

US Nuclear Regulatory Commission, RII  
2010 Exam Writers Work Shop  
*“Meeting the Standard”*



# Key OL Feedback

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# Presentation Goals

- Review some of key operator licensing feedback items.
- Demonstrate how to obtain the OL Feedback and the SRO Only guidance documents.

Where on the NRC website is OL  
Program Feedback located?

Where on the NRC website can I find  
information on how to write SRO  
Only exam questions?

# Where is the OL Feedback located?

- <http://www.nrc.gov/reactors/operator-licensing.html>
- <http://www.nrc.gov/reactors/operator-licensing/prog-feedback.html>
- <http://www.nrc.gov/reactors/operator-licensing/op-licensing-files/ol-feedback.pdf>

## Where is the SRO Only written exam guidance is located at?

- <http://www.nrc.gov/reactors/operator-licensing/regs-guides-comm.html>
- <http://www.nrc.gov/reactors/operator-licensing/op-licensing-files/sro-only-ml1007100031.pdf>

**301.3 - Do the audit exam and the NRC exam have to be 100% different?**

**To what extent do "similar events" between the audit and NRC exam need to be identified?**

**For example, if the audit examination contained a faulted SG [steam generator] in one scenario (safety valve stuck open) and the NRC examination contained a faulted SG (pipe rupture in containment), would these situations be considered "similar?"**

- **Do the audit exam and the NRC exam have to be 100% different.**
- No.
- As noted in Section D.1.a of ES-301 (NUREG-1021), simulator events and JPMs that are similar to those that were used on the audit test (or audit tests in the case of retake applicants) are permitted provided the actions required to mitigate the transient or complete the task (e.g., using an alternate path as discussed in Appendix C) are significantly different from those required during the audit examination. The facility licensee shall identify for the NRC chief examiner those simulator events and JPMs that are similar to those that were tested on the audit examination.

- The two events cited in the example are "similar" (in that they both involve a faulted SG) and should be discussed with the NRC chief examiner. In this case, the mitigation strategy for the two events - one being inside and the other outside containment - are sufficiently different that their use would probably be acceptable (unless there were other predictable patterns between the two scenarios).



## **301.16 - Is it NRC policy for every JPM to have adverse safety consequences if the operator makes an error?**

- No.
- As stated in Section D.1.c of ES-301, the K/As covered during the operating test should have importance factors of at least 2.5. Moreover, as stated in Section D.4.b, the JPMs should, individually and as a group, have meaningful performance criteria that will provide a legitimate basis for evaluating the applicant's understanding of and ability to safely operate the associated systems and the plant. Although Section D.3.b of ES-303 requires examiners to explain the safety consequences (as applicable) of the applicant's errors, this should not be misconstrued as a requirement for every JPM to have adverse safety consequences if the applicant makes an error.

**301.18 - In Revision 9 of NUREG 1021, Section B.1 of ES-301, which describes the “Administrative Topics” portion of the walk-through operating test, did NOT include subjects related to emergency operating procedures (EOPs) - E-Plan JPMs were allowed, but not EOPs. Supplement 1 to Revision 9 changed that. Why?**

- Supplement 1 to Revision 9 of NUREG-1021 erroneously listed "emergency operating procedures" as an example of the type of information that could be evaluated under the "Emergency Procedures/Plan" Administrative Topic of the operating test.

**401.7 - What do you do if your randomly selected questions identify a K/A that you know was not trained on or has been deselected for training? Do you ask it anyway or do you select another system or does it go deeper?**

**Can you change a K/A if no one can write a question for it?**

**What if a random K/A [knowledge or ability] can not be used to prepare a discriminating question?**

**Is it fair to replace the K/A with one that is more difficult? (Can we throw out a K/A simply because it is too hard to write a discriminatory question?)**

