

# Limerick 2021 Initial License Exam Outline Review Comments

## Simulator Scenario Outline Comments

- **SEG-5006E**

- **NRC:** SEG-5006E, Form ES-D-1 Turnover information, makes reference to a “CMO” evaluation. What does the acronym “CMO” stand for? Include the compound term description along with acronym.

**Limerick:**

Revised to “Component Maintenance Organization” and spelled out any other acronyms not previously described.

Based on overlap with scenario SEG-2158E (Event 4; Loss of Div 1 DC), we have removed the normal event to place CE HVAC in a rad isolation. In its place we have added performance of the Drywell H2 Mixing Fan ST.

- **NRC:** SEG-5006E, Event 4, “Low Pressure Feedwater Heater Level Transient,” credits the BOP position with the performance of a verifiable action. It does not appear, based on the description of this event, that the BOP applicant is performing a significant and verifiable action in response to the isolation of one Low Pressure Feedwater Heater String. What action is the BOP applicant taking in response to this event?

**Limerick:**

BOP has no verifiable actions as noted. D-1 has been revised.

- **NRC:** SEG-5006E, Event 5, “1A Loss of ASD Cooling,” credits the BOP position with the performance of a verifiable action. It appears, based on the description of this event, that the BOP applicant is taking the action to trip the ‘1A’ Adjustable Speed Drive (ASD) based on high cell temperature alarms. Would the action to trip the ASD, resulting in the Single Loop Operation, not be performed by the ATC applicant given that Recirc Flow Control and reactivity are both affected? Clarification required.

Separately, it appears that the guidance to trip the ASD on high cell temperatures is contained in an Alarm Response Procedure (ARP). The ARP, assuming one is applicable, is not referenced in the associated event description.

**Limerick:**

At LGS, normal operation of the ASD such as changing Recirc flow rate would be a function of the ATC. However, action to trip the ASD could be performed by either operator. BOP is likely to perform this action but there is not direction to preclude ATC from this action. Following the trip of the pump, the BOP will perform the actions in OT-112 to close the pump discharge valve and reopen it when the pump impeller has settled.

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Added a reference to S43.1.F which is directed from the ARP for ASD Major trouble (111-B2). This procedure will direct the tripping of the ASD if both coolant pumps trip. If the crew does not promptly trip the ASD, high temperatures will prompt them to trip the pump.

- **NRC:** SEG-5006E, Event 6, “Core Power Oscillations,” is scripted for use on the CERT Exam. The “Core Power Oscillation” event was used on the previous NRC Exam [SEG-7017E (Event 5)]. Limerick intends to use the previous NRC Exam (December 2019) as their CERT Exam. **(duplication/overlap concern with CERT Exam)**

NUREG 1021, ES-301, Section D.1.a, states “Operating tests may not duplicate test items (simulator scenarios or JPMs) from the applicant’s audit test given at or near the end of the license training class. Simulator events and JPMs that are similar to those that were tested on the audit examination are permitted provided that the actions required to mitigate the transient or complete the task (e.g., using an alternative path as discussed in Appendix C) are significantly different from those required during the audit examination.” The facility licensee shall identify for the NRC chief examiner those simulator events and JPMs that are similar to those that were tested on the audit examination.”

### Limerick:

Replaced the Core Power Oscillations malfunction with a trip of the 1B RRP. This will require a scram as an action directed out of OT-112. This is an ATC action.

- **NRC:** SEG-5006E, Major Event 7, “Loss of High Pressure Injection / LOCA Inside Containment,” and Post EOP Entry Event 8, “RCIC Controller in AUTO Failure,” were both used on the November 2018 NRC Exam (i.e., previous two exams; SEG-4058, Events 6 & 7), without any changes to alter the course of action within the emergency procedures for the 2021 NRC Exam. **(duplication/overlap concern with the 2018 NRC Exam).**

NUREG 1021, Appendix D, Section C.1.f, “Scenario Overlap,” states “Additionally, if any major event is repeated from either of the previous two NRC initial licensing operating tests, the examination author should change the major event, the ICs, or subsequent malfunctions (or a combination) to alter the course of action (within the emergency procedures) for the given scenario(s). The NRC expects that all major events would be broadly sampled over the course of several operating tests and that no major event will routinely be omitted without justification.”

