



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 14, 2019

MEMORANDUM TO: Christian B. Cowdrey, Chief  
Operator Licensing and Human Factors Branch  
Division of Reactor Oversight  
Office of Nuclear Reactor Regulation

FROM: Brian W. Tindell, Reactor Engineer (Examiner Qualified)/**RAI**  
Operator Licensing and Human Factors Branch  
Division of Reactor Oversight  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF OCTOBER 15, 2019, PUBLIC MEETING WITH  
INDUSTRY OPERATOR LICENSING REPRESENTATIVES

On October 15, 2019, the U.S. Nuclear Regulatory Commission (NRC) staff held a public meeting with representatives of the Nuclear Energy Institute's Licensed Operator Focus Group and other industry operator licensing representatives.

This meeting was the latest in a series of meetings intended to promote efficiency, effectiveness, and open communications. The discussions addressed a variety of operator licensing topics, including: Operating Test Performance Deficiency definition, Operating Test Critical Task definition and point deductions, relocating Operating Test Technical Specification testing, importance ratings for the Components and Theory Sections of the proposed revisions of the PWR and BWR Knowledge and Ability Catalogs, and proposed examination scheduling efficiencies.

Representatives of the NRC and the nuclear industry agreed that this meeting was useful for the exchange of information and agreed to continue the periodic meetings.

Enclosures:

1. List of Attendees
2. Agenda
3. Discussion Summary
4. Draft Critical Task Approach for Rev. 12 of NUREG-1021
5. Draft Performance Deficiency Guidance for Rev. 12 of NUREG-1021

CONTACT: Brian Tindell, NRR/DIRS  
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OPERATOR LICENSING REPRESENTATIVES

Dated: November 14, 2019

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OFFICE	NRR/DRO/IOLB	NRR/DRO/IOLB
NAME	BTindell*	CCowdrey*
DATE	11/14/2019	11/14/2019

**OFFICIAL RECORD COPY**

List of Attendees – Public Meeting with Industry Operator Licensing Representatives February 13, 2019	
Name	Organization
Christian Cowdrey	NRC
Theresa Buchanan	NRC
Lauren Nist	NRC
Bernie Litkett	NRC
Brian Tindell	NRC
Brandon Hartle	NRC
Eric Cushing	NRC
Travis Iskierka-Boggs	NRC
Maurin Scheetz	NRC (via telephone)
Jesse Seymour	NRC (via telephone)
Don Jackson	NRC (via telephone)
Robert Orlikowski	NRC (via telephone)
Joe Demarshall	NRC (via telephone)
Randy Baker	NRC (via telephone)
Matt Emrich	NRC (via telephone)
Greg Roach	NRC (via telephone)
Gerry McCoy	NRC (via telephone)
David Decker	NRC (via telephone)
Tim Riti	Nuclear Energy Institute
Kostas Dovas	Exelon (via telephone)
Gregg Ludlam	Entergy (via telephone)
Richard Baird	NextEra (via telephone)
Russ Joplin	Tennessee Valley Authority (via telephone)
Deann Raleigh	Curtis-Wright (via telephone)
Ozzie Vidal	Certrec (via telephone)
Rick Murray	Entergy (via telephone)

List of Attendees – Public Meeting with Industry Operator Licensing Representatives February 13, 2019	
Name	Organization
Frank Giannone	Duke (via telephone)
Yan Gao	Dominion (via telephone)
Christopher McComber	Duke (via telephone)
Fred Bruns	Exelon (via telephone)
Mark Otten	Ameren (via telephone)
Steve Dennis	Public Service Enterprise Group (via telephone)
Herb Searle	Dominion (via telephone)
Brendan Ryan	Ameren (via telephone)
Ken Jenkins	Southern Nuclear (via telephone)
Lesley Ainsworth	Dominion (via telephone)
Bob Meyer	Professional Reactor Operator Society (via telephone)
Mike Peterson	Excel (via telephone)
Aaron Forshaw	Tennessee Valley Authority (via telephone)
Max Heim	Tennessee Valley Authority (via telephone)
Pat Leary	NuScale Power (via telephone)

