

DPO Case File for DPO-2017-007

The following pdf represents a collection of documents associated with the submittal and disposition of a differing professional opinion (DPO) from NRC employees involving Operator Licensing Written Examinations- Tier 1 Test Items.

Management Directive (MD) 10.159, "NRC Differing Professional Opinions Program," describes the DPO Program. <https://www.nrc.gov/docs/ML1513/ML15132A664.pdf>

The DPO Program is a formal process that allows employees and NRC contractors to have their differing views on established, mission-related issues considered by the highest level managers in their organizations, i.e., Office Directors and Regional Administrators. The process also provides managers with an independent, multi-person review of the issue (one person chosen by the employee). After a decision is issued to an employee, he or she may appeal the decision to the Executive Director for Operations (or the Commission, for those offices that report to the Commission).

Because the disposition of a DPO represents a multi-step process, readers should view the records as a collection. In other words, reading a document in isolation will not provide the correct context for how this issue was reviewed and considered by the NRC.

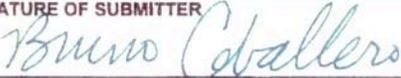
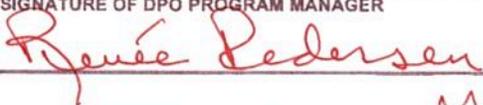
It is important to note that the DPO submittal includes the personal opinions, views, and concerns by NRC employees. The NRC's evaluation of the concerns and the NRC's final position are included in the DPO Decision.

The records in this collection have been reviewed and approved for public dissemination.

- Document 1: DPO Submittal
- Document 2: Memo Establishing DPO Panel
- Document 3: DPO Panel Report
- Document 4: DPO Decision
- Document 5: DPO Appeal
- Document 6: Statement of Views
- Document 7: DPO Appeal Decision

Document 1: DPO Submittal

Document Markings...

NRC FORM 680 (09-2015) NR_CMO 10.159 		U.S. NUCLEAR REGULATORY COMMISSION		DPO Case Number DPO-2017-007	
DIFFERING PROFESSIONAL OPINION				Date Received 10/10/2017	
Name and Title of Submitter Bruno Caballero and other examiners		Organization RII/DRS/OLB		Telephone Number (10 numeric digits) (404) 997-4608	
Name and Title of Supervisor Eugene Guthrie		Organization RII/DRS/OLB		Telephone Number (10 numeric digits) (404) 997-4551	
When was the prevailing staff view, existing decision or stated position established and where can it be found? Date 06/07/2017, 9/7/17 Where (i.e., ADAMS ML#, if applicable): ML17165A579, ML17249A961					
Subject of DPO Operator Licensing Written Examinations - Tier 1 Test Items					
Summary of prevailing staff view, existing decision, or stated position. (Use continuation pages or attach Word document)					
Reason for DPO, potential impact on mission, and proposed alternatives. (Use continuation pages or attach Word document)					
Do you believe the issue represents an immediate public health and safety concern?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Yes, (Explain on continuation page(s) or attach Word document).	
Is the issue directly relevant to a decision pending before the Commission?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Yes, Reference Document (i.e., ADAMS ML#)	
<input checked="" type="checkbox"/> Informal discussions took place (Identify with whom and time frame of discussions)		Extenuating circumstances prevented informal discussions			
Written Interaction: April 2017; subsequent discussion between NRR/IOLB and Region II DRS/OLB took place on August 24, 2017.					
Proposed panel members are (in priority order): 1. Craig Kontz 2. James Drake Jim Kellum 3. James Drake					
No names of potential panel members will be provided.					
When the process is complete, I would like the DPO case file: <input type="checkbox"/> Non-Public <input checked="" type="checkbox"/> Public					
SIGNATURE OF SUBMITTER 				DATE 10-10-17	
SIGNATURE OF CO-SUBMITTER (if any) 				DATE	
SCAN THE SIGNED AND DATED FORM (INCLUDE ANY CONTINUATION PAGES OR WORD DOCUMENTS) AND E-MAIL TO: DPOPM.Resource@nrc.gov					
SIGNATURE OF DPO PROGRAM MANAGER 				DATE 10/16/2017	
<input type="button" value="Delete Continuation Page"/>		<input checked="" type="checkbox"/> DPO accepted		<input type="checkbox"/> DPO returned	
				<input type="button" value="Add Continuation Page"/>	

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

Summary of existing NRC decision or agency's stated position

NRR/IOLB determined that Tier 1 written examination test items that test plant system design features, interlocks, and system operation adequately test applicant knowledge of emergency and abnormal evolutions on the site-specific written exam. This determination was documented in Record of Interaction (ROI) 17-09, NUREG 1021, ES-401 Tier 1 Written Exam Test Items (ML 17165A579), and was disseminated to industry stakeholders in Operator Licensing Feedback Item 401.55 (ML17249A961).

Operator Licensing Feedback Item 401.55 included two examples of Tier 1 written examination test item topics, one for PWR K/A Abnormal Evolution "Pressurizer Pressure Control Malfunctions", and the other for BWR K/A Emergency Evolution "High Drywell Pressure", and NRR/IOLB's feedback to industry stated that written examination test items were acceptable for these Tier 1 topics, if the test item solely tested how the system worked (i.e., Tier 2, Plant Systems knowledge aspect).

Reason for DPO

The writers of this DPO are identified on Page 17; the purpose of this DPO is to require NRR/IOLB to revise its recent policy determination for writing and assessing Tier 1 written examination test items. NRR/IOLB's position has the potential to undermine the 10 CFR 55.41 requirement that the written examination contain a representative selection of questions on the knowledge, skills, and abilities needed to perform licensed operator duties. Specifically, NRR/IOLB's policy interpretation will result in fewer questions that test the operator's knowledge of abnormal and emergency procedures, in accordance with 10 CFR 55.41(b)(10), on the site-specific written examination.

Title 10 of the Code of Federal Regulations (10 CFR) Part 55, "Operators' Licenses," requires that applicants for reactor operator (RO) and senior reactor operator (SRO) licenses pass a written examination. The regulation at 10 CFR 55.40(b) allows power reactor facility licensees to prepare the site-specific written examinations, provided that the facility licensee prepares the site-specific written examination in accordance with the criteria contained in NUREG-1021, Operator Licensing Examination Standards for Power Reactors.

In accordance with NUREG-1021, ES-401, Preparing Initial Site-Specific Written Examination, the site-specific written exam must be comprised of three parts:

- Tier 1: Emergency/Abnormal Plant Evolutions
- Tier 2: Plant Systems
- Tier 3: Generic Knowledges & Abilities

Interaction between Region II and NRR/IOLB to collaborate on clarifying the intent of Tier 1 Written Exam test items is documented in ROI 17-09 (March-June 2017 time frame). Also a teleconference was held on August 24, 2017, prior to disseminating the Operator Licensing Feedback Item 401.55 to industry stakeholders. NRR/IOLB program office Branch Chief began the teleconference by stating that opinions regarding the final resolution to ROI 17-09 (on 6-7-17) were not going to be discussed during the teleconference, and said the purpose of the phone call was to discuss enhancements for the phrasing or wording to the response to Operator Licensing Feedback Item 401.55, prior to disseminating to industry stakeholders.

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

NRR/IOLB's response to Region II in ROI 17-09 (ML17165A579) stated that testing applicants' knowledge of the emergency or abnormal procedure content for Tier 1 written examination test items was *"more restrictive than currently called for by NUREG-1021, and that this was a change in policy which would require a revision or supplement to NUREG-1021."* During the 8/24/17 teleconference, Region II asked the program office to explain the difference between Tier 1 and 2 written test items. The program office staff said they did not know what the authors of NUREG-1021 intended when constructing the two tiers, and did not attempt to justify or explain the difference between the Tiers during the teleconference.

The NRR/IOLB response in both ROI 17-09 and Operator Licensing Feedback Item 401.55 included: *"Tier 1 test items don't need to reference a procedure"* and *"Tier 1 test items don't require EOP/AOP entry"*, both which may be true, depending on a test item's particular construction. However, NRR/IOLB's response did not address the fundamental question regarding the intent of Tier 1 Emergency/Abnormal Evolution test items on the plant-specific written examination, nor did it explain the intended difference between Tier 1 and Tier 2 test items.

Impact on Agency's Mission

The impact of NRR/IOLB's policy interpretation will result in less testing of applicants' knowledge of abnormal and emergency procedures on the site-specific NRC written exam; a representative selection of 10 CFR 55.41(b)(10) may not be ensured on the NRC site-specific written examination. Although the NRC does not train operators, the NRC is responsible for testing operators after they complete their training program. Facility licensees make adjustments to their initial training program based, in part, on the NRC exam content. NRR/IOLB's policy interpretation means that the site-specific written exam will test less abnormal/emergency procedure knowledge; therefore, it is likely that licensee training programs may be inappropriately adjusted to reflect the NRR/IOLB policy determination. Actual consequences may occur when operator procedure knowledge declines, and plant events are not properly mitigated by operators because of inadequate procedure knowledge. See the DPO Section titled "Public Health and Safety Concern" for a disturbing trend identified by INPO in 2017 regarding operator knowledge of abnormal procedures. The impact of NRR/IOLB's policy determination, in turn, could affect the agency's Strategic Plan (ML14246A439), Safety Objective 1, Prevent and Mitigate Accidents and Ensure Radiation Safety, because licensed operators mitigate accidents during abnormal and emergency events.

The impetus for ROI 17-09 was actual inconsistencies in facility licensee interpretations of how to develop Tier 1 written exam test items; the ROI presented three differing viewpoints that currently exist. During the Region II 2017 Office Assessment, NRR/IOLB identified that several Tier 1 draft test items, as submitted by the facility licensee for the 2016 Brunswick NRC examination, were categorized as deficient (by the examiner) because the questions did not test applicant knowledge of emergency/abnormal procedures. The NRR/IOLB assessment (ML17095A958) concluded that NUREG-1021 did not require Tier 1 test items to test applicant knowledge of emergency/abnormal procedure content, and that the examiner's evaluation (that the draft test items did not match the intent of the K/A) was wrong.

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Proposed Alternative

As previously documented in ROI 17-09, the submitters of this DPO propose the following alternative, including its basis, instead of NRR/IOLB's position regarding Tier 1 written test items.

- A Tier 1 written test item should, whenever possible, within the wording of the K/A statement, test the applicant's knowledge of the abnormal condition or emergency procedure *content*, for example:
 - an immediate operator action,
 - an important subsequent manual operator action, or
 - overall mitigative strategy of the off-normal or emergency procedure.
- Tier 1 test items where the stem of the question mentions an ongoing abnormal/emergency evolution, but where the test item can be answered solely using Tier 2 (Plant Systems) knowledge, contain, in a sense, "window dressing"; these test items should be assessed as K/A mismatches, but assessed as "enhancement required", in accordance with ES-401-9, Written Exam Worksheet.
- If testing knowledge of the abnormal condition or emergency procedure content is not possible given the wording of the K/A, then accept the question as meeting the K/A as long as all other aspects of the K/A are met.

The benefit of this proposed alternative is that testing procedure knowledge is promoted, there is no penalty for the exam writer, and the random sample initially drawn is preserved.

Basis for Proposed Alternative

NRR/IOLB's response to Region II in ROI 17-09 (ML17165A579) stated that testing applicants' knowledge of the emergency or abnormal procedure content for Tier 1 written examination test items was "...more restrictive than currently called for by NUREG-1021, and that this was a change in policy which would require a revision or supplement to NUREG-1021."

Testing applicants' knowledge of EOPs and AOPs on the site-specific written exam is not a change in policy; there has always been precedence for testing applicant knowledge of EOPs and AOPs on the site-specific written examination. For example, even the original 1983 version of NUREG-1021, ES-203, Structure of Written Examination Administered to Reactor Operators – Power Reactors (ML15027A434) stated:

"In general, the candidate must demonstrate complete knowledge and understanding of the symptoms, automatic actions, and immediate action steps specified by abnormal and emergency procedures."

The original (1983 version) of ES-203 written exam cover page included Category 4, as shown below:

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Category Value	% of Total	Candidate's Score	% of Category Value	Category
_____	_____	_____	_____	1. Principles of Nuclear Power Plant Operation, Thermodynamics, Heat Transfer and Fluid Flow
_____	_____	_____	_____	2. Plant Design Including Safety and Emergency Systems
_____	_____	_____	_____	3. Instruments and Controls
_____	_____	_____	_____	4. Procedures - Normal, Abnormal, Emergency, and Radiological Control
_____	_____	_____	_____	TOTALS
			Final Grade _____%	

Testing applicants' knowledge of EOPs and AOPs in Tier 1 of the site-specific written exam is not more restrictive than currently called for in NUREG-1021 because the current versions of NUREG-1122, Rev. 2 and NUREG-1123, Rev. 2 (PWR & BWR Knowledge and Abilities Catalogs, respectively) Section 1.10, Emergency and Abnormal Evolutions, contain the following definition of an emergency and abnormal evolution:

EMERGENCY EVOLUTION: An emergency plant evolution is any condition, event, or symptom which leads to entry into the EOPs.

ABNORMAL EVOLUTION: An abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition, but nonetheless, adversely affecting a safety function.

The current version of NUREG-1021 (Rev. 11), includes Form ES-401-1 (BWR Written Exam Outline) and Form ES-401-2 (PWR Written Exam Outline), these forms identify Tier 1 as "EMERGENCY and ABNORMAL PLANT EVOLUTIONS."

NRR/IOLB's policy interpretation does not ensure that the site-specific written exam tests vendor-specific (Westinghouse, Babcock & Wilcox, Combustion Engineering) EOPs, as required by NUREG-1021.

To illustrate this point, consider Westinghouse procedure ECA-2.1, Uncontrolled Depressurization of All Steam Generators, listed in the Westinghouse Owner's Group EOP list of procedures:

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<u>Designator</u>	<u>Guideline</u>
E-0	Reactor Trip or Safety Injection
ES-0.0	Rediagnosis
ES-0.1	Reactor Trip Response
ES-0.2	Natural Circulation Cooldown
ES-0.3	Natural Circulation Cooldown With Steam Void in Vessel (With RVLIS)
ES-0.4	Natural Circulation Cooldown With Steam Void in Vessel (Without RVLIS)
E-1	Loss of Reactor or Secondary Coolant
ES-1.1	SI Termination
ES-1.2	Post LOCA Cooldown and Depressurization
ES-1.3	Transfer to Cold Leg Recirculation
ES-1.4	Transfer to Hot Leg Recirculation
E-2	Faulted Steam Generator Isolation
E-3	Steam Generator Tube Rupture
ES-3.1	Post-SGTR Cooldown Using Backfill
ES-3.2	Post-SGTR Cooldown Using Blowdown
ES-3.3	Post-SGTR Cooldown Using Steam Dump
ECA-0.0	Loss of All AC Power
ECA-0.1	Loss of All AC Power Recovery Without SI Required
ECA-0.2	Loss of All AC Power Recovery With SI Required
ECA-1.1	Loss of Emergency Coolant Recirculation
ECA-1.2	LOCA Outside Containment
ECA-2.1	Uncontrolled Depressurization of All Steam Generators
ECA-3.1	SGTR With Loss Of Reactor Coolant-Subcooled Recovery Desired
ECA-3.2	SGTR With Loss Of Reactor Coolant-Saturated Recovery Desired
ECA-3.3	SGTR Without Pressurizer Pressure Control

NUREG-1021, Form ES-401-2, identifies **000040 Steam Line Rupture – Excessive Heat Transfer (W E12)** as an emergency/abnormal plant evolution topic. The “**WE12**” designator on Form ES-401-2 for this topic refers to PWR K/A Catalog Section 4.5, Westinghouse Emergency Plant Evolutions, E12: Uncontrolled Depressurization of all Steam Generators. (See PWR K/A Catalog Section 4.5 listed below, item listed on page 4.5-31.)

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4.5 Westinghouse EPEs and APEs	4.5-1
Rediagnosis	4.5-1
SI Termination	4.5-4
LOCA Cooldown and Depressurization	4.5-7
LOCA Outside Containment	4.5-9
Loss of Secondary Heat Sink	4.5-12
Degraded Core Cooling	4.5-15
Saturated Core Cooling	4.5-18
Pressurized Thermal Shock	4.5-20
Natural Circulation Operations	4.5-23
Natural Circulation with Steam Void in Vessel with/without RVLIS	4.5-25
Loss of Emergency Coolant Recirculation	4.5-28
Uncontrolled Depressurization of all Steam Generators	4.5-31
Steam Generator Overpressure	4.5-34
High Containment Pressure	4.5-37
Containment Flooding	4.5-40
High Containment Radiation	4.5-43

The intent of the 000040 Steam Line Rupture – Excessive Heat Transfer (W E12) topic is to test the applicants' knowledge of the Westinghouse ECA-2.1 procedure. The vendor-specific AOPs and EOPs in the K/A Catalogs, and in ES-401, mirror the actual vendor procedures because the intent was to test the content of these important procedures.

Therefore, the NRR/IOLB policy determination, that applicants' knowledge of EOPs for Tier 1 test items like this ECA-2.1 example is adequately tested using test items that test plant system design features, interlocks, and system operation, does not ensure that the site-specific written exam tests vendor-specific (Westinghouse, Babcock & Wilcox, Combustion Engineering) EOP content, which is required by NUREG-1021, ES-401.

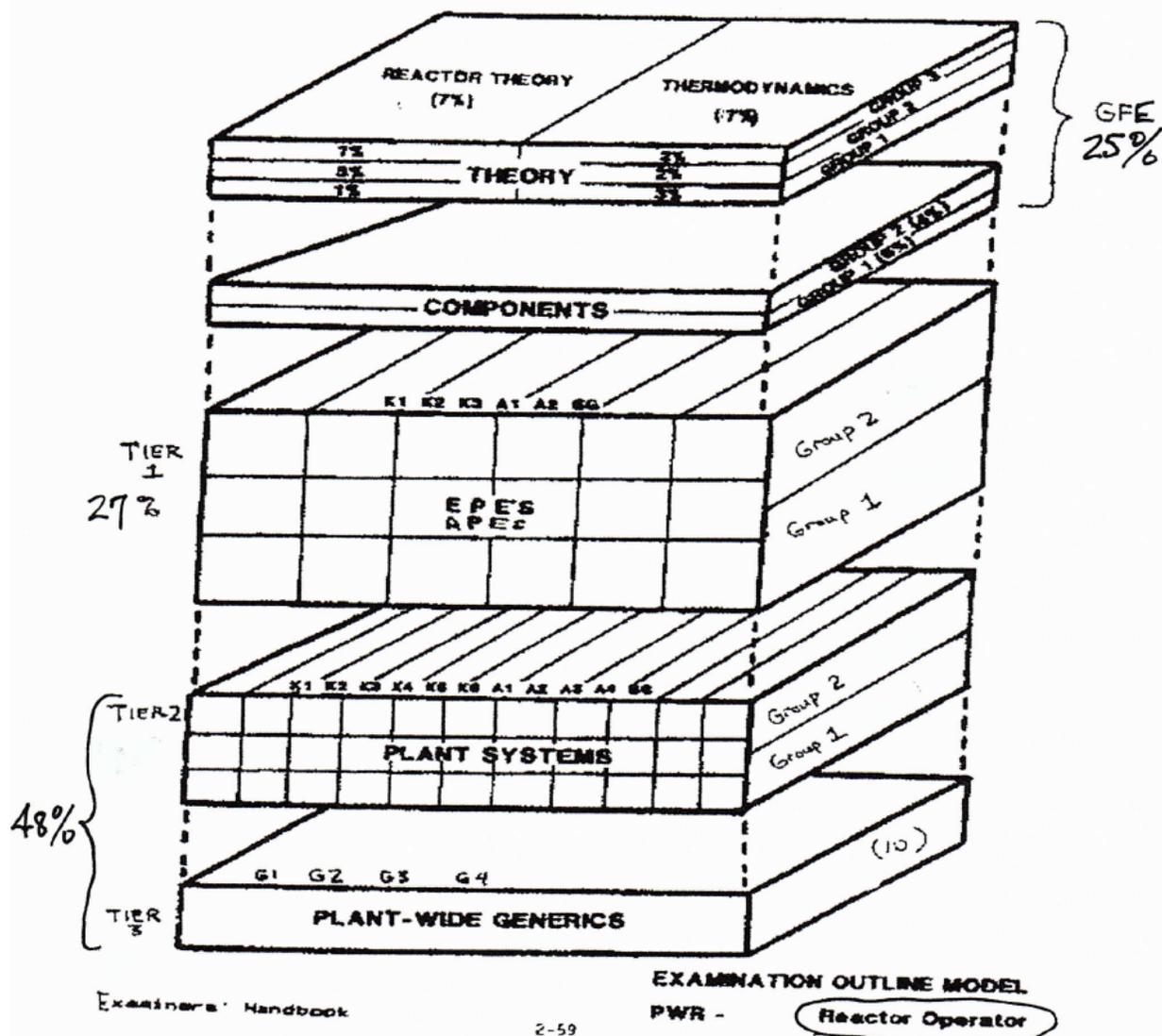
Instead, the writers of this DPO contend that the site-specific written exam Tier 1 test items, like the vendor-specific EOPs example discussed above, should, whenever possible, test the applicant's knowledge of:

- an immediate operator action,
- an important subsequent manual operator action, or
- overall mitigative strategy associated with the emergency procedure

During the 8-24-17 teleconference with Region II, when asked to explain the difference between Tier 1 and Tier 2 site-specific written exam items, NRR/IOLB's response was they did not know what the authors intended when constructing two Tiers, and subsequently did not attempt to justify or explain their policy determination for Tier 1 test items.

The original Examiner Standards Handbook included a graphic representation of the intended content of the generic and site-specific portions of the written examination: (see next page)

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This Examiners Standard Handbook representation depicts the middle Tier 1 “slice” as EPEs and APEs, i.e., emergency and abnormal plant evolutions. The Tier 1 “slice” is represented as a different “slice” compared to Tier 2; Tier 2 is plant systems knowledge. NRC Information Notice 88-40 (Examiners’ Handbook for Developing Operator Licensing Examinations) indicated that approximately 27% of the RO exam (40 % of the SRO exam) should normally sample emergency and abnormal plant evolutions in Tier 1. This graphical representation explained how the 10 CFR 55.41 (a) requirement for a “representative selection” was being met.

Based on the preceding discussion of historical precedence, definitions in the K/A catalogs, and ES-401 requirements for two Tiers, the writers of this DPO contend the following items:

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- Tier 2 site-specific written exam items are intended to test the applicant's knowledge of plant systems, and to a lesser degree, some procedure knowledge as it relates to A.2 K/As. The intent of Tier 2 is to test an applicant's mastery of "how the plant works."
- Tier 1 site-specific written exam items are intended to test the applicant's mastery of "how to operate the plant" in accordance with the abnormal (i.e., off-normal) and emergency operating procedures, during abnormal and emergency evolutions.

NRR/IOLB's response to Region II during the 8-24-17 teleconference was that "systems knowledge and Emergency/Abnormal procedure knowledge cannot be separated."

The writers of this DPO contend that systems knowledge and procedure knowledge can be separated. Systems knowledge includes, for example, plant system design features, interlocks, flow paths, actuation logic, and set points. Abnormal/emergency procedures knowledge includes, for example, required immediate operator actions, important subsequent actions, and overall mitigative strategy for off-normal and emergency evolutions. Consider the following "before" and "after" examples listed below, for the same Tier 1 K/A. In the "before" example, a fault inside containment causes pressure to rise above the Main Steam Trip Valve auto-isolation set point. In the "after" example, the applicants' knowledge of the overall mitigative procedure strategy is tested.

K/A:

040AK2.01

Steam Line Rupture

Knowledge of the interrelations between the Steam Line Rupture and the following:

Valves

Before:

Unit 2 is currently heating up following a refueling outage

- RCS Tavg = 520°F
- A Steam line break occurs on the "B" SG just downstream of the steam flow venturi
- The Main Steam Trip Valves receive an automatic close signal

Which ONE of the choices below completes the following statement?

The signal that caused the Main Steam Trip Valves to close is _____.

- A. High Steam flow coincident with Lo-Lo Tavg
- B. High Steam Line Differential Pressure
- C. High Steam flow coincident with Lo Steam Pressure
- D. Intermediate Hi-Hi Containment pressure

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K/A:

040AK2.01

Steam Line Rupture

Knowledge of the interrelations between the Steam Line Rupture and the following:

Valves

After:

10. Unit 2 is currently heating up following a refueling outage

- RCS Tavg = 520 °F

- A Steam line break occurs on the B SG one foot downstream of the steam flow venturi.

Which of the following completes both statements?

The signal that should auto-close the Main Steam Trip Valves (MSTVs) is ___(1)___.

In accordance with 2-E-2, Faulted Steam Generator Isolation, if the MSTVs can not be manually closed then the crew is required to close ___(2)___ SG Non-Return Valve(s).

- A. (1) High Steam flow coincident with Lo-Lo Tavg
(2) only the faulted
- B. (1) High Steam flow coincident with Lo-Lo Tavg
(2) all
- C. (1) Intermediate Hi-Hi Containment pressure
(2) only the faulted
- D. (1) Intermediate Hi-Hi Containment pressure
(2) all

As can be seen by this example, it is not difficult to avoid testing abnormal condition procedure content, and still meet the lower level wording of a Tier 1 K/A statement. Systems knowledge and procedures knowledge form the basis for the NRC's confidence when issuing a license to an operator applicant – the NRC issues a license to an applicant who knows 1) *how the plant works* (system knowledge) and 2) *how to operate the plant*, in accordance with procedures, during abnormal/emergency situations (procedure knowledge).

During the 8-24-17 teleconference with Region II, NRR/IOLB stated that changes to the yet unpublished K/A Catalog Emergency/Abnormal Stem Statements would be made (for the future Revision 3, which was published in the Federal Register in April 2017), commensurate with the recent NRR/IOLB policy determination in ROI 17-09 and Operator Licensing Feedback Item 401.55.

The last sentence of ROI 17-09 (Recommended Action/Resolution Section) referred to the new K/A Catalog (Revision 3) industry effort. The new BWR and PWR catalogs were the result of a joint agency-industry effort, compiled of stakeholder teams with years of industry experience,

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and were published in the Federal Register in April 2017. The new catalogs, as published in the Federal Register in April 2017, included basis statements for the emergency/abnormal knowledge and ability stem statements, which were intended to provide insight for the intent of Tier 1 topics. (See Table 4 below).

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)

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)

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)

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)

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)

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

If NRR/IOLB removes or alters these basis statements for the upcoming Revision 3 K/A Catalogs, then this refutes the experience and wisdom of the industry effort, and creates an inconsistency between the operating fleet K/A catalogs and the AP-1000 K/A Catalog, NUREG-2103. (See the following pages....)

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**Table 4
Knowledge and Ability Stem Statements for
Emergency and Abnormal Procedures**

Knowledge Stem Statements

- EK 1 Knowledge of the relationship between the [event] and the following systems or components:
(CFR: 41.8 / 41.10 / 45.3)
- EK 1 Lists the systems required to be monitored and/or operated by the procedure.*
- EK 2 Knowledge of the operational implications or cause and effect relationships of the following as they apply to [event]:
(CFR: 41.5 / 41.7 / 45.7 / 45.8)
- EK2 Lists the operationally based theoretical concepts applicable to the procedure.. These items typically came from the procedure bases, PRA, OE, procedure notes and cautions.*
- EK 3 Knowledge of the reasons for the following actions as they apply to [event]:
(CFR: 41.5 / 41.10 / 45.6 / 45.13)
- EK 3 Lists the actions and bases taken in the procedure.*

Ability Stem Statements

- EA 1 Ability to operate and/or monitor the following as they apply to a [event]:
(CFR: 41.5 / 41.7 / 45.5 to 45.8)
- EA 1 Lists the system and/or components required to be monitored and/or operated by the procedure.
- EA 2 Ability to evaluate the following parameters and/or conditions as they apply to [event]:
(CFR: 41.7 / 43.5 / 45.6)
- EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.

Note that the AP-1000 abnormal/emergency procedure numbers and titles are included on Form ES-401N-2

(See following page)

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ES-401N

2

Form ES-401N-2

ES-401N	AP-1000® Examination Outline							Form ES-401N-2	
Emergency and Abnormal Plant Evolutions—Tier 1/Group 1 (RO/SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G*	K/A Topic(s)	IR	#
E-0, Reactor Trip or Safeguards Actuation / 1, 2, 3, 4									
ES-0.1, Reactor Trip Response / 1, 2, 3, 4									
ES-1.3, ADS Stage 1–3 Actuation Response / 3									
ES-1.4, ADS Stage 4 Actuation Response / 3									
A-313, Uncontrolled Cooldown / 4									
A-336, Malfunction of Protection and Safety Monitoring System / 7									
E-1, Loss-of-Coolant Accident / 2, 3									
A-342, Reactor Coolant Pump Malfunction / 1, 2, 3, 4									
A-337, Passive RHR Heat Exchanger Leak / 4									
A-343, Loss of Normal Residual Heat Removal / 4									
A-317, Loss of Component Cooling Water / 8									
ES-0.2, Natural Circulation Cooldown / 4									
FR-S.1, Response to Nuclear Power Generation / 1									
E-3, Steam Generator Tube Rupture / 3									
E-2, Faulted Steam Generator Isolation / 4									
A-301, Rapid Power Reduction / 1									
A-307, DAS Operations at Local Cabinets / 7									
FR-C.1, Response to Inadequate Core Cooling / 4									
A-323, Loss of 6.9-kV, 4,160-V, or 480-V Bus Power / 6									
ES-1.1, Passive Safety System Termination / 3									
A-345, Loss of Nuclear Service Water / 4									
A-329, Loss of Instrument Air / 8									
ECA-1.1, Loss-of-Coolant Accident Outside Containment / 3									
FR-H.1, Response to Loss of Heat Sink / 4									
SDP-1, Response to Loss of RCS Inventory During Shutdown / 2									
SDP-2 Response to Loss of RNS During Shutdown / 4									
K/A Category Totals:							Group Point Total:		18/6

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Lastly, based on NRR/IOLB's policy interpretation, there is no need to even have separate Tier 1 and Tier 2 categories since the NRR/IOLB policy interpretation relies only on the lower wording of the K/A statement, and discounts the Tier in which the K/A was selected. It is not reasonable to assume that the authors of ES-401 arbitrarily designed two tiers that were not different. The reasonable assumption is that there was a reason for separate Tier 1 and Tier 2 categories. Tier 2 is "Plant Systems," which was meant to test the configuration of the plant systems and their design. The void is filled by Tier 1, which was meant to test how to operate the plant in accordance with plant procedures when confronted with abnormal/emergency situations that challenge safety.

Some may say that, since the site-specific written exam is not the only portion of the NRC exam that tests abnormal and emergency procedures, it doesn't matter if the quantity of test items requiring knowledge of the content of abnormal/emergency procedures is reduced.

Although the operating portion of the NRC exam does test abnormal and emergency procedure knowledge, the control room "team" and open-reference operating exam format should not be relied upon to satisfy the intent of 10 CFR 55.41(b) which requires a representative selection of the fourteen items, for each individual on a written examination.

Form ES-201-2, Examination Outline Quality Checklist, contains the following items that the facility licensee and Chief Examiner must assess for each NRC exam:

- Written Exam Item 1.c: "Assess whether the outline overemphasizes any systems, evolutions, or generic topics."
- General Item 4.b: "Assess whether the 10 CFR 55.41, 55.43, and 55.45 sampling is appropriate"
- General Item 4.e: "Check the entire exam for balance of coverage."

The Form ES-201-2 Quality Check Items (1.c, 4.b, and 4.e) will not be met because the result of NRR/IOLB's policy is that the number of site specific written exam test items that test abnormal/emergency procedure content will be lower, especially for RO exams, which leads to overemphasis of testing plant systems knowledge on the plant specific written exam.

To illustrate this point, a reactor operator (RO) written exam sample plan was reviewed to identify how many test items would test knowledge of abnormal/emergency procedure content when NRR/IOLB's policy determination was implemented. Specifically, the criteria used in this review was, unless the K/A statement wording specifically included the word "procedure", the test item was assumed to solely test a plant system design feature, interlock, or system operation aspect. The review results identified that only three of the 27 Tier 1 test items would test abnormal/emergency procedure content. Out of all three Tiers, (75 questions on the RO sample plan), a total of only NINE items would test abnormal/emergency procedure knowledge when the NRR/IOLB policy determination was implemented. This review meant that only 12% of the RO test items would be required to test abnormal/emergency procedure knowledge when NRR/IOLB's policy determination was implemented.

Based on this initial review, three additional RO written exam sample plans were independently reviewed, using the same criteria listed above, to verify the first review results.

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Percentage of 75 RO test items that would test abnormal/emergency procedure knowledge

Second Sample Plan Reviewed:	9% (7/75)
Third Sample Plan Reviewed:	10% (8/75)
Fourth Sample Plan Reviewed:	9% (7/75)

Based on these review results, implementation of NRR/IOLB's policy determination will result in less site-specific RO written exam test items that test abnormal/emergency procedure content, and is a departure from NRC Information Notice 88-40, which described the original methodology for fulfilling the 10 CFR 55.41 "representative selection" requirement for the site-specific written exam, including 10 CFR 55.41(b)(10).

To counter the opposing view that the operating test may somehow compensate for a reduced number of RO abnormal/emergency procedure test items on the site-specific written exam, during the scenario portion of the operating examination, SRO applicants' knowledge of EOPs is evaluated more so than RO applicants' knowledge of EOPs, since the SRO applicants direct RO emergency procedure actions. The site-specific written exam provides the only opportunity to evaluate knowledge of EOPs for RO applicants on an individual basis. The control room "team" and open-reference operating exam format should not be relied upon to satisfy the intent of 10 CFR 55.41(b) which requires a representative selection of the fourteen items, for each individual on a written examination.

One must look no further than pass rates on the operating portion of the examination. Pass rates on the dynamic simulator portion of the examination approach 100%. The percentage of applicants that receive satisfactory scores on more than 80% of the Systems Job Performance Measures (JPMs) also approaches 100%. The majority of operating test failures occur due to the contribution of failing scores on Administrative JPMs; citing a lower overall JPM pass rate for the purpose of justifying a reduced number of abnormal/emergency written test items is misleading because the majority of JPM Section failures occur as a result of the Administrative JPM contribution to the JPM Section failure. Therefore, although the dynamic simulator scenarios and JPMs test applicant knowledge of emergency and abnormal procedures, these sections of the operating exam do not discriminate at the same level as the site-specific RO written exam.

It is noteworthy that, during operating exam scenarios, applicants who are examined in the RO (a.k.a "operator-at-the-controls – OATC") and Balance of Plant (BOP) positions are typically provided direction from the SRO (a.k.a "control room supervisor, CRS"), who reads steps from the emergency procedures. When the SRO provides the directives, the OATC and BOP applicants then carry out the required emergency actions. This operating exam format tests the OATC and BOP applicants' ability to perform emergency actions, but it does not test the same in-depth emergency procedure knowledge that was intended to be tested in the Tier 1 portion of the site-specific written exam.

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

Public Health & Safety Concern

On September 7, 2017, NRR/IOLB published Operator Licensing Feedback Item 401.55, which means that facility licensees will likely develop Tier 1 plant-specific written test items that test less abnormal and emergency operating procedure knowledge. Facility licensees may inappropriately make adjustments to their initial license training program based, in part, on NRR/IOLB's response to Operator Licensing Feedback Item 401.55; therefore, actual consequences may occur as operator procedure knowledge continues to decline (see next paragraph) and plant events are not properly mitigated by operators due to lack of procedure knowledge. Because of NRR/IOLB's policy determination, applicant knowledge of the content of abnormal and emergency procedures, in accordance with 10 CFR 55.41(b)(10), will not be adequately tested on the site-specific written examination, prior to issuance of operator licenses.

On June 1, 2017, INPO identified operator weaknesses in the implementation of abnormal operating and off normal alarm response procedures in INPO IER 17-5, Line of Sight to the Core, (ML17171A309):

“Reviews of noteworthy events and evaluation data indicate that weaknesses exist in implementation of abnormal operating and alarm response procedures. In the majority of these events, abnormal plant conditions satisfied the entry conditions for multiple procedures, and operators chose implementation paths that resulted in inappropriate operator responses. Gaps in knowledge of abnormal and alarm response procedures led to a perception that it was allowable to be selective concerning procedural steps. Further, several of the events revealed procedural deficiencies resulting from inadequate revisions that, in turn, led to flawed rationale by operators.”

On March 28, 2010 at H. B. Robinson a 4KV cable fault caused a fire and damaged a transformer, and a second electrical fault and fire was caused by the operators when they inappropriately attempted to reset the generator lockout relay without first ensuring the cause of the lockout was cleared. The part of the event that is relevant to this DPO occurred while the crew was implementing the EOP response following the reactor trip; the operators came very close to losing a RCP seal, due to thermally shocking the seal, because they failed to implement Step 19 (Check RCP Seal Cooling) correctly. Specifically, the operators opened the RCP seal injection valve even though thermal barrier cooling was lost for 39 minutes coincident with no seal injection for 10 to 15 minutes. The operators complied with the procedure step for verifying that a charging pump was operating, when they made the determination that adequate seal injection existed, but did not comply with the intent of the step to verify that seal cooling had been maintained. The March 2010 H.B. Robinson event is a strong example of why testing abnormal/emergency procedure knowledge on the site-specific written exam is important. The final significance determination for the two WHITE findings was documented in NRC Inspection Report 05000261/2011008 (ML110310469).

