 - Other K/As also may be tested using alternate path JPMs (“cause-effect” relationships, power supplies, etc.)

ALTERNATE PATH JPMs

▶ Purpose

- With regard to the operating test, 10CFR55.45 specifically requires an assessment of the examinees' understanding of and ability to perform actions specified in the regulation. Alternate Path JPMs are used to assess such understanding during the walk-through (a.k.a., JPM) because they require examinees to evaluate unplanned conditions or events while executing procedures and to implement acceptable, alternative methods of accomplishing the assigned task. [NUREG-1021, Appendix A]

ALTERNATE PATH JPMs

▶ Definition

- Alternate paths incorporate malfunctions of instrumentation or components that require the examinee to perform actions other than those performed when a system responds normally. [NUREG-1021, Appendix C]
- Alternate path JPMs, JPMs in which malfunctions occur, are used to provide a methodology to evaluate whether an examinee has the skills and knowledge at the level needed to safely operate the system. [NUREG-1021, Appendix C]

ALTERNATE PATH JPMs

▶ History

- Why do we have Alternate Path JPMs?
 - Alternate Path JPMs were developed when pre-scripted questions were eliminated from the walkthrough portion of the exam.
 - Questions previously were used to evaluate knowledge of how to respond when the expected plant response was not obtained.
 - Alternate Path JPMs are now used to test the individual operator knowledge/abilities associated with malfunctions.

ALTERNATE PATH JPMs

- ▶ Five characteristics of alternate path JPMs:
 1. Valid success path
 2. Procedurally driven
 3. Logical sequence
 4. Independent of crew dynamics
 5. Validated in advance

[NUREG-1021, Appendix C]



ALTERNATE PATH JPMs

▶ Valid Success Path

- May require the applicant to analyze initial conditions to determine an alternate method for completing the task, mitigating a system-related problem that occurs during the task, or realigning the system. [NUREG-1021, Appendix C]
- A representative of Operations Management, as well as the Exam Development Team, should agree on the technical validity of the defined success path.

ALTERNATE PATH JPMS

▶ Procedurally Driven

- A procedure must address the actions that are required. [NUREG-1021, Appendix C]
 - Alarm Response Procedures
 - AOP / ONP
 - Response-Not-Obtained
 - Precaution or Limitation
 - Caution or Warning
 - Administrative Procedures (Conduct of Operations)
 - Operations Policy

ALTERNATE PATH JPMs

▶ Logical Sequence

- The sequence should be logical, but it should not evolve into a “mini-scenario”.
- The examinee should not be expected to correct a problem by entering ARPs, then AOPs, and then transition into the EOPs – this is better tested on the dynamic portion with the help of team members.
- Does this mean that (for example) it should not be expected that E-0, Reactor Trip or Safety Injection (Westinghouse), entry be tested?

ALTERNATE PATH JPMs

- ▶ Independent of Crew Dynamics
 - JPM should allow the examinee to complete the task, or mitigate the problem that occurs during a task, without having to rely on the actions of other control room operators.
 - What does this mean?
 - Does this prevent the booth operator from performing field actions (simulating) when requested by the examinee? Is this OK as the action for an Alt Path?
 - Does this prevent another board operator from being on the simulator floor to address other items unrelated to the JPM?

ALTERNATE PATH JPMS

- ▶ Validated in Advance
 - Each JPM should be validated before exam administration (actually before the draft submittal) and should not be changed thereafter.

ALTERNATE PATH JPMs

▶ Litmus Test

- The actions required to complete the task must be different than the actions expected based on the initiating cue for the task.
- FAQ 301.9 (Feedback from NRC public website):
 - Although most alternate path JPMs do involve some sort of system fault, the goal is to assess the applicant's response to a situation that is not as it should be or is somehow different from what the applicant might have expected based on the initiating cue for the task.

ALTERNATE PATH JPMS

- ▶ Does a “respond-to-plant conditions” JPM (a.k.a. “no-tell” JPMS) qualify as alternate path?

ALTERNATE PATH JPMS

- ▶ Do “respond-to-plant conditions” JPMS (a.k.a. “no-tell” JPMS) qualify as alternate path?
 - No
 - If a “no-tell” JPM is used, then the event itself should not be considered as the alternate path.
 - After the initiating event, IF an additional failure or malfunction occurs that requires the applicant to mitigate or address that additional malfunction, then it would be an acceptable Alternate Path JPM.

ALTERNATE PATH JPMs

- ▶ “No-Tell” Example: Przr PORV Fails Open
 - If the action for successful completion of the JPM is to close the PORV, then the JPM does not qualify as an alternate path.
 - If the PORV does not close when the operator attempts to close it and the operator then closes the block valve in response, then the JPM does qualify as an alternate path.

ALTERNATE PATH JPMs

- ▶ Response–Not–Obtained
 - Q: Does use of the RNO constitute an Alternate Path JPM?

ALTERNATE PATH JPMs

- ▶ Response–Not–Obtained
 - Q: Does use of the RNO constitute an Alternate Path JPM?
- ▶ Maybe
 - The RNO is a syntax that presents an If/Then conditional statement. If the conditions are addressing a malfunction, then the RNO may be appropriate for providing guidance for an alternate path.

ALTERNATE PATH JPMs

- ▶ Example where use of the RNO would not qualify as an Alternate Path:
 - Phase 'B' CIS has just occurred. The examinee is instructed to manually perform the attachment to verify alignment of Phase 'B' valves.

Left Column

- Valve B1 closed?

RNO

Manually close Valve B1

ALTERNATE PATH JPMs

- ▶ Example where use of the RNO would meet the intent of an Alternate Path JPM:
 - ▶ [1] ___ MANUALLY TRIP REACTOR ... (*Rx trips*)
 - ▶ [2] ___ VERIFY TURBINE TRIP:
 - ▶ a) Manually Trip Turbine (*turbine does not trip*)
 - ▶ b) Verify all Turbine Stop Valves – CLOSED (*valves NOT closed – failure during performance of task*)
 - ▶ [2] RNO
 - ▶ b) Put both EHC Pumps in PTL.
 - IF Turbine is still NOT tripped, THEN manually run back Turbine.
 - IF Turbine cannot be run back, THEN close MSTVs and Bypass Valves.

ALTERNATE PATH JPMs

- ▶ Performance Criteria (Standard)
 - Criteria must be objective.
 - Criteria must be supported by procedures, analysis, vendor information, etc. – especially when there is a time requirement.
 - How soon must a valve be closed? How soon must an EDG be stopped? How soon must the reactor be tripped?
 - Preferable to have the standard for successful completion tied to a plant parameter.
 - e.g.: close PORV BV to avoid reactor trip.

ALTERNATE PATH JPMs

- ▶ Objective Criteria:
 - 4 to 6 Alternate Path JPMs for ROs and Instant SROs.
 - 2–3 Alternate Path JPMs for Upgrade SROs.
[NUREG-1021, Form ES-301-2]
- ▶ Form ES-201-2 also contains one line-item that requires a signature for verification that the exam contains the required number of alternate path JPMs.
- ▶ Smart to target 5.

ALTERNATE PATH JPMs

- ▶ Questions?

TIME-CRITICAL JPMs

- ▶ What is a “time-critical” JPM
- ▶ “Time-critical” JPMs evaluate tasks identified in the facility’s JTA that must be completed within a defined time period for each licensed position.
 - Time requirements must have a basis:
 - E-Plan classification / communication requirement
 - Safety implications – time bounded by analysis

TIME-CRITICAL JPMs

- ▶ Successful Completion of JPM
 - To successfully complete a time-critical JPM, the operator must perform the “time-critical” steps within a pre-specified time period, in addition to successfully performing all of the critical steps that are not time-critical.

TIME-CRITICAL JPMs

▶ Checklists

- Form ES-301-3, “Operating Test Quality Checklist”
- Form ES-701-7, “LSRO Operating Test Quality Checklist”

TIME-CRITICAL JPMs

- ▶ Appendix E, Policies and Guidelines for Taking NRC Examinations
 - Examiner will state to the applicant that the task contains time-critical elements.
 - The examiner will not provide the actual time requirement to the applicant.
 - Time-critical JPMs have been validated by your facility and must be completed within the predetermined time interval in order to obtain a satisfactory grade for that JPM.

TIME-CRITICAL JPMs

- ▶ Questions?

Examples of unacceptable SRO written exam items

Bruno Caballero

Today's Goal

- ▶ Review SRO questions which were rated as unsatisfactory to identify the:
 - licensee's bases for why the question was acceptable;
 - the reason why the NRC graded the question as unacceptable; and
 - the final version of the question.

Tier 2, Group 1 215003 IRM

G2.1.27 Knowledge of system purpose and/or function

Q#1

1. This was a tough K/A to hit at the SRO level (i.e., knowledge of system purpose and/or function).
2. The Chief Examiner should be aware of the “tough” K/As at the time the sample plan is provided to the licensee. If the licensee cannot write a discriminating question at the SRO level for “tough” K/As, the Chief Examiner should provide a new K/A.
3. Remember, the SRO portion of the question must hit the K/A statement.

Unit 1 is in Mode 2, control rod withdrawal is in progress in accordance with 1-GOI-100-1A Unit Startup. Reactor Engineering is performing 1-SR-3.3.1.1.5, SRM and IRM Overlap Verification. The following are current conditions:

- SRM C is INOPERABLE and bypassed
- SRM readings are A - 50,000 cps, B - 40,000 cps, D - 45,000 and rising
- IRMs are on range 1 with the following indications:
- IRM A trending higher at 8
- IRM B trending higher at 11
- IRM C trending higher at 10
- IRM D trending higher at 10
- IRM E downscale light lit, stable at 4
- IRM F trending higher at 9
- IRM G downscale light lit, stable at 5
- IRM H stable at 7

Which ONE of the following completes the statement below?

SRM and IRM overlap verification _____.

- A. is MET
- B. is NOT MET; IRM E and G ONLY do NOT currently meet the overlap acceptance criteria
- C. is NOT MET; IRM E, G, and H ONLY do NOT currently meet the overlap acceptance criteria
- D. is NOT MET; IRM A, E, G and H do NOT currently meet the overlap acceptance criteria

Q#1

Licensee's Justification:

- Question tests Section II.F of the SRO clarification guidance document (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).
- At [name of plant], the SRM/IRM overlap surveillance is a reactor engineering function and the SRO has to initial the step in the surveillance document.
- The question tests information listed in Tech Spec Bases; that is, the definition of acceptable overlap was listed in Tech Spec Bases.

NRC ES-401-9 comments:

- Unsat, not SRO-only; ROs are responsible for monitoring the proper operation of nuclear instrumentation. Refer to BWR K/A Catalog 215004 (SRM), A4.07: Verification of proper functioning/ operability RO IR = 3.4
- Licensee's RO SRM lesson plan objective: "Describe the conditions required to verify SRM/IRM overlap during a reactor startup." **
- Objective not allowed to be deleted from lesson plan (**) due to INPO SOER 90-03, Nuclear Instrumentation Miscalibration.
- Just because SRM/IRM overlap criteria was listed in Tech Spec Bases, didn't mean that it didn't overlap an RO knowledge item.
- Just because an SRO signs the surveillance step doesn't mean that the item isn't an RO knowledge item.

New K/A selected.

261000 SBGT

G2.1.27 Knowledge of system
purpose and/or function

Q#1

After searching the Tech Spec Bases for an SRO knowledge that could be tested, everyone decided to randomly select another system.
SBGT was selected as a replacement.

The following conditions exist:

- Units 1 **AND** 3 are at 100% Reactor Power
- Unit 2 is in Mode 3, with cooldown to mode 4 in progress
- Standby Gas Treatment (SGT) System A was removed from service at 1000 on 3/1/12 for planned maintenance

At 1200 on 3/2/12 a coolant leak in the Drywell on Unit 2 results in the following plant conditions:

- Drywell Pressure is 2.85 psig
- Reactor Water Level is being controlled (+)2 to (+)51 inches with RCIC
- SGT B Blower tripped immediately upon initiation

SGT System B is restored to Operable at 1800 on 3/2/12.

Which ONE of the following completes the statements below?

The latest time / date that Tech Specs require Units 1 **AND** Unit 3 to be in Mode 4 is ___(1)___.

In accordance with Tech Specs, the design basis for the SGT System is to mitigate the consequences of a ___(2)___.

Reference Provided

- A. (1) 2200 on 3/8/12
(2) loss of coolant accident
- B. (1) 2200 on 3/8/12
(2) fuel handling accident
- C. (1) 2200 on 3/9/12
(2) loss of coolant accident
- D. (1) 2200 on 3/9/12
(2) fuel handling accident

Q#1 revised

FINAL Fix: We searched the SBGT TS 3.6.4.3 BASES to identify the specific tech spec required function of the SBGT (mitigate the consequences of a loss of coolant accident). The fuel handling accident was plausible because 1) the SBGT can be aligned to the reactor building, which contains the spent fuel pool, and 2) the TS 3.6.4.1 Secondary Containment (Reactor Building) operability requires SBGT operability. Since one of the postulated events for the secondary containment structure (Reactor Building) is a fuel handling accident, it is plausible that the design basis of the SBGT system is to mitigate the consequences of a fuel handling accident. On the other hand, the second part of choices B and D (fuel handling accident) is incorrect because the 2nd fill-in-the-blank statement specifically asks for the design bases of the SBGT (not Secondary Containment).

Tier 3: G.2.1.36

Knowledge of procedures and limitations involved in core alterations.

Q#2

The following conditions exist:

- Unit 3 is operating in MODE 6 with RCS temperature at 105°F and stable.
- Core reload activities were temporarily suspended with 7 fuel assemblies loaded in the core.
- The Unit Supervisor directed Attachment 5, Restart Minimum Equipment Checklist, of 3-NOP-040.02, Refueling Core Shuffle, to be performed before restarting fuel reload.
- The last items checked on the Restart Minimum Equipment Checklist were:
 - Emergency Air Lock Doors – ACTUAL STATUS: one of two doors is closed
 - NIS Channels – ACTUAL STATUS: N32 is OOS
N31 is available
 - Both Gamma Metric Channels are available
 - R-3-11 and R-3-12 – ACTUAL STATUS: R-3-11 and R-3-12 are available without Normal Containment Coolers running

Which ONE of the following describes the required action(s), if any, prior to the Refueling SRO recommencing fuel reload?

- A. Ensure Emergency Air Lock Doors are both closed.
- B. Ensure NIS Channel N32 is returned to service.
- C. Ensure one Normal Containment Cooler is running.
- D. No action is required.

Q#2

Licensee's Justification:

- SRO-only since it tests Tech Spec requirements, which are performed by SROs, as well as administrative controls related to Fuel Handling Activities. SRO clarification guidance lists examples under Fuel Handling Activities and Procedures: i.e., 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, and Emergency classifications.
- The procedure for Minimum Equipment Required for Refueling listed "containment rad monitors that initiate a containment and control room ventilation isolation , R-3-11, R-3-12."

NRC ES-401-9 comments:

- Unsat, not SRO-only; because the correct answer ("C") can be deduced using RO knowledge as follows:
 - For Choice "A" (Ensure emergency air lock doors are both closed): Tech Spec 3.9.4 (Containment Bldg Penetrations during fuel moves) above-the-line LCO information only requires a minimum of one door in each airlock be closed.
 - For Choice "B" (Ensure NIS Channel N32 is r-t-s): Tech Spec 3.9.2 (Refueling Instrumentation for Mode 6) above-the-line LCO information requires a minimum of one SRM w/ continuous visual/audible in Cnmt & CR indication + one backup SRMs with continuous visual.
 - Choice "D" (no action required) can be eliminated by knowing that Tech Spec 3.9.9, Containment Ventilation Isolation, consists of the containment rad monitors, R-3-11 and R-3-12. These rad monitors' process sample flow is derived via a tap in the containment HVAC ductwork. Since the stem says that the normal containment coolers are not running, the rad monitors essentially have no sample flow and are not operable.

Given the following:

Date	Time	Activity
12/31/2011	0000	A Unit 4 Shutdown to MODE 3 is commenced.
12/31/2011	0630	Unit 4 enters MODE 3.
12/31/2011	1320	Unit 4 enters MODE 4.
12/31/2011	2210	Unit 4 enters MODE 5.
01/01/2012	2200	The first Reactor Vessel Head Stud is detensioned.
01/03/2012	0100	The Reactor Vessel Head is removed.

Which ONE of the following is (1) the EARLIEST time to commence fuel movement in accordance with Technical Specifications, and (2) the basis for the time requirement?

- A. (1) 01/03/12 at 0630
(2) Ensures the heat load assumptions specified in the safety analysis are met to prevent boiling in the Spent Fuel Pool.
- B. (1) 01/03/12 at 0630
(2) Ensures that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are well within the values specified in the safety analysis.
- C. (1) 01/04/12 at 2200
(2) Ensures the heat load assumptions specified in the safety analysis are met to prevent boiling in the Spent Fuel Pool.
- D. (1) 01/04/12 at 2200
(2) Ensures that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are well within the values specified in the safety analysis.

Q#2_{revised}

The revised question is an SRO-only test item because it meets the wording of the K/A statement (Knowledge of procedures and limitations involved in core alterations) being tested, while simultaneously testing one of the seven topics listed in 10CFR55.43(b)(2) (Facility operating limitations in the Tech Specs and their bases).

Tier 3: G.2.4.31

Knowledge of annunciators,
alarms, indications, or response
procedures

Q#3

Unit 3 is at rated power with the following indications and annunciators in alarm:

- RECIRC PUMP MTR 'B' TEMP HIGH (3-9-4B, Window 13)
- RBCCW EFFLUENT RADIATION HIGH (3-9-3A, Window 17)
- RBCCW SURGE TANK LEVEL HIGH (3-9-4C, Window 6)
- RBCCW PUMP SUCT HDR TEMP HIGH (3-9-4C, Window 5)
 - RBCCW Suction Header Temperature indicator (3-TIS-70-3) is reading 101°F and slowly rising
- RECIRC PMP MTR 3A/3B Winding and BRG TEMP recorder, 3-TR-68-71 on panel 3-9-21 has the following readings:
 - Recirc PMP MTR 3B-CLG WTR from SEAL CLG 150°F
 - Recirc PMP MTR 3B-SEAL NO. 2 Cavity 215°F and rising

Which ONE of the following describes the actions that should be taken in accordance with plant procedures?

- A. Trip and isolate Reactor Recirculation Pump 3B and enter 3-AOI-68-1A, Recirc Pump Trip/Core Flow Decrease OPRMs Operable.
- B. Trip and isolate Reactor Recirculation Pump 3B and immediately commence a shutdown in accordance with 3-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations.
- C. Enter 3-AOI-70-1, Loss of Reactor Building Closed Cooling Water, maximize cooling to Reactor Recirculation Pump 3B.
- D. Enter 3-AOI-70-1, Loss of Reactor Building Closed Cooling Water, manually scram the reactor and then trip and isolate Reactor Recirculation Pump 3B.

Q#3

Licensee's Justification:

- Question is SRO-only since it requires assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations. [10CFR55.43 (b) (5)]
- Used on a previous year's RO exam (Q#25) WITH reference material; however, without reference material the question is SRO level knowledge because detailed knowledge of the contents of the procedures is required vs knowledge of the overall mitigative strategy.

NRC ES-401-9 comments:

- Unsat, not SRO-only; the correct answer (Choice A) can be deduced solely based on 1) RO knowledge of the overall mitigative strategy associated with a Recirc Pump seal (or seal cooler) failure AND 2) AOP entry conditions.
 - The overall strategy for a blown seal or broken seal cooler is to isolate the Recirc Pump to prevent the spread of contamination and loss of inventory. Choices C and D can be eliminated because they don't include the word "isolate."
 - Choice B can be eliminated because it doesn't say to enter the AOP; anytime a recirc pump is tripped, the AOP is entered.

Unit 3 is refueling, a fuel bundle is being loaded into a fuel cell for control rod 18-43.

- Refueling personnel report gas bubbles coming from the location that the bundle is being lowered into and the "Hoist Loaded" light extinguished before the bundle was seated in the core
- SRM A count rate increased 50 cps

Which ONE of the following completes the statement below given the attached illustrations?

The Unit Supervisor should direct entry to __ (1) __.

The Emergency Classification (if any) is __ (2) __.

Reference and Illustration Provided

A. (1) 3-AOI-79-1, Fuel Damage During Refueling
(2) Alert

B. (1) 3-AOI-79-2, Inadvertent Criticality During Incore Fuel Movements
(2) Alert

C. (1) 3-AOI-79-1, Fuel Damage During Refueling
(2) NONE, no classification currently exists

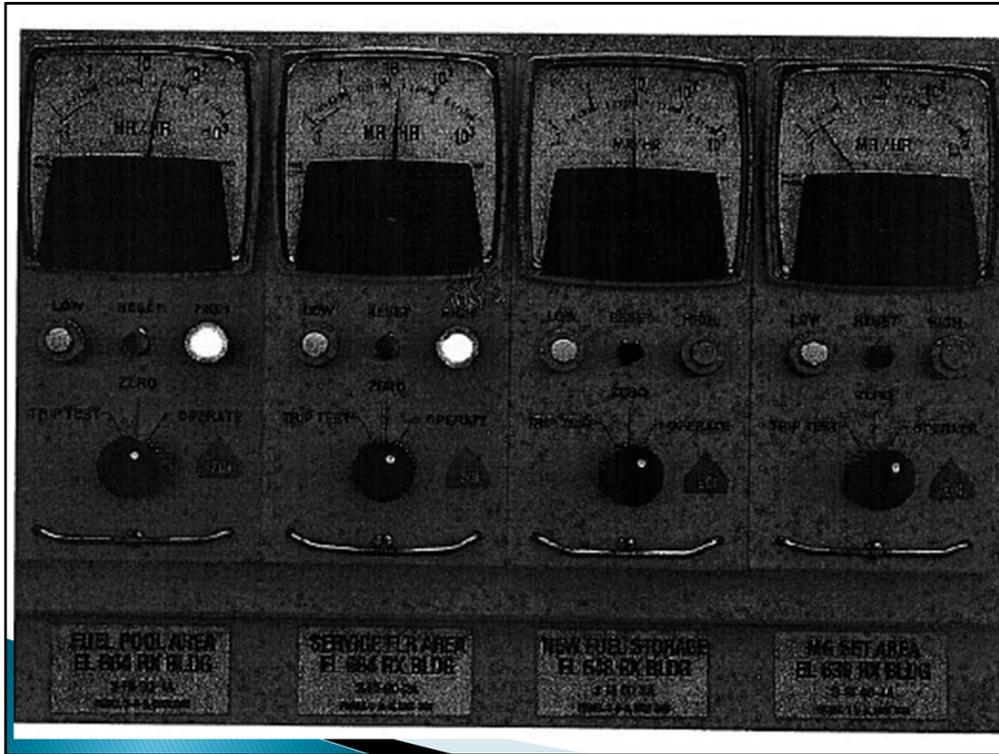
D. (1) 3-AOI-79-2, Inadvertent Criticality During Incore Fuel Movements
(2) NONE, no classification currently exists

Q#3_{revised}

(Answer is A.)

FINAL Fix to Q#99: The 2nd part of the revised question is an SRO-only test item because it meets the wording of the K/A statement (Knowledge of annunciators, alarms, indications, or response procedures) because the applicant must use the picture of area radiation monitor readings and alarms, to identify that the threshold for an alert classification has been met (Fuel Pool Area high rad alarm concurrent with refueling floor personnel confirmation that irradiated fuel damage may have occurred).

This question tests one of the seven topics listed in 10CFR55.43(b)(4) or (b)(5), that is, Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions OR Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.



(Original picture was much better, and in color.)

Tier 3: G.2.2.35

**Ability to determine Tech
Spec Mode of Operation**

Q#4

This is a tough K/A to hit because RO applicants are required to know Tech Spec Modes of Operation. This K/A should have probably been replaced instead of attempting to write a SRO test item.

Which ONE of the following describes (1) the required Technical Specification MODE to place Overpressure Mitigating Systems (OMS) in service and (2) in accordance with 0-ADM-536, Technical Specification Bases Control Program, the bases for the required HHSI flow path alignment when OMS is in service?

- A. (1) MODE 3
(2) High Pressure Safety Injections flow paths to the RCS shall be **isolated** to limit the mass input into the RCS during low temperature conditions
- B. (1) MODE 3
(2) High Pressure Safety Injections flow paths are **unisolated** to provide sufficient core cooling following a LOCA
- C. (1) MODE 4
(2) High Pressure Safety Injections flow paths to the RCS shall be **isolated** to limit the mass input into the RCS during low temperature conditions
- D. (1) MODE 4
(2) High Pressure Safety Injections flow paths are **unisolated** to provide sufficient core cooling following a LOCA

Proposed Answer: C

Q#4

Licensee's Justification:

- Question is SRO-only since it requires understanding of the TS basis for isolating the HPSI flowpath in Mode 4. (Ensure that mass and heat input transients more severe than those assumed in the LTOP analysis cannot occur.)

NRC ES-401-9 comments:

- Unsat, not SRO-only; because:
 - The 1st part of the question (which Mode OMS is required to be operable) is RO knowledge because it is LCO information "above-the-line."
 - The correct answer to the 2nd part of the question (Choice C: HPSI must be isolated) can be deduced by knowing the purpose of OMS (protects the RCS from over-pressurization due to the start of an idle RCP or HHSI pump injection, into a water solid RCS) and the word "isolated."
- Q=K/A comment: The K/A should test the applicants' ability to determine which TS mode the plant is in. Ideally the stem should provide temp/press/Keff/etc, and ask for the mode of operation and some other SRO knowledge item that also hits the K/A. (May be tough.)

A plant cooldown is in progress on Unit 3:

- RCS temperature is 260°F.
- RCS pressure is 350 psig.
- OMS was placed in service at 0900 at 275°F.
- At 1000, the crew discovered 3-OSP-041.4, Overpressure Mitigating System Nitrogen Backup Leak and Functional Test, was NOT completed for both PORVs.

Which ONE of the following describes the current MODE and the ~~LAST~~ TEST time the OMS Surveillance is required to be completed?

REFERENCE PROVIDED

Unit 3 Status 3-OSP-041.4 must be complete by

- | | | |
|----|--------|----------------|
| A. | MODE 3 | 0900, tomorrow |
| B. | MODE 3 | 2100, today |
| C. | MODE 4 | 2100, today |
| D. | MODE 4 | 0900, tomorrow |

Proposed Answer: C

Q#4_{revised}

Note: The reference provided was TS 3.4.9.3 (no surveillance requirements and no bases).

FINAL Fix to Q#95: The 2nd part of the revised question is SRO-only because the it meets the wording of the K/A statement (Ability to determine Tech Spec Mode of Operation): that is, cold leg temperature ≤ 275 °F can technically be considered a “mode” of operation, and a 12 hour delay from when CL temp is ≤ 275 °F is allowed to complete the surveillance. This information was only provided in the TS 3.4.9.3 bases (not provided as a reference). This question tests one of the seven topics listed in 10CFR55.43(b)(2) (Facility operating limitations in the Tech Specs and their bases). (Note that the 1st part of the fill-in-the-blank statement is RO knowledge.)

REACTOR COOLANT SYSTEM

OVERPRESSURE MITIGATING SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 The high pressure safety injection flow paths to the Reactor Coolant System (RCS) shall be isolated, and at least one of the following Overpressure Mitigating Systems shall be OPERABLE:

- a. Two power-operated relief valves (PORVs) with a lift setting of ≤ 468 psig, or
- b. The RCS depressurized with a RCS vent of greater than or equal to 2.20 square inches.

APPLICABILITY MODES 4 (when the temperature of any RCS cold leg is less than or equal to 275°F), 5, and 6 with the reactor vessel head on.

ACTION

Associated requirements for accomplishing specific tests and verifications in SR 4.4.9.3.1.a and 4.4.9.3.1.d allow a 12 hour delay after decreasing RCS cold leg temperature to $\leq 275^\circ\text{F}$. The bases for the 12 hour relief in completing the analog channel operation test (ACOT) and verifying the OPERABILITY of the backup Nitrogen supply are provided in the proposed license amendment correspondence L-2000-146 and in the NRC Safety Evaluation Report provided in the associated Technical Specification Amendments 208/202 effective October 30, 2000.

Common Problems with SRO test items

- ▶ The correct answer can be deduced using one or more “**back-door**” methods:
 - “Systems” knowledge
 - Overall mitigative strategy for an event
 - Immediate trip criteria, listed in foldout pages
 - LCO info “above-the-line”
- ▶ “**Tacking-on**” a piece of SRO testable knowledge that isn’t (itself) linked to the wording of the K/A statement

“Back Doors”

“Tack-Ons”

Tier 1, Group 1:
011 Large Break LOCA

EA2.02: Ability to determine or interpret the following as they apply to LB LOCA: Consequences to RHR of not resetting safety injection.

Q#5

Unit 1 has experienced a LOCA with the following conditions:

- EEP-1.0, Loss of Reactor or Secondary Coolant, is in progress.
- The following annunciators are in alarm:
 - CH2, RWST LVL A TRN LO
 - CH3, RWST LVL B TRN LO
- The Safety Injection signal can NOT be reset.

Which one of the following completes the statements below?

Transition to (1) is required for these conditions.

Once the procedure transition is made, if a Red or Orange path CSF occurs, Functional Restoration Procedures are required to be implemented (2).

A. 1) ESP-1.3, Transfer to Cold Leg Recirculation
2) when directed by ESP-1.3

B. 1) ESP-1.3, Transfer to Cold Leg Recirculation
2) immediately

C. 1) ECP-1.1, Loss of Emergency Coolant Recirculation
2) when directed by ECP-1.1

D. 1) ECP-1.1, Loss of Emergency Coolant Recirculation
2) immediately

Q#5

Note: The premise of the question is that RHR pumps are started by the SI signal, but RHR valves are already in their required position for Safety Injection. If the applicant thought that the RHR valves received an SI signal, and assumed that they couldn't be repositioned for Cold Leg Recirc, then he/she may (incorrectly) choose to go to loss of recirculation capability.

Licensee's Justification:

- Question is SRO-only since the 2nd part (when and how to implement FRPs) is an SRO decision in the control room.
- Detailed procedure knowledge is required to know that FRPs are only implemented after the Transfer to CL Recirc procedure tells the user to implement the FRP.

NRC ES-401-9 comments:

• This question was graded as "Enhancement-slash-Unsat" (E/U) because of a subtle but important flaw. Even though the 1st part of the question tests the K/A (the consequence of SI not being reset), it can be answered using RO systems knowledge (that is, by knowing the RHR standby lineup, the SI lineup, and the required lineup for CL Recirc). Therefore, the 2nd part of the question must also test the K/A statement because this is the only part of the question that tests SRO knowledge. Does the 2nd part of the question test the K/A statement? No. The 2nd part of the question is not testing the K/A; therefore, the question only tests the K/A at the RO level. The question must test the consequence to RHR of not resetting the SI during a LB LOCA at the SRO level. The SRO part of the question does not hit the K/A, a.k.a., "tack-on." Because this is a subtlety, the E/U grade was assessed.

New K/A selected.

011 Large Break LOCA

EA2.14: Ability to determine or interpret the following as they apply to LB LOCA:

Actions to be taken if limits for PTS are violated

Q#5

81. EEP-1.0, Loss of Reactor or Secondary Coolant, is in progress on Unit 2. The following conditions exist:

- RCS Pressure is 15 psig.
- LHSI flow is 3300 gpm on each Train.
- RCS Cold leg temperatures are 225°F.
- Containment radiation levels are 12 R/hr.
- Containment pressure peaked at 28 psig and is now reading 3.5 psig.
- The integrated dose levels inside containment have **NOT** been verified.

Which one of the following completes the statement below?

The required response to a valid RED PATH condition for the RCS Integrity Status Tree is to ____ .

Procedure titles:
 EEP-1.0, Loss of Reactor or Secondary Coolant
 FRP-P.1, Response to Imminent Pressurized Thermal Shock (PTS) Conditions

A. immediately enter FRP-P.1; and when directed, the crew will return to the EEP-1.0 step in progress when EEP-1.0's use was suspended

B. immediately enter FRP-P.1; and when directed, the crew will return to EEP-1.0 beginning at step 1, regardless of the step in progress when EEP-1.0's use was suspended

C. remain in EEP-1.0; Do not transition to FRP-P.1.
 Adverse containment criteria CAN be exited at this time if a channel check is completed.

D. remain in EEP-1.0; Do not transition to FRP-P.1.
 Adverse containment criteria CANNOT be exited at this time if a channel check is completed

Q#5_{revised}

(Answer is A)

The revised question is an SRO-only test item because it meets the wording of the K/A statement (LB LOCA: Ability to determine or interpret actions to be taken if limits for PTS are violated.) , while simultaneously testing one of the seven topics listed in 10CFR55.43(b)(5), that is, assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

Important note: Ensure no overlap with scenario major events.

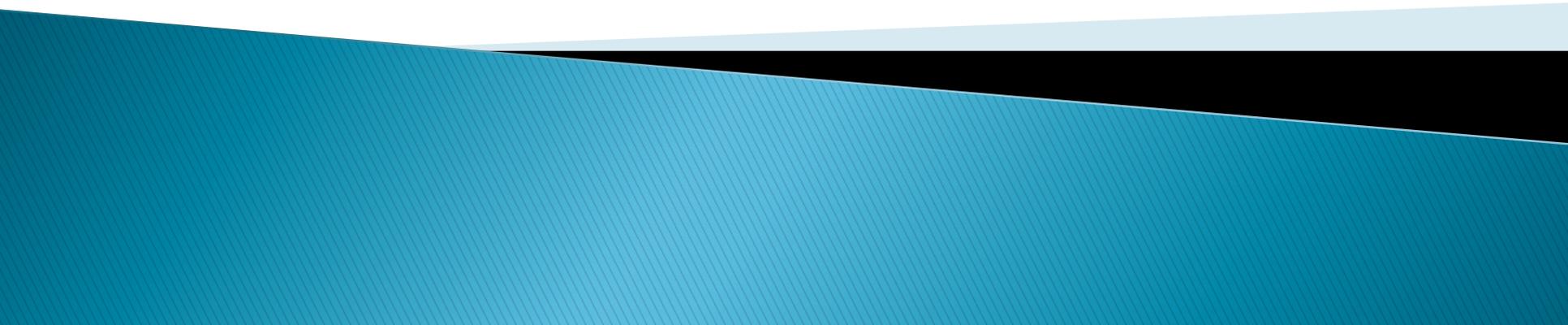
SRO Written Exam Items

“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. “

[NUREG-1021, ES-401, Section D.2.d]

Examples of unacceptable SRO written exam items

Bruno Caballero



Today's Goal

- ▶ Review SRO questions which were rated as unsatisfactory to identify the:
 - licensee's bases for why the question was acceptable;
 - the reason why the NRC graded the question as unacceptable; and
 - the final version of the question.
- 



Tier 2, Group 1

215003 IRM

**G2.1.27 Knowledge of system
purpose and/or function**



Unit 1 is in Mode 2, control rod withdrawal is in progress in accordance with 1-GOI-100-1A Unit Startup. Reactor Engineering is performing 1-SR-3.3.1.1.5, SRM and IRM Overlap Verification. The following are current conditions:

- SRM C is INOPERABLE and bypassed
- SRM readings are A - 50,000 cps, B – 40,000 cps, D – 45,000 and rising
- IRMs are on range 1 with the following indications:
- IRM A trending higher at 8
- IRM B trending higher at 11
- IRM C trending higher at 10
- IRM D trending higher at 10
- IRM E downscale light lit, stable at 4
- IRM F trending higher at 9
- IRM G downscale light lit, stable at 5
- IRM H stable at 7

Which ONE of the following completes the statement below?

SRM and IRM overlap verification _____.

- A. is MET
- B. is NOT MET; IRM E and G ONLY do NOT currently meet the overlap acceptance criteria
- C. is NOT MET; IRM E, G, and H ONLY do NOT currently meet the overlap acceptance criteria
- D. is NOT MET; IRM A, E, G and H do NOT currently meet the overlap acceptance criteria



New K/A selected.

261000 SBGT

G2.1.27 Knowledge of system
purpose and/or function

The following conditions exist:

- Units 1 **AND** 3 are at 100% Reactor Power
- Unit 2 is in Mode 3, with cooldown to mode 4 in progress
- Standby Gas Treatment (SGT) System A was removed from service at 1000 on 3/1/12 for planned maintenance

At 1200 on 3/2/12 a coolant leak in the Drywell on Unit 2 results in the following plant conditions:

- Drywell Pressure is 2.85 psig
- Reactor Water Level is being controlled (+)2 to (+)51 inches with RCIC
- SGT B Blower tripped immediately upon initiation

SGT System B is restored to Operable at 1800 on 3/2/12.

Which ONE of the following completes the statements below?

The latest time / date that Tech Specs require Units 1 **AND** Unit 3 to be in Mode 4 is ___(1)___.

In accordance with Tech Specs, the design basis for the SGT System is to mitigate the consequences of a ___(2)___.

Reference Provided

- A. (1) 2200 on 3/8/12
(2) loss of coolant accident
- B. (1) 2200 on 3/8/12
(2) fuel handling accident
- C.** (1) 2200 on 3/9/12
(2) loss of coolant accident
- D. (1) 2200 on 3/9/12
(2) fuel handling accident

Tier 3: G.2.1.36

Knowledge of procedures and limitations involved in core alterations.

 The following conditions exist:

- Unit 3 is operating in MODE 6 with RCS temperature at 105°F and stable.
- Core reload activities were temporarily suspended with 7 fuel assemblies loaded in the core.
- The Unit Supervisor directed Attachment 5, Restart Minimum Equipment Checklist, of 3-NOP-040.02, Refueling Core Shuffle, to be performed before restarting fuel reload.
- The last items checked on the Restart Minimum Equipment Checklist were:
 - Emergency Air Lock Doors – ACTUAL STATUS: one of two doors is closed
 - NIS Channels – ACTUAL STATUS: N32 is OOS

N31 is available

Both Gamma Metric Channels are available

- R-3-11 and R-3-12 – ACTUAL STATUS: R-3-11 and R-3-12 are available without Normal Containment Coolers running

Which ONE of the following describes the required action(s), if any, prior to the Refueling SRO recommencing fuel reload?

- A. Ensure Emergency Air Lock Doors are both closed.
- B. Ensure NIS Channel N32 is returned to service.
- C. Ensure one Normal Containment Cooler is running.
- D. No action is required.