- Section D.1.b of ES-401 (in NUREG-1021), allows the examination author to systematically and randomly select another K/A category and/or statement, as applicable, if the systematic selection process identifies a K/A statement having an importance rating that is below 2.5, a K/A statement that clearly does not apply to the subject facility, a generic K/A statement for which it would not be possible to develop a Tier 1 or Tier 2 question, or a K/A category that contains no K/A statements. *Failure to train on a selected K/A is not an acceptable basis for selecting another one.* The author should use Form ES-401-4, "Record of Rejected K/As," or an equivalent, to document the basis for excluding from the examination outline any K/A statements that were randomly selected, and submit the form to the NRC with the completed outline.
- As stated in Section D.2.a of ES-401, if it becomes necessary to deviate from the previously approved examination outline, the facility contact is expected to discuss the proposed deviations with the NRC chief examiner and obtain concurrence. The facility should be prepared to explain why the original proposal could not be implemented and why the proposed replacement is considered an acceptable substitute.

- **401.12 - Based on the SAT-based training program, you test on objectives. The current NUREG-1021 allows asking questions not covered by the utility's training program (objectives). This is contrary to the SAT-based training system.**
- **Should there be a way to ensure the students are examined on the training program content? (If it is determined that the program is SAT.) Operator Licensing Program Feedback Learning objectives are not required for the NRC examination, but our SAT-based program still requires them.**
- **Do we no longer follow our SAT-based program?**

- The NRC licensing examination is not a part of the facility licensee's SAT-based training process. The systematic sampling procedures for preparing the written and walk-through examination outlines per NUREG-1021 are designed around the structure of the NRC's K/A Catalogs and may not be compatible with the facility-specific task lists. NUREG-1021 contains provisions for facility licensees to add, substitute, or delete specific knowledge and ability requirements on a case-by-case basis. Allowing facility licensees to substitute their entire site specific task lists for the NRC's K/A Catalogs could decrease the level of examination consistency. The current approach of requiring facility licensees to explain deviations from the NRC's K/A Catalogs is conservative, consistent, and effective. Facility licensees should continue to follow their SAT-based training programs, with the understanding that the content of the NRC licensing examination is not necessarily restricted by the SAT-based training process. Licensees should consider developing learning objectives covering all the topics required by 10 CFR 55 and all the NRC K/As having importance ratings of 2.5 or higher, unless it can demonstrate that the K/A is not applicable at their facility.

- **401.21 - We are allowed to use 50 questions from the exam bank (including 25% exact repeats from the last two exams and quizzes), 40 modified questions, and 10 new questions. In theory we would only need to write 10 new questions. This reduces burden for the exam writer, and reduces difficulty on the student. In reality, students generally are exposed to the entire exam bank during the program so the "50" becomes 25. Also, with the lottery (systematic-random) method of choosing K/As, the likelihood of having more than a handful of repeat or modified questions.**
- **Recommend allowing exam writers to randomly select the 25 repeats and 40+ for modification by pulling questions randomly from all questions asked of the students during the program.**

- The changes implemented with Supplement 1 to Revision 8 (refer to Section D of ES-401 in NUREG-1021) raised the upper limit on the number of questions on an exam that can be taken directly from an examination bank from 50 to 75 percent. However, because only those questions that fit the systematic and randomly generated sample plan can be used on the examination, the practical limit on bank use is, for the time being, determined by the size of the bank from which the questions are drawn. Although facility licensees may have to develop more new and modified questions in the short term, the burden should decrease as the local and national examination banks grow in size.
- **NOTE:** Form 401-6, item 4 states, “If more than 4 RO and 2 SRO questions are repeated from the last two NRC licensing exams, the facility licensee’s sampling process was random and systematic.”



**201.9 - Does "independent review" by a supervisor include question-by-question approval/comment?**

Yes.

The independent managerial or supervisory reviewer is confirming and signing that the written examinations and operating tests meet the requirements of NUREG-1021. The extent of the review will typically be a function of the experience of the examination author and the quality of facility's examination bank.

## **401.17 - Why is a validated question not a good question?**

- Although a question that was previously used on an NRC examination at the facility since 10/1/95 (i.e., a validated question) may be acceptable in its own right, it may have to be edited or replaced if it conflicts with another question on the examination or if necessary to meet the criteria on the Written Examination Quality Checklist (Form ES-401-6 in NUREG-1021). Technical and psychometric flaws that cause the question to have no or multiple correct answers would have to be corrected regardless when they are identified.