### Limerick:

Replaced the RCIC flow controller failure with a failure of the RCIC pump discharge outboard isolation valve to open automatically. The BOP must diagnose and take manual action to open the discharge valve to establish RCIC flow. In addition, Event 9 subsequent malfunction, “1M Tailpipe Break at 50%,” was not used on the November 2018 NRC Exam.

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- **NRC:** SEG-5006E, Quantitative Attributes Table, specifies “2” for the number of Abnormal Events. The correct number of Abnormal Events should actually be “3”. NUREG 1021, Appendix D, Section C.2.d, “*Abnormal Events*,” states that Abnormal Events include Alarm Response Procedures (ARPs) if significant and verifiable actions are required. The Quantitative Attributes Table does not appear to credit the Event 3 APRM Failure as an Abnormal Event. The guidance to bypass the failed APRM is contained in an Alarm Response Card (ARC), which meets the intent of the aforementioned NUREG guidance.

### **Limerick:**

Changed the quantitative attributes table to indicate 3 abnormal events

CE (05/07/2021): Target Quantitative Attributes Table “Abnormal Event” count total changed from 3 to 4 due to inclusion of Event 6 “*1B Reactor Recirc Pump Trip*,” which had been previously omitted.

- **NRC:** SEG-5006E, T-101.2 Critical Task Addendum, for Inhibiting Auto ADS due to Low RPV Level, contains “Initiating Cue” information pertaining to “*Reactor power above 4% or unknown*,” which is not relevant to the scenario and should therefore be omitted.

### **Limerick:**

Removed reference to “*Reactor power above 4% or unknown*”

- **NRC:** SEG-5006E, T-101.5 Critical Task Addendum, for Conducting an Emergency Blowdown due to Low RPV Level, contains incomplete “Measurable Performance Standard Expected Action” criteria. Specifically, the “Expected Action” criteria, in addition to “*Commencing an emergency blowdown per T-112 to restore core cooling*,” should also include the opening of an additional SRV (following “1M” SRV Tailpipe Break in Event 9) to ensure that RPV T-112 depressurization requirements are met.

### **Limerick:**

Added additional “expected action” to T-101.5 CT which reads “Open an additional non-ADS SRV due to tailpipe failure of 1M SRV”

- **NRC:** SEG-5006E, Simulator Scenario Summaries, do not “*consistently*” specify the procedure “*Title*” or “*Noun Name*” the first time a procedure designator is referenced in the applicable event summary descriptions. Inclusion of procedure Titles / Noun Names serves to enhance the summaries by providing additional context and clarifying information.

### **Limerick:**

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SEG-5006E summary revised to provide the "*Title*" the first time a procedure designator is referenced in the description.

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- **SEG-2158E**

- **NRC:** SEG-2158E, Form ES-D-1 Initial Conditions (IC), should specify a value for Reactor Pressure, given that the Turnover Section provides direction for the crew to raise Reactor Pressure to 960 psig using the Digital Electro Hydraulic Control (DEHC) system, and continue the power ascension with rods, maintaining Reactor Pressure on the Main Turbine Bypass Valves (BPVs).

**Limerick:**

Revised ES-D-1 Initial Conditions, to specify 900 psig RPV Pressure as the starting pressure for the scenario.

- **NRC:** SEG-2158E, Event 5, “*Small Coolant Leak in Drywell,*” appears to credit the BOP position with isolating RWCU in response to an increase in Drywell Pressure. However, the event summary description states that the crew determines the Drywell Pressure increase is the result of an unisolable coolant leak requiring performance of a Rapid Plant Shutdown using GP-4. If the leak is unisolable, the BOPs actions to isolate RWCU would be unsuccessful. To count as a malfunction for the BOP, the actions taken must correct the condition.

NUREG 1021, Appendix D, Section C.2.b, “*Total Malfunctions,*” states “*To count as a separate malfunction, they must involve a significant system response and require operator action to correct.*”

Are any other actions being performed during the course of this event for which the BOP is receiving credit?

**Limerick:**

The BOP actions to isolate RWCU are taken in accordance with AOP OT-101, “*High Drywell Pressure,*” Attachment 4, due to the cause of the Drywell Pressure rise being “unidentified.” The BOP’s actions to isolate the system are successful. However, as previously stated, the leak in the drywell remains “unidentified.” We believe that the actions taken by the BOP should be credited as their actions are successful in the intended purpose (to isolate RWCU). This action would be verifiable IAW form ES-301-5 instruction #3.