Q#2

Given the following:

<u>Date</u>	<u>Time</u>	<u>Activity</u>
12/31/2011	0000	A Unit 4 Shutdown to MODE 3 is commenced.
12/31/2011	0630	Unit 4 enters MODE 3.
12/31/2011	1320	Unit 4 enters MODE 4.
12/31/2011	2210	Unit 4 enters MODE 5.
01/01/2012	2200	The first Reactor Vessel Head Stud is detensioned.
01/03/2012	0100	The Reactor Vessel Head is removed.

Which ONE of the following is (1) the EARLIEST time to commence fuel movement in accordance with Technical Specifications, and (2) the basis for the time requirement?

- A. (1) 01/03/12 at 0630
(2) Ensures the heat load assumptions specified in the safety analysis are met to prevent boiling in the Spent Fuel Pool.
- B. (1) 01/03/12 at 0630
(2) Ensures that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are well within the values specified in the safety analysis.
- C. (1) 01/04/12 at 2200
(2) Ensures the heat load assumptions specified in the safety analysis are met to prevent boiling in the Spent Fuel Pool.
- D. (1) 01/04/12 at 2200
(2) Ensures that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are well within the values specified in the safety analysis.

Tier 3: G.2.4.31

**Knowledge of annunciators,
alarms, indications, or response
procedures**



Unit 3 is at rated power with the following indications and annunciators in alarm:

- RECIRC PUMP MTR 'B' TEMP HIGH (3-9-4B, Window 13)
- RBCCW EFFLUENT RADIATION HIGH (3-9-3A, Window 17)
- RBCCW SURGE TANK LEVEL HIGH (3-9-4C, Window 6)
- RBCCW PUMP SUCT HDR TEMP HIGH (3-9-4C, Window 5)
 - RBCCW Suction Header Temperature indicator (3-TIS-70-3) is reading 101°F and slowly rising
- RECIRC PMP MTR 3A/3B Winding and BRG TEMP recorder, 3-TR-68-71 on panel 3-9-21 has the following readings:
 - Recirc PMP MTR 3B-CLG WTR from SEAL CLG 150°F
 - Recirc PMP MTR 3B-SEAL NO. 2 Cavity 215°F and rising

Which ONE of the following describes the actions that should be taken in accordance with plant procedures?

- A. Trip and isolate Reactor Recirculation Pump 3B and enter 3-AOI-68-1A, Recirc Pump Trip/Core Flow Decrease OPRMs Operable.
- B. Trip and isolate Reactor Recirculation Pump 3B and immediately commence a shutdown in accordance with 3-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations.
- C. Enter 3-AOI-70-1, Loss of Reactor Building Closed Cooling Water, maximize cooling to Reactor Recirculation Pump 3B.
- D. Enter 3-AOI-70-1, Loss of Reactor Building Closed Cooling Water, manually scram the reactor and then trip and isolate Reactor Recirculation Pump 3B.

Q#3

Unit 3 is refueling, a fuel bundle is being loaded into a fuel cell for control rod 18-43.

- Refueling personnel report gas bubbles coming from the location that the bundle is being lowered into and the "Hoist Loaded" light extinguished before the bundle was seated in the core
- SRM A count rate increased 50 cps

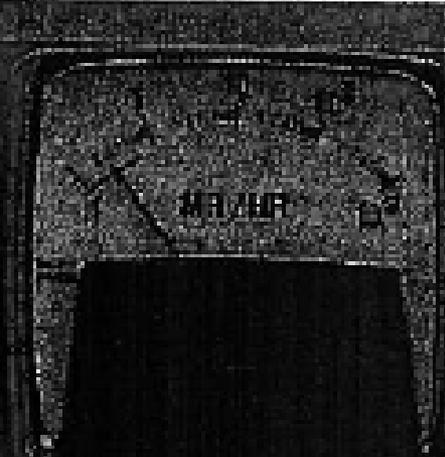
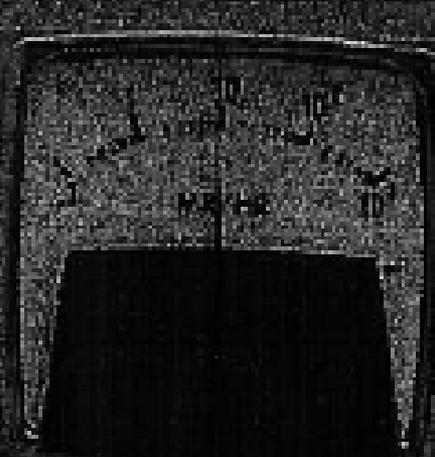
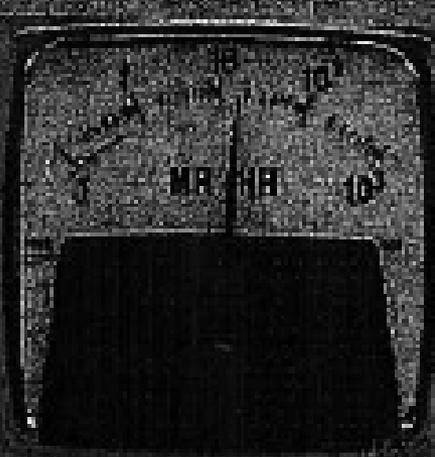
Which ONE of the following completes the statement below given the attached illustrations?

The Unit Supervisor should direct entry to __ (1) __.

The Emergency Classification (if any) is __ (2) __.

Reference and Illustration Provided

- A. (1) 3-AOI-79-1, Fuel Damage During Refueling
(2) Alert
- B. (1) 3-AOI-79-2, Inadvertent Criticality During Incore Fuel Movements
(2) Alert
- C. (1) 3-AOI-79-1, Fuel Damage During Refueling
(2) NONE, no classification currently exists
- D. (1) 3-AOI-79-2, Inadvertent Criticality During Incore Fuel Movements
(2) NONE, no classification currently exists



LOW RESET HIGH

ZERO

TRIP TEST OPERATE

ELI

FUEL POOL WHEN
EL 650 RUNS
2500 RPM

SERVICER RUN WHEN
EL 650 RUNS
2500 RPM

NEW FUEL STORAGE
EL 650 ON 100%
2500 RPM

MG SET WHEN
EL 650 RUNS
2500 RPM



Tier 3: G.2.2.35

**Ability to determine Tech
Spec Mode of Operation**

Which ONE of the following describes (1) the required Technical Specification MODE to place Overpressure Mitigating Systems (OMS) in service and (2) in accordance with 0-ADM-536, Technical Specification Bases Control Program, the bases for the required HHSI flow path alignment when OMS is in service?

- A. (1) MODE 3
(2) High Pressure Safety Injections flow paths to the RCS shall be **isolated** to limit the mass input into the RCS during low temperature conditions
- B. (1) MODE 3
(2) High Pressure Safety Injections flow paths are **unisolated** to provide sufficient core cooling following a LOCA
- C. (1) MODE 4
(2) High Pressure Safety Injections flow paths to the RCS shall be **isolated** to limit the mass input into the RCS during low temperature conditions
- D. (1) MODE 4
(2) High Pressure Safety Injections flow paths are **unisolated** to provide sufficient core cooling following a LOCA

Proposed Answer: C

Q#4



A plant cooldown is in progress on Unit 3:

- RCS temperature is 260°F.
- RCS pressure is 350 psig.
- OMS was placed in service at 0900 at 275°F.
- At 1000, the crew discovered 3-OSP-041.4, Overpressure Mitigating System Nitrogen Backup Leak and Functional Test, was NOT completed for both PORVs.

Which ONE of the following describes the current MODE and the ~~LAST~~ TEST time the OMS Surveillance is required to be completed?

REFERENCE PROVIDED

	<u>Unit 3 Status</u>	<u>3-OSP-041.4 must be complete by</u>
A.	MODE 3	0900, tomorrow
B.	MODE 3	2100, today
C.	MODE 4	2100, today
D.	MODE 4	0900, tomorrow

Proposed Answer: C

Q#4_{revised}

REACTOR COOLANT SYSTEM

OVERPRESSURE MITIGATING SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 The high pressure safety injection flow paths to the Reactor Coolant System (RCS) shall be isolated, and at least one of the following Overpressure Mitigating Systems shall be OPERABLE:

- a. Two power-operated relief valves (PORVs) with a lift setting of ≤ 468 psig, or
- b. The RCS depressurized with a RCS vent of greater than or equal to 2.20 square inches.

APPLICABILITY

MODES 4 (when the temperature of any RCS cold leg is less than or equal to 275°F), 5, and 6 with the reactor vessel head on.

ACTION

Associated requirements for accomplishing specific tests and verifications in SR 4.4.9.3.1.a and 4.4.9.3.1.d allow a 12 hour delay after decreasing RCS cold leg temperature to $\leq 275^\circ\text{F}$. The bases for the 12 hour relief in completing the analog channel operation test (ACOT) and verifying the OPERABILITY of the backup Nitrogen supply are provided in the proposed license amendment correspondence L-2000-146 and in the NRC Safety Evaluation Report provided in the associated Technical Specification Amendments 208/202 effective October 30, 2000.

Common Problems with SRO test items

- ▶ The correct answer can be deduced using one or more “back-door” methods:
 - “Systems” knowledge
 - Overall mitigative strategy for an event
 - Immediate trip criteria, listed in foldout pages
 - LCO info “above-the-line”
- ▶ “Tacking-on” a piece of SRO testable knowledge that isn’t (itself) linked to the wording of the K/A statement

“Back Doors”

“Tack-Ons”

Tier 1, Group 1: 011 Large Break LOCA

EA2.02: Ability to determine or interpret the following as they apply to LB LOCA: Consequences to RHR of not resetting safety injection.

Unit 1 has experienced a LOCA with the following conditions:

- EEP-1.0, Loss of Reactor or Secondary Coolant, is in progress.
- The following annunciators are in alarm:
 - CH2, RWST LVL A TRN LO
 - CH3, RWST LVL B TRN LO
- The Safety Injection signal can NOT be reset.

Which one of the following completes the statements below?

Transition to (1) is required for these conditions.

Once the procedure transition is made, if a Red or Orange path CSF occurs, Functional Restoration Procedures are required to be implemented (2).

- A. 1) ESP-1.3, Transfer to Cold Leg Recirculation
2) when directed by ESP-1.3
- B. 1) ESP-1.3, Transfer to Cold Leg Recirculation
2) immediately
- C. 1) ECP-1.1, Loss of Emergency Coolant Recirculation
2) when directed by ECP-1.1
- D. 1) ECP-1.1, Loss of Emergency Coolant Recirculation
2) immediately

Q#5

New K/A selected.

011 Large Break LOCA

EA2.14: Ability to determine or interpret the following as they apply to LB LOCA:

Actions to be taken if limits for PTS are violated

81. EEP-1.0, Loss of Reactor or Secondary Coolant, is in progress on Unit 2. The following conditions exist:

- RCS Pressure is 15 psig.
- LHSI flow is 3300 gpm on each Train.
- RCS Cold leg temperatures are 225°F.
- Containment radiation levels are 12 R/hr.
- Containment pressure peaked at 28 psig and is now reading 3.5 psig.
- The integrated dose levels inside containment have **NOT** been verified.

Which one of the following completes the statement below?

The required response to a valid RED PATH condition for the RCS Integrity Status Tree is to ____ .

Procedure titles:

EEP-1.0, Loss of Reactor or Secondary Coolant

FRP-P.1, Response to Imminent Pressurized Thermal Shock (PTS) Conditions

- A. immediately enter FRP-P.1; and when directed, the crew will return to the EEP-1.0 step in progress when EEP-1.0's use was suspended
- B. immediately enter FRP-P.1; and when directed, the crew will return to EEP-1.0 beginning at step 1, regardless of the step in progress when EEP-1.0's use was suspended
- C. remain in EEP-1.0; Do not transition to FRP-P.1.
Adverse containment criteria CAN be exited at this time if a channel check is completed.
- D. remain in EEP-1.0; Do not transition to FRP-P.1.
Adverse containment criteria CANNOT be exited at this time if a channel check is completed

Q#5 revised

SRO Written Exam Items

“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. “

[NUREG-1021, ES-401, Section D.2.d]

Examination Operating Experience and Lessons Learned

Phillip Capehart
RII Senior Operations Engineer

2013 Exam Writers' Conference

1

Topics

- Lessons learned since the last Exam Writers' Workshop
- Notable examples of delays encountered over the last years
- Examples of exam security near misses over the last year (or longer if significant enough)
- Give exam statistics (pass rates for Region II and overall in country)

2013 Exam Writers' Conference

2

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).

2013 Exam Writers' Conference

3

Challenges

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

2013 Exam Writers' Conference

4

Challenges

- Getting the final examination(s) (Operating test and Written examinations soon enough to get exam approved prior to the day of administration.)
- Exam Predictability

2013 Exam Writers' Conference

5

Exam Predictability

- Repeat exam questions outside of the last two exams. (10 questions from 3rd exam back)
- Repeat JPMs from 3rd exam back.
- Complete repeat scenarios from one of the last two exams.

2013 Exam Writers' Conference

6

Exam Predictability

- The license applicants should not be able to predict or narrow the possible scope or content of the licensing examination based on the facility licensee's examination practices (other than those authorized by NUREG-1021 or in writing by the NRC). ES-201, Page 17 of 27

2013 Exam Writers' Conference

7

Written Examinations

- Plausible Distractors
(Presentation by Ken & Dave)

2013 Exam Writers' Conference

8

Administrative JPMs

- JPM Validation (Operations expectations/time)
- A-4 JPMs not being linked to the Emergency Plan

2013 Exam Writers' Conference

9

Walkthrough JPMs

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

(Presentation on operating test requirements by Mike & Gerry)

2013 Exam Writers' Conference

10

Scenarios

- Verifiable Actions
- Streamline scenarios for time (goal is 90 min)
- T/S calls should be included in component/instrument malfunctions
- Intend to give 3 scenarios per day.
- Procedures used on simulator must be the same procedures used to validate.
- Validated

2013 Exam Writers' Conference

11

Scenarios

- Critical Tasks (when is task met?) (is it critical for this scenario?) (Presentation by Mike & Gerry.)
- Minimum number of malfunctions/tasks not being met until after the major transient.
- Confusion about Normals/Reactivity manipulations replacing component/instrument failures.

2013 Exam Writers' Conference

12

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

(Presentation by Andreas yesterday)

2013 Exam Writers' Conference

13

Administration

- Examination Failures and Waivers
 - Waivers are not automatic, previous examination performance will be reviewed prior to granting a waiver.
 - Post Examination Comments

2013 Exam Writers' Conference

14

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.

2013 Exam Writers' Conference

15

Positives

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

2013 Exam Writers' Conference

16

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.

2013 Exam Writers' Conference

17

- The following graphs illustrate the written examination, operating test, and overall pass-rates and the average written examination grades for reactor operator (RO) and senior reactor operator (SRO) initial license applicants on a fiscal year (FY) basis for each of the NRC's four Regions and nationally. (Each FY runs from October 1 of one year through September 30 of the following year.) Two additional graphs summarize the average grades and pass-rates on the SRO-only portion of the written examinations.
- The last graph summarizes the national written examination performance history (10 year) for ROs. For each year, it charts the percentage of the total number of examinations that had no failures, one failure, two failures, etc. For example, in FY 2012, about 86% of the RO written examinations (i.e., 35 of 41) had no failures, about 10% of the exams had one failure, about 2% of the exams had two failures, and about 2% of the exams had three failures. The chart illustrates that the vast majority (generally about 80% or more) of the RO written examinations over the past 10 years have had no failures, that the RO performance during that period has been relatively constant, and that a single examination with an unusually high failure rate (which can often be traced to deficiencies in the facility licensee's training program) can have a significant effect on the Regional performance trends summarized in the other graphs.

2013 Exam Writers' Conference

18

Your Thoughts?

2013 Exam Writers' Conference

19

Examination Operating Experience and Lessons Learned

Phillip Capehart
RII Senior Operations Engineer

Topics

- Lessons learned since the last Exam Writers' Workshop
- Notable examples of delays encountered over the last years
- Examples of exam security near misses over the last year (or longer if significant enough)
- Give exam statistics (pass rates for Region II and overall in country)

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 submittals that were less than adequate.

Challenges

- Getting the final examination(s) (Operating test and Written examinations soon enough to get exam approved prior to the day of administration.)
- Exam Predictability

Exam Predictability

- Repeat exam questions outside of the last two exams. (10 questions from 3rd exam back)
- Repeat JPMs from 3rd exam back.
- Complete repeat scenarios from one of the last two exams.

Exam Predictability

- The license applicants should not be able to predict or narrow the possible scope or content of the licensing examination based on the facility licensee's examination practices (other than those authorized by NUREG-1021 or in writing by the NRC). ES-201, Page 17 of 27

Written Examinations

- Plausible Distractors
(Presentation by Ken & Dave)

Administrative JPMS

- JPM Validation (Operations expectations/time)
- A-4 JPMS not being linked to the Emergency Plan

Walkthrough JPMs

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

(Presentation on operating test requirements by
Mike & Gerry)

Scenarios

- Verifiable Actions
- Streamline scenarios for time (goal is 90 min)
- T/S calls should be included in component/instrument malfunctions
- Intend to give 3 scenarios per day.
- Procedures used on simulator must be the same procedures used to validate.
- Validated

Scenarios

- Critical Tasks (when is task met?) (is it critical for this scenario?) (Presentation by Mike & Gerry.)
- Minimum number of malfunctions/tasks not being met until after the major transient.
- Confusion about Normals/Reactivity manipulations replacing component/instrument failures.

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

(Presentation by Andreas yesterday)

Administration

- Examination Failures and Waivers
 - Waivers are not automatic, previous examination performance will be reviewed prior to granting a waiver.
 - Post Examination Comments

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 (**Early**) 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 following graphs illustrate the written examination, operating test, and overall pass-rates and the average written examination grades for reactor operator (RO) and senior reactor operator (SRO) initial license applicants on a fiscal year (FY) basis for each of the NRC's four Regions and nationally. (Each FY runs from October 1 of one year through September 30 of the following year.) Two additional graphs summarize the average grades and pass-rates on the SRO-only portion of the written examinations.
- The last graph summarizes the national written examination performance history (10 year) for ROs. For each year, it charts the percentage of the total number of examinations that had no failures, one failure, two failures, etc. For example, in FY 2012, about 86% of the RO written examinations (i.e., 35 of 41) had no failures, about 10% of the exams had one failure, about 2% of the exams had two failures, and about 2% of the exams had three failures. The chart illustrates that the vast majority (generally about 80% or more) of the RO written examinations over the past 10 years have had no failures, that the RO performance during that period has been relatively constant, and that a single examination with an unusually high failure rate (which can often be traced to deficiencies in the facility licensee's training program) can have a significant effect on the Regional performance trends summarized in the other graphs.



Your Thoughts?

All Applications

ALL APPLICATIONS MUST HAVE ITEMS 1 THROUGH 10 COMPLETED

BLOCK 4 TYPE OF APPLICATION

- **New** – If you are a new applicant at the facility
 - Complete items 11-15.
- **Renewal** – If you are renewing a current license
 - Complete items 12, 13, 14 and 16.
 - Item 13.f is not required if BOTH 12.a and 12.b are checked YES.
- **Upgrade** – If you have an RO license and are applying for an SRO license
 - Complete items 12, 13 and 15 for the SRO upgrade.
- **Multi-Unit** – If you hold a license at the facility and are adding an additional unit to the license
 - Complete item 13 as it applies to the difference training.

BLOCK 4

NUREG 1021 – The NRC must be notified in writing to withdraw an application

- **Reapplication** – if you have previously been denied a license
 - Indicate first, second, or third denial, and
 - Describe in items 13 and 17 training conducted since last denial.
 - If application was previously withdrawn, check 4.e.4 and complete items 11-15 (as if for a new application).

BLOCK 4

4. TYPE OF APPLICATION (Check applicable boxes)

a. NEW c. WAIVER REQUESTED (Justify in item 17)

b. RENEWAL 1 - WRITTEN (Category)

e. UPGRADE 2 - OPERATING (Category)

NUREG 1021 Section ES-204 provides guidance on how waivers are processed

4 - WITHDRAWAL

- **Waiver Requested**
 - Mark appropriate waiver and **justify in detail** in item 17

BLOCK 4

GFE must be passed within 24 months

*

1 - FIRST DENIAL 2 - SECOND DENIAL

3 - THIRD DENIAL 4 - WITHDRAWAL

- Date passed GFE - Enter month and year passed for the facility. **Remember: Does not apply to SRO Upgrade or Renewal Applications** If 24 months, can be retrained and GFE not passed a prior exam (refer to item 17)
- Does not apply to **Any extra information not required by the instructions MUST be evaluated and may slow application processing.**
 - Research and test records
 - Licenses limited to fuel handling
 - Renewal
 - Upgrade

* This requires a waiver request

BLOCK 5 TYPE OF LICENSE

5. TYPE OF LICENSE APPLIED FOR				
<input type="checkbox"/> a. OPERATOR (RO)	a. DOCKET NO.	RO	SRO	LSRO
<input type="checkbox"/> b. SENIOR OPERATOR (SRO)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> c. LIMITED SRO (LSRO)	055-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Indicate type of license applied for
- Docket Number – Assigned after the GFE
- **Ensure this is filled in (past problem)**

BLOCKS 6-10

5. TYPE OF LICENSE APPLIED FOR		6. CURRENT OR PREVIOUS LICENSE(S) HELD	
<input type="checkbox"/> a. OPERATOR (RO)	b. DOCKET NO. NO. (NO) (NO)	b. LICENSE NUMBER	c. EXPIRATION DATE
<input type="checkbox"/> b. SENIOR OPERATOR (SRO)			MONTH YEAR
<input type="checkbox"/> c. LIMITED SRO (LSRO)			666-
7. NAME AND ADDRESS OF APPLICANT'S EMPLOYER (Include ZIP Code)		10. CURRENT POSITION AT FACILITY	
8. NAME OF APPLICANT'S FACILITY		<input type="checkbox"/> a. PLANT SUPERINTENDENT/MANAGER <input type="checkbox"/> b. ASSISTANT PLANT SUPERINTENDENT/MGR. <input type="checkbox"/> c. SHIFT SUPERVISOR <input type="checkbox"/> d. STAFF ENGINEER <input type="checkbox"/> e. SHIFT TECHNICAL ADVISOR/SHIFT ENGINEER <input type="checkbox"/> f. INSTRUCTOR <input type="checkbox"/> g. SENIOR CONTROL ROOM OPERATOR <input type="checkbox"/> h. CONTROL ROOM OPERATOR <input type="checkbox"/> i. AUXILIARY UNIT OPERATOR <input type="checkbox"/> j. OTHER (Specify)	
9. ADDITIONAL FACILITY DOCKETS (Multi-Unit Licenses)			

- 6 – Current or previous license(s) held
- 7 – Name and address
- 8 – Facility name
- 9 – Additional docket(s) (i.e., multi-unit licenses)
- 10 – Current position

BLOCK 11 EDUCATION

11. EDUCATION					
a. HIGH SCHOOL	b. COLLEGE		DEGREE CODES	c. VOCATIONAL/TECHNICAL	
<input type="checkbox"/> GRADUATE <input type="checkbox"/> GED EQUIVALENCY <input type="checkbox"/> NO	MAJOR AREAS OF STUDY	NUMBER OF YEARS	(To be used for HIGHEST DEGREE obtained)	TYPE OF TRAINING	
	ENGINEERING		0- NONE 1- CERTIFICATE 2- ASSOCIATE 3- BACHELOR 4- MASTER 5- DOCTORAL		
	OTHER				

- College
 - Major areas of study
 - Number of years in each area
 - Highest degree obtained
- Vocational/Technical
 - Number of months of each type of training
 - Indicate whether a certificate was awarded

BLOCK 12 POWER REACTOR OPERATOR TRAINING PROGRAM

12. POWER REACTOR OPERATOR TRAINING PROGRAM	
12.a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD?	12.b. IS A "PLANT REFERENCED SIMULATOR" (AS DEFINED IN 10 CFR 55.4) USED IN THE OPERATOR TRAINING PROGRAM?
<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO

- Items 13 and 15 are not required if 'YES' for BOTH 12.a and 12.b, except:
 - Certified instructors seeking an SRO license must complete item 15
 - Any waiver requests from education and experience requirements outlined by NANT must be explained in item 17, complete items 13 and 15

BLOCK 13 TRAINING

13. TRAINING (Since Last Application - See Instructions)			
a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS
	FROM	TO	
1 -- NUCLEAR POWER PLANT FUNDAMENTALS			
2 -- PLANT SYSTEMS			
3 -- PLANT PROCEDURES			
b. SIMULATOR			
c. SRO INSTRUCTION			
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM			
e. TIME ON SHIFT ABOVE 20% POWER			
f. REQUALIFICATION			
g. OTHER (Specify)			

- **Required unless:** both 12.a and 12.b are 'YES' and not requesting a waiver for education and experience requirements
- **Renewals:** Do not double list requl time

BLOCK 14 SIGNIFICANT CONTROL MANIPULATIONS

14. SIGNIFICANT CONTROL MANIPULATIONS			
DESCRIPTION	PLANT	SIMULATOR	
a.			
b.			
c.			
d.			
e.			

- Ensure events do not overlap for an applicant or between applicants
- Simulator requires at least a 10% power change

BLOCK 15 EXPERIENCE DETAILS

15. EXPERIENCE DETAILS					
POSITION TITLE	FROM	TO	MONTHS	FACILITY	DUTIES

- Describe each position held
- Do not double count time
- Use item 17 if more space is needed

BLOCK 16 RENEWALS

16. FOR RENEWALS ONLY		DATE		RESULT	
HOURS OPERATED FACILITY: <input type="checkbox"/> < 100 (LESS THAN) <input type="checkbox"/> 100 - 1000 <input type="checkbox"/> > 1000 (MORE THAN)	b. DATE AND RESULT OF LAST WRITTEN COMPREHENSIVE REQUALIFICATION EXAM AND ANNUAL OPERATING TEST	<input type="checkbox"/> W	<input type="checkbox"/> O	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL

- Only applies to renewals
- 16.a – Indicate number of operating hours since last renewal or issuance of license
- 16.b – Indicate date and results of most recent written requalification exam

BLOCK 17 COMMENTS

17. COMMENTS

- Examples of content:
 - Reapplication
 - Waiver requests
 - If GFE not passed
 - Additional space for education or experience
- Can attach additional information if space is not sufficient

BLOCKS 18 AND 19

19. NRC FORM 396, CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE, IS ATTACHED

19. SIGNATURES

ANY FALSE STATEMENT OR OMISSION IN THIS DOCUMENT INCLUDING A FALSIFICATION MAY BE SUBJECT TO CIVIL AND CRIMINAL SANCTIONS

19a. I certify under penalty of perjury that the information in this document and attachments is true and correct as described with the instructions. I further affirm that I have notified my current employer of (1) all previous employers; (2) any instance where I have been tested by a Health and Human Services (PHS) Certified Drug Testing Laboratory or a Designer's testing facility for alcohol or a controlled substance, and the test results exceeded the cutoff levels established pursuant to 10 CFR Part 20; (3) any instance where I have been arrested for the sale, use, or possession of a controlled substance described in 10 CFR Part 20; and (4) any reasons for removal or revocation of unescorted access at a nuclear facility. I also authorize the NRC to submit the results of examinations to my employers for use in preparing training programs, as necessary.

SIGNATURE - APPLICANT _____ DATE _____

CHECK APPLICABLE BOX FOR TYPE OF APPLICATION (i.e., check (b) if item 4.a, 4.c, 4.d, or 4.e is checked; check (c) if item 4.b, "RENEWAL," applies)

b. I certify that (1) the above named individual has successfully completed the facility licensee requirements to be licensed as an Operator/Senior Operator pursuant to Title 10, Code of Federal Regulations, Part 50; (2) the individual has a need for an Operator/Senior Operator license to perform his/her assigned duties; and (3) the facility will be made available for the examination. I also certify under penalty of perjury that the information in this document and attachments is true and correct as described with the instructions.

c. I certify that the above named individual completed the approved requalification program (with the exceptions noted as item 17) required for section 50.54a (1) of 10 CFR 50, and that he/she has discharged his/her licensed responsibilities competently and safely. I also certify under penalty of perjury that the information in this document and attachments is true and correct.

TRAINING COORDINATOR		SENIOR MANAGEMENT REPRESENTATIVE ON SITE	
PRINTED OR TYPED NAME AND TITLE	PRINTED OR TYPED NAME AND TITLE	SIGNATURE	SIGNATURE

- Check block 19.b or 19.c as appropriate
- Signatures can only be made after all requirements are complete

CHECKLIST FOR A SUCCESSFUL APPLICATION

- ✓ Follow all required directions
- ✓ Double check that all required boxes are checked
- ✓ Explain in item 17, attach additional sheets as necessary
- ✓ Ensure all required signatures are made AFTER all requirements (including training) are complete

IN CONCLUSION

120 day letter

- Be prepared to discuss potential waivers
- Identify unusual or applications that are not straightforward

Site visit for exam prep

- Have material available for reviews of applications (College degree, Reactivity manips, etc.)

Final Applications are due to the NRC's regional office at least 14 days prior to the exam date

QUESTIONS?

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.390

<p>NRC FORM 398 (05-2013) 10 CFR 55.31, 55.35, 55.47, and 55.57</p> <p align="center">U.S. NUCLEAR REGULATORY COMMISSION</p> <p align="center">PERSONAL QUALIFICATION STATEMENT--LICENSEE</p> <p align="center">TO REMAIN VALID, THIS FORM MUST NOT BE ALTERED</p>	<p>APPROVED BY OMB: NO. 3150-0090 EXPIRES: 03/31/2016</p> <p><small>Estimated burden per response to comply with this mandatory collection request: 2.56 hours. NRC requires this information to ensure that applicants/licensees meet all the requirements for taking reactor operator examinations. Send comments regarding burden estimate to the Information Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0090), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small></p>	<p>DATE RECEIVED <i>(To be completed by NRC)</i></p>
---	--	--

<p><input type="checkbox"/> Mr. <input type="checkbox"/> Mrs. <input type="checkbox"/> Ms.</p> <p>1. APPLICANT'S FULL NAME (Last, First, Middle)</p> <p>1a. APPLICANT'S FULL ADDRESS (Include ZIP Code)</p>	<p align="center">4. TYPE OF APPLICATION (Check applicable boxes)</p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> a. NEW</td> <td><input type="checkbox"/> f. WAIVER REQUESTED <i>(Justify In Item 17)</i></td> </tr> <tr> <td><input type="checkbox"/> b. RENEWAL</td> <td><input type="checkbox"/> 1 - WRITTEN (Category _____)</td> </tr> <tr> <td><input type="checkbox"/> c. UPGRADE</td> <td><input type="checkbox"/> 2 - OPERATING (Category _____)</td> </tr> <tr> <td><input type="checkbox"/> d. MULTI-UNIT (Amend to Include Additional Unit)</td> <td><input type="checkbox"/> 3 - ELIGIBILITY</td> </tr> <tr> <td><input type="checkbox"/> e. REAPPLICATION</td> <td><input type="checkbox"/> 4 - MEDICAL</td> </tr> <tr> <td><input type="checkbox"/> 1 - FIRST DENIAL</td> <td><input type="checkbox"/> 5 - OTHER</td> </tr> <tr> <td><input type="checkbox"/> 2 - SECOND DENIAL</td> <td><input type="checkbox"/> g. DATE PASSED GFE</td> </tr> <tr> <td><input type="checkbox"/> 3 - THIRD DENIAL</td> <td>MM YY</td> </tr> <tr> <td><input type="checkbox"/> 4 - WITHDRAWAL</td> <td> </td> </tr> </table>	<input type="checkbox"/> a. NEW	<input type="checkbox"/> f. WAIVER REQUESTED <i>(Justify In Item 17)</i>	<input type="checkbox"/> b. RENEWAL	<input type="checkbox"/> 1 - WRITTEN (Category _____)	<input type="checkbox"/> c. UPGRADE	<input type="checkbox"/> 2 - OPERATING (Category _____)	<input type="checkbox"/> d. MULTI-UNIT (Amend to Include Additional Unit)	<input type="checkbox"/> 3 - ELIGIBILITY	<input type="checkbox"/> e. REAPPLICATION	<input type="checkbox"/> 4 - MEDICAL	<input type="checkbox"/> 1 - FIRST DENIAL	<input type="checkbox"/> 5 - OTHER	<input type="checkbox"/> 2 - SECOND DENIAL	<input type="checkbox"/> g. DATE PASSED GFE	<input type="checkbox"/> 3 - THIRD DENIAL	MM YY	<input type="checkbox"/> 4 - WITHDRAWAL	
<input type="checkbox"/> a. NEW	<input type="checkbox"/> f. WAIVER REQUESTED <i>(Justify In Item 17)</i>																		
<input type="checkbox"/> b. RENEWAL	<input type="checkbox"/> 1 - WRITTEN (Category _____)																		
<input type="checkbox"/> c. UPGRADE	<input type="checkbox"/> 2 - OPERATING (Category _____)																		
<input type="checkbox"/> d. MULTI-UNIT (Amend to Include Additional Unit)	<input type="checkbox"/> 3 - ELIGIBILITY																		
<input type="checkbox"/> e. REAPPLICATION	<input type="checkbox"/> 4 - MEDICAL																		
<input type="checkbox"/> 1 - FIRST DENIAL	<input type="checkbox"/> 5 - OTHER																		
<input type="checkbox"/> 2 - SECOND DENIAL	<input type="checkbox"/> g. DATE PASSED GFE																		
<input type="checkbox"/> 3 - THIRD DENIAL	MM YY																		
<input type="checkbox"/> 4 - WITHDRAWAL																			
<p>2. CITIZENSHIP</p> <p><input type="checkbox"/> a. UNITED STATES</p> <p><input type="checkbox"/> b. OTHER (Specify) _____</p>	<p>3. BIRTH DATE</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td style="width:30px; height:30px;"></td> <td style="width:30px; height:30px;"></td> <td style="width:30px; height:30px;"></td> </tr> </table>	MONTH	DAY	YEAR															
MONTH	DAY	YEAR																	

<p>5. TYPE OF LICENSE APPLIED FOR</p> <p><input type="checkbox"/> a. OPERATOR (RO)</p> <p><input type="checkbox"/> b. SENIOR OPERATOR (SRO)</p> <p><input type="checkbox"/> c. LIMITED SRO (LSRO)</p>	<p align="center">6. CURRENT OR PREVIOUS LICENSE(S) HELD</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th rowspan="2">a. DOCKET NO.</th> <th rowspan="2">RO</th> <th rowspan="2">SRO</th> <th rowspan="2">LSRO</th> <th rowspan="2">b. LICENSE NUMBER</th> <th colspan="3">c. EXPIRATION DATE</th> <th rowspan="2">d. FACILITY DOCKET NUMBER</th> </tr> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td>055-</td> <td style="text-align:center"><input type="checkbox"/></td> <td style="text-align:center"><input type="checkbox"/></td> <td style="text-align:center"><input type="checkbox"/></td> <td></td> <td></td> <td></td> <td></td> <td>050-</td> </tr> </table>	a. DOCKET NO.	RO	SRO	LSRO	b. LICENSE NUMBER	c. EXPIRATION DATE			d. FACILITY DOCKET NUMBER	MONTH	DAY	YEAR	055-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					050-
a. DOCKET NO.	RO						SRO	LSRO	b. LICENSE NUMBER		c. EXPIRATION DATE			d. FACILITY DOCKET NUMBER								
		MONTH	DAY	YEAR																		
055-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					050-														

<p>7. NAME AND ADDRESS OF APPLICANT'S EMPLOYER (Include Zip Code)</p>	<p align="center">10. CURRENT POSITION AT FACILITY</p> <p><input type="checkbox"/> a. PLANT SUPERINTENDENT/MANAGER</p> <p><input type="checkbox"/> b. ASSISTANT PLANT SUPERINTENDENT/MGR.</p> <p><input type="checkbox"/> c. SHIFT SUPERVISOR</p> <p><input type="checkbox"/> d. STAFF ENGINEER</p> <p><input type="checkbox"/> e. SHIFT TECHNICAL ADVISOR/SHIFT ENGINEER</p> <p><input type="checkbox"/> f. INSTRUCTOR</p> <p><input type="checkbox"/> g. SENIOR CONTROL ROOM OPERATOR</p> <p><input type="checkbox"/> h. CONTROL ROOM OPERATOR</p> <p><input type="checkbox"/> i. AUXILIARY UNIT OPERATOR/ TRAINEE/TURBINE BUILDING/EQUIPMENT OPERATOR (NON-LICENSED OPERATOR)</p> <p><input type="checkbox"/> j. OTHER (Specify) _____</p>
<p>8. NAME OF APPLICANT'S FACILITY</p> <p>9. ADDITIONAL FACILITY DOCKETS (Multi-unit Licenses)</p>	<p>FACILITY DOCKET NUMBER</p>

11. EDUCATION									
a. HIGH SCHOOL	b. COLLEGE			DEGREE CODES <small>(To be used for "HIGHEST DEGREE" obtained)</small> 0 - NONE 1 - CERTIFICATE 2 - ASSOCIATE 3 - BACHELOR 4 - MASTER 5 - DOCTORAL	c. VOCATIONAL/TECHNICAL		NUMBER OF MONTHS	CERTIFICATE RECEIVED	
<input type="checkbox"/> GRADUATE <input type="checkbox"/> GED EQUIVALENCY <input type="checkbox"/> NO	MAJOR AREA(S) OF STUDY	NUMBER OF YEARS	HIGHEST DEGREE (Use Codes)		TYPE OF TRAINING			YES	NO
	ENGINEERING					<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER					<input type="checkbox"/>	<input type="checkbox"/>		

<p>12. POWER REACTOR OPERATOR TRAINING PROGRAM</p> <p>a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>				<p>b. IS A "PLANT-REFERENCED SIMULATOR" (AS DEFINED IN 10 CFR 55.4) USED IN THE OPERATOR TRAINING PROGRAM? <input type="checkbox"/> YES <input type="checkbox"/> NO</p>			
--	--	--	--	---	--	--	--

13. TRAINING (Since Last Application - See Instructions)				14. SIGNIFICANT CONTROL MANIPULATIONS			
a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS	DESCRIPTION	PLANT	SIMULATOR	
	FROM	TO					
1 - NUCLEAR POWER PLANT FUNDAMENTALS				a.	<input type="checkbox"/>	<input type="checkbox"/>	
2 - PLANT SYSTEMS				b.	<input type="checkbox"/>	<input type="checkbox"/>	
3 - PLANT PROCEDURES				c.	<input type="checkbox"/>	<input type="checkbox"/>	
b. SIMULATOR				d.	<input type="checkbox"/>	<input type="checkbox"/>	
c. SRO INSTRUCTION				e.	<input type="checkbox"/>	<input type="checkbox"/>	
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM				f.	<input type="checkbox"/>	<input type="checkbox"/>	
e. TIME ON SHIFT ABOVE 20% POWER				g.	<input type="checkbox"/>	<input type="checkbox"/>	
f. REQUALIFICATION				h.	<input type="checkbox"/>	<input type="checkbox"/>	
g. OTHER (Specify)				i.	<input type="checkbox"/>	<input type="checkbox"/>	
				j.	<input type="checkbox"/>	<input type="checkbox"/>	

INSTRUCTIONS FOR COMPLETING NRC FORM 398, PERSONAL QUALIFICATION STATEMENT--LICENSEE

You must complete items 1-10, 18, and 19, plus changes since your last application, and other items as specified below. For additional guidance refer to NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," or NUREG-1478, "Non-Power Reactor Operator Licensing Examiner Standards."