- **401.53 - Recently, guidance provided from examiners to facility authors indicates a limit on the quantity of questions that may have reference material(s) provided to the candidate for initial licensing written examinations.**
- **Specifically “no more than 50% on the SRO portion of the examination” has been offered as guidance. However, NUREG-1021 does not provide specific guidance on the percentage of use for these type of questions, and many of the SRO K/As and station training objectives require analysis of conditions along with use of reference materials to determine the correct action(s). These questions demonstrate operational validity and discrimination for the types of knowledge and abilities an SRO is expected to possess.**
- **ES-401, D.2.g states that “Reference materials (such as diagrams, sketches, and portions of facility procedures) may be used on a selective basis as attachments to the written examination. Ensure that any reference material used in the examination is easy to read and clearly marked, provides an effective and objective way for the applicant to demonstrate knowledge of the topic or concept, and does not give away the answers to other questions on the examination or improve the applicant’s chances of guessing the correct answer by eliminating incorrect distractors.”**
- **Is there a limit on the percentage of written exam questions that utilize references for the initial licensing exam? If so, what is the basis?**

- Question #401.42 addresses the differences between initial license examinations and requalification examinations regarding the approach of "closed-book" versus the use of references during examinations. That question properly states that references in closed-book, initial license examinations "should be used judiciously and sparingly."
- With regard to the initial license examinations, the Agency goal is to ensure that applicants prepare and study a broad, yet defined, body of knowledge. Applicant mastery of such a body of knowledge, as required in 10 CFR 55.41 and 55.43, better ensures that operators will be equipped to address public health and safety needs that may arise in the conduct of their reactor operator (RO) and senior reactor operator (SRO) duties. When an examination relies too heavily on the use of references to answer questions, then the applicant's preparation for such an examination is altered; the applicant likely will primarily focus his or her preparation on the use of references to answer questions and devote less attention on mastering the body of knowledge.

- In sum, the mental demands, requirements, and format of the examination will determine the applicant's method of preparation; moreover, the level of preparation will likely be deeper and more thorough given the expectation of a closed-book, limited reference examination.
- The RO and SRO initial license examinations largely and properly remain "closed-book;" current policy regarding the judicious and sparing use of references is appropriate. However, because of the supervisory nature of the SRO position that relies on a greater use of references and because of its separate 25-question examination that addresses content in 10 CFR 55.43, there 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

**201.14 - Why do the standards not allow the utility to give the same JPMs and scenarios the following day if the applicants sign a confidentiality agreement?**

**If an individual examinee is on security agreement, can you then reuse a JPM set?**

- The NRC takes examination security very seriously, and prohibiting the reuse of test materials is the most effective way to minimize the risk of compromising an examination.
- No.

**201.35 - Are there any requirements set by the NRC as to when Operation's training “freezes” procedure changes prior to an NRC initial licensing examination?**

**Can a plant freeze multiple procedures at different times based on the scope of the procedure change and how its implementation date affects examination development and administration?**



- Guidelines regarding the “freezing” of plant procedures in advance of an initial operator licensing examination have been added to NUREG-1021 as part of Supplement 1 to Revision 9, which was published in October 2007. Section C.2.c of ES-201 now specifically requires the topic to be discussed when confirming the examination arrangements, and Attachment 2 of the same ES provides some general guidance and cautions.

- **401.25 - At what point does a "modified" question become a "new" question?**
- **When has a written question been changed enough to be qualified as a NEW question on the written initial exam?**
- **Can we clarify the definition of a "significantly modified" question?**

- A modified question tests the same content topic as the original question but significantly alters the technical elements in the question (as discussed in Section D.2.f (last bullet) of ES-401) and gives it a different appearance. The intent of the modification is to preserve the focus and topic (i.e., the K/A reference) of the original question. If the question is created without reference to a bank question and has not been previously exposed at the facility, then it can be considered a "new" question.
- Note that changing the conditions in the stem such that one of the three distractors in the original question becomes the correct answer would also be considered a significant modification.