

2017 Exam Writers' Workshop

JULY 18-19, 2017
U.S. NRC REGION II
ATLANTA, GA



Tuesday, July 18

- ▶ 12:00–12:15 Welcome & Opening Remarks
Len Wert
Deputy Regional Administrator, Region II
- ▶ 12:15–12:45 Introduction, NRC Website, Rev. 11 Overview
Mike Donithan
- 12:45–13:00 Break
- ▶ 13:00–13:45 Anatomy of an Exam
Joe Viera
- 13:45–14:00 Break
- ▶ 14:00–14:45 K/A matching
Swetha Shah & Newton Lacy
- 14:45–15:00 Break
- ▶ 15:00–15:45 Plausibility
Phil Capehart
- ▶ 15:45–16:00 Q & A

Wednesday, July 19

Morning Session

- ▶ 07:00–08:00 Coffee & Donuts (8th floor Conference Rooms)
- ▶ 08:00–08:15 Welcome to Day 2 –
Tony Gody
Director, Division of Reactor Safety, Region II
- Day 1 Follow Up Q&A
- ▶ 08:15–09:15 New K/A Catalogs
Bruno Caballero
- 09:15–09:30 Break
- ▶ 09:30–10:15 SRO-Only Guidance
Mike Kennard & Jason Bundy
- 10:15–10:30 Break
- ▶ 10:30–11:15 Job Performance Measures
David Lanyi
- ▶ 11:15–12:15 Lunch

Wednesday, July 19

Afternoon Session

- ▶ 12:15–13:00 Operating Test
Mark Bates
- 13:00 –13:15 Break
- ▶ 13:15–14:15 NUREG-1021 Revision 11 Administrative
Dan Bacon
- 14:15–14:30 Break
- ▶ 14:30–15:30 Q & A
- ▶ 15:30 Adjourn

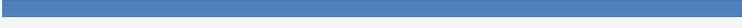
Introduction and the NRC Website

2017 Exam Writers' Workshop
Mike Donithan





Safety First!



This presentation will discuss:

- Reference materials available on the NRC Website
- Where to find frequently used forms
- Operator Licensing Program Feedback (aka FAQs)
- FAQs posted since the last workshop
- Very broad overview of NUREG-1021 Revision 11 changes



NRC Website,
Operator
Licensing
References

What's available on the NRC Website?

The next few slides will go over the available Operator Licensing reference material and where it can be found.

www.nrc.gov

The screenshot displays the NRC website interface. At the top, a navigation bar includes links for HOME, FAQ, GLOSSARY, FACILITY LOCATOR, WHAT'S NEW, SITE HELP, INDEX A-Z, CONTACT US, EMAIL UPDATES, and LISTEN TO PAGE. The main header features the U.S. NRC logo and the tagline "Protecting People and the Environment". A search bar and a "REPORT A SAFETY CONCERN" button are also present. Below the header is a secondary navigation menu with categories: NUCLEAR REACTORS, NUCLEAR MATERIALS, RADIOACTIVE WASTE, NUCLEAR SECURITY, PUBLIC MEETINGS & INVOLVEMENT, NRC LIBRARY, and ABOUT NRC. A left sidebar contains a "NUCLEAR REACTORS" section with sub-links for Power Reactors, Research & Test Reactors, Operating Reactors, and Operator Licensing. Two red arrows point to the "Operator Licensing" link in this sidebar. Below the sidebar are social media icons for Blog, Facebook, YouTube, and a "Spotlight" section. The main content area shows the breadcrumb "Home > Nuclear Reactors > Operator Licensing" and the page title "Operator Licensing". Under "On this Page:", there is a list of links: "What We Regulate", "How We Regulate", and "New Reactor Operator Licensing". A "What We Regulate" section follows, containing a paragraph about NRC licensing and a link to "Operator Licensing for Research and Test Reactors". On the right, a "KEY TOPICS" box lists "Generic Fundamentals Examinations" (BWR Exam, PWR Exam) and "Exam/Requalification Inspection Schedules" (Region I, II, III, IV). At the bottom left, there is an aerial photograph of a nuclear reactor facility.

- Power Reactors
- Research & Test Reactors
- Irradiation & Processing Facilities
- Operating Reactors
- Operator Licensing**
- New Reactors
- Operator Licensing for New Reactors



Spotlight

CHOOSE A SECTION

Operator Licensing

On this Page:

- [What We Regulate](#)
- [How We Regulate](#)
- [New Reactor Operator Licensing](#)

What We Regulate

The NRC licenses all individuals who either operate or supervise the operation of the controls of a commercially owned nuclear power reactor or a test/research (i.e., non-power) reactor in the United States. Although the regulations in this area generally apply to both power and research and test reactors, this site focuses primarily on the operator licensing activities at power reactor facilities. For more information on research and test reactors operator licensing, please refer to [Operator Licensing for Research and Test Reactors](#).

As of January 2017, there are approximately 4,550 NRC-licensed reactor operators in the United States.

 TOP

How We Regulate

NRC regulates the licensing of reactor operators and senior operators through a combination of regulatory requirements: initial licensing, including written examinations and operating tests; oversight of requalification training and examination programs, including enforcement. For more detail, see:

- [Regulations, Guidance, and Communications](#)
- [Licensing Process](#)
- [Generic Fundamentals Examinations](#)
- [Examination Schedule and Results](#)
- [Oversight Program](#)

KEY TOPICS

Generic Fundamentals Examinations

[BWR Exam](#)

[PWR Exam](#)

Exam/Requalification Inspection Schedules

[Region I](#)

[Region II](#)

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 [NUCLEAR REACTORS](#)[NUCLEAR MATERIALS](#)[RADIOACTIVE WASTE](#)[NUCLEAR SECURITY](#)[PUBLIC MEETINGS & INVOLVEMENT](#)[NRC LIBRARY](#)[ABOUT NRC](#)[PRINT](#)

OPERATOR LICENSING

[Regulations, Guidance, and Communications](#)[Licensing Process for Operators](#)[Examination Schedule and Results](#)[Oversight Program](#)[Public Involvement in Operator Licensing](#)[Related Documents and Other Resources](#)[Generic Fundamentals Examinations](#)[Program Feedback](#)[Contact Us](#)

Home > Nuclear Reactors > Operator Licensing > Regulations, Guidance, and Communications

Regulations, Guidance, and Communications

scroll

On this page:

- [Regulations](#)
- [Guidance](#)
- [Communications](#)

This page includes links to files in non-HTML format. See [Plugins, Viewers, and Other Tools](#) for more information.

Regulations

NRC's regulations are found in Chapter I of Title 10, "Energy," of the *Code of Federal Regulations (10 CFR)*. Chapter I is divided into Parts 1 through 199. The following are the principal parts governing the nuclear power plant operators.

- [Part 55 – Operators' Licenses](#)
- [Part 50 – Domestic Licensing of Production and Utilization Facilities](#)
- [Part 52 – Licenses, Certifications, and Approvals for Nuclear Power Plants](#)



Guidance

Regulatory guides (RGs) are issued in ten divisions and are intended to aid licensees in implementing regulations. The guides most applicable to licensing operators are in [Power Reactors \(Division 1\)](#).

The following guides in these divisions are the ones most relevant to licensed operators.

- [RG 1.8](#) – Qualification and Training of Personnel for Nuclear Power Plants
- [RG 1.114](#) – Guidance to Operators at the Controls and to Senior Operators in the Control Room of a Nuclear Power Unit
- [RG 1.134](#) – Medical Evaluation of Licensed Personnel for Nuclear Power Plants
- [RG 1.149](#) – Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations.

Each regulatory guide is listed by division number; title; date issued, and revisions, if applicable. A guide available at this site has an underscored number. Draft regulatory guides are listed separately. Many regulatory guides are available in NRC's Agency Document Access and Management System ([ADAMS](#)).

NUREGs are NRC published reports in the [NUREG-series](#), covering a variety of regulatory, technical, and administrative subjects. The following publications are the ones most relevant to the operator licensing process:

- Operator Licensing Examination Standards for Power Reactors ([NUREG-1021](#), Revision 10) became effective for all examinations administered after July 2, 2015. NUREG-1021, Revision 11, was issued on February 15, 2017. Per [10 CFR 55.40](#), NUREG-1021, Revision 11, becomes effective for all examinations administered on or after August 15, 2017.
- Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors ([NUREG-1122](#), Revision 2, Supplement 1) became effective for all examinations that are administered after April 16, 2008. NUREG-1122, Revision 3, has been issued for public comment (comments will be accepted until May 15, 2017).
- Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors ([NUREG-1123](#), Revision 2, Supplement 1) became effective for all examinations that are administered after April 16, 2008. NUREG-1123, Revision 3, has

scroll



- Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Westinghouse AP1000 Pressurized-Water Reactors ([NUREG-2103](#)) became effective for all examinations that are administered after April, 2012.
- Training Review Criteria and Procedures ([NUREG-1220, Revision 1](#)).
- Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses ([NUREG-1262](#)).

Additional guidance pertaining to operator licensing is included in the following:

1. "[Supplemental Guidance For Writing Effective Multiple Choice Questions](#)" 
2. "[Checklist for Transmitting and Receiving NRC Exam Material over the Internet](#)" 

 [TOP](#)

Communications

Generic Communications are NRC's primary method of sending information to specific classes of licensees. See our page on [Generic Communications Related to Operator Licensing](#). For information about the types of generic communications see:

- [Administrative Letters](#)
- [Bulletins](#)
- [Information Notices](#)
- [Generic Letters](#)
- [Regulatory Issue Summaries](#)

 [TOP](#)



Finding NRC Forms

Locating FORMS

Two options

- Option 1: Bottom of NRC Homepage, under “POPULAR DOCUMENTS”

The screenshot shows the NRC homepage with a red box highlighting the 'POPULAR DOCUMENTS' menu. A red arrow points from the 'FORMS' link in the menu to a detailed view of the 'POPULAR DOCUMENTS' page, where 'FORMS' is highlighted with a red arrow.

Spotlight

- OPM Data Breach
- Watts Bar Nuclear Plant Unit 2
- Regulatory Information Conference
- Commission Documents
- Fire Protection Program for Operating Reactors
- Japan Lessons Learned
- Seabrook Concrete Degradation
- NRC Safety Culture Policy Statement
- Tribal Policy Statement
- Underground Reactor Pipes and Tritium
- New Reactor Construction
- For the Record

[Spotlight Archive »](#)

News & Speeches

July 17, 2015

- NRC Schedules Meeting to Discuss Readiness Inspection of Watts Bar Unit 2

[More News »](#) [More Speeches »](#)

Public Meetings

July 2015

S	M	Tu	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

[« Prev](#) [Today](#) [Next »](#)

Open Government

NRC Approaches Open/Digital Government

[Read more »](#)

Students & Teachers

Information for Students and Teachers

[Read more »](#)

In a Nuclear Emergency ...

Know what to do

[Read more »](#)

2015 Fuel Cycle Information Exchange (FCIX)

POPULAR DOCUMENTS

- INFO DIGEST
- FACTSHEETS & BROCHURES
- [FORMS](#)
- ELECTRONIC SUBMITTALS APPLICATION
- NRC REPORTS – NUREG
- NRC REGULATIONS – 10-CFR
- INSPECTION REPORTS
- PLAIN WRITING
- ENFORCEMENT ACTIONS
- RULEMAKING

STAY CONNECTED

- BLOG
- FACEBOOK
- TWITTER
- YOUTUBE
- FLICKR
- GOVDELIVERY
- RSS

POPULAR DOCUMENTS

- INFO DIGEST
- FACTSHEETS & BROCHURES
- [FORMS](#)
- ELECTRONIC SUBMITTALS APPLICATION
- NRC REPORTS – NUREG
- NRC REGULATIONS – 10-CFR
- INSPECTION REPORTS
- PLAIN WRITING
- ENFORCEMENT ACTIONS
- RULEMAKING

HOME

- NEWS RELEASES
- EVENT REPORTS
- ADAMS
- OPEN GOV
- DIGITAL GOVERNMENT
- STUDENTS & TEACHERS
- PHOTOS & VIDEO
- FOR DEVELOPERS

ABOUT US

- STRATEGIC PLAN
- BUDGET & PERFORMANCE
- PERF & ACCOUNTABILITY REPT
- HISTORY OF THE NRC
- CAREER OPPORTUNITIES
- NRC ETHICS
- AGENCY STATUS
- CONTACT US

Regulations.gov **TSA.gov** **Recovery** **FOIA** **Ny Prop EEO** **Inspector General Program** **Site Map** **Accessibility** **Privacy Policy** **Site Disclaimer** **For Employees**

Two options

- Option 2: (OL specific forms only)

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“Lic

HOME
United States
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Regulations, Guidance, and Communications

Licensing Process for Operators

Examination Schedule and Results

Oversight Program

Public Involvement in Operator Licensing

Related Documents and Other Resources

Generic Fundamentals Examinations

Program Feedback

Contact Us

Licensing Process for Operators

Before the NRC licenses an individual to operate or supervise the controls of a commercial nuclear power reactor, the applicant must complete extensive training and pass rigorous examinations. Once licensed, operators and senior operators must comply with a number of requirements to maintain and renew their licenses. For more details see:

- [Process for New Operator Licenses](#)
- [Operator License Maintenance](#)
- [Operator License Renewal Process](#)

Process for New Operator Licenses

NRC's four regional offices ([locations](#)) are responsible for issuing licenses for operators and senior operators of commercial nuclear power plants in accordance with NRC's regulations for "Operators' Licenses" ([10 CFR Part 55](#)) and ([NRC Form 398](#) ; **Form currently being revised; once approved by OMB the form will be immediately effective**). An applicant sends or delivers a completed application ([NRC Form 398](#) ) to the Regional Administrator having jurisdiction over the plant at which the applicant hopes to work.

A completed application ([10 CFR 55.31](#)) describes the applicant's qualifications and requires the facility licensee for which the applicant will work to certify that the applicant has satisfied the facility licensee's training and experience requirements to be a licensed operator or senior operator. Applicants must also undergo a physical examination ([10 CFR 55.21](#)) and be certified ([NRC Form 396](#) ; **Form currently being revised; once approved by OMB the form will be immediately effective**) physically and mentally fit to be an operator. If an applicant's general medical condition does not meet the minimum standards



 **Spotlight**

CHOOSE A SECTION 



Operator
Licensing
Program
Feedback
(aka, FAQs)

What are FAQs?

- NRC's operator licensing (OL) program is governed by 10CFR55 and implemented IAW the guidance in NUREG-1021. Individuals interested in these regulations and standards have, over time, requested clarification regarding specific policies and issues.
- Some of the feedback is very specific in nature and may be limited in its applicability to other licensees, but it promotes a better understanding of the OL program. Licensees are **cautioned** to use the feedback as an aid in understanding the elements of the program and to discuss *specific circumstances* with their Regional Office or OL staff at the Office of Nuclear Reactor Regulation.
- The feedback represents NRC staff positions that are **NOT** intended as legal interpretations of the regulations.

What are FAQs?

- 21 categories
 - 17 based on sections of NUREG-1021
 - 1 for Requalification Inspections (IP-71111.11)
 - 1 for Simulation Facilities
 - 1 for 10 CFR 55
 - 1 for questions that don't fit anywhere else (General)
- Revised periodically, or to support changes in NUREG-1021, as happened recently.

Where are FAQs?

Operator Licensing

On this Page:

- [What We Regulate](#)
- [How We Regulate](#)
- [New Reactor Operator Licensing](#)

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- [Generic Fundamentals Examinations](#)
- [Examination Schedule and Results](#)
- [Oversight Program](#)
- [Public Involvement](#)
- [Related Documents and Other Resources](#)
- [Generic Communications Related to Operator Licensing](#)
- [Operator Licensing Program Feedback](#)
- [Contact Us About Operator Licensing](#)

KEY TOPICS

Generic Fundamentals Examinations

- [BWR Exam](#)
- [PWR Exam](#)

Exam/Requalification Inspection Schedules

- [Region I](#)
- [Region II](#)
- [Region III](#)
- [Region IV](#)

 SEARCH

- NUCLEAR REACTORS
- NUCLEAR MATERIALS
- RADIOACTIVE WASTE
- NUCLEAR SECURITY
- PUBLIC MEETINGS & INVOLVEMENT
- NRC LIBRARY
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OPERATOR LICENSING

- Regulations, Guidance, and Communications
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- Related Documents and Other Resources
- Generic Fundamentals Examinations
- Program Feedback**
- Contact Us



Home > Nuclear Reactors > Operator Licensing > **Program Feedback**

Operator Licensing Program Feedback

The NRC's operator licensing program is governed by the regulations in [10 CFR Part 55](#) and implemented in accordance with the guidance in [NUREG-1021](#), "Operator Licensing Examination Standards for Power Reactors," and other documents. Individuals interested in these regulations and standards have, over time, requested clarification from the NRC's operator licensing program office regarding specific policies and issues.

In general, the [Operator Licensing Program Feedback Summary](#)  is organized and revised to conform with the Examination Standards (ES) in [NUREG-1021](#), with bookmarks and links to related documents. Although some of the feedback is very specific in nature and may be limited in its applicability to other licensees, the staff believes that making it available on the website will promote a better understanding of the operator licensing program. Licensees are cautioned to use the feedback as an aid in understanding the elements of the operator licensing program and, if appropriate, to discuss their specific circumstances with the operator licensing staff at the Office of Nuclear Reactor Regulation or the appropriate NRC Regional Office; moreover, the feedback represents NRC staff positions that are NOT intended as legal interpretations of the regulations.

Changes since 2015 Workshop

Most recent revision: 3/13/2017

- Question 401.54 added to clarify required Tech Spec knowledge for RO applicants.
[FAQ 401.54.pdf](#)
- This is the only new FAQ, but 3 others were revised with Rev. 11.

Changes since 2015 Workshop

- Slight clarification to Question 202.1 to align with 10CFR55.59 and NUREG-1021 for what constitutes a power change.

[FAQ 202.1.pdf](#)

- (A) Plant or reactor startups to include a range that reactivity feedback from nuclear heat addition is noticeable and heatup rate is established.
- (B) Plant shutdown.
- (C) Manual control of steam generators or feedwater or both during startup and shutdown.
- (D) Boration or dilution during power operation.
- (E)** Significant (≥ 10 percent) power changes in manual rod control or recirculation flow.
- (F)** Reactor power change of 10 percent or greater where load change is performed with load limit control or where flux, temperature, or speed control is on manual (for HTGR).

Changes since 2015 Workshop

- Question 202.20 revised to include discussion of latest revision to ACAD 10-001 (Nov 2016).

Question 202.20 revision:

202.20 - The NANT “Guidelines for Initial Training and Qualification of Licensed Operators” -- ACAD 10-001 -- were revised in November 2016 to Revision 1. The revision updated and clarified experience and education eligibility guidance for selection of ROs and SROs in Section 2.0, Figures 2-1 through 2-4.

However, Rev. 11 of NUREG-1021 in ES-202 references the NANT guidelines issued in February 2010 (NANT 2010) and states “unless otherwise informed by a facility licensee, the NRC believes that the education and experience guidelines described in NANT 2010 constitute the facility licensee’s education and experience requirements to be licensed as an RO or SRO.” Given this NUREG-1021 description, **does the NRC also consider the ACAD 10-001, Rev. 1, guidelines an acceptable methodology for eligibility determinations?**

Question 202.20 revised answer:

What do you think the answer is?

Of course:

The NRC considers the eligibility guidelines for education and experience at existing nuclear power plants promulgated by the NANT including those issued in November 2016 -- ACAD 10-001, Rev. 1 -- as acceptable methods for meeting 10CFR55.31(a)(4).

Changes since 2015 Workshop

Question 205.1 revised to include Revision 11 changes (i.e., the allowance for facility licensee (other authors) to develop Generic Fundamental Exams), and to further clarify response.

Question 205.1 revision:

205.1 - At what point will the GFE be a computer-based exam including immediate grading? Proctor would be onsite. Could anything be done such that the GFES is generated (and thus administered) just-in-time?

In light of the increasing size of the GFES question banks, the NRC changed the bank/modified/new question distribution from 25/20/5 to 40/5/5 (based on a 50-question examination). ~~The NRC may consider allowing licensees to develop the 5 modified and 5 new questions if they were unable to participate in one of the regularly scheduled GFES.~~ Also, due to the reduction in the frequency of GFES starting in CY 2017, Rev. 11 of NUREG-1021 permits facility licensees (other authors) to develop up to 2 additional GFES per year (for review and approval by the NRC).

The NRC is uncertain, at this point, when and if GFES will be based entirely on bank questions or be a computer-based exam. The fundamental question to be addressed before either of these potential changes could be implemented is whether these changes will be able to ensure a discriminating, valid, and reliable examination (10CFR55.49).

Broad Overview of Rev. 11 Changes

- Most of these changes will be discussed more in-depth in later topics, so consider this a high-level overview.
- For the sake of efficiency, please hold specific questions until later topics.
- If by the end we haven't addressed something you're interested in, ASK!



Broad Overview of Rev. 11 Changes

- NRC is issuing Rev. 11 to:
 - Clarify the waiver process, the new excusal process, post-exam comments process and timeframe, and independent review (appeal) process
 - Clarify and modify grading criteria for the simulator op-test to improve objectivity and ensure proper emphasis on operator competence

Broad Overview of Rev. 11 Changes

ES-102 – Regulations and Publications

- Supports Rev 3 of K/A catalogs.
- Endorses Rev 4 (Sep 2014) of ANSI 3.4.

ES-201 – Initial Operator Licensing Exam Process

- Each region shall prepare at least 1 full exam/year.
- Added 2 months to the timeline.
- Waivers and excusals should be submitted as early as possible (ideally >60 days).
- Facility develops schedule and assigns crews.
- New restrictions on assigning examiners (and licensing official) for retakes.

Broad Overview of Rev. 11 Changes

ES-202 – Preparing & Reviewing Applications

- Adds the concept of “excusal” of written or op-test if passed on the immediately prior attempt.
- Relaxes experience and time-on-site requirements. (To match ACAD 10-001 changes.)

ES-204 – Processing Excusal/Waiver Requests

- Waivers/excusals should be requested at least 60 days before, and on preliminary apps 30 days before, but binding NRC resolutions are **only** documented on the final signed apps.

Broad Overview of Rev. 11 Changes

ES-205 – Procedures for Administering GFES

- From 4 to 2 times per year, with option for industry-based exam authors to develop others.
- GFE-takers can be designated as future enrollees in license class, vs. currently enrolled.
- NRC developing an online registration portal.

Broad Overview of Rev. 11 Changes

ES-301 – Preparing Initial Operating Tests

- SRO admin JPMs must be written at the SRO level.
- Every scenario shall be new or significantly modified: 2 events not used on previous 2 NRC exams. (Reactivity manipulations exempt.)
- At least 2 pre-identified CTs per scenario. Applicants should be evaluated on a similar number of CTs.
- New Form ES-301-7 – Op-Test Review Worksheet.

ES-302 – Administering Operating Tests

- Event classification is not required to be part of a scenario, and definitely can't be a CT.

Broad Overview of Rev. 11 Changes

ES-303 – Documenting and Grading Op-Tests

- 0 to 3 grading, and discontinuation of “point back”.
- “Communications” gets a special +1 grading.
- Every missed TS entry represents a PD.
- TS “Recognize & Locate” were split out.
- Errors are NOT carried forward.

ES-401 – Preparing Written Exams

- 50% of SRO questions (13) shall be at C/A level.
- Must now explain why answer is correct and distractors are plausible but incorrect.



Broad Overview of Rev. 11 Changes

ES-402 – Administering Written Exams

- 9 hours for SRO exam, no extensions.
- Post-exam comments in 20 calendar days.
- Licensee shall include a facility position for each applicant comment.

ES-403 – Grading Written Exams

- Truncate exam scores in tenths place.



Broad Overview of Rev. 11 Changes

ES-502 – Application Denials and Processing Requests for Informal NRC Staff Reviews

- Much more guidance added regarding the informal NRC staff review process.

ES-605 – License Maintenance, License Renewal Applications, and Requests for Administrative Reviews and Demands for Hearings

- New section for License Amendments (legal name change, address, addition of another unit).

Broad Overview of Rev. 11 Changes

Appendix C – JPM Guidelines

- Steps required to meet the task standard, but are not verifiable actions, must still be designated as critical. (Example: phone call to direct a field operator to open a valve would be designated critical.)

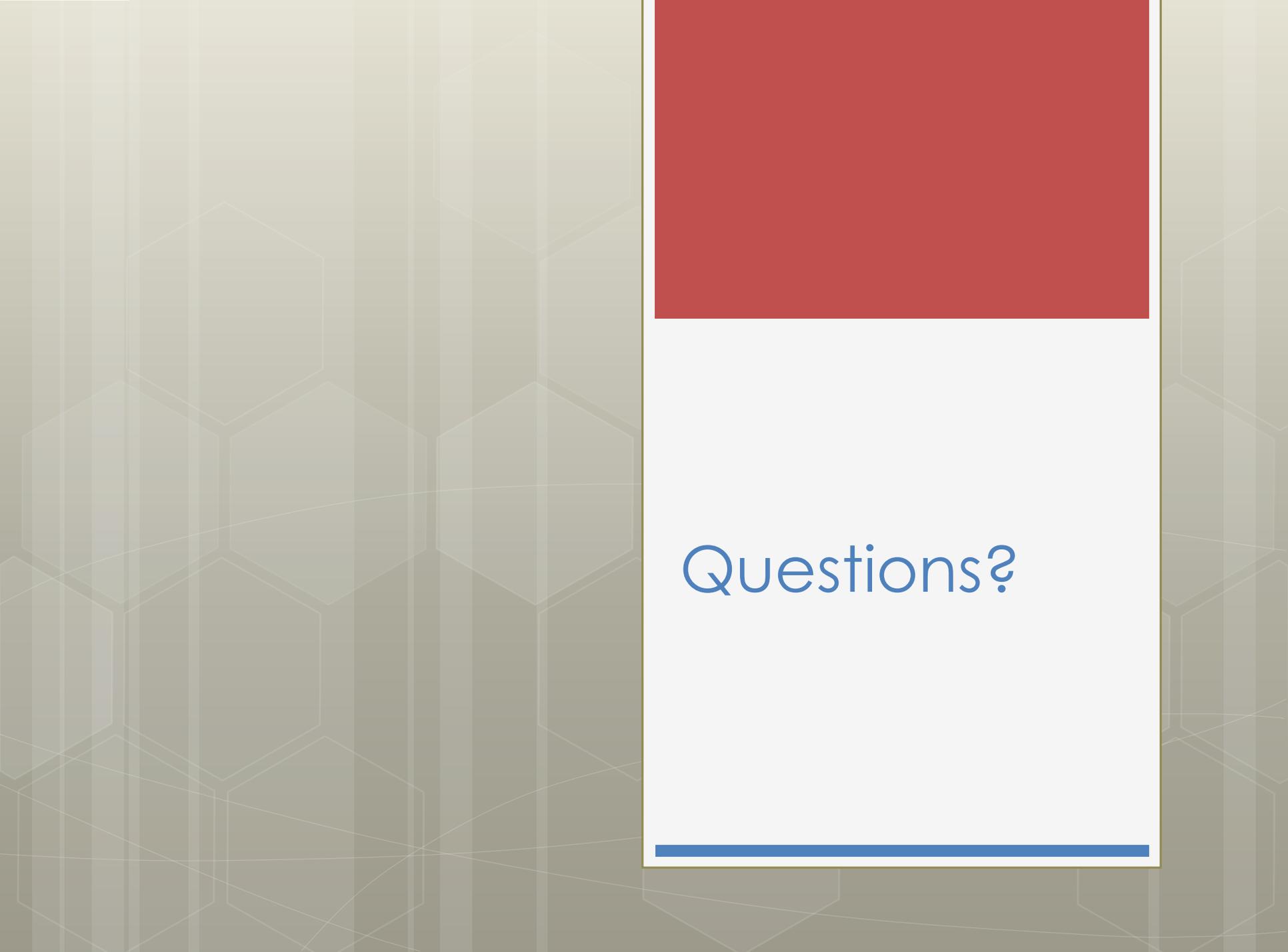
Appendix D – Simulator Testing Guidelines

- If a major event is repeated from prior 2 NRC exams, change the major, the ICs, or subsequent malfunctions to alter the course of action.
- Suggests blanket statement in scenario guides: “Causing an unnecessary plant trip or ESF actuation may constitute a CT failure.”

Broad Overview of Rev. 11 Changes

Appendix F – Glossary

- Event: Any normal evolution, instrument or component failure, equipment malfunction, reactivity manipulation and *major plant transient* when used in the context of a simulator scenario.



Questions?



Operator Licensing Program Feedback

is a justifiable basis to allow a greater number of references to be used on the SRO exam. Yet, in the spirit of Question #401.42, both RO and SRO exams, as initial license exams, should similarly rely more heavily on knowledge memory and the application of this knowledge, which the NRC staff believes does not diminish operational validity.

In this regard, the following ranges are provided regarding the allowable use of references on initial license examinations consistent with the principles discussed in Question #401.42. Note that these quantitative ranges are not absolute limitations, nor should they be construed as goals or requirements. You should also note that [NUREG-1021](#) does not permit any "direct lookup" questions or questions with references that provide an advantage in answering other "closed-reference" questions on the initial licensing examination.

RO (75 items) = up to ~5% or 4 questions

SRO (25 items) = up to ~20% - 25% or 5 - 6 questions

401.54 - According to ES-401, Attachment 2^[1], for writing SRO level Tech Spec questions, one screening criteria is to determine if the question can be answered solely by knowing the 'above the line' information. RO candidates are required to know the LCO statement and the Modes of applicability. Is RO knowledge limited specifically to these words in the LCO statement, or is knowing the subparts of the system which makes it Operable also considered required knowledge? The T/S basis contains a statement for the LCO which usually lists the necessary components and lineups which would make a system Operable.

Knowledge of the bases information/discussion in Technical Specifications (TS) for limiting conditions for operation (LCOs) is not considered RO required knowledge with the following one exception. Knowledge of and ability to apply less than or equal to one hour TS action statements is considered RO knowledge. In this instance, RO knowledge is NOT "limited specifically" to the "words in the LCO statement" and the TS bases knowledge indicating "the necessary components and lineups which would make a system [or component] Operable" is appropriate for testing on the RO written examination or operating test.

In summary, application of knowledge contained within the TS bases and NOT associated with an immediate or less than or equal to 1 hour TS Action Statement should not be tested on the RO examination when testing RO "above this line" TS knowledge as discussed in ES-401, Attachment 2 and depicted below:

^[1] ES-401 Attachment 2, "Clarification Guidance for SRO-only Questions," provides clarification and guidance for fulfilling the intent of 10 CFR 55.43 ... The use of this document is not a regulatory requirement"



Operator Licensing Program Feedback

Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
A.	One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours

RO knowledge

Above this line

For the TS 5.3.1 example above, a RO applicant would be expected to possess knowledge and understanding of the “Above this line” information but would **generally** not be expected to have knowledge of the TS LCO B 3.5.1 system/component parametric values and/or conditions necessary to determine Accumulator System OPERABILITY.

However, ACTION D for “Two or more accumulators inoperable” as shown below requires that LCO 3.0.3 be entered “**Immediately**.” Therefore, in this instance and notwithstanding that the information is provided in the LCO B 3.5.1 Bases, a RO **would** be expected to understand that for an accumulator to be considered OPERABLE, the isolation valve must be fully open, power removed above 1000 psig, and the TS Surveillance limits for accumulator volume, boron concentration, and nitrogen pressure must be met.



Operator Licensing Program Feedback

Accumulators
3.5.1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 ACCUMULATORS

LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
 MODE 3 with pressurizer pressure > 1000 psig.

ACTIONS

D.	Two or more accumulators inoperable.	D.1	Enter LCO 3.0.3.	Immediately
----	--------------------------------------	-----	------------------	-------------



Operator Licensing Program Feedback

ES-202

How to apply for a new license; eligibility; training; experience; reactivity manipulations; medicals

202.1 - Significant reactivity manipulations were defined in the Q&A portion of [NUREG-1262](#). The information notice issued a couple/three years ago seems to conflict with NUREG-1262. An answer to what is a significant manipulation should support NUREG-1262.

Reactivity manipulations for [initial licensed operator] ILO training: What is the status of allowing simulator manipulations (when unable to perform in-plant)? Also, define what constitutes a control manipulation. Why is a rod operability surveillance ok at one plant but not another? What constitutes a large change?

What is acceptable for reactivity manipulations? (any real-life examples of problems or rejected applications)

What are the criteria for doing reactivity manipulations on the simulator?

[Information Notice 97-67](#), "Failure to Satisfy Requirements for Significant Manipulations of the Controls for Power Reactor Operator Licensing," restated and clarified the NRC's position on this issue. The staff does not believe that the IN contradicts the guidance in NUREG-1262.

Effective on November 16, 2001, [10 CFR 55.31\(a\)\(5\)](#) was revised to allow the use of plant-referenced simulators to conduct the required control manipulations. Facility licensees that propose to use a plant-referenced simulator to perform the control manipulations must ensure that simulator fidelity has been demonstrated pursuant to 10 CFR 55.46(c).

The same test (e.g., started at a comparable power level, including a comparable number of rods, and a comparable reactivity change) should be acceptable on either plant. Without specifics, it is not possible to speculate why one was acceptable and the other was not.

10 CFR 55.31(a)(5) requires five "significant" control manipulations, and 10 CFR 55.59(c)(3)(i) provides a number of examples (which are not requirements). Per Example F, and as noted in IN 97-67, a power change of at least 10% is an example of a significant (or large) control manipulation. It would also be acceptable, when defining allowed reactivity manipulations, to evaluate the knowledge and abilities exercised in a controlled large evolution and then accept all smaller tasks that comparably exercise the same knowledge and abilities. The NRC expects such evaluations to be formally documented as part of the licensee's SAT-based (systematic approach to training) program.

The criteria for doing the 10 CFR 55.31(a)(5) reactivity manipulations on the simulator are discussed in [SECY-99-225](#), the staff paper that forwarded the associated rulemaking plan to the Commission for approval and [SECY-00-0083](#), the proposed rulemaking paper, which was issued on April 12, 2000. Facility licensees that propose to use a plant-referenced simulator to perform the control manipulations required by 10 CFR 55.31(a)(5) must ensure that simulator fidelity has been demonstrated pursuant to 10 CFR 55.46(c). Control manipulations performed



Operator Licensing Program Feedback

on the plant-referenced simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in 10 CFR 55.59(c)(3)(i)(A-F), (R), (T), (W), and (X), as applicable to the design of the plant for which the license application is submitted. As discussed in Section C.1.c of ES-202 (in [NUREG-1021](#)) power changes (**10 CFR 55.59(c)(3)(i)(E) and (F) only**) that are performed on the simulator must be 10% or greater in magnitude, while those on the plant may be smaller (to limit unnecessary transients on the facility) but of sufficient magnitude for the operator to experience appropriate feedback (i.e., clearly observable effects on the plant) as a result of the control manipulation.

202.2 - Can a candidate enrolled in a reactor operator initial license training program receive credit for significant control (reactivity) manipulations performed in the control room as the Balance of Plant (BOP) operator? For example, can the following manipulation, 10 CFR 55.59(c)(i)(C), be performed as BOP? Manual control of steam generators or feedwater or both during startup and shutdown.