4. TYPE OF APPLICATION

- a. **NEW** - "X" if you are a new applicant at this facility. Complete items 11-15 (10 CFR 55.31).
 - b. **RENEWAL** - "X" if you are renewing a current license. Complete items 12, 13.f, and 16 (10 CFR 55.57); if items 12.a and 12.b are checked "YES," then item 13.f does not have to be completed.
 - c. **UPGRADE** - "X" if you hold an RO license and are applying to upgrade your license to an SRO at the same facility. Complete items 12, 13, and 15 relevant to the SRO upgrade.
 - d. **MULTI-UNIT** - "X" if you hold a license at your facility and are applying to amend your current license to add an additional unit. Complete item 13 as it applies to unit differences.
 - e. **REAPPLICATION** - "X" if you have previously been denied a license. Indicate whether you are reapplying after a first denial, second denial, or third denial. Describe, in detail, in items 13 and 17, the additional training completed since the last denial (10 CFR 55.35). If you previously withdrew an application, check item 4.e.4 and complete items 11-15.
 - f. **WAIVER REQUESTED** - "X" the applicable waiver requested and explain/justify in detail in item 17 (10 CFR 55.47). Refer to NUREG-1021 or -1478, as applicable, for additional guidance.
 - g. **DATE PASSED GENERIC FUNDAMENTALS EXAMINATION (GFE)** - This is not applicable to research and test reactors or licenses limited to fuel handling (item 5.c), renewal or upgrade applications (items 4.b & c). Enter the month and year you passed the GFE for the type of facility (BWR/PWR) identified in item 8. If you have not passed the GFE, explain in item 17.
11. **EDUCATION** - For college, enter the major area(s) of study, the number of years spent in each major area of study and the highest degree obtained (using the degree codes listed on the form). For vocational/technical, enter the number of months for each type of training and whether a certificate was awarded. If additional space is needed, use item 17.
 12. **POWER REACTOR OPERATOR TRAINING PROGRAM** - Check the appropriate box in items 12.a and 12.b.
 - ! Checking "YES" in item 12.a indicates that you have completed a SAT-based training program that is accredited by the National Nuclear Accrediting Board and meets the education and experience requirements outlined by the National Academy for Nuclear Training in its current guidelines for initial training and qualification of licensed operators.
 - ! If "YES" is checked in both items 12.a and 12.b then items 13 and 15 do not have to be completed with the following exceptions: (1) certified instructors seeking an SRO license must complete item 15; (2) any exceptions or waivers from the education and experience requirements outlined by the National Academy for Nuclear Training must be explained in item 17.
 13. **TRAINING** - All requalification training time is to be accounted for in item 13.f (unless items 12.a and 12.b are checked "YES"). Do not "double list" the time spent in requalification training for classroom or simulator time under items 13.a or 13.b.
 14. **SIGNIFICANT CONTROL MANIPULATIONS** - If you are a new applicant (item 4.a), you must provide evidence that you have successfully manipulated the controls of the facility for which a license is sought. Describe (date, time, type, and magnitude) at least five significant control manipulations that affect reactivity or power level and whether the manipulations were performed in the plant or on the simulator (10 CFR 55.31(a)(5), 10 CFR 55.46(c)).
 15. **EXPERIENCE DETAILS** - For each position held, provide position title, time in position (from/to and number of months), facility, and a description of duties performed while in that position. Do not double count time. If you had overlapping duties, the time should reflect the amount of time you were assigned to those particular duties. In no case should the number of months reported exceed the number of months that are in that time period. If more space is needed, use item 17 or attach additional information.
 16. **FOR RENEWALS ONLY** - (a) Check the box that most accurately reflects your approximate number of operating hours since previous renewal or issuance of license if first renewal. (b) Enter the date and results of your most recent comprehensive written requalification examination and annual operating test (10 CFR 55.57).
 17. **COMMENTS** - Use this space to include any extra information or clarification for other items on the application form. If the space provided is not sufficient, you may attach extra information with your application.
 18. **NRC FORM 396, CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE, IS ATTACHED** - NRC Form 396 must accompany this application unless a waiver of the medical examination is being requested in item 4.f.4 (10 CFR 55.23).
 19. **SIGNATURES** - You must sign and date item 19.a. Obtain signatures of your training coordinator and your senior management representative on site and have them check block 19.b or 19.c, as directed (10 CFR 55.31, 10 CFR 55.57).

Detach these instructions and submit the completed original NRC Forms 398 and 396 to the appropriate address. (See reverse side for addresses and for the Privacy Act Statement.)

ADDRESSES

In accordance with 10 CFR 55.5, Communications, this form shall be submitted to the appropriate NRC office by mail addressed to:

REGIONAL ADMINISTRATOR, REGION I
U.S. NUCLEAR REGULATORY COMMISSION
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

REGIONAL ADMINISTRATOR, REGION II
U.S. NUCLEAR REGULATORY COMMISSION
245 PEACHTREE CENTER AVENUE, NE., SUITE 1200
ATLANTA, GA 30303-1257

REGIONAL ADMINISTRATOR, REGION III
U.S. NUCLEAR REGULATORY COMMISSION
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

REGIONAL ADMINISTRATOR, REGION IV
U.S. NUCLEAR REGULATORY COMMISSION
1600 E. LAMAR BOULEVARD
ARLINGTON, TX 76011-4511

U.S. NUCLEAR REGULATORY COMMISSION
RESEARCH AND TEST REACTORS
OVERSIGHT BRANCH
DIVISION OF POLICY AND RULEMAKING
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

PRIVACY ACT STATEMENT NRC FORM 398 PERSONAL QUALIFICATION STATEMENT LICENSEE

Pursuant to 5 U.S.C. 552(e)(3), enacted into law by Section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission (NRC) on NRC Form 398. This information is maintained as part of a system of records designated as NRC-16, described at 77 FR 67214 (November 8, 2012), or the most recent *Federal Register* publication of the NRC's "Republication of Systems of Records Notices" that is located in NRCs Agencywide Documents Access and Management System (ADAMS).

- 1. AUTHORITY:** 42 U.S.C. 2131-2141; 10 CFR Part 55.
- 2. PRINCIPAL PURPOSE(S):** To ensure that applicants/licensees meet all the requirements for taking reactor operator examinations.
- 3. ROUTINE USE(S):** Information may be used to determine if the individual meets the requirements of 10 CFR part 55 to take an examination or to be issued an operators license; to provide researchers with information for reports and statistical evaluations related to selection, training, and examination of facility operators; to provide examination, testing material, and results to facility management. Information may be disclosed to an appropriate Federal, State, local or Foreign agency in the event the information indicates a violation or potential violation of law; in the course of an administrative or judicial proceeding; to an appropriate Federal, State, local and foreign agency to the extent relevant and necessary for an NRC decision about you; in the course of discovery under a protective order issued by a court of competent jurisdiction, and in presenting evidence; to a Congressional office to respond to their inquiry made at your request; to NRC-paid experts, consultants, and others under contract with the NRC, on a need-to-know basis; or to appropriate persons and entities for purposes of response and remedial efforts in the event of a suspected or confirmed breach of data from this system of records.
- 4. WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION:** Disclosing this information is voluntary. However, if the information requested is not provided, NRC will not be able to evaluate whether the applicant meets the requirements of 10 CFR part 55.
- 5. SYSTEM MANAGER(S) AND ADDRESS:** Chief, Operator Licensing and Training Branch, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

LICENSE APPLICATION REQUIREMENTS

Exam Writers' Workshop

Andreas Goldau

July, 2013

NRC FORM 398

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.390

NRC FORM 398 <small>(05-2013) 10 CFR 65.31, 65.35, 65.47, and 65.67</small>		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0090 EXPIRES: 03/31/2016 DATE RECEIVED <small>(To be completed by NRC)</small>																																																																																																												
PERSONAL QUALIFICATION STATEMENT—LICENSEE TO REMAIN VALID, THIS FORM MUST NOT BE ALTERED																																																																																																																
1. APPLICANT'S FULL NAME (Last, First, Middle) Mr. <input type="checkbox"/> Mrs. <input type="checkbox"/> Ms. <input type="checkbox"/>		4. TYPE OF APPLICATION (Check applicable boxes) <input type="checkbox"/> a. NEW <input type="checkbox"/> f. WAIVER REQUESTED (Justify in Item 17) <input type="checkbox"/> b. RENEWAL <input type="checkbox"/> 1 - WRITTEN (Category) <input type="checkbox"/> c. UPGRADE <input type="checkbox"/> 2 - OPERATING (Category) <input type="checkbox"/> d. MULTI-UNIT (Amend to Include Additional Unit) <input type="checkbox"/> e. REAPPLICATION <input type="checkbox"/> 3 - ELIGIBILITY <input type="checkbox"/> 1 - FIRST DENIAL <input type="checkbox"/> 4 - MEDICAL <input type="checkbox"/> 2 - SECOND DENIAL <input type="checkbox"/> 5 - OTHER <input type="checkbox"/> 3 - THIRD DENIAL <input type="checkbox"/> g. DATE PASSED GFE <input type="checkbox"/> 4 - WITHDRAWAL MM YY																																																																																																														
2. CITIZENSHIP <input type="checkbox"/> a. UNITED STATES <input type="checkbox"/> b. OTHER (Specify)		3. BIRTH DATE MONTH DAY YEAR																																																																																																														
5. TYPE OF LICENSE APPLIED FOR <input type="checkbox"/> a. OPERATOR (RO) <input type="checkbox"/> b. SENIOR OPERATOR (SRO) <input type="checkbox"/> c. LIMITED SRO (LSRO)		6. CURRENT OR PREVIOUS LICENSE(S) HELD a. DOCKET NO. RO SRO LSRO 055- <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> b. LICENSE NUMBER c. EXPIRATION DATE d. FACILITY DOCKET NUMBER MONTH DAY YEAR MONTH DAY YEAR 050-																																																																																																														
7. NAME AND ADDRESS OF APPLICANT'S EMPLOYER (include Zip Code)		10. CURRENT POSITION AT FACILITY <input type="checkbox"/> a. PLANT SUPERINTENDENT/MANAGER <input type="checkbox"/> i. AUXILIARY UNIT OPERATOR/ TRAINER/TURBINE BUILDING/EQUIPMENT OPERATOR (NON-LICENSED OPERATOR) <input type="checkbox"/> b. ASSISTANT PLANT SUPERINTENDENT/MGR. <input type="checkbox"/> c. SHIFT SUPERVISOR <input type="checkbox"/> d. STAFF ENGINEER <input type="checkbox"/> j. OTHER (Specify) <input type="checkbox"/> e. SHIFT TECHNICAL ADVISOR/SHIFT ENGINEER <input type="checkbox"/> f. INSTRUCTOR <input type="checkbox"/> g. SENIOR CONTROL ROOM OPERATOR <input type="checkbox"/> h. CONTROL ROOM OPERATOR																																																																																																														
8. NAME OF APPLICANT'S FACILITY FACILITY DOCKET NUMBER		11. EDUCATION <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:25%;">a. HIGH SCHOOL</th> <th style="width:25%;">b. COLLEGE</th> <th style="width:25%;">DEGREE CODES</th> <th style="width:25%;">c. VOCATIONAL/TECHNICAL</th> </tr> <tr> <td rowspan="2"> <input type="checkbox"/> GRADUATE <input type="checkbox"/> GED EQUIVALENCY <input type="checkbox"/> NO </td> <td rowspan="2"> MAJOR AREA(S) OF STUDY ENGINEERING OTHER </td> <td> (To be used for "HIGHEST DEGREE" obtained) 0 - NONE 1 - CERTIFICATE 2 - ASSOCIATE 3 - BACHELOR 4 - MASTER 5 - DOCTORAL </td> <td> NUMBER OF MONTHS CERTIFICATE RECEIVED YES NO </td> </tr> <tr> <td> TYPE OF TRAINING </td> <td> YES NO </td> </tr> </table>				a. HIGH SCHOOL	b. COLLEGE	DEGREE CODES	c. VOCATIONAL/TECHNICAL	<input type="checkbox"/> GRADUATE <input type="checkbox"/> GED EQUIVALENCY <input type="checkbox"/> NO	MAJOR AREA(S) OF STUDY ENGINEERING OTHER	(To be used for "HIGHEST DEGREE" obtained) 0 - NONE 1 - CERTIFICATE 2 - ASSOCIATE 3 - BACHELOR 4 - MASTER 5 - DOCTORAL	NUMBER OF MONTHS CERTIFICATE RECEIVED YES NO	TYPE OF TRAINING	YES NO																																																																																																	
a. HIGH SCHOOL	b. COLLEGE	DEGREE CODES	c. VOCATIONAL/TECHNICAL																																																																																																													
<input type="checkbox"/> GRADUATE <input type="checkbox"/> GED EQUIVALENCY <input type="checkbox"/> NO	MAJOR AREA(S) OF STUDY ENGINEERING OTHER	(To be used for "HIGHEST DEGREE" obtained) 0 - NONE 1 - CERTIFICATE 2 - ASSOCIATE 3 - BACHELOR 4 - MASTER 5 - DOCTORAL	NUMBER OF MONTHS CERTIFICATE RECEIVED YES NO																																																																																																													
		TYPE OF TRAINING	YES NO																																																																																																													
12. POWER REACTOR OPERATOR TRAINING PROGRAM <input type="checkbox"/> a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD? YES NO <input type="checkbox"/> b. IS A "PLANT-REFERENCED SIMULATOR" (AS DEFINED BY 10 CFR 65.4) USED IN THE OPERATOR TRAINING PROGRAM? YES NO																																																																																																																
13. TRAINING (Since Last Application - See Instructions)		14. SIGNIFICANT CONTROL MANIPULATIONS																																																																																																														
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">a. CLASSROOM</th> <th colspan="2">MONTH AND YEAR</th> <th rowspan="2">NUMBER OF WEEKS</th> <th rowspan="2">DESCRIPTION</th> <th rowspan="2">PLANT</th> <th rowspan="2">SIMULATOR</th> </tr> <tr> <th>FROM</th> <th>TO</th> </tr> </thead> <tbody> <tr> <td>1 - NUCLEAR POWER PLANT FUNDAMENTALS</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>2 - PLANT SYSTEMS</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>3 - PLANT PROCEDURES</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>b. SIMULATOR</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>c. SRO INSTRUCTION</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>d. EXTRA PERSON ON SHIFT IN CONTROL ROOM</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>e. TIME ON SHIFT ABOVE 20% POWER</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>f. REQUALIFICATION</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>g. OTHER (Specify)</td> <td></td> <td></td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>		a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS	DESCRIPTION	PLANT	SIMULATOR	FROM	TO	1 - NUCLEAR POWER PLANT FUNDAMENTALS					<input type="checkbox"/>	<input type="checkbox"/>	2 - PLANT SYSTEMS					<input type="checkbox"/>	<input type="checkbox"/>	3 - PLANT PROCEDURES					<input type="checkbox"/>	<input type="checkbox"/>	b. SIMULATOR					<input type="checkbox"/>	<input type="checkbox"/>	c. SRO INSTRUCTION					<input type="checkbox"/>	<input type="checkbox"/>	d. EXTRA PERSON ON SHIFT IN CONTROL ROOM					<input type="checkbox"/>	<input type="checkbox"/>	e. TIME ON SHIFT ABOVE 20% POWER					<input type="checkbox"/>	<input type="checkbox"/>	f. REQUALIFICATION					<input type="checkbox"/>	<input type="checkbox"/>	g. OTHER (Specify)					<input type="checkbox"/>	<input type="checkbox"/>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DESCRIPTION</th> <th rowspan="2">PLANT</th> <th rowspan="2">SIMULATOR</th> </tr> <tr> <th>PLANT</th> <th>SIMULATOR</th> </tr> </thead> <tbody> <tr> <td>a.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>b.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>c.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>d.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>e.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>f.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>g.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>h.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>i.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>j.</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>				DESCRIPTION	PLANT	SIMULATOR	PLANT	SIMULATOR	a.	<input type="checkbox"/>	<input type="checkbox"/>	b.	<input type="checkbox"/>	<input type="checkbox"/>	c.	<input type="checkbox"/>	<input type="checkbox"/>	d.	<input type="checkbox"/>	<input type="checkbox"/>	e.	<input type="checkbox"/>	<input type="checkbox"/>	f.	<input type="checkbox"/>	<input type="checkbox"/>	g.	<input type="checkbox"/>	<input type="checkbox"/>	h.	<input type="checkbox"/>	<input type="checkbox"/>	i.	<input type="checkbox"/>	<input type="checkbox"/>	j.	<input type="checkbox"/>	<input type="checkbox"/>
a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS	DESCRIPTION					PLANT	SIMULATOR																																																																																																						
	FROM	TO																																																																																																														
1 - NUCLEAR POWER PLANT FUNDAMENTALS					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
2 - PLANT SYSTEMS					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
3 - PLANT PROCEDURES					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
b. SIMULATOR					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
c. SRO INSTRUCTION					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
e. TIME ON SHIFT ABOVE 20% POWER					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
f. REQUALIFICATION					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
g. OTHER (Specify)					<input type="checkbox"/>	<input type="checkbox"/>																																																																																																										
DESCRIPTION	PLANT	SIMULATOR																																																																																																														
			PLANT	SIMULATOR																																																																																																												
a.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
b.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
c.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
d.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
e.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
f.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
g.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
h.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
i.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														
j.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																														

APPLICANT'S FULL NAME: _____		DOCKET NO. 055- _____			
(MM/DD/YYYY)		15. EXPERIENCE DETAILS			
POSITION TITLE	FROM DATE	TO DATE	MONTHS	FACILITY	DUTIES
16. FOR RENEWALS ONLY					
a. HOURS OPERATED FACILITY:		<input type="checkbox"/> < 100 (LESS THAN) <input type="checkbox"/> 100 - 1000 <input type="checkbox"/> > 1000 (MORE THAN)		b. DATE AND RESULT OF LAST WRITTEN COMPREHENSIVE REQUALIFICATION EXAM AND ANNUAL OPERATING TEST.	
DATE		DATE		RESULT	
W		O		<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> PASS <input type="checkbox"/> FAIL	
17. COMMENTS					
18. NRC FORM 396, CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE, IS ATTACHED					
19. SIGNATURES ANY FALSE STATEMENT OR OMISSION IN THIS DOCUMENT, INCLUDING ATTACHMENTS, MAY BE SUBJECT TO CIVIL AND CRIMINAL SANCTIONS. 19a. I certify under penalty of perjury that the information in this document and attachments is true and correct in accordance with the instructions. I further certify that I have notified my current employer of: (1) all previous employers; (2) any instance where I have been tested by a Health and Human Services (HHS) Certified Drug Testing Laboratory or a Licensee's testing facility for alcohol or a controlled substance, and the test results exceeded the cutoff levels established pursuant to 10 CFR Part 26; (3) any instance where I have been arrested for the sale, use, or possession of a controlled substance described in 10 CFR Part 26; and (4) any reasons for removal or revocation of unsecured access at a nuclear facility. I also authorize the NRC to submit the results of examinations to my employers for use in preparing retraining programs, as necessary.					
SIGNATURE - APPLICANT			DATE		
CHECK APPLICABLE BOX FOR TYPE OF APPLICATION (i.e., check (b) if item 4.a, 4.c, 4.d, or 4.e is checked; check (c) if item 4.b, "RENEWAL," applies) <input type="checkbox"/> b. I certify that: (1) the above named individual has successfully completed the facility licensee's requirements to be licensed as an Operator/Senior Operator pursuant to Title 10, Code of Federal Regulations, Part 55; (2) the individual has a need for an Operator/Senior Operator license to perform his/her assigned duties; and (3) the facility will be made available for the examination. I also certify under penalty of perjury that the information in this document and attachments is true and correct in accordance with the instructions. <input type="checkbox"/> c. I certify that the above named individual completed the approved requalification program (with the exceptions noted in Item 17) required by section 50.546-1) of 10 CFR 50, and that he/she has discharged his/her licensed responsibilities competently and safely. I also certify under penalty of perjury that the information in this document and attachments is true and correct.					
TRAINING COORDINATOR			SENIOR MANAGEMENT REPRESENTATIVE ON SITE		
PRINTED OR TYPED NAME AND TITLE			PRINTED OR TYPED NAME AND TITLE		
SIGNATURE			SIGNATURE		
DATE			DATE		
FOR NRC USE					
WAIVER (Check or Complete items, as applicable)					
CATEGORY		GRANTED BY		DENIED BY	
WRITTEN		HEADQUARTERS REGION		HEADQUARTERS REGION	
OPERATING		<input type="checkbox"/> MEETS REQUIREMENTS <input type="checkbox"/> DOES NOT MEET REQUIREMENTS (Explain below)			
ELIGIBILITY					
MEDICAL					
OTHER				SIGNATURE DATE	

NRC FORM 398 INSTRUCTIONS PAGE

INSTRUCTIONS FOR COMPLETING NRC FORM 398, PERSONAL QUALIFICATION STATEMENT--LICENSEE

You must complete items 1-10, 18, and 19, plus changes since your last application, and other items as specified below. For additional guidance refer to NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," or NUREG-1478, "Non-Power Reactor Operator Licensing Examiner Standards."

4. TYPE OF APPLICATION

- a. **NEW** - "X" if you are a new applicant at this facility. Complete items 11-15 (10 CFR 55.31).
 - b. **RENEWAL** - "X" if you are renewing a current license. Complete items 12, 13.f, and 16 (10 CFR 55.57); if items 12.a and 12.b are checked "YES," then item 13.f does not have to be completed.
 - c. **UPGRADE** - "X" if you hold an RO license and are applying to upgrade your license to an SRO at the same facility. Complete items 12, 13, and 15 relevant to the SRO upgrade.
 - d. **MULTI-UNIT** - "X" if you hold a license at your facility and are applying to amend your current license to add an additional unit. Complete item 13 as it applies to unit differences.
 - e. **REAPPLICATION** - "X" if you have previously been denied a license. Indicate whether you are reapplying after a first denial, second denial, or third denial. Describe, in detail, in items 13 and 17, the additional training completed since the last denial (10 CFR 55.35). If you previously withdrew an application, check item 4.e.4 and complete items 11-15.
 - f. **WAIVER REQUESTED** - "X" the applicable waiver requested and explain/justify in detail in item 17 (10 CFR 55.47). Refer to NUREG-1021 or -1478, as applicable, for additional guidance.
 - g. **DATE PASSED GENERIC FUNDAMENTALS EXAMINATION (GFE)** - This is not applicable to research and test reactors or licenses limited to fuel handling (item 5.c), renewal or upgrade applications (items 4.b & c). Enter the month and year you passed the GFE for the type of facility (BWR/PWR) identified in item 8. If you have not passed the GFE, explain in item 17.
- 11. EDUCATION** - For college, enter the major area(s) of study, the number of years spent in each major area of study and the highest degree obtained (using the degree codes listed on the form). For vocational/technical, enter the number of months for each type of training and whether a certificate was awarded. If additional space is needed, use item 17.
- 12. POWER REACTOR OPERATOR TRAINING PROGRAM** - Check the appropriate box in items 12.a and 12.b.
- ! Checking "YES" in item 12.a indicates that you have completed a SAT-based training program that is accredited by the National Nuclear Accrediting Board and meets the education and experience requirements outlined by the National Academy for Nuclear Training in its current guidelines for initial training and qualification of licensed operators.
 - ! If "YES" is checked in both items 12.a and 12.b then items 13 and 15 do not have to be completed with the following exceptions: (1) certified instructors seeking an SRO license must complete item 15; (2) any exceptions or waivers from the education and experience requirements outlined by the National Academy for Nuclear Training must be explained in item 17.
- 13. TRAINING** - All requalification training time is to be accounted for in item 13.f (unless items 12.a and 12.b are checked "YES"). Do not "double list" the time spent in requalification training for classroom or simulator time under items 13.a or 13.b.
- 14. SIGNIFICANT CONTROL MANIPULATIONS** - If you are a new applicant (item 4.a), you must provide evidence that you have successfully manipulated the controls of the facility for which a license is sought. Describe (date, time, type, and magnitude) at least five significant control manipulations that affect reactivity or power level and whether the manipulations were performed in the plant or on the simulator (10 CFR 55.31(a)(5), 10 CFR 55.48(c)).
- 15. EXPERIENCE DETAILS** - For each position held, provide position title, time in position (from/to and number of months), facility, and a description of duties performed while in that position. Do not double count time. If you had overlapping duties, the time should reflect the amount of time you were assigned to those particular duties. In no case should the number of months reported exceed the number of months that are in that time period. If more space is needed, use item 17 or attach additional information.
- 16. FOR RENEWALS ONLY** - (a) Check the box that most accurately reflects your approximate number of operating hours since previous renewal or issuance of license if first renewal. (b) Enter the date and results of your most recent comprehensive written requalification examination and annual operating test (10 CFR 55.57).
- 17. COMMENTS** - Use this space to include any extra information or clarification for other items on the application form. If the space provided is not sufficient, you may attach extra information with your application.
- 18. NRC FORM 396, CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE, IS ATTACHED** - NRC Form 396 must accompany this application unless a waiver of the medical examination is being requested in item 4.f.4 (10 CFR 55.23).
- 19. SIGNATURES** - You must sign and date item 19.a. Obtain signatures of your training coordinator and your senior management representative on site and have them check block 19.b or 19.c, as directed (10 CFR 55.31, 10 CFR 55.57).

Detach these instructions and submit the completed original NRC Forms 398 and 396 to the appropriate address. (See reverse side for addresses and for the Privacy Act Statement.)

All Applications

<input type="checkbox"/> Mr. <input type="checkbox"/> Mrs. <input type="checkbox"/> Ms.		4. TYPE OF APPLICATION (Check applicable boxes)			
1. APPLICANT'S FULL NAME (Last, First, Middle)		<input type="checkbox"/> a. NEW		<input type="checkbox"/> f. WAIVER REQUESTED (Justify In Item 17)	
1a. APPLICANT'S FULL ADDRESS (Include ZIP Code)		<input type="checkbox"/> b. RENEWAL		<input type="checkbox"/> 1 - WRITTEN (Category _____)	
		<input type="checkbox"/> c. UPGRADE		<input type="checkbox"/> 2 - OPERATING (Category _____)	
		<input type="checkbox"/> d. MULTI-UNIT (Amend to Include Additional Unit)		<input type="checkbox"/> 3 - ELIGIBILITY	
		<input type="checkbox"/> e. REAPPLICATION		<input type="checkbox"/> 4 - MEDICAL	
2. CITIZENSHIP		3. BIRTH DATE		<input type="checkbox"/> 1 - FIRST DENIAL	
<input type="checkbox"/> a. UNITED STATES		MONTH DAY YEAR		<input type="checkbox"/> 2 - SECOND DENIAL	
<input type="checkbox"/> b. OTHER (Specify) _____				<input type="checkbox"/> 3 - THIRD DENIAL	
				<input type="checkbox"/> 4 - WITHDRAWAL	
				<input type="checkbox"/> g. DATE PASSED GFE	
				MM YY	
5. TYPE OF LICENSE APPLIED FOR		6. CURRENT OR PREVIOUS LICENSE(S) HELD			
<input type="checkbox"/> a. OPERATOR (RO)		a. DOCKET NO.		b. LICENSE NUMBER	
<input type="checkbox"/> b. SENIOR OPERATOR (SRO)		RO SRO LSRO		c. EXPIRATION DATE	
<input type="checkbox"/> c. LIMITED SRO (LSRO)		055-		MONTH DAY YEAR	
				d. FACILITY DOCKET NUMBER	
				050-	
7. NAME AND ADDRESS OF APPLICANT'S EMPLOYER (Include Zip Code)		10. CURRENT POSITION AT FACILITY			
		<input type="checkbox"/> a. PLANT SUPERINTENDENT/MANAGER		<input type="checkbox"/> i. AUXILIARY UNIT OPERATOR/ TRAINEE/TURBINE BUILDING/EQUIPMENT OPERATOR (NON- LICENSED OPERATOR)	
		<input type="checkbox"/> b. ASSISTANT PLANT SUPERINTENDENT/MGR.		<input type="checkbox"/> j. OTHER (Specify) _____	
		<input type="checkbox"/> c. SHIFT SUPERVISOR			
		<input type="checkbox"/> d. STAFF ENGINEER			
		<input type="checkbox"/> e. SHIFT TECHNICAL ADVISOR/SHIFT ENGINEER			
		<input type="checkbox"/> f. INSTRUCTOR			
		<input type="checkbox"/> g. SENIOR CONTROL ROOM OPERATOR			
		<input type="checkbox"/> h. CONTROL ROOM OPERATOR			
8. NAME OF APPLICANT'S FACILITY		9. ADDITIONAL FACILITY DOCKETS (Multi-unit Licenses)			
FACILITY DOCKET NUMBER					

ALL APPLICATIONS MUST HAVE ITEMS 1 THROUGH 10 COMPLETED

BLOCK 4 TYPE OF APPLICATION

4. TYPE OF APPLICATION (Check applicable boxes)					
<input checked="" type="checkbox"/> a. NEW	<input type="checkbox"/> f. WAIVER REQUESTED (Justify in Item 17)				
<input checked="" type="checkbox"/> b. RENEWAL	<input type="checkbox"/> 1 - WRITTEN (Category _____)				
<input checked="" type="checkbox"/> c. UPGRADE	<input type="checkbox"/> 2 - OPERATING (Category _____)				
<input checked="" type="checkbox"/> d. MULTI-UNIT (Amend to Include Additional Unit)	<input type="checkbox"/> 3 - ELIGIBILITY				
<input type="checkbox"/> e. REAPPLICATION	<input type="checkbox"/> 4 - MEDICAL				
<input type="checkbox"/> 1 - FIRST DENIAL	<input type="checkbox"/> 5 - OTHER				
<input type="checkbox"/> 2 - SECOND DENIAL	<input type="checkbox"/> g. DATE PASSED GFE				
<input type="checkbox"/> 3 - THIRD DENIAL	<table border="1"> <tr> <td>MM</td> <td>YY</td> </tr> <tr> <td></td> <td></td> </tr> </table>	MM	YY		
MM	YY				
<input type="checkbox"/> 4 - WITHDRAWAL					

- **New** – If you are a new applicant at the facility
 - Complete items 11-15.
- **Renewal** – If you are renewing a current license
 - Complete items 12, 13.f and 16.
 - Item 13.f is not required if **BOTH** 12.a and 12.b are checked YES.
- **Upgrade** – If you have an RO license and are applying for an SRO license
 - Complete items 12, 13 and 15 for the SRO upgrade.
- **Multi-Unit** – If you hold a license at the facility and are adding an additional unit to the license
 - Complete item 13 as it applies to the difference training.

BLOCK 4

4. TYPE OF APPLICATION (Check applicable boxes)

a. NEW f. WAIVER REQUESTED (Justify in Item 17)

e. REAPPLICATION

1 - FIRST DENIAL

2 - SECOND DENIAL

3 - THIRD DENIAL

4 - WITHDRAWAL

4 - MEDICAL

5 - OTHER

g. DATE PASSED GFE

MM	YY

NUREG 1021 – The NRC must be notified in writing to withdraw an application

- **Reapplication** – if you have previously been denied a license
 - Indicate first, second, or third denial, and
 - Describe in items 13 and 17 training conducted since last denial.
 - If application was previously withdrawn, check 4.e.4 and complete items 11-15 (as if for a new application).

BLOCK 4

4. TYPE OF APPLICATION (Check applicable boxes)

<input type="checkbox"/>	a. NEW	<input checked="" type="checkbox"/>	f. WAIVER REQUESTED (Justify in Item 17)
<input type="checkbox"/>	b. RENEWAL	<input checked="" type="checkbox"/>	1 - WRITTEN (Category _____)
<input type="checkbox"/>	c. UPGRADE	<input type="checkbox"/>	2 - OPERATING (Category _____)
<input type="checkbox"/>	4 - WITHDRAWAL	<input type="checkbox"/>	<input type="checkbox"/>

**NUREG 1021 Section ES-204
provides guidance on how waivers are
processed**

- *Waiver Requested*
 - *Mark appropriate waiver and justify in detail in item 17*

BLOCK 4

17)

GFE must be passed within 24 months

*

1 - FIRST DENIAL

2 - SECOND DENIAL

3 - THIRD DENIAL

4 - WITHDRAWAL

g. DATE PASSED GFE

MM	YY

- Date passed GFE - Enter month and year passed for the facility type identified in item 8 **Remember: Does not apply to SRO Upgrade or Renewal Applications if GFE not passed, explain in item 17** if >24 months, can be retrained and take a prior exam (refer to 25-26)
- Does not apply to:
 - Research and test reactors
 - Licenses limited to fuel handling
 - Renewal
 - Upgrade**Any extra information not required by the instructions MUST be evaluated and may slow application processing.**

* This requires a waiver request

BLOCK 5 TYPE OF LICENSE

5. TYPE OF LICENSE APPLIED FOR						
<input type="checkbox"/>	a. OPERATOR (RO)	a. DOCKET NO.		RO	SRO	LSRO
<input type="checkbox"/>	b. SENIOR OPERATOR (SRO)	055-		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	c. LIMITED SRO (LSRO)					

- *Indicate type of license applied for*
- *Docket Number – Assigned after the GFE*
- *Ensure this is filled in (past problem)*

BLOCKS 6-10

5. TYPE OF LICENSE APPLIED FOR				6. CURRENT OR PREVIOUS LICENSE(S) HELD							
<input type="checkbox"/> a. OPERATOR (RO)	a. DOCKET NO.	RO	SRO	LSRO	b. LICENSE NUMBER	c. EXPIRATION DATE			d. FACILITY DOCKET NUMBER		
<input type="checkbox"/> b. SENIOR OPERATOR (SRO)	055-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		MONTH	DAY	YEAR	050-		
<input type="checkbox"/> c. LIMITED SRO (LSRO)											
7. NAME AND ADDRESS OF APPLICANT'S EMPLOYER (Include ZIP Code)					10. CURRENT POSITION AT FACILITY						
					<input type="checkbox"/> a. PLANT SUPERINTENDENT/MANAGER	<input type="checkbox"/> i. AUXILIARY UNIT OPERATOR/ TRAINEE/TURBINE BUILDING/EQUIPMENT OPERATOR (NON- LICENSED OPERATOR)					
					<input type="checkbox"/> b. ASSISTANT PLANT SUPERINTENDENT/MGR.	<input type="checkbox"/> j. OTHER (Specify)					
8. NAME OF APPLICANT'S FACILITY					FACILITY DOCKET NUMBER						
9. ADDITIONAL FACILITY DOCKETS (Multi-unit Licenses)					<input type="checkbox"/> c. SHIFT SUPERVISOR						
					<input type="checkbox"/> d. STAFF ENGINEER						
					<input type="checkbox"/> e. SHIFT TECHNICAL ADVISOR/SHIFT ENGINEER						
					<input type="checkbox"/> f. INSTRUCTOR						
					<input type="checkbox"/> g. SENIOR CONTROL ROOM OPERATOR						
					<input type="checkbox"/> h. CONTROL ROOM OPERATOR						

- 6 – Current or previous license(s) held
- 7 – Name and address
- 8 – Facility name
- 9 – Additional dockets (i.e., multi-unit licenses)
- 10 – Current position

BLOCK 11 EDUCATION

11. EDUCATION											
a. HIGH SCHOOL		b. COLLEGE			DEGREE CODES (To be used for "HIGHEST DEGREE" obtained) 0 - NONE 1 - CERTIFICATE 2 - ASSOCIATE 3 - BACHELOR 4 - MASTER 5 - DOCTORAL	c. VOCATIONAL/TECHNICAL		NUMBER OF MONTHS	CERTIFICATE RECEIVED		
<input type="checkbox"/>	GRADUATE	MAJOR AREA(S) OF STUDY	NUMBER OF YEARS	HIGHEST DEGREE (Use Codes)		TYPE OF TRAINING			YES	NO	
<input type="checkbox"/>	GED EQUIVALENCY					ENGINEERING					
<input type="checkbox"/>	NO					OTHER					

- *College*

- *Major areas of study*
- *Number of years in each area*
- *Highest degree obtained*

- *Vocational/Technical*

- *Number of months of each type of training*
- *Indicate whether a certificate was awarded*

BLOCK 12

POWER REACTOR OPERATOR TRAINING PROGRAM

12. POWER REACTOR OPERATOR TRAINING PROGRAM

a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD?

YES

NO

b. IS A "PLANT-REFERENCED SIMULATOR" (AS DEFINED IN 10 CFR 55.4) USED IN THE OPERATOR TRAINING PROGRAM?