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

Summary of Concern

NRR/IOLB's policy interpretation, and subsequent communication to industry stakeholders, will result in fewer items that test applicant knowledge of abnormal and emergency procedure content on the site-specific written examination; abnormal and emergency procedures are required to be tested on the site-specific written exam in accordance with 10 CFR 55.41(b)(10). The control room "team" and open-reference operating exam format should not be relied upon to satisfy the intent of 10 CFR 55.41(b) which requires a representative selection of the fourteen items, for each individual on a written examination.

NRR/IOLB's policy interpretation does not ensure that the site-specific written exam tests vendor-specific (Westinghouse, Babcock & Wilcox, Combustion Engineering) EOPs, as required by NUREG-1021.

Facility licensees may inappropriately adjust training programs to reflect the NRR/IOLB policy determination.

Tier 1 site-specific written exam items are intended, whenever possible, to test the applicant's mastery of "how to operate the plant" during abnormal and emergency evolutions, in accordance with the abnormal/emergency procedures. NRR/IOLB's communication to industry in Operator Licensing Feedback Item 401.55 means Tier 1 site-specific written exam test items will likely become an extension of Tier 2 test items. Tier 2 site-specific written exam items are intended to test the applicant's systems knowledge of "how the plant works", and to a lesser degree, some procedure knowledge as it relates to A.2 K/As.

If NRR/IOLB removes or alters the basis statements for the upcoming Revision 3 K/A Catalogs, as published in the Federal Register on April 2017, to facilitate their policy determination, then the experience and wisdom of the industry effort for the Catalogs will be lost, and an unnecessary inconsistency between the operating fleet K/A catalogs and the AP-1000 K/A Catalog, NUREG-2103 will exist.

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test
Items (Document Date: 10-10-17)

Signatures

The writers of this DPO are Region II examiners, with extensive industry training and/or operating experience, many of which previously held SRO NRC licenses.

[Name (printed) / Signature / Date]

BRUNO CABALLERO / Bruno Caballero / 10-10-17

Daniel M. Bacon / Daniel M. Bacon / 10-10-17

Phillip G. Caphart / P. Caphart / 10-10-17

MICHAEL K. MEEKS / Michael Meeks / 10/10/2017

David R Lanyi / David R Lanyi / 10/10/2017
DAVID R. LANYI

MARK A. BATES / Mark A. Bates / 10/10/2017

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

The following pages contain important documents associated with this Differing Professional Opinion. Although these documents may be available in ADAMS, the writers of this DPO included these documents as part of the DPO.

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)



Operator Licensing Program Feedback

ML17249A961

9/7/17

401.55

Some Tier 1, "Emergency and Abnormal Plant Evolutions," written examination questions have been categorized as deficient, and in some instances, "Unsatisfactory" as a result of the NRC Form ES-401-9 Written Examination Review process because their stated Tier 1 knowledge or abilities (K/A) statement did not reference procedures and, therefore, only required system knowledge to answer.

Is a proposed Tier 1 written examination question deficient or unacceptable if it does not reference a procedure?

The Knowledge and Abilities Catalogs for Nuclear Power Plant Operators (K/A Catalogs) (NUREG-1122 and -1123) state that "an emergency plant evolution is any condition, event, or symptom which leads to entry into the plant specific emergency operating procedures (EOPs)" and "an abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition, but, nonetheless, adversely affecting a safety function."

However, NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," does not require Tier 1 written examination questions to reference a procedure. The Tier 1 category is designated as Emergency and Abnormal Plant Evolutions, but it cannot be completely separated from Plant Systems knowledge (Tier 2 category). Systems are designed to respond to Emergency and Abnormal Plant Evolutions, including design specifications, pressures, automatic actions, etc. and, as such, a Tier 1 question can test for these items, provided the system knowledge tested relates directly to the Emergency or Abnormal Plant Evolution

selected K/A statement, i.e., it matches the K/A statement from the outline. If a question meets its specific K/A statement in its entirety, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question. For example, a question testing PWR K/A APE 027 AA2.11 - "Ability to determine and interpret RCS pressure as they [RCS Pressure] apply to the Pressurizer Pressure Control Malfunctions" - would be acceptable even if it did not test specific detailed procedural knowledge as long as the Pressurizer Pressure Control Malfunction could ultimately lead to entry into EOPs or Abnormal Operating Procedures (AOPs). Similarly, a question testing BWR K/A EPE 295024 EK2.11 - "Knowledge of the interrelations between High Drywell Pressure and Drywell Spray (RHR) Logic" - would be acceptable if it tested the operator's knowledge as to the actions required to open the interlocked closed Drywell Spray Header Isolation valves upon receipt of a Low Pressure Coolant Injection (LPCI) initiation signal even if the question's conditions did not indicate entry into the EOPs.

In summary, rating a question as an "unacceptable" or "deficient" K/A mismatch, i.e., "unsatisfactory" or in need of "enhancement," because it can be answered based on plant system knowledge as it relates to the referenced Emergency or Abnormal Plant Evolution, is not supported by NUREG-1021. Moreover, testing plant system design features, interlocks, and system operation for conditions, events, or symptoms that lead to entry into EOPs or AOPs and match the Tier 1 K/A statement is not unacceptable simply because the EOPs or AOPs were not entered. Testing plant system design features, interlocks, and system operation will in many instances test 10 CFR 55.41(10) procedural knowledges and abilities albeit without entry into the procedure.

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01/2008	OPERATOR LICENSING REPORT ON INTERACTION (ROI)		Interaction No.:	
			ROI-17-09	
Subject:	NUREG 1021, ES-401 Tier 1 written exam test items			
Type of Action:	Waiver:	Policy Interpretation: <input checked="" type="checkbox"/>	Request for HQ Action:	
From:	Eugene F. Guthrie, Region II OL Branch Chief, OB2	Date:	07/28/15	
Contact Person:	Bruno Caballero, Sr. Operations Engineer RII, OB2			
To:	Nancy L. Salgado, Branch Chief NRR IOLB	Proposed Due Date:	06/01/17	
Info.:	ADAMS Accession No.: ML17165A579			

Issue/Purpose:

The purpose of this ROI is to gain agency alignment (policy interpretation) on writing and/or assessing Tier 1 written test items in accordance with ES-401-9, Written Examination Review Worksheet; this ROI presents three differing viewpoints for how Tier 1 test items are required to be written and/or assessed.

Background:

Section 1.10, Emergency and Abnormal Evolutions, of the PWR K/A Catalog (NUREG-1122, Rev. 2, Supplement 1), and BWR K/A Catalog (NUREG-1123, Rev. 2, Supplement 1) contain the following definitions:

- **Emergency Evolution:** An emergency plant evolution is any condition, event or symptom which leads to entry into the Emergency Operating Procedures (EOPs). (BWR and PWR Catalogs)
- **Abnormal Evolution:** An abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition. (PWR Catalog NUREG-1122, page 1.10).
- **Abnormal Evolution:** An abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition, but, nonetheless, adversely affecting a safety function. (BWR Catalog NUREG-1123, Page 1-10)

Section 1.10.1 (BWR NUREG-1123, Rev 2, Supplement 1), Table 4, K/A Statements for Emergency and Abnormal Plant Evolutions, lists the following K/A stem statements:

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

E/AK1	Knowledge of the operational applications of the following concepts as they apply to the (EMERGENCY OR ABNORMAL PLANT EVOLUTION): (CFR: 41.8 to 41.10)
E/AK2	Knowledge of the interrelations between (EMERGENCY OR ABNORMAL PLANT EVOLUTION) and the following: (CFR: 41.7 / 45.8)
E/AK3	Knowledge of the reasons for the following responses as they apply to (EMERGENCY OR ABNORMAL PLANT EVOLUTION): (CFR: 41.5 / 45.6)
E/AA1	Ability to operate and / or monitor the following as they apply to (EMERGENCY AND ABNORMAL PLANT EVOLUTION): (CFR: 41.7 / 45.8)
E/AA2	Ability to determine and interpret the following as they apply to (EMERGENCY AND ABNORMAL PLANT EVOLUTION): (CFR: 41.10 / 43.5 / 45.13)

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The Summary of Changes for the PWR K/A Catalog (PWR NUREG-1122, Rev 2, Supplement 1) state the following with respect to the Rev 2 changes for NUREG-1122:

1.7 Revised knowledge and ability stem statements for emergency plant evolutions.

The knowledge and ability stem statements (categories) for emergency plant evolutions were revised for consistency with the BWR catalog. This involved revising all five (5) knowledge stem statements as shown below. The changes are underlined.

- EK1. Knowledge of the operational implications of the following concepts as they apply to the (EMERGENCY PLANT EVOLUTION):
(CFR 41.8 / 41.10 / 45.3)
- EK2. Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:
(CFR 41.7 / 45.7)
- EK3. Knowledge of the reasons for the following responses as they apply to (EMERGENCY PLANT EVOLUTION):
(CFR 41.5 / 41.10 / 45.6 / 45.13)
- EA1. Ability to operate and / or monitor the following as they apply to (EMERGENCY PLANT EVOLUTION):
(CFR 41.7 / 45.6)
- EA2. Ability to determine and interpret the following as they apply to (EMERGENCY PLANT EVOLUTION):
(CFR 43.5 / 45.13)

NUREG-1021, Rev 10, ES-401, Section D.2 (page 6 of 50), and NUREG-1021, Rev 11, ES-401, Section D.2 (page 7 of 52), Select and Develop Questions, both state:

2. Select and Develop Questions

- a. Prepare the site-specific written operator licensing examination using a combination of existing, modified, and new questions that match the specific K/A statements in the previously approved examination outline (refer to Section D.1 and ES-201) and the criteria summarized below. Ensure that the questions selected for Tier 3 maintain their focus on plant-wide generic knowledge and abilities and do not become an extension of Tier 2, "Plant Systems."

NUREG-1021, Rev 10, Form ES-401-1 (BWR Written Exam Outline) and Form ES-401-2 (PWR Written Exam Outline) Tier 1 Group 1 and Tier 1 Group 2 Headers are "Emergency and Abnormal Plant Evolutions." For example:

ES-401	3	Form ES-401-2
ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions—Tier 1/Group 2 (RO/SRO)	Form ES-401-2

Consider the following Tier 1 Emergency/Abnormal Evolution K/A statement and the associated test item:

K/A:
040AK2.01
Steam Line Rupture
Knowledge of the interrelations between the Steam Line Rupture and the following:
Valves

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Unit 2 is currently heating up following a refueling outage

- RCS Tavg = 520°F
- A Steam line break occurs on the "B" SG just downstream of the steam flow venturi
- The Main Steam Trip Valves receive an automatic close signal

Which ONE of the choices below completes the following statement?

The signal that caused the Main Steam Trip Valves to close is _____.

- A. High Steam flow coincident with Lo-Lo Tavg
- B. High Steam Line Differential Pressure
- C. High Steam flow coincident with Lo Steam Pressure
- D. Intermediate Hi-Hi Containment pressure

In this test item, the fault inside containment causes pressure to rise to 17.8 psia, which auto-isolates the Main Steam Trip Valves. The test item could also be linked with the following Tier 2 (Plant Systems) knowledge and abilities statements:

039, Main and Reheat Steam System (MRSS)

K4.08: Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: Interlocks on MSIV and bypass valves

A3.02: Ability to monitor automatic operation of the MRSS, including: Isolation of the MRSS

On the other hand, the intent of the Tier 1 Emergency/Abnormal *Evolution* topic may be more appropriately tested in a different version of the original test item that tests the overall mitigative strategy of the Steam Line Rupture procedure (E-2) in the second portion of this question.

K/A:

040AK2.01

Steam Line Rupture

Knowledge of the interrelations between the Steam Line Rupture and the following:

Valves

10. Unit 2 is currently heating up following a refueling outage

- RCS Tavg = 520°F
- A Steam line break occurs on the B SG one foot downstream of the steam flow venturi.

Which of the following completes both statements?

The signal that should auto-close the Main Steam Trip Valves (MSTVs) is ___(1)___.

In accordance with 2-E-2, Faulted Steam Generator Isolation, if the MSTVs can not be manually closed then the crew is required to close ___(2)___ SG Non-Return Valve(s).

- A. (1) High Steam flow coincident with Lo-Lo Tavg
(2) only the faulted
- B. (1) High Steam flow coincident with Lo-Lo Tavg
(2) all
- C. (1) Intermediate Hi-Hi Containment pressure
(2) only the faulted
- D. (1) Intermediate Hi-Hi Containment pressure
(2) all

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Consider another Tier 1 K/A example.

K/A:

022AA2.02

Loss of Reactor Coolant Makeup

Ability to determine and interpret the following as they apply to the Loss of Reactor

Coolant Makeup:

Charging pump problems

Unit 1 is at 100%

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

The "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

In this test item, both charging pumps receive an auto-start signal and letdown auto-isolates when all charging pump breakers are open at the same time. This test item could also be linked with the Tier 2 (Plant Systems) knowledge and abilities statements:

004, Chemical Volume & Control System (CVCS)

A3.11: Ability to monitor automatic operation of the CVCS, including: Charging/Letdown

K6.04: Knowledge of the effect of a loss or malfunction on the following components: Pumps

**K4.14: Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following:
Control interlocks on letdown system**

On the other hand, the intent of the Tier 1 Emergency/Abnormal Evolution topic may be more appropriately tested by testing the overall mitigative strategy of the Abnormal Operating Procedure (AP-49):

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K/A:
022AA2.02
Loss of Reactor Coolant Makeup
Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup:
Charging pump problems

- Unit 1 is at 100% with the A charging pump running
 - The B charging pump is available with its control switch in AUTO-AFTER-STOP
 - The C charging pump is available with its control switch in AFTER-STOP
- The following indications are noted:
- Charging flow is erratic
 - Charging discharge header pressure is erratic
 - The A charging pump motor amps are erratic
 - The A charging pump trips
 - The B charging pump automatically starts
 - The same erratic indications are noted on the charging header and the B charging pump trips after 30 seconds
- Which of the following choices describes the required actions in accordance with 1-AP-49, Loss of Normal Charging?
- A. Go to 1-AP-48, Charging Pump Cross-Connect
 - B. Perform 1-AP-49 Attachment 2, Venting Charging Pumps
 - C. Immediately start the C charging pump
 - D. Close discharge MOVs on the previously running charging pumps and then start the C charging pump

THREE different viewpoints (licensees and/or examiners) associated with writing and/or evaluating Tier 1 written exam test items are:

VIEWPOINT #1:

The CFR item listed under the K/A statement must also be tested for Tier 1 test items, based on the following NUREG-1021 guidance: ES-401, Section D.1.b (page 4 of 50 in Rev 10; page 5 of 52 in Rev 11)

Examination authors and reviewers should ask themselves the following questions to help determine whether or not any K/A statement is appropriate for testing:

- (Fourth bullet)
 - Is it possible to prepare a question at the correct license level related to the subject K/A? A question at the RO level should test one (or more) of the 14 items listed under 10 CFR 55.41(b) that the K/A is linked to, or test at a RO level as determined from the facility's learning objectives. A question at the SRO-only level should test one (or more) of the seven items listed under 10 CFR 55.43(b) that the K/A is linked to, or test at a level that is unique to the SRO job position as determined from the facility's learning objectives.

The 13 items listed in 10 CFR 55.45 (a) are:

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- (1) Fundamentals of reactor theory, including fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.
- (2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation, and coolant flow.
- (3) Mechanical components and design features of reactor primary system.
- (4) Secondary coolant and auxiliary systems that affect the facility.
- (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.
- (6) Design, components, and function of reactivity control mechanisms and instrumentation.
- (7) Design, components, and function of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
- (8) Components, capacity, and functions of emergency systems.
- (9) Shielding, isolation, and containment design features, including access limitations.
- (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.
- (11) Purpose and operation of radiation monitoring systems, including alarms and survey equipment.
- (12) Radiological safety principles and procedures.
- (13) Procedures and equipment available for handling and disposal of radioactive materials and effluents.
- (14) Principals of heat transfer, thermodynamics and fluid mechanics.

When a Tier 1 K/A statement has CFR ITEM 7 listed, for example, this means that the Tier 1 test item must be written to test the design, component, and function of control and safety systems such as an automatic feature or valve interlock, etc. The only time the Tier 1 test item is required to test the following items is ONLY if CFR ITEM 10 is listed with the Tier 1 K/A statement:

- an immediate operator action,
- an important subsequent manual operator action,
- a long-range action or overall mitigative strategy, or
- a procedure requirement

The reason why Tier 2 Plant Systems K/A statements include the A2 K/A statements (*"Ability to predict the impacts and ...use procedures to correct, control, or mitigate"*) is because this "makes-up-for" Tier 1 test items that don't test the items listed above associated with the emergency/abnormal evolution.

VIEWPOINT #2

The 10 CFR 55.41 (a) item listed with a Tier 1 K/A statement does NOT mean that the test item must be written to test that specific CFR 55.41 item; a Tier 1 test item can be written to test ANY of the fourteen 10 CFR 55.41 (a) test items. Furthermore, as long as the stem of the question contains a situation where the crew entered an Emergency Operating Procedure or off-normal annunciator procedure or Abnormal Operating Procedure, then the test item is acceptable if it solely tests a Tier 2 Plant Systems

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aspect, such as:

- valve interlock
- automatic system response
- power supply arrangement
- component design
- failure mode

As long as the stem [emphasis added] of the question deals with an emergency/abnormal "evolution" then the answer choices don't necessarily have to test required operator actions listed in emergency/abnormal/off-normal annunciator procedures. The reason why Tier 2 Plant Systems K/A statements include the A2 K/A statements ("*Ability to predict the impacts and ...use procedures to correct, control, or mitigate*") is because this "makes up for" Tier 1 test items that don't test operator actions associated with the emergency/abnormal evolution.

VIEWPOINT #3

The 10 CFR 55.41 (a) item listed with a Tier 1 K/A statement does NOT mean that the test item must be written to test the specific CFR item. A Tier 1 test item should, whenever possible, be written to test 10 CFR 55.41 (a) Item #10 as it pertains to abnormal and emergency operating procedures:

(10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Test items where the stem of the question deals with an emergency/abnormal "evolution", or off-normal situation, are inappropriate Tier 1 test items, and are K/A mismatches, if the test item can be answered solely [emphasis added] with the Tier 2 (Plant Systems) knowledges or abilities such as:

- valve interlock logic
- automatic system response
- power supply arrangement
- component design, or
- equipment failure modes.

Tier 1 test items should, whenever possible, test a knowledge or ability associated with the off-normal annunciator, Abnormal Operating, or Emergency Operating Procedure. For example:

- an immediate operator action,
- an important subsequent manual operator action,
- a long-range action or overall mitigative strategy, or
- a procedure requirement.

The fact that Tier 2 Plant Systems K/A statements include the A2 K/A statements ("*Ability to predict the impacts and ...use procedures to correct, control, or mitigate*") does not mean that Tier 1 test items are allowed to become an extension of Tier 2.

Tier 1 test items where the stem contains an abnormal/emergency evolution, but where the test item can be answered solely with the Tier 2 (Plant Systems) knowledges or abilities listed above, become, in a sense, "window dressing"; these test items should be evaluated as K/A mismatches (unacceptable) in accordance with Form ES-401-9, Written Exam Review Worksheet.

Recommended Action/Resolution

The three tiers for the site-specific written exam are:

- Tier 1: Emergency/Abnormal Evolutions (or Procedures)
- Tier 2: Plant Systems
- Tier 3: Plant-wide Generic Administrative Requirements

When writing and/or assessing Tier 1 written test items for the current versions of the K/A catalogs,

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

Region II recommends viewpoint #3 because the 10 CFR 55.41 (a) requirement for "a representative selection of questions on the knowledge, skills, and abilities needed to perform licensed operator duties" may be in jeopardy when the written exam "systematic" sample is inappropriately skewed toward Tier 2 (Plant Systems) test items.

Note: It is likely this same issue may still exist when the new versions of the K/A catalogs are issued.

Final Action/Resolution:

The Region's recommended resolutions ("viewpoints"), that would implement requirements for Tier 1 test item content beyond what is required by NUREG-1021 as discussed below, are not approved.

Viewpoint #1: "The CFR item listed under the K/A statement **must** [emphasis added] also be tested for Tier 1 test items, based on the following NUREG-1021 guidance: ES-401, Section D.1.b (page 4 of 50 in Rev 10; page 5 of 52 in Rev 11)."

Resolution: The Region cites as the justification for this proposal guidance from ES-401, D.1.b which states "A question at the RO level **should** [emphasis added] test one (or more) of the 14 items listed under 10 CFR 55.41(b) that the K/A is linked to ..." However, the guidance also states "or test at a level as determined from the facility's learning objectives." While the guidance encourages question content consistent with both the K/A and its listed 10 CFR 55.41, 43, and/or 45 referenced item(s), it does not require or limit the question content as proposed by the Region's viewpoint, i.e., it would be incorrect to conclude that the question content "must" test "the CFR item listed under the K/A statement."

Viewpoint #2: "... a Tier 1 test item can be written to test ANY of the fourteen 10 CFR 55.41 (a) test items. Furthermore, as long as the stem of the question contains a situation where the crew entered an Emergency Operating Procedure or off-normal annunciator procedure or Abnormal Operating Procedure, then the test item is acceptable if it solely tests a Tier 2 Plant Systems aspect ..."

Resolution: The Region's proposal is partially correct in that it recognizes, as discussed in the Resolution to Viewpoint #1, that Tier 1 test items "can be written to test ANY" of the 10 CFR 55.41 and/or 55.43 items. However, the BWR and PWR K/A Catalogs state that "an emergency plant evolution is any condition, event or symptom which **leads to entry** [emphasis added] into Emergency Operating Procedures (EOPs)" and "an abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition." Therefore, contrary to the viewpoint position, entry into an EOP or Abnormal Operating Procedure (AOP) is not required for Tier 1 test items

Viewpoint #2: "The reason why Tier 2 Plant Systems K/A statements include the A2 K/A statements ("Ability to predict the impacts and ...use procedures to correct, control, or mitigate") is because this 'makes up for' Tier 1 test items that don't test operator actions associated with the emergency/abnormal evolution."

Resolution: The viewpoint discussion provides no justification to support the assertion that the A2 K/A (b) statement regarding procedure use "makes up for" Tier 1 test items that don't test operator actions associated with the emergency/abnormal evolution." However, even if correct, the A2 K/A (b) statement does not support the proposal that Tier 1 test items require entry into an EOP or AOP.

Viewpoint #3: "The 10 CFR 55.41 (a) item listed with a Tier 1 K/A statement does NOT mean that the test item must be written to test the specific CFR item. A Tier 1 test item should, whenever possible, be written to test 10 CFR 55.41 (a) Item #10 as it pertains to abnormal and emergency operating procedures."

Resolution: The Region's proposal is partially correct in that it recognizes the test item is not required to be written, as discussed in the Resolution to Viewpoint #1, to the 10 CFR item that the K/A is linked to. However, there is no justification provided to support the view that "a Tier 1 test item should, whenever possible, be written to test 10 CFR 55.41 (a) Item #10." This assertion is contrary to the justification provided by ES-401 D.1.b (see Viewpoint #1) which promotes testing the 10 CFR item linked by the K/A. Furthermore, while the Viewpoint #1 justification recognizes question testing as determined by the facility's learning objectives in lieu of the linked 10 CFR 55.41 and 55.43 items, it does not support preferentially testing 10 CFR 55.41, Item #10, "Administrative, normal, abnormal, and emergency

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

operating procedures."

Viewpoint #3: "Tier 1 test items where the stem contains an abnormal/emergency evolution, but where the test item can be answered solely with the Tier 2 (Plant Systems) knowledges or abilities listed above, become, in a sense, "window dressing"; these test items should be evaluated as K/A mismatches (unacceptable) in accordance with Form ES-401-9, Written Exam Review Worksheet."

Resolution: Again, rating a question as an "unacceptable" K/A mismatch because it can be answered based on plant system knowledge as it relates to the referenced Emergency or Abnormal Plant Evolution, is not supported by and is contrary to the one ES-401 justification provided in support of Viewpoint #1. Moreover, testing plant system design features, interlocks, and system operation for conditions, events, or symptoms that lead to entry into EOPs or AOPs and match the Tier 1 K/A statement is not unacceptable simply because the EOPs or AOPs were not entered. Testing plant system design features, interlocks, and system operation will in many instances test 10 CFR 41.10 procedural knowledges and abilities albeit without entry into the procedure.

In summary, each of the viewpoints/proposals presented above would implement test item content requirements more restrictive than currently called for by NUREG-1021. This type of change would likely require a revision or supplement to NUREG-1021 and could result in test items previously assessed as satisfactory for conformance with the reference K/A per the existing NUREG-1021 guidance now being assessed as unacceptable due to their not requiring entry into EOPs or AOPs.

It should also be noted that the program office position regarding the procedural content of Tier 1 test items was presented in a program office assessment (ML17095A958) of the 2016 Brunswick initial examination. The assessment noted that several Tier 1 questions were categorized as deficient because the questions did not reference procedures and only required system knowledge to answer. The assessment concluded that there is nothing in NUREG-1021 that requires Tier 1 questions to reference a procedure and if a question meets its specific K/A, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question.

OGC review is not necessary since no changes to existing NUREG-1021 guidance or requirements result from the ROI resolution.

Distribution:	RI, RII, RIII, and RIV OLBCs and OLAs and HOIB BC		
Signatures / Concurrences			
Originator:	Eugene F. Guthrie /RA/	Date:	3/30/2017
OGC:	N/A	Date:	
IOLB CH:	Nancy L. Salgado /RA/	Date:	6/7/2017
Distribution Completed by IOLB Secretary (Initials): RVS		Date:	6/14/2017

Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

June 22, 1988

NRC INFORMATION NOTICE NO. RR-40: EXAMINERS' HANDBOOK FOR DEVELOPING
OPERATOR LICENSING EXAMINATIONS

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice provides addressees a copy of NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Examinations." It is expected that recipients will review the information for applicability to their facilities. However, the information contained in this information notice does not constitute NRC requirements; therefore, no specific action or written response is required.

Background:

The NRC staff has developed the above-mentioned handbook to improve the content validity of the operator licensing examinations. The content has been made more valid through the performance of job/task analysis focusing on the delineation of essential knowledge and abilities. Additional copies of this handbook are available for examination and copying for a fee at the Public Document Room of the Nuclear Regulatory Commission, 1717 H Street, N.W., Washington, D.C. 20555.

Discussion:

After the NRC examiners have been trained in the procedures described in NUREG/BR-0122, the format of the operator licensing examinations administered under 10 CFR 55.41 or 55.43 should reflect the sampling plans contained in the handbook. These sampling plans should incorporate the knowledge and abilities requirements contained in NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors" and NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors."

The new format will change the sections of the written examinations for all initial and replacement examinations. As detailed in the enclosed handbook, the reactor operator written examination should normally sample: (1) 25% of its content from the fundamentals area (reactor theory, thermodynamics, and

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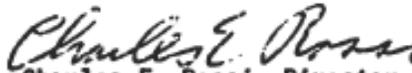
Differing Professional Opinion: Operator Licensing Written Exam Tier 1 Test Items (Document Date: 10-10-17)

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component operation), (2) 48% from plant systems and plant-wide safety and administrative procedures, and (3) 27% from emergency and abnormal plant evolutions. For senior reactor operators, the written examination content should normally sample: (1) 24% from fundamentals, (2) 33% from emergency and abnormal evolutions, and (3) 43% from plant systems and plant-wide safety and administrative procedures. Candidates must obtain a score of 70% in each of the three sections and an overall score of 80% to pass the written examination.

After full implementation of the handbook, expected in the fall of 1988, NUREG/BR-0122 will provide guidance to operator licensing examiners for the development of initial and replacement written licensing examinations. The training staff at the plants may wish to become familiar with the handbook as far in advance of their examinations as possible so that there will be a maximum benefit for candidates.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.


Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Susan F. Shankman, NRR
(301) 492-1053

Attachments:

1. NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Examinations"
2. List of Recently Issued NRC Information Notices

Document 2: Memo Establishing DPO Panel

November 6, 2017

MEMORANDUM TO: Raymond K. Lorson, Panel Chairperson
Region I

Matthew P. Emrich, Panel Member
Office of the Chief Human Capital Officer

Charles D. Zoia, Panel Member
Region III

THRU: Anne T. Boland, Director **/RA/**
Office of Enforcement

FROM: Renée M. Pedersen **/RA/**
Sr. Differing Professional Views Program Manager
Office of Enforcement

SUBJECT: AD HOC REVIEW PANEL - DIFFERING PROFESSIONAL
OPINION ON OPERATOR LICENSING WRITTEN
EVALUATIONS – TIER 1 TEST ITEMS (DPO-2017-007)

In accordance with Management Directive (MD) 10.159, "The NRC Differing Professional Opinion Program;" and in my capacity as the Differing Professional Opinion (DPO) Program Manager; and in coordination with Anne Boland, Director, Office of Enforcement, Brian Holian, Acting Director, Office of Nuclear Reactor Regulation; and the DPO submitters; you are being appointed as members of a DPO Ad Hoc Review Panel (DPO Panel) to review a DPO submitted by several NRC employees.

The DPO (Enclosure 1) raises concerns about the recent policy on writing and assessing Tier 1 written examination test items. The DPO has been forwarded to Mr. Holian for consideration and issuance of a DPO Decision.

CONTACTS: Renée Pedersen, OE
(301) 287-9426

Gladys Figueroa-Toledo, OE
(301) 287-9497

The DPO Panel has a critical role in the success of the DPO Program. Your responsibilities for conducting the independent review and documenting your conclusions in a report are addressed in the handbook for MD 10.159 in [Section II.F](#) and [Section II.G](#), respectively. The [DPO Web site](#) also includes helpful information, including interactive flow charts, frequently asked questions, and closed DPO cases, including previous DPO Panel reports. We will also be sending you additional information that should help you implement the DPO process. Because this process is not routine, we will be meeting and communicating with all parties during the process to ensure that everyone understands the process, goals, and responsibilities.

Disposition of this DPO should be considered an important and time sensitive activity. The timeliness goal for issuing a DPO Decision is 120 calendar days from the day the DPO is accepted for review. In this case, the DPO was accepted for review on October 16, 2017. The timeliness goal for issuing this DPO Decision is February 13, 2018.

Process Milestones and Timeliness Goals for this DPO are included as Enclosure 2. The timeframes for completing process milestones are identified strictly as goals—a way of working towards reaching the DPO timeliness goal of 120 calendar days. The timeliness goal identified for your DPO task is 75 calendar days from the date of this memorandum (January 20, 2018).

Although timeliness is an important DPO Program objective, the DPO Program also sets out to ensure that issues receive a thorough and independent review. The overall timeliness goal should be based on the significance and complexity of the issues and the priority of other agency work. Therefore, if you determine that your activity will result in the need for an extension beyond the overall 120-day timeliness goal, please send an e-mail to (OD/RA) with a copy to DPOPM.Resource@nrc.gov and include the reason for the extension request and a proposed completion date for your work and a proposed timeliness goal for issuance of a DPO Decision. Mr. Holian is responsible for subsequently forwarding the request for a new DPO timeliness goal to the EDO for approval.

An important aspect of our organizational culture includes maintaining an environment that encourages, supports, and respects differing views. As such, you should exercise discretion and treat this matter appropriately. Documents should be distributed on an as-needed basis. In an effort to preserve privacy, minimize the effect on the work unit, and keep the focus on the issues, you should simply refer to the employees as the DPO submitters. Avoid conversations that could be perceived as “hallway talk” on the issue and refrain from behaviors that could be perceived as retaliatory or chilling to the DPO submitters or that could potentially create a chilled environment for others. It is appropriate for employees to discuss the details of the DPO with their co-workers as part of the evaluation; however, as with other predecisional processes, employees should not discuss details of the DPO outside the agency. If you have observed inappropriate behaviors, heard allegations of retaliation or harassment, or receive outside inquiries or requests for information, please notify me.

On an administrative note, please ensure that all DPO-related activities are charged to Activity Code ZG0007.

We appreciate your willingness to serve and your dedication to completing a thorough and objective review of this DPO. Successful resolution of the issues is important for NRC and its stakeholders. If you have any questions or concerns, please feel free to contact me or Gladys.

We look forward to receiving your independent review results and recommendations.

Enclosures:

1. DPO-2017-007
2. Process Milestones and Timeliness Goals

cc:

B. Holian, NRR
M. Evans, NRR
B. McDermott, NRR
C. Haney, RII
B. Caballero, RII
D. Bacon, RII
P. Capehart, RII
M. Meeks, RII
D. Lanyi, RII
M. Bates, RII
D. Lew, RI
S. Rutledge, OCHCO
R. Orlikowski, RIII
A. Boland, OE
G. Figueroa-Toledo, OE

SUBJECT: AD HOC REVIEW PANEL - DIFFERING PROFESSIONAL OPINION ON
OPERATOR LICENSING WRITTEN EVALUATIONS – TIER 1 TEST ITEMS
(DPO-2017-007) DATE: November 6, 2017

ADAMS Package: ML17307A046

MEMO: ML17307A053

Enclosure 1 – ML17290A536

Enclosure 2 – ML17307A059

OE-011

OFFICE	OE: DPO/PM	OE: DPO/PM	OE: D
NAME	GFigueroa	RPedersen	ABoland
DATE	11/ 06 /2017	11/ 06 /2017	11/ 06 /2017

OFFICIAL RECORD COPY

Document 3: DPO Panel Report



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

March 19, 2018

MEMORANDUM TO: Brian E. Holian, Acting Director
Office of Nuclear Reactor Regulation

FROM: Jeffrey A. Clark, DPO Panel Chair **/RA/**
Matthew P. Emrich, DPO Panel Member
Charles D. Zoia, DPO Panel Member

SUBJECT: DIFFERING PROFESSIONAL OPINION PANEL REPORT ON
OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1
ITEMS (DPO-2017-007)

In a memorandum, dated November 21, 2017, we were appointed as members of a Differing Professional Opinion (DPO) Ad Hoc Review Panel (DPO Panel) to review a DPO regarding Operator Licensing written examinations; Tier 1 Items. The DPO Panel has reviewed the DPO in accordance with the guidance in Management Directive 10.159, "The NRC Differing Professional Opinion Program."

The results of the DPO Panel's evaluation of the concerns raised in the DPO are detailed in the enclosed DPO Panel Report and is submitted for your consideration. Based on our review of concerns raised in the DPO, the DPO Panel made a recommendation, with two additional considerations, if implemented.

Please do not hesitate to contact us if you have any questions regarding the enclosed report.

CONTACT: Jeffrey A. Clark, RIV/DRS
817-200-1180

Enclosure:
DPO Panel Report

Statement of Issue (SOI)

The Operator Licensing and Training Branch (IOLB) of the Office of Nuclear Reactor Regulation (NRR) determined that a test item developed for Tier 1 of the site-specific written exam matches the intent of its knowledge or ability (K/A) statement if the test item solely tests plant systems knowledge, such as a design feature, interlock, or automatic operation. IOLB determined it was inappropriate to evaluate Tier 1 test items as “enhancement required” or “inappropriate” on Form ES-401-9, Written Examination Review Worksheet, when the test item did not test knowledge of emergency or abnormal procedures. This determination was documented in Record of Interaction (ROI) 17-09, NUREG 1021, ES-401 Tier 1 Written Exam Test Items (ML17165A579); was disseminated to industry stakeholders in Operator Licensing Feedback Item 401.55 (ML17249A961); and was communicated during an operator licensing examiner training session conducted by IOLB staff on October 19, 2017.

Based on the Panel’s review of the Differing Professional Opinion (DPO) submittal and associated references, and interview and follow-up discussion with the submitters, we determined the following issue was expressed:

Some NRC staff are concerned that the IOLB policy determination conflicts with the purpose of Tier 1 test items to test emergency and abnormal operating procedural knowledge on the site-specific Reactor Operator (RO) written examination, which is required in accordance with 10 CFR 55.41 (b)(10). The staff members contend that the number of RO questions that test abnormal and emergency procedures on the site-specific written exam should not be reduced because the operating exam does not test individual applicant’s procedure knowledge to the same extent as the written exam because:

- Dynamic scenarios are administered in a “team,” open-book environment where the SRO reads or directs emergency/abnormal operating procedure steps to RO applicants, and systems Job Performance Measures (JPMs) are administered by directing the applicant to perform a task in accordance with a specific procedure.

These staff members are concerned that the IOLB policy determination precludes the Chief Examiner from evaluating a Tier 1 test item as “enhancement required” on Form ES-401-9, when the proposed test item does not test abnormal or emergency procedure knowledge *relevant to the K/A statement wording*, which would ensure overall exam balance of coverage for abnormal and emergency operating procedures.

Panel Review Summary and Recommendation

In response to DPO Case Number DPO-2017-007, its associated summary of concern (SOI), and after careful consideration of input obtained through independent research, interviews with the DPO submitters, and interviews with personnel from the IOLB, the DPO Panel offers the following recommendations:

1. A Chief Examiner (CE) should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the Chief Examiner’s responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e. Enhancements may be assessed per Form ES-401-9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question’s link to the specified knowledge and ability (K/A) statement of the test item is weak. Amplifying information is discussed below for how procedural “relevance” can be determined. If the only flaw for a test item being assessed is its link to a “relevant” procedure, then the question should not be assessed as “unsatisfactory.”
2. If recommendation #1 is implemented, IOLB should determine how to promulgate this policy change regarding the assessment of Tier 1 questions to both agency and industry stakeholders. Additionally, IOLB should consider coordinating with the staff at the Technical Training Center (TTC) to include appropriate modifications to the examiner training course (G-107).
3. If recommendation #1 is implemented, IOLB should also assess the necessity of changes to NUREG-1021, “Operator Licensing Examination Standards for Power Reactors.” The DPO Panel does not recommend any substantive changes to the current revision of NUREG-1021, as the current guidance supports recommendation #1. However, the next revision of NUREG-1021 may include clarifying guidance or examples providing the basis for the assessment of Tier 1 written exam questions (similar to what was included in previous revisions regarding SRO only written exam questions).