A related question is: Do Direct SRO candidates (i.e., instant SROs) have to perform the manipulations as ROs to get credit, or can they supervise them as SROs (i.e., procedure readers) to get credit?

[10 CFR 55.31\(a\)\(5\)](#) requires that an applicant provide evidence that the applicant, as a trainee, has successfully manipulated the controls of either the facility for which a license is sought or a plant-referenced simulator that meets the requirements of [10 CFR 55.46\(c\)](#). At a minimum, five significant control manipulations must be performed that affect reactivity or power level. Control manipulations performed on the plant-referenced simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in 10 CFR 55.59(c)(3)(i)(A-F),(R),(T),(W), and (X) of this part, as applicable to the design of the plant for which the license application is submitted.

Therefore, two criteria drive the requirements for the five control manipulations, they must be significant and must affect reactivity or power level. "Manual control of steam generators or feedwater or both during startup and shutdown" is only sufficient to meet those two criteria if the licensee can clearly show that the manual control was significant and noticeably affected reactivity or power level. There is no requirement for the control manipulations to be completed in the RO watch position, so any manipulation done in the BOP watch station would qualify as long as it meets the requirements discussed above.

With regard to direct, or instant, SRO applicants, the control manipulations must be done in either the RO or BOP positions (i.e., hands-on); supervising another operator performing the manipulations would not be acceptable.

Keep in mind, as noted in Revision 2 of [Regulatory Guide 1.8](#), "Qualification and Training of Personnel for Nuclear Power Plants," that every effort should be made to have a diversity of reactivity changes for each applicant. Moreover, in keeping with the definition of "Controls" in 10 CFR 55.4, it is preferable that the required manipulations focus on those apparatus and mechanisms that directly affect the reactivity or power level of the reactor (e.g., control rods, boration/dilution, and turbine load for a PWR; control rods and recirculation flow for a BWR). After all, in accordance with [10 CFR 50.54\(i\)](#), those are the only apparatus and mechanisms

Anatomy of an NRC Exam

NUREG-1021, (Rev 11)

2017 Exam Writers' Conference

Joe Viera



“I love deadlines. I like the whooshing sound they make as they fly by.” – Douglas Adams

~1 year prior to NRC Exam

- Facility will generally initiate contact with Region 2 when they are prepared to receive or begin working on an upcoming exam (i.e. in advance of the NUREG process, 195-day milestone).
- Written Exam Sample Plan (ES-201, C.1.e-f; C.2.h; C.3.d-e)
 - Provided on request, but allow 2 weeks for delivery
 - Ensure Examination Security Measures are in-place (Form ES-201-3)
- Ensure written exam outline pre-screened K/A items are submitted IAW ES-401, D.1.b, if applicable

ES-201	Examination Security Agreement	Form ES-201-3					
1. Pre-Examination							
I acknowledge that I have acquired specialized knowledge about the U.S. Nuclear Regulatory Commission (NRC) licensing examinations scheduled for the week(s) of _____ as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC's chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC's chief examiner any indications or suggestions that examination security may have been compromised.							
2. Post-Examination							
To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of _____. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.							
	PRINTED NAME	JOB TITLE/RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
1.	_____	_____	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____	_____	_____

ES-201, Page 31 of 31

Milestone Checklist

- Form ES-201-1: Examination Preparation Checklist
- Target due dates keyed to the examination date identified in the Corporate Notification Letter.
- However, the target due dates can be adjusted as necessary to accommodate a given situation.
- 240-day 'confirmation of administration date', met by verifying facility RIS request with OL schedule. May include brief phone call.

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			
-240	1. Examination administration date confirmed (C.1.a; C.2.a-b). For NRC-prepared exams, arrangements are made for the facility to submit reference materials (C.1.e; C.3.c; Attachment 3).				
-210	2. NRC examiners and facility contact assigned (C.1.d; C.2.f).				
-210	3. Facility contact briefed on security and other requirements (C.2.c). As applicable, the facility contact submits to the NRC any prescreened K/As for elimination from the written examination outline, with a description of the facility's prescreening process (ES-401, D.1.b).				
-210	4. Reference material due for NRC-prepared exams (C.1.e; C.3.c; Attachment 3).				
-210	5. Corporate notification letter sent (C.2.e).				
-195	6. NRC-developed written examination outline (ES-401-1/2 or ES-401N-1/2 and ES-401-3 or ES-401N-3) sent to facility contact (must be on the exam security agreement) (C.1.e-f; C.2.h; C.3.d-e).				
-150	7. Operating test outline(s) and other checklists due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, and ES-D-1, as applicable (C.1.e-f; C.3.d-e).				
-136	8. Operating test outline(s) reviewed by the NRC and feedback provided to facility licensee (C.2.h; C.3.d-e).				
-75	9. Proposed examinations (written, JPMs, and scenarios, as applicable) and outlines (Forms ES-301-1, ES-301-2, ES-D-1, ES-401-1/2 or ES-401N-1/2, and ES-401-3 or ES-401N-3); supporting documentation (including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, ES-401-6, ES-401N-6, and any Form ES-201-2 and ES-201-3 updates); and reference materials due (C.1.e-h; C.3.d).				
-75	10. Examinations prepared by the NRC are approved by the NRC supervisor and forwarded for facility licensee review (C.1.i; C.2.h; C.3.f-g).				
-60	11. Preliminary waiver/excusal requests due (C.1.m; C.2.c; ES-202).				
-50	12. Written exam and operating test reviews completed (C.3.f).				
-35	13. Examination review results discussed between the NRC and facility licensee (C.1.j; C.1.k-l; C.2.h; C.3.g). The NRC and the facility licensee conduct exam preparatory week.				
-30	14. Preliminary license applications and waiver/excusal requests, as applicable (NRC Form 398) due (C.1.m; C.2.i; ES-202).				
-14	15. Final license applications and waiver/excusal requests, as applicable (NRC Form 398), due and Form ES-201-4 prepared (C.1.m; C.2.k; ES-202).				
-7	16. Written examinations and operating tests approved by the NRC supervisor (C.2.j-k; C.3.h).				
-7	17. Request facility licensee management feedback on the examination (C.2.l).				
-7	18. Final applications reviewed; one or two (if more than 10) applications audited to confirm qualifications/eligibility; and examination approval and waiver/excusal letters sent (C.2.k; Attachment 5; ES-202, C.3.j; ES-204).				
-7	19. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k).				
-7	20. Approved scenarios and job performance measures distributed to NRC examiners (C.3.i).				

* Target dates are based on facility-prepared examinations and the examination date identified in the corporate notification letter. These dates are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.

210-day Facility Phone Call

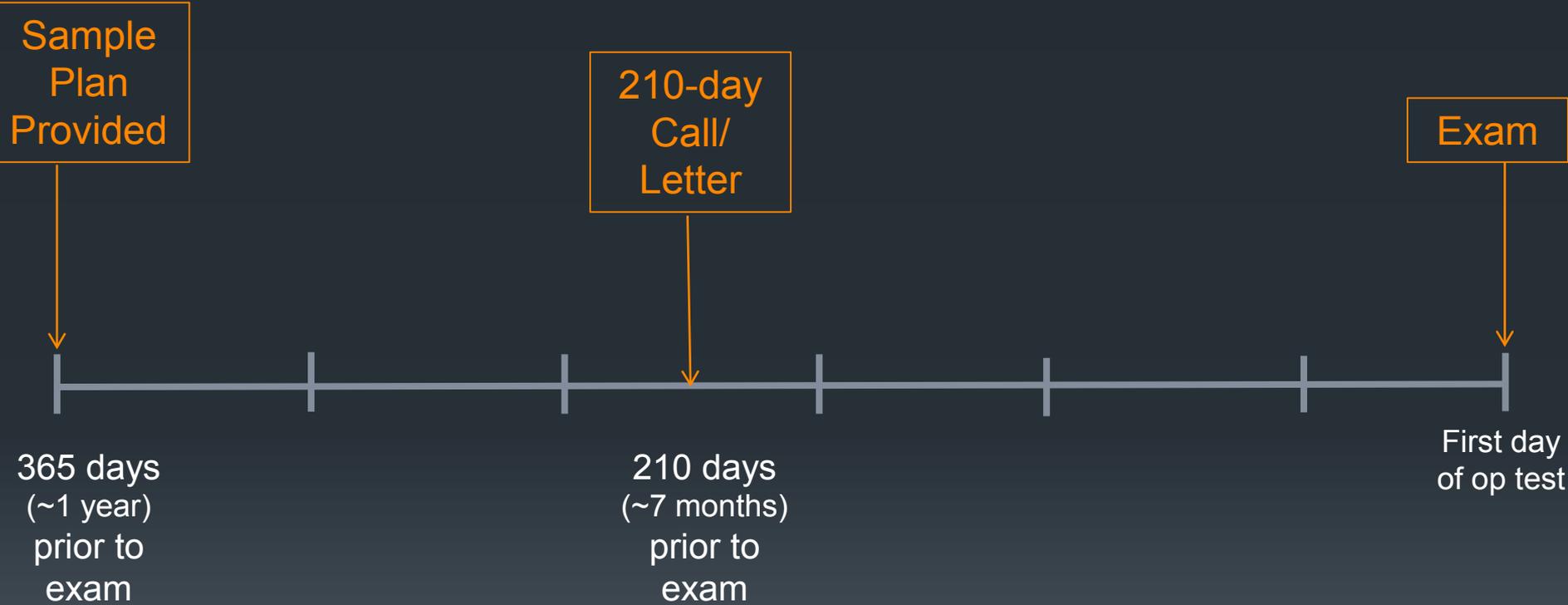
- ES-201, C.2.c and C.2.d
- The NRC regional office shall normally issue a letter confirming the arrangements no later than 210 days before the examination begins.
- The letter will be addressed to the person at the highest level of corporate management who is responsible for plant operations (e.g., 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 operator licensing examinations at <u>(facility name)</u> during the week(s) of <u>(date)</u> .		
As agreed upon 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 11 to 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> .]]		

Optional Pre-Review Test Items

- ES-201, C.2.c
- “Each Facility Licensee has the option to submit some sample test items (e.g., 5 to 10 written questions, 1 scenario, and 1 to 2 JPMs) for preliminary NRC review and comment.”
- This allowance is permitted to allow increased efficiency of the examination review process by promoting early identification and correction of generic examination development concerns.
- The sample items should not count toward the 20% threshold when determining the acceptable quality range expected by the NRC per ES-501, E.3.a if this review prompted changes which were incorporated and resulted in acceptable test items.

Initial Exam Events



~150 days prior to NRC Exam

- **Operating Test Outlines** submitted for review, ensure that any reference material needed to accomplish that review is included.
 - Must be *received* by the date agreed upon with the NRC regional office.
 - Separate Outline Forms should be submitted for each license level.
- ES-301-1: Administrative Topics Outline
 - ES-301-2: Control Room/In-Plant Systems Outline
 - ES-D-1: Scenario Outline
 - ES-301-5: Transient and Event Checklist

ES-301	Administrative Topics Outline	Form ES-301-1
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				R	I	U
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
RO <input type="checkbox"/>	RX													1	1	0	
	NOR													1	1	1	

~150 days prior to NRC Exam

- Outline Submittal also includes:

- ES-201-2: Examination Outline Quality Checklist

ES-201		Examination Outline Quality Checklist		Form ES-201-2	
Facility:		Date of Examination:			
Item	Task Description	Initials			
		a	b*	c**	
W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model in accordance with ES-401 or ES-401N.				
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 or ES-401N and whether all K/A categories are appropriately sampled.				
	c. Assess whether the outline overemphasizes any systems, evolutions, or generic topics.				
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.				
S I M U L	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 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				

- ES-201-3: Examination Security Agreement

ES-201		Examination Security Agreement		Form ES-201-3	
1. <u>Pre-Examination</u>					
<p>I acknowledge that I have acquired specialized knowledge about the U.S. Nuclear Regulatory Commission (NRC) licensing examinations scheduled for the week(s) of _____ as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC's chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC's chief examiner any indications or suggestions that examination security may have been compromised.</p>					
2. <u>Post-Examination</u>					
<p>ES-201-3 To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of _____. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.</p>					

~136 days prior to NRC Exam

- Operating Test Outline Review (14 days) conducted per ES-201, C.2.h and C.3.d-e, using the following forms:
- ES-201-2: Examination Outline Quality Checklist
- ES-301-3: Operating Test Quality Checklist
- ES-301-4: Simulator Scenario Quality Checklist
- ES-401(N)-6: Written Examination Quality Checklist (if written materials provided)

ES-201	Examination Outline Quality Checklist	Form ES-201-2
ES-301	Operating Test Quality Checklist	Form ES-301-3
ES-301	Simulator Scenario Quality Checklist	Form ES-301-4

Facility:	Date of Exam:	Scenario Numbers: / /	Operating Test No.:		
QUALITATIVE ATTRIBUTES			Initials		
			a	b*	c#
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 the following: <ul style="list-style-type: none"> the point in the scenario when it is to be initiated the malfunction(s) or conditions 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.	The events are valid with regard to physics and thermodynamics.				
5.	Sequencing and timing of events is reasonable and allows the examination team to obtain complete				

~150 days prior to NRC Exam



Operating Test Outlines:

- ES-201-2 and -3
- ES-301-1 through -5
- ES-D-1
- ES-401(N)-6 (if req'd)

210-day
Call/
Letter

Exam

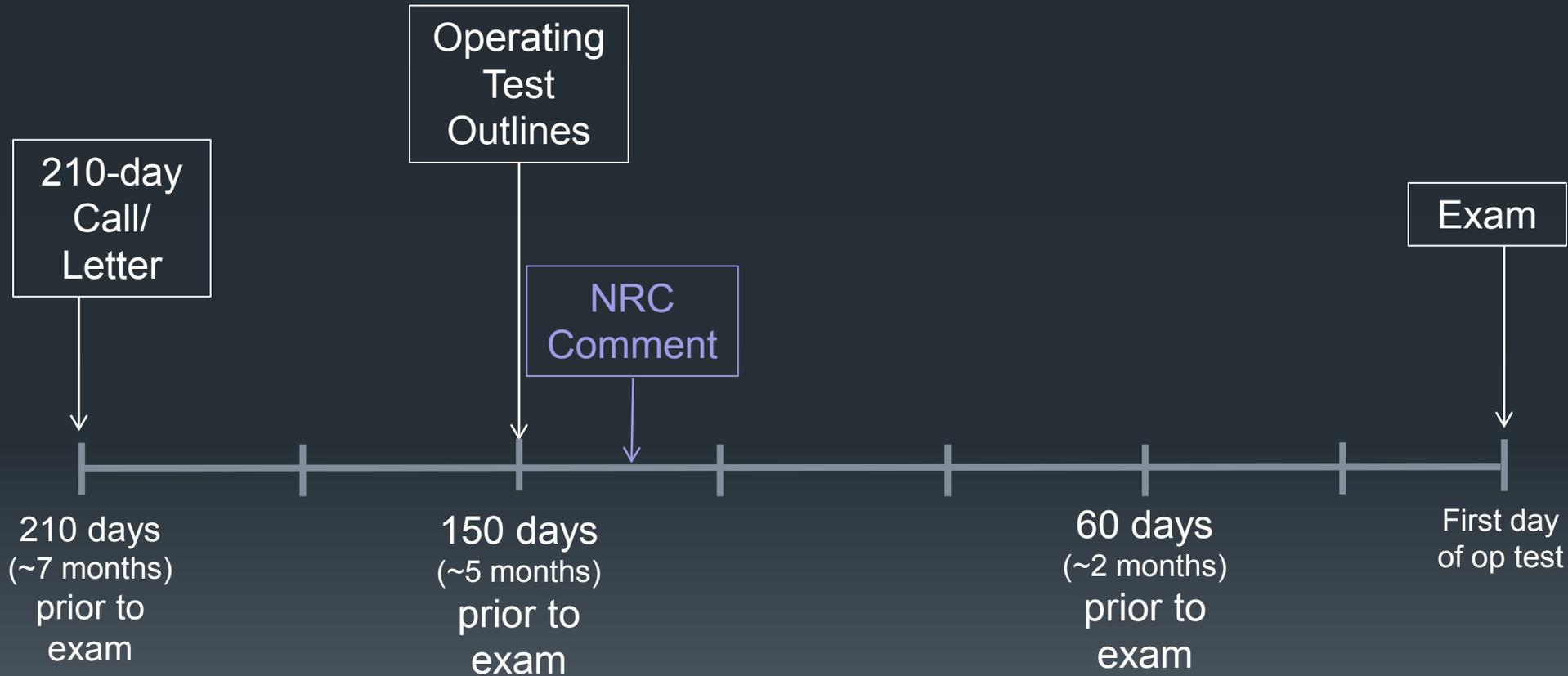
210 days
(~7 months)
prior to
exam

150 days
(~5 months)
prior to
exam

60 days
(~2 months)
prior to
exam

First day
of op test

~136 days prior to NRC Exam



~75 days prior to NRC Exam

Proposed Examinations submitted

- Operating Test (ES 301, Appendix C, Appendix D)
 - The facility will prepare the proposed operating exam, taking NRC comments from the Outline submittal into account.
 - Outlines typically resubmitted, unless no changes are specified following Outline submittal review.
 - Forms ES-301-1, ES-301-2, ES-D-1, ES-301-5
- Complete copies of all JPMs and JPM answer keys
- Complete Form ES-D-2: Required Operator Actions, for each scenario event, and
- Form ES-301-6: Competencies Checklist.

Appendix D Required Operator Actions Form ES-D-2

Op-Test No.: _____ Scenario No.: _____ Event No.: _____ Page ___ of ___

Event Description: _____

Time	Position	Applicant's Actions or Behavior

ES-301 Competencies Checklist Form ES-301-6

Facility: _____ Date of Examination: _____ Operating Test No.: _____

Competencies	APPLICANTS															
	RO				RO				RO				RO			
	SRO-I	SRO-I	SRO-U	SRO-U	SRO-I	SRO-I	SRO-U	SRO-U	SRO-I	SRO-I	SRO-U	SRO-U	SRO-I	SRO-I	SRO-U	SRO-U
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions																

~75 days prior to NRC Exam

- As with the Outline submittal, facility quality reviews conducted for development of the **Proposed Operating Test** are submitted per ES-201 C.1.f, using the following forms:
- Note: Form ES 201-2 (Outline Quality Checklist) would be resubmitted if changes to the outline were performed.
- ES-301-3: Operating Test Quality Checklist
- ES-301-4: Simulator Scenario Quality Checklist

ES-301	Operating Test Quality Checklist	Form ES-301-3			
ES-301	Simulator Scenario Quality Checklist	Form ES-301-4			
Facility:	Date of Exam:	Scenario Numbers: / /	Operating Test No.:		
QUALITATIVE ATTRIBUTES			Initials		
			a	b*	c#
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 the following: <ul style="list-style-type: none">the point in the scenario when it is to be initiatedthe malfunction(s) or conditions that are entered to initiate the eventthe symptoms/cues that will be visible to the crewthe expected operator actions (by shift position)the event termination point (if applicable)					
4. The events are valid with regard to physics and thermodynamics.					
5. Sequencing and timing of events is reasonable and allows the examination team to obtain complete					

~75 days prior to NRC Exam

Proposed Examinations submitted

- Written Exam (ES 401(N), Appendix A)
 - The facility will prepare the draft written exam (unless the exam is NRC-authored), taking any NRC pre-submittal question comments into account.
- Written Exam outlines typically *not* resubmitted (Forms ES-401(N)-1/2, -3).
- Form ES-401-4: Record of Rejected K/A's is submitted.
- Include information contained within Form ES-401(N)-5: Sample Written Examination Question Worksheet, for each proposed question.
 - Be sure to include the “parent” question if submitting either a Bank or Modified question. This ensures that the NRC can review any differences to verify NUREG compliance.

ES-401		Record of Rejected K/As	Form ES-401-4
Tier/Group	Randomly Selected K/A	Reason for Rejection	

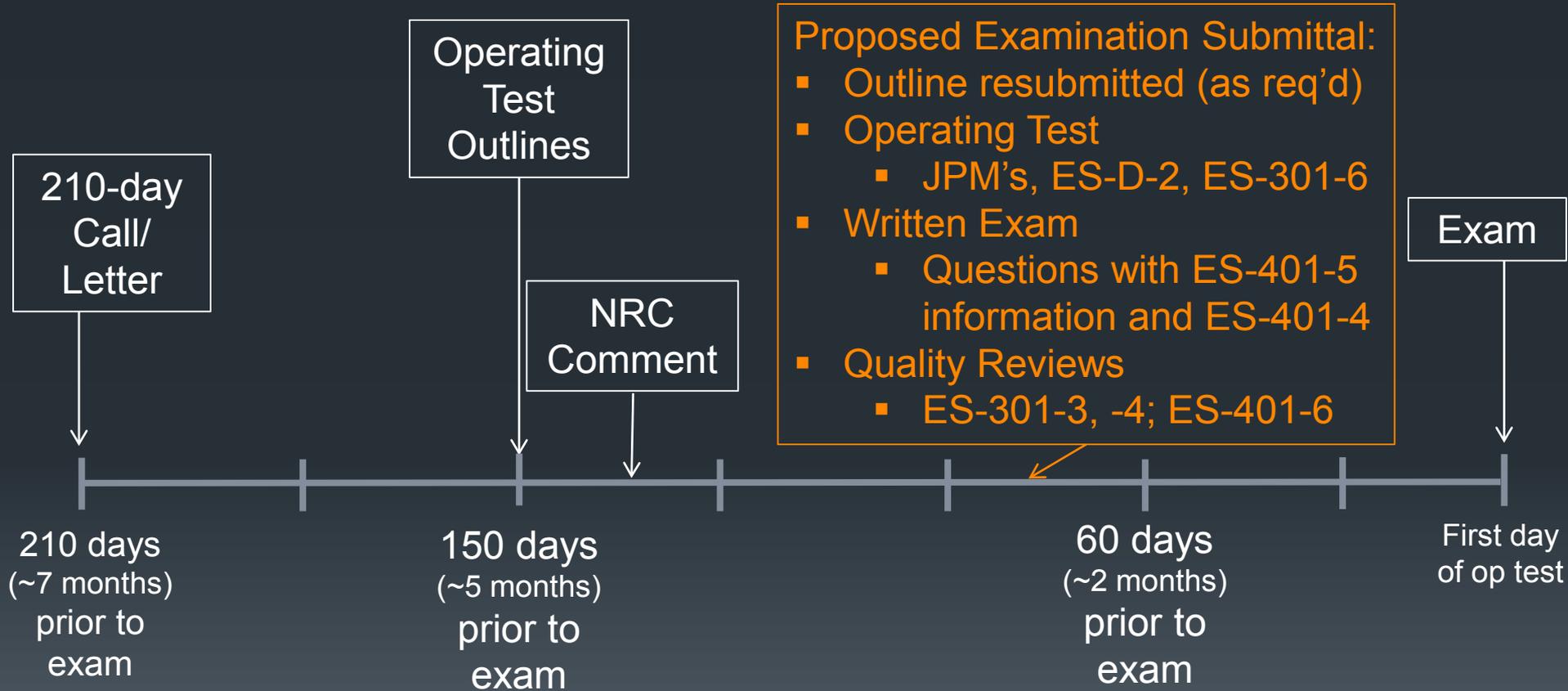
ES-401		Sample Written Examination Question Worksheet	Form ES-401-5
Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	_____
	Group #	_____	_____
	K/A #	_____	_____
	Importance Rating	_____	_____
K/A Statement: Proposed Question:			
Proposed Answer: _____			
Explanation (Optional):			
Technical Reference(s): _____			
(Attach if not previously provided, _____			
including version/revision number.) _____			
Proposed references to be provided to applicants during examination: _____			

~75 days prior to NRC Exam

- As with the Outline submittal, facility quality review conducted for development of the **Proposed Written Exam** is submitted per ES-201 C.1.f, using the following form:
- ES-401(N)-6: Written Examination Quality Checklist

ES-401		Written Examination Quality Checklist		Form ES-401-6	
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.			
	c.	Correct answer explanation and distractor analysis provided (ES-401, D.2.g)			
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 four RO or two SRO questions were repeated from the last two NRC licensing exams, consult the NRR/NRO OL program office).				
5.	Question duplication from the licensee 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 licensee certifies that there is no duplication, or ___ other (explain).				

~75 days prior to NRC Exam



~60 days prior to NRC Exam

- Preliminary Waiver/Excusal requests** due (ES-201 C.1.m, C.2.c, and ES-202)
 - Although previously discussed during the 210-day milestone call, this 60-day milestone represents a reminder for facility submittal of anticipated Form 398 requests.
 - Evaluate ES-204 D.1 “Excusals/Waivers Approved by the Regions” for situations where the Operator Licensing Program Office in D.C. requires involvement.
 - Although the preliminary application (unsigned) Form 398 submission is performed at the ‘~30 days prior to NRC Exam’ milestone, if your facility knows of waiver/excusal/deferral requests in advance, be prepared to submit unsigned Form 398’s.

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.390										
NRC FORM 398 (MM-YYYY) 10 CFR 55.31, 55.33, 55.35, 55.47, 55.53, and 55.57.				U.S. NUCLEAR REGULATORY COMMISSION PERSONAL QUALIFICATION STATEMENT -- LICENSEE			APPROVED BY OMB: NO. 3150-0090 EXPIRES: (MM/DD/YYYY)		DATE RECEIVED <i>(To be completed by NRC)</i>	
1. Last Name		2. First Name		3. Middle Initial	4. Birth Date: (MM/DD/YYYY)		5. E-mail Address			
6. Address (Number & Street, line 1)			7. Address (Suite, Unit No., etc., line 2)		8. City		9. State	10. Zip Code		
11. Type of Application (Check applicable boxes)					12. Deferrals/Excusals/Waivers (check all that apply and justify in item 25)					
<input type="checkbox"/> A. NEW		<input type="checkbox"/> E. REAPPLICATION			<input type="checkbox"/> a. DEFERRAL		<input type="checkbox"/> b. EXCUSAL		<input type="checkbox"/> c. WAIVER	
<input type="checkbox"/> B. RENEWAL		<input type="checkbox"/> 1 - FIRST DENIAL			<input type="checkbox"/> 1 - ELIGIBILITY		<input type="checkbox"/> 1 - WRITTEN (Category)	<input type="checkbox"/> 1 - WRITTEN (Category)		
<input type="checkbox"/> C. UPGRADE		<input type="checkbox"/> 2 - SECOND DENIAL			<input type="checkbox"/> 2 - EXPERIENCE		<input type="checkbox"/> 2 - OPERATING (Category)	<input type="checkbox"/> 2 - OPERATING (Category)		
<input type="checkbox"/> D. MULTI-UNIT (amend to include additional unit)		<input type="checkbox"/> 3 - THIRD DENIAL			<input type="checkbox"/> d. DATE PASSED GFE		<input type="checkbox"/> 3 - MEDICAL		<input type="checkbox"/> 4 - OTHER	
		<input type="checkbox"/> 4 - WITHDRAWAL			(MM) Select [] (YY)					
13. Type of License Applied for: <input type="checkbox"/> OPERATOR (RO) <input type="checkbox"/> SENIOR OPERATOR (SRO) <input type="checkbox"/> LIMITED (LSRO)										
14. Current or Previous License(s) Held										
Pocket Number(s)		DO		License Number(s)		Expiration Date(s)		Facility Docket Number(s)		

~50 days prior to NRC Exam

- Proposed Exam Submittal Review
 - NRC Regional Office Review (ES-201 C.3.f)

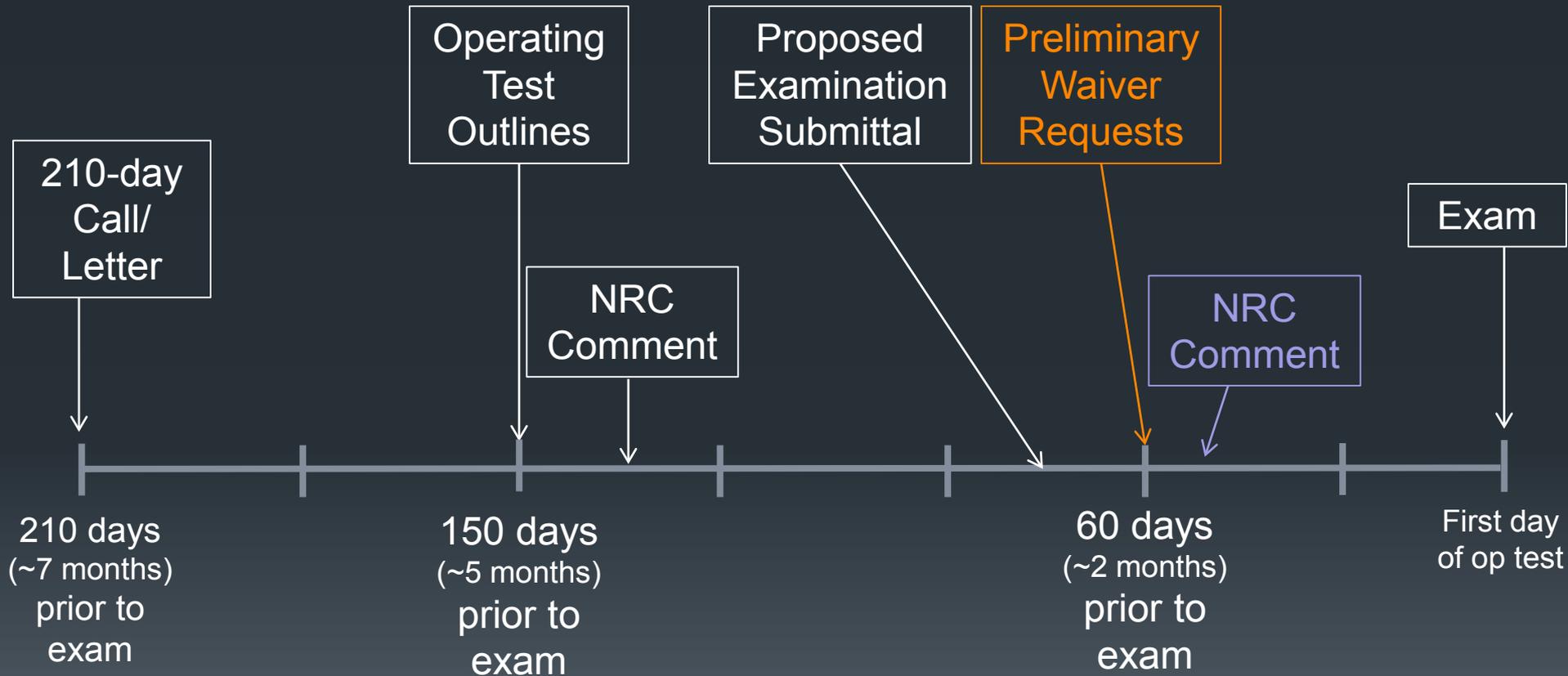
- Operating Test review (ES-301 E.2) – comments provided in advance of Prep Week
 - Form ES-301-7: Operating Test Review Worksheet

ES-301													Operating Test Review Worksheet			Form ES-301-7	
Facility:											Exam Date:						
Admin	JPMs	1 ADMIN Topic and K/A	2 LOD (1-5)	3 Attributes						4 Job Content		5 U/E/S	6 Explanation				
				I/C Focus	Cues	Critical Steps	Scope (N/B)	Overlap	Perf. Std.	Key	Minutia			Job Link			

- Written Exam review (ES-401(N) E.2) – comments provided in advance of In-Office Review (as req'd)
 - Form ES-401(N)-9: Written Examination Review Worksheet

ES-401													Written Examination Review Worksheet				Form ES-401-9	
Q	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws					5. Other		6. Source (B/M/N)	7. Status (U/E/S)	8. Explanation	
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job Link	Minutia	#/Units	Backward	Q – K/A	SRO Only					

~60 & ~50 days prior to NRC Exam

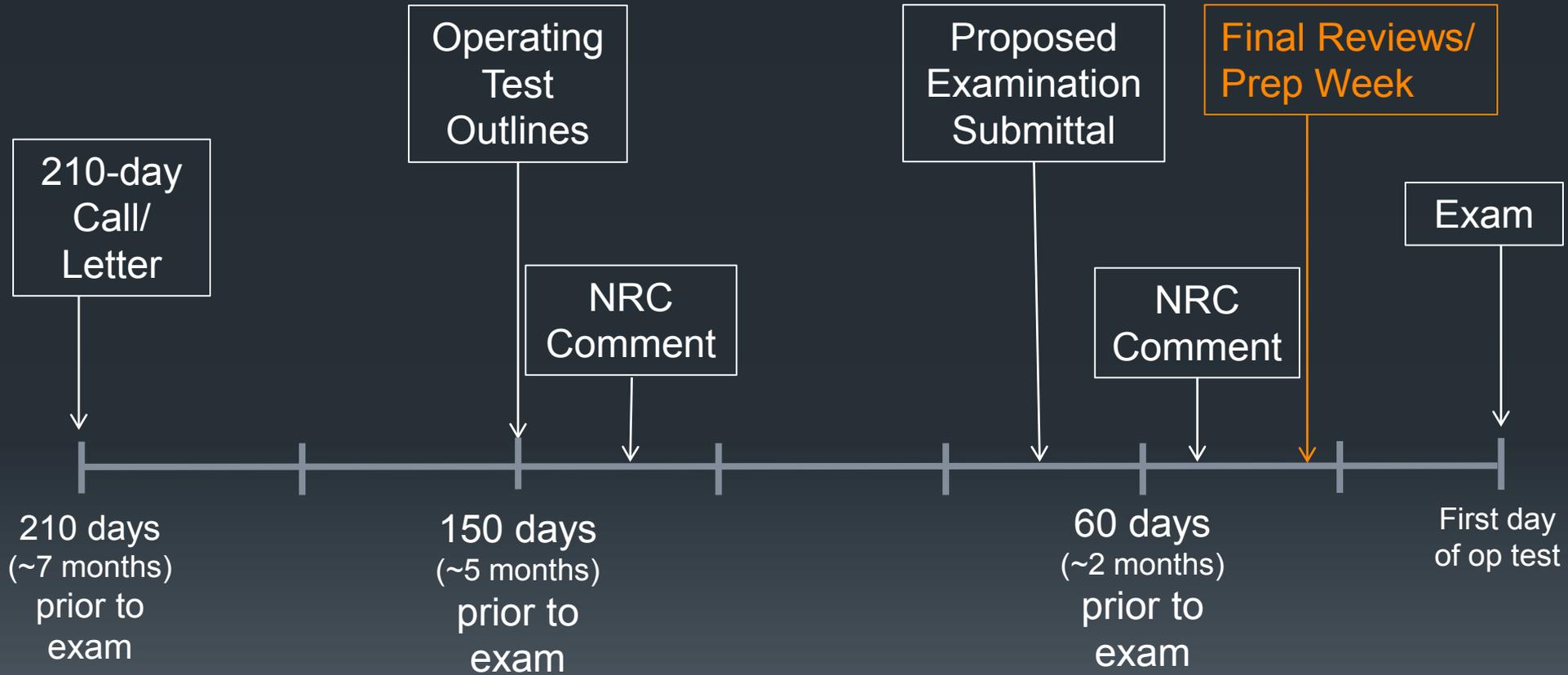


~ 35 days prior to NRC Exam

■ Final Reviews

- Operating Exam Prep Week (ES-201 C.1.i – I, C.2.h, C.3.g)
 - Typically occurs **5 weeks** prior to administration of the Operating Test
- Written Exam In-office Review (ES-201 C.1.i – I, C.2.h, C.3.g)
 - Can be conducted over the phone, in the region, or at the facility
 - Typically occurs the week before or the week after prep week

~35 days prior to NRC Exam



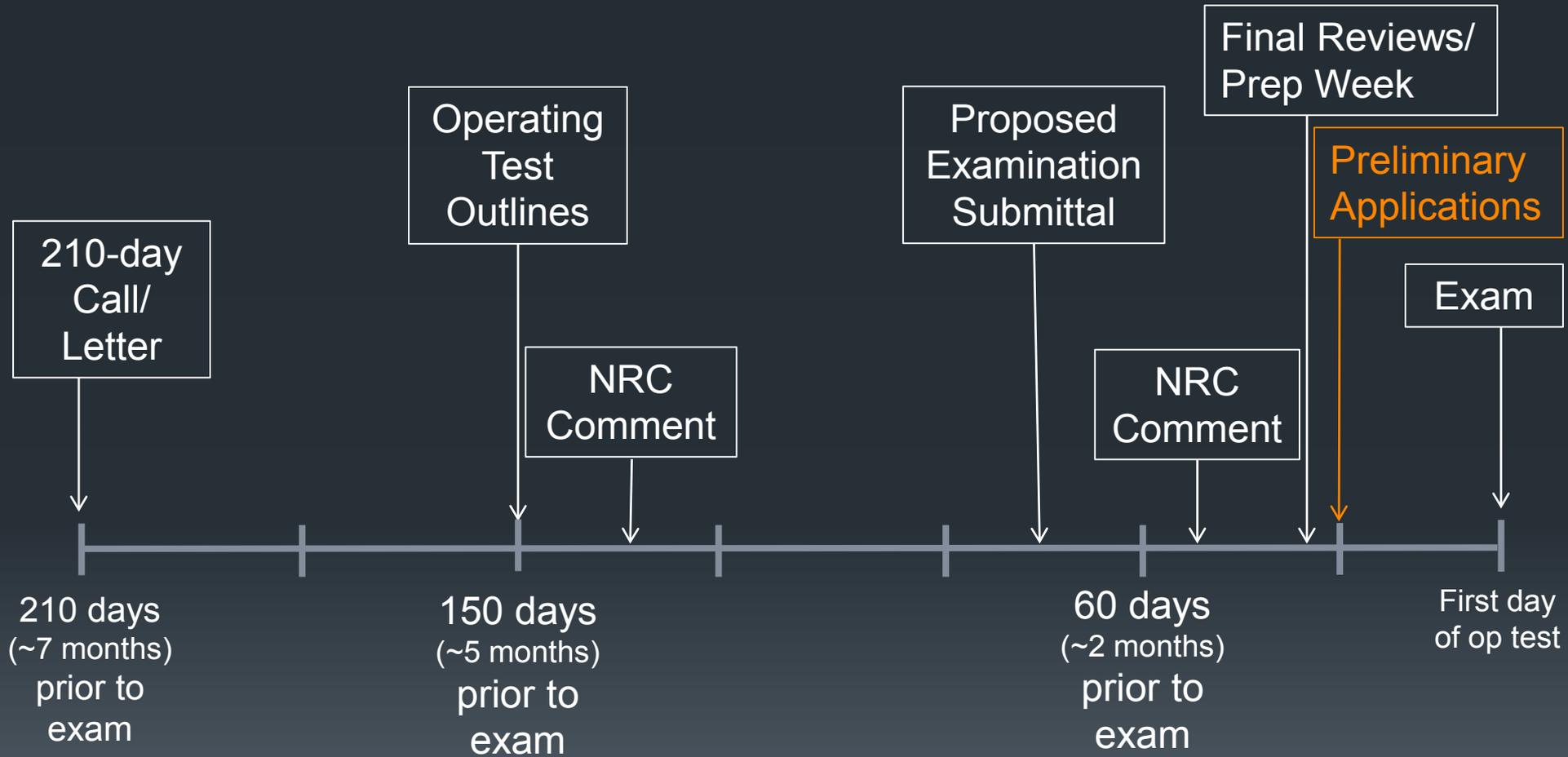
~30 days prior to NRC Exam

- **Preliminary License Applications and Waiver/Excusal requests** due (ES-201 C.1.m, C.2.i, and ES-202)
 - The NRC will review preliminary license applications in accordance with ES-202.
 - NRC Form 398: Personal Qualification Statement - Licensee (un-signed)
 - NRC Form 396: Certification of Medical Examination by Facility Licensee
 - At the same time, the NRC will internally evaluate any preliminary waiver requests in accordance with ES-204. Waiver decisions will not be made until an actual waiver request is received on the final application.