YES

NO

- *Items 13 and 15 are not required if 'YES' for BOTH 12.a and 12.b, except:*
 - *Certified instructors seeking an SRO license must complete item 15*
 - *Any waiver requests from education and experience requirements outlined by NANT must be explained in item 17, complete items 13 and 15*

BLOCK 13 TRAINING

13. TRAINING <i>(Since Last Application - See Instructions)</i>			
a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS
	FROM	TO	
1 -- NUCLEAR POWER PLANT FUNDAMENTALS			
2 -- PLANT SYSTEMS			
3 -- PLANT PROCEDURES			
b. SIMULATOR			
c. SRO INSTRUCTION			
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM			
e. TIME ON SHIFT ABOVE 20% POWER			
f. REQUALIFICATION			
g. OTHER <i>(Specify)</i>			

- *Required unless: both 12.a and 12.b are 'YES' and not requesting a waiver for education and experience requirements*
- *Renewals: Do not double list requal time*

BLOCK 14 SIGNIFICANT CONTROL MANIPULATIONS

14. SIGNIFICANT CONTROL MANIPULATIONS		
DESCRIPTION	PLANT	SIMULATOR
a.		
b.		
c.		
d.		
e.		

- *Ensure events do not overlap for an applicant or between applicants*
- *Simulator requires at least a 10% power change*

BLOCK 15 EXPERIENCE DETAILS

15. EXPERIENCE DETAILS

POSITION TITLE	FROM	TO	MONTHS	FACILITY	DUTIES

- *Describe each position held*
- *Do not double count time*
- *Use item 17 if more space is needed*

BLOCK 16 RENEWALS

16. FOR RENEWALS ONLY

HOURS OPERATED FACILITY: <input type="checkbox"/> < 100 (LESS THAN) <input type="checkbox"/> 100 - 1000 <input type="checkbox"/> > 1000 (MORE THAN)	b. DATE AND RESULT OF LAST WRITTEN COMPREHENSIVE REQUALIFICATION EXAM AND ANNUAL OPERATING TEST.		DATE	RESULT	
		W		<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL
		O		<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL

- *Only applies to renewals*
- *16.a – Indicate number of operating hours since last renewal or issuance of license*
- *16.b – Indicate date and results of most recent written requalification exam*

BLOCK 17 COMMENTS

17. COMMENTS

- *Examples of content:*
 - *Reapplication*
 - *Waiver requests*
 - *If GFE not passed*
 - *Additional space for education or experience*
- *Can attach additional information if space is not sufficient*

BLOCKS 18 AND 19

18. NRC FORM 396, CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE, IS ATTACHED

19. SIGNATURES

ANY FALSE STATEMENT OR OMISSION IN THIS DOCUMENT, INCLUDING ATTACHMENTS, MAY BE SUBJECT TO CIVIL AND CRIMINAL SANCTIONS.

19a. I certify under penalty of perjury that the information in this document and attachments is true and correct in accordance with the instructions. I further certify that I have notified my current employer of: (1) all previous employers; (2) any instance where I have been tested by a Health and Human Services (HHS) Certified Drug Testing Laboratory or a Licensee's testing facility for alcohol or a controlled substance, and the test results exceeded the cutoff levels established pursuant to 10 CFR Part 26; (3) any instance where I have been arrested for the sale, use, or possession of a controlled substance described in 10 CFR Part 26; and (4) any reasons for removal or revocation of unescorted access at a nuclear facility. I also authorize the NRC to submit the results of examinations to my employers for use in preparing retraining programs, as necessary.

SIGNATURE - APPLICANT

DATE

CHECK APPLICABLE BOX FOR TYPE OF APPLICATION (i.e., check (b) if item 4.a, 4.c, 4.d, or 4.e is checked; check (c) if item 4.b, "RENEWAL," applies)

- b. I certify that: (1) the above named individual has successfully completed the facility licensee's requirements to be licensed as an Operator/Senior Operator pursuant to Title 10, Code of Federal Regulations, Part 55; (2) the individual has a need for an Operator/Senior Operator license to perform his/her assigned duties; and (3) the facility will be made available for the examination. I also certify under penalty of perjury that the information in this document and attachments is true and correct in accordance with the instructions.
- c. I certify that the above named individual completed the approved requalification program (with the exceptions noted in Item 17) required by section 50.54(-1) of 10 CFR 50, and that he/she has discharged his/her licensed responsibilities competently and safely. I also certify under penalty of perjury that the information in this document and attachments is true and correct.

TRAINING COORDINATOR

SENIOR MANAGEMENT REPRESENTATIVE ON SITE

PRINTED OR TYPED NAME AND TITLE

PRINTED OR TYPED NAME AND TITLE

SIGNATURE

DATE

SIGNATURE

DATE

- Check block 19.b or 19.c as appropriate
- Signatures can only be made after all requirements are complete

CHECKLIST FOR A SUCCESSFUL APPLICATION

- ✓ *Follow all required directions*
- ✓ *Double check that all required boxes are checked*
- ✓ *Explain in item 17, attach additional sheets as necessary*
- ✓ *Ensure all required signatures are made AFTER all requirements (including training) are complete*

IN CONCLUSION

120 day letter

- Be prepared to discuss potential waivers*
- Identify unusual or applications that are not straightforward*

Site visit for exam prep

- Have material available for reviews of applications (College degree, Reactivity manips, etc.)*

Final Applications are due to the NRC's regional office at least 14 days prior to the exam date

QUESTIONS?

11. EDUCATION									
a. HIGH SCHOOL	b. COLLEGE			DEGREE CODES (To be used for "HIGHEST DEGREE" obtained) 0 - NONE 1 - CERTIFICATE 2 - ASSOCIATE 3 - BACHELOR 4 - MASTER 5 - DOCTORAL	c. VOCATIONAL/TECHNICAL	NUMBER OF MONTHS	CERTIFICATE RECEIVED		
<input type="checkbox"/> GRADUATE <input type="checkbox"/> GED EQUIVALENCY <input type="checkbox"/> NO	MAJOR AREA(S) OF STUDY	NUMBER OF YEARS	HIGHEST DEGREE (Use Codes)		TYPE OF TRAINING		YES	NO	
	ENGINEERING						<input type="checkbox"/>	<input type="checkbox"/>	
	OTHER					<input type="checkbox"/>	<input type="checkbox"/>		

12. POWER REACTOR OPERATOR TRAINING PROGRAM			
a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD?	<input type="checkbox"/> YES	<input type="checkbox"/> NO	b. IS A "PLANT-REFERENCED SIMULATOR" (AS DEFINED IN 10 CFR 55.4) USED IN THE OPERATOR TRAINING PROGRAM?
			<input type="checkbox"/> YES <input type="checkbox"/> NO

13. TRAINING (Since Last Application - See Instructions)	14. SIGNIFICANT CONTROL MANIPULATIONS					
a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS	DESCRIPTION	PLANT	SIMULATOR
	FROM	TO				
1 - NUCLEAR POWER PLANT FUNDAMENTALS				a.	<input type="checkbox"/>	<input type="checkbox"/>
2 - PLANT SYSTEMS				b.	<input type="checkbox"/>	<input type="checkbox"/>
3 - PLANT PROCEDURES				c.	<input type="checkbox"/>	<input type="checkbox"/>
b. SIMULATOR				d.	<input type="checkbox"/>	<input type="checkbox"/>
c. SRO INSTRUCTION				e.	<input type="checkbox"/>	<input type="checkbox"/>
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM				f.	<input type="checkbox"/>	<input type="checkbox"/>
e. TIME ON SHIFT ABOVE 20% POWER				g.	<input type="checkbox"/>	<input type="checkbox"/>
f. REQUALIFICATION				h.	<input type="checkbox"/>	<input type="checkbox"/>
g. OTHER (Specify)				i.	<input type="checkbox"/>	<input type="checkbox"/>
				j.	<input type="checkbox"/>	<input type="checkbox"/>

APPLICANT'S FULL NAME: DOCKET NO. 055-

(MM/DD/YYYY)				15. EXPERIENCE DETAILS		
POSITION TITLE	FROM DATE	TO DATE	MONTHS	FACILITY	DUTIES	

12. POWER REACTOR OPERATOR TRAINING PROGRAM

a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD?

YES NO

b. IS A "PLANT-REFERENCED SIMULATOR" (AS DEFINED IN 10 CFR 55.4) USED IN THE OPERATOR TRAINING PROGRAM?

YES NO

13. TRAINING (Since Last Application - See Instructions)

a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS
	FROM	TO	
1 - NUCLEAR POWER PLANT FUNDAMENTALS			
2 - PLANT SYSTEMS			
3 - PLANT PROCEDURES			
b. SIMULATOR			
c. SRO INSTRUCTION			
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM			
e. TIME ON SHIFT ABOVE 20% POWER			
f. REQUALIFICATION			
g. OTHER (Specify)			

Item 13.f is not required if BOTH 12.a and 12.b are checked YES

NRC FORM 398 (05-2013)

16. FOR RENEWALS ONLY

a. HOURS OPERATED FACILITY:	<input type="checkbox"/> < 100 (LESS THAN)	b. DATE AND RESULT OF LAST WRITTEN COMPREHENSIVE REQUALIFICATION EXAM AND ANNUAL OPERATING TEST.	DATE		RESULT	
	<input type="checkbox"/> 100 - 1000		W	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	
	<input type="checkbox"/> > 1000 (MORE THAN)		O	<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	

12. POWER REACTOR OPERATOR TRAINING PROGRAM

a. HAS THE APPLICANT COMPLETED THE OPERATOR TRAINING PROGRAM ACCREDITED BY THE NATIONAL NUCLEAR ACCREDITING BOARD?

YES NO

b. IS A "PLANT-REFERENCED SIMULATOR" (AS DEFINED IN 10 CFR 55.4) USED IN THE OPERATOR TRAINING PROGRAM?

YES NO

13. TRAINING (Since Last Application - See Instructions)

a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS
	FROM	TO	
1 - NUCLEAR POWER PLANT FUNDAMENTALS			
2 - PLANT SYSTEMS			
3 - PLANT PROCEDURES			
b. SIMULATOR			
c. SRO INSTRUCTION			
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM			
e. TIME ON SHIFT ABOVE 20% POWER			
f. REQUALIFICATION			
g. OTHER (Specify)			

NRC FORM 398 (05-2013)

(MM/DD/YYYY)

15. EXPERIENCE DETAILS

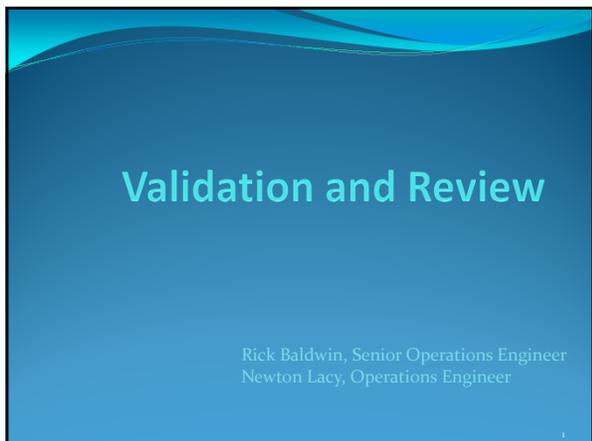
POSITION TITLE	FROM DATE	TO DATE	MONTHS	FACILITY	DUTIES

return 4

13. TRAINING (Since Last Application - See Instructions)

a. CLASSROOM	MONTH AND YEAR		NUMBER OF WEEKS
	FROM	TO	
1 -- NUCLEAR POWER PLANT FUNDAMENTALS			
2 -- PLANT SYSTEMS			
3 -- PLANT PROCEDURES			
b. SIMULATOR			
c. SRO INSTRUCTION			
d. EXTRA PERSON ON SHIFT IN CONTROL ROOM			
e. TIME ON SHIFT ABOVE 20% POWER			
f. REQUALIFICATION			
g. OTHER (Specify)			

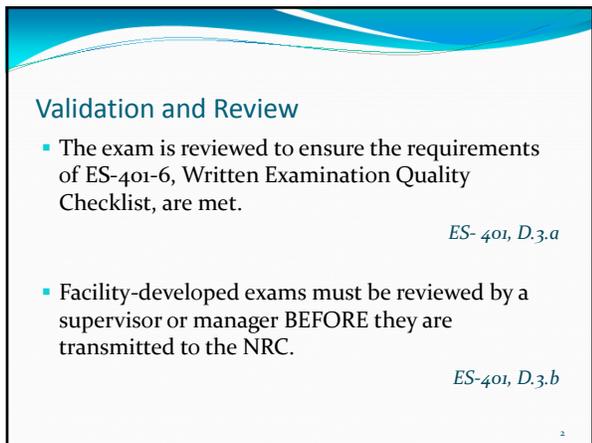
NRC FORM 398 (05-2013)



Validation and Review

Rick Baldwin, Senior Operations Engineer
Newton Lacy, Operations Engineer

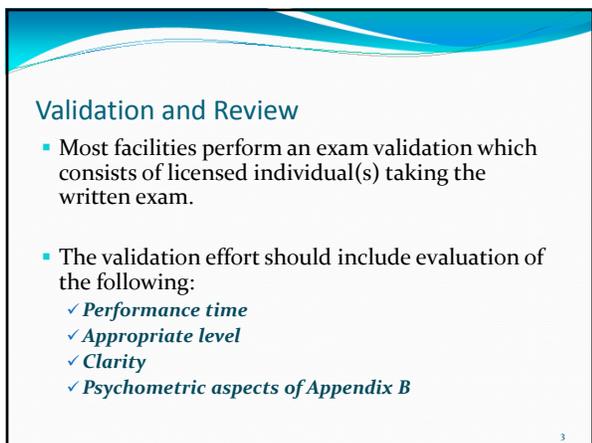
1



Validation and Review

- The exam is reviewed to ensure the requirements of ES-401-6, Written Examination Quality Checklist, are met.
ES- 401, D.3.a
- Facility-developed exams must be reviewed by a supervisor or manager BEFORE they are transmitted to the NRC.
ES-401, D.3.b

2



Validation and Review

- Most facilities perform an exam validation which consists of licensed individual(s) taking the written exam.
- The validation effort should include evaluation of the following:
 - ✓ *Performance time*
 - ✓ *Appropriate level*
 - ✓ *Clarity*
 - ✓ *Psychometric aspects of Appendix B*

3

Validation and Review

- Facility licensees are responsible for ensuring the contractor-prepared exams meet the NUREG-1021 guidelines.
ES-401, E.1
- The Facility review of the entire exam outline package shall use ES-201-2, Examination Outline Quality Checklist.
ES-201, C.f

4

Validation and Review

- ES-201-2 references using ES-301-5 for guidance; ES-301-5 is not completed at this time.
- ES-201-2 checks for duplication and overlap; this helps prevent double jeopardy.

5

Validation and Review

- The Facility review of the developed exam material shall also complete:
 - ❑ ES-401-6, Written Examination Quality Checklist
 - ❑ ES-301-4, Simulator Scenario Quality Checklist
 - ❑ ES-301-5, Transient and Event Checklist
 - ❑ ES-301-6, Competencies Checklist

6

Validation and Review

- Providing the information listed on ES-401-5 simplifies the review process.
 - *ES- 401-5, ES-201, C.1.h*
- NRC will review and provide feedback on a 10 question pre-submission sample to allow for mid-course adjustments; optional upon request.

7

Validation and Review

- Facility-developed exams must be reviewed by a supervisor or manager BEFORE they are transmitted to the NRC.

ES-401, E.1
- NRC review must be an independent review, based on provided references .

ES- 401, E.2
- NRC initially reviews at least 30 questions of the 75 questions (RO) and 100 questions (SRO/RO) in detail for technical accuracy and K/A intent matched. Complete review for K/A match triggered at > 20% missed.

ES- 401, E.2.c

 - Region II reviews 100% of the written exam in detail.

8

Validation and Review

- NRC question evaluation results are documented on the 401-9.
- The results of that review will be discussed with the facility licensee, NRR and Regional supervision, as appropriate.

ES-401, E.2.c
- Psychometric quality reviewed for at least 10 new questions and 20 additional questions.

ES-401, E.2.c

 - This is taken care of in the 100% Region II review.

9

Validation and Review

- No limit on the number of changes the NRC can direct.
ES-401, E.2.d
- Remember - enhancements are recommendations, not directed changes .
 - Example of unacceptable flaws are:
 - ✓ mismatched K/A
 - ✓ inappropriate license level
 - ✓ implausible distractors
 - ✓ lack of operation orientation

ES-401, E.2.d

10

Validation and Review

- Directed changes will be referenced to NUREG-1021, Appendix B.
ES-401, E.2.e
- If there are < 6 unacceptable flaws in the first 30 sampled questions, then regional personnel will review the rest of the exam questions.
ES-401, E.3.b
- If there are ≥ 6 unacceptable flaws in the first 30 sampled questions, then the exam **MAY** be returned to the facility without further review by the NRC for correction.
ES-401, E.3.b

11

Questions to Ask During Scenario Validation

- Did the operator(s) designated on the ES-D-1 to receive credit for each event actually perform the actions? Is it likely that the other operator could be assigned by the SRO to perform the required actions?
- Are the events which could possibly lead to a reactor trip/scram placed closest to the major event?
- Are the procedures listed in the ES-D-2 the ones that were actually used by the operating crew? Are there any other procedures that the crew could potentially use?
- Do the Technical Specification determinations match those listed in the ES-D-2?

12

Questions to Ask During Admin JPM Validation

- Is the proper range of acceptable values specified for calculations?
- Are all steps designated as critical steps actually necessary to correctly complete the task? Are all actual critical steps designated in the JPM?
- How does the examiner differentiate between acceptable and unacceptable performance?
- Are all of the references needed to complete the task available? Are there any procedures that may be used which are different from those included in the JPM?
- Are examiner cues provided as necessary?

13

Questions to Ask During Simulator and In-Plant JPM Validation

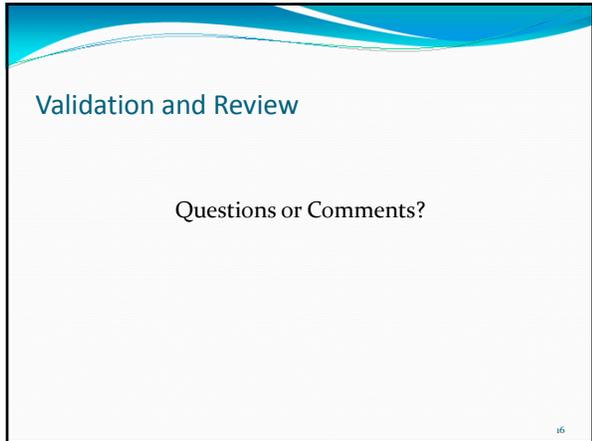
- For in-plant JPMs, is the JPM set up for the proper train regarding the work week (protected equipment) during the exam?
- Are all steps designated as critical steps actually necessary to correctly complete the task? Are all actual critical steps designated in the JPM?
- How does the examiner differentiate between acceptable and unacceptable performance?
- Are examiner cues provided as necessary?

14

Questions to Ask During Written Exam Validation

- How much time did it take to complete the exam?
- Was any overlap identified?
- Was the answer reached based on experience or license class knowledge?
- Was more information needed in the stem or initial conditions?
- Could the question or choices be written more clearly?
- If the question was answered correctly, why?
- If the question was answered incorrectly, why?

15



Validation and Review

Questions or Comments?

16

Validation and Review

Rick Baldwin, Senior Operations Engineer
Newton Lacy, Operations Engineer

Validation and Review

- The exam is reviewed to ensure the requirements of ES-401-6, Written Examination Quality Checklist, are met.

ES- 401, D.3.a

- Facility-developed exams must be reviewed by a supervisor or manager BEFORE they are transmitted to the NRC.

ES-401, D.3.b

Validation and Review

- Most facilities perform an exam validation which consists of licensed individual(s) taking the written exam.
- The validation effort should include evaluation of the following:
 - ✓ *Performance time*
 - ✓ *Appropriate level*
 - ✓ *Clarity*
 - ✓ *Psychometric aspects of Appendix B*

Validation and Review

- Facility licensees are responsible for ensuring the contractor-prepared exams meet the NUREG-1021 guidelines.

ES-401, E.1

- The Facility review of the entire exam outline package shall use ES-201-2, Examination Outline Quality Checklist.

ES-201, C.f

Validation and Review

- ES-201-2 references using ES-301-5 for guidance; ES-301-5 is not completed at this time.
- ES-201-2 checks for duplication and overlap; this helps prevent double jeopardy.

Validation and Review

- The Facility review of the developed exam material shall also complete:
 - ❑ ES-401-6, Written Examination Quality Checklist
 - ❑ ES-301-4, Simulator Scenario Quality Checklist
 - ❑ ES-301-5, Transient and Event Checklist
 - ❑ ES-301-6, Competencies Checklist

Validation and Review

- Providing the information listed on ES-401-5 simplifies the review process.
 - *ES- 401-5, ES-201, C.1.h*
- NRC will review and provide feedback on a 10 question pre-submission sample to allow for mid-course adjustments; optional upon request.

Validation and Review

- Facility-developed exams must be reviewed by a supervisor or manager BEFORE they are transmitted to the NRC.

ES-401, E.1

- NRC review must be an independent review, based on provided references .

ES- 401, E.2

- NRC initially reviews at least 30 questions of the 75 questions (RO) and 100 questions (SRO/RO) in detail for technical accuracy and K/A intent matched. Complete review for K/A match triggered at > 20% missed.

ES- 401, E.2.c

- Region II reviews 100% of the written exam in detail.

Validation and Review

- NRC question evaluation results are documented on the 401-9.
- The results of that review will be discussed with the facility licensee, NRR and Regional supervision, as appropriate.

ES-401, E.2.c

- Psychometric quality reviewed for at least 10 new questions and 20 additional questions.

ES-401, E.2.c

- This is taken care of in the 100% Region II review.

Validation and Review

- No limit on the number of changes the NRC can direct.

ES-401, E.2.d

- Remember - enhancements are recommendations, not directed changes .

- Example of unacceptable flaws are:

- ✓ mismatched K/A
- ✓ inappropriate license level
- ✓ implausible distractors
- ✓ lack of operation orientation

ES-401, E.2.d

Validation and Review

- Directed changes will be referenced to NUREG-1021, Appendix B.

ES-401, E.2.e

- If there are < 6 unacceptable flaws in the first 30 sampled questions, then regional personnel will review the rest of the exam questions.

ES-401, E.3.b

- If there are ≥ 6 unacceptable flaws in the first 30 sampled questions, then the exam **MAY** be returned to the facility without further review by the NRC for correction.

ES-401, E.3.b

Questions to Ask During Scenario Validation

- Did the operator(s) designated on the ES-D-1 to receive credit for each event actually perform the actions? Is it likely that the other operator could be assigned by the SRO to perform the required actions?
- Are the events which could possibly lead to a reactor trip/scram placed closest to the major event?
- Are the procedures listed in the ES-D-2 the ones that were actually used by the operating crew? Are there any other procedures that the crew could potentially use?
- Do the Technical Specification determinations match those listed in the ES-D-2?

Questions to Ask During Admin JPM Validation

- Is the proper range of acceptable values specified for calculations?
- Are all steps designated as critical steps actually necessary to correctly complete the task? Are all actual critical steps designated in the JPM?
- How does the examiner differentiate between acceptable and unacceptable performance?
- Are all of the references needed to complete the task available? Are there any procedures that may be used which are different from those included in the JPM?
- Are examiner cues provided as necessary?

Questions to Ask During Simulator and In-Plant JPM Validation

- For in-plant JPMs, is the JPM set up for the proper train regarding the work week (protected equipment) during the exam?
- Are all steps designated as critical steps actually necessary to correctly complete the task? Are all actual critical steps designated in the JPM?
- How does the examiner differentiate between acceptable and unacceptable performance?
- Are examiner cues provided as necessary?

Questions to Ask During Written Exam Validation

- How much time did it take to complete the exam?
- Was any overlap identified?
- Was the answer reached based on experience or license class knowledge?
- Was more information needed in the stem or initial conditions?
- Could the question or choices be written more clearly?
- If the question was answered correctly, why?
- If the question was answered incorrectly, why?

Validation and Review

Questions or Comments?

**Operating Test:
Outline, Predictability,
& Cueing**

2013 Exam Writers' Workshop
Mike Donithan
RII Operations Examiner
Gerry Laska
RII Senior Operations Examiner

1

Outline Submittal

• **75 Day Submittal:**

- **Examination Outline Quality Checklist, ES-201-2** (Written exam blocks can be N/A'd)
- **Exam Security Agreement, ES-201-3**
- **Administrative JPM Outline, ES-301-1**
- **Control Room/In-Plant Systems Outline, ES-301-2**
- **Operating Test Quality Checklist, ES-301-3**

2

Outline Submittal

- **Simulator Scenario Quality Checklist, ES-301-4**
- **Transient and Event Checklist, ES-301-5**
- **Competencies Checklist, ES 301-6**

3

Administrative Topics Outline, ES-301-1

“Conduct of Operations” evaluates knowledge of daily operation of the facility:

- shift turnover & staffing requirements
- temporary changes to procedures
- reactor plant startup requirements
- mode changes – key control – fuel handling
- plant parameter verification (ECP, heat balance)
- short-term information (night & standing orders)
- security (awareness and familiarity)

4

Administrative Topics

“Equipment Control” addresses the administrative requirements associated with managing and controlling plant systems and equipment:

- surveillance testing
- maintenance
- tagging and clearances
- temporary modification of systems
- familiarity with and use of P&IDs

5

Administrative Topics

“Radiation Control” evaluates knowledge and abilities with respect to radiation hazards and protection (of plant personnel and the public):

- use and function of portable radiation and contamination survey instruments and personnel monitoring equipment
- knowledge of significant radiation hazards
- control of radiation releases
- radiation work permits

6

Administrative Topics

- ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure
- radiation exposure limits & contamination control, including permissible levels in excess of those authorized

7

Administrative Topics

"Emergency Procedures/Plan" evaluates the knowledge of the facility's emergency plan, including, as appropriate, responsibility of the RO or SRO to decide whether the plan should be executed and duties assigned under the plan:

- lines of authority during an emergency
- emergency action levels and classifications
- emergency facilities & communications
- protective action recommendations

8

Administrative Topics

- SROs
- 5 administrative JPMs
- Must sample all topics

- ROs
- 4 administrative JPMs (Re-takes must have 5.)
- "Conduct of Operations" is required.

Topic	Number of Subjects	
	RO	SRO and RO Retakes
"Conduct of Operations"	1 (or 2)	2
"Equipment Control"	1 (or 0)	1
"Radiation Control"	1 (or 0)	1
"Emergency Procedures/Plan"	1 (or 0)	1
Total	4	5

Control Room/In-Plant Systems Outline, ES-301-2

- Used to determine whether the applicant has an adequate knowledge of plant system design and is able to safely operate those systems.

ES-301 Control Room/In-Plant Systems Outline Form ES-301-2		
Facility: _____		Date of Examination: _____
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: _____
Control Room Systems [®] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		

Control Room/In-Plant Systems

In-Plant Systems [®] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i.		
j.		
k.		
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for RO / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room	≥ 9 / ≥ 8 / ≥ 4	
(D)irect from bank	≥ 1 / ≥ 1 / ≥ 1	
(E)mergency or abnormal in-plant	- / - / ≥ 1 (control room system)	
(EN)gineered safety feature	≥ 1 / ≥ 1 / ≥ 1	
(L)ow-Power / Shutdown	≥ 2 / ≥ 2 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 3 / ≥ 3 / ≥ 2 (randomly selected)	
(P)revious 2 exams	≥ 1 / ≥ 1 / ≥ 1	
(R)ICA		
(S)imulator		

Control Room/In-Plant Systems

RO and SRO-Instants

- Each of the control room systems and evolutions (and separately, each of the in-plant systems and evolutions) should evaluate a different safety function.
- The same system or evolution should not be used to evaluate more than one safety function in each location.

License Level	Control Room	In-Plant	Total
RO	8	3	11
SRO-Instant (I)	7	3	10
SRO-upgrade (U)	2 or 3	3 or 2	5

Control Room/In-Plant Systems

SRO-Upgrades

- The five systems and evolutions *should* evaluate at least five different safety functions.
- One must be an engineered safety feature.
- The same system or evolution *should not* be used to evaluate more than one safety function.

License Level	Control Room	In-Plant	Total
RO	8	3	11
SRO-Instant (I)	7	3	10
SRO-upgrade (U)	2 or 3	3 or 2	5

Control Room/In-Plant Systems

- Tasks requiring applicants to execute alternative paths within the facility's operating procedures:
 - 4-6 for ROs and instant SROs
 - 2-3 for upgrade SROs
- At least 1 task related to a shutdown or low-power condition for all applicants.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≥ 9 / ≤ 8 / ≥ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(E)ngineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≥ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Control Room/In-Plant Systems

- At least 1 task requiring emergency or abnormal condition actions.
- At least 1 task requiring RCA entry.
(These can be the same JPM.)

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≥ 9 / ≤ 8 / ≥ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(E)ngineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≥ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Simulator Operating Test Outline, ES-D-1

- Scenario sets will be constructed by selecting and modifying scenarios from existing licensee or NRC scenario banks and by developing new scenarios.
- Initial conditions, normal operations, malfunctions, & major transients should be varied among the scenarios and should include startup, low-power, and full-power situations.

16

Simulator Operating Test

- Review the walk-through outline (if prepared), and take care not to duplicate operations that will be tested during the systems walk-through.
- Walk-through and simulator should not duplicate material covered on the written exam.

17

Simulator Operating Test

What is Required:

Every RO applicant should have a total of 6 events, comprised of:

- Instrument/Component malfunctions
- Normal Evolutions
- Reactivity Manipulations

These should be split between the RO and BOP positions.

18

Simulator Operating Test

This can be a combination of:

- Instrument/Component Failures (4)
- Reactivity Manipulations (1)
- Normal Evolutions (1)

These events should all be prior to the Major Transient.

Only *one* applicant can get credit for a reactivity manipulation or a normal evolution per scenario.

19

Simulator Operating Test

SRO Instants must:

- have two Tech Spec calls as the SRO
- have two instrument/ component malfunctions
- have a Normal Evolution or Reactivity Manipulation (can substitute an I/C)
- have a Major Transient
- stand the RO (OATC) position, and have:
 - two instrument/component malfunctions
 - a Major Transient

20

Simulator Operating Test

SRO Upgrades must have:

- two Tech Spec calls
 - two instrument/ component malfunctions
 - a Normal Evolution or Reactivity Manipulation (can substitute an I/C)
 - a Major Transient
- (Only required to be observed in one scenario.)

21

Operating Test Predictability

"Applicants should not be able to predict or narrow the possible scope or content of the licensing examination based on the facility's examination practices ..." (ES-201, Page 17)

- Steam generator tube leakage shouldn't always lead to a tube rupture.
- Severe weather shouldn't always cause a loss of offsite power.
- An auxiliary feedwater pump out of service shouldn't always lead to a loss of heat sink.
- An abnormal event shouldn't always lead to the same major transient.

22

Operating Test Predictability

One strategy to avoid predictability is to have a mostly standard set of scenario initial conditions:

- Small, ongoing S/G tube leak
- Severe thunderstorm warning
- AFW pump out of service for maintenance
- RHR pump out of service for maintenance
- Fuel handling in the Spent Fuel Pool

Consider adding additional items either to assist event progression or as distractors.

23

Operating Test Predictability

Other predictability concerns:

- For multi-unit sites: "Divide the operating test coverage among the units and do not become predictable by conducting the walk-through tests on only one unit." (ES-301 p. 8)
- Similarly, vary which train of equipment is used. Don't always use 'A' EDG because it's closer, etc.
- Admin JPMs don't always have to have something "wrong". Maybe the surveillance test *is* satisfactory, or work hour limits are *not* exceeded, etc.
- Many repeated JPMs/scenarios from 3rd exam back.

24

Avoiding Cueing in JPMs

- Statements that inappropriately limit the applicant's actions to only the right answer or path (should not tip-off the applicant to the right or wrong things to do).
 - If told to "verify" automatic actions or valve alignment, applicant will know that something will not have actuated or repositioned.
- No duplication from scenarios.

25

Critical Steps

- From NUREG-1021 Appendix C:

"Every procedural step that the examinee must perform correctly (i.e., accurately, in the proper sequence, and at the proper time) in order to accomplish the task standard shall be identified as a *critical step* and shall have an associated performance standard."
- Some recent exams have not specified failure criteria for Critical Steps.

26

Critical Step Failure Criteria

- Examples:
 - Tripping Reactor Coolant Pumps with loss of Component Cooling water ≤ 10 minutes: pretty clear failure criteria.
 - Cooling down the RCS to a target temperature band: if overshoot but allowed to heat back up, is that acceptable performance?
 - Emergency Diesel Generator parallel/isolate switch for dead-bus energization: it turned out not to matter which position the switch was in.

27

Critical Tasks

- From Appendix D Critical Task Methodology:

Critical Tasks are objective measures for determining whether the performance of an individual or a crew is satisfactory or unsatisfactory.

28

Critical Tasks

On initial licensing examinations, CTs provide a basis for individual operator competency evaluations because they help the examiner focus on those tasks that have a significant impact on safety of the plant or the public.

29

Critical Step/Task Failure Criteria

- Select grading criteria that identifies failure for the critical step or task:
 - Use plant parameters to decide basis for grading.
 - Define acceptable limits or bands based on pressure, temperature, time, position, etc.
 - Be specific. Validate/justify during prep week. If the performance criteria is, "Crew will do x before plant reaches condition y," *validate* that the simulated plant will reach that condition.

30

Critical Step/Task Failure Criteria

- continued
 - Seek Operations Department input, but it *must* be based on plant procedures, design basis, etc. "Consensus" is not equal to a "valid facility endorsed success path" that will withhold scrutiny during an appeal.
 - Lack of technical basis may preclude using a particular JPM.
 - If critical parameter is time, might be able to use double the validation time as a backstop.

31

Your thoughts?

32

Operating Test: Outline, Predictability, & Cueing

2013 Exam Writers' Workshop

Mike Donithan

RII Operations Examiner

Gerry Laska

RII Senior Operations Examiner

Outline Submittal

- **75 Day Submittal:**
 - **Examination Outline Quality Checklist, ES-201-2** (Written exam blocks can be N/A'd)
 - **Exam Security Agreement, ES-201-3**
 - **Administrative JPM Outline, ES-301-1**
 - **Control Room/In-Plant Systems Outline, ES-301-2**
 - **Operating Test Quality Checklist, ES-301-3**

Outline Submittal

- **Simulator Scenario Quality Checklist, ES-301-4**
- **Transient and Event Checklist, ES-301-5**
- **Competencies Checklist, ES 301-6**

Administrative Topics Outline, ES-301-1

- “Conduct of Operations”** evaluates knowledge of daily operation of the facility:
- shift turnover & staffing requirements
 - temporary changes to procedures
 - reactor plant startup requirements
 - mode changes – key control – fuel handling
 - plant parameter verification (ECP, heat balance)
 - short-term information (night & standing orders)
 - security (awareness and familiarity)

Administrative Topics

“Equipment Control” addresses the administrative requirements associated with managing and controlling plant systems and equipment:

- surveillance testing
- maintenance
- tagging and clearances
- temporary modification of systems
- familiarity with and use of P&IDs

Administrative Topics

“Radiation Control” evaluates knowledge and abilities with respect to radiation hazards and protection (of plant personnel and the public):

- use and function of portable radiation and contamination survey instruments and personnel monitoring equipment
- knowledge of significant radiation hazards
- control of radiation releases
- radiation work permits

Administrative Topics

- ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure
- radiation exposure limits & contamination control, including permissible levels in excess of those authorized

Administrative Topics

“Emergency Procedures/Plan” evaluates the knowledge of the facility’s emergency plan, including, as appropriate, responsibility of the RO or SRO to decide whether the plan should be executed and duties assigned under the plan:

- lines of authority during an emergency
- emergency action levels and classifications
- emergency facilities & communications
- protective action recommendations

Administrative Topics

- SROs

- 5 administrative JPMs
- Must sample all topics

- ROs

- 4 administrative JPMs (Re-takes must have 5.)
- “Conduct of Operations” is required.

Topic	Number of Subjects	
	RO	SRO and RO Retakes
“Conduct of Operations”	1 (or 2)	2
“Equipment Control”	1 (or 0)	1
“Radiation Control”	1 (or 0)	1
“Emergency Procedures/Plan”	1 (or 0)	1
Total	4	5

Control Room/In-Plant Systems Outline, ES-301-2

- Used to determine whether the applicant has an adequate knowledge of plant system design and is able to safely operate those systems.

ES-301		Control Room/In-Plant Systems Outline		Form ES-301-2	
Facility: _____		Date of Examination: _____			
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test No.: _____			
Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)					
System / JPM Title		Type Code*		Safety Function	
a.					
b.					
c.					

Control Room/In-Plant Systems

In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i.		
j.		
k.		
<p>[@] All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.</p>		
* Type Codes		Criteria for RO / SRO-I / SRO-U
(A)lternate path		4-6 / 4-6 / 2-3
(C)ontrol room		
(D)irect from bank		≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant		≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature		- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown		≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)		≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams		≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA		≥ 1 / ≥ 1 / ≥ 1
(S)imulator		

Control Room/In-Plant Systems

RO and SRO-Instants

- Each of the control room systems and evolutions (and separately, each of the in-plant systems and evolutions) should evaluate a different safety function.
- The same system or evolution should not be used to evaluate more than one safety function in each location.

License Level	Control Room	In-Plant	Total
RO	8	3	11
SRO-instant (I)	7	3	10
SRO-upgrade (U)	2 or 3	3 or 2	5

Control Room/In-Plant Systems

SRO-Upgrades

- The five systems and evolutions *should* evaluate at least five different safety functions.
- One must be an engineered safety feature.
- The same system or evolution *should not* be used to evaluate more than one safety function.

License Level	Control Room	In-Plant	Total
RO	8	3	11
SRO-instant (I)	7	3	10
SRO-upgrade (U)	2 or 3	3 or 2	5

Control Room/In-Plant Systems

- Tasks requiring applicants to execute alternative paths within the facility's operating procedures:
 - 4-6 for ROs and instant SROs
 - 2-3 for upgrade SROs
- At least 1 task related to a shutdown or low-power condition for all applicants.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Control Room/In-Plant Systems

- At least 1 task requiring emergency or abnormal condition actions.
 - At least 1 task requiring RCA entry.
- (These can be the same JPM.)

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	

Simulator Operating Test Outline, ES-D-1

- Scenario sets will be constructed by selecting and modifying scenarios from existing licensee or NRC scenario banks and by developing new scenarios.
- Initial conditions, normal operations, malfunctions, & major transients should be varied among the scenarios and should include startup, low-power, and full-power situations.

Simulator Operating Test

- Review the walk-through outline (if prepared), and take care not to duplicate operations that will be tested during the systems walk-through.
- Walk-through and simulator should not duplicate material covered on the written exam.

Simulator Operating Test

What is Required:

Every RO applicant should have a total of 6 events, comprised of:

- Instrument/Component malfunctions
- Normal Evolutions
- Reactivity Manipulations

These should be split between the RO and BOP positions.

Simulator Operating Test

This can be a combination of:

- Instrument/Component Failures (4)
- Reactivity Manipulations (1)
- Normal Evolutions (1)

These events should all be prior to the Major Transient.

Only *one* applicant can get credit for a reactivity manipulation or a normal evolution per scenario.

Simulator Operating Test

SRO Instants must:

- have two Tech Spec calls as the SRO
- have two instrument/ component malfunctions
- have a Normal Evolution or Reactivity Manipulation (can substitute an I/C)
- have a Major Transient
- stand the RO (OATC) position, and have:
 - two instrument/component malfunctions
 - a Major Transient

Simulator Operating Test

SRO Upgrades must have:

- two Tech Spec calls
- two instrument/ component malfunctions
- a Normal Evolution or Reactivity Manipulation
(can substitute an I/C)
- a Major Transient
(Only required to be observed in one scenario.)