AGENDA FOR THE U.S. NUCLEAR REGULATORY COMMISSION CATEGORY 2  
PUBLIC MEETING WITH INDUSTRY OPERATOR LICENSING REPRESENTATIVES

Tuesday, October 15, 2019  
1:00 p.m. to 2:00 p.m. Eastern Standard Time

NRC One White Flint North, Room 4B06  
11555 Rockville Pike  
Rockville, MD 20852

<u>TOPIC</u>	<u>PRESENTER</u>
Introductions and Opening Remarks	NRC/Industry
Operating Test Performance Deficiency, Critical Task, and Technical Specification Test Relocation	NRC/Industry
PWR & BWR Knowledge and Abilities Catalog Importance Ratings	NRC/Industry
Examination Scheduling Efficiencies	NRC/Industry
Closing Remarks	NRC/Industry
Public Comment	Public

## **DISCUSSION SUMMARY**

The presentation for the public meeting can be found at Agencywide Documents Access and Management System (ADAMS) Accession No. ML19273A904.

### **Operating Test Performance Deficiency, Critical Task, and Technical Specification Test Relocation**

The staff presented a draft definition for the operating test term "Performance Deficiency" in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The draft definition, when incorporated to the next revision of NUREG-1021, will provide greater consistency while grading operating tests. Members of the industry voiced support for the effort, provided comments on the draft definition, and offered to pilot the draft guidance. The staff updated the draft guidance based on the comments, with some exceptions:

- Members of the industry commented that examiner follow-up questions should be documented. NUREG-1021 currently has guidance regarding follow-up questions and a requirement for the questions to be documented.
- Members of the industry commented that, as a result of the guidance, applicants may not correct each other during the simulator operating test, limiting crew communication. The members of the industry recommended that the guidance include an allowance for crew members to communicate corrections to each other without a deduction. The staff replied that they believe that the draft guidance is consistent with current NUREG-1021 guidance and examiner practice.

The updated draft performance deficiency definition is attached to this summary as Enclosure 5. Additionally, Revision 12 of NUREG-1021 will be available for public comment prior to final publication.

The staff presented draft guidance for critical tasks on operating tests for use in the next revision of NUREG-1021 in order to improve consistency while grading operating tests. The draft guidance provides definitions for a significant error and critical error, with corresponding point deductions from rating factors. Members of the industry voiced support for the effort, provided comments on the draft guidance, and offered to pilot the draft guidance. The staff updated the draft guidance based on the comments, except for a comment regarding a significant reactivity error, which was received after the public meeting. The staff will evaluate the comment for Revision 12 of NUREG-1021. The updated draft definition is attached to this summary as Enclosure 4. Additionally, Revision 12 of NUREG-1021 will be available for public comment prior to final publication.

The staff discussed appropriateness of testing technical specifications during the operating test simulator scenarios and during administrative job performance measures (JPMs). The industry commented that removing technical specifications from the simulator scenarios may challenge operational validity and it may be challenging to develop appropriate JPMs. At this time, the staff will continue to monitor and evaluate testing of technical specifications on the operating test.

### **PWR & BWR Knowledge and Abilities Catalog Importance Ratings**

The staff provided an update on the ongoing revision to the PWR and BWR Knowledge and

Abilities Catalogs. For Section 5 (Components) and Section 6 (Theory), the staff decided to use a single column importance rating. To maintain consistency with the current testable population for the generic fundamentals examination, the staff decided to use the higher of reactor operator and senior reactor operator importance ratings to determine the single column importance rating. Industry representatives agreed with the decisions.

The staff also provided an update on the publication schedule. While editing and resolution of public comments has been completed, resolution of a concern regarding Tier 1 written examination questions will likely drive publication schedule. The industry commented that they needed a period of one year after publication of the revision to transition and align training and examination-writing programs. The industry asked for an allowance to use either revision of the catalogs during this one-year period following publication. The staff acknowledged the request and stated that there are several options to provide for the transition, depending on when the Tier 1 concern is resolved.