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.390									
NRC FORM 398 (MM-YYYY) 10 CFR 55.31, 55.33, 55.36, 55.47, 55.53, and 55.57.		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0090 EXPIRES: (MM/DD/YYYY)		DATE RECEIVED <i>(To be completed by NRC)</i>			
PERSONAL QUALIFICATION STATEMENT -- LICENSEE									
1. Last Name			2. First Name		3. Middle Initial	4. Birth Date: (MM/DD/YYYY)		5. E-mail Address	
6. Address (Number & Street, line 1)			7. Address (Suite, Unit No., etc., line 2)		8. City	9. State		10. Zip Code	
11. Type of Application (Check applicable boxes)					12. Deferrals/Excusals/Waivers (check all that apply and justify in item 25)				
<input type="checkbox"/> A. NEW <input type="checkbox"/> B. RENEWAL <input type="checkbox"/> C. UPGRADE <input type="checkbox"/> D. MULTI-UNIT (amend to include additional unit)		<input type="checkbox"/> E. REAPPLICATION <input type="checkbox"/> 1 - FIRST DENIAL <input type="checkbox"/> 2 - SECOND DENIAL <input type="checkbox"/> 3 - THIRD DENIAL <input type="checkbox"/> 4 - WITHDRAWAL			<input type="checkbox"/> a. DEFERRAL <input type="checkbox"/> 1 - ELIGIBILITY <input type="checkbox"/> 2 - EXPERIENCE <input type="checkbox"/> d. DATE PASSED OFE (MM) Select - (YY)		<input type="checkbox"/> b. EXCUSAL <input type="checkbox"/> 1 - WRITTEN (Category) <input type="checkbox"/> 2 - OPERATING (Category)		<input type="checkbox"/> c. WAIVER <input type="checkbox"/> 1 - WRITTEN (Category) <input type="checkbox"/> 2 - OPERATING (Category) <input type="checkbox"/> 3 - MEDICAL <input type="checkbox"/> 4 - OTHER
13. Type of License Applied for: <input type="checkbox"/> OPERATOR (RO) <input type="checkbox"/> SENIOR OPERATOR (SRO) <input type="checkbox"/> LIMITED (LSRO)									
14. Current or Previous License(s) Held									

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.390			
NRC FORM 396 (05-2012) 10 CFR 55.21, 55.23, 55.25, 55.27, 55.31, 55.33, 55.57		U.S. NUCLEAR REGULATORY COMMISSION	
APPROVED BY OMB: NO. 3150-0024 EXPIRES: (04/30/2015)		DATE RECEIVED (To be completed by NRC)	
CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE			
NAME OF APPLICANT AND DOCKET NUMBER		FACILITY	FACILITY DOCKET NUMBER
			050-
A. MEDICAL EXAM INFORMATION			
THIS IS TO CERTIFY THAT THE ABOVE NAMED APPLICANT FOR AN OPERATOR/SENIOR OPERATOR LICENSE HAS BEEN EXAMINED BY A PHYSICIAN AND THAT THE APPLICANT HAS BEEN FOUND TO MEET THE MEDICAL REQUIREMENTS FOR LICENSED OPERATORS AT THIS FACILITY.			
PRINTED NAME (of physician and other medical professionals)		STATE	LICENSE NUMBER
MOST RECENT BIENNIAL MEDICAL EXAMINATION DATE			
BASED ON THE RESULTS OF THE PHYSICAL EXAMINATION, INCLUDING INFORMATION FURNISHED BY THE APPLICANT, THE PHYSICIAN HAS DETERMINED THAT THE APPLICANT'S PHYSICAL CONDITION AND GENERAL HEALTH ARE SUCH THAT THE APPLICANT WOULD NOT BE EXPECTED TO CAUSE OPERATIONAL ERRORS ENDANGERING PUBLIC HEALTH AND SAFETY. I CERTIFY THAT IN REACHING THIS DETERMINATION, THE GUIDANCE CONTAINED IN THE ANSI STANDARD (AS ENDORSED BY THE APPLICABLE NRC REGULATORY GUIDE) OR AN ACCEPTABLE ALTERNATIVE METHOD APPROVED BY THE NRC, AS INDICATED BELOW, WAS FOLLOWED, AND THAT DOCUMENTATION IS AVAILABLE FOR REVIEW BY NRC.			
GUIDANCE USED:			
<input type="checkbox"/> ANS/ANS 3.4 -- 1996 <input type="checkbox"/> ANS/ANS 3.4 -- 1983 <input type="checkbox"/> ANS/ANS 15.4 -- 1988 <input type="checkbox"/> ANS/ANS 15.4 -- 2007 <input type="checkbox"/> OTHER			
ON THE BASIS OF THE RECOMMENDATION OF THE PHYSICIAN, IT IS REQUESTED THAT THE APPLICANT'S OPERATOR LICENSE BE CONDITIONED AS FOLLOWS: Check all that apply. PROVIDE EXPLANATION AND ATTACH SUPPORTING MEDICAL EVIDENCE FOR NRC REVIEW.			

~30 days prior to NRC Exam



~21 days prior to NRC Exam

▪ Final Submittal

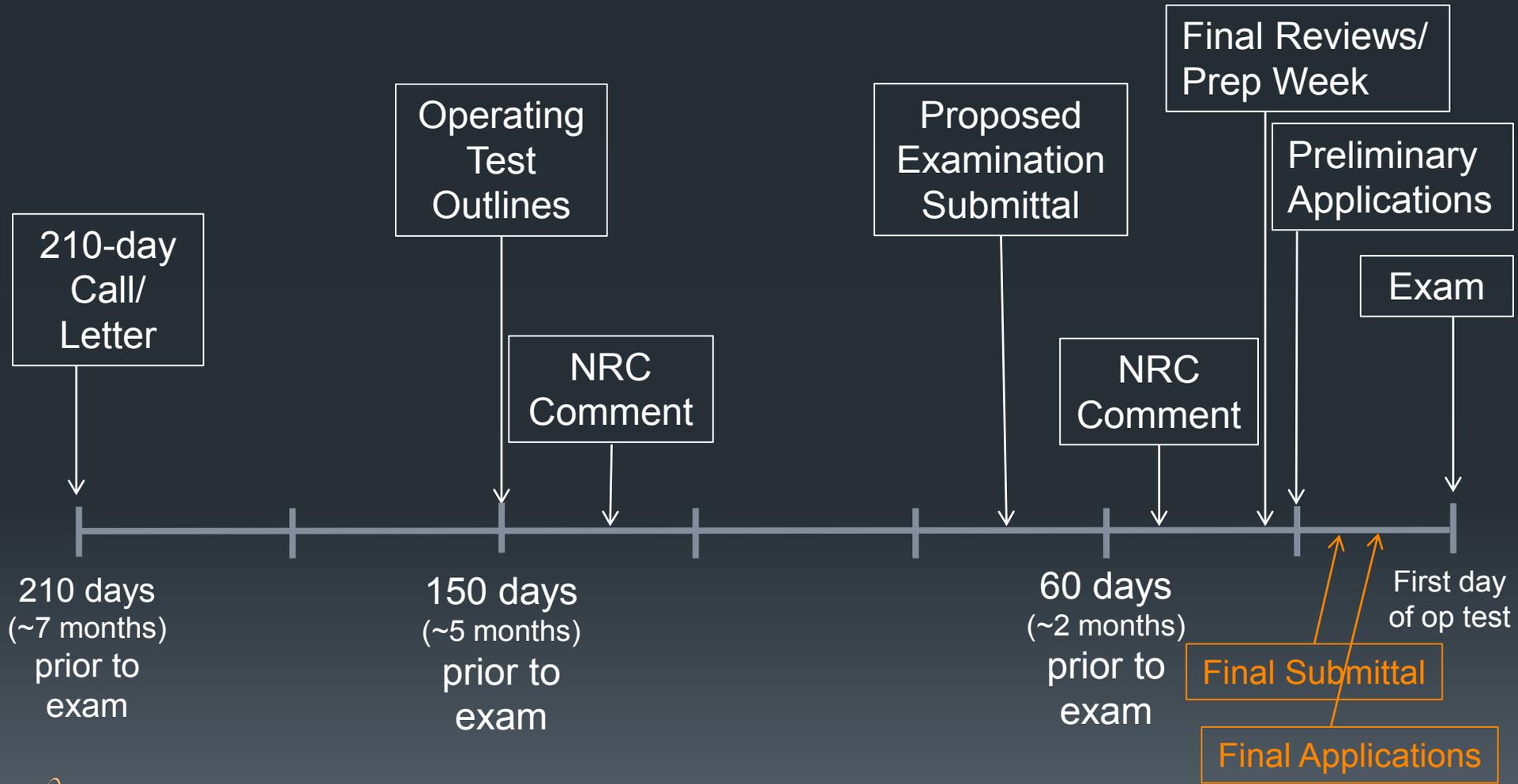
- Serves to provide the most up-to-date documentation of an exam's preparation for final NRC supervisory review and eventual inclusion into the ADAMS package (all exam documents, outline documents, and QA forms)
- Ensure QA forms are re-validated when re-submitted to reflect changes incorporated since initial outline/proposed exam submittal
- Not required to be submitted under company letterhead

~14 days prior to NRC Exam

- **Final License Applications** due (ES-201 C.1.m and C.2.k, ES-202)
 - In accordance with ES-202 (Preparing Applications), signed final license applications shall be submitted **with a letter** requesting that licensing examinations be administered. (NRC Form 398 and NRC Form 396)
- Once any applicable waivers are processed, final license applications are approved, and final versions of the examination are approved, the region will prepare:
 - Examination Approval Letter
 - ES-201-4: List of Applicants
 - If applicable, “Waiver Approval/Denial Letters” are sent to individual applicants.

ES-201	Sample Examination Approval Letter	Attachment 5					
(Date)							
(Name, Title)							
ES-201	List of Applicants	Form ES-201.4					
<i>PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY</i>							
Facility:	Written Examination Date:						
	Operating Test Dates:						
Applicant Name	Docket No.	Exam Level	Written	Operating Test			
			RO	SRO	Adm.	Sys.	Sim.

~21 & ~14 days prior to NRC Exam



Examination Administration

- NRC Examiners administer the operating exam.
- Typically, following the operating exam, the Facility administers the written examination.
 - ES-402 C.2.b: the Chief Examiner will ensure that an NRC point of contact is available in the regional office to respond to facility questions while the examinations are being given.
 - Applicant question and proctor answer process is formalized in Region 2 using a set of standard forms.
 - Following examination completion, applicant answer sheets are forwarded to the Chief Examiner.
 - The written examination and operating test dates may not diverge by more than 30 days without obtaining concurrence from the NRR/NRO operator licensing program office.

Examination Administration

- Applicant Question and Proctor Answer Forms

Written Exam Applicant Question Form QUESTION / RESPONSE DOCUMENTATION

FOR USE BY APPLICANT Name: _____ Exam: _____ Date: _____

Applicant Asking Question

Time	Question number	Question	Proctor response	NRC called Yes/No	NRC response	Provide to ONE / ALL Applicant(s)?
Time Question Asked:						
Question Number:						
Question Being Asked:						
FOR USE BY PROCTOR						
Response To Applicant:						

Time Response Provided To Applicant: _____

Post Exam Activities

■ ES-501 Section B

- The goal of the NRR/NRO operator licensing program office is to complete licensing or denial actions within **30 days after the facility submits** the graded examinations or its formal written examination comments to the NRC. The NRC and facility staffs should establish their priorities and schedules to achieve this goal.
- Post-Exam Process to follow assumes the Written Examination follows the Operating Test (i.e. the standard practice in Region 2).

+20 days following Written Exam

- Submit the following to the NRC in accordance with ES-501 C.1.b:
 - Each applicant's original answer sheet and a clean copy of each answer sheet
 - Each applicant's **Examination Cover Sheet (ES-401-7: RO or ES-401-8: SRO)**
 - Master examinations and answer keys (with any required annotations reflecting changes made during examination administration)
 - Questions asked by and answers given to applicants during the examination
 - Post exam comments – facility and applicant comments (with facility position), as well as any recommended substantive changes based on any grading analysis (ensure a comment recommendation is included as well as a basis that supports the recommendation)
 - Seating chart
 - A completed **ES-403-1: Written Examination Grading Quality Checklist**
 - The original **ES-201-3: Examination Security Agreement**, with pre- and post-examination signatures (may be more than +20 days)

+20 days following Written Exam

- ES-401-7 (8): RO (SRO) Written Examination Cover Sheet
- ES-403-1: Written Examination Grading Quality Checklist
- ES-201-3: Examination Security Agreement

ES-401	Site-Specific RO Written Examination Cover Sheet	Form ES-401-7
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ES-403	Written Examination Grading Quality Checklist	Form ES-403-1
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ES-201	Examination Security Agreement	Form ES-201-3
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1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the U.S. Nuclear Regulatory Commission (NRC) licensing examinations scheduled for the week(s) of _____ as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC's chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC's chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of _____. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

+20 days:
Post-Exam
Submittal



What the NRC Does, Post-Exam

- Region 2 will grade the exams in accordance with ES-303 and ES-403.
 - Operating Test Grading (ES-303)
 - ES-303-1: Individual Examination Report
 - Exam Summary
 - Examiner Recommendations
 - JPM Topic List (Page 2)
 - Simulator Competencies (Page 3)
 - ES-303-2: Operating Test Comments
 - Written Examination Grading (ES-403)
 - ES-403-1: Written Examination Grading Quality Checklist
- Chief Examiner will resolve any post-exam comments, recommendations, and/or answer key changes (as required). Coordination with the Operator Licensing Program Office may be 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 (%) ___ / ___ / ___		

What the NRC Does, Post-Exam

- Following the Licensing Decision, the following documents are completed:
 - Exam Results Summary Letter
 - Training Manager also receives copies of applicant 303's in order to evaluate required remediation
 - ES-501-2: Power Plant Examination Results Summary
- Facility notification is typically performed by phone call and followed up by transmittal of the reports above
- The OLA will prepare a preliminary results, notification, or license letter for each applicant.
 - Preliminary Results Letter – applicant afforded opportunity to provide additional information to support an informal staff review following exam failure (if requested)
 - Notification Letter – notification that license issuance will be delayed pending completion of deferral requirement

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:			Operating Test Date(s):				
Prepared by: Facility <input type="checkbox"/> NRC <input type="checkbox"/>			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 #	Type ⁽¹⁾	Written Grade	Operating Test ⁽²⁾			
	55-(___)		RO / SRO / TOT	W - T	ADM	SIM	

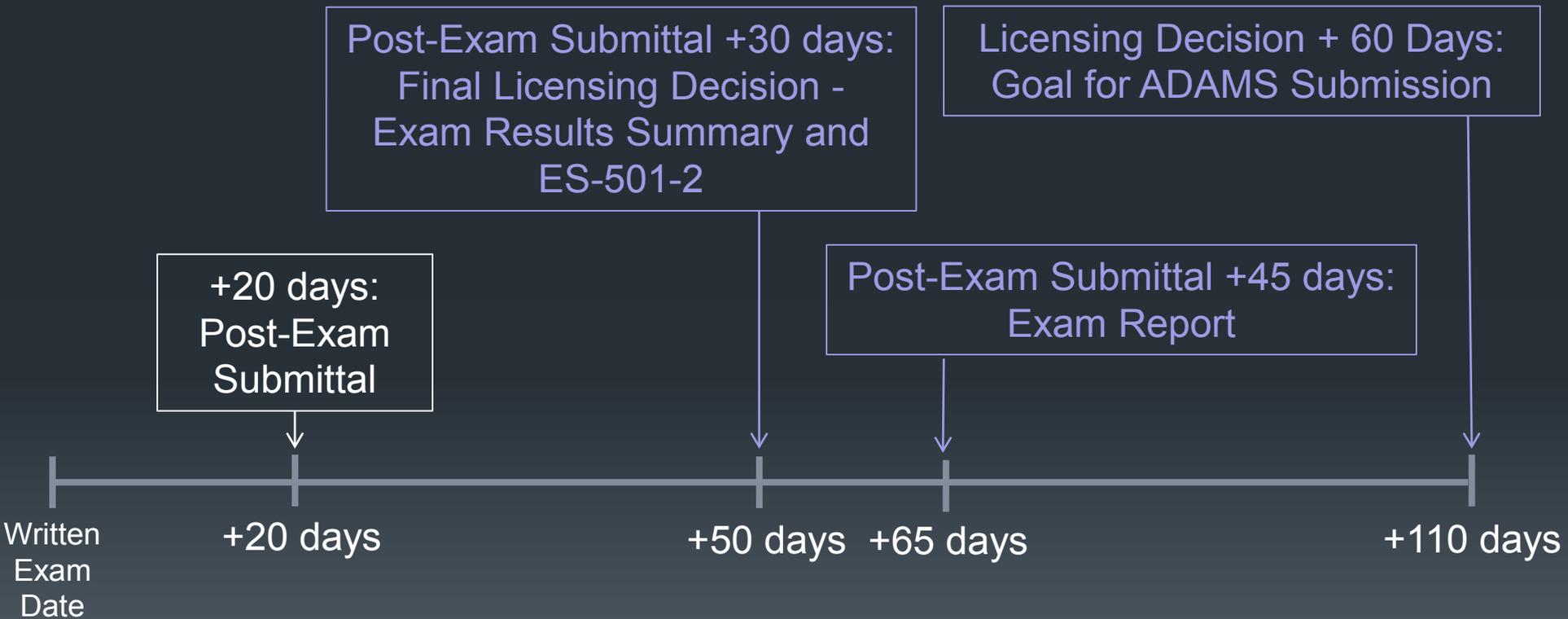
What the NRC Does, Post-Exam

- Along with the preliminary results, notification, or license letter, each applicant also receives their:
 - ES-303-1: Individual Examination Report
 - ES-303-2: Operating Test Comments
 - Appropriate “as-run” ES-D-1: Scenario Outline
 - ES-401-7 (8): RO (SRO) Written Examination Cover Sheets
 - Written Exam answer sheets (copy of the original)
- In the event of an examination failure, the following is also provided:
 - ES-D-2: Required Operator Actions (if applicable)
 - A copy of failed JPM’s (if applicable)
 - A copy of the final written exam and answer key (if applicable)

What the NRC Does, Post-Exam

- Finally, 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 (with reasons)
 - Any extensions required for administration of the written examination
 - Exam results, including any significant grading deficiencies (for facility-graded exams)
 - An overview of the exam security measures and activities evaluated
 - 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 (facility and applicant) and resolutions
 - NRC explanation for accepting or rejecting each facility recommendation or applicant comment
 - A Simulator Fidelity Report

Post Exam Activities



Questions?

- Presentations remaining...
 - K/A Matching
 - Plausibility
 - New K/A Catalogs
 - SRO-Only Guidance
 - JPM's
 - Operating Test
 - Administrative Topics

K/A Matching

Region II
Operator Licensing Exam Writers' Workshop

Newton Lacy / Swetha Shah

July 18, 2017

Contents

- 1 Sample Plan Generation**
- 2 Written Exam Review
- 3 K/A Tiers
- 4 Written Exam Question Examples
- 5 Other K/A Requirements

Sample Plan Generation

- 1** Contact chief examiner to request sample plan - sample plans developed by Michael Meeks and Phillip Capehart
- 2** Fill out the security agreement form [ES-201-3] before the chief examiner sends the sample plan to you
- 3** Discuss suppressed K/As with chief examiner and provide them for incorporation into RII computer generation program*
- 4** If you cannot write a question to the K/A, ask for help, get ideas from the chief examiner, or get a new K/A

ES-401, “Preparing Site-Specific Written Exams,” D.1 Develop Outline NUREG-1122 & 1123, “Knowledge and Abilities Catalog[s] for Nuclear Power Plant Operators: Pressurized [and Boiling Water] Reactors”

* Step 3 is optional

Sample Plan Generation Requirements

Some sample generation requirements include:

- 1.** A K/A statement is appropriate for testing if its **importance level is 2.5 or greater**
- 2.** **Generic K/As for Tiers 1 and 2** for RO and SRO exams should be randomly selected from the following set:

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, 2.4.18, 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

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1 Sample Plan Generation

2 Written Exam Review

3 K/A Tiers

4 Written Exam Question Examples

5 Other K/A Requirements

More ES-401-9 requirements...

Objectives

- All questions on NRC examinations shall be **objectively gradable**, regardless of the item format
- Questions developed with a **single correct answer** for which the credit given cannot vary, depending on who graded it or when it was graded
- Ensure that the concept being measured has a **direct, important relationship** to the ability **to perform the job**

Elements	Description
Level of Knowledge	<ul style="list-style-type: none">▪ When there is a choice between two levels of knowledge, try to write the question to reflect the higher level: Higher cognitive vs. Fundamental
Level of Difficulty	<ul style="list-style-type: none">▪ Questions with a difficulty 2 - 4 are acceptable▪ Avoid questions unnecessarily difficult or irrelevant
Psychometric Flaw	<ul style="list-style-type: none">▪ Stem focus: Stem lacks focus (e.g., unclear intent, more info is needed, or needless information)▪ Cues: Stem / distractors contain cues (e.g., clues, specific determiners, phrasing, length)▪ T/F: Answer choices are a collection of unrelated true/false statements▪ Cred. Dist.: Distractors are not credible▪ Partial: Distractors are partially correct (e.g., applicant makes unstated assumptions not contradicted by the stem)
Job Content Flaw	<ul style="list-style-type: none">▪ Job Link: Question not linked to job, i.e., it has a valid K/A but, is not operational in content▪ Minutia: Question requires recall of knowledge too specific and not required to be known from memory▪ #/Units: Data has unrealistic accuracy or inconsistent units (e.g., panel meter in % with question in gal)▪ Backward: Question requires reverse logic application compared to job requirements
SRO Only	<ul style="list-style-type: none">▪ K/A and license level mismatches are not acceptable

Elements of an Unsatisfactory Written Exam Question

Element	Description
① Answer	<ul style="list-style-type: none">▪ No answer is technically correct▪ More than one correct answer
② LOD	<ul style="list-style-type: none">▪ Level of difficulty 1 or 5
③ K/A Match	<ul style="list-style-type: none">▪ Question not matching K/A at the appropriate license level
④ Psycho-metric	<ul style="list-style-type: none">▪ Appendix B psychometric attributes not met

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- 1 Sample Plan Generation
- 2 Written Exam Review
- 3 K/A Tiers**
- 4 Written Exam Question Examples
- 5 Other K/A Requirements

ES-401 Excerpts on K/A Tiers

Description

Tier 1

- When selecting or writing questions for K/As that test **coupled K/As** (e.g., the A.2 K/As in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1 in Tier 3), try to **test both aspects** of the K/A statement. If that is not possible, **limit the scope** of the question to that aspect of the K/A statement requiring the **highest cognitive level** (e.g., the (b) portion of the A.2 K/A statements)

Tier 2

Tier 3

- Ensure that questions selected for Tier 3 maintain their **focus on plant-wide generic K/As** and do not become an extension of Tier 2

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1 Sample Plan Generation

2 Written Exam Review

3 K/A Tiers

4 Written Exam Question Examples

5 Other K/A Requirements

Example 1 - Tier 1 Group 1: A2 K/A (Slide 1 of 2)

K/A Tier 1 Group 1

062A2.11 A.C.

Electrical

Distribution: Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Aligning standby equipment with correct emergency power source (D/G)

Question Rev. 0

Given the following conditions:

- Unit 1 is in Mode 5
- 1H EDG PT is in progress with EDG load at 2550 KW and VARS at 0
- A Loss of offsite power occurs
- After all automatic equipment actuations are complete and load has stabilized on the 1H bus, VARS are reading 1000 kVARS out

Which ONE of the choices below correctly completes the following statements?

Following any automatic load changes, 1H EDG load will be ___(1)___ than 2550 kw

AND

VARS ___(2)___ be adjusted using voltage control

- A. (1) LESS (2) can
- B. (1) LESS (2) cannot
- C. (1) GREATER (2) can
- D. (1) GREATER (2) cannot

Answer: B

The (b) portion of the A2 K/A statement (use procedures to correct, control, mitigate) is not being met. The first part of the question tests automatic load sequencing and the second part tests island mode capability of the voltage regulator.

Example 1 - Tier 1 Group 1: A2 K/A (Slide 2 of 2)

K/A Tier 1 Group 1

062A2.11 A.C.

Electrical

Distribution: Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Aligning standby equipment with correct emergency power source (D/G)

Question Rev. X

Unit 1 is at 100% power

- 1-CH-P-1C is running on the H emergency bus
- 1-CH-P-1A and 1-CH-P-1B are in AUTO AFTER STOP
- The H emergency bus de-energizes due to the normal feeder breaker tripping open

Which of the following completes both statements?

After the H EDG re-energizes the H emergency bus, the ___(1)___ charging pumps will be running.

In accordance with 0-AP-10, Attachment 21, Unit 1 EDG Load Configuration To Prevent Overloading, the ___(2)___ charging pump will be left running.

REFERENCE PROVIDED*

- | | | |
|----|-------------|-------|
| A. | (1) A and B | (2) C |
| B. | (1) B and C | (2) C |
| C. | (1) A and B | (2) A |
| D. | (1) B and C | (2) A |

Answer: B

The (b) portion of the A2 K/A statement (use procedures to correct, control, mitigate) is met – acceptable match.

Example 2 - Tier 2 Group 1: A2 K/A (Slide 1 of 2)

K/A Tier 2 Group 1

259002 A2.04 Ability to (a) predict the impacts of the following on the **Reactor Water Level Control System**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: RFP run out condition: Plant-specific

Question Rev. 0

Unit 2 is at 85% power and RFPT 2A and 2B are on the Master Level Controller in 3-element control when the RO notes the following:

- RPV water level shows a slow rise above normal

Then the following conditions are noted:

- RFPT 2B speed begins to rise
- RFPT 2A speed begins to lower slowly
- Master Level Controller output is lowering

Which ONE of the following completes the statements below?

The upper speed limit for RFPT governor control will allow is __ (1) __.
The operator action that will correct this condition is to depress __ (2) __ and take manual control.

- A.** (1) 5600 (2) RFPT 2A Speed Control Raise/Lower 2-HS-46-8A
- B.** (1) 5600 (2) RFPT 2B Speed Control Raise/Lower 2-HS-46-9A
- C.** (1) 5850 (2) RFPT 2A Speed Control Raise/Lower 2-HS-46-8A
- D.** (1) 5850 (2) RFPT 2B Speed Control Raise/Lower 2-HS-46-9A

Answer: D

In order to meet the intent of the second part of the K/A statement (use procedures to correct, control, mitigate), the 2nd fill-in-the-blank statement needs to be modified to refer to the required action in accordance with 2-AOI-3-1, Loss of Reactor Feedwater or Reactor Water Level High/Low.

Example 2 - Tier 2 Group 1: A2 K/A (Slide 2 of 2)

K/A Tier 2 Group 1

259002 A2.04 Ability to (a) predict the impacts of the following on the **Reactor Water Level Control System**; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: RFP run out condition: Plant-specific

Question Rev. X

Unit 2 is at 85% power and RFPT 2A and 2B are being controlled by 2-LIC-46-5, Master Level Controller in three element control when the Unit Operator notes the following Reactor Water Level transient:

- Reactor Water level, on all narrow range level instruments, has risen to 38 inches.

Then the following conditions are noted:

- RFPT 2A speed is lowering
- RFPT 2B speed is rising

Which ONE of the following completes the statements below?

The Unit 2 RFPT control system upper speed limit is __ (1) __ rpm.

In accordance with 2-AOI-3-1, Loss of Reactor Feedwater or Reactor Water Level High/Low, the __ (2) __ RFPT controller is required to be taken to manual to correct this condition.

- A. (1) 5600 (2) 2A
- B. (1) 5600 (2) 2B
- C. (1) 5850 (2) 2A
- D. (1) 5850 (2) 2B

Answer: D

The (b) portion of the A2 K/A statement (use procedures to correct, control, mitigate) is met – acceptable match.

Example 3 - Tier 1 Group 1: A2 K/A (Slide 1 of 2)

K/A Tier 1 Group 1

004A2.22 Chemical and Volume Control System (CVCS)

Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations:
Mismatch of letdown and charging flows

Question Rev. 0

Unit 1 is at 100%

- "C" charging pump is running powered from the 1J emergency bus (15J7)
- "A" charging pump (1-CH-P-1A) is in AUTO
- "B" charging pump (1-CH-P-1B) is in AUTO

"C" charging pump trips due to an electrical fault in the motor

Which ONE of the choices below completes the following statements?

___(1)___ charging pump(s) will automatically start

AND

The crew ___(2)___ have to restore letdown.

- A. (1) Only B (2) will
- B. (1) Both A and B (2) will
- C. (1) Only B (2) will not
- D. (1) Both A and B (2) will not

Answer: B

The (b) portion of the A2 K/A statement (use procedures to correct, control, mitigate) is not being met.

Example 3 - Tier 1 Group 1: A2 K/A (Slide 2 of 2)

K/A Tier 1 Group 1

004A2.22 Chemical and Volume Control System (CVCS)

Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Mismatch of letdown and charging flows

Question Rev. X

Unit 2 is at 50% power with an unidentified leak in progress

- Pressurizer level is 46% and stable
- 2-CH-FCV-2122, Charging Flow Control Valve, is in auto
- Charging flow is 74 gpm
- Letdown flow is 79 gpm
- Seal injection flows are: A = 8.1 gpm, B = 7.9 gpm, C = 8.2 gpm
- Seal leak off flows are: A = 2.4 gpm, B = 2.2 gpm, C = 2.6 gpm

Which of the choices below completes both statements?

VCT automatic make up will first occur at __ (1) __%.

AND

In accordance with 2-AP-16, Increasing Primary Plant Leakage, step 5, Identify and Isolate System Leakage, letdown __ (2) __ required to be isolated.

- A. (1) 21.5 (2) is not
- B. (1) 21.5 (2) is
- C. (1) 15 (2) is not
- D. (1) 15 (2) is

Answer: A

The (b) portion of the A2 K/A statement (use procedures to correct, control, mitigate) is met – acceptable match.