Operating Test Predictability

“Applicants should not be able to predict or narrow the possible scope or content of the licensing examination based on the facility’s examination practices ...” (ES-201, Page 17)

- Steam generator tube leakage shouldn’t always lead to a tube rupture.
- Severe weather shouldn’t always cause a loss of offsite power.
- An auxiliary feedwater pump out of service shouldn’t always lead to a loss of heat sink.
- An abnormal event shouldn’t always lead to the same major transient.

Operating Test Predictability

One strategy to avoid predictability is to have a mostly standard set of scenario initial conditions:

- Small, ongoing S/G tube leak
- Severe thunderstorm warning
- AFW pump out of service for maintenance
- RHR pump out of service for maintenance
- Fuel handling in the Spent Fuel Pool

Consider adding additional items either to assist event progression or as distractors.

Operating Test Predictability

Other predictability concerns:

- For multi-unit sites: “Divide the operating test coverage among the units and do not become predictable by conducting the walk-through tests on only one unit.” (ES-301 p. 8)
- Similarly, vary which train of equipment is used. Don’t always use ‘A’ EDG because it’s closer, etc.
- Admin JPMs don’t always have to have something “wrong”. Maybe the surveillance test *is* satisfactory, or work hour limits are *not* exceeded, etc.
- Many repeated JPMs/scenarios from 3rd exam back.

Avoiding Cueing in JPMs

- Statements that inappropriately limit the applicant's actions to only the right answer or path (should not tip-off the applicant to the right or wrong things to do).
 - If told to “verify” automatic actions or valve alignment, applicant will know that something will not have actuated or repositioned.
- No duplication from scenarios.

Critical Steps

- From NUREG-1021 Appendix C:
“Every procedural step that the examinee must perform correctly (i.e., accurately, in the proper sequence, and at the proper time) in order to accomplish the task standard shall be identified as a *critical step* and shall have an associated performance standard.”
- Some recent exams have not specified failure criteria for Critical Steps.

Critical Step Failure Criteria

- Examples:
 - Tripping Reactor Coolant Pumps with loss of Component Cooling water ≤ 10 minutes: pretty clear failure criteria.
 - Cooling down the RCS to a target temperature band: if overshoot but allowed to heat back up, is that acceptable performance?
 - Emergency Diesel Generator parallel/isolate switch for dead-bus energization: it turned out not to matter which position the switch was in.

Critical Tasks

- From Appendix D Critical Task Methodology:

Critical Tasks are objective measures for determining whether the performance of an individual or a crew is satisfactory or unsatisfactory.

Critical Tasks

On initial licensing examinations, CTs provide a basis for individual operator competency evaluations because they help the examiner focus on those tasks that have a significant impact on safety of the plant or the public.

Critical Step/Task Failure Criteria

- Select grading criteria that identifies failure for the critical step or task:
 - Use plant parameters to decide basis for grading.
 - Define acceptable limits or bands based on pressure, temperature, time, position, etc.
 - Be specific. Validate/justify during prep week. If the performance criteria is, "Crew will do x before plant reaches condition y," *validate* that the simulated plant will reach that condition.

Critical Step/Task Failure Criteria

- continued
 - Seek Operations Department input, but it *must* be based on plant procedures, design basis, etc. “Consensus” is not equal to a “valid facility endorsed success path” that will withhold scrutiny during an appeal.
 - Lack of technical basis may preclude using a particular JPM.
 - If critical parameter is time, might be able to use double the validation time as a backstop.



Your thoughts?

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												18			6		
	2					N/A					N/A		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				
<p>Note:</p> <ol style="list-style-type: none"> Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two). The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories. * The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43. 																		

ES-401

2

Form ES-401-2

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	1	2	3	4	5	6	K/A Topic(s)	IR	#
	K 1	K 2	K 3	A 1	A 2	G			
[01] 000007 Reactor Trip - Stabilization - Recovery / 1									
[02] 000008 Pressurizer Vapor Space Accident / 3									
[03] 000009 Small Break LOCA / 3									
[04] 000011 Large Break LOCA / 3									
[05] 000015/17 RCP Malfunctions / 4									
[06] 000022 Loss of Rx Coolant Makeup / 2									
[07] 000025 Loss of RHR System / 4									
[08] 000026 Loss of Component Cooling Water / 8									
[09] 000027 Pressurizer Pressure Control System Malfunction / 3									
[10] 000029 ATWS / 1									
[11] 000038 Steam Gen. Tube Rupture / 3									
[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
[13] 000054 Loss of Main Feedwater / 4									
[14] 000055 Station Blackout / 6									
[15] 000056 Loss of Off-site Power / 6									
[16] 000057 Loss of Vital AC Inst. Bus / 6									
[17] 000058 Loss of DC Power / 6									
[18] 000062 Loss of Nuclear Svc Water / 4									
[19] 000065 Loss of Instrument Air / 8									
[20] W/E04 LOCA Outside Containment / 3									
[21] W/E11 Loss of Emergency Coolant Recirc. / 4									
[22] W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
[23] 000077 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:							Group Point Total:		18/6

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						Form ES-401-2		
E/APE # / Name / Safety Function	1	2	3	4	5	6	K/A Topic(s)	IR	#
	K 1	K 2	K 3	A 1	A 2	G			
[01] 000001 Continuous Rod Withdrawal / 1									
[02] 000003 Dropped Control Rod / 1									
[03] 000005 Inoperable/Stuck Control Rod / 1									
[04] 000024 Emergency Boration / 1									
[05] 000028 Pressurizer Level Malfunction / 2									
[06] 000032 Loss of Source Range NI / 7									
[07] 000033 Loss of Intermediate Range NI / 7									
[08] 000036 Fuel Handling Accident / 8									
[09] 000037 Steam Generator Tube Leak / 3									
[10] 000051 Loss of Condenser Vacuum / 4									
[11] 000059 Accidental Liquid RadWaste Rel. / 9									
[12] 000060 Accidental Gaseous Radwaste Rel./ 9									
[13] 000061 ARM System Alarms / 7									
[14] 000067 Plant Fire On-site / 8									
[15] 000068 Control Room Evac. / 8									
[16] 000069 (W/E14) Loss of CTMT Integrity / 5									
[17] 000074 (W/E06&E07) Inad. Core Cooling / 4									
[18] 000076 High Reactor Coolant Activity / 9									
[19] W/E01 & E02 Rediagnosis & SI Termination / 3									
[20] W/E13 Steam Generator Over-pressure / 4									
[21] W/E15 Containment Flooding / 5									
[22] W/E16 High Containment Radiation / 9									
[23] W/E03 LOCA Cooldown - Depress. / 4									
[24] W/E09&E10 Natural Circ. / 4									
[25] W/E08 RCS Overcooling - PTS / 4									
K/A Category Point Totals:							Group Point Total:		9/4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-2		
System # / Name	1	2	3	4	5	6	7	8	9	10	11	K/A Topic(s)	IR	#
	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G			
[01] 003 Reactor Coolant Pump														
[02] 004 Chemical and Volume Control														
[03] 005 Residual Heat Removal														
[04] 006 Emergency Core Cooling														
[05] 007 Pressurizer Relief/Quench Tank														
[06] 008 Component Cooling Water														
[07] 010 Pressurizer Pressure Control														
[08] 012 Reactor Protection														
[09] 013 Engineered Safety Features Actuation														
[10] 022 Containment Cooling														
[22] 025 Ice Condenser														
[11] 026 Containment Spray														
[12] 039 Main and Reheat Steam														
[13] 059 Main Feedwater														
[14] 061 Auxiliary/Emergency Feedwater														
[15] 062 AC Electrical Distribution														
[16] 063 DC Electrical Distribution														
[17] 064 Emergency Diesel Generator														
[18] 073 Process Radiation Monitoring														
[19] 076 Service Water														
[20] 078 Instrument Air														
[21] 103 Containment														
K/A Category Point Totals:												Group Point Total:		28/5

ES-401

5

Form ES-401-2

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)											Form ES-401-2			
System # / Name	1	2	3	4	5	6	7	8	9	10	11	K/A Topic(s)	IR	#	
	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G				
[01] 001 Control Rod Drive															
[02] 002 Reactor Coolant															
[03] 011 Pressurizer Level Control															
[04] 014 Rod Position Indication															
[05] 015 Nuclear Instrumentation															
[06] 016 Non-nuclear Instrumentation															
[07] 017 In-core Temperature Monitor															
[08] 027 Containment Iodine Removal															
[09] 028 Hydrogen Recombiner and Purge Control															
[10] 029 Containment Purge															
[11] 033 Spent Fuel Pool Cooling															
[12] 034 Fuel Handling Equipment															
[13] 035 Steam Generator															
[14] 041 Steam Dump/Turbine Bypass Control															
[15] 045 Main Turbine Generator															
[16] 055 Condenser Air Removal															
[17] 056 Condensate															
[18] 068 Liquid Radwaste															
[19] 071 Waste Gas Disposal															
[20] 072 Area Radiation Monitoring															
[21] 075 Circulating Water															
[22] 079 Station Air															
[23] 086 Fire Protection															
K/A Category Point Totals:													Group Point Total:		10/3

Facility:		Date of Exam:					
Category	K/A #	Topic		RO		SRO-Only	
				IR	#	IR	#
1. Conduct of Operations	2.1.	[01] G 2.1.7	[23] G 2.4.1				
	2.1.	[02] G 2.1.19	[24] G 2.4.2				
	2.1.	[03] G 2.1.20	[25] G 2.4.3				
	2.1.	[04] G 2.1.23	[26] G 2.4.4				
	2.1.	[05] G 2.1.25	[27] G 2.4.6				
	2.1.	[06] G 2.1.27	[28] G 2.4.8				
	Subtotal	[07] G 2.1.28	[29] G 2.4.9				
2. Equipment Control	2.2.	[08] G 2.1.30	[30] G 2.4.11				
	2.2.	[09] G 2.1.31	[31] G 2.4.18				
	2.2.	[10] G 2.1.32	[32] G 2.4.20				
	2.2.		[33] G 2.4.21				
	2.2.	[11] G 2.2.3	[34] G 2.4.30				
	2.2.	[12] G 2.2.4	[35] G 2.4.31				
	Subtotal	[13] G 2.2.12	[36] G 2.4.34				
3. Radiation Control	2.3.	[14] G 2.2.22	[37] G 2.4.35				
	2.3.	[15] G 2.2.25	[38] G 2.4.41				
	2.3.	[16] G 2.2.36	[39] G 2.4.45				
	2.3.	[17] G 2.2.37	[40] G 2.4.46				
	2.3.	[18] G 2.2.38	[41] G 2.4.47				
	2.3.	[19] G 2.2.39	[42] G 2.4.49				
	Subtotal	[20] G 2.2.40	[43] G 2.4.50				
4. Emergency Procedures / Plan	2.4.	[21] G 2.2.42					
	2.4.	[22] G 2.2.44					
	2.4.						
	2.4.						
	2.4.						
	2.4.						
	Subtotal						
Tier 3 Point Total					10		7

Random and Systematic:



Written Exam Sample Plans

Michael Meeks
USNRC Region II

Random and Systematic:



Written Exam Sample Plans

Michael Meeks
USNRC Region II

Introductory Slides...

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

NRC



- NRC Region II – August 2008
- Qualified on Westinghouse, Babcock & Wilcox, and Combustion Engineering



United States Nuclear Regulatory Commission
Protecting People and the Environment

July 2013 Random and Systematic: Written Exam Sample Plan Michael Meeks

Why Cover Sample Plans?

- Feedback From Previous Years' Workshops
- **Region II Policy Unchanged**

July 2013 Random and Systematic: Written Exam Sample Plan Michael Meeks

What's In It For You?

- Better Understanding of Sample Plan Process
- Better Understanding of the Impact of K/A Changes
- **Potential Use on Audits or Other Final Exams**

July 2013 Random and Systematic: Written Exam Sample Plan Michael Meeks

Sample Plan Trivia No. 1

As specified in rev. 9, supp. 1 of NUREG-1021 Form ES-201-1, what is the “target date” for written exam sample plans to be provided?

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Sample Plan Trivia No. 1

A. 180 Days
B. 120 Days
C. 90 Days
D. 75 Days

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Recommendation No. 1

Recommendation: Ask your assigned Chief Examiner for the written exam sample plan ~2 weeks before it would be ‘useful’ to you.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Recommendation No. 1

Recommendation: Ask your assigned Chief Examiner for the written exam sample plan ~2 weeks before **you are ready to start developing questions.**

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

What Do You Need to Do?

- At least one person signed on to this exam's Form ES-201-3.
- Fulfill your site's procedural requirements for exam security.
- **(Optional) Provide NRC with site-specific K/A lists.**

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Site-Specific K/A Lists

- Any K/As with IR<2.5 that should be included in the sample due to site-specific priority?
- **'Suppression List:' K/As that are not relevant at the subject facility.**

{ref. ES-401 D.1.b}

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Why Two Weeks?

- Availability of Chief Examiner, M. Meeks or P. Capehart, and Branch Chief.
- **Cross-Checks and Approvals (Partial Form ES 201-1)**

July 2011 Random and Systematic: Written Exam Sample Plan Michael Meeks

Westinghouse Sample Plan

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

Facility:		Date of Exam:													SRO-Only Points				
Tier	Group	RO K/A Category Points											Total	A2	G*	Total			
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*							
1. Emergency & Abnormal Plant Evolutions	1													18			6		
	2					N/A						N/A		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	7

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

July 2011 Random and Systematic: Written Exam Sample Plan Michael Meeks

Westinghouse Sample Plan

ES-401 PWR Examination Outline Form ES-401

Facility:		Date of Exam:													SRO-Only Points			
Tier	Group	RO K/A Category Points											Total	A2	G*	Total		
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*						
1. Emergency & Abnormal Plant Evolutions	1	3	3	3										3	18			6
	2					N/A							N/A		9			4
	Tier Totals														27			10
2. Plant Systems	1														28			5
	2														10			3
	Tier Totals														38			8

July 2011 Random and Systematic: Written Exam Sample Plan Michael Meeks

Sample Plans, In Theory									
000025 Loss of RHR System / 4									
000026 Loss of Component Cooling Water / 8									
000027 Pressurizer Pressure Control System Malfunction / 3				X					
000029 ATWS / 1					X				
000038 Steam Gen. Tube Rupture / 3						X			
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X								
000054 (CE/E06) Loss of Main Feedwater / 4		X							
000055 Station Blackout / 6			X						
000056 Loss of Off-site Power / 6									

Sample Plans, In Theory									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
000054 (CE/E06) Loss of Main Feedwater / 4									
000055 Station Blackout / 6			X						
000056 Loss of Off-site Power / 6		X							
000057 Loss of Vital AC Inst. Bus / 6	X								
000058 Loss of DC Power / 6						X			
000062 Loss of Nuclear Svc Water / 4					X				
000065 Loss of Instrument Air / 8				X					
W/E04 LOCA Outside Containment / 3									

Sample Plans, In Theory									
000025 Loss of RHR System / 4									
000026 Loss of Component Cooling Water / 8									
000027 Pressurizer Pressure Control System Malfunction / 3		X							
000029 ATWS / 1	X								
000038 Steam Gen. Tube Rupture / 3						X			
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X				
000054 (CE/E06) Loss of Main Feedwater / 4				X					
000055 Station Blackout / 6			X						
000056 Loss of Off-site Power / 6									

Sample Plans, In Theory									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
000054 (CE/E06) Loss of Main Feedwater / 4									
000055 Station Blackout / 6			X						
000056 Loss of Off-site Power / 6		X							
000057 Loss of Vital AC Inst. Bus / 6	X								
000058 Loss of DC Power / 6							X		
000062 Loss of Nuclear Svc Water / 4					X				
000065 Loss of Instrument Air / 8			X						
W/E04 LOCA Outside Containment / 3									

Sample Plans, In Theory									
[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
[13] 000054 Loss of Main Feedwater / 4									
[14] 000055 Station Blackout / 6				X					
[15] 000056 Loss of Off-site Power / 6		X							
[16] 000057 Loss of Vital AC Inst. Bus / 6	X								
[17] 000058 Loss of DC Power / 6							X		
[18] 000062 Loss of Nuclear Svc Water / 4					X				
[19] 000065 Loss of Instrument Air / 8			X						
[20] W/E04 LOCA Outside Containment / 3									

Sample Plans, In Theory									
EPE: 055 Loss of Offsite and Onsite Power (Station Blackout)									
K/A.NO.	KNOWLEDGE	IMPORTANCE RO...SRO							
EK3	Knowledge of the reasons for the following responses as they apply to the Station Blackout. (CFR 41.5 / 41.10 / 45.6 / 45.13)								
EK3.01	Length of time for which battery capacity is designed	2.7	3.4						
EK3.02	Actions contained in EOP for loss of offsite and onsite power	4.3	4.6						
<u>ABILITY</u>									

Sample Plans, In Theory

[12]	000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
[13]	000054 Loss of Main Feedwater / 4							
[14]	000055 Station Blackout / 6			X				
[15]	000056 Loss of Off-site Power / 6		X					
[16]	000057 Loss of Vital AC Inst. Bus / 6	X						
[17]	000058 Loss of DC Power / 6						X	
[18]	000062 Loss of Nuclear Svc Water / 4						X	
[19]	000065 Loss of Instrument Air / 8			X				
[20]	W/E04 LOCA Outside Containment / 3							

July 2011
Michael Meeks
Random and Systematic
Written Exam Sample Plans

Red Squares

[12]	000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
[13]	000054 Loss of Main Feedwater / 4							
[14]	000055 Station Blackout / 6							
[15]	000056 Loss of Off-site Power / 6							
[16]	000057 Loss of Vital AC Inst. Bus / 6	X						
[17]	000058 Loss of DC Power / 6							
[18]	000062 Loss of Nuclear Svc Water / 4							
[19]	000065 Loss of Instrument Air / 8							
[20]	W/E04 LOCA Outside Containment / 3							

July 2011
Michael Meeks
Random and Systematic
Written Exam Sample Plans

Red Squares

APE:	057 Loss of Vital AC Electrical Instrument Bus				
K/A NO.	KNOWLEDGE	IMPORTANCE	RO	SRO	
AK1.	Knowledge of the operational implications of the following concepts as they apply to Loss of Vital AC Instrument Bus: (CFR 41.8 / 41.10 / 45.3)				
	None				
AK2.	Knowledge of the interrelations between the Loss of Vital AC Instrument Bus and the following: (CFR 41.7 / 45.7)				
AK2.01	Valves	1.9	2.1		
AK2.02	Sensors, detectors, and indicators	2.2*	2.3*		
AK2.03	Controllers and positioners	2.2*	2.4		
AK2.04	Pumps	2.0	1.9		
AK2.05	Breakers, relays and disconnects	2.2*	2.3		
AK3.	Knowledge of the reasons for the following responses as they apply to				

July 2011
Michael Meeks
Random and Systematic
Written Exam Sample Plans

Orange Squares

[12]	000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4								
[13]	000054 Loss of Main Feedwater / 4								
[14]	000055 Station Blackout / 6								
[15]	000056 Loss of Off-site Power / 6								
[16]	000057 Loss of Vital AC Inst. Bus / 6				X				
[17]	000058 Loss of DC Power / 6								
[18]	000062 Loss of Nuclear Svc Water / 4								
[19]	000065 Loss of Instrument Air / 8								
[20]	W/E04 LOCA Outside Containment / 3								

July 2011
Michael Meeks
Random and Systematic
Written Exam Sample Plans

Orange Squares

APE:	057 Loss of Vital AC Electrical Instrument Bus		
<u>K/A/NO</u>	<u>KNOWLEDGE</u>	<u>RO</u>	<u>SRO</u>
AK3.	Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: (CFR 41.5,41.10 / 45.6 / 45.13)		
AK3.01	Actions contained in EOP for loss of vital ac electrical instrument bus ...	4.1	4.4
	<u>ABILITY</u>		

July 2011
Michael Meeks
Random and Systematic
Written Exam Sample Plans

Green Squares

[12]	000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4								
[13]	000054 Loss of Main Feedwater / 4								
[14]	000055 Station Blackout / 6								
[15]	000056 Loss of Off-site Power / 6								
[16]	000057 Loss of Vital AC Inst. Bus / 6				X				
[17]	000058 Loss of DC Power / 6								
[18]	000062 Loss of Nuclear Svc Water / 4								
[19]	000065 Loss of Instrument Air / 8								
[20]	W/E04 LOCA Outside Containment / 3								

July 2011
Michael Meeks
Random and Systematic
Written Exam Sample Plans

Green Squares

APE: 040 Steam Line Rupture

K/A NO.	KNOWLEDGE	IMPORTANCE	
		RO	SRO
AK2. Knowledge of the interrelations between the Steam Line Rupture and the following: (CFR 41.7 / 45.7)			
AK2.01	Valves	2.6*	2.5
AK2.02	Sensors and detectors	2.6*	2.6
AK2.03	Controllers and positioners	2.4*	2.4
AK2.04	Pumps	2.0	2.1
AK2.05	Breakers, relays, and disconnects	1.9	2.1
AK2.06	Motors	2.0	2.1

July 2011 Random and Systematic: Michael Meeks
 Written Exam Sample Plan

Other Colors

- Gray = SRO-only
- Pink = Radiation Monitors
- Time for Trivia No. 2

July 2011 Random and Systematic: Michael Meeks
 Written Exam Sample Plan

Sample Plan Trivia No. 2

In accordance with rev. 2, supp. 1 of NUREG-1122 (PWR K/A Catalog), what K/A category has the most individual K/A statements (irrespective of importance rating)?

July 2011 Random and Systematic: Michael Meeks
 Written Exam Sample Plan

Why Include Safety Function?

a. ... The emergency and abnormal plant evolutions (E/APEs) listed in Section 1.10 of the appropriate NUREG may also be used to evaluate the applicable safety function (as specified for each E/APE in the first tier of the written examination outlines attached to ES-401, "Preparing Initial Site-Specific Written Examinations").

{ref. ES-301 D.4.a}

July 2011

Random and Systematic:
Written Exam Sample Plans

Michael Meeks

Tier 1/Group 1

000009 Small Break LOCA / 3										
000011 Large Break LOCA / 3										
000015/17 RCP Malfunctions / 4										
000022 Loss of Rx Coolant Makeup / 2										
000025 Loss of RHR System / 4										
000026 Loss of Component Cooling Water / 8										

July 2011

Random and Systematic:
Written Exam Sample Plans

Michael Meeks

Tier 1/Group 1

APE : 015/017 Reactor Coolant Pump (RCP) Malfunctions

K/A/NO.	KNOWLEDGE	IMPORTANCE	
		RO	SRO
AK1.	Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): (CFR 41.8 / 41.10 / 45.3)		
AK1.01	Natural circulation in a nuclear reactor power plant	4.4	4.6
AK1.02	Consequences of an RCPS failure	3.7	4.1
AK1.03	The basis for operating at a reduced power level when one RCP is out of service	3.0*	4.0*
AK1.04	Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow	2.9	3.1*
AK1.05	Effects of unbalanced RCS flow on in-core average temperature, core imbalance, and quadrant power tilt	2.7	3.3

July 2011

Random and Systematic:
Written Exam Sample Plans

Michael Meeks

Tier 1/Group 1

Sample Plan Generator:

015 AK ... or 015 AA ... etc.

July 2011 Random and Systematic:
Written Exam Sample Plans Michael Meeks

Tier 1/Group 1

000029 ATWS / 1									
000038 Steam Gen. Tube Rupture / 3									
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
000054 (CE/E06) Loss of Main Feedwater / 4									

July 2011 Random and Systematic:
Written Exam Sample Plans Michael Meeks

Tier 1/Group 1

[10] 000029 ATWS / 1									
[11] 000038 Steam Gen. Tube Rupture / 3									
[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4									
[13] 000054 Loss of Main Feedwater / 4									

July 2011 Random and Systematic:
Written Exam Sample Plans Michael Meeks

Tier 1/Group 1

Westinghouse
E12 Uncontrolled Depressurization of all Steam Generators

K/A NO. KNOWLEDGE

EK1. Knowledge of the operational implications of the following concepts as they apply to the (Uncontrolled Depressurization of all Steam Generators) (CFR: 41.8 / 41.10 / 45.3)

EK1.1 Components, capacity, and function of emergency systems.
 IMPORTANCE RO 3.4 SRO 3.8

EK1.2 Normal, abnormal and emergency operating procedures associated with (Uncontrolled Depressurization of all Steam Generators).
 IMPORTANCE RO 3.5 SRO 3.8

EK1.3 Annunciators and conditions indicating signals, and remedial actions associated with the (Uncontrolled Depressurization of all Steam Generators).
 IMPORTANCE RO 3.4 SRO 3.7

EK2. Knowledge of the interrelations between the (Uncontrolled Depressurization of all Steam Generators) and the following: (CFR: 41.7 / 45.7)

July 2013 Written Exam Sample Plan Michael Meeks

Tier 1/Group 1

[10]	000029 ATWS / 1						
[11]	000038 Steam Gen. Tube Rupture / 3						
[12]	000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						
[13]	000054 Loss of Main Feedwater / 4						

July 2013 Random and Systematic Written Exam Sample Plan Michael Meeks

Generic K/As in Tier 1/2

[21]	W/E11 Loss of Emergency Coolant Recirc. / 4						
[22]	W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					X	
[23]	000077 Generator Voltage and Electric Grid Disturbances / 6						

July 2013 Random and Systematic Written Exam Sample Plan Michael Meeks

Generic K/As in Tier 1/2

-W/E05EG2.1.44:

Question associated with Westinghouse FR-H.1, “Loss of Secondary Heat Sink,” and knowledge of RO duties in the control room during fuel handling....

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

The topics for the generic K/A category in Tiers 1 and 2 (i.e., Column “G” on Forms ES-401-1 and ES-401-2) shall be selected from Section 2, “Generic Knowledge and Abilities,” of the applicable K/A catalog. However, only those topics that are relevant to the selected evolution or system shall be included; therefore, generic K/As for Tiers 1 and 2 for both RO and SRO examinations should be randomly selected from the following:
 2.1.7, 2.1.19, 2.1.20, 2.1.23, 2.1.25, 2.1.27, 2.1.28, 2.1.30, 2.1.31, 2.1.32, 2.2.3, 2.2.4, 2.2.12, 2.2.22, 2.2.25, 2.2.36, 2.2.37, 2.2.38, 2.2.39, 2.2.40, 2.2.42, 2.2.44, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.6, 2.4.8, 2.4.9, 2.4.11, 2.4.18, 2.4.20, 2.4.21, 2.4.30, 2.4.31, 2.4.34, 2.4.35, 2.4.41, 2.4.45, 2.4.46, 2.4.47, 2.4.49, and 2.4.50.
 {ref. ES-401 D.1.b}

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

Category	K/A #	Topic
1. Conduct of Operations	2.1.	[01] G 2.1.7 [23] G 2.4.1
	2.1.	[02] G 2.1.19 [24] G 2.4.2
	2.1.	[03] G 2.1.20 [25] G 2.4.3
	2.1.	[04] G 2.1.23 [26] G 2.4.4
	2.1.	[05] G 2.1.25 [27] G 2.4.6
	2.1.	[06] G 2.1.27 [28] G 2.4.8
	Subtotal	[07] G 2.1.28 [29] G 2.4.9
	2.2.	[08] G 2.1.30 [30] G 2.4.11

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

Examples of RO-level Tier 1/2 Generics:

G 2.2.39 Knowledge of less than or equal to one hour Technical Specification actions statements for systems.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

Examples of RO-level Tier 1/2 Generics:

G 2.2.39,

G 2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

Examples of RO-level Tier 1/2 Generics:

G 2.2.39, G 2.2.42,

G 2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

Examples of SRO-level Tier 1/2 Generics:

G 2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Generic K/As in Tier 1/2

Examples of SRO-level Tier 1/2 Generics:

G 2.2.25,

G 2.4.30 Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Sample Plan Trivia No. 3

Rev. 2, supp. 1 of NUREG-1122 (PWR K/A Catalog) states that the PWR Catalog contains approximately _____ knowledge and ability (K/A) statements for ROs and SROs at PWRs.

July 2013 Random and Systematic: Written Exam Sample Plans Michael Meeks

Sample Plan Trivia No. 3

A. 4,000

B. 5,000

C. 6,000

D. 7,000

July 2013 Random and Systematic:
Written Exam Sample Plan Michael Meeks

Sample Plan Trivia No. 3

Rev. 2, supp. 1 of NUREG-1123 (BWR K/A Catalog) states that the BWR Catalog contains approximately _____ knowledge and ability (K/A) statements for ROs and SROs at BWRs.

July 2013 Random and Systematic:
Written Exam Sample Plan Michael Meeks

Sample Plan Trivia No. 3

A. 4,000

B. 5,000

C. 6,000

D. 7,000

July 2013 Random and Systematic:
Written Exam Sample Plan Michael Meeks

Sample Plan Trivia No. 4

A. none

B. 2

C. 5

D. 6

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Sample Plan Trivia No. 4

How many individual K/As in rev. 2, supp. 1 of NUREG-1123 (BWR K/A Catalog) have Importance Ratings of “TBD”?

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

SRO Exam Tier 1

Tier		Group	Date of Exam:											SRO-Only Points					
			RO K/A Category Points																
			K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Total	A2	G*	Total		
1. Emergency & Abnormal Plant Operations	1		3	3	3				3	3			3	18	3	3	6		
	2		2	1	2				2	1			N/A	9	2	2	4		
	Tier Totals			5	4	5				5	4				27	5	5	10	
2. Plant Systems	1		2	3	3	2	3	2	3	3	3	2	2	28			5		
	2		1	1	1	0	1	1	1	1	1	1	1	10			3		
	Tier Totals			3	4	4	2	4	3	4	4	4	3	3	38			8	
3. Generic Knowledge and Abilities Categories														10	1	2	3	4	7

1. Ensure that at least two topics from every applicable KA category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each KA category shall not be less than two).

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Sample Plan Trivia No. 5

What do the symbols mean next to the importance ratings?

(?) = More than 15% of the raters felt that they were not familiar with the knowledge or ability as related to the particular system or design feature.

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

Sample Plan Trivia No. 5

What do the symbols mean next to the importance ratings?

(†) = More than 20% of the raters indicated that the level of knowledge or ability required by an SRO is different than the level of knowledge or ability required by an RO.

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

K/A Changes

- No limit to number of K/A changes
- Try to stay in same system and category if possible (004 K5)
- Extra care in Tier 2/Group 1...

July 2011 Random and Systematic: Written Exam Sample Plans Michael Meeks

THE END!

July 2011 Random and Systematic:
Written Exam Sample Plans Michael Marks

Random and Systematic:



Please

SILENCE

Cell Phones

And Pagers

Written Exam Sample Plans

Michael Meeks
USNRC Region II

Introductory Slides...

NRC



- NRC Region II – August 2008
- Qualified on Westinghouse, Babcock & Wilcox, and Combustion Engineering



Why Cover Sample Plans?

- Feedback From Previous Years' Workshops
- Region II Policy Unchanged

What's In It For You?

- Better Understanding of Sample Plan Process
- Better Understanding of the Impact of K/A Changes
- Potential Use on Audits or Other Final Exams

Sample Plan Trivia No. 1

As specified in rev. 9, supp. 1 of NUREG-1021 Form ES-201-1, what is the “target date” for written exam sample plans to be provided?

Sample Plan Trivia No. 1

A. 180 Days

B. 120 Days

C. 90 Days

D. 75 Days

Recommendation No. 1

Recommendation: Ask your assigned Chief Examiner for the written exam sample plan ~2 weeks before it would be 'useful' to you.

Recommendation No. 1

Recommendation: Ask your assigned Chief Examiner for the written exam sample plan ~2 weeks before **you are ready to start developing questions.**

What Do You Need to Do?

- At least one person signed on to this exam's Form ES-201-3.
- Fulfill your site's procedural requirements for exam security.
- (Optional) Provide NRC with site-specific K/A lists.

Site-Specific K/A Lists

- Any K/As with $IR < 2.5$ that should be included in the sample due to site-specific priority?

- ‘Suppression List:’ K/As that are not relevant at the subject facility.

{ref. ES-401 D.1.b}

Why Two Weeks?

- Availability of Chief Examiner, M. Meeks or P. Capehart, and Branch Chief.
- Cross-Checks and Approvals (Partial Form ES 201-1)

Westinghouse Sample Plan

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												18			6
	2				N/A					N/A			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			
Note:		<p>1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. The point total for each group and tier in the proposed outline must match that specified in the table.</p>														

Westinghouse Sample Plan

ES-401

PWR Examination Outline

[Form ES-401-](#)

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	3	3	3	N/A			3	3	N/A		3	18			6
	2				N/A					N/A			9			4
	Tier Totals				N/A					N/A			27			10
2. Plant Systems	1												28			5
	2												10			3
	Tier Totals												38			8

Sample Plans, In Theory

000029 ATWS / 1							
000038 Steam Gen. Tube Rupture / 3							
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
000054 (CE/E06) Loss of Main Feedwater / 4							
000055 Station Blackout / 6			X				
000056 Loss of Off-site Power / 6							
000057 Loss of Vital AC Inst. Bus / 6							
000058 Loss of DC Power / 6							
000062 Loss of Nuclear Svc Water / 4							

Sample Plans, In Theory

$$\left(\frac{1}{23 \text{ E/APEs}}\right) \left(\frac{1}{6 \text{ K/A Categories}}\right) = \left(\frac{1}{138}\right)$$

$$\left(\frac{1}{138}\right) \cong 0.00725 \cong 0.725\%$$

Sample Plans, In Theory

000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
000054 (CE/E06) Loss of Main Feedwater / 4							
000055 Station Blackout / 6			X				
000056 Loss of Off-site Power / 6				X			
000057 Loss of Vital AC Inst. Bus / 6					X		
000058 Loss of DC Power / 6						X	
000062 Loss of Nuclear Svc Water / 4	X						
000065 Loss of Instrument Air / 8		X					
W/E04 LOCA Outside Containment / 3							

Sample Plans, In Theory

000025 Loss of RHR System / 4							
000026 Loss of Component Cooling Water / 8							
000027 Pressurizer Pressure Control System Malfunction / 3				X			
000029 ATWS / 1					X		
000038 Steam Gen. Tube Rupture / 3						X	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	X						
000054 (CE/E06) Loss of Main Feedwater / 4		X					
000055 Station Blackout / 6			X				
000056 Loss of Off-site Power / 6							

Sample Plans, In Theory

000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
000054 (CE/E06) Loss of Main Feedwater / 4							
000055 Station Blackout / 6			X				
000056 Loss of Off-site Power / 6		X					
000057 Loss of Vital AC Inst. Bus / 6	X						
000058 Loss of DC Power / 6						X	
000062 Loss of Nuclear Svc Water / 4					X		
000065 Loss of Instrument Air / 8				X			
W/E04 LOCA Outside Containment / 3							

Sample Plans, In Theory

000025 Loss of RHR System / 4							
000026 Loss of Component Cooling Water / 8							
000027 Pressurizer Pressure Control System Malfunction / 3		X					
000029 ATWS / 1	X						
000038 Steam Gen. Tube Rupture / 3						X	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X		
000054 (CE/E06) Loss of Main Feedwater / 4				X			
000055 Station Blackout / 6			X				
000056 Loss of Off-site Power / 6							

Sample Plans, In Theory

000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
000054 (CE/E06) Loss of Main Feedwater / 4							
000055 Station Blackout / 6			X				
000056 Loss of Off-site Power / 6		X					
000057 Loss of Vital AC Inst. Bus / 6	X						
000058 Loss of DC Power / 6						X	
000062 Loss of Nuclear Svc Water / 4					X		
000065 Loss of Instrument Air / 8				X			
W/E04 LOCA Outside Containment / 3							

Sample Plans, In Theory

[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
[13] 000054 Loss of Main Feedwater / 4							
[14] 000055 Station Blackout / 6			X				
[15] 000056 Loss of Off-site Power / 6			X				
[16] 000057 Loss of Vital AC Inst. Bus / 6	X						
[17] 000058 Loss of DC Power / 6						X	
[18] 000062 Loss of Nuclear Svc Water / 4					X		
[19] 000065 Loss of Instrument Air / 8				X			
[20] W/E04 LOCA Outside Containment / 3							

Sample Plans, In Theory

EPE: 055 Loss of Offsite and Onsite Power (Station Blackout)

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>

EK3 Knowledge of the reasons for the following responses as they apply to the Station Blackout:
(CFR 41.5 / 41.10 / 45.6 / 45.13)

EK3.01	Length of time for which battery capacity is designed	2.7	3.4
EK3.02	Actions contained in EOP for loss of offsite and onsite power	4.3	4.6

ABILITY

Sample Plans, In Theory

EPE: 055 Loss of Offsite and Onsite Power (Station Blackout)

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>

EK3 Knowledge of the reasons for the following responses as they apply to the Station Blackout:
(CFR 41.5 / 41.10 / 45.6 / 45.13)

EK3.01	Length of time for which battery capacity is designed	2.7	3.4
EK3.02	Actions contained in EOP for loss of offsite and onsite power	4.3	4.6

ABILITY

$$(1/138) * (1/2) = (1/276) \sim 0.362\%$$

Sample Plans, In Theory

[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
[13] 000054 Loss of Main Feedwater / 4							
[14] 000055 Station Blackout / 6			X				
[15] 000056 Loss of Off-site Power / 6			X				
[16] 000057 Loss of Vital AC Inst. Bus / 6	X						
[17] 000058 Loss of DC Power / 6						X	
[18] 000062 Loss of Nuclear Svc Water / 4					X		
[19] 000065 Loss of Instrument Air / 8				X			
[20] W/E04 LOCA Outside Containment / 3							

Sample Plans, In Theory

APE: 056 Loss of Offsite Power

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>
AK2.	Knowledge of the interrelations between the Loss of Offsite Power and the following: (CFR 41.7 / 45.7)		
AK2.01	Valves	1.8	1.8
AK2.02	Sensors, detectors, and indicators	2.0*	1.9
AK2.03	Controllers and positioners	1.9	1.9
AK2.04	Pumps	1.7	1.7
AK2.05	Motors	1.7	1.7
AK2.06	Heat exchangers and condensers	1.6	1.7
AK2.07	Demineralizers and ion exchangers	1.6	1.6
AK2.08	Breakers, relays, and disconnects	2.1*	2.1
AK3.	Knowledge of the reasons for the following responses as they apply to		

Sample Plans, In Theory

[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
[13] 000054 Loss of Main Feedwater / 4							
[14] 000055 Station Blackout / 6			X				
[15] 000056 Loss of Off-site Power / 6			X				
[16] 000057 Loss of Vital AC Inst. Bus / 6	X						
[17] 000058 Loss of DC Power / 6						X	
[18] 000062 Loss of Nuclear Svc Water / 4					X		
[19] 000065 Loss of Instrument Air / 8				X			
[20] W/E04 LOCA Outside Containment / 3							

Red Squares

[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
[13] 000054 Loss of Main Feedwater / 4							
[14] 000055 Station Blackout / 6							
[15] 000056 Loss of Off-site Power / 6							
[16] 000057 Loss of Vital AC Inst. Bus / 6							
[17] 000058 Loss of DC Power / 6							
[18] 000062 Loss of Nuclear Svc Water / 4							
[19] 000065 Loss of Instrument Air / 8							
[20] W/E04 LOCA Outside Containment / 3							

Red Squares

APE: 057 Loss of Vital AC Electrical Instrument Bus

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>
AK1.	Knowledge of the operational implications of the following concepts as they apply to Loss of Vital AC Instrument Bus: (CFR 41.8 / 41.10 / 45.3)		
	None		
AK2.	Knowledge of the interrelations between the Loss of Vital AC Instrument Bus and the following: (CFR 41.7 / 45.7)		
AK2.01	Valves	1.9	2.1
AK2.02	Sensors, detectors, and indicators	2.2*	2.3*
AK2.03	Controllers and positioners	2.2*	2.4
AK2.04	Pumps	2.0	1.9
AK2.05	Breakers, relays and disconnects	2.2*	2.3
AK3.	Knowledge of the reasons for the following responses as they apply to		

Orange Squares

[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						
[13] 000054 Loss of Main Feedwater / 4						
[14] 000055 Station Blackout / 6						
[15] 000056 Loss of Off-site Power / 6						
[16] 000057 Loss of Vital AC Inst. Bus / 6			X			
[17] 000058 Loss of DC Power / 6						
[18] 000062 Loss of Nuclear Svc Water / 4						
[19] 000065 Loss of Instrument Air / 8						
[20] W/E04 LOCA Outside Containment / 3						

Orange Squares

APE: 057 Loss of Vital AC Electrical Instrument Bus

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>
AK3.	Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: (CFR 41.5,41.10 / 45.6 / 45.13)		
AK3.01	Actions contained in EOP for loss of vital ac electrical instrument bus ...	4.1	4.4
	<u>ABILITY</u>		

Green Squares

[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		X				
[13] 000054 Loss of Main Feedwater / 4						
[14] 000055 Station Blackout / 6						
[15] 000056 Loss of Off-site Power / 6						
[16] 000057 Loss of Vital AC Inst. Bus / 6						
[17] 000058 Loss of DC Power / 6						
[18] 000062 Loss of Nuclear Svc Water / 4						
[19] 000065 Loss of Instrument Air / 8						
[20] W/E04 LOCA Outside Containment / 3						

Green Squares

APE: 040 Steam Line Rupture

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>
AK2.	Knowledge of the interrelations between the Steam Line Rupture and the following: (CFR 41.7 / 45.7)		
AK2.01	Valves	2.6*	2.5
AK2.02	Sensors and detectors	2.6*	2.6
AK2.03	Controllers and positioners	2.4*	2.4
AK2.04	Pumps	2.0	2.1
AK2.05	Breakers, relays, and disconnects	1.9	2.1
AK2.06	Motors	2.0	2.1

Other Colors

- Gray = SRO-only
- Pink = Radiation Monitors
- Time for Trivia No. 2

Sample Plan Trivia No. 2

In accordance with rev. 2, supp. 1 of NUREG-1122 (PWR K/A Catalog), what K/A category has the most individual K/A statements (irrespective of importance rating)?

