Ginna October 2012 Initial License Exam Outline Comments
07/06/12

Written

1. Reselect K/A's for the repeated generics in Tiers 1 and 2. Of the 43 possible generics specified in ES-401, Section D.1.b, the same generic (K/A 2.2.44) was selected 4 times out of 8 and another generic (K/A 2.2.38) was selected 2 times out of 8.

2. Review the NKEG software to determine if generic K/A selection is actually random. Of the eight generics selected for Tiers 1 and 2, four of them are the same (2.2.44) and two others are also the same (2.2.38). It is highly unlikely that a random selection of 8 generics would return 4 of the same KA.

   ES-401, Section D.1.b lists 43 acceptable generics for use in Tiers 1 and 2. Using the probability mass function for a binomial distribution, the probability of hitting the same generic K/A on 4 times out of 8, given a sample population of 43 different generic K/As is 0.0000186, which is $1.86 * 10^{-5}$ or 1 time of every 53,660 times you run the selection of 8 K/As. In contrast, the likelihood of selecting the same KA on 2 out of 8 selections is much higher, at 1 time of every 76 times you run the selection of 8 K/As.

   Excel Formula: =BINOMDIST(number_s, trials, probability_s, cumulative)

   Calculate Prob Mass Function by setting *cumulative* equal to "0" in Function BINOMDIST

Probability of selecting same generic K/A 4 times:	1.8636E-05	- or -	1 in	53660
Number of Trials: 8				
Sample Space(defined as number of possible K/As):	43			
Probability That Any Trial Will Return a Success (defined as a specific K/A):	1/43			

Probability of selecting same generic K/A 2 times:	0.01314941	- or -	1 in	76
Number of Trials: 8				
Sample Space(defined as number of possible K/As):	43			
Probability That Any Trial Will Return a Success (defined as a specific K/A):	1/43			

Probability Mass Function:

$$f(k;n,p) = \Pr(K = k) = \binom{n}{k} p^k (1-p)^{n-k}$$

for k successes in n trials, for k = 0, 1, 2, ..., n, where

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

Ginna October 2012 Initial License Exam Outline Comments
07/06/12

Admin JPMs

3. N-SA-3 JPM (review a completed surveillance) sounds like one that might be successfully performed by someone without specific SRO knowledge, by just reading and checking the calculations. JPMs need to test RO or SRO specific knowledge, as appropriate.

4. N-SA-5 JPM should be time-critical.

Control Room/In-plant JPMs

5. For all alternate-path JPMs, please put an examiner note in the JPM, before the step where the JPM becomes alternate path, to identify the step that constitutes the alternate path decision point.

6. Control Room JPM B description states this is alternate path because of multiple RNO actions. Please recognize that in a valid alternate path JPM, the applicant should be proceeding down a selected strategy path, encounter an obstacle (malfunctioning equipment, unanticipated plant condition, etc.) and have to determine and follow an alternate course of action to successfully complete the task. The goal is to create a situation where the examiner can evaluate the applicant's ability to respond to equipment failure or malfunction by observing how the examinees execute alternative paths.

7. May need to modify JPM H per the note above, to have a decision point for an alternate strategy. Perhaps the leak starts out small, then after tank filling commenced, the leak size increases.

8. ES-301, Section D.4.a states that one of the control room systems or evolutions for an SRO upgrade must be an engineered safety feature. However, the outline shows an in-plant JPM is credited for that feature instead. Need to have a control room JPM meeting the "EN" designation.

Simulator Scenario #1

9. Event #2. TS call is simplistic. Only requires recognition that component is TS related and entry into associated component action requirement. Recommend replace this with another component that forces application of 3.8.1.1 Required Action B.2. Perhaps have the field operator report a broken oil bubbler on the 'A' Train CS Pump. Applicant would have to determine that CS 'A' is inop. Concurrent with EDG 'B' inop, this would require entry into 3.6.6 F and implementation of 3.0.3 requirements for two trains of CS inoperable.

10. Event #3. Does this have consequence? What will occur if no action taken? Will mismatch circuit automatically mitigate any consequences?

11. Event #3. Recommend coding as C, vice R for the RO. The R already credited in Event #4.

12. Event #5. What action is being credited for the C? Looks like scenario written to mitigate feed isolation failure by bringing in LOAAC.