Supporting Information

The information below provides the basis from which the DPO Panel arrived at the recommendation outlined above. Based on the summary of concern outlined in the DPO, the DPO panel analyzed the applicable sections of the current revision of NUREG-1021 related to written examination construction and evaluation. As a result of this analysis, the DPO Panel noted the following:

1. Per ES-401 of NUREG-1021, Revision 11 (underlined text indicates emphasis added):

“The content of the written licensing examinations for ROs and SROs is dictated by 10 CFR 55.41, “Written Examination: Operators,” and 10 CFR 55.43, “Written Examination: Senior Operators,” respectively. Each examination shall contain a representative selection of questions concerning the knowledge and abilities (K/As) and skills needed to perform duties at the desired license level. Both the RO and SRO examinations will sample the 14 items specified in 10 CFR 55.41(b), and the SRO examination will also sample the 7 additional items specified in 10 CFR 55.43(b).”

“Except as noted in Section D.1.b of this examination standard, NUREG-1122, “Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors,” and

NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors," available in the Agencywide Documents Access and Management System (ADAMS), provide the basis for developing content-valid operator licensing examinations. Each K/A stem statement has been linked to an applicable item number in 10 CFR 55.41 and/or 10 CFR 55.43. Preparing the license examination using the appropriate K/A catalog, in conjunction with the instructions in this NUREG-series report, will ensure that the Examination includes a representative sample of the items specified in the regulations."

Conclusion: Following the sample plan methodology as described in NUREG-1021 (and the applicable K/A catalog) ensures that the NRC written exam meets the content requirements as outlined in the items from 10CFR55.41 and 10CFR55.43.

2. From 10 CFR 55.41:

"(b) The written examination for an operator for a facility will include a representative sample from among the following 14 items, to the extent applicable to the facility.

- (1) Fundamentals of reactor theory, including fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.
- (2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation, and coolant flow.
- (3) Mechanical components and design features of the reactor primary system.
- (4) Secondary coolant and auxiliary systems that affect the facility.
- (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.
- (6) Design, components, and functions of reactivity control mechanisms and instrumentation.
- (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
- (8) Components, capacity, and functions of emergency systems.
- (9) Shielding, isolation, and containment design features, including access limitations.
- (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.
- (11) Purpose and operation of radiation monitoring systems, including alarms and survey equipment.
- (12) Radiological safety principles and procedures.
- (13) Procedures and equipment available for handling and disposal of radioactive materials and effluents.
- (14) Principles of heat transfer thermodynamics and fluid mechanics."

Note: Items 1 and 14 from the above list are not part of the site-specific NRC licensing examination as they are covered on the Generic Fundamentals Exam.

3. From 10 CFR 55.43:

"(b) The written examination for a senior operator for a facility will include a representative sample from among the following seven items and the 14 items specified in § 55.41 of this part, to the extent applicable to the facility:

- (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.”

4. Sample plan methodology / Knowledge and Ability (K/A) Stem Links:

The site-specific written exam sample plan (or exam outline) is divided into 3 distinct Tiers:

Tier 1 → Emergency and Abnormal Plant Evolutions

Tier 2 → Plant Systems

Tier 3 → Generic K/A Categories

As can be observed from Table 1, a properly constructed exam outline (per the requirements of ES-401 and Form ES-401-1) is designed to include K/A stem statements that are linked to all of the items (55.41(b)(2) through 55.41(b)(13)) required by regulation for a Reactor Operator written examination AND all of the items (55.43(b)(1) through 55.43(b)(7)) for a Senior Reactor Operator written examination.

Following the above (which was taken directly from NUREG-1021; ES-401), the K/A catalogs “provide the basis for developing content-valid operator licensing examinations” AND “each K/A stem statement has been linked to an applicable item number in 10 CFR 55.41 and/or 10 CFR 55.43.” With that in mind, consider the following 10 CFR 55.41 and 10 CFR 55.43 links for the K/A statements associated with Tier 1 (Emergency and Abnormal Plant Evolutions) questions on the exam outline (Table 1) {Bold Italics added for emphasis}:

- Reactor Operator
 - (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.
 - (6) Design, components, and functions of reactivity control mechanisms and instrumentation.
 - (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
 - (8) Components, capacity, and functions of emergency systems.
 - (9) Shielding, isolation, and containment design features, including access limitations.
 - (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.***
- Senior Reactor Operator
 - (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.
(5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

From the two lists above, only item (10) for the Reactor Operator, and items (3) and (5) for the Senior Reactor Operator specifically mention “procedures.” The **blue-shaded** blocks on Table 1 indicate the K/A stem statements associated with these items for the **Tier 1** section of the exam outline. As highlighted on Table 1, the K/A categories with 10 CFR links to items that refer to “procedures” are K1, A2, and G.

Conversely, the 10 CFR links associated with **Tier 2** questions that refer to “procedures” (blocks highlighted in **green** on Table 1) only include the ‘G’ K/A category. An exception to this observation is the ‘A2’ category, which consists of K/A stem statements that specifically call out procedure selection as part of the required knowledge and ability of the applicant (see example below):

“Ability to (a) predict the impacts of the following on the RHR/LPCI: INJECTION MODE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations.”

Based on these observations, The DPO Panel believes that Tier 1 questions in the K1, A2, and G categories should have some procedural aspect associated with them in order to appropriately test the 10 CFR item(s) they are linked to, and be in conformance with the existing regulation. While not explicit (i.e. shall), disregarding the 10 CFR links listed in the K/A stem statements risks not testing in a manner to ensure all of the CFR 55.41 and 10 CFR 55.43 items are sampled.

5. From NUREG-1123 (underlined text indicates emphasis added):

“...The K/A’s were linked to their applicable 10CFR55 item numbers. SRO level K/A’s were identified by 10CFR55.43 item numbers.” (Taken from NUREG-1123 abstract)

“The linkage of K/A’s to the 10 CFR 55.41, 43, and 45 requirements was done to help ensure that the examinations include a representative sample from among the applicable items...” (Taken from NUREG-1123, Rev. 2, Supp.1 – Summary of Significant Changes)

“...All knowledge and abilities (K/A’s) in this catalog are directly linked by item number to 10 CFR 55.”

These statements agree with ES-401, which states that, “Each K/A stem statement has been linked to an applicable item number in 10 CFR 55.41 and/or 10 CFR 55.43.”

Also, from NUREG-1123 related to the Knowledge and Ability Stem Statements for Emergency and Abnormal Plant Evolutions:

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

- E/AK1 Knowledge of the operational implications of the following concepts as they apply to the (EMERGENCY OR ABNORMAL PLANT EVOLUTION):
(CFR: 41.8 to 41.10)
- E/AK2 Knowledge of the interrelations between (EMERGENCY OR ABNORMAL PLANT EVOLUTION) and the following:
(CFR: 41.7 / 45.8)
- E/AK3 Knowledge of the reasons for the following responses as they apply to (EMERGENCY OR ABNORMAL PLANT EVOLUTION):
(CFR: 41.5 / 45.6)
- E/AA1 Ability to operate and / or monitor the following as they apply to (EMERGENCY AND ABNORMAL PLANT EVOLUTION):
(CFR: 41.7 / 45.6)
- E/AA2 Ability to determine and interpret the following as they apply to (EMERGENCY AND ABNORMAL PLANT EVOLUTION):
(CFR: 41.10 / 43.5 / 45.13)

Note: Similar statements are found related to the structural layout of the exam outline and associated K/A stem statement links to 10 CFR 55 for PWR written examinations in NUREG-1122, Revision 2, Supplement 1, and the Advanced Reactor designs (AP-1000 and ABWR) in NUREG-2103 and 2104. Also refer to Tables 2, 3, and 4 (highlighted in the same manner as described above for Table 1) for a comparison of the related K/A stem statement links to 10 CFR 55 for each of the K/A categories that comprise the exam outlines for the additional reactor designs.

6. From NUREG-1021, Appendix B (underlined text indicates emphasis added):

“Failing to focus on testing the individual operator’s cognitive abilities (i.e., comprehension, problem-solving, and decision-making) or paying insufficient attention to the operator’s fundamental understanding of job content (e.g., systems, components, and procedures) may ultimately place job performance at risk of gradual degradation.”

Conclusion: The random and systematic sampling process used when generating the exam outline in accordance with ES-401 of NUREG-1021 ensures that the written examination is content valid. The job content (for the written examination) that is being tested per existing regulation are those items identified in 10 CFR 55.41 and 55.43. The K/A catalogs link to the knowledges and abilities prescribed in 10 CFR 55 in a specific manner (refer to Tables 1 and 2.) Failing to ensure that written exam questions developed for NRC examination test applicants to meet the intent of the 10 CFR 55 links, creates a risk that all of the 10 CFR 55 items may not be sampled appropriately, and therefore the validity inference that our process was designed to have may become skewed. For example, for those Tier 1 K/A categories previously mentioned, if there was not a procedural aspect for questions in categories K1, K2 (PWR), A2, and G, then the exam may overemphasize plant systems and under-emphasize plant procedures. The chief examiner’s quality assurance checks, per Form ES-201-2 items 4.b and 4.e, specifically direct verifying that the 10 CFR 55.41, 43, and 45 sampling is appropriate and exam coverage is balanced (see the form on the next page.)

7. From NUREG-1021, ES-201 (underlined text indicates emphasis added):

“There are no minimum or maximum limits on the number or scope of changes the NRC may direct the facility licensee to make to its proposed examinations, provided that they are necessary to make the examinations conform with established acceptance criteria or to attain an appropriate level of examination difficulty.”

Conclusion: The Chief Examiner is responsible for ensuring that the 10CFR55.41, 55.43, and 55.45 sampling is appropriate and exam coverage is balanced for the entire exam. Thus, if the Chief Examiner believes that the licensee’s proposed exam under-emphasizes procedural knowledge, it is not only prudent, but required by the QA checklist in ES-201 for the Chief Examiner to ensure that this issue is corrected prior to approving the exam for administration. This may be performed by either providing “unsatisfactory” or “enhancement required” comments to the licensee via Form ES-401-9.

Final Conclusion

From the information outlined above, the DPO panel recommends that IOLB partially implement the proposed alternative outlined in the DPO submittal, by implementing the above recommendation. Due to the current guidance in the K/A catalogs and NUREG-1021, the panel also feels that a Chief Examiner would be justified in asking a facility licensee to enhance Tier 1 written examination questions to test a procedural concept in K/A categories K1, K3 (PWR only), A2, and G as relevant to the respective K/A statement, or any other situation where the exam coverage becomes skewed. This approach helps ensure that NRC site-specific written examinations reflect the “representative sample” of 10CFR55 items required by regulation, exams will not over-emphasize plant systems knowledge, or under-emphasize plant procedural knowledge. Test items that appropriately solicit knowledge of plant system operation/response, or design associated with an emergency or abnormal event in categories K2, K3 (BWR only), and A1, should be deemed satisfactory if their K/A statement was met with no other psychometric flaws.

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c**
W R I T T E N	1. 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 T O R	2. a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.			
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.			
	c. To the extent possible, assess whether the outline(s) conforms with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D and in Section D.5, "Specific Instructions for the 'Simulator Operating Test,'" of ES-301 (including overlap).			
W A L K T H R O U G H	3. a. Verify that the systems walkthrough outline meets the criteria specified on Form ES-301-2: (1) The outline(s) contains the required number of control room and in-plant tasks distributed among the safety functions as specified on the form. (2) Task repetition from the last two NRC examinations is within the limits specified on the form. (3) No tasks are duplicated from the applicant's audit test(s). (4) The number of new or modified tasks meets or exceeds the minimums specified on the form. (5) The number of alternate-path, low-power, emergency, and radiologically controlled area tasks meets the criteria on the form.			
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) The tasks are distributed among the topics as specified on the form. (2) At least one task is new or significantly modified. (3) No more than one task is repeated from the last two NRC licensing examinations.			
	c. Determine whether there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.			
G E N E R A L	4. a. Assess whether plant-specific priorities (including probabilistic risk assessment and individual plant examination insights) are covered in the appropriate exam sections.			
	b. Assess whether the 10 CFR 55.41, 55.43, and 55.45 sampling is appropriate.			
	c. Ensure that K/A importance ratings (except for plant specific priorities) are at least 2.5.			
	d. Check for duplication and overlap among exam sections and the last two NRC exams.			
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).			
		Printed Name/Signature		Date
a. Author	_____			_____
b. Facility Reviewer (*)	_____			_____
c. NRC's Chief Examiner (#)	_____			_____
d. NRC Supervisor	_____			_____
* Not applicable for NRC-prepared examination outlines. # The independent NRC reviewer initials items in column "c"; the chief examiner's concurrence is required.				

DIFFERING PROFESSIONAL OPINION PANEL REPORT ON OPERATOR LICENSING
WRITTEN EXAMINATIONS – TIER 1 ITEMS (DPO-2017-007) – MARCH 19, 2018

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Document 4: DPO Decision



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

April 27, 2018

MEMORANDUM TO: Bruno L. Caballero, Senior Operations Engineer
Operations Branch 2
Division of Reactor Safety
Region II

Daniel M. Bacon, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

David R. Lanyi, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

Phillip G. Capehart, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

Michael K. Meeks, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

FROM: Brian E. Holian, Acting Director */RA/*
Office of Nuclear Reactor Regulation

SUBJECT: DIFFERING PROFESSIONAL OPINION INVOLVING
OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1
ITEMS (DPO 2017-007)

On October 10, 2017, in accordance with Management Directive 10.159, "The NRC Differing Professional Opinions Program," you submitted a differing professional opinion (DPO) involving operator licensing written examinations (DPO-2017-007). Specifically, your DPO raises concerns that the recent policy determination made by NRR staff for writing and assessing Tier 1 written examination test items has the potential to undermine the 10 CFR 55.41 that the

CONTACT: Trent L. Wertz, NRR
301-415-1568

written examination should contain a representative selection of questions on the knowledge, skills, and abilities needed to perform licensed operator duties. Specifically, the policy interpretation will result in fewer questions that test the operator's knowledge of abnormal and emergency procedures. The purpose of this memorandum is to respond to your DPO.

On January 21, 2017, a DPO Ad Hoc Review Panel (the Panel) was established and tasked to meet with you, review your DPO submittal, and issue a DPO report, including conclusions and recommendations to me regarding the disposition of the issues presented in your DPO. On March 19, 2018, after reviewing the applicable documents, completing internal interviews of relevant individuals and completing their deliberations, the Panel issued their report to me.

On April 19, 2018, I talked to you by telephone to discuss the Panel's report and to get your insights and comments. On April 25, 2018, you provided me additional insights into your concerns and your thoughts for resolving the issue.

In order to make a decision with regard to your DPO, I reviewed your DPO submittal, the Panel's report, met with the headquarters operator licensing staff, talked with you, and then re-considered your comments to me. In addition, on April 26, 2018, I discussed these issues with the DPO Panel Chair

Statement of Concern

The Operator Licensing and Training Branch (IOLB) of the Office of Nuclear Reactor Regulation (NRR) determined that a test item developed for Tier 1 of the site-specific written exam matches the intent of its knowledge or ability (K/A) statement if the test item solely tests plant systems knowledge, such as a design feature, interlock, or automatic operation. IOLB determined it was inappropriate to evaluate Tier 1 test items as "enhancement required" or "inappropriate" on Form ES-401-9, Written Examination Review Worksheet, when the test item did not test knowledge of emergency or abnormal procedures. This determination was documented in Record of Interaction (ROI) 17-09, NUREG 1021, ES-401 Tier 1 Written Exam Test Items (ML17165A579); was disseminated to industry stakeholders in Operator Licensing Feedback Item 401.55 (ML17249A961); and was communicated during an operator licensing examiner training session conducted by IOLB staff on October 19, 2017.

Based on the Panel's review of the Differing Professional Opinion (DPO) submittal and associated references, and interview and follow-up discussion with the submitters, the panel determined the following issue was expressed:

Some NRC staff are concerned that the IOLB policy determination conflicts with the purpose of Tier 1 test items to test emergency and abnormal operating procedural knowledge on the site-specific Reactor Operator (RO) written examination, which is required in accordance with 10 CFR 55.41 (b)(10). The staff members contend that the number of RO questions that test abnormal and emergency procedures on the site-specific written exam should not be reduced because the operating exam does not test individual applicant's procedure knowledge to the same extent as the written exam because:

- Dynamic scenarios are administered in a "team," open-book environment where the SRO reads or directs emergency/abnormal operating procedure steps to RO applicants, and systems Job Performance Measures (JPMs) are administered by directing the applicant to perform a task in accordance with a specific procedure.

These staff members are concerned that the IOLB policy determination precludes the Chief Examiner (CE) from evaluating a Tier 1 test item as “enhancement required” on Form ES-401-9 when the proposed test item does not test abnormal or emergency procedure knowledge *relevant to the K/A statement wording*, which would ensure overall exam balance of coverage for abnormal and emergency operating procedures.

Panel Recommendations

The Panel concluded and recommended the following:

1. A CE should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the Chief Examiner’s responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e. Enhancements may be assessed per Form ES-401- 9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question’s link to the specified knowledge and ability (K/A) statement of the test item is weak. Amplifying information is discussed below for how procedural “relevance” can be determined. If the only flaw for a test item being assessed is its link to a “relevant” procedure, then the question should not be assessed as “unsatisfactory.”
2. If recommendation #1 is implemented, IOLB should determine how to promulgate this policy change regarding the assessment of Tier 1 questions to both agency and industry stakeholders. Additionally, IOLB should consider coordinating with the staff at the Technical Training Center (TTC) to include appropriate modifications to the examiner training course (G-107).
3. If recommendation #1 is implemented, IOLB should also assess the necessity of changes to NUREG-1021, “Operator Licensing Examination Standards for Power Reactors.” The DPO Panel does not recommend any substantive changes to the current revision of NUREG-1021, as the current guidance supports recommendation #1. However, the next revision of NUREG-1021 may include clarifying guidance or examples providing the basis for the assessment of Tier 1 written exam questions (similar to what was included in previous revisions regarding SRO only written exam questions).

After considering all the information, I essentially agree with the recommendations provided by the DPO panel. They have thoroughly and conscientiously endeavored to address your well-thought out and articulated concerns. I have the following comments/clarifications to the recommendations.

Regarding Recommendations 1 and 3, I directed my staff to revise the Operator Licensing Program Feedback response (Question 401.55) to clarify that CEs are allowed to make reasonable changes for balance of coverage throughout the examination. I agree that Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge. However, when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not basis to remove it from the test. I considered the amplifying information referenced in Recommendation 1 and find there is no need to revise the current guidance that written examination questions should, but are not required to, test one of the 10 CFR 55 written examination items that the K/A is linked to, or to a facility learning objective. This is, in part,

because the linkage of K/A items to 10 CFR 55 written examination items does not represent an exhaustive list. I have assigned the above task to DIRS, NRR, to be completed by June 30, 2018.

Regarding Recommendation 2, the acknowledgement that CEs may request enhancements to written examination items, including the failure to test a "relevant" procedural concept will be promulgated through a revision to ROI 17-09 and an update to Question 401.55 on the Operator Licensing Program Feedback webpage. This action is also assigned to DIRS, NRR, to be completed by June 30, 2018.

A summary of the DPO will be included in the Weekly Information Report (when the case is closed) to advise interested employees of the outcome.

Thank you for raising your DPO and for your active participation in the DPO process. An open and thorough exploration of how we carry out our regulatory processes is essential to keeping these programs effective. Your willingness to raise concerns with your colleagues and managers and ensure that your concerns are heard and understood is admirable and vital to ensuring a healthy safety culture within the Agency.

Enclosure:

DPO Panel report, dated March 19, 2018

cc: R. Lorson, NRR
M. Evans, NRR
A. Boland, OE
G. Figueroa-Toledo, OE
C. Haney, RII
C. Miller, NRR
M. Johnson, OEDO

SUBJECT: DIFFERING PROFESSIONAL OPINION INVOLVING OPERATOR LICENSING
WRITTEN EXAMINATIONS – TIER 1 ITEMS (DPO 2017-007)
DATED APRIL 27, 2018

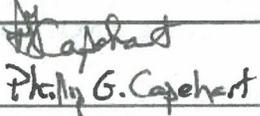
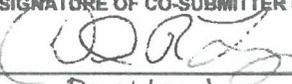
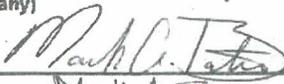
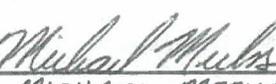
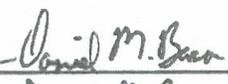
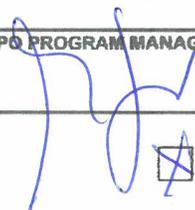
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OFFICE	NRR
NAME	BHolian
DATE	4/27/18

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Document 5: DPO Appeal

Document Markings...

NRC FORM 690 (08-2015) NRCMD 10.159 		U.S. NUCLEAR REGULATORY COMMISSION DIFFERING PROFESSIONAL OPINION -- APPEAL	DPO Case Number 2017-007
			Date Appeal Received 10/25/2018
Name and Title of Submitter Bruno Caballero and other RII Senior Operations Engineers	Organization RII/DRS/OB	Telephone Number (10 numeric digits) (404) 997-4608	
Name and Title of Supervisor Eugene Guthrie/Gerald McCoy	Organization RII/DRS/OB	Telephone Number (10 numeric digits) (404) 997-4662	
Basis for filing appeal. Focus should be on perceived flaws in the DPO Decision and why the agency should come to a different conclusion. (Use continuation pages or attach Word document)			
See Attached			
SIGNATURE OF SUBMITTER  		DATE 10-23-18	
SIGNATURE OF CO-SUBMITTER (If any)    		DATE 10-23-18	
SCAN THE SIGNED AND DATED FORM (INCLUDING CONTINUATION PAGES OR WORD DOCUMENTS) AND EMAIL TO: DPOPM.Resource@nrc.gov			
SIGNATURE OF DPO PROGRAM MANAGER 		DATE 10/29/18	
<input checked="" type="checkbox"/> DPO appeal accepted		<input type="checkbox"/> DPO appeal returned	
<input type="button" value="Delete Continuation Page"/>		<input type="button" value="Add Continuation Page"/>	

DPO Appeal of the Inadequate Implementation of DPO 2017-007: Operator Licensing Written Exam Tier 1 Test Items

CONTENTS OF THIS APPEAL

- I. Reason for the Appeal
- II. Safety Significance of this Issue
- III. Executive Summary
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 - D. DPO Submitter's Proposed Solution
 - E. Interactions with NRR
 - F. DIRS Action Memo
 - G. Closing Argument
- IV. History of the DPO 2017-007 Decision
- V. Analysis of the NRR DPO Decision Memo
- VI. Analysis of OL Feedback Item 401.55
- VII. Analysis of the DIRS Action Memo
 - A. Why stating the Intent of Tier 1 K/A Statements is NOT Creating a new requirement
 - B. Why waiting until the next revision of NUREG-1021 is not necessary
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- IX. Attachments and ML Numbers

DPO Appeal of the Inadequate Implementation of DPO 2017-007: Operator Licensing Written Exam Tier 1 Test Items

I. REASON FOR THE APPEAL

The reason for this appeal is that the corrective action taken for DPO-2017-007 was inadequate. The corrective action was to revise NRR-IOLB's answer to a stakeholder's question, on the NRC public webpage, hereafter referred to as "OL Feedback Item 401.55." The revised answer to the stakeholder's question does not state the intent of Tier 1 (Emergency and Abnormal Plant Evolutions) written examination questions, is misleading, contradictory, and incorrect. Clear and correct guidance to internal and external stakeholders is crucial for the content of operator licensing written exams.

The DPO Submitters did not initially appeal the DPO-2017-007 decision because they trusted that the full spirit and intent of the DPO Panel Recommendations and the NRR Decision Memo would be included in the revised answer to OL Feedback Item 401.55. The NRR Decision Memo stated agreement with the intent of Tier 1 test items, and provided general guidance on how to address Tier 1 items that did not test emergency and abnormal procedure knowledge. If the spirit and intent of the words in the DPO 'ad hoc' Panel Recommendations and the NRR Decision Memo had been implemented, this issue would have been concluded long ago.

This appeal will show how the information on the NRC's public website contradicts itself, the intent of Tier 1 as stated in existing published NUREGs used for developing initial license exams, the DPO 'ad hoc' Panel recommendations, and the NRR Decision Memo. This appeal also provides additional information supporting our disagreement, and will provide an acceptable alternative to the inadequate corrective action taken by NRR.

II. SAFETY SIGNIFICANCE OF THIS ISSUE

Getting adequate resolution to our DPO Appeal is important because it is a nuclear safety imperative that reactor operator (RO) applicants' knowledge of abnormal and emergency procedures be adequately tested on the written exam before the NRC issues a license. A recent industry report contained an analysis of significant operational events; the analysis showed that a key contributor to the events was weaknesses in the operators' implementation of abnormal operating and alarm response procedures. Details concerning the nuclear industry organization's significant event report are not included in this DPO Appeal due to the proprietary information contained in the report; however, a redacted version is available in ADAMS (ML17171A309).

The safety significance of this issue is that allowing the current version of OL Feedback Item 401.55 to remain on the public webpage may result in the NRC issuing licenses to operators who have not been adequately examined in emergency and abnormal procedure knowledge on the RO written exam. This is a safety concern because the published resolution on the webpage ignores requirements that are already in place to ensure that emergency and abnormal condition procedures are adequately tested on the RO written exams. The original DPO (ML17290A536) should be referenced to understand this safety concern, because it objectively showed that an RO written exam could contain an extremely limited number of abnormal and emergency condition procedure questions if NRR's guidance to exam writers is not corrected. The original DPO also showed why testing emergency and abnormal procedure knowledge on the operating test was not a basis for inadequately testing emergency and abnormal procedure test items on the RO written exam.

DPO Appeal of the Inadequate Implementation of DPO 2017-007: Operator Licensing Written Exam Tier 1 Test Items

III. EXECUTIVE SUMMARY

A. How We Got Here

The DPO submitters are all of the Region II Senior Examiners, with collective experience that includes multiple reactor operator and senior reactor operator licenses and instructor certifications, as well as decades of collective NRC chief examiner experience. The Region II Senior Examiners engaged NRR before DPO 2017-007 was submitted, because NRR-IOLB's initial answer to a stakeholder's question (Attachment 1) on the NRC's public webpage was misleading and incorrect. After the DPO was resolved, the DPO submitters accepted the results of the DPO decision, as documented in the NRR Decision Memo (Attachment 2, ML18117A079), because the statements in the NRR Decision Memo largely agreed with the intent of the "Ad Hoc" DPO Panel Recommendations (Attachment 3, ML18079A001).

The corrective action was to revise OL Feedback Item 401.55 (Attachment 4); however, the DPO submitters concluded that the NRR DIRS Operator Licensing Program Office did not adequately address important and necessary aspects of the NRR Decision Memo, and the intent of the DPO Panel Recommendations in the revision. Again, the DPO submitters engaged the NRR DIRS Operator Licensing Program Office on the inadequate implementation of the NRR Decision Memo and the DPO Panel Report Recommendations. This interaction caused the Acting Director of DIRS to write a memo to the Acting Director of NRR on August 15, 2018; hereafter referred to as the "DIRS Action Memo" (Attachment 5, ML18225A149), which changed the scope and intent of the corrective actions that were originally published in the NRR Decision Memo.

In response to the DIRS Action Memo, the DPO submitters spoke to two non-management members of the "Ad Hoc" DPO Panel about the revision to OL Feedback Item 401.55. These Panel Members agreed with the DPO Submitters, that the corrective action taken to revise OL Feedback Item 401.55 did not fully address the recommendations in the DPO Panel Report, and did not address what the DPO submitters and two-thirds of the "Ad Hoc" Panel believed to be the intent of the NRR Decision Memo. After confirming that the consulted DPO Panel members agreed that the NRR DIRS Operator Licensing Program Office did not fully implement corrective actions of the NRR Decision Memo, as recommended in the DPO Panel Report, this appeal of DPO 2017-007 was submitted.

B. Objective evidence for the Intent of Tier 1 RO Written Test Items

The NRC written exam for RO applicants contains three sections, or "Tiers":

- Tier 1 (Emergency and Abnormal Plant Evolutions)
- Tier 2 (Plant Systems)
- Tier 3 (Generic plant-wide knowledge).

The following is a list of objective evidence that proves the intent of the Tier 1 portion of the RO written exam is, *and has always been*, to test applicants' knowledge of how to respond to emergency and abnormal conditions in accordance with plant procedures. The NRR-DIRS/IOLB Office's position is that it is permissible for Tier 1 questions to only

DPO Appeal of the Inadequate Implementation of DPO 2017-007: Operator Licensing Written Exam Tier 1 Test Items

test systems knowledge, even though Tier 2 is intended to test how plant systems are designed to operate. The original DPO submittal (ML17290A536) presented Items 1 – 6 below.

1. The authors of NUREG-1021 and the K/A Catalogs, had a reason for why the written exam outline included Tiers 1 and 2, and a reason for why a random and systematic selection process was required to ensure adequate distribution from each of these Tiers. IF (as stated by NRR-DIRS/IOLB) Tier 1 questions were intended to be answered using only systems knowledge, THEN there is absolutely no reason for NUREG-1021 to contain a process that separates Tier 1 and Tier 2; every topic from the current Tiers 1 and 2 could be placed into a single tier if that were the case. There is a reason for Tier 1.
2. Tier 1 topics correlate to the titles of abnormal condition and emergency procedures, for each of the reactor technologies. This is not a coincidence.
3. Information Notice 88-40, Examiners' Handbook for Developing Operator Licensing Examinations, (Attachment 6) is longstanding evidence, from the beginning of the operator licensing examination process, that there is an intended proportion of questions required to test systems versus emergency and abnormal evolutions. These proportions still exist in the current version of NUREG-1021.
4. The 1983 version of the NUREG-1021 Examiner Standard (Attachment 7) stated, "In general, the candidate must demonstrate complete knowledge and understanding of the symptoms, automatic actions, and immediate action steps specified by abnormal and emergency procedures." Testing applicant knowledge of abnormal and emergency procedures on the written exam is not a new requirement, it has always been the intent.
5. Table 4, Knowledge and Ability Statements for Emergency and Abnormal Evolutions, (Attachment 8) in the AP-1000 (NUREG-2103) and ABWR (NUREG-2104) K/A Catalogs contain basis statements which state the intent to test procedure knowledge.
6. The industry's proposed Revision 3 to the operating fleet BWR (NUREG-1123) and PWR (NUREG-1122) K/A Catalogs, includes bases statements in Table 4, Knowledge and Ability Statements for Emergency and Abnormal Evolutions, which emphasize the intent to test procedure knowledge. (Attachment 9)

We have additional objective evidence, already published in the NUREGs used for exam development, which further substantiates that the intent of Tier 1 is to test emergency and abnormal procedure knowledge. In fact, not testing emergency and abnormal procedure knowledge on the RO written exam, is a violation of the current examination requirements. The additional evidence is presented in Items 7 – 10 below.

7. NUREG-1021, Revision 11, Form ES-401-6, Written Exam Quality Checklist, Item 9 (Attachment 10), is a check to see if a question is appropriate for the Tier to which it is assigned. There would be no reason to even have an Item 9 check

DPO Appeal of the Inadequate Implementation of DPO 2017-007: Operator Licensing Written Exam Tier 1 Test Items

if there was no difference between the Tiers – see Item 1 above which states that the original authors must have had a reason to construct Tier 1 and 2.

8. Revision 11 of NUREG-1021, ES-401, states: “Preparing the license examination using the appropriate K/A Catalog, *in conjunction with* the instructions in this NUREG-series report, will ensure that the examination includes a representative sample of the items specified in the regulations.”
 - The approved K/A Catalogs for new reactors [AP-1000 (NUREG-2103) and ABWR (NUREG-2104)], as well as the industry’s proposed Revision 3 for the PWR (NUREG-1122) and BWR (NUREG-1123) K/A Catalogs include Table 4, Knowledge and Ability Statements for Emergency and Abnormal Evolutions. Recall that Table 4 in these catalogs includes basis statements that point to testing procedures.
 - The *title* of Tier 1 of the written exam outlines contained in ES-401 (and ES-401N) is “Emergency and Abnormal Plant Evolutions.” The *title* of Table 4 in these K/A Catalogs is “Knowledge and Ability Statements for Emergency and Abnormal Evolutions.” The fact that these titles are the same is not a coincidence.
9. SECY-12-0151 from the NRR Director to the Commissioners (Attachment 11, ML12278A258), states that Revision 3 of the operating plant K/A catalogs will follow the same process that was used for the AP-1000 and ABWR catalogs, both of which contain basis statements for Table 4, Knowledge and Ability Statements for Emergency and Abnormal Evolutions.
10. NEI and members of industry have communicated to NRR DIRS Operator Licensing Branch Chief via official letter (Attachment 12, ML18180A121), that their submittals for Revision 3 of the operating plant K/A catalogs have “both appropriate technical justification and our full support.” Testing abnormal and emergency procedure knowledge in Tier 1 is not a new requirement. The Revision 3 K/A catalog submittals referred to by NEI contain the basis statements for Table 4, Knowledge and Ability Statements for Emergency and Abnormal Evolutions. Revision 3 of the catalogs have a section titled, “Summary of Significant Changes,” and those basis statements were not listed as a significant change in the revision 3 submittals.

The collective evidence means that the longstanding intent of the Tier 1 portion of the written exam is, *and always was*, to test emergency and abnormal procedure knowledge. It is imperative, from a safety perspective, to validate a licensed operator’s knowledge on how to operate the plant using procedures during emergency and abnormal conditions, prior to entrusting them with protecting the public health and safety, as well as the environment. Clearly communicating this requirement to test the intent of Tier 1 is in keeping with the NRC’s principles of good regulation.

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C. Flaws with NRR's Guidance to Exam Writers on the NRC's Public Webpage

There are four flaws with OL Feedback Item 401.55 on the NRC's public webpage. These flaws are analyzed in detail in Section VI of this appeal.

1. The current guidance does not state the intent of Tier 1 questions.
2. The current guidance is not clear for how to handle a situation where a Tier 1 question does not test abnormal or emergency procedure knowledge, or when it is not possible to write a question because of the difficulty with the randomly selected K/A.
3. The current guidance does not define "adequate balance of coverage," which is now necessary to define because the NRR Decision Memo used this phrase; the NRR Decision Memo states that chief examiners can make changes to questions that do not meet Tier 1 when "adequate balance of coverage" does not exist.
4. The current guidance contradicts itself.

NRR-IOLB authorized flawed guidance to be posted on the public webpage in OL Feedback Item 401.55, even though the DPO submitters used every opportunity to engage and negotiate before each posting. When the current (6-27-18) version of OL Feedback Item 401.55 was posted to the public web page (Attachment 4), the Acting Director of DIRS stated, "This is the best we can do." In spite of this, the DPO submitters have continued to pursue the issue because we believe that we, as an Agency, can do much better, serve all stakeholders better, and at the same time ensure that safe operators staff the controls of our nuclear power plants.

D. DPO Submitter's Proposed Solution

The Region II DPO submitters propose that the following paragraphs should be used to replace the current version of OL Feedback Item 401.55, in order to provide guidance to stakeholders for (1) the intent of Tier 1, (2) how to address Tier 1 questions that do not test emergency or abnormal procedure knowledge, and (3) what adequate balance of coverage means.

Questions written to test knowledge of a Tier 1 K/A should test abnormal/emergency procedure knowledge in order to meet the intent of a Tier 1 question. However, it is recognized that other portions of the exam may contribute to testing abnormal/emergency procedure knowledge; therefore, if a Tier 1 question does not test abnormal/emergency procedure knowledge, this should not be used as the basis to modify or remove the question IF (emphasis added) proper balance is exhibited within the written exam.

Chief examiners may request enhancements to written examination questions to ensure adequate abnormal/emergency procedure knowledge is tested. It may be prudent for examination authors to try to meet the intent of Tier 1 K/As by writing questions that test abnormal/emergency procedure knowledge, when relevant, to ensure balance of coverage, which may reduce the amount of re-

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work that could surface during the review process if adequate balance of coverage is not present due to inadequate abnormal/emergency procedure knowledge being tested.

Proper balance, as discussed in this response, can be analytically determined by looking at the NUREG-1021 requirements for generating a random and systematic sample plan.

The minimum number of questions required to test emergency and abnormal condition procedure knowledge is determined by the number of RO Tier 1 K/As (e.g., 27 for PWR) plus the minimum number of Tier 2 "A2" K/As (2 because each category in each tier requires a minimum of 2). The A2 K/As require testing an applicant's knowledge on predicting the impact of a malfunction or operation and using procedures to correct, control or mitigate; therefore, the number of Tier 1 K/As in the sample plan should be increased by 2 for making a determination on whether the exam contains the minimum number of emergency and abnormal procedure questions to claim adequate balance. For the example of a PWR RO Exam, the minimum number of questions testing emergency and abnormal procedure knowledge would be 29 (27 + 2).

For simplicity, this DPO Appeal solely focuses on adequate resolution to the current OL Feedback 401.55 revision on the NRC's public webpage. However, it is the DPO Submitters' expectation that a similar revision to ROI 17-09R will follow.