### **Examination Scheduling Efficiencies**

The staff proposed including regional availability with the yearly examination scheduling Regulatory Issue Summary so that licensees can request available examination dates. Members of the industry commented that the staff could make a three-year examination schedule available on the website to confirm scheduling. The staff agreed to evaluate making the schedule available. Members of the industry also commented that a “first-come, first-served” approach to examination scheduling would not be desirable. The staff scheduling guidance has further considerations in OLMC-120, “National Examination Schedule,” revised September 2019, and is publicly available at ADAMS Accession No. ML19261B408.

### **Industry and Public Comments**

The staff and industry representatives commented that the meeting was appreciated and that more meetings should be planned prior to revising NUREG-1021.

A member of the public raised a question via e-mail regarding the proposed reintegration of the generic fundamentals examination with the site-specific initial licensing examination and expressed concern that this proposal would de-emphasize the reactor theory and thermodynamics topics by decreasing the number of questions asked. The comment raised the possibility of adverse impacts of this change on future licensed operator performance and facility training programs. The NRC responded that a validation effort for the GFE reintegration proposal was ongoing to evaluate the feasibility of the proposal and that these concerns would also be considered as a part of that effort. The NRC added that an additional opportunity for public comment on the proposal will be provided before any change is implemented and any comments received at that time would be formally documented and resolved.

## Draft Critical Task Approach for Rev. 12 of NUREG-1021

Errors related to **Critical Tasks** (CTs) are referred to as “Critical Errors.” A Critical Error on the part of an applicant results in failure of the simulator operating test. Inherent in the evaluation of Critical Errors is the need to properly categorize **Performance Deficiencies**, as defined, including those instances where individual errors are corrected by other crew members. CTs that are initially incorporated into a scenario are referred to as “preidentified” CTs. The difficulty level and equitable administration of the operating test must be considered when assessing the appropriateness of the number of such preidentified CTs in a scenario or scenario set. ES-301 outlines the target number of preidentified CTs per scenario. Preidentified CTs are part of the scenario design and are included on the ES-D forms. In contrast, “post-scenario” CTs are created by the occurrence of unexpected applicant actions during a scenario. Both preidentified and post-scenario CTs are identified and designated using the same criteria (discussed below).

If a facility maintains a CT list derived from guidance provided by their vendor owner’s group, this list should be referenced *as an aid* in identifying CTs. Be aware that such CT lists have not been subjected to NRC review and may contain tasks that are not sufficiently discriminatory for the purposes of an NRC operating test. Furthermore, scenario CTs are dependent upon both specific equipment configurations and malfunctions, while owner’s group CTs are based upon specific accident sequences that may not match those of a given scenario.

In conjunction with facility CT lists (or in the absence of such a list), the following guidance shall be applied in the identification and designation of CTs:

- Where a success path exists, applicants must prevent significant safety challenges; this includes preventing conditions that warrant initiation of emergency depressurization (BWR specific), result in orange or red path critical safety functions (Westinghouse and AP-1000 specific), warrant transitioning to functional recovery guidelines (CE specific), or adversely impact the implementation of those emergency operating procedure actions essential to the mitigative strategy for the event in question (B&W specific).
- Applicants must properly implement procedural actions for mitigating significant safety challenges when those actions directly lead to restoring safety functions.
- Applicants must properly implement procedural actions of emergency operating procedures when those actions are essential to an event’s overall mitigative strategy.
- Applicants must avoid unnecessarily creating situations that would result in EAL entry or escalation on loss or potential loss of more than one fission product barrier per the facility’s EALs.
- *Note: in applying this guidance, the specific equipment configurations, malfunctions, and accident sequences of a given scenario must be carefully considered to ensure that CTs are designated and bounded in a manner this is reasonable for evaluation purposes.*

Additionally, CTs must also possess each of the following attributes:

- Initiating Cue: An initiating cue is an expected signal or notice (indication, alarm, communication, or procedure step) that designates when a CT should be performed. The cue need not indicate that the action is a CT.