13. Event #6. Recommend coding as C, vice R for the RO. The R already credited in Event #4.

14. Event #7. First significant operator mitigative action in ECA-0.0 is Step 19 operator initiated cooldown. Recommend EDG restoration at Step 20, vice Step 18 to allow evaluation of operator cooldown actions. This change also helps to ensure the AFW actions are critical.

Simulator Scenario #2

15. Event #1. Where will alignment for 50 gpm blowdown occur (discussed in turnover information)?

16. Events #5, 6, and 7. All 3 malfunctions occur simultaneously. Recommend they be listed as a single event, "Spurious SI, Concurrent w/LOOP and LOCA Outside Containment."

17. Event #3. Listed as TS call for SRO, but not supported by narrative. What is the TS call?

18. Event #9. What is the consequence? What adverse condition would result from failure to manually close those isolations?

Simulator Scenario #3

19. Turnover. Inoperable MDAFW Pump concurrent with planned switchyard work telegraphs the strong possibility that scenario will exercise FR-H, which it does. Recommend change inop equipment to something unrelated to AFW and then have the AFW pump fail later in the scenario instead.

20. Event #2. Sounds like a very slow moving transient. Would it be better to have the channel fail high?

21. Event #4. If possible, would prefer a fixed or gradually increasing leak, simulating expected real plant response. Very unlikely real-life scenario where leak gets small on its own.

22. Events #6, 7, 8, and 9. Similar to Comment #16 above, recommend combining these events into single event: "Reactor trip on loss of vacuum, with loss of Bus 14, 4kV bus auto transfer failure and loss of AFW.

23. Event #10. Cannot be relied on consistently in scenario since some crews may choose to go directly to bleed and feed. Recommend preload FDW15B malfunction but delete reference to a credited event #10 from the outline.

24. Critical Task #1. Does not appear to be a valid critical task for the scenario. Although SI is demanded by the actuation system, there is no actual loss of RCS inventory and therefore no adverse consequence to failure to actuate. In any case, operators will

actuate SI shortly in FR-H when it is needed for bleed and feed.

Simulator Scenario #4

25. Events #4, 5, and 6. Combine events as described above in Items 16 and 22.

26. Event #3. Narrative does not explain how this is a SRO TS call.

Ginna October 2012 Initial License Exam Outline Comments
07/06/12

[Note: CE discussed these comment resolutions with the facility developers on 7/18/12. Outstanding items (#18, 21, 24, and 27) are in red with NRC additional comment in bold-black. All other blue facility responses accepted.]

Written

1. Reselect K/A's for the repeated generics in Tiers 1 and 2. Of the 43 possible generics specified in ES-401, Section D.1.b, the same generic (K/A 2.2.44) was selected 4 times out of 8 and another generic (K/A 2.2.38) was selected 2 times out of 8. ***Replaced 6 duplicated K/As with randomly selected – no duplication. Listed those replaced on ES-401-4 form.***

2. Review the NKEG software to determine if generic K/A selection is actually random. Of the eight generics selected for Tiers 1 and 2, four of them are the same (2.2.44) and two others are also the same (2.2.38). It is highly unlikely that a random selection of 8 generics would return 4 of the same KA. ***Ran two test outlines to check for duplication/multiples. Test outline #1 had no duplication, Test outline #2 had one K/A duplicated within the RO exam (T1-G1, T2-G2), and two K/As duplicated between the RO exam and SRO exam. Also contacted another utility who uses NKEG software, same version, and they have had no issues like this in their experience. Will contact the vendor to discuss the concern.***

   ES-401, Section D.1.b lists 43 acceptable generics for use in Tiers 1 and 2. Using the probability mass function for a binomial distribution, the probability of hitting the same generic K/A on 4 times out of 8, given a sample population of 43 different generic K/As is 0.0000186, which is $1.86 * 10^{-5}$ or 1 time of every 53,660 times you run the selection of 8 K/As. In contrast, the likelihood of selecting the same KA on 2 out of 8 selections is much higher, at 1 time of every 76 times you run the selection of 8 K/As.