Sample Plan Trivia No. 2

A. 001 K5

SYSTEM: **001 Control Rod Drive System**

K5 **Knowledge of the following operational implications as they apply to the CRDS:**
(CFR: 41.5/45.7)

Sample Plan Trivia No. 2

B. 004 K5

SYSTEM **004 Chemical and Volume Control System**

K5 **Knowledge of the operational implications of the following concepts as they apply to the CVCS:
(CFR: 41.5/45.7)**

Sample Plan Trivia No. 2

C. 045 K4

SYSTEM **045 Main Turbine Generator (MT/G) System**

K4 **Knowledge of MT/G system design feature(s) and/or interlock(s) which provide for the following:
(CFR: 41.7)**

Sample Plan Trivia No. 2

D. 056 AA2

APE: 056 Loss of Offsite Power

**AA2. Ability to determine and interpret the following as they apply to
the Loss of Offsite Power:
(CFR: 43.5 / 45.13)**

Sample Plan Trivia No. 2

A. 001 K5

B. 004 K5

C. 045 K4

D. 056 AA2

Tier 1 / Group 1

ES-401

2

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1					
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							
000008 Pressurizer Vapor Space Accident / 3							
000009 Small Break LOCA / 3							
000011 Large Break LOCA / 3							

Why Include Safety Function?

- a. ... The emergency and abnormal plant evolutions (E/APEs) listed in Section 1.10 of the appropriate NUREG may also be used to evaluate the applicable safety function (as specified for each E/APE in the first tier of the written examination outlines attached to ES-401, “Preparing Initial Site-Specific Written Examinations”).

{ref. ES-301 D.4.a}

Tier 1 / Group 1

000009 Small Break LOCA / 3							
000011 Large Break LOCA / 3							
000015/17 RCP Malfunctions / 4							
000022 Loss of Rx Coolant Makeup / 2							
000025 Loss of RHR System / 4							
000026 Loss of Component Cooling Water / 8							

Tier 1 / Group 1

APE : 015/017 Reactor Coolant Pump (RCP) Malfunctions

<u>K/A NO.</u>	<u>KNOWLEDGE</u>	<u>IMPORTANCE</u>	
		<u>RO</u>	<u>SRO</u>
AK1.	Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): (CFR 41.8 / 41.10 / 45.3)		
AK1.01	Natural circulation in a nuclear reactor power plant	4.4	4.6
AK1.02	Consequences of an RCPS failure	3.7	4.1
AK1.03	The basis for operating at a reduced power level when one RCP is out of service	3.0 *	4.0*
AK1.04	Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow.....	2.9	3.1*
AK1.05	Effects of unbalanced RCS flow on in-core average temperature, core imbalance, and quadrant power tilt	2.7	3.3

Tier 1 / Group 1

Sample Plan Generator:

015 AK ... or 015 AA ... etc.

Tier 1 / Group 1

000029 ATWS / 1							
000038 Steam Gen. Tube Rupture / 3							
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							
000054 (CE/E06) Loss of Main Feedwater / 4							

Tier 1 / Group 1

[10] 000029 ATWS / 1					
[11] 000038 Steam Gen. Tube Rupture / 3					
[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					
[13] 000054 Loss of Main Feedwater / 4					

Tier 1 / Group 1

[10] 000029 ATWS / 1					
[11] 000038 Steam Gen. Tube Rupture / 3					
[12] 000040 (W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					
[13] 000054 Loss of Main Feedwater / 4					

Generic K/As in Tier 1/2

[21] W/E11 Loss of Emergency Coolant Recirc. / 4							
[22] W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4						X	
[23] 000077 Generator Voltage and Electric Grid Disturbances / 6							

Generic K/As in Tier 1/2

-W/E05EG2.1.44:

Question associated with Westinghouse FR-H.1, “Loss of Secondary Heat Sink,” and knowledge of RO duties in the control room during fuel handling....

Generic K/As in Tier 1/2

The topics for the generic K/A category in Tiers 1 and 2 (i.e., Column “G” on Forms ES-401-1 and ES-401-2) shall be selected from Section 2, “Generic Knowledge and Abilities,” of the applicable K/A catalog. However, only those topics that are relevant to the selected evolution or system shall be included; therefore, generic K/As for Tiers 1 and 2 for both RO and SRO examinations should be randomly selected from the following:

2.1.7, 2.1.19, 2.1.20, 2.1.23, 2.1.25, 2.1.27, 2.1.28, 2.1.30, 2.1.31, 2.1.32, 2.2.3, 2.2.4, 2.2.12, 2.2.22, 2.2.25, 2.2.36, 2.2.37, 2.2.38, 2.2.39, 2.2.40, 2.2.42, 2.2.44, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.6, 2.4.8, 2.4.9, 2.4.11, 2.4.18, 2.4.20, 2.4.21, 2.4.30, 2.4.31, 2.4.34, 2.4.35, 2.4.41, 2.4.45, 2.4.46, 2.4.47, 2.4.49, and 2.4.50.

{ref. ES-401 D.1.b}

Generic K/As in Tier 1/2

Category	K/A #	Topic
1. Conduct of Operations	2.1.	[01] G 2.1.7 [23] G 2.4.1
	2.1.	[02] G 2.1.19 [24] G 2.4.2
	2.1.	[03] G 2.1.20 [25] G 2.4.3
	2.1.	[04] G 2.1.23 [26] G 2.4.4
	2.1.	[05] G 2.1.25 [27] G 2.4.6
	2.1.	[06] G 2.1.27 [28] G 2.4.8
	Subtotal	[07] G 2.1.28 [29] G 2.4.9
	2.2.	[08] G 2.1.30 [30] G 2.4.11

Generic K/As in Tier 1/2

Examples of RO-level Tier 1/2 Generics:

G 2.2.39 Knowledge of less than or equal to one hour Technical Specification actions statements for systems.

Generic K/As in Tier 1/2

Examples of RO-level Tier 1/2 Generics:
G 2.2.39,

G 2.2.42 Ability to recognize system parameters that are entry-level conditions for Technical Specifications.

Generic K/As in Tier 1/2

Examples of RO-level Tier 1/2 Generics:
G 2.2.39, G 2.2.42,

G 2.4.4 Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.

Generic K/As in Tier 1/2

Examples of SRO-level Tier 1/2 Generics:

G 2.2.25 Knowledge of the
bases in Technical
Specifications for limiting
conditions for operations and
safety limits.

Generic K/As in Tier 1/2

Examples of SRO-level Tier 1/2 Generics:
G 2.2.25,

G 2.4.30 Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.

Sample Plan Trivia No. 3

Rev. 2, supp. 1 of NUREG-1122 (PWR K/A Catalog) states that the PWR Catalog contains approximately _____ knowledge and ability (K/A) statements for ROs and SROs at PWRs.

Sample Plan Trivia No. 3

A. 4,000

B. 5,000

C. 6,000

D. 7,000

Sample Plan Trivia No. 3

Rev. 2, supp. 1 of NUREG-1123 (BWR K/A Catalog) states that the BWR Catalog contains approximately _____ knowledge and ability (K/A) statements for ROs and SROs at BWRs.

Sample Plan Trivia No. 3

A. 4,000

B. 5,000

C. 6,000

D. 7,000

Tier 1 / Group 2

ES-401

PWR Examination Outline

[Form ES-401-](#)

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	3	3	3				3	3				3	18			6
	2				N/A					N/A				9			4
	Tier Totals													27			10
2. Plant Systems	1													28			5
	2													10			3
	Tier Totals													38			8

Tier 1 / Group 2

ES-401

PWR Examination Outline

[Form ES-401-](#)

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	3	3	3	N/A			3	3	N/A		3	18			6
	2	2	1	2	N/A			2	1	N/A		1	9			4
	Tier Totals				N/A					N/A			27			10
2. Plant Systems	1												28			5
	2												10			3
	Tier Totals												38			8

Tier 1 / Group 2

ES-401

PWR Examination Outline

[Form ES-401-](#)

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	3	3	3	N/A			3	3	N/A		3	18			6
	2	2	1	2	N/A			2	1	N/A		1	9			4
	Tier Totals	5	4	5	N/A			5	4	N/A		4	27			10
2. Plant Systems	1												28			5
	2												10			3
	Tier Totals												38			8

Tier 1 / Group 2

ES-401

PWR Examination Outline

[Form ES-401-](#)

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	3	3	3				3	3				3	18			6
	2	2	1	2	N/A			2	1	N/A			1	9			4
	Tier Totals	5	4	5				5	4				4	27			10
2. Plant Systems	1													28			5
	2													10			3
	Tier Totals													38			8

Tier 1 / Group 2

[09]	000037 Steam Generator Tube Leak / 3	Green	Red	White	White	Grey	Grey	White
[10]	000051 Loss of Condenser Vacuum / 4	Red	Red	Yellow	Yellow	Yellow	Grey	White
[11]	000059 Accidental Liquid RadWaste Rel. / 9	White	Green	White	White	Grey	Grey	Red
[12]	000060 Accidental Gaseous Radwaste Rel./ 9	White	Green	White	Green	Grey	Grey	Red
[13]	000061 ARM System Alarms / 7	Yellow	Yellow	Yellow	Yellow	Grey	Grey	Red
[14]	000067 Plant Fire On-site / 8	Green	Red	Green	White	Grey	Grey	White

Tier 1 / Group 2

[16]	000069 (W/E14) Loss of CTMT Integrity / 5							
[17]	000074 (W/E06&E07) Inad. Core Cooling / 4							
[18]	000076 High Reactor Coolant Activity / 9							
[19]	W/E01 & E02 Rediagnosis & SI Termination / 3							
[20]	W/E13 Steam Generator Over-pressure / 4							
[21]	W/E15 Containment Flooding / 5							

Tier 2/Group 1

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*	Tot		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18			6		
	2	2	1	2	N/A			2	1	N/A		1	9			4		
	Tier Totals	5	4	5	N/A			5	4	N/A		4	27			10		
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	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

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

Tier 2/Group 1

[08] 012 Reactor Protection		Yellow			Green		Yellow	Grey	Green		Grey	
[09] 013 Engineered Safety Features Actuation		Yellow				Yellow		Grey	Green		Grey	
[10] 022 Containment Cooling		Green	Green		Red	Red		Grey	Yellow		Grey	
[22] 025 Ice Condenser		Red	Yellow	Yellow	Green	Yellow		Grey	Green	Green	Grey	
[11] 026 Containment Spray	Green	Green	Green		Red	Red		Grey	Green	Green	Grey	
[12] 039 Main and Reheat Steam		Red				Red		Grey	Yellow		Grey	
[13] 059 Main Feedwater		Red			Red	Red	Green	Grey			Grey	

Tier 2/Group 1

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)										
System # / Name	1	2	3	4	5	6	7	8	9	10	11
	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G
[01] 003 Reactor Coolant Pump											
[02] 004 Chemical and Volume Control											
[03] 005 Residual Heat Removal											
[04] 006 Emergency Core Cooling											
[05] 007 Pressurizer Relief/Quench Tank											

Tier 2/Group 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*	T	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18			
	2	2	1	2	N/A			2	1	N/A			1	9			
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27			
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28				
	2	1	1	1	0	1	1	1	1	1	1	1	10				
	Tier Totals												38				
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

Tier 2/Group 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*	To	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18			
	2	2	1	2	N/A			2	1	N/A			1	9			
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27			
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28				
	2	1	1	1	0	1	1	1	1	1	1	1	10				
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38				
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

Tier 2/Group 2

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)										
System # / Name	1	2	3	4	5	6	7	8	9	10	11
	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G
[01] 001 Control Rod Drive											
[02] 002 Reactor Coolant											
[03] 011 Pressurizer Level Control											
[04] 014 Rod Position Indication											

Tier 2/Group 2

[15] 045 Main Turbine Generator												
[16] 055 Condenser Air Removal												
[17] 056 Condensate												
[18] 068 Liquid Radwaste												
[19] 071 Waste Gas Disposal												
[20] 072 Area Radiation Monitoring												
[21] 075 Circulating Water												

Tier 3

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	3	3	3	N/A			3	3	N/A			3	18			6	
	2	2	1	2	N/A			2	1	N/A			1	9			4	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27			10	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28			5		
	2	1	1	1	0	1	1	1	1	1	1	1	10			3		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38			8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					2		3		2		3							

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

Sample Plan Trivia No. 4

How many individual K/As in rev. 2, supp. 1 of NUREG-1122 (PWR K/A Catalog) have Importance Ratings of “TBD”?

Sample Plan Trivia No. 4

A. none

B. 2

C. 5

D. 6

Sample Plan Trivia No. 4

How many individual K/As in rev. 2, supp. 1 of NUREG-1123 (BWR K/A Catalog) have Importance Ratings of “TBD”?

SRO Exam Tier 1

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	3	3	3	N/A			3	3	N/A			3	18	3	3	6		
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4		
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10		
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28			5			
	2	1	1	1	0	1	1	1	1	1	1	1	10			3			
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38			8			
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					2		3		2		3								

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

SRO Exam Tier 2/Group 1

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	3	3	3	N/A			3	3	N/A			3	18	3	3	6		
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4		
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10		
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	2	3	5			
	2	1	1	1	0	1	1	1	1	1	1	1	10			3			
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38			8			
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					2		3		2		3								

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

SRO Exam Tier 2/Group 1

Ability:		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	3	3	3	N/A			3	3	N/A			3	18	3	3	6	
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3	2	5		
	2	1	1	1	0	1	1	1	1	1	1	1	10			3		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38			8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					2		3		2		3							

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

SRO Exam Tier 2/Group 2

Ability:		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	3	3	3	N/A			3	3	N/A			3	18	3	3	6	
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3	2	5		
	2	1	1	1	0	1	1	1	1	1	1	1	10	0	1	3		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38			8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					2		3		2		3							

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

SRO Exam Tier 2/Group 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	3	3	3	N/A			3	3	N/A			3	18	3	3	6		
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4		
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10		
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3	2	5			
	2	1	1	1	0	1	1	1	1	1	1	1	10	0	2	1	3		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38				8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4	7
					2		3		2		3								

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

SRO Exam Tier 2/Group 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	3	3	3	N/A			3	3	N/A			3	18	3	3	6	
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3	2	5		
	2	1	1	1	0	1	1	1	1	1	1	1	10	1	1	3		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38			8		
3. Generic Knowledge and Abilities Categories					1	2	3	4					10	1	2	3	4	7
					2	3	2	3										

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

SRO Exam Tier 2/Group 2

[11] 033 Spent Fuel Pool Cooling	Green	Red	White	White	Red	Red	Green	Grey	Green	Red	Grey
[12] 034 Fuel Handling Equipment	Grey	Red	Red	Grey	Red	Yellow	Yellow	Grey	Grey	Green	Grey
[13] 035 Steam Generator	White	Red	White	White	Green	White	Green	Grey	Green	White	Grey
[14] 041 Steam Dump/Turbine Bypass Control	White	Green	White	White	White	Yellow	Green	Green	White	White	Grey
[15] 045 Main Turbine Generator	White	Red	Yellow	White	White	Red	Green	Grey	White	White	Grey

SRO Exam Tier 3

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	3	3	3	N/A			3	3	N/A			3	18	3	3	6	
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	4	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	10	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3	2	5		
	2	1	1	1	0	1	1	1	1	1	1	1	10	1	1	1	3	
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38	5	3	8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					2		3		2		3			2	1	2	2	

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

Sample Plan Trivia No. 5

What do the symbols mean next to the importance ratings?

Sample Plan Trivia No. 5

What do the symbols mean next to the importance ratings?

(*) = (1) Rating spread was very broad, or (2) more than 15% of the raters indicated that the knowledge or ability is not required for the RO/SRO position at their plant.

Sample Plan Trivia No. 5

What do the symbols mean next to the importance ratings?

(?) = More than 15% of the raters felt that they were not familiar with the knowledge or ability as related to the particular system or design feature.

Sample Plan Trivia No. 5

What do the symbols mean next to the importance ratings?

(†) = More than 20% of the raters indicated that the level of knowledge or ability required by an SRO is different than the level of knowledge or ability required by an RO.

K/A Changes

- No limit to number of K/A changes
- Try to stay in same system and category if possible (004 K5)
- Extra care in Tier 2/Group 1...

K/A Changes

Need to replace RO K/A 007K5.02...

SYSTEM:	007 Pressurizer Relief Tank/Quench Tank System (PRTS)		
K5	Knowledge of the operational implications of the following concepts as they apply to PRTS: (CFR: 41.5 / 45.7)		
K5.01	Principles of steam quenching	2.2	2.6
K5.02	Method of forming a steam bubble in the PZR	3.1	3.4
K5.03	Characteristics of convection heat transfer	1.8	2.1
K5.04	Properties of noncondensable gases in contact with water	1.9	2.2
K5.05	Characteristics of conduction heat transfer	1.8	2.1
K5.06	Properties of condensable gases in contact with water	1.9	2.2
K6	Knowledge of the effect of a loss or malfunction on the following will have		

K/A Changes

Need to replace RO K/A 007K5.02...

Note 4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.

K/A Changes

Need to replace RO K/A 007K5.02...

System # / Name	1	2	3	4	5	6	7	8	9	10	11	K/A Topic(s)
	K 1	K 2	K 3	K 4	K5	K6	A 1	A 2	A 3	A 4	G	
[01] 003 Reactor Coolant Pump												
[02] 004 Chemical and Volume Control												
[03] 005 Residual Heat Removal												
[04] 006 Emergency Core Cooling												
[05] 007 Pressurizer Relief/Quench Tank					X	→	X					
[06] 008 Component Cooling Water												
[07] 010 Pressurizer Pressure Control												

K/A Changes

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*		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	3		3	
	2	2	1	2	N/A			2	1	N/A			1	9	2		2	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5		5	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3		2		
	2	1	1	1	0	1	1	1	1	1	1	1	10	1	1	1		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38	5		3		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4
					2		3		2		3				2	1	2	2

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

K/A Changes

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*		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	3		3	
	2	2	1	2	N/A			2	1	N/A			1	9	2		2	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5		5	
2. Plant Systems	1	2	3	3	2	3	2	3	3	3	2	2	28	3		2		
	2	1	1	1	0	1	1	1	1	1	1	1	10	1	1	1		
	Tier Totals	3	4	4	2	4	3	4	4	4	3	3	38	5		3		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4
					2		3		2		3				2	1	2	2

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

K/A Changes

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*		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	3	3	
	2	2	1	2	N/A			2	1	N/A			1	9	2	2	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5	5	
2. Plant Systems	1	2	3	3	2	2	2	4	3	3	2	2	28	3	2		
	2	1	1	1	0	1	1	1	1	1	1	1	10	1	1	1	
	Tier Totals	3	4	4	2	3	3	5	4	4	3	3	38	5	3		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4
					2		3		2		3			2	1	2	2

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

K/A Changes

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*		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	3		3	
	2	2	1	2	N/A			2	1	N/A			1	9	2		2	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5		5	
2. Plant Systems	1	2	3	3	3	2	2	3	3	3	2	2	28	3		2		
	2	1	1	1	1	0	1	1	1	1	1	1	10	1	1	1		
	Tier Totals	3	4	4	4	2	3	4	4	4	3	3	38	5		3		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	
					2		3		2		3			2	1	2	2	

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

K/A Changes

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*		
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	3		3	
	2	2	1	2	N/A			2	1	N/A			1	9	2		2	
	Tier Totals	5	4	5	N/A			5	4	N/A			4	27	5		5	
2. Plant Systems	1	2	3	3	3	1	2	4	3	3	2	2	28	3		2		
	2	1	1	1	1	0	1	1	1	1	1	1	10	1	1	1		
	Tier Totals	3	4	4	4	1	3	5	4	4	3	3	38	5		3		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10		1	2	3	4
					2		3		2		3				2	1	2	2

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

In Summary

- Sample Plan Process
- Developed a Hypothetical Sample Plan
- Discussed Aspects of K/A Changes on Sample Plans

THE END!

Exam Submittal Plausibility

**NUREG 1021, ES-401
PREPARING INITIAL SITE-SPECIFIC
WRITTEN EXAMINATIONS
D.2.b**

Ensure that each question is technically accurate
*And free of the following psychometric flaws that
Could diminish the validity of the examination:*

- implausible distractors

**NUREG 1021, ES-
401.D.2.g**

- To facilitate the review process, examination authors should consider providing a brief explanation of why the answer is correct, and each of the distractors is plausible but incorrect.
- This **optional practice increases the efficiency** of the examination review process and promotes the detection and correction of problem questions before the examinations are administered. **Or reviewed by the NRC**

NUREG 1021, Appx. B Att.1 Question Dev. Checklist

- 12. Are the answer options homogeneous and highly plausible? Are common misconceptions used as distractors? Is the question free of trivial distractors?

NUREG 1021, ES-401-9

3. Check the appropriate box if a psychometric flaw is identified:

- The distractors are not credible; single implausible distractors should be repaired, more than one is unacceptable.


UNSAT

Why are plausibility statements important?

- It helps identify flaws.
- It helps in developing higher quality questions.

Poor plausibility descriptions result in:

- More time spent by us in researching the questions and answers.
- More time spent by you answering our questions.
- More \$\$\$\$ spent on preparing the exam.

What makes a good plausibility statement?

- Why is the answer incorrect?
- Why would someone think it is correct?

Example – Good Statement

Given the following Unit 1 conditions:

- Both ND pumps are operating in RHR mode.
- Cold Leg temperatures are:
 - Loop 1A: 215.4°F
 - Loop 1B: 214.1°F
 - Loop 1C: 211.8°F
 - Loop 1D: 209.4°F
- The 1ND-3 (1A ND Pump Suction From NC Loop B Header Relief) lift setpoint is WITHIN the required range.
- The 1ND-38 (1B ND Pump Suction From NC Loop C Header Relief) lift setpoint is OUTSIDE of the required range.
- One PORV (1NC-32B) is INOPERABLE.

Considering only the above conditions, is entry into LCO 3.4.12, (Low Temperature Overpressure) required, and why or why not?

A. YES, because only ONE PORV is operable.

B. NO, because the LCO does not apply for the given Unit conditions.

C. **NO, because Unit conditions satisfy the requirements of the specification.**

D. YES, because only ONE ND suction relief valve lift setpoint is within the required range.

Example – Good Statement

Distractor Analysis

A. **Incorrect.** Plausible that the LCO is entered with only one PORV operable, since two PORVs is part of the actual specification. But with one RHR suction relief valve also operable, the LTOP protection is considered adequate, per the specification.

B. **Incorrect.** Plausible that the specification does not apply: many plant parameters require a 2 /4 condition to be considered "valid" - here the applicant sees that only ONE Tcold is less than the temperature of applicability, and thinks that two Tcolds $\leq 210^{\circ}\text{F}$ are required for the spec. to be applicable.

C. **CORRECT.** LCO 3.4.12, (LTOP) requires either of the following:
Two PORVs OR
Two RHR suction relief valves OR
One RHR suction relief valve AND one PORV

Since one PORV and one RHR suction relief is operable, the requirements of the spec. are met. The spec. applies in MODE 4 with any RCS cold leg temperature $\leq 210^{\circ}\text{F}$.

D. **Incorrect.** Plausible to think that TWO RHR suction relief valves are required, because both trains of RHR are in service. But, with one PORV AND one RHR suction relief valve, adequate LTOP protection exists, per the specification.

Is it incorrect enough?

- Typically, appeals are won by a distractor that isn't wrong enough.
- There can be a fine line between an answer being correct and incorrect.

Why is it incorrect?

Sometimes, the distractor analysis just doesn't state why the answer is incorrect.

We have to research it.

We will bill you for it.

Why is it plausible?
Why are we having this discussion?

"It's plausible because..."

Why is it plausible?
• If the applicant is confused about the setpoint, he may think that this is correct.

Why would he be confused?

Why is it plausible?
• If the applicant doesn't know the correct answer, they may think that this is correct.

Really?

Why is it plausible?

- It's the opposite of the correct answer.
- At (another plant), this could be correct.
- If the applicant assumes..... they may think it's correct.

Why is it plausible?

- If the applicant is not familiar with the procedure he may choose this answer.
- There is no plausibility statement.

Why is it plausible?

Good examples:

In mode X, it would be correct

Given the following:

- Unit 1 is in Mode 3 with RCS temperature at 390°F during a plant heatup.
- The MSIV bypass valves are open to warm the Main Steam Lines.
- Differential pressure across the MSIVs is 30 psid.
- The operating crew is planning to open the MSIVs when the steamline temperature criteria is met.

Which ONE of the following completes the statements below?

The lowest of the listed Steam Line temperatures that will meet the criteria to open the MSIVs is __ (1) __ in accordance with SOI-1.01, "Main Steam System."

When the first MSIV is opened, the affected SG level will tend to __ (2) __.

A. (1)379°F (2)shrink
B. (1)379°F (2)swell
C. (1)386°F (2)shrink
D. (1)386°F (2)swell

DISTRACTOR ANALYSIS:

A. Incorrect, Plausible because the steam lines being required to be a minimum of 12°F less than RCS temperature would be correct prior to Mode 3 entry and the steam generator level shrinking would be a misconception but plausible because additional inventory is being removed from the steam generator.

B. Incorrect, Plausible because the steam lines being required to be a maximum of 12°F less than RCS temperature would be correct prior to Mode 3 entry and the steam generator level swelling is correct.

C. Incorrect, Plausible because the steam lines being required to be a minimum of 385°F is correct and the steam generator level shrinking would be a misconception but plausible because additional inventory is being removed from the steam generator.

D. Correct, SOI-1.01 identifies if using deltaT to determine when the MSIVs can be opened after entering Mode 3, then the deltaT between the steam lines and the RCS must be within 5°F. With RCS at 390 °F the steam line temperatures must be at least 385°F, and one of the effects when opening the MSIVs is a steam generator level swell due to the pressure dropping.

If RCS pressure were XXX, it would be correct.

A transient has occurred on Unit One causing the following plant conditions:

- Drywell pressure 12 psig
- Reactor water level 65 inches
- Reactor pressure 360 psig

Which one of the following choices completes the statement below?
Core Spray A Inboard Injection Valve (E2-FOO5A) is (1) , and Mm Flow Bypass Valve (E2-FO31A) is (2) .

A. (1) open
(2) open

B. (1) open
(2) closed

C. (1) closed
(2) open

D. (1) closed
(2) closed

Answer: A

Explanation: Initiation signal present due to low RPV pressure and high DW pressure. Injection valves are open <410 psig, but RPV press is above 300 psig, the shutoff head of the pump; therefore the pump will be running on min flow.

Distractor Analysis:

Choice A: Correct Answer, see explanation

Choice B: Plausible because if reactor pressure was below 300 psig, Core Spray would be injecting (discharge pressure greater than shutoff head) and the minimum flow valve would be closed.

Choice C: Plausible because if reactor pressure was above 410 psig, the discharge valve Foo5A would be closed and the minimum flow valve FO31A would be open.

Choice D: Plausible because if an initiation signal was not present, the injection valve would be closed.

Why is it plausible?

- On the other unit, it would be correct.

Obviously, this is not applicable to everyone.

Example

Unit 2 has experienced a large break Loss of Coolant accident with the following conditions:

- Two (2) Containment fan coolers are operating.
- One Containment Spray pump operating with 2500 gpm flow.
- Containment temperature is 245°F.
- Containment pressure is 22 psig.
- Hydrogen Concentration is 0.5%.

Which of the following MINIMUM actions are necessary to meet the Containment Temperature and Pressure control safety function?

- A. Start an additional Containment Spray pump and ensure Spray flow is 2550 gpm or greater.
- B. Increase the flow rate on the running Containment Spray pump to 2550 gpm or greater.
- C. Start one additional Containment Cooler.
- D. Start two additional Containment Coolers.

Explanation (Optional):

- A. Would be correct if Unit 1 question. Unit 1 requires 2550 gpm flow or greater in addition to two Containment Coolers.
- B. Would be correct if Unit 1 question.
- C. Would be incorrect for both units.
- D. Correct. One CS pump with flow 2700 gpm or greater and two Containment coolers OR Four Containment coolers.

It is a setpoint on a similar system.

- The "A" distractor is plausible if the applicant confuses the setpoints between the upscale alarm and the upscale trip alarm (80/125 vs 115/125). The second part is correct.
- The "B" distractor is plausible if the applicant confuses the setpoints between the upscale alarm and the upscale trip alarm (80/125 vs 115/125). The second part is plausible if the applicant thinks that the front panel IRM lights will remain illuminated and confuses this with the back panel indication.
- The "C" distractor is plausible since the first part is correct and the second is plausible if the applicant thinks that the front panel IRM lights will remain illuminated and confuses this with the back panel indication.

Why is it plausible?

- It would be correct if in a different procedure (i.e. rapid shutdown as opposed to a normal shutdown).
- The limit would apply if in a different procedure.

Why is it plausible?

- In general, why would a applicant choose this answer.

Unit 1 Main Steam System SOI-1.01 Rev. 0042 Page 84 of 90

Appendix C (Page 1 of 1)
Guidelines for Opening MSIVs

1.0 DISCUSSION
When a MSIV is opened, steam flow transients may include RCS cooldown and reactivity transient, SG Level swell and Feedwater Isolation, Steam line pressure drop and Steam line Isolation, and Water/Steam Hammer. To preclude these adverse effects, the AP across the MSIV must be minimized before opening. The decision to open MSIV is based on evaluation of current parameters.

2.0 CRITERIA
At least one of the following criteria should be satisfied BEFORE opening an MSIV:

A. Actual z/P less than 25 psid. This may be read from installed SG Pressures and downstream header press [1-M-4]. If installed, temporary instruments may be used.

B. Downstream piping "fully warmed". This may be obtained by comparing **Distractor** points T2300 thru T2303 with RCS Temperature [1-M-5]. Steam line temp should be within 50°F of RCS Temperature while less than 250°F; within 12°F of RCS Temperature between 250 and 350°F, and within 5°F of RCS Temperature in mode 2 or 3. **Correct**

C. Excessive flow is NOT heard locally through the open MSIV Bypass **Correct**

Unit 2 initial conditions:

- Reactor startup in progress
- Control Rod Groups 1-4 are fully withdrawn
- Control Rod Group 5 is fully inserted

Current conditions:

- A group 2 safety rod drops fully into the core and cannot be moved
- SDM has been determined NOT to be within the limit specified in the COLR

Based on the above conditions:

(1) Is entry into TS 3.1.5, SAFETY ROD POSITION LIMITS, required?
 (2) What is the maximum time allowed to initiate boration to restore SDM to within the limit stated in the COLR?

A. (1) yes
 (2) 1 hour
 B. (1) yes
 (2) 15 minutes
 C. (1) no
 (2) 1 hour
 D. (1) no
 (2) 15 minutes

A. 1st part is incorrect but plausible because as soon as Group 5 rod bottom lights are cleared during withdrawal, the rod withdrawal is stopped and Mode 2 is declared which would make TS 3.1.5 applicable. 2nd part is incorrect but plausible because this is the time requirement in TS 3.1.5 which would be applicable during Modes 1 & 2.

B. 1st part is incorrect but plausible (see A). 2nd part is correct.

C. 1st part is correct because the plant is still in mode 3 therefore, TS 3.1.5 is not applicable. 2nd part is incorrect (see A).

D. Correct.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

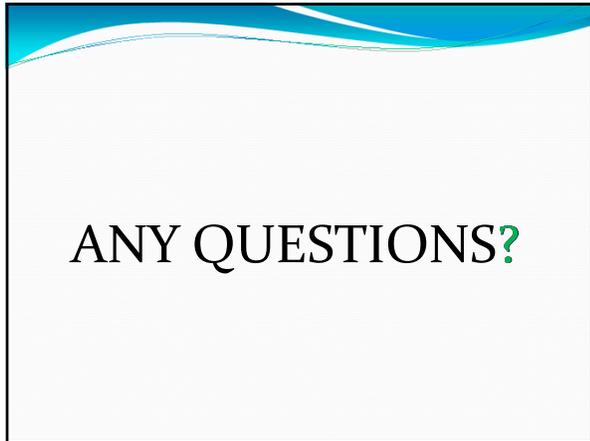
LCO 3.1.1 The SDM shall be within the limit specified in the COLR.

APPLICABILITY: **MODES 3, 4, and 5.**

ACTIONS

CONDITION	REQ ACTION	COMP TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

Note: An arrow points from 'MODES 3, 4, and 5' to the '15 minutes' cell in the table, with the word 'Correct' written above the arrow.



Exam Submittal Plausibility

NUREG 1021, ES-401

PREPARING INITIAL SITE-SPECIFIC WRITTEN EXAMINATIONS

D.2.b

Ensure that each question is technically accurate
*And free of the following psychometric flaws that
Could diminish the validity of the examination:*

- implausible distractors

NUREG 1021, ES-401.D.2.g

- To facilitate the review process, examination authors should consider providing a brief explanation of why the answer is correct, and each of the distractors is plausible but incorrect.
- This ***optional practice increases the efficiency*** of the examination review process and promotes the detection and correction of problem questions before the examinations are administered. **Or reviewed by the NRC**

NUREG 1021, Appx. B Att.1 Question Dev. Checklist

- 12. Are the answer options homogeneous and highly plausible? Are common misconceptions used as distractors? Is the question free of trivial distractors?

NUREG 1021, ES-401-9

3. Check the appropriate box if a psychometric flaw is identified:

- The distractors are not credible; single implausible distractors should be repaired, more than one is unacceptable.



UNSAT

Why are plausibility statements important?

- It helps identify flaws.
- It helps in developing higher quality questions.

Poor plausibility descriptions result in:

- More time spent by us in researching the questions and answers.
- More time spent by you answering our questions.
- More \$\$\$\$ spent on preparing the exam.

What makes a good plausibility statement?

- Why is the answer incorrect?
- Why would someone think it is correct?

Example – Good Statement

Given the following Unit 1 conditions:

- Both ND pumps are operating in RHR mode.
- Cold Leg temperatures are:
 - Loop 1A: 215.4°F
 - Loop 1B: 214.1°F
 - Loop 1C: 211.8°F
 - Loop 1D: 209.4°F
- The 1ND-3 (1A ND Pump Suction From NC Loop B Header Relief) lift setpoint is **WITHIN** the required range.
- The 1ND-38 (1B ND Pump Suction From NC Loop C Header Relief) lift setpoint is **OUTSIDE** of the required range.
- One PORV (1NC-32B) is **INOPERABLE**.

Considering only the above conditions, is entry into LCO 3.4.12, (Low Temperature Overpressure) required, and why or why not?

- A. YES, because only ONE PORV is operable.
- B. NO, because the LCO does not apply for the given Unit conditions.
- C. **NO, because Unit conditions satisfy the requirements of the specification.**
- D. YES, because only ONE ND suction relief valve lift setpoint is within the required range.

Example – Good Statement

Distractor Analysis

A. Incorrect. Plausible that the LCO is entered with only one PORV operable, since two PORVs is part of the actual specification. But with one RHR suction relief valve also operable, the LTOP protection is considered adequate, per the specification.