## Draft Critical Task Approach for Rev. 12 of NUREG-1021

- Performance Feedback: During the time span of a CT, performance feedback must be available to at least one member of the crew. This feedback provides the crew member with information about the effect of the crew's actions or inaction related to or because of the CT. The crew must be able to oversee that its action had an impact or that its inaction is causing plant conditions to degrade.
- Measurable Performance Standard: The measurable performance standard for a CT consists of observable actions taken by at least one member of the crew. Consequently, the performance standard for a CT includes both expected action and *boundary conditions* that clearly identify at what point a CT must be accomplished; such conditions must be objective in nature. The ES-D forms should document the limits for each preidentified CT before the examination begins.

In establishing objective boundary conditions, the criteria used shall be developed based upon the guidance in the following list, with first consideration given to the preferred boundary criteria:

- Preferred boundary criteria:
  - Thresholds where safety functions are severely challenged or lost;
  - Thresholds that result in changes to the mitigative strategy for an event, such as transitions to contingency procedures or functional recovery procedures;
  - Time-critical operator actions that are applicable to the facility;
  - Technical Specification Safety Limits
- Alternative boundary criteria (should preferred criteria usage not be practical):
  - Exits or transitions from the procedure that first directs CT accomplishment;
  - The expiration of a reasonable period of time or exceeding of a parameter value (i.e. limits from the facility's FSAR or design documentation) as mutually agreed upon by the Chief Examiner and facility.
  - *Note: for post-scenario CTs during major transients, the judgement of the lead examiner present will dictate the scenario endpoint.*

**Significant Errors** are more severe than errors that would only result in a single point deduction, but do not meet the criteria for a Critical Error. The identification of a Significant Error *only occurs post-scenario* because of an error made during the scenario by one or more applicants. Significant Errors result in larger Rating Factor point deductions (i.e. 2 points) than errors not meeting the criteria to be considered a Significant Error. Significant Errors consist of:

- Errors that either cause an automatic RPS/ESF actuation or that warrant or involve a manual RPS/ESF actuation that should have otherwise been avoidable had the applicant responded to the event as expected.
  - *Note: subsequent RPS/ESF actuations that do not alter equipment alignments would not warrant additional point deductions.*
- Errors that would result in EAL entry or escalation per the facility's EALs.
- Errors resulting in unplanned power changes of >10% rated thermal power.

**Draft Critical Task Approach for Rev. 12 of NUREG-1021**

<b>Table 1: Error Grading Summary by Type</b>			
<b>Competency / Rating Factor</b>	<b>Critical Error ("go/no-go" criteria)</b>	<b>Significant Error point deduction</b>	<b>Error (regular) point deduction</b>
Rating Factors <u>other</u> than those in Communications	<i>Failure of Simulator Operating Test</i>	2 points	1 point
Communications Rating Factors <u>only</u>	<i>Failure of Simulator Operating Test</i>	1 point (minimum R.F. score of 1)	Refer to ES-303

## Draft Performance Deficiency Guidance for Rev. 12 of NUREG-1021

During administration of the simulator operating test, the NRC examination team observes an applicant's performance in a licensed operator position. In accordance with 10 CFR 55.45, "Operating Tests," the NRC uses these observations to determine if an applicant has demonstrated, [emphasis provided] "an **understanding** of and the **ability** to perform the actions necessary to accomplish a representative sample" from the 13 items listed in § 55.45(a).

In accordance with 10 CFR 55.33, "Disposition of an Initial Application," by approving an initial application the NRC has determined the applicant "has learned to operate a facility competently and safely, and additionally, in the case of a senior operator...the applicant has learned to direct the licensed activities of licensed operators competently and safely."

### Performance Deficiency Definition

In the context of the simulator operating test, a performance deficiency is an observed action or inaction (including operational tasks, procedure/process implementation, communications, and administrative functions), or a statement of understanding or intent, which demonstrates a lack of ability or understanding as outlined by an established standard for operator performance (e.g., facility procedure, policy, learning objective, regulatory requirement, etc.).