Admin JPMs

3. N-SA-3 JPM (review a completed surveillance) sounds like one that might be successfully performed by someone without specific SRO knowledge, by just reading and checking the calculations. JPMs need to test RO or SRO specific knowledge, as appropriate. ***At Ginna, the STA, RO, and SRO can all be called upon to perform 1/M plots. We would like to propose substituting N-RA-3 for N-SA-3 (i.e, the same JPM on both the RO and SRO exam)***

   N-RA-3 This JPM is new. The examinee will utilize a data sheet to construct a 1/M plot for a Rx startup. The plot will include the + and – 500 pcm values, the Bank B 0% power RIL value, calculation and plotting of multiple 1/M values, and projection of whether criticality will occur within the acceptable range or not (it will not). Candidate will have to take the action required for the projected critical rod height outside the band.

4. N-SA-5 JPM should be time-critical. ***Agree. JPM itself will be modified to reflect that it is time-critical.***

Control Room/In-plant JPMs

5. For all alternate-path JPMs, please put an examiner note in the JPM, before the step where the JPM becomes alternate path, to identify the step that constitutes the alternate path decision point. ***Agree – will add examiner notes prior to alternate path decision points.***

6. Control Room JPM B description states this is alternate path because of multiple RNO actions. Please recognize that in a valid alternate path JPM, the applicant should be proceeding down a selected strategy path, encounter an obstacle (malfunctioning equipment, unanticipated plant condition, etc.) and have to determine and follow an alternate course of action to successfully complete the task. The goal is to create a situation where the examiner can evaluate the applicant's ability to respond to equipment failure or malfunction by observing how the examinees execute alternative paths. ***Understand the clarification that performance of several RNO actions due to insufficient subcooling does not constitute an "obstacle" which requires an alternate course of action. Removed 'A' designation from JPM B and reviewed the remaining 4 alternate-path JPMs (the minimum required) to ensure they met this alternate path standard.***

7. May need to modify JPM H per the note above, to have a decision point for an alternate strategy. Perhaps the leak starts out small, then after tank filling commenced, the leak size increases. ***Understood. During validation this week, we worked on the timing of changes in leakrate and believe this will work. The challenge to the candidate will be that no additional alarms will occur, and require that he frequently monitor the status of the leak, as indicated by the change in surge tank level.***

8. ES-301, Section D.4.a states that one of the control room systems or evolutions for an SRO upgrade must be an engineered safety feature. However, the outline shows an in-plant JPM is credited for that feature instead. Need to have a control room JPM meeting the "EN" designation. ***Replaced JPM A for SROU candidate with JPM G, a control room JPM with 'EN' designation***

Simulator Scenario #1

9. Event #2. TS call is simplistic. Only requires recognition that component is TS related and entry into associated component action requirement. Recommend replace this with another component that forces application of 3.8.1.1 Required Action B.2. Perhaps have the field operator report a broken oil bubbler on the 'A' Train CS Pump. Applicant would have to determine that CS 'A' is inop. Concurrent with EDG 'B' inop, this would require entry into 3.6.6 F and implementation of 3.0.3 requirements for two trains of CS inoperable. ***We're proposing to use a different cue (report for acrid smell – no fire – from the breaker cubicle of A CS pump) which will clearly identify that they're going to have to rack out the breaker to investigate/troubleshoot, thus rendering that pump inoperable. ITS 3.8.1 Required Action B.2 would allow 4 hours from the discovery of the inoperability of A CS pump before 3.0.3 would be invoked. Per the Basis, the 4 hours allows the operator time to evaluate and repair any discovered inoperabilities.***

10. Event #3. Does this have consequence? What will occur if no action taken? Will mismatch circuit automatically mitigate any consequences? ***The severity (630°F) of the high failure will overwhelm any power mismatch error which may result. There is a***

an auto rod stop which should stop the auto rod motion on a ± 4°F mismatch, but the concurrent ROD12 malfunction will disable this auto rod stop. Crew will have to diagnosis and take manual control of the rods to stop continuous inward rod motion at 66 steps/min.

11. Event #3. Recommend coding as C, vice R for the RO. The R already credited in Event #4. ***RO now credited with C vice R. (Not sure we understand why it's important to make this differentiation)***

12. Event #5. What action is being credited for the C? ***The RCP trip which will require both ROs to perform the IAs of E-0.*** Looks like scenario written to mitigate feed isolation failure by bringing in LOAAC. ***This was not our intent. The previous Avg-Tavg failure high will prevent the auto closure of the FRVs when actual Tavg drops to <554°F after the trip. Operators should recognize that the auto FW isolation has not occurred and take action. If they do nothing, the high feed rate will cool down the primary, reduce RCS pressure, and eventually result in low pressure SI. If you would prefer to watch how they handle the FRVs (before SI trips MFPs and closes MFW isolation valves), we can delay the LOAAC event.***