E. Interactions with NRR

After the DPO decision, the NRR/IOLB Branch Chief emailed the proposed revision to OL Feedback Item 401.55 to the Region II Operator Licensing Branch Chiefs for review on May 31, 2018. The Region II Branch Chiefs forwarded the proposal to the Region II Examiners. The examiners read the proposal, which triggered Mark Bates' email to the NRR/IOLB Branch Chief on June 14, 2018 (Attachment 13). The Bates June 14 email reiterated many of the technical points that had already been discussed, as well as how the proposed revision did not fully implement the intent of the DPO Panel Report or the NRR Decision Memo. The NRR/IOLB Branch Chief replied to the June 14 Bates email on June 27, 2018, stating that they were moving forward with posting the proposed revision to OL Feedback Item 401.55 despite the concerns. Mark Bates forwarded the NRR/IOLB Branch Chief's email response to one of the original DPO Panel Members to re-confirm that the Region II DPO submitters' understanding of the intent of Tier 1 K/As, as well as the DPO submitters' conclusions that the corrective actions, did not adequately address key aspects of the recommendations of the panel and the DPO decision memo. The DPO Panel member's reply (Attachment 14) was: "I think your group in Region 2 and I are in alignment on the fact that the 'revised' OL Feedback Item response does not answer the mail based on the DPO panel recommendations and the tasking memo from Mr. 'Acting NRR Director'."

During the June – July, 2018 timeframe, the Region II DPO submitters made many attempts to have a meaningful dialogue with the Acting NRR Director and the Acting DIRS Director on this issue. The Acting NRR Director, in a July 3 email (Attachment 15), stated, "I know 'the Acting DIRS Director' has reviewed the DPO closely and has talked

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with DPO panel chair.” However, on a later phone call between Dan Bacon and the Acting DIRS Director, the Acting DIRS Director stated to Dan Bacon that he had not read the entire DPO. In the July 3 Acting NRR Director email, the Acting NRR Director also stated, “I’m aware of the intent not to diminish the number of procedure questions – and the flexibility that should be the Chief Examiner’s... At the same time I would not intend to revise what is currently required...preferring consistency and only making changes that are well-vetted with all stakeholders.” In rebuttal to the Acting NRR Director’s statement in his July 3 email, one should consider these points:

1. Bases statements (Attachment 9) are already part of the draft Revision 3 catalogs for operating reactors, which were submitted by NEI, representing the industry, and a letter from NEI to the Operator Licensing Branch Chief on November 2, 2017, states, “Notwithstanding our previous comments, all other changes contained in both documents have both appropriate technical justification and our full support.” Furthermore, both the new reactor K/A catalogs and revision 3 of the operating fleet catalogs are also published as NUREGs and have progressed through the public comment period, and in the case of the AP-1000 catalog, are being used for initial license examinations. In other words, testing emergency and abnormal procedure knowledge is already required; however, clarification is warranted to ensure consistency throughout all exams in every region.
2. NUREG-1021 states that the K/A catalogs, in conjunction with NUREG-1021 itself, provide the basis for developing content-valid operator licensing exams by ensuring that a representative sample of items is included on every exam. The combination of NUREG-1021 and the applicable K/A catalog determines the representative sample of test items. The K/A catalogs have already been through the public comment period, the authors of the catalogs attest to the technical justification of the revisions; therefore, the stakeholders have already vetted the content of Revision 3 of the operating fleet K/A catalogs, as well as the AP-1000 and ABWR catalogs.
3. The Acting NRR Director stated that consistency was a concern. If the intent of Tier 1 is not communicated to stakeholders in OL Feedback Item 401.55, then inconsistency between regions will be allowed to exist, and more re-work could result for exam writers. Also, if OL Feedback Item 401.55 is not adequately revised, an inconsistency will exist between what was submitted by NEI (Rev 3 of the operating fleet K/A Catalogs) and OL Feedback Item 401.55. Furthermore, IF the basis statements are deleted from Revision 3 of the operating fleet K/A Catalogs, which was suggested by NRR-IOLB, then an inconsistency will exist between the new reactor catalogs and the operating fleet catalogs.
4. The Acting NRR Director stated that he did not intend to revise what is currently required. Even if one considered stating the intent of Tier 1 as a change (which it is NOT), then consider the statement in NUREG-1021: “Because licensees are not required to prepare examinations, changes made to the criteria used to prepare them are not imposed upon them; therefore, changes to NUREG-1021 for initial examination development do not meet the definition of ‘backfitting.’” This is relevant because, the Region II DPO submitters do not view stating the intent of Tier 1 as a new requirement; the intent of Tier 1 is a longstanding requirement, which is supported by the basis statements not being listed as a significant change within

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Revision 3 of the catalogs. Furthermore, even if adding the basis statements were viewed as a change, the backfitting discussion in NUREG-1021 makes it clear that making a change to NUREG-1021 is not “imposing a new requirement” because facilities are not required to write their own exams.

F. DIRS Action Memo

On August 15, 2018, the Acting DIRS Director, as he has done several times throughout this process, called each of the DPO submitters individually to tell us that he was going to send a memo to the Acting NRR Director and copy the DPO submitters. Following these individual conversations between Dan Bacon, Mark Bates, and Acting DIRS Director, Mark Bates and Dan Bacon both sent emails (Attachment 16 & 17) to the Acting DIRS Director to memorialize their conversations. Prior to sending these emails, Mark Bates recapped the Acting DIRS Director’s concerns verbally before the email was sent at the conclusion of the phone call. The Acting DIRS Director did not reply to either email. The Acting DIRS Director verbally described his concerns with Mark Bates and Dan Bacon as follows:

- NRR viewed stating the intent of Tier 1 topics, as described in the Acting NRR Director DPO Decision memo, was adding a new requirement to the exam process.
- The reason NRR did not revise OL Feedback Item 401.55 to include the intent of a Tier 1 K/A is that a NUREG change process must be followed in order to revise, or add a new requirement to the exam process. NRR believed that clarifying the intent of Tier 1, as described in the Acting NRR Director DPO Decision memo, would constitute a new requirement.

The Acting DIRS Director, on the phone call said that he was going to recommend in the memo he would send to the Acting NRR Director, that NUREG-1021 be revised to address this issue during the next revision, but did not provide any specifics on what the revision would contain. On the phone call, the Acting DIRS Director stated that NRR did not intend on making any further revisions to OL Feedback Item 401.55.

The Acting DIRS Director’s memo to the Acting NRR Director, hereafter known as the “DIRS Action Memo” (Attachment 5, ML 18225A149), was sent on August 15, 2018, soon after the individual phone calls with the DPO submitters. The Acting DIRS Director stated in this memo, “As NUREG-1021 is binding upon both the staff and the regulated industry, I was cautious to ensure that the answer to question 401.55 did not create a new requirement or a new regulatory position for licensees that prepare written examinations.” The DPO submitters believe that NRR current guidance to stakeholders in OL Feedback Item 401.55 actually does exactly what the Acting DIRS Director is supposedly concerned with, which is changing a NUREG requirement without the proper processes being followed and involving all internal and external stakeholders. The objective evidence supporting that the intent of Tier 1 K/As is to test procedure knowledge is overwhelming, as well as evidence that indicates that there is a difference between Tier 1 and Tier 2 K/As, so NRR’s response to OL Feedback Item 401.55 actually changes the exam content requirements as defined by NUREG-1021 and the K/A catalogs. Refer to the four numbered points in Section III.C of this appeal. Objective evidence and precedence already exists, so that providing the intent of Tier 1

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to stakeholders does not create a new requirement; it is a longstanding requirement, has already been through the NUREG revision process, and the basis statements for the new K/A catalogs were written by and submitted by the industry. This leaves us confused to understand how the Acting DIRS Director could be concerned with imposing a new requirement on the industry, when the industry wrote the requirement and attested to the technical justification of the requirement.

It is the NRC's job to ensure safe operators receive licenses. One key component to ensuring this is to adequately test applicant knowledge on how to operate the plant in accordance with emergency and abnormal procedures. The Acting DIRS Director claims to be concerned with all stakeholders. The public may have the largest stake in nuclear safety of all the possible stakeholders. The Senior Examiners in Region II, as well as members of the nuclear industry who submitted the K/A catalogs containing Tier 1 bases statements, are stakeholders too, and we believe that adequately testing emergency and abnormal procedure knowledge is important and the right thing to do to ensure that safe operators staff the control rooms of nuclear power plants.

The Acting DIRS Director, in his August 15, 2018 memo, continues with, "Having reviewed the applicable documents, and through discussions with you (Acting NRR Director) and a number of the DPO submitters, I have concluded that the current revision to question 401.55 meets the intent of your direction..." It should be re-iterated at this point that the DPO submitters discussed the revised response to OL Feedback Item 401.55 with two of the three DPO panel members and they both informed us that the revision did not fully implement the recommendations in the DPO Panel Report and the NRR Decision Memo. This begs the question how the Acting DIRS Director believes that the full intent of the NRR Decision Memo had been implemented, when the majority of the DPO panel itself did not believe that to be the case.

The Acting DIRS Director also stated in his memo that he was recommending that the next NUREG-1021 revision should address the intent of Tier 1 questions and to take up the issue of "balance of coverage" in the written examinations. The Acting DIRS Director continues to say, "By addressing both of these topics in NUREG-1021, in a forum open to internal and external stakeholder participation and comment, the agency and licensed community should benefit from increased clarity (leading to increased efficiency) in binding guidance." In response to this, the DPO submitters have provided a proposed solution to replace NRR's response to OL Feedback Item 401.55. Because the intent of the Tier 1 K/As has been systematically justified within this appeal process, a logical thought process can be applied to the random and systematic sampling process that will ensure adequate balance of coverage.

G. Closing Argument

According to Management Directive MD 10.159, NRC Differing Professional Opinion Program, the scope of the DPO appeal must be limited to the originally agreed upon Summary of Issues (SOI) Statement; therefore, this appeal does not address any potential safety culture issue. Within this appeal, the reader may draw conclusions on how the integrity of the DPO process itself can be undermined, but that is not the purpose of this appeal. The purpose of this appeal is the technical safety issue of Tier 1 written exam items. For the technical safety issue associated with DPO-2017-007, the

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Acting Director of NRR stated that he directed NRR staff to revise OL Feedback Item 401.55 to state that chief examiners could request licensees to make enhancements to the exams to obtain the proper balance of coverage. He continued to state that he agreed that Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge. He continued to state that OL Feedback Item 401.55 would be revised to acknowledge that chief examiners can request enhancements to written examination items, including the failure to test a “relevant” procedure concept. The NRR/IOLB program office “literally” complied with the direction to revise OL Feedback Item 401.55 to say that chief examiners could request licensees to make changes to the exams to obtain the proper balance of coverage, but the NRR/IOLB program office did not revise OL Feedback Item 401.55 to explain the intent of Tier 1 questions, and the revision did not clearly communicate that chief examiners could request enhancements to Tier 1 questions that did not test emergency and abnormal procedure knowledge.

It is not the intent of this appeal to ask for a determination on whether the NRR Decision Memo was intentionally written to direct one small action, while at the same time stating agreement with the DPO Panel Recommendations, with no intent to ever fully incorporate those recommendations into the final corrective actions. At the time the NRR Decision Memo was issued, the DPO submitters believed that the full spirit and intent of the DPO Panel Recommendations and the NRR Decision Memo would be included in the corrective action to revise OL Feedback Item 401.55. Therefore, the DPO decision was not initially contested. The DIRS Action Memo, altered the implementation of both the DPO Panel Recommendations and the original NRR Decision Memo. Because the DIRS Action Memo essentially changed the DPO decision, the appeal process was made available to the DPO submitters and this appeal was drafted. The two non-management representatives on the “Ad Hoc” DPO Panel confirmed, one via email, and the other via telephone, that the corrective actions did not fully implement the DPO Panel Recommendations.

It is important to recognize that the justification provided by the Acting DIRS Director for not correcting OL Feedback Item 401.55 is refuted point-by-point in Section VII of this Appeal. The Acting DIRS Director’s justification included a concern of imposing a new requirement on the licensee without going through an official NUREG revision process. This concern is without merit because the licensee wrote and submitted the basis statements for Revision 3 of the K/A Catalogs and those basis statements require testing procedure knowledge for Tier 1 topics. The concern about imposing a new requirement without undergoing an official NUREG revision process is also without merit, because the basis statements provided by industry have been through the NUREG revision process. The Acting DIRS Director’s concern with imposing a new requirement on licensees is without merit, because NUREG-1021 itself states that the requirements for exam development can change and it does **not** impose a new requirement on the licensee because the licensees are not required to write their own exams (it is just an option for them to write the exam).

Lastly, it is also important to note that SECY-12-0151 (Attachment 11) informed the Commission that the same process that developed the AP-1000 and ABWR K/A catalogs would be followed for Revision 3 of the operating fleet K/A catalogs. The industry followed the guidance in SECY-0151 and submitted Revision 3 of the K/A catalogs to the NRC for review via the NUREG revision process, which included

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submitting basis statements for the Tier 1 topics. Then NEI, in a letter to the NRR/IOLB Branch Chief (Attachment 12), stated that Revision 3 of the catalogs had both appropriate technical justification and their full support. This series of events does not support the concern of the Acting DIRS Director with respect to imposing a new requirement on the industry, for exams that the industry is not even required to write themselves, when it was the industry itself that wrote Revision 3 of the K/A catalogs, and endorsed their technical justification in separate correspondence sent to the Operator Licensing Branch Chief.

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IV. HISTORY OF THE DPO 2017-007 DECISION

Six experienced Senior Operations Engineers in Region II submitted Differing Professional Opinion (DPO) 2017-007, “Operator Licensing Written Exam Tier 1 Test Items,” (ML17290A536) on October 10, 2017. The DPO submitters contended the following points:

- A Tier 1 written test item should, whenever possible, within the wording of the K/A statement, test the applicant’s knowledge of the abnormal condition or emergency procedure *content*, for example:
 - an immediate operator action,
 - an important subsequent manual operator action, or
 - overall mitigative strategy of the off-normal or emergency procedure.
- Tier 1 test items where the stem of the question mentions an ongoing abnormal/emergency evolution, but where the test item can be answered solely using Tier 2 (Plant Systems) knowledge, contain, in a sense, “window dressing”; these test items should be assessed as K/A mismatches, but assessed as “enhancement required”, in accordance with ES-401-9, Written Exam Worksheet.
- If testing knowledge of the abnormal condition or emergency procedure content is not possible given the wording of the K/A, then accept the question as meeting the K/A as long as all other aspects of the K/A are met.

The Independent (“ad hoc”) Panel Report

On March 19, 2018, the ‘ad hoc’ DPO Panel tasked with reviewing DPO 2017-007 issued its report (Attachment 3, ML18079A001), which endorsed, in part, the concerns and recommendations of the DPO 2017-007 submitters. The ‘ad hoc’ DPO Panel stated the following as their “Final Conclusion:”

From the information outlined above, the DPO panel recommends that IOLB partially implement the proposed alternative outlined in the DPO submittal, by implementing the above recommendation. **Due to the current guidance in the K/A catalogs and NUREG-1021, the panel also feels that a Chief Examiner would be justified in asking a facility licensee to enhance Tier 1 written examination questions to test a procedural concept in K/A categories K1, K3 (PWR only), A2, and G as relevant to the respective K/A statement, or any other situation where the exam coverage becomes skewed. This approach helps ensure that NRC site-specific written examinations reflect the “representative sample” of 10CFR55 items required by regulation, exams will not over-emphasize plant systems knowledge, or under-emphasize plant procedural knowledge.** [emphasis added] Test items that appropriately solicit knowledge of plant system operation/response, or design associated with an emergency or abnormal event in categories K2, K3 (BWR only), and A1, should be deemed satisfactory if their K/A statement was met with no other psychometric flaws.

The three recommendations made by the ‘ad hoc’ DPO panel mentioned above are as follows:

1. **A Chief Examiner (CE) should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the Chief Examiner’s responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e. Enhancements may be assessed per Form ES-401-9**

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of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure [emphasis added], or if the question's link to the specified knowledge and ability (K/A) statement of the test item is weak. Amplifying information is discussed below for how procedural "relevance" can be determined. If the only flaw for a test item being assessed is its link to a "relevant" procedure, then the question should not be assessed as "unsatisfactory."

2. If recommendation #1 is implemented, IOLB should determine how to promulgate this policy change regarding the assessment of Tier 1 questions to both agency and industry stakeholders. Additionally, IOLB should consider coordinating with the staff at the Technical Training Center (TTC) to include appropriate modifications to the examiner training course (G-107).
3. If recommendation #1 is implemented, IOLB should also assess the necessity of changes to NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The DPO Panel does not recommend any substantive changes to the current revision of NUREG-1021, as the current guidance supports recommendation #1. However, the next revision of NUREG-1021 may include clarifying guidance or examples providing the basis for the assessment of Tier 1 written exam questions (similar to what was included in previous revisions regarding SRO only written exam questions).

The NRR Decision Memo

On April 27, 2018, the Acting Director of the NRC Office of Nuclear Reactor Regulation (NRR) issued a memorandum ("NRR Decision Memo") to the submitters of DPO 2017-007¹ (Attachment 2, ML18117A079) detailing the agency resolution to the submitted DPO and the 'ad hoc' DPO Panel Report mentioned above. Under the section of the DPO Decision Memo entitled "Panel Recommendations," the acting NRR Director re-stated the three recommendations quoted above, and then continued as follows:

After considering all the information, I essentially agree with the recommendations provided by the DPO panel. They have thoroughly and conscientiously endeavored to address your well-thought out and articulated concerns. I have the following comments/clarifications to the recommendations.

Regarding Recommendations 1 and 3, I directed my staff to revise the Operator Licensing Program Feedback response (Question 401.55) to clarify that CEs are allowed to make reasonable changes for balance of coverage throughout the examination. I agree that Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge. However, when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not basis to remove it from the test. I considered the amplifying information referenced in Recommendation 1 and find there is no need to revise the current guidance that written examination questions should, but are not required to, test one of the 10 CFR 55 written examination items that the K/A is linked to, or to a facility learning objective. This is, in part, because the linkage of K/A items to 10 CFR 55 written examination

¹ Note that in an apparent clerical error, the memo from the Acting Director, NRR, is only addressed to five of the six submitters of DPO 2017-007. The individual omitted from the memo was, and is, still fully participating in the DPO 2017-007 process. No explanation has yet been provided as to why the individual was omitted from the DPO Decision Memo.

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items does not represent an exhaustive list. I have assigned the above task to DIRS, NRR, to be completed by June 30, 2018.

Regarding Recommendation 2, the acknowledgement that CEs may request enhancements to written examination items, including the failure to test a “relevant” procedural concept will be promulgated through a revision to ROI 17-09 and an update to Question 401.55 on the Operator Licensing Program Feedback webpage. This action is also assigned to DIRS, NRR, to be completed by June 30, 2018.

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V. ANALYSIS OF THE NRR DECISION MEMO

A careful reading of the contents of the DPO Decision Memo is required to fully understand the direction that is given to the staff to implement.

After quoting—verbatim—the three recommendations of the ‘ad hoc’ DPO Panel, the NRR Director stated: “I essentially agree with the recommendations provided by the DPO panel.” He then stated: “I have the following comments/clarifications to the recommendations.” Note that the NRR Director is not changing the recommendations; the NRR Director is not modifying the recommendations; in fact, the NRR Director is endorsing the recommendations of the DPO Panel, with the proviso that his specified comments/clarifications are followed.

The NRR Director’s next sentence explicitly directs the staff to revise OL Feedback Item 401.55 to align with recommendations 1 and 3: “Regarding Recommendations 1 and 3, I directed my staff to revise the Operator Licensing Program Feedback response (Question 401.55) to clarify that CEs [Chief Examiners] are allowed to make reasonable changes for balance of coverage throughout the examination.” What constitute “reasonable changes for balance of coverage?” “Reasonable changes” was already clearly defined by recommendation 1, stated above.

Conclusion: NRC staff was directed by the NRR Director to revise Question 401.55 in the language of recommendation 1, specifically to state that:

A Chief Examiner (CE) should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the Chief Examiner’s responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e. Enhancements may be assessed per Form ES-401- 9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question’s link to the specified knowledge and ability (K/A) statement of the test item is weak.

The NRR Director then continues as follows: “I agree that Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge.”

The above sentence linked with the next sentence is crucial in understanding the DPO Decision.

The NRR Director then stated: “However, when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not basis to remove it from the test.”

Although it is not explicitly stated, the NRR Director is assuming that IF there is NOT proper balance in the overall exam, THEN Chief Examiners may assess Tier 1 written questions as Enhancement required, and direct these items removed from the test to ensure the appropriate balance of coverage in Abnormal and Emergency procedure knowledge. The reason for this allowance is because the intent of Tier 1 questions is, when relevant, to test abnormal/emergency procedure knowledge.

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Conclusion: NRC staff was further directed by the NRR Director to revise Question 401.55, specifically to state that:

Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge.

A CE can require a Tier 1 question that does not tie to a procedure be removed from the test when there is not a proper balance in the overall exam.

However, when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not a basis to remove it from the test.

The NRR Director then reiterated his directives in the next paragraph, which stated:

Regarding Recommendation 2, the acknowledgement that CEs may request enhancements to written examination items, including the failure to test a “relevant” procedural concept will be promulgated through a revision to ROI 17-09 and an update to Question 401.55 on the Operator Licensing Program Feedback webpage. [...]

Therefore, the NRR Decision Memo mandated that OL Feedback Item 401.55 be modified to direct the following points:

Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge.

A Chief Examiner (CE) should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the Chief Examiner’s responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e.

Enhancements may be assessed per Form ES-401- 9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question’s link to the specified knowledge and ability (K/A) statement of the test item is weak.

A Chief Examiner (CE) can require a Tier 1 question that does not tie to a procedure be removed from the test when there is not a proper balance in the overall exam.

However, when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not a basis to remove it from the test.

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VI. ANALYSIS OF OL FEEDBACK ITEM 401.55

The original August 25, 2017 answer to OL Feedback Item 401.55 (Attachment 1, ML17249A961) stated, in part, the following:

[...] However, NUREG-1021, “Operator Licensing Examination Standards for Power Reactors,” does not require Tier 1 written examination questions to reference a procedure. [...]

If a question meets its specific K/A statement in its entirety, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question. [...]

In summary, rating a question as an “unacceptable” or “deficient” K/A mismatch, i.e. “unsatisfactory” or in need of “enhancement,” because it can be answered based on plant system knowledge as it relates to the referenced Emergency or Abnormal Plant Evolution, is not supported by NUREG-1021. [...]

From the original answer to OL Feedback Item 401.55, stakeholders got the following WRONG messages:

WRONG MESSAGE #1: The intent of Tier 1 written examination questions is not to test procedure knowledge.

WRONG MESSAGE #2: IF a Tier 1—or any other Tier—written examination question meets its specific K/A statement, THEN it meets the intent of that question’s Tier. A Chief Examiner is not allowed to remove a Tier 1 written examination from a test to increase procedure knowledge balance-of-coverage, since the intent of Tier 1 is already met by meeting the specific K/A statement—irrespective of whether or not the proposed question tests systems knowledge or abnormal/emergency procedure knowledge.

WRONG MESSAGE # 3: Moreover, rating a question as either “unacceptable” or “enhancement” due to a lack of abnormal/emergency procedure knowledge “is not supported by NUREG-1021.” In other words, Chief Examiners—who are bound to follow NUREG-1021 to conduct an exam—are not allowed to rate a Tier 1 question deficient of procedure knowledge as “enhancement;” if a Chief Examiner were to do so, it would be a practice “not supported by NUREG-1021.”

In the revised version of OL Feedback Item 401.55 (Attachment 2, ML18178A581), all of the above language was left unchanged. The only modification that was made was to add the following paragraph to the end of the existing text:

As a clarification, Chief Examiners are allowed to make reasonable changes that are necessary to ensure an adequate balance of coverage throughout the examination. In addition, the resolution to this question is not intended to restrict the Chief Examiner’s ability to request reasonable enhancements to any written examination items when necessary, including those that do not test a relevant procedural concept.

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The result of adding this language to the end of OL Feedback Item 401.55, without modifying any of the preceding text, was to officially promulgate contradictory and confusing guidance. Here are the reasons why OL Feedback Item 401.55 still remains incorrect, misleading, and contradictory to the NRR Decision Memo.

- 1. The NRR Decision Memo stated that “... Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge.”**

Contrary to the DPO Decision Memo, the revised OL Feedback Item 401.55 states that “NUREG-1021 ... does not require Tier 1 written examination questions to reference a procedure.”

Conclusion: The current revised version of OL Feedback Item 401.55 does not support the NRR Decision Memo that the intent of Tier 1 written exam questions is to test abnormal or emergency procedure knowledge whenever relevant.

- 2. The NRR Decision Memo stated that “Enhancements may be assessed per Form 401-9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure....”**

Contrary to the DPO Decision Memo, the revised OL Feedback Item 401.55 states that “rating a question as ... in need of “enhancement,” because it can be answered based on plant system knowledge ... is not supported by NUREG-1021.”

Conclusion: The current revised version of OL Feedback Item 401.55 does not support the NRR Decision Memo because it states that Tier 1 questions that do not test relevant procedure knowledge can not be rated as “Enhancement” required on Form 401-9 (arguably depending on which section of OL Feedback Item 401.55 the reader references, as shown by point 5. below).

- 3. The NRR Decision Memo stated that “when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not basis to remove it from the test.” It therefore must be logically true that when there is not a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is basis to remove it from the test.**

Contrary to the DPO Decision Memo, the revised OL Feedback Item 401.55 states that “If a question meets its specific K/A statement in its entirety, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question.”

Conclusion: The current revised version of OL Feedback Item 401.55 does not support the NRR Decision Memo because it states that there is no reason to remove a Tier 1 question from the test, even if it does not specifically test procedural knowledge, because as long as any question meets its specific K/A statement, then it meets the intent of the Tier category it is within.

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4. Section ES-401 D.2.a of NUREG-1021 states, in part: “[...] Ensure that the questions selected for Tier 3 maintain their focus on plant-wide generic K/As and do not become an extension of Tier 2.” Furthermore, NUREG-1021 Form 401-6, Written Exam Quality Checklist, Item 9 requires that CEs certify that “Question content conforms to specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.” [emphasis added] It is therefore clear that NUREG-1021 requires CEs to consider both the specific K/A statement and (in addition) the tier to which the question is assigned.

Contrary to NUREG-1021, the revised OL Feedback Item 401.55 states that “If a question meets its specific K/A statement in its entirety, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question.”

Conclusion: The current revised version of OL Feedback Item 401.55 contradicts current NUREG-1021 requirements.

5. **The current revision of OL Feedback Item 401.55 is self-contradictory.**

The revised version of OL Feedback Item 401.55 states: “the resolution to this question is not intended to restrict the Chief Examiner’s ability to request reasonable enhancements to any written examination items when necessary, including those that do not test a relevant procedural concept.”

However, contrary to its own guidance, the revised version of OL Feedback Item 401.55 also states the following: “rating a question as ... in need of “enhancement,” because it can be answered based on plant system knowledge ... is not supported by NUREG-1021.”

Conclusion: The current revised version of OL Feedback Item 401.55 allows a Chief Examiner to rate a question an “Enhancement” when necessary, including a question that “do[es] not test a relevant procedural concept;” whilst, and at the same time, the current revised version of OL Feedback Item 401.55 also states that a Chief Examiner should **not** rate a question as “Enhancement” because it can be answered based on plant system knowledge, because such an action “is not supported by NUREG-1021.” **This is an example of obvious and blatant self-contradiction contained in the currently promulgated guidance of OL Feedback Item 401.55.**

There is no other way possible: either a CE can rate a Tier 1 question as “Enhancement” due to lack of procedural knowledge content, or a CE cannot rate a Tier 1 question as “Enhancement” due to lack of procedural knowledge content. The current agency guidance as expressed in the revised version of OL Feedback Item 401.55 is an exercise in illogical confusion and represents a violation of the basic fundamental principle of self-contradiction.

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VII. ANALYSIS OF THE DIRS ACTION MEMO

Following the publication of the revision to OL Feedback Item 401.55 detailed above, the DPO Submitters engaged NRC staff and management in an attempt to correct the inadequate implementation of the DPO decision. On August 15, 2018, the Acting DIRS Director issued a memorandum to the Acting NRR Director entitled "ACTION ON DIFFERING PROFESSIONAL OPINION INVOLVING OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1 ITEMS (DPO 2017-007)." (Attachment 5, ML#18225A149) In the DIRS Action Memo, the Acting DIRS Director stated, in part, the following:

[...] Per your direction in that memorandum, Operator Licensing Program Feedback response 401.55 has been updated. [...]

In assessing the need for a further revision to the answer to question 401.55, I considered the language of your written direction and the report submitted by the DPO panel (see memorandum from J. Clark to yourself, "Differing Professional Opinion Panel Report on Operator Licensing Written Examinations-Tier 1 Items (DPO-2017-007)", ML18117A132). In considering these memoranda, I was also mindful that 10 CFR 55 requires that the Commission "shall use the criteria in NUREG-1021, 'Operator Licensing Examination Standards for Power Reactors,' in effect six months before the examination date to prepare the written examinations required by §§ 55.41 and 55.43." As NUREG-1021 is binding upon both the staff and the regulated industry, I was cautious to ensure that the answer to question 401.55 did not create a new requirement or a new regulatory position for licensees that prepare written examinations.

Having reviewed the applicable documents, and through discussions with you and a number of the DPO submitters, I have concluded that the current revision to question 401.55 meets the intent of your direction. Specifically, your statement "when relevant," when taken in the context of both the "Statement of Concern" in your memorandum ("... when relevant to the K/A statement wording ... ") and the conclusion of the DPO panel led me to conclude that Tier 1 questions do not, by definition, require a procedural basis for all KA categories, and that implying an overall statement of intent for Tier 1 questions in the answer to feedback question 401.55 might create a new or revised regulatory position. The current revision of the answer to feedback question 401.55 also makes it clear that the balance of coverage for an examination remains the responsibility of the CE and that the CE has the authority to request reasonable changes to insure that balance of coverage exists.

While I find that the current answer to feedback question 401.55 is consistent with NUREG-1021, revision 11 (the revision currently in force), increased clarity (on the topics of Tier 1 questions and examination coverage) in the NUREG should be pursued. Consequently, I have directed Operator Licensing Branch (IOLB) staff to include two new items into the preparation of an upcoming revision to NUREG-1021. First, IOLB has been directed to take up the issue of the intent of Tier 1 questions. In this effort, staff is to consider whether a general statement of intent should be explicitly defined or discussed in the standard and, if so, to develop such language. Second, IOLB has been directed to take up the issue of "balance of coverage" in written examinations. The goal of this effort would be to define the phrase as clearly as possible in NUREG-1021, mindful of the complexity of the issue, in order to provide a clear standard to both industry and NRC staff. As the DPO authors have indicated, this topic was the subject of an Information Notice (IN) in 1988 (see IN 88-04), which may provide a basis for this work. By addressing both of these topics in NUREG-1021, in a forum open to internal and external stakeholder participation and comment, the agency

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and licensed community should benefit from increased clarity (leading to increased efficiency) in binding guidance.

There are three contentions raised in the DIRS Action Memo that are incorrect, without merit, and fail to implement the DPO 2017-007; the three contentions are:

- (1) The current revision to OL Feedback Item 401.55 fully complies with and meets all the requirements of the NRR Decision Memo. No further revisions shall be made.
- (2) To state the intent of Tier 1 written exam questions would be to “create a new requirement or a new regulatory position.”
- (3) Due to the danger of creating a new requirement or new regulatory position, we must wait until the next revision of NUREG-1021 to determine what the intent of Tier 1 questions are, and to define what constitutes a proper “balance of coverage” in written examinations.

In answer to the first contention stated above, Part VI, Inadequate Revision to OL Feedback Item 401.55, of this DPO Appeal proves that, contrary to the DIRS Action Memo claims, the revised version of OL Feedback Item 401.55 (Attachment 4) is inadequate, contradictory and confusing, and certainly not in accordance with the direction of the NRR Decision Memo.

It is a very important point to understand why, contrary to the DIRS Action Memo, stating the intent of Tier 1 written exam questions is not creating a new requirement or regulatory position.

A. Why stating the Intent of Tier 1 K/A Statements is NOT Creating a new requirement

It is imperative that reviewers of this appeal educate themselves on the content of the original DPO (ML17290A536). Within the original DPO, and in the Executive Summary of this Appeal, objective evidence exists to support that the intent of Tier 1 K/A topics is, and always has been, to test abnormal and emergency condition procedure knowledge. The following paragraphs explain the new supporting evidence, and shows that NUREG-1021 states that it is the combination of NUREG-1021 and the K/A catalogs which define the scope of an initial license exam.

NUREG-1021 endorses the use of the draft AP-1000 K/A catalog, which contains Tier 1 basis statements (Attachment 8) requiring procedure knowledge to be tested; these AP-1000 K/A catalogs have been used for multiple exams and are a key part of the current initial operator licensing exam process. SECY-12-0151 (Attachment 11) shows that NRR itself informed the Commission that the latest revision (Revision 3) of the K/A catalogs would be based on the new draft AP-1000 and ABWR K/A catalogs. The industry submitted Revision 3 of the operating fleet K/A catalogs (Attachment 9) and specifically attested to the technical basis within those catalogs and explicitly stated that those catalogs have their full support (Attachment 12), with one exception that is not related to the basis, or intent, of Tier 1 K/A statements. The submitted Revision 3 catalogs, as well as the AP-1000 and ABWR catalogs from which they were based, all contain basis statements that adequately define the intent of Tier 1 K/A statements.

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NUREG-1021, ES-401 and ES-401N (Attachment 1 and 2), both state that preparing the license examination using the appropriate K/A catalog, in conjunction with the instructions in this NUREG-series report, will ensure that the examination includes a representative sample of the items in the regulations and is the basis for developing content valid exams. NUREG-1021 provides Item 9 on Forms ES-401-6 and ES-401N-6 (Attachment 10) to ensure that the question content is appropriate for the Tier to which they are assigned. Item 9 on these Forms is evidence that a K/A residing in a specific Tier means something. If NRR's position is applied, the Tiers to which a K/A resides is meaningless. The existence of Item 9 is an indicator that there is a difference between Tier 1 and Tier 2.

NUREG-1021, ES-401N, Section B, Page 1 of 53, states that the AP-1000 K/A catalog issued in October 2011, and the ABWR K/A catalog issued December 2011, will provide the basis for developing content-valid operator licensing examinations. These new reactor K/A catalogs both contain basis statements that clearly communicate the intent of Tier 1 K/A statements (Attachment 8). In the case of the NUREG-2104, for AP-1000 reactors, these NUREG-level catalogs have already been used for multiple exams. The basis statements from Table 4 of the AP-1000 catalog are as follows (the word "procedure" has been underlined for emphasis):

EK 1 Lists the systems required to be monitored and/or operated by the procedure.

EK 2 Lists the operationally based theoretical concepts applicable to the procedure. These items typically came from the procedure bases, PRA, OE, procedure notes and cautions.

EK 3 Lists the actions and bases taken in the procedure.

EA 1 Lists the systems and/or components required to be monitored and/or operated by the procedure.

EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.

The basis statements from Table 4 of the ABWR catalog are as follows (again, the word "procedure" has been underlined for emphasis):

E/AK 1 Lists the operational implications applicable to the procedure. These items can come from the procedure bases, PRA, OE, procedure notes and cautions.

E/AK 2 Lists the systems required to be monitored and/or operated by the procedure.

E/AK 3 Lists the actions and bases taken in the procedure.

EA 1 Lists the systems and/or components required to be monitored and/or operated by the procedure.

EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.

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SECY-12-0151 from the Director NRR, to the Commissioners, on November 2, 2012 (Attachment 12, ML12278A258), stated that the NRC will work with the NEI Licensed Operator Focus Group (LOFG) to revise the NRC's Knowledge and Abilities (K/A) Catalogs for Nuclear Power Plant Operators and the K/A statement selection process for the written examinations. Within this SECY paper it states that an industry working group be established, with NRC participation, to revise the operating fleet K/A Catalogs (NUREG-1122 and NUREG-1123) to better reflect the licensed operator knowledge requirements, skills, and abilities required in the current operating environment. The SECY also states that the revision process would be modeled after the processes, including lessons learned, used to develop Draft NUREG-2103 and NUREG-2104, which are the K/A Catalogs for AP-1000 and ABWR reactor designs. It is worth reinforcing the fact that the AP-1000 and ABWR K/A Catalogs contain basis statements that describe how testing procedure knowledge is necessary to meet the Tier 1 K/A statements.

Draft Revision 3 of the operating plant K/A catalogs were submitted by NEI and these revisions contained basis statements for the Tier 1 K/As (Attachment 9), clearly describing the intent of the Tier 1 K/As.

NEI, sent a letter to the NRR-IOLB Branch Chief on November 2, 2017 (Attachment 12), to request the removal of unintended changes contained in NUREG-1122, revision 3 and NUREG-1123, revision 3. NEI described in this letter that these unintended changes were associated with changes to the generic fundamentals K/As, listed in Sections 5 and 6 of those catalogs (issues which are unrelated to this DPO). The NEI letter continued to state, "Notwithstanding our previous comments, all other changes contained in both documents have both appropriate technical justification and our full support." It is worth reinforcing the fact that among those other changes, were the basis statement additions for the Tier 1 K/As which were modeled after the AP-1000 and ABWR K/A Catalogs.

The basis statements for Tier 1 of revision 3 of the PWR K/A Catalog, NUREG-1122, are as follows (as before, the word "procedure" has been underlined for emphasis):

E/AK1 Lists the operationally based theoretical concepts applicable to the procedure. These items can come from the procedure bases, probabilistic risk assessment, operating experience, procedure notes and cautions.

E/AK2 Lists the systems required to be monitored and/or operated by the procedure.

E/AK3 Lists the reasons responses and/or actions are taken in the procedure.