Example 4 - Tier 3 Generic K/A (Slide 1 of 3)

K/A Tier 3

G2.3.11 Ability to control radiation releases

Question Rev. 0

Given the following conditions:

- A Liquid Effluent Discharge is in progress in accordance with 0-SI-4.8.A.1-1, Liquid Effluent Permit.
- Discharge is going to Unit 3 CCW
- RADWASTE EFFL RADIATION MONITOR DOWNSCALE, (3-9-3A, window 23) alarms

Which ONE of the following completes the statement below?

Contact the __ (1) __ operator to __ (2) __ 0-FCV-77-58A/B, RADWASTE LOW/HIGH FLOW RATE DISCHARGE ISOLATION VALVES.

- A.** (1) Radwaste (2) verify the automatic closure of
- B.** (1) Radwaste (2) manually isolate
- C.** (1) Unit 2 (2) verify the automatic closure of
- D.** (1) Unit 2 (2) manually isolate

Answer A

The Tier 3 aspect (admin requirements) of this K/A is not being tested. Instead, the question tests (1) the location of the radwaste control switch and (2) knowledge of a design feature or interlock (Tier 2) that provides for automatic isolation to contain the radioactive release (fail safe tripping of process rad monitoring).

Example 4 - Tier 3 Generic K/A (Slide 2 of 3)

K/A Tier 3

G2.3.11

Ability to control radiation releases

Question Rev. X

Unit Two is at 100% power.

- A BSEP Radioactive Liquid Release Permit is being completed for discharge of the Unit Two Saltwater Release Tank via the General Electric Radiation Monitor IAW 00P-6.4, Discharging Radioactive Liquid Effluents to the Discharge Canal.
- 2-G16-FIT-N057, Liquid Radwaste Effluent Flow Measurement Device, is INOPERABLE.

Which one of the following completes both statements below?

IAW the ODCM, the maximum release rate is determined so that __ (1) __ limits are not exceeded after dilution in the discharge canal.

AND

IAW 00P-6.4, release of the Unit Two Saltwater Release Tank __ (2) __.

- A.** (1) 10 CFR 100, Reactor Site Criteria
(2) may be authorized if ODCM compensatory actions are implemented
- B.** (1) 10 CFR 100, Reactor Site Criteria
(2) is NOT allowed unless 2-G16-FIT-N057 is OPERABLE
- C.** (1) 10 CFR 20, Standards for Protection Against Radiation
(2) may be authorized if ODCM compensatory actions are implemented
- D.** (1) 10 CFR 20, Standards for Protection Against Radiation
(2) is NOT allowed unless 2-G16-FIT-N057 is OPERABLE

Answer: C

The Tier 3 aspect (admin requirements) of this K/A is being tested through CFR requirements and asking whether a release is allowed with / without monitoring – acceptable match.

Example 4 - Tier 3 Generic K/A (Slide 3 of 3)

K/A Tier 3

G2.3.11
Ability to control radiation releases

Question Rev. X

Consider the following conditions relating to planned radiation releases:

- EMF-50 (WG Disch Monitor - Waste Gas) Trip 2 has actuated.
- Turbine Building Sump release exceeds EMF-31 (Turbine Building Sump) pre-set level.

In accordance with the applicable procedures, which ONE of the following completes the below statements (consider each separately):

Re-initiation of the Waste Gas release at least once without resampling ___(1)___ allowed.

AND

Re-initiation of the Turbine Building Sump release at least once without resampling ___(2)___ allowed when the release exceeds EMF-31 pre-set level.

- A.** (1) is (2) is NOT
- B.** (1) is (2) is
- C.** (1) is NOT (2) is
- D.** (1) is NOT (2) is NOT

Answer: A

The Tier 3 aspect (admin requirements) is being tested by asking whether releases are allowed before resampling when the release exceeds a pre-set level – acceptable match.

Example 5 - Tier 3 Generic K/A (Slide 1 of 2)

K/A Tier 3

G2.2.40

Ability to apply
Technical
Specifications
for a system

Question Rev. 0

Given the following conditions:

- Unit 2 is at 50% power
- 2H EDG has been declared inoperable due to mechanical failure

According to technical specifications, with one EDG inoperable, 0-PT-80 , AC Sources Operability Verification, must be performed __ (1) __ the operability declaration, and at least once per __ (2) __ hours thereafter.

- A. (1) within one hour of (2) 8
- B. (1) immediately upon (2) 8
- C. (1) within one hour of (2) 12
- D. (1) immediately upon (2) 12

Answer A

The Tier 3 plant-wide generic aspect is missing because the question solely tests EDG Tech Spec requirements. The Tier 3 aspect of “Ability to apply Tech Specs for a system” may be better targeted by testing a generic Tech Spec concept that applies to ANY Tech Spec system/component.

Example 5 - Tier 3 Generic K/A (Slide 2 of 2)

K/A Tier 3

G2.2.40 Ability to apply Technical Specifications for a system

Question Rev. X

Unit 1 is in Mode 3 preparing to start up.

Which ONE of the following identifies the earliest time that Tech Spec LCOs for Mode 2 are applicable?

- A. $T_{avg} > 350^{\circ}\text{F}$
- B. First Shutdown Bank withdrawn
- C. First Control Bank withdrawn
- D. $350^{\circ}\text{F} > T_{avg} > 200^{\circ}\text{F}$

Answer: C

The Tier 3 plant-wide generic aspect is addressed by asking about mode applicability – acceptable match.

Example 6 – Tier 3 Generic K/A (Slide 1 of 2)

K/A Tier 3

GEN2.3 2.3.5 - GENERIC - Radiation Control

Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

Question Rev. 0

Given the following conditions:

- A Large Break LOCA has occurred
- Containment pressure is 32 psig and rising
- HVH-1 and HVH-2 have tripped
- Containment Sump level is rising
- R-32A, CV High Range Monitor, is indicating 1E2 Rad/hr.

Which one of the following choices completes the statement below?

The Shift Manager must declare a __ (1) __ due to __ (2) __.

- A.** (1) Site Area Emergency (2) Loss of the Reactor Coolant AND Fuel Cladding Barriers
- B.** (1) General Emergency (2) Loss of the Reactor Coolant, Fuel Cladding AND Containment Barriers
- C.** (1) Site Area Emergency (2) Loss of the Reactor Coolant Barrier AND a Potential Loss of the Containment Barrier
- D.** (1) General Emergency (2) Loss of the Reactor Coolant AND Fuel Cladding Barrier AND Potential Loss of the Containment Barrier

Answer: A

Question does not match the K/A at the Tier 3 Generic level.

Example 6 – Tier 3 Generic K/A (Slide 2 of 2)

K/A Tier 3

GEN2.3 2.3.5 GENERIC - Radiation Control

Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.

Question Rev. X

In accordance with 1-EOP-UG-01, E-1 EOP User's Guide, which one of the following choices completes both statements below?

Adverse containment values must be used when implementing the EOPs when either containment pressure on 1PI-450A, CNMT PRESS MON, exceeds 5 psig, or when 1RT-AR020, CNMT HI RANGE RADIATION MON, exceeds ____ (1) ____ R/hr.

AND

Use of adverse containment values __ (2) __ allowed to be discontinued if 1RT-AR020 lowers to 10^2 R/hr.

- A. (1) 10^3 (2) is
- B. (1) 10^3 (2) is NOT
- C. (1) 10^5 (2) is
- D. (1) 10^5 (2) is NOT

Answer: D

The Tier 3 plant-wide generic aspect is addressed by asking about adverse containment readings' applicability – acceptable match.

Written Exam Question Generation – K/A Reasons and System Purpose

There is **more than one way to test K/As** that require knowledge of the **reasons** for a certain operation or plant response and/or **system purpose**

1

Directly ask for the reason or system purpose in the **question stem**

2

Indirectly ask the reason or system purpose in the **answer choices** by testing **procedure knowledge, equipment and/or instrumentation behavior, actuations, operator actions**, etc. as appropriate

*Examples shown on following slides

Example 7 – K/A Reasons

K/A T1 G1

056AK3.01

Loss of Offsite Power

Knowledge of the reasons for the following responses as they apply to Loss of Offsite Power: Order and time to initiation of power for the load sequencer

Question Rev. 0

Given the following initial conditions:

- Unit 1 was in MODE 5 when a Loss of Offsite Power occurred.
- All Emergency Diesel Generators start and re-energize the emergency busses.

Which one of the choices below completes the following statement?

When power is restored following the undervoltage condition, the Stub Bus breaker will automatically re-close after a __ (1) __ second time delay in order to __ (2) __.

- A.** (1) 20 (2) prevent overloading the emergency diesel generator
- B.** (1) 20 (2) to ensure service water flow is promptly restored
- C.** (1) 15 (2) prevent overloading the emergency diesel generator
- D.** (1) 15 (2) to ensure service water flow is promptly restored

Answer C

This question tests the reason directly in the question stem – acceptable match.

Example 8 - K/A Reasons (Slide 1 of 2)

K/A T1 G1

295005

AK3.04

Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: Main generator trip

Question Rev. 0

The Unit 2 Reactor scrammed and the Main Turbine tripped due to a high Moisture Separator water level event. A short time later, as a result of not performing actions of the Reactor Scram BOP Unit Operator Hard Card, the Main Generator Breaker automatically trips.

Which one of the following is prevented by this Main Generator Relay protective action?

- A. Excessive field voltage
- B. Motoring the Main Generator
- C. Main Generator over excitation
- D. Damaging the Automatic Voltage Regulator (AVR)

Answer: B

The question does not test the (1) procedure requirements or (2) the reason why the procedure directed the action.

Example 8 - K/A Reasons (Slide 2 of 2)

K/A T1 G1

295005

AK3.04

Knowledge of the reasons for the following responses as they apply to MAIN TURBINE GENERATOR TRIP: Main generator trip

Question Rev. X

Unit 2 is operating at 100% when the following annunciator is received:

- GEN CONDITION MONITOR ABNORMAL, 2-9-8B Window 28

The crew entered 2-AOI-35-1, Generator Condition Monitor Alarm, and determined that the alarm is valid. The crew reduced Generator load 30MWe and the alarm has not reset.

NOTE: 2-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations

Which one of the following completes the statement below?

2-AOI-35-1 directs Operators to __ (1) __ because __ (2) __.

- A.** (1) immediately SCRAM and trip the Main Turbine
(2) 2-H2I-35-12A, Hydrogen purity, is less than 90%
- B.** (1) immediately SCRAM and trip the Main Turbine
(2) the generator is overheating
- C.** (1) perform a shutdown in accordance with 2-GOI-100-12A
(2) 2-H2I-35-12A, Hydrogen purity, is less than 90%
- D.** (1) perform a shutdown in accordance with 2-GOI-100-12A
(2) the generator is overheating

Answer: B

This question tests the reason directly in the question stem – acceptable match.

Example 9 – K/A Reasons

K/A Tier 1 Group 2

033AK3.01

Loss of Intermediate Range Nuclear Instrumentation

Knowledge of the reasons for the following responses as they apply to the Loss of Intermediate Range Nuclear

Instrumentation:

Termination of startup following loss of intermediate range instrumentation.

Question Rev. 0

Giving the following conditions:

- Unit 2 is starting up in accordance with 2-OP-1.5, Unit Startup From MODE 3 To MODE 2.
- Intermediate Range NIs are reading 3×10^{-11} amps.
- Annunciator 2A-B5, NIS IR CH II LOSS OF COMP VOLT, alarms.

Which one of the following choices completes both statements below?

N-36 will indicate __ (1) __ than actual.

AND

2-AP-4.2, Malfunction of Nuclear Instrumentation (Intermediate Range), __ (2) __ allows the crew to raise power above P-6

- A. (1) higher (2) does
- B. (1) lower (2) does
- C. (1) higher (2) does not
- D. (1) lower (2) does not

Answer C

The REASON for stopping the power increase is being tested - that is, power is required to be stopped but NOT lowered to < P-6 because only ONE IR has failed – acceptable match.

Example 10 – K/A Reasons

K/A T1 G2

068AK3.17 Control Room Evacuation

Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation:
Injection of boric acid into the RCS

Question Rev. 0

- Unit 2 was operating at 100% power
- The crew was forced to evacuate the main control room.
- The crew is performing 2-AP-20, Operation From The Auxiliary Shutdown Panel, Step 12 – Check If Emergency Boration Is Required.

Which one of the following completes both statements below in accordance with 2-AP-20?

Emergency boration is required if __ (1) __ IRPI(s) indicate(s) greater than 10 steps.

2-CH-MOV-2350, Emergency Boration Valve, __ (2) __ be operated from the Auxiliary Shutdown Panel.

- A. (1) 2 or more (2) can not
- B. (1) any (2) can not
- C. (1) 2 or more (2) can
- D. (1) any (2) can

Answer: A

The REASON for emergency boration is tested through IRPI indications – acceptable match.

Example 11 – K/A Reasons

K/A T1 G2

295035 EK3.02 Secondary Containment High Differential Pressure;

Knowledge of the reasons for the following responses as they apply to secondary containment high differential pressure: Secondary containment ventilation response

Question Rev. 0

Unit 2 is operating at 100%. The following alarms are received:

- RX BLDG VENTILATION ABNORMAL
- REACTOR ZONE DIFFERENTIAL PRESSURE LOW

Reactor Building AUO reports:

- Reactor Building ΔP is +0.55 inches and lowering

Which one of the following completes the statements below?

An automatic Reactor Zone Static Pressure Isolation __ (1) __ occurred.

EOI-3, Secondary Containment Control, entry __ (2) __ required.

- A. (1) has (2) is
- B. (1) has (2) is NOT
- C. (1) has NOT (2) is
- D. (1) has NOT (2) is NOT

Answer: A

Testing whether EOI-3 entry is/is not required is another way to test the “reason” associated with ventilation response – acceptable match.

Example 12 - Tier 1 Reasons (Slide 1 of 2)

K/A T1 G1

295019

AK3.03

Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : (CFR: 41.5) Service air isolations: Plant Specific

Question Rev. 0

A Control Air leak has occurred on Unit 1.

Which one of the following completes the statements below concerning the Control Air Crosstie Valve?

1-PCV-032-3901, U-1 TO U-2 CONT AIR CROSSTIE, will auto ___ (1) ___ when air header pressure lowers to 65 psig.

Automatic action of 1-PCV-032-3901 reduces the potential for a SCRAM on ___ (2) ___.

- A. (1) open (2) Unit 1
- B. (1) open (2) Unit 2
- C. (1) close (2) Unit 1
- D. (1) close (2) Unit 2

Answer: D

The question is not testing the reason for the procedure action. Need to test a required operator action from 1AOI-32-2; the “reason” for the required operator action will be indirectly tested since the applicant must know the “reason” for why the action is required.

Example 12 - Tier 1 Reasons (Slide 2 of 2)

K/A T1 G1

295019 AK3.03

Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR : (CFR: 41.5)
Service air isolations:
Plant Specific

Question Rev. X

All 3 units are operating at 100% power when the "G" Air compressor trips. AIR COMPRESSOR ABNORMAL, has alarmed.

Conditions are as follows:

- 'A' and 'B' compressors are running
- 'C' and 'D' compressors failed to start.
- Control Air header pressure, is lowering

Which one of the following completes both statements in accordance with 0-AOI-32-1, Loss of Control and Service Air Compressors?

0-FCV-33-1, Service Air crosstie to Control Air valve, automatically opens when control air header pressure first lowers to __ (1) __ psig.
Reactor SCRAM on Unit 1 is required if Control and Service Air Compressors cannot maintain Control Air Header pressure above __ (2) __ psig.

- A. (1) 70 (2) 55
- B. (1) 70 (2) 66
- C. (1) 85 (2) 55
- D. (1) 85 (2) 66

Answer: C

The REASON for service air isolation is being tested through the automatic function of the service air crosstie valve – acceptable match.

K/As Requiring Information Interpretation

Description

- The word, “interpret” has a broad meaning with respect to K/As.
- Interpretation of information can be tested through the use of graphs, charts, tables, calculations, simulator screen shots, etc. as relevant.
- Interpretation can also be tested by asking for required actions related to the K/A topic.

Example 13 – K/A Interpretation

K/A Tier 1 Group 2

076AA2.03 High Reactor Coolant Activity - Ability to determine and interpret the following as they apply to High Reactor Coolant Activity: RCS radioactivity level meter.

Question Rev. 0

Unit 2 is at 100% power.
Annunciator K-D2, RAD MONITOR SYSTEM HI, alarms due to the Letdown Radiation Monitor.
The crew is performing 2-AP-5, Unit 2 Radiation Monitoring System, Attachment 8, Reactor Coolant Letdown Radiation Monitor.

Which one of the choices below completes the following statement?

In accordance with Attachment 8 Step 3, the operator is required to check the Letdown Radiation Monitor reading by selecting screen display Channel _____.

- A. FuelFail%
- B. Vol Act μ ci/cc
- C. ProcDose mrem/h
- D. BG Hx Rm mrem/h

Answer: C

The applicants' ability to determine and interpret which radiation monitor screen is required (AP-5, Attach 8) is a way to hit the K/A – acceptable match.

Testing Generic Fundamentals Exam (GFE) Knowledge on Written Exams

Description

- Avoid testing GFE knowledge on the NRC written exam without testing site-specific knowledge.
- For K/As that appear to ask for GFE knowledge, written exam questions should test the information by asking how a plant specific parameter, equipment or instrumentation will respond and/or what site-specific actions are required as a result of the GFE topic.

Example 14 – GFE Knowledge (Slide 1 of 2)

K/A T1 G1

700000 AK3.02

Knowledge of the reasons for the following responses as they apply to Generator Voltage and Grid Disturbances: Actions contained in abnormal operating procedure for voltage and grid disturbances

Question Rev. 0

Given the following conditions:

- 0-AOI-57-1E, Grid Instability, has been entered by all three units.
- The 500KV Voltage as indicated on ICS is 507 KV.
- Grid frequency is 59.90 Hz.

Which ONE of the following completes both statements below as directed by 0-AOI-57-1E, Grid Instability?

To assist in maintaining grid stability, the UOs will adjust __(1)__.

For degrading voltage conditions the initial rising trend in pump amps will be indicated on 4KV UNIT boards 1C, 2C, and 3C because __(2)__.

- A.** (1) real power using HS-96-32 Recirc Master Control raise Medium
(2) they carry a heavier electrical load
- B.** (1) real power using HS-96-32 Recirc Master Control raise Medium
(2) they do not have tap changer regulation
- C.** (1) reactive power using HS-57-26 Voltage Regulator Lower/Raise Adjust
(2) they carry a heavier electrical load
- D.** (1) reactive power using HS-57-26 Voltage Regulator Lower/Raise Adjust
(2) they do not have tap changer regulation

Answer: D

First part of the question is testing GFES knowledge.

Example 14 – GFE Knowledge (Slide 2 of 2)

K/A Tier 1 Group 1

700000 AK3.02

Knowledge of the reasons for the following responses as they apply to Generator Voltage and Grid

Disturbances:

Actions contained in abnormal operating procedure for voltage and grid disturbances

Question Rev. X

Given the following conditions:

- 0-AOI-57-1E, Grid Instability, has been entered by all three units.
- The 500KV Voltage as indicated on ICS is 507 KV.
- Grid frequency is 59.90 Hz.

Which ONE of the following completes both statements below as directed by 0-AOI-57-1E, Grid Instability?

To assist in maintaining grid stability, the UOs will adjust__(1)___.

For degrading voltage conditions, the initial rising trend in pump amps will be indicated on 4KV UNIT boards 1C, 2C, and 3C because they__(2)___ .

- A. (1) Recirc Flow Control (2) carry a heavier electrical load
- B. (1) Recirc Flow Control (2) do Not have tap changer regulation
- C. (1) Volt Regulator Lower/Raise Adjust (2) carry a heavier electrical load
- D. (1) Volt Regulator Lower/Raise Adjust (2) do Not have tap changer regulation

Answer: D

Question tests plant specific knowledge versus GFES knowledge - reactive power (MVAR) is adjusted by varying generator voltage and with voltage below 510 KV, 0-AOI-57-1E directs raising voltage to restore voltage above 510KV or the reactive limit +300MVAR is reached. Question also directly tests the reasons for the actions related to grid instability – acceptable match.

Example 15 – GFE Knowledge

K/A Tier 2 Group 1

003K5.02 Reactor Coolant Pump System (RCPS)

Knowledge of the operational implications of the following concepts as they apply to the RCPS: Effects of RCP coast down on RCS parameters

Question Rev. 0

Given the following conditions:

- Unit 1 is starting up following a mid-cycle forced outage.
- The crew has commenced slowly raising power in preparations for placing the unit online.
- At approximately 4% power, “B” RCP trips.

Which ONE of the following identifies the effect of the RCP trip on the DNBR, AND includes the action the crew will perform in response to the failure.

- A.** DNBR has decreased; insert Control Bank D rods to less than 5 steps then trip the reactor.
- B.** DNBR has decreased; immediately trip the reactor
- C.** DNBR has increased; insert Control Bank D rods to less than 5 steps then trip the reactor.
- D.** DNBR has increased; immediately trip the reactor

Answer: B

Although the first part of the question is testing generic fundamentals knowledge, the second part tests the plant specific operational implication of RCP coastdown – acceptable match.

Contents

- 1 Sample Plan Generation
- 2 Written Exam Review
- 3 K/A Tiers
- 4 Written Exam Question Examples
- 5 Other K/A Requirements**

Other K/A Requirements

Tech Specs

- In addition to SRO K/As about Fire Protection, is there an NRC expectation that questions concerning NFPA 805 LCOs / procedures be included?
- In the simulator, will those LCOs count for the attributes for the SROs?

TS /
TRM

ODCM

NFPA
805

During **scenarios**, the TS competency must evaluate either **TSs or TRM**; other items such as the ODCM will NOT be credited for Competency 6. TRMs can be credited for Competency 6 during scenarios because the K/A Catalog G2.0.1 wording allows both TSs and TRM.

However, the **written exam** and the **admin JPM** portion of the operating exam can certainly test the applicant's ability to use the **ODCM, NFPA 805 LCOs**, etc., as long as the K/A match exists. For example, K/A G2.2.38, 286000 A2s, and 600000 A2s.

JPM K/As

- For K/As related to JPMs, does the K/A listed have to be an exact match to the task being performed? Instead, can the K/A related to the system be listed?
- If K/A score for the system is < 2.5, can a generic K/A related to the topic be applied?

If a K/A for the **task** is available, that K/A is **preferred** over the **system** K/A. For example, if the task is related to emergency boration to the RCS, the K/A related to this specific task should be applied rather than the K/A related to the CVCS system.

If a **JPM** is related to a task or system that has a **K/A score < 2.5**, it is **unacceptable** to develop a JPM to that K/A. Additionally, it is **not acceptable** to use a **generic K/A** topic to cover the task or system related to this JPM.

Task
K/A

System
K/A

Generic
K/A



Plausible vs. Implausible Distractors



- ▶ Phillip Capehart
- ▶ Senior Operations Engineer/Chief Examiner
- ▶ NRC Region II

July 2017

Background

Nuclear Navy, Oyster Creek – RP Supv., RP/Chemistry Training, Hot License class, Operator Training. BFN – 6 years, Hot License and Requal training. Palo Verde – 10 years, last 5 years as NRC exam writer.

NRC Region II – January 2007

Qualified on Westinghouse, Babcock & Wilcox, Combustion Engineering, General Electric, and AP-1000



U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Objectives:

- **Where implausible distractors are addressed in the Examiner Standards.**
- **How to identify implausible distractors.**
- **Examples of implausible distractors.**
- **How to write or correct plausible distractors.**

Plausible Distractors

“Plausible”:

1. Having an appearance of truth or reason; seemingly worthy of approval or acceptance; credible; believable: “a plausible excuse.”
2. Well-spoken and apparently, but often deceptively, worthy of confidence or trust: “a plausible commentator.”

“Distractor”:

1. A person or thing that distracts the attention.
2. An incorrect choice among multiple-choice answers on a test.

“Plausible Distractor”: a credible or believable incorrect choice among multiple-choice answers on a test.

Plausible Distractors

- Key to the discriminatory value of a question is the ability to confidently show that a less-than-competent operator will choose an incorrect answer.
- With this in mind, incorrect answers must be “plausible” or they would never get chosen.
- If distractors are implausible the question will have an incorrectly high success rate.
- Though there is some specific guidance information available on what is plausible, the subjective nature has resulted in “appropriate” plausibility determination to be all over the board.

Plausible Distractors

Appendix B of NUREG-1021 gives examples of four basic models that are acceptable and may be used in combination with one another:

Model A:

- a. correct answer
- b. plausible incorrect answer
- c. plausible incorrect answer
- d. plausible incorrect answer

This model depicts the traditional multiple-choice design format with one correct single-word/phrase answer followed by three incorrect single-word/phrase options. Note that all options are of similar length.

Plausible Distractors

Appendix B of NUREG-1021 gives examples of four basic models that are acceptable and may be used in combination with one another:

Model B:

- a. correct answer
- b. plausible **misconception**
- c. plausible incorrect answer
- d. plausible incorrect answer

This variation of Model A uses a plausible misconception as one of the three incorrect answers. Again, note that all options are of similar length.

Plausible Distractors

Appendix B of NUREG-1021 gives examples of four basic models that are acceptable and may be used in combination with one another:

Model C:

- a. correct answer with correct condition (e.g., because, since, when, if, and other such conditions)
- b. correct answer with plausible incorrect condition
- c. plausible incorrect answer with incorrect condition
- d. plausible incorrect answer with incorrect condition

Model C depicts an acceptable design that uses answers with conditions (i.e., a setting, event, cause, or effect) that may make the answer correct or incorrect.

Plausible Distractors

Appendix B of NUREG-1021 gives examples of four basic models that are acceptable and may be used in combination with one another:

Model D:

- a. correct answer
- b. plausible incorrect answer
- c. correct answer with plausible incorrect condition
- d. plausible incorrect answer with incorrect condition

Model D is useful when it is not possible to create four options of similar length. This model shows paired lengths (two long and two short), which prevents any one option from standing apart from the remaining options.

Plausible Distractors

Appendix B of NUREG-1021 gives examples of four basic models that are acceptable and may be used in combination with one another:

When using Model C or D, it is particularly important to maximize the plausibility of any incorrect conditions that appear in multiple distractors to minimize the chances that examinees will be able to eliminate those distractors by detecting one piece of implausible information.

Implausible Distractors

How hard is it to detect an implausible distractor?

Here's a simple example of non-plausibility:

Which of the following AC power sources provides power to the ECCS electrical buses?

- A. Essential AC Power
- B. Non-Essential AC Power
- C. 4KV AC Power
- D. 125 VDC Power

Implausible Distractors

How hard is it to detect an implausible distractor?
Here's a simple example of non-plausibility:

Which of the following AC power sources provide power to the ECCS electrical buses?

- A. Essential AC Power
- B. Non-Essential AC Power
- C. 480V AC Power
- D. 125 VDC Power

Not Plausible!

Clearly at least one of these choices is not plausible, but rarely are the issues so obvious.

On the other end of the scale are distractors that are partially or fully correct. Debates on this topic are frequent and long. One implausible distractor is a comment, two is Unsat.

Plausible Distractors

Some **SUBJECTIVITY** is involved in determining whether a distractor is plausible or not.

GUIDELINES:

- Put yourself in the position of a license candidate (with the expected knowledge, abilities, and training)
- **Remember**, what is implausible to someone with 30 years of nuclear power plant experience, may not be implausible to someone who has just gone through license training.

Plausible Distractors

- Some guidelines for plausibility:
 - A plausible distractor must be an incorrect answer.
 - There could be a student without the required knowledge who would select the incorrect choice as the correct answer.
- Though it seems obvious that an incorrect answer should actually be technically incorrect, distractors fail this test regularly and thus become “ultimately” plausible.
- The most reliable method of determining plausibility is by validation:
 - If a “qualified” operator selects a distractor then it can be presumed to be plausible.

Plausible Distractors

- However, there will typically not be enough validation resources to apply the “will-they-pick-it” method, so most often examiner opinion is used instead.
- Sources of plausibility:
 - Common misconceptions
 - Improper use of a table or graph
 - Incorrect mathematical process
 - Similar (but different) system design
 - Plant design changes or differences
 - Improper procedure use
- Document what the plausibility is because you may not remember when the examiner asks later.

References

- NUREG 1021
- “Supplemental Guidance for Writing Multiple Choice Questions” located at:
<https://www.nrc.gov/reactors/operator-licensing/regs-guides-comm.html#communications>,
ADAMS ML13281A409

Methodology

- Put yourself in the mindset of a novice operator who does not know the answer.
- Can you use logic, basic plant knowledge, and/or the relationship (“interplay”) between distractors to eliminate distractors?
- If yes, the distractor(s) may not be plausible.

Implausibility

Common errors that lead to implausibility:

- Requires Only Basic Plant Knowledge
- Fails Common Sense Test
- “Double Distractors” [1 of 2 Taken Twice] with 2 Distractors Having LOD = 1
- Physics Not Correct
- Distractors Conflict with Information in Stem
- Distractors Not Independent from Each Other (Subset Issues)
- Use of a Distractor About a Plant Process that Does Not Exist or Used to Exist

Requires Only Basic Plant Knowledge

Given the following conditions:

- Condenser pit flooding caused an automatic turbine/reactor trip.
- SI actuated due to a small break LOCA.
- Bus 11 is deenergized.
- RCS pressure stable at 1725 psig.
- 11 SG level 13% NR and rising.
- 12 SG level 48% NR and stable.
- AFW flow 50 gpm to 11 SG only.
- "Post-LOCA Cooldown and Depressurization" is in progress.

What method for cooldown should be selected?

- A. Dump steam to the condenser from both SGs.
- B. Dump steam to the condenser from 12 SG only.
- C. Place RHR in service per SOI-4, "RHR System."
- D. Dump steam from both SG PORVs.

Not plausible to place RHR in service with RCS at 1725 psig.

Requires Only Basic Plant Knowledge

Given the following conditions:

- Plant is preparing for a startup
- STP 3.8.1-06, “Standby DG Operability Test,” in progress for “A” SBDG
- Next step of STP is, “When the synchroscope is at 12:00, momentarily place the 4KV BREAKER 1A311 “A” DG control switch in CLOSE”
- BEFORE 1A311 is taken to CLOSE, the **1A3 BUS LOCKOUT** activates

Which of the following is the correct action for the Diesel and the Lockout for this situation?

- A. Shutdown the Diesel to prevent overheating.
- B. Return the Diesel to Standby Readiness because it tripped on the Lockout.
- C. Restore 1A3 BUS TRANSFER SWITCH to AUTO to allow 1A3 to automatically reenergize.
- D. Continue with the STP and close 4KV BREAKER 1A311 to restore power to 1A3.

Requires Only Basic Plant Knowledge

Given the following conditions:

- Plant is preparing for a startup
- STP 3.8.1-06, “Standby DG Operability Test,” in progress for “A” SBDG
- Next step of STP is, “When the synchroscope is at 12:00, momentarily place the 4KV BREAKER 1A311 “A” DG control switch in CLOSE”
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Which of the following is the correct action for the Diesel and the Lockout for this situation?

- A. Shutdown the Diesel to prevent overheating.
- B. Return the Diesel to Standby Readiness because it tripped on the Lockout.
- C. Restore 1A3 BUS TRANSFER SWITCH to AUTO **to allow 1A3 to automatically reenergize.**
- D. Continue with the STP and **close 4KV BREAKER 1A311 to restore power to 1A3.**

Not plausible that a DG would be aligned to a Bus that is locked out.

Fails Common Sense Test

Given the following conditions:

- Fuel handling is in progress in Containment and the SFP
- R-5, SPENT FUEL POOL AREA MONITOR, fails LOW
- All other radiation monitors are operable

What is the impact of this failure?

- A. Fuel handling in the SFP and Containment must be stopped.
- B. Fuel handling in the SFP ONLY must be stopped.
- C. The SFP must be evacuated.
- D. None, provided that R-28, NEW FUEL PIT AREA CRITICALITY MONITOR, is operable.

Not plausible to require SFP evacuation on a failed-low radiation monitor.

“Double Distractors” [1 of 2 Taken Twice] With 2 Distractors Having LOD = 1

A Large Break LOCA (DBA) occurred 5 minutes ago.

Which of the following describes the expected conditions of the pumps?

- A. SI and RHR pumps running and injecting.
CS pumps OFF.
- B. SI pumps running and injecting into the RCS, RHR pumps running.
CS pumps OFF.
- C. SI pumps running and injecting.
RHR and CS pumps running.
- D. SI and RHR pumps running and injecting.
CS pumps running.

“Double Distractors” [1 of 2 Taken Twice] With 2 Distractors Having LOD = 1

A Large Break LOCA (DBA) occurred 5 minutes ago.

Which of the following describes the expected conditions of the pumps?

- A. SI and RHR pumps running and injecting.
CS pumps OFF.
- B. SI pumps running and injecting into the RCS, RHR pumps running.
CS pumps OFF.
- C. SI pumps running and injecting.
RHR and CS pumps running.
- D. SI and RHR pumps running and injecting.
CS pumps running.

Not plausible that the CS pumps would be OFF during a DBA LOCA.

NOTE: Questions with “Double Distractors” [1 of 2 Taken Twice] that have 2 easily-eliminated distractors (i.e., LOD = 1) lend themselves to having 2 implausible distractors.

“Double Distractors” [1 of 2 Taken Twice] With 2 Distractors Having LOD = 1

Given the following plant conditions:

- Reactor power is 100%
- Pressurizer pressure channel I, 429, removed from service for surveillance testing, with its associated bistables tripped
- Pressurizer pressure channel IV, 449, fails LOW

Which of the following describes the result of these conditions?

- A. Reactor trip, but NO Safety Injection, Pzr PORV PR-2A remains closed
- B. Reactor trip AND Safety Injection, Pzr PORV PR-2A remains closed
- C. Reactor trip but NO Safety Injection, Pzr PORV PR-2A opens
- D. Reactor trip AND Safety Injection, Pzr PORV PR-2A opens

“Double Distractors” [1 of 2 Taken Twice] With 2 Distractors Having LOD = 1

Given the following plant conditions:

- Reactor power is 100%
- Pressurizer pressure channel I, 429, removed from service for surveillance testing, with its associated bistables tripped
- Pressurizer pressure channel IV, 449, fails LOW

Which of the following describes the result of these conditions?

- A. Reactor trip, but NO Safety Injection, Pzr PORV PR-2A remains closed
- B. Reactor trip AND Safety Injection, Pzr PORV PR-2A remains closed
- C. Reactor trip but NO Safety Injection, **Pzr PORV PR-2A opens**
- D. Reactor trip AND Safety Injection, **Pzr PORV PR-2A opens**

C & D not plausible, since there is no reason for a PORV to open on a low Pressurizer pressure signal.

Physics Not Correct

Torus water temperature rises from 75°F to 95°F over several weeks due to summer heat.

Which of the following describes the effect of the rise in torus water temperature?

- A. The INCREASE in torus airspace would result in LOWER post-LOCA peak drywell pressure.
- B. The DECREASE in torus water level would result in LOWER available NPSH for the ECCS pumps.
- C. The DECREASE in torus airspace would result in HIGHER post-LOCA peak drywell pressure.
- D. The INCREASE in torus water level would result in HIGHER available NPSH for the ECCS pumps.

Physics Not Correct

Torus water temperature rises from 75°F to 95°F over several weeks due to summer heat.