### Implementation Guidance

All performance deficiencies shall be noted on the applicant's Form ES-303, regardless of whether or not they affect the applicant's simulator operating test score. In order to determine if the performance deficiency causes a point deduction, it is assessed using the rating factor competency descriptions established by NUREG-1021, Forms ES-303-3/4 and Appendix D, Section E. If the examiner concludes a "No" response exists after comparing the performance deficiency against the ES-303-3/4 rating factor questions and assessing the performance using the guidance below, the examiner is required to lower the applicant's score in the corresponding rating factor(s) by the appropriate number of points.

When applying the performance deficiency definition above, the following considerations should be used when determining whether or not the performance deficiency affects the applicant's simulator operating test score.

For a performance deficiency related to the applicant's **ability** to operate (including operating controls, directing operations, and implementing procedures), a point deduction in the applicable rating factor(s) occurs if either of the following criteria is observed:

1. The applicant's action or inaction fails to meet an expectation established by a standard for operator performance.
2. The applicant's inaction or intent to perform an action, would have failed to meet an expectation established by a standard for operator performance but was corrected by another crew member.

## Draft Performance Deficiency Guidance for Rev. 12 of NUREG-1021

For a performance deficiency related to the applicant's **understanding** (including diagnosing plant conditions and understanding system operation), a point deduction occurs if any of the following criteria are observed:

1. The applicant exhibits a lack of understanding by providing an **erroneous response to a follow-up question** related to an observed potential performance deficiency during the scenario.
2. The **applicant's statement** (verbal or written) reveals a lack of understanding (related to required operator knowledge), that is uncorrected by the applicant, using his or her own knowledge, prior to taking improper action based on the misunderstanding or prior to the initiation of the next scenario event. The applicant may use a reference to correct himself/herself.
3. The **applicant's delay** in taking a required action reveals a lack of understanding, that is uncorrected by the applicant, using his or her own knowledge, resulting in action not being taken prior to complicating the crew's response to the event.

Note: Typically, an unsatisfactory delay in taking required action should be assessed in Rating Factor 3.a as lack of **ability** to manipulate controls in a timely and accurate manner. However, if misunderstanding is the primary cause of the applicant's delay, then Rating Factor 3.b can be considered. The NRC does not expect the applicant to exhibit an immediate and unwavering understanding of plant conditions at all times. The applicant will need a period of time to evaluate plant conditions and come to a state of understanding. The applicant may pause while operating the plant to establish, improve, or confirm this understanding. This behavior is consistent with industry expectations and standards for operator human performance techniques (e.g. STAR). The examiner must provide evidence of the applicant's lack of understanding while operating plant controls in order to cite Rating Factor 3.b for a point deduction. The following are examples of a lack of understanding (3.b):

- The applicant relies on another crew member's knowledge to effectively assess and operate the plant.
- The applicant does not successfully exhibit the understanding required to take prompt and prudent action to avoid more complicated plant conditions.
- The applicant provides an erroneous response to follow-up questions.

For a performance deficiency related to the applicant's **ability** to communicate, a point deduction occurs if the following criteria is observed:

- Communication made by the applicant is inaccurate, incomplete, or not in accordance with the licensee's established means for ensuring precise communications (e.g., three-

## **Draft Performance Deficiency Guidance for Rev. 12 of NUREG-1021**

part communication), the communication is not self-corrected, and the communication is needed to support effective plant operation.

Note: Temporary miscommunication that results simply from one applicant mishearing another, as long as it is corrected by licensee's established means for ensuring precise communications, shall not result in a point deduction.

### Clarifying Guidance

This guidance is intended to ensure greater consistency in identification and grading of performance deficiencies. In any instance where this guidance is in conflict with NUREG-1021, Revision 11, then the requirements of NUREG-1021 take precedence.

In accordance with NUREG-1021, ES-303 D.2.b, no point deduction is taken for the first performance deficiency assessed in the communications competency, and the minimum score for communications rating factors is a "1."

In accordance with NUREG-1021, ES-303 D.1.d, a single performance deficiency shall be cited in no more than two different rating factors.

For performance deficiencies related to technical specifications, follow the grading process detailed in ROI-17-13 ([ML17213A397](#)).

For a single performance deficiency to result in a three-point reduction within a single competency rating factor, it must result in the failure to meet a critical task as defined by NUREG-1021, Appendix D, Section D.