E/AA1 Lists the systems and/or components required to be monitored and/or operated by the procedure. E/AA1 may include systems from E/AK2.

EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.

Similarly, the basis statements for Tier 1 of revision 3 of the BWR K/A Catalog, NUREG-1123, are (the word "procedure" has been underlined for emphasis):

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- E/AK1 Lists the operationally based theoretical concepts applicable to the procedure. These items can come from the procedure bases, PRA, OE, procedure notes and cautions.*
- E/AK2 Lists the systems required to be monitored and/or operated by the procedure.*
- E/AK3 Lists the reasons responses and/or actions are taken in the procedure.*
- E/AA1 Lists the systems and/or components required to be monitored and/or operated by the procedure. EA1 may include systems from EK2.*
- EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.*

Using the above information, one can conclude that the intent, or the basis, of Tier 1 written exam items is to test abnormal or emergency procedure knowledge. The intent of Tier 1 has already been used for AP-1000 exams and is clearly stated in both draft K/A catalogs for AP-1000 and ABWR, which are endorsed for use within NUREG-1021, ES-401N. NRR directed the Revision 3 of the operating fleet K/A catalogs to be based on the AP-1000 and ABWR catalogs that are already endorsed by NUREG-1021 and have been used. NEI LOFG, consisting of a large population of industry representatives, states that the revision 3 of the operating fleet K/A catalogs, as submitted by the LOFG, have appropriate technical justification and their full support, with the exception of inadvertent generic fundamental K/A changes. Therefore, the intent of Tier 1 is not a new requirement. When NEI submitted Revision 3 of the operating fleet catalogs, they did not even list the addition of the basis statements as a significant change (potentially because it is not viewed as a change).

As one additional point to make regarding the issue of whether the intent of Tier 1 is a new item, the 'ad hoc' panel's report clearly stated: "The DPO Panel does not recommend any substantive changes to the current revision of NUREG-1021, as the current guidance supports recommendation #1." [emphasis added]

B. Why waiting until the next revision of NUREG-1021 is not necessary

For the sake of disproving the third argument raised in the DIRS Action Memo, this section will demonstrate two examples of changes made to the NRC exam process outside the NUREG-1021 revision cycle. In other words, even if one believed that defining the intent of Tier 1 written exam questions was a new regulatory position or requirement, this section will demonstrate that changes can and have been made using other methods than directly revising NUREG-1021.

First Example: May 15, 2014 "Interim Guidance" Memo

On May 15, 2014, the DIRS Director issued a memorandum to the four regional DRS Directors with the subject "INTERIM GUIDANCE RELATED TO THE CONDUCT OF INITIAL OPERATOR LICENSING EXAMINATIONS." In this memorandum, the DIRS

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Director imposed requirements upon all regional examiners that changed the existing requirements in the then-current revision of NUREG-1021 (which was Revision 9, Supplement 1—ADAMS ML15198A190).

For example, ES-204 section c.2.b (third paragraph) stated the following:

The region does not require written concurrence from NRR to deny an applicant's waiver request, but it should discuss its decision with the operator licensing program office before informing the applicant; formal concurrence may be desirable in some cases.

The above direction given in NUREG-1021 was changed by the "Interim Guidance" memo, which stated:

Regional management shall discuss with the NRR program office its decision to deny an applicant's request for waiver of a test based on previously passing that portion of the examination. Concurrence shall be obtained using the ROI process.

So, it is clear that the NRC examination process as specified in NUREG-1021 was, and can be, changed/modified and superseded by memorandum.

A further example in the "Interim Guidance" memo was the discussion of simulator grading policies as it related to applicants who committed two non-critical errors in one simulator rating factor. In this case, revision 9, supplement 1 of NUREG-1021 stated the following (section ES-303, D.2.b. fourth bulleted paragraph):

If an applicant makes two errors related to a rating factor, circle an "RF Score" of "1" for that rating factor unless a score of "2" can be justified (and documented as discussed in Section D.3, below) based on correctly performing another activity (or activities) related to the same rating factor; three or more errors generally require a score of "1," regardless of the applicant's compensatory actions.

Section D.3.d of ES-303 further clarified the simulator grading policy of revision 9, supplement 1 of NUREG-1021 as follows:

As noted in Section D.2, above, deviations from the nominal grading criteria must be explained in detail. For example, an examiner may conclude that an applicant's performance is acceptable despite exhibiting deficiencies that would normally result in an unsatisfactory grade (e.g., committing two or more errors related to the same simulator rating factor ...).

The above grading allowance was changed by the "Interim Guidance" memo, which stated, in part:

... the exercise of this provision is not subject to examiner discretion. If an applicant commits two non-critical errors in a rating factor, but performs another activity correctly related to that same rating factor, the rating factor score must be increased from "1" to "2."

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Again, it is obvious that the previously stated “Interim Guidance” Memo changed the requirements that then existed in NUREG-1021. As an aside, the current requirements of Revision 11 to NUREG-1021 have dis-allowed the practice of increasing rating factor scores due to correct performance.

Second Example: OL Feedback Item 401.53

As a second example of changing (or providing clarifying information) to the exam process, consider the answer NRR provided in OL Feedback Item 401.53 (available in the current OL Feedback document (ML18178A581). This OL Feedback Item answer provided new guidance concerning acceptable number of “open reference” questions allowable on an NRC written examination as follows:

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

Note that this new guidance on the recommended number of allowable “open reference” questions was not included as a change to NUREG-1021. As shown above, providing new guidance in the OL Feedback format is seemingly an acceptable method to make changes to the NRC initial operator examination process—formally revising NUREG-1021 is not required.

C. Why the NRC’s Examination Process is NOT Subject to “Backfit” Considerations

The current revision 11 of NUREG-1021 (ML17038A432), page xiii, states that revisions to NUREG-1021 are not considered a backfit because licensees are not mandated to prepare initial operating exams required by the CFR. Specifically, under the section “Backfitting and Issue Finality,” NUREG-1021 stated the following, in part:

Revision 11 to NUREG-1021 does not represent “backfitting” as that term is defined in 10 CFR 50.109, “Backfitting,” and is not inconsistent with the issue finality provisions in 10 CFR Part 52. Current holders of operating licenses under 10 CFR Part 50 or combined licenses under 10 CFR Part 52 are not mandated to prepare the written examinations required by 10 CFR 55.41 and 10 CFR 55.43 and the operating tests required by 10 CFR 55.45, which must be prepared using the criteria in NUREG-1021 in effect 6 months before the examination date.¹ Because licensees under 10 CFR Part 50 and 10 CFR Part 52 are not required to prepare the 10 CFR 55.41 and 10 CFR 55.43 examinations and 10 CFR 55.45 tests, changes to the criteria used to prepare the examinations and tests are not imposed upon them; therefore, these

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changes do not meet the definition of “backfitting” in 10 CFR 50.109 and are not inconsistent with the finality provisions in 10 CFR Part 52.

In other words, because licensees are not required to prepare examinations, changes made to the criteria used to prepare them are not imposed upon them; therefore, changes to NUREG-1021 for initial examination development do not meet the definition of “backfitting.” (This is relevant because the August 15, 2018, memorandum claims that clarifying the intent of Tier 1 K/As, as suggested by the DPO submitters, would constitute a new requirement being imposed on the exact same licensees that submitted revision 3 of the K/A catalogs.)

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VIII. Timeline of Events for DPO 2017-007

- March 30, 2017: Region II submitted ROI 17-09 to NRR-IOLB for Tier 1 Test Items
- June 7, 2017: NRR-IOLB issued resolution to ROI 17-09
- August 24, 2017: Teleconference between Region II and NRR-IOLB to discuss proposed wording OL Feedback Item 401.55
- August 25, 2017: Operator Licensing Feedback Item 401.55 posted on public web
- October 10, 2017: DPO 2017-007 submitted by Region II Chief Examiners
- October 19, 2017: NRR-IOLB provided negative training to all examiners on Tier 1 test items
- March 19, 2018: Independent DPO Panel Report issued
- April 27, 2018: NRR Decision Memo issued
- May 30, 2018: ROI 17-09R (revision) issued
- May 31, 2018: NRR-IOLB distributed proposed revision to OL Feedback Item 401.55 to regional Branch Chiefs
- June 14, 2018: DPO Submitters emailed NRR-IOLB Branch Chief that the proposed revision to OL Feedback Item 401.55 was incorrect and contradicted itself.
- June 27, 2018: OL Feedback Item 401.55 revision posted on the public webpage.
- July 3, 2018: Conference between DPO Submitters and NRR to attempt to resolve differences.
- August 1-13, 2018: DIRS Acting Branch Chief contacted DPO Submitters individually to discuss differences.
- August 15, 2018: DPO Submitters provided Acting DIRS Director (via email) with the K/A Catalog Rev. 3 information regarding basis for emergency abnormal stem statements, including industry's previous acknowledgement.
- August 15, 2018: DIRS Action Memo issued.
- October 25, 2018: DPO Appeal Submitted

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IX. Attachments and ML Numbers (each attachment provided after the next page)

1. The 8/25/17 (original) version of OL Feedback Item 401.55 (ML17249A961)
2. NRR Decision Memo (ML18117A079)
3. Independent DPO Panel Report (ML18079A001)
4. The 6/27/18 (revised) version of OL Feedback Item 401.55
5. DIRS Action Memo (ML1822A149)
6. Information Notice 88-40, Examiners' Handbook For Developing Operator Licensing Examinations
7. NUREG-1021, 1983 Version (ML15027A414)
8. AP-1000 and ABWR K/A Catalog Table 4, Knowledge and Ability Statements for Emergency and Abnormal Procedures
9. Operating Fleet PWR and BWR K/A Catalog, Revision 3, Table 4, Knowledge and Ability Statements for Emergency and Abnormal Procedures
10. Form ES-401-6, Written Exam Quality Checklist
11. SECY-12-0151, From Eric Leeds to the Commissioners (ML12278A258)
12. NEI Letter from Gregory R. Cameron to Nancy Salgado (ML18180A121)
13. Mark Bates June 14, 2018 email to NRR/IOLB Branch Chief
14. DPO Independent Panel member June 27, 2018 email to Mark Bates
15. Acting NRR Director July 3, 2018 email to Bruno Caballero
16. Mark Bates August 15, 2018 email to Acting DIRS Director
17. Dan Bacon August 15, 2018 email to Acting DIRS Director

Other ML numbers (not included as Attachments)

- ROI 17-09 (ML#17165A579)
- Entire OL Feedback Package on 8/25/17 (ML17249A961)
- Entire OL Feedback Package on 6/27/18 (ML18178A581)
- Entire DPO Case File (ML18150A469)
- NUREG-2103, AP-1000 K/A Catalog (ML11307A3670)
- NUREG-2104, ABWR K/A Catalog (ML11354A280)
- NUREG-1122, PWR K/A Catalog, Rev. 2, Supplement 1 (ML102571881)
- NUREG-1122, PWR K/A Catalog, Rev. 3 Draft (ML17097A204)
- NUREG-1123, BWR K/A Catalog, Rev. 2, Supplement 1 (ML13086A115)
- NUREG-1123, BWR K/A Catalog, Rev. 3 Draft (ML17097A214)
- NUREG-1021, Operator Licensing Examination Standards for Power Reactors, Rev. 11 (ML17038A432)



Operator Licensing Program Feedback

08/25/2017	ES-401	New Question 401.55 was added to provide clarification on evaluating Tier 1 questions as “unacceptable” or “deficient” based on the question failing to reference an Emergency or Abnormal Operating Procedure even though the question met the K/A statement.
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401.55

Some Tier 1, “Emergency and Abnormal Plant Evolutions,” written examination questions have been categorized as deficient, and in some instances, “Unsatisfactory” as a result of the NRC Form ES-401-9 Written Examination Review process because their stated Tier 1 knowledge or abilities (K/A) statement did not reference procedures and, therefore, only required system knowledge to answer.

Is a proposed Tier 1 written examination question deficient or unacceptable if it does not reference a procedure?

The Knowledge and Abilities Catalogs for Nuclear Power Plant Operators (K/A Catalogs) ([NUREG-1122](#) and [-1123](#)) state that “an emergency plant evolution is any condition, event, or symptom which leads to entry into the plant specific emergency operating procedures (EOPs)” and “an abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition, but, nonetheless, adversely affecting a safety function.”

However, [NUREG-1021](#), “Operator Licensing Examination Standards for Power Reactors,” does not require Tier 1 written examination questions to reference a procedure. The Tier 1 category is designated as Emergency and Abnormal Plant Evolutions, but it cannot be completely separated from Plant Systems knowledge (Tier 2 category). Systems are designed to respond to Emergency and Abnormal Plant Evolutions, including design specifications, pressures, automatic actions, etc. and, as such, a Tier 1 question can test for these items, provided the system knowledge tested relates directly to the Emergency or Abnormal Plant Evolution selected K/A statement, i.e., it matches the K/A statement from the outline. If a question meets its specific K/A statement in its entirety, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question. For example, a question testing PWR K/A APE 027 AA2.11 - “Ability to determine and interpret RCS pressure as they [RCS Pressure] apply to the Pressurizer Pressure Control Malfunctions” - would be acceptable even if it did not test specific detailed procedural knowledge as long as the Pressurizer Pressure Control Malfunction could ultimately lead to entry into EOPs or Abnormal Operating Procedures (AOPs). Similarly, a question testing BWR K/A EPE 295024 EK2.11 - “Knowledge of the interrelations between High Drywell Pressure and Drywell Spray (RHR) Logic” - would be acceptable if it tested the operator’s knowledge as to the actions required to open the interlocked closed Drywell Spray Header Isolation valves upon receipt of a Low Pressure Coolant Injection (LPCI) initiation signal even if the question’s conditions did not indicate entry into the EOPs.

In summary, rating a question as an “unacceptable” or “deficient” K/A mismatch, i.e., “unsatisfactory” or in need of “enhancement,” because it can be answered based on plant system knowledge as it relates to the referenced Emergency or Abnormal Plant Evolution, is not supported by NUREG-1021. Moreover, testing plant system design features, interlocks, and system operation for conditions, events, or symptoms that lead to entry into EOPs or AOPs and match the Tier 1 K/A statement is not unacceptable simply because the EOPs or AOPs were not entered. Testing plant system design features, interlocks, and system operation will in many instances test [10 CFR 55.41\(10\)](#) procedural knowledges and abilities albeit without entry into the procedure.



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

April 27, 2018

MEMORANDUM TO: Bruno L. Caballero, Senior Operations Engineer
Operations Branch 2
Division of Reactor Safety
Region II

Daniel M. Bacon, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

David R. Lanyi, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

Phillip G. Capehart, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

Michael K. Meeks, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

FROM: Brian E. Holian, Acting Director
Office of Nuclear Reactor Regulation

A handwritten signature in black ink, appearing to read "B-E-Holian".

SUBJECT: DIFFERING PROFESSIONAL OPINION INVOLVING
OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1
ITEMS (DPO 2017-007)

On October 10, 2017, in accordance with Management Directive 10.159, "The NRC Differing Professional Opinions Program," you submitted a differing professional opinion (DPO) involving operator licensing written examinations (DPO-2017-007). Specifically, your DPO raises concerns that the recent policy determination made by NRR staff for writing and assessing Tier 1 written examination test items has the potential to undermine the 10 CFR 55.41 that the

CONTACT: Trent L. Wertz, NRR
301-415-1568

written examination should contain a representative selection of questions on the knowledge, skills, and abilities needed to perform licensed operator duties. Specifically, the policy interpretation will result in fewer questions that test the operator's knowledge of abnormal and emergency procedures. The purpose of this memorandum is to respond to your DPO.

On January 21, 2017, a DPO Ad Hoc Review Panel (the Panel) was established and tasked to meet with you, review your DPO submittal, and issue a DPO report, including conclusions and recommendations to me regarding the disposition of the issues presented in your DPO. On March 19, 2018, after reviewing the applicable documents, completing internal interviews of relevant individuals and completing their deliberations, the Panel issued their report to me.

On April 19, 2018, I talked to you by telephone to discuss the Panel's report and to get your insights and comments. On April 25, 2018, you provided me additional insights into your concerns and your thoughts for resolving the issue.

In order to make a decision with regard to your DPO, I reviewed your DPO submittal, the Panel's report, met with the headquarters operator licensing staff, talked with you, and then re-considered your comments to me. In addition, on April 26, 2018, I discussed these issues with the DPO Panel Chair

Statement of Concern

The Operator Licensing and Training Branch (IOLB) of the Office of Nuclear Reactor Regulation (NRR) determined that a test item developed for Tier 1 of the site-specific written exam matches the intent of its knowledge or ability (K/A) statement if the test item solely tests plant systems knowledge, such as a design feature, interlock, or automatic operation. IOLB determined it was inappropriate to evaluate Tier 1 test items as "enhancement required" or "inappropriate" on Form ES-401-9, Written Examination Review Worksheet, when the test item did not test knowledge of emergency or abnormal procedures. This determination was documented in Record of Interaction (ROI) 17-09, NUREG 1021, ES-401 Tier 1 Written Exam Test Items (ML17165A579); was disseminated to industry stakeholders in Operator Licensing Feedback Item 401.55 (ML17249A961); and was communicated during an operator licensing examiner training session conducted by IOLB staff on October 19, 2017.

Based on the Panel's review of the Differing Professional Opinion (DPO) submittal and associated references, and interview and follow-up discussion with the submitters, the panel determined the following issue was expressed:

Some NRC staff are concerned that the IOLB policy determination conflicts with the purpose of Tier 1 test items to test emergency and abnormal operating procedural knowledge on the site-specific Reactor Operator (RO) written examination, which is required in accordance with 10 CFR 55.41 (b)(10). The staff members contend that the number of RO questions that test abnormal and emergency procedures on the site-specific written exam should not be reduced because the operating exam does not test individual applicant's procedure knowledge to the same extent as the written exam because:

- Dynamic scenarios are administered in a "team," open-book environment where the SRO reads or directs emergency/abnormal operating procedure steps to RO applicants, and systems Job Performance Measures (JPMs) are administered by directing the applicant to perform a task in accordance with a specific procedure.

These staff members are concerned that the IOLB policy determination precludes the Chief Examiner (CE) from evaluating a Tier 1 test item as "enhancement required" on Form ES-401-9 when the proposed test item does not test abnormal or emergency procedure knowledge *relevant to the K/A statement wording*, which would ensure overall exam balance of coverage for abnormal and emergency operating procedures.

Panel Recommendations

The Panel concluded and recommended the following:

1. A CE should not be prohibited from assessing written examination questions as "enhancement required" for any reasonable situation, since it is the Chief Examiner's responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e. Enhancements may be assessed per Form ES-401-9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question's link to the specified knowledge and ability (K/A) statement of the test item is weak. Amplifying information is discussed below for how procedural "relevance" can be determined. If the only flaw for a test item being assessed is its link to a "relevant" procedure, then the question should not be assessed as "unsatisfactory."
2. If recommendation #1 is implemented, IOLB should determine how to promulgate this policy change regarding the assessment of Tier 1 questions to both agency and industry stakeholders. Additionally, IOLB should consider coordinating with the staff at the Technical Training Center (TTC) to include appropriate modifications to the examiner training course (G-107).
3. If recommendation #1 is implemented, IOLB should also assess the necessity of changes to NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The DPO Panel does not recommend any substantive changes to the current revision of NUREG-1021, as the current guidance supports recommendation #1. However, the next revision of NUREG-1021 may include clarifying guidance or examples providing the basis for the assessment of Tier 1 written exam questions (similar to what was included in previous revisions regarding SRO only written exam questions).

After considering all the information, I essentially agree with the recommendations provided by the DPO panel. They have thoroughly and conscientiously endeavored to address your well-thought out and articulated concerns. I have the following comments/clarifications to the recommendations.

Regarding Recommendations 1 and 3, I directed my staff to revise the Operator Licensing Program Feedback response (Question 401.55) to clarify that CEs are allowed to make reasonable changes for balance of coverage throughout the examination. I agree that Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge. However, when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not basis to remove it from the test. I considered the amplifying information referenced in Recommendation 1 and find there is no need to revise the current guidance that written examination questions should, but are not required to, test one of the 10 CFR 55 written examination items that the K/A is linked to, or to a facility learning objective. This is, in part,

because the linkage of K/A items to 10 CFR 55 written examination items does not represent an exhaustive list. I have assigned the above task to DIRS, NRR, to be completed by June 30, 2018.

Regarding Recommendation 2, the acknowledgement that CEs may request enhancements to written examination items, including the failure to test a "relevant" procedural concept will be promulgated through a revision to ROI 17-09 and an update to Question 401.55 on the Operator Licensing Program Feedback webpage. This action is also assigned to DIRS, NRR, to be completed by June 30, 2018.

A summary of the DPO will be included in the Weekly Information Report (when the case is closed) to advise interested employees of the outcome.

Thank you for raising your DPO and for your active participation in the DPO process. An open and thorough exploration of how we carry out our regulatory processes is essential to keeping these programs effective. Your willingness to raise concerns with your colleagues and managers and ensure that your concerns are heard and understood is admirable and vital to ensuring a healthy safety culture within the Agency.

Enclosure:

DPO Panel report, dated March 19, 2018

cc: R. Lorson, NRR
M. Evans, NRR
A. Boland, OE
G. Figueroa-Toledo, OE
C. Haney, RII
C. Miller, NRR
M. Johnson, OEDO



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

March 19, 2018

MEMORANDUM TO: Brian E. Holian, Acting Director
Office of Nuclear Reactor Regulation

FROM: Jeffrey A. Clark, DPO Panel Chair */RA/*
Matthew P. Emrich, DPO Panel Member
Charles D. Zoia, DPO Panel Member

SUBJECT: DIFFERING PROFESSIONAL OPINION PANEL REPORT ON
OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1
ITEMS (DPO-2017-007)

In a memorandum, dated November 21, 2017, we were appointed as members of a Differing Professional Opinion (DPO) Ad Hoc Review Panel (DPO Panel) to review a DPO regarding Operator Licensing written examinations; Tier 1 Items. The DPO Panel has reviewed the DPO in accordance with the guidance in Management Directive 10.159, "The NRC Differing Professional Opinion Program."

The results of the DPO Panel's evaluation of the concerns raised in the DPO are detailed in the enclosed DPO Panel Report and is submitted for your consideration. Based on our review of concerns raised in the DPO, the DPO Panel made a recommendation, with two additional considerations, if implemented.

Please do not hesitate to contact us if you have any questions regarding the enclosed report.

CONTACT: Jeffrey A. Clark, RIV/DRS
817-200-1180

Enclosure:
DPO Panel Report

Statement of Issue (SOI)

The Operator Licensing and Training Branch (IOLB) of the Office of Nuclear Reactor Regulation (NRR) determined that a test item developed for Tier 1 of the site-specific written exam matches the intent of its knowledge or ability (K/A) statement if the test item solely tests plant systems knowledge, such as a design feature, interlock, or automatic operation. IOLB determined it was inappropriate to evaluate Tier 1 test items as “enhancement required” or “inappropriate” on Form ES-401-9, Written Examination Review Worksheet, when the test item did not test knowledge of emergency or abnormal procedures. This determination was documented in Record of Interaction (ROI) 17-09, NUREG 1021, ES-401 Tier 1 Written Exam Test Items (ML17165A579); was disseminated to industry stakeholders in Operator Licensing Feedback Item 401.55 (ML17249A961); and was communicated during an operator licensing examiner training session conducted by IOLB staff on October 19, 2017.

Based on the Panel’s review of the Differing Professional Opinion (DPO) submittal and associated references, and interview and follow-up discussion with the submitters, we determined the following issue was expressed:

Some NRC staff are concerned that the IOLB policy determination conflicts with the purpose of Tier 1 test items to test emergency and abnormal operating procedural knowledge on the site-specific Reactor Operator (RO) written examination, which is required in accordance with 10 CFR 55.41 (b)(10). The staff members contend that the number of RO questions that test abnormal and emergency procedures on the site-specific written exam should not be reduced because the operating exam does not test individual applicant’s procedure knowledge to the same extent as the written exam because:

- Dynamic scenarios are administered in a “team,” open-book environment where the SRO reads or directs emergency/abnormal operating procedure steps to RO applicants, and systems Job Performance Measures (JPMs) are administered by directing the applicant to perform a task in accordance with a specific procedure.

These staff members are concerned that the IOLB policy determination precludes the Chief Examiner from evaluating a Tier 1 test item as “enhancement required” on Form ES-401-9, when the proposed test item does not test abnormal or emergency procedure knowledge *relevant to the K/A statement wording*, which would ensure overall exam balance of coverage for abnormal and emergency operating procedures.

Panel Review Summary and Recommendation

In response to DPO Case Number DPO-2017-007, its associated summary of concern (SOI), and after careful consideration of input obtained through independent research, interviews with the DPO submitters, and interviews with personnel from the IOLB, the DPO Panel offers the following recommendations:

1. A Chief Examiner (CE) should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the Chief Examiner’s responsibility to ensure balance of coverage throughout the entire exam, as stated on Form ES-201-2, Item 4.e. Enhancements may be assessed per Form ES-401-9 of NUREG-1021, in the opinion of the CE, if the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question’s link to the specified knowledge and ability (K/A) statement of the test item is weak. Amplifying information is discussed below for how procedural “relevance” can be determined. If the only flaw for a test item being assessed is its link to a “relevant” procedure, then the question should not be assessed as “unsatisfactory.”
2. If recommendation #1 is implemented, IOLB should determine how to promulgate this policy change regarding the assessment of Tier 1 questions to both agency and industry stakeholders. Additionally, IOLB should consider coordinating with the staff at the Technical Training Center (TTC) to include appropriate modifications to the examiner training course (G-107).
3. If recommendation #1 is implemented, IOLB should also assess the necessity of changes to NUREG-1021, “Operator Licensing Examination Standards for Power Reactors.” The DPO Panel does not recommend any substantive changes to the current revision of NUREG-1021, as the current guidance supports recommendation #1. However, the next revision of NUREG-1021 may include clarifying guidance or examples providing the basis for the assessment of Tier 1 written exam questions (similar to what was included in previous revisions regarding SRO only written exam questions).

Supporting Information

The information below provides the basis from which the DPO Panel arrived at the recommendation outlined above. Based on the summary of concern outlined in the DPO, the DPO panel analyzed the applicable sections of the current revision of NUREG-1021 related to written examination construction and evaluation. As a result of this analysis, the DPO Panel noted the following:

1. Per ES-401 of NUREG-1021, Revision 11 (underlined text indicates emphasis added):

“The content of the written licensing examinations for ROs and SROs is dictated by 10 CFR 55.41, “Written Examination: Operators,” and 10 CFR 55.43, “Written Examination: Senior Operators,” respectively. Each examination shall contain a representative selection of questions concerning the knowledge and abilities (K/As) and skills needed to perform duties at the desired license level. Both the RO and SRO examinations will sample the 14 items specified in 10 CFR 55.41(b), and the SRO examination will also sample the 7 additional items specified in 10 CFR 55.43(b).”

“Except as noted in Section D.1.b of this examination standard, NUREG-1122, “Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors,” and

NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors," available in the Agencywide Documents Access and Management System (ADAMS), provide the basis for developing content-valid operator licensing examinations. Each K/A stem statement has been linked to an applicable item number in 10 CFR 55.41 and/or 10 CFR 55.43. Preparing the license examination using the appropriate K/A catalog, in conjunction with the instructions in this NUREG-series report, will ensure that the Examination includes a representative sample of the items specified in the regulations."

Conclusion: Following the sample plan methodology as described in NUREG-1021 (and the applicable K/A catalog) ensures that the NRC written exam meets the content requirements as outlined in the items from 10CFR55.41 and 10CFR55.43.

2. From 10 CFR 55.41:

"(b) The written examination for an operator for a facility will include a representative sample from among the following 14 items, to the extent applicable to the facility.

- (1) Fundamentals of reactor theory, including fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.
- (2) General design features of the core, including core structure, fuel elements, control rods, core instrumentation, and coolant flow.
- (3) Mechanical components and design features of the reactor primary system.
- (4) Secondary coolant and auxiliary systems that affect the facility.
- (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.
- (6) Design, components, and functions of reactivity control mechanisms and instrumentation.
- (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
- (8) Components, capacity, and functions of emergency systems.
- (9) Shielding, isolation, and containment design features, including access limitations.
- (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.
- (11) Purpose and operation of radiation monitoring systems, including alarms and survey equipment.
- (12) Radiological safety principles and procedures.
- (13) Procedures and equipment available for handling and disposal of radioactive materials and effluents.
- (14) Principles of heat transfer thermodynamics and fluid mechanics."

Note: Items 1 and 14 from the above list are not part of the site-specific NRC licensing examination as they are covered on the Generic Fundamentals Exam.

3. From 10 CFR 55.43:

"(b) The written examination for a senior operator for a facility will include a representative sample from among the following seven items and the 14 items specified in § 55.41 of this part, to the extent applicable to the facility:

- (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.”

4. Sample plan methodology / Knowledge and Ability (K/A) Stem Links:

The site-specific written exam sample plan (or exam outline) is divided into 3 distinct Tiers:

Tier 1 → Emergency and Abnormal Plant Evolutions

Tier 2 → Plant Systems

Tier 3 → Generic K/A Categories

As can be observed from Table 1, a properly constructed exam outline (per the requirements of ES-401 and Form ES-401-1) is designed to include K/A stem statements that are linked to all of the items (55.41(b)(2) through 55.41(b)(13)) required by regulation for a Reactor Operator written examination AND all of the items (55.43(b)(1) through 55.43(b)(7)) for a Senior Reactor Operator written examination.

Following the above (which was taken directly from NUREG-1021; ES-401), the K/A catalogs “provide the basis for developing content-valid operator licensing examinations” AND “each K/A stem statement has been linked to an applicable item number in 10 CFR 55.41 and/or 10 CFR 55.43.” With that in mind, consider the following 10 CFR 55.41 and 10 CFR 55.43 links for the K/A statements associated with Tier 1 (Emergency and Abnormal Plant Evolutions) questions on the exam outline (Table 1) {Bold Italics added for emphasis}:

- Reactor Operator
 - (5) Facility operating characteristics during steady state and transient conditions, including coolant chemistry, causes and effects of temperature, pressure and reactivity changes, effects of load changes, and operating limitations and reasons for these operating characteristics.
 - (6) Design, components, and functions of reactivity control mechanisms and instrumentation.
 - (7) Design, components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
 - (8) Components, capacity, and functions of emergency systems.
 - (9) Shielding, isolation, and containment design features, including access limitations.
 - (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.***
- Senior Reactor Operator
 - (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.**
- (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.**

From the two lists above, only item (10) for the Reactor Operator, and items (3) and (5) for the Senior Reactor Operator specifically mention “procedures.” The **blue-shaded** blocks on Table 1 indicate the K/A stem statements associated with these items for the **Tier 1** section of the exam outline. As highlighted on Table 1, the K/A categories with 10 CFR links to items that refer to “procedures” are K1, A2, and G.

Conversely, the 10 CFR links associated with **Tier 2** questions that refer to “procedures” (blocks highlighted in **green** on Table 1) only include the ‘G’ K/A category. An exception to this observation is the ‘A2’ category, which consists of K/A stem statements that specifically call out procedure selection as part of the required knowledge and ability of the applicant (see example below):

“Ability to (a) predict the impacts of the following on the RHR/LPCI: INJECTION MODE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations.”

Based on these observations, The DPO Panel believes that Tier 1 questions in the K1, A2, and G categories should have some procedural aspect associated with them in order to appropriately test the 10 CFR item(s) they are linked to, and be in conformance with the existing regulation. While not explicit (i.e. shall), disregarding the 10 CFR links listed in the K/A stem statements risks not testing in a manner to ensure all of the CFR 55.41 and 10 CFR 55.43 items are sampled.

5. From NUREG-1123 (underlined text indicates emphasis added):

“...The K/A's were linked to their applicable 10CFR55 item numbers. SRO level K/A's were identified by 10CFR55.43 item numbers.” (Taken from NUREG-1123 abstract)

“The linkage of K/A's to the 10 CFR 55.41, 43, and 45 requirements was done to help ensure that the examinations include a representative sample from among the applicable items...” (Taken from NUREG-1123, Rev. 2, Supp.1 – Summary of Significant Changes)

“...All knowledge and abilities (K/A's) in this catalog are directly linked by item number to 10 CFR 55.”

These statements agree with ES-401, which states that, “Each K/A stem statement has been linked to an applicable item number in 10 CFR 55.41 and/or 10 CFR 55.43.”

Also, from NUREG-1123 related to the Knowledge and Ability Stem Statements for Emergency and Abnormal Plant Evolutions:

**“Table 4
Knowledge and Ability Stem Statements for
Emergency and Abnormal Plant Evolutions**”

- E/AK1 Knowledge of the operational implications of the following concepts as they apply to the (EMERGENCY OR ABNORMAL PLANT EVOLUTION):
(CFR: 41.8 to 41.10)
- E/AK2 Knowledge of the interrelations between (EMERGENCY OR ABNORMAL PLANT EVOLUTION) and the following:
(CFR: 41.7 / 45.8)
- E/AK3 Knowledge of the reasons for the following responses as they apply to (EMERGENCY OR ABNORMAL PLANT EVOLUTION):
(CFR: 41.5 / 45.6)
- E/AA1 Ability to operate and / or monitor the following as they apply to (EMERGENCY AND ABNORMAL PLANT EVOLUTION):
(CFR: 41.7 / 45.6)
- E/AA2 Ability to determine and interpret the following as they apply to (EMERGENCY AND ABNORMAL PLANT EVOLUTION):
(CFR: 41.10 / 43.5 / 45.13)"

Note: Similar statements are found related to the structural layout of the exam outline and associated K/A stem statement links to 10 CFR 55 for PWR written examinations in NUREG-1122, Revision 2, Supplement 1, and the Advanced Reactor designs (AP-1000 and ABWR) in NUREG-2103 and 2104. Also refer to Tables 2, 3, and 4 (highlighted in the same manner as described above for Table 1) for a comparison of the related K/A stem statement links to 10 CFR 55 for each of the K/A categories that comprise the exam outlines for the additional reactor designs.

6. From NUREG-1021, Appendix B (underlined text indicates emphasis added):

"Failing to focus on testing the individual operator's cognitive abilities (i.e., comprehension, problem-solving, and decision-making) or paying insufficient attention to the operator's fundamental understanding of job content (e.g., systems, components, and procedures) may ultimately place job performance at risk of gradual degradation."

Conclusion: The random and systematic sampling process used when generating the exam outline in accordance with ES-401 of NUREG-1021 ensures that the written examination is content valid. The job content (for the written examination) that is being tested per existing regulation are those items identified in 10 CFR 55.41 and 55.43. The K/A catalogs link to the knowledges and abilities prescribed in 10 CFR 55 in a specific manner (refer to Tables 1 and 2.) Failing to ensure that written exam questions developed for NRC examination test applicants to meet the intent of the 10 CFR 55 links, creates a risk that all of the 10 CFR 55 items may not be sampled appropriately, and therefore the validity inference that our process was designed to have may become skewed. For example, for those Tier 1 K/A categories previously mentioned, if there was not a procedural aspect for questions in categories K1, K2 (PWR), A2, and G, then the exam may overemphasize plant systems and under-emphasize plant procedures. The chief examiner's quality assurance checks, per Form ES-201-2 items 4.b and 4.e, specifically direct verifying that the 10 CFR 55.41, 43, and 45 sampling is appropriate and exam coverage is balanced (see the form on the next page.)

7. From NUREG-1021, ES-201 (underlined text indicates emphasis added):

“There are no minimum or maximum limits on the number or scope of changes the NRC may direct the facility licensee to make to its proposed examinations, provided that they are necessary to make the examinations conform with established acceptance criteria or to attain an appropriate level of examination difficulty.”

Conclusion: The Chief Examiner is responsible for ensuring that the 10CFR55.41, 55.43, and 55.45 sampling is appropriate and exam coverage is balanced for the entire exam. Thus, if the Chief Examiner believes that the licensee’s proposed exam under-emphasizes procedural knowledge, it is not only prudent, but required by the QA checklist in ES-201 for the Chief Examiner to ensure that this issue is corrected prior to approving the exam for administration. This may be performed by either providing “unsatisfactory” or “enhancement required” comments to the licensee via Form ES-401-9.

Final Conclusion

From the information outlined above, the DPO panel recommends that IOLB partially implement the proposed alternative outlined in the DPO submittal, by implementing the above recommendation. Due to the current guidance in the K/A catalogs and NUREG-1021, the panel also feels that a Chief Examiner would be justified in asking a facility licensee to enhance Tier 1 written examination questions to test a procedural concept in K/A categories K1, K3 (PWR only), A2, and G as relevant to the respective K/A statement, or any other situation where the exam coverage becomes skewed. This approach helps ensure that NRC site-specific written examinations reflect the “representative sample” of 10CFR55 items required by regulation, exams will not over-emphasize plant systems knowledge, or under-emphasize plant procedural knowledge. Test items that appropriately solicit knowledge of plant system operation/response, or design associated with an emergency or abnormal event in categories K2, K3 (BWR only), and A1, should be deemed satisfactory if their K/A statement was met with no other psychometric flaws.