Which of the following describes the effect of the rise in torus water temperature?

- A. The **INCREASE** in torus airspace would result in LOWER post-LOCA peak drywell pressure.
- B. The **DECREASE** in torus water level would result in LOWER available NPSH for the ECCS pumps.
- C. The **DECREASE** in torus airspace would result in HIGHER post-LOCA peak drywell pressure.
- D. The **INCREASE** in torus water level would result in HIGHER available NPSH for the ECCS pumps.

Not plausible that an increase in water temperature would cause a decrease in water level or an increase in torus airspace (since almost everyone knows that water expands when heated over this temperature range).

Distractors Conflict With Information In Stem

Plant is at 100% power.

A failure of the governor/pressure regulator occurs which causes the turbine control valves to **fully open**.

Which one of the following RPS functions will scram the reactor?

- A. Main Steam Isolation Valve Closure
- B. APRM flux – Upscale
- C. Low RPV water level
- D. Turbine Control Valve Closure

Not plausible that turbine control valve closure would cause the reactor scram, since the question stem states that the turbine control valves have failed open.

'Subset' Issue

Given the following:

- Unit at 100%
- PZR pressure begins to lower rapidly

Which of the following PZR pressure values results in an automatic Reactor Trip AND SI?

A. 1930 psig

B. 1900 psig

C. 1800 psig **Correct answer, right?**

D. 1785 psig **But this is also a true statement.**

[At this plant, reactor trip occurs at 1900 psig, SI at 1800 psig.]

So to fix it, we could change the last 2 answer choices:

'Subset' Issue

Given the following:

- Unit at 100%
- PZR pressure begins to lower rapidly

Which of the following PZR pressure values results in an automatic Reactor Trip AND SI?

A. 1930 psig

B. 1900 psig

C. 1860 psig

D. 1800 psig

Still the correct answer, and the
ONLY correct answer, so...

Have we fixed it?

'Subset' Issue

Given the following:

- Unit at 100%
- PZR pressure begins to lower rapidly

Which of the following PZR pressure values results in an automatic Reactor Trip AND SI?

- A. 1930 psig {not as bad as ↓}
- B. 1900 psig {not as bad as ↓}
- C. 1860 psig {not as bad as ↓}
- D. 1800 psig {worst case choice}

'Subset' Issue

Given the following:

- Unit at 100%
- PZR pressure begins to lower rapidly

Which of the following PZR pressure values results in an automatic Reactor Trip AND SI?

- A. 1930 psig {not plausible}
- B. 1900 psig {not plausible}
- C. 1860 psig {not plausible}
- D. 1800 psig {Can get to the correct answer
by process of elimination}

'Subset' Issue

Given the following:

- Unit at 100%
- PZR pressure begins to lower rapidly

Which of the following is the **MAXIMUM** PZR pressure which results in an automatic Reactor Trip AND SI?

- A. 1930 psig
- B. 1900 psig
- C. 1800 psig
- D. 1785psig

Another 'Subset' Example

A qualified Radiation Worker was escorting a male visitor with no previous exposure through the Reactor Building when they inadvertently walked through a High Radiation Area.

RP personnel read their dosimeters and calculated they had received the following exposures:

- Chest 800 mr
- Hands 1060 mr
- Lens of Eye 510 mr
- Internal 550 mr

Which, if any, exposure limit has been exceeded?

- A. Both exceeded federal TEDE limits.
- B. Both exceeded administrative TEDE limits.
- C. The visitor exceeded the federal TEDE limit.
- D. The Radiation Worker exceeded the federal TEDE limit.

Another 'Subset' Example

A qualified Radiation Worker was escorting a male visitor with no previous exposure through the Reactor Building when they inadvertently walked through a High Radiation Area.

RP personnel read their dosimeters and calculated they had received the following exposures:

- Chest 800 mr
- Hands 1060 mr
- Lens of Eye 510 mr
- Internal 550 mr

Which, if any, exposure limit has been exceeded?

- A. Both exceeded federal TEDE limits.
- B. Both exceeded administrative TEDE limits.
- C. The visitor exceeded the federal TEDE limit.
- D. The Radiation Worker exceeded the federal TEDE limit.

D is not plausible because it is a subset of A.

If A were correct, then D would also be correct.

Use of a Distractor About a Plant Process That Does Not Exist or Used to Exist

Maintenance is about to commence a surveillance test, which:

- will cause a TECH SPEC-REQUIRED plant instrument to be INOPERABLE for the duration of the test
- does NOT require an LCO ACTION entry

Which ONE of the following describes a CRS required action, PRIOR to Maintenance beginning the surveillance?

- A. Direct the RO to hang an Adverse Condition Monitoring Tag on the associated annunciator window.
- B. Direct Maintenance to hang an Equipment Status Tag on the instrument, and the RO to hang a Miniature EST in the Control Room.
- C. Identify the Tech Spec-required action in the event the instrument is still INOPERABLE when the Short Duration Time Clock expires.
- D. Identify the Maximum Out of Service Time (MOST) for the instrument and direct IMD to notify the control room if the test is still in progress within 30 minutes of the MOST.

Use of a Distractor About a Plant Process That Does Not Exist or Used to Exist

Maintenance is about to commence a surveillance test, which:

- will cause a TECH SPEC-REQUIRED plant instrument to be INOPERABLE for the duration of the test
- does NOT require an LCO ACTION entry

Which ONE of the following describes a CRS required action, PRIOR to Maintenance beginning the surveillance?

A. Direct the RO to hang an Adverse Condition Monitoring Tag on the associated annunciator window.

This isn't plausible because Adverse Condition Monitoring Tags don't exist at this station!

Suggested changing to: "Initiate a Degraded Equipment Log entry for the instrument," a process that does exist.

Examples of Improved Multiple Choice Questions

BEFORE (Basic Plant Knowledge):

Plant is at 100% with EDG #1 under clearance for maintenance.

Subsequently:

- An inadvertent reactor trip occurs COINCIDENT with a LOOP
- All SG levels “shrink” to 10% NR

Which of the following predicts the AFW pump that will be running, including the electrical bus providing its power?

- A. “A” AFW pump from 480V Bus 8N
- B. “A” AFW pump from 4KV Bus 2AE
- C. “B” AFW pump from 480V Bus 9P
- D. “B” AFW pump from 4KV Bus 2DF

Distractors A and B can be easily eliminated by knowing that EDG #1 is the Train A emergency power supply, and these are Train A busses.

LET’S IMPROVE IT:

Examples of Improved Multiple Choice Questions

AFTER (Basic Plant Knowledge):

Plant is at **25%** with EDG #1 under clearance for maintenance.

Subsequently:

- An inadvertent reactor trip occurs **COINCIDENT** with a **LOOP**
- All SG levels “shrink” to **25% NR**

Assuming no operator actions are taken, which of the following predicts the AFW system response?

- A. **NO** AFW pumps are running
- B. **ONLY** the Steam Driven AFW pump is running
- C. **ONLY** the “B” AFW pump is running
- D. **BOTH** the Steam Driven and “B” AFW pump are running

Examples of Improved Multiple Choice Questions

BEFORE (Specific Determiners - Cueing):

Plant is at 100% with all systems in normal alignment.

Power is lost to Vital 125 VDC Bus 11A.

Which of the following identifies the effect, if any, to DG-1A?

- A. Loss of ALL engine protective tripping capability
- B. Loss of Normal and Emergency engine start circuits
- C. No effect, DG-1A remains FUNCTIONAL from bus 11C
- D. Loss of ALL engine operating parameters indications from any location

Examples of Improved Multiple Choice Questions

BEFORE (Specific Determiners - Cueing):

Plant is at 100% with all systems in normal alignment.

Power is lost to Vital 125 VDC Bus 11A.

Which of the following identifies the effect, if any, to DG-1A?

- A. Loss of **ALL** engine protective tripping capability
- B. Loss of Normal and Emergency engine start circuits
- C. **No** effect, DG-1A remains FUNCTIONAL from bus 11C
- D. Loss of **ALL** engine operating parameters indications from any location

Distractors A, C, and D are weak due to the absolute nature of the responses (ALL, no effect, ALL)

Examples of Improved Multiple Choice Questions

AFTER (Specific Determiners - Cueing):

Plant is at 100% with all systems in normal alignment.

Power is lost to Vital 125 VDC Bus 11A.

Which of the following identifies the effect, if any, to DG-1A?

- A. The DG will NOT start on a Safety Injection signal
- B. The DG will start and run unloaded on a LOOP signal
- C. The DG will NOT start automatically or manually from the MCB, but can be started from the local diesel control panel.
- D. After DG-1A is started, it will NOT trip on an overspeed condition

Examples of Improved Multiple Choice Questions

BEFORE (Baseless Distractors):

The plant is in MODE 5, **REFUELING**.

Which of the following is the **MINIMUM** acceptable water level above the Reactor Vessel Flange, **AND** the reason?

- A. 20.5' provides adequate Iodine absorption following an accident.
- B. 20.5' provides adequate shielding of personnel during core alterations.
- C. 26.5' provides adequate Iodine absorption following an accident.
- D. 26.5' provides adequate shielding of personnel during core alterations.

Examples of Improved Multiple Choice Questions

BEFORE (Baseless Distractors):

The plant is in MODE 5, **REFUELING**.

Which of the following is the **MINIMUM** acceptable water level above the Reactor Vessel Flange, **AND** the reason?

- A. 20.5' provides adequate Iodine absorption following an accident.
- B. 20.5' provides adequate shielding of personnel during core alterations.
- C. **26.5'** provides adequate Iodine absorption following an accident.
- D. **26.5'** provides adequate shielding of personnel during core alterations.

There's no reason behind 26.5' in the Accident Analysis, Tech Spec Bases, or plant procedures.

Examples of Improved Multiple Choice Questions

AFTER (Baseless Distractors):

The plant is in MODE 5, **REFUELING**.

Which of the following is the **MINIMUM** acceptable water level above the Reactor Vessel Flange, **AND** the reason?

- A. 20.5' provides adequate Iodine absorption following an accident.
- B. 20.5' provides adequate shielding of personnel during core alterations.
- C. 22.0' provides adequate Iodine absorption following an accident.
- D. 22.0' provides adequate shielding of personnel during core alterations.

22' is the SFP level (over the spent fuel racks) required by Tech Specs.

In Summary

- **Discussed how to identify implausible distractors.**
- **Types of implausible distractors (i.e., what to look out for).**
- **Examples of implausible distractors.**
- **How to correct implausible distractors.**

The End



A
WARNER BROS. —
FIRST NATIONAL
Picture

K/A Catalog Changes

Bruno Caballero

Senior Operations Engineer, RII

Presentation Goals

- Discuss changes to:
 - Table of Contents
 - Importance Ratings
 - Stem Statements
 - Generic K/As
 - ES-401 Written Exam Outline grids
- State the Catalog implementation date

Changes to Table of Contents

1 ORGANIZATION OF THE CATALOG

1.1 Introduction

1.2 10 CFR Part 55

1.3 Reactor Operator Written Examination

1.4 Senior Reactor Operator Written Examination

1.5 RO and SRO Operating Test Items

1.6 Senior Reactor Operators Limited to Fuel Handling

1.7 Organization of the PWR Catalog

1.8 Generic Knowledge and Abilities

1.9 Plant Systems

1.10 Emergency and Abnormal Plant Evolutions

1.11 Components

1.12 Theory

1.13 Importance Ratings

1.14 Rules of Use

1.15 General Guidance

New

1.16 Acronyms and Terms

1.14 Rules of Use

To ensure consistency in applying this catalog the following terms are interpreted as:

- “Parameters” include any characteristic of a system/component that is measured.
- “Actuation” includes actuation logic, signals, blocks, bypasses, permissives, interlocks, and resets.

1.15 General Guidance

The following strategies and principles are utilized in this catalog:

- The use of set points is minimized. Values included are specific to titles or procedures. If a value included in the catalog changes, the statement is still testable if it meets the intent of the statement.
- When referencing a system or component the associated indications, controls, and alarms that support the system function are applicable.
- K/A statement overlap in multiple sections is minimized. K/As are assigned to the most appropriate section.
- All importance ratings are single column format except A2 and Generic K/As and fuel handling. Fuel handling is not an RO license activity and will have N/A marked in the RO column.
- The K/As use generic terminology. If the specific design utilizes comparable but different terminology, the concept is still applicable. Examples of comparable terms include:
 - Safety Injection Tanks (SIT) may be comparable to Core Flood Tanks (CFT)
 - Engineering Safety Feature Actuation System (ESFAS) may be comparable to Engineering Safety Actuation System (ESAS)
 - Auxiliary Feed Water (AFW) may be comparable to Emergency Feed Water (EFW)
 - Component Cooling Water (CCW) may be comparable to interface Cooling Water (ICW)
- Subsystems, where applicable, are listed prior to each associated system.

Changes to Table of Contents

3 PLANT SYSTEMS BWR

3.1 Safety Function 1: Reactivity Control

CRDH	Control rod drive hydraulic system
CRDM	Control rod and drive mechanism
RMCS	Reactor manual control system
RSCTL	Recirculation flow control system
RS	Recirculation system
RCIS	Rod control and information system
SLCS	Standby liquid control system

Acronyms were added
to Table of Contents
and system pages

3 PLANT SYSTEMS PWR

3.1 Safety Function 1: Reactivity Control

CRDS	Control Rod Drive System
CVCS	Chemical and Volume Control System
RPI	Rod Position Indication System
ICS	Integrated Control System

Changes to Table of Contents - BWR

3.5 Safety Function 5: Containment Integrity

PCS	Primary containment system and auxiliaries
PCIS	Primary containment isolation system/nuclear steam supply shut-off Deleted "Reactor Vessel Internals"
RHR SPC	RHR/LPCI: torus/suppression pool cooling mode
RHR CSS	RHR/LPCI: containment spray system mode
RHR SPS	RHR/LPCI: torus/suppression pool spray mode
SC	Secondary containment

3.9 Safety Function 9: Radioactivity Release

MSVLCS	Main steam isolation valve leakage control system
OG	Offgas system
PVS	Plant ventilation systems
RMS	Radiation monitoring system
RW	Radwaste system Deleted "Reactor Vessel Internals"
CRV	Control room ventilation
FPCCU	Fuel pool cooling and clean-up
SGTS	Standby gas treatment system

Changes to Table of Contents - BWR

4.2 Generic Abnormal Plant Evolutions (APE)

Added
acronyms

- APE 1 Partial or Complete Loss of Forced Core Flow Circulation
- APE 2 Loss of Main Condenser Vacuum
- APE 3 Partial or Complete Loss of AC Power
- APE 4 Partial or Complete Loss of DC Power
- APE 5 Main Turbine Generator Trip
- APE 6 SCRAM
- APE 7 High Reactor Pressure
- APE 8 High Reactor Water Level
- APE 9 Low Reactor Water Level
- APE 10 High Drywell Pressure
- APE 11 High Containment Temperature (Mark III Containment Only)
- APE 12 High Drywell Temperature
- APE 13 High Suppression Pool Water Temperature
- APE 14 Inadvertent Reactivity Addition
- APE 15 Incomplete SCRAM
- APE 16 Control Room Abandonment
- APE 17 **Abnormal** Off-Site Release Rate ← was: *High Off-Site Release Rate*
- APE 18 Partial or Complete Loss of Component Cooling Water
- APE 19 Partial or Complete Loss of Instrument Air

New entry in written exam outline grid Form ES-401-1:

295017 (APE 17) Abnormal Offsite Release Rate / 9									
---	--	--	--	--	--	--	--	--	--

* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.

Changes to Table of Contents - PWR

3.8 Safety Function 8: Plant Service Systems

CCW	Component Cooling Water System
CPS	Containment Purge System
SFPCS	Spent Fuel Pool Cooling System
FHS	Fuel-Handling Equipment System
CW	Circulating Water System
IAS	Instrument Air System
SAS	Station Air System - DELETED
FPS	Fire Protection System

SUMMARY OF SIGNIFICANT CHANGES

The changes to Revision 3 include:

9. Standardized common systems between the PWR and BWR catalogs.

Changes to Table of Contents - PWR

4.2 Generic Abnormal Plant Evolutions (APEs)

APE 001	Continuous Rod Withdrawal
APE 003	Dropped Control Rod
APE 005	Inoperable/Stuck Control Rod
APE 008	Pressurizer Vapor Space Accident
APE 015	Reactor Coolant Pump Malfunctions
APE 017	Reactor Coolant Pump Malfunctions (Loss of RC Flow) Deleted
APE 022	Loss of Reactor Coolant Makeup
APE 024	Emergency Boration
APE 025	Loss of Residual Heat Removal System
APE 026	Loss of Component Cooling Water
APE 027	Pressurizer Pressure Control System Malfunction
APE 028	Pressurizer Level Control Malfunction

Changes to Table of Contents - PWR

4.2 Generic Abnormal Plant Evolutions (APEs)

APE 032	Loss of Source Range Nuclear Instrumentation	
APE 033	Loss of Intermediate Range Nuclear Instrumentation	
APE 036	Fuel-Handling Incidents	
APE 037	Steam Generator Tube Leak	
APE 040	Steamline Rupture	
APE 051	Loss of Condenser Vacuum	
APE 054	Loss of Main Feedwater	
APE 056	Loss of Offsite Power	
APE 057	Loss of Vital AC Electrical Instrument Bus	
APE 058	Loss of DC Power	
APE 059	Accidental Liquid Radwaste Release	
APE 060	Accidental Gaseous Radwaste Release	
APE 061	Area Radiation Monitoring System Alarms	
APE 062	Loss of Service Water	Used to be "Loss of Nuclear SW"
APE 065	Loss of Instrument Air	
APE 067	Plant Fire on Site	
APE 068	Control Room Evacuation	
APE 069	Loss of Containment Integrity	
APE 076	High Reactor Coolant Activity	
APE 077	Generator Voltage and Electric Grid Disturbances	
APE 078	Reactor Coolant System Leak	New system

New entry in written exam outline grid Form ES-401-2:

000078 (APE 78*) RCS Leak / 3									
-------------------------------	--	--	--	--	--	--	--	--	--

* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.

Changes to Table of Contents - PWR

4.3 Babcock and Wilcox (BW) Emergency Plant Evolutions (EPEs) and Abnormal Plant Evolutions (APEs)

BW E02	Reactor Trip	Used to be “Vital System Status Verification”
BW E03	Inadequate Subcooling Margin	
BW E04	Inadequate Heat Transfer	
BW E05	Excessive Heat Transfer	
BW E08	LOCA Cooldown	
BW E09	Natural Circulation Cooldown	
BW E10	Post-Trip Stabilization	
BW E13	EOP Rules	
BW E14	EOP Enclosures	
BW A01	Plant Runback	
BW A02	Loss of NNI-X	
BW A03	Loss of NNI-Y	
BW A04	Turbine Trip	
BW A05	Emergency Diesel Actuation	
BW A06	Shutdown Outside Control Room	
BW A07	Flooding	
BW A08	Refueling Canal Level Decrease	

Changes to Table of Contents - PWR

4.4 Combustion Engineering (CE) Emergency Plant Evolutions (EPEs) and Abnormal Plant Evolutions (APEs)

Words added

CE E02 Standard Post-Trip Actions and Reactor Trip Recovery

CE E05 Excess Steam Demand

CE E06 Loss of Feedwater

CE E09 Functional Recovery

New topic

CE E13 Loss of Forced Circulation and/or LOOP and/or a Blackout

CE A11 RCS Overcooling (K/As **DELETED**, incorporated in CE E05)

CE A13 Natural Circulation (K/As **DELETED**, incorporated in CE E13)

CE A16 Excess RCS Leakage

Presentation Goals

- Discuss changes to
 - Table of Contents
 - Importance Ratings
 - Stem Statements
 - Generic K/As
 - ES-401 Written Exam Outline grids
- State the Catalog implementation date

Changes to Importance Ratings (IRs)

- Re-rated all IRs
 - Rating criteria was “important to safe plant operation”
 - Raters received training
 - NEI survey software used for raters
- Only one IR for a K/A; RO & SRO IRs combined
 - Except for:
 - Generics
 - A2
 - Fuel Handling K/As

Importance Rating training provided to raters

The following list of questions should be considered when determining the importance to safe plant operation:

- 1) Is the knowledge or ability related to a safety related function?
- 2) Is the knowledge or ability related to a system or function described in the plant licensing basis?
- 3) Is the knowledge or ability related to protection of a fission product barrier?
- 4) Does the knowledge or ability contribute to an increase in core damage frequency?
- 5) Is the knowledge or ability related to one of the items in 10 CFR 55.41, 10 CFR 55.43 and 10 CFR 55.45?
- 6) Is the knowledge or ability related to a system or function that, if lost, would upset plant stability or cause a reactor trip?
- 7) Is the knowledge or ability related to a structure, system, or component within the scope of the maintenance rule?
- 8) Is the knowledge or ability related to a system or function that includes an industrial safety hazard?
- 9) Is the knowledge or ability related to maintaining any of the following safety functions listed in the K/A catalog?
 - a. Reactivity control
 - b. Reactor water inventory control
 - c. Reactor pressure control
 - d. Heat removal from reactor core
 - e. Containment integrity
 - f. Electrical
 - g. Instrumentation
 - h. Plant service systems
 - i. Radioactive release

Changes to Importance Ratings (IRs)

A1 Ability to predict or monitor changes in parameters associated with operation of the fire protection system including:
(CFR: 41.5 / 45.5)

One IR

- A1.01 System pressure
- A1.02 System flow
- A1.03 Fire doors
- A1.04 Fire dampers
- A1.05 System lineups
- A1.06 Fire water tank pressure

- 3.4
- 3.1
- 3.1
- 3.1
- 3.1
- 2.5

A2 Ability to (a) predict the impacts of the following on the fire protection system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations:
(CFR: 41.5 / 45.6)

Two IRs

- A2.01 System logic failure
- A2.02 DC distribution failure
- A2.03 AC distribution failure
- A2.04 CCWS failure
- A2.05 Fire protection pump trips
- A2.06 Low fire main pressure
- A2.07 Inadvertent system initiation
- A2.08 Failure to actuate when required
- A2.09 Valve closures
- A2.10 Valve openings
- A2.11 DELETED**
- A2.12 Low diesel fuel supply

RO	SRO
2.8	3.1
2.6	2.8
2.8	3.0
2.0	2.0
3.4	3.2
3.3	3.3
3.2	2.9
3.7	3.3
2.9	2.9
2.9	2.9
3.1	3.0

Numbering scheme retained, even if KA was DELETED.

Presentation Goals

- Discuss changes to
 - Table of Contents
 - Importance Ratings
 - **Stem Statements**
 - Generic K/As
 - ES-401 Written Exam Outline grids
- State the Catalog implementation date

Changes to Stem Statements

Table 2: Knowledge and Ability Stem Statements for Plant Systems

- K1. Knowledge of the physical connections or cause-effect relationships between the (SYSTEM) and the following systems: **(was: and/or)**
(CFR: 41.2 to 41.9 / 45.7 to 45.8) **new**

Basis – K1 contains the systems that have a connection to (SYSTEM). The “concepts” will move from K1 to K5 where the stem statement covers concepts. “Cause and effect relationship” will remain so that questions to that effect can be written in K1. The specific controls and interlocks are listed in K4. Electrical systems typically were not included in K1, they are addressed in K2.

- K2. Knowledge of electrical power supplies to the following: (CFR: 41.7)

Basis – K2 lists the power supplies to system components for which knowledge of power supplies is testable. The intent is to include the required knowledge for power supplies to components that are important to safe plant operation or operationally significant. When determining importance or significance, consider plant specific PRA, technical specifications, plant specific operating experience, emergency procedures, and abnormal procedures.

- K3. Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following systems or system parameters: (CFR: 41.7 / 45.4)

new

Basis – K3 lists the systems included in K1 that will be affected by a loss of (SYSTEM).

Changes to Stem Statements

- K4. Knowledge of (SYSTEM) design feature(s) or interlock(s) that provide for the following:
(CFR: 41.7) (was: and/or)

Basis – K4 contains the plant protection/control design features and interlocks.

- K5. Knowledge of the operational implications or cause-effect relationships of the following concepts as they apply to the (SYSTEM): new
(CFR: 41.5 / 45.3)

Basis – The stem for K5 was revised to include cause-effect relationships and concepts. Contains theoretical concepts related to the operation of the system.

- K6. Knowledge of the effect of the following plant conditions, system malfunctions, or component malfunctions on the (SYSTEM): (CFR: 41.7 / 45.7) (was: “that a loss or malfunction”)

Basis – The stem for K6 was modified to address plant conditions, system malfunctions, and component malfunctions on (SYSTEM). K6 lists the systems included in K1 that will have an effect on (SYSTEM) if the listed system is not operating according to design. It also lists the components of (system) whose failure can affect the operation of the (SYSTEM). Power supplies from K2 should be considered.

Changes to Stem Statements

Table 2: Knowledge and Ability Stem Statements for Plant Systems

A1. Ability to predict or monitor changes in parameters associated with operation of the (SYSTEM) including: (CFR: 41.5 / 45.5)

Basis – The stem for A1 was revised by removing reference to exceeding design limits and now includes any departure beyond normal operating characteristics. A1 lists the parameters monitored to verify proper operation of the system.

Old PWR catalog

A2. Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operations: (CFR: 41.5 / 45.6)

Basis – A2 is the ability to predict and mitigate the consequences of selected items from K6.

(was: operations)

A3. Ability to monitor automatic features of the (SYSTEM) including: (CFR: 41.7 / 45.7)

Basis – A3 includes the automatic features of the (SYSTEM) identified in K4 that can be monitored from the control room.

A4. Ability to manually operate or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)

(was: and/or)

Basis – A4 includes the features of the (SYSTEM) that can be manually performed in the control room or manually performed locally that are important to plant safety and monitored in the control room. This also includes automatic features listed in A3 that can be performed manually. A4 includes system monitoring associated with the listed manual actions. A4 for the Fuel Handling System (FHS) includes manual operation of refueling equipment from the equipment location.

Changes to Stem Statements

Table 4: Knowledge and Ability Stem Statements for Emergency and Abnormal Plant Evolutions

E/AK1 Knowledge of the operational implications or cause-effect relationships of the following concepts as they apply to [event]: (CFR: 41.5 / 41.7 / 45.7 / 45.8) ^{new}
was: applications

Basis - Lists the operationally based theoretical concepts applicable to the procedure. These items typically come from the procedure bases, PRA, OE, procedure notes and cautions.

E/AK2 Knowledge of the relationship between the [event] and the following systems or components: (CFR: 41.8 / 41.10 / 45.3) ^{new}

Basis - Lists the systems required to be monitored or operated by the procedure.

E/AK3 Knowledge of the reasons for the following responses or actions as they apply to [event]: (CFR: 41.5 / 41.10 / 45.6 / 45.13) ^{new}

Basis - Lists the reasons responses or actions taken in the procedure.

E/AA1 Ability to operate or monitor the following as they apply to [event]: (CFR: 41.5 / 41.7 / 45.5 to 45.8) ^(was: and/or)

Basis - Lists the system or components required to be monitored or operated by the procedure. EA1 may include systems from EK2.

E/AA2 Ability to determine or interpret the following as they apply to [event]: (CFR: 41.10 43.5 / 45.13) ^(was: AND)

Basis - Lists the parameters or conditions that are monitored to verify successful implementation of the procedure.

Presentation Goals

- Discuss changes to
 - Table of Contents
 - Importance Ratings
 - Stem Statements
 - **Generic K/As**
 - ES-401 Written Exam Outline grids
- State the Catalog implementation date

Changes to generic K/As

Example of reference provided, or open reference K/A:

2.2.15 Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups or, tag-outs (reference potential)

(CFR: 41.10 / 43.3 / 45.13)

IMPORTANCE RO 3.9 SRO 4.3

Example of SRO-Only K/A:

2.2.25 Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits (SRO Only)

(CFR: 43.2)

IMPORTANCE RO (N/A) SRO 4.2

Presentation Goals

- Discuss changes to
 - Table of Contents
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 - **ES-401 Written Exam Outline grids**
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Presentation Goals

- Discuss changes to
 - Table of Contents
 - Importance Ratings
 - Stem Statements
 - Generic K/As
 - ES-401 Written Exam Outline grids
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New Catalog implementation date

- Public Comment period closed on May 15, 2017
 - ~ 100 comments received on the DRAFT versions of NUREG-1122 (PWR) and -1123 (BWR)
- FINAL versions expected in July 2017
- Optional to use current version OR new version (Rev 3) for one year
 - July 2018 mandatory use of Rev. 3 required
 - Sample plan generator not available for Rev 3 yet; Region will provide manually-generated sample plans until generator revised

Takeaways

- New PWR/BWR Catalogs will be REV 3
- July 2018 is forecasted to be drop-dead date to begin using REV 3
- IRs all different; only one IR except for A2, Generics, and FH
- Training program databases may refer to K/A that is deleted; numbering scheme in new catalog held in place.
- New K/As are sequenced AFTER the last number in the current catalog
- Generic K/As may contain the terms “reference potential” and “SRO-only”
- New PWR systems/topics: ICS, CR Ventilation, RCS Leak
- New BWR systems/topics: Service Water
- Deleted PWR systems: Station Air & RCP Loss RC Flow



SRO-Only Written Question Challenges

Mike Kennard
Operations Engineer
U. S. Nuclear Regulatory Commission

July 19, 2017

Highlights

- References for SRO-only questions
- Sample plans
- KAs for SRO-only questions
- SRO-only guidance
- 10 CFR part 55.43 (seven items)
- Writing the questions
- Common flaws
- QA checks/concept of validity
- Examples of questions with flaws

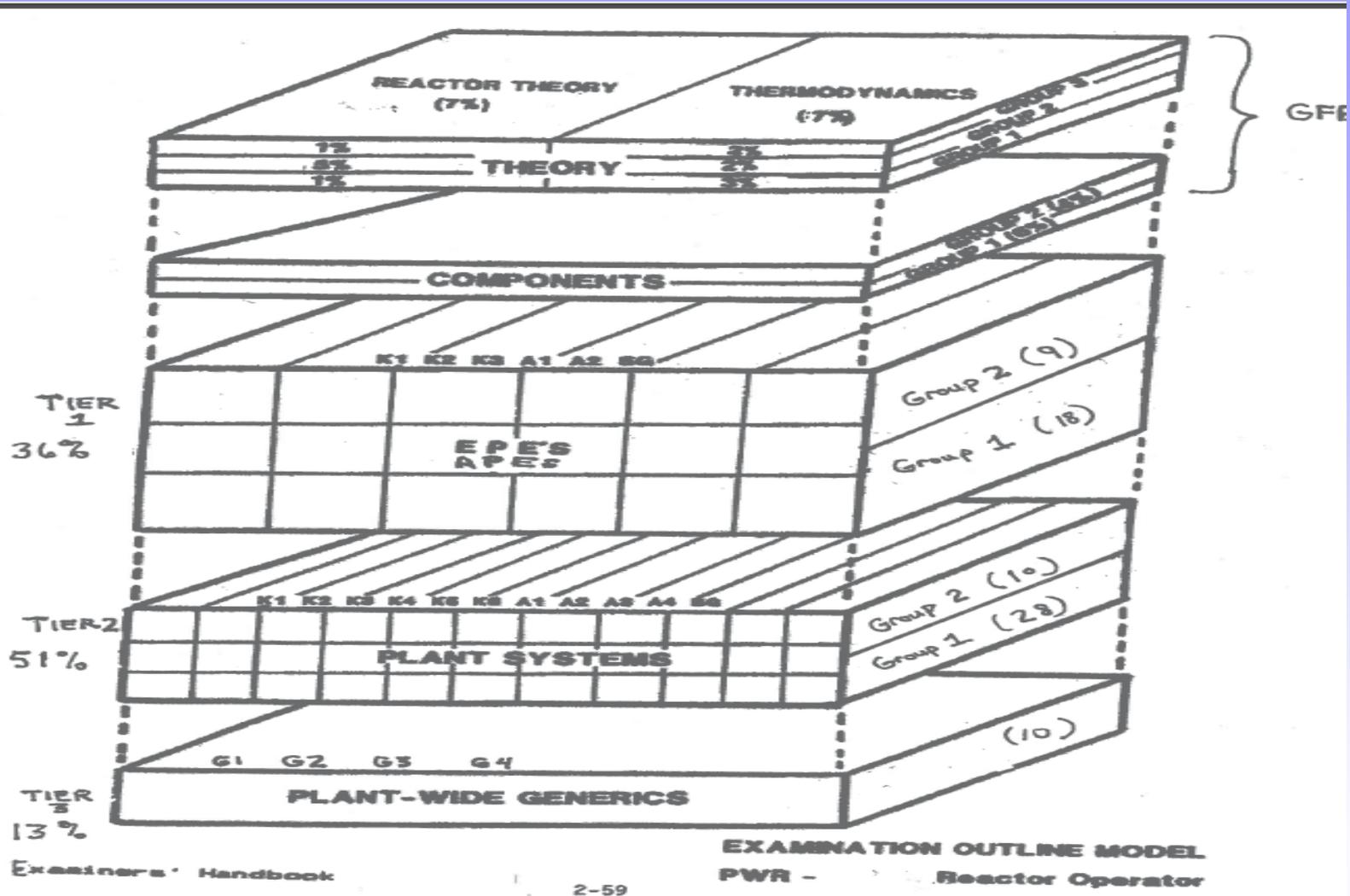
References needed

- NUREG-1021, Rev 11
 - 1) ES-401 (general)
 - 2) ES-401, Attachment 2 (SRO-only guidance)
 - 3) Appendix A, General
 - 4) Appendix B, Written Exam
 - 5) QA forms ES-401-1/2, 3, 4, and 6
- KA catalogs (NUREG-1122/1123, Rev 2, Supp 1 or Rev 3)
- 10 CFR part 55.43 (7 items)

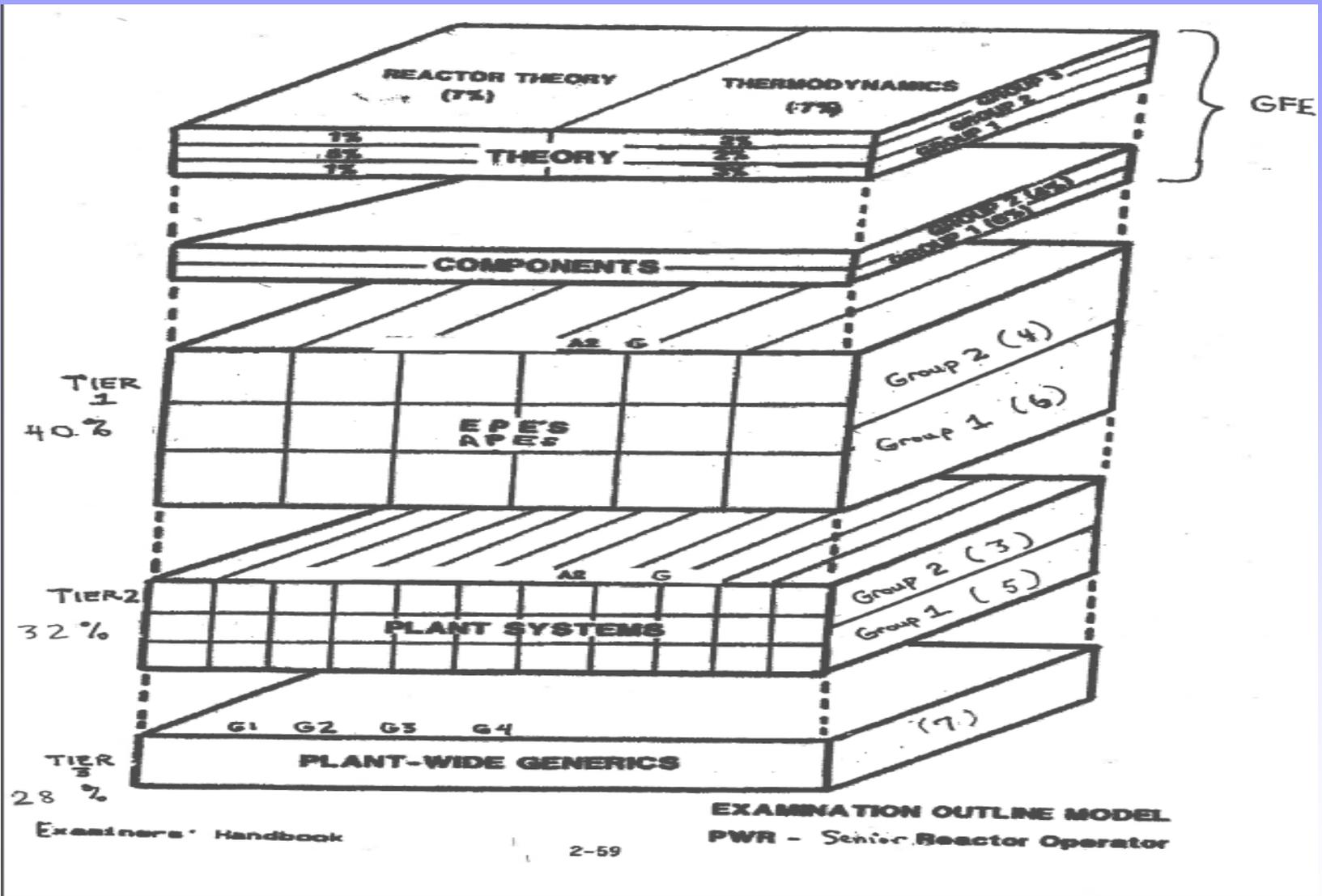
Outline Basis

Where did the sample plan come from?