- **NRC:** SEG-2158E, Event 5, “*Small Coolant Leak in Drywell,*” event summary description states that the crew will perform a Rapid Plant Shutdown using GP-4. Questioning whether a Rapid Plant Shutdown would actually be performed on the Unit given the Initial Conditions, i.e., Unit 1 at 5.0% power with a GP-2 Normal Plant Startup in progress. Are any significant and verifiable actions being performed by the ATC? Form ES-D-1 does not presently assign a component failure to the ATC position.

**Limerick:**

Description changed in the scenario summary to indicate the crew will scram the reactor rather than perform a rapid plant shutdown.

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Though the ATC takes action to scram the reactor, the control rods do not insert. Action to initiate ARI is part of Event 6 and is credited there.

- **NRC:** SEG-2158E, Event 5, “*Small Coolant Leak in Drywell,*” event description on Form ES-D-1 contains a reference to “*CT-1,*” indicating that performance of Critical Task 1 (CT-1) actions are associated with this event. The CT-1 designation should be applied to Event 6, “*RPS ‘A’ Fails to Scram (ARI Successful).*”

### **Limerick:**

Agree, assigned CT-1 to event 6.

- **NRC:** SEG-2158E, Event 7, “*Steam Leak in the Drywell,*” event summary description states “*The SRO will evaluate/direct Drywell Sprays when Drywell Pressure exceeds 7.5 psig.*” Suspect that “*Drywell Pressure exceeds 7.5 psig*” should be replaced with “*Suppression Pool Pressure exceeds 7.5 psig*” in this statement.

### **Limerick:**

Agree, replaced to read “*when Suppression Pool pressure exceeds 7.5 psig.*”

- **NRC:** SEG-2158E, Quantitative Attributes Table, specifies “3” for the number of *Malfunctions After EOP Entry*. The correct number should actually be “2” for this attribute. In this scenario, the *Malfunctions After EOP Entry* are the malfunctions associated with Events 8 (*Downcomer Break; PSP*) and 9 (*1B RHR Pump Trip*) following Major Event 7 (*Steam Leak in the Drywell*), which results in entry into EOP T-102 on High Drywell Pressure (1.68 psig).

### **Limerick:**

Changed number to 2

- **NRC:** SEG-2158E, T-102.9 Critical Task Addendum, for Conducting an Emergency Blowdown due to High Drywell Pressure, should specify “*Lowering RPV Pressure*” for the Performance Feedback element in lieu of the “*Commencement of ‘T-112 / Emergency Blowdown actions.’*” The Performance Feedback provides the crew with information about the effect of their actions.

### **Limerick:**

In the performance feedback section the feedback item has been revised to read “*Lowering RPV Pressure*”

- **NRC:** SEG-2158E, Simulator Scenario Summaries, do not “*consistently*” specify the procedure “*Title*” or “*Noun Name*” the first time a procedure designator is referenced in the applicable event summary descriptions. Inclusion of procedure Titles / Noun Names serves to enhance the summaries by providing additional context and clarifying information.

### **Limerick:**

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SEG-2158E summary revised to provide the "*Title*" the first time a procedure designator is referenced in the description.

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- **SEG-6215E**

- **NRC:** SEG-6215E, Event 2, “1B RBM Fails INOP,” should be classified as an “Instrument” failure instead of a “Component” failure on Form ES-D-1.

Separately, the event description summary states that the RBM failure and resultant Rod Block are triggered when the second Control Rod is selected. Will the reactivity manipulation associated with movement of the first Control Rod alone be sufficient to produce a clearly observable plant response?

**Limerick:**

Changed designator of Event #2 to Instrument.

The initial rod movement should provide a 2 to 3% APRM power change as well as response on the RBM. Following the RBM INOP, the crew would bypass the RBM and then continue with the rod manipulation to complete the reactivity change. Additionally, lowered the initial power level to 94% to allow for rod withdraw and trimming with Recirc flow to restore power to 100%.

- **NRC:** SEG-6215E, Event 5, “MSIV Closure with Hydraulic ATWS and SLC Line Rupture,” event description summary (last sentence of the “Evaluation” paragraph) should be revised to state “The SRO directs performance of T-221 to keep MSIVs A, B, and C open, and T-217 to insert control rods.” Revision warranted because the ‘D’ Inboard MSIV fails closed and cannot be re-opened upon completion of T-221. Accordingly, the Event Description on Form ES-D-1 should also be revised to read “D MSIV Closure with Hydraulic ATWS and SLC Line Rupture.”