Facility:		Date of Examination:		
Item	Task Description	Initials		
		a	b*	c**
1. 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.			
2. S I M U L A T O R	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 least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.			
	c. To the extent possible, assess whether the outline(s) conforms with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D and in Section D.5, "Specific Instructions for the 'Simulator Operating Test,'" of ES-301 (including overlap).			
3. W A L K T H R O U G H	a. Verify that the systems walkthrough outline meets the criteria specified on Form ES-301-2: (1) The outline(s) contains the required number of control room and in-plant tasks distributed among the safety functions as specified on the form. (2) Task repetition from the last two NRC examinations is within the limits specified on the form. (3) No tasks are duplicated from the applicant's audit test(s). (4) The number of new or modified tasks meets or exceeds the minimums specified on the form. (5) The number of alternate-path, low-power, emergency, and radiologically controlled area tasks meets the criteria on the form.			
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) The tasks are distributed among the topics as specified on the form. (2) At least one task is new or significantly modified. (3) No more than one task is repeated from the last two NRC licensing examinations.			
	c. Determine whether there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.			
4. G E N E R A L	a. Assess whether plant-specific priorities (including probabilistic risk assessment and individual plant examination insights) are covered in the appropriate exam sections.			
	b. Assess whether the 10 CFR 55.41, 55.43, and 55.45 sampling is appropriate.			
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.			
	d. Check for duplication and overlap among exam sections and the last two NRC exams.			
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).			
		Printed Name/Signature		Date
a. Author	_____			_____
b. Facility Reviewer (*)	_____			_____
c. NRC's Chief Examiner (#)	_____			_____
d. NRC Supervisor	_____			_____
* Not applicable for NRC-prepared examination outlines. # The independent NRC reviewer initials items in column "c"; the chief examiner's concurrence is required.				

Table 1: K/A Stem Statement Links to 10CFR55.41 and 10CFR55.43 (NUREG-1123)

		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G
Tier 1	Group 1	41.8 to 41.10	41.7	41.5	N/A			41.7	41.10 and 43.5	N/A		41.8, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.8 to 41.10	41.7	41.5	N/A			41.7	41.10 and 43.5	N/A		41.8, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
Tier 2	Group 1	41.2 to 41.9	41.7	41.7	41.7	41.5	41.7	41.5	41.5	41.7	41.7	41.8, 41.9, 41.7, 41.10, 41.1, 43.2, 43.3, 43.5
	Group 2	41.2 to 41.9	41.7	41.7	41.7	41.5	41.7	41.5	41.5	41.7	41.7	41.8, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
*Generic K/As as outlined in ES-401, Section D.1.b (see "G" column above)												
	Conduct of Operations	Equipment Control	Radiation Control	Emergency Procedures Plan								
Tier 3 (Generic K/As only)	41.1, 41.2, 41.5, 41.7, 41.10, 43.2, 43.5, 43.6, 43.7	41.5, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5	41.11, 41.12, 41.13, 43.4	41.6, 41.7, 41.10, 41.12, 43.1, 43.2, 43.5								

Table 2: K/A Stem Statement Links to 10CFR55.41 and 10CFR55.43 (NUREG-1122)

		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*
Tier 1	Group 1	41.8, 41.10	41.7	41.5, 41.10	N/A			41.7	41.7, 43.5	N/A		41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.8, 41.10	41.7	41.5, 41.10	N/A			41.7	41.7, 43.5	N/A		41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
Tier 2	Group 1	41.2 to 41.9	41.7	41.7	41.7	41.5	41.7	41.5	41.5, 43.5	41.7	41.7	41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.2 to 41.9	41.7	41.7	41.7	41.5	41.7	41.5	41.5, 43.5	41.7	41.7	41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
*Generic K/As as outlined in ES-401, Section D.1.b (see "G" column above)												
	Conduct of Operations	Equipment Control	Radiation Control	Emergency Procedures / Plan								
Tier 3 (Generic K/As only)	41.1, 41.2, 41.5, 41.7, 41.10, 43.2, 43.5, 43.6, 43.7	41.5, 41.6, 41.7, 41.10, 43.2, 43.3, 43.5, 43.6	41.11, 41.12, 41.13, 43.4	41.6, 41.7, 41.10, 41.12, 43.1, 43.2, 43.5								

Table 3: K/A Stem Statement Links to 10CFR55.41 and 10CFR55.43 (NUREG-2103)

		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*
Tier 1	Group 1	41.9, 41.10	41.5, 41.7	41.5, 41.10	N/A			41.5, 41.7	41.7, 43.2	N/A		41.5, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.5, 41.10	41.5, 41.7	41.5, 41.10				41.5, 41.7	41.7, 43.2			41.5, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
Tier 2	Group 1	41.2 to 41.9	41.7	41.7	41.7	41.7	41.7	41.5	41.5, 43.5	41.7	41.7	41.5, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.2 to 41.9	41.7	41.7	41.7	41.7	41.7	41.5	41.5, 43.5	41.7	41.7	41.5, 41.9, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
*Generic K/As as outlined in ES-401, Section D.1.b (see "G" column above)												
	Conduct of Operations	Equipment Control	Radiation Control	Emergency Procedures Plan								
Tier 3 (Generic K/As only)	41.1, 41.2, 41.5, 41.7, 41.10, 43.1, 43.2, 43.5, 43.6, 43.7	41.5, 41.6, 41.7, 41.10, 43.2, 43.1, 43.2, 43.3, 43.5, 43.6	41.11, 41.12, 41.13, 43.4	41.6, 41.7, 41.10, 41.12, 43.1, 43.2, 43.5								

Table 4: K/A Stem Statement Links to 10CFR55.41 and 10CFR55.43 (NUREG-2104)

		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G'
Tier 1	Group 1	41.6 to 41.10	41.7	41.5	N/A			41.7	41.10, 43.5	N/A		41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.6 to 41.10	41.7	41.5	N/A			41.7	41.10, 43.5	N/A		41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
Tier 2	Group 1	41.2 to 41.9	41.7	41.7	41.7	41.5	41.7	41.5	41.5	41.7	41.7	41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
	Group 2	41.2 to 41.9	41.7	41.7	41.7	41.5	41.7	41.5	41.5	41.7	41.7	41.5, 41.6, 41.7, 41.10, 43.1, 43.2, 43.3, 43.5
*Generic K/As as outlined in ES-401, Section D.1.b (see "G" column above)												
	Conduct of Operations	Equipment Control	Radiation Control	Emergency Procedures Plan								
Tier 3 (Generic K/As only)	41.1, 41.2, 41.5, 41.7, 41.10, 43.1, 43.2, 43.5, 43.6, 43.7	41.5, 41.6, 41.7, 41.10, 43.2, 43.3, 43.5, 43.6	41.11, 41.12, 41.13, 43.4	41.6, 41.7, 41.10, 41.12, 43.1, 43.2, 43.5								

DIFFERING PROFESSIONAL OPINION PANEL REPORT ON OPERATOR LICENSING
WRITTEN EXAMINATIONS – TIER 1 ITEMS (DPO-2017-007) – MARCH 19, 2018

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Operator Licensing Program Feedback

401.55

Some Tier 1, "Emergency and Abnormal Plant Evolutions," written examination questions have been categorized as deficient, and in some instances, "Unsatisfactory" as a result of the NRC Form ES-401-9 Written Examination Review process because their stated Tier 1 knowledge or abilities (K/A) statement did not reference procedures and, therefore, only required system knowledge to answer.

Is a proposed Tier 1 written examination question deficient or unacceptable if it does not reference a procedure?

The Knowledge and Abilities Catalogs for Nuclear Power Plant Operators (K/A Catalogs) ([NUREG-1122](#) and [-1123](#)) state that "an emergency plant evolution is any condition, event, or symptom which leads to entry into the plant specific emergency operating procedures (EOPs)" and "an abnormal plant evolution is any degraded condition, event, or symptom not directly leading to an EOP entry condition, but, nonetheless, adversely affecting a safety function."

However, [NUREG-1021](#), "Operator Licensing Examination Standards for Power Reactors," does not require Tier 1 written examination questions to reference a procedure. The Tier 1 category is designated as Emergency and Abnormal Plant Evolutions, but it cannot be completely separated from Plant Systems knowledge (Tier 2 category). Systems are designed to respond to Emergency and Abnormal Plant Evolutions, including design specifications, pressures, automatic actions, etc. and, as such, a Tier 1 question can test for these items, provided the system knowledge tested relates directly to the Emergency or Abnormal Plant Evolution selected K/A statement, i.e., it matches the K/A statement from the outline. If a question meets its specific K/A statement in its entirety, then it meets the intent of the Tier category it is within, even if it does not specifically test procedural knowledge for a Tier 1 question. For example, a question testing PWR K/A APE 027 AA2.11 - "Ability to determine and interpret RCS pressure as they [RCS Pressure] apply to the Pressurizer Pressure Control Malfunctions" - would be acceptable even if it did not test specific detailed procedural knowledge as long as the Pressurizer Pressure Control Malfunction could ultimately lead to entry into EOPs or Abnormal Operating Procedures (AOPs).

In summary, rating a question as an "unacceptable" or "deficient" K/A mismatch, i.e., "unsatisfactory" or in need of "enhancement," because it can be answered based on plant system knowledge as it relates to the referenced Emergency or Abnormal Plant Evolution, is not supported by NUREG-1021. Moreover, testing plant system design features, interlocks, and system operation for conditions, events, or symptoms that lead to entry into EOPs or AOPs and match the Tier 1 K/A statement is not unacceptable simply because information located within the EOPs or AOPs is not tested.

As a clarification, Chief Examiners are allowed to make reasonable changes that are necessary to ensure an adequate balance of coverage throughout the examination. In addition, the resolution to this question is not intended to restrict the Chief Examiner's ability to request reasonable enhancements to any written examination items when necessary, including those that do not test a relevant procedural concept.



Operator Licensing Program Feedback

Record of Changes

Date	Section(s) Affected	Summary
06/27/2018	ES-401	Question 401.55 was revised to provide further clarification on evaluating Tier 1 questions as “unacceptable” or “deficient” based on the question failing to reference a procedure.
11/28/2017	ES-301	New Question 301.20 was added to provide clarification to Section D.5.b and what is meant by a “new” scenario.
11/14/2017	ES-202 and Record of Changes	<p>New Question 202.22 was added to highlight and summarize the noteworthy changes made to NRC Form 396 and NRC Form 398 as a result of the October 2017 revisions.</p> <p>Organized “Record of Changes” table to show most-recent change at the top.</p>
10/26/2017	ES-202	New Question 202.21 was added to provide clarification and guidance when revisions to NRC Form 396 and 398 are issued and as a result of the October 2017 revisions to NRC Form 396 and 398.
08/31/2017	All and General	<p>Incorporated formatting changes and hyperlinks throughout to improve ease of use. Removed “FAQ” terminology.</p> <p>New Questions Gen. 54 and Gen. 55 were added to provide clarification on medical reporting requirements and Question Gen. 25.</p> <p>Questions Gen. 24 and Gen. 25 were revised to reference the correct NRC Form 396 medical condition, i.e., NRC Form 396 Box 5 condition changed to Box 4.</p>
08/25/2017	ES-401	New Question 401.55 was added to provide clarification on evaluating Tier 1 questions as “unacceptable” or “deficient” based on the question failing to reference an Emergency or Abnormal Operating Procedure even though the question met the K/A statement.



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

August 15, 2018

MEMORANDUM TO: Brian E. Holian, Acting Director
Office of Nuclear Reactor Regulation

FROM: Mark S. Miller, Acting Director /RA/
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

SUBJECT: ACTION ON DIFFERING PROFESSIONAL OPINION
INVOLVING OPERATOR LICENSING WRITTEN
EXAMINATIONS – TIER 1 ITEMS (DPO 2017-007)

This is to provide an update in response to your memorandum of April 27, 2018 to B. Caballero, et.al "Differing Professional Opinion (DPO) Involving Operator Licensing Written Examinations – Tier 1 Items (DPO 2017-007)" (ML18117A132). Per your direction in that memorandum, Operator Licensing Program Feedback response 401.55 has been updated. Specifically, the question has been updated to include "[a]s a clarification, Chief Examiners are allowed to make reasonable changes that are necessary to ensure an adequate balance of coverage throughout the examination. In addition, the resolution of this question is not intended to restrict the Chief Examiner's ability to request reasonable enhancements to any written examination items when necessary, including those that do not test a relevant procedural concept."

The Office of Nuclear Reactor Regulation (NRR) update of 401.55 was not acceptable to the DPO authors. While the update made changes pursuant to your direction ("I directed my staff...to clarify that Chief Examiners (CEs) are allowed to make reasonable changes for balance of coverage throughout the examination"), the DPO authors felt that the update was not consistent with the intent of your direction to staff. Specifically, the DPO authors felt that your statement that "I agree that test items should, *when relevant* [emphasis added], test abnormal/emergency procedure knowledge" indicated your agreement that Tier 1 written examination questions should test procedure knowledge with very limited exceptions.

Through discussions with several of the DPO submitters, I concluded that their overarching concerns could be characterized as two-fold. First, they feel that clarifying the intent of Tier 1 questions is needed. Specifically, it was expressed to me that the intent to Tier 1 questions should be specified as testing applicants' knowledge of abnormal and emergency operating procedures.

Secondly, and associated with the first, they want to ensure efficiency in the development of examinations. Efficiency is challenged when questions that may satisfy a particular

CONTACT: Mark S. Miller, NRR/DIRS
301-415-1004

Tier 1 Knowledge and Abilities (KA) statement, but that do not test procedural knowledge, are found to require changes to ensure adequate balance of coverage for a written examination from the standpoint of procedure-based questions. Several of the DPO authors mentioned that the lack of clarity in NUREG-1021 and in the response to question 401.55 creates confusion among licensees that are preparing examinations as to what the “target” of acceptability might be.

In assessing the need for a further revision to the answer to question 401.55, I considered the language of your written direction and the report submitted by the DPO panel (see memorandum from J. Clark to yourself, “Differing Professional Opinion Panel Report on Operator Licensing Written Examinations – Tier 1 Items (DPO-2017-007)”, ML18117A132). In considering these memoranda, I was also mindful that 10 CFR 55 requires that the Commission “shall use the criteria in NUREG-1021, ‘Operator Licensing Examination Standards for Power Reactors,’ in effect six months before the examination date to prepare the written examinations required by §§ 55.41 and 55.43.” As NUREG-1021 is binding upon both the staff and the regulated industry, I was cautious to ensure that the answer to question 401.55 did not create a new requirement or a new regulatory position for licensees that prepare written examinations.

Having reviewed the applicable documents, and through discussions with you and a number of the DPO submitters, I have concluded that the current revision to question 401.55 meets the intent of your direction. Specifically, your statement “when relevant,” when taken in the context of both the “Statement of Concern” in your memorandum (“...when relevant to the K/A statement wording...”) and the conclusion of the DPO panel led me to conclude that Tier 1 questions do not, by definition, require a procedural basis for all KA categories, and that implying an overall statement of intent for Tier 1 questions in the answer to feedback question 401.55 might create a new or revised regulatory position. The current revision of the answer to feedback question 401.55 also makes it clear that the balance of coverage for an examination remains the responsibility of the CE and that the CE has the authority to request reasonable changes to insure that balance of coverage exists.

While I find that the current answer to feedback question 401.55 is consistent with NUREG-1021, revision 11 (the revision currently in force), increased clarity (on the topics of Tier 1 questions and examination coverage) in the NUREG should be pursued. Consequently, I have directed Operator Licensing Branch (IOLB) staff to include two new items into the preparation of an upcoming revision to NUREG-1021. First, IOLB has been directed to take up the issue of the intent of Tier 1 questions. In this effort, staff is to consider whether a general statement of intent should be explicitly defined or discussed in the standard and, if so, to develop such language. Second, IOLB has been directed to take up the issue of “balance of coverage” in written examinations. The goal of this effort would be to define the phrase as clearly as possible in NUREG-1021, mindful of the complexity of the issue, in order to provide a clear standard to both industry and NRC staff. As the DPO authors have indicated, this topic was the subject of an Information Notice (IN) in 1988 (see IN 88-04), which may provide a basis for this work. By addressing both of these topics in NUREG-1021, in a forum open to internal and external stakeholder participation and comment, the agency and licensed community should benefit from increased clarity (leading to increased efficiency) in binding guidance.

SUBJECT: ACTION ON DIFFERING PROFESSIONAL OPINION INVOLVING OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1 ITEMS (DPO 2017-007)

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OFFICE	NRR/DIRS
NAME	MMiller
DATE	8/ 15 /18

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

June 22, 1988

**NRC INFORMATION NOTICE NO. 88-40: EXAMINERS' HANDBOOK FOR DEVELOPING
OPERATOR LICENSING EXAMINATIONS**

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice provides addressees a copy of NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Examinations." It is expected that recipients will review the information for applicability to their facilities. However, the information contained in this information notice does not constitute NRC requirements; therefore, no specific action or written response is required.

Background:

The NRC staff has developed the above-mentioned handbook to improve the content validity of the operator licensing examinations. The content has been made more valid through the performance of job/task analysis focusing on the delineation of essential knowledge and abilities. Additional copies of this handbook are available for examination and copying for a fee at the Public Document Room of the Nuclear Regulatory Commission, 1717 H Street, N.W., Washington, D.C. 20555.

Discussion:

After the NRC examiners have been trained in the procedures described in NUREG/BR-0122, the format of the operator licensing examinations administered under 10 CFR 55.41 or 55.43 should reflect the sampling plans contained in the handbook. These sampling plans should incorporate the knowledge and abilities requirements contained in NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors" and NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors."

The new format will change the sections of the written examinations for all initial and replacement examinations. As detailed in the enclosed handbook, the reactor operator written examination should normally sample: (1) 25% of its content from the fundamentals area (reactor theory, thermodynamics, and

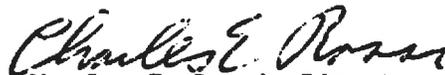
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component operation), (2) 48% from plant systems and plant-wide safety and administrative procedures, and (3) 27% from emergency and abnormal plant evolutions. For senior reactor operators, the written examination content should normally sample: (1) 24% from fundamentals, (2) 33% from emergency and abnormal evolutions, and (3) 43% from plant systems and plant-wide safety and administrative procedures. Candidates must obtain a score of 70% in each of the three sections and an overall score of 80% to pass the written examination.

After full implementation of the handbook, expected in the fall of 1988, NUREG/BR-0122 will provide guidance to operator licensing examiners for the development of initial and replacement written licensing examinations. The training staff at the plants may wish to become familiar with the handbook as far in advance of their examinations as possible so that there will be a maximum benefit for candidates.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.



Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Susan F. Shankman, NRR
(301) 492-1053

Attachments:

1. NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Examinations"
2. List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-39	LaSalle Unit 2 Loss of Recirculation Pumps With Power Oscillation Event	6/15/88	All holders of OLs or CPs for BWRs.
88-38	Failure of Undervoltage Trip Attachment on General Electric Circuit Breakers	6/15/88	All holders of OLs or CPs for nuclear power reactors.
88-37	Flow Blockage of Cooling Water to Safety System Components	6/14/88	All holders of OLs or CPs for nuclear power reactors.
88-36	Possible Sudden Loss of RCS Inventory During Low Coolant Level Operation	6/8/88	All holders of OLs or CPs for PWRs.
88-35	Inadequate Licensee Performed Vendor Audits	6/3/88	All holders of OLs or CPs for nuclear power reactors.
88-34	Nuclear Material Control and Accountability of Non-Fuel Special Nuclear Material at Power Reactors	5/31/88	All holders of OLs or CPs for nuclear power reactors.
87-61, Supplement 1	Failure of Westinghouse W-2-Type Circuit Breaker Cell Switches	5/31/88	All holders of OLs or CPs for nuclear power reactors.
88-33	Recent Problems Involving the Model Spec 2-T Radiographic Exposure Device	5/27/88	All Agreement States and NRC licensees authorized to manufacture, distribute or operate radiographic exposure devices and source changers.

OL = Operating License
 CP = Construction Permit

component operation), (2) 48% from plant systems and plant-wide safety and administrative procedures, and (3) 27% from emergency and abnormal plant evolutions. For senior reactor operators, the written examination content should normally sample: (1) 24% from fundamentals, (2) 33% from emergency and abnormal evolutions, and (3) 43% from plant systems and plant-wide safety and administrative procedures. Candidates must obtain a score of 70% in each of the three sections and an overall score of 80% to pass the written examination.

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*SEE PREVIOUS CONCURRENCES

D/DOEA:NRR CERoss1 06/6/88	*C/OGCB:DOEA:NRR CHBerlinger 06/14/88	*PPMB:ARM TechEd 06/09/88	*D/DLPQ:NRR JWRoe 06/10/88
*OGCB:DOEA:NRR PKadambi 06/08/88	*LOLB:DLPQ:NRR SShankman 06/07/88	*LOLB:DLPQ:NRR LAWiens 06/9/88	*DD/DLPQ:NRR JZwolinski 06/10/88

component operation), (2) 48% from plant systems and plant-wide safety and administrative procedures, and (3) 27% from emergency and abnormal plant evolutions. For senior reactor operators, the written examination content should normally sample: (1) 24% from fundamentals, (2) 33% from emergency and abnormal evolutions, and (3) 43% from plant systems and plant-wide safety and administrative procedures. Candidates must obtain a score of 70% in each of the three sections and an overall score of 80% to pass the written examination.

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Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Susan F. Shankman, NRR
(301) 492-1053

Attachments:

1. NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Examinations"
2. List of Recently Issued NRC Information Notices

***SEE PREVIOUS CONCURRENCES**

D/DOEA:NRR	C/OGCB:DOEA:NRR	*PPMB:ARM	D/DLPQ:NRR
CERossi	CHBerlinger	TechEd	JWBoe
06/ /88	06/14/88	06/09/88	06/10/88
*OGCB:DOEA:NRR	*LOLB:DLPO:NRR	LOLB:DLPO:NRR	C/LOLB:DLPO:NRR
PKadambi	SShankman	LAWiens	JHannon
06/08/88	06/07/88	06/9/88	06/9/88

should normally sample: (1) 24% from fundamentals, (2) 33% from emergency and abnormal evolutions, and (3) 43% from plant systems and plant wide safety and administrative procedures. Candidates must obtain a score of 70% in each of the three sections and an overall score of 80% to pass the written examination.

After full implementation of the handbook, expected in the Fall of 1988, NUREG/BR-0122 will provide guidance to Operator Licensing Examiners for the development of initial and replacement written licensing examinations. The training staff at the plants should become familiar with the handbook as far in advance of their examinations as possible so that there would be a maximum benefit for candidates.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

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(301) 492-1053

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Transmitted by

dated _____

*SEE PREVIOUS CONCURRENCES

	D/DOEA:NRR	C/OGCB:DOEA:NRR	PPMB:ARM	D/DLPQ:NRR
	CERoss	CHBerlinger	TechEd	JWRoe
NPK	06/ /88	06/ /88	06/9 /88	06/ /88
OGCB:DOEA:NRR	*LOLB:DLPQ:NRR	LOLB:DLPQ:NRR	C/LOLB:DLPQ:NRR	DD/DLPQ:NRR
PKadamb	SShankman	LAWiens	JHannon	JZwolinski
06/8/88	06/07/88	06/ /88	06/ /88	06/ /88

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Transmitted by _____ dated _____

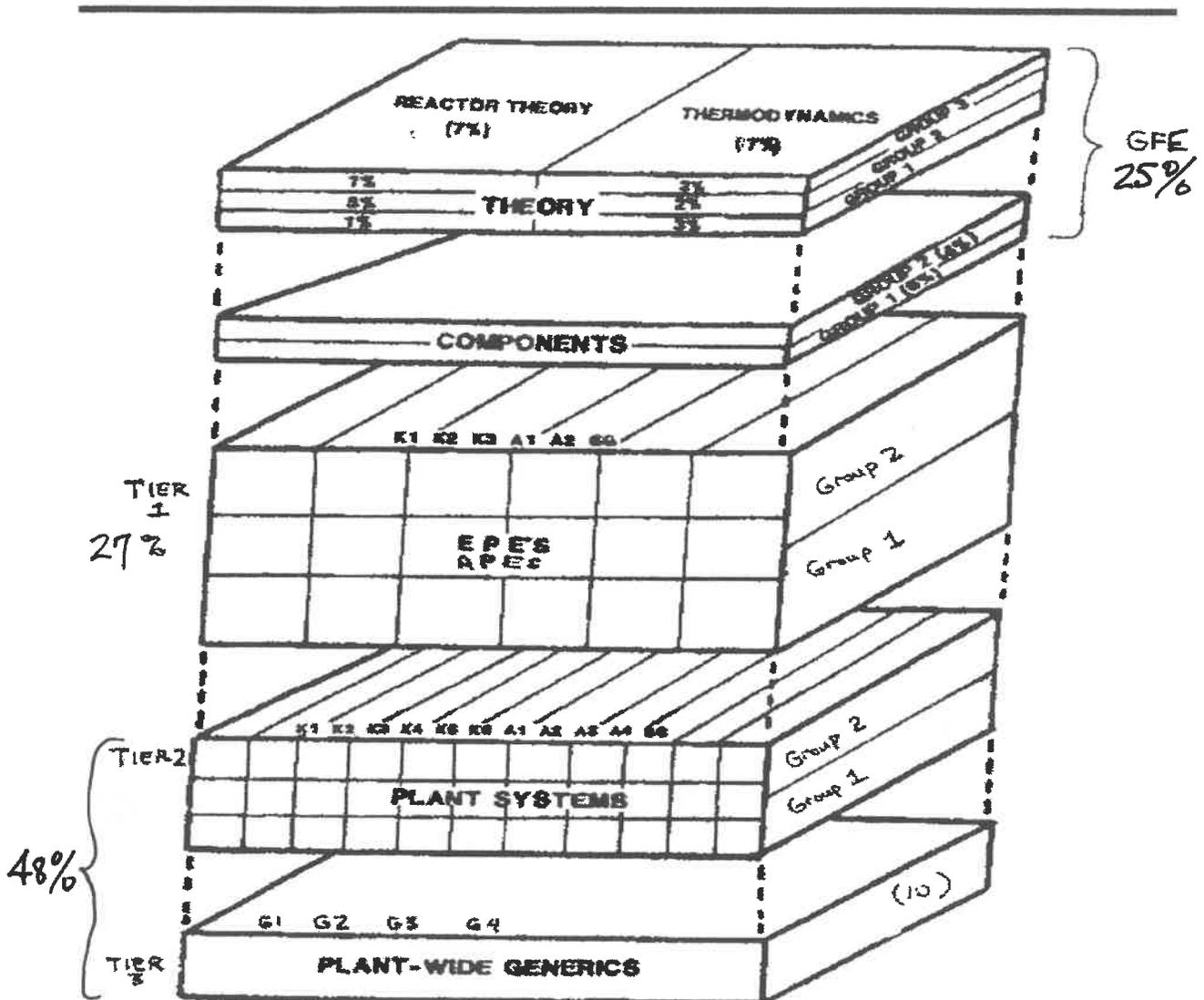
	D/DOEA:NRR	C/OGCB:DOEA:NRR	PPMB:ARM	D/DLPQ:NRR
	CERossi	CHBerlinger	TechEd	JWRoe
	06/ /88	06/ /88	06/ /88	06/ /88
OGCB:DOEA:NRR	LOLB:DLPQ:NRR	LOLB:DLPQ:NRR	C/LOLB:DLPQ:NRR	DD/DLPQ:NRR
PKadambi	SShankman	LAWiens	JHannon	JZwolinski
06/ /88	06/7/88	06/ /88	06/ /88	06/ /88
	<i>with change</i>			

Operator Licensing Examiner Standards

Manuscript Completed: September 1983
Date Published: October 1983

Division of Human Factors Safety
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555





Answering these questions may require mathematical ability including algebra and fundamental knowledge in reactor physics. Questions in this category shall be related to reactors in general and reactors of the type used at the facility.

2. Plant Design, Including Safety and Emergency Systems

This category shall contain questions on the design features of the particular facility, with emphasis on those systems that are designed to maintain, and protect against, the uncontrolled release of radioactive materials. The candidate should be able to reproduce, from memory, sketches or descriptions of various hydraulic, pneumatic, or electrical distribution systems and mechanical components. Questions on design intent, construction, operation, and interrelationships of those systems most directly associated with normal nuclear power plant operation and reactor safety can also be included. The candidate should be familiar with the conditions that require the use of safety and emergency systems and why such protection is required, with emphasis on areas where a malfunction will require immediate operator action.

3. Instruments and Controls

This category shall contain questions on the characteristics and interrelationship of the nuclear, process, and radiological instrumentation and facility control systems. The candidate should have sufficient knowledge of the nuclear instruments (e.g., source, intermediate, and power), the process instruments (e.g., temperature, pressure, level, and flow), and radiological instruments (e.g., ionization, G-M, and scintillation), to answer questions concerning principles of detector operations, location and setpoints of instruments, and diagrammatic representation of instrumentation systems. Questions on control systems (e.g., control rod drive, level, pressure, electrohydraulic control, and integrated control) will include function, operation, interlocks, and interrelationships with other plant systems.

A candidate is not expected to have the knowledge of an instrument technician, but answers should indicate the ability to recognize the indications and consequences of improper instrument performance (e.g., overcompensation, power failure, air supply failure, and signal failure), including the traces that recorders would show. He also should be able to make use of all available instrumentation to provide checks or verification of observed readings.

4. Procedures - Normal, Abnormal, Emergency, and Radiological Control

This category shall contain questions on the knowledge and use of facility procedures including normal, abnormal, emergency, administrative, and radiological control procedures. The candidate is not

TABLE ES-203-1

U.S. NUCLEAR REGULATORY COMMISSION
 REACTOR OPERATOR LICENSE EXAMINATION

Facility: _____

Reactor Type: _____

Date Administered: _____

Examiner: _____

Candidate: _____

INSTRUCTIONS TO CANDIDATE:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

Category Value	% of Total	Candidate's Score	% of Category Value	Category
_____	_____	_____	_____	1. Principles of Nuclear Power Plant Operation, Thermodynamics, Heat Transfer and Fluid Flow
_____	_____	_____	_____	2. Plant Design Including Safety and Emergency Systems
_____	_____	_____	_____	3. Instruments and Controls
_____	_____	_____	_____	4. Procedures - Normal, Abnormal, Emergency, and Radiological Control
_____	_____	_____	_____	TOTALS
			Final Grade _____%	

All work done on this examination is my own. I have neither given nor received aid.

 Candidate's Signature

Knowledge and Abilities Catalog for Nuclear Power Plant Operators

Pressurized Water Reactors
Westinghouse AP1000

Draft Report for Comment

*(Until after the first refueling outage, or
until Final; used on 1st 3 exams already)*

Table 4
Knowledge and Ability Stem Statements for
Emergency and Abnormal Procedures

Knowledge Stem Statements

- EK 1 Knowledge of the relationship between the [event] and the following systems or components:
(CFR: 41.8 / 41.10 / 45.3)
- EK 1 Lists the systems required to be monitored and/or operated by the procedure.*
- EK 2 Knowledge of the operational implications or cause and effect relationships of the following as they apply to [event]:
(CFR: 41.5 / 41.7 / 45.7 / 45.8)
- EK2 Lists the operationally based theoretical concepts applicable to the procedure.. These items typically came from the procedure bases, PRA, OE, procedure notes and cautions.*
- EK 3 Knowledge of the reasons for the following actions as they apply to [event]:
(CFR: 41.5 / 41.10 / 45.6 / 45.13)
- EK 3 Lists the actions and bases taken in the procedure.*

Ability Stem Statements

- EA 1 Ability to operate and/or monitor the following as they apply to a [event]:
(CFR: 41.5 / 41.7 / 45.5 to 45.8)
- EA 1 Lists the system and/or components required to be monitored and/or operated by the procedure.
- EA 2 Ability to evaluate the following parameters and/or conditions as they apply to [event]:
(CFR: 41.7 / 43.5 / 45.6)
- EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.

1.11 Components

Basic components such as valves and pumps are found in many systems. NUREG-1021 lists 8 categories of components. The 8 categories of components for which additional knowledge statements are necessary are listed below and delineated in Section 5 of this catalog.



NUREG-2104

Knowledge and Abilities Catalog for Nuclear Power Plant Operators

Advanced Boiling Water Reactors

Draft Report for Comment

Office of New Reactors

1.10.1 Knowledge and Ability Stem Statements for Emergency and Abnormal Plant Evolutions

The information delineated within each emergency or abnormal evolution is organized into three (3) different types of knowledge and two (2) different types of ability. If there are no knowledge or ability statements following a stem statement there is no applicable K/A.

The applicable 10 CFR 55.41, 43, and 45 item numbers are included with each stem statement. In most cases the K/As associated with the stem statements can be used for both the written and operating examinations. See Table 4, below:

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

Knowledge Stem Statements

- E/AK 1 Knowledge of the operational implications of the following concepts as they apply to the (Emergency Plant or Abnormal Plant Evolution):
(CFR: 41.8 to 41.10)
- E/AK 1 Lists the operational implications applicable to the procedure. These items can come from the procedure bases, PRA, OE, procedure notes and cautions.*
- E/AK2 Knowledge of the interrelations between (Emergency Plant or Abnormal Plant Evolution) and the following:
(CFR: 41.7 / 45.8)
- E/AK 2 Lists the systems required to be monitored and/or operated by the procedure.*
- E/AK 3 Knowledge of the reasons for the following responses as they apply to (Emergency Plant or Abnormal Plant Evolution):
(CFR: 41.5 / 45.6)
- E/AK 3 Lists the actions and bases taken in the procedure.*

Ability Stem Statements

- E/AA 1 Ability to operate and / or monitor the following as they apply to (Emergency Plant or Abnormal Plant Evolution):
(CFR: 41.7 / 45.6)
- EA 1 Lists the system and/or components required to be monitored and/or operated by the procedure.*
- E/AA 2 Ability to determine and / or interpret the following as they apply to (Emergency Plant or Abnormal Plant Evolution):
(CFR: 41.10 / 43.5 / 45.13)
- EA 2 Lists the parameters and/or conditions that are monitored to verify successful implementation of the procedure.



NUREG-1123 Rev. 3

Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors

Draft Report for Comment

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)

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)

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)

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)

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)

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

1.11 Components

Basic components such as valves and pumps are found in many systems. NUREG-1021, Section ES-205, "Procedure for Administering the General Fundamentals Examination Program," lists eight categories of components. The component knowledge statements are more detailed than those provided in the system listing, yet at the same time they are generic to the component types. Each of the eight categories of components has a unique six digit code number and 10 CFR 55.41 (b) item number, for which additional knowledge statements are necessary. Components are delineated in Section 5 of the BWR catalog, and listed in Table 5 below.



NUREG-1122, Rev. 3

Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors

Draft Report for Comment

Office of Nuclear Reactor Regulation

E05	Loss of Secondary Heat Sink
E06	Degraded Core Cooling
E07	Saturated Core Cooling
E08	Pressurized Thermal Shock
E09	Natural Circulation Operations
E10	Natural Circulation with Steam Void in Vessel with/without Reactor Vessel Level Indicating System
E11	Loss of Emergency Coolant Recirculation
E12	Uncontrolled Depressurization of All Steam Generators
E13	Steam Generator Overpressure
E14	High Containment Pressure
E15	Containment Flooding
E16	High Containment Radiation

Knowledge and Ability Stem Statements for Emergency and Abnormal Plant Evolutions

The information delineated within each emergency or abnormal plant evolution is organized into three types of knowledge and two types of ability. If there are no knowledge or ability statements following a stem statement there is no applicable K/A.

Each stem statement includes the applicable 10 CFR 55.41 / 43 / 45 item numbers. In most cases, the K/As associated with the stem statements can be used for both the written and the operating examinations, as shown in Table 4.

Table 4. K/A Stem Statements for EPEs and APEs

E/AK1	<p>Knowledge of the operational implications and/or cause and effect relationships of the following concepts as they apply to the [EVENT]: (CFR: 41.5 / 41.7 / 45.7 / 45.8)</p> <p>Basis – Lists the operationally based theoretical concepts applicable to the <u>procedure</u>. These items typically come from the procedure bases, probabilistic risk assessment, operating experience, procedure notes, and cautions.</p>
E/AK2	<p>Knowledge of the relationship between the [EVENT] and the following systems or components: (CFR: 41.8 / 41.10 / 45.3)</p> <p>Basis – Lists the systems required to be monitored and/or operated by the <u>procedure</u>.</p>
E/AK3	<p>Knowledge of the reasons for the following responses and/or actions as they apply to the [EVENT]: (CFR: 41.5 / 41.10 / 45.6 / 45.13)</p> <p>Basis – Lists the reasons responses and/or actions are taken in the <u>procedure</u>.</p>
E/AA1	<p>Ability to operate and/or monitor the following as they apply to the [EVENT]: (CFR: 41.5 / 41.7 / 45.5 to 45.8)</p> <p>Basis – Lists the system and/or components required to be monitored and/or operated by the <u>procedure</u>. E/AA1 may include systems from E/AK2.</p>

E/AA2 Ability to determine and/or interpret the following as they apply to the [EVENT]:
(CFR: 41.10 / 43.5 / 45.13)

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

1.11 Components

Basic components such as valves and pumps are found in many systems. NUREG- 1021, Section ES-205, "Procedure for Administering the General Fundamentals Examination Program," lists eight categories of components. The component knowledge statements are more detailed than those provided in the system listing, yet at the same time they are generic to the component types. Each of the eight categories of components has a unique six-digit code number and 10 CFR 55.41(b) item number, for which additional knowledge statements are necessary. Components are delineated in Section 5 of the PWR Catalog, and listed in Table 5 below.

Table 5. Components

191001	Valves (CFR: 41.3)
191002	Sensors and Detectors (CFR: 41.7)
191003	Controllers and Positioners (CFR: 41.7)
191004	Pumps (CFR: 41.3)
191005	Motors and Generators (CFR: 41.7)
191006	Heat Exchangers and Condensers (CFR: 41.4)
191007	Demineralizers and Ion Exchangers (CFR: 41.3)
191008	Breakers, Relays, and Disconnects (CFR: 41.7)

1.12 Theory

NUREG-1021, Section ES-205, "Procedure for Administering the General Fundamentals Examination Program," lists theory items. General fundamental knowledge which underlies safe performance on the job is delineated in Section 6 of the PWR Catalog. These theory topics represent general fundamental concepts related to plant operation. Each theory topic has a unique six-digit code number. The applicable 10 CFR 41(b) item number is provided for Reactor Theory and Thermodynamics Theory.