Skyscraper Basis for Reactor Operators



Skyscraper Basis for Senior Reactor Operators



Outline Issues

Outlines are provided by NRC regional office and are a starting point only. If a KA needs to be replaced, work with your CE.

There is a process and a form (ES-401-4) for this.

Some valid reasons to reject a KA:

- 1) Can't write a valid question based on:
 - a. system design at your facility
 - b. tier/group sampled doesn't support this KA
 - c. KA is really for RO/SRO portion of exam
 - d. Topics are imbalanced (ex. too many refueling questions)
- 2) Can't develop 3 credible distracters and correct answer
- 3) Spending too much time and not getting anywhere – consider calling the CE for help on the question for this one

NOTE: Main reason you **cannot** reject a KA is “You don't train on it.”

KAs for the SRO-only written

- Generic for Tier 1 and 2 (specific set of KAs, ES-401 p. 4, some have changed since Rev. 10)
- Generics for Tier 3 (must not be equipment specific, limit SRO selections to those with a 10 CFR 55.43 link)
- A2 KAs, usually with an ‘a’ and a ‘b’ part.

Example: A2.12: Ability to a) predict impact and b) use procedures to correct or mitigate.

10 CFR 55.43

These are the 7 items in the regulations for the SRO-only portion of the written exam:

- 1) **Conditions and limitations in the facility license.**
- 2) **Facility operating limitations in the technical specifications and their bases.**
- 3) Facility licensee procedures required to obtain authority for design and operating changes in the facility.
- 4) Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.
- 5) **Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.**
- 6) 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.
- 7) Fuel handling facilities and procedures.

Writing the Questions

Start with the KA and the major 55.43 topic you want to get to and try to get a stem and answer together that answers the KA (usually something like a TS call, a procedure selection, or something in the TS bases that ties to the KA directly).

Next, try to develop distractors from common misconceptions or other similar items to the answer, but that are not correct.

Finally, review the question against the SRO-only guidance, recheck the KA to make sure you have a fit, and use other human performance tools to check for flaws (flow charts, etc.).

Common Flaws

Appendix B of NUREG 1021:

- Direct look-up
- KA mismatch
- LOD = 1
- Non-credible distracters
- Validity issues
- None or all of the above, no change, no TS entry, etc.

Validity Types

Discriminatory Validity

Content Validity

Operational Validity

SRO-only guidance

Big picture items include:

1. Basic EOP/AOP entry knowledge is RO knowledge
2. System knowledge is RO knowledge
3. Above-the-line TS information is RO knowledge
4. One-hour TS information is RO knowledge

Note: if you give a reference for a TS question or an EAL question then there has to be something else needed (i.e. other knowledge not included in the question or reference provided, such as TS bases info) to prevent it from being direct look up.

Common Problems with SRO Questions

“Back Doors”

The correct answer can be deduced using one or more back door methods:

- Systems knowledge
- Immediate trip criteria
- AOP/EOP entry criteria
- Overall mitigative strategy
- Above-the-line LCO

“Tack – Ons”

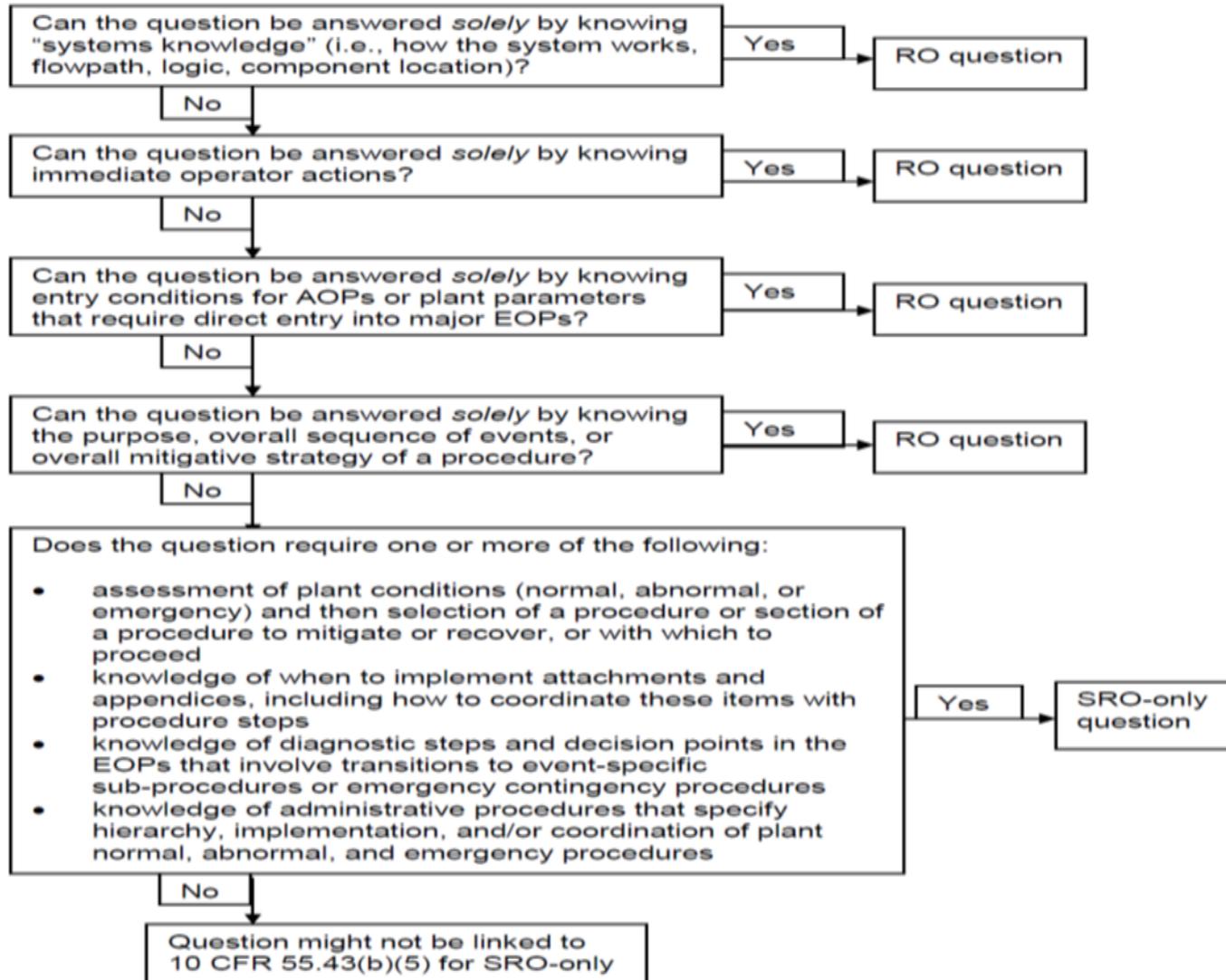
Tacking on something that is SRO level but has nothing to do with the K/A.

QA checks

- **ES-401 Attachment 2, “SRO-Only Guidance”**
- **Att. 2 also contains the flow charts (Tech Specs & Procedure Selection) for screening SRO-only questions**
- Attachment 1 of Appendix B, “Question Development Checklist,” has some good things in it
- Form ES-401-6, “Written Exam Quality Checklist”
- Station-specific human performance tools

SRO-Only Flow Chart

Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)



Question Samples

Attachment 2 of ES-401 has some examples of SRO-only questions

Attachment 2 of Appendix B has some examples of questions that contain flaws

Several other examples are shown below:

Example 1

Reactor power is 29% during a reactor startup when the RO trips the turbine due to high vibration. The SRO should anticipate implementing procedures that will:

- A. maintain reactor power $< 29\%$ since power will increase after the turbine trip.
- B. recover from the reactor scram caused by the turbine trip.
- C. recover vessel level using the feed and condensate system.
- D. scram the reactor.

Example 1 Answer

- This test item disguises itself as SRO-only since the stem suggests the SRO is assessing plant conditions to determine which procedure to implement.
- The test item is actually evaluating the applicant's system knowledge of how reactor power will respond when the turbine is tripped at 29% power.
- This is therefore NOT a satisfactory SRO-only question.

Example 2

The plant has experienced an ATWS with the following conditions:

- Reactor Power 23%
- Reactor Pressure 875 psig
- MSIVs ISOLATED
- Suppression Pool Temp 117°F
- Standby Liquid Control pump “A” is injecting

Subsequently, “A” ES Bus NORMAL SUPPLY BKR trips, causing loss of “A” ES Bus.

Which of the following describes the impact of this condition on SLC and which procedure should the CRS direct in order to mitigate this condition?

- SLC ‘A’ will continue to inject; Direct use of EOP Enclosure 15 to determine when Hot Shutdown Boron Weight has been injected.
- SLC ‘A’ is no longer injecting; Direct use of SOP-034 Hardcard to initiate SLC ‘B’.
- No SLC pumps are available; Direct use of EOP Enclosure 15 to commence alternate SLC injection.
- SLC ‘B’ will automatically commence injecting; Direct use of SOP-34 Hardcard to verify SLC ‘B’ alignment.

Example 2 Answer

This test item only requires system knowledge of SLC to answer and not the ability to assess diagnostically a proper procedural path based on plant conditions.

Example 3

The plant is operating at 97% and the following occurs:

- RFP 'A' Trips
- RPV level lowers to 25" NR

(1) How is the Recirculation Flow Control System affected?

(2) What action should the CRS direct?

A.(1) Both Recirculation Pumps run back to 22% speed

(2) Direct the RO to Scram the reactor IAW alarm response R2D2, Reactor Low Water Level

B.(1) Both Recirculation Pumps run back to 22% speed

(2) Direct the RO to ensure that each Condensate Pump flow is within 5000 to 6000 gpm IAW AB23, Condensate and Feedwater Abnormal

C.(1) Both Recirculation Pumps run back to 45% speed

(2) Direct the RO to Scram the reactor IAW alarm response R2D2, Reactor Low Water Level

D.(1) Both Recirculation Pumps run back to 45% speed

(2) Direct the RO to ensure that each Condensate Pump flow is within 5000 to 6000 gpm IAW AB23, Condensate and Feedwater Abnormal

Example 3 Answer

This test item only requires Recirculation system knowledge to answer the first part of the question.

Two distractors refer to immediate action steps, which would be RO-level knowledge and thus could be automatically eliminated.

Example 4

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

- SRM C is INOPERABLE and bypassed
- SRM A – 50,000 cps
- SRM B – 40,000 cps
- SRM D – 45,000 cps

IRMs are on range 1 with the following readings:

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

Example 4 Answer

Unsat, not SRO-only; ROs are responsible for monitoring proper operation of nuclear instrumentation. BWR K/A 215004 (SRM), A4.07: Verification of proper functioning/operability. RO IR = 3.4

Licensee's RO SRM lesson plan objective: "Describe conditions required to verify SRM/IRM overlap during 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 the item isn't an RO knowledge item.

Feedback Page

Operator Licensing Feedback located at:

<https://www.nrc.gov/reactors/operator-licensing/prog-feedback.html>

In your handout I have provided several of the frequently asked questions regarding SRO written questions.

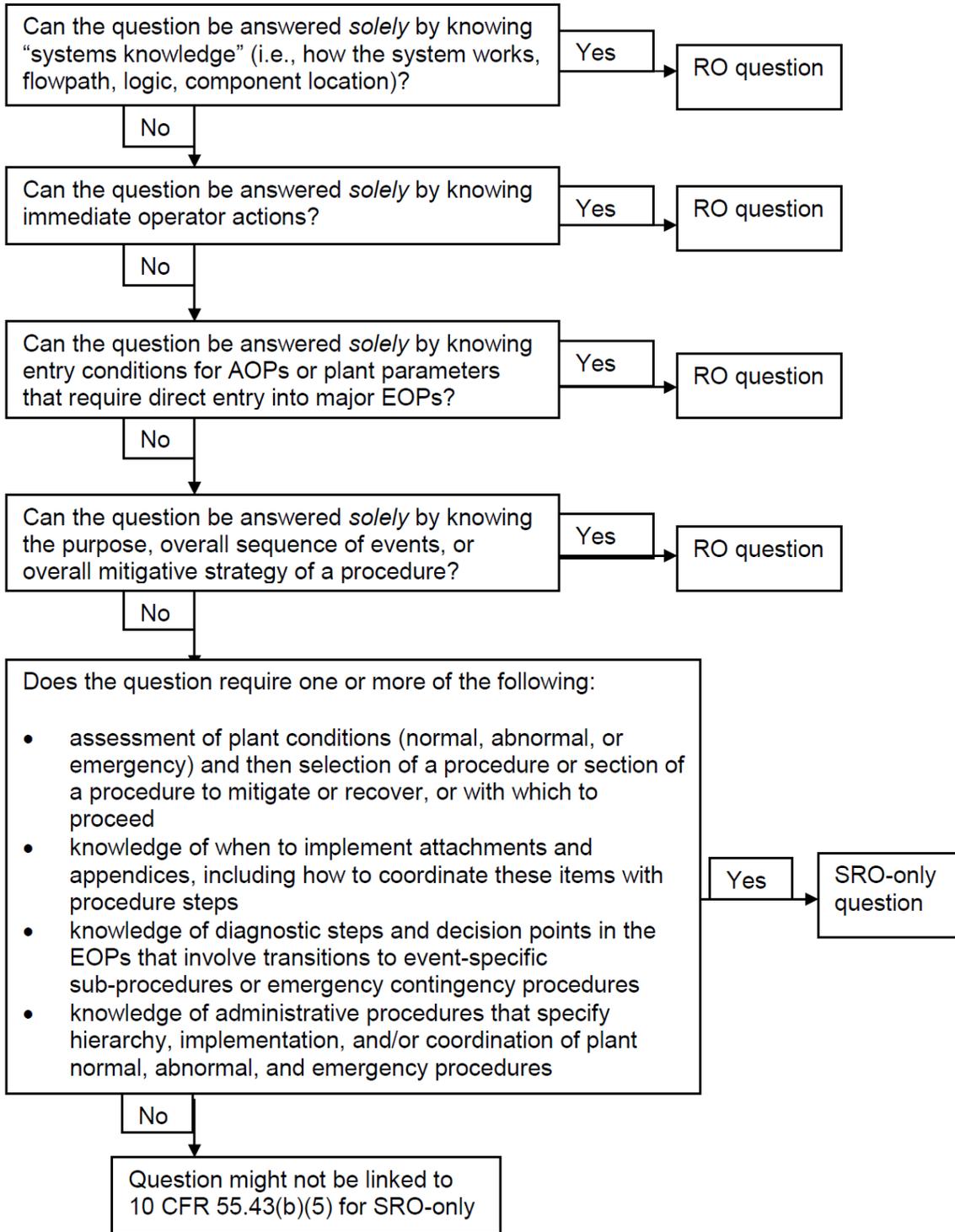
Conclusions

- 1. Take advantage of “free” reviews.**
- 2. If you have a concern about a KA or don’t understand it, call your CE.**
- 3. Use the SRO-only guidance before and after question creation.**
- 4. Get a good QA check by someone who knows how to write questions and knows the NUREG standards.**
- 5. Know what you are signing for on the QA forms.**

Questions?

SRO Only Handout

**Figure 2-2 Screening for SRO-Only Linked to 10 CFR 55.43(b)(5)
(Assessment and Selection of Procedures)**



Example 1

Reactor power is 29 percent during a reactor startup when the reactor operator trips the main turbine due to high vibration. The SRO should now anticipate implementing procedures that will:

- A. maintain reactor power < 29 percent since power will increase after the main turbine trip.
- B. recover from the reactor scram caused by the turbine trip.
- C. recover vessel level using the feed and condensate system.
- D. scram the reactor.

Licensee's Justification:

SRO only because the applicant must evaluate plant conditions and determine the plant procedural path to implement.

Example 2

The plant has experienced an ATWS with the following conditions:

- Reactor Power 23%
- Reactor Pressure 875 psig
- MSIVs ISOLATED
- Suppression Pool Temp 117°F
- Standby Liquid Control (SLC) pump "A" Injecting

Subsequently, a trip of the "A" ES bus NORMAL SUPPLY BRKR causes a loss of the "A" switchgear.

Which of the following describes the impact of this condition on SLC and which procedure should the CRS direct in order to mitigate this condition?

- SLC 'A' will continue to inject, Direct the use of EOP Enclosure 15 to determine when Hot Shutdown Boron Weight has been injected.
- SLC 'A' is no longer injecting, Direct the use of SOP-034 Hardcard to initiate SLC 'B'
- No SLC pumps are available, Direct the use of EOP Enclosure 15 to commence alternate SLC injection
- SLC 'B' will automatically commence injecting, Direct the use of SOP-34 Hardcard to verify SLC 'B' alignment

Licensee's Justification:

SRO only because the applicant must evaluate plant conditions and select the plant procedure to implement.

Example 3

The plant is operating at 97% Reactor Power and the following occurs:

- RFP 'A' Trips
- RPV level lowers to 25 inches on NR level instruments

(1) How is the Recirculation Flow Control System affected?

AND

(2) What action should the CRS direct?

- A. (1) Both Recirculation Pumps run back to 22% speed
(2) Direct the RO to Scram the reactor IAW alarm response R2D2 (Reactor Low Water Level)
- B. (1) Both Recirculation Pumps run back to 22% speed
(2) Direct the RO to ensure that each Condensate Pump flow is within 5000 to 6000 gpm
IAW AB23, Condensate and Feedwater Abnormal
- C. (1) Both Recirculation Pumps run back to 45% speed
(2) Direct the RO to Scram the reactor IAW alarm response R2D2 (Reactor Low Water Level)
- D. (1) Both Recirculation Pumps run back to 45% speed
(2) Direct the RO to ensure that each Condensate Pump flow is within 5000 to 6000 gpm
IAW AB23, Condensate and Feedwater Abnormal

Licensee's Justification:

SRO only because the applicant must evaluate plant conditions and select the plant procedure to implement.

Example 4

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

- SRM C is INOPERABLE and bypassed
- SRM A – 50,000 cps
- SRM B – 40,000 cps
- SRM D – 45,000 cps

IRMs are on range 1 with the following readings:

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

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.

Frequently Asked Question from OL website

401.29 - Regarding ES-401: How do you assure that the extra 10 CFR 55.43 topics are covered in a "representative sample" in the test outline?

The SRO-only examination outlines sample only those K/A categories that are linked to 10 CFR 55.43(b), including a number of the generic K/As in Section 2 of the catalogs and all of the Category A2, AA2, and EA2 K/A statements. All the K/A categories related to the fuel handling facilities are also subject to sampling because that system is specifically identified in 55.43(b)(7). As stated in Section D of ES-401, the specific topics to be sampled on the examination shall be systematically selected.

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

The NRC's initial response to this question indicated a commitment to look "into the quality and consistency of SRO-only questions and [the NRC] may develop additional guidance in this area." The review was completed in March 2010. The clarification guidance for SRO written exam items is located at <http://www.nrc.gov/reactors/operator-licensing/op-licensing-files/sro-only-ml1007100031.pdf> and provides examples of SRO exam items for each of the seven 10CFR55.43(b) topics.

401.35 - Certain "newer" K/As have a 10 CFR 55 reference given in parenthesis to show a tie between the CFR and NUREG-1122(1123). We were told that questions did not meet the criteria of SRO only (those 25 questions only on the SRO written) if the K/A reference included both 55.41 and 55.43. It is our understanding that questions need be written at SRO knowledge level in these situations. We do not think that this dual CFR reference should be interpreted to eliminate the K/A from being selected for an SRO question.

The policy regarding the 25 SRO-only questions on the written examination is stated in Section D.2.d of ES-401. The fact that a K/A is linked to both 55.41 and 55.43 does not mean that the K/A cannot be used to develop an SRO-only question. Questions related to 55.41 topics may be appropriate SRO-level questions if they evaluate knowledge and abilities at a level that is unique to the SRO job position as determined by the facility licensee's learning objectives. Although your observation is valid, please note that NUREG-1021 contains provisions for facility licensees to add, substitute, or delete specific K/As on a case-by-case basis and to use K/As having importance ratings below 2.5 if it is justified based on plant-specific learning objectives.

When the NRC revised NUREGs-1122 and -1123 to incorporate cross-references to specific items in 10 CFR 55, the primary purpose was to establish at least one regulatory connection for every K/A. The fact that a particular K/A does not reference 55.41 or 55.43 does not, in and of itself, disqualify the K/A from testing on the RO or SRO written examination.

401.36 - According to ES-401, the 25 "SRO-level" questions on the written examination shall be derived from the seven areas in 10 CFR 55.43. However, this guidance is sometimes being misinterpreted such that questions testing 10 CFR 55.43 topics are being rejected as "SRO-level" if the facility licensee also expects ROs to possess the same 10 CFR 55.43 knowledge. Is it correct to say that an "SRO-level" question is simply different from the questions on the RO examination and related to one of the seven items listed in 10 CFR 55.43 (b)?

The fact that a facility licensee expects its ROs to master certain 10 CFR 55.43 knowledge, skills, and abilities does not mean that they can no longer be used as the basis for "SRO-level" questions. However, ES-401 also requires questions to be "appropriate for the job level being examined." Therefore, "SRO-level" questions need to be carefully constructed to ensure that they accurately test the additional knowledge and abilities required for the higher license level according to 10 CFR 55.43(b). For example, both 10 CFR 55.41(b)(10) and 55.43(b)(5) require emergency operating procedure (EOP) knowledge, but the latter requires the "SRO-level" questions to evaluate the additional knowledge and abilities necessary for "assessment of facility conditions and selection of appropriate procedures during ... emergency situations." Questions that evaluate the knowledge of specific bases for EOPs (K/A 2.4.18) and/or the operational implications of EOP cautions (K/A 2.4.20), but not the higher level "assessment and selection" knowledge, would generally not be valid "SRO-level" questions. However, questions that evaluate K/A number 2.4.21 (knowledge of the parameters and logic used to assess the status of EOP safety functions) would generally be considered valid "SRO-level" questions even if the facility licensee's SAT-based program has identified this additional 10 CFR 55.43(b)(5) knowledge as an RO job requirement. Consequently, questions that test knowledge and abilities per 10 CFR 55.43(b) can be considered "SRO-level" per Section D.2.d of ES-401 even though the facility licensee's training program requires the same level of knowledge for its ROs.

401.37 - ES-401 does not address using a K/A that references 10 CFR 55.43 for testing on the RO written examination; is that acceptable?

Yes, it is. 10 CFR 55.41(a) states that "the knowledge, skills, and abilities [to be tested on the RO written examination] will be identified, in part, from learning objectives derived from a systematic analysis of licensed operator duties performed by each facility licensee and contained in its training program." Although ES-401 does not specifically address using a K/A linked to 10 CFR 55.43 to develop an RO written examination question, it does allow the facility licensee to use plant-specific priorities (and a site-specific task list) to justify using an otherwise unimportant K/A for questioning. Therefore, questions associated with topics in 10 CFR 55.43(b) should be acceptable for the RO examination if they are supported by documented RO learning objectives derived from the RO job task analysis at the site.

401.43 - Can 25 questions from the previous 2 NRC exams be used if randomly generated without modification?

Yes. However, in accordance with Section D.1.b of ES-401 (in [NUREG-1021](#)), the specific K/A statements (e.g., K1.03 or A2.11) for the examination outline must be selected in a truly random fashion (as verified by the NRC chief examiner) and the questions selected to implement the outline must clearly match the intent of the selected K/A statements (which will be verified on a sampling basis by the NRC chief examiner).

Given the number of K/A statements in the testable population, the NRC staff believes that it is extremely unlikely that a random selection process would result in that many duplicate questions. Per Item 4 on Form ES-401-6, the NRC will review the facility licensee's sampling process to ensure that it was random and systematic if more than 4 RO and 2 SRO-only questions are repeated from the last two NRC licensing exams.

401.54 - According to ES-401, Attachment 2[1], for writing SRO level Tech Spec questions, one screening criteria is to determine if the question can be answered solely by knowing the 'above the line' information. RO candidates are required to know the LCO statement and the Modes of applicability. Is RO knowledge limited specifically to these words in the LCO statement, or is knowing

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 ACCUMULATORS

LCO 3.5.1 Four ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with pressurizer pressure > 1000 psig.

ACTIONS

D.	Two or more accumulators inoperable.	D.1	Enter LCO 3.0.3.	Immediately
----	--------------------------------------	-----	------------------	-------------

For the TS 5.3.1 example above, a RO applicant would be expected to possess knowledge and understanding of the “Above this line” information but would **generally** not be expected to have knowledge of the TS LCO B 3.5.1 system/component parametric values and/or conditions necessary to determine Accumulator System OPERABILITY.

However, ACTION D for “Two or more accumulators inoperable” as shown below requires that LCO 3.0.3 be entered “**Immediately.**” Therefore, in this instance and notwithstanding that the information is provided in the LCO B 3.5.1 Bases, a RO **would** be expected to understand that for an accumulator to be considered OPERABLE, the isolation valve must be fully open, power removed above 1000 psig, and the TS Surveillance limits for accumulator volume, boron concentration, and nitrogen pressure must be met.

Job Performance Measures

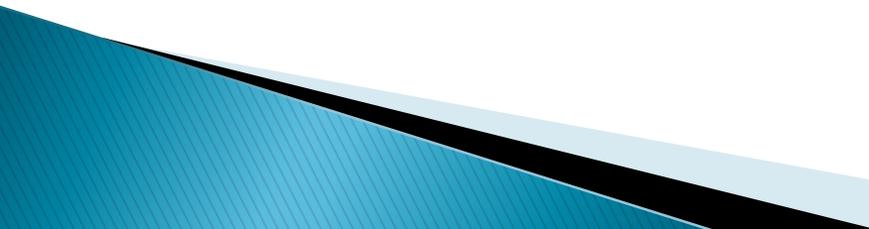
2017 Exam Writers' Workshop

David Lanyi

*"Some people thrive under pressure,
but pressure can also ruin your
performance, it can push you down
angles which you don't want to go" —
Henry Cavill*

- 10 CFR 55.45 – the operating test will require the applicant to demonstrate an understanding and ability to perform the actions necessary to accomplish a representative sample of 13 listed abilities.
 - NUREG-1021, ES-301 divides the operating test into 3 distinct sections.
 1. Administrative Topics
 2. Control Room/In-Plant Systems
 3. Simulator Operating Test
- 

General Guidelines

- Once a JPM has been started, it needs to be completed for everyone taking that JPM before sequestering ends.
 - Operating test items may not duplicate test items from the applicants' audit test.
 - To the extent permitted, select and modify material from your banks.
 - Only use K/As with an Importance Rating ≥ 2.5 unless there is a substantive reason to use one below 2.5.
 - Ensure JPMs and scenarios are chosen to enhance the examiner's ability to differentiate a competent operator from a less-than-competent operator.
 - If the site is for a dual or multi-unit license, ensure the unit differences are examined.
 - Do not overlap material on the written exam.
- 

Other JPM Trivia

Administrative Topics

- Bank JPMs : ≤ 3 for ROs, ≤ 4 for SRO & RO Retakes
- New or Modified JPMs: ≥ 1
- Previous 2 exams: ≤ 1 (selected randomly)

Control Room/In-Plant JPMs

- Alternate Path: 4–6 (RO or SRO-I); 2–3 (SRO-U)
- Bank JPMs: ≤ 9 (RO); ≤ 8 (SRO-I); ≤ 4 (SRO-U)
- Emergency/Abnormal: ≥ 1 (RO); ≥ 1 (SRO-I); ≥ 1 (SRO-U)
- ESF (≥ 1 in Control Room): ≥ 1 (RO); ≥ 1 (SRO-I); ≥ 1 (SRO-U)
- Low Power/ S/D: ≥ 1 (RO); ≥ 1 (SRO-I); ≥ 1 (SRO-U)
- New or Modified: ≥ 2 (RO); ≥ 2 (SRO-I); ≥ 1 (SRO-U)
- Previous 2 exams: ≤ 3 (RO); ≤ 3 (SRO-I); ≤ 2 (SRO-U)
- RCA: ≥ 1 (RO); ≥ 1 (SRO-I); ≥ 1 (SRO-U)

Administrative Topics

- **Conduct of Operations**
1 or 2 for RO; 2 for SRO or RO Retake
 - **Equipment Control**
1 or 0 for RO; 1 for SRO or RO Retakes
 - **Radiation Control**
1 or 0 for RO; 1 for SRO or RO Retakes
 - **Emergency Plan**
1 or 0 for RO; 1 for SRO or RO Retakes
- 

Revision 11 Change

ALL SRO administrative JPMs must be written at the SRO level.

RO applicants only need to understand the mechanics and intent of the related subjects as they relate to tasks at the facility.

Control Room /In-Plant Systems

- Drawn for the Safety Functions listed in the K/A catalogs
- In-Plant
 - 3 for ROs and SRO-Instants
 - 2 or 3 for SRO-Upgrades
- Control Room
 - 8 for ROs
 - 7 for SRO-Instants
 - 3 or 2 for SRO-Upgrades
- All RO and SRO-Instant control room (and in-plant) systems must be different and serve different safety functions
- All SRO-Upgrade systems must serve different safety functions

Job Performance Measure Guidelines

Appendix C, NUREG-1021

- Specify Initial Conditions
 - Identify References and Tools
 - Develop Performance Criteria
 - Develop Examiner Cues
 - Develop a Time Standard
- 

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 walkthrough portion 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
- 

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

- ▶ 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 alternate path.
 - But 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 alternate path.

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 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)
 - Must be objective.
 - 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 & 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.

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-701-9, “LSRO Operating Test Quality Checklist”

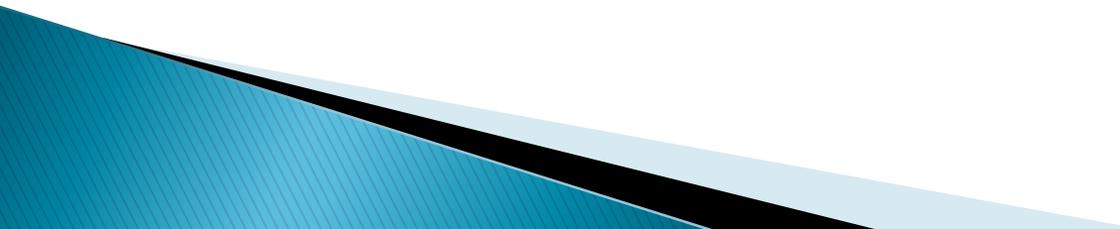
TIME-CRITICAL JPMS

- 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.
- 

CRITICAL STEPS

Critical steps are those steps that when not performed correctly, in the proper sequence, or at the proper time, will prevent the system from functioning properly or preclude successful completion of the task.

(Appendix C B.3)



CRITICAL STEPS

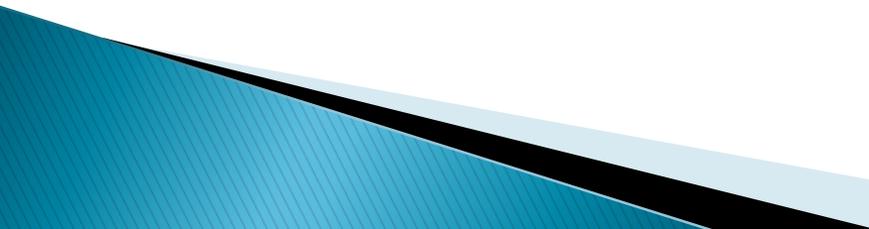
- Should consist of verifiable actions
- However, performance of some JPM steps may be required to meet the task standard, but these steps do not meet the definition of a verifiable action (refer to ES-301, Attachment 2, “Verifiable Action Guidelines,” for information on verifiable actions)
- JPM steps that **are required to meet the task standard**, but are not verifiable actions, must still be designated as critical steps

(NUREG-1021, Appendix C)

CRITICAL STEPS

Example:

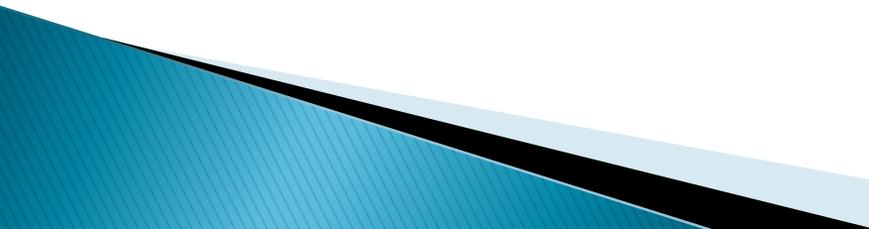
During a control room JPM where a system is being aligned, if a manual valve in the plant must be opened in order for the task to be completed, the phone call to direct a field operator to open the valve **would be** designated a critical step, even though a phone call to have a field operator manipulate a component is *not* a verifiable action.



CRITICAL STEPS

Example:

An in-plant JPM involves aligning a system. If the applicant is required to call the control room to start a pump or open a valve and the actions taken in the control room are necessary to accomplish the overall task standard, the phone call to direct those actions **would be** designated a critical step, even though phone calls are not verifiable actions.