**Limerick:**

Revised the scenario due to our recognition that an individual MSIV isolation with an ATWS results in a complete Group 1 isolation. This occurred due to a recent simulator load update.

Replaced this event with a downscale failure of a RPS level transmitter in which RPS half scram does not result. This is an entry to OT-117, RPS Failures. I have created a new event #5 for the actions resulting from this failure. The end result is the insertion of a full scram signal and the entry into T-101 on the Hydraulic ATWS.

- **NRC:** SEG-6215E, Post EOP Entry Event 6, “RDCS Failure,” is scripted for use on the CERT Exam. The “RDCS Failure” event was used on the previous 2019 NRC Exam [SEG-7017E (Event 7)] and was sequenced immediately after the ATWS Major Event, similar to Event Sequences 5 and 6 in SEG-6215E for the 2021 NRC Exam. Limerick intends to use the previous NRC Exam (December 2019) as their CERT Exam. (**duplication/overlap concern with CERT Exam**)

NUREG 1021, ES-301, Section D.1.a, states “Operating tests may not duplicate test items (simulator scenarios or JPMs) from the applicant’s audit test given at or near the end of the license training class. Simulator events and JPMs that are similar to those that were tested on the audit examination are permitted



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*provided that the actions required to mitigate the transient or complete the task (e.g., using an alternative path as discussed in Appendix C) are significantly different from those required during the audit examination.” The facility licensee shall identify for the NRC chief examiner those simulator events and JPMs that are similar to those that were tested on the audit examination.”*

### Limerick:

As noted above, addition of a new event makes this event #7. Removed RDCS INOP malfunction and replaced this malfunction with a trip of the B loop RHRSW pump. When the pump trips, the BOP will start the other B Loop pump. Additionally, when power is reduced to approx. 14%, a failure of the RWM will prevent further rod insertion. This is necessary to achieve the goal of the second lowering by preventing further power reduction.

- **NRC:** SEG-6215E, Quantitative Attributes Table, specifies “2” for the number of Abnormal Events. The correct number of Abnormal Events should actually be “3”. NUREG 1021, Appendix D, Section C.2.d, “*Abnormal Events*,” states that Abnormal Events include Alarm Response Procedures (ARPs) if significant and verifiable actions are required. The Quantitative Attributes Table does not appear to credit the Event 2 RBM Failure as an Abnormal Event. The guidance to bypass the RBM is assumed to be in an ARP, which would meet the intent of the aforementioned NUREG guidance.

### Limerick:

Changed the Abnormal events number to 4 due to crediting of the RBM event and replacement Event 5 (RPS Half Scram Failure requiring OT-117 entry).

- **NRC:** SEG-6215E, Simulator Scenario Summaries, do not “*consistently*” specify the procedure “*Title*” or “*Noun Name*” the first time a procedure designator is referenced in the applicable event summary descriptions. Inclusion of procedure Titles / Noun Names serves to enhance the summaries by providing additional context and clarifying information.

### Limerick:

Added title and noun names where appropriate.

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- SEG-3158E *(Designated Spare Scenario– Information Redacted)*

- NRC: [Redacted]

Limerick:

[Redacted]

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## JPM Outline Comments

- **Admin JPMs**

- **NRC:** Generic K/A 2.4.41, “*Knowledge of the emergency action level thresholds and classification,*” has been used repeatedly at Limerick for the SRO Emergency Plan Admin JPM going back at least 11 years to the 2010 NRC Exam. NUREG-1021, ES-301, Section D.3.d, “*Emergency Plan,*” states:

*“As discussed in Section D.1, ensure that the test topic does not become predictable by always performing a different variation of the same activity (e.g., always testing this topic with an emergency classification). Instead, the test items for this topic should be varied from examination to examination to include items from the bulleted list for the emergency plan from Section ES-301, B.1.”*

The types of information that could be evaluated under the E-Plan topic listed in ES-301, Section B.1, Page 3 of 33, include the following:

- Lines of authority during an emergency
- Operator responsibilities during an emergency
- Emergency plan procedures
- Emergency action levels and classifications
- Emergency facilities
- Emergency communications
- Emergency protective recommendations
- Security event procedures (non-Safeguards Information)

### Limerick:

Replaced EAL with a JPM for Authorizing Use of KI, LOJPM-6733, “Authorizing The Use of KI”. Added this to the 301-1, SRO for EP.