Reactor Theory (CFR: 41.1)

192001	Neutrons
192002	Neutron Life Cycle
192003	Reactor Kinetics and Neutron Sources
192004	Reactivity Coefficients
192005	Control Rods
192006	Fission Product Poisons
192007	Fuel Depletion and Burnable Poisons
192008	Reactor Operational Physics

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).							
6.	Bank use meets limits (no more than 75% from the bank, at least 10% new, and the rest new or modified); enter the actual RO/SRO-only question distribution(s) at right.	Bank	Modified	New				
		/	/	/				
7.	Between 38 and 45 questions of the questions on the RO exam and at least 13 questions of the questions on the SRO-only portion of the exam are written at the comprehension/analysis level (see ES-401, D.2.c); enter the actual RO/SRO-only question distribution(s) at right.	Memory	C/A					
		/	/					
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.							
9.	Question content conforms to specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.							
10.	Question psychometric quality and format meet the guidelines in Appendix B.							
11.	The exam contains the required number of one-point, multiple-choice items; the total is correct and agrees with the value on the cover sheet.							
			Printed Name/Signature			Date		
a.	Author	_____				_____		
b.	Facility Reviewer (*)	_____				_____		
c.	NRC Chief Examiner (#)	_____				_____		
d.	NRC Regional Supervisor	_____				_____		
Note:	* The facility reviewer's initials or signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initials items in Column "c"; chief examiner concurrence is required.							

POLICY ISSUE INFORMATION

November 2, 2012

SECY-12-0151

FOR: The Commissioners

FROM: Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

SUBJECT: STATUS REPORT ON THE NUCLEAR REGULATORY
COMMISSION'S OPERATOR LICENSING AND
REQUALIFICATION TRAINING INSPECTION PROGRAMS
FOR LICENSED OPERATORS

PURPOSE:

The purpose of this paper is to inform the Commission on the status of the U.S. Nuclear Regulatory Commission's (NRC's) operator licensing and requalification inspection programs for licensed operators. This information paper was requested in a tasking memorandum to the Executive Director for Operations, dated February 8, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12039A155). This paper does not address any new commitments or resource implications.

SUMMARY:

This paper provides an overview of the NRC's current initial licensing examination program, its effectiveness, and the results of an independent program assessment chartered by the Nuclear Energy Institute (NEI). The NEI independent program assessment concluded that the current examination process is effective, but it made several recommendations for NRC and industry consideration to enhance the current NRC examination process. The staff has agreed to work with the NEI Licensed Operator Focus Group (LOFG) to revise the NRC's Knowledge and Abilities (K/A) Catalogs for Nuclear Power Plant Operators and the K/A statement selection process for the written examinations.

BACKGROUND:

The staff provided periodic reports to the Commission on the status of the NRC's licensed operator requalification and initial licensed operator programs from August 28, 1989

CONTACT: John J. McHale, NRR/DIRS
301-415-3254

(SECY-89-264, "Quarterly Status Report on the NRC Requalification Program"), through March 12, 2003 (SECY-03-0038, "Annual Status Report for FY 2002 on the Administration of the NRC's Requalification Program and the Results of Initial Operator Licensing Examinations"). The last report concluded that the NRC's licensed operator requalification inspection program continues to effectively ensure that licensed operators maintain the required level of competence to safely perform their licensed duties. The report also concluded that the NRC's initial operator licensing program continues to provide assurance that only those applicants who have mastered the knowledge, skills, and abilities to safely operate are being licensed. Based on the maturity and stability of the programs, the staff discontinued the periodic reports ("Staff Requirements - SECY-03-0038 - Annual Status Report for FY 2002 on the Administration of the NRC's Requalification Program and the Results of Initial Operator Licensing Examinations," dated March 25, 2003).

Over the past several years, the nuclear industry has noted instances of inconsistent performance with the training and licensing of licensed operator applicants. As a result, the NEI chartered a review of the NRC initial operator licensing examination process by an Independent Review Team (IRT) and provided the results to the staff in June 2011 (ADAMS Accession No. ML111940287).

DISCUSSION:

Operator Licensing Goals and Objectives

The NRC is responsible for licensing nuclear power plant operators to ensure that they are capable of understanding and controlling both the day-to-day operation of their power plants and potentially complex abnormal and emergency events that might occur. The licensed operators have a direct and immediate responsibility for preventing and mitigating operational events at their plants.

Section 107 of the Atomic Energy Act (AEA) of 1954, as amended, requires the NRC to determine the qualifications of individuals applying for an operator license, to prescribe uniform conditions for licensing such individuals, and to issue licenses as appropriate. Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operator's Licenses," requires operator license applicants to pass a written examination and an operating test satisfying the content requirements specified in the regulation. The intent of the written examination and operating test is to measure the applicants' knowledge, skills, and abilities such that those who pass would be expected to perform the duties required of a licensed reactor operator (RO) or senior reactor operator (SRO). The license examination is a confirmation that the NRC-approved, industry-accredited training programs produce operators with the knowledge, skills, and abilities to safely operate their plants. To ensure the uniformity that the AEA requires, the NRC and facility licensees comply with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," which contains specific instructions for developing, administering, and grading the licensing examinations.

Since the accident at Three Mile Island, the NRC has implemented numerous changes, clarifications, and enhancements to the operator licensing process in 10 CFR Part 55 and NUREG-1021 to improve the efficiency and effectiveness of the licensing process while ensuring it continues to reliably predict whether an individual will be a competent operator or senior operator. The most significant of these process improvements include:

- An increase in the scope of the written examinations with the addition of new examination questions testing the principles of heat transfer and fluid mechanics, and the theory of fluids and thermodynamics. The written examination passing score increased from 70 percent to 80 percent.
- Development of NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors," and NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors," which provide the basis for the development of content-valid, performance-based operator licensing examinations.
- In 1987, consistent with the Commission Policy Statement on Training and Qualification of Nuclear Power Plant Personnel, the NRC amended 10 CFR Part 55 and endorsed industry-accredited, systems approach to training (SAT)-based programs to provide an improved basis for administering the operator licensing process. The amended rule also required the operating test to include an evaluation of the applicant's team skills and to be partially administered on a plant-referenced simulator or an NRC-approved simulation facility.
- Implementation of a generic fundamentals examination (GFE) that is administered early in the facility licensees' operator training programs. The examination tests the fundamental knowledge topics required by 10 CFR 55.41, "Written Examination: Operators," and 10 CFR 55.43, "Written Examination: Senior operators," and is a prerequisite for applicants to take the site-specific written licensing examination.
- In 1999, the NRC amended 10 CFR Part 55 to allow facility licensees to voluntarily prepare the site-specific written examinations and operating tests for NRC review and approval. The NRC retains final grading responsibility and administers the operating test.
- In 2001, the NRC amended 10 CFR Part 55 to allow license applicants to fulfill a portion of the application experience requirements by manipulating the controls of a plant-referenced simulator, in place of the facility, for the minimum required five significant control manipulations.

License Applicant Selection and Training Processes

In accordance with 10 CFR 55.31(a)(4), a license applicant must provide evidence that he or she has successfully completed the facility licensee's requirements to be licensed as an RO or SRO. Regulatory Guide (RG) 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Revisions 2 and 3, provide guidance on an acceptable method of implementing this regulation. Generic Letter (GL) 87-07, "Information Transmittal of Final Rulemaking for Revisions to Operator Licensing: 10 CFR Part 55 and Conforming Amendments," informed facility licensees that they have the option to substitute an accredited, SAT-based program in place of the operator training program that the NRC staff previously approved for the given facility. Licensed operator training programs are accredited through the independent National Nuclear Accrediting Board (NNAB). Every facility licensee has obtained and periodically renewed the accreditation of its licensed operator training program, indicating that every facility

licensee is implementing the education and experience guidelines that the NNAB endorses. The NRC administers licensing examinations to applicants who meet the license eligibility education and experience guidelines outlined in the National Academy for Nuclear Training (NANT)¹ "Guidelines for Initial Training and Qualification of Licensed Operators," and who have successfully completed the facility's NNAB-accredited SAT-based training program.

The Institute of Nuclear Power Operations (INPO) monitors the overall implementation of the industry's SAT-based programs as part of its accreditation reviews conducted periodically at all nuclear power plants. The NRC monitors INPO accreditation activities instead of conducting inspections to assess facility compliance with the SAT requirements contained in 10 CFR Part 55. However, other than endorsing the NANT license eligibility guidelines, the NRC is not involved in the facility licensees' licensed operator applicant selection process.

Since 2007, one of the industry's concerns, also raised by the Professional Reactor Operator Society (PROS), is that the NRC's written examination process has resulted in an increasing level of difficulty that is adversely affecting the success rate or "throughput"² for applicants entering the licensed operator training programs. For example, while the NRC RO and SRO examination pass rates in 2011 were 91 percent and 92 percent, respectively, the industry-reported RO and SRO throughputs were 62 percent and 72 percent. The staff's view is that the average written examination scores are a better indicator of examination difficulty. Over the last 10 years, the RO and SRO average written examination scores have been relatively constant, hovering in the 85 percent to 89 percent range, indicative of a consistently moderate difficulty level. With respect to throughput, the staff's view is that other factors, not related to the NRC's current written examination process, are the main causal factors affecting the success rate of licensed operator applicants. Several industry root cause assessments, conducted after NRC examinations that resulted in high failure rates, identified contributing factors such as facility licensee audit written examination level of difficulty not commensurate with NRC licensing examinations, inadequate audit and NRC written examination validation processes, and weak management oversight of applicant performance.

As a result of the industry's concern with low applicant throughput, INPO coordinated an industry-wide self-assessment and "Call to Action" to identify the key attributes necessary for initial license training class success. These attributes have since been added to the NANT "Guidelines for Initial Training and Qualification of Licensed Operators."

In summary, the staff acknowledges industry stakeholders' concerns that the written examination process may be adversely affecting candidate selection and success rate (i.e., throughput). Notwithstanding the staff's view that the written examination process is not a significant causal factor for low applicant throughput, the staff has agreed to work with the NEI LOFG as discussed below to revamp the NRC's Knowledge and Abilities (K/A) Catalogs (NUREG-1122 and NUREG-1123) and the K/A statement selection process for the written examinations.

¹ The NANT operates under the auspices of the Institute of Nuclear Power Operations (INPO). It integrates the training efforts of all U.S. nuclear utilities, the activities of the National Nuclear Accrediting Board (NNAB), and the training-related activities of INPO.

² "Throughput" is the ratio of individual applicants who are licensed by the NRC to the applicants who enter the training program.

Overview of the Current Initial Operator Licensing Examination Process

The NRC's initial operator licensing examination consists of the following parts: (1) a written GFE (covering reactor theory, thermodynamics, and components) administered nationwide on a quarterly basis that license applicants have to pass as a prerequisite for taking the site-specific examination; (2) a site-specific written examination covering plant systems, emergency and abnormal plant evolutions, and plant-wide generic K/As; and (3) a site-specific operating test consisting of a crew-based, dynamic simulator performance demonstration, an individual, task-based walk-through operating test covering control room and in-plant systems, and various plant administrative requirements.

The site-specific written examination consists of 75 multiple choice RO questions and 25 SRO questions that sample the topics listed in 10 CFR 55.41 and 10 CFR 55.43. The examination authors (either the facility licensee or the NRC) develop or select written examination questions based on a "systematic and random" sample plan of K/A statements selected from the applicable K/A Catalog. Because the K/A Catalogs are based on generic job and task analyses, and not all facilities of even the same vendor type are the same, examination authors can eliminate inapplicable or inappropriate K/A statements.

The site-specific simulator and walk-through operating tests sample the topics listed in 10 CFR 55.45, "Operating tests." Although the operating tests use the K/A Catalogs as a reference, given the logistics and guidelines for development and administration of the operating test, development of the operating test based on a random sample of K/A statements is not considered practical. Instead, a systematic approach is used to develop the operating test.

The K/A Catalogs provide the basis for the development of content-valid written examinations and operating tests and ensure compliance with the "uniform conditions" for licensing individuals as operators required in Section 107 of the AEA of 1954. The pressurized-water reactor (PWR) and boiling-water reactor (BWR) K/A Catalogs were developed in 1986 based on an INPO Job Task Analysis and contain approximately 5,100 and 7,000 K/A statements, respectively. A team of industry licensed operators and senior operators, as well as NRC operator licensing examiners, rated each K/A statement for its importance to the safe operation of the plant in a manner ensuring personnel and public health and safety. Importance ratings are given for each K/A statement based on a rating scale that starts at a "1" rating that represents "Insignificant Importance" up to a "5" rating for "Essential Importance." Absent a plant specific priority, only those K/A statements having an importance rating of 2.5 or higher will be selected for testing.

Thus, the licensing examinations are developed based on validated job performance criteria, the K/A Catalogs, which provide an objective basis to judge an applicant with sufficient confidence to grant or deny a license.

Initial Operator Licensing Program Assessment and Feedback

As a result of the industry's concerns with some aspects of the initial operator licensing examination process and, in particular, its concern with low throughput for applicants entering the licensed operator training programs, NEI chartered a review of the initial operator licensing examination process by an IRT. The IRT's charter was to assess the effectiveness and efficiency of the operator licensing examination and training processes. The IRT was comprised of three individuals with expertise in educational processes and testing theory, nuclear power

plant management, and licensed operator training and testing processes. NRC management and staff representatives, comprised of individuals from headquarters and all four regions, met with the IRT on several occasions to exchange information and gain perspective. The IRT also interacted with nuclear power plant personnel; representatives of other testing organizations, such as the Educational Testing Service and the U.S. Navy; and INPO. The IRT discussed its preliminary findings with the NRC staff and industry executives before issuing its final report in June 2011. The NEI Nuclear Strategic Issues Advisory Committee (NSIAC) was supportive of the IRT recommendations but requested a more detailed assessment of the level of effort needed to implement some of the recommendations. The NEI LOFG is leading the effort to coordinate resolution of the IRT recommendations with the NRC's involvement in the process.

The IRT concluded that the current examination structure, consisting of written, simulator, and job task performance tests, "has been a viable and effective means of verifying operator competence" and "should be retained." The IRT's proposed recommendations also included updating the job task analyses for licensed operators to reflect changes in job duties that may have evolved since the current NRC K/A Catalogs were first developed in 1986. The IRT proposed that an integrated examination strategy be developed to indicate the preferred method (written examination or operating performance test) of examining each selected K/A statement. The IRT also highlighted enhanced guidance for use of previously developed ("exam bank") written questions and more stringent NRC operating performance test "pass/fail" criteria as potential areas for industry and staff consideration. In addition to these measures, which would involve the NRC, the IRT recommended that facilities fully implement the existing INPO guidelines to address weaknesses in the examination validation process as well as applicant training and evaluation at some facilities that have contributed to inadequate applicant selection and performance in the initial license examination process. INPO recommended that the industry focus on areas such as applicant selection, preparation, training, and mentoring as a way of improving license applicant success rates (i.e., throughput). The IRT also recommended that accredited training program learning objectives be better linked to the updated K/A statements.

The IRT first shared these recommendations with the NRC staff in a public meeting on November 15, 2010 (ADAMS Accession No. ML103260196). Subsequently, the NRC held a public meeting with the NEI LOFG on December 8, 2011 (ADAMS Accession Nos. ML120040069 and ML113500224), which included an LOFG presentation describing proposed actions related to addressing several, but not all, of the IRT recommendations. After its review of the IRT report and discussions during public meetings, the staff concludes that changes to the K/A Catalogs or changes to the initial license examination process are not required to ensure that the NRC continues to make appropriate decisions on whether the applicants have demonstrated that they have the knowledge, skills, and abilities to safely operate their plants. However, the staff agrees that enhancements could be made to the examination process, and possibly the K/A Catalogs, to improve the consistency and validity of the NRC's initial operator licensing process.

As discussed previously, PROS has communicated to the Commission and staff that there has been an increase in the written examination level of difficulty. PROS attributes the increase in examination difficulty to the two following attributes:

- "written test questions have become an exercise in memorization of trivial items"
- "written tests are closed-book, but in the plant procedure use is required"

Consistent with the "Written Examination Guidelines" detailed in NUREG-1021, the staff agrees that "the knowledge tested should not be trivial in nature." Given the number of site-specific written examination questions prepared per year and the number of different facility licensee examination developers, it is inevitable that a small number of flawed test items will be approved for use on the written examinations. However, there has been no factual evidence provided to substantiate the concern that a significant number of NRC examination questions are testing trivial knowledge. Facility licensees develop, review, and validate more than 90 percent of the NRC examinations. The staff's view is that NUREG-1021's pre- and post-examination quality assurance (QA) review processes are sufficient for facility examination developers to identify and address any questions determined to be unacceptable because of testing concepts with no direct, important relationship to the licensed operators' or senior operators' ability to perform their job. As stated previously, absent a plant specific priority, only those K/A statements having an importance rating of 2.5 or higher will be selected for testing. These QA reviews also allow facility licensees to eliminate any K/A statements pre-examination for which a psychometrically sound question cannot be developed and a post-examination requirement for facility licensees to evaluate the validity of questions missed by half, or more than half, of the applicants. The post-examination review process also solicits test item feedback from the applicants with the facility position(s) to better ensure that the NRC grading process properly resolves any problematic questions.

As to open-reference written examination questions, the staff notes that there is no prohibition on their use on NRC examinations. The staff has provided quantitative ranges for the typical numbers of open-reference questions on the written examination, but it cautioned that these ranges are not absolute limits or goals. The staff's position has been that open-reference questions should be judiciously and sparingly used because the initial license examinations should rely more heavily on closed-reference questions that evaluate more effectively the applicants' level of knowledge and how well the applicants are able to recall, comprehend, and answer or resolve issues and problems. The initial examination should not simply be a test of the applicant's ability to answer a question by looking up information in reference materials (i.e., open-reference "direct lookup questions"). Psychometrically sound closed-reference multiple-choice questions, and not rote memorization, evaluate the applicant's recognition of the correct answer, thereby maintaining test item operational validity.

Ongoing NRC/Industry Initiatives for Improving the Examination Process

The staff monitors the effects on the industry as new regulations and associated guidance documents on operator licensing process are implemented. In 1999, the LOFG was formed in cooperation with the NEI to provide a forum for discussing and resolving issues related to the initial operator licensing examination program. The staff has conducted public meetings at least annually with the NEI LOFG to solicit industry feedback and promote the efficient, effective, and consistent preparation and administration of initial operator licensing examinations. As noted above, in a December 2011 public meeting, the staff and the NEI LOFG discussed the LOFG's preliminary recommendations for revising the K/A Catalogs and the NUREG-1021 K/A sample plan process. The LOFG proposed that an industry working group, with NRC examiner participation, revise the K/A Catalogs (NUREG-1122 and NUREG-1123) to better reflect licensed operator knowledge requirements, skills, and abilities required in the current operating environment. The revision process would be modeled after the processes, including lessons learned, used to develop Draft NUREG-2103, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Westinghouse AP1000 Pressurized-Water Reactors," and Draft

NUREG-2104, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Advanced Boiling-Water Reactors." The revision effort will also consider development of an integrated examination sample plan that defines the K/A statements to be tested in each of the three examination settings - the written examination, the dynamic simulator operating test, and the control room/in-plant operating test. The staff has agreed to participate in the revision efforts and will schedule a public meeting with the LOFG for December 2012 to provide a status update.

The staff also monitors the administration of the operator licensing functions in the regional offices. The headquarters staff annually performs an assessment in one regional office to evaluate the overall effectiveness of that office's operator licensing program and its adherence to 10 CFR Part 55, NUREG-1021, and other policy documents. The assessment includes a detailed review of the preparation, administration, and grading of initial operator licensing examinations with an emphasis on examination consistency and the quality of the regional review and comment resolution processes for facility licensee-developed examinations. Each regional office conducts a similar self-assessment during the years when they are not evaluated by the headquarters staff.

Overview of the Licensed Operator Requalification Process and Other New Initiatives

The overall process for licensed operator requalification is dictated by 10 CFR 55.59, "Requalification," which requires each licensed operator and senior operator to complete a requalification program that the facility licensee has developed and the Commission has approved. Requalification programs are considered approved by the Commission when they are based on a SAT and accredited by the NNAB after evaluation by INPO. INPO reviews the details of each facility's licensed operator requalification program every 4 years. As 10 CFR 55.59 further requires, each requalification program is to be conducted for a continuous period not to exceed 2 years promptly followed by successive requalification programs, and that each 2-year requalification program include a comprehensive written examination and an annual operating test. Since 1994, the examinations have been developed and administered solely by facility licensees, although the NRC could develop and administer these exams if the NRC loses confidence in the ability of the facility licensee to do so.

Beyond what has been discussed above, there are no additional specific regulatory requirements for licensed operator requalification training and examination. For example, there are no specific regulatory requirements for the number of training hours that must occur in every 2-year requalification program, nor are there any specific requirements for the topics to be trained on or the content of the examinations. These details are contained in the industry standard for requalification as outlined in the NANT "Guidelines for the Continuing Training of Licensed Personnel," and in additional communication between INPO and facility licensees (e.g., significant operating experience reports).

The primary role of the NRC in licensed operator requalification is to provide oversight of facility programs through inspection. (INPO also provides oversight as discussed above). These inspections are conducted in accordance with Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program and Licensed Operator Performance." The inspections performed at each facility include an annual collection of examination results, a biennial inspection by NRC examiners, and a quarterly inspection by the resident staff. The biennial inspection reviews requalification written examination and operating test quality, remedial

training and re-examinations, conformance with operator license conditions, simulator performance, problem identification and resolution (PI&R) as it relates to licensed operator performance, and observation and assessment of the facility licensee's ability to administer requalification examinations and assess their licensed operators, including the ability of the facility to maintain appropriate examination security. The review effort includes direct observation of operating crew performance during the simulator operating test scenarios as well as observation of individual operator performance during the control room or in-plant portion of the operating test.

The resident inspector staff's quarterly inspection includes observing licensed operator requalification training and testing activities (4 hours per quarter), and observing licensed operator performance in the actual plant's main control room during periods of heightened activity or risk (4 hours per quarter, which may be combined with other resident inspector activities in the main control room). Major changes incorporated into IP 71111.11 as a result of a January 2012 revision included: (1) revised tools for assessing the biennial inspection areas to make the IP more effective and easier to use; (2) the addition of the PI&R section; and (3) the addition of the resident staff's observation of licensed operator performance in the actual plant's main control room with guidance provided for performing this inspection activity. The addition of the PI&R review and the observation of licensed operator performance in the actual plant control room were added to address recent licensed operator performance issues, which include operating fundamentals such as command and control, procedure adherence, and conduct of operations.

The staff is also considering changes to the initial operator licensing and requalification processes as part of the NRC's response to the Fukushima accident. These initiatives may include additional NRC oversight of severe accident management and extensive damage mitigation guidelines, and the training and examination of licensed operators on these subjects.

CONCLUSIONS:

The NRC's initial operator licensing examination program, as confirmed by the NEI IRT assessment, continues to provide reasonable assurance that only those applicants who have mastered the knowledge, skills, and abilities required to safely operate and supervise the reactor controls are being licensed to do so. However, the staff agrees that licensing process enhancements may be appropriate and is working with the NEI LOFG to revamp the NRC's K/A Catalogs and the K/A statement selection process for the written examinations.

COORDINATION:

The Office of the General Counsel has reviewed this Commission paper and has no legal objection.

/RA/

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

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COORDINATION:

The Office of the General Counsel has reviewed this Commission paper and has no legal objection.

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

G20120083/EDATS: OEDO-2012-0075

ADAMS ACCESSION NO.: ML12278A258 Pkg: ML12278A283 *Concurrence via email

OFFICE	DIRS/IOLB	Tech Editor*	DIRS/IOLB:BC	DIRS: D	OGC	NRR
NAME	JMunro	CHsu	JMcHale	HNieh	SUttal	ELeeds
DATE	10/04/12	09/28/12	10/04/12	10/0512	10/18/12	11/02/12

OFFICIAL RECORD COPY

GREGORY R. CAMERON

Senior Project Manager, Regulatory Affairs

1201 F Street, NW, Suite 1100
Washington, DC 20004
P: 202.739.8105
grc@nei.org
nei.org



November 2, 2017

Ms. Nancy L. Salgado
Chief, Operator Licensing and Training Branch
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Request for Removal of Unintended Changes Contained in NUREG-1122, Revision 3, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors" and NUREG-1123, Revision 3, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors."

Project Number: 689

Dear Ms. Salgado:

On November 2, 2015, the Nuclear Energy Institute (NEI)¹, submitted via letter the revised NEI Knowledge and Abilities Master Catalog for Boiling Water Reactors (BWR)², and the associated BWR Knowledge and Abilities (K/As) Catalog Basis Document. Subsequently, on January 27, 2016, NEI submitted the revised NEI Knowledge and Abilities Master Catalog for Pressurized Water Reactors (PWR)³, and the associated PWR Knowledge and Abilities Catalog Basis Document. These documents were included in NUREG-1122, Revision 3, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors" and NUREG-1123, Revision 3, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors" for endorsement by the Nuclear Regulatory Commission. Following additional discussions with NRC staff and the publication of the draft NUREGs for public comment, NEI provided additional comments via letter on May 15, 2017⁴.

¹ The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

² See, e.g., "BWR Knowledge and Abilities Master Catalog," dated November 2, 2015,"; Letter from B. Montgomery (NEI) to S.Sloan (NRC).

³ See, e.g., "PWR Knowledge and Abilities Master Catalog," dated January 27, 2016,"; Letter from B. Montgomery (NEI) to S.Sloan (NRC).

⁴ See, e.g., "NEI Comments on NUREG-1122, Revision 3, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors" and NUREG-1123, Revision 3, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors," FRN 2017-18018, NRC Docket ID 2017-0068, dated May 15, 2017," Letter from G. Cameron (NEI) to C. Bladley (NRC).

Ms. Salgado
November 2, 2017
Page 2

As the industry prepared to implement the revised K/As contained in NUREG-1122 and NUREG-1123, Revision 3 for upcoming examinations, licensees identified that the revisions contained changes to K/As related to the generic fundamentals examination which were unfamiliar to the industry. Specifically, section 5, "Components" and section 6, "Theory" of both NUREG-1122 and NUREG-1123 contain a number of changes to K/A numbering, description, or importance.

Following a series of document reviews and interviews, the industry panel that developed the revised K/A catalogs could not identify a technical justification for the generic fundamental K/A changes nor when during the revision process the changes were made. Industry and NRC personnel interviewed do not recall any intention to modify this portion of the K/A catalog beyond matching K/A wording between the PWR and BWR catalogs.

To be clear, the industry did not intend to make substantive changes to sections 5 and 6 of the catalogs. We recognize that these changes, although unintentional, were contained in our original submission and were not addressed in our subsequent comment letter. We apologize for that oversight. Notwithstanding our previous comments, all other changes contained in both documents have both appropriate technical justification and our full support.

While the industry accepts culpability for the changes made to sections 5 and 6 of the K/A catalogs, we request that they be removed prior to the final publishing of NUREG-1122 and NUREG-1123, Revision 3 because the changes are both unnecessary and unintended. Reverting to the wording contained in NUREG-1122, Revision 2 and NUREG-1123, Revision 2 for sections 5 and 6 would sufficiently address our concern.

We appreciate your consideration of this issue, and look forward to the publication of documents which contain thoughtful revisions in the interest of safe plant operations. Should you require additional discussion related to this request, please contact me.

Sincerely,



Gregory R. Cameron

Bates, Mark

From: Salgado, Nancy
Sent: Wednesday, June 27, 2018 1:19 PM
To: Bates, Mark
Cc: Miller, Mark; King, Michael; Miller, Chris; McCoy, Gerald; Guthrie, Eugene; Buchanan, Theresa; Cowdrey, Christian
Subject: (Response) NRR PROPOSED REVISION TO FAQ 401.55
Attachments: OLPF 401.55 revision_tb_ns_5-30.docx

Dear Mark,

Thank you for your email. Sorry for the delay in responding, I vetted this request through DIRS management (Mark Miller) and it was re-confirmed this morning that the attached document will be posted to the OL webpage in response to the ticketed item.

Kind regards,
Nancy

From: Bates, Mark
Sent: Thursday, June 14, 2018 11:41 AM
To: Salgado, Nancy <Nancy.Salgado@nrc.gov>
Cc: Cowdrey, Christian <Christian.Cowdrey@nrc.gov>; Buchanan, Theresa <Theresa.Buchanan@nrc.gov>; Holian, Brian <Brian.Holian@nrc.gov>; Miller, Chris <Chris.Miller@nrc.gov>; Miller, Mark <Mark.Miller@nrc.gov>; Lopez-Santiago, Omar <Omar.Lopez-Santiago@nrc.gov>; Gody, Tony <Tony.Gody@nrc.gov>; McCoy, Gerald <Gerald.McCoy@nrc.gov>; Guthrie, Eugene <Eugene.Guthrie@nrc.gov>; King, Michael <Michael.King2@nrc.gov>; Emrich, Matthew <Matthew.Emrich@nrc.gov>; Callaway, Gary <Gary.Callaway@nrc.gov>; Zoia, Charles <Charles.Zoia@nrc.gov>; Clark, Jeff <Jeff.Clark@nrc.gov>; Lanyi, David <David.Lanyi@nrc.gov>; Meeks, Michael <Michael.Meeks@nrc.gov>; Bacon, Daniel <Daniel.Bacon@nrc.gov>; Caballero, Bruno <Bruno.Caballero@nrc.gov>; Capehart, Phillip <Phillip.Capehart@nrc.gov>
Subject: NRR PROPOSED REVISION TO FAQ 401.55

Nancy,

The IOLB update to the response on Operator Licensing Program Feedback question # 401.55, which was directed by Brian Holian and based on DPO 2017-007, only partially meets the concerns of the DPO submitters. The IOLB proposed response does not help to ensure that exams submitted by the licensee adequately tests reactor operator procedure knowledge and does not convey that Tier 1 test items should, when relevant, test abnormal/emergency procedure knowledge as stated in Brian Holian's response to the DPO (see attached).

Although the proposed updated response does state that chief examiners are allowed to make reasonable changes that are necessary to ensure an adequate balance of coverage throughout the exam and to request reasonable enhancements to any written examination item when necessary, it does not provide the licensees with guidance that will help ensure that proper balance of coverage is initially achieved on their draft submittal, which could lead to extensive changes late in the review and approval process. This lack of guidance could lead to unnecessary rework for both the NRC and the licensee.

Retaining statements from the initial response to the FAQ does not act to concisely provide guidance to exam authors on how to meet the intent of Tier 1 questions; rather, retaining the statements from the initial response has the potential to distract the reader and does not address the question at hand. The revised response to

the FAQ should concisely and effectively provide guidance to exam authors so that each submitted Tier 1 question meets the intent of the selected Tier 1 K/A, thereby facilitating a more efficient exam review process.

Please see the DPO submitters' proposed response (attached) that would provide exam developers with the necessary information to construct Tier 1 questions that meet the intent of the Tier 1 K/As. I have also attached the original copy of the response to FAQ 401.55, which is the version on which the DPO was based, and NRR's recently proposed revision to the FAQ, which prompted this email. A file that contains statements, mostly from NUREG-1021, that explains the basis for the proposed FAQ revision is attached. Lastly, for thoroughness, the ADAMS accession number for the entire DPO package is ML18150A469.

Our concerns are focused on addressing the "intent" of the DPO and the associated response to that DPO. We believe that it is good regulatory practice and in good keeping with agency values to communicate this important information clearly and effectively to the stakeholders who are most impacted by the intent of the DPO. Therefore, we have attached two paragraphs that we believe, if published as the FAQ response (replacing what was previously published), would provide the exam authors with the necessary information to write questions that are consistent with the outcome of the DPO. We attempted to closely mirror the words from Brian Holian's memo and the conclusions reached by the DPO panel when writing this proposed FAQ response.

Our Branch Chief informed us that NRR has asked us to write a "contrary to" statement, but we do not entirely understand what the "contrary to" statement is being requested to address. I believe that if you look at the original FAQ response, NRR's initial FAQ revision, the DPO submitters proposed revision, the DPO panel report, and the memo from Brian Holian (all attached to this email), you will see that NRR's proposed revision, although in verbatim compliance with the specific direction in the memo, did not adequately address the intent of the DPO and would not effectively communicate necessary information to the external stakeholders.

We are interested in working with you to resolve the issue and provide effective communication to the stakeholders.

Sincerely,
Mark Bates
U.S. N.R.C. Region II
Sr. Operations Engineer
404-997-4612

Bates, Mark

From: Emrich, Matthew
Int: Wednesday, June 27, 2018 3:25 PM
ro: Bates, Mark
Subject: RE: (Response) NRR PROPOSED REVISION TO FAQ 401.55

Mark,

I think your group in Region 2 and I are in alignment on the fact that the "revised" OLPF response does not answer the mail based on the DPO panel recommendations and the tasking memo from Mr. Holian.

I've expressed my concern to the program office that we will likely find ourselves back in the same boat that we were in back in 2015 when all of this Tier 1 stuff started.

Quite frankly, I find the revised response to be a little contradictory in nature as it outlines clarification guidance and then essentially states that the CE's can do what they have to do in order to ensure that the written exam complies with NUREG requirements. If I was at the licensee, I'd be scratching my head a little bit.

Bottom line – I was expecting more and definitely think that we can do better....

Feel free to give me a jingle if you want to discuss in more detail.

V/r,

Matthew P. Emrich
Senior Reactor Technology Instructor
U.S. Nuclear Regulatory Commission
Technical Training Center
Office: 423-855-6673
Cell: 315-857-1785

From: Bates, Mark
Sent: Wednesday, June 27, 2018 2:04 PM
To: Emrich, Matthew <Matthew.Emrich@nrc.gov>
Subject: FW: (Response) NRR PROPOSED REVISION TO FAQ 401.55

What are your thoughts?

From: Salgado, Nancy
Sent: Wednesday, June 27, 2018 1:19 PM
To: Bates, Mark <Mark.Bates@nrc.gov>
Cc: Miller, Mark <Mark.Miller@nrc.gov>; King, Michael <Michael.King2@nrc.gov>; Miller, Chris <Chris.Miller@nrc.gov>; McCoy, Gerald <Gerald.McCoy@nrc.gov>; Guthrie, Eugene <Eugene.Guthrie@nrc.gov>; Buchanan, Theresa <Theresa.Buchanan@nrc.gov>; Cowdrey, Christian <Christian.Cowdrey@nrc.gov>
Subject: (Response) NRR PROPOSED REVISION TO FAQ 401.55

ear Mark,

Bacon, Daniel

From: Holian, Brian
Sent: Tuesday, July 03, 2018 7:26 AM
To: Caballero, Bruno
Cc: Bates, Mark; Bacon, Daniel; Lanyi, David; Capehart, Phillip; Meeks, Michael; Miller, Mark
Subject: RE: NRR PROPOSED REVISION TO FAQ 401.55

Thanks for the update.

~~I know Mark Miller has reviewed the DPO closely and has talked with DPO panel chair.
As I am aware - He, and program office, are staying true to the words and intent of the Director Decision.~~

~~I'm aware of the intent not to diminish the number of procedure questions – and the flexibility that should be the Chief Examiner's...~~

~~At the same time I would not intend to revise what is currently required... preferring consistency and only making changes that are well-vetted with all stakeholders.~~

Hope this helps as you all have a lunch time call !!
Great 4th to all
Brian Holian

From: Caballero, Bruno
Sent: Monday, July 02, 2018 2:55 PM
To: Holian, Brian <Brian.Holian@nrc.gov>
Cc: Bates, Mark <Mark.Bates@nrc.gov>; Bacon, Daniel <Daniel.Bacon@nrc.gov>; Lanyi, David <David.Lanyi@nrc.gov>; Capehart, Phillip <Phillip.Capehart@nrc.gov>; Meeks, Michael <Michael.Meeks@nrc.gov>; Miller, Mark <Mark.Miller@nrc.gov>
Subject: RE: NRR PROPOSED REVISION TO FAQ 401.55

Brian,

We (DPO submitters) have a telephone conference with Mark Miller tomorrow (7/3/18) at noon. The purpose of the telephone conference is to see whether the program office is willing to work with us to revise the proposed answer to OL Feedback Item 401.55, so that it incorporates the spirit and INTENT of the DPO Final Decision.

The DPO submitters are not satisfied with IOLB's proposed revision to OL Feedback Item 401.55 because:

- it does not clarify the spirit and intent of Tier 1 test items, as described in your DPO Final Decision Memo, and
- it conflicts with your DPO Final Decision Memo, that said Chief Examiners may request enhancements to written exam items, including the failure to test a relevant procedure.

If we're unsuccessful in gaining IOLB's cooperation to make acceptable changes to OL Feedback Item 401.55, we may request assistance from you to get suitable resolution.

bruno

From: Holian, Brian
Sent: Thursday, June 28, 2018 6:51 AM

Bates, Mark

From: Bates, Mark
Sent: Wednesday, August 15, 2018 11:12 AM
To: Miller, Mark
Cc: Gody, Tony; McCoy, Gerald; Guthrie, Eugene; Meeks, Michael; Bacon, Daniel; Caballero, Bruno; Lanyi, David; Capehart, Phillip
Subject: DPO Conversation Summary

Mark,

Per our discussion, I understand the following:

- NRR does not intend to revise the FAQ.
- NRR views stating the intent of Tier 1 topics, as described in Holian's memo, as adding a new requirement to the exam process.
- NRR is stating that they will consider enhancements to NUREG-1021 wrt Tier 1 intent for the next revision (Rev 12).
- The reason NRR will not revise the FAQ is that a NUREG change process must be followed in order to revise or add a new requirement to the exam process. NRR believes that clarifying the intent of Tier 1, as described in the Holian memo, would constitute adding a new requirement.