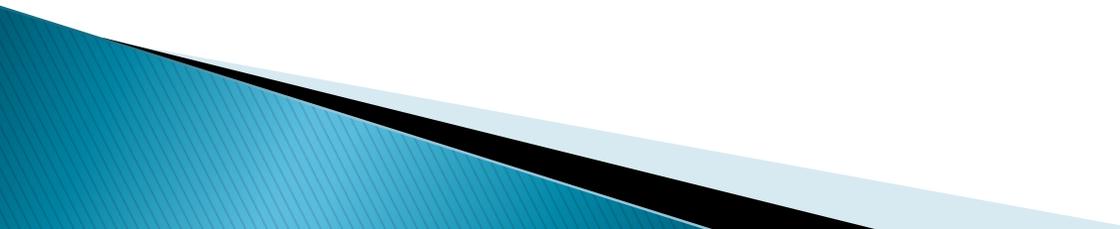
CRITICAL STEPS

Critical steps are those steps that when not performed correctly, in the proper sequence, or at the proper time, will prevent the system from functioning properly or **preclude successful completion of the task.**

Clearly stating the task will allow easier defining of the critical steps.

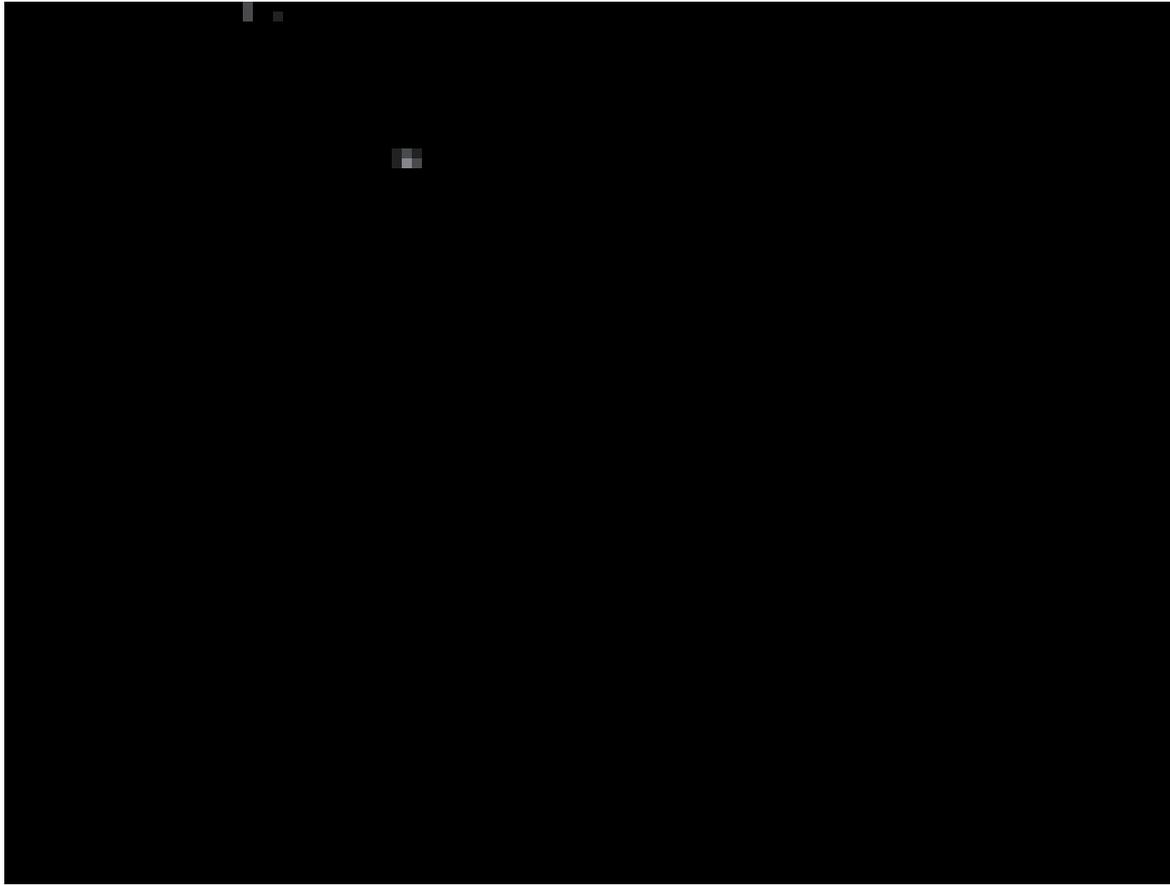
CRITICAL STEPS

Examples

1. JPM with Specific Task Statement
 2. JPM with Open Task Statement
 3. Admin JPM
- 

JPMs

▶ Questions?





jpm a	
CRO-065C	
TITLE: Perform An Emergency Boration	
ACCEPTABLE EVALUATION METHOD: <u> X </u> PERFORM ___ SIMULATE ___ DISCUSS	
EVALUATION LOCATION: <u> X </u> SIMULATOR ___ CONTROL ROOM ___ PLANT	
PROJECTED TIME: <u> 15 MIN </u> SIMULATOR IC NUMBER: <u> IC-211 (Base -73) </u>	
ALTERNATE PATH <u> X </u> TIME CRITICAL ___ PRA	

JPM DIRECTIONS:

1. Examinee will obtain all references from the simulator.
2. The actions of this task are intended to be performed on an Active Simulator in which the examinee may diagnose the correctness of system response to his/her actions and respond to any abnormal conditions which may arise.
3. Provide student with HANDOUT.
4. Allow student time to review control board.
5. Instructor will be provided to address alarms not related to evaluated task.

TASK STANDARD: Upon successful completion of this JPM, the examinee will:

- Perform An Emergency Boration

Examinee:	
Overall JPM Performance:	Satisfactory <input type="checkbox"/> Unsatisfactory <input type="checkbox"/>
Evaluator Comments (attach additional sheets if necessary)	

EXAMINER: _____

Developer		12/6/16
NRC Approval	SEE NUREG 1021 FORM ES-301-3	

EVENT DESCRIPTION	ACTION	DETAILS
Reset into IC-211		
Run Simulator	EXTREME ACE RUN	
Acknowledge computer alarms	SIPC	
Acknowledge Alarms		
Turn Horns ON		
Freeze Simulator	EXTREME ACE FREEZE	

CONDITIONS

When I tell you to begin, you are to **Perform An Emergency Boration**. The conditions under which this task is to be performed are:

- a. Unit 1 is in Mode 3 at normal operating temperature.
- b. CVCS is in operation with 1C charging pump running.
- c. 1A BAT is on service, 1B BAT is in standby.
- d. A Reactor Trip has occurred, and ESP-0.1, Reactor Trip Response, is in progress.
- e. A pre-job brief is NOT required.

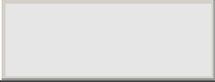
Your task is to initiate an emergency boration in accordance with ESP-0.1 beginning at step 4.

INITIATING CUE: "You may begin."

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
START TIME		
Candidate will evaluate step 4 and determine there is one stuck rod. The RNO steps are below.		
1. 4.1 RNO Start 1A or 1B boric acid transfer pump.	1A or 1B BAT Pump hand switch taken to start and observes pump breaker indicator lights LIT.	S / U
<p>NOTE:</p> <ul style="list-style-type: none"> • NO flow will be observed after opening MOV8104 due to a clogged Boric Acid filter. It is likely that the candidate may perform a variety of the following actions after completing element 2: <ul style="list-style-type: none"> - Start a second BAT Pump (Repeat of element 1). - Evaluate that the normal emergency flow path is NOT available and perform RNO step 4.2.2, align manual emergency boration flowpath (Element 3). - Continue with or without noticing the inability to obtain boric acid flow through FI-110. (Element 4) - May use AOP-27.0 guidance (STEP 2-NOTE: and align flow through FCV113A&B to attempt to establish a flow path), the actions of AOP-27 are consistent with these elements. • The Radside SO may be dispatched to investigate pumps, valves, local flow indicators or pressures. If so, the reports will be consistent with fully functional pumps with elevated discharge pressures; NO flow indicated locally on FI-110A. If Boric Acid filter DP directed to be checked, then inform the Control room that the D/P is 35 psid. 		
2. 4.2.1 RNO Align normal emergency boration flow path.	Open EMERG BORATE TO CHG PUMP SUCT MOV8104. Observes MOV8104 RED light is LIT.	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
3. 4.2.2 RNO IF determined that Normal emergency flowpath is NOT available then align manual emergency boration flowpath. - Directs Radside SO to open V185	Uses Gaitronics to contact Radside SO. Directs Opening of V185 per RNO step 4.2.2 of ESP-0.1. CUE from Booth operator: Radside SO acknowledges  irf loa-cvc033 1 10 AFTER valve is open: CUE from Booth operator: Time compression ahead - V185 is open.	S / U S / U
- OPENS FCV113A (may also open FCV113B while waiting on local actions per AOP-27)	OPENS FCV-113A and Observes FCV113A RED light is lit	
<p>NOTE:</p> <ul style="list-style-type: none"> Although not directed by this procedure, the candidate might raise Charging flow, and place PK-145 in manual at 50% demand prior to opening a letdown orifice isolation, to prevent Letdown pressure surges and temperature alarms (per operating procedure for letdown). ARP-1.4 DE1, which will come into alarm if the actions above are not taken, and would direct the adjustment of charging flow, if addressed. DE3 will also alarm but the ARP doesn't give the same guidance as DE1. 		
4. 4.3.1 RNO Verify 45 gpm letdown orifice in service.	OPEN LTDN ORIF ISO 45 GPM HV8149A. Observes HV8149A RED light is LIT.	S / U
OR 5. 4.3.2 RNO Verify 60 gpm letdown orifice in service.	OPEN LTDN ORIF ISO 60 GPM HV8149B or C. Observes HV8149B or C RED light is LIT.	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
6. 4.4.1 RNO Verify charging flow greater than 40 gpm.	Adjust charging flow to greater than 40 gpm by manually opening FCV-122. Observes FI-122A reads >40 gpm.	S / U
7. 4.4.2/3/4 RNO) Check emergency or manual emergency boration flow greater than 30 gpm.	Check emergency & manual boration flow greater than 30 gpm. Observes FI-110 and/or FI-113 indicate <30 gpm. Then goes to Attachment 1. IF REQUESTED, CUE from Booth operator: RADSIDE SO reports FI-110A indicates ≤ 10 gpm.	S / U
<p>NOTE:</p> <ul style="list-style-type: none"> Examinee will determine Boration flow not adequate and commence verifying Boration flow path per Attachment 1. Element 8 has two potential flowpaths dependent upon the actions taken above and the determination made by the candidate regarding the “aligned” flowpath. IF RNO column implemented, then element 8a will apply. 		
8. ATT 1 - 1 Verify 1C CHG PUMP header valves open.	Observes CHG PUMP DISCH HDR ISO MOV 8132A, 8132B, 8133A & 8133B RED lights are lit.	S / U
8a ATT 1 – 1 (RNO) Verify 1C CHG PUMP header valves open.	Observes CHG PUMP SUCTION HDR ISO MOV 8130A, 8130B, 8130C AND CHG PUMP DISCH HDR ISO MOV 8132A, 8132B, 8133A & 8133B RED lights are lit	S / U

EVALUATION CHECKLIST

ELEMENTS:	STANDARDS:	RESULTS: (CIRCLE)
9. ATT 1 - 2 Check boration flow adequate.	Determine that NO boration flow from any boration flow path is available. Observes FI-110 and FI-113 indicates ≤ 10 gpm. IF REQUESTED, CUE from Booth operator:RADSIDE SO reports FI-110A indicates ≤ 10 gpm.	S / U
* 10. ATT 1 - 2 RNO Align charging pump suction to RWST.	Open RWST TO CHG PMP valves LCV115B & D, Close VCT OUTLET ISO LCV115C & E. Observes LCV115B & D red lights are LIT, LCV115C & E GREEN lights are LIT.	S / U
11. ATT 1 - 3.1 Verify charging pump discharge flow path – ALIGNED.	Verify CHG PUMPS TO REGEN HX MOV8107 & MOV8108 open. Observes MOV8107 & 8108 RED lights are LIT.	S / U
12. ATT 1 - 3.2 Verify only one charging line valve – OPEN.	Verify RCS NORMAL CHG LINE HV8146 OR RCS ALT CHG LINE HV8147 OPEN. Observes Q1E21HV8146 RED light is LIT.	S / U

NOTE: Element 13 is critical; Although the necessary adjustments may have been performed as early as Element 4 (while placing letdown in service).

* 13. ATT 1 - 3.3 (RNO) Verify charging flow - GREATER THAN 92 gpm.	CHG FLOW FK 122 manually adjusted as necessary. Observes FI-122A indicates >92 gpm.	S / U
--	--	-------

STOP TIME

Terminate when flow rate has been determined/verified adequate.

CRITICAL ELEMENTS: Critical Elements are denoted with an asterisk (*) before the element number.

GENERAL REFERENCES:

1. █████-1-ESP-0.1, Version 35.0
2. Technical Specifications
3. K/As: 024AA2.02 RO-3.9 SRO-4.4
024AA2.01 RO-3.8 SRO-4.1

GENERAL TOOLS AND EQUIPMENT:

1. None

Critical ELEMENT justification:

<u>STEP</u>	<u>Evaluation</u>
1.	Not critical since this course of action will not be successful.
2.	Not critical since this course of action will not be successful.
3.	Aligning manual emergency makeup is an alternative path that could be taken, but is not critical since this course of action will not be successful.
4.	Not critical: Verify 45 gpm letdown orifice in service is not critical since this will be addressed later in the procedure.
5.	Not critical: Verify 60 gpm letdown orifice in service is not critical since this will be addressed later in the procedure.
6.	Not critical since this flow is not sufficient for the required supply. However this is the step at which the required flow is likely to be achieved.
7.	Not critical since this step is a check and improper evaluation alone does not constitute the critical step.
8.	Not critical since these valves are open
9.	Not critical since the BA filter is clogged.
10.	Critical: Align charging pump suction to RWST since these MOVs are closed and this is required to align boration flow to the chg pump suctions.
11.	not critical since these valves are open
12.	not critical since one of these valves is open
13.	Critical: Verify charging flow - GREATER THAN 92 gpm is a critical step since charging flow is low at the beginning and there is no requirement until now to increase flow to > 92 gpm until this step.

COMMENTS:

CONDITIONS

When I tell you to begin, you are to **Perform An Emergency Boration**. The conditions under which this task is to be performed are:

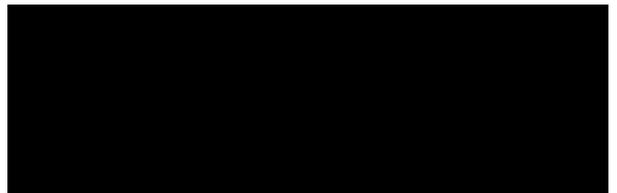
- a. Unit 1 is in Mode 3 at normal operating temperature.
- b. Chemical and Volume Control System is in operation with 1C charging pump running.
- c. 1A BAT is on service, 1B BAT is in standby.
- d. A Reactor Trip has occurred, and ESP-0.1, Reactor Trip Response, is in progress.
- e. A pre-job brief is NOT required.

Your task is to complete the actions of ESP-0.1, beginning at step 4.


**Operations Training
Job Performance Measure (JPM)**

FINAL
CR-SIM 5 (ALL)

Title: Perform a Manual Initiation of Drywell Sprays (Alternate Path)		
Author: 	Media Number: CR-SIM 5 2016-301	Time: 15.0 Minutes
Line Review By (N/A for minor revisions) N/A		Date: N/A
Reviewed by Instructional Technologist or designee (N/A for minor revisions) N/A		Date: N/A
Approved By (Training Program Manager or Lead Instructor) 		Date: 05/30/16



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Line Contributors

The following individuals contributed to the development of this lesson plan.

Ver. No.	List of Contributors

UNIT 1 () UNIT 2 (X)

TASK TITLE: **Perform a Manual Initiation of Drywell Sprays (Alternate Path)**

JPM NUMBER: CR-SIM 5 2016-301

TASK STANDARD: The task shall be completed when the RHR System has been initiated in the Drywell spray mode, per 34SO-E11-010-2 with total RHR flow > 5000gpm but <17,000gpm. Operator is to take action based on Overload protection alarm for the 2A RHR pump by securing the pump.

TASK NUMBER: 007.001

OBJECTIVE NUMBER: 007.001.O

JTA IMPORTANCE RATING:

RO 4.71

SRO 4.05

K/A CATALOG NUMBER: 226001A4.03

K/A CATALOG JTA IMPORTANCE RATING:

RO 3.50

SRO 3.50

OPERATOR APPLICABILITY: Nuclear Plant Operator (NPO)

GENERAL REFERENCES:	Unit 1	Unit 2
	N/A	34SO-E11-010-2 Ver. 42.0 31EO-EOP-012-2 Ver. 6

REQUIRED MATERIALS:	Unit 1	Unit 2
	N/A	34SO-E11-010-2 Ver. 42.0

APPROXIMATE COMPLETION TIME: 15.0 Minutes

SIMULATOR SETUP: Refer to Simulator setup sheet on the following page.

SIMULATOR SETUP

Simulator Initial Conditions:

1. **RESET** the Simulator to **IC # 113 (100%)** or **SNAP 615** and leave in **FREEZE**.
2. **ACTIVATE THE FOLLOWING EVENT TRIGGERS:**

Trigger #	DESCRIPTION	CONDITIONS
EGE11-31	Inserts 2A RHR Pump Overload Alarm	loE11-F021AR2.algToPanel = 1

3. **INSERT** the following **MALFUNCTIONS:**

Activator	MALF #	TITLE	FINAL VALUE	RAMP RATE
ST 0	mfE41_107	HPCI Failure to Start (F001 Stuck)		
ST 0	mfE51_110	RCIC Turbine Trip		
ST 0	mfB21_229B	FW Line B Break Inside Containment (Var)	10	100
ST 0	mfR22_183	4KV Buss 2F Fault	1	
ST 0	mfR43_167B	Diesel Gen Failure to Start 1B	1	

4. **INSERT** the following **REMOTE FUNCTIONS:**

Activator	REM #	Description	Status
ST 0	rfE11_167	2E11-F017A & B Override 5 Min Timer	ORIDE

5. **INSERT** the following **OVERRIDES:**

Activator	TAG #	S/M/L	DESCRIPTION	Final Value	Ramp Rate	Delay
ST-0	diE11-F028B	S	Torus Spray OR Test Vlv	CLOSE		0
ST-0	diE11-F027A	S	Torus Spray Vlv	CLOSE		0

6. Take the Simulator **OUT OF FREEZE** and **PERFORM** the following **MANIPULATIONS**:

- A. Perform first five (5) Steps of RC-1.
- B. Close 2N21-F006B. Allow the valve to go FULL CLOSE.
- C. Perform actions of RC-2 to stabilize RWL around 9 inches.
- D. Place RHR pump 2B in OFF.
- E. Trip Recirculation Pumps 2A and 2B place in PTL.
- F. Secure all Drywell cooling fans.
- G. Allow Simulator to run approximately 10 min to stabilize conditions.
- H. Acknowledge all Annunciators.

7. **PLACE DANGER TAGS** on the following equipment:

MPL #	COMPONENT	TAGGED POSITION
	NONE	

8. **PLACE** Protected Equipment tags on the following: **NONE**

9. **PLACE** the Simulator in **FREEZE** until the INITIATING CUE is given.

10. **ESTIMATED** Simulator **SETUP TIME**: 30 **Minutes**

EVALUATOR COPY

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

1. Torus pressure is greater than 11 psig.
31EO-EOP-012-2, PC Primary Containment Control is in progress.
2. 2E11-F027A, Torus Spray Valve, is bound closed and cannot be opened.
3. Drywell pressure and temperature are within the SAFE region of the Drywell Spray Initiation Limit Curve. (GRAPH 8).
4. Pre-Job Brief is NOT required.

INITIATING CUES:

Initiate Drywell sprays using the RHR Loop 2A per 34SO-E11-010-2.

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
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For **INITIAL** Operator Programs:
For OJT/OJE; ALL PROCEDURE STEPS must be completed for Satisfactory Performance.
For License Examinations; ALL CRITICAL STEPS must be completed for Satisfactory Performance.

	IF	THEN
PASS	<input type="checkbox"/> Human performance tools, safety, PPE met (1), AND <input type="checkbox"/> For initial trg all steps completed correctly OR <input type="checkbox"/> For continuing trg, critical steps (if used) completed correctly	<input type="checkbox"/> Mark the JPM as a PASS
FAIL	<input type="checkbox"/> Above standards not met	<input type="checkbox"/> Mark the JPM as a FAIL

(1) The standard for human performance tools, safety, PPE, and other pertinent expectations is considered met provided any deviations are minor and have little or no actual or potential consequence. Errors may be self-corrected provided the action would not have resulted in significant actual or potential consequences.

START TIME: _____

NOTE: This JPM is set up for the Operator to use the CONTAINMENT SPRAY INITIATION PLACARD.

1.	IF RWL <2/3 core height, (-193 inches), PLACE the Cnmt Spray Vlv Cntl 2/3 Core Ht Permis keylock in MANUAL OVERRD. Step 1	Operator VERIFIES that RWL is >-193" and this step is not applicable.	
**2.	IF required by EOPs AND LOCA signal present, PLACE Cnmt Spray Vlv Cntl switch in the MANUAL position. Step 2	At panel 2H11-P601, the Operator PLACES the CONTAINMENT SPRAY VALVE CONTROL switch to MANUAL, white light illuminated for 2A Loop RHR.	
3.	Confirm CLOSED 2E11-F015A and/or 2E11-F017A, unless required for core cooling. Step 3	At panel 2H11-P601, CONFIRM Closed 2E11-F015A and/or 2E11-F017A.	

(Indicates critical step)**

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
4.	IF power is being provided by EDG, CHECK EDG loading prior to start of RHR pump(s). Step 4	Operator VERIFIES that EDGs are not providing power to emergency buses.	
5.	START RHR pump(s) in loop A. Step 5	At panel 2H11-P601, Operator VERIFIES the 2A RHR pump is RUNNING, red light illuminated.	
6.	IF TORUS Spray is desired, PERFORM the following: Step 6	Operator DETERMINES that Torus Sprays are in service on 2B Loop of RHR remainder of step 6 is NOT required.	
**7.	IF DRYWELL Spray is desired, PERFORM the following: OPEN Containment Spray Valve 2E11-F021A. Step 7.1	At panel 2H11-P601, the Operator OPENS 2E11-F021A CNMT SPRAY INBD VLV.	

ALTERNATE PATH STARTS HERE

(When 2E11-F021A goes intermediate (>50% Open),

2A RHR pump indicates an overload condition but the pump fails to trip).

8.	Operator identifies annunciator RHR Pump A OVLD/LOCKOUT Relay Trip is alarming.	Operator IDENTIFIES annunciator, RHR Pump A OVLD/LOCKOUT Relay Trip (601-212), is alarming.	
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NOTE: The Operator may refer to the Annunciator Response Procedure (ARP) 34AR-601-212-2 "RHR PUMP A OVLD/LOCKOUT RELAY TRIP" only step 5.1 is required action.

**9.	IF 2E11-C002A, RHR Pump A has NOT tripped, TRIP 2E11-C002A, panel 2H11-P601, ARP – Step 5.1	Operator TRIPS 2A RHR pump (2E11-C002A) at Panel 2H11-P601.	
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PROMPT: IF Operator asks, **INFORM** the Operator that Maintenance will investigate the problem with 2A RHR Pump.

PROMPT: IF Operator asks, **INFORM** the Operator to Spray the Drywell.

(** Indicates critical step)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
10.	IF RWL <2/3 core height, (-193 inches), PLACE the Cnmt Spray Vlv Cntl 2/3 Core Ht Permis keylock in MANUAL OVERRD. Step 1	Operator VERIFIES that RWL is >-193" and this step is not applicable.	
**11.	IF required by EOPs AND LOCA signal present, PLACE Cnmt Spray Vlv Cntl switch in the MANUAL position. Step 2	At panel 2H11-P601, the Operator PLACES the CONTAINMENT SPRAY VALVE CONTROL switch to MANUAL, white light illuminated for 2B Loop RHR.	
12.	Confirm CLOSED 2E11-F015B and/or 2E11-F017B, unless required for core cooling. Step 3	At panel 2H11-P601, the Operator CONFIRMS Closed 2E11-F015B and/or 2E11-F017B.	
13.	IF power is being provided by EDG, CHECK EDG loading prior to start of RHR pump(s). Step 4	Operator VERIFIES that EDGs are not providing power to emergency buses.	
14.	START RHR pump(s) in Loop B. Step 5	At panel 2H11-P601, Operator VERIFIES the 2B RHR pump is RUNNING, red light illuminated	
15.	IF TORUS Spray is desired, PERFORM the following: Step 6	Operator DETERMINES that Torus Sprays cannot be placed in service on 2B Loop of RHR so remainder of Step 6 is not required.	
**16.	IF DRYWELL Spray is desired, PERFORM the following: OPEN 2E11-F021B Step 7.1	At panel 2H11-P601, the Operator OPENS 2E11-F021B CNMT SPRAY INBD VLV.	

NOTE: To achieve the proper spray pattern from the nozzles, a Minimum Drywell Spray flow of at least **5,000** gpm is required.

**17.	THROTTLE OPEN 2E11-F016B Step 7.2	The Operator THROTTLES OPEN 2E11-F016B, CNMT SPRAY OUTBD VLV.	
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(** Indicates critical step)

STEP #	PERFORMANCE STEP	STANDARD	SAT/UNSAT (COMMENTS)
**18.	Operator establishes RHR Total flow to provide adequate drywell spray flow.	The Operator ESTABLISHES Total RHR Flow of >5000 gpm.	
19.	Operator verifies proper response.	The Operator OBSERVES drop in Drywell pressure.	
20.	Refer to 34SO-E11-010-2, AND place RHR Hx into service. Step 8	Operator REFERS to 34SO-E11-010-2	

PROMPT: **IF** Operator proceeds to place RHR HX into service, **INFORM** the Operator another Operator will perform those actions.

**END
TIME:** _____

NOTE: The terminating cue shall be given to the operator when any of the following conditions are met:

- Operator completes step 20 of this JPM.
- With no reasonable progress, the operator exceeds double the allotted time.
- Operator states the task is complete.

TERMINATING CUE: We will stop here.

Summary of JPM Attributes

JPM CR-SIM 5 2016-301:

SUMMARY OF JPM QUANTITATIVE ATTRIBUTES

<u>CATEGORY</u>	<u>Minimum NRC Attributes</u>	<u>JPM CONTENT</u>
<u>Total Critical Steps</u>	At least 2	5
Step 9 Operator TRIPS 2A RHR pump		Action required protecting equipment from potential fire.
Step 11 PLACES switch to MANUAL		Action required for opening drywell spray valves
Step 16 OPENS 2E11-F021B		Required to initiate drywell sprays.
Step 17 THROTTLES OPEN 2E11-F016B		Required to establish drywell sprays.
Step 18 ESTABLISHES Total RHR Flow		Minimum flow is >5000gpm for drywell sprays.
<u>Number of JPM Steps</u>	<30	20
<u>Time to Perform JPM</u>	<45 min	10 min
<u>Normal / Faulted / Alternate Path</u>		
Alternate		While drywell sprays are being aligned in the 2A Loop of RHR the 2A RHR pump receives an overload condition but does not trip. This requires the operator to trip the 2A RHR pump and establish drywell sprays in the 2B Loop of RHR.
<u>Setting (administered)</u>		
Simulator		
<u>Is LOD "1" or "5"</u>	NO	NO

UNIT 2

READ TO THE OPERATOR

INITIAL CONDITIONS:

- 1.** Torus pressure is greater than 11 psig.
31EO-EOP-012-2, PC Primary Containment Control is in progress.
- 2.** 2E11-F027A, Torus Spray Valve, is bound closed and cannot be opened.
- 3.** Drywell pressure and temperature are within the SAFE region of the Drywell Spray Initiation Limit Curve. (GRAPH 8).
- 4.** Pre-Job Brief is NOT required.

INITIATING CUES:

Initiate Drywell sprays using the RHR Loop 2A per 34SO-E11-010-2.

NRC RO Admin Job Performance Measure “c”

Facility: [REDACTED]

Task No: [REDACTED]

Task Title: Perform Power Level Monitoring with IPC Calorimetric, UQ1118, Non-Functional

JPM No: [REDACTED]

K/A Reference: G2.2.38 RO 3.6

Examinee: _____

NRC Examiner: _____

Facility Evaluator: _____

Date: _____

Method of testing:

Simulated Performance _____

Actual Performance _____

Classroom _____

Simulator _____

Plant _____

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions: Unit 1 is in Mode 1.

IPC Calorimetric, UQ1118, is NOT functional based on an Engineering determination 1.5 hours ago.

Reduced power limitation of TR 13.3.7, “Ultrasonic Mode Calorimetric,” is in effect.

Control room instruments indicate the following:

<i>CURRENT INDICATIONS</i>	
QMCB LOOP 1 ΔT (1TDI-411A)	98.0%
QMCB LOOP 2 ΔT (1TDI-421A)	98.5%
QMCB LOOP 3 ΔT (1TDI-431A)	98.6%
QMCB LOOP 4 ΔT (1TDI-441A)	97.3%
NIS DRAWER PR N41	98.6%
NIS DRAWER PR N42	98.7%
NIS DRAWER PR N43	98.5%
NIS DRAWER PR N44	98.6%
QMCB PR N41 (from NR-45)	98.4%
QMCB PR N42 (from NR-45)	99.1%
QMCB PR N43 (from NR-45)	99.0%
QMCB PR N44 (from NR-45)	97.9%

Initiating Cue: With UQ1118 non-functional, the Shift Supervisor has directed you to initiate power level monitoring by performing 12004-C, “Power Operation (Mode 1),” Section 4.3.3.3.

Task Standard: Applicant performs power level monitoring using 12004-C, "Power Operation (Mode 1)," and 14915-1, "Special Conditions Surveillance Logs," determines that the average hourly reactor power exceeds the TR 13.3.7 reduced power limit, and initiates eight hour average reactor power monitoring.

Required Materials: 14915-1, "Special Conditions Surveillance Logs" (rev. 50)
12004-C, "Power Operation (Mode 1)" (rev. 117.1)
TR 13.3.7, "Ultrasonic Mode Calorimetric"
Red pens
Calculator

General References: None

Time Critical Task: No

Validation Time: 15 minutes

Performance Information

Critical steps denoted with an asterisk and bolded.

START TIME: _____

12004-C, "Power Operation (Mode 1)"

JPM 1. 4.3.3.3 Operation With UQ1118 Non-Functional

NOTE

While operating at reduced power per TR 13.3.7, maximum allowed power level is 98.3% (3565 MWt) or 98.2% (3562 MWt if excess letdown is in service). Reference 14915-1, "Special Conditions Surveillance Logs," Data Sheet 11.

- a. Monitor Delta-T and Power Range Nuclear Instruments to verify the highest average (Delta-T or NIS) is less than or equal to 100.0%.
- b. Record hourly values of Reactor Power from RCS Delta-T and Power Range Nuclear Instruments per 14915-1, "Special Conditions Surveillance Logs," Data Sheet 11, "Power Level Monitoring, Section 2."

Standard: Applicant determines from NOTE that 98.3% (3565 MWt) is the maximum allowed power level and selects 14915-1, Data Sheet 11, to record Delta-T and Power Range NI values.

Comment:

14915-1, "Special Conditions Surveillance Logs"

***JPM 2. Record Delta-T readings and determine Delta-T average power level.**

DATA SHEET 11 (Sheet 3 of 4)

SECTION 2

NOTES

- Both **Delta-T** and NIS readings must be recorded.
- Round % power from Delta-T to the nearest 0.1%.
- **DELTA-T AVG is obtained from** Plant Computer Point UV0485 or **the average of the readings from the RCS Delta-T meters on the Main Control Board.** If the computer point is utilized, then mark 1TDI-411A through 1TDI-441A blanks N/A.
- If either DELTA-T AVG or NIS AVG exceeds 100.0%, then initiate Section 1. Transcribe the highest hourly average value to Section 1.

DATE current date

TIME	1TDI-411A (%)	1TDI-421A (%)	1TDI-431A (%)	1TDI-441A (%)	DELTA-T AVG (%)
Current time	98.0	98.5	98.6	97.3	98.1

Standard: Applicant records control board Delta-T readings and determines the average is 98.1% [no range since recording to nearest 0.1% is required].

Comment:

***JPM 3. Record NIS readings and determine NIS average power level.**

DATA SHEET 11 (Sheet 4 of 4)

SECTION 2

NOTES

- Both Delta-T and **NIS readings must be recorded.**
- Round % power from NIS to the nearest 0.1%.
- **NIS AVG is obtained from** Plant Computer Point UV0049 **or the average of the readings from the NIS drawers or NR-45 recorder.** If the Computer Point is used, then mark N41 through N44 blanks NA.
- If either DELTA-T AVG or NIS AVG exceeds 100.0%, then initiate Section 1. Transcribe the highest hourly average value to Section 1.

DATE current date

TIME	N41 (%)	N42 (%)	N43 (%)	N44 (%)	NIS AVG (%)
Current time (<i>NIS drawers</i>)	98.6	98.7	98.5	98.6	98.6
Current time (<i>NR-45</i>)	98.4	99.1	99.0	97.9	98.6

NOTE TO EXAMINER: Applicant may enter both NIS drawer values and NR-45 recorder values on the table for comparison.

Standard: Applicant records the NR-45 control board and/or NIS drawer readings and determines the average is 98.6% [no range since recording to nearest 0.1% is required].

Comment:

JPM 4. 4.3.3.3 Operation With UQ1118 Non-Functional

- c. If the hourly average reactor power is greater than 100.0% per Step 4.3.3.3b, then calculate the eight hour average reactor power per 14915-1, "Special Conditions Surveillance Logs," Data Sheet 11, "Eight-Hour Average Reactor Power Calculation," and evaluate the overpower to determine if any reportability requirements exist.

Standard: Applicant determines that Data Sheet 11, Section 1, is required based on the results of Data Sheet 11, Section 2, or Step 4.3.3.3.c.

Comment:

***JPM 5. Record highest hourly average power and initiate Section 1 for eight-hour average power calculation.**

DATA SHEET 11 (Page 2 of 4)

SECTION 1

NOTES

- **The initial value is at the time when power first exceeded 100.0% (3625.6 MWt or 3565 MWt if at reduced power level).**
- Use 3622.6 MWt (or 3562 MWt if at reduced power level) if excess letdown is in service. The subsequent 7 values represent the next 7 hours.
- Use UQ1129 if available.
- **Use highest hourly average from Section 2 if UQ1129 is not available.**
- Mark the unused column N/A.
- Round MWt to the nearest whole megawatt. Round % power to the nearest 0.1%.

Date current date

Excess Letdown in service (circle one) Yes **No**

TIME	REACTOR POWER (MWt) UQ1129	REACTOR POWER (%) SECTION 2
Current time	N/A	98.6
AVG POWER		

Completed By: name / date / time

SS Review: / /
 Initial Date Time

CUE: “An extra operator will record future power levels.”