- **NRC:** The respective versions of the RO and SRO Admin JPMs for the Equipment Control topic (*Review Drywell Floor Drain Sump/Equipment Drain Tank Logs and Determine Compliance with TS 3.4.3.2*) and Radiation Control topic (*Area Rad Monitor(s) Fail Downscale*), each have the same JPM identifier/designator. This is confusing given that the summary descriptions for these JPMs indicate that there is an additional Tech Spec (TS) element for the SRO versions. Recommend assigning different JPM identifiers for the RO and SRO versions to make this distinction.

Separately, the RO version of the Equipment Control topic JPM, based on the summary description, requires the applicant to identify the affected TS. The only apparent difference between the RO and SRO JPMs is that the SRO applicants must also identify the required action(s) for the non-compliance. If the RO applicants are required to identify the affected TSs, then it would seem a relatively straight forward task to be able to identify the associated required actions as well. ES-301, Section D.3.c, states:

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*“In general, SROs have more administrative responsibilities than ROs; therefore, SRO applicants are evaluated in greater depth on the administrative topics. All SRO administrative JPMs must be written at the SRO level. RO applicants only need to understand the mechanics and intent of the related subjects as they relate to tasks at the facility.”*

Accordingly, questioning whether the SRO Equipment Control Admin JPM is written at the SRO level.

### Limerick:

Created new JPM for the SRO only activities. LOJPM6758 was created to separate it from LOJPM6708.

ROs are expected to be able to identify applicable Tech Specs. However, in this case, the RO candidate should be able to use the provided ST procedure to identify the tech spec as it is referenced multiple times. The ROs are not provided the Tech specs for their review.

Identifying Tech Spec actions for LCOs of greater than 1 hour duration is a requirement for SROs. The SROs will be provided Tech specs for their review.

Created new JPM for the SRO only ARM downscale – LOJPM6759. This activity requires the SRO to evaluate ARM operation and identify Tech Spec issues and associated actions. The RO only version LOJPM6718 does not require the RO to identify any tech spec impact.

- **Control Room Systems JPMs**

- **NRC:** Control Room Systems JPM ‘f,’ “Scram Channel A1 and A2 Functional Test,” Type Codes include the “EN” designator for “Engineered Safety Feature.” The “EN” Type Code was not applied to the alternate path version of this JPM on the 2018 NRC Exam. Clarification required regarding this difference.

### Limerick:

The RPS system is considered an ESF/EN system. It should have been designated that previously on the 2018 NRC Exam.

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## NRC Written Exam Outline/Audit Exam Outline

- **NRC:** ES-401.C.1.g states *“Facility licensees that prepare the examination shall implement appropriate controls to keep the comprehensive audit or screening examination that is given at or near the end of the license class from compromising the integrity of the licensing examination.”* The following potential duplication/overlap items were noted during review of the Audit Written Exam Outline. Comparison between NRC and Audit Written Exam Questions will be required in order to confirm no duplication/overlap.
  - 295026 EA1.03 (NRC Exam Q13, Audit Exam Q13)
  - 212000 K6.04 (NRC Exam Q34, Audit Exam Q34)
  - NRC Exam Q36 (215003; A1.05) and Audit Exam Q36 (215003; A1.03)
  - NRC Exam Q46 (262001; A1.05) and Audit Exam Q48 (262001; A1.01)
  - 223001 K2.09 (NRC Exam Q60, Audit Exam Q59)
  - Tier 3 Generic 2.2.21 (NRC Exam Q97, Audit Exam Q96)
  - Tier 3 Generic 2.3.13 (NRC Exam Q98, Audit Exam Q72)
  - Tier 3 Generic 2.4.26 (NRC Exam Q74, Audit Exam Q74)

### **Limerick:**

We perform overlap checks on multiple levels to avoid this problem. We previously had noted the potential overlap with the KAs noted above. We will perform overlap checks in our exam bank program as well as manual checks using word documents/word searches for duplication.

CE (06/04/2021): Chief Examiner review confirms that all overlap concerns between the Audit and NRC Written Examinations have been sufficiently addressed.