In response to my understanding of the above items, I would like to point out a few things:

1. The intent of Tier 1 K/As was published in Rev 3 Draft K/A catalogs (Federal Register – April 2017). – see original DPO starting on page 9.
2. The K/A catalogs contain many changes to the exam process and are published as a NUREG.
3. The intent of Tier 1, as published in the K/A catalogs in the Federal Register, was written and submitted by members of industry.
4. The intent of Tier 1, in Draft Rev 3 of these catalogs, was written by industry and aligns with the new reactor catalogs currently being used. These new reactor catalogs are also published as NUREGs.
5. The Rev 3 K/A catalogs, which describe the intent of Tier 1, have already been entered into the NUREG change process. The Rev 3 Catalogs are being delayed due to issues related to GFES important ratings, but not for stating the intent of Tier 1.
6. The revised K/A catalogs did not even list the Basis statements that clarify the intent of Tier 1 as a significant change in the summary of changes (likely because there was no change of intent)

Based on the above facts, there is no need to wait until Rev 12 of NUREG-1021 to clearly communicate with stakeholders on the intent of Tier 1. Rev 3 of the K/A catalogs as submitted by industry and the new reactor catalogs that have been used multiple times, all address the "intent" of Tier 1. Because these catalogs are published as NUREGs, they have been undergoing the process that NUREG-1021 would presumably go through for a Rev 12 revision.

NRR has stated that they may delete those Basis statements for Tier 1 when they finalize those revisions. Deleting what was already submitted by industry, and what provides clarity on the intent of Tier 1, would only serve to delay providing the stakeholders with needed information, and delay satisfactory resolution to the issue.

As we stated on our last conference call, we are prepared to pursue other options. Thanks for your time and consideration,

Mark Bates
S. N.R.C. Region II
Sr. Operations Engineer

Bates, Mark

From: Bacon, Daniel
Sent: Wednesday, August 15, 2018 2:19 PM
To: Bates, Mark
Subject: FW: Intent of Tier 1
Attachments: ML17097A204.pdf; ML17097A214.pdf

Mark,
Here it is.
Dan

From: Bacon, Daniel
Sent: Wednesday, August 15, 2018 1:25 PM
To: Miller, Mark <Mark.Miller@nrc.gov>
Cc: McCoy, Gerald <Gerald.McCoy@nrc.gov>; Guthrie, Eugene <Eugene.Guthrie@nrc.gov>; Meeks, Michael <Michael.Meeks@nrc.gov>; Bates, Andrew <Andrew.Bates@nrc.gov>; Capehart, Phillip <Phillip.Capehart@nrc.gov>; Caballero, Bruno <Bruno.Caballero@nrc.gov>; Lanyi, David <David.Lanyi@nrc.gov>; Gody, Tony <Tony.Gody@nrc.gov>
Subject: Intent of Tier 1

Mark,

Based on our conversation this morning, I would like to submit the following information for your consideration.

The attached files are Revision 3 of NUREG-1122 and 1123. These revisions were developed by an industry working group and submitted to the NRC. Please refer to the bases for the EPE and APE K/A stem statements that are listed on page 23 of 513 for NUREG-1122 and page 23 of 461 for NUREG-1123. Also, note that these bases are **NOT** listed on the summaries of significant changes on page 13 for each catalog. The same type of EPE and APE K/A stem bases statements are contained in the New Reactor K/A catalogs that are currently being used for examinations.

These catalogs are posted as "Draft for Comment" on the NRC public website and were entered into the Federal Register in April, 2017. It is my understanding, based on numerous discussions during IOLB Bi-weekly meetings, that final publication of these catalogs is being delayed due to industry comments related to GFES importance ratings, not K/A stem bases statements listed for EPEs and APEs.

These items seem to provide strong evidence that the intent of Tier 1 EPE and APE K/As is to test procedure knowledge as is stated in the DPO decision memo, which is contained in a publicly available ADAMS document.

Operator licensing exams are developed using a combination of NREG-1021 and the applicable K/A catalog (NUREG-1122, NUREG-1123...). The attached K/A catalogs **have** been through the NUREG change process, including the public comment period. For these reasons, I do not believe that the reasons you stated for not being able to clearly state the intent of Tier 1 written examination items in FAQ 401.55 are valid.

I believe that the FAQ (401.55) that is currently published on the website is **unacceptable** for the following reasons:

- It contradicts information that is contained in the DPO decision memo (and within itself for that matter).
- It does not provide clear direction to the stakeholders and could result in significant rework late in the exam development and approval process.
- In my opinion, it does not meet the principles of good regulation.

Also, I believe that you discussed routing a memo that will effectively change the wording of the final DPO decision. Please let me know if I misunderstood this. Does this mean that you are re-opening the DPO case that has already been closed and made public? I need to know exactly where we are in the DPO process in order to determine my next course of action. My intention is to coordinate with my fellow DPO submitters and pursue further action in an attempt to reach a satisfactory resolution to this situation.

Very respectfully,

Dan Bacon

Senior Operations Engineer

U.S. Nuclear Regulatory Commission (Region II)

245 Peachtree Center Avenue, NE (Suite 1200)

Atlanta, GA 30303-1257

office: 404-997-4518

e-mail: Daniel.Bacon@nrc.gov

Document 6: Statement of Views



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

January 22, 2019

MEMORANDUM TO: Margaret M. Doane
Executive Director for Operations

FROM: Ho K. Nieh, Director /RA/
Office of Nuclear Reactor Regulation

SUBJECT: STATEMENT OF VIEWS REGARDING APPEAL OF DIFFERING
PROFESSIONAL OPINION CONCERNING OPERATOR
LICENSE DPO-2017-007

Introduction

The purpose of this memorandum is to provide you with my statement of views regarding the appeal of Differing Professional Opinion (DPO)-2017-007.¹ The appeal raises concerns that corrective actions taken by the Office of Nuclear Reactor Regulation (NRR) staff in response to the associated NRR Director's memoranda² were inadequate. Specifically, the appellars believe that NRR's revised answer to Operator License (OL) Program Feedback item 401.55 (ML18178A581) is misleading, contradictory, and incorrect. The appellars hold the position that the intent of Tier 1 (Emergency and Abnormal Plant Evolutions) written examination questions is to test the applicant's knowledge of abnormal and emergency procedures.

Since I was not involved with the review of the original DPO, and, given the programmatic importance of the issues raised by the appellars, it was necessary to take sufficient time to have discussions with the appellars, my predecessor, and staff involved with evaluating the original DPO. Furthermore, my assessment of the appeal required the review of existing OL program guidance and discussions with headquarters OL program staff. All of these steps were needed to provide this statement of views and to determine if any additional corrective actions are needed to better address the underlying issues raised by the appellars.

CONTACT: Jeanne D. Johnston, NRR
301-415-1349

¹ On October 10, 2017, several Senior Operations Engineers from RII submitted a differing professional opinion regarding operator licensing (OL) written examination test items for abnormal and emergency plant evolutions. Specifically, the submitters are concerned that a NRR policy interpretation on the adequacy of certain written examination questions will result in inadequate testing of operators' knowledge of emergency and abnormal procedures.

² On April 17, 2018, the acting NRR Director, Brian Holian, issued a Director's Decision that essentially agreed with the Ad Hoc DPO panel recommendations and offered additional clarifications. On April 27, 2018, Brian Holian tasked NRR staff to implement corrective actions consistent with the Ad Hoc DPO Panel recommendations with additional clarifications (ML18117A079).

My views on the appeal

The appellars expressed a safety concern because the answer to OL Program Feedback item 401.55 does not ensure that emergency and abnormal condition procedures are adequately tested in reactor operator exams. I disagree with this assertion because it is unfounded in fact. Based on a sampling, the headquarters OL program has assessed that reactor operator exams in all four regions sufficiently test knowledge of procedures in accordance with NUREG-1021.

As a general matter of principle, I believe that the Nuclear Regulatory Commission's (NRC) examination process for a control room operator should test for knowledge of plant systems, integrated response and procedures. The operating test is an essential and significant component of the operator licensing process that provides a major opportunity to test an applicant's knowledge of procedures. The written examination, which is the focus of this DPO and appeal, provides a complementary measure of an applicant's overall level of knowledge of plant systems, integrated response, and procedures.

On page 6 of the appeal, the appellars specified four flaws with the revised answer to OL Program Feedback item 401.55. My views on the four flaws are as follows:

1. **“The current guidance does not state the intent of Tier 1 questions.”** I think the current answer to feedback item 401.55 sufficiently addresses the intent of Tier 1 questions. Regarding the appellars' position that all Tier 1 questions should test abnormal or emergency procedure knowledge, the headquarters OL program position is that each Tier 1 written examination question is not required to test procedural knowledge. A Tier 1 question can test system level knowledge without a reference to a specific procedure, so long as the question directly pertains to the selected emergency and abnormal evolutions knowledge or abilities (K/A) statement. The headquarters position is currently supported by the most current version of NUREG-1021, which is the guidance document used to implement the operator licensing requirements in Title 10 of the *Code of Federal Regulations* Part 55.
2. **“The current guidance is not clear on how to handle a situation where a Tier 1 question does not test abnormal or emergency procedure knowledge or when it is not possible to write a question because of the difficulty with the randomly selected K/A.”** I believe that the current guidance attempted to answer the specific question that was being asked related to rating Tier 1 questions that do not reference a specific procedure. I do consider that the answer could be improved for better clarity.
3. **“The current guidance does not define ‘adequate balance of coverage,’ which is now necessary to define because the NRR decision memo used this phrase.”** I agree with appellars' view that balance of coverage is not defined. Given the currently available guidance that exists today, NRC Chief Examiners in the regions have fairly broad discretion to apply their experience and judgment in preparing a written examination. As such, the NRC is susceptible to regional variations in exam content. Thus far, no significant regional consistency concerns with written examinations have been identified by the headquarters OL program. Notwithstanding, balance of coverage should be better defined.
4. **“The current guidance contradicts itself.”** I agree, in part, with the appellars' view. In stepping through the four paragraphs of the revised answer to OL Program Feedback item 401.55, the first two paragraphs are intended to provide the context and intent of

Tier 1 questions as they relate to emergency and abnormal plant evolutions. The third paragraph is intended to apply to the rating of a specific question by itself. The fourth, final paragraph, is intended to apply to the exam's overall balance of coverage. It is my impression from discussions with the appealers that they do not support the view of a two-part approach where a Tier 1 question is rated by itself, then considered as part of a holistic review of the exam for adequate balance of coverage. While it is arguable whether the current guidance is contradictory, I do consider that the revised answer could be improved for better clarity. Specifically, the guidance in item 401.55 could be enhanced to clarify the expectation for the Chief Examiner to review an exam outline for balance of coverage with the facility at the beginning of the examination development process. Such a review would be intended to preclude a licensee's need to replace a significant number of questions after the draft exam has been written.

It should be noted that none of the other regional offices has taken exception to the revised answer to OL Program Feedback item 401.55. This apparent fact was even acknowledged by several of the appealers. Nevertheless, I found that the revised answer could be improved. In this regard, I reviewed the proposed solution offered by the appealers to replace the current version of the OL Program Feedback item 401.55 (see page 6 of the appeal).

I found the appealers' proposed solution to be too restrictive, particularly with their proposal to specify a minimum number of questions to test procedure knowledge in Tier 1 and Tier 2 questions. My concern is that such guidance could potentially result in the balance of coverage being skewed too heavily toward procedure knowledge. For example, applying the appealers' proposal could result in a reactor operator's written examination having upwards of two-thirds of the 75 questions being procedures-based. This could have unintended consequences such as narrowing the scope of the written examination to procedural content included in abnormal and emergency operating procedures. These potential consequences and other possible implications have not been evaluated with a diverse group of stakeholders.

Additional actions to be taken by NRR

The additional information presented in the appeal justifies further corrective actions to be taken by NRR. I have directed the staff in NRR's Division of Inspection and Regional Support, Operator Licensing Branch, to do the following:

1. Clarify the answer to OL Program Feedback item 401.55 to be more clear on the intent of Tier 1 questions and rating of Tier 1 question that do not reference specific procedures or require procedural knowledge to answer;
2. Work with the OL staff in all regions to identify the most effective way to provide guidance on what constitutes adequate balance of coverage, with consideration of insights from an analysis of the balance of coverage in past exams from all regions;
3. Include the intent and rating of Tier 1 questions and balance of coverage as discussion topics for the upcoming biennial OL examiners conference in April 2019 so that input from all regions can be obtained; and
4. Incorporate into the next revision to NUREG-1021 guidance for adequate balance of coverage.

NRR will commit to revising the OL Program Feedback item 401.55 to better clarify the intent and rating of Tier 1 questions by no later than June 30, 2019.

NRR will commit to developing draft guidance for adequate balance of coverage by September 30, 2019. This draft guidance will be brought into the periodic update process for NUREG-1021.

SUBJECT: STATEMENT OF VIEWS REGARDING APPEAL OF DIFFERING
PROFESSIONAL OPINION CONCERNING DPO-2017-007
DATED JANUARY 22, 2019

DISTRIBUTION:

NRR R/F
J. Johnston, NRR
B. Caballero, RII
D. Bacon, RII
D. Lanyi, RII
P. Capehart, RII
M. Meeks, RII
B. Holian, NSIR
C. Miller, NRR
M. Evans, NRR
H. Nieh, NRR
G. Figueroa-Toledo, OE
G. Wilson, OE
M. Doane, OEDO

ADAMS Accession No.: ML19015A010

OFFICE	NRR	NRR
NAME	JJohnston	HNieh
DATE	1/22/2019	1/22/2019

OFFICIAL RECORD COPY

Document 7: DPO Appeal Decision



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

December 10, 2019

MEMORANDUM TO:

Bruno L. Caballero, Senior Operations Engineer
Operations Branch 2
Division of Reactor Safety
Region II

Phillip G. Capehart, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

David R. Lanyi, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

Mark A. Bates, Senior Operations Engineer
Operations Branch 2
Division of Reactor Safety
Region II

Michael K. Meeks, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

Daniel M. Bacon, Senior Operations Engineer
Operations Branch 1
Division of Reactor Safety
Region II

FROM:

Margaret M. Doane */RA/*
Executive Director for Operations

SUBJECT:

DIFFERING PROFESSIONAL OPINION APPEAL INVOLVING
OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1
ITEMS (DPO-2017-007)

The purpose of this memorandum is to inform you of my considerations and conclusions regarding the Differing Professional Opinion (DPO) appeal you submitted on October 25, 2018. The appeal raised concerns with the decision issued by the Acting Office Director of the Office of Nuclear Reactor Regulation (NRR) on April 27, 2018, regarding operating licensing written

CONTACT: Christopher Cook, OEDO
(301) 415-6397

examinations (Agencywide Documents Access and Management System (ADAMS) Accession No.: ML18117A132). I evaluated the issues you raised in the appeal using the process described in Management Directive 10.159, "The NRC Differing Professional Opinions Program," to ensure appropriate agency action in this matter.

After careful consideration of your appeal, I have concluded the following:

- 1) Operator licensing examinations must continue to ensure that future licensed operators demonstrate proficiency of knowledge and ability to execute emergency and abnormal evolutions, including the site-specific abnormal and emergency operating procedures.
- 2) The Chief Examiner (CE) remains the responsible individual for ensuring the 10 CFR 55.41 and 55.43 items are appropriately sampled and that written examination coverage is balanced.
- 3) Neither the applicable regulations nor the history of the written examinations require a strict interpretation that each Tier 1 question include a specific reference to an abnormal or emergency plant procedure in order to be deemed fully satisfactory.
- 4) It is permissible for a CE to rate a Tier 1 question in need of editorial enhancement if the question does not reference a procedure when the CE determines that, on balance, the examination lacks sufficient testing of the abnormal or emergency operating procedures. Conversely, a CE may accept a Tier 1 question that does not reference an abnormal or emergency operating procedure when the CE determines that, on balance, the examination includes sufficient testing of these procedures.
- 5) The current version of Operator Licensing Feedback Item 401.55 (updated June 13, 2019; ADAMS Accession No.: ML19169A208) does not represent a consensus view between CEs in all Regional Offices and NRR. This Feedback Item should be updated to remove ambiguity regarding acceptable balance of coverage for testing Tier 1 procedures.

To this end, I will task NRR and the regional offices to work together to revise Feedback Item 401.55 (ADAMS Accession No.: ML19169A208) and related NRC guidance, as necessary, for the purpose of defining appropriate balance for use by CEs to evaluate coverage of site-specific abnormal and emergency operating procedures in Tier 1 of the written examination.

Thank you for taking the time to raise your concerns to me and for the detailed information you provided to support your position and my review. Your willingness to raise concerns through the DPO process is consistent with our organizational values of Openness and Commitment.

EXECUTIVE DIRECTOR FOR OPERATIONS REVIEW AND DECISION PROCESS

In order to better understand your concerns, I assigned the Deputy Executive Director for Materials, Waste, Research, State, Tribal, Compliance, Administration, and Human Capital Programs (DEDM), an Executive Technical Assistant from my office, and an attorney from the Office of the General Counsel, to review the issues. The DEDM review team gathered information through discussions with you, the Deciding Official, and the NRR Director who wrote the Statement of Views, and reviewed documents pertinent to this appeal. The information collected provided independent insights and perspectives for my consideration.

Background

On October 10, 2017, you submitted a DPO related to the Operator Licensing Written Examinations – Tier 1 Test Items. The main documents in dispute were the Report on Interaction-17-09, “NUREG-2014, ES-401 Tier 1 written examination test items” (ADAMS Accession No.: ML17165A579) and Operator Licensing Feedback Item 401.55 (ADAMS Accession No.: ML17249A961). In response to your concerns, a panel was formed and tasked by the NRC DPO Program Managers to review your DPO. The DPO panel issued their report on March 19, 2018, to the Deciding Official, the acting director of NRR, and provided recommendations (ADAMS Accession No.: ML18078A009). Of note is Recommendation 1, which states that a CE should not be prohibited from assessing written examination questions as “enhancement required” for any reasonable situation, since it is the CE’s responsibility to ensure balance of coverage throughout the entire exam. Recommendation 1 also states that a question should not be assessed as “unsatisfactory” if the only flaw is its lack of a link to an abnormal or emergency operating procedure.

On April 27, 2018, the Deciding Official issued his decision regarding the DPO’s concerns as informed by the DPO Panel report and his own review (ADAMS Accession No.: ML18117A132). He essentially agreed with the submitters regarding Recommendation 1, and he directed his staff to revise Operator Licensing Feedback Item 401.55 to clarify that CEs are allowed to make reasonable changes for balance of coverage throughout the examination. He agreed that Tier 1 test items should “when relevant” test abnormal/emergency procedure knowledge. However, he also stated that when there is a proper balance in the overall exam, not having a Tier 1 question tie to a procedure is not a basis to remove the question from the test.

On August 15, 2018, the acting Director of the Division of Inspection and Regional Support (DIRS), NRR, issued a letter to the acting Director of NRR with the subject, “Action of Differing Professional Opinion involving Operator Licensing Written Examinations – Tier 1 Items” (ADAMS Accession No.: ML18225A149). The letter expanded on the Deciding Official’s decision in several key ways that are germane to the DPO appeal. First, the context surrounding use of the phrase “when relevant” was discussed in several paragraphs. The DIRS Director expressed concern that a new or revised regulatory position could be implied if the Deciding Official’s letter was interpreted as implying a statement of intent for Tier 1 questions in the answer to Feedback Question 401.55. To clarify, the DIRS Director stated that Tier 1 items do not, by definition, require a procedural basis for all knowledge and ability (K/A) categories. Second, the DIRS letter stated that the current version of Feedback Item 401.55 meets the intent of the Deciding Official’s letter. Third, the DIRS Director stated that the balance of coverage for an examination remains the responsibility of the CE and that the CE has the authority to request reasonable changes to ensure that balance of coverage exists.

In the appeal you submitted on October 25, 2018, you state that the reason for this appeal is that the corrective action taken for DPO-2017-007 following issuance of the Deciding Official’s letter was inadequate. In your view, the corrective action, which was to revise Operator Licensing Feedback Item 401.55, did not properly state the intent of Tier 1-written examination questions and that the response remains incorrect, misleading, and contradictory. You also state that if the spirit and intent of the words in the DPO panel report and the Deciding Official’s letter had been implemented, this appeal would not have been needed.

In response to your appeal, on January 22, 2019, the permanent Director of NRR issued his Statement of Views letter (ADAMS Accession No.: ML19015A010). He organized his letter

around the four specific flaws you identified with Operator Licensing Feedback Item 401.55. These four flaws (in bold) addressed by the NRR Director are as follows:

1. **“The current guidance does not state the intent of Tier 1 questions.”**

I think the current answer to feedback item 401.55 sufficiently addresses the intent of Tier 1 questions. Regarding the appealers’ position that all Tier 1 questions should test abnormal or emergency procedure knowledge, the headquarters OL program position is that each Tier 1 written examination question is not required to test procedural knowledge. A Tier 1 question can test system level knowledge without a reference to a specific procedure, so long as the question directly pertains to the selected emergency and abnormal evolutions knowledge or abilities (K/A) statement. The headquarters position is currently supported by the most current version of NUREG-1021, which is the guidance document used to implement the operator licensing requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55.

2. **“The current guidance is not clear on how to handle a situation where a Tier 1 question does not test abnormal or emergency procedure knowledge or when it is not possible to write a question because of the difficulty with the randomly selected K/A.”**

I believe that the current guidance attempted to answer the specific question that was being asked related to rating Tier 1 questions that do not reference a specific procedure. I do consider that the answer could be improved for better clarity.

3. **“The current guidance does not define ‘adequate balance of coverage,’ which is now necessary to define because the NRR decision memo used this phrase.”**

I agree with appealers’ view that balance of coverage is not defined. Given the currently available guidance that exists today, NRC Chief Examiners in the regions have fairly broad discretion to apply their experience and judgment in preparing a written examination. As such, the NRC is susceptible to regional variations in exam content. Thus far, no significant regional consistency concerns with written examinations have been identified by the headquarters OL program. Notwithstanding, balance of coverage should be better defined.

4. **“The current guidance contradicts itself.”**

I agree, in part, with the appealers’ view. In stepping through the four paragraphs of the revised answer to OL Program Feedback item 401.55, the first two paragraphs are intended to provide the context and intent of Tier 1 questions as they relate to emergency and abnormal plant evolutions. The third paragraph is intended to apply to the rating of a specific question by itself. The fourth, final paragraph, is intended to apply to the exam’s overall balance of

coverage. It is my impression from discussions with the appealers that they do not support the view of a two-part approach where a Tier 1 question is rated by itself, then considered as part of a holistic review of the exam for adequate balance of coverage. While it is arguable whether the current guidance is contradictory, I do consider that the revised answer could be improved for better clarity. Specifically, the guidance in item 401.55 could be enhanced to clarify the expectation for the Chief Examiner to review an exam outline for balance of coverage with the facility at the beginning of the examination development process. Such a review would be intended to preclude a licensee's need to replace a significant number of questions after the draft exam has been written.

On June 13, 2019, NRR updated the response to Operator Licensing Feedback Item 401.55 and published it on the NRC web site (ADAMS Accession No.: ML19169A208). The updated Feedback Item implements changes directed by the NRR Director in his Statement of Views letter. The updated feedback states that the intent of Tier 1 questions is to test an applicant's knowledge of emergency and abnormal evolutions. It also states, citing the K/A catalogs, that an emergency plant evolution is defined as any condition, event or system which leads to entry into emergency operating procedures (EOPs), and an abnormal plant evolution is defined as any degraded condition, event, or symptom not directly leading to an EOP entry condition, but nonetheless, adversely affecting a safety function.

The updated Feedback Item also states that guidance in NUREG-1021 does not specifically require Tier 1 written examination questions reference a procedure or that the content of a Tier 1 written examination question be limited to only the information embedded, or contained within, the site's plant procedures. It states that a Tier 1 question should not be rated as "unacceptable" (i.e., "unsatisfactory") only because the Tier 1 question does not reference a procedure or test knowledge of information that is contained within the facility's plant procedure. Likewise, the Tier 1 question should not be rated in need of "editorial enhancement" for the same reasons, unless there is a concern with balance of coverage within the exam.

To this end, the updated Feedback Item states that this Feedback Item is not intended to restrict the CE's ability to request reasonable changes to any written examination items when necessary, including those that do not test a relevant procedural concept. The CE may require reasonable changes, such as editorial enhancement, to the examination to achieve this balance, despite the relative merit of individual questions which may be replaced. The updated Feedback Item concludes that the CE and examination author should discuss expectations for adequate balance of testing procedures, along with the other 10 CFR 55.41 and 55.43 sample items, during the development, review, and approval of the written examination outline.

Review of Operator Licensing Examination Regulations, SECYs, and Guidance Documents

In evaluating this appeal, the following key documents were considered, as well as NRC guidance and other documents related to Operator Licensing Examinations, including:

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses," requires that applicants for reactor operator (RO) and senior reactor operator (SRO) licenses pass both a written examination and an operating test (both initially and for requalification). Moreover, the regulations mandate that the license examinations must be developed and administered in

accordance with 10 CFR 55.41, “Written Examination: Operators,” and 10 CFR 55.45, “Operating Tests,” for ROs or 10 CFR 55.43, “Written Examination: Senior Operators,” and 10 CFR 55.45 for SROs. The regulation at 10 CFR 55.40(a) states the following: The Commission shall use the criteria in NUREG-1021, “Operator Licensing Examination Standards for Power Reactors,” in effect 6 months before the examination date to prepare the written examinations required by §§ 55.41 and 55.43 and the operating tests required by § 55.45. The Commission shall also use the criteria in NUREG-1021 to evaluate the written examinations and operating tests prepared by power reactor facility licensees.

Pursuant to 10 CFR 55.40(b)(1), power reactor facility licensees may prepare, proctor, and grade the written examinations required by 10 CFR 55.41 and 10 CFR 55.43 and may prepare the operating tests required by 10 CFR 55.45 as long as they prepare the required examinations and tests in accordance with the criteria in NUREG-1021. NUREG-1021 establishes the policies, procedures, and practices for administering the required initial and requalification written examinations and operating tests. These standards describe the provisions of the Atomic Energy Act of 1954, as amended, and the regulations on which the operator licensing program is based. They also ensure the equitable and consistent administration of examinations to all applicants and licensed operators at all licensee facilities that are subject to the regulations.

Pursuant to 10 CFR 55.40, “Implementation,” “[t]he Commission shall use the criteria in NUREG-1021...in effect 6 months before the examination date to prepare the written examinations required by [10 CFR] 55.41 and [10 CFR] 55.43 and the operating tests required by [10 CFR] 55.45. The Commission shall also use the criteria in NUREG-1021 to evaluate the written examinations and operating tests prepared by power reactor facility licensees pursuant to paragraph (b) of this section.”

The rulemaking documents for the 1986 Amendments to 10 CFR Part 55 includes SECY-84-76, SECY-84-76A, SECY-84-76B, SECY-86-123, SRM-86-123, the proposed rule at 49 FR 46428, and the final rule at 52 FR 9453. These documents cover the promulgation of the rules, the contemporary understanding of the rules, and the responses to public comments for 10 CFR Part 55, including 10 CFR 55.41 and 10 CFR 55.43. While these records document the rationale for written exams, they do not include a discussion on a specific makeup of the written exams aside from the rule’s requirement that the examination constitute a “representative sample” of the listed items.

Information Notice 88-40 is the “Examiners’ Handbook for Developing Operator Licensing Examinations” (<https://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1988/in88040.html>). This information notice provided addressees copies of NUREG/BR-0122, “Examiners’ Handbook for Developing Operator Licensing Examinations” and provided additional guidance that the “format of the operator licensing examinations administered under 10 CFR 55.41 or 55.43 should reflect the sampling plans contained in the handbook.” However, since that time, the NRC has promulgated NUREG-1021 which stated, in Revision 9, that it explicitly supersedes those standards and that “NUREG/BR-0122 is no longer in effect.” Additionally, the information notice and the handbook utilize the same term, “evolution,” with the same definition, when describing the content of Tier 1 questions. The handbook further stated that the outline provided is “not intended to dictate how many K/As or which K/As should be included in any outline” but that the handbook, other guidance, plant-specific priorities, and the examiner’s knowledge contribute to making such decisions.

SECY-98-266, "Final Rule-Requirements for Initial Operator Licensing Examinations," along with its associated Voting Record, Staff Requirements Memorandum, and the proposed and final rules (62 FR 42426; 64 FR 19868). As was identified in your supplemental email, the background section in the SECY and the final rule describe the site-specific written examination as "covering plant systems, emergency and abnormal plant procedures, and plant-wide generic knowledge and abilities." While these categories roughly correspond to the tiers that were discussed in your appeal, I did not see this as dispositive on the makeup of exams. This discussion is only included in the general background section and is not tied to the rules that were being promulgated at the time. As a result, I did not find that this was a clear and deliberate statement as to the required makeup of an examination, and even so, that it could not be changed through later guidance.

NUREG-1021, Revision 11, Chapter ES-401 (pg. 1; ADAMS Accession No.: ML17038A432) states:

The content of the written licensing examinations for ROs and SROs is dictated by 10 CFR 55.41, "Written Examination: Operators," and 10 CFR 55.43, "Written Examination: Senior Operators," respectively. Each examination shall contain a representative selection of questions concerning the knowledge and abilities (K/As) and skills needed to perform duties at the desired license level. Both the RO and SRO examinations will sample the 14 items specified in 10 CFR 55.41(b), and the SRO examination will also sample the 7 additional items specified in 10 CFR 55.43(b).

Three tiers of information comprise the licensed operator written examination, as defined and used in NUREG-1021. In particular, Section D.1.b of the NUREG discusses preparation of the examination outline, and describes each tier as follows:

Systematically and randomly select specific K/A statements (e.g., K1.03 or A2.11) from NUREG-1122 (for PWRs) or NUREG-1123 (for BWRs) to complete each of the three tiers (i.e., Tier 1, "Emergency and Abnormal Plant Evolutions"; Tier 2, "Plant Systems"; and Tier 3, "Generic Knowledge and Abilities") of the applicable examination outline. (pg. 3)

The specific K/A topics, which must be examined in order for the examination to meet requirements in 10 CFR 55, are detailed in Form ES-401 of NUREG-1021, with the "-1" version of the form specific to boiling water reactors and the "-2" version specific to pressurized water reactors. Footnotes on Form ES-401 discuss usage of the form, as does Attachment 1 to Section ES-401. Attachment 1 provides one acceptable sampling methodology for randomly selecting K/As within the structure of the written examination outline. Throughout Form ES-401 and Attachment 1, Tier 1 topics are consistently referred to as emergency and abnormal plant *evolutions*.

The current version of NUREG-1122 (Rev. 2, Supp. 1; ML102571881), Section 1.10, "Emergency and Abnormal Plant Evolutions," defines an emergency plant evolution (EPE) as any condition, event, or symptom which leads to entry into Emergency Operating Procedures (EOPs). Likewise, an abnormal plant evolution (APE) is any degraded condition, event, or symptom not directly leading to an EOP entry condition. The NUREG goes on to state that for each condition, there are degrees of severity. The EOP entry conditions were used as the bases for classifying a condition either as an EPE or an APE. Any abnormal condition which

degrades as to threaten the plant safety will result in entry into the EOPs is treated as an emergency condition.

While the authors' original prerogative for writing the title of Tier 1 of ES-401, NUREG-1021, to focus on K/A topics for *evolutions* versus *procedures* may be lost to the passage of time, and although these two words do mean different things, the NRC's practical use of these terms inseparably ties the two words together. For example, "EOP entry conditions were used as the bases for classifying a condition either as an EPE or an APE" (pg. 1.10, NUREG-1122, Rev 2). Regardless, the goal of the Tier 1 portion of the written examination remains unchanged; namely to reliably test the RO's and SRO's knowledge of, and ability to, operate the power reactor safely during emergency and abnormal conditions.

EXECUTIVE DIRECTOR FOR OPERATIONS ASSESSMENT

The CE is responsible for confirming the 10 CFR 55.41 and 55.43 items are appropriately sampled and that coverage of the K/A categories in the written examination is balanced. This is practically executed through the CE's concurrence on NUREG-1021, Form ES-201-2, as part of preparation activities to develop the examination outline. During the written examination review, the CE may also assess a question to need editorial enhancement through the application of NUREG-1021, Forms ES-401-9 or ES-401N-9. If the submitted question does not test a relevant concept of the applicable abnormal or emergency operating procedure, or if the question's link to a specified K/A statement of the test item is weak, the CE should not be prohibited from assessing the question as needing enhancement for any reasonable situation.

The documents discussed above do not support the interpretation that each Tier 1 test question must include a specific reference to an abnormal or emergency plant procedure. As discussed earlier, the three tiers discussed in NUREG-1021, Revision 11, are defined as: Tier 1, Emergency and Abnormal Plant Evolutions; Tier 2, Plant Systems; and Tier 3, Generic Knowledge and Abilities Categories. While definitions for evolutions and procedures can be debated, the safety objective of Tier 1 is clear: demonstrated knowledge and proficiency of how to safely operate the plant during emergency or abnormal conditions. These facility evolutions are a significant aspect of operating a nuclear power plant safely, and knowledge of these evolutions, including the use of abnormal and emergency procedures as appropriate, must be robustly understood by each licensed operator.

As a result, it is permissible for a CE to assess a question as in need of editorial enhancement if the question does not reference a procedure if the CE determines that, on balance, the examination lacks sufficient testing of abnormal or emergency operating procedures. This is because the CE has the responsibility to evaluate each examination separately, based on the examiner's knowledge of the plant. The CE is therefore allowed to emphasize procedures in Tier 1 if the CE determines this emphasis is important to safety based on the plant-specific complexity of the emergency or abnormal operating procedures. Conversely, a CE may accept a Tier 1 question that does not reference an abnormal or emergency procedure if the CE determines, on balance, the examination sufficiently tests these procedures.

Licensing examinations must continue to ensure power reactor operators have demonstrated proficiency of knowledge in elements required by NRC regulations, including robust knowledge of, and the ability to, execute site-specific abnormal and emergency operating procedures when called upon. As discussed above, CEs play a critical safety role in development of the operator licensing examination. As evidenced by your appeal however, the current version of Operator Licensing Feedback Item 401.55 (ML19169A208) is not satisfactory. In particular, this

Feedback Item does not represent a consensus view between CEs across the NRC regarding how to determine balance of coverage, particularly of Tier 1 procedures. Defining appropriate balance of coverage is necessary for the Feedback Item to be aligned with our Principles of Good Regulation. In particular, the principle of clarity discusses how there should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated. Agency positions should be easily understood and easily applied. This DPO appeal decision demonstrates that the current version of Operator Licensing Feedback Item 401.55 should be improved to clarify its use of “balance of coverage.”

The enclosure tasks the Director of NRR and the four Regional Administrators to revise this guidance document. The revised guidance should provide CEs with a methodology to openly and reliably determine if an examination has appropriate balance of coverage of the site-specific abnormal and emergency operating procedures. The new guidance should also provide sufficient clarity so that independent CEs will consistently agree that an examination is or is not balanced in its coverage of Tier 1 procedures. Licensing examinations must continue to ensure that future licensed operators demonstrate a proficiency of knowledge and the ability to safely operate the power reactor under all foreseeable conditions.

In accordance with MD 10.159, a summary of this appeal decision will be included in the Weekly Information Report posted on the NRC’s public Web site to advise interested employees and members of the public of the outcome.

Enclosure:

OEDO Ticket Assignment Form

SUBJECT: DIFFERING PROFESSIONAL OPINION APPEAL INVOLVING OPERATOR LICENSING WRITTEN EXAMINATIONS – TIER 1 ITEMS (DPO-2017-007)
 DATED DECEMBER 10, 2019

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DOCUMENT: https://usnrc-my.sharepoint.com/personal/cbc1_nrc_gov/Documents/CBC1/P-Drive_CBC/ETA-FOLDER/OE/DPO-2017-007_OL-ExamTier1/DPO-2017-007-APPEAL-DECISION.docx

Non-Public Designation Category: MD 3.4 Non-Public (A.7)
ADAMS ACCESSION NUMBER: ML19333B979

*via email

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OEDO TICKET ASSIGNMENT REQUEST FORM

Task Due Date:	TBD
Assigned Office(s):	NRR (lead) RII (co-lead) RI RIII RIV
CC Routing: (Mark "N/A" if None)	N/A
Description of Task:	DEDM alignment brief prior to briefing the EDO regarding actions to clarify guidance discussing balance of coverage associated with abnormal and emergency plant procedures in Tier 1 of the operator license written examination.
Special Instructions for Assigned Office(s):	<u>Background:</u> DPO-2017-007-Appeal: EDO Decision dated December XX, 2019 (MLYYDDDAYYY). Revise the content of Feedback Item 401.55 (ADAMS Accession No.: ML19169A208) and related NRC guidance, as necessary, for the purpose of defining appropriate balance for use by CEs to evaluate coverage of site-specific abnormal and emergency operating procedures in Tier 1 of the written examination.
Type of Response (memo, email, etc.)	EDO briefing
<i>NOTE: Please attach a copy of any original incoming correspondence that will be needed as part of the ticket action.</i>	