NOTE TO EXAMINER: The “Completed By” line may not be filed in by the applicant since the data sheet is not complete. This is acceptable.

Standard: Applicant determines that the current average reactor power exceeds the maximum allowed power level of 3565 MWt (98.3%) and initiates Section 1 of Data Sheet 11 for eight-hour average power calculations.

Comment:

STOP TIME: _____

Terminating cue: Applicant returns initiating cue sheet.

KEY (DO NOT PROVIDE TO APPLICANTS)

SECTION 2, Sheet 3 of 4

TIME	1TDI-411A (%)	1TDI-421A (%)	1TDI-431A (%)	1TDI-441A (%)	DELTA-T AVG (%)
Current time	98.0	98.5	98.6	97.3	98.1

SECTION 2, Sheet 4 of 4

TIME	N41 (%)	N42 (%)	N43 (%)	N44 (%)	NIS AVG (%)
Current time <i>(NIS drawers)</i>	98.6	98.7	98.5	98.6	98.6
Current time <i>(NR-45)</i>	98.4	99.1	99.0	97.9	98.6

SECTION 1, Sheet 2 of 4

TIME	REACTOR POWER (MWt) UQ1129	REACTOR POWER (%) SECTION 2
Current time	N/A	98.6
AVG POWER		

Verification of Completion

Job Performance Measure No. [REDACTED]

Examinee's Name:

Examiner's Name:

Date Performed:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

Response: _____

Result: Satisfactory / Unsatisfactory

Examiner's signature and date: _____

Initial Conditions: Unit 1 is in Mode 1.

IPC Calorimetric, UQ1118, is NOT functional based on an Engineering determination 1.5 hours ago.

Reduced power limitation of TR 13.3.7, "Ultrasonic Mode Calorimetric," is in effect.

Control room instruments indicate the following:

<i>CURRENT INDICATIONS</i>	
QMCB LOOP 1 ΔT (1TDI-411A)	98.0%
QMCB LOOP 2 ΔT (1TDI-421A)	98.5%
QMCB LOOP 3 ΔT (1TDI-431A)	98.6%
QMCB LOOP 4 ΔT (1TDI-441A)	97.3%
NIS DRAWER PR N41	98.6%
NIS DRAWER PR N42	98.7%
NIS DRAWER PR N43	98.5%
NIS DRAWER PR N44	98.6%
QMCB PR N41 (from NR-45)	98.4%
QMCB PR N42 (from NR-45)	99.1%
QMCB PR N43 (from NR-45)	99.0%
QMCB PR N44 (from NR-45)	97.9%

Initiating Cue: With UQ1118 non-functional, the Shift Supervisor has directed you to initiate power level monitoring by performing 12004-C, "Power Operation (Mode 1)," Section 4.3.3.3.

RII Exam Writer's Workshop

NUREG 1021 - Rev 11 ***SIMULATOR*** ***OPERATING*** ***TEST***

Mark Bates

Senior Operations Engineer

Operations Branch 1

Division of Reactor Safety

US NRC Region II

404-997-4612

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NUREG 1021 - Rev 11

- Purpose:
 - Discuss changes with development, administration, and grading of initial license exam – simulator operating test.



NUREG 1021 - Rev 11

ES-201

Form ES-201-1 Exam Prep Checklist

- Timeline Changes
 - Operating Test Outlines will now have a target date of -150 days, vs. -90 days.
 - Draft/proposed examinations will now have a target date of -75 days, vs. -60 days.
 - Final operating test approved by NRC supervisor now has a target date of -7 days, vs. -14 days.



NUREG 1021 - Rev 11

ES-201

Form ES-201-2 Outline Quality Checklist

- Item 2.c: added item to check conformance with ES-301, Section D.5, “Specific Instructions for the Simulator Test.”



NUREG 1021 - Rev 11

ES-301

Section D.5.b

- To maintain test integrity, every scenario **shall** be new or significantly modified to ensure that the applicant has not had the opportunity to rehearse or practice the scenario. A significant modification means that, for each scenario, at **least two events have not been used on the previous two NRC initial licensing operating exams.** Because of a limited number of methods for adding reactivity, reactivity manipulation events are exempt from this overlap limit.



NUREG 1021 - Rev 11

ES-301

Section D.5.d

- ... chief examiners and exam writers should carefully assign applicant teams to each scenario set so that, whenever possible, the applicants are evaluated on a similar number of pre-identified critical tasks.



NUREG 1021 - Rev 11

ES-301

Section E.1

- Facility Licensee Management Review: the requirements are mostly unchanged; however, Rev 11 states that the person doing this review shall be familiar with both exam content and NUREG requirements.



NUREG 1021 - Rev 11

ES-301

Form ES-301-4 Scenario Quality CL

- Additional Item (Item 13): Applicants are evaluated on a similar number of pre-identified critical tasks across scenarios, when possible.
- Target Quantitative Attributes Item 6: Changed from “EOP based critical tasks (2-3)” to “Pre-identified critical tasks (≥ 2)”



NUREG 1021 - Rev 11

ES-301

Form ES-301-5 Transient & Event CL

- Item 4 (bottom of page) changed:
 - from “For licensees that use the ATC operator primarily for monitoring...SRO-I may be placed in the BOP position or ATC position, whichever one allows for better evaluation.
 - To “For new reactor facility licensees....”

[Placing SRO-I as BOP (and not ATC) can only be done for AP-1000 currently.]



NUREG 1021 - Rev 11

ES-301

Form ES-301-7 Op Test Review Worksheet

- New worksheet to be used by the chief examiner to facilitate review
 - Items reflect criteria located throughout ES-301.



NUREG 1021 - Rev 11

ES-302

Administering Op Test

- Section D.1.f: For exam efficiency or to minimize surrogates, it may be acceptable for an examiner, other than the examiner of record, to administer one of the scheduled scenarios if: (1) it is the N+1 scenario, (2) examiner of record is present, & (3) HQ approved.



NUREG 1021 - Rev 11

ES-302

Administering Op Test

- Section D.1.i: NRC CE should ensure the facility develops an efficient schedule.
- Audio/Video Recording: licensees (if they choose to record) are responsible for all laws associated with audio and video recording.
- Applicants who fail will be given a chance to view video (NRC required to be notified).



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

- Terminology: “performance deficiency” (PD) replaces “error”. (D.1.d)
- Performance deficiencies will be assigned to no more than two rating factors. (D.1.d)



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

- Revised Grading Scale
 - Rev 10 used a “1-3” grading scale
 - Rev 11 uses a “0-3” grading scale (except for Communications)



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

- Revised Grading Scale (Non-Comms RFs)
 - 0 PDs = RF score of 3
 - 1 PD = RF score of 2
 - 2 PDs = RF score of 1
 - 3 PDs = RF score of 0



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

- Revised Grading Scale (Communications RF)
 - 0 PDs = RF score of 3
 - 1 PD = RF score of 3
 - 2 PDs = RF score of 2
 - 3 PDs = RF score of 2
 - ≥ 4 PDs = RF score of 1



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

- Critical Task (CT) Grading
 - CT PD related to Comms = RF score of 1
 - CT PD related to Non-Comms = RF score of 0



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

- Tech Spec Evaluation (D.1.d)
 - 3 Rating Factors (RFs): Recognize, Locate & Comply
 - Every missed Tech Spec Entry represents a PD
 - Tech Spec errors will not be carried forward unless post-scenario questioning substantiates performance deficiencies in subsequent RFs



NUREG 1021 - Rev 11

ES-303

Documenting & Grading Initial Op Tests

6. Tech Spec Rating Factors

- A. Recognize Recognize when I/C were inoperable or when conditions were covered by TS.
- B. Locate Locate the appropriate TS for the I/C or conditions.
- C. Comply Correctly interpret and comply with TS action statements.



NUREG 1021 - Rev 11

App. D

Simulator Testing Guidelines

- PDs made for a CT, but corrected by another crew member
 - Applicant making the PD will be held accountable for the consequences as if the action or inaction was not corrected.
- Other changes within App. D reflect previously discussed items in this presentation.



NUREG 1021 - Rev 11

QUESTIONS?



**Administrative Changes
NUREG-1021, Revision 11
and
Proposed Revisions to NRC Forms
396/398**

Dan Bacon, Senior Operations Engineer
R-II/DRS/Operations Branch 2

Objectives

Discuss Revision 11 changes to:

- ES-201: Initial Operator Licensing Examination Process
- ES-202: Preparing and Reviewing Operator Licensing Applications
- ES-204: Processing Excusals and Waivers Requested by RO and SRO Applicants

Objectives

Discuss Revision 11 changes to:

- ES-605: License Maintenance, License Renewal Applications, and Requests for Administrative Reviews and Demands for Hearings
- Appendix E: Policies and Guidelines for Taking NRC Examinations

Objectives

Discuss proposed changes to:

- NRC Form 396
- NRC Form 398

ES-201 Highlights

Revises entire exam development schedule
(Form ES-201-1)

- Now starts at day 240 vice day 180
- Adds 6 weeks for exam prep
- Adds 2 weeks to review, address comments, and get exam approved
- Adds item for facility to submit pre-screened K/A's
- Adds date for NRC to provide written exam outline
- Adds date for NRC to provide an NRC-prepared exam to facility
- Adds date for facility to submit preliminary waiver and excusal requests

ES-201 Highlights

- Adds terms for defer, excuse, and waive:
 - Throughout NUREG-1021
 - Definitions in Appendix F

Defer

To postpone completion of a license application requirement(s) until a later date, typically after the applicant passes an initial NRC licensing examination. An applicant's request to defer a requirement(s) is documented as a "deferral" on NRC Form 398. The applicant **shall** complete the deferred item(s) before the NRC issues a license.

Excuse

To excuse a re-applicant from the requirement to complete portions of a re-examination or test in accordance with 10CFR55.35(b). Granting such a release is referred to as an “excusal.”

10 CFR 55.35(b)

An applicant who has passed either the written examination or operating test and failed the other may request in a new application on Form NRC-398 to be excused from re-examination on the portion(s) of the examination or test which the applicant passed. The Commission may in its discretion grant the request, if it determines that sufficient justification is presented.

Waive

To forgo or relinquish a legal requirement that the NRC is legally entitled to enforce. Forgoing such a requirement is documented as a “waiver.” The NRC’s ability to waive examination and test requirements is specified in 10CFR55.47, “Waiver of Examination and Test Requirements.”

10 CFR 55.47

(a) On application, the Commission may waive any or all of the requirements for a written examination and operating test, if it finds that the applicant:

- (1) Has had extensive actual operating experience at a comparable facility, as determined by the Commission, within two years before the date of application;
- (2) Has discharged his/her responsibilities competently and safely and is capable of continuing to do so; and
- (3) Has learned the operating procedures for and is qualified to operate competently and safely the facility designated in the application.

10 CFR 55.47

(b) The Commission may accept as proof of the applicant's past performance a certification of an authorized representative of the facility licensee or of a holder of an authorization by which the applicant was previously employed. The certification must contain a description of the applicant's operating experience, including an approximate number of hours the applicant operated the controls of the facility, duties performed, and the extent of the applicant's responsibility.

10 CFR 55.47

(c) The Commission may accept as proof of the applicant's current qualifications a certification of an authorized representative of the facility licensee or of a holder of an authorization where the applicant's services will be utilized.

Should vs. Shall

- Many “should” statements have been changed to “shall” statements throughout NUREG-1021.
- We will discuss some of these as we cover the various portions of the NUREG.

ES-201 Highlights

- Defines the minimum requirements for maintaining examiner proficiency
 - Full written exam
 - Outlines for JPMs and Scenarios
 - *Does NOT account for qualification requirements of IMC 1245 Appendix C10 (must write at least half of JPM's and scenario guides).
- Adds guidance related to eligibility decisions
 - Decisions made on final, signed applications **ONLY**

ES-201 Highlights

- NRC **shall** provide written exam outlines
 - Licensees can submit pre-screened K/As
 - NRC approves changes to the sample plan
- Facility-developed exams **shall** be submitted to NRC under cover letter for initial submittal
- Facility licensee to submit original bank question if it was changed “in any way”
 - Ensures NRC understands changes to previous questions
 - Not required for only formatting changes (i.e. font, spacing)

ES-201 Highlights

- Licensees **shall** make the simulator available to develop and validate NRC-prepared exams
- Licensees must provide chief examiner with list of simulator deficiencies at prep week and at beginning of operating test
 - Allows chief examiner to determine if scenarios and JPMs are still valid for administration
- Licensee develops schedule, identifying crews and proposing which examiner will evaluate which applicant
 - Chief examiner may revise if necessary with justification
 - Provide at least two weeks notice if revision will change crew assignments

ES-201 Highlights

- Adds opportunity for facility to re-validate exams following NRC review
 - Requested by industry
- Adds requirement to notify program office if use of surrogates is contrary to guidance
 - Ensures program office aware of possible impact to equitable exam administration
- Clarifies that an examiner involved in operating test or excusal denial cannot participate in retake
 - Licensing official must also be different for retake
 - Based on LLRT to ensure there is no perception of bias towards the applicant

ES-202 Highlights

- Deletes requirement to request an excusal within one year of previous exam
 - Not supported by regulation
 - Note that ES-204 still has the one year limitation
 - Anything greater than one year must be approved by the program office
- Removes specific references to NRC Forms 396 and 398 block numbers
 - No need to update NUREG-1021 if forms change
- Clarifies which positions get credit for reactivity manipulations
 - Must be at-the-controls or balance-of-plant
 - SROs under instruction in a supervisory role do NOT get credit

ES-202 Highlights

- Adds clarifying guidance related to an applicant/licensee withdrawing from an examination prior to completion
 - Adds sample letters to ES-501
- Specifies information that must be supplied to applicant for a license denial
 - Nature of deficiencies or reasons for denial
 - Applicant's right to demand a hearing within 20 days
- Deletes words that NRC will not accept a re-application if a hearing is in progress
 - Re-application timeline based on date of denial letter and NOT on the status of any hearings in progress

ES-202 Highlights

- Updates RO and SRO eligibility requirements to be consistent with NANT guidelines
- Revises cold license eligibility to clarify that candidates do not need to satisfy experience requirements before entering the training program
- Removes ability for applicant to request an informal review following denial of an application
 - Originally intended for applications denied BEFORE exam administration
 - If application denied based on medical, applicant can submit supplements to the application to address denial reasons, or request a hearing
 - If application denied based on eligibility, applicant can immediately reapply once the deficiencies are addressed, or request a hearing

ES-204 Highlights

- Adds guidance to address excusals
- Regions must notify the program office if an excusal/waiver is being denied
 - Written concurrence from program office is not required
- Adds guidance to address group waivers or deferrals
 - Primarily for new reactors
- Provides examples of justifications for examination waivers
 - Remediation, retesting and retraining performed per facility's SAT program

ES-204 Highlights

- Enhanced guidance on SRO-I receiving an RO license
 - New application required with justification for waiver
 - Must evaluate RO eligibility and performance on SRO simulator exam
 - Ensure applicant passed RO portion of written exam
 - Still requires program office concurrence to issue an RO license

ES-605 Highlights

Adds new section for License Amendments

- Provides examples of changes that do and do not require an amendment request
 - Legal name, address, license level, permanent medical condition, and adding another unit require an amendment request
- Amendment request **must** be signed by the individual with the license
- For medical related amendments, Form 396 is acceptable if signed by license holder
- For all other amendments, e-mail or electronic information exchange is acceptable

ES-605 Highlights

- Clarifies guidance for licensees suspending participation in the Requalification Program
 - Notify region when any licensed operator is suspended from the requalification program and submit a plan for returning the applicant to current status for requalification prior to resuming operator duties
 - Do not amend the license
 - Common examples for suspending requalification added to guidance

ES-605 Highlights

- Clarifies reactivation guidance for the supervisory portion of an SRO license
 - Must include a complete plant tour
 - Must include shift turnovers
- Adds guidance for examining physician to consider “drug interactions and dosages” when assessing prescription drug use
 - Latest version of ANSI/ANS-3.4

ES-605 Highlights

- Clarifies guidance for actions NRC can take for license renewals
 - May ask for further information
 - Either approve renewal or deny application
 - Removes informal review of application denials for eligibility or medical conditions
 - Provides guidance for demanding a hearing

Appendix E Highlights

- Revises written exam guidance to allow 9 hours for full SRO exam
- Clarifies time extensions for taking the written exam only allowed under “uncontrollable” conditions
 - Emergency response, loss of power, building evacuation
 - The applicant is responsible for ensuring his or her physical capability to complete the examination in the allotted time

Appendix E Highlights

- Clarifies that for the operating test, an applicant cannot solicit technical information from “any other person”
- Clarifies that a facility instructor will act as any necessary personnel outside the control room during the simulator scenarios
 - Examiner no longer responsible for this function

NRC Form 396

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.380			
NRC FORM 396 <small>(06/1997)</small> <small>10/29/98, 01/99, 02/99, 03/99, 04/99, 05/99, 06/99, 07/99, 08/99, 09/99, 10/99, 11/99, 12/99</small>		U.S. NUCLEAR REGULATORY COMMISSION <small>APPROVED BY OMB: NO. 3150-0026</small> <small>EXPIRES: (MM/DD/YYYY)</small>	
<p style="text-align: center;">CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE</p>			
<small>Name of Applicant/Operator</small> <input type="text"/>		<small>Applicant/Operator Social Number</small> <input type="text"/>	
<small>Facility Address of Applicant/Operator</small> <input type="text"/>		<small>Facility</small> <input type="text"/>	
		<small>Facility District Number</small> <input type="checkbox"/> 060- <input type="checkbox"/> 062- <input type="text"/>	
A. MEDICAL EXAM INFORMATION			
<p>BASED ON THE RESULTS OF THE PHYSICAL EXAMINATION, INCLUDING INFORMATION FURNISHED BY THE APPLICANT/ OPERATOR, I CERTIFY THAT THE ABOVE NAMED APPLICANT/OPERATOR HAS BEEN FOUND TO MEET THE MEDICAL REQUIREMENTS FOR LICENSED OPERATORS AT THIS FACILITY. I ALSO CERTIFY THAT IN REACHING THIS DETERMINATION, THE GUIDANCE CONTAINED IN THE ANSI STANDARD OR AN APPROVED NRC ALTERNATIVE METHOD WAS FOLLOWED AND THAT DOCUMENTATION IS AVAILABLE FOR REVIEW BY THE NRC.</p>			
<p>GUIDANCE USED:</p> <p> <input type="checkbox"/> ANSISANS 3.4 -- 1983 <input type="checkbox"/> ANSISANS 3.4 -- 2013 <input type="checkbox"/> ANSISANS 15.4 -- 2007 <input type="checkbox"/> Other (Specify below) </p> <p> <input type="checkbox"/> ANSISANS 3.4 -- 1996 <input type="checkbox"/> ANSISANS 15.4 -- 1988 <input type="checkbox"/> ANSISANS 15.4 -- 2016 <input type="text"/> </p>			
<small>Typed or Printed Name of Physician</small> <input type="text"/>	<small>Physician's Certification Date (MM/DD/YYYY)</small> <input type="text"/>	<small>State</small> <input type="text"/>	<small>License Number</small> <input type="text"/>
<p>BASED ON THE RECOMMENDATION OF THE PHYSICIAN, IT IS REQUESTED THAT THE APPLICANT/OPERATOR LICENSE BE CONDITIONED AS FOLLOWS: Check all that apply. PROVIDE EXPLANATION IN BOX BELOW AND ATTACH APPLICABLE SUPPORTING MEDICAL EVIDENCE (letter from the examining physician outlining the condition, treatment and or medication (name, dose, timing & tolerance) and medical examination/ test results (current blood pressure reading, A1C, TSH levels, etc.)</p>			
<input type="checkbox"/> 1. NO RESTRICTIONS			
<input type="checkbox"/> 2. CORRECTIVE LENSES SHALL BE WORN WHEN PERFORMING LICENSED DUTIES			
<input type="checkbox"/> 3. HEARING AID SHALL BE WORN WHEN PERFORMING LICENSED DUTIES. THIS DOES NOT APPLY TO CONDITIONS THAT REQUIRE PROTECTION IN HIGH NOISE AREAS.			
<input type="checkbox"/> 4. SHALL TAKE MEDICATION AS PRESCRIBED TO MAINTAIN MEDICAL QUALIFICATIONS			
<input type="checkbox"/> 5. SHALL USE THERAPEUTIC DEVICE(S) AS PRESCRIBED TO MAINTAIN MEDICAL QUALIFICATIONS			
<input type="checkbox"/> 6. SOLO OPERATION IS NOT AUTHORIZED			
<input type="checkbox"/> 7. SHALL SUBMIT MEDICAL STATUS REPORT EVERY: <input type="checkbox"/> 3 <input type="checkbox"/> 6 <input type="checkbox"/> 12 months, or <input type="checkbox"/> Other <input type="text"/>			
<input type="checkbox"/> 8. SHALL NOT PERFORM LICENSED DUTIES REQUIRING A RESPIRATOR			
<input type="checkbox"/> 9. OTHER RESTRICTIONS OR EXCEPTION			
<input type="checkbox"/> 10. RESTRICTION CHANGE FROM PREVIOUS SUBMITTAL			
<input type="checkbox"/> 11. INFORMATION ONLY			

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.380	
NRC FORM 396 <small>(06/1997)</small>	
CERTIFICATION OF MEDICAL EXAMINATION BY FACILITY LICENSEE (continued)	
<small>Name of Applicant/Operator</small> <input type="text"/>	<small>Social Number</small> <input type="text"/>
<small>Proposed Wording of Restriction (Check # on page 1)</small> <input type="text"/>	
<small>Relationship of Restriction to Disqualifying Condition (Clearly indicate how restriction will correct the disqualifying condition)</small> <input type="text"/>	
<small>Explanation(s)</small> <input type="text"/>	
B. APPLICANT/OPERATOR'S SIGNATURE	
<p>I acknowledge the information in this certification and attachments as they apply to my licensure by the NRC. I authorize my facility to provide this certification and attachments to the NRC to use in the exercise of its authority over my licensure.</p>	
<small>Signature</small> <input type="text"/>	<small>Date</small> <input type="text"/>
C. FACILITY CERTIFICATION	
<p>I CERTIFY UNDER PENALTY OF PERJURY THAT THE INFORMATION IN THIS DOCUMENT AND ATTACHMENTS IS TRUE AND CORRECT.</p>	
<small>Printed Name and Title of Senior Manager and Representative</small> <input type="text"/>	<small>Date</small> <input type="text"/>

NRC Form 396 Overview of Changes

- Added Applicant/Operator mailing address
- Added a check box for selection of 10 CFR Part 50 or Part 52 Facility Docket Numbers
- Added check box under Guidance Used for ANSI/ANS 3.4-2013 and ANSI/ANS 15.4-2016
- Added Physician's Certification date
- Added Applicant/Operator Name and Docket Number on second page
- Added Applicant/Operator Signature and date blocks
- Revised Instructions

NRC Form 398

PERSONALLY IDENTIFIABLE INFORMATION - WITHHOLD UNDER 10 CFR 2.390

NRC FORM 398 <small>(2016 YYYY)</small> <small>10 CFR 55.31, 55.32, 55.33, 55.41, 55.42, and 55.47</small>		 U.S. NUCLEAR REGULATORY COMMISSION PERSONAL QUALIFICATION STATEMENT -- LICENSEE		<small>APPROVED BY OMB NO. 3150-0080</small> <small>EXP. DATE (MM/YYYY)</small> <small>DATE RECEIVED (To be completed by NRC)</small>	
Federal notice or response to court will be mailed within 10 days. NRC makes the information in this form available to the public. If you wish to withhold information, you must file a request with the Office of Information and Regulatory Affairs, 4010 7th St., Washington, DC 20503. To request that we keep an information collection item or its use confidential, see 5 CFR 1.506. An NRC may not collect or publish a person's information if the information is exempt.					
1. Last Name	2. First Name	3. Middle Initial	4. Birth Date (MM/YYYY)	5. Home Address	
6. Address (Number & Street, Box 1)		7. Address (Suite, Unit No., etc., Box 2)		8. City	9. State
10. Zip Code					
11. Type of Application (Check applicable boxes)			12. Deferrals/Excuses/Waivers (Check all that apply and justify in Item 25)		
<input type="checkbox"/> A. NEW <input type="checkbox"/> B. RENEWAL <input type="checkbox"/> C. UPGRADE <input type="checkbox"/> D. MULTIPLE (limited to one additional)		<input type="checkbox"/> K. REAPPLICATION <input type="checkbox"/> 1. FIRST DENIAL <input type="checkbox"/> 2. SECOND DENIAL <input type="checkbox"/> 3. THIRD DENIAL <input type="checkbox"/> 4. WITHDRAWAL		<input type="checkbox"/> a. DISQUALIFIED <input type="checkbox"/> 1. SUSPENSION <input type="checkbox"/> 2. EXPIRATION <input type="checkbox"/> 3. DATA PASSED OFF	
				<input type="checkbox"/> L. RESCIND <input type="checkbox"/> M. WAIVER <input type="checkbox"/> 1. WRITTEN (Category) State <input type="checkbox"/> 2. OPERATOR (Category) <input type="checkbox"/> 3. MEDICAL <input type="checkbox"/> 4. OTHER	
13. Type of License Applied for: <input type="checkbox"/> OPERATOR (RO) <input type="checkbox"/> SENIOR OPERATOR (SRO) <input type="checkbox"/> LIMITED (LSRO)					
14. Current or Previous License(s) Held					
Denial Number(s) 066 -		<input type="checkbox"/> RO <input type="checkbox"/> LSRO <input type="checkbox"/> SRO	License Number(s) Registration Date(s)	<input type="checkbox"/> 060 <input type="checkbox"/> 062	
15. Name of Applicant's Facility		16. Facility Denial Number(s)		17. Additional Facility Denial Number(s) (Multi-unit Licenses)	
		<input type="checkbox"/> 060 <input type="checkbox"/> 062			
18. Current Position at Facility					
<input type="checkbox"/> A. Plant Supervisor/Manager <input type="checkbox"/> B. Assistant Plant Supervisor/Manager <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. Trainee <input type="checkbox"/> J. Non-Licensed Operator <input type="checkbox"/> K. Other (Specify in block 26)	
19. Education					
<input type="checkbox"/> a. High School <input type="checkbox"/> Graduate <input type="checkbox"/> GED Equivalency <input type="checkbox"/> No		<input type="checkbox"/> b. College High Grade of Study: _____ Degree of Years: _____ Highest Course Taken: _____		<input type="checkbox"/> c. Vocational/Technical Type of Training: _____ Number of Months: _____ Certificate Received: <input type="checkbox"/> Yes <input type="checkbox"/> No	
20. 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					
21. Training (Since Last Application - See Instructions)					
a. Classroom From (MM/YYYY) To (MM/YYYY) No. of Hours			b. Extra Person on Shift in Control Room From (MM/YYYY) To (MM/YYYY) No. of Hours		
1 - Nuclear Power Plant Fundamentals			4 - Time on Shift Above 20% Power		
2 - Plant Systems			5 - Requalification		
3 - Plant Procedures			6 - Other (Specify below)		
d. Simulator					
c. SRO Instruction					
22. Significant Control Manipulations					
DESCRIPTION		PLANT	SIMULATOR	DESCRIPTION	
a.		<input type="checkbox"/>	<input type="checkbox"/>	e.	
b.		<input type="checkbox"/>	<input type="checkbox"/>	f.	
c.		<input type="checkbox"/>	<input type="checkbox"/>	g.	
d.		<input type="checkbox"/>	<input type="checkbox"/>	h.	
e.		<input type="checkbox"/>	<input type="checkbox"/>	i.	
f.		<input type="checkbox"/>	<input type="checkbox"/>	j.	

NRC FORM 398 (2016 YYYY) Page 1 of 2

NRC Form 398

NRC FORM 398 Rev. 11/11			U.S. NUCLEAR REGULATORY COMMISSION										
<small>TO OPR 59.21, 59.23, 59.24, 59.47, 59.53, and 59.57</small>													
PERSONAL QUALIFICATION STATEMENT – LICENSEE (Continued)													
1. Last Name	2. First Name	3. Middle Initial	Contract Number(s)										
			066 -										
23. Nuclear Experience Details													
POSITION TITLE	FROM DATE	TO DATE	MONTHS	FACILITY	DUTIES								
24. For Renewals Only													
4. Hours Operated Facility	<input type="checkbox"/> < 100 (LESS THAN)	5. Date and result of last written comprehensive requalification exam and annual operating test.	Date	Result									
	<input type="checkbox"/> 100 - 1000			<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL								
	<input type="checkbox"/> > 1000 (MORE THAN)			<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL								
6. Date and result of last written comprehensive requalification exam and annual operating test. <table border="1"> <tr> <td>W</td> <td></td> <td><input type="checkbox"/> PASS</td> <td><input type="checkbox"/> FAIL</td> </tr> <tr> <td>O</td> <td></td> <td><input type="checkbox"/> PASS</td> <td><input type="checkbox"/> FAIL</td> </tr> </table>						W		<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL	O		<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL
W		<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL										
O		<input type="checkbox"/> PASS	<input type="checkbox"/> FAIL										
25. Comments													
26. NRC FORM 396, CERTIFICATION OF MEDICAL EXAMINATION BY A FACILITY LICENSEE, IS ATTACHED				<input type="checkbox"/> Yes	<input type="checkbox"/> No								
<small>NRC FORM 398 (Rev. 11/11)</small>				<small>Page 2 of 3</small>									

NRC Form 398

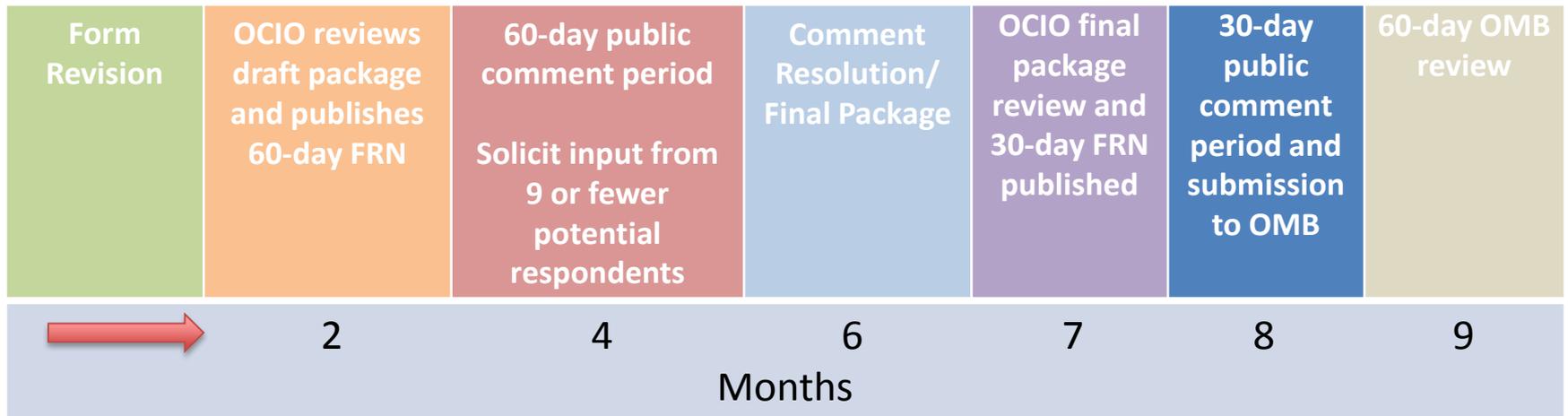
NRC FORM 398 (REV. 11/11) 12 CFR 55.31, 55.32, 55.33, 55.47, 55.53, and 55.57		U.S. NUCLEAR REGULATORY COMMISSION			
PERSONAL QUALIFICATION STATEMENT – LICENSEE (Continued)					
1. Last Name	2. First Name	3. Middle Initial	District Number (N)		
			066 -		
27. Signature					
ANY FALSE STATEMENT OR OMISSION IN THIS DOCUMENT, INCLUDING ATTACHMENTS, MAY BE SUBJECT TO CIVIL AND CRIMINAL SANCTIONS.					
I certify under penalty of perjury that the information in this document and attachments is true and correct in accordance with the instructions. I also authorize the NRC to submit the results of examinations to my employers for use in preparing retaining programs, as necessary.					
Signature - Applicant					Date
<input type="checkbox"/> Electronic Correspondence Option: By checking this box, you are acknowledging that the NRC will be providing operator licensing correspondence electronically.					
27b. CHECK APPLICABLE BOX FOR TYPE OF APPLICATION (i.e., check 1 if item c, 4, f, or g is checked; check (d) if item 5.d is checked; and check (e) if item 5.b is checked.)					
<input type="checkbox"/> 1. 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"/> 2. I certify that the above named individual completed the approved requalification program (with the exceptions noted in item 1b) required by section 55.54c(1) of 10 CFR 55, 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.					
<input type="checkbox"/> 3. I certify that the justifications provided in item 1b support the deferrals, excusals, and/or waivers requested in item 5e for the above named individual. I also certify under penalty of perjury that the information in this document and attachments is true and correct in accordance with the instructions.					
TRAINING COORDINATOR					
Typed or Printed Name and Title (Training Coordinator)					
Signature (Training Coordinator)					Date
SENIOR MANAGEMENT REPRESENTATIVE ON SITE					
Typed or Printed Name and Title (Senior Management Representative on Site)					
Signature (Senior Management Representative on Site)					Date
FOR NRC USE					
Deferral/Excusal/Waiver Requests (Check or Complete Items, as applicable)		GRANTED BY		DENIED BY	
		HEADQUARTERS	REGION	HEADQUARTERS	REGION
Deferral	Eligibility				
	Experience				
Excusal	Written				
	Operating				
Waiver	Written				
	Operating				
	Medical				
Other					
Explanation:					
<input type="checkbox"/> MEETS REQUIREMENTS <input type="checkbox"/> DOES NOT MEET REQUIREMENTS					
Signature					Date
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NRC Form 398 Overview of Changes

- Streamlined name (Last, First, MI)
- Added E-mail address box
- Added Deferral/Excusal/Waiver Section
- Added a check box for selection of 10 CFR Part 50 or Part 52 Facility Docket Numbers
- Electronic Correspondence Option
- NRC Use: Addition of Deferral/Excusal/Waiver sections
- Revised Instructions

Timeline

Information Collection (OMB)



Questions



ADAMS Submittal

- Items delayed from public release for 2 years from date of administration
 - Draft and Final RO/SRO written examination with reference handouts (or list thereof)
 - Draft and Administered Scenario sets: ES-D-1 and ES-D-2
 - Draft and Administered Walk-through tests including ES-301-1, ES-301-2
 - Written examination and operating test outline(s) and worksheet(s): Forms ES-401(N)-1, ES-401(N)-2, ES-401(N)-3, ES-401(N)-4, ES-401(N)-5, ES-401(N)-6, ES-401(N)-9, ES-301-7

- Items not delayed from public release and immediately released
 - Post examination comments and facility supporting documentation
 - Examination check sheets: ES-201-1, ES-201-2, ES-201-3, ES-301-3, ES-301-4, ES-301-5, ES-301-6, ES-401(N)-1/2/3, ES-403(N)-1