B. Incorrect. Plausible that the specification does not apply: many plant parameters require a 2 /4 condition to be considered "valid" - here the applicant sees that only ONE Tcold is less than the temperature of applicability, and thinks that two Tcolds $\leq 210^{\circ}\text{F}$ are required for the spec. to be applicable.

C. **CORRECT.** LCO 3.4.12, (LTOP) requires either of the following:

Two PORVs OR
Two RHR suction relief valves OR
One RHR suction relief valve AND one PORV

Since one PORV and one RHR suction relief is operable, the requirements of the spec. are met. The spec. applies in MODE 4 with any RCS cold leg temperature $\leq 210^{\circ}\text{F}$.

D. Incorrect. Plausible to think that TWO RHR suction relief valves are required, because both trains of RHR are in service. But, with one PORV AND one RHR suction relief valve, adequate LTOP protection exists, per the specification.

Is it incorrect enough?

- Typically, appeals are won by a distractor that isn't wrong enough.
- There can be a fine line between an answer being correct and incorrect.

Why is it incorrect?

Sometimes, the distractor analysis just doesn't state why the answer is incorrect.

We have to research it.

We will bill you for it.

Why is it plausible?

Why are we having this discussion?

“It’s plausible because...”

Why is it plausible?

- If the applicant is confused about the setpoint, he may think that this is correct.

Why would he be confused?

Why is it plausible?

- If the applicant doesn't know the correct answer, they may think that this is correct.

Really?

Why is it plausible?

- It's the opposite of the correct answer.
- At (another plant), this could be correct.
- If the applicant assumes..... they may think it's correct.

Why is it plausible?

- If the applicant is not familiar with the procedure he may choose this answer.
- There is no plausibility statement.



Why is it plausible?

Good examples:

In mode X, it would be correct

Given the following:

- Unit 1 is in Mode 3 with RCS temperature at 390°F during a plant heatup.
- The MSIV bypass valves are open to warm the Main Steam Lines.
- Differential pressure across the MSIVs is 30 psid.
- The operating crew is planning to open the MSIVs when the steamline temperature criteria is met.

Which ONE of the following completes the statements below?

The lowest of the listed Steam Line temperatures that will meet the criteria to open the MSIVs is __(1)__ in accordance with SOI-1.01, "Main Steam System."

When the first MSIV is opened, the affected SG level will tend to __(2)__.

- A. (1)379°F (2)shrink
- B. (1)379°F (2)swell
- C. (1)386°F (2)shrink
- D. (1)386°F (2)swell**

DISTRACTOR ANALYSIS:

- A. Incorrect, Plausible because the steam lines being required to be a minimum of 12°F less than RCS temperature would be correct prior to Mode 3 entry and the steam generator level shrinking would be a misconception but plausible because additional inventory is being removed from the steam generator.
- B. Incorrect, Plausible because the steam lines being required to be a maximum of 12°F less than RCS temperature would be correct prior to Mode 3 entry and the steam generator level swelling is correct.

C. Incorrect, Plausible because the steam lines being required to be a minimum of 385°F is correct and the steam generator level shrinking would be a misconception but plausible because additional inventory is being removed from the steam generator.

D. Correct, SOI-1.O1 identifies if using ΔT to determine when the MSIVs can be opened after entering Mode 3, then the ΔT between the steam lines and the RCS must be within 5°F . With RCS at 390°F the steam line temperatures must be at least 385°F , and one of the effects when opening the MSIVs is a steam generator level swell due to the pressure dropping.

If RCS pressure were XXX, it would be correct.

A transient has occurred on Unit One causing the following plant conditions:

- Drywell pressure 12 psig
- Reactor water level 65 inches
- Reactor pressure 360 psig

Which one of the following choices completes the statement below?

Core Spray A Inboard Injection Valve (E21-FOO₅A) is (1) , and Mm Flow Bypass Valve (E21-FO₃IA) is (2)

- A. (1) open
 (2) open
- B. (1) open
 (2) closed
- C. (1) closed
 (2) open
- D. (1) closed
 (2) closed

Answer: A

Explanation: Initiation signal present due to low RPV pressure and high DW pressure. Injection valves are open <410 psig, but RPV press is above 300 psig, the shutoff head of the pump; therefore the pump will be running on min flow.

Distractor Analysis:

Choice A: Correct Answer, see explanation

Choice B: Plausible because if reactor pressure was below 300 psig, Core Spray would be injecting (discharge pressure greater than shutoff head) and the minimum flow valve would be closed.

Choice C: Plausible because if reactor pressure was above 410 psig, the discharge valve FO05A would be closed and the minimum flow valve FO31A would be open.

Choice D: Plausible because if an initiation signal was not present, the injection valve would be closed.

Why is it plausible?

- On the other unit, it would be correct.

Obviously, this is not applicable to everyone.

Example

Unit 2 has experienced a large break Loss of Coolant accident with the following conditions:

- Two (2) Containment fan coolers are operating.
- One Containment Spray pump operating with 2500 gpm flow.
- Containment temperature is 245°F.
- Containment pressure is 22 psig.
- Hydrogen Concentration is 0.5%.

Which of the following MINIMUM actions are necessary to meet the Containment Temperature and Pressure control safety function?

- A. Start an additional Containment Spray pump and ensure Spray flow is 2550 gpm or greater.
- B. Increase the flow rate on the running Containment Spray pump to 2550 gpm or greater.
- C. Start one additional Containment Cooler.
- D. Start two additional Containment Coolers.

Explanation (Optional):

- A. Would be correct if Unit 1 question. Unit 1 requires 2550 gpm flow or greater in addition to two Containment Coolers.
- B. Would be correct if Unit 1 question.
- C. Would be incorrect for both units.
- D. Correct. One CS pump with flow 2700 gpm or greater and two Containment coolers OR Four Containment coolers.

It is a setpoint on a similar system.

- The "A" distractor is plausible if the applicant confuses the setpoints between the upscale alarm and the upscale trip alarm (80/125 vs 115/125). The second part is correct.
- The "B" distractor is plausible if the applicant confuses the setpoints between the upscale alarm and the upscale trip alarm (80/125 vs 115/125). The second part is plausible if the applicant thinks that the front panel IRM lights will remain illuminated and confuses this with the back panel indication.
- The "C" distractor is plausible since the first part is correct and the second is plausible if the applicant thinks that the front panel IRM lights will remain illuminated and confuses this with the back panel indication.

Why is it plausible?

- It would be correct if in a different procedure (i.e. rapid shutdown as opposed to a normal shutdown).
- The limit would apply if in a different procedure.

Why is it plausible?

- In general, why would a applicant choose this answer.

Appendix C

(Page 1 of 1)

Guidelines for Opening MSIVs

Correct

1.0 DISCUSSION

When a MSIV is opened, steam flow transients may include RCS cooldown and reactivity transient, SG Level swell and Feedwater Isolation, Steam line pressure drop and Steam line Isolation, and Water/Steam Hammer. To preclude these adverse effects, the AP across the MSIV must be minimized before opening. The decision to open MSIV is based on evaluation of current parameters.

2.0 CRITERIA

At least one of the following criteria should be satisfied BEFORE opening an MSIV:

A. Actual z\|P less than 25 psid. This may be read from installed SG Pressures and downstream header press [1-M-4]. If installed, temporary instruments may be used.

B. Downstream piping “fully warmed”. This may be obtained by comparing temperature points T2300 thru T2303 with RCS Temperature [1-M-51]. Steam line temp should be within 50°F of RCS Temperature while less than 250°F, within 12°F of RCS Temperature between 250 and 350°F, and within 5°F of RCS Temperature in mode 2 or 3.

Correct

C. Excessive flow is NOT heard locally through the open MSIV Bypass

Distractor

Unit 2 initial conditions:

- Reactor startup in progress
- Control Rod Groups 1-4 are fully withdrawn
- Control Rod Group 5 is fully inserted

Current conditions:

- A group 2 safety rod drops fully into the core and cannot be moved
- SDM has been determined NOT to be within the limit specified in the COLR

Based on the above conditions:

- (1) Is entry into TS 3.1.5, SAFETY ROD POSITION LIMITS, required?
- (2) What is the maximum time allowed to initiate boration to restore SDM to within the limit stated in the COLR?

- A. (1) yes
(2) 1 hour
- B. (1) yes
(2) 15 minutes
- C. (1) no
(2) 1 hour
- D (1) no
(2) 15 minutes**

- A. 1st part is incorrect but plausible because as soon as Group 5 rod bottom lights are cleared during withdrawal, the rod withdrawal is stopped and Mode 2 is declared which would make TS 3.1.5 applicable. 2nd part is incorrect but plausible because this is the time requirement in TS 3.1.5 which would be applicable during Modes 1 & 2.
- B. 1st part is incorrect but plausible (see A). 2nd part is correct.
- C. 1st part is correct because the plant is still in mode 3 therefore, TS 3.1.5 is not applicable. 2nd part is incorrect (see A).
- D. Correct.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN (SDM)

LCO 3.1.1 The SDM shall be within the limit specified in the COLR.

APPLICABILITY: **MODES 3, 4, and 5.**

ACTIONS

Correct

CONDITION	REQ ACTION	COMP TIME
A. SDM not within limit.	A.1 Initiate boration to restore SDM to within limit.	15 minutes

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 Safety Rod Position Limits

LCO 3.1.5 Each safety rod shall be fully withdrawn.

-----NOTE-----

Not required for any safety rod positioned to perform SR 3.1.4.2.

APPLICABILITY: **MODES 1 and 2.**

Distractor

ACTIONS

CONDITION	REQ ACTION	COMP TIME
A. One SAFETY ROD NOT FULLY WITHDRAWN	A.1 Withdraw the rod fully.	15 minutes
	<u>OR</u> A.2.1.1 Verify SDM is within the limit specified in the COLR	1 hour
	<u>OR</u> A2.1.2 Initiate boration to restore SDM to within limit.	1 hour

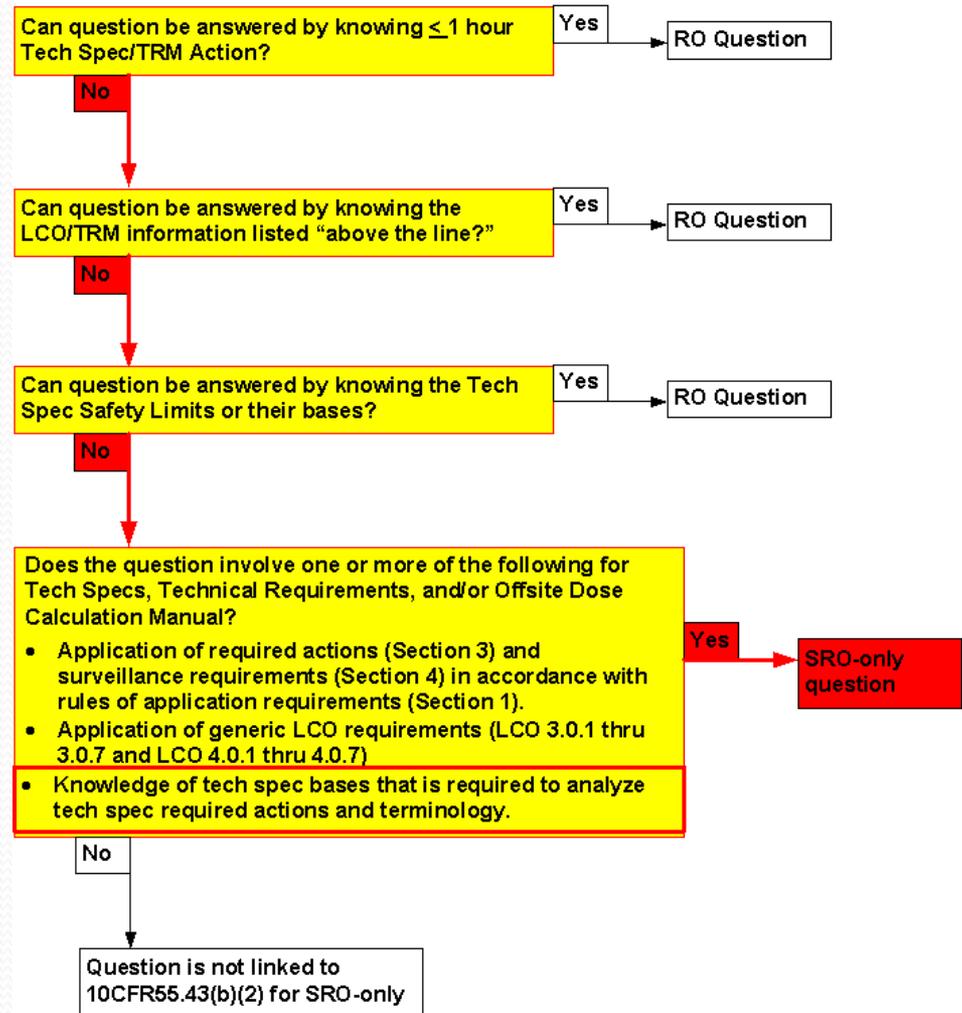
**Unit Startup From 532°F/2155 psig
To MODE 1**

- 3.15 **IF** PT/0/A/0711/001 (ZPPT) is **NOT** in progress, perform the following:
- Ensure SEQUENCE is selected on Diamond. (R.M.)
 - Ensure "LO SET" selected for NI Recorder per OP/0/A/1108/001 (Curves and General Information).
- 3.16 Begin withdrawing Regulating CRDs per OP/1/A/1105/019 (Control Rod Drive System). (R.M.)
- 3.17 WHEN Group 5 rods are off IN LIMIT, stop Group 5 rod withdrawal.**
- 3.18 Perform the following:**
- Ensure **MODE 2** selected on OAC.
 - Ensure **MODE 2** selected for Unit 1 in TSAIL.
 - Announce on Plant Page "Unit 1 has entered **MODE 2**".
 - Notify Assistant Outage Manager of Unit 1 entry into **MODE 2**.

_____/_____
Person Notified Date Time

Figure 1: Screening for SRO-only linked to 10CFR55.43(b)(2) (Tech Specs)

Why is it SRO Only?





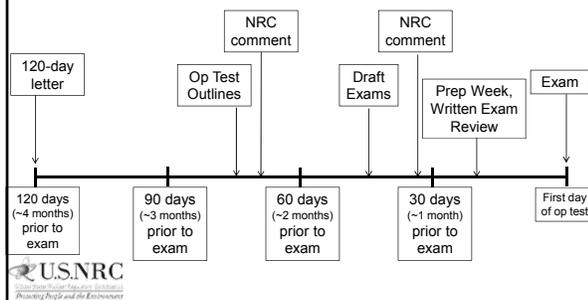
ANY QUESTIONS?

What happens next

- Exam Prep Week (ES 301 C.1.d, C.1.e, E.2.b, E.2.e)
 - Typically occurs 2-3 weeks prior to the Operating Test
- Written Exam In-office Review (ES 401 C.1.d, E.2.e)
 - Can also occur over the phone or at the facility
 - Generally the week before or the week after prep week



Timeline



Between Prep Week and the Exam

- The facility will make all agreed-upon changes to the operating test and the written exam.
- The Chief Examiner will ensure all agreed-upon changes are incorporated.

The NRC retains final authority to approve the written exam and operating tests.



Post Exam Activities

- ES 501 B
- The goal of the NRR operator licensing program office is to complete licensing or denial actions within 30 days after the facility licensee submits the graded examinations or its formal written examination comments to the NRC. The NRC and facility licensee staffs should establish their priorities and schedules to achieve this goal.



5 Days After the Written Exam

- Submit the following to the NRC after the Written Exam:
 - Each applicant's original answer and examination cover sheets plus a clean copy of each applicant's answer sheet
 - Master exams and answer keys (with any required annotations)
 - Questions asked by and answers given during the written examination
 - Post exam comments – includes applicants comments, as well as any recommended substantive changes based on any grading analysis
 - Seating chart
 - A completed Form ES-403-1, "Written Examination Grading Quality Checklist"
 - The original Form ES-201-3, "Examination Security Agreement," with a pre- and post-examination signatures



What the NRC Does, Post-Exam

- The NRC Regional Office will grade the exams IAW ES 303 and ES 403.
- Borderline exams are graded in detail (78-82% overall, 66-74% on SRO-only).
- Regional office completes the Written Exam Grading Form (ES-403-1) and an Individual Exam Report (ES-303-1) for each applicant.

ES-403 Written Examination Grading Quality Checklist Form ES-403-1

Facility	Date of Exam	Examiner(s) (NRC/DOE)	Notes
1. Clean, precise, printed (typed) master grading			
2. Answer key changes and question numbers justified and documented			
3. Applicant's answer sheets for applicant's review. Responses not shown, only final examination			
4. Results for all candidates (name, ID#, correct and % of correct) as well as ES-403-1, ES-303-1, ES-403-2, ES-403-3, ES-403-4, ES-403-5, ES-403-6, ES-403-7, ES-403-8, ES-403-9, ES-403-10, ES-403-11, ES-403-12, ES-403-13, ES-403-14, ES-403-15, ES-403-16, ES-403-17, ES-403-18, ES-403-19, ES-403-20, ES-403-21, ES-403-22, ES-403-23, ES-403-24, ES-403-25, ES-403-26, ES-403-27, ES-403-28, ES-403-29, ES-403-30, ES-403-31, ES-403-32, ES-403-33, ES-403-34, ES-403-35, ES-403-36, ES-403-37, ES-403-38, ES-403-39, ES-403-40, ES-403-41, ES-403-42, ES-403-43, ES-403-44, ES-403-45, ES-403-46, ES-403-47, ES-403-48, ES-403-49, ES-403-50, ES-403-51, ES-403-52, ES-403-53, ES-403-54, ES-403-55, ES-403-56, ES-403-57, ES-403-58, ES-403-59, ES-403-60, ES-403-61, ES-403-62, ES-403-63, ES-403-64, ES-403-65, ES-403-66, ES-403-67, ES-403-68, ES-403-69, ES-403-70, ES-403-71, ES-403-72, ES-403-73, ES-403-74, ES-403-75, ES-403-76, ES-403-77, ES-403-78, ES-403-79, ES-403-80, ES-403-81, ES-403-82, ES-403-83, ES-403-84, ES-403-85, ES-403-86, ES-403-87, ES-403-88, ES-403-89, ES-403-90, ES-403-91, ES-403-92, ES-403-93, ES-403-94, ES-403-95, ES-403-96, ES-403-97, ES-403-98, ES-403-99, ES-403-100			
5. All other grading information needed to ensure that grades are accurate			
6. Performance on selected questions checked for fairness, relevance and scoring problems, evaluate ability of questions to measure knowledge and skills			
Printed Name/Signature _____ Date _____			
a. Grader			
b. Facility Reviewer(s)			
c. NRC Chief Examiner (s)			
d. NRC Examiner (s)			
This quality checklist is not applicable for examinations graded by the NRC. See ES-403-1 for more information.			



ES-303 Individual Examination Report Form ES-303-1

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

U.S. Nuclear Regulatory Commission
Individual Examination Report

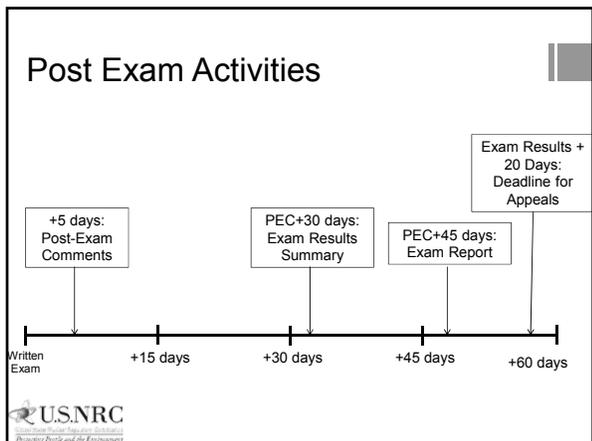
Applicant's Name		Facility Name	
I	R	Examination Type (Initial or Retake)	Facility Name
		Reactor Operator	Facility
		Senior Reactor Operator (SRO) Initial	Code
		SRO Upgrade	Power
		SRO Limited to Fuel Handling	PWR

Written Examination Summary

NRC Author/Reviewer	ROS/SRO Total Exam Points	___ / ___
NRC Grader/Reviewer	Applicant Points	___ / ___
Date Administered	Applicant Grade (%)	___ / ___

Operating Test Summary

Administered by	Date Administered
Walk-Through (Overall)	

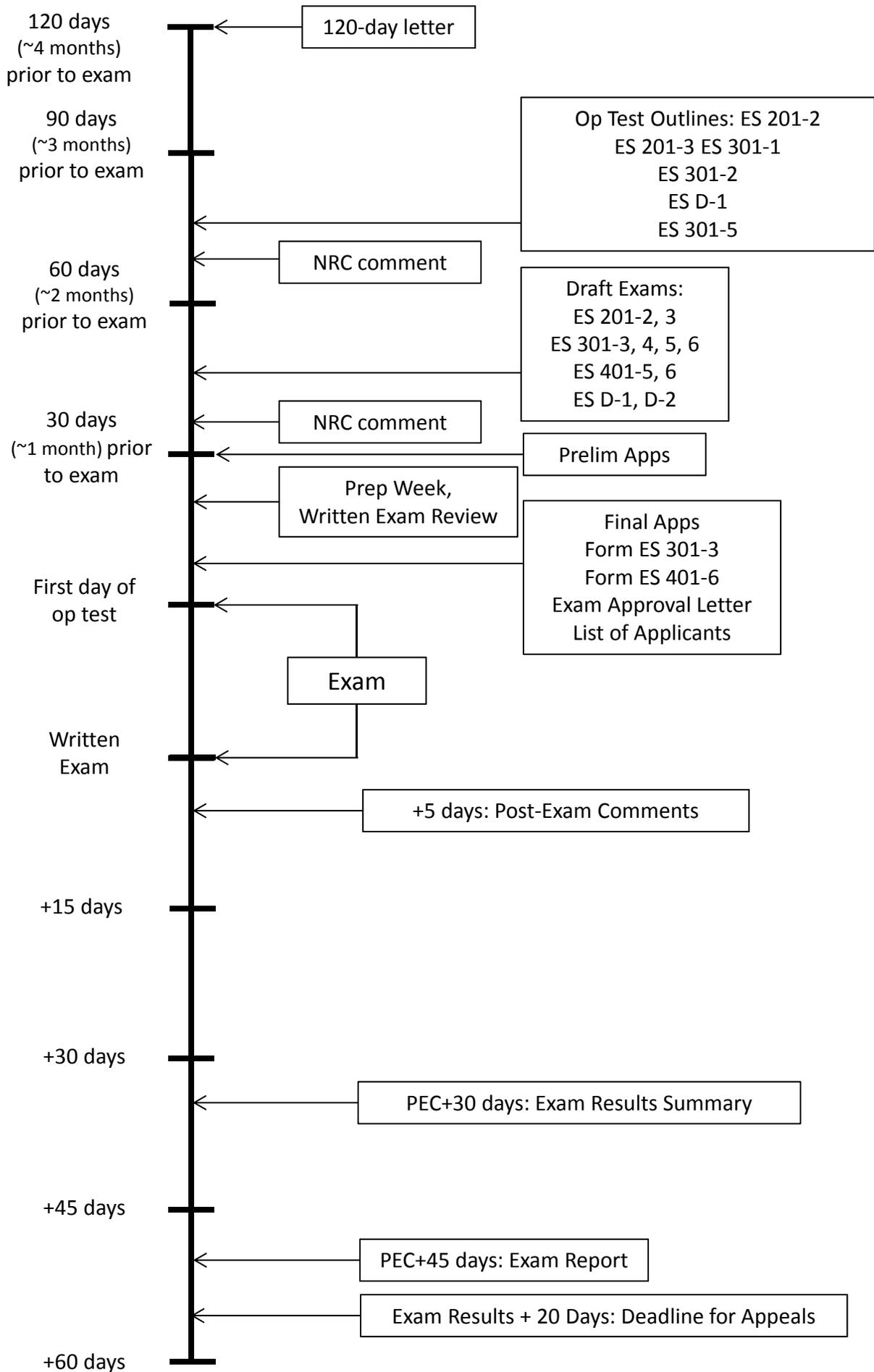


Related Presentations

- Operating Test Development: Mike Donithan and Gerry Laska
- Exam Validation: Newton Lacy and Rick Baldwin
- Sample Plan Development and KA Matching: Michael Meeks
- Plausibility: David Lanyi and Ken Schaaf
- SRO-Only Guidance: Bruno Caballero

Questions?

USNRC logo: *United States Nuclear Regulatory Commission*
Protecting People and the Environment



ES-201 Examination Preparation Checklist Form ES-201-1

Target Date*	Task Description (Reference)	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a and b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-120	3. Facility contact briefed on security and other requirements (C.2.c)	
-120	4. Corporate notification letter sent (C.2.d)	
[-90]	5. Reference material due (C.1.e; C.3.c; Attachment 3)	
[-75]	6. Integrated examination outline(s) due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, ES-D-1's, ES-401-1/2, ES-401-3, and ES-401-4, as applicable (C.1.e and f; C.3.d)	
[-70]	7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)	
[-45]	8. Proposed examinations (including written, walk-through, JIPMs, and scenario) reviewed by NRC examiners including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, and ES-401-5, and Form ES-201-3 (updates), and reference materials due (C.1.e, f, g and h; C.3.d)	
-30	9. Preliminary license applications (NRC Form 398's) due (C.1.i; C.2.g; ES-202)	
-14	10. Final license applications due and Form ES-201-4 prepared (C.1.i; C.2.i; ES-202)	
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g)	
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	
-7	14. Final applications reviewed; 1 or 2 (if >10) applications audited to confirm qualifications / eligibility; and examination approval and waiver letters sent (C.2.i; Attachment 5; ES-202, C.2.e; ES-204)	
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k)	
-7	16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	

* Target dates are generally based on facility-prepared examinations and are keyed to the examination date identified in the scenario. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.
 [Applies only] (Does not apply) to examinations prepared by the NRC.

ES-201 Examination Outline Quality Checklist Form ES-201-2

Item	Task Description	Initials
		a b* c*
1. W R I T T E N	a. Verify that the outline(s) fits the appropriate mode, in accordance with ES-401. b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all KVA categories are appropriately sampled. c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics. d. Assess whether the justifications for deselected or rejected KVA statements are appropriate.	
2. S I M U L T A N E O U S	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients. b. Assess whether there are enough scenario sets (and spaces) to test the projected number of applicable in accordance with the expected crew composition and rotation schedule without exceeding the maximum number of test scenarios. If not, the testing using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicant's audit test(s), and that scenarios will not be repeated on subsequent days. c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	
3. W I T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicant's audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form. b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the outline(s) include the topics specified on the form (2) at least one task is repeated (3) no more than one task is repeated from the last two NRC licensing examinations c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.	
4. E N E R G E T I C A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections. b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate. c. Ensure that KVA importance ratings (except for plant-specific priorities) are at least 2.5. d. Check for duplication and overlap among exam sections. e. Check the entire exam for balance of coverage. f. Assess whether the exam fits the appropriate job level (RO or SRO).	
a. Author _____ Printed Name/Signature _____ Date _____ b. Facility Reviewer (*) _____ c. NRC Chief Examiner (#) _____ d. NRC Supervisor _____		
Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required. Not applicable for NRC-prepared examination outlines		

Facility: _____ Date of Examination: _____ Exam Level: RO <input type="checkbox"/> SRO <input type="checkbox"/> SRO-U <input type="checkbox"/> Operating Test Number: _____		
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations		
Conduct of Operations		
Equipment Control		
Radiation Control		
Emergency Procedures/Plan		
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are relating only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1; randomly selected)		

Facility: _____ Date of Examination: _____ Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/> Operating Test No.: _____		
Control Room Systems* (6 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
a.	System / JPM Title	Type Code*
b.		
c.		
d.		
e.		
f.		
g.		
h.		
In-Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i.		
j.		
k.		
* Type Codes (A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator		
Criteria for RO / SRO-I / SRO-U 4-6 / 4-6 / 2-3 ≤ 9 / ≤ 8 / ≤ 4 ≥ 1 / ≥ 1 / ≥ 1 - / - / ≥ 1 (control room system) ≥ 1 / ≥ 1 / ≥ 1 ≥ 2 / ≥ 2 / ≥ 1 ≤ 3 / ≤ 3 / ≤ 2 (randomly selected) ≥ 1 / ≥ 1 / ≥ 1		
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		

Facility:	Date of Examination:	Operating Test Number:	Initials	
			a	b*
1. General Criteria				
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR §§ 45, operational importance, safety function distribution).			
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.			
c.	The operating test shall not duplicate items from the applicants' audit tests. (see Section D.1.a.)			
d.	Overlap with the written examination and between different parts of the operating test is within acceptable limits.			
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.			
2. Walk-Through Criteria				
a.	Each JPM includes the following, as applicable: <ul style="list-style-type: none"> - initial cues - references and tools, including associated procedures - reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time-critical by the facility licensee - operationally important specific performance criteria that include: <ul style="list-style-type: none"> - detailed expected actions with exact criteria and nomenclature - system response and other examiner cues - statements describing important observations to be made by the applicant - criteria for successful completion of the task - identification of critical steps and their associated performance standards - instructions on the sequence or steps, if applicable 			
b.	Ensure that any changes from the previously approved systems and administrative walk-through outlines (Forms ES-301-1 and 2) have not caused the test to deviate from any of the acceptance criteria (e.g., item distribution, bank use, repetition from the last 2 NRC examinations) specified on those forms and Form ES-201-2.			
3. Simulator Criteria				
The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.				
a.	Author			Date
b.	Facility Reviewer(*)			
c.	NRC Chief Examiner (#)			
d.	NRC Supervisor			
NOTE: * The facility signature is not applicable for NRC-developed tests # Independent NRC reviewer initial items in Column 'c', chief examiner concurrence required.				

Facility:	Date of Exam:	Scenario Numbers:	Operating Test No.:	Initials	
				a	b*
QUALITATIVE ATTRIBUTES					
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.				
2.	The scenarios consist mostly of related events.				
3.	Each event description consists of <ul style="list-style-type: none"> - the point in the scenario when it is to be initiated - the malfunction(s) that are entered to initiate the event - the symptoms/cues that will be visible to the crew - the expected operator actions (by shift position) - the event termination point (if applicable) 				
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.				
5.	The events are valid with regard to physics and thermodynamics.				
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.				
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.				
8.	The simulator modeling is not altered.				
9.	The scenarios have been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.				
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301.				
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).				
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).				
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.				
Target Quantitative Attributes (Per Scenario; See Section D.5.d)				Actual Attributes	
1.	Total malfunctions (5-8)	/	/	/	/
2.	Malfunctions after EOP entry (1-2)	/	/	/	/
3.	Abnormal events (2-4)	/	/	/	/
4.	Major transients (1-2)	/	/	/	/
5.	EOP's entered/requiring substantive actions (1-2)	/	/	/	/
6.	EOP contingencies requiring substantive actions (0-2)	/	/	/	/
7.	Critical tests (2-3)	/	/	/	/

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-						Page of
Reactor Operator Simulator Operating Test Grading Details						
Competencies/ Rating Factors (RFs)	RF Weights	RF Scores	RF Grades	Comp. Grades	Comment Page No.	
1. Interpretation/Diagnosis a. Recognize & Verify Status b. Interpret & Diagnose Conditions c. Prioritize Response	—	—	—	—	—	—
2. Procedures/Tech Specs a. Reference b. Procedure Compliance c. Tech Spec Entry	—	—	—	—	—	—
3. Control Board Operations a. Locate & Manipulate b. Understanding c. Manual Control	—	—	—	—	—	—
4. Communications a. Provide Information b. Receive Information c. Carry Out Instructions	—	—	—	—	—	—

(Note: Enter RF Weights (nominal, adjusted, or "0" if not observed (NCO)), RF Scores (1, 2, 3, or NO), and RF Grades from Form ES-303-3 and sum to obtain Competency Grades.)

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-		Page of
Walk-Through Grading Details	Evaluation (S or U)	Comment Page Number
Administrative Topics		
a.		
b.		
c.		
d.		
e.		
Systems — Control Room		
a.		
b.		
c.		
d.		
e.		
f.		
g.		
h.		
Systems — In-Plant		
i.		
j.		
k.		

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Facility:	Date of Exam:	Exam Level: RO <input type="checkbox"/> SRO <input type="checkbox"/>		
		Item Description	Initial	
		a	b*	c*
1.	Questions and answers are technically accurate and applicable to the facility.			
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.			
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401			
4.	The sampling process was random and systematic (if more than 4 RO or 2 SRO questions were repeated from the last 2 NRC licensing exams, consult the NRC OL program office).			
5.	Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: ___ the audit exam was systematically and randomly developed; or ___ the audit exam was completed before the license exam was started; or ___ the examinations were developed independently; or ___ the license permits that there is no duplication; or ___ other (explain) _____			
6.	Bank use meets limits (no more than 75 percent from the bank, at least 10 percent new, and the rest new or modified); enter the actual RO / SRO-only question distribution(s) at right.	Bank / / /	Modified / / /	New / / /
7.	Between 50 and 60 percent of the questions on the RO exam are written at the comprehension/analysis level; the SRO exam may exceed 60 percent if the randomly selected K/As support the higher cognitive levels; enter the actual RO / SRO question distribution(s) at right.	Memory / / /	CIA / / /	
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.			
9.	Question content conforms with specific K/As statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.			
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.			
11.	The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.			
a. Author _____		Printed Name / Signature _____		Date _____
b. Facility Reviewer (*) _____				
c. NRC Chief Examiner (R) _____				
d. NRC Regional Supervisor _____				
Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c", chief examiner concurrence required.				

Examination Outline Cross-Reference: Level _____ RO _____ SRO _____
 Tier # _____
 Group # _____
 K/A # _____
 Importance Rating _____

Proposed Question: _____

Proposed Answer: _____

Explanation (Optional): _____

Technical Reference(s): _____
 (Attach if not previously provided)
 (including version/revision number) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____ Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam _____
 (Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
 Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
 55.43 _____

Comments: _____



Anatomy of an NRC Exam

2013 Exam Writers' Conference
Amanda Toth

Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55) requires that applicants for reactor operator (RO) and senior reactor operator (SRO) licenses must pass both a written examination and an operating test. The regulation allows power reactor facility licensees to prepare the site-specific written examinations and operating tests, provided that (1) the facility licensee shall prepare the examinations and tests in accordance with the criteria contained herein; (2) the facility licensee shall establish, implement, and maintain procedures to control examination security and integrity; (3) an authorized representative of the facility licensee shall approve the examinations and tests before they are submitted to the NRC for review and approval; and (4) the facility licensee shall obtain NRC approval of its proposed written examinations and operating tests. Moreover, the regulation requires that the license examinations must be developed and administered in accordance with 10 CFR 55.41 and 55.45 for ROs, or 10 CFR 55.43 and 55.45 for SROs.

What This Presentation Will Cover

- Facility licensees and NRC staff should use Form ES-201-1, “Examination Preparation Checklist,” to track the examination preparations.
- As noted on the form, the target due dates can be adjusted as necessary to accommodate a given situation.

ES-201 Examination Preparation Checklist		Form ES-201-1
Facility: _____		Date of Examination: _____
Developed by: Written - Facility <input type="checkbox"/> NRC <input type="checkbox"/> // Operating - Facility <input type="checkbox"/> NRC <input type="checkbox"/>		
Target Date*	Task Description (Reference)	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a and b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-120	3. Facility contact briefed on security and other requirements (C.2.c)	
-120	4. Corporate notification letter sent (C.2.d)	
[-90]	[5. Reference material due (C.1.e; C.3.c; Attachment 3)]	
{-75}	6. Integrated examination outline(s) due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, ES-D-1's, ES-401-1/2, ES-401-3, and ES-401-4, as applicable (C.1.e and f; C.3.d)	
{-70}	{7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)}	
{-45}	8. Proposed examinations (including written, walk-through JPMS, and scenarios, as applicable), supporting documentation (including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, and ES-401-6, and any Form ES-201-3 updates), and reference materials due (C.1.e, f, g and h; C.3.d)	
-30	9. Preliminary license applications (NRC Form 398's) due (C.1.i; C.2.g; ES-202)	
-14	10. Final license applications due and Form ES-201-4 prepared (C.1.i; C.2.i; ES-202)	
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g)	
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	
-7	14. Final applications reviewed; 1 or 2 (if >10) applications audited to confirm qualifications / eligibility, and examination approval and waiver letters sent (C.2.i; Attachment 5; ES-202, C.2.e; ES-204)	
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k)	
-7	16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	
<p>* Target dates are generally based on facility-prepared examinations and are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee. [Applies only] {Does not apply} to examinations prepared by the NRC.</p>		

Freezing Procedures

- ES-201 C.1.e (page 3 of 28)
- The facility contact shall submit the required reference materials, examination outlines, and examinations, as applicable, based on the level of facility participation.
- For the purposes of operator training and examination, the facility licensee may "freeze" the plant procedures at a particular revision in order to facilitate examination development. The facility licensee shall discuss this option with the NRC chief examiner in advance and refer to Attachment 2 for additional guidance on procedure freezes.