13. Event #6. Recommend coding as C, vice R for the RO. The R already credited in Event #4. ***RO now credited with C vice R. (Not sure we understand why it's important to make this differentiation)***

14. Event #7. First significant operator mitigative action in ECA-0.0 is Step 19 operator initiated cooldown. Recommend EDG restoration at Step 20, vice Step 18 to allow evaluation of operator cooldown actions. This change also helps to ensure the AFW actions are critical. ***Agree – ES-D-1 description has been modified, and scenario will be modified.***

Simulator Scenario #2

15. Event #1. Where will alignment for 50 gpm blowdown occur (discussed in turnover information)? ***At Ginna, all S/G blow down alignment is in the field. This step is encountered soon after entering O-1.2, so we wanted to provide guidance during the turnover rather than waste time in the procedure so they already knew what the direction would be.***

16. Events #5, 6, and 7. All 3 malfunctions occur simultaneously. Recommend they be listed as a single event, "Spurious SI, Concurrent w/LOOP and LOCA Outside Containment." ***Combined events 4,5,6 per guidance provided.***

17. Event #3. Listed as TS call for SRO, but not supported by narrative. What is the TS call? ***Agree- an oversight on our part. Will add new ITS item: When the crew attempts to realign AFW following MFW transition in Event 1, AOV-4008 cannot be reopened, requiring ITS interpretation.***

18. Event #9. What is the consequence? What adverse condition would result from failure to manually close those isolations? ***Agree – need to re-evaluate this further.***

Simulator Scenario #3

19. Turnover. Inoperable MDAFW Pump concurrent with planned switchyard work telegraphs the strong possibility that scenario will exercise FR-H, which it does. Recommend change inop equipment to something unrelated to AFW and then have the AFW pump fail later in the scenario instead. ***Agree – will remove MDAFW pump failure and replace with 'B' CS pump OOS at turnover. MDAFW failure will then occur on the auto start.***

20. Event #2. Sounds like a very slow moving transient. Would it be better to have the channel fail high? ***Agree. Audit exam has the same PT failure, but in the HIGH direction (faster crew response required, different plant response). Propose "swapping" the two failures.***

21. Event #4. If possible, would prefer a fixed or gradually increasing leak, simulating expected real plant response. Very unlikely real-life scenario where leak gets small on its own. ***The initial, more rapid leakrate is needed to get the crew moving towards a rapid load reduction, but not so rapid as to trip the turbine/reactor. Once load reduction is initiated, the leak can be reduced (and is not really seen by the crew) because they'll believe the "stabilizing vacuum" is due to their load reduction. Once load reduction is evaluated, higher leakrate can be resumed to drive them to the turbine trip decision. [Facility agreed to revisit - to try different malf severities to see if can settle on one specific leak size that allows sufficient time for mitigative action and allows consistent implementation of the scenario to different crews.]***

22. Events #6, 7, 8, and 9. Similar to Comment #16 above, recommend combining these events into single event: "Reactor trip on loss of vacuum, with loss of Bus 14, 4kV bus auto transfer failure and loss of AFW. ***Rearranged events per recommendation.***

23. Event #10. Cannot be relied on consistently in scenario since some crews may choose to go directly to bleed and feed. Recommend preload FDW15B malfunction but delete reference to a credited event #10 from the outline. ***Modified per this guidance.***

24. Critical Task #1. Does not appear to be a valid critical task for the scenario. Although SI is demanded by the actuation system, there is no actual loss of RCS inventory and therefore no adverse consequence to failure to actuate. In any case, operators will actuate SI shortly in FR-H when it is needed for bleed and feed. ***Per WOG guidance, this CT does not apply only to LOCAs – need to discuss further. [Facility agreed to look at modifying scenario such that task is justifiably critical in the situation provided.]***

25. ***We would like to replace Event 3 (which is NOT a TS event) with one which is. Recommend PORV leakage of 15GPM, which renders the PORV inoperable if >10GPM per ITS 3.4.11. Requires familiarity with Basis section.***

Simulator Scenario #4

26. Events #4, 5, and 6. Combine events as described above in Items 16 and 22. ***Modified per this guidance.***

27. Event #3. Narrative does not explain how this is a SRO TS call. ***Need to discuss this – looking for another TS possibility.***