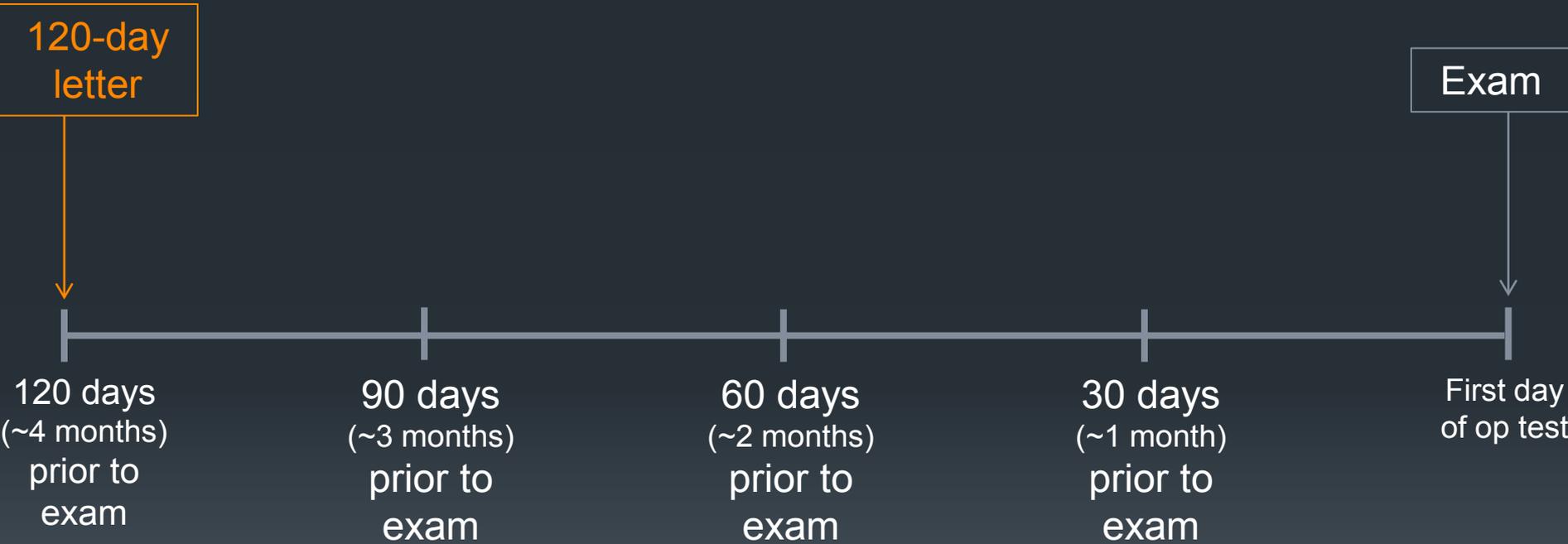
-180	1. Examination administration date confirmed (C.1.a; C.2.a and b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-120	3. Facility contact briefed on security and other requirements (C.2.c)	
-120	4. Corporate notification letter sent (C.2.d)	
[-90]	[5. Reference material due (C.1.e; C.3.c; Attachment 3)]	

The 120-day phone call

- ES 201 C.2.c
- The NRC regional office shall normally issue a letter confirming the arrangements no later than 120 days before the examination begins. The letter should be addressed to the person at the highest level of corporate management who is responsible for plant operations (e.g., Vice President of Nuclear Operations).

ES-201	Sample Corporate Notification Letter	Attachment 4
(Date)		
<u>(Name, Title)</u> <u>(Name of facility)</u> <u>(Address)</u> <u>(City, State, Zip code)</u>		
Dear <u>(Name)</u> :		
In a telephone conversation on <u>(date)</u> between Mr./Ms. <u>(Name, Title)</u> and Mr./Ms. <u>(Name, Title)</u> , arrangements were made for the administration of licensing examinations at <u>(facility name)</u> during the week(s) of <u>(date)</u> .		
As agreed during the telephone conversation, [your staff][[the staff of the U.S. Nuclear Regulatory Commission (NRC)]] will prepare the examinations based on the guidelines in Revision 9, Supplement 1, of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." [The NRC's regional office will discuss with your staff any changes that might be necessary before the examinations are administered.][[Your staff will be given the opportunity to review the examinations during the week of <u>(date)</u> .]]		
To meet the above schedule, it will be necessary for your staff to furnish the [examination outlines by <u>(date)</u> . The written examinations, operating tests, and supporting] reference materials identified in Attachment 3 to ES-201 [will be due] by <u>(date)</u> . [Pursuant to Title 10, Section 55.40(b)(3), of the Code of Federal Regulations (10 CFR 55.40(b)(3)), an authorized representative of the facility licensee shall approve the outlines, examinations, and tests		

Timeline



In General:

Submitting Items to the NRC

- ES 201 C.1.g
 - An authorized representative of the facility licensee must approve the exam outlines and the proposed examinations before they are submitted to the NRC regional office.
 - The outlines and exams should include a cover letter signed by the facility representative.
- ES 201 C.1.h.
 - When submitting an exam, the facility must provide:
 - The source of each item.
 - For modified items, note changes made or submit a copy of the original item.
- ES 201 C.1.i
 - Submit license applications IAW ES-202 along with a letter requesting that licensing examinations be administered.

~6 months prior to NRC Exam

- Written Exam Sample Plan (ES 401 C.1.a, D.1.e)
 - Region II provides the Written Exam Sample plan to the facility
 - Typically a request is received ~6 months in advance, but we provide the Sample Plans on demand (need a few weeks of turn around)

~75 days prior to NRC Exam

- Operating Test Outlines (ES 301: C.1.a, C.1.b, D.3.g, D.4.c, D.5.e)
 - Proposed outlines and any reference material needed for their review
 - Must be *received* by the date agreed upon with the NRC regional office, normally approximately 75 days before the scheduled examination date.
 - Admin JPMs: ES 301-1 for each applicant level
 - Control Room JPMs: ES 301-2 for each applicant level
 - Simulator Scenarios: ES D-1s for each scenario. Also complete Form ES 301-5.

ES-301		Administrative Topics Outline										Form ES-301-1					
Facility: _____												Date of Examination: _____					
ES-301		Control Room/In-Plant Systems Outline										Form ES-301-2					
Appendix D		Scenario Outline										Form ES-D-1					
ES-301		Transient and Event Checklist										Form ES-301-5					
Facility: _____		Date of Exam: _____										Operating Test No.: _____					
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S	A	B	S	A	B	S	A	B	S	A	B				
		R	T	O	R	T	O	R	T	O	R	T	O				
<input type="checkbox"/> RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1
<input type="checkbox"/>	TS														0	2	2
<input type="checkbox"/> RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1
<input type="checkbox"/>	TS														0	2	2
<input type="checkbox"/> RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1

Timeline



120-day
letter

Op Test
Outlines:
ES 201-2
ES 201-3
ES 301-1
ES 301-2
ES D-1
ES 301-5

Exam

120 days
(~4 months)
prior to
exam

90 days
(~3 months)
prior to
exam

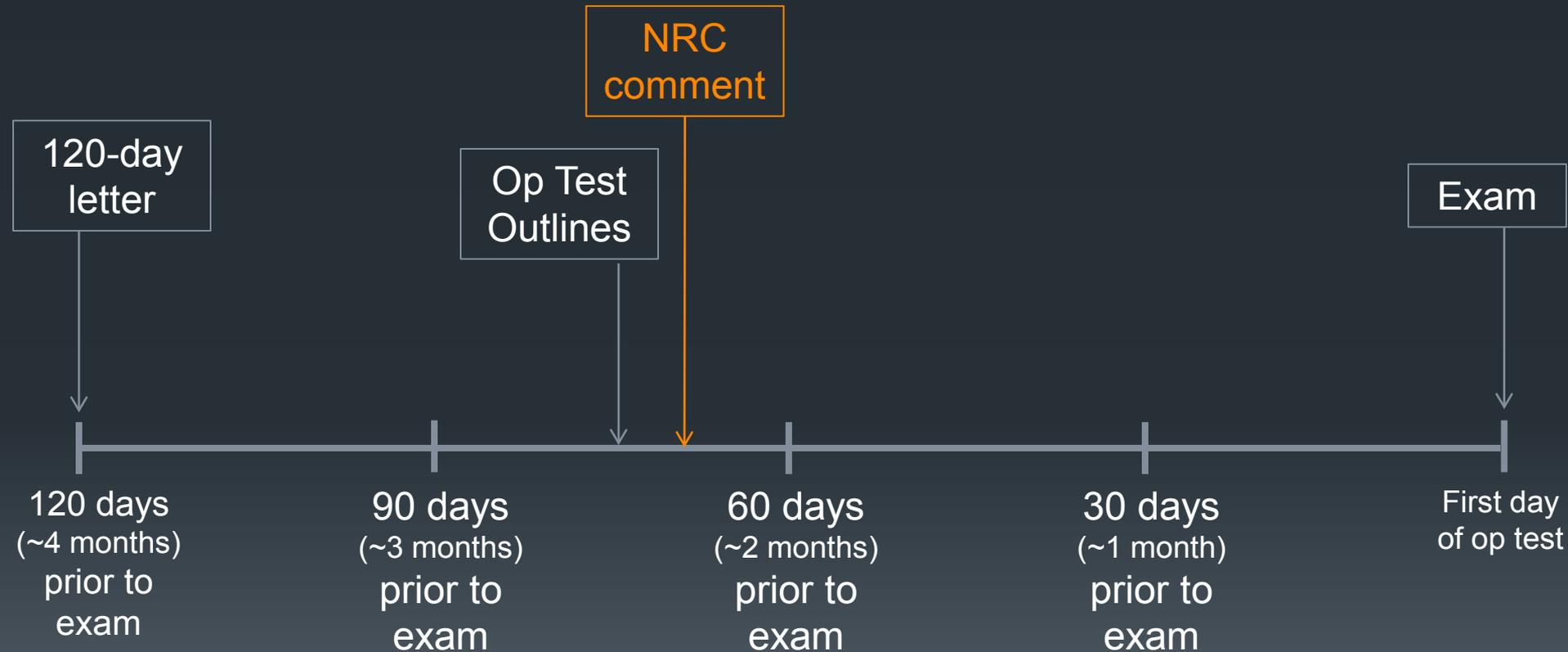
60 days
(~2 months)
prior to
exam

30 days
(~1 month)
prior to
exam

First day
of op test

~70 days prior to NRC Exam

- NRC will review the Operating Test outlines and provide feedback



~45 days prior to NRC Exam

Draft Exams Due

■ Written Exam

- The facility will prepare the draft written exam (unless the exam is NRC-authored), taking any NRC pre-submittal comments into account.
- Include information on Form ES 401-5, “Sample Written Exam Question Worksheet” for each proposed question.

ES-401	Sample Written Examination Question Worksheet	Form ES-401-5
Examination Outline Cross-Reference:	Level Tier # Group # K/A # Importance Rating	RO _____ _____ _____ _____ SRO _____ _____ _____ _____
Proposed Question:		
Proposed Answer:	_____	
Explanation (Optional):		
Technical Reference(s): (Attach if not previously provided) (including version/revision number)	_____ _____ _____	
Proposed references to be provided to applicants during examination:	_____	
Learning Objective:	_____ (As available)	
Question Source:	Bank # Modified Bank # New	_____ _____ _____ (Note changes or attach parent)
Question History:	Last NRC Exam	_____
<i>(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)</i>		
Question Cognitive Level:	Memory or Fundamental Knowledge Comprehension or Analysis	_____ _____

~45 days prior to NRC Exam

Draft Exams Due

- Quality Reviews (ES 301: D.3.i, D.4.e, E.1; ES 401: D.3, E.1)
 - Review the quality of the Operating Test using Forms ES 301-3, “Operating Test Quality Checklist” and ES 301-4, “Simulator Scenario Quality Checklist.”
 - Review the quality of the Written Exam using Form ES 401-6, “Written Exam Quality Checklist.”
 - Review the quality of the entire draft exam using ES 201-2, “Examination Outline Quality Checklist.”
 - Facility supervisory review is required prior to submittal.

ES-301	Operating Test Quality Checklist	Form ES-301-3
Facility: _____ Date of Examination: _____ Exam Level: RO <input type="checkbox"/> SRO <input type="checkbox"/>		
ES-301	Simulator Scenario Quality Checklist	Form ES-301-4
ES-401	Written Examination Quality Checklist	Form ES-401-6
Facility: _____ Date of Exam: _____ Exam Level: RO <input type="checkbox"/> SRO <input type="checkbox"/>		
ES-201	Examination Outline Quality Checklist	Form ES-201-2
Facility: _____ Date of Examination: _____		
		Initials
Item	Task Description	a b* c#
1.	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.	
W	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.	
R	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	
I	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	
T		
E		
N		
2.	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	
S	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.	
I		
M		
U		
L		
A		
T		
O		
R	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.	

a. Author

b. Facility Reviewer (*)

c. NRC Chief Examiner (#)

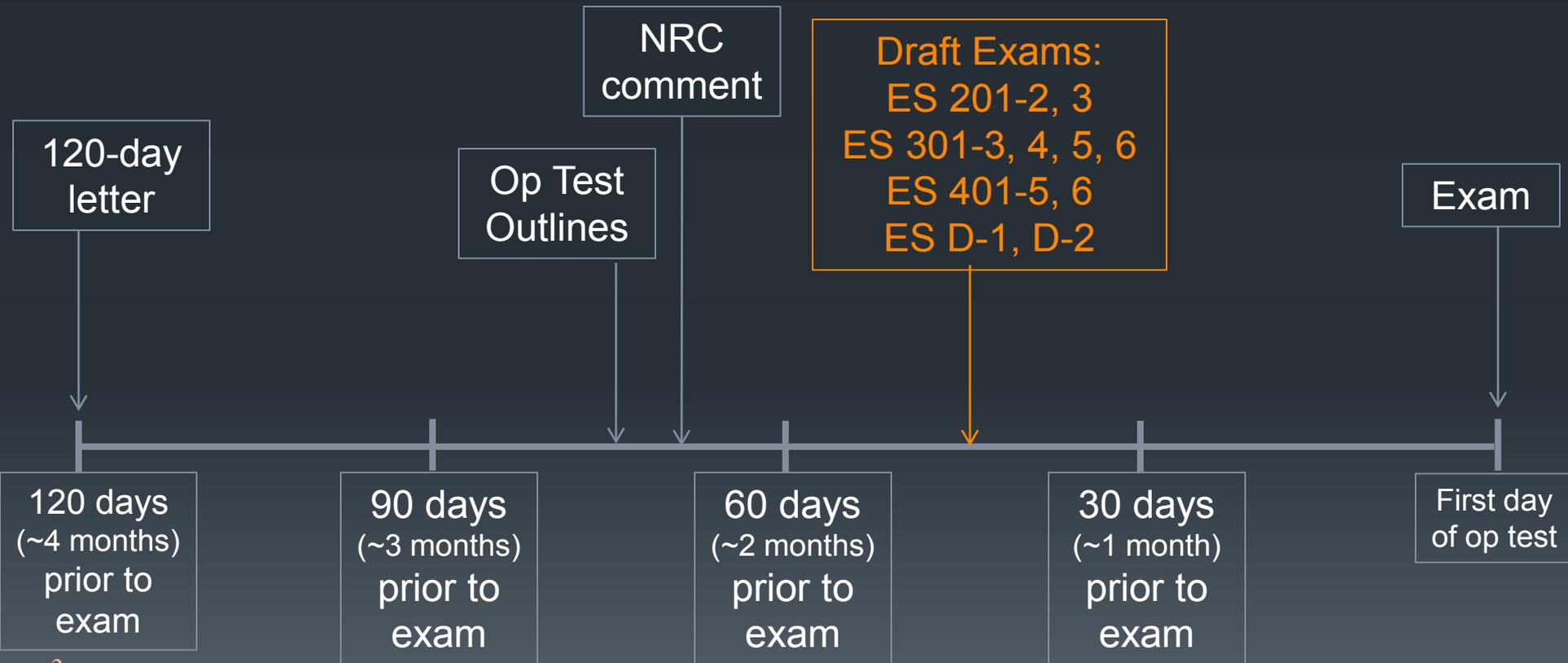
d. NRC Supervisor

Printed Name/Signature

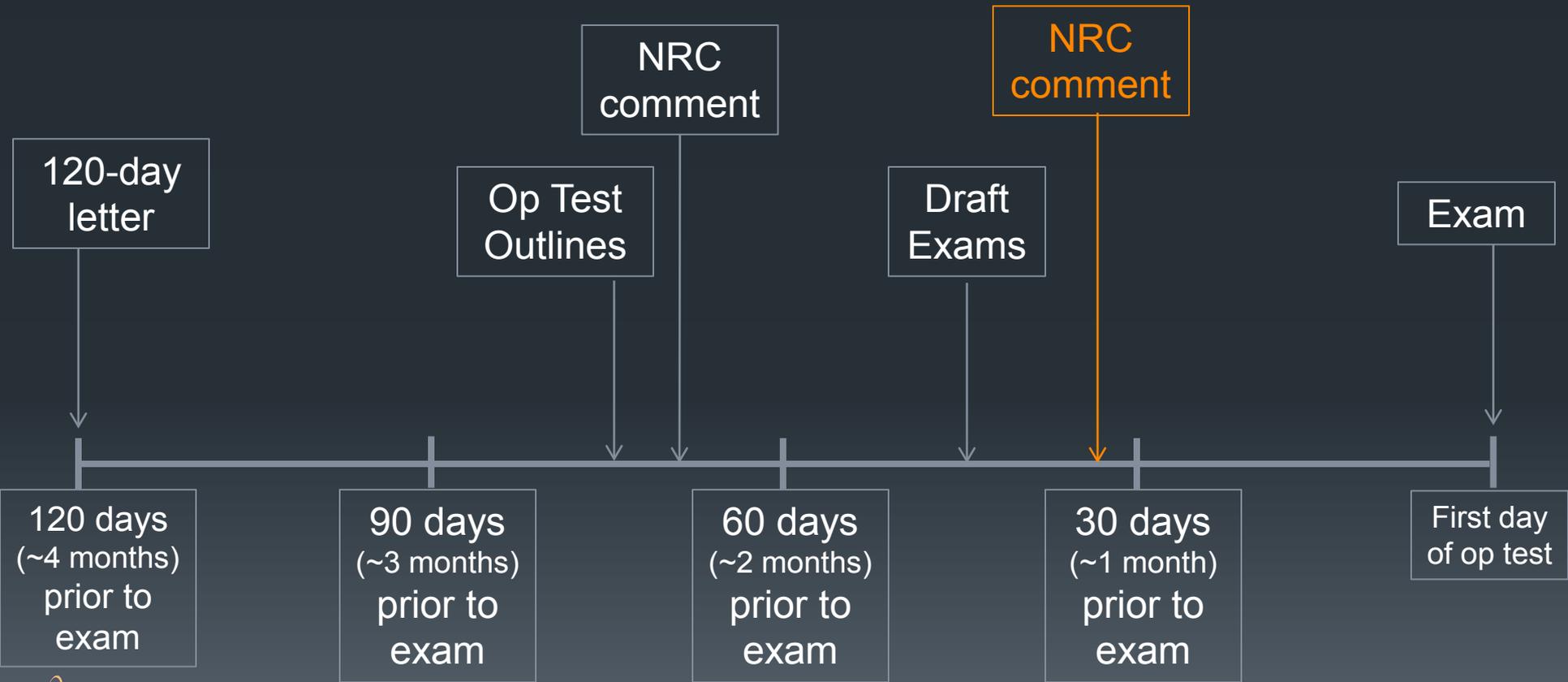
Date

~45 days prior to NRC Exam

- Other items to submit
 - Include any updates to ES 201-3



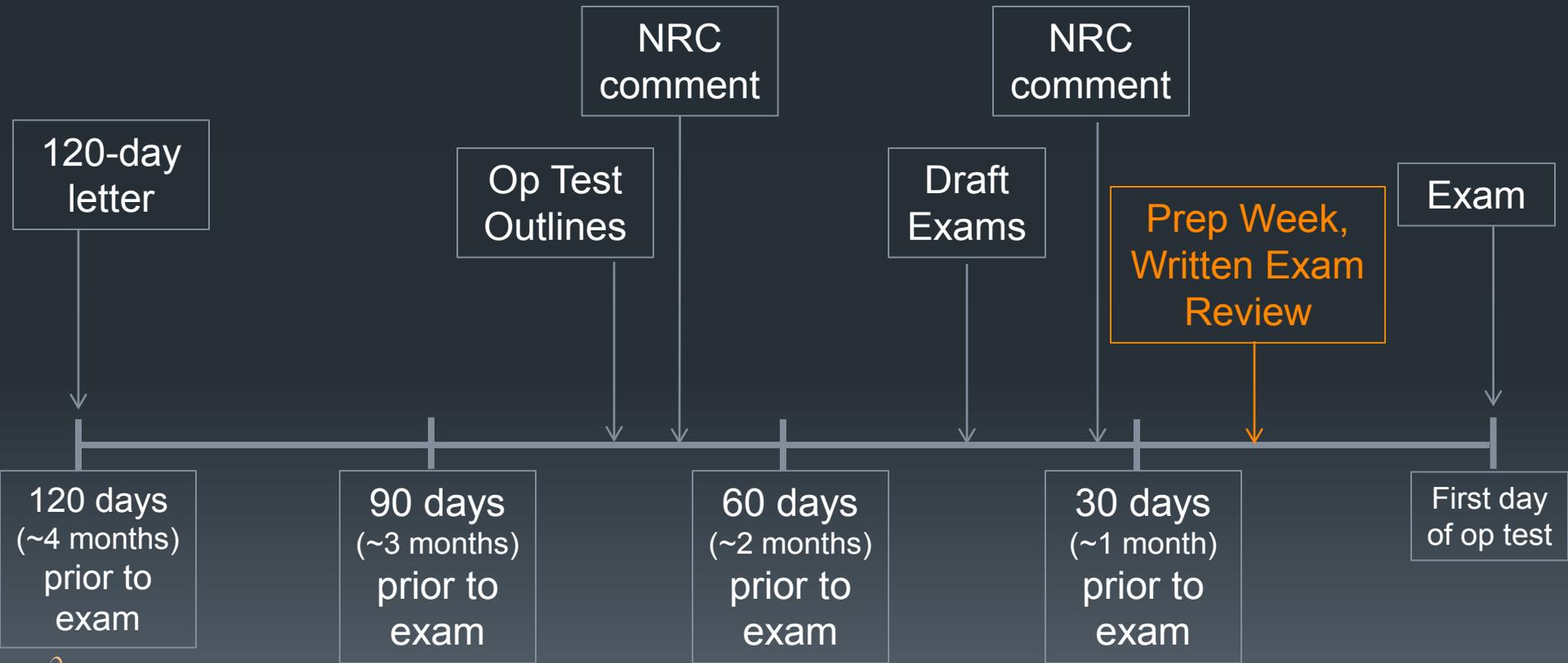
Timeline



What happens next

- Exam Prep Week (ES 301 C.1.d, C.1.e, E.2.b, E.2.e)
 - Typically occurs 2-3 weeks prior to the Operating Test
- Written Exam In-office Review (ES 401 C.1.d, E.2.e)
 - Can also occur over the phone or at the facility
 - Generally the week before or the week after prep week

Timeline



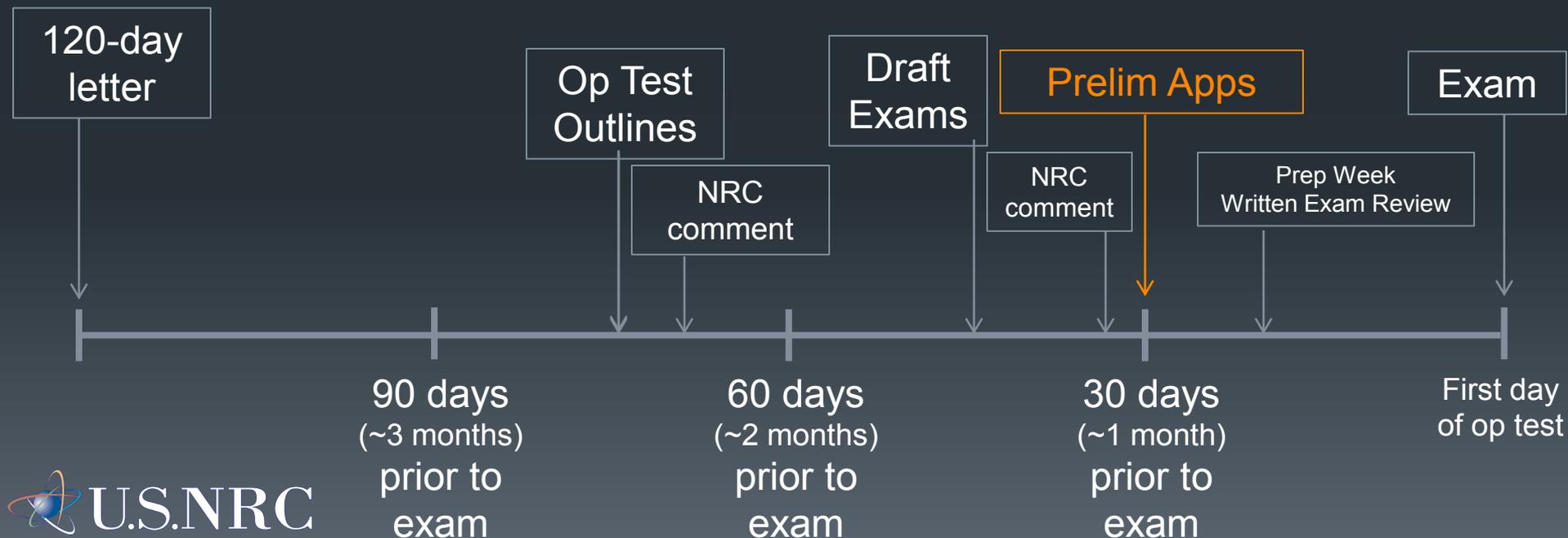
Between Prep Week and the Exam

- The facility will make all agreed-upon changes to the operating test and the written exam.
- The Chief Examiner will ensure all agreed-upon changes are incorporated.

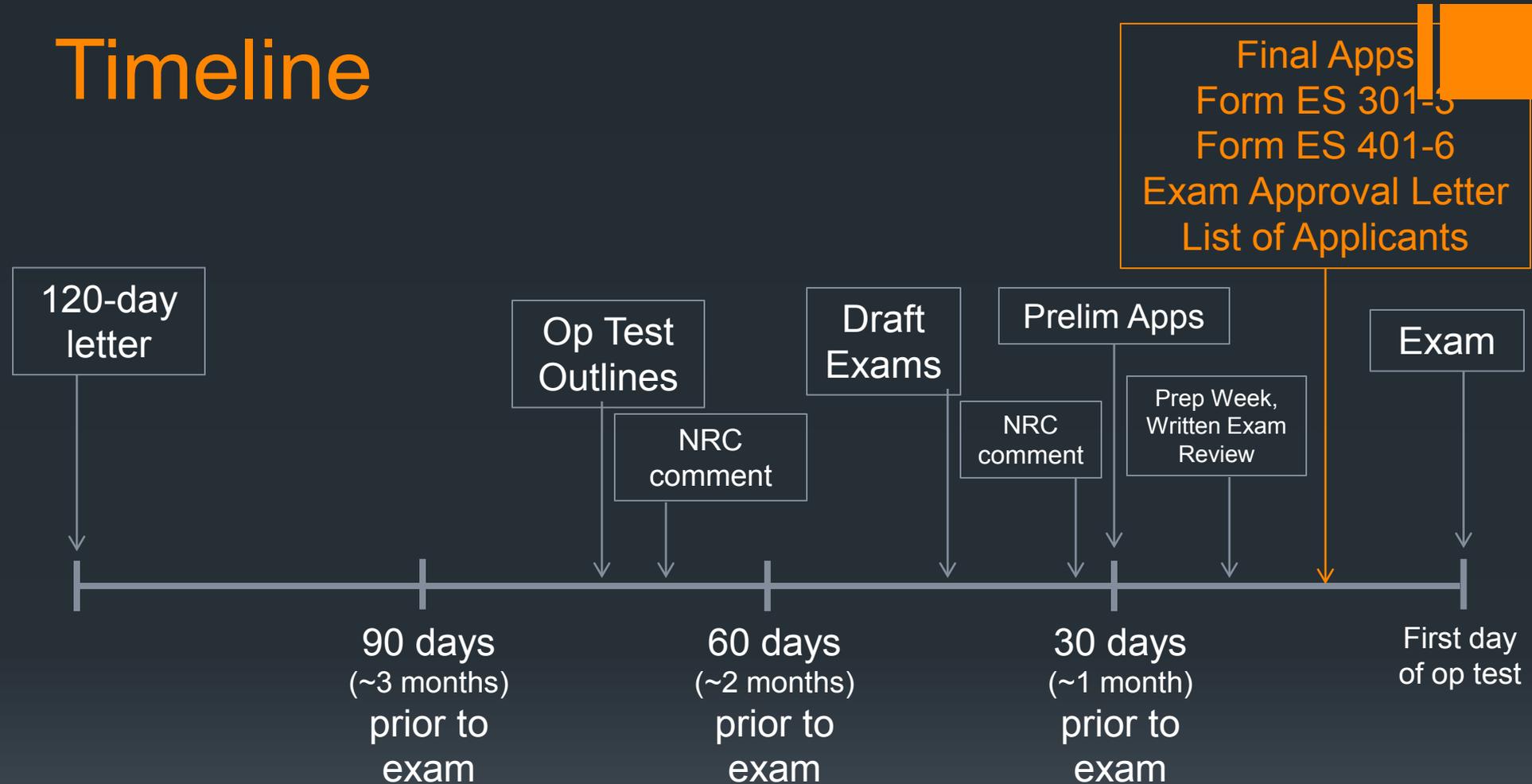
The NRC retains final authority to approve the written exam and operating tests.

Preliminary License Applications

- ES 201 C.2.g
 - The NRC will review preliminary license applications IAW ES 202. Preliminary applications are due ~30 days before the examination date.
 - At the same time, the NRC will evaluate any waiver requests in accordance with ES-204.



Timeline



Post Exam Activities

- ES 501 B
- The goal of the NRR operator licensing program office is to complete licensing or denial actions within 30 days after the facility licensee submits the graded examinations or its formal written examination comments to the NRC. The NRC and facility licensee staffs should establish their priorities and schedules to achieve this goal.

5 Days After the Written Exam

- Submit the following to the NRC after the Written Exam:
 - Each applicant's original answer and examination cover sheets plus a clean copy of each applicant's answer sheet
 - Master exams and answer keys (with any required annotations)
 - Questions asked by and answers given during the written examination
 - Post exam comments – includes applicants comments, as well as any recommended substantive changes based on any grading analysis
 - Seating chart
 - A completed Form ES-403-1, "Written Examination Grading Quality Checklist"
 - The original Form ES-201-3, "Examination Security Agreement," with a pre- and post-examination signatures

What the NRC Does, Post-Exam

- The NRC Regional Office will grade the exams IAW ES 303 and ES 403.
- Borderline exams are graded in detail (78-82% overall, 66-74% on SRO-only).
- Regional office completes the Written Exam Grading Form (ES-403-1) and an Individual Exam Report (ES-303-1) for each applicant.

ES-403		Written Examination Grading Quality Checklist		Form ES-403-1	
Facility:		Date of Exam:		Exam Level: RO <input type="checkbox"/> SRO <input type="checkbox"/>	
Item Description		Initials			
		a	b	c	
1. Clean answer sheets copied before grading					
2. Answer key changes and question deletions justified and documented					
3. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)					
4. Grading for all borderline cases (80 ±2% overall and 70 or 80, as applicable, ±4% on the SRO-only) reviewed in detail					
5. All other failing examinations checked to ensure that grades are justified					
6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants					
Printed Name/Signature		Date			
a. Grader	_____	_____			
b. Facility Reviewer(*)	_____	_____			
c. NRC Chief Examiner (*)	_____	_____			
d. NRC Supervisor (*)	_____	_____			
(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.					

ES-303		Individual Examination Report		Form ES-303-1	
PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY					
U.S. Nuclear Regulatory Commission Individual Examination Report					
Applicant's Name				Docket Number 55-	
I	R	Examination Type (Initial or Retake)		Facility Name	
		Reactor Operator		Facility Description	Hot
		Senior Reactor Operator (SRO) Instant			Cold
		SRO Upgrade			BWR
		SRO Limited to Fuel Handling			PWR
Written Examination Summary					
NRC Author/Reviewer			RO/SRO/Total Exam Points ___/___/___		
NRC Grader/Reviewer			Applicant Points ___/___/___		
Date Administered			Applicant Grade (%) ___/___/___		
Operating Test Summary					
Administered by			Date Administered		
Walk-Through (Overall)					

What the NRC Does, Post-Exam

- Exam results are recorded on the Power Plant Examination Results Summary (ES-501-2).
- The responsible supervisor reviews the results, determines whether a license will be issued or denied, and signs the ES-403-1 and the ES-303-1.
- The OLA will then prepare a license, denial, or notification letter for each applicant.
 - Notification letters are sent in the event waiver requirements need to be met, or when the exam is borderline (license held pending any exam appeals).

ES-501	Sample License Letters	Attachment 3
<i>NRC Letterhead</i>		
(Date)		
LICENSE		
(Applicant's name) (Street address) (City, State Zip code)		
Pursuant to the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974 (Public Law 93-438), as amended; and subject to the conditions and limitations incorporated herein, the U.S. Nuclear Regulatory Commission hereby licenses you to manipulate all controls of the (Name of facility, facility license number).		
Your License No. is OP-(number), and your Docket No. is 55-(number). The effective date is (date). Unless sooner terminated, renewed, or upgraded, this license shall expire 6 years from the effective date.		

ES-501		Power Plant Examination Results Summary			Form ES-501-2		
PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY							
Power Plant Examination Results Summary							
Facility:				Plant Status: Hot <input type="checkbox"/> Cold <input type="checkbox"/>			
Written Examination Date: Prepared by: Facility <input type="checkbox"/> NRC <input type="checkbox"/>				Operating Test Date(s): Prepared by: Facility <input type="checkbox"/> NRC <input type="checkbox"/>			
NRC Examiners:							
Overall Results							
Applicants:		Total #	# Passed	% Passed	# Failed	% Failed	
RO							
SRO							
Individual Results							
Name	Docket # 55-(_____)	Type (1)	Written Grade			Operating Test(2)	
			RO / SRO / TOT	W-T	ADM	SIM	
			/ /				
			/ /				

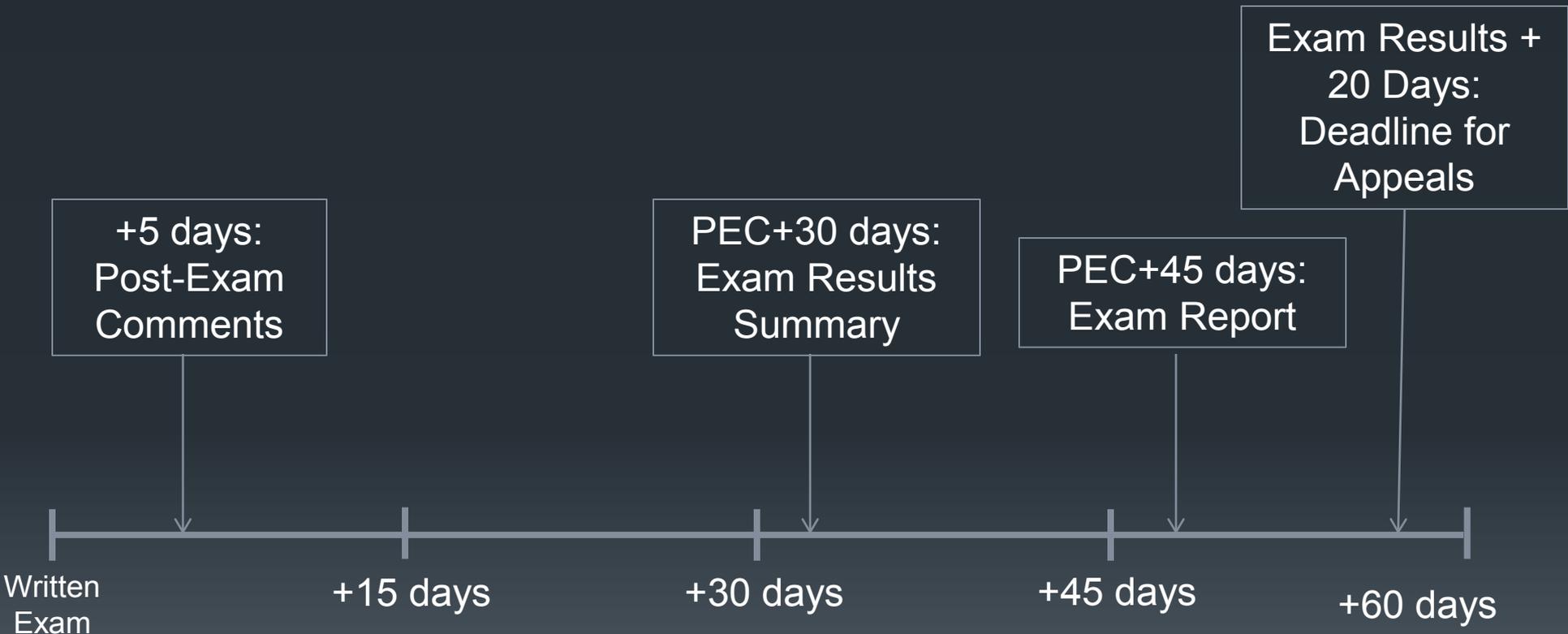
What the NRC Does, Post-Exam

- Facility is generally notified via phone of the exam results and license numbers.
- ES-501-2 is mailed to the facility.
- Each applicant is sent a license, denial, or notification letter, along with their ES-303-1, the as-run ES-D-1 and their written exam cover and answer sheets.
 - A license denial package will also include an ES-D-2 and a master copy of the written exam and answer key.

What the NRC Does, Post-Exam

- The Regional office prepares the Exam Report:
- The exam report documents:
 - The quality of the exam submission (SAT or UNSAT)
 - Any delays in administering the examination (and the reason)
 - Any extensions of the written examination time
 - Exam results, including any significant grading deficiencies (for facility graded exams)
 - An overview of the exam security measures
 - Any other issues or findings discussed at the exit meeting
 - The report will also include (or reference):
 - A copy of the final written exam and answer key, including any changes
 - Post Exam Comments and resolutions
 - NRC explanation for accepting or rejecting each facility recommendation
 - a simulator fidelity report

Post Exam Activities



Related Presentations

- Operating Test Development: Mike Donithan and Gerry Laska
- Exam Validation: Newton Lacy and Rick Baldwin
- Sample Plan Development and KA Matching: Michael Meeks
- Plausibility: David Lanyi and Ken Schaaf
- SRO-Only Guidance: Bruno Caballero

Questions?

Agenda

U.S. NRC Region II 2013 Exam Writers' Workshop

Tuesday, July 23

12:00–12:15 Welcome & Opening Remarks –
 Len Wert, Deputy Regional
 Administrator for Operations,
 Region II

12:15–12:45 NRC Website – Bacon
12:45–13:00 Break

13:00–13:45 Anatomy of an Exam - Toth
13:45–14:00 Break

14:00–14:45 License Application Process –
 Goldau
14:45–15:00 Break

15:00–15:45 Sample Plan Development and
 K/A Matching – Meeks

15:45–16:00 Q & A

Wednesday, July 24

07:00–08:00 Coffee & Donuts - Veranda Marquis One

08:00–08:15 Follow Up Q & A Day 1

08:15–09:00 Examination OE – Capehart
09:00–09:15 Break

09:15–10:00 Plausibility – Lanyi / Schaaf
10:00–10:15 Break

10:15–11:00 SRO Only Guidance – Caballero
11:00–12:00 Lunch

12:00–12:45 Alternate Path JPMs – Bates
12:45 –13:00 Break

13:00–13:45 Operating Test – Donithan / Laska
13:45–14:00 Break

14:00–14:45 Exam Validation – Lacy / Baldwin
14:45–15:00 Break

15:00–15:30 Q & A
15:30 Adjourn